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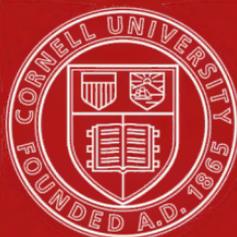
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Catalogue of the Marsupialia and Monotre



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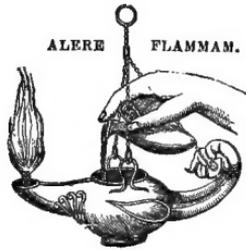
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CATALOGUE  
OF THE  
M A R S U P I A L I A  
AND  
M O N O T R E M A T A  
IN THE  
COLLECTION  
OF THE  
B R I T I S H M U S E U M  
(NATURAL HISTORY).

BY  
OLDFIELD THOMAS.

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LONDON:  
PRINTED BY ORDER OF THE TRUSTEES.  
1888.



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## PREFACE.

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THIS volume, the greater part of which is devoted to the *Marsupialia*, has been prepared by Mr. O. Thomas, one of the Assistants in this Department, on the plan of the new series of the Zoological Catalogues of the British Museum; it contains descriptions of every species known, with references to all the descriptions and figures previously published, and gives a complete detailed list of the specimens in the Museum Collection.

The large series of specimens examined by the author has enabled him to pay special attention to the various degrees of relation which obtain between forms previously described under uniformly binomial terms; in judging of these relationships he has relied on craniological as well as external characters.

Beside the Marsupials the Monotremes have been embodied in this volume, this division of Mammals being numerically too small to form a volume by itself.

Since the year 1843, when 'The List of Mammalia in the Collection of the British Museum' was prepared by my predecessor, no general account of the Marsupials in that collection has been published, whilst nearly all the other Orders of the Class were made the subjects of continuous study and revision. This seeming neglect was chiefly due to the appearance of two works, viz. Waterhouse's standard work on these Mammals in 1846, which then, in the course of the following twelve years, was supplemented by Gould's excellent illustrations in his 'Mammals of Australia.' Both these works had a direct relation to the collection of the British Museum, and for many years seemed to fully satisfy the needs of the zoologist.

However, the collection grew apace like that of the other Mammalia; no opportunity was lost of making such additions as were required to complete the series, so that the number of specimens appears now, after the lapse of some forty years, to be about trebled. Especially in the course of the last three years, during which the preparation of this volume has been in progress, the collection has received important additions through the efforts of the author, who, besides, has personally visited most of the European Museums with the object of examining types and other important specimens.

The best thanks of the Department are due to all those fellow-labourers abroad who have given him facilities to attain that object.

ALBERT GÜNTHER,  
*Keeper of the Department of Zoology.*

British Museum (N. H.),  
Sept. 27, 1888.

## INTRODUCTION.

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THIS volume contains the descriptions of 151 species of Marsupials and 3 of Monotremata, in addition to 12 recognizable varieties of the former and 2 of the latter, making a total of 168 definable forms. The last general work on the subject (that of Mr. G. R. Waterhouse, published in 1846) contained 120 species; but of these a certain number have since proved to be invalid, the increase of species known being therefore rather greater than appears at first sight. Of the 168, only 20 are not represented in the British Museum collection. The specimens enumerated amount to 1240 Marsupials and 64 Monotremes, making 1304 in all, a number that would be increased by at least one-half were the old method adopted of counting the skin and the separated skull of the same individual as two specimens. Of this total, 173 are preserved whole in spirits, while the osteological collection of skeletons and skulls, both separate and belonging to skins in the Museum, amounts to 703.

In the 'List of the Mammalia in the British Museum,' published in 1843, 343 Marsupials and Monotremes are enumerated, referred to 94 species; and in the 'Catalogue of the Bones of Mammalia,' issued in 1862, 331 skulls and skeletons are referred to, a number less than one-half the present total.

Apart from the mere number of specimens, however, as the value of zoological collections depends so largely upon their possession of type specimens, the following table showing the distribution

of the types and co-types of the recognized species and varieties may be of interest:—

	Museums of							
	British Museum.	Paris.	Sydney.	Leyden.	Genoa.	Chris- tiana.	Vienna.	Berlin.
Macropedidæ...	31	10	3	3	1	1	0	0
Phalangeridæ...	14	5	0	2	2	4	0	1
Phascologyidæ.	0	0	0	0	0	0	0	0
Peramelidæ ...	6	4	3	0	1	0	0	0
Dasyuridæ .....	15	1	1	3	2	0	0	1
Didelphyidæ ...	7	1	0	0	0	0	4	1
Monotremata ...	1	0	1	0	1	0	0	0
Total.....	74	21	8	8	7	5	4	3

There are also two types in the Melbourne Museum, and one each in the Museums of Copenhagen, Munich, Rio Janeiro, and of the College of Surgeons and the Geological Society of London. The types of 40 species are not traceable.\*

This comparative richness of the British Museum, both in specimens and types, is largely due to the accession of the collection of Australian Mammals formed by the late Mr. John Gould, which contained not only a complete set of the types of the many species described by him, but also fine series of all the Australian Mammals he obtained.

Next in importance to the Gould Collection come those of Sir George Grey from South Australia, and of Mr. Ronald Gunn from Tasmania, both containing many valuable typical specimens described by Dr. J. E. Gray, and both presented by their respective collectors to the Museum.

Of the other donors of specimens included in the present Catalogue, special mention may be made of Lord Derby, Dr. G. Bennett, Messrs. O. Salvin, F. D. Godman, John Macgillivray, and F. M. Rayner.

In this Catalogue, probably for the first time, double synopses of the genera and species have been drawn up, in order to enable students to identify specimens either from the external characters

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\* These numbers amount to a total in excess of that of the known species and varieties, owing to the fact that many forms have two or more "co-types," and that, when these are preserved in different Museums, each of the latter is credited with the possession of one type.

alone or from the skulls alone. But, in order that inexperienced workers may obtain the full benefit of the cranial synopses, a few words on the nomenclature used for the teeth are here necessary.

In most of the earlier systematic works on Mammalia all the teeth were simply numbered from before backwards, a system that answered well enough in the case of the incisors and molars, as these teeth in the gradual process of their reduction in number were generally lost posteriorly, so that, for example, the first three molars of an animal with four molars were severally homologous with the three of an animal possessing only the latter number. In the case of the premolars, however, the matter is far more complicated, as not only are the last one or two the most stable of all, but in some Placentals and in most Marsupials the first premolar to be lost was at neither end of the series but in the middle of it, being the second of the four normally present. The system here adopted for the numeration of the teeth is that by which each tooth is represented by a sign always belonging to its homologue in all the different species, whatever their total number of teeth may be. Thus, for example, the last premolar of the Opossums, the only one that has a milk predecessor, being homologous with the fourth premolar of Mammals possessing the full set of four premolars, is called "p.<sup>4</sup>," although it is preceded in the jaw by only two other premolars. In the same way the two premolars of *Dasyurus* are called "p.<sup>1</sup>" and "p.<sup>3</sup>," since the missing premolars appear in this case to be the second and fourth of the full set.

The general principle of this system was first introduced by Owen, and it has since been used by a large and steadily increasing number of authors. It is true that there are many cases in which the homologies of the individual teeth are very difficult of determination, and in which mistakes are at first nearly certain to be made.

It is hoped, however, that these mistakes will in time be rectified, and in any case, if only to stimulate further inquiry, it seems better to make an attempt to work out systematically the tooth-homologies of such a group as the present, rather than to rest content with the old and admittedly imperfect system of simple numeration from before backwards.

The measurements given throughout the volume are taken as follows :—

Head and body.—In stuffed specimens taken with a tape from the tip of the nose to the root of the tail, following the curves.

In small spirit-specimens the body is placed as nearly as possible straight, and the measurement taken in a straight line. These measurements are at best only approximate, and those taken from skins are still less exact, giving merely a general idea of the size of the animal.

**Tail.**—From the anus to the tail-tip. In spirit-specimens the point of the compass is placed quite within the anus in order to get to the true root of the tail.

**Hind foot.**—From the heel to the tip of the longest toe, not including the claw. This is the only really exact external measurement and should be taken with the greatest accuracy. The claw should never be included, as thereby a second variable factor is introduced.

**Lower leg.**—From the upper side of the knee to the sole of the heel, the thigh and foot being each in their normal position at right angles to the lower leg.

**Ear.**—Taken behind the conch, from the crown of the head to the tip of the ear.

**In the Skull:**—

**Basal length.**—From the “basion,” or lower front edge of the *foramen magnum*, to the “gnathion,” or most anterior point of the premaxilla.

**Nasals, length.**—Greatest length, whether along the central suture or to one side of it.

**Nasals, greatest breadth.**—Greatest breadth of the two nasals together, generally across their posterior third.

**Nasals, central breadth.**—Between the tips of the ascending processes of the premaxillæ.

**Nasals, least breadth.**—Least breadth behind the commencement of the naso-premaxillary suture.

**Constriction, breadth.**—Least breadth between the two orbito-temporal fossæ. When the narrowest point is behind the postorbital processes, as is usual, the measurement should be termed the “intertemporal,” and not the “interorbital” breadth as it is often loosely called.

**Palate, length.**—From the “gnathion” to the back of the bony palate.

**Palate, breadth outside m.<sup>2</sup>**—Breadth between the external edges of the second molars of the two sides.

**Palate, breadth inside m.<sup>2</sup>**—Distance between the inner edges of the same pair of teeth. Half the difference between this and the previous measurement gives the actual breadth of the tooth.

**Diastema** (in *Macropodidæ* and *Phascolomyidæ*).—From the back of the alveolus of the last incisor to the front of that of the most anterior of the cheek-teeth, generally p.<sup>4</sup>

**Basi-cranial axis**.—From the “basion” to the suture between the basi- and pre-sphenoid bones, giving the combined lengths of the basi-occipital and basi-sphenoid bones. As already shown elsewhere \*, this is a better axis for ordinary zoological work than the theoretically superior, but practically unattainable, axis proposed by Professor Huxley †.

**Basi-facial axis**.—From the sphenoid suture to the gnathion. This axis, now proposed for the first time, forms the natural complement of the last, and shows very fairly the length of the muzzle and jaw.

**Facial index**.—The ratio that the Basi-facial bears to the Basi-cranial axis, the latter being taken as 100. This index gives with a minimum of trouble an exact numerical idea of the relative proportions of the cranial and facial portions of the skull.

In the *Tooth*-measurements:—

Length always means horizontal antero-posterior length unless otherwise stated.

Length of ms.<sup>1-3</sup>—Greatest combined length of the three anterior molars *in situ*.

As in the other Catalogues of the present series, the affixes to the names of the Donors, &c., are as follows:—“[P.]” signifies “Presented by”; “[C.]” “Collected by”; and “[E.]” “Received in exchange from.”

In conclusion, it is my pleasant duty to return my sincere thanks to the many friends, both at home and abroad, who have assisted me in the preparation of this Catalogue. Of those abroad I am indebted to Dr. F. A. Jentink, Director of the Leyden Museum, to Prof. Milne-Edwards and M. Huet, of that at Paris, to Dr. Krauss at Stuttgart, to Dr. Reichenow at Berlin, Dr. A. B. Meyer and Dr. Haase at Dresden, Dr. von Pelzeln and Dr. von Lorenz at Vienna, and to the Directors of many of the smaller continental Museums, both for much personal kindness and for the facilities I have everywhere enjoyed for the study of the typical or other specimens under their respective charges. These facilities have enabled

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\* P. Z. S. 1882, p. 65, and 1884, p. 451 (footnotes).

† P. Z. S. 1880, p. 240.

me to make a personal examination of every typical specimen of the present group of animals now preserved in Europe. But above all my most particular thanks are due to the Marquis Giacomo Doria, of the Museo Civico, Genoa, both for much personal and epistolary assistance, and, especially, for the kindness with which he has granted me the loan, without limit of time, of the whole collection of Papuan Marsupials there preserved. That collection contains so many types and well-preserved series of specimens belonging to some of the most difficult groups of Marsupials, that without their help it would have been almost impossible to have worked out satisfactorily such obscure but important Australasian families as the *Peramelidæ* and *Dasyuridæ*. For other most useful and timely loans of specimens I am indebted to Dr. R. Collett, of the Christiania Museum, to Mr. De Vis, of Brisbane, and to Mr. Frederick Moore, of Liverpool.

Lastly, of friends at home I must express my acknowledgments for advice and assistance in various ways to Prof. Stewart, Mr. P. L. Sclater, and to Mr. R. Lydekker, whose knowledge of fossil Marsupials has frequently been of considerable service to me.

OLDFIELD THOMAS.

British Museum (N. H.),  
Aug. 20, 1888.

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# CATALOGUE

OF

# MARSUPIALIA.

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## MARSUPIALIA.

ARBOREAL or terrestrial Mammals, whose young are brought forth in a very imperfect condition, and are nourished by milk injected into them from the mammæ, to which they are firmly attached for some time after birth. These mammæ are always abdominal in position, and are generally situated within a fold of the integument, which forms a pouch (*marsupium*), whence the Order derives its name. The brain is proportionally small and little folded. The vagina is double, and its two horns frequently communicate with one another proximally. The limbs are normal in their position and relative development, the hinder pair always the larger and forming the chief agents in progression. A tail is almost invariably present, is generally long, and often prehensile. In the skeleton long epipubic bones\*, commonly called "marsupial" bones, but bearing no special relation to the pouch, are present in both sexes. Clavicles are present in all except the *Peramelidæ*.

The skull has usually a large facial and comparatively small cranial portion. The nasal bones are large, and generally expanded behind. The zygomata are complete, and the malar bone is large and extends backwards below the zygomatic process of the squamosal as far as the glenoid fossa. The orbit is never completed by bone behind. The palate is generally more or less imperfect,

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\* Rudimentary in *Thylacinus*.

having vacuities between the posterior molars. The alisphenoids are large, and form the auditory bullæ should these be developed; while the tympanics are small, annular, or tubular, and but rarely fused with the other bones of the skull. Finally, the mandible, except in *Tarsipes*, has its angle more or less inflected, although some Marsupials have this character less developed than certain of the Insectivora.

The teeth are exceedingly variable in structure, being modified either for a graminivorous, frugivorous, insectivorous, or carnivorous mode of life. Their number is, normally, as follows:—

$$I. \frac{3 \text{ to } 5}{1 \text{ to } 4}, C. \frac{1}{1}, P. \frac{3}{3}, M. \frac{4}{4} \times 2 = 40 \text{ to } 50,$$

but the total number sometimes descends to 22 (*Tarsipes*), while it amounts to 52 in *Myrmecobius*.

The division of the seven cheek-teeth ordinarily present into three premolars and four molars is very characteristic of the Order, as compared to the four premolars and three molars of the typical placental Mammals.

The tooth-change is always confined to a single tooth, the last of the premolars ( $p^4$ ), which alone has a milk-predecessor; and in some cases even this milk-tooth is rudimentary or altogether aborted.

### Synopsis of the Families.

#### I. EXTERNAL CHARACTERS.

- A. (*Diprotodont*.) Hind feet syndactylous.  
Vegetable-feeding\*. —
- a. Tail long †; ears well developed.  
a<sup>1</sup>. Hind limbs much larger than fore‡.  
No hallux § . . . . . I. *Macropodidæ*, p. 3.  
b<sup>1</sup>. Limbs subequal. A large opposable hallux . . . . . II. *Phalangeridæ*, [p. 126.
- b. Tail and ears rudimentary . . . . . III. *Phascolomyidæ*, [p. 212.
- B. (*Polyprotodont*.) Animal-feeding\*.
- c. Hind feet syndactylous. Hallux minute or absent . . . . . IV. *Peramelidæ*, [p. 219.
- d. Hind feet not syndactylous.  
c<sup>1</sup>. Hallux not opposable. Tail not prehensile . . . . . V. *Dasyuridæ*, p. 253.  
d<sup>1</sup>. Hallux opposable. Tail generally prehensile . . . . . VI. *Didelphidæ*, [p. 315.

\* With a few unimportant exceptions.

† Except *Phascolarctus*.

‡ Except *Dendrolagus* and *Hypsiprymnodon*.

§ Except *Hypsiprymnodon*.

## II. CRANIAL CHARACTERS.

- A. Diprotodont: incisors large, not exceeding  $\frac{3}{8}$ , commonly  $\frac{3}{1}$  in number; upper canines generally, and lower always minute or absent.
- a. Molars rooted. Upper incisors 3.
- a<sup>1</sup>. A deep cavity at the base of the masseteric fossa. No minute teeth between the lower i.<sup>1</sup> and p.<sup>4</sup>
- b<sup>1</sup>. No cavity in the masseteric fossa. Minute teeth generally present between the lower i.<sup>1</sup> and p.<sup>4</sup> . . . . .
- b. All the teeth rootless. Upper incisors 1 on each side . . . . .
- B. Polyprotodont: incisors small,  $\frac{4 \text{ or } 5}{8}$  or  $\frac{4}{3}$ ; canines, both above and below, long and pointed.
- c. Incisors  $\frac{4 \text{ or } 5}{8}$ .
- c<sup>1</sup>. Upper molars with\* four external cusps; wearing flat in old age. . . . .
- d<sup>1</sup>. Upper molars with three external cusps; sharply cuspidate throughout life . . . . .
- d. Incisors  $\frac{5}{4}$  . . . . .
- I. *Macropodidæ*, p. 3.
- II. *Phalangeridæ*, [p. 126.
- III. *Phascolomyidæ*, [p. 212.
- IV. *Peramelidæ*, [p. 219.
- V. *Dasyuridæ*, p. 253.
- VI. *Didelphyidæ*, [p. 315.

## Suborder I. DIPROTODONTIA.

Incisors three above (one in *Phascolomyidæ*) and one below (rudimentary second and third incisors sometimes present in *Phalangeridæ*), the latter very long and powerful. Canines usually small, and much surpassed in development by the incisors, especially by i.<sup>1</sup>; almost invariably absent below. Molars bluntly tuberculate or ridged.

Frugivorous and graminivorous; rarely insectivorous.  
Australian only\*.

## Family I. MACROPODIDÆ.

Diprotodont Marsupials adapted for a terrestrial (rarely arboreal) phytophagous life. Progression generally saltatorial, the hind limbs decidedly longer than the fore. Fore feet with five digits.

\* At the present time. Found during the Mesozoic epoch in Europe, South Africa, and America, and persistent in the latter until the earlier part of the Eocene period.

Hind limbs syndactylous; the fourth toe very large and with a strong claw; the fifth similar, but smaller; the second and third very slender, united; hallux wholly absent (except in *Hypsiprymmodontinae*, where it is opposable). Tail long, hairy, sometimes more or less prehensile (naked and scaly in *Hypsiprymmodontinae*). Stomach sacculated. Cæcum present. Pouch large, opening forwards.

*Skull* long, smooth and rounded. Nasals nearly always markedly expanded behind. Palatal vacuities generally present between the molars, but often, especially in the larger species, entirely absent. Tip of maxillary zygomatic process generally produced downwards as a slender bony process, the infrazygomatic process, often descending below the level of the molars; this process small or absent in the *Potoroinae*, and very variable in its development throughout the family. Bullæ variable, either rough and unswollen, or large, bulbous, and transparent; their lower wall running back to and applied against the base of the long paroccipital processes. Masseteric fossa of mandible hollowed out below into a deep cavity, walled in externally by a plate of bone, and communicating with the inferior dental canal by a large foramen, through which one or more branches of the inferior dental artery pass outwards into the masseter muscle.

*Dentition*:—I.  $\frac{1.2.3}{1.0.0}$ , C.  $\frac{1 \text{ or } 0}{0}$ , P.M.  $\frac{0.0.3.4}{0.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 32$  or 34.

Incisors sharp and cutting, the lower pair often with a scissor-like action with one another, in addition to their cutting-action against the upper ones. Canines small (not equalling  $i^1$  in length) or absent above, always wholly absent below. Premolars reduced to two above and below; and of these the anterior ( $p^3$ ) is always shed with the milk-premolar ( $m.p.^4$ ) at the tooth-change. Molars broad, ridged or bluntly tuberculate, suited for chewing vegetable substances. Series of molars and premolars moving forwards in the skull during the life of the animal, by the absorption of bone in front of, and its deposition behind, their roots; the rate of motion greatest in the larger species.

Tooth-change always present; the milk-premolar well developed and long-persistent, molariform.

*Range*. Papuan and Australian subregions.

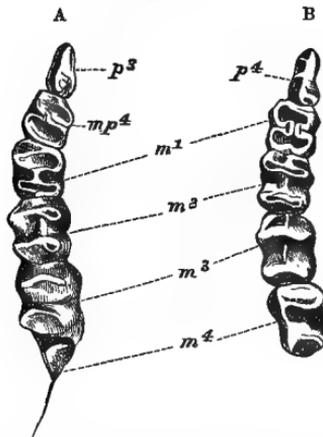
Before commencing the systematic study of the *Macropodidæ*, it is absolutely necessary that a clear idea should be gained of the general characters of the dentition, and especially of the manner in which age affects these characters—subjects worked out in great detail both by Professors Owen and Flower, but constantly neglected by systematic zoologists, for whom these changes are of the greatest importance.

The full dentition of the members of this family consists, in the upper jaw, first of three incisors, then of a small canine (often, however, suppressed), and then of six cheek-teeth, of which the second in the series is the only one which has a "milk" or deciduous

predecessor, and is therefore the one to be regarded as the last premolar, or "p.<sup>4</sup>," of the typical Mammalian dentition.

The special characteristics that render the development and succession of the teeth in the *Macropodidæ*, and especially in the genus *Macropus*, so puzzling to systematic zoologists are:—firstly, a general progression forwards in the jaw of the whole tooth-row, comparable to that found elsewhere only in the Elephants and some Sirenians; and, secondly, the fact that before the tooth-change the first tooth of the series (p.<sup>3</sup>) and the single milk-tooth (m.p.<sup>4</sup>) placed next to it, both of which fall out at that change, are respectively so very similar in shape and size to the first and second cheek-teeth of the permanent series, viz. the permanent premolar (p.<sup>4</sup>) and the first molar (m.<sup>1</sup>), as to be most naturally mistaken for, or compared to, them in specific descriptions. The following woodcuts (figs. 1 & 2),

Fig. 1.

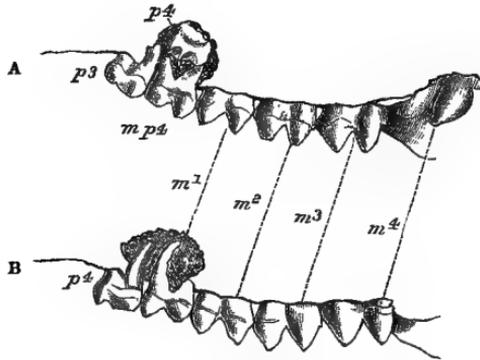


*Macropus ruficollis*.—Upper cheek-teeth of (A) immature and (B) adult, showing the superficial resemblances and the true relationships of the former to the latter.

taken from two specimens of the same species, show this resemblance, which is in most cases sufficiently close to render very great care necessary, lest skulls in different stages of dentition should be unknowingly compared together for purposes of specific description. The necessary knowledge as to the stage of dentition in which any skull may be can often only be gained by cutting open the bone either above and behind the first tooth of the series to see if the true permanent p.<sup>4</sup> be still buried there (in which case, of course, that first tooth is only p.<sup>3</sup>), or behind the last visible molar to see if there is yet another tooth behind it, showing it to be m.<sup>3</sup> and not m.<sup>4</sup> The first plan is, as a rule, the best, as p.<sup>4</sup> is generally by far the most important tooth for diagnostic purposes, and its characters have therefore in any case to be taken into account. The side views (fig. 2) of the same two skulls show the position at which p.<sup>4</sup> should

be sought for if still in the bone, although at still younger stages its position is generally rather more above  $p.^3$  than  $m.p.^4$ , owing to the fact that allowance has to be made for the movement forwards of

Fig. 2.



*Macropus ruficollis*.—A and B as in fig. 1.

the tooth-row, by which  $m.p.^4$  will be brought opposite the succeeding  $p.^4$  just at the time that the latter tooth is ready to emerge from the bone.

The time of the appearance of  $p.^4$  varies in the different members of the family; but for the most part the tooth is cut shortly after  $m.^3$ , and always before  $m.^4$  is in place.

The movement forward of the whole row of teeth is also a point which should be specially noticed, in order that the common error of taking as a systematic character the relative position of individual teeth to the skull may be avoided—such relative position, although of importance in other groups, being entirely valueless in the more typical *Macropodidæ*. It should, however, be observed that the general position of the tooth-row as a whole and the length of the diastema are both fairly constant throughout the life of the animal, partly owing to the fact that at the tooth-change two teeth ( $p.^3$  and  $m.p.^4$ ) fall out, and only one ( $p.^4$ ) succeeds, and partly to the counteracting effect of the longitudinal growth of the jaw-bone. Moreover, in certain of the larger species, in which the pace at which the teeth move forwards is far greater than in the smaller ones,  $p.^4$  itself, and either one or two of the anterior molars, may also fall out as the rest move forwards—a process by which the distance from the anterior cheek-teeth to the front of the mouth is always kept about the same.

Another point to which attention should be directed is that the molars, especially of the larger species, emerge from the bone with their hollows nearly entirely filled up with cement, external to and quite distinct from the enamel of the tooth. The result of this is that some specimens have the cusps and ridges of their molars

apparently rounded off, and have none of the deep valleys and sharply defined crests so marked in other individuals. This difference may easily be mistaken for one of specific value, especially if by the method of cleaning the skull the cement has become white and shining, and not readily distinguishable by colour or texture from the enamel. During life this cement in some individuals soon gets chipped or worn off, while in others it persists until the tooth is completely worn down. The only way, therefore, to get at the true character of the molars in such specimens is to chip out with a sharp point the bits of cement filling up the depressions, by which means the valleys and crests are brought into their proper relative prominence.

The incisors of the *Macropodidæ*, like many other permanently growing teeth in the Mammalian series, have both a definitely marked non-growing enamel-covered portion, whose size and shape are of systematic importance, and also a constantly lengthening dentine root, which, as the crown wears off, may in old animals form very nearly the whole of the tooth. All systematic descriptions of the incisors should therefore, and in the present volume do, refer entirely to their unvarying enamel-covered portion.

Owing to the relatively late development of the posterior molars in this group, the word "adult" cannot be confined, as it is elsewhere, to individuals with all the molars in place, these being therefore here called "aged," while the word "adult" is used for those in which  $p.^4$  is in place, although  $m.^4$  is still below the bone. The late development of  $m.^4$  was also originally the cause of the choice, as a basis-measurement of the teeth, of the combined lengths of the three anterior molars only; but the measurement has been found so convenient in the other families also that, as already noted, it has been adhered to throughout the Order.

### *Synopsis of the Genera.*

#### I. EXTERNAL CHARACTERS.

A. Hallux absent. Tail hairy.

*a.* Size variable, generally large. Claws of fore feet not disproportionately large, subequal.

Ears generally long and pointed . . . . Subfamily **Macropodinæ**.

*a*<sup>1</sup>. Back not cross-banded\*.

*a*<sup>2</sup>. Nape-hairs directed backwards †.

Form markedly macropine.

*a*<sup>3</sup>. Rhinarium naked †. Size variable, generally large or medium.

*a*<sup>4</sup>. Central hind claw long and strong. Tail tapering, short-haired, rarely crested . . . . .

1. **MACROPUS**, p. 10.

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\* Rarely and very indistinctly banded in one or two species of *Macropus*.

† Except, rarely, in two or three species of *Macropus*.

‡ Except in *Macropus giganteus*.

- b*<sup>4</sup>. Central hind claw very short.  
Tail cylindrical, bushy . . . . . 2. PETROGALE, p. 62.
- b*<sup>3</sup>. Rhinarium hairy. Size small (head and body less than 700 millim.).  
*c*<sup>4</sup>. A horny spur at end of tail . . . . . 3. ONYCHOGALE, p. 73.
- d*<sup>4</sup>. No spur on tail . . . . . 4. LAGORCHESTES,  
[p. 79.]
- b*<sup>2</sup>. Nape-hairs directed forwards. Form less macropine.  
*c*<sup>3</sup>. Limbs unequal. Hind claws straight. Tail uniformly short-haired . . . . . 5. DORCOPSIS, p. 86.
- d*<sup>3</sup>. Limbs subequal. Hind claws curved. Tail thickly hairy . . . . . 6. DENDROLAGUS, p. 92.
- b*<sup>1</sup>. Back cross-banded. Form macropine. Rhinarium naked. Size small . . . . . 7. LAGOSTROPHUS,  
[p. 100.]
- b*. Size small (head and body not exceeding 600 millim.). Claws of fore feet very large, unequal, the median ones much the longest. Ears small and rounded. . . . . Subfamily **Potoroinæ**.
- c*<sup>1</sup>. Rhinarium hairy. Hind foot longer than head. . . . . 8. ÆPYPRYMNUMS,  
[p. 102.]
- d*<sup>1</sup>. Rhinarium naked.  
*c*<sup>2</sup>. Hind foot as long as or longer than head.  
*e*<sup>3</sup>. Tail more or less distinctly crested along the top terminally . . . . . 9. BETTONGIA, p. 104.
- f*<sup>3</sup>. Tail without any trace of a darker crest . . . . . 10. CALOPRYMNUMS,  
[p. 114.]
- d*<sup>2</sup>. Hind foot decidedly shorter than head . . . . . 11. POTOROUS, p. 116.
- B.** Hallux present, opposable. Tail naked, scaly. . . . . Subfamily **Hypsiprymnodontinæ**.
- c*. Size very small . . . . . 12. HYPsipRYMNODON,  
[p. 123.]

## II. CRANIAL CHARACTERS.

- A.** *P*<sup>4</sup> with its axis in the general line of the tooth-row, or but slightly twisted outwards anteriorly.
- a*. Molars transversely ridged, increasing in size backwards; *m*<sup>4</sup> not smaller than *m*<sup>3</sup>. Canine generally minute or absent. Upper *i*<sup>1</sup> but little exceeding the other incisors in vertical length . . . . . Subfamily **Macropodinæ**.
- a*<sup>1</sup>. The two sets of incisors widely divergent backwards. Incisors narrow, sharp-edged; *i*<sup>2</sup> smaller than *i*<sup>1</sup>.
- a*<sup>2</sup>. Canines absent, or, when present, followed by a *p*<sup>4</sup> not, or but little, longer than *m*<sup>4</sup>.
- a*<sup>3</sup>. Bullæ generally unswollen. Canines minute or absent.
- a*<sup>4</sup>. *P*<sup>4</sup> variable. *I*<sup>3</sup> generally large, its outer anterior lamina the longest. Bullæ never swollen. 1. **MACROPUS**, p. 10.

- b*<sup>4</sup>. P.<sup>4</sup> 6-8 millim. long. I.<sup>3</sup> small.  
Bullæ sometimes swollen . . . . . 2. PETROGALE, p. 62.
- c*<sup>4</sup>. P.<sup>4</sup> small, rounded, constricted  
in the centre, without internal  
ledge. I.<sup>3</sup> very small and slender,  
slanted obliquely forward. . . . . 3. ONYCHOGALE, p. 72.
- b*<sup>3</sup>. Bullæ swollen. Canines present.  
P.<sup>4</sup> large, not constricted, with  
internal ledge . . . . . 4. LAGORCHESTES,  
[p. 79.
- b*<sup>2</sup>. Canines present. P.<sup>4</sup> much longer  
than m.<sup>4</sup> Bullæ unswollen. . . . .
- c*<sup>3</sup>. P.<sup>4</sup> longer than m.<sup>1</sup> and m.<sup>2</sup> com-  
bined. Palate incomplete . . . . . 5. DORCOPSIS, p. 86.
- d*<sup>3</sup>. P.<sup>4</sup> shorter than m.<sup>1</sup> and m.<sup>2</sup> com-  
bined. Palate complete . . . . . 6. DENDROLAGUS,  
[p. 92.
- δ*<sup>1</sup>. The two sets of incisors nearly parallel.  
Incisors broad, flat-topped; i.<sup>1</sup> smaller  
than i.<sup>2</sup> Canines absent . . . . . 7. LAGOSTROPHUS,  
[p. 100.
- b*. Molars quadri-tuberculate, decreasing in  
size backwards; m.<sup>4</sup> smaller than m.<sup>3</sup>  
Canine present. Upper i.<sup>1</sup> decidedly  
longer vertically than the other in-  
cisors . . . . . Subfamily **Potoroinæ**.
- c*<sup>1</sup>. Molars, especially m.<sup>4</sup>, oblong, much  
longer than broad. Palate nearly or  
quite perfect. P.<sup>4</sup> with about 7 ver-  
tical grooves. Canines large. Bullæ  
unswollen . . . . . 8. ÆPYPRYMNUS,  
[p. 102.
- d*<sup>1</sup>. Molars quadrate, scarcely longer than  
broad. Palate with large vacuities.  
Bullæ more or less swollen. . . . .
- c*<sup>2</sup>. Upper p.<sup>4</sup> very large, with 7 or more  
prominent oblique grooves ex-  
ternally . . . . . 9. BETTONGIA, p. 104.
- d*<sup>2</sup>. Upper p.<sup>4</sup> with 6 or less shallow, in-  
distinct, vertical grooves. . . . .
- e*<sup>3</sup>. Canine minute, the anterior pala-  
tine foramen extending behind its  
level. Grooves on p.<sup>4</sup> almost  
obsolete, 4 to 6 in number . . . . . 10. CALOPRYMNUS,  
[p. 114.
- f*<sup>3</sup>. Canine well developed; anterior  
palatine foramen not or barely  
reaching backwards to its level.  
Grooves on p.<sup>4</sup> shallow, 2 to 4 in  
number . . . . . 11. POTOROUS, p. 116.
- B. P.<sup>4</sup> above and below abruptly twisted out-  
wards . . . . . Subfamily **Hypsiptymnodontinæ**.
- c*. Canines present. Bullæ small, swollen.  
Molars decreasing backwards . . . . . 12. HYPSPRYMNODON,  
[p. 123.

## Subfamily I. MACROPODINÆ.

Size variable, large or medium.

Claws of fore feet of moderate size, subequal, the median not disproportionately larger than the outer ones. Hind feet without hallux. Tail long, hairy. Œsophagus entering the stomach near the cardiac end; liver with a spigelian lobe\*. Canine generally minute or absent, rarely well developed. P.<sup>4</sup> set quite in the same general line as the other teeth. Molars transversely ridged, increasing in size backwards; m.<sup>4</sup> rising into its place very late in life, always as large as and generally markedly exceeding m.<sup>3</sup> First upper incisor but little exceeding the others in length.

## 1. MACROPUS.

	Type.
Macropus, <i>Shaw, Nat. Misc.</i> i. Text to plate xxxiii. (1790) . . . . .	M. giganteus.
Kangurus, <i>Geoff. Bull. Soc. Philom.</i> i. p. 106 (1796). . . . .	M. giganteus.
Halmaturus, <i>Ill. Prodr. Syst. Mamm.</i> p. 80 (1811). . . . .	M. giganteus.
Thylogale, <i>Gray, Charlesw. Mag. N. H.</i> i. p. 583 (1837) . . . . .	M. thetidis.
Osphranter, <i>Gould, P. Z. S.</i> 1841, p. 80 . . . . .	M. antilopinus.
Setonyx, <i>Less. N. Tabl. R. A., Mamm.</i> p. 194 (1842). . . . .	M. brachyurus.
Gerboides, <i>Geoff. apud Gerv. H. N. Mamm.</i> ii. p. 271 (1855) . . . . .	M. rufus.
Phascolagus, <i>Owen, Phil. Trans.</i> 1874, pp. 262 <i>et seqq.</i> . . . . .	M. robustus.
Borlogale, <i>Owen†, t. c.</i> pp. 247 <i>et seqq.</i> . . . . .	M. magnus.

Size variable, ranging from that of a rabbit to that of a man. Rhinarium naked‡. Ears well developed. Fur on nape directed downwards§. Limbs very unequal, the hind much longer and stronger than the fore. Central hind claws long, markedly exceeding the terminal pad in length. Tail thick, tapering, evenly haired, not bushy||. Mammæ 4.

*Skull* as described above. Bullæ not inflated.

*Dentition* :—I.  $\frac{1.2.3}{1.0.0}$ , C.  $\frac{0 \text{ or } 1}{0}$ ¶, P.  $\frac{0.0.3.4}{0.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 32$  or 34.

Incisor series forming an open curve; the individual teeth large and strong, the first the longest, rooted higher and descending lower than the others. I.<sup>3</sup> almost always the longest horizontally, and in most species with a prominent infolding of the enamel on its external or posterior side. Canines rudimentary, minute, early deciduous. P.<sup>3</sup> small but functional, deciduous, pushed out along

\* Cf. Garrod, *P. Z. S.* 1875, p. 58.

† Several of Owen's names for fossil "genera" should also be placed here; e. g. *Leptosiaigon*, *Pachysiaigon*, *Protamnodon*, &c.—See Lydekker, *Cat. Foss. Mamm. B. M.* v. p. 206 (1887).

‡ Except (partially) in *M. giganteus*, *M. agilis*, and *M. dorsalis*.

§ Except occasionally in *M. rufus* and *M. thetidis*.

|| Crested in *M. irma*.

¶ When the formula number is italicized the tooth, although present, is minute and probably functionless.

with the milk-premolar (m.p.<sup>4</sup>) by p.<sup>4</sup> when the latter takes its place in the series. M.<sup>4</sup> appearing after p.<sup>4</sup> is in place, and therefore never in position at the same time as p.<sup>3</sup> Each of the molars with a well-marked central connecting ridge between the two main transverse ridges\*. Lower incisors long, scalpriform, their inner margins sharp-edged, opposable. Lower canines entirely absent; premolars and molars much as in the upper jaw.

*Habits.* Terrestrial, saltatorial, graminivorous.

*Range.* Australian, and Eastern half of Austro-Malayan, sub-regions.

The members of the genus *Macropus* divide themselves very naturally into three groups, most easily distinguishable by size, but each possessing characters which show that the species of each group are, on the whole, more nearly related to each other than to the members of other groups.

Within the three groups the species seem to be very closely related to one another; and although each may be easily distinguished both externally and by their skulls, yet this is only done by ringing the changes on a certain limited set of characters, all of which seem to be equally trivial and unimportant in any deeper sense than for mere specific distinction.

Were it possible to separate the Kangaroos generically from the Wallabies, it would be exceedingly convenient to do so; but unfortunately the characters by which the groups are separated from each other are neither sufficiently constant nor important to found generic distinction upon, and I have therefore retained the somewhat unwieldy genus *Macropus* for all the true Kangaroos and Wallabies with the exception of the three small groups marked off by definite generic characters.

### *Synopsis of the Species.*

#### I. EXTERNAL CHARACTERS.

- A. Hind foot more than 260 millim. long.  
(KANGAROOS.)
- |   |                                       |
|---|---------------------------------------|
| a. Nose hairy between the nostrils. Central hind claw long. Colour greyish brown ..   | 1. <i>M. giganteus</i> , p.15.        |
| b. Nose with a distinct naked rhinarium. Central hind claw short.   |                                       |
| a <sup>1</sup> . Fur coarse and straight, not woolly. Face-markings obsolete.   |                                       |
| a <sup>2</sup> . Fur very short and sparse, antilopine red.....   | [p. 21.<br>2. <i>M. antilopinus</i> , |
| b <sup>2</sup> . Fur long and thick, smoky grey .....   | 3. <i>M. robustus</i> , p. 22.        |
| b <sup>1</sup> . Fur soft, but straight. Colour isabelline. Front of neck sharply defined white ..                                | 4. <i>M. isabellinus</i> ,            |
| c <sup>1</sup> . Fur soft, short and woolly. Colour rufous. Face-markings present. White on front of neck not sharply defined.... | [p. 25.<br>5. <i>M. rufus</i> , p.25. |
| c. External characters unknown .....  | 6. <i>M. magnus</i> , p. 27.          |

\* Nearly obsolete in *M. bruni* and *M. brachyurus*.

- B. Hind foot from 160 to 250 millim. long.  
(LARGE WALLABIES.)
- d.* Fur of back longish, brown, grey, or rufous, never sandy. Hip-stripe inconspicuous or absent (except in *M. dorsalis*).
- d*<sup>1</sup>. Tail not black-crested (except at extreme tip).
- c*<sup>2</sup>. Tail black. Round base of ear yellowish or rufous . . . . . 7. *M. ualabatus*, [p. 30.]
- d*<sup>2</sup>. Tail grey or whitish. Round base of ear like rest of head.
- a*<sup>3</sup>. Ears uniform behind. No white stripe on nape.
- a*<sup>4</sup>. No black line down back.
- a*<sup>5</sup>. Top of muzzle brown. Face-markings ill-defined . . . . . 8. *M. ruficollis*, p. 32.
- b*<sup>5</sup>. Top of muzzle light grey. Face-markings sharp and well-defined . . . . . 9. *M. greyi*, p. 36.
- b*<sup>4</sup>. A black line down centre of back. Hip-stripe prominent . . . . . 10. *M. dorsalis*, p. 37.
- b*<sup>3</sup>. Ears parti-coloured behind. A white stripe on nape . . . . . 11. *M. parryi*, p. 39.
- e*<sup>1</sup>. Tail with distinct black crests above and below . . . . . 12. *M. irma*, p. 40.
- e.* Fur of back short; uniform sandy. A prominent white hip-stripe . . . . . 13. *M. agilis*, p. 42.
- C. Hind foot less than 150 millim. long. (SMALL WALLABIES.)
- f.* Round base of ear, and back of lower leg, bright clear red. Nape grey or brown, not red.
- f*<sup>1</sup>. Fur short, coarse, and sparse; general colour dark sandy; a white hip-stripe . . . . . 14. *M. coxeni*, p. 44.
- g*<sup>1</sup>. Fur soft and thick; general colour brown-grey, with rufous markings.
- e*<sup>2</sup>. Hip-stripe prominent. Flanks rich red . . . . . 15. *M. stigmaticus*, [p. 47.]
- f*<sup>2</sup>. Hip-stripe indistinct or absent. Flanks rufous grey . . . . . 16. *M. wilcoxi*, p. 48.
- g.* Round base of ear, and back of lower leg, grey or brown\*.
- h*<sup>1</sup>. Fur thin and sparse, not mottled; uniform chocolate-brown.
- g*<sup>2</sup>. Back of ears black; a white hip-stripe. . . . . 17. *M. brunii*, p. 49.
- h*<sup>2</sup>. Back of ears brown, like the head; no hip-stripe . . . . . 18. *M. browni*, p. 51.
- i*<sup>1</sup>. Fur long and thick, mottled on back.
- i*<sup>2</sup>. Tail more than three times as long as head. Nape and fore-quarters usually red.
- c*<sup>3</sup>. Nape rich rufous, no trace of a dark nuchal streak. Rhinarium broad and naked to the lip . . . . . 19. *M. thetidis*, p. 52.

\* Sometimes red in *M. thetidis*.

- d*<sup>3</sup>. Nape dull rufous or grey, with a dark nuchal streak. Rhinarium ending below at the top of a distinct cleft.
- c*<sup>4</sup>. Back grey, shoulders generally rufous. Nuchal stripe broad, vaguely defined.—W. and S.W. Australia . . . . . 20. *M. eugenii*, p. 54.
- d*<sup>4</sup>. Back and shoulders uniform dull grizzled rufous. Nuchal stripe narrow, well-defined.—S.E. Australia . . . . . 21. *M. parma*, p. 57.
- j*<sup>2</sup>. Tail barely  $2\frac{1}{2}$  times the length of the head. Nape and fore-quarters brown, like the back.
- e*<sup>3</sup>. Hind foot more than 115 millim. long. Fur thick and soft.—Victoria and Tasmania . . . . . 22. *M. billardieri*, [p. 58.
- f*<sup>3</sup>. Hind foot less than 110 millim. long. Fur coarse and harsh.—Western Australia . . . . . 23. *M. brachyurus*, [p. 60.

## II. CRANIAL CHARACTERS.

- A. Basal length of skull, when adult, more than 135 millim. Combined lengths of ms.<sup>1-3</sup> 30 millim. or more. (KANGAROOS.)
- a*. I.<sup>3</sup> very long horizontally, with two external notches. Supraorbital edges rounded, inflated . . . . . 1. *M. giganteus*, p. 15.
- b*. I.<sup>3</sup> shorter, with one or no external notches.
- a*<sup>1</sup>. Anterior transverse molar-ledges well developed, clearly visible externally.
- a*<sup>2</sup>. Sides of muzzle enormously inflated. Anterior molar-bridges prominent . . 2. *M. antilopinus*, [p. 21.
- b*<sup>2</sup>. Sides of muzzle but little inflated. Anterior molar-bridges generally small or absent.
- a*<sup>3</sup>. Palatal foramen shorter than m.<sup>1</sup> Nasals short and broad. Anterior molar-bridges variable. Supraorbital edges sharp, not inflated . . 3. *M. robustus*, p. 22.
- b*<sup>3</sup>. Palatal foramen longer than m.<sup>1</sup> Nasals long and narrow. Anterior molar-bridges entirely absent. Supraorbital edges slightly inflated . . 5. *M. rufus*, p. 25.
- b*<sup>1</sup>. Anterior transverse molar-ledges nearly obsolete, not visible externally. Palatal foramen very long. I.<sup>1</sup> without notches. 6. *M. magnus*, p. 27.
- c*. Cranial characters unknown . . . . . 4. *M. isabellinus*, p. 25.
- B. Skull, when adult, between 108 and 130 millim. Ms.<sup>1-3</sup> from 21 to 28 millim. I.<sup>3</sup> large, with one central notch. (LARGE WALLABIES.)
- d*. I.<sup>3</sup> more than 6 millim. long.
- c*<sup>1</sup>. P. longer than m.<sup>2</sup>
- c*<sup>2</sup>. P.<sup>4</sup> longer than m.<sup>4</sup> Posterior lamina of i.<sup>3</sup> shorter than anterior. Nasals somewhat expanded behind . . . . . 7. *M. ualabatus*, [p. 30.



## Group I. KANGAROOS.

The members of the first group agree among themselves by their large size, somewhat uniform and dull coloration as compared with that of the more brightly marked and variegated Wallabies, and by their large heavy skulls, in which, as is usual in the larger as compared with the smaller members of any group, the facial portion is increased at a far greater ratio than the cranial, whence their high facial indices (see Table). Their palates are, for the most part, much more complete posteriorly than those of the Wallabies, and their molars differ in the frequent development of the anterior central connecting ridge, almost or quite obsolete in the Wallabies, and the general suppression of the antero-external ridge present in those animals. These latter points are, however, by no means constant.

1. *Macropus giganteus* \*.a. *Macropus giganteus*, var. *typicus*.

- Kangaroo, *Cook, Hawkesw. Voy.* (4to) iii. pp. 157 & 173, pl. xx. (animal) (1773); *Phillip, Voy. Bot. Bay*, pp. 106 & 168, pls. x. & xxx. (animal and skull) (1789); *White, Journ. Voy. N.S.W.* p. 272 (1790).  
 Yerboa gigantea, *Zimm. Spec. Zool. Geogr.* p. 526 (1777).  
 Jaculus giganteus, *Erxl. Syst. Regn. An.* p. 409 (1777); *Blumenb. Handb. Naturg.* p. 88 (1779).  
 Didelphys gigantea, *Schreb. Säug.* iii. p. 552, pl. cliv. (1778); *Gmel. Linn. S. N.* i. p. 109 (1788); *Donnd. Zool. Beytr.* i. p. 354 (1792); *Kerr, Linn. An. K.* p. 197 (1792); *Meyer, Syst. Uebers. Zool. Entd.* p. 13 (1793); *G. Cuv. Tabl. Elém.* p. 126 (1798); *Geoff. Ann. Mus.* i. p. 178 (1802); *Desm. N. Dict. d'H. N.* xii. p. 355 (1803); *Blumenb. Man. d'Hist. Nat.* i. p. 109 (1803); *G. Fisch. Anat. Maki*, p. 189, pl. xix. (skull) (1804); *Turt. Linn. S. N.* i. p. 67 (1806).  
 Didelphis kenguru, *Zimm. Geogr. Gesch.* ii. p. 231 (1780).  
 Didelphys kanguro, *Bodd. Elench. An.* i. p. 78 (1785).  
 Macropus giganteus, *Shaw, Nat. Misc.* i. pl. xxxiii. (1790); *Pander & D'Alton, Vergl. Osteol., Beutelth.* pls. i. & vii. (skull and skeleton) (1828); *Fisch. Syn. Mamm.* p. 281 (1829); *F. Cuv. H. N. Mamm.* (fol.) iii. livr. lv. (1829); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 377 (1836); *Waterh. Cat. Mamm. Mus. Zool. Soc.* p. 66 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 192 (1841); *Less. N. Tabl. R. A. Mamm.* p. 193 (1842); *Waterh. N. H. Mamm.* i. p. 62, pl. iii. figs. 3-5, and v. figs. 1 & 2 (teeth) (1846); *Desm. Dict. Univ. d'H. N.* vii. p. 170 (1849); *Gunn, P. Roy. Soc. Tasm.* ii. p. 88 (1852); *Gerv. Hist. Nat. Mamm.* ii. p. 270, pl. xlv. (1855); *Giebel, Odontogr.* p. 43, pl. xix. fig. 14, a, b (incisors) (1855); *Schleg. Dierk.* p. 142 (1857); *Gieb. Säug.* p. 672 (1859); *id. Thierr.* i. p. 235, figs. 397-400 (1859); *Blyth, Cat. Mamm. Mus. As. Soc.* p. 183 (1863); *Schäfer*

\* a. Size larger. Hind foot of male more than 300 millim.

a'. Fur shorter and paler. *Hab. Australia* ...

b'. Fur longer and darker. *Hab. Tasmania* ..

b. Size smaller. Hind foot of male less than 300 millim. ....

a. Var. *typicus*.

b. Var. *fuliginosus*,

[p. 19.

c. Var. *metanops*, p. 20.

- & Williams, *P. Z. S.* 1876, p. 165 (anat.); Giebel, *Bronn's Klass. u. Ordn.* vi. Abth. v. pl. xlvii. fig. 21, 1 & 2 (incisors) (1876); Brehm, *Thierl.* ii. p. 591 (1880); Flower, *Encycl. Brit.* (9) xiii. p. 838 (1881), art. *Kangaroo*; Chapman, *P. Ac. Philad.* 1881, p. 468, pl. xx. (anat.); Flow. & Gars. *Cat. Ost. Coll. Surg.* ii. p. 707 (1884); Lyd. *Cat. Foss. Mamm. B. M.* v. p. 225 (1887); Jent. *Cat. Ost. Leyd. Mus.* p. 317 (1887); *Coll. Zool. Jahrb.* ii. p. 876 (1887).
- Macropus major*, Shaw, *Gen. Zool.* i. pt. ii. p. 505, pl. cxv. (1800); *G. Cuv. R. A.* i. p. 183 (1817); *F. Cuv. Dict. Sci. Nat.* xxiv. p. 347 (1822); *id. Dents Mamm.* pl. xliii. (teeth) (1825); Owen, *P. Z. S.* 1831, p. 159, 1833, p. 128, & 1837, pp. 82 & 120; Gray, *Charlesw. Mag. N. H.* i. p. 582 (1837); Blyth, *Cuv. An. Kingd.* p. 106 (1840); Owen, *Tr. Z. S.* ii. pp. 328 & 388 (1841); Gray, *Grey's Austr.*, App. ii. p. 402 (1841); Fennel, *Nat. Hist. Quadr.* p. 275 (1841); Gould, *Mon. Maer.* pl. i. (animal) (1841); Gray, *List Mamm. B. M.* p. 87 (1843); Gould, *Strzelecki's N. S. W.* p. 316 (1845); Owen, *Odontogr. Text.* p. 390, Atl. pl. c. fig. 8 (teeth) (1845); *id. Art. Marsupialia, Todd's Cycl. Anat. Phys.* iii. p. 266, fig. 92 (1847), and *Art. Teeth, op. cit.* iv. p. 993, fig. 594 (teeth) (1848); *G. Cuv. Anat. Comp.* ii. pls. clxxxiii.-cciii. (myology) (1849); Owen, *Cat. Ost. Mus. Coll. Surg.* i. p. 320 (1853); Gould, *Mamm. Austr.* ii. pls. i. & ii. (animal) (1857); Gerrard, *Cat. Bones Mamm. B. M.* p. 124 (1862); Krefft, *Cat. Mamm. Austr. Mus.* p. 47 (1864); *Huxl. & Hawk. Atl. Comp. Ost.* pl. xi. figs. 4 & 6 (pelvis and foot) (1864); Flower, *Phil. Trans.* 1867, p. 633, pl. xxix. figs. 1, 2, & 3 (milk-dentition); Owen, *Comp. Anat. Phys.* iii. p. 379, fig. 296 (dentition) (1868); Krefft, *Notes Faun. Tasm.* p. 4 (1868); *id. Mamm. Austr.* pls. x. & x. bis (animal) (1871); Owen, *Phil. Trans.* 1874, pp. 245 *et seqq.* pl. xx. fig. 15 (lower jaw); F. G. Waterh. *Harc. S. Austr.* p. 284 (1876); Owen, *P. Z. S.* 1877, p. 358; Fletcher, *P. Linn. Soc. N.S.W.* vii. p. 651 (1882), and viii. p. 9 (anat.) (1883); Higg. & Pett. *P. Roy. Soc. Tasm.* 1883, p. 196.
- Kangaroo gigas*, Lacép. *Mém. Inst.* iii. p. 491 (1801).
- Kangurus giganteus*, E. Geoff. *Cat. Mus.* p. 154 (1803); Tiedem. *Zool.* i. p. 435 (1808); G. Fisch. *Zoogn.* iii. p. 19 (1814).
- Halmaturus giganteus*, Ill. *Prodr. Syst. Mamm.* p. 80 (1811); Goldfuss, *Zool.* ii. p. 446 (1820); Schinz, *Cuv. Thierr.* i. p. 263 (1821); Leuckh. *Meck. Arch. Phys.* viii. p. 442 (anat.) (1823); *Burm. Lehrb. Naturg.* p. 547 (1830); Kaup, *Thierr.* i. p. 243 (1835); Wagn. Schreb. *Saug. Supp.* iii. p. 108 (1843); v. p. 302 (1855); Schinz, *Syn. Mamm.* i. p. 546 (1844).
- (?) *Halmaturus rutilans*, Ill. *Abh. Ak. Berl.* 1811, p. 102 (1815) (nom. nudum).
- Kangurus labiatus*, Desm. *N. Dict. d'H. N.* (2) xvii. p. 33 (1817); *id. Mamm.\** i. p. 273, pl. xxi. fig. 4 (animal) (1820); Schinz, *Cuv. Thierr.* i. p. 263 (1821); F. Cuv. *Dents Mamm.* p. 137, pl. xliii. A (teeth) (1825); Geoff. *Dict. Class. d'H. N.* ix. p. 110 (1826); Gray, *Griff. Cuv. An. Kingd.* v. p. 201 (1827).
- Halmaturus griseofuscus*, labiatus, and griseorufus, Goldfuss, *Isis*, 1819, pp. 266, 267.
- Kangaroo géant*, F. Cuv. *H. N. Mamm.* (fol.) i. livr. xi. (1819).

\* This is merely the part containing the Mammals of the great French 'Encyclopédie Méthodique,' published at Paris from 1782 to 1832, and is sometimes quoted as "Encycl. Méth."

- Macropus labiatus*, *F. Cuv. Dents Mamm.* p. 137, pl. xliii. A (teeth) (1825); *Less. Man. Mamm.* p. 225 (1827).  
*Macropus ocydromus*, *Gould, Ann. Mag. N. H.* (1) x. p. 1 (1842); *Gray, List Mamm. B. M.* p. 87 (1843); *Gilbert, P. Z. S.* 1844, p. 33 (habits); *Gould, Mann. Austr.* ii. pls. iii. & iv. (animal) (1860), and *Introd.* i. p. xxix (1863); *Gerrard, Cat. Bones Mamm. B. M.* p. 124 (1862); *Kreff, Mann. Austr.* text to pl. x. p. 1 (1871).  
*Yerbua kanguru*, *Forst. Descr. Anim.* p. 367 (1844).

#### GREAT GREY KANGAROO.

Size large, form comparatively slender and graceful. Fur short, close, and rather woolly, its direction on the fore part of the body variable, not constant as in the coarser-haired species. Muzzle hairy (see Pl. V. fig. 1), the hair coming down between the nostrils nearly to the lip, and leaving only a narrow naked edge along the nostrils. General colour grey-brown, underside and limbs nearly white. Face coloured like back, a rather darker "whisker-mark" on sides of nose. Back of ears generally rather lighter than the head in Western, and darker in Eastern specimens, but this apparently far from constant. Arms and legs white or greyish white down to metacarpus and metatarsus; fingers and toes gradually becoming nearly black at their tips. Central hind claw long and strong, projecting more than an inch beyond the tip of the toe and showing quite clear of the hairs. Tail brown, gradually darkening to the extreme tip, which is quite black.

*Female* coloured like male.

*Skull.* Muzzle long, conical, the walls of the nasal chamber swollen, but much less so than in *M. antilopinus*. Nasals long, broadening behind, their posterior about half as much again as their middle width, the latter going from  $3\frac{1}{2}$  to 5 times into their length. Interorbital region swollen, the supraorbital edges smoothly rounded. Intertemporal constriction never very strongly marked, its least breadth always nearly or quite equal to the combined breadths of the two nasals. Opening of lacrymal canal entirely in the lacrymal bone. Palatal foramina short, not reaching backwards to the maxillo-premaxillary suture. Anterior palate long and narrow, its least breadth about one third of the diastema, its edges well defined though not sharp. Posterior palate fairly complete, two small narrow vacuities generally present just in front of the palato-maxillary suture, and numerous minute holes in the bone behind it.

*Teeth.* Roots of the first pair of incisors far apart, so that their tips converge at a considerable angle. Roots of  $i.^2$  and  $i.^3$  slanting markedly backwards; enamel-covered portion of  $i.^2$  very short, its longitudinal as great as its vertical diameter.  $I.^3$  very long, its edge equal to or greater than the combined lengths of  $i.^1$  and  $i.^2$ , and with two distinct notches on its outer side, the posterior notch about the centre of the tooth.  $P.^3$  hourglass-shaped, its length equal to or exceeding that of  $p.^4$ .  $P.^4$  small, only about 7-8 millim. long, and proportionately narrow, early deciduous. Molars with well-defined ridges and hollows, their anterior transverse ledges

broad, with well-marked central connecting ridges (see Pl. VI. fig. 4). Anterior molars deciduous. Lower p.<sup>4</sup> very small, only about 6 millim. long.

*Dimensions.*

	♂. Spec. k (stuffed). millim.	♀. Spec. l (stuffed). millim.	
Head and body . . . . .	1500	1170	
Tail . . . . .	930	730	} (Range ♂ 320-358; ♀ 278-298.)
Hind foot . . . . .	337	289	
Ear . . . . .	100	98	

Skull, see p. 29.

*Hab.* All Australia except the extreme north; replaced in Tasmania by the variety *fuliginosus*.

*Type* not in existence.

This, the common Kangaroo of the greater part of Australia, and, except *M. brunii*, the earliest known of the family, has formed the basis for nearly all the numerous and important investigations into the anatomy and natural history of the family. As to its systematic history, it has, as is usual with widely spread species, been split up into several so-called different species. Of these, I am inclined for the present to consider two (*M. fuliginosus* and *M. melanops*) as of varietal rank, while I am unable to admit that Mr. Gould's *M. ocydromus*, the Western Australian form, is in any way separable from the common type.

a. Ad. skull, ♀.	North of Rockhampton, Queensland ( <i>Bennett</i> ).	Sir R. Owen [P.]
b. { Ad. sk. } ♀. { Skull. }	Inland, New South Wales.	K. H. Bennett, Esq. [P. & C.]
c. Fœtus (about 23 mm. long).	New England District, N. S. W.	G. E. Adlard, Esq. [P. & C.]
d, e. Ad. skeletons, ♂ ♀.	Dubbo, N. S. W.	Purchased.
f, g. { Ad. st. } ♂ ♀. { Skulls. }	South Australia.	Sir Geo. Grey [P.]
h. { Ad. sk. } ♀. { Skull. }	South Australia.	Purchased.
i. Ad. skull.	Redesdale, S. A. ( <i>F. G.</i> <i>Waterhouse</i> ).	Sir R. Owen [P.]
j. Imm. skull.	Mt. Iyor, S. A. ( <i>F. G. W.</i> ).	Sir R. Owen [P.]
k, l. Ad. st., ♂ ♀.	Swan River, W. A. ( <i>Mr.</i> <i>Priest</i> ).	Gould Coll. ( <i>Co-</i> <i>types of M. ocydromus</i> , Gould.)
m. Ad. sk., ♀.	Swan R., W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
n. { Ad. sk. } ♂. { Skull. }	Toodyay, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
o, p. Ad. ♀ & yg. sks.	Wongar, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
q. Imm. st., ♀ (semi- albino).	West Australia ( <i>J. Gilbert</i> ).	Gould Coll.
r. Ad. sk., ♀.	Moore's R., W. A. ( <i>J. Gil-</i> <i>bert</i> ).	Gould Coll.

<i>s-u.</i> Skulls.	Moore's R., W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
<i>v.</i> Skull.	Toodyay, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
<i>w.</i> Aged skull, ♂ ("weight of animal 160 lbs.").	Murray, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
<i>x, y.</i> Ad. skulls, ♂.	Northam, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
<i>z.</i> Imm. skull, ♂.	Augusta R., W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
<i>a'.</i> Ad. skull, ♀.	West Australia ( <i>J. Gilbert</i> ).	Gould Coll.
<i>b'.</i> Yg. sk. (new-born).		Zool. Soc.
<i>c.</i> Skull.		

*b. Macropus giganteus, var. fuliginosus.*

*Kangurus fuliginosus*, *Desm. N. Dict. d'H. N.* (2) xvii. p. 35, pl. xxii. fig. 1 (1817); *id. Mamm.* i. p. 273 (1820); *Geoff. Dict. Class. d'H. N.* ix. p. 109 (1826); *Gray, Griff. Cuv. An. K.* v. p. 202 (1827); *Gerv. Hist. Nat. Mamm.* ii. p. 270 (1855).

*Macropus fuliginosus*, *Less. Man. Mamm.* p. 225 (1827); *Fisch. Syn. Mamm.* p. 281 (1829); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 377 (1836); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 200 (1841); *Gray, Grey's Austr., App.* ii. p. 402 (1841); *Gould, Mon. Macr.* pl. xvi. (animal) (1842); *Less. N. Tabl. R. A., Mamm.* p. 194 (1842); *Gray, List Mamm. B. M.* p. 88 (1843); *Gould, Mamm. Austr.* ii. pl. v. (animal) (1858); *Kreff, Mamm. Austr.* text to pl. x. p. 1 (1871).

*Halmaturus fuliginosus*, *Wagn. Schr. Säug. Supp.* iii. p. 109 (1843); *Schinz, Syn. Mamm.* i. p. 546 (1844).

TASMANIAN GREAT KANGAROO.

As large as, or larger than, the typical form; fur much longer, coarser, and darker in colour, the general colour being a dull smoky grey, with no tinge of fawn in it; belly white; hands and feet grizzled grey, not black at their tips. Tail grizzled grey, the terminal quarter deep black.

*Dimensions.*

	♂.
	<i>a</i> (skin).
	millim.
Head and body . . . . .	(c.) 1350
Tail . . . . .	(c.) 1000
Hind foot . . . . .	359
Ear . . . . .	(c.) 120
Skull (basal length) . . . . .	195

*Hab.* Tasmania.

*Type* in the Paris Museum.

This is obviously the usual Tasmanian climatic variety of the Common Kangaroo, and its modifications are just those which might have been expected.

The original habitat of this form was said to be Kangaroo Island, South Australia, where Desmarest states, but with some doubt, that it was obtained by Péron and Lesueur. This doubt is

confirmed by the fact that (*vide* Gould) it does not exist on Kangaroo Island, and by its common occurrence in Tasmania, where those collectors spent a considerable time.

a. { Ad. sk. } ♂. Tasmania. Purchased.  
 { Skull. }

c. *Macropus giganteus*, var. *melanops*.

*Macropus melanops*, Gould, P. Z. S. 1842, p. 10; Gray, *List Mamm. B. M.* p. 88 (1843); Gould, *Mamm. Austr. (Introd.)*, i. p. xxix (1863); Poulton, P. Z. S. 1883, p. 607.  
*Halmaturus melanops*, Schinz, *Syn. Mamm.* i. p. 566 (1844).

BLACK-FACED KANGAROO.

Similar to *M. giganteus* in all essential characters, but much smaller, more lightly built, and darker coloured. General colour dark brown, belly lighter. Face darker than the rest; a brown patch on the muzzle, connecting the two usual dark "whisker-marks." Arms and legs not paler than body; fingers and toes black.

*Dimensions.*

	♂. b (stuffed). millim.
Head and body . . . . .	980
Tail . . . . .	725
Hind foot . . . . .	277
Ear . . . . .	97

*Hab.* Eastern and South-eastern Australia; North Australia (?).  
*Type* in collection.

I am quite unable at present to make out the true relationship of this animal to the typical *M. giganteus*, of which it is apparently a dwarf form. The two live side by side in the same districts, but whether or no they interbreed, I am unable to ascertain. Gould himself places *M. melanops* as a synonym of *M. giganteus* in his later work, and all the evidence at my disposal tends to show that it is too closely related to that animal to be admitted as a distinct species. The type was said to have come from Port Essington, North Australia; but this locality has not as yet been confirmed, and is very probably erroneous.

a. Imm. sk., ♂. Port Essington. Gould Coll. (*Type*  
 of variety.)  
 b. Ad. st., ♂. Zoological Society.  
 c. Ad. sk., ♀. Zoological Society.  
 d. Skeleton, ♂ (diseased). Zoological Society.  
 e. { Ad. sk. } ♀. Gould Coll.  
 { Skull. }

2. *Macropus antilopinus*.

- Osphranter antilopinus*, *Gould*, *P. Z. S.* 1841, p. 80; *Gray*, *List Mamm. B. M.* p. 91 (1843); *Gould*, *Mon. Macr.* pl. xxii. (animal) (1842); *id.* *Mamm. Austr.* ii. pls. viii. & ix. (animal) (1858); *Gerrard*, *Cat. Bones Mamm. B. M.* p. 127 (1862).
- Halmaturus antilopinus*, *Schinz*, *Syn. Mamm.* i. p. 564 (1844); *Wagn. Schr. Säug. Supp.* v. p. 309 (1855).
- Macropus antilopinus*, *Waterh. N. H. Mamm.* i. p. 95 (1846), pl. v. fig. 15 (incisors); *Giebel*, *Odontogr.* pl. xix. fig. 12 c (1855) (incisors); *Schleg. Dierk.* p. 142 (1857); *Gieb. Säug.* p. 677 (1859); *Kreff*, *Mamm. Austr.* text to pl. x. p. 2 (1871); *Gieb. Bronn's Kl. u. Ordn.* vi. Abth. v. pl. xlvii. fig. 21 (incisors) (1876); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 711 (1884).

## ANTILOPINE KANGAROO.

Size large, form stout and heavy. Fur very short, coarse and straight; underfur entirely absent. Muzzle with a large naked rhinarium. General colour rich rufous; head, body, and limbs all of a deep uniform red, very similar to that of many Antelopes. No face-markings. Ears short, their colour behind quite the same as that of the head. Chin, chest, and belly, and inner sides of limbs whitish. Hands and feet rufous brown, becoming black on the fingers and toes. Central hind claw very short, only projecting about two thirds of an inch beyond the foot-pad; feet rather short in proportion to size of body. Tail concolorous with body, becoming rather darker at the extreme tip.

*Female* smaller and less brightly coloured; the general rufous tinge of the body replaced by a dull greyish fawn.

*Skull.* Muzzle short and broad, the nasal chamber enormously enlarged by the swelling out of its lateral walls (Pl. VI. fig. 3). Nasals very broad, their posterior about  $1\frac{1}{2}$  their central width, the latter going barely three times into their length. Interorbital region not swollen at all, the supraorbital edges sharp and well defined, and with a well-marked concavity on the forehead between them. Intertemporal constriction very marked, the least transverse breadth in specimen *a* no more than the posterior breadth of one of the nasals. Opening of lacrymal canal bounded partly by maxillary. Palatal foramina rather long, reaching backwards to the maxillo-premaxillary suture. Anterior palate very broad, its least breadth about two thirds of the diastema, and its edges smoothly rounded off, owing to the inflation of the lateral walls of the nasal chamber above. Palate very complete; only a few small foramina in palatine bone.

*Teeth.* Incisors much as in *M. giganteus*, except that all three are placed more vertically, and *i.*<sup>3</sup> only has a single well-developed external notch, in the position of the posterior notch of that species; a faint trace of the anterior notch, however, is present in the female skull. *P.*<sup>4</sup> large, oval. Molars as in *M. giganteus*. Anterior cheek-teeth persistent\*, at least until extreme old age. Lower incisors unusually short.

\* Except, of course, the invariably deciduous *p.*<sup>3</sup>

*Dimensions.*

	♂. a (stuffed). Aged. millim.	♀. b (stuffed). Barely adult. millim.
Head and body .....	1390	1000
Tail .....	890	700
Hind foot .....	320	273
Ear .....	76	90

Skull, see p. 29.

*Hab.* Coburg Peninsula, Northern Territory.

*Co-types* in collection.

According to Mr. Gould, the male here measured weighed about 120 lbs., but he states that he had heard of old males attaining a weight of 170 lbs.

Although this magnificent species was described more than forty years ago, no specimens, except those originally mentioned by Gould, seem ever to have been sent to Europe\*, nor have any of the Australian zoologists made any reference to it. We are therefore quite ignorant of the extent of its range southwards, and of any points in its history beyond what can be made out from an examination of Mr. Gould's typical specimens.

a, b. { Ad. sks. { ♂ ♀. Port Essington (*J. Gilbert*). Gould Coll.  
      { Skulls. }

### 3. *Macropus robustus*.

*Macropus* (*Petrogale*) *robustus*, *Gould*, *P. Z. S.* 1840, p. 92; *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 241 (1841).

*Petrogale robusta*, *Gray, Grey's Austr., App.* ii. p. 403 (1841); *Gould, Mon. Macr.* pl. v. (animal) (1841).

*Heteropus robustus*, *Less. N. Tabl. R. A. Mamm.* p. 195 (1842).

*Osphranter robustus*, *Gray, List Mamm. B. M.* p. 91 (1843); *Gould, Mamm. Austr.* ii. pls. x. & xi. (animal) (1858); *Gerrard, Cat. Bones Mamm. B. M.* p. 127 (1862); *Kreffl, Cat. Mamm. Austr. Mus.* p. 48 (1864); *Selater, P. Z. S.* 1870, p. 383; *Fletcher, P. Linn. Soc. N. S. W.* vii. p. 643 (anat.) (1882); *Jent. Cat. Ost. Leyd. Mus.* p. 318 (1887).

*Halmaturus robustus*, *Schinz, Syn. Mamm.* i. p. 560 (1844); *Wagn. Schr. Säug. Supp.* v. p. 310 (1855); *Coll. Zool. Jahrb.* ii. p. 879 (1887).

*Macropus robustus*, *Waterh. N. H. Mamm.* i. p. 100 (1846); *Schleg. Dierk.* p. 142 (1857); *Gieb. Säug.* p. 678 (1859); *Hill, P. Z. S.* 1867, p. 476; *Kreffl, Mamm. Austr.* text to pl. x. p. 2 (1871); *Owen, Phil. Trans.* 1874, p. 246 *et seqq.* pl. xx. fig. 13 (lower jaw); *Lyd. Cat. Foss. Mamm. B. M.* v. p. 222 (1887).

\* The skeleton in the Museum of the Royal College of Surgeons, mentioned by Flower and Garson (*l. c.*), turns out on examination to be really referable to *M. rufus*.

*Halmaturus erubescens*, *Sclater*, *P. Z. S.* 1870, pp. 126 & 669, pl. x. (animal), and 1871, p. 240, figs. 5 & 6 (skull); *Owen*, *Phil. Trans.* 1874, p. 246 *et seqq.* pl. xx. figs. 1-5 (skull and teeth); *Sclater*, *List An. Zool. Soc.* (8th ed.) p. 201, fig. 38 (1883); *id.* *P. Z. S.* 1883, p. 131, 1885, p. 322.

*Phascalagus erubescens*, *Owen*, *l. c.* p. 262 (1874).

*Osphranter "erubescens," F. G. Waterh., Harc. S. Austr.* p. 284 (1876).

#### WALLAROO.

Size large, form stout and heavy. Fur of medium length, rather thick and coarse, directed downwards; underfur thin and sparse. Muzzle (Pl. V. fig. 2) with a definite marked rhinarium, as in *M. antilopinus*. General colour (of male) dark smoky brown, strongly suffused, in South-Australian specimens, with rufous; nasal region and back of ears nearly black; lips, inside and base of ears white or pale grey. Belly rather paler than back; chest still lighter, nearly white. Arms, legs, and tail very dark brown, gradually becoming black distally. Central hind toe very short, almost wholly hidden by the coarse black hair of the toes.

*Female* (not fully adult) smaller, and much lighter-coloured throughout; general colour pale smoky grey, also often suffused with rufous. Nose and back of ears not darker than body. Extreme tips only of fingers and toes black. Tail greyish white, tip brown. In fully adult females the colours probably more nearly approach those of the male. The general colour of the male also appears to darken very considerably as life advances.

*Skull.* Muzzle with slight lateral inflation. Nasals rather broad and short, their middle breadth about one third of their length, their anterior end sharply pointed. Interorbital region not inflated, the supraorbital edges sharp and well defined; intertemporal constriction very narrow in old specimens. Lacrymal canal variable, its opening generally partly bounded by the maxilla. Palatal foramina short, not so long as  $m.^1$ , entirely confined to the pre-maxillæ. Anterior palate with well-defined edges, the breadth of its narrowest part about one half the length of the diastema. Palate quite complete, its only vacuities being the invariable posterior palatine foramina and a few minute holes in its extreme postero-lateral corners.

*Teeth.* Roots of second and third incisors placed more vertically than in *M. giganteus*. Enamel-covered part of  $i.^2$  about as high as long, with an indistinct groove down the centre of its outer face.  $I.^3$  long, nearly equalling the combined lengths of  $i.^1$  and  $i.^2$ , with one external notch near its front edge, the notch often obscured.  $P.^3$  about 7 millim. long.  $P.^4$  comparatively large and powerful. Molars as in *M. giganteus*, with well-developed transverse ledges, but the connecting-ridges smaller and sometimes absent.

## Dimensions.

	♂. a (stuffed).*	♀. b (stuffed).†
	Aged. millim.	Immature. millim.
Head and body .....	1290	1030
Tail .....	900	750
Hind foot .....	304	270
Ear.....	94	94

Skull, see p. 29.

*Hab.* Queensland, New South Wales, and South Australia (mountainous districts).

*Co-types* in collection.

The difference in size between the sexes in this species and in *M. antilopinus* has probably been much overrated, owing to the fact that in each case the typical male specimen figured by Gould is very old, the last molar having been up and in use for some time; whereas the female is immature or barely adult, and all recent writers have merely copied Gould's statements on the subject. There is undoubtedly a difference in size, but it is probably little more than occurs in the other large Kangaroos.

I cannot distinguish specifically the Kangaroo described as *M. erubescens*, which seems to be merely a more rufous form of the present species. As to colour, every intermediate gradation appears to occur, and the skulls of the two forms are quite identical. In a general way South-Australian specimens belong to "*erubescens*" and New-South-Wales ones to *robustus*, but specimens agreeing with both are often found in one and the same place.

a.	{ Aged sk. } ♂.	Rocky Mts., N. S. W. ( <i>J. G.</i> ).	Gould Coll.
	{ Skull. }		
b.	{ Imm. sk. } ♀.	Liverpool Plains, N. S. W.	Gould Coll. ( <i>Co-</i>
	{ Skull. }	( <i>J. G.</i> ).	<i>types</i> of species.)
c.	Aged skull (♂) †.	New South Wales.	Gould Coll.
(?) d.	Ad. skull.		Sir R. Owen [P.].
e.	{ Ad. sk. } ♂.	Parachilna, S. A.	Colonial Exhibi-
	{ Skull. }		tion of 1886.
f.	{ Imm. st. } ♂.	Port Augusta, S. A.	Zoological Society.
	{ Skeleton. }		
g.	Ad. skull.	400 miles N. of Adelaide.	F. G. Waterhouse,
			Esq. [P.].
h.	Ad. skull.	"Far North," S. A.	F. G. Waterhouse,
			Esq. [P.].
i.	Ad. skull.	"Far North," S. A. ( <i>F. G.</i>	Sir R. Owen [P.].
		<i>Waterhouse</i> ).	

\* When in the tables of measurements specimens are said to be "stuffed" which are afterwards put down as "skins" in the lists of specimens, it means that after the dimensions given were taken the animal was unstuffed and made into a skin.

† P.<sup>3</sup> and mp.<sup>4</sup> still in place on the left side, and p.<sup>4</sup> up and in position on the right.

‡ The signs ♂ or ♀ are placed in brackets when the sex of the specimen is only inferred from cranial characters, and not from external or historical evidence.

4. *Macropus isabellinus*.

*Osphranter isabellinus*, *Gould, P. Z. S.* 1841, p. 81; *Gray, List Mamm. B. M.* p. 92 (1843); *Gould, Mamm. Austr. (Intro.)*, i. p. xxx (1863).

*Halmaturus isabellinus*, *Schinz, Syn. Mamm.* i. p. 564 (1844); *Wagn. Schr. Säug. Supp.* v. p. 313 (1855).

*Macropus isabellinus*, *Waterh. N. H. Mamm.* i. p. 99 (1846); *Kreff, Austr. Vert.* p. 10 (1871).

## ISABELLINE KANGAROO.

Fur of medium length, very soft and fine, but not woolly. General colour rich foxy red; underside and limbs white. Front of neck pure white, sharply defined from the rufous colour of the nape by a ridge of opposed hairs. Belly and upper part of arms white. Tail rufous grey.

Dimensions about the same as those of *M. rufus*.

*Hab.* North-west Australia.

*Type* in collection.

The above are all the particulars that can be obtained about this species from the only known specimen, which consists merely of a flat skin, without head, arms below elbows, legs or tip of tail, so that it is almost impossible to make out its affinities. It appears, however, to be most nearly allied to *M. rufus*, from which it differs by its longer straighter fur, and by the sharp separation of the white on the front of the neck from the dark colour on the back. The species is evidently an exceedingly fine and handsome one, and it is much to be hoped that further specimens will soon be obtained of it.

a. Flat skin. Barrow I., N.W. coast of Australia. Capt. Stokes [P. & C.].  
(*Type* of species.)

5. *Macropus rufus*.

*Kangurus rufus*, *Desm. Mamm. (Supp.)* ii. p. 541 (1822); *Gray, Griff. Cuv. An. K.* v. p. 202 (1827).

*Kangurus laniger*, *Gaim. Bull. Soc. Philom.* 1823, p. 138; *Quoy & Gaim. Voy. Uranie*, p. 65, pl. ix. (1824); *Geoff. Dict. Class. d'H.* N. ix. p. 111 (1826); *Desm. Dict. Univ. d'H. N.* vii. p. 170, *Atlas*, pl. xix. (animal) (1849).

? *Kangurus griseo-lanosus*, *Quoy & Gaim. Ann. Sci. Nat.* v. p. 482 (1825).

*Macropus lanigerus*, *Gray, Griff. Cuv. An. K.* iii. p. 49 (plate—animal) (1827).

*Macropus laniger*, *Less. Man. Mamm.* p. 226 (1827); *Fisch. Syn. Mamm.* p. 231 (1829); *Less. H. N. Mamm. Compl. Buff.* v. p. 377, pl. xxxiv. (1836); *Benn. Cat. N. H. Austr. Mus.* p. 6 (1837); *Gray, Grey's Austr.*, App. ii. p. 402 (1841); *Gould, Mon. Macr.* pl. ii. (animal) (1841); *Waterh. Jard. Nat. Libr.*, *Mamm.* xi. p. 198 (1841); *Less. N. Tabl. R. A. Mamm.* p. 193 (1842); *Gray, List Mamm. B. M.* p. 88 (1843); *Owen, Cat. Ost. Mus. Coll. Surg.* i. p. 325 (1853); *Gerrard, Cat. Bones Mamm. B. M.* p. 124 (1862).

*Macropus rufus*, *Benn. Cat. N. H. Austr. Mus.* p. 6 (1837); *Waterh. N. H. Mamm.* i. p. 104, pl. v. fig. 3 (incisors) (1846); *Giebel, Odon-*

- togr.* pl. xix. fig. 14c (incisors) (1855); *id.* Säug. p. 678 (1859); *Schleg. Dierk.* p. 142 (1857); *Wolf & Sclater, Zool. Sketches*, ii. pl. xxvi. (animal) (1867); *Kreffl, Mamm. Austr.* text to pl. x. p. 1 (1871); *Owen, Tr. Z. S.* ix. p. 418, pls. lxxiv.-lxxxiii. (skull and skeleton) (1876); *Giebel, Bronn's Kl. u. Ordn.* vi. Abth. v. pl. xlvii. fig. 21 (incisors) (1876), and pl. lxxxix. (carpus) (1883); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 710 (1884).
- Halmaturus laniger*, *Wagn. Schr. Säug. Supp.* iii. p. 110 (1843); v. p. 311 (1855); *Schinz, Syn. Mamm.* i. p. 547 (1844).
- Osphranter lanigerus*, *Gould, Strzelecki's N. S. W.* p. 316 (1845).
- Osphranter rufus*, *Gould, Mamm. Austr.* ii. pls. vi. & vii. (animal) (1853); *Kreffl, Cat. Mamm. Austr. Mus.* p. 48 (1864); *Fletcher, P. Linn. Soc. N. S. W.* vii. p. 645 (1882), and viii. p. 8 (1883) (anat.); *Mikl.-Macl. P. Linn. Soc. N. S. W.* ix. p. 1155 (1885); *Jent. Cat. Ost. Leyd. Mus.* p. 318 (1887).
- Macropus* (*Osphranter*) *pictus*, *Gould, P. Z. S.* 1860, p. 373.
- Macropus ruber*, *Crisp, P. Z. S.* 1862, p. 135.

## RED KANGAROO.

Size very large, form slender and graceful. Fur short, close, and woolly or cottony in texture, and formed entirely by what is in other species the underfur; its direction variable, especially on the head. Muzzle with a naked rhinarium, intermediate between those of *M. giganteus* and *M. robustus* (see Pl. V. fig. 3). General colour (of male) brilliant rufous. Face grey; face-markings present, consisting of a black whisker-mark, and below it a whitish blotch, passing into a faintly defined white cheek-stripe; these markings more developed than in the other large Kangaroos, but very faint compared to those of the Wallabies. Ears grey or brown outside, whitish in. Chest, arms from elbows, legs from knees, groin and anal region white or pale grey, the hair on these parts coarse and straight, and corresponding to the ordinary upper fur of other species. Belly rufous and soft-haired like back, the rufous colour passing round the animal as a broad belt, markedly different from the paler-coloured chest and anal region. Fingers and toes black. Central hind claw short. Tail uniform grey, not darkening to end.

*Female* with the colours distributed as in the male, but the rufous is generally, though not invariably, replaced throughout by a peculiar bluish grey, and the light-coloured parts are clearer and more distinctly defined.

*Skull* with a very long facial and short cranial portion. Muzzle slightly inflated. Nasals very long, narrow, parallel-sided, their middle breadth going from 4 to  $4\frac{1}{2}$  times in their length. Inter-orbital region variable, generally slightly inflated, with faintly defined supraorbital edges. Opening of lacrymal canal entirely surrounded by lacrymal bone. Palatal foramina long, reaching back to the suture. Anterior palate long, narrow, generally with sharply defined edges. Posterior palate incomplete, with numerous small vacancies in the palatine portion.

*Teeth.* Incisors much longer vertically and shorter antero-posteriorly than in *M. giganteus*. Roots of first pair close together, their tips meeting at a very acute angle. Enamel-covered part of  $i^2$  from

once and a half to twice as high as long;  $i^3$  short (6-7 millim. long), smooth, generally with a small and inconspicuous groove down the centre of its external face, but this often absent.  $P^3$  oblong, not so markedly hourglass-shaped as in *M. giganteus*.  $P^4$  of medium length (8-9 millim.). Molars with well-defined anterior transverse ledges; but these entirely without the central connecting-ridges, a character which at once distinguishes *M. rufus* from all those of its allies whose skulls are known (see Pl. VI, fig. 5).

## Dimensions.

	♂. <i>d</i> (aged). Stuffed. millim.	♀. <i>e</i> (immature). Stuffed. millim.	
Head and body . . . . .	1580	1100	
Tail . . . . .	1050	785	
Hind foot . . . . .	358	290	{ (Range ♂ 300-358.)
Ear . . . . .	109	111	

Skull, see p. 29.

*Hab.* Eastern, South-eastern, and South Australia\*.

*Type* in the Paris Museum.

<i>a.</i> { Ad. sk. { ♂.	Lower Namoi R., N. S. W.	Gould Coll.
{ Skull. { ♂.	( <i>J. G.</i> ).	
<i>b, c.</i> Skeletons, ♂ ♀	Dubbo, N. S. W.	Purchased.
(mounted).		
<i>d.</i> Ad. st., ♂.	South Australia.	Sir George Grey [P.].
<i>e.</i> { Ad. st. { ♀.	South Australia.	Sir George Grey [P.].
{ Skull. { ♀.		
<i>f, g.</i> Yg. sks.		Gould Coll.
<i>h, i.</i> { Ad. sks. { ♂ ♀.	West Australia (?).	— Austin, Esq. [P.].
{ Skull of <i>f.</i> { ♂ ♀.		
<i>j.</i> { Ad. sk. { ♂.		Zool. Soc.
{ Skeleton. { ♂.		
<i>k.</i> { Imm. sk. { ♀.		Zool. Soc.
{ Skeleton. { ♀.		
<i>l.</i> Yg. sk.		Purchased.

6. *Macropus magnus*.

*Macropus* (*Boriogale*) *magnus*, *Owen, Phil. Trans.* 1874, p. 247 et seqq. pl. xx. figs. 12, 19, & 26 (teeth).

External characters unknown.

*Skull* (Pl. VI, fig. 1). Muzzle with slight lateral inflation. Nasals distorted in the type, but apparently rather broad, the middle breadth going about three and a half times into the length. Interorbital region slightly swollen, its edges rounded. Opening of lacrymal

\* The stated locality of "Western Australia" of specimens *h* and *i* is most probably erroneous, as no other record seems to exist of the occurrence of *M. rufus* there, and Gould states distinctly that it is not found west of South Australia.

canal entirely in lacrymal bone. Palatal foramina very long, extending some way into the maxilla. Anterior palate short and narrow, its edges well defined. Posterior palate very incomplete, there being two large vacuities, each as large as  $m.^1$ , opposite the infrazygomatic processes, and the palatine portion forming a network of minute vacuities.

*Teeth* (Pl. VI. figs. 1 & 2, and Owen, *l. c.*). Incisors very like those of *M. rufus*, longer vertically and slenderer than those of *M. giganteus*. Roots of the first pair of incisors close together, so that their tips meet at a very acute angle. Enamel-covered portion of  $i.^2$  much higher than long.  $I.^3$  small, and, as well as  $i.^1$  and  $i.^2$ , entirely ungrooved externally.  $P.^4$  very similar to, but slightly smaller than, that of *M. giganteus*. Molars remarkable for their high and sharply developed cusps, and, especially, for the great reduction of their anterior transverse ledges. Thus,  $m.^1$  has the ledge reduced to a narrow rim not half a millimetre in breadth,  $m.^2$  is entirely without it,  $m.^3$  has it too narrow to be seen from the outside, and  $m.^4$ , which has the largest ledge, has it still only as broad as that on  $m.^1$  in the other allied species. In no cases are there any traces of anterior connecting-ridges. Lower  $p.^4$  rather small in proportion, 5·3 millim. long.

*Dimensions*.—Animal unknown. Skull, see next page.

*Hab.* Central Australia.

*Type* in collection.

Of this species there is, up to the present, only known the single skull here described, which was found among a collection of skulls presented by Sir R. Owen, and on examination turned out to be the specimen figured by that author (*l. c.*) under the name of "*M. (Boriogale) magnus*." No specific description seems to have been ever given of it, but the named and published figure forms a sufficient claim to the authorship of the species.

*M. magnus* is undoubtedly most nearly allied to *M. rufus*, but is distinguished from it, as from all other Kangaroos, by the reduction or absence of the anterior ledges of the molars, and by its longer palatal foramina. It is very remarkable that a species so large as this should have remained so long unknown, and it is much to be hoped that the animal itself may soon be obtained and described. There is of course a possibility that *M. magnus* may turn out to be identical with *M. isabellinus*, which, as already noted, is only known from an imperfect skin.

a. Ad. skull. "Far North," S. A. (*F. G. Waterhouse*). Sir R. Owen [P.]. (*Type of species*.)

The following are the detailed dimensions of the skulls of the large Kangaroos :—

Skull Measurements of Large Kangaroos (in millims.).

Species .....	<i>M. giganteus</i> .		<i>M. antilopinus</i> .		<i>M. robustus</i> .		<i>M. rufus</i> .		<i>M. magnus</i> .
	♂. <i>i.</i> aged.	♀. <i>b.</i> adult.	♂. <i>a.</i> aged.	♀. <i>b.</i> barely ad.	♂. <i>c.</i> aged.	♀. <i>b.</i> imm.	♂. <i>j.</i> aged.	♀. <i>e.</i> imm.	? <i>a.</i> adult.
Basal length .....	196	151	(c.) 166	(c.) 137	171	134	182	150	150
Greatest breadth .....	108	90	101	84	98	81	98	85	82
Nasals, length .....	86	67	70	50	76	65	81	62	68
" greatest breadth .....	30	25	32	25	32.5	25	28.5	21	(c.) 21*
" central breadth .....	18	17	22.5	16	22	17	19.7	15	(c.) 18.5*
Constriction .....	27	26	16	15.5	18	19	23	19.5	18
Palate, length .....	138	106	...	94	117	94	128	100.	104
" breadth outside m. <sup>2</sup> .....	52.5	49	50	42.7	47	42	50.5	46	47.7
" inside m. <sup>2</sup> .....	36	31	33	28	30.5	27	33	27	29.1
Palatal foramen .....	9.2	11	15	14.3	8.1	10	12.7	12	17
Diastema .....	67	51	48†	36.5	43.5	38	55.5	40	(c.) 46
{	(m. <sup>1</sup> )	(m. <sup>1</sup> )	...	...	...	...	(m. <sup>1</sup> )	(p. <sup>3</sup> )	...
Basi-cranial axis .....	52.5	42	...	...	48	40	45	40.5	41
Basi-facial axis .....	145	118	...	...	127	101	140	112	113
Facial index .....	276	269	...	...	265	252	311	276	276
Teeth—length of i. <sup>1</sup> .....	10.3	...	9.8	8.7	10	10	8	8	7.1
" p. <sup>4</sup> .....	...	...	9.2	.8	9.2	8	...	...	7
" ms. <sup>1-3</sup> .....	35.2	33.2	33	30	33	31	...	...	32.3

\* Nasals diseased and distorted.

† To the front edge of the alveolus of the posterior root of the tooth, the anterior having disappeared and its alveolus closed up.

## Group II. LARGE WALLABIES.

The members of this group are very closely allied in size and other external characters, but there is a rather greater diversity in the proportions of their skulls than in the last group. Their coloration is bright and ornamental, especially on the face; their size is fairly uniform (hind foot about 160–240 millim.), and there is less difference in this respect than occurs among the Kangaroos. Their feet are larger in proportion to the size of their bodies than is the case in the small Wallabies, which they probably exceed very considerably in their saltatory powers. In their skulls the palate is, as a rule, much more incomplete than in the Kangaroos, and their third incisor is always provided with a single well-marked external notch, placed at or about the centre of the tooth. The molars, compared with those of the larger species, are characterized by always having at the antero-external corner of the tooth a well-marked connecting-ridge joining the anterior transverse ledge to the body of the tooth, while, on the other hand, the median anterior connecting-ridge, prominent in most of the Kangaroos, is small or entirely absent.

7. *Macropus ualabatus* \*.a. *Macropus ualabatus*, var. *typicus*.

- Kangurus bruni*, *Desm. N. Dict. d'H. N.* (2) xvii. p. 42 (1817); *id. Mamm. i.* p. 275 (1820, *nec Schreb.*).
- Kangurus ualabatus*, *Less. & Garn. Voy. Coquille, Zool. i.* p. 161, pl. vii. (animal) (1826).
- Halmaturus ualabatus*, *Less. Man. Mamm.* p. 227 (1827); *Fisch. Syn. Mamm.* p. 283 (1829); *Less. H. N. Mamm. (Compl. Buff.) v.* p. 378 (1836); *Waterh. Cat. Mamm. Mus. Z. S.* p. 66 (1838); *id. Jard. Nat. Misc. Mamm. xi.* p. 219, pl. xx. (animal) (1841); *Less. N. Tabl. R. A., Mamm. p.* 194 (1842); *Giebel, Odontogr. p.* 43, pl. xix. fig. 11 e (incisors) (1855); *id. Säug. p.* 680 (1859); *id. Bronn's Kl. u. Ordn. vi.* Abth. v. pl. xlvii. fig. 21 (12) (1876); *Lyd. Cat. Foss. Mamm. B. M. v.* p. 219 (1887).
- Halmaturus lessoni*, *Gray, Charlesw. Mag. N. H. i.* p. 583 (1837); *id. Grey's Austr., App. ii.* p. 402 (1841).
- Halmaturus ualabatus*, *Gray, Grey's Austr., App. ii.* p. 402 (1841); *Gould, Mon. Macrop. pl.* xviii. (animal) (1842); *Gray, List Mamm. B. M. p.* 89 (1843); *Gould, Mamm. Austr. ii.* pls. xxii. & xxiii. (animal) (1857); *Gerrard, Cat. Bones Mamm. B. M. p.* 125 (1862); *Blyth, Cat. Mamm. Mus. As. Soc. p.* 184 (1863); *Kreffl, Cat. Mamm. Austr. Mus. p.* 49 (1864); *id. Mamm. Austr. pl.* xi. (animal) (1871); *Fletcher, P. Linn. Soc. N. S. W. viii.* p. 8 (1883); *Poulton, P. Z. S.* 1883, p. 600 (anat.); *Jent. Cat. Ost. Leyd. Mus. p.* 319 (1887).

\* a. Fur longer. Face-markings dull and indistinct.

*Hab.* New South Wales and Victoria..... a. Var. *typicus*.

b. Fur shorter. Face-markings bright and conspicuous. *Hab.* Queensland .....

b. Var. *apicalis*, p. 32.

- Halmaturus nemoralis*, *Wagn. Schr. Säug. Supp.* iii. p. 114 (1843), v. p. 319 (1855); *Schinz, Syn. Mamm.* i. p. 553 (1844).  
*Macropus (Halmaturus) ualabatus*, *Waterh. N. H. Mamm.* i. p. 136, pl. v. fig. 12 (incisors) (1846); *Owen, Phil. Trans.* 1874, p. 246 et seqq. pl. xx. figs. 20 & 27 (teeth).

## BLACK-TAILED WALLABY.

General form rather short and clumsy. Fur long, thick, and rather coarse. General colour dark rufous grey, the rufous predominating on the hinder back. Underfur long, soft, dark greyish brown. Crown of head, round base of ear, outside of elbows, chin, chest, and belly pale rufous, or yellow, the colour, however, very variable both in extent and intensity, and often fading very much in specimens long exposed to light. Face-markings, in the typical variety, vague and indistinct, consisting of a dark-brown or blackish whisker-mark from muzzle to eye, with a whitish cheek-stripe. Ears short, coloured like the top of the head. Fore-quarters and sides coarsely grizzled grey; a broad mark just behind the elbow, due to the absence there of the longer grey-tipped fur, and the consequent showing through of the dark underfur. Hands and feet brown, becoming black on the toes. Tail black, its proximal half sometimes grizzled with grey.

*Skull* with large brain-case and comparative short face (facial index about 220). Premaxillæ short and upright, scarcely visible from above beyond the tips of the nasals; nasals long, narrow, and straight-sided, slightly broadening behind, their central breadth going about four times in their length. Supraorbital edges sharp and square, sometimes slightly overhanging, but not forming distinct postorbital processes; constriction fairly well marked. Infraorbital foramen opening comparatively far from orbit, about 10 to 13 millim. distant. Palate with two large openings, each about as big as the first two molars together.

*Teeth.* Incisors (Pl. IX. fig. 1) placed more vertically than in the other species. I.<sup>3</sup> with the portion behind the notch decidedly shorter than that in front. P.<sup>3</sup> evenly oval, nearly as broad in front as behind, about 7 millim. long. P.<sup>4</sup> (Pl. X. fig. 1) oval, very large and heavy, recalling the corresponding tooth in *Dorcopsis*; generally longer than any of the molars, its outer side with three distinct vertical grooves, and its inner with a broad cuspidate ledge. Lower p.<sup>4</sup> about 8 millim. long.

*Dimensions.*

	♂.	♀.
	<i>a</i> (skin).	<i>b</i> (stuffed).
	Adult.	Adult.
	millim.	millim.
Head and body . . . . .	820	815
Tail . . . . .	650	650
Hind foot . . . . .	208	187
Ear . . . . .	59	63

Skull, see p. 45.

*Hab.* New South Wales and Victoria.

*Type* in the Paris Museum.

Specimen *d* is remarkable for having its head pale grey, and in parts quite white, and for having numerous white hairs mixed in with the ordinary fur of the body, both being, no doubt, due to extreme old age.

a. { Ad. sk. } ♂.	Mountain top, Liverpool Range, N. S. W. ( <i>J. G.</i> ).	Gould Coll.
b. Ad. st., ♀.	Hunter R., N. S. W. ( <i>J. G.</i> ).	Gould Coll.
c. Aged skull, ♂.	Mosquito Id., Hunter R. ( <i>Voy. 'Herald'</i> ).	J. Macgillivray [P.].
d, e. Ad. & imm. sk., ♂.	Western Port, Victoria.	Purchased.
f, g. Ad. skulls, ♀.		Sir R. Owen [P.].

**b. *Macropus ualabatus*, var. *apicalis*.**

? *Halmaturus mastersi*, *Kreffl, Austr. Vert.* p. 10 (1871) (*nom. nudum*).

*Halmaturus apicalis*, *Günth. P. Z. S.* 1874, p. 653, pl. lxxvii. (animal).

Size and colours like those of the typical variety, but the fur shorter and coarser, the underfur thinner, and the markings, especially those on the face, more sharply defined. The brown mark on the side of the face is continued through the eye to just in front of the ear, and is sharply separated below from the white whisker-mark. The rufous on the lower back is of a richer brighter tinge, and the tail is tipped with white, though this character is probably variable.

*Skull* and *teeth* precisely as in the typical form.

*Hab.* N.E. Queensland.

*Type* in collection.

Dimensions of the type (a skin), ♂:—Head and body 850 millim.; tail 635; hind foot 209; ear 55. Skull, see p. 45.

a. { Ad. sk. } ♂.	Cape Grafton, N.E. Queensland.	Purchased. ( <i>Type of variety.</i> )
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**8. *Macropus ruficollis* \*.**

**a. *Macropus ruficollis*, var. *typicus*.**

(<sup>p</sup>) *Halmaturus kingii*, *Ill. Abh. Ak. Berl.* 1811, p. 102 (1815) (*sine descr.*).

*Kangurus ruficollis*, *Desm. N. Dict. d'H. N.* (2) xvii. p. 37 (1817); *id. Mamm.* i. p. 274 (1820); *Geoff. Dict. Class. d'H. N.* ix. p. 110 (1826); *Gray, Griff. Cuv. An. K.* v. p. 203 (1827).

*Kangurus rufogriseus*, *Desm. N. Dict. d'H. N.* (2) xvii. p. 36 (1817);

\* a. Fur shorter. Colour bright, markings prominent. *Hab.* Australia .....

a. Var. *typicus*.

b. Fur longer. Colour dull and sombre; markings inconspicuous. *Hab.* Tasmania .....

b. Var. *bennettii*, p. 34.

- id. Mamm.* i. p. 273 (1820); *Geoff. Dict. Class. d'H. N.* ix. p. 110 (1826).
- Halmaturus ruficollis*, *Goldf. Isis*, 1819, p. 267; *Gould, Mon. Macrop.* pl. xvii. (animal) (1842); *Wagn. Schr. Säug. Supp.* iii. p. 112 (1843), v. p. 318 (1855); *Schinz, Syn. Mamm.* i. p. 552 (1844); *Gould, Mamm. Austr.* ii. pls. xiv., xv. (animal) (1854); *Blyth, Cat. Mamm. Mus. As. Soc.* p. 184 (1863); *Kreff, Cat. Mamm. Austr. Mus.* p. 50 (1864); *id. Mamm. Austr.* text to pl. x. p. 3 (1871); *Fletcher, P. Linn. Soc. N. S. W.* vii. p. 641 (1882), viii. p. 7 (1883); *Jent. Cat. Ost. Leyd. Mus.* p. 318 (1887).
- Macropus ruficollis*, *Less. Man. Mamm.* p. 226 (1827); *Fisch. Syn. Mamm.* p. 282 (1829); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 378 (1836); *Benn. Cat. N. H. Austr. Mus.* p. 5 (1837); *Waterh. Cat. Mamm. Mus. Z. S.* p. 66 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 216 (1841); *Less. N. Tabl. R. A., Mamm.* p. 194 (1842); *Gieb. Säug.* p. 680 (1859).
- Macropus rufogriseus*, *Less. Man. Mamm.* p. 226 (1827); *Fisch. Syn. Mamm.* p. 282 (1829); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 378 (1836); *Benn. Cat. N. H. Austr. Mus.* p. 5 (1837); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 217 (1841); *Less. N. Tabl. R. A., Mamm.* p. 194 (1842).
- Kangurus griseus*, *Gray, Griff. Cuv. An. K.* v. p. 202 (1827).
- Macropus banksianus*, *Less. Man. Mamm.* p. 226 (1827); *Fisch. Syn. Mamm.* p. 282 (1829); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 377 (1836); *id. N. Tabl. R. A., Mamm.* p. 194 (1842).
- Halmaturus elegans*, *Gray, Grey's Austr., App.* ii. p. 403 (1841); *id. List Mamm. B. M.* p. 89 (1843); *Gerrard, Cat. Bones Mamm. B. M.* p. 126 (1862) (*nec Lambert*).
- Halmaturus rufogriseus*, *Wagn. Schr. Säug. Supp.* iii. p. 111 (1843); *Schinz, Syn. Mamm.* i. p. 532 (1844).
- Macropus (Halmaturus) ruficollis*, *Waterh. N. H. Mamm.* i. p. 125 (1846); *Gunn, P. Roy. Soc. Tasm.* ii. p. 88 (1852); *Owen, Phil. Trans.* 1874, p. 246 *et seqq.* pl. xx. figs. 9, 10, & 21 (teeth).

## RED-NECKED WALLABY.

Largest of the group. Form slender. Nose naked, as in all the other Wallabies except *M. agilis* and *irma*; the hair not growing between the nostrils (see Pl. V. fig. 4). General colour greyish fawn, grading into bright rufous on the back of the neck and on the rump, clearer grey on the centre of the back. An indistinct whitish hip-mark sometimes visible. Underfur thin and sparse, brownish rufous. Face-markings inconspicuous, the top of the muzzle dark brown, connecting the dark lateral whisker-marks, below which there are indistinct whitish cheek-stripes, running from the angle of the mouth to just below the eye. Crown of head rufous grey. Ears rather longer than usual, their backs rufous,

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[*Macropus elegans*, *Lambert, Linn. Trans.* viii. p. 381, pl. xvi. (animal) (1805).

It is impossible to decide with certainty to which species this description belongs. Gray considered it to be the present species, while Waterhouse assigned it to *M. parryi*; but the figure shows no trace of the latter's prominent face-markings, which could hardly be overlooked by the most careless artist. In fact the description might be applied either to small specimens of *M. giganteus* (e. g. var. *melanops*) or of *M. robustus*, or to large ones of *M. parryi* or of *M. ruficollis*. The name must therefore be ignored as of uncertain application.]

becoming blacker towards their tips. Hands and feet grey, becoming gradually quite black at the ends of the digits. Chin, chest, and belly white or greyish white. Tail uniform grey above and white below, an inconspicuous black pencil generally present at the tip.

*Skull.* General form much as in *M. ualabatus*, but the facial part longer in proportion to the cranial (facial index 230-240). Pre-maxillæ long, and slanting very much forward, so that they project some 10 or 12 millim. beyond the tips of the nasals. Nasals of medium length, slightly expanded behind. Supraorbital edges sharp, not overhanging; no trace of postorbital processes. A distinct intertemporal constriction always present, but never becoming, even in old specimens, very strongly marked. Infra-orbital foramen opening only from 7-9 millim. from orbit. Palate fairly complete for this group, from two to four larger openings generally present, each about as big as one of the molars, and a few small openings in the palatine portion.

*Teeth.* Incisors (Pl. IX. fig. 2) large, long, and powerful. I.<sup>2</sup> with its vertical several times as great as its horizontal diameter; i.<sup>3</sup> large, a strongly marked notch at the centre of its outer margin. P.<sup>3</sup> about 5.5 or 6 millim. long. P.<sup>4</sup> (Pl. X. fig. 2) small, narrow, and triangular, about as long as m.<sup>1</sup>, its anterior part without an internal ledge. Lower p.<sup>4</sup> about 5 millim. long.

*Dimensions.*

	♂. a (stuffed). millim.	♀. b (stuffed). millim.
Head and body . . . . .	1050	925
Tail . . . . .	750	700
Hind foot . . . . .	230	220
Ear . . . . .	78	76

Skull, see p. 45.

*Hab.* New South Wales and Victoria.

*Type* in the Paris Museum.

a, b. Ad. st., ♂ ♀.	Bong Bong, N. S. W. ( <i>C. Throsby, Esq.</i> ).	Gould Coll.
c. Imm. skull.	Sydney, N. S. W.	Sir R. Owen [P.].
d-g. Skulls.	Mt. Gambier, extreme S.E. South Australia.	F. G. Waterhouse, Esq. [C. & P.].
h. Skull.		Zoological Society.

*b. Macropus ruficollis, var. bennettii.*

† *Macropus albus*\*, *Gray, Spic. Zool.* ii. p. 10 (1830); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 214 (1841).

\* Even were this name certainly applicable to the present form, it would have no claim to adoption, being incorrect and misleading.

- ? *Halmaturus albus*, *Gray, Charlesw. Mag. N. H.* i. p. 583 (1837).  
*Macropus bennettii*, *Waterh. P. Z. S.* 1837, p. 103; *id. Cat. Mamm. Mus. Z. S.* p. 66 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 211 (1841); *Owen, Tr. Z. S.* ii. p. 383, pl. lxxi. (palate & teeth) (1841); *Gulliver, P. Z. S.* 1841, p. 50, et 1842, pp. 64-70; *Less. N. Tabl. R. A., Mamm.* p. 194 (1842); *Owen, Cat. Ost. Mus. Coll. Surg.* i. p. 324 (1853); *Gieb. Odontogr.* p. 43, pl. xix. fig. 16 A (incisors) (1855); *Schleg. Dierk.* i. p. 142 (1857); *Gieb. Bronn's Kl. u. Ordn.* vi. Abth. v. pl. xlvii. fig. 21 (9) (incisors) (1876); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 711 (1884).  
*Halmaturus ualabatus*, *Gray, Charlesw. Mag. N. H.* i. p. 583 (1837) (*nec Less.*).  
*Macropus (Halmaturus) fruticus*, *Og. Ann. Mag. N. H.* i. p. 219 (1838).  
*Halmaturus bennettii*, *Gould, Mon. Macrop.* pl. vii. (animal) (1841); *Gray, Grey's Austr., App.* ii. p. 402 (1841); *id. List Mamm. B. M.* p. 89 (1843); *Wagn. Schr. Säug. Supp.* iii. p. 115 (1843), v. p. 317 (1855); *Schinz, Syn. Mamm.* i. p. 550 (1844); *Gould, Mamm. Austr.* ii. pls. xvi., xvii. (animal) (1856); *Gerrard, Cat. Bones Mamm. B. M.* p. 125 (1862); *Blyth, Cat. Mamm. Mus. As. Soc.* p. 184 (1863); *Peters, P. Z. S.* 1867, p. 953; *Kreffl, Notes Faun. Tasm.* p. 4 (1868); *id. Austr. Vert.* p. 10 (1871); *Gieb. Bronn's Kl. u. Ordn.* vi. Abth. v. pl. xxi. figs. 8-10 (skull) (1874); *Schmidt, P. Z. S.* 1880, p. 305; *Higg. & Pett. P. Roy. Soc. Tasm.* 1883, p. 196; *Jent. Cat. Ost. Leyd. Mus.* p. 319 (1887).  
*Halmaturus fruticus*, *Wagn. Schr. Säug. Supp.* iii. p. 118 (1843).  
*Halmaturus leptonyx*, *Wagn. Schr. Säug. Supp.* iii. p. 116 (1843); *Schinz, Syn. Mamm.* i. p. 554 (1844).  
*Macropus (Halmaturus) ruficollis*, *var. bennettii*, *Waterh. N. H. Mamm.* i. p. 130, pl. v. fig. 9 (incisors) (1846).

#### BENNETT'S WALLABY.

Arrangement of colours as in typical variety, but the whole much more sombre in tone, the bright rufous of the nape and rump replaced by dull rufous brown, the back of the ears nearly black, the face-markings scarcely visible, the chest and belly dirty greyish white, and the tail a darker grey. The fur is very much longer and thicker, and the underfur is of a dark smoky-brown colour, with scarcely a tinge of rufous.

*Skull and teeth* precisely as in the true *M. ruficollis*.

Dimensions of a female (spec. *a*) stuffed:—Head and body 915; tail (c.) 690; hind foot 208; ear 70. Skull, see p. 45.

*Hab.* Tasmania.

*Type* not traceable.

I am fully at one with Mr. Waterhouse in regarding Bennett's Wallaby as not specifically separable from the Australian *M. ruficollis*, of which it obviously forms the Tasmanian climatic representative, and to which it bears precisely the same relation that *M. fuliginosus* does to *M. giganteus*.

<i>a, b.</i> Ad. ♀ & yg. st.	Tasmania.	Gould Coll.
<i>c, d.</i> Imm. st.	Tasmania.	Purchased.
<i>e.</i> { Imm. st. }		Voy. 'Herald.'
{ Skull. }		
<i>f.</i> Ad. skull.	Tasmania.	Sir R. Owen [P.].

g. Ad. skull.	Tasmania.	
h. Yg. skull.	(Voy. 'Fly.')	J. B. Jukes, Esq. [P.].
i, j. Skeletons.		Purchased.

### 9. *Macropus greyi*.

*Halmaturus greyi*, Gray, *List Mamm. B. M.* p. 90 (1843) (*sine descr.*).

*Macropus (Halmaturus) greyi*, Waterh. *N. H. Mamm.* i. p. 122 (1846) (*descr. orig.*).

*Halmaturus greyi*, Gould, *Mamm. Austr.* ii. pls. xviii. & xix. (animal) (1852); *Wagn. Schr. Säug. Supp.* v. p. 316 (1855); *Gerrard, Cat. Bones Mamm. B. M.* p. 127 (1862); *Kreff, Austr. Vert.* p. 10 (1871).

#### GREY'S WALLABY.

Form slender and delicate. General colour very similar to that of *M. ruficollis*, greyish fawn on the back, becoming more rufous on the nape and back of head. Underfur rather thick and woolly, slaty brown at its base, rufous at tip. Ears rufous behind, their edges blackish. Face-markings distinct; tip of muzzle pale grey, but the fur bordering the naked rhinarium black for about half an inch; sides of muzzle with a distinct black whisker-mark from the nose to the eye, sharply bordered below by the clear white cheek-stripe, which involves the edges of the mouth, and passes backwards under the eye nearly to the ear. An indistinct whitish hip-stripe probably visible in some specimens. Arms and hands to metacarpus, legs and feet to end of metatarsus white or yellowish, then abruptly turning to black on the fingers and toes. Central posterior claws unusually slender and long, exceeding the pads by more than an inch. Belly pale grey, with a tinge of rufous. Tail very pale grey, becoming whiter to its tip; indistinct upper and lower crests of white hair developed on its distal half.

*Skull* (Pl. VII. fig. 2). General form very unlike the other members of this group, and more like that of those of the next. Brain-case very small; facial region long and powerful (facial index 275, as in the large Kangaroos). Nasals short, broad, and enormously expanded behind. Interorbital region very broad, the supraorbital edges sharp, and becoming thickened and overhanging in old specimens, the two sides quite parallel, without any noticeable intertemporal constriction. Opening of infraorbital canal about 7 millim. from orbit. Palate very complete, only a few small openings present.

*Teeth* all very small in proportion to the size of the animal. Incisors (Pl. IX. fig. 3) small and light. I.<sup>3</sup> very short, small and triangular, very similar to that of the members of the next group of Wallabies, its edge scarcely longer than that of i.<sup>2</sup>, a small external notch just behind its centre. P.<sup>4</sup> both above and below much as in *M. ruficollis*.

*Dimensions.*

	♂. a (stuffed). millim.	♀. b (stuffed). millim.
Head and body .....	810	840
Tail .....	730	710
Hind foot .....	212	216
Ear.....	65	71
Skull, see p. 45.		

*Hab.* South-eastern South Australia.

*Co-types* in collection.

The skull and dentition of this species show that, while by its external characters it closely resembles *M. ruficollis* and other members of the present group, yet it is probably more nearly related genetically to the next group of Wallabies. This is specially shown by the small size of the brain-case, the shape and feebleness of the incisors, and the character of the nasal bones. In all groups an increase of size is marked by a corresponding increase in the proportionate size of the face, so that, judging from its very high facial index and by the other characters just mentioned, we ought to regard *M. greyi* as a comparatively recently enlarged member of the group of small Wallabies.

a, b. { Ad. sks. } ♂ ♀. South Australia. Sir George Grey [P. & C.].  
 { Skulls. } (Co-types of species.)

10. *Macropus dorsalis*.

*Halmaturus dorsalis*, *Gray, Charlesw. Mag. N. H.* i. p. 583 (1837); *id. Grey's Austr., App.* ii. p. 403 (1841); *Gould, Mon. Macrop.* pl. viii. (animal) (1841); *Gray, List Mamm. B. M.* p. 90 (1843); *Wagn. Schr. Säug. Supp.* iii. p. 127 (1843), v. p. 322 (1855); *Schinz, Syn. Mamm.* i. p. 556 (1844); *Desm. Dict. Univ. d'H. N.* vii. p. 170, *Atl.* pl. xviii. (animal) (1849); *Gould, Mamm. Austr.* ii. pls. xxvi. & xxvii. (animal) (1857); *Gerrard, Cat. Bones Mamm. B. M.* p. 127 (1862); *Gray, P. Z. S.* 1866, p. 221; *Kreffl, Mamm. Austr.* pl. xi. (animal) (1871); *Fletcher, P. Linn. Soc. N. S. W.* vii. p. 641 (1882), viii. p. 8 (1883) (anat.); *Jent. Cat. Ost. Leyd. Mus.* p. 320 (1887); *Coll. Zool. Jahrb.* ii. p. 885 (1887).

*Macropus (Halmaturus) dorsalis*, *Waterh. N. H. Mamm.* i. p. 152, pl. v. fig. 14 (incisors) (1846).

*Macropus dorsalis*, *Waterh. Cat. Mamm. Mus. Z. S.* p. 67 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 230 (1841); *Giebel, Odontogr.* p. 43, pl. xix. fig. 12 B (incisors) (1855); *id. Säug.* p. 681 (1859); *id. Bronn's Kl. u. Ordn.* vi. Abth. v. pl. lxxvii. fig. 21 (14) (incisors) (1876).

## BLACK-STRIPED WALLABY.

Size small; form light and delicate. Rhinarium (Pl. V. fig. 5) wholly naked. General colour grey, becoming rich rufous on the forequarters; a distinct narrow black line from occiput to centre

of back\*. Underfur grey-brown. General colour of face grey; face-markings nearly obsolete, the dark whisker-mark scarcely distinguishable, and the white cheek-stripe reduced merely to the white upper lip; a white spot at the base of the outer edge of the ear. Back of ears rufous, darkening to their tips. A distinct white hip-stripe present, running horizontally backwards from the knee. Arms rufous; legs grey; fingers and toes gradually becoming quite black to their tips. Central hind claw rather shorter than usual. Chin, chest, and belly white or greyish white, rather more sharply defined than is usual in the group. Tail grey above, its extreme tip black.

*Skull.* General form light and slender. Premaxillæ obliquely set. Nasals narrow, very slightly expanded behind. Interorbital region broad, flat, not constricted; supraorbital edges thick and prominent, developing low rounded convexities in the usual position of the postorbital processes. Infraorbital foramen opening from 8 to 11 millim. from orbit. Palate with a pair of very large vacuities opposite the anterior root of the zygoma.

*Teeth* small and light. I.<sup>3</sup> fairly long, its external notch central. P.<sup>3</sup> about 5 millim. long, broader behind than in front. P.<sup>4</sup> (Pl. X. fig. 3) about the length of m.<sup>1</sup>, narrow, converging forward, with a well-marked postero-internal talon, and a narrow internal ledge.

*Dimensions.*

	♂. e (stuffed). Aged. millim.	♀. f (stuffed). Adult. millim.	
Head and body . . . . .	790	660	
Tail . . . . .	610	510	
Hind foot . . . . .	175	168	} (Range, ♂, 156-175.)
Ear . . . . .	63	63	

Skull, see p. 45.

*Hab.* Inland districts of Queensland and New South Wales.

*Type* not traceable.

a. Ad. al., ♂.	Queensland.	Mr. J. Abrahams [P.].
b. } Imm. sk. } ♀.	Queensland.	Purchased.
} Skull. }		
c. Imm. skull.	Queensland ( <i>Leichardt's Expedition</i> ).	John Gilbert, Esq. [C.].
Imm. skull, ♂.	Brezi, N. S. W.	Gould Coll.
d. } Ad. st. } ♂.	Interior N. S. W.	Gould Coll.
} Skull. }		
f, g. Ad. st., ♀ & yg.	Interior N. S. W.	Gould Coll.

\* Dr. Collett (*l. c.*) records that in one specimen from Rockhampton, three transverse dark stripes were visible on the back, in addition to the ordinary longitudinal one.

11. *Macropus parryi*.

- Macropus parryi*, *Benn. P. Z. S.* 1834, p. 151; *id. Tr. Z. S.* i. p. 295, pl. xxxvii. (animal and teeth) (1835); *Owen, Tr. Z. S.* i. p. 298 (anat.) (1835); *Less. H. N. Mamm. (Compl. Buff.)* x. p. 365 (1836); *Waterh. Cat. Mamm. Mus. Z. S.* p. 66 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 206, pl. xviii. (animal) (1841); *Gray, Grey's Austr., App.* ii. p. 402 (1841); *Giebel, Säug.* p. 679 (1859); *Lyd. Cat. Foss. Mamm. B. M.* v. p. 220 (1887).
- Halmaturus parryi*, *Gray, Charlesw. Mag. N. H.* i. p. 583 (1837); *Gould, Mon. Macrop.* pl. xix. (animal) (1842); *Gray, List Mamm. B. M.* p. 89 (1843); *Wagn. Schr. Säug. Supp.* iii. p. 112 (1843), v. p. 314 (1855); *Schinz, Syn. Mamm.* i. p. 549 (1844); *Gerrard, Cat. Bones Mamm. B. M.* p. 127 (1862); *Kreffl, Cat. Mamm. Austr. Mus.* p. 49 (1864); *Hyrtl, Denk. Ak. Wien*, xxii. p. 158 (1864); *Kreffl, Mamm. Austr.* text to pl. x. p. 2 (1871); *Coll. Zool. Jahrb.* ii. p. 881 (1887).
- Macropus (Osphranter) parryi*, *Less. N. Tabl. R. A. Mamm.* p. 194 (1842).
- Macropus (Halmaturus) parryi*, *Waterh. N. H. Mamm.* i. p. 113 (1846).
- Osphranter (?) parryi*, *Gould, Mamm. Austr.* ii. pls. xii., xiii. (animal) (1852).

## PARRY'S WALLABY.

Size of *M. ruficollis*. Form very slender and graceful. Fur soft, almost woolly. General colour clear grey, with a bluish tinge, rump rather more rufous. Underfur thin and sparse, pale grey. Face-markings distinct and well defined; top of muzzle brown, slightly paler than the two dark whisker-marks; cheek-stripe pure white and sharply defined, passing backwards to beneath the eye; a grey band passing backwards from the angle of the mouth between the cheek-stripe and the white chin. Crown of head grey, becoming whiter between the ears, the white passing backwards as a nuchal stripe to about halfway down the neck; a darker mark on each side of it. Ears unusually long, their interior white, their exterior parti-coloured, brown for the basal half, then white and the extreme tips brown. Sides of rump white, but this not corresponding in any way to the white femoral stripes of other species. Chin pure white; chest, belly, and inner sides of limbs greyish white. Arms and legs grey like the body, hands and feet gradually becoming nearly or quite black on the digits. Tail very long, pale grey, an inconspicuous black or grey crest below the tip.

*Skull.* General form much as in *M. ruficollis*. Relative proportions of brain-case and face medium (index about 230). Premaxillæ very oblique, projecting far beyond the nasals. Nasals very slightly expanded behind. Interorbital region broad, the supraorbital edges strong, thickened, and developing short but distinct postorbital processes, behind which there is a feebly marked intertemporal constriction. Top of crown unusually convex, the parietal region bent down at a very considerable angle to the line of the face. Infra-orbital opening about 9 or 10 millim. from orbit. Palate with two large vacuities, each about as large as two of the molars combined.

*Teeth.* Incisors small and light;  $i^2$  with its vertical barely exceeding its horizontal diameter;  $i^3$  of medium length, with the notch central.  $P^3$  oval, about 6 millim. long;  $p^4$  (Pl. X. fig. 4) proportionally very small and narrow, with no anterior internal ledge, and the postero-internal talon very small. Lower  $p^4$  corresponding, as usual, in size and proportion to the upper one, about 5 millim. in length.

*Dimensions.*

	♀. a (stuffed). Adult. millim.
Head and body .....	800
Tail .....	740
Hind foot.....	237
Ear .....	78
Skull, see p. 45.	

*Hab.* Mountain-ranges of Queensland and Northern New South Wales.

*Type* in collection.

a. { Ad. sk. } ♀.	Stroud, near Port Stephens, N. S. W. ( <i>Sir E. Parry</i> ).	Zool. Soc. Coll. ( <i>Type</i> of species.)
b. Ad. skull.	New South Wales ( <i>J. Mac Arthur, Esq.</i> ).	Zool. Soc. Coll.
c. { Imm. sk. } ♀.		Australian Museum.
d. { Yg. st. } Skull.		J. Ingall Esq. [P.]

12. *Macropus irma.*

*Halmaturus irma*, *Jourl. Ann. Sci. Nat.* viii. p. 371 (1837); *id.* *C. R.* v. p. 523 (1837); *Less. N. Tabl. R. A., Mamm.* p. 195 (1842); *Gray, List Mamm. B. M.* p. 89 (1843); *Wagn. Schr. Säug. Supp.* iii. p. 127 (1843); *Schinz, Syn. Mamm.* i. p. 553 (1844); *Schleg. Dierk.* i. p. 142 (1857); *Gerrard, Cat. Bones Mamm. B. M.* p. 127 (1862); *Jent. Cat. Ost. Leyd. Mus.* p. 318 (1887).

*Macropus (Halmaturus) manicatus*, *Gould, P. Z. S.* 1840, p. 127.

*Macropus manicatus*, *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 223 (1841).

*Macropus irma*, *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 222 (1841); *Giebel, Säug.* p. 679 (1859).

*Halmaturus manicatus*, *Gould, Mon. Macrop.* pl. ix. (animal) (1841); *Gray, Grey's Austr., App.* ii. p. 402 (1841); *Less. N. Tabl. R. A., Mamm.* p. 195 (1842); *Gilbert, P. Z. S.* 1844, p. 35 (habits); *Schinz, Syn. Mamm.* i. p. 555 (1844); *Gould, Mamm. Austr.* ii. pls. xx., xxi. (animal) (1852); *Wagn. Schr. Säug. Supp.* v. p. 314 (1855); *Kreff, Mamm. Austr.* text to pl. x. p. 3 (1871).

*Macropus (Halmaturus) irma*, *Waterh. N. H. Mamm.* i. p. 117 (1846).

BLACK-GLOVED WALLABY.

Size rather small; form very slender and graceful. Nose partly hairy between the nostrils (Pl. V. fig. 6). Fur thick and soft. General colour dark bluish grey. Underfur pale rufous, showing through the longer fur, especially on the sides. Face-markings clear and well-defined, arranged as in *M. parryi*, but the pale cheek-stripe yellow instead of white, and passing backwards much further, being continuous with a prominent pale blotch at the base of the outer margin of the ear. Back of ears and crown of head black, the black passing backwards as a dark nuchal stripe. Inside of ears pale yellow except at the tip, where there is a prominent black border. A very inconspicuous pale hip-stripe present, separated from the pale flanks by a triangular portion of dark grey like that on the back. Belly pale grey, with a tinge of yellowish or rufous. Arms and outsides of legs grey; hands to metacarpus, front of legs and feet to ends of metatarsus bright yellow. Fingers and toes sharply defined pure black. Tail grey like the body for its proximal quarter and all along its sides, but for its distal three-quarters there is a well-defined crest of long stiff black hairs on both the upper and under sides; in some specimens the extreme tip is white.

*Skull.* Small and lightly built. Premaxillæ upright. Nasals long and narrow, their central breadth going nearly five times into their length, very slightly expanded behind. Interorbital region broad and flat, the supraorbital edges parallel without marked intertemporal constriction. Palate very complete for a Wallaby, the largest vacuities not larger than p.<sup>3</sup> or p.<sup>4</sup>

*Teeth.* Incisors small and slender; i.<sup>3</sup> very short, not longer than p.<sup>4</sup> P.<sup>3</sup> oval, about 5 millim. long. P.<sup>4</sup> short and broad, with a well-developed postero-internal talon.

#### Dimensions.

	♀ a (stuffed). Adult. millim.
Head and body .....	780
Tail .....	720
Hind foot .....	195
Ear .....	65
Skull, see p. 45.	

*Hab.* Western Australia (southern districts).

*Type* not traceable.

This beautiful species of Wallaby, distinguished by its peculiarly double-crested tail and its well-defined markings, is the only representative of the present group in Western Australia.

a.	{ Ad. sk. { ♀	Swan R., W. A. ( <i>J. Gilbert</i> ).	Gould Coll. ( <i>Type</i>
	{ Skull. {		of <i>H. manicatus</i> , Gould.)
b.	{ Imm. st. {	Toodyay, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
	{ Skull. {		

- c. { Imm. sk. } ♂. Toodyay, W. A. (*J. Gilbert*). Gould Coll.  
 { Skull. }  
 d. Imm. sk., ♀. Perth, W. A. Government of W.  
 Australia [P.].  
 e. Imm. skull. Gould Coll.  
 f. Yg. sk. Purchased.

### 13. *Macropus agilis*.

- Halmaturus agilis*, *Gould*, *P. Z. S.* 1841, p. 81; *id. Mon. Macrop.* pl. xx. (animal) (1842); *Schinz, Syn. Mamm.* i. p. 562 (1844); *Hombr. & Jacq. Voy. Pôle Sud*, *Zool.* iii. p. 36, *Atl.* pl. xix. (animal, skull and feet) (1853); *Wagn. Schr. Säug. Supp.* v. p. 312 (1855); *Gould, Mamm. Austr.* ii. pls. xxiv. & xxv. (animal) (1857); *Gerrard, Cat. Bones Mamm. B. M.* p. 125 (1862); *Gray, P. Z. S.* 1866, p. 221; *Krefftt, Mamm. Austr.* text to pl. x. p. 4 (1871); *Slater, P. Z. S.* 1875, p. 469; *Jent. Cat. Ost. Leyd. Mus.* p. 318 (1887); *Coll. Zool. Jahrb.* ii. p. 884 (1887).  
*Halmaturus binoc.*, *Gould, P. Z. S.* 1842, p. 58; *Gray, List Mamm. B. M.* p. 91 (1843); *Schinz, Syn. Mamm.* i. p. 565 (1844).  
*Macropus (Halmaturus) agilis*, *Waterh. N. H. Mamm.* i. p. 108, pl. v. fig. 13 (incisors) (1846).  
*Macropus agilis*, *Gieb. Odontogr.* p. 43, pl. xix. fig. 12A (incisors) (1855); *id. Säug.* p. 678 (1859); *id. Bronn's Kl. u. Ordn.* vi. Abth. v. pl. lxxvii. figs. 21 (13) (incisors) (1876).  
*Macropus papuanus*, *Peters & Doria, Ann. Mus. Genov.* vii. p. 544 (1875), and xvi. p. 683, pls. xv. (animal) and xvi. (skull) (1881) (juv.).  
*Macropus papuensis*, *Slater, P. Z. S.* 1875, p. 532.  
*Halmaturus crassipes*, *Rams. P. Linn. Soc. N. S. W.* i. p. 162 (1876).  
*Macropus crassipes*, *Rams. P. Linn. Soc. N. S. W.* i. p. 395 (1876), iii. p. 244 (1878), iv. p. 87 (1879).  
*Halmaturus jardinii*, *De Vis, P. Roy. Soc. Queensl.* i. p. 109 (1884).  
*Halmaturus papuanus*, *Jent. Cat. Ost. Leyd. Mus.* p. 321 (1887).

#### AGILE WALLABY.

Form stouter and heavier than in others of the group. Nose partly hairy between the nostrils (Pl. V. fig. 7). Fur short and coarse. General colour dark grizzled sandy. Underfur almost absent in Australian, thin and sparse in Papuan examples, pale brown. Face-markings inconspicuous; the brown whisker-mark only reaching halfway from the eye towards the nose, passing below into the whitish cheek-stripe, which again is separated from the white chin by a band of sandy grey. Top of head sandy brown, which becomes darker between the ears, and passes down the neck as an ill-defined dark nuchal line. Ears very short, their interior and base white or yellowish, and their back dark sandy, tipped and edged anteriorly with black. Flanks paler than the back. A dark brownish mark running forwards and downwards from the nape to behind the elbow. A well-marked white hip-stripe always present, separated from the pale flanks by a triangular portion of dark sandy colour, continuous with that of the back. Chest and belly white or greyish white, sometimes with a tinge of yellow. Arms and legs white or pale sandy, the antero-internal side of the

legs always white. Hands and feet greyish white, rarely becoming black on the extreme tips of the digits. Tail with its first third above sandy like the body, the rest whitish, except the extreme tip, which has generally an inconspicuous black pencil.

*Skull* (Pl. VII. fig. 1). General form stout and heavy. Brain-case small in proportion to the long and heavy facial part of skull (facial index about 270, as in many of the larger Kangaroos). Pre-maxillæ slanting forwards very much. Nasals long, narrow, and straight-sided, scarcely broader behind. Interorbital region broad, with a very strongly marked inter-temporal constriction, and sharp well-defined supraorbital edges. Infraorbital opening very far from the orbit, from 13 to 15 millim. distant. Palate with two very large vacuities opposite the anterior root of the zygoma.

*Teeth* large and powerful. Incisors long;  $i^3$  very long, the portion behind its notch decidedly longer than that in front.  $P^3$  oval, about 8 millim. in length\*;  $p^4$  (Pl. X. fig. 5) very large and heavy, as in *M. walabatus*, with a well-defined internal ledge. Lower  $p^4$  about 8 millim. long.

#### Dimensions.

	Australian.		Papuan.	
	$f$ (♂). millim.	$g$ (♀). millim.	$a$ (♂). millim.	$b$ (♀). millim.
Head and body ..	915	765	(c.) 840	(c.) 790
Tail .....	850	..	(c.) 660	(c.) 580
Hind foot .....	234	200	196	179
	Range { ♂ 215-234 ♀ 175-210		Range { ♂ 176-196 ♀ 175-180	
Ear .....	64	57	58	59

Skull, see p. 45.

*Hab.* South-eastern New Guinea, North Queensland, and Northern Territory of South Australia.

*Type* in collection.

This species is very markedly distinct from any of its allies, being distinguished at once by its short ears, long tail, and its generally uniform sandy coloration, the numerous markings described above, although apparently fairly constant, being quite inconspicuous in a general view of the animal. I can see nothing in the descriptions of *H. jardinii*, De Vis, and *H. crassipes*, Rams., to separate them from *M. agilis*, except that in the case of the former the term "rufous" is used for parts I should call "dark sandy." I have myself examined the type of *H. papuanus*, Peters, at Genoa, and find that it is unquestionably a young specimen of this species. It will be seen by the list that the Museum possesses specimens of

\* Cf. the figure of the skull of "*Macropus papuanus*" given by Peters and Doria, *l. c.*

*M. agilis* from all the localities from which these three so-called species have been described. Papuan specimens appear to be somewhat smaller, and to have longer fur and better-defined markings than their North-Australian representatives; but these characters are not sufficiently well marked to separate the two forms specifically.

a, b.	{ Ad. sks. } ♂ ♀.	Port Moresby, N. G.	K. Broadbent, Esq.
	{ Skulls. }		[C.].
c, d.	Ad. sks., ♂ ♀.	Port Moresby, N. G.	K. Broadbent, Esq.
			[C.].
e.	Ad. sk., ♂.	Cape York ( <i>Stanley</i> ).	Voy. 'Rattlesnake.'
f, g.	{ Ad. sks. } ♂ ♀.	Port Essington, N. T.	Gould Coll. ( <i>Co-</i>
	{ Skulls. }	( <i>Sir J. Richardson</i> ).	<i>types</i> of species.)
h.	{ Ad. sk. } ♀.	Port Essington, N. T.	Gould Coll. ( <i>Type</i>
	{ Skull. }	( <i>Sir J. Richardson</i> ).	of <i>H. binoc.</i> , Gould.)
i, j.	Ad. ♀ and imm. sks.	Port Essington, N. T.	Lord Derby [P.].
k.	{ Yg. st. }	Port Essington, N. T.	Lord Derby [P.].
	{ Skull. }		
l, m.	Ad. sks., ♂ ♀.	Port Denison, N. T.	Gould Coll.
		( <i>A. R. Wallace</i> ).	
n.	Yg. sk.	(North Australian Ex- pedition.)	Dr. J. R. Elsey [P.].

### Group III. SMALL WALLABIES.

The members of this group are all small, lightly-built animals, some of them not exceeding a rabbit in size. Their muzzles are invariably naked, and in many of them have a central upward naked projection, the hair growing downwards on each side of it (see for example Pl. XI. fig. 1). In their skulls the anterior palatine foramina are always very small, and the palatal vacuities very large, usually consisting of a pair of large openings separated by a narrow septum in the middle line. Their nasals are, as a rule, much expanded behind, and their interorbital region is generally parallel-sided, without strongly marked interorbital constriction. Their third incisor is smaller in proportion than in the last group, and has always one single well-marked notch, usually close to the posterior end of the tooth.

The range of this group extends much further into the tropics than that of either of the other two, one of its members being the anciently known "Filander" or Aru-Island Wallaby (*M. brunii*), and another (*M. brownii*) extending through New Guinea into the New Britain group of islands.

#### 14. *Macropus coxeni*.

*Halmaturus coxeni*, *Gray*, *P. Z. S.* 1866, p. 220, pl. xxv. (animal).

*Halmaturus gazella*, *De Vis*, *P. Roy. Soc. Queensl.* i. p. 110 (1884).

CAPE YORK WALLABY.

*Skull Measurements of Large Wallabies.*

Species.....	<i>M. ulabatus.</i>		<i>M. ruficollis.</i>		<i>M. greyi.</i>		<i>M. dorsalis.</i>		<i>M. parryi.</i>		<i>M. irma.</i>		<i>M. agilis.</i>	
	Var. <i>typicus.</i> ♂. <i>a.</i> aged.	Var. <i>typicus.</i> ♀. <i>e.</i> aged.	Var. <i>typicus.</i> <i>d.</i> Ad.	Var. <i>bennettii.</i> <i>g.</i> aged.	♂. <i>a.</i> aged.	♀. <i>b.</i> aged.	♂. <i>d.</i> imm.	♂. <i>e.</i> aged.	?	♂. <i>e.</i> imm.	Anstralian. ♂. <i>f.</i> ad.	Papuan. ♂. <i>a.</i> ad.	♂. <i>a.</i> ad.	♀. <i>b.</i> aged.
Basal length.....	127	110	122	127	111	114	105	112	120	98	130	122	124	
Greatest breadth.....	68	65	64.5	74	63	64	60	65	72	58	74	73	71.5	
Nasals, length.....	57	47	54	54	55	57	..	49	51	46	..	56	55.5	
" greatest breadth.....	20.5	17.6	19.5	18	29	27	15	18.5	20	16	21	16	16.7	
" central breadth.....	13	12.6	11.5	12.5	16.5	16	10.5	12.5	15	10	16	11.5	12.5	
Constriction.....	18.5	18.5	17	17.5	21	22.5	16	17.5	20.5	19.3	17	13	14	
Palate, length.....	81	69	80	(c.) 85	74	75	70	79	82	65	88	84	85	
" breadth, outside m. <sup>2</sup> .....	37.5	33	35	38	35.5	31.5	30.5	32.3	34	30	40	36.7	38	
" breadth, inside m. <sup>2</sup> .....	23	21	21.6	24.2	24.	6.1	18.2	20.5	21.5	18.7	26	24.1	25	
Palatal foramina.....	7	6	6.6	7.2	7.3	7.3	4.3	6.0	8.2	5.5	6.5	6.8	7.6	
Diastema.....	30	22.5	34	30.5	33	35	29.5	30.5	39.5	24.5	33	31.5	29.5	
Basal-cranial axis.....	40	35.3	36	39	30.5	31.5	32	33.5	35	(p. <sup>3</sup> ) 31.3	36	33.5	34.5	
Basal-facial axis.....	90	77	87	90	84	86	76.5	81.3	89	69	96	91	92	
Facial index.....	225	218	242	231	275	273	239	243	228	220	267	272	267	
Teeth—length of i. <sup>2</sup> .....	8*	..	8.6	..	4.4	..	7	7.3	7.6	5	9.8	8	..	
" p. <sup>4</sup> .....	10	8.6	6.8	8.1	6.3	6.2	6	6.2	5.8	6	9.7	10	9.1	
" ms. <sup>1-3</sup> .....	24	22.7	25	25.5	21.4	19	21.8	22	25	22.2	28	25	23	

\* Of specimen *d.*

Form rather stouter and thicker than in others of the group. Rhinarium (Pl. XI. fig. 1) with the hair bordering it above forming two paired projections downwards instead of a single median one; lower part continued to the lip. Fur short, close and coarse. Underfur almost or quite absent. General colour dark grizzled sandy. Face sandy, more rufous on the crown and round the bases of the ears; face-markings inconspicuous; a white cheek-stripe present, but not prominent. Back of ears, occiput, back of neck, withers, and a patch behind the forearm dark brown, contrasting with the general sandy colour. Back dark sandy, grizzled with black, sides clearer. A well-marked white hip-stripe present. Chin, chest, and belly white. Arms and legs sandy, the tips of the toes brown. Tail black above, white below and at the extreme tip.

*Skull* (Pl. VIII. fig. 1). Facial portion rather long and heavy in proportion to brain-case. Muzzle longer, narrower, and less tapering than in *M. stigmaticus* and *M. wilcoxi*. Premaxillæ upright, produced forwards in old specimens into a marked subnasal process, projecting beyond the level of the teeth. Naso-premaxillary and naso-maxillary sutures about equal. Nasals long, their least from one half to three fifths their greatest breadth. Naso-frontal suture slightly and evenly bowed backwards. Interorbital region long, parallel-sided; the supraorbital edges thick, rounded and slightly overhanging, but not forming distinct postorbital processes. Palatal foramina of medium length, about equal to  $m^2$ .

*Teeth*. Incisors small and light.  $I^3$  small, about the length of  $m^1$ , its notch quite posterior, the inner lamina showing but little behind the outer.  $P^4$  (Pl. X. fig. 6) about the length of  $m^4$ , oblong, nearly as broad in front as behind, and with a well-marked internal ledge.

#### Dimensions.

	♂. <i>a</i> (skin). millim.
Head and body .....	(c.) 700
Tail .....	360
Hind foot.....	132
Ear .....	53

Skull, see p. 63.

*Hab.* North Queensland.

*Types* in collection.

This species seems to bear exactly the same relationship to the members of the present group that *M. agilis* does to those of the last, and the pair form an interesting example of the independent development of similar characters under similar conditions. The two species are the only true Wallabies found in North Queensland, and, although belonging to different groups, are each distinguished from their allies by their short fur, sandy colour, non-

prominent markings, and white hip-stripe. As Mr. De Vis has remarked (*l. c.*), *M. coxeni* has, at first sight, very much the look of a young *M. agilis*; but there can be no question that the two have no such direct relationship to one another, except what they have in common as members of the genus *Macropus*.

a, b. { Ad. & imm. sks. } ♂ ♀. Port Albany, C. Coxen, Esq. [C.]  
 { Skulls. } C. York. (Co-types of species.)

### 15. *Macropus stigmaticus*.

*Halmaturus stigmaticus*, Gould, *P. Z. S.* 1860, p. 375; *id. Mamm. Austr.* ii. pls. xxxiii., xxxiv. (animal) (1860); *Kreff, Austr. Vert.* p. 10 (1871).

#### BRANDED WALLABY.

Form light and slender. Rhinarium with its upper border forming two paired convexities, as in *M. coxeni*; lower part continued to the lip. Fur short, close and rather coarse; underfur thin and scanty, dark slaty grey. General colour rufous grey, the grey predominating on the nape and forequarters, and the rufous on the lower back. Muzzle grey; crown, cheeks, and the region round the base of the ear deep rust-colour, a few hairs round the notch of the latter pale yellow. An indistinct pale cheek-stripe present, with a rufous line below it, running from the lower lip to beneath the eye. Back of ears, occiput, and nape brown, with an indistinct darker nuchal streak. Sides of body rich rufous, brighter towards the belly, where two longitudinal bright rusty bands border the white of the belly. Hip-stripe yellowish, very prominent, contrasting markedly with the rufous round it. Sides of rump deep rufous, gradually passing into brilliant rust-colour on the back and outside of the lower leg. Chin, chest, belly, and inner sides of limbs white. Arms rufous, hands and feet grey or rufous grey, the tips of the toes brown. Tail uniform grey-brown above, whitish below.

*Skull* stout and strong. Muzzle long, conical. Premaxillæ long, obliquely set, the naso-premaxillary twice as long as the nasomaxillary suture. Nasals long, broad behind, their least about half their greatest breadth, the latter situated in front of the maxillo-frontal suture; naso-frontal suture sinuous, bowed forwards laterally, strongly backwards centrally. Interorbital region flat, its edges overhanging and very slightly converging backwards. Palatal foramen about the length of m.<sup>1</sup>

*Teeth* generally stout and strong. I.<sup>3</sup> much as in *M. coxeni*, but rather longer, slightly longer than m.<sup>4</sup> P.<sup>4</sup> (Pl. X. fig. 7) large and strong, about equal to m.<sup>4</sup>, shaped as in *M. coxeni*.

*Dimensions.*

	♂. a (skin). millim.
Head and body .....	(c.) 700
Tail .....	380
Hind foot .....	129
Ear .....	50

Skull, see p. 63.

*Hab.* N.E. Queensland.

*Type* in collection.

- a. { Ad. sk. { ♂. Point Cooper, N. of Rocking- J. MacGillivray,  
 { Skull. { ham Bay, Queensland (*Voy.* Esq. [P.]. (*Type*  
                   ' *Rattlesnake* '). of species.)

16. *Macropus wilcoxi*.

*Halmaturus wilcoxi*, *McCoy, Ann. Mag. N. H.* (3) xviii. p. 322 (1866); *Krefft, Austr. Vert.* p. 10 (1871); *Jent. Cat. Ost. Leyd. Mus.* p. 320 (1887).

*Halmaturus temporalis*, *De Vis, P. Roy. Soc. Queensl.* i. p. 111 (1884).

## RED-LEGGED WALLABY.

Like *M. stigmaticus* in all essentials, but the fur longer and softer, the colours everywhere less brilliant, and the contrasts not so strong. The face is grey, but the cheeks, an ill-defined patch above each eye, and the region round the base of the ear are deep rust-colour; the base of the outside of the ear is also rusty. Flanks grey, scarcely tinged with rufous, not forming rusty longitudinal bands. Hip-stripe almost or wholly obsolete, just visible in some specimens. White of belly tinged with grey. Arms, hands, and feet greyish or pale rufous, browner distally. Tail grey above, white below. Female smaller and more lightly built than male.

*Skull* (Pl. VIII. fig. 2) much as in *M. stigmaticus*; facial index 210-225. Premaxillæ short and uprightly set, the naso-premaxillary suture much shorter than in *M. stigmaticus*, only just about equal to the naso-maxillary. Subnasal projection just surpassed anteriorly by the front edge of i.<sup>1</sup> Nasals rather short, broad and expanded behind, contracting suddenly about their centre, their least half or less than half their greatest width, the latter situated some way in front of the maxillo-frontal suture; their posterior edge sinuous, strongly bowed backwards in the centre and forwards laterally (see Plate). Interorbital region shorter, its edges rather more markedly converging backwards than in *M. stigmaticus*, and with rounded convexities corresponding to postorbital processes. Palatal foramina short and rounded, about the length of m.<sup>1</sup>

*Teeth* as in *M. stigmaticus*, but the incisors and molars slightly larger. P.<sup>4</sup> (Pl. X. fig. 8) rather more evenly oval.

*Dimensions.*

	♂. <i>a</i> (stuffed). millim.	♀. <i>b</i> (stuffed). millim.
Head and body .....	610	530
Tail .....	345	300
Hind foot .....	138	116
Ear.....	48	46

Skull, see p. 63.

*Hab.* S. Queensland and New South Wales.

*Type* in the Melbourne Museum.

It is evident that *M. stigmaticus* and *M. wilcoxi* only form respectively the tropical and non-tropical representatives of one and the same original species, and will nearly certainly have in time to be united altogether, or be merely separated under varietal names. As is usual in such cases, the northern form is shorter-haired and more brilliantly coloured than the southern, the external distinctions being exactly those that separate the typical *M. ualabatus* of the south from *M. ualabatus* var. *apicalis* of Queensland. In that case, however, the skulls were absolutely identical, but in the present one the solitary representative available of the northern form presents certain cranial and dental differences from the southern; and therefore, although believing that intermediate specimens will probably be found, I yet hesitate definitely to place the two together without seeing further material. Externally, the specimen described by Mr. De Vis as *H. temporalis* would seem to be fairly intermediate, but no description is given of its teeth, and therefore, chiefly on account of its locality, I consider it for the present as a synonym of *M. wilcoxi* rather than of *M. stigmaticus*.

<i>a, b.</i>	{ Ad. st. } ♂ ♀.	Richmond R.,	J. F. Wilcox, Esq.
	{ Skeletons. }	N. S. W.	[P. & C.].
<i>c-e.</i>	{ Ad. sks. }		Purchased.
	{ Skulls of <i>c</i> & <i>d.</i> }		

17. *Macropus brunii*.

Philander, *De Bruyn, Reiz. Mosk. Perz. Ind.* p. 374, pl. ccxiii.  
(animal) (1714).

*Didelphys brunii*\*, *Schreb. Säug.* iii. p. 551, pl. cliii. (animal)

\* The proper spelling of the specific name of this species is somewhat doubtful. The author of the "Reize over Moskovie door Perzie en Indie" nearly invariably spelt his name De Bruyn, which was altered in the French and English editions of his work into Le Brun, on which Schreber formed the name of the animal. In another earlier work by the same author, however, the "Reizen door de vermaadste Deelen van Klein Asia, &c." (4to, Delft, 1698), Bruyn, Bruin, and Brun all occur on one single page of the Introduction, the last in the very form needed for a specific name, viz. "Cornelii Brunii," as the Latin genitive of the author's name. I have therefore used this, the oldest and best known form, instead of the corrected one "brunyii" or "bruinii," as used by one or two later authors.

- (1778); *Gmel. Linn. S. N. i.* p. 109 (1789); *Kerr, Linn. An. K.* p. 197 (1792); *Donnd. Zool. Beytr.* i. p. 354 (1792); *G. Cuv. Tabl. Élém.* p. 126 (1798); *Shaw, Gen. Zool.* i. p. 480 (1800); *Turton, Linn. S. N. i.* p. 67 (1806); *F. Cuv. Dict. Sci. Nat.* xxiv. p. 348 (1822).
- Didelphis brunii*, *Zimm. Geogr. Gesch.* ii. p. 230 (1780).
- Didelphys asiatica*, *Pall. N. Act. Petrop.* for 1777, pt. ii. p. 228, pl. ix. figs. 4 & 5 (skull and foot-bones) (publ. 1780).
- Javan Opossum, *Penn. Quadr.* ii. p. 305, pl. xxxv. (animal) (1781).
- Didelphys javana*, *Bodd. Elench. Anim.* i. p. 78 (1785).
- Yerboa brunii*, *Bechst. Syst. Uebers. Vierf. Thiere*, ii. p. 345 (1800).
- Kangurus philander*, *E. Geoff. Cat. Mus.* p. 154 (1803); *id. Dict. Class. d'H. N.* ix. p. 111 (1826).
- Kangurus brunii*, *Desm. N. Dict. d'H. N.* xii. p. 358 (1803); *Tiedem. Zool.* i. p. 435 (1808); *G. Fisch. Zoogn.* iii. p. 19 (1814); *Gray, Griff. Cuv. An. K. v.* p. 204 (1827).
- Halmaturus brunii*, *Ill. Prodr. Syst. Mamm.* p. 80 (1811); *Goldf. Isis*, 1819, p. 269; *Schinz, Cuv. Thierr.* i. p. 264 (1821); *Kaup, Thierr.* i. p. 245 (1835); *Jent. Cat. Ost. Leyd. Mus.* p. 321 (1887).
- Macropus brunii*, *G. Cuv. R. A. i.* p. 183 (1817); *Schleg. Ned. Tijdschr. Dierk.* iii. p. 350 (1866); *Garrod, P. Z. S.* 1875, p. 49 *et seqq.* pl. ix. figs. 11-15 (teeth); *Peters & Doria, Ann. Mus. Genov.* xvi. p. 685 (1880).
- Macropus brunii*, *J. B. Fisch. Syn. Mamm.* p. 283 (1829).
- Dorcopsis bruni*, *Gieb. Bronn's Kl. u. Ord.* vi. Abth. v. pl. xx. figs. 8-10 (skull) (1874).

#### ARU ISLAND WALLABY.

Size and form medium. Female markedly smaller than male. Upper border of rhinarium with only a single central prominence downwards. Fur short, close and straight; underfur almost entirely absent. General colour uniform chocolate-brown. Head brown; a well-marked white whisker-mark from the mouth to beneath the eye. Ears short, their backs black, contrasting with the general brown colour, but the crown of the head between the ears sometimes black as well. Whole of body uniform brown, becoming finely grizzled with grey on the lower rump and hips. A well-marked white hip-stripe present. Chin brown; throat, chest, and belly white, faintly tinged with brown. Arms, hands, legs, feet, and tail grey or brown, more or less grizzled with white.

*Skull* (Pl. VIII. fig. 4) stout and strongly built. Facial index high for the present group. Muzzle broad and conical. Premaxillæ and nasals exactly as in *M. wilcoxi* in both shape and proportions. Interorbital region as in *M. stigmaticus*.

*Teeth* stout and heavy. Incisors as in *M. coxeni*, notch of i.<sup>3</sup> close to the back. P.<sup>4</sup> large and broad, with two external vertical grooves, its internal ledge continued to the front. Molars with their cusps low and blunt, and their main central connecting ridges less developed than usual.

*Dimensions.*

	♂. a (skin). millim.	♀. c (skin). millim.
Head and body . . . . . (c.)	770	500
Tail . . . . .	334	305
Hind foot . . . . .	130	115
Ear . . . . . (c.)	45	43

Skull, see p. 63.

*Hab.* Aru and Kei Islands.

*Type* not in existence.

The very complicated history and synonymy of this species, the longest known of the genus, have been so far cleared up by Profs. Schlegel and Garrod (*U. cc.*) that no further reference to them is here necessary. From *Dorcopsis mülleri*, whose remarkable external resemblance to *M. brunii* has caused all the confusion, it may be distinguished by its very much shorter head, by the backwardly directed hairs of its nape, and by its distinct white hip-stripe.

a, b.	{ Ad. sks. } { Skulls. }	♂ ♀.	Aru Islands.	Purchased.
c.	{ Ad. sk. } { Skull. }	♀.	Aru Islands.	H.M.S. 'Challenger.'
d.	{ Ad. sk. } { Skull. }	♀.	Aru Islands.	Purchased.
e.	Yg. sk.		Aru Islands.	Dr. A. B. Meyer [C.].

18. *Macropus browni*.

*Halmaturus browni*, *Rams. P. Linn. Soc. N. S. W. i.* p. 307 (1877).

*Macropus lugens*, *Alst. P. Z. S.* 1877, p. 126, pl. xix. (animal).

*Macropus browni*, *Alst. t. c.* p. 743.

*Macropus jukesii*, *Mikl.-Macl. P. Linn. Soc. N. S. W.* ix. p. 890, pl. xxxix. figs. 1-6 (skull and teeth) (1885) (*juv.*).

*Macropus gracilis*, *Mikl.-Macl. t. c.* p. 894, pl. xxxix. figs. 7, 8 (animal and incisors) (1885) (*nec Gould*).

*Macropus tibol*, *Mikl.-Macl. op. cit.* x. p. 141, pl. xix. (animal and skull) (1885) (*juv.*).

SOMBRE WALLABY.

Exceedingly similar to *M. brunii* in all characters, but the fur somewhat thicker and softer, the general colour of a greyer tinge and more distinctly grizzled, the ears brown like the head behind, instead of black, the belly yellow instead of white, and the sides of the hip with scarcely a trace of the prominent white hip-mark characteristic of that species.

*Skull and teeth*, so far as can be made out from the single immature specimen available, precisely similar to those of *M. brunii*, except that the cusps and ridges on the molars appear to be as sharp and well defined as in the other species.

## Dimensions.

	♂.
	<i>a</i> (skin).
	Immature.
	millim.
Head and body . . . . .	(c.) 540
Tail . . . . .	340
Hind foot . . . . .	117
Ear . . . . .	42

Skull, see p. 63.

*Hab.* New Britain group of islands; Eastern and South-eastern New Guinea.

*Type* in the Sydney Museum.

This species presents much the same external resemblance to *Dorcopsis luctuosa* that *M. brunii* does to *D. mülleri*. It may, however, be easily distinguished, as in the other case, by its shorter head and by the direction of its nape-hairs. The "*M. jukesii*," "*M. gracilis*," and "*M. tibol*" of Miklouho-Maclay are apparently, so far as can be made out from the very insufficient description of them, all based on variously aged specimens of this species, so that its range extends over a much wider area than has hitherto been recorded. The skull of "*M. jukesii*," figured by Maclay, exactly matches that of the type of *M. lugens* (specimen *a* below), so that its degree of immaturity can be easily gauged.

*a.* { Imm. sk. } ♂. Duke of York Isl. Rev. G. Brown [C.]  
 { Skull. } (Type of *M. lugens*, Alst.)

19. *Macropus thetidis*.

*Halmaturus thetis*, *Less. Man. Mamm.* p. 229 (1827); *id. N. Tabl. R. A., Mamm.* p. 195 (1842); *Gray, List Mamm. B. M.* p. 90 (1843).

*Halmaturus thetidis*, *F. Cuv. H. N. Mamm.* (fol.) livr. lvi. (fig. of animal) (1829); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 379 (1836); *id. Journ. Voy. Thétis*, ii. p. 305, pl. xxxvii. (animal) (1837); *Gould, Mon. Macrop.* pl. xxi. (animal) (1842); *Wagn. Schr. Säug. Supp.* iii. p. 124 (1843), v. p. 320 (1855); *Gould, Mamm. Austr.* ii. pls. xxxi. & xxxii. (animal) (1857); *Gerrard, Cat. Bones Mamm. B. M.* p. 125 (1862); *Kreff, Cat. Mamm. Austr. Mus.* p. 51 (1864); *id. Austr. Vert.* p. 10 (1871); *Jent. Cat. Ost. Leyd. Mus.* p. 319 (1887).

*Macropus thetis*, *Fisch. Syn. Mamm.* p. 284 (1829).

*Halmaturus* (*Thylogale*) *eugenii*, *Gray, Charlesw. Mag. N. H.* i. p. 583 (1837) (*nec Desm.*).

*Halmaturus nuchalis*, *Wagn. Schr. Säug. Supp.* iii. p. 128 (1843).

*Macropus* (*Halmaturus*) *thetidus*, *Waterh. N. H. Mamm.* i. p. 144, pl. iii. fig. 2 (incisors) (1846).

*Macropus thetidis*, *Gieb. Odontogr.* p. 43, pl. xix. figs. 11 A & B (incisors) (1855); *id. Säug.* p. 681 (1859); *Brehm, Thierl.* ii. p. 592 (figure of animal) (1880).

PADEMELON WALLABY.

Size medium; form light and agile. Rhinarium (Pl. XI. fig. 2) broad to the lip, the latter but little developed, not hiding the front teeth. Fur of medium length, thick and soft, its direction on the nape variable, sometimes as in *Dorcopsis*. Underfur long, slaty grey. General colour grizzled grey, with rufous neck. Whole of head uniform finely grizzled grey, gradually passing on the occiput into the brilliant rufous of the neck and forequarters. No trace of a dark nuchal streak. Very rarely the red extends on to the cheeks and round the base of the ear, but in most specimens these parts are grey. Ears long, their backs grey, edged anteriorly with brown or black. The rufous on the forequarters passing gradually into deep grizzled grey on the lower back, the whole sometimes tinged with rufous. A faint trace of a white hip-stripe sometimes present. Chin, chest, and belly white, that on the front of the neck often sharply defined from the rufous by a ridge of opposed hairs. Arms and legs grey or rufous; hands and feet pale brown. Tail with its basal fourth covered with long soft grey hairs like those on the back; the remainder brown above, white below.

*Skull* (Pl. VIII. fig. 3) large and long, lightly built. Facial index about 230. Muzzle long, broad posteriorly, strongly tapering forwards. Premaxillæ oblique; incisors projecting far beyond sub-nasal prominence; naso-premaxillary about equal to naso-maxillary suture. Nasals long, comparatively but slightly expanded behind, their least a little more than half their greatest breadth, the latter situated at the maxillo-frontal suture; naso-frontal suture much bowed backwards in the centre, and slightly forwards at the sides. Interorbital region short, its edges thickened and forming distinct overhanging postorbital prominences; intertemporal constriction well-marked. Palatal foramina short, not so long as  $m^1$ .

*Teeth*.  $I^3$  (Pl. IX. fig. 4) very large, long and cutting, the notch quite at the back, internal lamina scarcely visible externally behind the outer.  $P^4$  (Pl. X. fig. 9) rather small, shorter than  $i^3$ , oval, the internal ledge well developed anteriorly.

*Dimensions.*

	♂. c (stuffed). millim.	♀. f (stuffed). millim.
Head and body . . . . .	620	540
Tail . . . . .	..	380
Hind foot . . . . .	131	118
Ear . . . . .	57	51

Skull, see p. 63.

*Hab.* S. Queensland\*, New South Wales, and Victoria.

*Types* in the Paris Museum.

\* *Apud* Krefft.

a. Ad. skull, ♂.	Mosquito Isl., Hunter R., N. S. W. ( <i>Voy. 'Herald'</i> ).	J. Macgillivray, Esq.
b. { Ad. sk. } { Skull. } ♂.	Brushes of Hunter R., N. S. W.	Gould Coll.
c. Ad. st., ♂.	New South Wales.	Gould Coll.
d, e. { Ad. & yg. sk. } { Skull of d. } }	New South Wales.	Gould Coll.
f. Ad. st., ♀.	New South Wales.	
g. Ad. sk.		
h. Ad. skull, ♀.		Gould Coll.
i. Ad. skeleton, ♂.		Purchased.

20. *Macropus eugenii*.

- Kangaroo de l'île Eugène, *Pér. & Les. Voy. Terr. Austr.* ii. p. 117 (1816).
- Kangurus eugenii*, *Desm. N. Dict. d'H. N.* (2) xvii. p. 38 (1817); *id. Mamm.* i. p. 274 (1820); *Geoff. Dict. Class. d'H. N.* ix. p. 110 (1826); *Gray, Griff. Cuv. An. K.* v. p. 203 (1827).
- Halmaturus eugenii*, *Schinz, Cuv. Thierr.* i. p. 888 (1821); *Gray, Grey's Austr., App.* ii. p. 403 (1841); *Less. N. Tabl. R. A., Mamm.* p. 194 (1842); *Wagn. Schr. Säug. Supp.* iii. p. 127 (1843); *Schinz, Syn. Mamm.* i. p. 557 (1844).
- Macropus eugenii*, *Less. Man. Mamm.* p. 227 (1827); *Fisch. Syn. Mamm.* p. 282 (1829); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 378 (1836); *Waterh. Cat. Mamm. Mus. Z. S.* p. 66 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 232 (1841); *Gieb. Säug.* p. 681 (1859).
- Halmaturus derbianus*, *Gray, Charlesw. Mag. N. H.* i. p. 583 (1837); *id. Grey's Austr., App.* ii. p. 403 (1841); *Gould, Mon. Macrop.* pl. xi. (animal) (1841); *Gray, List Mamm. B. M.* p. 91 (1843); *Wagn. Schr. Säug. Supp.* iii. p. 128 (1843), v. p. 323 (1855); *Schinz, Syn. Mamm.* i. p. 557 (1844); *Gould, Mamm. Austr.* ii. pls. xxix., xxx. (animal) (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 126 (1862); *Blyth, Cat. Mamm. Mus. As. Soc.* p. 185 (1863); *Krefft, Austr. Vert.* p. 10 (1871); *Garrod, P. Z. S.* 1875, p. 57; *Jent. Cat. Ost. Leyd. Mus.* p. 320 (1887).
- Macropus derbianus*, *Waterh. Cat. Mamm. Mus. Z. S.* p. 67 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 234, pl. xxi. (animal) (1841); *Owen, Cat. Ost. Mus. Coll. Surg.* i. p. 325 (1853); *Gieb. Säug.* p. 682 (1859); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 713 (1884).
- Halmaturus emiliae*, *Gray, List Mamm. B. M.* p. 90 (1843) (*nom. nudum*).
- Halmaturus houtmanni*, *Gould, P. Z. S.* 1844, p. 31; *Gerrard, Cat. Bones Mamm. B. M.* p. 126 (1862); *Gould, Mamm. Austr. (Introd.)* i. p. xxx (1863) (habits); *Krefft, Austr. Vert.* p. 10 (1871).
- Halmaturus dama*, *Gould, P. Z. S.* 1844, p. 32; *Wagn. Schr. Säug. Supp.* v. p. 321 (1855); *Gerrard, Cat. Bones Mamm. B. M.* p. 126 (1862); *Gould, Mamm. Austr. (Introd.)* i. p. xxxi (1863) (habits); *Krefft, Austr. Vert.* p. 10 (1871); *Jent. Cat. Ost. Leyd. Mus.* p. 319 (1887).
- Macropus gracilis*, *Gould, P. Z. S.* 1844, p. 103.

- Macropus* (*Halmaturus*) *eugenii*, *Waterh. N. H. Mamm.* i. p. 140, pl. v. fig. 8 (incisors) (1846) [*M. dama* on plate].
- Macropus* (*Halmaturus*) *derbianus*, *Waterh. N. H. Mamm.* i. p. 154, pl. v. fig. 6 (incisors) (1846) [*M. houtmanni* on plate].
- Macropus* *houtmanni*, *Owen, Cat. Ost. Mus. Coll. Surg.* i. p. 326 (1853); *Gieb. Odontogr.* p. 43, pl. xix. fig. 2 c (incisors) (1855); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 713 (1884).
- Macropus* *dama*, *Gieb. Odontogr.* p. 43, pl. xix. fig. 11 d (incisors) (1855).
- Halmaturus* *gracilis*, *Gerrard, Cat. Bones Mamm. B. M.* p. 125 (1862); *Gould, Mamm. Austr. (Introd.)* i. p. xxxii (1863).

## DAMA WALLABY.

Size medium, form light and graceful. Rhinarium (Pl. XI. fig. 3) ending some way from the mouth, opening at the top of a distinct cleft running down to the upper lip, the lip itself much more developed in front than usual. Fur rather short in mainland, longer in island specimens. Underfur thick and soft, dark slaty grey. General colour grizzled grey, with rufous shoulders. Face and head uniform grey; an indistinct white cheek-stripe generally present. Ears long in mainland, short in island specimens, uniform dark grey, brown behind. Neck with an ill-defined central brown band passing down from between the ears to the back, sometimes scarcely visible, especially in immature specimens. Shoulders, sides of neck, and arms rufous, very variable both in extent and tint; these parts sometimes (? in winter) grey, with scarcely a tinge of rufous. Back grizzled grey, a rufous tinge becoming again apparent on the flanks, lower rump, and hind legs. Chin, chest, and belly white or greyish white, generally well defined. Hands, feet, and tail grey, becoming nearly black at their extremities.

*Skull* (Pl. VII. fig. 3) strongly built. Facial portion proportionally small; facial index low. Muzzle short, rather narrow behind, and therefore not so markedly conical as in some of the other species. Premaxillæ oblique; naso-premaxillary about equal to naso-maxillary suture. Nasals short, expanded behind, their posterior edge sinuous, bowed backwards, but their detailed shape very variable, ordinarily as in the figure. Interorbital edges parallel, sharp, with a tendency, in mainland specimens only, to form rudimentary postorbital processes; intertemporal constriction scarcely observable. Palatal foramina small.

*Teeth.* Incisors small and light. I.<sup>3</sup> slanting forwards, its notch decidedly behind its centre. P.<sup>4</sup> (Pl. X. fig. 10) very small, about the length of m.<sup>1</sup> or m.<sup>2</sup>, its posterior breadth markedly greater than its anterior, the inner ledge obsolete in front; two vertical grooves on its outer side; its anterior end rounded. Molars strong and with well-developed cusps and ridges in mainland specimens; but in those from the islands the molars are small and narrow, and the cusps and ridges low and blunt.

	<i>Dimensions.</i>			
	Mainland.		Island.	
	♂. <i>c</i> (stuffed). millim.	♀. <i>d</i> (stuffed). millim.	♂. <i>l</i> (stuffed). millim.	♀. <i>o</i> (stuffed). millim.
Head and body . . . .	610	560	700	540
Tail . . . . .	420	380	420	(c.) 330
Hind foot . . . . .	144	129	136	124
Ear . . . . .	63	60	44	48

Skull, see p. 63.

*Hab.* Mainland of Western Australia, and islands off the coasts of both West and South Australia.

*Type* not traceable.

The proper treatment of the numerous small Wallabies which have been described under the names of *eugenii*, *derbianus*, *dama*, *houtmanni*, *gracilis*, and *parma* has given rise to much doubt. Waterhouse considered *M. derbianus* to be distinct from *M. eugenii*, with which he united Gould's *M. dama* and *gracilis*, and he also founded the eastern species *M. parma*. Gould, on the other hand, seems to have had a very fair idea of the real state of affairs, as he believed that there were three species, viz.: the mainland "*H. dama*," the insular "*H. houtmanni*," and the New South Wales one, although he confused the names which should properly belong to each. After much thought, and the examination of a very large series of specimens, I have come to the conclusion that it is impossible to admit more than a single western species, notwithstanding the very striking differences that exist between the individuals long isolated in the islands of Houtmann's Abrolhos and those living on the mainland. The differences fade away on the examination of large series, and specimens from the small islets close to the coast are as a rule more or less intermediate. The type of *M. eugenii* has unfortunately disappeared, but there can be little doubt as to the identity of the present species with that obtained by Péron and Lesueur on Eugene Island, especially as specimen *a* comes from a locality so close to that place.

With regard to the New South Wales species *M. parma*, it seems to differ sufficiently in its cranial and external characters for its provisional retention as a species, although should specimens be obtained from intermediate localities, so as to reduce the very wide geographical gap that now appears to exist, it is probable that they will be so intermediate in their characteristics as to necessitate its union also with *M. eugenii*. Until such specimens are found, however, I retain the species as distinct.

<i>a.</i>	{ Ad. sk. } ♀	Kangaroo I., Spencer Gulf, S. A.	Gould Coll.
	{ Skull. }		
<i>b.</i>	{ Ad. sk. } ♂	"S. Coast Australia."	Gould Coll.
	{ Skull. }		
<i>c.</i>	{ Ad. st. } ♂	Wongan Hills, W. A.	Gould Coll.
	{ Skull. }	( <i>J. Gilbert</i> ).	

d, e.	{ Ad. ♀ sk. & yg. st. } { Skulls. }	Moore's R., W. A. ( <i>J. Gilbert</i> ).	Gould Coll. ( <i>d. Type of M. dama</i> , Gould.)
f, g.	{ Imm. ♀ sk. & yg. st. } { Skulls. }	Walyema Swamps, N.E. of Northam, W. A. ( <i>J. Gilbert</i> ).	Gould Coll. ( <i>f. Type of M. gracilis</i> , Gould.)
h, i.	{ Ad. sk. } { Skull of h. }	Perth, W. A.	Govt. of W. Australia [P.].
j.	{ Ad. sk. } { Skull. } ♀.	Swan River, W. A.	Lord Derby (through Zool. Soc.). ( <i>Type of H. derbianus</i> , Gould.)
k.	{ Ad. sk. } { Skull. } ♂.	Garden I., Mouth of Swan R., ( <i>J. Gilbert</i> ).	Gould Coll.
l, m.	{ Ad. ♂ st. & ♀ sk. } { Skulls. }	E. Wallaby I., Houtmann's Abrolhos.	Gould Coll. ( <i>Co-types of H. houtmanni</i> , Gould.)
n, o.	Ad. st., ♂ & ♀.	Wallaby I., Houtmann's Abrolhos.	B. Bynoe, Esq. [P. & C.].
p-s.	Skulls.	Houtmann's Abrolhos.	Gould Coll.
t.	{ Ad. sk. } { Skull. }		Old Coll. ( <i>Type of H. emilie</i> , Gray.)
u, v.	Ad. skeletons.		Zoological Society.

21. *Macropus parma*.

- Macropus* (*Halmaturus*) *parma*, *Waterh. N. H. Mamm.* i. p. 149, pl. v. fig. 7 (incisors) (1846) (*descr. orig.*).
- Halmaturus parma*, *Gray, Grey's Austr., App.* ii. p. 403 (1841) (*nom. nudum*); *id. List Mamm. B. M.* p. 91 (1843) (*nom. nudum*); *Wagn. Schr. Säug. Supp.* v. p. 324 (1855); *Gould, Mamm. Austr.* ii. pl. xxviii. (animal) (1856); *Kreffl, Cat. Mamm. Austr. Mus.* p. 50 (1864); *id. Austr. Vert.* p. 10 (1871); *Jent. Cat. Ost. Leyd. Mus.* p. 320 (1887).
- Macropus parma*, *Owen, Cat. Ost. Mus. Coll. Surg.* i. p. 325 (1853); *Gieb. Odontogr.* p. 43, pl. xix. fig. 11 c (incisors) (1855).

## PARMA WALLABY.

All essential characters as in *H. eugenii*, but the whole back more evenly mixed with rufous, the nape and forequarters not contrasting therefore with the centre of the back. White cheek-stripe and brown nuchal stripe both more clearly defined, and the latter somewhat narrower. Front of throat pure white, sharply contrasting with the sides of the neck. Belly greyish white. Ears short, their backs rufous grey.

*Skull* as in *M. eugenii*, but rather larger and heavier, and the nasals more evenly tapering forward, and their posterior edge less markedly bowed backwards. Rudimentary postorbital processes present.

*Teeth.* Incisors (Pl. IX. fig. 5) long and strong. I.<sup>3</sup> broad and stout, its posterior edge vertical or even slanting backwards, its external fold at its centre. P.<sup>4</sup> (Pl. X. fig. 11) more sharply pointed in front than in *M. eugenii*. Molars larger than in that species (see table of measurements, p. 63).



*Halmaturus rufiventer*, *Less. N. Tabl. R. A. Mamm.* p. 194 (1842);  
*Wagn. Schr. Säug. Supp.* iii. p. 120 (1843).

*Halmaturus brachytarsus*, *Wagn. Schr. Säug. Supp.* iii. p. 121 (1843).  
*Macropus (Halmaturus) billardieri*, *Waterh. N. H. Mamm.* i. p. 159,  
pl. v. fig. 11 (incisors) (1846); *Gunn, P. R. Soc. Tasm.* ii. p. 87  
(1852).

*Halmaturus brachyurus*, *Owen, Phil. Trans.* 1874, p. 787, pl. lxxvii.  
fig. 1 (lower view of skull) (*nec Quoy & Gaim.*).

#### RUFIOUS-BELLIED WALLABY.

Size large; form stout and heavy. Fur long, thick, and soft. Underfur long and soft, slaty grey. General colour uniform greyish brown, with an olive tinge, especially on the head and rump. Face and head olive-grey; face-markings quite obsolete, except that there is a pale yellowish line along the upper lip. Ears very short, their backs mostly olive-grey like the head, but margined anteriorly with black. Nape and forequarters usually dull grey-brown, sometimes with a tinge of rufous; an indistinct nuchal streak often present. Back and sides coarsely grizzled grey and black; a faint yellowish hip-stripe visible in some specimens. Chin, chest, and belly yellow, orange or rufous, the anal region most deeply coloured. Arms and legs grey-brown. Hands and feet brown. Tail very short, only about  $2\frac{1}{2}$  times as long as the head, greyish brown like the back, above orange proximally, and greyish white distally below.

*Skull* long and lightly built; facial index 207 to 220. Muzzle broad behind, tapering rapidly forwards. Premaxillæ oblique; incisors projecting much beyond the sub-nasal prominence; nasopremaxillary suture decidedly shorter than naso-maxillary. Nasals shaped somewhat as in *M. coxeni*, *i. e.* tapering gently forwards, their broadest point at the maxillo-frontal suture, and their posterior edge running nearly transversely across, instead of being bowed backwards into centre. Interorbital region strongly constricted, its edges not forming overhanging prominences. Anterior palatal foramina longer than in the allied species, about the length of *m*.<sup>4</sup>

*Teeth.* Incisors long and slender; *i*.<sup>3</sup> of medium length, the notch not quite so far back as in most of the present group. *P*.<sup>4</sup> (Pl. X. fig. 12) very peculiar in shape, broad posteriorly, with a well-marked postero-internal talon, and narrowing anteriorly to a point, the internal ledge not continued beyond about half the length of the tooth; three or four distinct external vertical ridges. Molars narrow and delicate.

#### Dimensions.

	♂.	♀.
	<i>h</i> (stuffed).	<i>j</i> (stuffed).
	millim.	millim.
Head and body ..	650	660
Tail .....	360	..
Hind foot .....	135	130
Ear .....	46	57

{ (Range from 130 to 140.)

Skull, see p. 63.

*Hab.* South-eastern South Australia, Victoria and Tasmania.

*Type* in the Paris Museum.

*M. billardieri* is the common small Wallaby of Victoria and Tasmania, where it is excessively abundant. It has been very often confused with the next species, the specimens of it in many museums and zoological gardens being labelled as *M. brachyurus*, which it resembles in its general colour and proportions, but which it exceeds very considerably in size, to say nothing of the very obvious differences between the two species in cranial and dental characters.

The length of the molars in this species is very remarkably constant, as in all the twelve specimens measured the combined lengths of ms.<sup>1-3</sup> falls between 16·5 and 17·1 millim., a range of only 0·6 millim.

a, b. { Ad. sks. } ♂ ♀.	Western Port, Victoria.	Purchased.
c. Skeleton, ♂.	Western Port, Victoria.	Purchased.
d-g. Ad. skulls.	Hummock's I., Bass's Straits ( <i>Voy. 'Herald'</i> ).	F. M. Rayner, Esq. [P.].
h. { Ad. sk. } ♂.	Tasmania.	Zool. Soc.
i. Ad. sk.	Tasmania.	( <i>Type of M. rufiventer</i> , Ogilb.) R. Gunn, Esq. [P. & C.].
j. Ad. st., ♀.	Tasmania.	( <i>Type of H. (Thylogale) tasmanei</i> , Gray.) Gould Coll.
k. { Ad. sk. } ♂.	Tasmania.	Gould Coll.
l. Imm. sk.	Tasmania.	Capt. Ross [P. & C.].
m. Imm. sk.	Tasmania.	Purchased.
n. Yg. sk.	Tasmania.	Purchased.
o. Ad. skull, ♂.	Tasmania.	Sir R. Owen [P.].
p. Ad. skull.	Tasmania ( <i>Voy. 'Fly'</i> ).	J. B. Jukes, Esq. [P.].
q. Ad. skull.	Mt. Gambier.	Sir R. Owen [P.].
r, s. Ad. & imm. skeletons.	S.E. South Australia.	Purchased.
t. Yg. skull.		Purchased.

### 23. *Macropus brachyurus*.

*Kangurus brachyurus*, *Quoy & Gaim. Voy. Astrolabe, Zool. i. p. 114, Atl. pl. xix.* (animal and skull) (1830).

*Macropus brachyurus*, *Less. H. N. Mamm. (Compl. Buff.) v. p. 378* (1836); *Waterh. Jard. Nat. Libr., Mamm. xi. p. 236* (1841); *Gieb. Odontogr. p. 43, pl. xix. fig. 1 B* (incisors) (1855); *id. Säug. p. 683* (1859); *id. Bronn's Kl. u. Ordn. vi. Abth. v. pl. xlvi. fig. 21 (16)* (incisors) (1876).

*Halmaturus (Thylogale) brevicaudatus*, *Gray, Ann. Mag. N. H. i. p. 108* (1838); *id. List Mamm. B. M. p. 90* (1843); *Gerrard, Cat. Bones Mamm. B. M. p. 125* (1862).

*Halmaturus brachyurus*, *Gray, Grey's Austr., App. ii. p. 403* (1841); *Wagn. Schr. Säug. Supp. iii. p. 123* (1843), *v. p. 326* (1855); *Schinz, Syn. Mamm. i. p. 558* (1844); *Gould, Mamm. Austr. ii.*

pls. xxxvii., xxxviii. (animal) (1855); *Jent. Cat. Ost. Leyd. Mus.* p. 320 (1887).

*Macropus (Setonyx) brachyurus*, *Less. N. Tabl. R. A., Mamm.* p. 194 (1842); *Chenu, Encycl. d' H. N., Mars.* p. 346 (1879).

*Macropus (Halmaturus) brachyurus*, *Waterh. N. H. Mamm.* i. p. 162, pl. v. figs. 16 & 16 a (skull and teeth) (1846).

#### SHORT-TAILED WALLABY.

Size small; form short and squat. Rhinarium with a central upward projection, as in *M. coxeni*. Fur long and thick, but coarse, at least in adult specimens. Underfur long and soft, dark slaty grey. General colour uniform, coarsely grizzled grey-brown, with a tinge of rufous in some specimens. Face grizzled grey, without definite markings; sides of cheeks pale grey or rufous. Ears very short and rounded, projecting but little from the long fur of the top of the head; their backs thickly haired, grizzled-grey. Back coarsely grizzled with grey and black; no body-markings at all. Chin, chest, and belly slaty grey. Arms and legs like body, hands and feet brown. Tail very short, only about twice the length of the head; brown above, greyish white beneath.

*Skull* (Pl. VII. fig. 4) much smaller than those of other members of the group, strongly built and broad in proportion to its length. Muzzle short, stout, and conical. Premaxillæ upright, the nasopremaxillary suture about equalling the naso-maxillary. Nasals short, very little broader behind than in front, their contraction forwards gradual and even, and their posterior suture much bowed backwards in the centre. Supraorbital edges forming in old specimens distinct postorbital processes, behind which there is a strongly marked intertemporal contraction. Zygomata remarkably broad and strong. Palatal foramina very short. Coronoid process of lower jaw unusually broad and powerful.

*Teeth* very differently proportioned to those of any other member of the genus. Incisors (Pl. IX. fig. 6) small and light;  $i^2$  very small, its edge shorter than that of either  $i^1$  or  $m^1$ , its notch about its centre instead of at the back.  $P^4$  (Pl. X. fig. 13) oblong, enormously broad and powerful, as broad in front as behind, with a well-marked internal ledge, and with three or four external vertical grooves. Molars very similar to those of *Dorcopsis*, small and light, with nearly or quite obsolete central connecting-ridges.

#### Dimensions.

	♂.
	a (skin).
	millim.
Head and body .....	(c.) 580
Tail .....	250
Hind foot .....	105
Ear .....	42

Skull, see p. 63.

*Hab.* Western Australia.

*Type* in the Paris Museum.

Although the cranial and dental characters of *M. brachyurus* show no approximation to those of *Potorous*, yet externally it so strikingly resembles the members of that genus found in the same region that its confusion with one of them would be by no means improbable. It may, however, always be distinguished either from *P. gilberti* or *P. platyops* by its longer feet, larger and proportionally shorter and thicker head, hairier ears, and grey instead of rufous-tipped underfur.

a.	{ Ad. sk. }	{ ♂.	King George's Sound, W. A.	John Gilbert, Esq.
	{ Skull. }			[C.].
b.	Imm. st.,	♀.	King George's Sound, W. A.	Gould Coll.
			( <i>J. Gilbert</i> ).	
c.	{ Imm. st. }	{ ♀.	Perth, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
	{ Skull. }		( <i>b &amp; c. Co-types of H. brevicaudatus, Gray.</i> )	
d.	Imm. sk.,	♀.	Augusta, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.

## 2. PETROGALE.

*Type.*

*Heteropus*, *Jour. C. R.* v. p. 522, Oct. 1837; *Ann. Sci.*

*Nat.* (2) viii. p. 368 (1837). (*Nec Pal. de Beauv.*

1805, Orthoptera; *nec Fitzinger*, 1826, Reptilia.) . . . *P. penicillata*.

*Petrogale*, *Gray, Charlesw. Mag. N. H.* i. p. 583, Nov.

1837 . . . . . *P. penicillata*.

Rhinarium naked. Fur on back of neck directed downwards. Central hind claws very short, only exceeding the toe-pads by two or three millimetres. Tail long, cylindrical, not so thick as in *Macropus*, thickly haired and pencilled at its extremity.

*Skull* as in the smaller members of the genus *Macropus*. Supra-orbital edges well developed, more or less overhanging. Palatal foramina short. Bony palate with large vacuities. Bullæ sometimes more or less inflated.

*Dentition*:—I.  $\frac{1.2.3}{1.0.0}$ , C.  $\frac{0}{0}$ , P.  $\frac{0.0.3.4}{0.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 32$ .

Incisors small and light;  $i^3$  very similar to that of *Macropus brachyurus*, viz. small, delicate, with a well-marked notch about its centre, the part behind the notch nearly as long as that in front.  $P^4$  large and heavy, very similar in all the species, resembling in shape and size that of certain of the smaller Wallabies, such as *M. coxeni* or *wilcoxi*; a well-marked internal ledge running its whole length, and two or three indistinct vertical ridges on its external side. Molars as in the Wallabies (*Macropus*, groups II. & III.).

*Range.* The whole of Australia, but not Tasmania.

Although very closely allied to the second and third groups of the genus *Macropus*, the Rock-Wallabies are, on the whole, fairly entitled to generic separation, as they form a natural and easily definable group. Their habits differ considerably from those of the plain-loving Wallabies, as they inhabit rocky regions, climbing

*Skull Measurements of Small Wallabies.*

Species .....	<i>M. cozzeni</i>		<i>M. stig- maticus</i>		<i>M. epicozzi</i>		<i>M. browni</i>		<i>M. thetidis</i>		<i>M. eugenii</i>				<i>M. parma</i>		<i>M. billardieri</i>		<i>M. bra- chyurus</i>													
	♂. a. aged.	(c.) 104	♂. a. aged.	...	♂. a. aged.	91.5	♀. b. aged.	88	♂. a. imm.	(c.) 84	(♂). a. aged.	106	(♀). h. just aged.	91	(Mainland.) ♂. v. aged.	93	(Mainland.) ♀. j. aged.	87	(Island.) ♂. n. aged.	90	♂. nearly ad. adult.	84	(♂). a. aged.	99	(♀). a. aged.	95.5	♂. a. aged.	(c.) 86				
Basal length .....	54.5	56	49.5	45.5	54.5	58	39	32	14	16.5	16.3	83	8.5	10.7	15	14.8	15	14.2	14	12	14.2	14.2	14	14	12	14	12	14	12			
Greatest breadth .....	42	43.3	36	39	37.5	37.5	36	32	18	17.2	17.2	8.6	7	8.6	8.5	8.5	10.7	9.3	9.8	9	8	7.3	7.3	7.5	9	9	9	9	9			
Nasals, length .....	15.2	16.8	13.2	14	13.2	14	13.5	18	6.5	7	7	10.1	8.3	8.5	8.5	8.5	10.7	9.3	9.8	9	8	7.3	7.3	7.5	9	9	9	9	9			
" greatest breadth .....	9	8	7	8.6	6.5	7	7	8.6	6.5	7	7	10.1	8.3	8.5	8.5	10.7	9.3	9.8	9	8	7.3	7.3	7.5	9	9	9	9	9	9	9		
" least breadth * .....	15.1	16.5	13.5	18	14	14	13.5	18	14.5	14.5	12.8	12.9	14.1	15	14.3	16	15	14.3	16	14.8	15	14.8	15	14	12.1	10	10	10	10	10		
Constriction, breadth .....	67	66	56	63	60	60	56	63	(c.) 51	70	60	61	58	58	54	54	58	54	54	60	54	60	54	62.5	57.5	53	53	53	53	53		
Palate, length .....	28.2	31	28	30	29	31	29	30	27	31	29	27	25.5	24	23	23	25.5	24	23	27	27	27	28	28	27	26.5	26.5	26.5	26.5	26.5		
" " outside m. 2 .....	19	19.5	18.5	19.5	18.3	18.3	18.5	19.5	16	20	17.7	17.6	16	15.3	15.4	16	15.3	15.4	15.3	17	17	17	18.8	18	18	17.4	17.4	17.4	17.4	17.4		
" " inside m. 2 .....	5.6	5.5	5.7	5.8	5.2	5.2	5.7	5.8	5.9	4.7	4.7	5.1	4.7	5	4	5	5	4	4	5.1	6	7	7	6.7	6.7	6.7	6.7	6.7	6.7	6.7		
Palatal foramen .....	22.5	21.5	19	22	20.5	20.5	19	22	16	27	19.3	25	25	25	21	21	25	21	21	24.5	22	24	24	22	22	15.6	15.6	15.6	15.6	15.6		
Diastrama .....	...	...	29	29.5	29	29	29.5	29.5	...	33.5	28	30	28	30	28.7	28.6	28	28	28.7	28.6	27.5	27.5	32	32	31.4	...	...	...	...	...		
Basal-cranial axis .....	...	70	64.5	69	64.5	64.5	61	69	57	76.5	64.5	64	60	61	58	63.8	60	61	58	63.8	58	58	70.2	70.2	65.1	...	...	...	...	...		
Basal-facial axis .....	...	224	214	234	224	224	214	234	...	239	230	213	213	203	202	223	213	203	202	223	211	211	219	219	207	...	...	...	...	...		
Facial index .....	5.1	6	5.3	5.3	5.1	5.1	5.3	5.3	5.5	7	7.1	4.8	4.7	4	3.6	5.7	4.7	4	3.6	5.7	6	6	6	6	5.4	3.5	3.5	3.5	3.5	3.5		
Teeth—length of 1.3 .....	7	7.5	7.7	7	7.7	7.7	8.5	7	7.1	6.1	7	5	5	5	4.7	5	5	5	4.7	5	5.1	5.1	6.3	6.3	6.1	8	8	8	8	8		
" " p.4 .....	17.3	19.3	17.5	18.5	17.5	17.5	17.4	18.5	19.5	20	19.7	18	16	15.6	15.5	21.2	16	16	15.6	21.2	19.5	19.5	17	17	17	15.4	15.4	15.4	15.4	15.4	15.4	
" " ms.1-3 .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

\* In this group it has been found more useful to take, instead of the "central," the least breadth of the nasals posterior to the junction of their edges with the ascending process of the premaxillary.

about the cliffs with remarkable agility. Their long bushy tails are used as balancers, and are not therefore thickened and strengthened for use as a third support, as is the case with the ordinary Wallabies.

*Synopsis of the Species.*

I. EXTERNAL CHARACTERS.

- A. Tail annulated with brown and pale yellow.  
*a.* A dark nuchal stripe present. Ears uniform yellow behind : . . . . . 1. *P. xanthopus*, p. 64.
- B. Tail unannulated, darkening towards end.  
*b.* Back of ears grey at base, brown or black for terminal half. A black occipital streak.  
*a*<sup>1</sup>. Tail nearly all black. Occipital streak not extending down neck. E. Australia . . . . . 2. *P. penicillata*, p. 66.  
*b*<sup>1</sup>. Tail about half black. Occipital streak passing down neck to centre of back. W. Australia . . . . . 3. *P. lateralis*, p. 68.
- c.* Back of ears uniform grey or fawn, sometimes tipped with white. No occipital or nuchal streak.  
*c*<sup>1</sup>. Shoulder-markings present. . . . . 4. *P. brachyotis*, p. 69.  
*d*<sup>1</sup>. No shoulder- or flank-markings present.  
*a*<sup>2</sup>. Size medium; hind foot about 130 millim. . . . . 5. *P. inornata*, p. 70.  
*b*<sup>2</sup>. Size very small; hind foot about 100 millim. . . . . 6. *P. concinna*, p. 71.

II. CRANIAL CHARACTERS.

- A. Length of skull, when adult, more than 90 millim.  
*a.* Muzzle broad, its sides and the interorbital region inflated. Greatest breadth of nasals about one third their length . . . . . 1. *P. xanthopus*, p. 64.  
*b.* Muzzle narrow, neither its sides nor the interorbital region inflated. Greatest breadth of nasals about one fourth their length . . . . . 2. *P. penicillata*, p. 66.
- B. Length of skull between 80 and 90 millim.  
*c.* Frontal outline concave above front of orbit. Nasals little expanded behind . . . . . 3. *P. lateralis*, p. 68.  
*d.* Frontal outline convex or straight above front of orbit. Nasals expanded behind, as in Pl. XII. fig. 2 . . . . . 4. *P. brachyotis*, p. 69.
- C. Length of skull less than 75 millim.  
*e.* Nasals much expanded behind . . . . . 6. *P. concinna*, p. 71.
- D. Cranial characters unknown . . . . . 5. *P. inornata*, p. 70.

1. *Petrogale xanthopus*.

*Petrogale xanthopus*, Gray, *P. Z. S.* 1854, p. 249, pl. xxxix. (animal); Gould, *Mamm. Austr.* ii. pls. xliii., xlv. (animal) (1855); Gerrard, *Cat. Bones Mamm. B. M.* p. 128 (1862); Krefft, *Austr. Vert.*

p. 11 (1871); *Brehm, Thierl.* ii. p. 594 (fig. of animal) (1880); *List. & Fletcher, P. Z. S.* 1881, p. 984 (anat.); *Jent. Cat. Ost. Leyd. Mus.* p. 323 (1887); *Poulton, P. Z. S.* 1883, p. 609 (anat. of tongue).

"*Phalangista xanthopygus*," *Gieb. Bronn's Kl. u. Ordn.* vi. Abth. v. pl. xx. figs. 4-7 (skull) (1874).

*Macropus xanthopus, Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 715 (1884).

#### YELLOW-FOOTED ROCK-WALLABY.

Size large. Fur long, soft and silky. Underfur thick and close, dark grey. General colour of back grey; head and extremities richly ornamented. Face and crown grey, with a tinge of yellowish; a well-defined white cheek-stripe running from the mouth below the eye nearly to the ear; a rich orange spot above each eye. Ears long, their backs uniform dark yellow, and their inner sides edged with white, except at the tips, which are yellow, like the outer. Back grey, a well-defined black streak running from between the ears to the middle of the back. A triangular brown blotch behind the elbow, followed by a pure white lateral streak, which runs down the body to the hip. Top of knee with another brown mark, outside which there is a prominent white patch. Chin, chest, and belly pure white. Arms and hands, legs and feet uniform rich yellow, the tips of the fingers and toes brown. Tail annulated above with alternate bands of dark brown and pale yellow, the brown bands gradually becoming united on the upperside, and forming a well-marked blackish crest; the bands visible on the sides nearly to the tip; underside yellowish or brownish white all along; extreme tip sometimes yellow.

*Skull* (Pl. XII. fig. 1) large and strong, especially the facial portion. Muzzle broad and conical, the sides inflated, especially just above p.<sup>4</sup> Premaxillæ fairly upright. Nasals long, expanded behind, their greatest width about twice their least, and going about three times into their length; the shape of their posterior edge variable. Interorbital and posterior nasal region swollen, the swelling passing away opposite the intertemporal constriction. Supraorbital edges rounded in front, sharp and overhanging behind, converging backwards. Bullæ transparent, slightly swollen.

*Teeth* largest and heaviest in the genus.

#### *Dimensions.*

	♂. a (skin). millim.	♀. c (stuffed). millim.
Head and body.....	(c.) 800	680
Tail .....	600	600
Hind foot .....	170	160
Ear .....	74	70
Skull, see p. 72.		

*Hab.* South Australia.

*Co-types* in collection.

This animal is by far the most strikingly coloured of the family, but the contrasts are of so glaring a nature as to prevent its being pleasing to the eye. Its skull is readily distinguishable from those of the other species by the inflation of the muzzle and forehead, although this inflation cannot compare in extent with that found in *Macropus antilopinus*, being more like the moderate inflation present in *M. giganteus* (see *suprà*, p. 17).

a, b.	$\left. \begin{array}{l} \text{Ad. sks.} \\ \text{Skull of } a. \end{array} \right\} \begin{array}{l} \text{♂} \\ \text{♀} \end{array}$	Flinder's Range, S. A.	F. Strange [C.]
c.			Ad. st., ♀.
d.	Yg. st.	South Australia.	Zoological Society.
e.	Ad. skull.	South Australia (F. G. Waterhouse).	Sir R. Owen [P.].

## 2. *Petrogale penicillata*.

- Kangurus penicillatus*, *Gray, Griff. Cuv. An. K. v. p. 204 (1827)*.  
*Macropus penicillatus*, *Benn. P. Z. S. 1835, p. 1, 1836, p. 41*;  
*Less. H. N. Mamm. (Compl. Buff.) x. p. 364 (1836)*; *Benn. Cat. N. H. Austr. Mus. p. 6 (1837)*; *Waterh. Cat. Mamm. Mus. Zool. Soc. p. 66 (1838)*; *id. Jard. Nat. Libr., Mamm. xi. p. 243, pl. xxii. (animal) (1841)*; *Gieb. Odontogr. p. 43, pl. xix. fig. 16 B (incisors) (1855)*; *id. Nat. Thierr. i. p. 236 (1859)*; *id. Säug. p. 683 (1859)*; *id. Bronn's Kl. u. Ordn. vi. Abth. v. pl. xlvii. fig. 21 (10) (1876)*; *Lyd. Cat. Foss. Mamm. B. M. v. p. 221 (1887)*.  
*Heteropus albogularis*, *Jourd. C. R. v. p. 522 (1837)*; *id. Ann. Sci. Nat. (2) viii. p. 368 (1837)*; *Less. N. Tabl. R. A., Mamm. p. 194 (1842)*.  
*Petrogale penicillata*, *Gray, Charlesw. Mag. N. H. i. p. 583 (1837)*; *id. Grey's Austr., App. ii. p. 403 (1841)*; *Gould, Mon. Macrop. pl. xxiii. (animal) (1842)*; *Gray, List Mamm. B. M. p. 92 (1843)*; *Gould, Mamm. Austr. ii. pls. xxxix., xl. (animal) (1853)*; *Gerrard, Cat. Bones Mamm. B. M. p. 128 (1862)*; *Kreffft, Cat. Mamm. Austr. Mus. p. 51 (1864)*; *id. Austr. Vert. p. 11 (1871)*; *Brehm, Thierl. ii. p. 594 (1880)*; *Fletch. P. Linn. Soc. N. S. W. viii. p. 7 (1883)*; *Jent. Cat. Ost. Leyd. Mus. p. 322 (1887)*; *Coll. Zool. Jahrb. ii. p. 891 (1887)*.  
*Halmaturus albogularis*, *Wagn. Schr. Säug. Supp. iii. p. 126 (1843)*; *Schinz, Syn. Mamm. i. p. 561 (1844)*.  
*Halmaturus penicillatus*, *Wagn. Schr. Säug. Supp. iii. p. 125 (1843), v. p. 327 (1855)*; *Schinz, Syn. Mamm. i. p. 559 (1844)*; *Blyth, Cat. Mamm. Mus. As. Soc. p. 185 (1863)*.  
*Macropus (Heteropus) penicillatus*, *Waterh. N. H. Mamm. i. p. 167, pl. i. (animal), pl. v. fig. 10 (incisors) (1846)*.  
*Macropus albogularis*, *Schleg. Dierk. p. 143 (1857)*.  
 (?) *Petrogale longicauda* \*, *Kreffft, P. Z. S. 1865, p. 324*.

\* Said to be distinguished "from all other species by its remarkably long and bushy tail, which is about a foot longer than that of any other Rock-Wallaby." I can only presume that Mr. Krefft had not a full-grown male specimen of *P. penicillata* with a perfect tail available, as the tail of this species often attains a length of 24 inches, so that the 27 inches of the specimen described by Mr. Krefft is by no means beyond what might be expected occasionally to occur.

(?) *Petrogale assimilis*\*, *Rams. P. Linn. Soc. N. S. W.* i. p. 360 (1876).

*Macropus* (*Heteropus*) *assimilis*, *Rams. P. Linn. Soc. N. S. W.* ii. p. 11 (1877).

BRUSH-TAILED ROCK-WALLABY.

Size large; form stout and heavy. Fur long, thick and coarse. General colour not unlike that of *Macropus ualabatus*, viz. dull brown, more rufous on rump. Face dark grey-brown, ill-defined dark whisker-mark and light cheek-stripe. Crown grey, a narrow black line running along its centre from just behind the level of the eye to the occiput, not extending down the neck. Ears short, their insides and their posterior edges outside yellow; rest of their backs grey at base, black terminally. Back dull grey-brown, the hairs tipped with white on the forequarters, gradually becoming deep rufous on the rump and base of tail. A black mark behind the shoulder succeeded by a pale grey one, but both often hardly visible. Chin and chest pale grey. Belly brown tinged with yellow; anal region rich yellowish rufous. Arms and legs brown or rufous-brown; fingers and toes black. Tail long, more or less bushy, pencilled at tip, its basal three or four inches rufous like the back, the remainder deep black; extreme tip sometimes yellow.

*Skull* long, more lightly built than in *P. xanthopus*, the muzzle long and slender. No inflation on sides of muzzle or on forehead. Nasals very long, narrow, and little expanded behind, their greatest width only about once and a half their least, and barely one quarter of their length. Interorbital region markedly concave; supraorbital edges prominent, raised and overhanging, not converging backwards so much as in *P. xanthopus*. Palatal foramina short, not penetrating into maxilla. Bullæ opaque, rough and unswollen.

*Teeth* (Pl. IX. fig. 7 and Pl. X. fig. 14) as usual;  $i^3$  rather longer and more *Macropus*-like than in the other species.

*Dimensions.*

	♂. <i>a</i> (stuffed). millim.	♀. <i>b</i> (skin). millim.
Head and body . . . . .	720	720
Tail . . . . .	560	560
Hind foot . . . . .	164	154
Ear . . . . .	48	51

Skull, see p. 72.

*Hab.* Eastern Coast districts, from Queensland to Victoria (Port Essington?)

*Type* not in existence.

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\* This species is stated to be smaller, to have less bristly feet, and less prominent side-stripe than in *P. penicillata*; but these points do not seem to be sufficiently well marked to justify its retention as a separate species, especially as the type was a female, and may easily have been not fully adult.

a. Ad. st., ♂.	New South Wales.	Gould Coll.
b, c. { Ad. sks. } { Skull of b. } ♀.	New South Wales.	Gould Coll.
d, e, f. { Ad. & yg. sks. } { Skulls of e & f. }	Port Essington (?)*	Purchased.
g, h, i. Ad. & yg. skeletons.		Zoological Society.
j. Skull.		G. R. Waterhouse, Esq. [P.].

### 3. *Petrogale lateralis*.

*Petrogale lateralis*, *Gould, Mon. Macrop.* pl. xxiv. (animal) (1842) (*descr. orig.*); *Gray, Grey's Austr., App.* ii. p. 403 (1841) (*nom. nud.*); *id. List Mamm. B. M.* p. 92 (1843); *Gould, Mamm. Austr.* ii. pls. xli., xlii. (animal) (1857); *Gerrard, Cat. Bones Mamm. B. M.* p. 128 (1862); *Kreffl, Austr. Vert.* p. 11 (1871); *Jent. Cat. Ost. Leyd. Mus.* p. 322 (1887).

*Macropus* (*Heteropus*) *lateralis*, *Waterh. N. H. Mamm.* i. p. 172 (1846).

*Halmaturus lateralis*, *Wagn. Schr. Säug. Supp.* v. p. 328 (1855).

*Macropus lateralis*, *Gieb. Säug.* p. 683 (1859).

#### WEST-AUSTRALIAN ROCK-WALLABY.

Size small; form slender and light. Fur long, soft, close, and of a rather woolly texture. General colour light grey. Face grey; a well-defined dark whisker-mark running through the eye nearly to the ear, succeeded below by a whitish or yellowish cheek-stripe. Crown dark grey, the tips of the hairs black; between the ears there commences a narrow black or brown line which runs down the neck and disappears about the centre of the back. Ears short, inside and at base of outside yellow, terminal half outside brown, but extreme tips yellow. Back grey, with a faint rusty tinge; a prominent black or brown mark just behind the elbow, succeeded by a well-defined white stripe running down to the hip. Front of knee brown, connected by a brown band with the dark shoulder-spot. Chin, centre of chest, and belly yellowish grey; sides of chest and inner sides of arms brown. Arms, legs, and feet grey; fingers and toes black. Tail grey for its proximal, black for its terminal half.

*Skull* (Pl. XII. fig. 3) small and lightly built. Muzzle long and slender. Nasals long and narrow, evenly but slightly expanded behind. Interorbital region very markedly concave, so much so as to make a distinct concavity at this point in the general profile-line, when viewed from the side. Supraorbital ridges prominent, overhanging, not converging backwards, forming indistinct rudimentary postorbital processes. Bullæ smooth, transparent, distinctly swollen.

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\* This locality is probably incorrect, as it is very unlikely that the species should occur in a place where the fauna is so wholly different from that of the Eastern and South-eastern coast of Australia.

*Teeth* (Pl. IX. fig. 8, and Pl. X. fig. 15) comparatively small and delicate; their proportion as usual.

*Dimensions.*

	♂. b (skin). millim.	♀. c (stuffed). millim.
Head and body . . . . .	(c.) 590	600
Tail . . . . .	460	420
Hind foot . . . . .	139	120
Ear . . . . .	48	49

Skull, see p. 72.

*Hab.* Western Australia.

*Types* in collection.

a.	{ Ad. sk. } { Skull. } ♂.	N.W. coast of Australia.	B. Bynoe, Esq. [P. & C.].
b, c.	{ Ad. sks. } { Skulls. } ♂ ♀.	Swan R., W. A. ( <i>J. Gilbert</i> ).	Gould Coll. ( <i>Co-types</i> of species.)
d.	Skull.	Swan R., W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
e.	Skull.		Gould Coll.

4. *Petrogale brachyotis*.

*Macropus* (*Petrogale*) *brachyotis*, *Gould, P. Z. S.* 1840, p. 129; *Less. N. Tabl. R. A., Mamm.* p. 194 (1842).

*Petrogale brachyotis*, *Gould, Mon. Macrop.* pl. vi. (animal) (1841); *Gray, Grey's Austr., App.* ii. p. 403 (1841); *Gray, List Mamm. B. M.* p. 92 (1843); *Gould, Mamm. Austr.* ii. pl. xlvii. (animal) (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 128 (1862); *Kreffl, Austr. Vert.* p. 11 (1871).

*Macropus brachyotis*, *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 247 (1841); *Gieb. Säug.* p. 684 (1859).

*Halmaturus brachyotis*, *Schinz, Syn. Mamm.* i. p. 562 (1844); *Wagn. Schr. Säug. Supp.* v. p. 330 (1855).

*Macropus* (*Heteropus*) *brachyotis*, *Waterh. N. H. Mamm.* i. p. 176 (1846).

SHORT-EARED ROCK-WALLABY.

Size small, form light and slender. Fur short and thin; underfur sparse, dark slaty grey. General colour greyish fawn. Head pale grey; face-markings almost obsolete. Ears very short, their backs uniform fawn-grey like the head, their edges and extreme tips white. Body-markings present, but not prominent; a dark brown blotch behind the elbow, succeeded by a whitish band. Chin, chest, and belly greyish white. Limbs pale grey. Tail grey above, whitish below for three-fourths of its length, the terminal fourth tufted with longer dark brown hairs.

*Skull* (Pl. XII. fig. 2) about the same size as that of *P. lateralis*, but more heavily built. Muzzle broad, conical. Nasals narrow in front, much expanded behind, their posterior edge projecting backwards in the centre only. Interorbital region flat or very slightly

concave, but this concavity not enough to show in a lateral view of the skull. Supraorbital edges sharp, less prominent than in *P. lateralis*. Bullæ slightly inflated.

*Teeth* as in *P. lateralis*, but p.<sup>4</sup> rather larger and heavier.

*Dimensions.*

	♂. a (stuffed). millim.	♀. b (skin). millim.
Head and body . . . . .	540	540
Tail . . . . .	400	360 (?)
Hind foot . . . . .	130	122
Ear . . . . .	40	34

Skull, see p. 72.

*Hab.* North-west coast of Australia.

*Co-types* in collection.

a, b. } Ad. sks. } ♂ ♀ Hanover Bay, N.W. coast of Gould Coll. (*Co-*  
 } Skulls. } Australia (*Sir G. Grey*). } *types* of species.)

5. *Petrogale inornata*.

*Petrogale inornata*, *Gould*, *P. Z. S.* 1842, p. 5; *id. Mon. Macrop.* pl. xxv. (animal) (1842); *Gray*, *List Mamm. B. M.* p. 92 (1843); *Gould*, *Mamm. Austr.* ii. pls. xlv., xlvi. (animal) (1860); *Kreffft*, *Austr. Vert.* p. 11 (1871).

*Halmaturus inornatus*, *Schinz*, *Syn. Mamm.* i. p. 566 (1844); *Wagn. Schr. Säug. Supp.* v. p. 331 (1855).

*Macropus (Heteropus) inornatus*, *Waterh. N. H. Mamm.* i. p. 175 (1846).

*Macropus inornatus*, *Gieb. Säug.* p. 684 (1859).

PLAIN-COLOURED ROCK-WALLABY.

“General colour of the upper parts sandy grey, grizzled over the shoulders and becoming much lighter on the flanks; an indistinct line of a lighter hue along the face under the eye; ears sandy grey, bordered by a very narrow line of dark brown on their inner edge; a dark patch on the occiput, passing into a dark line down the forehead; a dusky red patch behind the elbow; under surface sandy white, inclining to rufous on the lower part of the abdomen; arms and tarsi sandy grey, passing into dark brown at the extreme tips of the toes; basal half of the tail sandy brown, the remainder black, the former colour extending along the sides of the tail for some distance towards the tip.”

(Skull and teeth unknown.)

*Dimensions*, ♂. “Head and body 580 millim.; tail (c.) 390; hind foot 133\*; ear 47.”

*Hab.* “North coast of Australia.”

*Type* not traceable.

The above description is taken from Gould’s ‘Mammals of Australia,’ as the typical specimen referred to by him, although originally deposited in the Museum, was afterwards reclaimed by Mr. B.

\* Including claw.

Bynoe, its discoverer, and has now disappeared. The species must be very closely allied to *P. brachyotis*, and may indeed have been founded upon an individual of that species with the markings unusually indistinct.

### 6. *Petrogale concinna*.

*Petrogale concinna*, *Gould, P. Z. S.* 1842, p. 57; *Gray, List Mamm. B. M.* p. 92 (1843); *Gould, Mamm. Austr.* ii. pl. xlviii. (animal) (1856); *Krefft, Austr. Vert.* p. 11 (1871).

*Halmaturus concinnus*, *Schinz, Syn. Mamm.* i. p. 565 (1844); *Wagn. Schr. Säug. Supp.* v. p. 331 (1855).

*Macropus (Heteropus) concinnus*, *Waterh. N. H. Mamm.* i. p. 177 (1846).

*Macropus concinnus*, *Gieb. Säug.* p. 684 (1859).

#### LITTLE ROCK-WALLABY.

Size very small; form slender. Fur short, soft, and silky. Underfur thick, long, and soft, slate-coloured at base, rufous-fawn at tip. General colour rich orange-rufous. Head pale fawn, face-markings obsolete. Ears very short, their backs like the head. Body without any markings, except a very faint trace of the dark patch behind the elbow. Fur of back mainly made up of the underfur, the rufous tips of which give the general tone to the colour; the longer hairs, which are black for their basal half or terminal fourth, the other fourth being white, scarcely affecting the general colour. Chin, chest, and belly white or greyish white. Arms, legs, and feet greyish fawn. Tail pale rufous grey at its base, gradually becoming darker towards the tip, the hairs forming a yellowish-brown, and not a black, terminal pencil.

*Skull* (Pl. XII. fig. 4) very small, and quite different in shape from that of the other species. Facial portion comparatively short and brain-case large. Muzzle short, narrow, and pointed, not inflated. Nasals very narrow in front and enormously broadened behind, their greatest breadth more than three times their least, and more than half their length. Interorbital region broad, flat, parallel-sided, the edges sharp but not thickened. Bullæ slightly swollen.

*Teeth.* Incisors (Pl. IX. fig. 9) very small and slender;  $i^3$  about the length of the edge of  $i^1$ . Cheek-teeth, in the only available specimen, all square and molariform, five on one side and four on the other. Whether, however, the molar-shaped anterior tooth of the five is a much modified  $p^4$ , a milk- $p^4$  with its successor aborted, or an  $m^1$  in a specimen developing five molars on each side\*, it is impossible to determine without further specimens for comparison.

*Dimensions*, ♂ (imm.). Head and body 350; hind foot 94; ear 27. Skull, see next page.

*Hab.* North-west Australia.

*Type* in collection.

a. { Imm. sk. { ♂ N.W. coast of Australia Sir John Richardson [P.]  
 { Skull. { (Lieut. Emery). (Type of species.)

\* As happens occasionally in *Bettongia*, see below, p. 105 (footnote).



## 3. ONYCHOGALE.

Type.

*Onychogalea*, Gray, *Grey's Austr.*, App. ii. p. 402 (1841);  
*id. List Mamm. B. M.* p. 88 (1843) (*nec Gray, P. Z. S.*  
 1864, pp. 509, 570)..... *O. unguifera*.

Rhinarium hairy, the bottom of the internasal septum alone naked in some species. Central hind claws long, narrow, compressed, and very sharp. Tail long, tapering, short-haired, not bushy, more or less crested towards the tip; its extreme end provided with a peculiar horny epidermic excrecence, forming a spur or nail at the tip.

*Skull* much as in *Macropus*. Bullæ more or less inflated.

*Dentition* :—I.  $\frac{1.2.3}{1.0.0}$ , C.  $\frac{0 \text{ or } 1}{0}$ , P.  $\frac{0.0.3.4}{0.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 32$   
 or 34.

Incisors small and light, decreasing evenly in size from before backwards;  $i^2$  and  $i^3$  very slender, slanting strongly forwards;  $i^3$  thinner and lighter than  $i^2$ , its edge considerably shorter than  $m^1$  or even  $p^4$ , its notch about its centre (see Plate IX. figs. 10 & 11). Canines small or absent.  $P^4$  small, hourglass-shaped, without internal ledge. Molars as in *Macropus*.

*Range*. All Australia. Not found in Tasmania.

The Nail-tailed Wallabies form a natural little group, distinguished both by the shape of the incisors and by the peculiar horny excrecence at the tip of the tail. This latter character is altogether unique among Marsupials, and is only found among other Mammals in the Lion, which sometimes has a somewhat similar horny spur at the end of its tail. In the case of the Wallabies it is difficult to conceive what can be the use of the spur; and observations on the living animal are much needed with regard to this interesting point.

*Synopsis of the Species.*

## I. EXTERNAL CHARACTERS.

- A. General colour fawn. Tail very long, its terminal nail large, flattened ..... 1. *O. unguifera*, p. 74.  
 B. General colour grey. Tail medium, its terminal nail small, rounded.  
 a. White shoulder-stripes running forwards along back of neck; centre of neck black or grey ..... 2. *O. frenata*, p. 75.  
 b. White shoulder-stripes ending above scapulae; neck dark rufous ..... 3. *O. lunata*, p. 77.

## II. CRANIAL CHARACTERS.

- A. Forehead inflated. Canines present.  $P^4$  more than 4 millim. long ..... 1. *O. unguifera*, p. 74.  
 B. Forehead flat. Canines minute or absent.  $P^4$  less than 4 millim.  
 a. Palatal foramen equal to or longer than  $m^1$ . Bullæ but little inflated ..... 2. *O. frenata*, p. 75.  
 b. Palatal foramen shorter than  $m^1$ . Bullæ much inflated. .... 3. *O. lunata*, p. 77.

1. *Onychogale unguifera*.

- Macropus unguifer*, *Gould, P. Z. S.* 1840, p. 93; *id. Mon. Macrop.* pl. iv. (animal) (1841); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 201 (1841); *Less. N. Tabl. R. A., Mamm.* p. 194 (1842); *Gerv. H. N. Mamm.* ii. p. 270 (1855); *Schleg. Dierk.* p. 142 (1857); *Gieb. Säug.* p. 674 (1859).
- Macropus (Onychogalea) unguifer*, *Gray, Grey's Austr.* ii. p. 402 (1841); *Waterh. N. H. Mamm.* i. p. 75 (1846).
- Onychogalea unguifer*, *Gray, List Mamm. B. M.* p. 88 (1843); *Gould, Mamm. Austr.* ii. pls. lii., liii. (animal) (1859); *Kreffl, Austr. Vert.* p. 11 (1871).
- Halmaturus unguifer*, *Schinz, Syn. Mamm.* i. p. 547 (1844); *Wagn. Schr. Säug. Supp.* v. p. 303 (1855).
- Onychogalea annulicauda*, *De Vis, P. Roy. Soc. Queensl.* i. p. 157 (1884).

## NAIL-TAILED WALLABY.

Largest of genus; form light and slender. Rhinarium (Pl. XI. fig. 5) broad, less hairy than in the other species, the hair coming down in the centre barely to the level of the lower edge of the nostril. Fur thick, close, and rather short, very largely composed of the long, soft, rufous underfur. General colour uniform sandy fawn\*. Face and head pale fawn, the tips of the hairs white. An indistinct white cheek-stripe. In some (? immature) specimens the muzzle is brown, and there are darker markings between the eye and ear and behind the base of the latter. Ears thinly covered with white hairs. Neck and back uniform rich sandy fawn; a central darker stripe on the back and rump, very variable in its intensity. Sides paler, the bases of the longer and the whole of the underfur dark slate-colour. An indistinct white mark behind the elbow, corresponding to the well-defined white line in the other species, and a white hip-stripe present. Chin, chest, and belly white, the bases of the hairs slaty grey. Arms and hands, feet and front of legs white; back of legs fawn. Tail very long, white above, sandy below, its terminal third showing a tendency to annulation, the rings being brown and gradually becoming darker, and coalescing into the wholly black tail-tip, the black hairs forming a crest along the uppersides and a well-marked pencil at the tip. Terminal nail (Pl. XI. fig. 6) large and flattened laterally, from 10 to 15 millim. long and about 7 or 8 broad, placed vertically; wholly hidden in the long pencil of hairs.

*Skull* heavily built. Facial portion very long in comparison to cranial (facial index 250). Forehead markedly inflated, the posterior half of the nasals much bowed upwards in the middle line. Nasals evenly converging forwards, their greatest breadth nearly half their length, their posterior edge sinuous. Interorbital space flat, its edges converging backwards, overhanging, and forming rudimentary postorbital processes. Palatal foramina rather shorter

\* In specimens long exposed to light this colour becomes nearly or quite white, especially on the head.

than m.<sup>1</sup> Posterior palate with only a few small vacuities. Bullæ smooth, slightly swollen.

*Teeth.* Incisors (Pl. IX. fig. 10) largest in the genus; i.<sup>3</sup> long, slanting nearly horizontally forwards. Canines present and probably functional to a certain extent, about 3 or 4 millim. long and 1 millim. in diameter, their tips rounded. P.<sup>4</sup> triangular, rounded, its posterior transverse diameter nearly double its anterior, owing to the large size of the postero-internal talon; its two main cusps very high, and the notch between them unusually deep.

*Dimensions.*

	♂. a (skin). millim.
Head and body . . . . .	660
Tail . . . . .	665
Hind foot . . . . .	174
Ear . . . . .	61
Skull, see p. 79.	

*Hab.* North-western and Northern Central Australia.

*Type* in collection.

The only difference of importance that I can perceive between Mr. De Vis's description of *O. annulicauda* and our specimens of this species is the presence in the former of a "nearly black" muzzle and of darker face-markings in front of and behind the base of the ear. That these, however, are individual and not specific characteristics is shown by the fact that there is in the Paris Museum a specimen\*, also from the Gulf of Carpentaria, which has no trace of them, although it has the same distinct dorsal stripe and comes from the same locality as the type of *O. annulicauda*. It should, however, be mentioned, in justice to Mr. De Vis, that, owing to the faded condition of the typical specimen, neither the dorsal stripe nor the caudal annulations are shown in Gould's figures of the species, nor is any reference to the latter character made either by that author or by Waterhouse.

a. { Ad. sk. } ♂	N. W. coast of Australia.	B. Bynoe, Esq. [P. & C.]
{ Skull. }		(Type of species.)
b. Ad. sk.	Roebuck Bay, Dampier Land.	Mr. Duboulay [C.]

## 2. *Onychogale frenata.*

*Macropus frænatus*, Gould, P. Z. S. 1840, p. 92; *id.* Mon. *Macrop.* pl. iii. (animal) (1841); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 202 (1841); *Less. N. Tabl. R. A., Mamm.* p. 194 (1842); *Gerv. Hist. Nat. Mamm.* ii. p. 270 (1855); *Schleg. Dierk.* p. 143 (1857); *Grieb.*

\* For a careful description of which I have to thank Mons. J. Huet, of that institution.

*Säug.* p. 675 (1859); *Blyth, Cat. Mamm. Mus. As. Soc.* p. 184 (1863).

*Macropus (Onychogalea) frænatus*, *Gray, Grey's Austr., App.* ii. p. 402 (1841); *Waterh. N. H. Mamm.* i. p. 77 (1846).

*Onychogalea frænata*, *Gray, List Mamm. B. M.* p. 88 (1843); *Gould, Mamm. Austr.* ii. pl. liv. (animal) (1849); *Kreffl, Cat. Mamm. Austr. Mus.* p. 53 (1864); *id. Austr. Vert.* p. 11 (1871); *Jent. Cat. Ost. Leyd. Mus.* p. 321 (1887); *Coll. Zool. Jahrb.* ii. p. 887 (1887).

*Halmaturus frænatus*, *Schinz, Syn. Mamm.* i. p. 548 (1844); *Wagn. Schr. Säug. Supp.* v. p. 303 (1855).

#### BRIDLED WALLABY.

Size small; form very light and delicate. Rhinarium narrow, wholly hairy. Fur soft and thick; underfur plentiful, dark slate-coloured at base and light grey at tip. General colour clear grey, the forequarters ornamented with white stripes. Face pale grey, an inconspicuous whitish spot over each eye, and an indistinct white cheek-stripe present. Ears short, inside white, outside greyish brown. Centre of back of neck black\*, passing gradually in the middle line into the dark grey of the back, the black edged on each side with a continuation of the white shoulder-stripe, which, starting from the light belly-colour about an inch behind the elbow, runs upwards and forwards along the sides of the back of the neck to just behind the ears. The black sometimes continued inconspicuously forwards along the middle line of the head. Sides of neck grey with a rufous tinge, arising from the rufous tips to the underfur. A very indistinct pale hip-stripe. Chin and chest white; belly pale grey, the bases of the hairs slate-colour. Arms and outside of legs grey, fingers black, front of legs and feet white. Tail of medium length, uniform grey, extreme tip black. Terminal nail (Pl. XI. fig. 7) consisting merely of a rounded horny point, 2 or 3 millim. in diameter.

*Skull.* Facial portion smaller in proportion to cranial than in *O. unguifera* (index about 225). Forehead flat, not inflated. Nasals evenly tapering forwards, their greatest breadth going about  $2\frac{1}{2}$  times in their length, their posterior edge evenly but slightly curved backwards. Supraorbital edges parallel, overhanging, but not forming rudimentary postorbital processes. Palatal foramina long and narrow, as long as or longer than  $m.^1$ , sometimes equalling  $m.^3$ . Posterior palate with two very large and several smaller vacuities. Bullæ smooth, but opaque, very slightly swollen.

*Teeth.* Incisors much as in *O. unguifera*, but  $i.^3$  shorter and not so much slanted forwards. Canines nearly always absent; if present excessively minute, functionless.  $P.^4$  very small, hourglass-shaped, its posterior but little exceeding its anterior diameter, its cusps low and without an unusually deep notch between them. Molars as usual.

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\* Grey in immature specimens.

*Dimensions.*

	♂. a (stuffed). millim.	♀. b (stuffed). millim.
Head and body . . . . .	650	460
Tail . . . . .	450	380
Hind foot . . . . .	152	120
Ear . . . . .	62	60

Skull, see p. 79.

*Hab.* Eastern Australia, from Queensland to Victoria.

*Type* in collection.

a. Ad. st., ♂.	New South Wales.	Gould Coll. ( <i>Type</i> of species.)
b. Ad. st., ♀.	New South Wales.	Gould Coll.
c, d. } Imm. sks. {	Oakey Creek, Darling Downs, N. S. W.	Gould Coll.
Skull of d. } ♂ & ♀.		
e, f. } Imm. sks. {	New South Wales.	Zool. Soc. (Gould Coll.).
Skull of e. }		
g. Imm. skeleton (♂).	New South Wales.	Purchased.

3. *Onychogale lunata.*

*Macropus lunatus*, *Gould, P. Z. S.* 1840, p. 93; *Gray, Grey's Austr., App.* ii. p. 402 (1841); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 203 (1841); *Less. N. Tabl. R. A., Mamm.* p. 194 (1842); *Gray, List Mamm. B. M.* p. 88 (1843); *Gerv. H. N. Mamm.* ii. p. 270 (1855); *Gieb. Säug.* p. 675 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 125 (1862).

*Halmaturus lunatus*, *Schinz, Syn. Mamm.* i. p. 548 (1844); *Wagn. Schr. Säug. Supp.* v. p. 304 (1855).

*Macropus (Onychogalea) lunatus*, *Waterh. N. H. Mamm.* i. p. 79 (1846).

*Onychogale lunata*, *Gould, Mamm. Austr.* ii. pl. lv. (animal) (1849); *Kreffl, Cat. Mamm. Austr. Mus.* p. 53 (1864); *id. Austr. Vert.* p. 11 (1871); *F. G. Waterh. Harc. S. Austr.* p. 285 (1876).

## CRESCENT WALLABY.

Size and proportions much as in *O. frenata*. Rhinarium narrow, the base of the internasal septum naked. Fur soft and woolly; underfur long, slaty at base, pale grey terminally. General colour dark grey. Face grey, a mark over eye and cheek-stripe slightly paler. Ears short, white inside, brown out. Back and sides of neck uniform rich rufous, this colour coming from the rufous tips of the underfur passing gradually into the dark grey of the back. White shoulder-stripe very prominent, running backwards from the white of the belly and ending abruptly over the scapula, not encroaching upon the back of the neck. Sides paler than back; a whitish stripe just above the hip and another parallel to it in the usual position of the

hip-stripe, neither of them very well-defined. Chin, chest, and belly whitish, the bases of the hairs grey. Arms, legs, and feet pale grey, fingers and toes brown. Tail rather short, uniform grey; its terminal nail as in *O. frenata*.

*Skull* very small and light. Muzzle slender and pointed. Facial index only from 200 to 215. Forehead flat, not inflated. Nasals very narrow, their greatest breadth going about  $2\frac{1}{2}$  times into their length, their posterior edge slightly sinuous. Supraorbital edges parallel, sharp and well-defined, not thickened or overhanging. Palatal foramina short and rounded, not so long as *m*.<sup>1</sup> Posterior palate with large vacuities. Bullæ large and much swollen, transparent.

*Teeth* much as in *O. frenata*, but smaller and lighter. Incisors (Pl. IX. fig. 11) very small and slender, *i*.<sup>3</sup> more upright than in *O. frenata*. Canine generally present, but exceedingly minute and quite functionless, its point not projecting above the bone. *P*.<sup>4</sup> very small, hourglass-shaped, its posterior scarcely greater than its anterior diameter, its postero-internal talon obsolete, and its upright cusps unusually low and rounded.

#### Dimensions.

	♂. <i>e</i> (stuffed). millim.
Head and body . . . . .	500
Tail . . . . .	332
Hind foot . . . . .	120
Ear . . . . .	58

Skull, see next page.

*Hab.* West and South Australia.

*Type* in collection.

<i>a.</i> { Imm. sk. } ♂.	Swan R., W. A. ( <i>J. Gilbert</i> ).	Gould Coll. ( <i>Type</i> of species.)
{ Skull. }		
<i>b, c.</i> { Imm. sks. } ♂.	Swan R., W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
{ Skull of <i>c.</i> }		
<i>d.</i> Yg. st., ♂.	West Australia.	Purchased.
<i>e.</i> Ad. st., ♂.	South Australia.	Sir G. Grey [P. & O.].
<i>f, g.</i> Yg. sks.	South Australia.	Sir G. Grey [P. & C.].
<i>h.</i> Aged skeleton (♀).		Zoological Society.

## Skull Measurements of Onychogale.

Species .....	<i>O. unguifera.</i>		<i>O. frenata.</i>		<i>O. lunata.</i>	
	Sex .....	♂.	(♂.)	♂.	(♀.)	
Specimens .....	<i>a.</i>	<i>g.</i>	<i>a.</i>	<i>h.</i>		
Age .....	adult.	imm.	imm.	aged.		
Basal length .....	87	78	64	61		
Greatest breadth .....	52.5	48	39	39		
Nasals, length .....	45	34	28	25		
"  greatest breadth .....	20	15	10.2	10		
"  least breadth .....	7.5	6	4.3	5		
Constriction, breadth .....	16	19.5	14.5	13.5		
Palate, length .....	57	49	38	38		
"  breadth, outside m. <sup>2</sup> .....	28.5	23	20	20.2		
"  "  inside m. <sup>2</sup> .....	17.3	15	12	13		
Palatal foramen .....	5.5	6	3.1	3		
Diastema .....	25	21 (p. <sup>3</sup> )	16.5	14		
Basi-cranial axis .....	26	25	21.5	20		
Basi-facial axis .....	65	56	43	43		
Facial index .....	250	224	200	215		
Teeth—length of i. <sup>3</sup> .....	3.4	2.5	2.6	2		
"  "  p. <sup>4</sup> .....	4.5	3.5	..	2.8		
"  "  ms. <sup>1-3</sup> .....	21	15.3	14.5	13.7		

## 4. LAGORCHESTES.

Type.

Lagorchestes, *Gould, Mon. Macrop.* letterpress to  
pl. xii. (1841)..... *L. leporoides.*

Rhinarium wholly or partly hairy. Central hind claws long and strong, not hidden by the hair of the foot. Tail rather short, not bushy or crested, but evenly short-haired throughout; no trace of a caudal spur.

Skull with a short muzzle, the diastema less than the length of the first three molars. Bullæ inflated.

*Dentition*:—I.  $\frac{1.2.3}{1.0.0}$ , C.  $\frac{1 \text{ or } 1}{0}$ , P.  $\frac{0.0.3.4}{0.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 34$ .

Incisors small and sharp-edged; i.<sup>3</sup> slightly longer than i.<sup>2</sup>, with a shallow notch about its centre. Canines present, functional in *L. conspicillatus*, very small in *L. leporoides* and *L. hirsutus*. P.<sup>4</sup> large, not constricted at its centre, with a well-marked internal ledge running its whole length.

*Range.* The whole of Australia. Not found in Tasmania.

*Synopsis of the Species.*

## I. EXTERNAL CHARACTERS.

- A. Underfur of back uniform blackish brown.  
Ears less than one third of hind feet. Two  
white lateral bands present ..... 1. *L. conspicillatus*, [p. 80.]

- B. Underfur of back bicolor, dark slate with paler tips. Ears more than one third of hind feet. No lateral bands.
- a. Rump-piles tipped white or grey. A black patch on elbow ..... 2. *L. leporoides*, p. 82.
- b. Rump-piles tipped red. No black patch on elbow ..... 3. *L. hirsutus*, p. 84.

## II. CRANIAL CHARACTERS.

- A. Muzzle broad and heavy. Canines well developed, functional ..... [p. 80.
- B. Muzzle narrow and light. Canines minute } 1. *L. conspicillatus*,  
 } 2. *L. leporoides*, p. 82.  
 } 3. *L. hirsutus*, p. 84.

### 1. *Lagorchestes conspicillatus* \*.

#### a. *Lagorchestes conspicillatus*, var. *typicus*.

*Lagorchestes conspicillatus*, *Gould, P. Z. S.* 1841, p. 82; *id. Mon. Macrop.* pl. xxviii. (animal) (1842); *Gray, List. Mamm. B. M.* p. 95 (1843); *Gould, Mamm. Austr.* ii. pl. lix. (animal) 1860; *Gerrard, Cat. Bones Mamm. B. M.* p. 131 (1862); *Kreff, Austr. Vert.* p. 11 (1871).

*Halmaturus conspicillatus*, *Schinz, Syn. Mamm.* i. p. 563 (1844); *Wagn. Schr. Säug. Supp.* v. p. 306 (1855).

*Macropus (Lagorchestes) conspicillatus*, *Waterh. N. H. Mamm.* i. p. 85 (1846).

*Macropus conspicillatus*, *Gieb. Säug.* p. 676 (1859).

#### SPECTACLED HARE-WALLABY.

Size comparatively large, and form thick and heavy. Rhinarium less hairy than in the other species, the lower half of the nasal septum and the edges of the nostrils naked. Fur long and coarse, no longer piles projecting above the general level; underfur long, soft, and thick, uniform dark brown, or nearly black above, grey tipped with rufous on the sides, and uniform slaty grey below. General colour coarsely grizzled yellowish grey. Head grizzled white and black; a well-marked chestnut-coloured patch round each eye, very variable in its intensity, not passing forwards on to the sides of the muzzle. Ears very short, their length going from  $3\frac{1}{2}$  to 4 times into that of the tarsus, their backs pale grizzled grey, their edges and insides nearly white. Hairs of the back black for their basal half and at their tips, with a broad pale yellow band just below the latter; the general colour not unlike that of a common hare, but varying very much in its richness and intensity. Two whitish lateral bands present, one just in front of, and the other on the hip; the latter running on to the rump, which is a clear pale grizzled grey, all the yellow disappearing from the longer hairs some three inches from the root of the tail, and being replaced by white.

\* a. Back yellowish grey. Markings dull. Insular. a. Var. *typicus*.

b. Back deep fawn. Markings brilliant. Continental..... b. Var. *leichardti*, p. 82.

Sides dull yellowish grey, the tips of the underfur showing through. Chin, chest, and belly mixed white and slaty grey. Arms and hands, legs, and feet grey, more or less tinged with rufous. Tail very thinly covered above and laterally with pure white hairs, except for its basal three inches, where it is grey like the rump; below, the hairs are more numerous and are more or less tinged with fawn.

*Skull* (Pl. XIII. fig. 3) large, stout and heavy, very different in general shape to that of the other species. Facial portion proportionally large, index 205–215. Muzzle broad and strong, evenly but slightly tapering forwards. Nasals expanded behind, very short and broad, but with the part in front of their junction with the premaxillæ long and tapering, their greatest breadth nearly one half their length. Interorbital space flat or concave, its edges sharp and strongly developed, overhanging, often markedly converging backwards. Palatal foramina rather shorter than  $m$ .<sup>1</sup> Posterior palate more complete than in the other species, a few small vacuities only present. Bullæ large, swollen, flatter and rougher than in *L. leporoides* and *L. hirsutus*, and their substance less transparent.

*Teeth* proportionally very thick and powerful. Posterior edge of  $i$ .<sup>3</sup> (Pl. IX. fig. 12) vertical or bent backwards, its notch nearly obsolete. Canines comparatively large and strong, evidently becoming functional in old specimens.  $P$ .<sup>4</sup> (Pl. X. fig. 16) as in the other species, but larger and broader.

#### Dimensions.

	♂. $a$ (skin). millim.	♀. $b$ (stuffed). millim.
Head and body . . . . .	480	490
Tail . . . . .	425	
Hind foot . . . . .	126	122
Ear . . . . .	33	35

Skull, see p. 85.

*Hab.* Islands off the North-west coast of Australia; represented on the Continent by var. *leichardti*.

*Co-types* in collection.

$a$ .	{ Ad. sk. } ♂.	Barrow Isl., N.W. coast of Australia.	B. Bynoe, Esq. [P. & C.].
	{ Skull. }		
$b$ .	{ Ad. sk. } ♀.	Barrow Island.	Captain Wickham [P. & C.].
	{ Skull. }		( <i>Co-types</i> of species.)
$c$ .	Skull, ♂.	Trimouille Isl., Dampier Archipelago.	Gould Coll.

b. *Lagorchestes conspicillatus*, var. *leichardti*.

*Lagorchestes leichardti*, *Gould, Mamm. Austr.* ii. pl. lx. (animal) (1863); *Kreffl, Cat. Mamm. Austr. Mus.* p. 52 (1864); *id. Austr. Vert.* p. 11 (1871).

*Lagorchestes conspicillatus*, var. *leichardti*, *Coll. Zool. Jahrb.* ii. p. 889 (1887).

With all the essential characters of the typical form, but differing in the much greater brilliancy of the markings and colour. The yellowish grey of the back is replaced by deep fawn, the dull chestnut patches round the eye by much broader and brilliant rufous ones; the yellowish grey on the tips of the lateral underfur by rich rufous, and this colour extends forwards along the side of the head below the ear. Chin, chest, belly, and pale lateral bands nearly pure white, contrasting markedly with the rufous of the sides and back. The ears also are slightly longer than in *L. conspicillatus*, although still decidedly shorter than in *L. leporoides*.

*Dimensions.*

	♀.
	a (skin).
	millim.
Head and body . . . . . (c.)	520
Tail . . . . .	460
Hind foot . . . . .	137
Ear . . . . .	39

*Hab.* North Australia, from east to west.

*Type* in the Sydney Museum.

This beautiful Wallaby is certainly not specifically separable from *L. conspicillatus*, to which it bears very much the same relationship that *Macropus ruficollis* var. *bennettii* does to the typical form (see *suprà*, p. 35). It is probably spread over the whole of central and north-western tropical Australia, while the true *L. conspicillatus* is as yet only known from certain islands off the North-west coast; the latter, therefore, although the earlier described, being really, in nature, but a more dully coloured and shorter-eared insular variety of the continental form. It is somewhat unfortunate that the rules forbid our recognizing this fact in the nomenclature of the two, and regarding *L. leichardti* as the original, and the insular form as the variety.

a. { Ad. sk. { ♀. Roebuck Bay, N.W. coast Mr. Duboulay [C.].  
 { Skull. { of Australia.

2. *Lagorchestes leporoides*.

*Macropus leporoides*, *Gould, P. Z. S.* 1840, p. 93; *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 204 (1841); *Less. N. Tabl. R. A., Mamm.* p. 194 (1842); *Gieb. Säug.* p. 675 (1859); *id. Thierr.* i. p. 236 (1859); *id. Bronn's Kl. u. Ordn.* vi. Abth. v. pl. xlvi. fig. 21 (17)

- (incisors) (1876); *Brehm, Thierl.* ii. p. 594 (1880); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 714 (1884).
- Lagorchestes leporoides*, *Gould, Mon. Macrop.* pl. xii. (animal) (1841); *Gray, Grey's Austr., App.* ii. p. 403 (1841); *id. List Mamm. B. M.* p. 94 (1843); *Gould, Mamm. Austr.* ii. pl. lvii. (animal) (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 130 (1862); *Kreffl, Cat. Mamm. Austr. Mus.* p. 52 (1864); *id. Austr. Vert.* p. 11 (1871); *Jent. Cat. Ost. Leyd. Mus.* p. 321 (1887).
- Halmaturus leporoides*, *Schinz, Syn. Mamm.* p. 549 (1844); *Wagn. Schr. Säug. Supp.* v. p. 305 (1855).
- Macropus (Lagorchestes) leporoides*, *Waterh. N. H. Mamm.* i. p. 82, pl. v. figs. 17 & 17 a (skull and teeth) (1846).
- Lagorchestes gymnotis*, *Blyth, J. A. S. B.* xxvii. p. 276 (1859); *id. Cat. Mamm. Mus. As. Soc.* p. 184 (1863).

## COMMON HARE-WALLABY.

General form light and slender. Rhinarium (Pl. XI. fig. 4) hairy, the base of the nasal septum alone naked. Quality of fur much as in *L. conspicillatus*. Underfur long and soft, everywhere on the body dark slaty grey at base, broadly tipped with pale brown, and that on some parts with a second darker subterminal band. General colour exceedingly like that of a Common Hare, even more so than in *L. conspicillatus*. Head coloured on the same essential pattern as in *L. conspicillatus*, but far more obscurely, and the rufous colour round the eye more prolonged forwards on the sides of the muzzle. Ears comparatively long, their length going from  $2\frac{1}{2}$  to 3 times in that of the hind feet, their backs and insides whitish. Back with the subterminal pale band on the longer hairs white with a tinge of yellow, the yellow disappearing on the rump. Sides with a very faint and inconspicuous trace of the two lateral bands present in *L. conspicillatus*. Chin, chest, and belly dirty yellowish grey. Arms with a well-marked black patch on the outside of the proximal half of the forearm, caused by the entire absence of longer piles, and the consequent prominence of the underfur, which is here nearly black. Legs like body; hands and feet finely grizzled greyish white. Tail thinly haired, grizzled brownish grey above, nearly white on the sides and below.

*Skull* light and slender, with a long narrow muzzle; facial index 230-235. Nasals long and narrow, their greatest breadth going about  $2\frac{1}{2}$  times in their length, slightly expanded behind; their posterior border evenly curved backwards, slightly recurved forwards in the centre. Interorbital space flat, its edges parallel, sharp, but little overhanging. Palatal foramina short, barely the length of m.<sup>1</sup> Posterior palate with considerable vacuities. Bullæ much swollen, globular, smooth and transparent.

*Teeth.* Incisors (Pl. IX. fig. 13) small and delicate; i.<sup>3</sup> much slanted forwards, slightly exceeding i.<sup>2</sup> in horizontal length, its notch about the centre of its outer edge. Canines very small, scarcely projecting above the gum. P.<sup>4</sup> oblong, parallel-sided, about the length of m.<sup>4</sup>, its internal ledge running its whole length.

*Dimensions.*

	♂.	♀.
	<i>a</i> (skin).	<i>b</i> (stuffed).
	millim.	millim.
Head and body . . . . .	(c.) 450	490
Tail . . . . .	320	300
Hind foot . . . . .	128	122
Ear . . . . .	45	57

Skull, see next page.

*Hab.* South Australia and New South Wales.

*Co-types* in collection.

<i>a, b.</i>	{ Ad. sks. } ♂ ♀.	Interior of New South Wales ( <i>J. G.</i> ).	Gould Coll.
	{ Skulls. }		( <i>Co-types</i> of species.)
<i>c, d.</i>	{ Ad. sks. } ♀.	South Australia.	Sir G. Grey
	{ Skull of <i>c.</i> }		[P. & C.].
<i>e.</i>	{ Yg. st. }	South Australia.	Sir G. Grey
	{ Skull. }		[P. & C.].
<i>f-i.</i>	Skulls.	South Australia ( <i>J. Strange</i> ).	Gould Coll.

### 3. *Lagorchestes hirsutus.*

*Lagorchestes hirsutus*, *Gould, P. Z. S.* 1844, p. 32; *id. Mamm. Austr.* pl. lviii. (animal) (1849); *Gerrard, Cat. Bones Mamm. B. M.* p. 131 (1862); *Krefft, Austr. Vert.* p. 11 (1871); *Jent. Cat. Ost. Leyd. Mus.* p. 322 (1887).

*Macropus (Lagorchestes) hirsutus*, *Waterh. N. H. Mamm.* i. p. 93, pl. v. fig. 5 (incisors) (1846).

*Halmaturus hirsutus*, *Wagn. Schr. Säug. Supp.* v. p. 307 (1855).

*Macropus hirsutus*, *Gieb. Odontogr.* p. 43, pl. xix. fig. 2 *b* (incisors) (1855); *id. Säug.* p. 677 (1859); *id. Bronn's Kl. u. Ordn.* vi. Abth. v. pl. xlvii. fig. 21 (5) (incisors) (1876); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 714 (1884).

#### RUFOUS HARE-WALLABY.

Size and form much as in *L. leporoides*. Rhinarium nearly wholly hairy. Underfur long and distinctly bicolor as in *L. leporoides*, but the tips paler, and in some parts much more rufescent. General colour finely grizzled grey. Band round eye scarcely more rufous than rest of head. Ears comparatively long, as in *L. leporoides*, their backs grizzled grey, their insides and edges white. Head and fore part of back grizzled black and white, the longer hairs with a white subterminal and a black terminal band. On the posterior part of the back the hairs are very much longer, and their subterminal pale band gradually becomes broader and more rufous, until on the rump the band is rich rufous, and often nearly an inch in extent. Sides with scarcely a trace of lateral bands. Arms and hands, front of legs, and feet pale yellowish white or grey. Outsides and backs of legs more or less rufous, sometimes rich red, as in *Macropus wilcoxi*. Tail short-haired, dull grizzled grey.

## Skull Measurements of Lagorchestes and Lagostrophus.

Species	<i>Lagorchestes conspicillatus.</i>		<i>Lagorchestes leporoides.</i>		<i>Lagorchestes hirsutus.</i>	<i>Lagostrophus fasciatus.</i>
	♂. c. aged.	♀. b. adult.	♂. f. adult.	♀. b. adult.	♂. d. adult.	♀. f. aged.
Basal length	77	72	79	69	...	61
Greatest breadth	53	49	48	45	45	40.5
Nasals, length	33	31	37	35	32	27.5
" greatest breadth	16.8	16	16	14	12.8	11
" least breadth	10.2	9	9.5	7.5	8	3.6
Constriction, breadth	13.4	13.2	16	15	13.7	11.2
Palate, length	49	45	50	44	42	39.5
" breadth outside m. <sup>2</sup>	26	25.5	25	23	23.5	20
" inside m. <sup>2</sup>	14	16.5	17	15.7	15.6	12
Palatal foramen	4.5	6	4	4.7	3.5	2.8
Diastema	9	13.5	17	13.4	13.8	14
Basal-cranial axis	25.2	24.3	24	22	...	20
Basal-facial axis	54	50	56.5	49	46.5	42.2
Facial index	214	206	235	232	...	211
Teeth—length of i. <sup>3</sup>	3	3	3.6	2.8	...	2.6
" " p. <sup>4</sup>	7.8	6.9	6.7	5.6	5.7	4.8
" " ms. <sup>1-3</sup>	18	16.6	18	16.2	17.2	14.6

*Skull and teeth* very much as in *L. leporoides*, but the nasals are as a rule slightly less expanded behind, and *i*.<sup>3</sup>, the canine, and *p*.<sup>4</sup> all somewhat smaller. These points are, however, neither sufficient in themselves nor constant enough to supply definite and invariable means of distinguishing the skulls of the two species.

*Dimensions.*

	♂. a (stuffed). millim.	♀. b (stuffed). millim.
Head and body . . . . .	404	450
Tail . . . . .	250	310
Hind foot . . . . .	117	112
Ear . . . . .	40	44

Skull, see last page.

*Hab.* Western Australia.

*Type* in collection.

a.	{ Imm. sk. } ♂.	York, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
	{ Skull. }		( <i>Type</i> of species.)
b.	{ Ad. st. } ♀.	West Australia ( <i>J. Gilbert</i> ).	Gould Coll.
	{ Skull. }		
c.	Ad. skull, ♂.	West Australia ( <i>J. Gilbert</i> ).	Gould Coll.
d.	{ Ad. sk. } ♂.	West Australia.	Purchased.
	{ Skull. }		
e.	Imm. skull.		

### 5. DORCOPSIS.

*Type.*

Dorcopsis, <i>Schleg. &amp; Müll. Verh. Nat. Ges. Ned.</i> p. 130 (1839-44) . . . . .	D. mülleri.
Conoyces, <i>Less. N. Tabl. R. A., Mamm.</i> p. 194 (1842) . . . . .	D. mülleri.
Pelandor, <i>Gray, List Mamm. B. M.</i> p. xxii (1843) . . . . .	D. mülleri.

General build macropodiform, but the disproportion between the anterior and posterior limbs less than in *Macropus*. Rhinarium large and broad, wholly naked. Head long and narrow. Ears small. Fur on nape, from occiput to withers, directed wholly or partially forwards. Hind claws long and strong, not hidden by hairs. Tail evenly haired, nearly naked at tip.

*Skull* narrow and elongated. Bullæ entirely unswollen.

*Dentition* :—I.  $\frac{1.2.3}{1.0.0}$ , C.  $\frac{1}{0}$ , P.  $\frac{0.0.3.4}{0.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 34$ .

Incisors small. I.<sup>1</sup> shorter, rounder, and less prominent than in *Macropus*. I.<sup>2</sup> and i.<sup>3</sup> about equal in size, each with an inconspicuous notch near the centre of its outer edge. Canines present, fairly well-developed, apparently more or less functional. Premolars large and heavy, *p*.<sup>4</sup> enormously long antero-posteriorly, generally exceeding in length the combined *m*.<sup>1</sup> and *m*.<sup>2</sup>, a well-defined internal ledge running its whole length, and both its outer and inner sides prominently grooved. Molars low, rounded, the central antero-posterior bridge almost or quite obsolete, and the

anterior transverse ledge narrow and not extending to the inner side of the tooth. Premolar and molar series of the two sides nearly or quite parallel, instead of being more or less convergent before and behind.

*Range.* New Guinea only.

This genus forms with the next, as Prof. Garrod has shown, a small separate group, whose distinguishing characters, however, do not seem to be quite so constant as that author supposed, especially as the recent discovery of *D. macleayi* provides a link between *Dorcopsis* and *Macropus*.

### *Synopsis of the Species.*

#### I. EXTERNAL CHARACTERS.

- A. Whole of nape-hair directed forwards.
- a. Back chocolate-brown. A white stripe in front of hip. Arms and hands whitish . . . 1. *D. mülleri*, p. 87.
  - b. Back grizzled smoky grey. No stripe in front of hip. Arms and hands brown . . . 2. *D. luctuosa*, p. 89.
- B. Hair of upper nape directed backwards, of lower forwards . . . . . 3. *D. macleayi*, p. 92.

#### II. CRANIAL CHARACTERS.

- A. Skull long and narrow. P.<sup>4</sup> longer than m.<sup>1</sup> and m.<sup>2</sup>, more than 11 millim. long.
- a. Canines as large as or larger than i.<sup>3</sup>. . . . . 1. *D. mülleri*, p. 87.
  - b. Canines smaller than i.<sup>3</sup>. . . . . 2. *D. luctuosa*, p. 89.
- B. Skull shorter. P.<sup>4</sup> shorter than m.<sup>1</sup> and m.<sup>2</sup> combined; less than 10 millim. long . . . . . 3. *D. macleayi*, p. 92.

#### 1. *Dorcopsis mülleri*.

*Kangurus veterum*\*, *Less. Voy. Coquille, Zool. i. p. 164 (1826)*.

*Macropus veterum, Less. Man. Mamm. p. 227 (1827)*.

*Didelphys brunii, Quoy & Gaim. Voy. Astrolabe, Zool. i. p. 116, Atl. pl. xx. (animal) (1830) (nec Schreb.)*.

*Macropus brunii, Waterh. Jard. Nat. Libr., Mamm. xi. p. 225 (1841); id. N. H. Mamm. i. p. 180 (1846); Schleg. Dierk. p. 143 (1857); Gieb. Säug. p. 684 (1859)*.

*Macropus (Conoyces) brunii, Less. N. Tabl. R. A., Mamm. p. 194 (1842); Chenu, Encycl. d'H. N., Mars. p. 346 (1879)*.

*Dorcopsis brunii, Schleg. & Müll. Verh. Nat. Ges. Ned. p. 131, pls. xxi. to xxiv. (animal, skull and teeth) (1839-44); Gould, Mamm. Austr. ii. pl. li. (animal) (1858), Krefft, Austr. Vert. p. 11 (1871)*.

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\* This name having been given under an entire misapprehension, and the species being distinctly *not* the "Kangaroo of the ancients," by which is meant the "Filander" of De Bruyn, *i. e. Macropus brunii*, it is evident that the specific name of *veterum* has no claim to adoption.

- Halmaturus oruni, *Wagn. Schr. Säug. Supp.* iii. p. 119 (1843);  
*Schinz, Syn. Mamm.* i. p. 555 (1844).  
 Halmaturus asiaticus, *Gray, List Mamm. B. M.* p. 91 (1843) (*nec*  
*Pall.*); *Gerrard, Cat. Bones Mamm. B. M.* p. 126 (1862).  
 Hypsiprymnus dorcocephalus, *Owen, Odontogr.*, Text, p. 289 (1845).  
 Kangurus bruni, *Desm. Dict. Univ. d' H. N.* vii. p. 170 (1849).  
 Dorcopsis asiaticus, *Gray, Voy. Samarang, Vert.* p. 32 (1850); *id.*  
*P. Z. S.* 1858, p. 106.  
 Hypsiprymnus bruni, *Wagn. Schr. Säug. Supp.* v. p. 300 (1855).  
 Macropus mülleri, *Schleg. Ned. Tijdschr. Dierk.* iii. p. 353 (1866);  
*id. Dierent.* p. 171 (1872).  
 Dorcopsis mülleri, *Garrod, P. Z. S.* 1875, p. 49 *et seqq.* pl. ix. figs. 6-  
 10 (teeth); *Peters & Doria, Ann. Mus. Genov.* xvi. p. 685 (1880);  
*Jent. Cat. Ost. Leyd. Mus.* p. 322 (1887).

#### BROWN DORCOPSIS.

Rhinarium wholly naked (see Pl. XI. fig. 9). Fur short, close, and glossy, the whole of that on the nape and shoulders and fore-quarters directed forwards. General colour uniform chocolate-brown. Head brown, muzzle and sides of face paler, the fur here excessively short; an indistinct whitish cheek-stripe just appreciable. Ears very short and small, their backs rather darker than the crown of the head. Head and back uniform brown, the bases of the hairs nearly white. Sides with a short transverse white stripe running from the belly towards the back just in front of the hip. Chin, chest, and belly white, the hairs white to their roots. Inner sides of hips quite naked. Arms and hands, and front of legs white or very pale brown; back of legs and feet brown. Tail about as long as the body without the head, brown above and below, its terminal three inches white, nearly naked.

*Female* considerably smaller than the male, and with the belly-fur on each side of the pouch slightly darker than the rest of the belly, but not forming prominent dark stripes as in *D. luctuosa*.

*Skull* very much elongated, its greatest breadth just half its length. Brain-case also long and narrow, so that the facial index is not remarkably high (215-217). Muzzle strong and conical. Nasals narrow, evenly rounded behind, but little expanded. Inter-orbital space flat, its edges strongly ridged, overhanging and forming rudimentary postorbital processes. Upper opening of lachrymal canal generally partly within the orbit, and not shut off by a bony ridge. Palatal foramina oval, rounded. Posterior palatal vacuities generally confined to palatal bone, and not encroaching upon the maxillary.

*Teeth.* Incisors small and light. I.<sup>3</sup> with its external notch in front of the middle of the tooth. Canines stout and strong, exceeding I.<sup>3</sup> in size. Two sets of cheek-teeth quite parallel, not converging before or behind. P.<sup>4</sup> as long as m.<sup>1</sup>, m.<sup>2</sup>, and half m.<sup>3</sup> combined, its outer side with four or five vertical grooves. Molars as described above.

## Dimensions.

	♂. * (Stuffed). millim.	♀. c (skin). millim.
Head and body . . . . .	825	(c.) 530
Tail . . . . .	500	380
Hind foot . . . . .	156 (Range from 130)	112
Ear . . . . .	42	35

Skull, see p. 91.

*Hab.* N.W. New Guinea and adjoining islands (Mysol, Salawatti, &c.).

*Type* in the Leyden Museum.

The striking superficial resemblance that this species bears to *Macropus brunii*, and the confusion in nomenclature caused thereby, have been already referred to (*suprà*, p. 51). The two animals do not, so far as is yet known, occur absolutely in the same localities, but their ranges approximate so nearly that the confusion of Dr. Bruyn's "Filander" with the present rather commoner and better known animal is not at all to be wondered at. The distinctions between the two have already been fully pointed out. *D. mülleri*, unlike *D. luctuosa*, seems to be a very uniform and unvarying species, as all the specimens that I have seen are almost precisely alike.

*u.* Ad. sk., ♂. Lobo Bay, N.W. New Guinea (*Dutch East Indian Expedition*). Leyden Museum [E.].

(One of the specimens described by Schlegel and Müller as *Dorcopsis brunii*.)

<i>b, c.</i> { Ad. sks. { ♂ ♀	Mysol.	A. R. Wallace, Esq. [C.].
{ Skulls. {		
<i>d.</i> Yg. sk., ♂.	Mysol.	A. R. Wallace, Esq. [C.].

2. *Dorcopsis luctuosa*.

*Halmaturus luctuosus*, *D'Albertis*, *P. Z. S.* 1874, p. 110; *Sclater*, *P. Z. S.* 1874, p. 247, pl. xlii. (animal).

*Dorcopsis luctuosa*, *Garrod*, *P. Z. S.* 1875, p. 49 *et seqq.* pls. vii., viii., ix. (skull, head, and teeth); *D'Albertis*, *P. Z. S.* 1875, p. 531; *Schäfer & Williams*, *P. Z. S.* 1876, p. 165; *Owen*, *P. Z. S.* 1877, p. 352; *Rams. P. Linn. Soc. N. S. W.* iv. p. 87 (1879); *Peters & Doria*, *Ann. Mus. Genov.* xvi. p. 686 (1880); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 724 (1884); *Mikl.-Macl. P. Linn. Soc. N. S. W.* ix. p. 1151, pl. lxxi. fig. 1 (animal) (1885); *Jent. Cat. Ost. Leyd. Mus.* p. 323 (1887).

*Dorcopsis chalmersi*, *Mikl.-Macl. P. Linn. Soc. N. S. W.* ix. p. 569, pl. xix. (skull, teeth, &c.) (1884) (*juv.*).

*Dorcopsis beccarii*, *Mikl.-Macl. P. Linn. Soc. N. S. W.* x. p. 146, pl. xx. figs. 1-4 (skull and teeth) (1885).

GREY DORCOPSIS.

Smaller than *D. mülleri*. Fur soft and thick, longer than in that species. Whole of hair on nape and top of neck reversed. General colour dark smoky grey, very variable in depth. Face dark grey, a faint paler cheek-stripe present. Ears larger than in *D. mülleri*, their backs thinly haired, not darker than the crown. Head and back dark finely grizzled grey, the hairs white for their basal half, then black or dark grey, and their tips glossy yellow or white. Sides without any trace of a hip-stripe. Chin brown; chest and belly dull grey, or greyish white, the distinction from the colour of the back very gradual; a large patch surrounding anus white or yellow. Arms and hands, legs and feet uniform dark smoky grey. Tail decidedly shorter than the body, dark brown or black above and below, its tip white and naked.

*Female* with a prominent dark band passing down the lower belly on each side of the opening of the pouch.

*Skull* rather smaller than that of *D. mülleri* and with the premaxillæ less markedly bent downwards, the supraorbital edges less overhanging, and the posterior palatal vacuities larger.

*Teeth* (Pl. XIII. fig. 2). I.<sup>3</sup> with its external notch just behind its centre. Canine small, not equalling i.<sup>2</sup> P.<sup>4</sup> rather shorter and broader than in *D. mülleri*.

#### Dimensions.

	♂. b (stuffed). millim.	♀. a (skin). millim.
Head and body . . . . .	600	600
Tail . . . . .	320	300
Hind foot . . . . .	112	111
Ear . . . . .	36	34

Skull and teeth, see next page.

*Hab.* Eastern and South-eastern New Guinea.

*Type* in collection.

This species has the same sort of superficial resemblance to *Macropus browni*, Rams., that *D. mülleri* has to *M. brunii*; its most obvious distinguishing characters have been pointed out, *suprà*, p. 52. It is much more variable in colour than *D. mülleri*, and it has therefore been made the basis of several untenable species.

a.	{ Ad. sk. } ♀.	S.E. New Guinea.	L. M. D'Albertis [C.]
	{ Skeleton. }		(Type of species.)
b.	{ Ad. st. } ♂.	Aleya, S.E. New	Dr. James [C.].
	{ Skull. }	Guinea.	
c, d.	{ Ad. & yg. sks. } ♂ ♀.	Aleya.	Dr. James [C.].
	{ Skulls. }		

## Skull Measurements of Dorcopsis.

Species .....	<i>D. millleri.</i>		<i>D. luctuosa.</i>			<i>D. macleani</i> *.
	♂. ♂. aged.	♀. c. aged.	♂. †. aged.	♂. b. adult.	♀. a. adult.	Type. ? ?
Basal length .....	108	104	106	97	96	(c.) 85
Greatest breadth .....	55	52	55	49.5	53.5	48
Nasals, length .....	46	(c.) 50	48	48	(c.) 43	36
" greatest breadth .....	13	13.7	14	12.5	13.8	13
" least breadth .....	8.8	8	8.3	9	9	7.6
Constriction, breadth .....	17.4	16.5	15.3	16.5	17	13.5
Palate, length .....	69.5	66	69	62	60	(c.) 52
" breadth outside m. <sup>2</sup> .....	30.4	28	31	29.5	29.3	23.5
"    " inside m. <sup>2</sup> .....	19	18	20	19	18.5	16
Palatal foramen .....	5	4.8	7	4.5	5	...
Diastema .....	23	24	25	22.5	20.5	10
Basal-cranial axis .....	35	34	33	32	30.5	...
Basal-facial axis .....	75.8	73	75	69	66.5	...
Facial index .....	217	215	227	216	218	...
Teeth—length of i. <sup>3</sup> .....	3.8	3.5	4	3.3	3	1.5
"    " p. <sup>4</sup> .....	14.5	13.6	13.8	13	12.5	9.5
"    " ms. <sup>1-3</sup> .....	18.4	17.3	18.3	18	17	14

\* Measured, as already stated, from the original figures. All the figures are said to be of the natural size, but fig. 8 is on a decidedly larger scale than figs. 5, 6, & 7, which are all alike, and from which these dimensions are taken.

† Preserved in the Leyden Museum.

3. *Dorcopsis macleayi*.

*Dorcopsis macleayi*, *Mikl.-Macl. P. Linn. Soc. N. S. W.* x. p. 149, pl. xx. figs. 5-9 (animal, skull, and teeth) (1885).

Smaller than *D. milleri* and *D. luctuosa*. Fur on nape of neck presenting two centres of irradiation—one on the occiput, whence the hairs are directed *backwards*, and the other on the withers, in front of which the hairs are directed forwards as in the other species, the opposed hairs meeting about halfway down the neck. General colour brownish grey, a little lighter on the ventral side. Tip of tail nearly bare, white.

*Skull* smaller, shorter, and broader than in the other species. Nasals slightly expanded behind, their posterior edge sinuous. Interorbital space broad, with strongly ridged overhanging edges, converging backwards.

*Teeth*. Incisors very small and light, not touching each other. Canines short and slender. P.<sup>4</sup> broad, evenly oval, far shorter than usual, and much resembling the deciduous p.<sup>3</sup> of *D. luctuosa*.

*Dimensions.*

	(skin). millim.
Head and body . . . . .	490
Tail . . . . .	320
Hind foot (? with claws) . . . . .	115
Ear ("measured behind") . . . . .	30

Skull, see last page.

*Hab.* South coast of New Guinea.

*Type* in the Macleay Museum, Sydney.

The above particulars are taken from the original description and figures, and the dimensions of the skull given in the table are measured directly from these figures, so that the artist must be held responsible for their accuracy. The species as described is in many ways intermediate between *Dorcopsis* and *Macropus*, so that it seems just possible that the type specimen may be a hybrid between *D. luctuosa* and *Macropus browni*, both of which occur in Southern New Guinea. Pending, however, the arrival of further material bearing on this suggestion, I provisionally retain *D. macleayi* as a somewhat doubtful species of the genus to which its describer referred it.

6. **DENDROLAGUS.**

*Dendrolagus*, *Schleg. & Müll. Verh. Nat. Ges. Ned.* Type.  
p. 138 (1839-44) . . . . . *D. ursinus*.

General build of the ordinary mammalian proportions, not macropodiform at all. Rhinarium (Pl. XI. fig. 8) broad, only partly naked, the hairs growing downwards on to the upper part of the nasal septum, but these hairs and those on the top of the muzzle

are so short and sparsely scattered as to give a general impression of nakedness to the whole muzzle. Fur on nape, and sometimes on back also, directed forwards. Anterior limbs stout and strong, nearly as large as posterior; hind feet broad, the syndactylous second and third digits not disproportionally small as compared to the fourth and fifth. Claws stout and strong, those on the fourth and fifth hind toes curved like those on the hand, not straight and conical as in the other genera. Tail very long, evenly and thickly haired.

*Skull* heavily built; muzzle short, broad, and strong. Posterior palate complete, without vacuities. Bullæ entirely unswollen.

*Dentition*:—I.  $\frac{1.2.3}{1.0.0}$ , C.  $\frac{1}{0}$ , P.  $\frac{0.0.3.4}{0.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 34$ .

Incisors thick and strong;  $i^2$  and  $i^3$  about equal. Canines much smaller than incisors (except in *D. dorianus*).  $P^4$  large and stout, but far shorter than in *Dorcopsis*. Molars as in that genus.

*Habits*. Arboreal, phytophagous.

*Range*. New Guinea and North Queensland.

In their general proportions the Tree-Kangaroos present a striking contrast to the other members of the present subfamily, but in their essential characters they do not show any approach to the arboreal *Phalangeridæ*, to whose habits and proportions of limbs they have evidently independently attained. The species are confined to the tropical forests of New Guinea and North Queensland, none of them being found in any part of temperate Australia.

### Synopsis of the Species.

#### I. EXTERNAL CHARACTERS.

- A. Fur on back directed backwards.
- a. Body, tail, and limbs black; face nearly white 1. *D. ursinus*, p. 94.
  - b. Body, tail, and limbs grey mixed, or whitish; face dark.
    - $a^1$  Back and sides dark grizzled grey . . . . 2. *D. inustus*, p. 95.
    - $b^1$ . Back pale grey\*; sides white . . . . . 3. *D. lumholtzi*, p. 96.
- B. Fur on whole of back reversed, directed forwards 4. *D. dorianus*, p. 98.

#### II. CRANIAL CHARACTERS.

- A.  $I^1$  but little exceeding  $i^2$  and  $i^3$  in its downward projection. Canine much smaller than  $i^2$ .
- a. Forehead not inflated. Fronto-nasal suture curved backwards.
    - $a^1$ .  $P^4$  much broader than  $m^1$ ; its posterior much greater than its anterior transverse diameter . . . . . 1. *D. ursinus*, p. 94.
    - $b^1$ .  $P^4$  not or little broader than  $m^1$ ; its posterior but little greater than its anterior diameter . . . . . 2. *D. inustus*, p. 95.

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\* ? Occasionally more or less rufous or fulvous; see below, p. 97 (footnote).

- b. Forehead inflated. Fronto-nasal suture recurved forwards in the centre . . . . . 3. *D. lunholtzi*, p. 96.  
 B. I.<sup>1</sup> twice as long vertically as i.<sup>2</sup> and i.<sup>3</sup>  
 Canine nearly or quite equal to i.<sup>2</sup> . . . . . 4. *D. dorianus*, p. 98.

### 1. *Dendrolagus ursinus*.

*Dendrolagus ursinus*, *Schleg. & Müll. Verh. Nat. Ges. Ned.* p. 141, pls. xix. to xxiv. (animal, skull, and limb-bones) (1839-44); *Gould, Mon. Macrop.* pl. xxvi. (animal) (1842); *Gray, List Mamm. B. M.* p. 87 (1843); *Wagn. Schr. Säug. Supp.* iii. p. 134 (1843), v. p. 286 (1855); *Waterh. N. H. Mamm.* i. p. 185 (1846); *Grdy, Voy. Samarang, Vert.* p. 32 (1850); *Hombr. & Jacq. Voy. Pôle Sud, Zool.* iii. p. 36, *Atl.* pl. xviii. (1853); *Gerv. H. N. Mamm.* ii. p. 271 (1855); *Gould, Mamm. Austr.* ii. pl. xlix. (animal) (1856); *Schleg. Dierk.* p. 144 (1857); *Gray, P. Z. S.* 1858, p. 106; *Gieb. Säug.* p. 685 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 123 (1862); *Kreffl, Austr. Vert.* p. 11 (1871); *Peters & Doria, Ann. Mus. Genov.* xvi. p. 686 (1880); *Brehm, Thierl.* ii. p. 596 (1880); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 724 (1884); *Jent. Cat. Ost. Leyd. Mus.* p. 323 (1887).

#### BLACK TREE-KANGAROO.

General form thick and clumsy. Rhinarium (Pl. XI. fig. 8) tuberculated only to the level of the superior internal angle of the nostrils, but the whole top of the muzzle so thinly haired as to be practically naked. An abrupt change of colour on the muzzle at the junction between the thinly-haired and the granulated portion, the former black, the latter nearly white, as shown in the figure, drawn from a spirit-specimen. Lower lip with two distinct diverging grooves running backwards under the chin. Fur of body, limbs, and tail long, straight, and coarse; this longer hair entirely absent on the face, which is only covered by a continuation of the body underfur. Underfur short, woolly, pale brown. Fur of back of neck, from withers to crown, directed forwards. General colour uniform black. Face pale whitish brown or grey, rather darker round eyes and paler on lower cheeks. Forwardly directed nape-hair forming a transverse crest level with the anterior edge of the ears. Ears short, rounded, thickly covered outside and on the margins inside with soft woolly black hairs. Back, arms, and hands, legs and feet, and tail uniformly black, the extreme tip of the latter sometimes yellow. Chest and belly white or pale brown.

*Skull* broad and strong; muzzle stout and heavy. Nasals short and broad, slightly expanded behind, their posterior edge slightly curved backwards in the centre. Interorbital space broad and slightly concave, its edges well defined, without or only with very faint indications of inflation. Naso-premaxillary about half of naso-maxillary suture.

*Teeth* strong and stout. Canine very small. P.<sup>4</sup> large, broad, and heavy, strongly ridged and grooved externally; internal ledge broad and flat, not notched at its centre; postero-internal talon well-defined, and increasing markedly the posterior as compared to the anterior breadth of the tooth.

*Dimensions.*

	♀.	
	<i>a</i> (stuffed).	
	millim.	
Head and body . . . . .	530	
Tail . . . . .	590	
Hind foot . . . . .	108	
Ear . . . . .	36	{ (48 in the spirit- specimen <i>b.</i> ) }

Skull, see p. 99.

*Hab.* N.W. New Guinea.

*Co-types* in the Leyden Museum and in collection.

- a.* Ad. sk., ♀. Lobo Bay, N.W. New Guinea Leyden Museum [E].  
(*Dutch East-Indian Expedition*).  
(*Co-type* of species. The specimen figured by Gould.)
- b.* Ad. al., ♀. Skroë, Maclure Inlet, H. O. Forbes, Esq. [C].  
N.W. New Guinea.

2. *Dendrolagus inustus.*

*Dendrolagus inustus*, Müll. & Schleg. *Verh. Nat. Ges. Ned.* p. 143, pls. xx. to xxiv. (animal, skull, and limb-bones) (1839-44); Gould, *Mon. Macrop.* pl. xxvii. (animal) (1842); Wagn. *Schr. Säug. Supp.* iii. p. 134 (1843), v. p. 287 (1855); Waterh. *N. H. Mamm.* i. p. 188 (1846); Gray, *Voy. Samarang, Vert.* p. 32 (1850); Owen, *P. Z. S.* 1852, p. 103 (anat.); Gould, *Mamm. Austr.* ii. pl. 1. (animal) (1856); Schleg. *Dierk.* p. 144 (1857); Gray, *P. Z. S.* 1858, p. 106; Gieb. *Säug.* p. 685 (1859); Gerrard, *Cat. Bones Mamm. B. M.* p. 123 (1862); Krefft, *Austr. Vert.* p. 11 (1871); Peters & Doria, *Ann. Mus. Genov.* xvi. p. 687 (1880); Jent. *Cat. Ost. Leyd. Mus.* p. 324 (1887).

## BROWN TREE-KANGAROO.

Rather more slenderly built than *D. ursinus*. Rhinarium and muzzle hairy to about the same degree as in that species. Fur long, coarse and harsh; underfur soft and woolly, dark brown, the thicker harsher fur present on the face as elsewhere. Nape-hairs, from withers to crown, directed forwards. General colour dark coarsely grizzled grey. Face brown or black. Ears small, pointed, thickly haired, but the hairs much shorter and coarser than in *D. ursinus*, outside black, inside yellow or white. Fur of back and sides dark brown or black four fifths of its length, then broadly tipped with shining yellow, the general result being a very coarsely grizzled appearance. Chin, chest, and belly white or dirty yellow. Arms to metacarpus, and legs to metatarsus coarsely grizzled grey and white, but the white predominating; fingers and toes black. Tail-hairs either white or black, the proportions of the two varying very much, so that the general tinge may be anything from white slightly mixed with black, to black faintly grizzled with white.

*Skull* stout and heavy. Nasals somewhat expanded behind, their posterior edges together forming a well-marked backwardly

directed angle in the centre. Ascending process of premaxillæ not broadened above, the naso-premaxillary rather more than half the length of the naso-maxillary suture. Interstitial region flat, not inflated, its edges parallel, thickened and forming blunt and rounded rudimentary postorbital processes. Temporal crests well-defined.

*Teeth.* Incisors thick and heavy.  $I^1$  but little longer than  $i^2$  and  $i^3$ ; these latter thick and triangular in section. Canines very small, scarcely projecting above the gum.  $P^4$  broad and thick, about 10 or 11 millim. in length, its breadth behind but little exceeding that in front, with a broad flat internal ledge running its whole length; a well-marked postero-internal talon, just in front of which is a sharp notch on the inner side of the ledge, and with three vertical grooves on its external surface.

#### Dimensions.

	♂.	♀.
	<i>e</i> (stuffed). millim.	<i>Co-type</i> * (stuffed). millim.
Head and body .....	650	550
Tail .....	680	640
Hind foot .....	137	127
Ear .....	40	41
Skull and teeth, see p. 99.		

*Hab.* New Guinea.

*Co-types* in the Leyden Museum.

<i>a-c.</i> { Ad. and imm. sks. } { Skull of <i>b.</i> } } ♂ ♀.	N.W. New Guinea.	A. R. Wallace, Esq. [C.].
<i>d.</i> Imm. sk., ♀.	E. New Guinea†.	Capt. Moresby, R.N. [P.].
<i>e.</i> Ad. st., ♂.	New Guinea.	Zool. Soc.
<i>f.</i> Imm. skeleton.	New Guinea.	Purchased.

### 3. *Dendrolagus lumholtzi* †.

*Dendrolagus lumholtzi*, *Coll. P. Z. S.* 1884, p. 387, figs. 7 & 8 (skull), pl. xxxii. (animal); *Lumholtz*, *P. Z. S.* 1884, p. 407 (habits); *Jent. Notes Leyd. Mus.* vii. p. 25 (1884); *Coll. Zool. Jahrb.* ii. p. 893, figs. 1-5 (skull, adult and young) (1887).

#### QUEENSLAND TREE-KANGAROO.

\* Preserved in the Leyden Museum.

† The specimen referred to *J. Roy. Geogr. Soc.* xlv. p. 169 (1875). No exact locality is given, but although the species has not been hitherto recorded from this part of New Guinea, there can be no doubt it really was from *Eastern New Guinea* that it was obtained.

‡ Two more Tree-Kangaroos have been recently described by Mr. De Vis from Queensland. The first of these is referred to as *D. bennettianus*, in the Abstract of the Proceedings of the Linnean Society of New South Wales, for Oct. 27, 1886 (p. v), but the full paper is not published in the "Proceedings"

Fur shorter and softer than in *D. ursinus* or *D. inustus*. Underfur very thin and sparse, pale grey; face covered with the coarser fur, as in *D. inustus*. Fur from withers to crown reversed. General colour pale finely grizzled grey. Face black; a paler band passing across the forehead just in front of the ears, and ending on each side in a white or yellowish spot below the ear. Ears black outside, yellow within, the hair on them short and coarse. Back of neck black, gradually passing into the pale grizzled grey of the back, where each hair is pale slaty grey for four fifths of its length, and then has a black subterminal and a yellowish or whitish terminal ring. Sides and belly pale yellowish white. Chin black; chest white or pale grey. Arms to metacarpus, and legs to end of metatarsus, clear pale yellow, darker on wrists and ankles; fingers and toes black. Tail mixed black and pale yellow, its upperside paler than its lower, but with a darker patch just beyond the base.

*Skull* of much the same proportions as those of *D. ursinus* and *D. inustus*, but rather more delicately built. Nasals short, broad, very much expanded behind, their posterior suture recurved forwards in the centre. Ascending processes of premaxillæ broadened above, the naso-premaxillary nearly or quite the length of the nasomaxillary suture. Interorbital space rounded, swollen and inflated, its edges smooth, not ridged, but with minute rudimentary post-orbital processes. Foramen magnum broader than high.

*Teeth*. Incisors smaller and lighter than those of the last species, cutting-edge of three incisors together only about 10 millim. I.<sup>2</sup> and i.<sup>3</sup> shorter, smaller, and less thick transversely than in *D. inustus*. Canines very small. P.<sup>4</sup> (Pl. XIII. fig. 1) broad and strong, differing markedly from that of *D. inustus* by having an external, as well as an internal ledge and posterior talon, the main crest being therefore nearly in the centre line of the tooth, instead of on its outer side. Molars as usual, but rather small in proportion.

#### Dimensions.

	♀.
	a (skin).
	millim.
Head and body . . . . .	(c.) 520
Tail . . . . .	(c.) 520
Hind foot . . . . .	119
Ear . . . . .	27

Skull, see p. 99.

for that day, and therefore the only information as yet available about it is that it is "more nearly allied to *D. dorianus* than to *D. lumholtzi*." The second species was described under the name of *D. fulvus* at the October (1887) meeting of the Royal Society of Queensland, and an abstract of its description published in the Brisbane 'Evening Observer' for Oct. 17, 1887. From the characters there given, I am inclined to suspect that it will turn out to be only an erythristic form of *D. lumholtzi*, the differences appearing to consist merely of the presence of rufous or fulvous in the parts ordinarily light grey in *D. lumholtzi*. No definite conclusion, however, can be arrived at until Mr. De Vis's full paper is published.

*Hab.* Central North Queensland.

Typical specimens in the Christiania, Copenhagen, and Genoa Museums, and in collection.

- a. { Imm. sk. } ♀. Herbert Vale, Central Queens- Dr. R. Collett [P.].  
 { Skull. } land (C. *Lumholtz*). (Co-type of species.  
 The specimen figured.)

#### 4. *Dendrolagus dorianus*.

*Dendrolagus dorianus*, *Ramsay, P. Linn. Soc. N. S. W.* viii. p. 17 (1883); *Mikl.-Macl. P. Linn. Soc. N. S. W.* ix. p. 1153, pl. lxxi. figs. 2-4 (animal and incisors) (1885).

##### DORIA'S TREE-KANGAROO.

“Rhinarium blackish, margin of nostrils only naked. Fur dense, long, apparently of one kind only, that on the back wholly reversed, directed forwards from a point just above the root of the tail. General colour uniform dark brown. Head short-haired, paler than the body. Ears very short, densely covered at the base, inside and out, with woolly hairs like that of the head, of a dark brown, becoming blackish on the tips and margins. Arms and legs darker than body, hands and feet black. Tail black, an irregular chestnut or fawn-coloured patch on its upperside, a few inches from its base; its hair comparatively short, close, stiff and harsh.”

*Skull* unknown.

*Teeth*. I.<sup>1</sup> conical, descending far below the level of the other incisors, and quite twice their length, 13 millim. long in the type. Canines large and strong, nearly or quite as large as i.<sup>2</sup>

##### *Dimensions.*

	♂. millim.	[♂*. millim.	♀*. millim.
Head and body.....	750	780	770
Tail.....	610	560	550]
Hind foot.....	107		

Skull, see next page.

*Hab.* Mt. Astrolabe region, S.E. New Guinea.

*Co-types* in the Macleay Museum, Sydney.

The above description of this very remarkable species is extracted from the original account given by Mr. E. P. Ramsay, but without either a description or good figures of the skull and dentition it is impossible to obtain a clear idea of its affinities. The reversal of the whole of the fur of the back and the great proportional size of the first incisors are both characters of so much importance as to show that *D. dorianus* is a species very distinct from any of the other members of the genus.

\* Measurements of the typical specimens as given by Miklouho-Maclay (*l. c.*).

## Skull Measurements of Dendrolagus.

Species .....	<i>D. ursinus.</i>		<i>D. inustus.</i>	<i>D. lumholtzi.</i>		<i>D. dorianus</i> †.
	(Leyden Museum.) ♂. ... aged.	♀. ... aged.		(*) ? ... adult.	♀. a. imm.	
Sex .....						♀ Type.
Specimen .....						
Age .....						
Basal length .....	103	102	98	105	91	(?) 132 †
Greatest breadth .....	61.5	61	58	67	59	69
Nasals, length .....	39	...	43	43	36	
" greatest breadth .....	19.2	...	18.5	23.5	19.5	
" least breadth .....	10.1	...	10	10	10	
Constriction, breadth .....	19	22	21.5	23	23	
Palate, length .....	59	60	57	64	54	
" breadth outside m. <sup>3</sup> .....	31.5	30.5	30	32	29.5	
" inside m. <sup>2</sup> .....	21.5	20.5	19	21.5	19	24
Palatal foramen .....	48	5	5	5.3	5	
Diastema .....	20	20.6	20	19.5	15	
Basiovarial axis .....	35.5	37	33.5	34.6	32	36
Basifacial axis .....	69	66.5	66	72	61	
Facial index .....	194	180	197	208	191	
Teeth—length of i. <sup>3</sup> .....	...	...	4.2	3.4	3.3	
" " p. <sup>4</sup> .....	9.8	9.2	9.4	9.5	9.5	
" " ms. <sup>1-3</sup> .....	18.1	17.8	18.7	18	17.8	

\* In Christiania Museum.

† From Ramsay (*l. c.*).

‡ This is probably the greatest length of the skull, which would give a "basal length" of about 115 millim.

## 7. LAGOSTROPHUS.

Type.

Lagostrophus, *Thomas, P. Z. S.* 1886, p. 544 . . . . . *L. fasciatus*.

Rhinarium naked. Hind feet covered with long bristly hairs, hiding the claws. Back cross-banded.

Skull with a very narrow pointed muzzle. Bullæ inflated. Condyles of lower jaw broad, transverse, with well-developed internal processes. Coronoid processes slightly concave on their anterior edges. *Symphysis menti* firm and immovable.

Dentition:—I.  $\frac{1.2.3}{1.0.0}$ , C.  $\frac{0}{0}$ , P.  $\frac{0.0.3.4}{0.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 32$ .

Incisor-series (Pl. XIII. fig. 4) forming a sharp angle in the centre, the two sets nearly parallel, and diverging but little behind. I.<sup>1</sup> the smallest of the three in cross-section, and scarcely longer than the others, with a blunt, conical point. I.<sup>2</sup> with a broad, flat palatal surface, suitable for grinding rather than cutting; i.<sup>3</sup> smaller than i.<sup>2</sup>, similarly flattened, but with a broad shallow groove running down the centre of its palatal surface, and ending at its postero-external corner, thus producing a notch homologous with that found in other genera. Canines wholly absent. Premolars (both p.<sup>3</sup> and p.<sup>4</sup>) short, oval, rounded, with well-marked internal ledges. Molars as in *Macropus*. Lower incisors in adult animals stouter and less scalpriform than in *Macropus*, their inner edges square, without sharp opposable cutting-edges.

Range. Western Australia.

1. *Lagostrophus fasciatus*.

*Kangurus fasciatus*, *Pér. & Less. Voy. Terres Austr.* i. p. 114, *Atl.* pl. xxvii. (animal) (1807); *Desm. N. Dict. d'H. N.* xvii. p. 39 (1817); *id. Mamm.* i. p. 274 (1820); *F. Cuv. Dict. Sci. Nat.* xxiv. p. 349 (1822); *Geoff. Dict. Class. d'H. N.* ix. p. 110 (1826); *Gray, Griff. Cuv. An. K.* v. p. 203 (1827); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 379 (1836); *Desm. Dict. Univ. d'H. N.* vii. p. 170 (1849).

*Macropus elegans*, *G. Cuv. R. A.* i. p. 183 (1817) ( *nec Lambert*).

*Halmaturus fasciatus*, *Goldf. Isis*, 1819, p. 268; *Schinz, Cuv. Thierr.* i. p. 264 (1821); *F. Cuv. Dents Mamm.* p. 186, pl. xliii. (teeth) (1825); *Gray, Grey's Austr., App.* ii. p. 403 (1841); *Wagn. Schr. Säug. Supp.* iii. p. 123 (1845), v. p. 307 (1855); *Schinz, Syn. Mamm.* i. p. 559 (1844).

*Halmaturus elegans*, *Goldf. Handb. Zool.* ii. p. 446 (1820); *Less. Man. Mamm.* p. 228 (1827); *Pander & D'Alton, Vergl. Osteol. Beutelh.* pl. ii. (skull and skeleton) (1828); *Less. H. N. Mamm. (Compl. Buff.)* v. pl. xxxv. (animal) (1836).

*Macropus fasciatus*, *Fisch. Syn. Mamm.* p. 284 (1829); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 237 (1841); *Gieb. Odontogr.* p. 43, pl. xix. fig. 2 A (incisors) (1855); *Schleg. Dierk.* p. 143 (1857); *Gieb. Säug.* p. 676 (1859); *id. Bronn's Kl. u. Ordn.* vi. Abth. v. pl. xlvii. fig. 21 (4) (1876); *Chenu, Encycl. d'H. N., Mars.* p. 346 (1879).

*Bettongia fasciata*, *Gould, Mon. Macrop.* pl. xxx. (animal) (1842).

*Lagorchestes albipilis*, *Gould, Ann. Mag. N. H.* (1) x. p. 2 (1842);

- Gilbert, P. Z. S.* 1844, p. 33 (habits); *Gieb. Bronn's Kl. u. Ordn.* vi. Abth. v. pl. xxi. figs. 5-7 (skull) (1874).  
*Halmaturus striatus*, *Less. N. Tabl. R. A., Mamm.* p. 195 (1842) (*nom. nudum*).  
*Macropus (Lagorhastes) fasciatus*, *Waterh. N. H. Mamm.* i. p. 87 pl. v. fig. 4 (incisors) (1846).  
*Lagorhastes fasciatus*, *Gould, Mamm. Austr.* pl. lvi. (animal) (1849); *Gerrard, Cat. Bones Mamm. B. M.* p. 131 (1862); *Kreff, Austr. Vert.* p. 11 (1871); *Jent. Cat. Ost. Leyd. Mus.* p. 321 (1887).  
*Lagostrophus fasciatus*, *Thomas, P. Z. S.* 1886, p. 544, pl. lix. (skull, teeth, &c.).

## BANDED WALLABY.

Size small. General form light and graceful. Rhinarium (Pl. XI. fig. 10) naked, the hair growing downwards just to the level of the superior internal angle of the nostrils. Fur thick and soft, consisting of three distinct sorts, viz. the soft slaty grey underfur, the ordinary coarse hair, and finally a large number of long isolated piles, from two to three inches in length, projecting far beyond the other hairs. General colour grizzled grey-brown, the lower back cross-banded; ears short, their backs grey. Head and forequarters uniform finely grizzled grey, the ordinary coarse fur black for its basal two thirds, then with a white or yellowish-white subterminal and a brown or black terminal band; lower back with the hair so arranged as to bring the black and white bands opposite each other, so as to produce well-defined transverse bands across the back; the bands connected down the centre by an indistinct longitudinal black line. Long piles everywhere, black for their basal four-fifths, then with a broad white and prominent band, their extreme tips black. Chin, chest, and belly mixed grey and white. No face, shoulder, flank, or hip-marks present, except that a pair of indistinct reddish patches are sometimes present on the sides of the belly, just in front of the hips. Arms and back of legs grey with a reddish tinge; hands and feet dull yellow or yellowish grey; the long hairs on the sides of the feet and on the toes quite hiding the claws. Tail uniformly clothed with short close-set hairs, yellowish grey above, dull yellow below; an inconspicuous pencil of longer hairs at the tip.

*Skull* broad, but lightly built; muzzle short, slender, and tapering to a point; nasals very narrow in front, much expanded behind; interorbital space flat, its edges parallel or slightly converging backwards, square and forming slightly overhanging ridges in old specimens. Premaxillæ small and slender, naso-premaxillary much shorter than naso-maxillary suture; palatal foramina short and narrow; posterior palate with large vacuities; bullæ but slightly inflated, their substance smooth and transparent.

*Teeth* (Pl. XIII. fig. 4) as described above. P.<sup>3</sup> with three or four external grooves, p.<sup>4</sup> with four or five, the former scarcely smaller than the latter, and just about equal in length to m.<sup>1</sup>

*Dimensions.*

	♂. a (stuffed). millim.	♀. f (stuffed). millim.
Head and body .....	460	415
Tail .....	330	320
Hind foot .....	100	103
Ear .....	46	49

Skull, see p. 85\*.

*Hab.* Western Australia †.

*Co-types* in the Paris Museum.

a.	{ Ad. sk. } ♂.	Wongar Hills, W. A. ( <i>Priess</i> ).	Gould Coll.
	{ Skull. }		
b.	{ Ad. sk. } ♀.	York, W. A. ( <i>Priess</i> ).	Gould Coll.
	{ Skull. }	( <i>Co-types</i> of <i>L. albipilis</i> , Gould.)	
c.	Imm. skull.	West Australia ( <i>J. Gilbert</i> ).	Gould Coll.
d, e.	Ad. sks., ♂ ♀.	Perth, W. A.	Government of W. Australia [E.].
f.	{ Ad. st. } ♀.	West Australia.	Purchased.
	{ Skull. }		

## Subfamily II. POTOROINÆ.

Size small. Claws of fore feet very large, those of the median disproportionately larger than those of the outer fingers. Hind foot without a hallux. Tail long, hairy. Œsophagus entering the stomach near the pyloric end; liver without a Spigelian lobe ‡. Canines always present, generally well-developed. P.<sup>4</sup> set in the same general line as the other teeth, or very slightly bent outwards anteriorly. Molars more or less tuberculate, decreasing in size backwards; m.<sup>4</sup> rising early into its place, smaller than m.<sup>3</sup> First upper incisor markedly longer than the others.

## 8. ÆPYPRYMNUS.

*Æpyprymnus*, *Garrod*, *P. Z. S.* 1875, p. 59 ..... *Æ. rufescens*. Type.

Rhinarium (Pl. XI. fig. 11) partially hairy, the hairs extending about halfway down the front of the nasal septum. Fore claws very long and strong, those of the third and fourth digits considerably longer than the others. Hind feet longer than the head, their soles narrow, naked, coarsely granulated. Tail evenly hairy, not crested above.

\* The skull measurements, for the sake of comparison, have been placed next to those of *Lagorchestes*.

† Also recorded by Gould from South Australia, but this has not as yet been confirmed.

‡ *Cf.* *Garrod*, *P. Z. S.* 1875, p. 58.

*Skull* stout and strongly built, with a thick conical muzzle. Nasals short and broad, expanded behind. Supraorbital edges square, not forming postorbital processes. Anterior palatine foramina very short and small, confined to the premaxillæ, barely extending backwards to the level of the canines. Posterior palate comparatively perfect, either wholly without or with very small and irregular palatal vacuities. Bullæ unswollen. Lower jaw short and thick, very convex below. Coronoid process long and strong.

*Dentition*:—I.  $\frac{1.2.3}{1.0.0}$ , C.  $\frac{1}{0}$ , P.  $\frac{0.0.3.4}{0.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 34$ .

Upper incisors short and thick;  $i^2$  round and  $i^3$  triangular in section, the former scarcely smaller than the latter. Canines present.  $P^4$  long, narrow, without any internal edge or postero-internal talon, its outer and inner surfaces with about 7 or 8 vertical grooves. Molars (Pl. XIII. fig. 5) oblong, more ridged and less distinctly quadritubercular than in the other genera of the subfamily, and their decrease in size backwards less strongly marked,  $m^1$  being decidedly and  $m^2$  very slightly smaller than  $m^3$ , which is still, however, distinctly larger than  $m^4$ .

*Range*. Eastern Australia.

### 1. *Æpyprymnus rufescens*.

*Bettongia rufescens*, *Gray, Charlesw. Mag. N. H.* i. p. 584 (1837); *Gould, Mon. Macrop.* pl. xiii. (animal) (1841); *Gray, Grey's Austr.*, App. ii. p. 404 (1841); *id. List Mamm. B. M.* p. 94 (1843); *Gould, Mamm. Austr.* ii. pl. lxx. (animal) (1855); *Gerrard, Cat. Bones Mamm. B. M.* p. 129 (1862); *Kreffl, Cat. Mamm. Austr. Mus.* p. 46 (1864).

*Hypsiprymnus melanotis*, *Ogilb. P. Z. S.* 1838, p. 62; *Waterh. Cat. Mamm. Mus. Zool. Soc.* p. 65 (1838); *Wagn. Schr. Säug. Supp.* iii. p. 100 (1843).

*Hypsiprymnus rufescens*, *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 188 (1841); *Schinz, Syn. Mamm.* i. p. 543 (1844); *Waterh. N. H. Mamm.* i. p. 196 (1846); *Wagn. Schr. Säug. Supp.* v. p. 290 (1855); *Gieb. Säug.* p. 687 (1859).

*Macropus rufescens*, *Schleg. Dierk.* p. 143 (1857); *id. Dierent.* p. 171 (1872).

*Æpyprymnus rufescens*, *Garrod, P. Z. S.* 1875, p. 59; *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 727 (1884); *Lyd. Cat. Foss. Mamm. B. M.* v. p. 205 (1887); *Jent. Cat. Ost. Leyd. Mus.* p. 325 (1887).

### RUFIOUS RAT-KANGAROO.

The largest of the Rat-Kangaroos. Rhinarium (Pl. XI. fig. 11) with the hair forming two small pointed processes downwards, extending about halfway down the nasal septum, the extreme edges of the nostrils naked. Fur long and coarse, of a peculiar hispid texture; underfur abundant. General colour rufescent grey. Face pale grey, the coarser hairs with a white subterminal band and a black tip. Ears rather long for the subfamily, hairy, their backs black or dark brown. Back coarsely grizzled bright

reddish grey, the longer hairs dark for about three fifths of their length, then white passing distally into deep red; their extreme tips black. Underfur slaty brown at base, pale grey passing into rusty red terminally. An indistinct white stripe passing across the sides just in front of the hips. Chin, chest, and belly dirty white. Outsides of hind legs grey; rest of limbs white. Hairs on back of hands very long and coarse, partly hiding the claws. Feet brown or greyish brown. Central hind claw long and strong, exceeding the pad by half an inch or more. Tail thickly and evenly haired, not crested, pale grey or whitish above, white below.

*Skull* and *teeth* as described above. Greatest breadth of nasals about three fifths their length. Upper p.<sup>4</sup> about twice the length of m.<sup>1</sup>. P.<sup>3</sup> about the length of m.<sup>2</sup>, with five or six vertical external grooves.

*Dimensions.*

	♂. d (stuffed.) Adult. millim.
Head and body . . . . .	520
Tail . . . . .	380
Hind foot . . . . .	134
Ear . . . . .	41

Skull, see p. 125.

*Hab.* New South Wales.

*Type* in collection.

This species may be readily distinguished from the other Rat-Kangaroos by its ruddy colour, black-backed ears, whitish hip-stripe, and hairy rhinarium.

a, b.	{ Ad. & imm. sks. }	New South Wales	Gould Coll.
	{ Skull. }	(J. G.).	
c.	{ Ad. sk. }	New South Wales.	Zool. Soc.
	{ Skull. }	(Type of species and of <i>H. melanotis</i> , Og.)	
d.	Ad. st., ♂ (albino).		Zool. Soc.
e.	{ Ad. st. }		Purchased.
	{ Skull. }		
f.	Ad. skull, ♂.	New South Wales	Gould Coll.
		(J. G.).	
g, h.	Ad. & imm. skeletons.		Purchased.

9. BETTONGIA.

*Bettongia*, Gray, *Charlesw. Mag. N. H.* i. p. 584 (1837). B. cuniculus. Type.

Rhinarium (Pl. XI. fig. 12) wholly naked, the naked part running backwards in the centre for a short distance, and terminating in a point. Ear very short, rounded. Fore claws shorter and weaker than in *Æpyprymnus*: their proportions as in that genus. Hind feet longer than the head; their soles naked, coarsely granulated. Tail more or less prehensile, thickly hairy, the hairs

on the upper side longer than those on the lower, and generally darker in colour, forming a more or less distinct crest.

*Skull* short, stout and strong, with a very short muzzle. Interorbital space broad and flat, its edges square or slightly rounded. Anterior palatine foramina very short, extending as a rule only from about the middle of  $i.^3$  to the middle of the canine. Palate with a single pair of very large vacuities between the molars, only bordered behind by a narrow bar of bone, and often confluent in the middle line. Bullæ very variable in size, generally much, but sometimes only slightly swollen. Lower jaw short, thick, with a marked convexity below.

*Dentition* :—I.  $\frac{1.2.3}{1.0.0}$ , C.  $\frac{1}{0}$ , P.  $\frac{0.0.3.4}{0.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} * \times 2 = 34$ .

Incisors much as in *Æpyprymnus*. Canines present, thick, rather shorter than the posterior incisors.  $P.^4$  (Pl. XIII. figs. 6–10) very long, powerful and trenchant, with but little trace of internal ledge, but with a small postero-internal talon; its two surfaces each with from seven to fifteen distinct oblique grooves passing downwards and backwards; the inner ones effaced by wear in old individuals. Deciduous  $p.^3$  similar to  $p.^4$ , but shorter and smaller. Molars quadrangular and quadritubercular, markedly decreasing in size backwards;  $m.^4$  much the smallest of all.

*Range*. Australia (except the extreme north) and Tasmania.

The members of this genus alone among terrestrial mammals have their tails prehensile, using them for carrying grass, sticks, or other objects, which, as shown in Gould's figures, are held by the tail being twisted downwards round them.

The four species, although very distinct and easily definable from each other by their cranial and dental characters, are yet extraordinarily similar to each other externally. So much is this the case that in the following synopsis it has been found impossible to do more than point out the most obvious distinguishing characters; characters that are, however, so slight and so variable that absolute reliance can be placed on no determination that does not depend upon an examination of the skull.

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\* Normally; but the members of this genus are apparently only now in process of losing their fifth molars, and present therefore the remarkable condition of retaining such an ancient and generalized character as the possession of more than four molars, while at the same time they have the comparatively highly specialized characters of the other members of the present family. Waterhouse (N. H. Mamm. i. p. 206) notices the occurrence of a fifth molar in a specimen of *B. lesueuri*, but in addition I have been able to find one other instance of its occurrence on one side of the upper jaw, two instances on both sides, and, finally, one instance, in *B. cuniculus*, of its occurrence on both sides of both jaws, this animal having therefore a total of 20 molars. In several cases the extra teeth are still beneath the bone, and appear as if they never would have been cut, a state of things quite paralleled in the now progressing reduction of the number of human molars, by the frequent non-eruption after development of the so-called "wisdom-teeth" ( $m.^3$ ). On the other hand  $m.^4$  is itself often aborted in *Bettongia*, there being then only three molars.

*Synopsis of the Species.*

## I. EXTERNAL CHARACTERS.

- a.* Size larger; hind foot generally upwards of 110 millim. Tail-crest but little developed, scarcely darker than the rest of the tail . . . . . 1. *B. cuniculus*, p. 106.
- b.* Size smaller, but hind foot longer in proportion, about 110 millim. Caudal crest distinct, black, extending along about the distal half of the tail. Hind feet and underside of tail white . . . . . 2. *B. gaimardi*, p. 108.
- c.* Size as in *B. gaimardi*, but hind foot rarely exceeding 105 millim. Caudal crest very distinct, black, covering the distal half or three fourths of the tail; tip of the latter rarely or never white. Hind feet and underside of tail brown or whitish brown . . . . . 3. *B. penicillata*, p. 110.
- d.* As in *B. penicillata*, but the tail scarcely crested at all, and its tip nearly invariably white all round . . . . . 4. *B. lesueuri*, p. 112.

## II. CRANIAL CHARACTERS.

- A. Bullæ low and but little inflated, their surface rough.
- a.* Upper p.<sup>4</sup> about 8 millim. long, with seven or eight external grooves . . . . . 1. *B. cuniculus*, p. 106.
- B. Bullæ smooth, rounded and inflated.
- b.* Upper p.<sup>4</sup> shorter than m.<sup>1</sup> and m.<sup>2</sup> combined, with from seven to nine external grooves. Bullæ small or medium.
- a*<sup>1</sup>. Upper p.<sup>4</sup> quite straight, 6 to 7 millim. long. Nasals broad, their posterior edges curved. Bullæ small, their most prominent part about 8 millim. below the level of the glenoid fossa . . . . . 2. *B. gaimardi*, p. 108.
- b*<sup>1</sup>. Upper p.<sup>4</sup> about 7 millim. long, with its axis bent outwards anteriorly. Nasals narrow, square-edged behind. Bullæ medium, their most prominent point projecting about 9 or 10 millim. below the level of the glenoid fossa . . . . . 3. *B. penicillata*, p. 110.
- c.* Upper p.<sup>4</sup> more than 7·5 millim. long, generally longer than m.<sup>1</sup> and m.<sup>2</sup> combined, with from ten to fourteen external grooves. Bullæ very large, projecting from 11 to 15 millim. below the level of the glenoid fossa . . . . . 4. *B. lesueuri*, p. 112.

1. *Bettongia cuniculus*.

*Bettongia setosa*, Gray, *Charlesw. Mag. N. H.* i. p. 584 (1837) (*nec Ogilb.*); *id. Gray's Austr., App. ii.* p. 403 (1841); *id. List Mamm. B. M.* p. 93 (1843).

*Hypsiprymnus cuniculus*, *Ogilb. P. Z. S.* 1838, p. 63; *Waterh. Cat. Mamm. Mus. Zool. Soc.* p. 65 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 186 (1841); *Wagn. Schr. Säug. Supp.* iii. p. 101 (1843), v. p. 291 (1855); *Schinz, Syn. Mamm.* i. p. 543 (1844); *Gieb. Odontogr.* p. 43, pl. xix. fig. 13 (teeth) (1855); *id. Säug.* p. 687 (1859); *id. Bronn's Kl. u. Ordn.* vi. Abth. v. pl. xlvii. fig. 24 (teeth) (1876).

*Bettongia cuniculus*, *Gould, Mon. Macrop.* pl. xxix. (animal) (1842); *id. Mamm. Austr.* ii. pl. lxiii. (animal) (1854); *Gerrard, Cat. Bones Mamm. B. M.* p. 128 (1862); *Kreffl, Cat. Mamm. Austr. Mus.* p. 47 (1864); *id. Notes Faun. Tasm.* p. 4 (1868); *id. Mamm. Austr.* text to pl. xi. p. 5 (1871); *Higg. & Pett. P. R. Soc. Tasm.* 1883, p. 196; *Jent. Cat. Ost. Leyd. Mus.* p. 325 (1887).

*Hypsiprymnus (Bettongia) cuniculus*, *Waterh. N. H. Mamm.* i. p. 200 (1846); *Gunn, P. R. Soc. Tasm.* ii. p. 86 (1852).

#### TASMANIAN JERBOA-KANGAROO.

Size largest of the genus; form comparatively clumsy. Fur soft, and close and straight; underfur thick and woolly. General colour of head and body grizzled grey, the longer hairs dark, with a white subterminal band; the underfur dark slate-colour at base, pale yellowish grey at tip, the latter colour showing through and giving a general greyish tinge to the whole. Ears hairy behind, coloured like the head. Chin, chest, and belly white; no trace of a whitish hip-mark. Arms and legs, hands and feet white, the hairs on the latter long and hispid, nearly or quite hiding the claws. Fore claws very long and strong. Tail above coloured like the body, the hairs along the upper surface, although longer than elsewhere, not forming a distinct crest, and only occasionally becoming dark brown or black towards the end; underside of tail dirty white; tail-tip sometimes white all round.

*Skull* stout, heavily built, and on the whole more rounded and less angular than in the other species. Nasals (Pl. XIV. fig. 1) with their least slightly more than half their greatest width, the latter going from  $2\frac{1}{4}$  to  $2\frac{1}{2}$  times in their length; their sides concave in front and convex behind, their posterior edges bowed backwards, and their postero-external angles rounded. Interorbital space broad and smooth, its edges rounded, not sharply angular. Palatal vacuities extending forwards to about the middle of  $m.^2$ . Bullæ (Pl. XIV. fig. 2) low and flattened, their most projecting part only about 8 millim. below the level of the condyloid surface of the glenoid fossa.

*Teeth.* Upper  $p.^4$  (Pl. XIII. fig. 8) long and narrow, about 8 millim. in length, its postero-internal talon minute; its outer surface with seven or eight grooves. Deciduous  $p.^3$  rather longer than  $m.^2$ , with five or six grooves.  $M.^4$  nearly as large as  $m.^3$ , oblong. Lower  $p.^4$  about 7 or 8 millim. long, with seven or eight internal grooves;  $p.^3$  as in the upper jaw.

*Dimensions.*

	♀.	
	♂ (stuffed).	
	millim.	
Head and body .....	440	
Tail .....	300	{ (Range up to 120.)
Hind foot.....	105	
Ear .....	30	
Skull, see p. 125.		

*Hab.* (Eastern Australia \* and) Tasmania.

*Type* in collection.

a. Ad. sk.	"Hunter's R., N.S.W."	Zool. Soc. ( <i>Type</i> of species.) Purchased.
b. { Ad. st. } { Skull. } ♀.		
c. { Imm. sk. } { Skull. } ♀.	Tasmania.	Gen. Hardwicke [P.] ( <i>Type</i> of <i>B. setosa</i> , Gray.)
d. Ad. sk.	Tasmania.	
e. Ad. sk., ♀.	Tasmania.	Purchased.
f. Ad. skull.	Tasmania.	Gould Coll.
g. Ad. skull.	(Voy. H.M.S. 'Fly')	J. B. Jukes, Esq. [P. & C.].
h.† Skeleton.		Purchased.

## 2. *Bettongia gaimardi*.

*Kangurus gaimardi*, *Desm. Mamm., Supp.* ii. p. 542 (1822).

*Hypsiprymnus whitei*, *Quoy & Gaim. Voy. Uranie, Zool., Text*, p. 62, Atlas, pl. x. (animal and skull) (1824); *Less. Man. Mamm.* p. 222 (1827); *id. Dict. Class. d'H. N.* xiv. p. 243 (1828); *id. H. N. Mamm. (Compl. Buff.)* iv. p. 492, pl. xxxii. (animal and skull) (1830); *Benn. Cat. Mamm. Austr. Mus.* p. 5 (1837); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 181 (1841); *Schinz, Syn. Mamm.* i. p. 541 (1844).

*Kangurus lepturus*, *Gaim. Bull. Sci. Nat.* i. p. 271 (1824).

*Hypsiprymnus formosus and philippii*, *Ogilb. P. Z. S.* 1838, p. 62; *Wagn. Schr. Säug. Supp.* iii. p. 100 (1843).

*Bettongia whitei*, *Gray, Grey's Austr., App.* ii. p. 403 (1841); *id. List Mamm. B. M.* p. 92 (1843); *Gerrard, Cat. Bones Mamm. B. M.* p. 129 (1862).

*Hypsiprymnus hunteri*, *Owen, Tr. Z. S.* ii. p. 408, pl. lxxi. (skull) (1841); *id. Cat. Ost. Coll. Surg.* i. p. 328 (1853).

*Hypsiprymnus (Bettongia) gaimardi*, *Waterh. N. H. Mamm.* i. p. 207 (1846).

*Hypsiprymnus gaimardi*, *Wagn. Schr. Säug. Supp.* v. p. 292 (1855); *Greb. Säug.* p. 688 (1859).

\* The original locality of "Hunter's R., New South Wales," assigned to the type has never been confirmed, and is probably erroneous. The species is therefore presumably peculiar to Tasmania.

† With five molars above and below.

*Bettongia gaimardi*, *Flou. & Gars. Cat. Ost. Coll. Surg.* ii. p. 726 (1884); *Jent. Cat. Ost. Leyd. Mus.* p. 325 (1887).

GAIMARD'S RAT-KANGAROO.

Size smaller than in *B. cuniculus*, but the hind feet rather longer in proportion. Fur woollier in texture than in the other species, the woolly underfur thicker and longer. Details of coloration on body and limbs quite as in *B. cuniculus*, but the general tone rather more yellowish or fawn. Tail coloured like the body for its basal third, then gradually darkening above and the hairs lengthening until there is, on the terminal third, a distinct black crest, the longest hairs of which are upwards of an inch in length; underside short-haired, white; a few hairs at the extreme tip white, but these very inconspicuous, hidden by the longer black hairs.

*Skull* smooth and rounded, with a broad conical muzzle. Nasals (Pl. XIV. fig. 3) short and broad, their least from one half to three fifths their greatest width, the latter going only about once and three quarters into their length; their sides but little curved, and their posterior margin straighter across and less curved than in *B. cuniculus*; but more than in *B. penicillata*. Interorbital space broad and smooth, its edges square or slightly rounded. Palatal foramina very short. Posterior palatal vacuities extending to about the middle of m.<sup>2</sup> Bullæ (Pl. XIV. fig. 4) smooth and transparent, but low and but little inflated, their most prominent point only about 8 millim. below (in the natural position) the condyloid surface of the glenoid fossa.

*Teeth.* Upper p.<sup>4</sup> (Pl. XIII. fig. 10) small, narrow, its axis set perfectly straight antero-posteriorly, its postero-internal talon distinct; its inner and outer surfaces each with seven or eight grooves. Deciduous p.<sup>3</sup> with five or six grooves. M.<sup>4</sup> oblong, about three fourths the size of m.<sup>3</sup> Lower m.<sup>3</sup> with six or seven grooves on each side; p.<sup>3</sup> with five.

*Dimensions.*

	♂. a (skin). millim.
Head and body . . . . .	390
Tail . . . . .	280
Hind foot . . . . .	112
Ear . . . . .	29

Skull, see p. 125.

*Hab.* New South Wales.

*Type* in the Paris Museum.

a.	{ Ad. sk. } ♂.	New South Wales ( <i>J. G.</i> ).	Gould Coll.
	{ Skull. }		
b.	{ Imm. sk. } ♂.	New South Wales ( <i>J. G.</i> ).	Gould Coll.
	{ Skull. }		
c.	Skull.		Zool. Soc.

3. *Bettongia penicillata*.

- Bettongia penicillata*, Gray, *Charlesw. Mag. N. H.* i. p. 584 (1837); *Gould, Mon. Macrop.* pl. xiv. (animal) (1841); *Gray, List Mamm. B. M.* p. 93 (1843); *Gould, Mamm. Austr.* ii. pl. lxi. (animal) (1852); *Gerrard, Cat. Bones Mamm. B. M.* p. 129 (1862); *Kreffl, Mamm. Austr.* text to pl. xi. p. 5 (1871); *Coll. Zool. Jahrb.* ii. p. 905 (1887); *Jent. Cat. Ost. Leyd. Mus.* p. 325 (1887).
- Hypsiprymnus penicillatus*, *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 183 (1841); *Schinz, Syn. Mamm.* i. p. 541 (1844); *Wagn. Schr. Säug. Supp.* v. p. 294 (1855); *Gieb. Säug.* p. 688 (1859); *Brehm, Therl.* ii. p. 597, fig. (animal) (1880).
- Hypsiprymnus ogilbyi* (*Gould*), *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 185 (1841); *Schinz, Syn. Mamm.* i. p. 542 (1844).
- Bettongia ogilbyi*, *Gray, Grey's Austr., App.* ii. p. 403 (1841); *id. List Mamm. B. M.* p. 93 (1843); *Gould, Mamm. Austr.* ii. pl. lxii. (animal) (1852); *Gerrard, Cat. Bones Mamm. B. M.* p. 129 (1862); *Kreffl, Cat. Mamm. Austr. Mus.* p. 45 (1864); *id. Mamm. Austr.* text to pl. xi. p. 5 (1871).
- Bettongia gouldi*, *Gray, List Mamm. B. M.* p. 94 (1843).
- Hypsiprymnus* (*Bettongia*) *penicillatus*, *Waterh. N. H. Mamm. i.* p. 212, pl. vii. fig. 1 (animal), pl. vi. fig. 3 (skull) (1846).
- Macropus penicillatus*, *Schleg. Dierk.* p. 143 (1857).

## BRUSH-TAILED RAT-KANGAROO.

*Rhinarium* (Pl. XI. fig. 12) naked, as in the other species. Head, body, and limbs not definitely different from those of *B. cuniculus* and *B. gaimardi*, except that there is a more rufous tinge on the sides of the head round the bases of the ears, and that the hands and feet are pale brown instead of white. Bristly hairs of feet not hiding the claws. Tail long, prominently and distinctly crested along its upper surface; the crest wholly black, and extending along from the terminal one third to two thirds of the tail; the longer hairs generally about an inch in length. Base of tail above coloured like the back; underside pale brown, like the feet; end of tail not tipped with white.

*Skull* light and delicate. *Nasals* (Pl. XIV. fig. 5) narrow, evenly broadening backwards, their greatest width going from  $2\frac{1}{4}$  to  $2\frac{3}{4}$  times into their length; their posterior edge quite straight, transverse, and their postero-external corners quite sharp and angular. Their shape, however, varies, and sometimes more approaches that found in *B. gaimardi*. *Interorbital space* flat, its edges sharp and square. *Posterior palatine vacuities* generally ending about opposite the front of *m.*<sup>2</sup> *Bullæ* (Pl. XIV. fig. 6) large, smooth, transparent, much inflated, their most prominent point about 10 or 11 millim. below the level of the floor of the glenoid fossa.

*Teeth*. Upper *p.*<sup>4</sup> (Pl. XIII. fig. 9) about 7 millim long, its axis twisted outwards anteriorly, its sides with seven or eight grooves, its postero-internal talon small but distinct. *P.*<sup>2</sup> with five or six grooves. *M.*<sup>4</sup> oval, generally about one third the size of *m.*<sup>3</sup>, but sometimes as proportionally large as in *B. gaimardi*. Lower *p.*<sup>2</sup> with eight or nine, and *p.*<sup>3</sup> with six grooves.

## Dimensions.

	♂. t (skin). adult. millim.	♀. d (skin). adult. millim.
Head and body . . . . .	(c.) 360	390
Tail . . . . .	310	310
Hind foot . . . . .	105	108
Ear . . . . .	25	25

Skull, see p. 125.

*Hab.* All Australia, except the extreme north; not found in Tasmania.

*Type* in collection.

This species seems to be the commonest of all the Rat-Kangaroos, and has a wider range than any other. There can be no question that the western form ("*B. ogilbyi*") is not specifically separable from the eastern, the distinguishing characters given by Gould being quite unimportant. With regard to the relationship of *B. penicillata* to *B. gaimardi* it is more difficult to decide, as, although the great mass of specimens are readily distinguishable by the cranial characters above described, yet some few show a decided tendency to intergradation, at least in the shape of their nasals and in their dental characters. I have, however, found no specimens intermediate in the size of their bullæ, a point in which typical specimens of the two forms differ so materially as to render it unlikely that they will be found to intergrade, although many more, and especially eastern, specimens must be examined before the question can be looked upon as finally settled.

a. { Ad. st. } ♀	Liverpool Plains, N.S.W.	Gould Coll.
{ Skull. }	( <i>J. G.</i> )	
b. { Ad. sk. } ♀	Namoi R., N.S.W. ( <i>J. G.</i> )	Gould Coll.
{ Skull. }		
c. { Ad. sk. } ♂	New South Wales.	Zool. Soc. ( <i>Type of species.</i> )
{ Skull. }		
d. Ad. sk., ♀	South Australia ( <i>J. G.</i> )	Gould Coll.
e. Yg. st.	South Australia ( <i>J. G.</i> )	Gould Coll.
f, g. Imm. sk.	South Australia.	Sir Geo. Grey [P. & C.]
h. Yg. st.	South Australia.	Sir Geo. Grey [P. & C.]
i. Yg. sk.	Gulf St. Vincent, S. A.	C.D.E. Fortnum, Esq. [P. & C.]
j, k. Skulls.	Scrub near Adelaide, S. A.	( <i>Type of B. gouldi</i> , Gr.) C.D.E. Fortnum, Esq. [P. & C.]
l, m. Ad. sk., ♂ & ♀, 9/85.	Perth, W. A.	Government of W. Australia [P.]
n. { Imm. sk. } { Skull. }	York, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
	20/6/39.	( <i>Type of B. ogilbyi</i> , Gould.)

o-s.* Skulls.	West Australia ( <i>J. Gilbert</i> ).	Gould Coll.
t, u. Ad. ♂ & yg. sks.	West Australia.	Purchased.
v. Skull.	Shark's Bay, W. A. ( <i>Voy.</i> <i>'Herald'</i> ).	F. M. Rayner, Esq. [P. & C.]
w. Skull. (Dwarf skull figured by Waterhouse.)		Zool. Soc.
x. Skeleton.		Zool. Soc.
y. Skeleton.		Purchased.

#### 4. *Bettongia lesueuri*.

- Hypsiprymnus lesueuri*, *Quoy & Gaim. Voy. Uranie*, p. 64 (1824); *Less. Man. Mamm.* p. 222 (1827); *id. Dict. Class. d'H. N.* xiv. p. 244 (1828); *Fisch. Syn. Mamm.* p. 280 (1829); *Gray, Grey's Austr., App.* ii. p. 403 (1841); *Desm. Dict. Univ. d'H. N.* x. p. 449 (1849).
- Hypsiprymnus grayi*, *Gould, P. Z. S.* 1840, p. 178; *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 190 (1841); *Schinz, Syn. Mamm.* i. p. 544 (1844); *Wagn. Schr. Säug. Supp.* v. p. 293 (1855); *Gieb. Säug.* p. 687 (1859).
- Bettongia grayi*, *Gray, Grey's Austr., App.* ii. p. 403 (1841); *id. List Mamm. B.M.* p. 93 (1843); *Gould, Mamm. Austr.* ii. pl. lxiv. (animal) (1855); *Gerrard, Cat. Bones Mamm. B. M.* p. 129 (1862); *Krefft, Cat. Mamm. Austr. Mus.* p. 45 (1864); *id. Mamm. Austr.* text to pl. xi. p. 5 (1871); *Flow. Encycl. Brit.* (9) xiii. p. 840, fig. 4 (skull) (1881); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 727 (1884); *Jent. Cat. Ost. Leyd. Mus.* p. 325 (1887).
- Perameles harveyi*, *Waterh. P. Z. S.* 1842, p. 47; *Schinz, Syn. Mamm.* i. p. 520 (1844).
- Hypsiprymnus (Bettongia) grayi*, *Waterh. N. H. Mamm.* i. p. 203 (1846); *Peters, MB. Ak. Berl.* 1876, p. 366.

#### LESUEUR'S RAT-KANGAROO.

Head, body, and limbs not definably different from those of *B. gaimardi* and *B. penicillata*. There is, however, sometimes an indistinct indication of a whitish stripe across the hip, absent in other species. Hands and feet white or very pale brown; hairs of feet long, bristly, nearly or quite hiding the claws. Tail coloured like the back, the hairs on the upperside, although longer than elsewhere, not forming a distinct crest, and not or scarcely darker towards the end. Tip of tail apparently always white for from half an inch to two inches. Underside of tail white or pale brown.

*Skull* short and broad, with a very short conical muzzle. Nasals (Pl. XIV. fig. 7) small, their lateral edges sinuous, and their posterior evenly bowed backwards; their greatest breadth rather less than half their length. Supraorbital edges sharp and angular, parallel to each other. Posterior palatine vacuities extending forwards to the middle or front of m.<sup>1</sup> Bullæ (Pl. XIV. fig. 8) enormously large and swollen, especially anteriorly, but varying very

\* With five right upper molars.

considerably in size, their most prominent point from 12 to 15 millim. below the level of the floor of the glenoid fossa.

*Teeth* (Pl. XIII. figs. 6 & 7). Upper  $i^1$  broader and flatter in front than in the other species.  $P^4$  enormously large and long, exceeding in length the two anterior molars combined; its posterod-intern talon well developed, and its inner side with a rudimentary internal ledge, at least in some specimens; its external grooves from eleven to thirteen in number.  $P^3$  but little longer than in *B. penicillata*, with six grooves.  $M^4$  about one third the size of  $m^3$ . Lower  $p^4$  with ten to twelve grooves;  $p^3$  with six.

*Dimensions.*

	♂. <i>i</i> (stuffed). millim.	♀. <i>p</i> (skin). millim.
Head and body . . . . .	457	420
Tail . . . . .	290	260
Hind foot . . . . .	103	98
Ear . . . . .	29	30

Skull, see p. 125.

*Hab.* South and Western Australia.

*Type* in the Paris Museum.

The three skulls (*q* to *s*) received from Dirk Hartog's Island, Sharks Bay, the very locality where the original type of *B. lesueurii* was obtained, have all decidedly smaller bullæ than the other specimens collected further south. As this difference, however, does not appear to be accompanied by any others, there is not sufficient reason for the specific or varietal separation of the two forms.

<i>a, b.</i> { Ad. ♀ & yg. sks. } { Skull of <i>a.</i> }	Port Lincoln, S. A.	W. Harvey, Esq. [P. & C.].
<i>c.</i> Ad. sk.	South Australia.	Zool. Soc. [J. B. Harvey, Esq., P. & C.].
		( <i>Type</i> of <i>Perameles harveyi</i> , Waterh.)
<i>d, e*.</i> { Ad. sks. } { Skulls. }	South Australia.	Zool. Soc. [J. B. Harvey, Esq., P. & C.].
<i>f.</i> { Ad. sk. } ♀ { Skull. }	South Australia.	Sir George Grey [P. & C.].
<i>g, h.</i> Skulls.	Gawler Plains, S. A.	Purchased.
<i>i†.</i> { Ad. sk } ♂ { Skull. }	Swan River, W. A.	Gould Coll. ( <i>Type</i> of <i>B. grayi</i> , Gould.)
<i>j.</i> Yg. sk.		Gould Coll.
<i>k-n.</i> Skulls.		Gould Coll.
<i>o.</i> Skull.	"Darling Downs" †.	Gould Coll.
<i>p.</i> Ad. sk., ♀.	West Australia.	Purchased.

\* With five left upper molars.

† With five upper molars on both sides.

‡ This locality is written on the skull in Mr. Gould's own writing. It cannot be the Queensland Darling Downs, but it may have something to do with the Darling Range, West Australia.

<i>g-s.</i> Skulls.	Dirk Hartog's Isl., Sharks Bay, W.A. ( <i>Voy. H.M.S. 'Herald'</i> ).	F. M. Rayner, Esq. [P. & C.].
<i>t.</i> { Ad. st. } { Skeleton. } ♂.		Zool. Soc.
<i>u.</i> Skeleton, mounted.		Zool. Soc.
<i>v.</i> Yg. skeleton.		Zool. Soc.
<i>w.</i> Skull.	No history.	

## 10. CALOPRYMNUS.

Type.

Genus novum ..... C. campestris.

Rhinarium naked as in *Bettongia*, but the edge of the hairy part less emarginate backwards in the centre. Ears short, rounded, hairy. Limbs as in *Bettongia*. Tail thin, cylindrical, evenly short-haired, without trace of a crest, the hairs of the upper surface as short as or even shorter than those on the sides and below.

*Skull* (Pl. XIV. fig. 9) broad and flattened, with a peculiarly short, broad and conical muzzle, quite unlike that of any other Marsupial. Nasals very large, enormously broadened behind; the frontal processes of the premaxillæ reduced to mere narrow strips. Supraorbital edges sharp and overhanging. Anterior palatine foramina long, encroaching as far backwards into the maxillæ as forwards into the premaxillæ. Posterior palate as in *Bettongia*. Bullæ large, swollen, smooth and transparent. Lower jaw short and thick, convex below.

*Dentition*:—I.  $\frac{1.2.3}{1.0.0}$ , C.  $\frac{1}{0}$ , P.  $\frac{0.0.3.4}{0.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 34$ .

Upper *i*.<sup>1</sup> broad and strong, *i*.<sup>2</sup> small, *i*.<sup>3</sup> medium, much slanted forwards. Canine very small, almost rudimentary, and therefore very different from that of the rest of the subfamily. P.<sup>4</sup> shorter than in *Bettongia*, and with only a few shallow grooves placed vertically; its postero-internal talon large. P.<sup>3</sup> similar to p.<sup>4</sup>, but shorter and smaller. Molars quadrangular, but their pattern rather more folded and complex than in *Bettongia*, and more resembling that found in *Apyprymnus*. M.<sup>4</sup> rather, but not very much, smaller than m.<sup>3</sup>

*Range*. South Australia.

This genus is formed to contain the remarkable animal hitherto known as *Bettongia campestris*, a species whose external characters and general shape of skull resemble those of *Bettongia*, whose molars have the structure of those of *Apyprymnus*, whose p.<sup>4</sup> resembles that of *Potorous*, and the structure of whose nasal region is wholly peculiar to itself. Its position being thus intermediate between the other genera, no extension of their limits would bring it within one rather than another, and therefore, without amalgamating all the genera of the subfamily, a new genus is clearly necessary for its reception.

1. *Caloprymnus campestris*.

- Bettongia campestris*, *Gould, P. Z. S.* 1843, p. 81; *id. Mamm. Austr.* ii. pl. lxvi. (animal) (1851); *Gerrard, Cat. Bones Manm. B. M.* p. 128 (1862); *Kreffl, Mamm. Austr.* text to pl. xi. p. 5 (1871); *Tate, Tr. Phil. Soc. S. Austr.* ii. p. 124 (1878).
- Hypsiprymnus* (*Bettongia*) *campestris*, *Waterh. N. H. Mamm.* i. p. 221, pl. vi. fig. 2 (skull) (1846).
- Hypsiprymnus campestris*, *Schinz, Syn. Mamm.* ii. *Supp.* p. 47 (1845); *Wagn. Schr. Säug. Supp.* v. p. 296 (1855); *Grieb. Säug.* p. 689 (1859).

## PLAIN RAT-KANGAROO.

General form slender and delicate. Face peculiarly broadened between the orbits. Fur soft and straight, underfur thick and abundant. General colour grizzled sandy, darker on the back, brighter on the sides. Ears thickly clothed with short yellow hairs. Longer hairs of head and back slaty grey for three fifths their length, then with a broad prominent white band, their extreme tips brown or black. Underfur slate-coloured at base, then dull sandy, its tips brown on the top of the head and centre of the back, rich sandy rufous on the sides, it being the colour of the underfur that gives the prevailing sandy rufous tone to the whole animal. Chin, sides of chest, and belly pale sandy white; centre of chest naked in all the specimens examined, and apparently glandular (see below under *Petaurus* and *Myrmecobius*). Arms and legs bright sandy rufous; hands and feet white; hairs of feet quite short, not hiding the nails. Tail sparsely covered with pale yellowish hairs, the most thickly clothed part being the underside of the tip, where, in some specimens, there is a rudimentary inferior crest.

*Skull* (Pl. XIV. fig. 9) as described above. Nasals with their least going two and a half times in their greatest breadth, and the latter going only once and a half in their length, and nearly or quite equal to the distance from  $m^1$  to the front of the premaxillæ. Supraorbital edges sharp and forming rudimentary postorbital processes. Anterior palatine foramina extending some way behind the canines. Posterior palatal vacuities very large, extending forwards to the front of  $m^1$ . Bullæ large, their most prominent point about 10 millim. below the level of the glenoid fossa.

*Teeth* as above.  $P^4$  (Pl. XIII. fig. 11) with four or five shallow inconspicuous vertical grooves;  $p^3$  very small, with only two or three grooves.  $M^4$  about three-fourths the size of  $m^3$ .

*Dimensions.*

	♂. a (stuffed). Agcd. millim.
Head and body . . . . .	440
Tail . . . . .	360
Hind foot . . . . .	121
Ear . . . . .	31
Skull, see p. 125.	

*Hab.* South Australia.

*Type* in collection.

a.	{ Aged sk. } ♂.	South Australia.	Sir G. Grey [P. & C.]
	{ Skull. }		( <i>Type</i> of species.)
b.	{ Imm. st. }	South Australia.	Sir G. Grey [P. & C.]
	{ Skull. }		
c.	{ Imm. sk. }	South Australia.	Sir G. Grey [P. & C.]
	{ Skull. }		

### 11. POTOROUS\*.

*Type.*

Potorous, <i>Desm. N. Dict. d'H. N.</i> (1) xxiv. <i>Tabl. Méth.</i>	
p. 20 (1804).....	P. tridactylus.
Hypsiprymnus, <i>Ill. Prodr. Syst. Mamm.</i> p. 79 (1811)..	P. tridactylus.

Rhinarium naked, variable in its extent on the upperside of the muzzle. Ears very short, rounded. Fore claws long, rather slender, the median much longer than the outer ones. Hind feet very short, the whole hind limb not disproportionately longer than the fore; soles naked, coarsely granulated. Tail shorter than in *Bettongia*, tapering, covered with short closely adpressed hairs and without any trace of a crest.

*Skull* lightly built, long and narrow, except in *P. platyops*. Interorbital space broad, flat or slightly convex, its edges square, not ridged, but in old age forming short postorbital processes. Anterior palatine foramina very short. Palate with a single pair of rather small vacuities opposite the posterior molars, and entirely confined to the palatal bone. Bullæ very slightly swollen, nearly flat. Lower jaw long and slender, not strongly convex below.

*Dentition* :—I.  $\frac{1.2.3}{1.0.0}$ , C.  $\frac{1}{0}$ , P.  $\frac{0.0.3.4}{0.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 34$ .

Upper incisors small and light, i.<sup>1</sup> long and pointed. Canines small and thin, compressed laterally. P.<sup>4</sup> (Pl. XIII. fig. 12) long and trenchant, though considerably shorter than in *Bettongia*; without trace of internal ledge or postero-internal talon, its outer and inner surfaces with from two to four shallow vertical grooves. Deciduous p.<sup>3</sup> similar but smaller. Molars quadrangular and quadrangular, evenly but slightly decreasing in size backwards, except that m.<sup>1</sup> is generally rather smaller than m.<sup>2</sup> Lower incisors very long and slender.

*Range.* Australia (south of the tropics) and Tasmania.

As would be inferred from the decreased size of their hind feet, the members of this genus are far less saltatorial in their method of progression than any of the preceding *Macropodidæ*. This difference is thus described by Mr. Gould, on the authority of Mr. Richter :—

\* By no possible interpretation of the rules of nomenclature can the familiar name of *Hypsiprymnus* be used instead of *Potorous*, the latter name having been superseded in favour of the former by Illiger without the slightest justification. That change, although protested against by Desmarest, has been accepted without inquiry by the great majority of authors.

“Though these animals stand as much on the hind legs as the *Bettongia*, they run in an entirely different manner, using the fore as well as the hind legs in a sort of gallop; they also never attempt to kick with their hind legs.”

The species are extremely similar externally, while in their cranial characters they present such a considerable range of variation as to make their proper discrimination by no means easy.

### *Synopsis of the Species.*

#### I. EXTERNAL CHARACTERS.

- A. Naked part of rhinarium running back for some distance along the top of the muzzle. Head long and narrow. Hind foot, in adults, more than 65 millim. long.
- a. Size generally larger. East Australian .. 1. *P. tridactylus*, p. 117.  
 b. Size smaller. West Australian ..... 2. *P. gilberti*, p. 120.
- B. Naked part of rhinarium not running back along the top of the muzzle. Head short and broad. Hind foot less than 65 millim. long.
- c. Size small. West Australian ..... 3. *P. platyops*, p. 121.

#### II. CRANIAL CHARACTERS.

- A. Muzzle elongated. Orbit to anterior nares more than 28 millim., always nearly equaling, generally more than, the zygomatic breadth.
- a. Muzzle scarcely inflated laterally, its upper outline straight or concave. P.<sup>4</sup> 6 millim. or more ..... 1. *P. tridactylus*, p. 117.  
 b. Muzzle decidedly inflated laterally, its upper outline convex. P.<sup>4</sup> less than or barely 6 millim. .... 2. *P. gilberti*, p. 120.
- B. Muzzle very short. Orbit to anterior nares 26 millim. or less, not exceeding three fourths of the zygomatic breadth.
- c. P.<sup>4</sup> very small, about 4·5 millim. long .... 3. *P. platyops*, p. 121.

#### 1. *Potorous tridactylus*.

- Kangaroo Rat, *Phillip, Voy. Botany Bay*, p. 277, pl. xlvii. (animal) (1789).
- Poto-roo, *White, Journ. Voy. N. S. W.* p. 286, pl. lx. (animal) (1790); *Vicq-d'Azyr, Syst. Anat. Quadr. (Encycl. Méth.)* ii. p. 545 (1792).
- Didelphis tridactyla*, *Kerr, Linn. An. K.* p. 198 (1792); *Turt. Linn. S. N.* i. p. 67 (1806).
- Didelphis potoru*, *Meyer, Syst. Uebers. Zool. Entd.* p. 13 (1793).
- Yerboa potoru*, *Bechst. Syst. Uebers. Vierf. Thiere*, ii. pp. 356 & 686 (1800).
- Didelphis murina*, *Cuv. Tabl. Elém.* p. 126 (1798) (*nec Linn.*); *Desm. N. Dict. d'H. N.* (1) xii. p. 358 (1803).
- Macropus minor*, *Shaw, Gen. Zool.* i. pt. 2, p. 513, pl. cxvi. (animal)

- (1800); *Fisch. Syn. Mamm.* p. 280 (1829); *G. Cuv. Anat. Comp.* ii. pls. 180-182 (myology) (1849); *Schleg. Dierent.* p. 171 (1872).
- Potorous murinus*, *Desm. N. Dict. d'H. N.* (1) xxiv. *Tabl. Méth.* p. 20 (1804); *id. op. cit.* (2) xxviii. p. 80 (1819); *id. Mamm.* i. p. 271 (1820); *F. Cuv. Dict. Sci. Nat.* xliii. p. 155 (1826); *Gray, Griff. Cuv. An. K.* v. p. 201 (1827); *Higg. & Pett. P. Roy. Soc. Tasm.* 1883, p. 196.
- Kangurus murinus*, *Tiedem. Zool.* p. 435 (1808).
- Hypsiprymnus potorou*, *Ill. Prodr. Syst. Mamm.* p. 79 (1811).
- Kanguru potoroo*, *G. Fisch. Zoogn.* iii. p. 20 (1814).
- Hypsiprymnus minor*, *G. Cuv. R. A.* i. p. 181 (1817); *F. Cuv. Dents Mamm.* p. 133, pl. xlii. (teeth) (1825); *Gray, Charlesw. Mag. N. H.* i. p. 584 (1837); *id. Grey's Austr., App.* p. 403 (1841); *id. List Mamm. B. M.* p. 94 (1843); *Gerrard, Cat. Bones Mamm. B. M.* p. 130 (1862).
- Hypsiprymnus murinus*, *Goldf. Handb. Zool.* p. 447 (1820); *Schinz, Cuv. Thier.* i. p. 262 (1821); *Pand. & D'Alt. Vergl. Osteol. Beutelth.* pl. iii. (skeleton and skull) (1828); *Burm. Lehrb. Naturg.* p. 548 (1830); *Ogilb. P. Z. S.* 1838, p. 63; *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 175 (1841); *Less. N. Tabl. R. A., Mamm.* p. 193 (1842); *Wagn. Schr. Säug. Supp.* iii. p. 101 (1843), v. p. 297 (1855); *Schinz, Syn. Mamm.* i. p. 539 (1844); *Desm. Dict. Univ. d'H. N.* x. p. 448 (1849); *Gould, Mamm. Austr.* ii. pl. lxvii. (animal) (1854); *Gieb. Säug.* p. 689 (1859); *Kreffth, Cat. Mamm. Austr. Mus.* p. 44 (1864); *id. Mamm. Austr.* text to pl. xi. p. 5 (1871); *Garrod, P. Z. S.* 1875, p. 58; *Schmidt, P. Z. S.* 1880, p. 305; *Brehm, Thierl.* ii. p. 598, fig. (animal) (1880); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 725 (1884); *Jent. Cat. Ost. Leyd. Mus.* p. 324 (1887).
- Hypsiprymnus peronii*, *Quoy & Gaim. Voy. Uranie, Zool.* p. 64 (1824); *Less. Man. Mamm.* p. 223 (1827); *Desm. Dict. Univ. d'H. N.* x. p. 449 (1849).
- Macropus peronii*, *Fisch. Syn. Mamm.* p. 281 (1829).
- Hypsiprymnus setosus*, *Ogilb. P. Z. S.* 1831, p. 149; *Less. H. N. Mamm. (Compl. Buff.)* v. p. 375 (1836); *Waterh. Cat. Mamm. Mus. Z. S.* p. 65 (1838); *Wagn. Schr. Säug. Supp.* iii. p. 99 (1843); *Gulliver, P. Z. S.* 1844, p. 9; 1875, p. 494, pl. lv. fig. 51 (blood-corpusele); *Desm. Dict. Univ. d'H. N.* x. p. 449 (1849).
- Hypsiprymnus myosurus*, *Ogilb. P. Z. S.* 1838, p. 62; *Waterh. Cat. Mamm. Mus. Z. S.* p. 65 (1838); *Wagn. Schr. Säug. Supp.* iii. p. 99 (1843).
- Perameles tuckeri*, *Gray, Ann. Mag. N. H.* v. p. 150 (1840); *Wagn. Schr. Säug. Supp.* iii. p. 62 (1843); *Schinz, Syn. Mamm.* i. p. 518 (1844).
- Hypsiprymnus (Potorous) murinus*, *Waterh. N. H. Mamm.* i. p. 224, pl. viii. figs. 2, 3 (skull) (1846); *Gunn, P. R. Soc. Tasm.* ii. p. 86 (1852).
- Hypsiprymnus apicalis*, *Gould, Mamm. Austr.* pl. lxviii. (animal) (1851); *Kreffth, Notes Faun. Tasm.* p. 4 (1868); *id. Mamm. Austr.* text to pl. xi. p. 5 (1871).
- Potorous rufus*, *Higg. & Pett. P. Roy. Soc. Tasm.* 1883, pp. 181, 196.

## COMMON RAT-KANGAROO.

Size variable, generally large. Naked part of rhinarium (Pl. XI. fig. 13) running back along the top of the muzzle for about half an inch, ending posteriorly in a blunt point. Fur long, coarse and

straight, mainly consisting of underfur. General colour coarsely grizzled dark greyish brown, with a greater or less suffusion of rufous. Face long and narrow, grey, without special markings. Ears short, rounded, hairy, their backs dark brown. Back with the longer hairs grey for their basal three fifths, then with a broad white subterminal ring and a black tip. Underfur slaty blue for three fourths of its length, then dirty greyish white or rufous at the tip, this colour showing through and giving the general tone to the body-colour; younger specimens generally more rufous, older greyer. Sides like back. Chin, chest, and belly white or greyish white, the hairs slate-coloured at their bases. Hands and feet short-haired, grey or brown. Tail grey at bases, then brown, becoming gradually darker to black terminally; its extreme tip often white, especially in Tasmanian examples.

*Skull* very long and narrow. Muzzle not markedly inflated laterally (its breadth at the middle of the premaxillo-maxillary suture less than the length of the molar series), and more or less flattened above, so that its upper outline is straight or concave. Nasals (Pl. XIV. fig. 10) variable, generally long and narrow and scarcely expanded behind, but sometimes (in northern examples) much shorter and more expanded posteriorly. Interorbital region smooth, its edges square or slightly rounded, and forming in old age rudimentary postorbital processes. Anterior palatine foramina extending from about the middle of  $i$ .<sup>3</sup> to just in front of the canines. Posterior vacuities small, opposite  $m$ .<sup>3</sup> and  $m$ .<sup>4</sup>

*Teeth.* Incisors and canines as described above.  $P$ .<sup>4</sup> (Pl. XIII. fig. 12) very variable; in the large Tasmanian form ("apicalis") 7 or 8 millim. long, with four distinct grooves; in the smaller New South Wales examples, and in the still smaller Tasmanian form described as "*rufus*," 6 or 7 millim. long, with only three grooves. Deciduous  $p$ .<sup>3</sup> varying *pari passu* with  $p$ .<sup>4</sup> Molars evenly quadrangular, their size ( $m$ .<sup>1</sup> to  $m$ .<sup>3</sup>) ranging from 11.5 millim. in "*rufus*" to 14 millim. in "*apicalis*."

#### Dimensions.

	♂.	
	$i$ (stuffed).	
	millim.	
Head and body . . . .	410	
Tail . . . . .	230	
Hind foot . . . . .	81	{ Range up to 85 in " <i>apicalis</i> " and down to 67 in " <i>rufus</i> ." }
Muzzle to eye . . . . .	61	
Ear . . . . .	35	

Skull, see p. 125.

*Hab.* New South Wales, Victoria, South Australia, and Tasmania.

*Type* not in existence.

The variation in size of this species makes it difficult to decide, without much more material, whether it should be divided into three or amalgamated into one. The general rule seems to be that Tasmanian specimens ("*P. apicalis*," Gould) are decidedly larger

than New South Wales ones, and have larger and four-grooved instead of three-grooved posterior premolars, while at the same time the peculiar dwarf form described from Tasmania as "*P. rufus*" is again even smaller than the New South Wales specimens. On the other hand, however, intermediate specimens certainly occur, as well as exceptions to the general rule as to locality\*, and therefore I feel constrained for the present to unite all the varieties under a single name.

<i>a, b.</i>	{ Ad. ♀ & yg. sks. }	New South Wales.	Gould Coll.
	{ Skull of <i>a.</i> }		
<i>c.</i>	Ad. sk.	New South Wales.	Zool. Soc.
		(Type of <i>Hypsiprymnus myosurus</i> , Ogilb.)	
<i>d.</i>	{ Imm. sk. }	Victoria (?).	Dr. Lhotsky [P.].
	{ Skeleton (mounted). }		
<i>e.</i>	{ Ad. sk. }	New Norfolk, Tas-	Gould Coll.
	{ Skull. }	mania.	
		(Type of <i>Hypsiprymnus apicalis</i> , Gould.)	
<i>f, g.</i>	{ Imm. & yg. sks. }	Tasmania.	Gould Coll.
	{ Skull of <i>f.</i> }		
<i>h.</i>	{ Ad. sk. }	Tasmania.	Capt. Ross, R.N. [P. & C.].
	{ Skull. }		
<i>i.</i>	{ Ad. st. }	Tasmania.	Purchased.
	{ Skull. }		
<i>j.</i>	Ad. sk.	Tasmania.	Purchased.
<i>k.</i>	Ad. sk. (imperfect).	Tasmania.	W. F. Petterd, Esq. [E.].
<i>l.</i>	Yg. skull.	Launceston, Tasmania.	T. Higgins, Esq. [C.].
<i>m.</i>	Ad. skull (♂).	( <i>k</i> & <i>l</i> typical of <i>Potorous rufus</i> , Higg. & Pett.)	
<i>n.</i>	Skeleton.	Launceston, Tasmania.	T. Higgins, Esq. [C.].
			Purchased.

## 2. *Potorous gilberti*.

*Hypsiprymnus gilberti*, *Gould, P. Z. S.* 1841, p. 14; *id. Mon. Macrop.* pl. xv. (animal) (1841); *Gray, Grey's Austr., App.* ii. p. 403 (1841); *id. List Mamm. B. M.* p. 94 (1843); *Schinz, Syn. Mamm.* i. p. 542 (1844); *Gould, Mamm. Austr.* ii. pl. lxxix. (animal) (1854); *Wagn. Schr. Säug. Supp.* v. p. 288 (1855); *Gieb. Odontogr.* p. 43, pl. xix. fig. 10 (teeth) (1855); *id. Säug.* p. 690 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 130 (1862); *Kreffl, Mamm. Austr.* text to pl. xi. p. 5 (1871); *Garrod, P. Z. S.* 1875, p. 58.  
*Hypsiprymnus micropus* (*Gould*), *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 180 (1841); *Schinz, Syn. Mamm.* i. p. 540 (1844).  
*Hypsiprymnus* (*Potorous*) *gilberti*, *Waterh. N. H. Mamm.* i. p. 229, pl. viii. fig. 1 (skull) (1846).

### GILBERT'S RAT-KANGAROO.

External characters precisely as in *P. tridactylus*, except that the size is less than is usual in that species, although greater than in the dwarf form "*P. rufus*." Naked part of rhinarium apparently not running quite so far back along the top of the muzzle.

\* As, for example, skull no. 3804 of the College of Surgeons, from the Murray River, South Australia, which has a distinctly four-grooved upper p.<sup>4</sup>

*Skull* shorter and broader than in *P. tridactylus*. Muzzle very markedly inflated along the sides from the anterior nares to the front of the orbit, its breadth at the middle of the premaxillo-maxillary suture equal to, or greater than, the length of the molar series. Posterior nasal region also inflated vertically so as to make the general fronto-nasal outline distinctly and evenly convex. Nasals expanded behind, their greatest breadth going about  $2\frac{1}{2}$  times into their length. Interorbital space smooth and rounded. Palatal foramina and vacuities as in *P. tridactylus*; bullæ apparently rather more swollen than in that species.

*Teeth* as in *P. tridactylus*, except that  $p^4$  is shorter, about  $5\frac{1}{2}$  or 6 millim. long, and has only two or three grooves.

*Dimensions.*

	♀. a (skin). millim.
Head and body . . . . .	390
Tail . . . . .	170
Hind foot . . . . .	68
Muzzle to eye . . . . .	48
Ear . . . . .	26

Skull, see p. 125.

*Hab.* West Australia (southern district).

*Type* in collection.

a.	{ Ad. sk. } ♀.	King George's Sound, W. A.	Gould Coll.
	{ Skull. }	( <i>J. Gilbert</i> ).	( <i>Type</i> of species.)
b.	{ Imm. st. } ♀.	King George's Sound, W. A.	Gould Coll.
	{ Skull. }	( <i>J. Gilbert</i> ).	

### 3. Potorous platyops.

*Hypsiprymnus platyops*, *Gould*, *P. Z. S.* 1844, p. 103; *id. Mamm. Austr.* ii. pl. lxx. (animal) (1851); *Wagn. Schr. Säug. Supp.* v. p. 299 (1855); *Gieb. Säug.* p. 690 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 130 (1862); *Krefft, Mamm. Austr.* text to pl. xi. p. 5 (1871); *Garrod, P. Z. S.* 1875, p. 58.

*Hypsiprymnus* (Potorous) *platyops*, *Waterh. N. H. Mamm.* i. p. 231 (1846).

#### BROAD-FACED RAT-KANGAROO.

Size very small. Rhinarium naked, but not, or scarcely, extending backwards in the centre above. Face very short and broad, contrasting markedly with that of the other species. Length and quality of fur and colour everywhere as in *P. tridactylus*, except that the tail is more or less bicolor, black above and dirty white below. Hind feet very short, the hairs on them long, and partially hiding the claws.

*Skull* (Pl. XIII. fig. 13) short and broad, but the bones thin and

smooth. Muzzle short, broad and conical, sharply pointed anteriorly, its sides not prominently inflated. Nasals short, narrow in front, much expanded behind, their greatest breadth about half their length. Outline of fronto-nasal region evenly convex. Interorbital space smooth, its edges parallel, square, not beaded, and not forming postorbital processes. Anterior palatine foramina very short. Posterior vacuities proportionally larger than in the other species, extending forwards to the middle of  $m.^2$  Bullæ apparently distinctly inflated.

*Teeth* very small and light. Upper  $i.^1$  very long;  $i.^2$ ,  $i.^3$ , and the canine small.  $P.^4$  about equal in length to the two posterior molars, narrow, sharp-edged, with two broad shallow grooves externally and internally. Lower  $p.^4$  like upper.

*Dimensions.*

	♀. a (skin). millim.
Head and body .....	340
Tail .....	190
Hind foot .....	62
Muzzle to eye .....	33
Ear .....	22
Skull, see p. 125.	

*Hab.* West Australia.

*Type* in collection.

a.	} Ad. sk. } ♀.	Walyema Swamps, Victoria, West Australia ( <i>J. Gilbert</i> ).	Gould Coll. ( <i>Type</i> of species.)
b.	} Ad. sk. } ♂.	Albany, King George's Sound, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.

Subfamily III. HYPsiprymnodontinæ.

Size very small. Claws quite small and feeble, subequal. Hind feet with an opposable hallux. Tail naked, scaly.  $P.^4$  twisted obliquely outwards, its axis not in the same line as the other teeth. Incisors, canines, and molars as in *Potoroinæ*.

This Subfamily contains but a single species, and one so intermediate between the *Macropodidæ* and the *Phalangeridæ* that there is considerable doubt as to which family it ought to be assigned. On the whole, however, the macropine characters of its lower jaw, in which there is a deep cavity at the base of the masseteric fossa, continuous with the inferior dental canal, have induced me to retain it in the present family, although the general structure of its teeth, hind feet, and tail so closely resemble those of certain of the *Phalangeridæ* as to render the division between the two families by no means so sharp and well-defined as it has been usually considered to be.

## 12. HYPsipRYMNODON.

Type.

Hypsiprymnodon, *Ramsay, P. Linn. Soc. N. S. W. i.*  
 p. 33 (1876) ..... H. moschatus.  
 Pleopus, *Owen, Ann. Mag. N. H. (4) xx. p. 542 (1877)*.. H. moschatus.

Form rat-like. Rhinarium wholly naked. Ears large, thin, naked. Limbs subequal, not saltatorial. Hands with five toes, the claws small and delicate. Hind feet (Pl. XV. fig. 1) with a long opposable clawless hallux articulated comparatively near to the heel. Fourth toe not disproportionately larger than the others, the fifth and the combined second and third toes both strong and well-developed, the claws of all four about equal. Tail cylindrical, tapering, naked and scaly, its extreme base only hairy.

*Skull* narrow and slender. Nasals long, slightly expanded behind. Supraorbital edges square, not ridged. Anterior palatine foramina of medium length, extending backwards to the level of the back of the canines. Posterior palate with one large united vacuity extending the whole length of the molars. Bullæ small, but little expanded. Lower jaw slender, with a long, laterally compressed symphyseal portion.

*Dentition*:—I.  $\frac{1.2.3}{1.0.0}$ , C.  $\frac{1}{0}$ , P.  $\frac{0.0.3^*.4}{0.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 34$ .

Upper incisors light and weak,  $i^1$  oval in section. Canine well-developed, about as long as  $i^2$ .  $P^4$  (Pl. XIV. fig. 11) narrow, cutting, without trace of internal ledge or talon, its axis inclined outwards at a sharp angle to the line of the molars. Molars small, quadritubercular, evenly decreasing backwards. Lower  $i^1$  very long and slender. Check-teeth similar to the upper ones.

*Range*. Queensland.

## 1. Hypsiprymnodon moschatus.

Hypsiprymnodon moschatus, *Rams. P. Linn. Soc. N. S. W. i. p. 34* (1876); *Owen, Ann. Mag. N. H. (5) i. p. 103 (1878)*; *id. Tr. Linn. Soc. (2) i. p. 573, pls. lxxi. & lxxii.* (animal, skull, and limb-bones) (1879); *Coll. Zool. Jahrb. ii. p. 906 (1887)*.

Pleopus nudicaudatus, *Owen, Ann. Mag. N. H. (4) xx. p. 542 (1877)*.

Size and form very much those of a large rat. Fur close, crisp, and velvety, consisting almost entirely of underfur. General colour all over dull, finely grizzled rusty orange-grey, the orange deepest on the back, less on the belly, scarcely perceptible on the head and limbs. Ears large, rounded, laid forward (in spirit specimens) they just reach to the posterior canthus of the eye; quite naked, except at their bases behind; their substance blackish flesh-colour. Arms and hands brown, the hairs short, and only running on to the metacarpus, leaving the fingers quite naked and scaly; palms with five large transversely-ridged pads. Feet brown, the hairs on the

\* The temporary presence of  $p^3$  is presumed, but has not as yet been actually ascertained.

upper surface passing down their centres to the tip of the middle (fourth) toe, and leaving the sides of the metatarsus and the whole of the hallux, second, third, and fifth digits naked. Soles naked, coarsely granulated, with five prominent transversely-striated pads, the postero-external about 12 millim. long; pads at tips of toes also striated. Tail hairy for its basal inch, then becoming abruptly naked and scaly, a few minute hairs only growing between the scales; its colour black above, paler below.

*Skull* and *teeth* as described above. Greatest breadth of nasals going about  $3\frac{1}{2}$  times in their length. P.<sup>4</sup> above and below with five or six distinct oblique grooves outside and inside.

*Dimensions.*

	♂. a (in spirit). millim.
Head and body .....	250
Tail .....	162
Hind foot .....	61
Ear .....	27

Skull, see next page.

*Hab.* Queensland.

*Type* in the Sydney Museum.

The following account of the habits of this species is extracted from Mr. Pierson Ramsay's original description (*l. c.*):—"I first met with this highly interesting and anomalous marsupial while on a visit to the Herbert River in January 1874, where it inhabits the dense and damp portions of the scrubs which fringe the rivers and clothe the sides of the coast-range in that district. The animal is by no means rare, yet from its retiring habits and the dense nature of the parts frequented by it, it is at all times difficult to obtain. Its habits are chiefly diurnal, and its actions when not disturbed by no means ungraceful; it progresses in much the same manner as the Kangaroo-rats (*Hypsiprymnus*), to which it is closely allied, but procures its food by turning over the *débris* in the scrubs in search of insects, worms, and tuberous roots, frequently eating the palm-berries (*Ptychosperma alexandræ*), which it holds in its fore paws after the manner of the phalangiers, sitting up on its haunches, or sometimes digging like the bandicoots. Seldom more than one or two are found together, unless accompanied by the young. In March 1874 I obtained from Mr. K. Broadbent a female with two young in the pouch, very small, and resembling young bandicoots. During the same month a halfgrown young one was shot in company with the adult male and female. They evidently breed during the rainy season, which lasts from February to May."

a. Ad. al., ♂.  
b, c. } Ad. sks. } ♂ ♀.  
      } Skulls. }

Queensland. Sir R. Owen [P.].  
Queensland. Trustees of the Sydney  
Museum [P.].  
(Co-types of *Pleopus nudicaudatus*, Owen.)

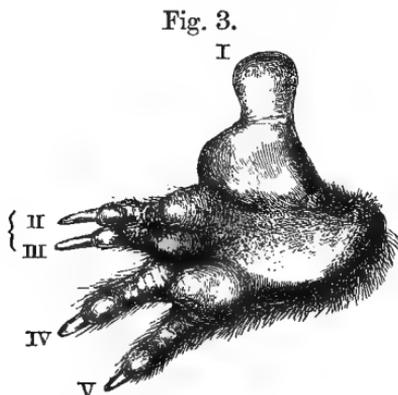
*Skull Measurements of Potoroïnae and Hypsiprymnotontinae.*

Species.....	<i>Aepyprymnus rufescens.</i>		<i>Bettongia cuniculus.</i>		<i>B. gaimardi.</i>		<i>B. penicillata.</i>		<i>B. lesneuri.</i>		<i>Caloprymnus campestris.</i>		<i>Potorous tridactylus.</i>		<i>P. gilberti.</i>		<i>P. platyops.</i>		<i>Hypsiprymnoton moschatus.</i>	
	♂. c. adult.	?	♂. c. adult.	?	♂. c. adult.	?	♂. c. adult.	?	♂. c. adult.	♂. m. aged.	♀. * aged.	♂. a. aged.	♀. a. aged.	♂. b. adult.	♀. c. adult.	(c.)	(c.)	♀. c. adult.	(c.)	
Sex .....																				
Specimen .....																				
Age .....																				
Basal length .....	73.5		64		63.5		64		64		66.5		(c.) 68		(c.) 50		(c.) 57			
Greatest breadth .....	50		42		43.5		42		45		45		41.5		35		33			
Nasals, length .....	32		30.6		30		30.6		26.5		35		35		24		30.5			
" greatest breadth .....	17		14		15.6		14		13.5		12.3		13.5		13		8.4			
" least breadth .....	10		7.7		9		7.7		6.5		6		6		4.6		4.2			
Constriction, breadth .....	15.5		17		18.7		17		16.3		15.5		17		14.6		12.3			
Palate, length .....	49		44		50		42		40		43		44		30		38			
" breadth, outside m. <sup>3</sup> .....	28.5		21.8		22.2		21.8		23		20.5		20.5		15.5		16			
" " inside m. <sup>3</sup> .....	19		14.2		14.2		12.5		13.5		12.4		12.5		10		11			
Palatal foramen .....	3.5		2.7		3		2.7		3.5		4.2		3		2.1		5.2			
Diastema. (from i. <sup>3</sup> to p. <sup>4</sup> ) .....	10		13.3		12		13.3		8		17		12		7.8		17.2			
Basi-cranial axis .....	23		20		19.8		20		22.5		21		19		...		...			
Basi-facial axis .....	52		44.3		44.5		44.3		42		61		48		...		...			
Facial index .....	226		221		225		221		187		290		253		...		40			
Teeth—length of p. <sup>4</sup> .....	10		7.5		6.5		7.5		9.6		8		6.6		...		4.3			
" " ms. <sup>1-3</sup> .....	19		12		12.8		12		13.1		13.9		12.7		8.9		9			
" " m. <sup>4</sup> .....	5.2		2		3.7		2		2.6		4		3.6		2.1		2.1			

\* Belonging to the College of Surgeons. The original type of White's "Poto-roo."

## Family II. PHALANGERIDÆ.

Diprotodont Marsupials adapted for an arboreal, phytophagous (rarely sarcophagous or insectivorous) life. Progression scansorial, sometimes assisted by parachute-like expansions of skin, giving the power of making lengthened leaps through the air. Both fore and hind feet with five digits, the anterior generally subequal. Hind limbs syndactylous, fairly stout and well-developed; fourth toe the



*Phalanger celebensis*.—Hind foot, showing "syndactyly."

longest, but the fifth only slightly smaller; hallux present, large, widely opposable, with a broad nailless terminal pad. Tail (except in *Phascolarctinae*) very long and nearly invariably prehensile, sometimes very markedly so. Stomach simple. Cæcum present (except in *Tarsipedinae*). Pouch well-developed, opening forwards.

*Skull* (except in *Tarsipes*) broad and conical. Nasals expanded behind. Palate generally incomplete. Bullæ swollen, except in some few of the larger forms. Masseteric fossa not hollowed out below externally, and not communicating with the inferior dental canal, except that in some genera there is a minute foramen corresponding to the large opening found in the *Macropodidæ*.

*Dentition* too variable for formulation as a whole, owing to the presence in very unequal numbers of minute and rudimentary teeth, not constant in the same genus, species, or even on the two sides of the jaw in the same individual. Speaking only of the large and obviously functional teeth, and excluding *Tarsipedinae*, the following formula may be drawn up:—

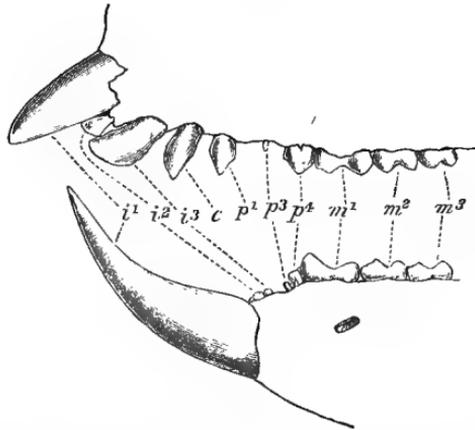
$$I. \frac{1.2.3}{1.0.0}, C. \frac{1}{0}, P. \frac{1.0.3 \text{ (or } 0).4}{0.0.3 \text{ (or } 0).4 \text{ (or } 0)}, M. \frac{1.2.3.4 \text{ (or } 0)}{1.2.3.4 \text{ (or } 0)} \times 2 = 26 \text{ to } 36.$$

*Teeth*\*. Incisors long and strong, the lower pair very long and pointed, but without the scissor-like action found in the *Macropodidæ*.

\* This description does not include the *Tarsipedinae*, in which the teeth are nearly all minute and rudimentary.

Upper premolars two or three in number (one in *Phascolarctinæ*); the last one,  $p^4$ , generally sharp-edged and cutting, but not so much so

Fig. 4.



*Dactylopsila trivirgata*.—Front of jaw, showing diprotodont dentition.

as in the *Macropodidæ*. Molars either with sharp cutting-crests or bluntly tuberculate, usually four in number, but the last is sometimes absent. Lower posterior incisors and anterior premolars minute, probably nearly functionless, very variable in number.

Tooth-change as a rule in a very much aborted state; the milk-premolar generally very small and early deciduous, and in many cases apparently quite functionless. So far as is yet known, *Phalanger* and *Trichosurus* alone have their milk-premolars persistent long enough to be of service.

*Range.* Austro-Malayan, Papuan, and Australian subregions, from Celebes to Tasmania.

This family, among the Diprotodonts, corresponds to the *Dasyuridæ* among the Polyprotodonts, as being the most generalized, and therefore probably containing the most ancient forms now existing of the Suborder. In their general external form and the characters of their limbs its members are fairly closely related to each other, but their teeth are exceedingly diverse, and present a very considerable range of variability. On this account the homologies of the teeth and the best way of formulating them for descriptive purposes are here matters of very considerable difficulty. Of the upper teeth the incisors, canine, and molars are of course homologized easily enough; but in the case of the premolars it is very difficult to determine which of the full series of four has disappeared to leave the common number of three. Among the Polyprotodonts it has been shown (Phil. Trans. clxxviii. p. 446, 1887), that  $p^2$  is the one lost; and a consideration of the present family convinces me that the same tooth, although quite independently, has probably disap-

peared in most of the modern *Phalangeridæ*\*. To this conclusion I am brought by the comparison of such premolars as those of *Phalanger* and *Pseudochirus*, by which one sees that it is neither  $p.^3$  nor  $p.^4$  that has disappeared, and, as to  $p.^1$ , by the position of the anterior premolar (when present) in *Trichosurus*, and, above all, by the fact that occasionally in *Phalanger* † two minute teeth are present between the large anterior and posterior premolars, the numeration of which would be impossible were the anterior functional premolar not reckoned here, and therefore (presumably) elsewhere, as  $p.^1$ . An exception to this rule, however, is shown by *Dromicia nana* (see below, footnote, p. 145), which rather appears to have lost  $p.^1$  than  $p.^2$ ; and therefore it is possible that as the loss of the fourth premolar is certainly a very recent occurrence, different teeth may have been lost in different genera.

The homologies of the lower rudimentary teeth are far more difficult to make out, and I am only able to make quite a tentative interpretation of them. Taking, again, the largest numbers known, we find that occasionally there are five, and, at least in one instance ‡, six teeth between  $i.^1$  and  $m.^1$ ; of these six the last two are obviously  $p.^3$  and  $p.^4$ , and the others should, I think, be reckoned as  $i.^2$ ,  $i.^3$ , canine, and  $p.^1$ , the little anterior tooth at the base of  $i.^1$  being therefore  $i.^2$ , and not the canine as it has been generally considered. When there are, as is of course usually the case, much fewer teeth in the jaw than this, they may apparently be generally reckoned as having disappeared in the following order—canine,  $p.^1$  or  $i.^3$ , then  $p.^3$ , and lastly  $i.^2$ . In one genus only, *Distæchurus*,  $p.^4$  is lost, but this loss is unaccompanied by that of  $p.^3$  or  $p.^1$ . Thus the four intermediate teeth commonly present in *Petaurus* or *Dactylopsila* (fig. 4) would be  $i.^2$ ,  $i.^3$ ,  $p.^3$ , and  $p.^4$ , while the two so often only present in *Trichosurus* would be  $i.^2$  and  $p.^4$ . This general rule would, of course, be modified in individual cases by the variations in the positions of the different teeth; and again in some cases, as for example in many specimens of *Pseudochirus*, it is impossible to homologize every individual tooth, the variations in position being apparently much too erratic §.

As to the means of formulating the various dentitions found in

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\* This was suggested, but not definitely asserted, in the paper in which the homologies of the Polyprotodont premolars were worked out (see Phil. Trans. 1887, vol. clxxviii. p. 447, footnote). In the Mesozoic Plagiaulacidæ, however, also Diprotodont, it was clearly  $p.^1$  that was first lost; but they were evidently even at that time so exceedingly specialized that they could not have been the direct ancestors of any of the modern Diprotodonts, and therefore their evidence on this point has but little importance.

† *E. g.* the specimen (no. 104) of *Phalanger orientalis* described by Jentink, Notes Leyd. Mus. vii. p. 90, of which that author has kindly sent me a sketch.

‡ The same specimen referred to in the last footnote.

§ An alternative arrangement would be by looking upon the tooth here called  $i.^3$  as the canine, on that called the canine as  $p.^1$ , and on that called  $p.^1$  as  $p.^2$ , and therefore looking upon  $i.^3$  instead of  $p.^2$  as the tooth always absent, even in the many-toothed *Phalanger* above referred to. On the whole, however, until further evidence is brought forward, I prefer the homologies given above.

this family, I have found it convenient to represent each tooth as usual by its own serial number, but to put this number in italicized figures when the tooth is minute, as compared to the other larger and more obviously functional teeth, and to add to it one asterisk when it is occasionally, and two when it is generally absent. Thus the ordinary normal premolar formula of *Phalanger orientalis* would be  $P. \frac{1.0.3^*.4}{1.0.3^*.4}$  as compared, to  $P. \frac{1.0.3^{**}.4}{1.0.3^{**}.4}$  in *Ph. maculatus*, such exceptional variations as that of the *Ph. orientalis* above referred to ( $P. \frac{1.2.3.4}{1.2.3.4}$ ) being looked upon as too abnormal to have a place in the specific or generic description.

Finally, it should be specially noted that the numbers and positions of the minute teeth, while affording to the species and genera additional characters in a broad and general way, are yet too variable to be of any systematic importance in individual instances. All the chief specific characters should therefore be taken primarily from the large and obviously functional teeth.

In the homologies of these, the diagnostic teeth, no difficulty can occur except in the case of the lower  $p.^4$  and  $m.^1$  in species with only four large and functional cheek-teeth. They may, however, always be distinguished by the fact that  $m.^1$  is tricuspid, with one high anterior and a pair of low posterior cusps, while  $m.^2$  is quadricuspid, and  $p.^4$  never has more than one cusp in the same transverse line.

As in other climbing forms (see below, under *Didelphyidæ*, p. 317), the hind feet are here so shortened for the purpose of grasping that their length is of little use in determining the general size of the animal. The length of the lower leg, measured from the top of the knee (when bent) to the sole, is therefore used as the standard measurement for the members of this family.

Some of the members of the present family present a very noteworthy example of the comparative readiness with which lateral parachute-like extensions of the skin may be developed for the purpose of aiding in flight. Thus three different genera possess such lateral flying-membranes, these three having apparently developed their membranes independently, as is proved by the fact that each of them is exceedingly closely allied to some non-flying form, while their relations to each other are of the most distant kind. Thus *Petauroides* and *Petaurus* present absolutely no generic cranial or dental differences from *Pseudochirus* and *Gymnobelideus* respectively, while *Acrobates* is but little further removed from *Distoechurus*.

*Synopsis of Subfamilies and Genera.*

## I. EXTERNAL CHARACTERS.

- A. Tail well developed, frequently longer than the head and body.
- a. Tongue extensile. Muzzle very long and narrow, the distance between the anterior corners of the eyes less than half that to the tip of the muzzle . . . **Tarsipedinæ.**
- a<sup>1</sup>. Tail slender, tapering, evenly short-haired . . . . . 1. TARSIPES, p. 132.
- b. Tongue not extensile. Muzzle short and broad, the distance between the eyes more than half that to the end of the muzzle. . . . . **Phalangerinæ.**
- b<sup>1</sup>. Tail distichous.
- a<sup>2</sup>. A flying-membrane. Face not striped . . . . . 2. ACROBATES, p. 136.
- b<sup>2</sup>. No flying-membrane. Face striped . . . . . 3. DISTECHURUS, p. 139.
- c<sup>1</sup>. Tail not distichous.
- c<sup>2</sup>. Fore claws short, not exceeding the terminal toe-pads. Tail evenly short-haired terminally, murine in character. . . . . 4. DROMICIA, p. 140.
- d<sup>2</sup>. Fore claws long, extending beyond the toe-pads. Tail never murine in character.
- a<sup>3</sup>. Tail bushy to end, *including its extreme tip below.*
- a<sup>4</sup>. No flying-membrane. Fifth finger shorter than third. . . . . 5. GYMNABELIDEUS, p. 149.
- b<sup>4</sup>. A flying-membrane, extending from fifth finger to ankle. Fifth finger longer than third . . . . . 6. PETAURUS, p. 150.
- b<sup>3</sup>. Tail partly naked terminally, even if only on its extreme tip below.
- c<sup>4</sup>. Fore toes unequal in length, the fourth enormously longer than the others. Body broadly striped with black and white . . . . . 7. DACTYLOPSILA, p. 159.
- d<sup>4</sup>. Fore toes subequal in length. Body not broadly striped.
- a<sup>5</sup>. A flying-membrane, extending from elbow to knee. Ears very large, thickly furry externally . . . . . 8. PETAUROIDES, p. 163.
- b<sup>5</sup>. No flying-membrane. Ears medium or short, rarely quite covered with fur externally.
- i<sup>6</sup>. Tail hairy above and on sides to end.
- a<sup>7</sup>. First and second fingers more or less

- opposable to the rest.  
Tail tapering, its terminal half comparatively short-haired . . . 9. PSEUDOCHIRUS, p. 166.
- b*<sup>7</sup>. Fingers not opposable. Tail evenly bushy to end . . . . . 10. TRICHOSURUS, p. 184.
- b*<sup>8</sup>. Tail naked all round terminally . . . . . 11. PHALANGER, p. 193.
- B. Tail rudimentary, not visible externally. **Phascolarctinæ.**
- c*. Ears thickly hairy. Fore toes opposable, as in *Pseudochirus* . . . . . 12. PHASCOLARCTUS, [p. 209.]

II. CRANIAL CHARACTERS.

- A. Cheek-teeth minute, rudimentary . . . . . **Tarsipedinæ.**
- a*. Dentition (at most):—I.  $\frac{1.2.0}{1.0.0}$ , C.  $\frac{1}{0}$   
P.  $\frac{0.0.0.4}{0.0.0.0}$ , M.  $\frac{1.2.3}{1.2.3} = 22$ . . . . . 1. TARSIPES, p. 132.
- B. Cheek-teeth well developed.
- b*. Bullæ rounded, little prominent, their vertical much less than their horizontal diameter. One or more premolars, additional to *p*<sup>4</sup>, generally present . . . . . **Phalangerinæ.**
- a*<sup>1</sup>. Molars  $\frac{3}{3}$  (rarely  $\frac{4}{4}$ ). Basal length less than 30 millim.
- a*<sup>2</sup>. All upper premolars and lower *p*<sup>3</sup> long and pointed, as high as the molars.
- a*<sup>3</sup>. Both upper and lower *p*<sup>4</sup> long, equalling the molars in height . . . . . 2. ACROBATES, p. 136.
- b*<sup>3</sup>. Upper *p*<sup>4</sup> small, shorter than either the molars or *p*<sup>3</sup>. Lower *p*<sup>4</sup> absent. . . . . 3. DISTECHURUS, p. 139.
- b*<sup>2</sup>. Upper *p*<sup>1</sup> and *p*<sup>3</sup> much smaller than *p*<sup>4</sup>. Lower *p*<sup>3</sup> minute. . . . . 4. DROMICIA, p. 140.
- b*<sup>1</sup>. Molars  $\frac{4}{4}$ . Basal length more than 30 millim.
- c*<sup>2</sup>. Lower *p*<sup>4</sup> small, not equalling the molars in height.
- c*<sup>3</sup>. Molars rounded. Upper *i*<sup>3</sup> shorter than canine. Supra-orbital edges ridged . . . . . } [p. 149.]  
5. GYMNOBELDEUS,  
6. PETAURUS, p. 150.
- d*<sup>3</sup>. Molars oblong. Upper *i*<sup>5</sup> as long as or longer than canine. Supraorbital edges rounded . . . . . 7. DACTYLOPSILA, p. 159.
- d*<sup>2</sup>. Lower *p*<sup>4</sup> large and functional, as high as or higher than the molars.
- e*<sup>3</sup>. Upper *p*<sup>3</sup> well developed, but little smaller than *p*<sup>4</sup>; the latter placed quite in the general series. Molars with marked crescentic ridges. . . . . } 8. PETAUROIDES, p. 163.  
9. PSEUDOCHIRUS, [p. 166.]

- b*<sup>3</sup>. Upper *p*<sup>3</sup> minute or absent. *P*<sup>4</sup> with its axis obliquely twisted outwards. Molars with blunt rounded cusps.
- a*<sup>4</sup>. Upper canine shorter than any of the incisors, and placed some distance behind *i*<sup>3</sup> ..... 10. TRICHOSURUS, p. 184.
- b*<sup>4</sup>. Canine longer at least than the posterior, and generally than any of the incisors, close to *i*<sup>3</sup> ..... 11. PHALANGER, p. 193.
- c*. Bullæ very high and prominent, their vertical about equal to their horizontal diameter. No teeth present between *p*<sup>4</sup> and the canine above or *i*<sup>1</sup> below ..... **Phascolarctinæ.**
- c*<sup>1</sup>. Dentition: I.  $\frac{1.2.3}{1.0.0}$ , C.  $\frac{1}{0}$ , P.  $\frac{0.1}{0.0.0.4}$ ,  
M.  $\frac{1.2.3.4}{1.2.3.4} = 30$  ..... 12. PHASCOLARCTUS,  
[p. 209.]

### Subfamily I. TARSIPEDINÆ.

Tail long. Snout very long and slender; tongue extensile. No cæcum. Cheek-teeth minute, rudimentary.

#### 1. TARSIPES.

Tarsipes, *Gerv. & Verr. P. Z. S.* 1842, p. 1 ..... Type. T. rostratus.

Size small; form slender. Head long and narrow; muzzle elongated; tongue long, extensile. Ears medium, thinly haired. Palms and soles naked, granulated; claws of all the fingers and toes rudimentary, except those on the syndactylous second and third hind digits, where they are well developed. Pouch present. Tail very long, thinly haired; prehensile. Walls of combined urogenital and anal openings prolonged downwards as a distinct elongated tube opening antero-terminally, and forming a sort of external cloaca.

*Skull* very slight and delicate. Supraorbital edges not ridged. Palate very imperfect. Presphenoid surface of brain-case in front of bullæ prominently inflated downwards, so as to give the appearance of a second anterior pair of bullæ in the dried skull; but these prominences are not shut off from the brain-cavity, and are in the fresh subject filled with brain-substance. Zygomata slender and thread-like; the malar sending a long posterior branch downwards and backwards, abutting against the surface of the bulla-like prominences. True bullæ large, prominent, transparent. Lower jaw very slender, without coronoid or angular processes.

*Dentition* (apparently):—I.  $\frac{1.2.0}{1.0.0}$ , C.  $\frac{1}{0}$ , P.  $\frac{0.0.0.4}{0.0.0.0}$ , M. (at most)  $\frac{1.2.3}{1.2.3} \times 2 = 22$ .

Upper canines and lower incisors comparatively well developed; all the others, upper and lower, minute and rudimentary.

*Range.* Western Australia.

### 1. *Tarsipes rostratus*.

*Tarsipes rostratus*, *Gerv. & Verr. P. Z. S.* 1842, p. 1; *ibid. Mag. Zool.* 1842, pls. xxxv.–xxxvii. (animal, skull, &c.); *ibid. Proc. Verb. Soc. Philom.* 1842, p. 19; *Less. N. Tabl. R. A. Mamm.*, p. 187 (1842); *Schinz, Syn. Mamm.* i. p. 514 (1844); *Gould, Mamm. Austr.* i. pl. v. (animal) (1845); *Waterh. N. H. Mamm.* i. p. 345, pl. xi. fig. 1 (animal), pl. xix. fig. 6 (skull) (1846); *Wagn. Schr. Säug. Supp.* v. p. 265 (1855); *Gerv. H. N. Mamm.* ii. p. 278, figs. (animal and skull) (1855); *Gieb. Säug.* p. 705 (1859); *Kreffl, Mamm. Austr.* text to pl. vii. p. 3 (1871); *Schleg. Dierent.* p. 168 (1872); *Flow. Encycl. Brit.* (9) xv. p. 382, fig. 31 (animal) (1883); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 706 (1884); *Jent. Cat. Ost. Leyd. Mus.* p. 317 (1887).

*Tarsipes spenseræ*, *Gray, Ann. Mag. N. H.* (1) ix. p. 40 (1842); *ibid. op. cit.* xi. p. 76 (habits) (1843); *ibid. List Mamm. B. M.* p. 87 (1843); *Gerrard, Cat. Bones Mamm. B. M.* p. 121 (1862).

#### TARSIPES.

Fur short, coarse, and hispid. General colour grey, striped dorsally with black or brown. Rhinarium naked, finely granular, its limits sharply defined. Whiskers fine, but unusually long and numerous. Face finely grizzled greyish brown, a rather darker line running down its centre, and with an indistinct paler area round each eye. Ears of medium size; laid forward, in spirit-specimens, they barely reach to the posterior canthus of the eye; evenly rounded, a prominent fold on the inner side of the bases of their outer margins; metatragus well developed. Palate-ridges 8, the anterior four bowed forwards in the centre, the posterior backwards; a peculiar circular space in the centre opposite the molars caused by this arrangement. Back pale grizzled grey, with one distinct blackish line running from the crown to the base of the tail, and two others, less distinct and more rufous in colour, running backwards from the shoulders to the hips. Flanks with a pale rufous tinge. Chin, chest, and belly yellowish white, the bases of the hairs sometimes grey. Pouch well developed. Mammæ 4. Arms and legs grey, hands and feet white. Palms and soles granulated, each with five distinct pads. On the fore feet all the claws are quite flat and rudimentary, not perceptible to the touch and far surpassed by the pads, which are, however, not markedly broadened. Of the fingers the third is the longest, and then follow, in the order named, the fourth, second, fifth, and first, the two latter being considerably shorter than the other three. Of the hind toes, the fourth and fifth are disproportionally long, and are both, like the hallux, practically clawless; fifth nearly to the end of the second phalanx of the fourth; syndactylous second and third toes,

however, each with a sharp and distinct claw; junction of these toes unusually complete, their terminal pads even united into one. Tail cylindrical, longer than the head and body, slightly furry all round its base, and naked at its extreme tip below, otherwise uniformly finely hairy; its colour brown above, white or pale yellow on the sides and below.

*Skull* as described above.

*Teeth.* Upper incisors minute, unicuspid, placed close to the anterior end of the premaxillæ. Canines fairly well developed, straight, not tapering. About 2 millim. behind these canines there are a pair of distinct unicuspid teeth, provisionally homologized with pm.<sup>4</sup>, and again, about 1½ or 2 millim. further back, occur either one, two, or three more, still more minute and rudimentary teeth, presumably molars. Lower incisors (i.<sup>1</sup>) about 3 millim. in length, sharp-edged upwards, and pointed terminally; projecting quite horizontally from the front of the mandible. No other lower teeth present, except one, two, or three minute rudimentary molars placed at about 7 millim. from the base of the incisors.

*Dimensions.*

	♂.	♀.
	a (in spirit). Barely adult. millim.	g (in spirit). Adult. millim.
Head and body.....	68	80
Tail .....	88	100
Lower leg.....	19·5	21·6
Hind foot .....	14·0	15·5
Muzzle to eye .....	12·6	14·0
Ear .....	9·0	9·3
Skull, see p. 148.		

*Hab.* Western Australia.

*Type* in the Paris Museum.

This most interesting little species is, perhaps, in its wide distinction from all its allies, alone equalled among Marsupials by *Myrmecobius fasciatus*, also a native of Western Australia, and also, curiously enough, distinguished by its small teeth and extensile tongue. In the case of that animal, however, early and primitive characters seem to have been retained almost unchanged, while the *Tarsipes*, even if retaining some ancient characteristics, has evidently widely diverged from the ancestors common to it and the other *Phalangeridæ*. This divergence has been chiefly brought about by the specialization of its gustatory and alimentary organs, and by the degradation of its teeth, in correlation with its nectar-sucking and also more or less insectivorous habits. Of these habits the two following extracts give some idea.

Mrs. Grey, the wife of Capt. (afterwards Sir George) Grey, records \*:—"We had two of them for some time in our possession ;

\* Gray, Ann. & Mag. N. H. xi. p. 77 1843).

the first specimen (which is sent home) died, I fear from starvation, for I was told that they feed on roots and nuts; but this I found was a mistake, for they are carnivorous and feed on moths and flies, at least the last we had did so; it used to take the moths &c. by their two wings, holding them by its fore paws; it ate the bodies, and the wings it threw away. I never saw it drink. It generally slept during the day rolled up like a ball, but at night it became very lively, and was fond of climbing branches of trees; it would hang suspended by its tail to a small branch, and suddenly jump to another."

Mr. Gilbert also, after speaking of the eagerness with which the Tarsipes caught and eat flies, says \* :—"The artificial food given it was sopped bread made very sweet with sugar, into which it inserted its long tongue precisely in the way in which the honey-eaters among birds do theirs into the flower-cups for honey. . . . Mr. Johnson Drummond shot a pair in the act of sucking the honey from the blossoms of the *Melaleuca*; he watched them closely, and distinctly saw them insert their long tongues into the flower precisely after the manner of the birds above-mentioned."

a, b. Ad. al. ♂ ♀, 9/85.	Perth, W. A.	Government of Western Australia [P.].
c. Skeleton.	Swan R., W. A.	
d. Ad. st., 28/6/43.	Albany, W. A.	Gould Coll.
	( <i>J. Gilbert</i> ).	
e. Ad. sk., ♂.	King George's Sound.	Sir G. Grey [P. & C.]. ( <i>Type of T. spenserae</i> , Gray.)
f. Ad. sk.	Western Australia.	Sir G. Grey [P. & C.].
g-i. { Ad. al. { ♀.	†	Ronald Gunn, Esq. [P.].
g-i. { Skull of i. {		
j, k. Skulls.	(Figured by Waterhouse, <i>l. c.</i> )	G. R. Waterhouse, Esq. [P.].

## Subfamily II. PHALANGERINÆ.

Tail long, generally prehensile. Snout short and broad. Tongue not extensile. No cheek-pouches. Cæcum present, large. Stomach simple. Bullæ low and rounded, or not inflated at all.

Teeth large and well developed. One or more additional teeth present between the canine and the large p.<sup>4</sup> above, and between i.<sup>1</sup> and p.<sup>4</sup> below ‡.

\* Gould, *l. c.*

† These specimens, like the rest of Mr. Gunn's collections, were sent as from Tasmania; but they agree so precisely with ordinary Western specimens, and the species would so certainly have been discovered if occurring in Tasmania, that there can be little doubt that they really came from Western Australia.

‡ Except occasionally in *Pseudochirus* and *Trichosurus*.

## 2. ACROBATES.

Type.

Acrobates, *Desm. N. Dict. d'H. N.* (2) xxv. p. 405

(1817) ..... A. pygmæus.

Cercopithecus, *Gloger, Handb. Naturg.* p. 85 (1842) .... A. pygmæus.

Size very small. Ears (Pl. XV. fig. 4) medium, thinly hairy, but with small tufts of hairs placed round their bases, and on the prominences inside them. Flanks with a flying-membrane, but a very narrow one so far as the membrane, apart from its fringing hairs, is considered; only running from the elbow to the flank, and from the flank to the knee, being scarcely developed at all in the centre. Mammæ 4. Toes of normal proportions, but each, both before and behind, provided with a much broadened striated terminal pad; length of fore toes in the following order—4, 3, 5, 2, 1. Claws sharp and well developed, although but little prominent compared to the enormous toe-pads. Tail markedly distichous, short-haired above and below, but with a broad fringe of hairs along each side.

*Skull* short, especially in the facial region, broad, and flattened. Squamosal part of zygomata not inflated, or forming sinuses. Anterior palatine foramina situated nearly wholly in the maxillary bones, extending backwards to the level of p.<sup>1</sup> Palate very imperfect posteriorly. Base of brain-case in front of bullæ slightly inflated downwards, but far less than in *Tarsipes*. Bullæ low, broadly rounded, little prominent. Lower jaw with a distinct foramen at the lower edge of the masseteric fossa.

*Dentition*:—I.  $\frac{1.2.3}{1.2.0}$ , C.  $\frac{1}{0}$ , P.  $\frac{1.0.3.4}{1.0.3.4}$ , M.  $\frac{1.2.3}{1.2.3} = 16 + 2 \times 2 = 36$ .

*Teeth* (Pl. XVI. fig. 1) sharp and obviously more or less insectivorous in character. Upper canine long and strong, close to i.<sup>3</sup> Upper premolars all large or functional, projecting beyond the level of the molars. Molars small and rounded, with smooth unridged cusps. M.<sup>4</sup> absent. Anterior lower incisors long and slightly curved. I.<sup>2</sup> and p.<sup>1</sup> minute, unicuspid, both present in all the specimens examined. P.<sup>3</sup> and p.<sup>4</sup> both long and pointed, about equal to one another and to the anterior pointed cusp of m.<sup>1</sup>

*Range*. That of the only species.

## 1. Acrobates pygmæus.

*Didelphis pygmæa*, *Shaw, Zool. New Holland*, i. p. 5, pl. ii. (animal) (1794); *id. Gen. Zool.* i. pt. ii. p. 501, pl. cxiv. (animal) (1800); *Turt. Linn. S. N.* i. p. 69 (1806).

*Volucella pygmæa*, *Bechst. Uebers. Vierf. Thiere*, ii. pp. 352, 686 (1800).

*Phalangista pygmæa*, *E. Geoff. Cat. Mus.* p. 151 (1803); *G. Cuv. R. A.* i. p. 179 (1817); *Goldf. Zool.* ii. p. 451 (1820); *Schinz, Cuv. Thier.* i. p. 259 (1821); *F. Cuv. Dict. Sci. Nat.* xxxix. p. 416 (1826).

*Acrobates pygmæus*, *Desm. N. Dict. d'H. N.* (2) xxv. p. 405 (1817); *id. Mamm.* i. p. 270 (1820); *Gray, King's Surv. Austr.*, App. ii.

- p. 414 (1827); *Waterh. Cat. Mamm. Mus. Z. S.* p. 68 (1838); *Gray, Grey's Austr., App.* ii. p. 402 (1841); *Less. N. Tabl. R. A., Mamm.* p. 189 (1842); *Gray, List. Mamm. B. M.* p. 83 (1843); *Gould, Mamm. Austr.* i. pl. xxviii. (animal) (1849); *Gerv. H. N. Mamm.* ii. p. 277, fig. (skull) (1855); *Gerrard, Cat. Bones Mamm. B. M.* p. 119 (1862); *Kreffl, Cat. Mamm. Austr. Mus.* p. 41 (1864); *id. Mamm. Austr.* text to pl. vii. p. 3 (1871); *Brehm, Thierl.* ii. p. 574, fig. (animal) (1880); *Döbs. J. Anat. Phys.* xvii. p. 151 (1882); *Coll. Zool. Jahrb.* ii. p. 933 (1887).
- Petaurista pygmæa*, *Gray, Griff. Cuv. An. K.* v. p. 200 (1827).
- Petaurus pygmæus*, *Less. Dict. Class. d'H. N.* xiii. p. 289 (1828); *J. B. Fisch. Syn. Mamm.* p. 279 (1829); *Less. H. N. Mamm. (Compl. Buff.)* iv. p. 444 (1830); *Wagn. Schr. Säug. Supp.* iii. p. 91 (1843), v. p. 280 (1855); *Schinz, Syn. Mamm.* i. p. 534 (1844); *Owen, Odontogr. Atl.* pl. c. fig. 5 (lower jaw) (1845); *Gieb. Odontogr.* p. 42, pl. xviii. fig. 5 (teeth) (1855); *id. Säug.* p. 702 (1859); *Owen, Anat. Vert.* ii. p. 335, fig. 219 (skull) (1866); *Jent. Cat. Ost. Leyd. Mus.* p. 317 (1887).
- Petaurus (Acrobates) pygmæus*, *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 293, pl. xxx. (animal) (1841); *id. N. H. Mamm.* i. p. 339, pl. xix. fig. 5 (skull) (1846).
- Dromicia frontalis*, *De Vis, P. Linn. Soc. N. S. W.* (2) i. p. 1134 (1887).

#### PIGMY FLYING-PHALANGER.

Form very light and delicate. Fur soft, straight and silky. General colour greyish brown\*. Rhinarium naked, well defined, with two well-marked lateral notches below. Face fawn, an ashy tinge often present on the tips of the hairs; area round and just in front of eyes brown. Whiskers very numerous; well-marked tufts of hairs also growing from a spot just behind the eye, from the metatragus, the antitragus, and from two other fleshy projections within the ear-conch. Ears of mediûm size, laid forward they reach to about the centre of the eye, their inner surfaces and edges with fine elongated hairs, their outer with short, anteriorly fawn, and posteriorly white hairs. Centre of back fawn, with a more or less ashy tinge; sides, including upper surface of parachute and outer sides of limbs, slaty grey. Anterior and posterior sides of limbs, and all along the edges of the parachute, prominently fringed with longer hairs. Whole of under surface to the edges of the parachute and inner sides of limbs white, the hairs sometimes grey basally. Pouch distinct, extending below the outer skin forwards and laterally for some distance. Mammæ 4. Combined urogenital and anal opening placed on an eminence, although not tubular as in *Tarsipes*. Hands and feet brown above. Lengths of anterior toes in the following order—4, 3, 2, 5, 1, but none of them disproportionally exceeding the others. Pollex with a slight tendency to opposability. Palms naked, with four broad low pads; tips of toes with enormous broadened and flattened pads, finely striated longitudinally (see Pl. XV. fig. 2); claws thin and sharp, but scarcely

\* The figures in Gould's 'Mammals of Australia' are coloured of much too deep a grey.

or not extending beyond the level of the pads. Hind feet (fig. 3) similarly constructed, the soles with five pads, and the tips of the toes all with flattened and striated pads, those on the syndactylous second and third toes separate and well developed, although smaller than the others; these two toes only united to the ends of the first phalanx. Tail rather longer than the head and body, its short-haired part dark fawn above and pale fawn below; its lateral fringe, which only commences about half an inch from its base, bright fawn throughout, sometimes, however, rather more slaty grey; extreme tip below naked and probably slightly prehensile.

*Skull* as described above.

*Teeth.* Upper  $i.^1$  about two thirds the vertical length of the canine;  $i.^2$  quite minute. Canine close to, but rather outside the level of  $i.^3$ , and some little distance from  $p.^1$ . Three premolars all large and functional;  $p.^1$  and  $p.^4$  about equal,  $p.^3$  slightly longer. Molars smoothly rounded, the last,  $m.^3$ , about half the size in cross section of  $m.^2$ . Lower  $i.^1$  long and slightly curved;  $i.^2$  and  $p.^1$  touching each other,  $i.^1$  in front and  $p.^3$  behind, but both quite minute.  $P.^3$  and  $p.^4$  long, sharply pointed, about equal in length.  $M.^1$  with a high antero-external pointed cusp nearly as long as  $p.^4$ .

*Dimensions.*

	♂. h (in spirit). Adult. millim.	♀. b (in spirit). Adult. millim.
Head and body .....	67	64
Tail .....	78	69
Lower leg .....	23	22.2
Hind foot .....	13.6	13
Muzzle to eye.....	9	9
Ear .....	9	9

Skull, see p. 148.

*Hab.* Queensland (south of about 20° S. lat.), New South Wales, and Victoria.

*Co-types* in collection.

a, b. Ad. al., ♂ ♀.	Queensland.	H.M.S. 'Challenger.'
c. Ad. al., ♂.	Port Stephens, N. S. W.	Dr. G. Bennett [P. & C.].
d, e. Ad. al., ♂ ♀.	New South Wales (J. White).	Roy. Coll. Surgeons [E.]. (Co-types of species.)
f. Ad. sk., ♂.	New South Wales (J. G.).	Gould Coll.
g. Ad. al., ♀.	Australia.	G. Krefft, Esq. [C.].
h, i. Ad. al., ♂.	Australia.	Purchased.
j. } Ad. st. {	Australia.	J. P. Atkins, Esq. [P.].
} Skull. {		
k, l. Ad. st., ♂ ♀.	Australia.	J. S. Hume, Esq. [P.].
m. Ad. al., ♂.	Gippsland, Victoria.	Purchased.
n. Ad. sk.		India Museum Coll.
o. Skeleton (mounted), ♂.		Purchased.
p, q. Skulls.		Zool. Soc. Coll.

## 3. DISTŒCHURUS.

Type.

Distœchurus (subg.), *Peters, Ann. Mus. Genov.* vi. p. 303  
(1874) ..... D. pennatus.

Size small. Ears rather short, thinly hairy themselves, but with small tufts round the bases as in *Acrobates*. Flanks without a flying-membrane. Toes of normal proportions, their terminal pads not expanded. Claws sharp and curved. Tail markedly distichous, as in *Acrobates*.

*Skull* as in *Acrobates*.

*Dentition*:—I.  $\frac{1.2.3}{1.2.0}$ , C.  $\frac{1}{0}$ , P.  $\frac{1.0.3.4}{1.0.3.0}$ , M.  $\frac{1.2.3}{1.2.3} = 14 + 3 \times 2 = 34$ .

*Teeth* essentially the same as in *Acrobates*, except that p.<sup>4</sup> is much reduced above and is wholly absent below.

*Range*. That of the only species.

This genus is very closely allied to *Acrobates*, although externally its single species presents a most striking contrast to *A. pygmæus* in size, colour, and general appearance. The two genera together stand some way apart from all the other Phalangers, their dentition especially being wholly distinct. It is interesting to note that, as in the case of so many other animals, the Papuan form is by far the most brightly coloured of the two, while, at the same time, in all its more essential characters it is in a far lower and less specialized condition than its Australian representative.

## 1. Distœchurus pennatus.

Phalangista (Distœchurus) pennata, *Peters, Ann. Mus. Genov.* vi. p. 303 (1874); *Peters & Doria, Ann. Mus. Genov.* xvi. p. 677, pl. vi. figs. 5-10 (skull), pl. xiii. (animal) (1881).

Phalangista pinnata, *Rams. P. Linn. Soc. N. S. W.* ii. p. 12 (1878).

## FEATHER-TAILED PHALANGER.

Form very dormouse-like. Fur soft, thick and woolly. General colour of head striped, of body dull buff, the contrast between the richly ornamented head and the dull plain body very striking. Rhinarium sharply defined, pentagonal. Ground-colour of face white, but with two broad sharply defined black or dark brown bands passing from the sides of the muzzle through the eyes on to the crown just between the ears. Ears short, laid forward they do not reach to the eye, broader than long, with a long anterior basal projection; their substance thin but with several thick fleshy prominences on their inner surfaces, each of which has a distinct tuft of long hairs upon it: region between eye and ear also tufted. A prominent black patch present just below the ear. Back dull buff or fawn, the hairs slate-coloured basally. Chin, chest, and belly white, the line of demarcation on sides not strongly marked. Mammæ two only\*. Outsides of limbs like back, inner sides like belly. Soles smooth, not granulated; the pads low and rounded, five anteriorly and posteriorly. Tail markedly longer than the

\* *ide* Peters and Doria, *l. c.*

head and body, its basal half-inch furry like the body, its remainder naked or nearly naked above and below, but prominently fringed laterally, just as in *Acrobates pygmaeus*.

*Skull*, except for its much superior size, almost precisely similar to that of *Acrobates pygmaeus*.

*Teeth* much as in *Acrobates*; the premolars, however, different in their relative proportions. Upper p.<sup>1</sup> and p.<sup>3</sup> long, sharp and pointed, about equal in length to i.<sup>1</sup>; p.<sup>4</sup> small, barely half the height of the molars, and crushed obliquely outwards between p.<sup>3</sup> and m.<sup>1</sup> Lower i.<sup>2</sup> and p.<sup>1</sup> small, oval, touching one another; p.<sup>3</sup> long and pointed, with a posterior basal cusp; p.<sup>4</sup> entirely aborted.

#### Dimensions.

	♂. (in spirit) *.	♀. Co-type (in spirit) †.
	Adult. millim.	Adult. millim.
Head and body .....	106	100
Tail .....	153	123
Hind foot .....	19	18·3
Ear .....	9	7·7

Skull, see p. 148.

*Hab.* N.W. New Guinea (Andai, Hatam). South New Guinea (Ethel R. †).

*Co-types* in the Berlin and Genoa Museums.

#### 4. DROMICIA.

*Dromicia*, Gray, *Grey's Austr.*, *App.* ii. p. 407 (1841) ..... *D. nana*. Type.

Size small, general appearance very murine, or rather myoxine. Ears large and thin, almost naked, their bases and internal surfaces not tufted. No flying-membrane present. Fingers and toes of normal proportions and structure, without broadened terminal pads; lengths of the former in the following order—3, 4, 2, 5, 1; fore claws very short and rudimentary, exceeded in length by the pads below them; hind claws long and sharp as usual. Tail very murine in character; cylindrical, rounded, not distichous, slender, at least for its terminal portion; its base furry like the body, the remainder finely scaly, uniformly clothed with short fine hairs, except for its extreme tip below, where it is roughened and naked, and evidently prehensile.

*Skull* short and broad. Supraorbital edges square. Inflation of zygomatic part of squamosal variable. Palatine foramina short, scarcely or not extending past the canines. Palate more or less imperfect posteriorly. Brain-case in front of bullæ not inflated downwards. Bullæ very large and prominent; transparent. Lower jaw without an opening from the masseteric fossa to the base of the inferior dental canal.

\* In the Leyden Museum.

† In the Genoa Museum.

‡ *Fide* Ramsay, *l. c.*

*Dentition*:—I.  $\frac{1.2.3}{1.2.0}$ , C.  $\frac{1}{0}$ , P.  $\frac{1(\text{or } 2).0.3(\text{or } 3).4}{1^* .0.3 .4(\text{or } 4)}$ , M.  $\frac{1.2.3.0(\text{or } 4)}{1.2.3.0(\text{or } 4)}$   
 =(at most, normally)  $17 + 3 \times 2 = 40$ .

Upper  $i^1$  much longer than  $i^2$  and  $i^3$ , slightly spatulate.  $I^2$  and  $i^3$  about equal in height, but the former only about half the size of the latter in cross section. Canine long and strong, placed some distance behind  $i^3$ . Premolars variable;  $p^4$  always large and strong, but  $p^1$  and  $p^3$  either minute and probably almost functionless, or well developed and functional. Molars evenly rounded, each (except the last) with four small smooth cusps;  $m^4$  either present or absent. Lower  $p^4$  either large and functional or minute. Small intermediate teeth three or four (rarely five) in number. Molars as in the upper jaw. Milk  $p^4$  not as yet found, probably minute and early deciduous.

*Range*. New Guinea, Western Australia, and Tasmania.

This genus is evidently intermediate between *Acrobates* and *Petaurus*, and has apparently had to give way to these more highly specialized and, presumably, later forms wherever the two have come in contact. Of this the distribution of the genus is a curious example, since it is isolated in the three places most conspicuous for their retention of ancient forms—New Guinea, Western Australia, and Tasmania, while no species appears now to live in the temperate parts of Eastern Australia\*, where the more highly developed genera above referred to have their principal home, and where, judging by its present distribution, *Dromicia* must obviously at one time have lived.

### *Synopsis of the Species.*

#### I. EXTERNAL CHARACTERS.

- A. Belly-hairs slate-coloured basally.
- a. Size small; head and body less than 85 millim., lower leg than 20 millim., hind foot than 13 millim. Tasmania. . . . . 1. *D. lepida*, p. 142.
  - b. Size large; the above dimensions all exceeded in adults.
    - a<sup>1</sup>. Tail long, more than 120 millim. Dark mark through eye strongly defined. New Guinea . . . . . 2. *D. caudata*, p. 143.
    - b<sup>1</sup>. Tail medium, less than 120 millim. Darker eye-mark indistinct. Tasmania. 3. *D. nana*, p. 144.
- B. Belly-hairs pure white.
- c. Size small, as in *D. lepida*. Eye-mark almost obsolete. West Australia. . . . . 4. *D. concinna*, p. 146.

#### II. CRANIAL CHARACTERS.

- A. Lower  $p^4$  large, as high as molars.
- a. Molars  $\frac{4}{4}$ .
    - a<sup>1</sup>. Size small,  $ms^{1-3}$  less than 3 millim. Upper  $p^1$  and  $p^3$  triangular, double-

\* See footnote to *D. nana*, p. 146.

- rooted, not minute in proportion. No squamosal inflation. . . . . 1. *D. lepida*, p. 142.
- b<sup>1</sup>. Size large, ms.<sup>1-3</sup> more than 4 millim. . . . . 2. *D. caudata*, p. 143.
- b. Molars  $\frac{3}{3}$ .
- c<sup>1</sup>. Size large, ms.<sup>1-3</sup> about  $3\frac{1}{2}$  to 4 millim. Anterior premolars cylindrical, single-rooted, minute, close together near p.<sup>4</sup> Squamosal root of zygoma inflated . . . . . 3. *D. nana*, p. 144.
- B. Lower p.<sup>4</sup> minute, no larger than p.<sup>1</sup> and p.<sup>3</sup>
- c. Molars  $\frac{3}{3}$ . Size small, ms.<sup>1-3</sup> less than 3 millim. Upper p.<sup>1</sup> and p.<sup>3</sup> cylindrical, single-rooted. Squamosal root of zygoma inflated. . . . . 4. *D. concinna*, p. 146.

### 1. *Dromicia lepida*.

Size small; form, as usual, slender and graceful. Fur fine, soft and silky. General colour pale bright fawn. Rhinarium finely granulated, sharply defined. Face pale fawn, the usual darker mark through eye inconspicuous and vaguely defined. Whiskers numerous, long and slender; no prominent hair-tufts round base of or inside ear. Ears (Pl. XV. fig. 8) large, broad, thin, laid forward they reach slightly beyond the tip of the muzzle; middle third of their outer margins slightly concave, lower third markedly convex; very finely hairy, almost naked. Palate-ridges 8, evenly convex forwards. Whole of back uniform bright fawn, the tips of the hairs, however, only this colour, their bases dark slaty grey. Hairs of chin white, of chest and belly dark slaty for three fourths of their length, their tips white; line of demarcation on sides not sharply defined. Mammeæ 4. Palms and soles naked, finely granulated, each with five low striated pads. Tail rather longer than the head and body, its basal half-inch furry like the body, the remainder finely haired, with ill-defined minute scales.

*Skull* (Pl. XVI. figs. 2 & 3) broad, smoothly rounded. Supra-orbital edges not ridged. Zygomatic part of squamosal quite without inflation. Palatine foramina extending back to the level of the canines. Larger posterior palatal vacuities reaching forwards to the level of the middle of m.<sup>1</sup>; a smaller pair just in front of the back edge of the bony palate. Bullæ prominent, rounded, transparent.

*Teeth* (Pl. XVI. figs. 4 & 5). Upper incisors and canine as usual. P.<sup>1</sup> and p.<sup>3</sup> two-rooted, triangular in side view, each with a long central and a minute backwardly projecting basal cusp; a diastema of about equal length between the canine and p.<sup>1</sup>, p.<sup>1</sup> and p.<sup>3</sup>, and p.<sup>3</sup> and p.<sup>4</sup>, the latter slightly the shortest; p.<sup>4</sup> projecting slightly lower than the tips of the molars, without a large posterior cusp, but with its main cusp slightly bifid at its tip, the anterior point the shortest. Molars four in number, rather squarer than in the other species, and rapidly decreasing in size backwards; m.<sup>4</sup> quite minute, more or less triangular in section. Lower i.<sup>1</sup> as usual. Intermediate teeth three in number, apparently representing i.<sup>2</sup>, p.<sup>1</sup>, and p.<sup>3</sup>, not

touching one another. P.<sup>4</sup> markedly higher than any of the molars, its extremity bifid, the two points equal. Lower molars four, the three anterior about equal in size, the last much smaller, all more or less oblong in shape.

This species has always hitherto been taken for the young of *D. nana*, to which it bears considerable external resemblance\*. Its cranial and dental characters, however, are very markedly different from those of that species, and would, in any less variable genus than the present, be of generic importance.

#### Dimensions.

	♀. a (in spirit). Adult. millim.
Head and body .....	70
Tail .....	75
Lower leg .....	19·6
Hind foot .....	12·0
Muzzle to eye.....	8·7
Ear.....	16·0

Skull, see p. 148.

*Hab.* Tasmania.

*Type* in collection.

a. } Ad. al. } ♀ (and 4 young } Skull. } in pouch).	Tasmania.	Ronald Gunn, Esq. [P. & C.] ( <i>Type</i> of species.)
b. Imm. sk.	Launceston, Tasmania.	W. F. Petterd, Esq. [C. & E.].

## 2. *Dromicia caudata*.

*Dromicia caudata*, *M.-Edw. C. R. lxxxv. p. 1079 (1877)*.

LONG-TAILED DORMOUSE-PHALANGER.

Size largest of genus. Fur very long, soft and silky. General colour dull rufous. Face rufous fawn, with two broad black bands passing from nose through eyes, not quite reaching ears. Ears rather long and narrow, evenly oval, naked. Back-hairs slaty grey for five sixths of their length, their tips dull rufous. Chest and belly pale yellowish white, the bases of the hairs slate-coloured.

\* On discovering, since visiting the Paris Museum, that there were two species of *Dromicia* in Tasmania, I thought it possible that the original type of *D. nana*, which is of about the same size as *D. lepida*, would prove to be this smaller one, and not to be the same as Bell's *D. gliriformis*, the larger one. M. Huet, of the Paris Museum, however, has kindly sent me a drawing of the premolars of Desmarest's specimen, and this shows their shape to be that so characteristic of the larger species. The Paris type must therefore be a young specimen of the common form, with which *D. gliriformis* is synonymous, while the present smaller species must be regarded as new.

Arms and legs grey; hands and feet dull fawn. Tail much longer than the head and body, very thin, furry like the body for its basal half-inch; the remainder short-haired as usual.

Skull and dentition much as in *D. nana*, except that there are four molars both above and below; m.<sup>4</sup> minute, triangular.

*Dimensions.*

	♀.
	Type (stuffed).
	Adult.
	millim.
Head and body . . . . .	(c.) 100
Tail . . . . .	144
Hind foot . . . . .	16
Ear . . . . .	10.5

Skull, see p. 148.

*Hab.* N.W. New Guinea (Mt. Arfak).

*Type* in the Paris Museum.

3. *Dromicia nana.*

*Phalangista nana*, *Desm. N. Dict. d'H. N.* (2) xxv. p. 477 (1817); *id. Mamm.* i. p. 268 (1820); *F. Cuv. Dict. Sci. Nat.* xxxix. p. 415 (1826); *Temm. Mon. Mamm.* i. p. 9 (1827); *Gray, Griff. Cuv. An. K. v.* p. 198 (1827); *Less. Mon. Mamm.* p. 218 (1827); *id. Dict. Class. d'H. N.* xiii. p. 334 (1828); *J. B. Fisch. Syn. Mamm.* p. 276 (1829); *Less. H. N. Mamm. (Compl. Buff.)* iv. p. 466 (1830); *Waterh. Cat. Mamm. Mus. Z. S.* p. 68 (1838); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 279, pl. xxvi. (animal) (1841); *Less. N. Tabl. R. A., Mamm.* p. 188 (1842); *Schinz, Syn. Mamm.* i. p. 530 (1844); *Gieb. Säug.* p. 699 (1859); *Gulliver, P. Z. S.* 1875, p. 491.

*Phalangista gliriformis*, *Bell, Trans. Linn. Soc.* xvi. p. 121, pls. xiii. & xiv. (animal, feet, &c.) (1828); *J. B. Fisch. Syn. Mamm.* p. 383 (1829); *Less. H. N. Mamm. (Compl. Buff.)* iv. p. 467 (1830); *id. N. Tabl. R. A., Mamm.* p. 188 (1842); *Wagn. Schr. Säug. Supp.* iii. p. 82 (1843), v. p. 276 (1855); *Owen, Odontogr. Atl.* pl. c. fig. 3 (skull) (1845).

*Dromicia nana*, *Gray, Grey's Austr., App.* ii. p. 401 (1841); *id. List Mamm. B. M.* p. 85 (1843); *Gerv. H. N. Mamm.* ii. p. 275 (1855); *Gerrard, Cat. Bones Mamm. B. M.* p. 121 (1862).

*Dromicia gliriformis*, *Gray, List Mamm. B. M.* p. 85 (1843); *Gould, Mamm. Austr.* i. pl. xxix. (animal) (1845); *Gerrard, Cat. Bones Mamm. B. M.* p. 120 (1862); *Kreffft, Notes Faun. Tasm.* p. 4 (1863); *id. Mamm. Austr.* text to pl. vii. p. 3 (1871).

*Phalangista (Dromicia) nana*, *Waterh. N. H. Mamm.* i. p. 309 (1846); *Gunn, P. Roy. Soc. Tasm.* ii. p. 85 (1852).

*Dromicia unicolor*, *Kreffft, P. Z. S.* 1863, p. 49; *Gould, Mamm. Austr. (Introd.)* i. p. xxvi (1863); *Kreffft, Cat. Mamm. Austr. Mus.* p. 42 (1864).

COMMON DORMOUSE-PHALANGER.

Size rather smaller than in *D. caudata*. Form thicker and clumsier than in the other species. Fur thick and soft, rather

woolly in texture. General colour uniform dull fawn. Rhinarium naked, finely granulated, sharply defined. Face greyish; darker mark round and in front of eye indistinct and little defined. Ears large, laid forward (in spirit-specimens) they reach just about to the tip of the muzzle, narrower than in *D. lepida*; their outline evenly oval. Palate-ridges eight, the outer corner of the second projecting between the canine and p.<sup>1</sup> in such a way as to simulate very closely an additional anterior premolar. Fur of back slaty grey for three fourths of its length, dull fawn terminally. Chin dull white; hairs of chest and belly slate, tipped with dirty white, those along the centre line sometimes wholly white; line of demarcation along sides very indistinctly marked. Mammæ 4. Fore and hind limbs grey; hands brown, feet whitish. Palms and soles (Pl. XV. figs. 5, 6, and 7) naked, with large prominent pads, five on each. Tail slightly longer than the head and body, its basal inch furry like the body, and generally much incrassated; terminal portion as usual.

*Skull* (Pl. XVI. fig. 6) broad and rounded. Interorbital space flat, its edges square and slightly beaded. Posterior root of zygoma markedly inflated. Anterior palatine foramina reaching backwards to halfway between the canine and p.<sup>1</sup> Posterior palate imperfect from the level of the front of m.<sup>1</sup> nearly to its hinder edge. Bullæ very large and prominent, much inflated.

*Teeth* (Pl. XVI. fig. 7). Upper i.<sup>1</sup> and canine very long, about equal. P.<sup>1</sup> and p.<sup>3</sup> minute, single-rooted, cylindrical, placed close together \* near the base of p.<sup>4</sup>; p.<sup>4</sup> very large and strong, with a long pointed main cusp corresponding to the bifid cusp of *D. lepida*, and a prominent secondary posterior one, almost or quite as high as the tips of the molars. Molars broad and rounded, three in number. Lower i.<sup>1</sup> unusually long in proportion. Small intermediate teeth three in number, apparently corresponding to i.<sup>2</sup>, p.<sup>1</sup>, and p.<sup>3</sup>, touching one another, no doubt functional to a certain extent; p.<sup>4</sup> large, simple, and pointed. Molars as in the upper jaw, but more oblong in shape.

#### Dimensions.

	♂. <i>d</i> (in spirit). Adult. millim.	♀. <i>f</i> (in spirit). Adult. millim.
Head and body .....	100	97
Tail .....	104	111
Lower leg .....	26	27
Hind foot .....	14·7	16
Muzzle to eye .....	11	11·3
Ear .....	17·4	17
Skull, see p. 148.		

\* Their position in fact such that without the analogy of the other species one would be more inclined to call them p.<sup>2</sup> and p.<sup>3</sup>, and therefore, on the whole, rather telling against the homologies here used. Moreover, in specimen *g* there are on the left side three minute premolars, of which, although the exact correspondence is not easy to determine with certainty, the additional one seems to be the anterior, in which case we should have to reckon in *Dromicia* the missing premolar as p.<sup>1</sup>

*Hab.* Tasmania\*.

*Type* in the Paris Museum.

This species is remarkable for its tendency to form fatty accumulations, both in the base of its tail and elsewhere, a tendency specially manifested in confinement; nearly all specimens are exceedingly difficult to preserve, owing to the oily exudation that takes place all over them.

a-c.	Ad. al., ♂ ♀.	Tasmania.	Ronald Gunn, Esq. [P. & C.].
d, e.	{ Ad. al. } { Skull of d. } ♂ ♀.	Tasmania.	Mr. J. Abrahams [P.].
f.	Ad. al., ♀ & 4 young.	Tasmania.	Dr. Milligan [P.].
g.	{ Ad. sk. } { Skull. } ♀.		Thomas Bell, Esq. [P.].
h.	Ad. st.	Tasmania.	( <i>Type</i> of <i>D. gliriformis</i> , Bell.) Gould Coll.
i, j.	{ Ad. & yg. sks. } { Skull of i. }	Tasmania.	Gould Coll.
k.	{ Ad. sk. } { Skull. } ♀.	Tasmania.	Dr. J. E. Gray [P.].
l.	Ad. st.	Tasmania.	Dr. J. E. Gray [P.].
m.	Skeleton.	Tasmania.	Dr. J. E. Gray [P.].
n.	Imm. sk.	Tasmania.	Lieut. A. Smith [P.].
o.	Skeleton ♀ (mounted).	Tasmania ( <i>Voy.</i> 'Fly').	J. B. Jukes, Esq. [P. & C.].
p, q.	{ Ad. st. } { Skulls. }		Zool. Soc.

#### 4. *Dromicia concinna*.

*Dromicia concinna*, *Gould, P. Z. S.* 1845, p. 2; *id. Mamm. Austr.* i. pl. xxx. (animal) (1855).

*Phalangista* (*Dromicia*) *concinna*, *Waterh. N. H. Mamm.* i. p. 314, pl. xi., fig. 2 (animal) (1846); *Wagn. Schr. Säug. Supp.* v. p. 277 (1855); *Gieb. Säug.* p. 699 (1859).

*Phalangista* (*Dromicia*) *neilli*, *Waterh. N. H. Mamm.* i. p. 315, pl. xix. fig. 3 (skull) (1846); *Wagn. Schr. Säug. Supp.* v. p. 277 (1855); *Gieb. Säug.* p. 700 (1859).

#### LESSER DORMOUSE-PHALANGER.

Size small, form very light and delicate. General colour bright fawn. Face pale fawn, the usual darker mark round and in front of the eye scarcely distinguishable. Ears long, rather narrow, evenly oval. Back-hairs slaty grey at base, their tips bright fawn, with a slight tinge of rufous. Chin, chest, and belly pure white, the line of demarcation on sides sharply marked. Outsides of limbs like

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\* The two specimens of "*D. unicolor*" mentioned by Krefft came from the near neighbourhood of Sydney, and I have no doubt had both escaped from captivity, as the species has otherwise never been recorded from the mainland, while it is at the same time to be found in the collection of almost every dealer in live animals.

back, inner sides white, but the hairs partly grey basally. Tail about as long as the head and body, slender, not incrassated, its basal half-inch furry like the back, the remainder uniformly short-haired as usual.

*Skull* on the whole very similar to that of *D. nana*, with which it agrees closely in its general proportions, and in the degree of inflation of the posterior root of its zygoma. Bullæ very large, swollen, transparent.

*Teeth* (Pl. XVI. fig. 8). Upper  $i^1$  and canine about equal.  $P^1$  and  $p^3$  minute, cylindrical, single-rooted as in *D. nana*, but their positions more as in *D. lepida*, as they stand about equidistant from each other, from the canine, and from  $p^4$ .  $P^4$  large, pointed, markedly higher than the molars, not bifid at its extremity, and without a posterior cusp. Molars three, as in *D. nana*, narrower and more oblong than usual. Lower intermediate unicuspidate teeth generally four in number, apparently corresponding to  $i^3$ ,  $p^1$ ,  $p^3$ , and  $p^4$ ; but a fifth, probably  $i^3$ , present on the right side of specimen *d*. The lower  $p^4$  is therefore quite different from that of the other species, being minute and unicuspidate like  $p^3$ . Molars as in the upper jaw.

*Dimensions.*

	♀ (in spirit). Adult. millim.
Head and body . . . . .	80
Tail . . . . .	89
Lower leg . . . . .	21
Hind foot . . . . .	12.2
Muzzle to eye . . . . .	8.8
Ear . . . . .	12

Skull, see p. 148.

*Hab.* South and Western Australia.

*Co-types* in collection.

$a, b.$ { Ad. al. { ♀	South Australia.	Purchased.
{ Skull of <i>a.</i> {		
<i>c.</i> Ad. st.	South Australia.	Sir G. Grey [P. & C.].
<i>d.</i> Skull, ♂.	King George's Sound, W. A. ( <i>Neill</i> ).	G. R. Waterhouse, Esq. [P.].
	(From type of <i>D. neilli</i> , Waterh.)	
$e, f.$ { Ad. sk. { ♂	Swan R., W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
{ Skulls. {		( <i>Co-types</i> of species.)

## Skull Dimensions of Tarsipes, Acrobatæ, Distœchurus, and Dromicia.

Species	Tarsipes <i>rostratus</i> .		Acrobatæ <i>pygmaeus</i> .		Distœchurus <i>pennatus</i> .		Dromicia <i>lepidæa</i> .		D. <i>caudata</i> .		D. <i>nana</i> .		D. <i>concinna</i> .	
	Sex	a. old.	j. adult.	♀. Type. adult.	♀. a. adult.	♀. Type. adult.	♀. g. adult.	♀. a. aged.						
Basal length	.....	23.7	18.3	24.5	17.5	24.4	23.6	19.6						
Greatest breadth	.....	9.5*	13.3	18	13	18	16.9	14						
Nasals, length	.....	11.6	7.1	8.9	8.2	11	9	7.5						
" greatest breadth	.....	2	3.1	3.8	3	4.2	3	3						
" least breadth	.....	1.4	2	...	1.8	...	1.8	1.7						
Interorbital breadth	.....	2.7	4.9	6	4.2	5.7	4.7	4.1						
Palate, length	.....	14.2	11	14.9	10.3	14.6	13	10.5						
" breadth outside m. <sup>3</sup>	.....	...	5.8	8	6	9	7.5	5.8						
" " inside m. <sup>2</sup>	.....	...	3.9	5.2	4	5.6	4.8	4						
Palatal foramen	.....	4.5	2	3	1.6	...	2.7	...						
Basi-cranial axis	.....	7.6	7.2	9	6.4	...	9	...						
Basi-facial axis	.....	16.2	11.4	15.6	11.2	...	14.8	...						
Facial index	.....	213	158	173	175	...	164	...						
Teeth—height of canine	.....	1	1.7	...	1.3	...	2.1	...						
" horizontal length of p. <sup>4</sup>	.....	...	0.9	...	0.8	...	1.7	...						
" length of ms. <sup>1,3</sup>	.....	...	2.8	4.1	2.5	4.6	4	2.8						
" " lower i. <sup>1</sup>	.....	3.5	3	...	2.9	5	4.3	2.6†						

\* Across the brain-case.

† Worn down, in a younger specimen 3.0.

## 5. GYMNABELIDEUS.

Type.

Gymnabelideus, *McCoy, Ann. Mag. N. H.* (3) xx. p. 287 (1867)..... G. leadbeateri.

General appearance as in *Petaurus*. Ears large, naked, untufted. No flying-membrane present. Toes of normal proportions, their length anteriorly in the following order—4, 3, 5, 2, 1; claws less developed than in *Petaurus*. Tail cylindrical, bushy.

*Skull and teeth* as in *Petaurus*.

Dental formula:—I.  $\frac{1.2.3}{1.2.0}$ , C.  $\frac{1}{0}$ , P.  $\frac{1.0.3.4}{1.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4}$  =  
 $16 + 4 \times 2 = 40$ .

This genus is exceedingly closely allied to *Petaurus*, from which it only differs by having no flying-membrane, and by its fifth being slightly shorter, instead of longer, than its third fore toe. It may in fact be looked upon as the primitive form from which the more highly specialized *Petaurus* has been developed.

1. *Gymnabelideus leadbeateri*.

*Gymnabelideus leadbeateri*, *McCoy, Ann. Mag. N. H.* (3) xx. p. 287, pl. vi. (animal, teeth, &c.) (1867); *id. Prodr. Zool. Vict.* (Decade x.) pl. xci. (animal, skull, and feet) (1883).

The following description is taken, nearly verbally, from the accounts published by Prof. McCoy:—

General appearance very like that of *Petaurus breviceps* (*infra*, p. 156) except for the entire absence of the lateral flying-membranes. Fur soft and close. General colour of upper surface brownish grey, with a blackish dusky streak from the top of the head along the back to the sacrum. A dark patch under the base of the ear, and fainter ones before and behind the eye. Ears large, semi-elliptical, nearly naked towards the tip. Under surface dull yellowish. Fore feet with the terminal toe-pads very large and wrinkled, and sometimes exceeding the claws in length. Palm- and sole-pads large, low, finely striated. Tail long, evenly bushy, the hairs along the basal shorter than those along the terminal half, its colour throughout pale brown.

*Skull*, so far as can be made out from the figures, only differing from that of *Petaurus breviceps* by the rather greater length and narrowness of the muzzle, and by the presence of large vacuities in the palate, extending forward to the front of m.<sup>2</sup>

*Teeth* as in *P. breviceps*.

*Dimensions.*

	Type*. millim.
Head and body .....	135
Tail .....	162

\* Allowance must be made here for possible differences in the manner of taking the measurements.

	millim.
Hind foot.....	26
.Ear .....	19
Skull, see p. 162.	

*Hab.* Victoria (Bass River).

*Type* in the Melbourne Museum.

## 6. PETAURUS.

	Type.
Petaurus, <i>Shaw, Nat. Misc.</i> ii. text to pl. lx. (1791) ..	P. australis.
Ptilotus, <i>G. Fisch. Zoogn.</i> iii. p. 512 (1814) .....	P. australis.
Belideus, <i>Waterh. P. Z. S.</i> 1838, p. 151 .....	P. sciureus.
Xenochirus, <i>Glog. Handb. Naturg.</i> p. 85 (1842) ....	P. sciureus.

Size medium or small. Fur unusually soft and silky. Ears fairly large, oval, nearly naked, not tufted. Flanks with a broad flying-membrane, stretching from the outside of the fifth fore finger (Pl. XV. fig. 11) to the ankle, where it is inserted just over the large internal malleolas of the tibia. Fore toes evenly lengthened towards the outside, the fifth (which bears the membrane) the longest, at least in the larger species, the others following in the regular order 4, 3, 2, 1; in the smaller species, however, the order is 4, 5, 3, 2, 1. Claws very strong and sharp, much curved. Tail long, not distichous, evenly bushy all round to its extreme tip. Special glands, no doubt sexual in their nature, present both on the crown between the ears and on the chest; more prominent and better developed in males than in females.

*Skull* short, broad, and strongly built. Nasals widely expanded behind. Supraorbital edges with sharp overhanging ridges. Posterior, squamosal portion of zygomata much inflated by air-cells. Palate nearly or quite complete; a small pair of vacuities opposite  $m.^3$  generally present. Bullæ inflated, variable in size. Lower jaw with a small but distinct communication between the masseteric fossa and the inferior dental canal.

*Dentition*:—I.  $\frac{1.2.3}{1.2.0}$ , C.  $\frac{1}{0}$ , P.  $\frac{1.0.3.4}{1.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} = 16 + 4 \times 2 = 40$ .

Upper  $i.^1$  very large, exceeding the canine in length. Premolars simple, pointed, two-rooted;  $p.^1$  nearly as large as  $p.^4$ ;  $p.^3$  much smaller, but not minute. Molars squarely rounded, quadricuspid, except the last, which is triangular. Lower minute teeth generally four in number, consisting apparently of  $i.^2$ ,  $p.^1$ ,  $p.^3$ , and  $p.^4$ , nearly or quite touching one another; all present in most specimens; an additional one (probably  $i.^3$ ) occasionally developed.

*Range.* Papuan and Australian subregions, from Gilolo to Victoria.

*Synopsis of the Species.*

## I. EXTERNAL CHARACTERS.

- A. Size large; lower leg more than 80 millim.; tail more than 400 millim. Underside of heel thickly hairy.
- a. Posterior side of hips and legs broadly fringed with black. Belly deep orange. 1. *P. australis*, p. 151.
- B. Size smaller; lower leg less than 80 millim., tail than 350. Underside of heel partly or wholly hairy.
- b. Size larger; lower leg more than 60, tail than 230 millim. Tail very bushy, especially basally, where the hairs exceed 40 millim. in length ..... 2. *P. sciureus*, p. 153.
- c. Size smaller; lower leg less than 60 millim. and tail than 230 ..... 3. *P. breviceps*, p. 156.

## II. CRANIAL CHARACTERS.

- A. Size large; basal length more than 46 millim. Molars <sup>1-3</sup> more than 7·3 millim. long.
- a. Bullæ large, the posterior projecting lower than the anterior part ..... 1. *P. australis*, p. 151.
- B. Size smaller; basal length less than 46 millim. Molars less than 7·3 millim.
- b. Size larger; basal length above 38 millim., and molars <sup>1-3</sup> above 6·5 millim.
- a<sup>1</sup>. Bullæ large, with a prominent projection anteriorly ..... 2. *P. sciureus*, p. 153.
- c. Size smaller; basal length below 38, and molars <sup>1-3</sup> below 6·5 millim.
- b<sup>1</sup>. Bullæ variable, large in typical, small in Papuan variety ..... 3. *P. breviceps*, p. 156.

1. *Petaurus australis*.

Hepoona Roo, *White, Journ. Voy. N. S. W.* p. 288, pl. lxi. (animal) (1790).

*Petaurus australis*, *Shaw, Nat. Misc.* ii. pl. lx. (animal) (1791); *Gray, List Mamm. B. M.* p. 83 (1843); *Gieb. Säug.* p. 701 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 120 (1862); *Schleg. Dierent.* p. 166 (1872); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 705 (1884); *Thos. Encycl. Brit.* (9) xviii. p. 729 (1885); *Jent. Cat. Ost. Leyd. Mus.* p. 316 (1887).

*Sciurus (Petaurus) australis*, *Kerr, Linn. An. K.* p. 269 (1792).

*Sciurus novæ-hollandiæ*, *Meyer, Uebers. Zool. Entd. Neuhol.* p. 11 (1793) (in part).

*Didelphys petaurus*, *Shaw, Gen. Zool.* i. pt. ii. p. 496, pl. cxii. (animal) (1800).

*Ptilotus australis*, *G. Fisch. Zoogn.* iii. p. 513 (1814).

*Phalangista petaurus*, *G. Cuv. R. A. i.* p. 180 (1817); *Schinz, Cuv. Thierr.* i. p. 260 (1821); *Burm. Lehrb. Naturg.* p. 548 (1830); *Wagl. Syst. Amph. Säug.* p. 26 (1830).

*Petaurus flaviventer*, *Desm. N. Dict. d'H. N.* (2) xxv. p. 403 (1817);

- J. B. Fisch. Syn. Mamm.* p. 278 (1829); *Gray, Grey's Austr., App.* ii. p. 402 (1841); *Wagn. Schr. Süng. Supp.* iii. p. 89 (1843), v. p. 278 (1855); *Schinz, Syn. Mamm.* i. p. 532 (1844); *Owen, Odontogr. Atl.* pl. c. fig. 4 (teeth) (1845); *Gieb. Odontogr.* p. 42, pl. xviii. fig. 4 (teeth) (1855).
- Petaurista flaviventer, Desm. Mamm.* i. p. 269 (1820); *Gray, Griff. Cuv. An. K.* v. p. 199 (1827); *Waterh. Cat. Mamm. Mus. Z. S.* p. 68 (1838).
- Petaurus (Belideus) flaviventer, Waterh. Jard. Nat. Libr., Mamm.* xi. p. 286 (1841); *id. N. H. Mamm.* i. p. 327 (1846).
- Belideus flaviventer, Less. N. Tabl. R. A., Mamm.* p. 189 (1842); *Gould, Mamm. Austr.* i. pl. xxiii. (animal) (1845); *Benn. P. Z. S.* 1859, p. 218 (habits); *Kreffl, Cat. Mamm. Austr. Mus.* p. 39 (1864); *id. Mamm. Austr.* text to pl. vii. p. 2 (1871); *Dobs. J. Anat. Phys.* xvii. p. 150 (1882).
- Petaurus cunninghami, Gray, List Mamm. B. M.* p. 83 (in synonymy) (1843).

#### YELLOW-BELLIED FLYING PHALANGER.

Size large. Fur long, soft and silky. General colour brown, variously marked with dark orange and black. Rhinarium large, naked, finely granulated. Face yellowish brown, darker on the crown, on the sides of the muzzle, round the eyes, and at the back of the ear basally. Ears long, laid forward (in spirit-specimens) they just fall short of the top of the muzzle; narrow, evenly oval, naked altogether inside and terminally outside, their bases behind dark brown, except that there is a prominent yellowish patch along their posterior margins. Hairs of back dark brown or nearly black along the median line and on the upper surface of the parachutes; slaty grey tipped with dark orange along the sides of the back, and on a distinct lighter line running down the upper (*outer* in the ordinary quadrupedal position) sides of the thighs. Edge of parachute margined with orange, except just near its origin and insertion, where it is broadly fringed with black. Posterior edge of thighs also margined with black. Chin, inner sides of wrists, and ankles blackish; otherwise the whole of the under surface and the inner sides of the limbs uniform deep orange\*. Hands and feet above wholly black. Mammæ 2†. Palms (Pl. XV. fig. 11) and soles naked, finely striated, the part under the ankle, however, thickly hairy; the pads broad, rounded, not sharply defined. Length of fore toes in the following order—5, 4, 3, 2, 1. Claws very large and powerful, strongly curved. Tail enormously long, very bushy, especially at its base, evenly but slightly tapering to its tip; its colour generally greyish above, and orange below basally, gradually darkening to black at its tip.

*Skull* broad and rounded, with a sharp-pointed muzzle. Nasals much expanded behind, their greatest breadth nearly two thirds

\* This colour fades on exposure to light, and becomes a dirty yellowish white.

† So far as can be made out from specimen *g*, the only adult female in spirit available.

their length. Interorbital space flat, its edges laterally ridged and overhanging, but not forming distinct postorbital processes. Bullæ large and transparent, but their anterior not so much swollen as to project lower (in the natural position) than the posterior part.

*Teeth* rather variable in size. Upper canine short, flattened laterally. P.<sup>1</sup> about equidistant from the canine and p.<sup>3</sup>; p.<sup>4</sup> triangular in section, narrower in front than behind, its point but little higher than that of p.<sup>1</sup> Lower i.<sup>1</sup> more rounded in section and less spatulate than usual; intermediate teeth comparatively well developed, closely fitting against one another; p.<sup>4</sup>, although quite in series with the small teeth in front of it, yet showing a tendency towards the usual elongated triangular shape.

*Dimensions.*

	♂. f (in spirit). Adult. millim.	♀. g (in spirit). Adult. millim.
Head and body .....	310	280
Tail .....	425	420
Lower leg .....	86	88
Hind foot .....	43	42
Ear.....	45	46
Skull, see p. 162.		

*Hab.* New South Wales and Victoria (mountainous coast-districts).

*Type* not in existence.

a-c. Ad. st.	New South Wales.	Gould Coll.
d. Ad. st.	New South Wales.	Allan Cunningham, Esq. [P.].
e. } Ad. sk. {	New South Wales.	Zool. Soc.
} Skull. {		
f-h. Ad. al., ♂ ♀ & yg.	Victoria.	Purchased.
h-i. Ad. skeleton and imm. skull.		Zool. Soc.
j. Skeleton.		Purchased.

2. *Petaurus sciureus.*

? Norfolk-Island Flying Squirrel, *Phillip, Voy. Bot. Bay*, p. 151, pl. xvii. (animal) (1789).

? *Sciurus* (*Petaurus*) *norfolcensis* \*, *Kerr, Linn. An. K.* p. 270 (1792).  
*Sciurus novæ-hollandiæ*, *Meyer, Uebers. Zool. Entd. Neuholl.* p. 11 (1793) (in part only †).

\* The species not being really indigenous to Norfolk Island, this name is incorrect, and therefore untenable. It is also not by any means certain that Phillip's description, and therefore Kerr's name, do not really refer to *P. breviceps*, the figure being equally similar to either.

† Description mainly founded on White's account of the "Hepoonsa-Roo" (= *P. australis*).

- Didelphys sciurea*, *Shaw, Zool. New Holl.* i. p. 29, pl. xi. (animal) (1794); *id. Gen. Zool.* i. pt. ii. p. 498, pl. cxiii. (animal) (1800); *Turt. Linn. S. N.* i. p. 68 (1806).
- Voluccella sciurea*, *Bechst. Uebers. vierf. Thiere*, ii. pp. 352, 686 (1800).
- Ptilotus sciureus*, *G. Fisch. Zoogn.* iii. p. 514 (1814).
- Petaurus sciureus*, *Desm. N. Dict. d'H. N.* (2) xxv. p. 403 (1817); *Less. Dict. Class. d'H. N.* xiii. p. 288 (1828); *J. B. Fisch. Syn. Mamm.* p. 279 (1829); *Less. H. N. Mamm. (Compl. Buff.)* iv. p. 443 (1830); *Kaup, Thierr.* i. p. 242 (1835); *Gray, Grey's Austr. App.* ii. p. 402 (1841); *id. List Mamm. B. M.* p. 83 (1843); *Wagn. Schr. Säug. Supp.* iii. p. 89 (1843), v. p. 279 (1855); *Schinz, Syn. Mamm.* i. p. 533 (1844); *Gieb. Säug.* p. 702 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 119 (1862); *Brehm, Thierl.* ii. p. 571, fig. (animal) (1880); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 706 (1884); *Thos. Encycl. Brit.* (9) xviii. p. 729, fig. 2 (animal) (1885); *Coll. Zool. Jahrb.* ii. p. 929 (1887); *Jent. Cat. Ost. Leyd. Mus.* p. 316 (1887).
- Petaurista sciurea*, *Desm. Mamm.* i. p. 270 (1820); *Gray, Griff. Cuv. An. K.* v. p. 199 (1827); *id. King's Surv. Austr., App.* ii. p. 414 (1827); *Waterh. Cat. Mamm. Mus. Z. S.* p. 68 (1838); *Gulliver, P. Z. S.* 1875, p. 491.
- Phalangiata sciurea*, *Schinz, Cuv. Thierr.* i. p. 260 (1821); *F. Cuv. Dents. Mamm.* p. 253 (1825); *id. Dict. Sci. Nat.* xxxix. p. 416 (1826).
- Petaurus (Belideus) sciureus*, *Waterh. P. Z. S.* 1838, p. 151; *id. Jard. Nat. Libr., Mamm.* xi. p. 289, pl. xxviii. (animal) (1841); *id. N. H. Mamm.* i. p. 331 (1846).
- Belideus sciureus*, *Less. N. Tabl. R. A., Mamm.* p. 189 (1842); *Gould, Mamm. Austr.* i. pl. xxiv. (animal) (1845); *Gerv. H. N. Mamm.* ii. p. 275, fig. (animal) (1855); *Krefft, Cat. Mamm. Austr. Mus.* p. 40 (1864); *id. Mamm. Austr.* text to pl. vii. p. 3 (1871).
- Belideus gracilis*, *De Vis, P. Linn. Soc. N. S. W.* vii. p. 619 (1882).

#### SQUIRREL FLYING PHALANGER.

Size markedly smaller than in the last species. Fur soft and silky, slightly woolly. General colour a soft pale grey. Face lighter grey, a well-defined dark brown or black band commencing between the eyes and running backwards along the dorsal surface. Area round eyes darker, but not prominently so. Ears rather variable in size, nearly naked inside, and terminally outside; a deep black patch present along their external bases, succeeded posteriorly by a prominent white or pale yellow spot. Hairs of back slaty grey, their tips nearly white, except along the central dorsal streak, which ends between the hips. Upper surface of parachute dark brown or greyish, its edges fringed with white or pale yellow. Whole of underside and inner sides of limbs white, with a tinge of yellow. Outsides of limbs like back, but a darker mark generally distinguishable running down the posterior side of the hips, succeeded behind by a paler marginal fringe. Hands and feet white or pale grey above. Palms and soles much as in *P. australis*, but the lower surface of the heel generally naked, a narrow naked line running backwards to the tip of the heel below. Tail proportionally much shorter than in *P. australis*, very bushy,

especially along its basal third, where the hairs often attain a length of about 60 millim.; its colour above and below grey, darkening terminally into black.

*Skull* almost an exact miniature of that of *P. australis*, but rather narrower in proportion, with a longer muzzle. Supraorbital ledges well developed, and more distinctly notched anteriorly, so as to form more definite postorbital processes. Palate complete. Bullæ much swollen, especially anteriorly, where there is a prominent downwardly projecting point, which descends below the level of the posterior part of the bulla.

*Teeth* as in *P. australis*. Length of the first three upper molars from 6.6 to 7.2 millim.; of the lower molar series 9 to 9.3 millim.

*Dimensions.*

	♂.	♀.
	<i>e</i> (skin).	<i>h</i> (skin).
	Adult.	Adult.
	millim.	millim.
Head and body.. (c.)	250	(c.) 210
Tail .....	280	250
Lower leg..... (c.)	70	69
Hind foot.....	35	32
Ear .....	26 (contracted)	27 (contracted).

Skull, see p. 162.

*Hab.* Eastern Australia, from Queensland to Victoria.

*Type* not in existence.

a. Skeleton.	Port Essington.	Capt. Chambers [P.].
b. } Ad. sk. } ♀.	Gayndah, Queensland.	Godeffroy Museum.
c. Ad. sk., ♀.	Moreton Bay, Queens- land.	Dr. J. R. Elsey [P.].
d. } Ad. sk. } ♂.	Upper Hunter R., N. S. W.	Gould Coll.
e. } Ad. sk. } ♂.	Liverpool Plains, N. S. W.	Gould Coll.
f. Ad. sk.	Liverpool Plains, N. S. W.	Gould Coll.
g. Ad. sk., ♂, 20/8/46.	New South Wales.	Sir T. L. Mitchell [P. & C.].
h. Ad. sk., ♀, 8/5/46.	New South Wales.	Sir T. L. Mitchell [P. & C.].
i. Ad. sk., ♀.	Port Phillip, Victoria.	Gould Coll.
j. Imm. sk.		G. R. Waterhouse, Esq. [P.].
k. Skeleton (mounted).		

3. *Petaurus breviceps*\*.a. *Petaurus breviceps*, var. *typicus*.

- Petaurus* (*Belideus*) *breviceps*, *Waterh. P. Z. S.* 1838, p. 152; *id. Jard. Nat. Libr., Mamm.* xi. p. 290, pl. xxix. (animal) (1841); *id. N. H. Mamm.* i. p. 334 (1846).
- Petaurus breviceps*, *Gray, Grey's Austr., App.* ii. p. 402 (1841); *id. List Mamm. B. M.* p. 83 (1843); *Wagn. Schr. Säug. Supp.* iii. p. 90 (1843), v. p. 279 (1855); *Schinz, Syn. Mamm.* i. p. 532 (1844); *Gieb. Säug.* p. 702 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 119 (1862); *Coll. Zool. Jahrb.* ii. p. 931 (1887).
- Belideus breviceps*, *Less. N. Tabl. R. A., Mamm.* p. 189 (1842); *Gould, Mamm. Austr.* i. pl. xxv. (animal) (1849); *Kreffft, Cat. Mamm. Austr. Mus.* p. 40 (1864); *id. Mamm. Austr.* text to pl. vii. p. 3 (1871).
- Belideus ariel*, *Gould, P. Z. S.* 1842, p. 11; *id. Mamm. Austr.* i. pl. xxvii. (animal) (1849); *Kreffft, Cat. Mamm. Austr. Mus.* p. 41 (1864); *id. Mamm. Austr.* text to pl. vii. p. 3 (1871).
- Petaurus ariel*, *Gray, List Mamm. B. M.* p. 84 (1843); *Schinz, Syn. Mamm.* i. p. 534 (1844); *Wagn. Schr. Säug. Supp.* v. p. 279 (1855); *Gerrard, Cat. Bones Mamm. B. M.* p. 119 (1862); *Gieb. Z. ges. Nat.* xxvii. p. 394 (1866).
- Petaurus sciureus*, *Gunn (nec Shaw), P. Roy. Soc. Tasm.* i. p. 253 (1851). (Introduction into Tasmania.)
- Petaurus* (*Belideus*) *notatus*, *Peters, M.B. Ak. Berl.* 1859, p. 14.
- Belideus notatus*, *Gould, Mamm. Austr.* i. pl. xxvi. (animal) (1860).

## LESSER FLYING PHALANGER.

Size small. Fur soft and silky, not so long as in *P. sciureus*. Colours almost precisely as in that species, the ground-colour being of the same soft pale grey, and the dark markings situated on the same parts of the body; the dorsal stripe, however, is often more or less indistinct, the hairs of the underside are nearly always grey basally (at least in the continental variety), and the extreme tip of the tail is very frequently white. Ears (Pl. XV. fig. 9) large, evenly oval, laid forward (in spirit-specimens) they reach to about halfway between the eye and the tip of the nose. Length of fore toes in the following relative order of length—4, 5, 3, 2, 1. Underside of heel hairy, except a round spot on its tip, which is therefore separated from the main part of the naked sole by a narrow hairy band. Tail markedly more bushy basally than terminally, the hairs attaining a length of from 20 to 30 millim. along its proximal inch.

*Skull* (Pl. XVI. fig. 9) as in *P. sciureus*, but with a shorter and more sharply pointed muzzle, and of course very considerably smaller. Supraorbital edges more or less parallel, distinctly beaded.

- 
- \* a. Ears comparatively large. Colour grey. Bullæ large, projecting downwards anteriorly.  
 Australian..... Var. *typicus*.
- b. Ears small. Colour more yellowish. Bullæ small. Papuan ..... Var. *papuanus*, p. 158.

Palate complete. Bullæ large, their anterior portion projecting markedly downwards; their total length antero-posteriorly about 8 millim.; much smaller in var. *papuanus*.

*Teeth* (Pl. XVI. fig. 10). Upper  $i^1$  considerably larger than the canine. Diastema between  $i^3$  and canine sufficiently long to be visible to the extent of nearly a millimetre when the skull is looked at directly from the side. Premolars and molars as usual; combined length of the three upper anterior molars from 5.5 to 6.2, of the lower molar series about 7 millim.

*Dimensions.*

	♂. <i>m</i> (in spirit). Adult. millim.
Head and body . . . . .	172
Tail . . . . .	190
Lower leg . . . . .	55
Hind foot . . . . .	29
Ear . . . . .	28

Skull, see p. 162.

*Hab.* Queensland, New South Wales, and Victoria. (Introduced into Tasmania in 1835\*.)

*Type* in collection.

This species, at least in its typical continental form, resembles *P. sciureus* so closely in every way that it can often only be distinguished with certainty by the considerably smaller size of its molar teeth. The Papuan form, however, is apparently different, and would be specifically separable were it not that the two seem to grade into each other, to a degree very remarkable considering the differences between typical specimens of the two. The Papuan variety has always hitherto been referred to under the name of *P. ariel*, Gould; but the types of the latter, from Port Essington, undoubtedly belong to the present race, the northern one therefore now needing a new varietal name.

<i>a, b.</i>	{ Ad. sks. } { Skull of <i>a.</i> } ♀.	Port Essington, Northern Territory.	Gould Collection.
<i>c.</i>	{ Ad. sk. } { Skulls. } ♀, 12/44.	Port Essington ( <i>J. MacGillivray</i> ).	( <i>Co-types</i> of <i>P. ariel</i> , Gould.) Earl of Derby [P.].
<i>d.</i>	{ Ad. sk. } { Skull. } ♀.	Port Essington.	Capt. W. Chambers [P.].
<i>e.</i>	Ad. st.	N.W. coast of Australia.	Zool. Soc.

\* See Gunn (*l. c.*), by whom this species was called *P. sciureus*; but his determination was evidently incorrect, as is shown by specimen *m*, collected in Tasmania by himself.

f.	{ Ad. sk. }	(North Australian Ex-	— Barnes, Esq. [P.].
	{ Skull. }	pedition.)	
g.	{ Ad. sk. }	(North Australian Ex-	Dr. J. R. Elsey [P.].
	{ Skull. }	pedition.)	
h, i.	{ Ad. sk. }	Camden Co. (Illawarra),	Gould Coll.
	{ Skulls. }	N. S. W. ( <i>J. Strange</i> ).	
j.	Ad. sk.	New South Wales.	Zoological Society.
			( <i>Type of species</i> .)
k, l.	Ad. al., ♂.	Victoria.	Purchased.
m.	Ad. al., ♂.	[Tasmania.]	Ronald Gunn, Esq.
			[P. & C.]
n.	{ Ad. sk. }		J. P. Atkins, Esq.
	{ Skull. }		[P.].
	{ Imm. st. }		Purchased.
	{ Skull. }		
p.	Skeleton.		Capt. P. P. King
			[P. & C.].
q.	Skeleton.		Purchased.

**b. *Petaurus breviceps*, var. *papuanus*.**

*Belideus ariel* (*nec Gould*), *Gray, P. Z. S.* 1858, p. 109, and 1860, p. 5; *Alst. P. Z. S.* 1877, p. 125; *Rams. P. Linn. Soc. N. S. W.* ii. p. 12 (1878), iii. p. 243 (1879).

*Petaurus ariel*, *Schleg. Ned. Tijdschr. Dierk.* iii. p. 357 (1866); *Peters & Doria, Ann. Mus. Genov.* xvi. p. 683 (1881); *Jent. Cat. Ost. Leyd. Mus.* p. 317 (1887).

**PAPUAN FLYING PHALANGER.**

Fur shorter and closer than in the typical form. Stripes and markings as in that animal, but better defined, owing to the shortness of the hair. Ears (Pl. XV. fig. 10) comparatively small, laid forward (in spirit-specimens) they barely reach to the anterior canthus of the eye; their general shape narrower and less rounded than in the Australian form. Whole of underside yellowish or orange, the hairs not or very slightly grey basally. Mammæ 4. Heel less hairy than in *P. breviceps*, the main naked part of the sole connected with the tip of the heel by a narrow naked line. Tail long, evenly cylindrical, not more bushy basally than terminally; its basal three fourths pale yellowish grey, its tip black.

*Skull* (Pl. XV. fig. 11) with the bullæ small, rounded, little prominent, their greatest antero-posterior diameter generally only about 5·5 millim.; no projecting point on their anterior portion.

*Teeth* as in the typical form, except that they are rather smaller and lighter, and the diastema between the upper i.<sup>s</sup> and canine is so reduced that these teeth almost or quite appear to overlap when viewed from the side.

\* These specimens had no exact locality marked upon them, but as they are the only ones received from Mr. Gould, they are presumably those from Illawarra referred to in his 'Mammals of Australia.'

*Dimensions.*

	♂. <i>n</i> (in spirit). Adult. millim.	♀. <i>j</i> (in spirit). Adult. millim.
Head and body .....	143	138
Tail .....	176	182
Lower leg .....	46	45
Hind foot .....	25	26
Ear .....	21	19.5

Skull, see p. 162.

*Hab.* Papuan subregion, from Gilolo eastward to the New Britain group.

*Type* in collection.

Of this race the most typical and strongly marked examples are those from New Guinea itself and the islands to the north-west; while, on the other hand, Aru Island individuals present so many resemblances to Port Essington specimens of the continental form that I have found it impossible to separate specifically the two geographical races.

<i>a.</i> Ad. sk., ♂.	Batchian ( <i>A. R. Wallace</i> ).	H. Seebohm, Esq. [P.].
<i>b.</i> { Ad. sk. } ♂.	Mysol.	A. R. Wallace, Esq. [C.].
{ Skull. }		
<i>c.</i> { Ad. st. } ♀.	Aru Islands.	A. R. Wallace, Esq. [C.].
{ Skull. }		
<i>d.</i> Skull.	Soek, Aru Islands.	Kowalevski Coll.
<i>e.</i> Skull.	Dorey, N.W. New Guinea.	Kowalevski Coll.
<i>f*, g.</i> { Ad. sk. } ♂.	Huon Gulf, E. New Guinea.	P. Comrie, Esq. [C.].
{ Skulls. }		( <i>f.</i> <i>Type</i> of variety.)
<i>h, i.</i> { Ad. sks. } ♂ ♀.	Port Moresby, S.E. New Guinea.	Dr. Turner [C.].
{ Skull of <i>h.</i> }		
<i>j.</i> Ad. al., ♀.	Port Moresby.	Dr. Turner [C.].
<i>k, l.</i> { Ad. sks. } ♂ ♀.	New Britain group.	Rev. G. Brown [C.].
{ Skull of <i>k.</i> }		
<i>m.</i> Imm. al., ♀.	New Britain group.	Rev. G. Brown [C.].
<i>n, o.</i> Ad. & imm. al., ♂.		Mr. J. Beazley [C.].

## 7. DACTYLOPSILA.

*Type.*

*Dactylopsila*, *Gray*, *P. Z. S.* 1858, p. 109 ..... *D. trivirgata*.

Size medium. Body prominently striped with black or white. Ears oval, nearly naked terminally. Flanks without any trace of a flying-membrane. Lengths of fore toes (*Pl. XVII. fig. 1*) very unequal, the fourth enormously longer than the others, which succeed in the

\* This specimen is selected as the type of the variety, as being the most strongly characteristic of it.

following order—3, 5, 2, 1. Hind fourth and fifth toes also markedly longer than usual. Carpus with a peculiar prominent proximal pad in addition to the usual five palm-pads (Pl. XXI. fig. 1). Claws long, less curved than in *Petaurus*. Tail long, cylindrical, evenly bushy, its extreme tip more or less naked below.

*Skull* narrow, but with very strong and widely expanded zygomata. Interorbital region markedly contracted, its edges smoothly rounded, without postorbital processes. Squamosal portion of zygomata but little inflated by air-cells. Palate quite complete. Lower jaw without any trace of a connection between the masseteric fossa and the inferior dental canal.

*Dentition*:— $I. \begin{smallmatrix} 1.2.3 \\ 1.2.3^* \end{smallmatrix} C. \begin{smallmatrix} 1 \\ 0 \end{smallmatrix} P. \begin{smallmatrix} 1.0.3^*.4 \\ 0.0.3^*.4 \end{smallmatrix} M. \begin{smallmatrix} 1.2.3.4 \\ 1.2.3.4 \end{smallmatrix} = 15 + 5 \times 2 = 40.$

Upper incisors (fig. 4, p. 127) very large;  $i^1$  directed nearly horizontally forwards, and wearing down quite in front instead of below. Canine small,  $p^1$  placed close to it and almost precisely similar to it in size and shape;  $p^3$  minute, sometimes absent;  $p^4$  of medium size, about equal to the canine in cross section, but much shorter vertically; its longer axis oblique, bent inwards in front. Molars oblong, quadricuspid. Lower  $i^1$  proportionally longer than in any other genus. Minute intermediate teeth from two to four in number, and apparently representing, when four are present,  $i^2$ ,  $i^3$ ,  $p^3$ , and  $p^4$ , of which the most frequently absent are the two middle ones,  $i^3$  and  $p^3$ .

*Range*. Papuan and North Australian subregions.

### 1. *Dactylopsila trivirgata*.

*Dactylopsila trivirgata*, Gray, *P. Z. S.* 1858, p. 111, pl. lxiii. (animal), figs. 1-4 (skull); *Gerrard, Cat. Bones Mamm. B. M.* p. 121 (1862); Gray, *P. Z. S.* 1866, p. 220; *Kreff, Mamm. Austr.* text to pl. vii. p. 3 (1871); *Coll. Zool. Jahrb.* ii. p. 932 (1887); *Jent. Cat. Ost. Leyd. Mus.* p. 316 (1887).

*Phalangista trivirgata*, Schleg, *Dierent.* p. 166 (1872).

*Phalangista (Dactylopsila) trivirgata*, Peters & Doria, *Ann. Mus. Genov.* xvi. p. 673 (1881).

*Dactylopsila albertisi*, Peters & Doria, *Ann. Mus. Genov.* vii. p. 542 (1875).

*Phalangista (Dactylopsila) angustivittis*, *id. op. cit.* xvi. p. 674 (1881).

#### STRIPED PHALANGER.

Fur close, thick and woolly, rather harsh. General colour white, with dark longitudinal stripes. Ears oval, rounded, nearly naked, except basally outside. Ground-colour of face and back white or pale yellowish; central black stripe commencing between the eyes, broadening rapidly, and passing down the back to the rump, where it again narrows, and is continued along the upper surface of the tail until it is lost in the dark terminal or subterminal band. Lateral stripes each commencing on the side of the nose, passing across the eye and behind the ear down the sides of the neck and back, sending off a short branch down in front of the shoulder,

and a second longer one running down the outer side of the arm to the wrist and hand; posteriorly it broadens and is less sharply defined on the back, and turns downwards on the rump, passing down the back of the hind limbs to the heel. Chin with a prominent black spot; chest, belly, and whole of inner sides of limbs white or pale yellow. Hands and feet brown. Proportions of toes as above described. Soles finely granulated. Pads (Pl. XXI. fig. 1.) large, rounded, finely striated, the supplementary pad on the carpus high and narrow, its surface smooth and unstriated. Tail cylindrical, evenly bushy, its tip below naked for rather more than an inch; its colour grey for its proximal two thirds, except where the narrow black stripe runs along its upper surface; its terminal third either wholly black, or with a prominent white tip.

*Skull and teeth* as described above.

*Dimensions.*

	♂. c (in spirit). Adult. millim.	♀. * (in spirit). Adult. millim.
Head and body .....	300	235
Tail .....	318	318
Lower leg .....	70	—
Hind foot .....	49	44
Naked part below tail-tip . . .	35	—
Ear.....	29	24

Skull, see p. 162.

*Hab.* Waigiou to Central Queensland.

*Type* in collection.

Considering the entire identity of the single specimen of "*D. albertisi*" † with this species in all other characters except the narrowness of the white dorsal stripes and the smaller size of the carpal pad, I cannot look upon it as representing more than an individual, or at most a slight local variation.

a. { Ad. sk. } ♀.	Aru Islands.	A. R. Wallace, Esq. ( <i>Type</i> of species.)
b. Skull.	Aru Islands.	Kowalevsky Coll.
c. Ad. al., ♂.	Sogere, S.E. New Guinea, 1750 feet.	H. O. Forbes, Esq. [C.].
d. { Ad. sk. } ♀.	Port Albany, Cape York.	C. Coxen, Esq. [C.].
e. { Ad. sk. } { Skull. }	Cape York.	Purchased.

\* From Sorong, New Guinea. *Type* of *D. albertisi*, Peters and Doria.

† Preserved in the Museo Civico, Genoa, where by the kindness of the Marquis G. Doria I have had the opportunity of examining it.

Skull Dimensions of *Gymnobelideus*, *Petaurus*, and *Dactylopsila*.

Species	<i>Gymnobelideus leadbeateri</i> *.	<i>Petaurus australis</i> .	<i>P. sciurus</i> .	<i>P. breviceps</i> .		<i>Dactylopsila trivirgata</i> .
				Var. <i>typicus</i> .	Var. <i>popuianus</i> .	
Sex .....	...	...	♀.	♂.	♂.	♀.
Specimen .....	Type.	adult.	♂.	♂.	♂.	♀.
Age .....	adult.	adult.	adult.	old.	adult.	adult.
Basal length .....	33	49.2	42.8	33.2	56.5	...
Greatest breadth .....	24.3	38.8	31.5	25.5	42.5	39
Nasals, length .....	12	21.2	16	14.2	22.3	20
" greatest breadth .....	6.5	13.4	7.4	6.8	7.9	9.2
" least breadth .....	2.5	5.8	4.1	3.7	2.8	3.3
Intertemporal breadth .....	8	11.2	9.5	9	8	8
Palate, length .....	17.5	...	24.7	21.7	34	29.5
" breadth outside m. <sup>2</sup> .....	...	17	12.8	12	...	13
" inside m. <sup>2</sup> .....	...	11.8	8.6	8.2	...	7.9
Palatal foramen .....	...	3	3.1	2	3	2.3
Basal-cranial axis .....	...	...	15	13.4	...	...
Basal-facial axis .....	...	...	28.3	24.4	...	...
Facial index .....	...	...	189	182	...	...
Teeth—height of canine .....	2.5	3	2.3	2.5	...	...
" horizontal length of p. <sup>4</sup> .....	1.7	2.5	2	2	...	2.8
" length of ms. <sup>1-3</sup> .....	4.6	7.4	7	5.4	...	8.6
" lower i. <sup>1</sup> .....	5.2	9.4	9	6.7	...	12.7

\* Measurements approximate, taken from the published figure.

† Preserved in the Berlin Museum.

## 8. PETAUROIDES\*.

Type.

<i>Voluccella</i> , <i>Bechst. Uebers. vierf. Thiere</i> , ii. p. 351 (1800) [ <i>nec Fabricius</i> (Diptera), 1794] .....	<i>P. volans</i> .
<i>Petaurista</i> , <i>Desm. Mamm.</i> i. p. 268 (1820) [ <i>nec G. Fisch.</i> <i>Zoogn.</i> iii. p. 498 (1814) (= <i>Pteromys</i> )] .....	<i>P. volans</i> .

Size large. Fur exceedingly long, soft, and silky. Ears very large, oval, their backs entirely and closely covered with fur similar to that on the crown, their insides quite naked. Flanks with a flying-membrane, stretching from the wrist to the ankle, but very narrow along the sides of the forearm and lower leg (see Pl. XVII. fig. 2). Fore toes subequal, their respective lengths in the following order—4, 3, 5, 2, 1. Claws very long, strongly curved, sharply pointed. Tail long, cylindrical, evenly bushy, except just below its extreme tip (Pl. XVII. fig. 3), where it is naked and prehensile. No crown- or chest-glands present.

*Skull* (Pl. XVIII. fig. 1) short and broad. Nasals short, the premaxillæ projecting some way in front of them. Interorbital space narrow, much contracted, its edges strongly marked, slightly inflated anteriorly, sharply beaded posteriorly. Squamosal portion of zygomata slightly inflated. Palatal foramina reaching to the level of  $p^1$ . Posterior palate with two large vacuities opposite the molars. Bullæ inflated, smoothly bulbous. Lower jaw with a distinct opening leading from the masseteric fossa into the inferior dental canal.

*Dentition*:—I.  $\frac{1.2}{1.2^{**}.0}$ .3, C.  $\frac{1}{0}$ , P.  $\frac{1(\text{or } 1).0.3}{1^{**}.0.3^{**}.4}$ .4, M.  $\frac{1.2.3.4}{1.2.3.4}$  = 17 + (at most) 3 (or 16 + 4)  $\times$  2 = 40.

All the upper teeth (Pl. XVIII. fig. 2) very uniform in height.  $I^1$  not much exceeding the others in length. Canine smaller than  $i^3$  and situated some way behind it.  $P^1$  still smaller than canine, similar in shape, sometimes minute or absent; diastemata in front of and behind it about equal.  $P^3$  and  $p^4$  both large and functional, about equal in height to the molars, and quite in even series with them;  $p^3$  about two thirds the size of  $p^4$  in section. Molars large, oblong, the usual rounded cusps found in the previous genera modified into sharp points, with curved ridges radiating from them. Lower minute intermediate teeth often entirely absent, and very seldom more than two or three in any one jaw; if these are present they would appear to be  $i^2$ ,  $p^1$ , and  $p^3$ .  $P^4$  large and functional, as high as the molars. Molars with sharp curved crests much as in the upper jaw.

*Range*. That of the only species.

This genus occupies the same relation to *Pseudochirus* that *Petaurus* does to *Gymnobelideus*, its identity in cranial and dental characters being even more complete (especially as compared to *P. lemuroides*). On the other hand, it is externally exceedingly different, not presenting even the superficial resemblance to the non-flying forms that is found in the parallel case.

\* *Nom. nov.*

1. *Petauroides volans* \*.a. *Petauroides volans*, var. *typicus*.

- Black Flying Opossum, *Phillip, Voy. Bot. Bay*, p. 297, pl. liv. (animal) (1789).
- Didelphis volans*, *Kerr, Linn. An. K.* p. 199 (1792); *G. Cuv. Tabl. Élém.* p. 126 (1798); *Turt. Linn. S. N. i.* p. 68 (1806).
- Didelphis volucella*, *Meyer, Uebers. Zool. Entd. Neuhol.* p. 26 (1793).
- Didelphis macroura*, *Shaw, Zool. New Holl. i.* p. 33, pl. xii. (animal) (1794); *id. Gen. Zool. i. pt. ii.* p. 500, pl. cxiii. (animal) (1800); *Turt. Linn. S. N. i.* p. 69 (1806).
- Volucella nigra and macroura*, *Bechst. Uebers. vierf. Thiere, ii.* pp. 351, 352, & 686 (1800).
- Phalanger volans*, *Lacép. Mém. Inst. iii.* p. 491 (1801).
- Phalangista petaurista*, *E. Geoff. Cat. Mus.* p. 150 (1803).
- Phalangista volans*, *Desm. N. Dict. d'H. N. (1)* xvii. p. 381 (1804); *Tiedem. Zool.* p. 433 (1808).
- Petaurus macrurus and peronii*, *Desm. N. Dict. d'H. N. (2)* xxv. pp. 402, 404 (1817); *F. Cuv. Dict. Sci. Nat.* xxxix. pp. 418, 419 (1826); *Less. Dict. Class. d'H. N. xiii.* p. 288 (1828); *J. B. Fisch. Syn. Mamm.* pp. 278, 279 (1829); *Less. H. N. Mamm. (Compl. Buff.) iv.* pp. 441, 442 (1830); *Gray, Grey's Austr., App. ii.* p. 402 (1841); *Less. N. Tabl. R. A., Mamm.* p. 189 (1842); *Wagn. Schr. Säug. Supp. iii.* pp. 86, 87 (1843); *Schinz, Syn. Mamm. i.* pp. 532, 533 (1844).
- Petaurus taguanoides*, *Desm. N. Dict. d'H. N. (2)* xxv. p. 400 (1817); *F. Cuv. Dents Mamm.* pp. 129, 253 (1825); *id. Dict. Sci. Nat.* xxxix. p. 418 (1826); *Less. Dict. Class. d'H. N. xiii.* p. 288 (1828); *J. B. Fisch. Syn. Mamm.* p. 278 (1829); *Less. H. N. Mamm. (Compl. Buff.) iv.* p. 440 (1830); *Waterh. P. Z. S.* 1838, p. 149; *id. Jard. Nat. Libr., Mamm. xi.* p. 283, pl. xxvii. (animal) (1841); *Less. N. Tabl. R. A., Mamm.* p. 189 (1842); *Wagn. Schr. Säug. Supp. iii.* p. 86 (1843), v. p. 278 (1855); *Schinz, Syn. Mamm. i.* p. 531 (1844); *Gerv. H. N. Mamm. ii.* p. 276 (1855); *Gieb. Odontogr. p.* 42, pl. xviii. fig. 3 (teeth) (1855); *id. Säug. p.* 701 (1859); *Schleg. Dierent. p.* 166 (1872); *Brehm, Thierl. ii.* p. 573 (1880); *Flow. & Gars. Cat. Ost. Coll. Surg. ii.* p. 705 (1884); *Jent. Cat. Ost. Leyd. Mus.* p. 316 (1887).
- Petaurista taguanoides*, *Desm. Mamm. i.* p. 269 (1820); *Gray, Griff. Cuv. An. K. v.* p. 198 (1827); *Waterh. Cat. Mamm. Mus. Z. S.* p. 68 (1838); *Gray, Grey's Austr., App. ii.* p. 402 (1841); *id. List Mamm. B. M.* p. 84 (1843); *Gould, Mamm. Austr. i.* pl. xxii. (animal) (1853); *Gerrard, Cat. Bones Mamm. B. M.* p. 120 (1862); *Kreffl, Cat. Mamm. Austr. Mus.* p. 38 (1864); *id. Mamm. Austr. text to pl. vii.* p. 2 (1871); *Haswell, P. Linn. Soc. N. S. W. (2)* i. p. 176 (myology) (1886); *De Vis, P. Linn. Soc. N. S. W. (2)* i. p. 1132 (1887).
- Petaurista macroura and peronii*, *Desm. Mamm. i.* pp. 269, 270 (1820); *Gray, Griff. Cuv. An. K. v.* pp. 199, 200 (1827).
- Phalangista macroura*, *Schinz, Cuv. Thierr.* p. 260 (1821).
- Petaurus didelphoides*, *F. Cuv. Dents Mamm.* pp. 129, 253 (1825).
- Petaurus leucogaster*, *Mitch. Exped. East. Austr. i.* p. xvii (1838).

\* a. Size larger. Upper canine and p.<sup>1</sup> well developed.Southern..... Var. *typicus*.b. Size smaller. Upper canine and p.<sup>1</sup> quite small.Northern..... Var. *minor*, p. 166.

- Petaurista leucogaster, *Gray, Grey's Austr., App.* ii. p. 402 (1841).  
 Petaurus (Belideus) macrourus, *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 288 (1841).  
 Petaurus (Petaurista) taguanoides, *Waterh. N. H. Manum.* i. p. 322, pl. xix. fig. 4 (skull) (1846).  
 Petaurus volans, *Thos. Ann. Mag. N. H.* (5) iv. p. 397 (1879).  
 Petaurista volans, *Thos. Encycl. Brit.* (9) xviii. p. 728 (1885).

TAGUAN FLYING PHALANGER.

Fur long, soft, and fluffy. General colour dark ashy grey, very variable in tone, sometimes nearly black all over, sometimes pale whitish grey. Ears very large, oval, evenly rounded; laid forward (in spirit-specimens) they reach nearly to the tip of the muzzle; their inner surface entirely naked, their outer thickly covered all over with fur like that on the rest of the head. Back without special markings, its colour as above described. Whole of under surface white or pale yellowish, the hairs not grey basally. Outer sides and backs of limbs black or dark brown, inner sides white or pale grey. Hands and feet thickly fringed all over with deep black hairs. Fingers and toes very thick, with strong curved claws. Palms (Pl. XVII. fig. 2) and soles naked, the pads low, rounded, finely striated. Tail very long, evenly furry all along, its colour ashy grey or blackish, generally markedly darkening terminally. Naked part under the tip (Pl. XVII. fig. 3) short, not sharply separated from the hairy part, its surface not roughened.

*Skull and teeth* (Pl. XVIII. figs. 1, 2) as above described. Upper canine and p.<sup>1</sup> larger in the present form, smaller in var. *minor*.

*Dimensions.*

	♂.
	<i>d</i> (in spirit).
	Adult.
	millim.
Head and body . . . . .	430
Tail . . . . .	490
Lower leg . . . . .	120
Hind foot . . . . .	50
Ear . . . . .	56
Naked part below tail-tip . . . (c.)	14

Skull, see p. 185.

*Hab.* Queensland to Victoria.

*Type* not in existence.

- |                |                            |                       |
|----------------|----------------------------|-----------------------|
| a. Ad. st., ♂. | Liverpool Range,           | Gould Coll.           |
|                | N. S. W. ( <i>J. G.</i> ). |                       |
| b. Ad. st., ♀. | New South Wales.           | AllanCunningham, Esq. |
|                |                            | [P.].                 |
| c. Ad. sk.     | New South Wales.           | AllanCunningham, Esq. |
|                |                            | [P.].                 |
| d. Ad. al., ♂. | Victoria.                  | Purchased.            |
| e. Ad. st., ♂. |                            | Gould Coll.           |
| f. } Ad. st. { |                            | Purchased.            |
| } Skull. {     | ♂ (albino).                |                       |

- g. Ad. sk., ♀.  
 h. Skeleton.  
 i. Skull.  
 j. Skull.  
 k. Skull.

Zoological Society.  
 Purchased.  
 Mr. J. Baker [P.].  
 Zoological Society.  
 Purchased.

δ. *Petauricides volans*, var. *minor*.

*Petaurista volans*, var. *minor*, *Coll. Zool. Jahrb.* ii. p. 926 (1887).

Similar to the typical form in all essential characters, but differing by its smaller size (*cf.* the skull dimensions, p. 185), and especially by the much feebler development of the upper canine, which is barely one half as long as *i*.<sup>3</sup>, and of *p*.<sup>1</sup>, which is quite minute and sometimes absent. The upper *i*.<sup>2</sup> and *i*.<sup>3</sup> are also proportionally smaller and weaker (see Pl. XVIII. fig. 3).

*Hab.* Central Queensland.

*Co-types* in the Christiania Museum and in collection.

This smaller form of *P. volans* was discovered by Dr. Lumholtz during his exploration of Central Queensland, and an excellent description of it has been given by Dr. Collett in his general account of Dr. Lumholtz's collection.

- a. { Ad. sk. } ♂, 1/84. Coomooboolaroo, Queens- Christiania Museum  
 { Skull. } land (C. Lumholtz). [E.]  
 (One of the *co-types* of variety. Specimen D of Dr. Collett's list.)

9. PSEUDOCHIRUS.

- |   |                         |
|---|-------------------------|
|   | Type.                   |
| Pseudochirus, <i>Ogilb. P. Z. S.</i> 1836, p. 26.....                               | <i>Ps. peregrinus</i> . |
| <i>Cercaertus</i> ( <i>Glog.</i> ), <i>Burm. Handb. Naturg.</i> p. 814 (1837) ..... | _____*                  |
| Hepoona, <i>Gray, Grey's Austr., App.</i> ii. p. 402 (1841) ..                      | <i>Ps. cooki</i> .      |
| <i>Cercaertus, Gloger, Handb. Naturg.</i> i. p. 85 (1842) ..                        | <i>Ps. peregrinus</i> . |
| <i>Hemibelideus</i> (subg.), <i>Coll. P. Z. S.</i> 1884, p. 385 ....                | <i>Ps. lemuroides</i> . |

Size large or medium. Fur shorter and woollier than in *Petauroides*. Ears medium or short, hairy behind, but rarely closely furry all over their backs as in *Petauroides*, their inner surfaces with extra tragoid projections in addition to the metatragus (see Pl. XVII. fig. 4). Flanks without a flying-membrane. Fore toes subequal, the first two very markedly opposable to the outer three (see Pl. XVII. fig. 6), their relative lengths in the following order—4, 3, 5, 2, 1. Claws medium. Palms and soles naked, with large rounded and striated pads; underside of heel hairy. Tail long, tapering, its distal third generally comparatively short-haired; its tip naked underneath for a distance varying from 4 to 150 millim., generally about 100 millim.; the whole of the underside shorter-haired than the upper; markedly prehensile (see Pl. XVII. figs. 7, 8). Mammæ 4†. No chest- or crown-glands,

\* Said to be founded on *Trichosurus vulpecula*, but obviously a misspelt form of Gloger's *Cercaertus*.

† At least in *Ps. cooki*, *canescens*, and *forbesi*.

but apparently, judging only from dried skins, there is one occasionally present placed on the upperside of the base of the tail\*.

*Skull.* Nasals generally projecting nearly or quite as far forwards as the premaxillæ. Interorbital space flat or concave, its edges ridged or rounded, often inflated. Squamosal portion of zygomata inflated as usual. Palate variable, generally nearly perfect. Bullæ as a rule rather more inflated than in *Trichosurus*. Base of masseteric fossa generally with a small opening into the inferior dental canal.

*Dentition*:—I.  $\frac{1.2.3 \text{ (or 0)}}{1.2^*.0}$ , C.  $\frac{1 \text{ (or 0)}}{0}$ , P.  $\frac{1.0.3.4}{1^{**}.0.3^*.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} = 15$  or 17+ (at most)  $3 \times 2 = 36$  or 40.

Upper teeth all fairly uniform in length, but  $i^1$  generally longer in proportion to the others than in *Petauroides*. Premolars variable in size and in their distances from each other;  $p^3$ , in section, from one third to three fourths the size of  $p^4$ . Molars with crescentic ridges as in *Petauroides*. Lower intermediate teeth generally very small and sometimes altogether absent; when three are present they have the positions of  $i^2$ ,  $p^1$ , and  $p^3$ . In *Ps. albertisi* and *archeri*, owing to the shortness of the jaw, there is only a single intermediate tooth (probably  $i^2$ ), which is, however, larger in proportion than usual. Lower  $p^3$  elongated, as high as the molars, with several distinct cusps.

*Range.* New Guinea, Australia, and Tasmania.

This genus, with its close ally *Petauroides*, by the complicated subselenodont character of its molars, stands somewhat apart from most of the other Phalangers, and approaches *Phascolarctus*, in which a rather simpler form of the same modification is observable. In young Cuscuses, however, a tendency towards the same structure is also visible, but the crests on the molars soon wear off, and then there appears but little difference between their molars and the simple smoothly quadricuspid ones of *Petaurus*, *Dactylopsila*, and their allies.

The species of *Pseudochirus* fall naturally into three groups, of which *Ps. peregrinus*, *albertisi*, and *canescens* may respectively be taken as typical. The members of the first group are restricted to Australia and Tasmania, of the third to New Guinea, while the two species of the second occur, the one in North Australia and the other in New Guinea. All the species except *Ps. peregrinus* seem to have rather restricted ranges, and this fact has been taken advantage of in the following synopsis, since, partly owing to the absence of spirit-specimens, characters of more than specific value have not been easily found.

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\* The appearances indicative of a glandular structure are specially strongly marked in *Ps. archeri* and *albertisi*.

*Synopsis of the Species.*

## I. EXTERNAL CHARACTERS.

- A. Ears of medium length, not excessively short; longer than broad. Tail white-tipped.—Australian and Tasmanian.
- a. Naked part below tail-tip shorter than head. Tail nearly cylindrical, evenly bushy.—Central Queensland . . . . . 1. *Ps. lemuroides*, p. 170.
- b. Naked part below tail-tip longer than head. Tail short-haired terminally.
- a<sup>1</sup>. Ears smaller, their backs and bases all dark like the rest of the head. Chin brown.—Central Queensland. 2. *Ps. herbertensis*, p. 170.
- b<sup>1</sup>. Ears larger, their backs with a spot, generally white, sometimes rufous, on their posterior margins. Chin white or rufous.
- a<sup>2</sup>. Grey, outsides of limbs rufous.
- a<sup>3</sup>. Ear-spot usually small, white or rufous. White part of tail variable in length.—Eastern Australia . . . . . 3. *Ps. peregrinus*, p. 172.
- b<sup>2</sup>. Dark smoky grey, without or with but little tinge of rufous.
- b<sup>3</sup>. White ear-spot quite small. White part of tail 5 or 6 inches long.—Western Australia . . . . . 4. *Ps. occidentalis*, p. 174.
- c<sup>3</sup>. White ear-spot extending over nearly the whole of the posterior half of the back of the ear. White part of tail 3 or 4 inches long.—Tasmania. . . . . 5. *Ps. cooki*, p. 176.
- B. Ears very short, broader than long. Tail not white-tipped, except in *P. archeri*.
- c. Form thick and stout. Dorsal striping conspicuous. Colour coppery or yellowish.
- c<sup>1</sup>. Tail white-tipped. Colour greenish yellow, with three vague darker and two lighter dorsal stripes.—Central Queensland . . . . . 6. *Ps. archeri*, p. 177.
- d<sup>1</sup>. Tail not white-tipped. Colour grizzled coppery, with one deep black dorsal stripe.—Papuan . . . . . 7. *Ps. albertisi*, p. 178.
- d. Form light and slender. Striping inconspicuous. Colour grey.—Papuan.
- e<sup>1</sup>. Tail only naked for about 4 millim. at extreme tip. Face coloured like back. Forehead unstreaked; a pale spot below ear . . . . . 8. *Ps. schlegeli*, p. 180.
- f<sup>1</sup>. Tail naked below tip for 2 or 3 inches. Face paler than back, orange or rufous.
- c<sup>2</sup>. Forehead with a dark central streak; no paler spot below ear. 9. *Ps. canescens*, p. 181.
- d<sup>2</sup>. Forehead unstreaked; a pale spot below ear . . . . . 10. *Ps. forbesi*, p. 183.

## II. CRANIAL CHARACTERS.

- A. Molars<sup>1-3</sup> more than 10·5 millim.
- a. Nasals reaching forwards only to about the level of *i*.<sup>3</sup>
- a<sup>1</sup>. Canine about as long as *i*.<sup>3</sup>\* Ms.<sup>1-3</sup> about 12 millim. . . . . 1. *Ps. lemuroides*, p. 170
- b. Nasals reaching to about the level of *i*.<sup>1</sup>
- b<sup>1</sup>. Dental series interrupted, with marked diastemata in the pre-molar region. *i*.<sup>2</sup> not, or little, longer horizontally than *i*.<sup>3</sup> Upper edge of lower *i*.<sup>1</sup> straight or convex.
- a<sup>2</sup>. Nasals vaulted, very convex along the centre. Diastema between *i*.<sup>3</sup> and canine more than 3 millim. Ms.<sup>1-3</sup> 11 to 11·5 millim. . . . . 2. *Ps. herbertensis*, p. 170.
- b<sup>2</sup>. Nasals flat above, not vaulted. Diastema between *i*.<sup>3</sup> and canine less than 3 millim.
- a<sup>3</sup>. Supraorbital edges sharp, not inflated. Ms.<sup>1-3</sup> 11·2 to 12·6 millim. . . . . 3. *Ps. peregrinus*, p. 172.
- b<sup>3</sup>. Supraorbital edges rounded, inflated.
- a<sup>4</sup>. Nasal notch shallow, nasals projecting less than 7 millim. beyond their junction with the premaxillæ. Ms.<sup>1-3</sup> 12·5 to 13·2 millim. . . . . 4. *Ps. occidentalis*, p. 174.
- b<sup>4</sup>. Nasal notch very deep, nasals projecting more than 7 millim. beyond their junction with the premaxillæ. Ms.<sup>1-3</sup> 13 to 14 millim. . . . . 5. *Ps. cooki*, p. 176.
- c<sup>1</sup>. Dental series nearly or quite continuous; *i*.<sup>2</sup> elongated horizontally, its antero-posterior diameter twice that of *i*.<sup>3</sup> Upper edge of lower *i*.<sup>1</sup> concave.
- c<sup>2</sup>. Molars<sup>1-3</sup> 13·6 millim. . . . . 6. *Ps. archeri*, p. 177.
- d<sup>2</sup>. Molars<sup>1-3</sup> 12·2 to 12·5 millim. . . . . 7. *Ps. albertisi*, p. 178.
- B. Molars<sup>1-3</sup> less than 10·5 millim.
- c. *i*.<sup>3</sup> and *p*.<sup>1</sup> present. Canine about as long as *i*.<sup>3</sup> Bullæ rounded, swollen, transparent.
- d<sup>1</sup>. Molars large, ms.<sup>1-3</sup> 10 millim.; *p*.<sup>1</sup> touching *p*.<sup>3</sup> . . . . . 8. *Ps. schlegeli*, p. 180.
- e<sup>1</sup>. Molars small, ms.<sup>1-3</sup> less than 9 millim.; *p*.<sup>1</sup> separated from *p*.<sup>3</sup> . . . . . 9. *Ps. canescens*, p. 181.
- d. *i*.<sup>3</sup> and *p*.<sup>1</sup> aborted; canine minute, much shorter than *i*.<sup>2</sup> Bullæ flattened, little swollen, opaque.
- f<sup>1</sup>. Molars small, ms.<sup>1-3</sup> 8·8 millim . . . . . 10. *Ps. forbesi*, p. 183.

\* Canine markedly shorter than *i*.<sup>3</sup> . . . . . *Petauroides volans*, p. 164.

1. *Pseudochirus lemuroides*.

*Phalangista* (Hemibelideus) *lemuroides*, *Coll. P. Z. S.* 1884, p. 385, pl. xxxi. (animal), figs. 5 & 6 (skull); *Lumholtz, P. Z. S.* 1884, p. 407 (habits).

*Pseudochirus* (Hemibelideus) *lemuroides*, *Coll. Zool. Jahrb.* ii. p. 923 (1887).

Fur soft and woolly, even on the hands and feet. General colour of head and back dark brownish grey, grizzled with reddish brown on the shoulders and ashy grey on the hips. Head dark brown, with a rufous tinge. Ears medium, projecting but little beyond the thick fur of the head, thinly hairy. Centre of nape and back with an indistinct darker line. Chest and belly dirty yellowish grey, not sharply defined from the upper colour. Limbs dark brown, gradually becoming black terminally. Tail black, uniformly thickly clothed with fur for its whole length, very slightly tapering, and agreeing in this respect more with *Trichosurus* than with the other *Pseudochiri*. Naked part of tail very short, its length less than that of the head.

*Skull* short and broad, and bearing a very close resemblance to that of *Petauroides volans*. Nasals short, flattened above, their tips not projecting nearly as far forwards as the front of the premaxillæ. Interorbital space concave, gradually narrowing backwards, its edges with sharp upstanding ridges, and quite without inflation. Palate nearly perfect. Bullæ very slightly inflated.

*Teeth*. Anterior incisors separated in front. Distinct diastemata present in front of and behind canine and behind  $p^1$ ; canine as long as or slightly longer than  $i^3$ ,  $p^1$  about two thirds its height. No lower intermediate teeth present in any of the three known specimens.\*

*Dimensions.*

	Type (skin). millim.	Adult.
Head and body .....	370	
Tail .....	295	
Ear .....	20	

Skull, see p. 185.

*Hab.* Herbert River, Central Queensland.

*Type* in the Christiania Museum.

2. *Pseudochirus herbertensis*.

*Phalangista herbertensis*, *Coll. P. Z. S.* 1884, p. 383, pl. xxx. (animal), figs. 3 & 4 (skull); *Lumholtz, P. Z. S.* 1884, p. 407 (habits).

*Pseudochirus mongan*, *De Vis, P. Linn. Soc. N. S. W.* (2) i. p. 1130 (1887).

*Pseudochirus herbertensis*, *Coll. Zool. Jahrb.* ii. p. 917 (1887).

## HERBERT-RIVER PHALANGER.

Fur thick, close, and woolly. General colour dark umber-brown. Face uniform dark brown, no lighter marks anywhere, even in the

\* This account is compiled from Dr. Collett's figure and descriptions of the typical specimen, which I had the opportunity of examining in 1884.

region round the ear. An indistinct blackish line runs from between the eyes on to the nape of the neck, but owing to the general dark colour this is very inconspicuous. Ears short, projecting but little beyond the fur, thinly hairy outside, nearly naked in. Hairs of back dark smoky brown, their tips sometimes shining coppery. Chin brown, like the face. Chest and belly either mixed grey and white, with irregular pure white patches, or wholly pure white, sharply defined from the upper surface, this colour also occasionally passing round the proximal ends of the limbs in the form of white rings, sharply contrasted with the general brown colour. Whole of limbs otherwise like back. Tail tapering, the hairs woolly to its tip, not straight terminally; its colour uniform smoky brown, with from one to three inches of its tip white. Naked part below tip 5 or 6 inches in length, coarsely shagreened, sharply defined from the hairy proximal part.

*Skull* (Pl. XIX. fig. 1) narrower and more elongated than that of *Ps. lemuroides*. Nasals long, much vaulted above along the middle line, their anterior points falling but little short of the level of the tips of the premaxillæ, the nasal notch shallow, the nasals only projecting about 2 or 3 millim. in front of their junction with the ascending process of the premaxillæ; naso-maxillary and nasopremaxillary sutures about equal in length; posterior edge of nasals very convex backwards in the centre. Interorbital region narrow, tapering evenly backwards, concave in the centre; its edges more or less inflated anteriorly, sharply ridged posteriorly. Anterior palatine foramina reaching to about halfway between the canine and p.<sup>1</sup> Posterior palate perfect, except that it has a few minute openings, in no way comparable to the large vacuities present in many species. Bullæ slightly inflated.

*Teeth* (Pl. XVIII. fig. 4). Upper i.<sup>1</sup> long, the amount by which it exceeds i.<sup>2</sup> nearly twice the vertical height of that tooth. I.<sup>2</sup> and i.<sup>3</sup> small and delicate, about equal in section. Canine about as long as i.<sup>3</sup>, rather longer than p.<sup>1</sup> P.<sup>3</sup> about half the size of p.<sup>4</sup> in cross-section. Molars rather small (see dimensions, p. 185). Lower i.<sup>1</sup> simple, slender, spatulate. Intermediate teeth much reduced in size, hardly visible.

#### Dimensions.

	♂. Co-type* (stuffed). Adult. millim.	♀. Co-type* (stuffed). Adult millim.
Head and body . . . . .	360	360
Tail . . . . .	315	330
Lower leg . . . . . (c.)	78	80
Hind foot . . . . . (c.)	40	45
Ear . . . . .	12·5	15·5

Skull, see p. 185.

\* I have to thank my friend Dr. R. Collett, of the Christiania Museum, for the loan of these specimens, and also for his permission to have casts made of their skulls and of those of the two other Queensland species described by him.

*Hab.* Central Queensland (Herbert-River district).

*Co-types* in the Christiania Museum.

The variability in the presence or absence of white rings round the limbs of this species is a very remarkable characteristic, and has been thought to be of specific value by Mr. De Vis, who has separated the non-ringed form from the other under the name of *Ps. mongan*. On a renewed examination of the typical specimens, however, I must agree with Dr. Collett in looking upon these rings as of too little importance to distinguish animals otherwise so precisely identical.

### 3. *Pseudochirus peregrinus*.

Opossum, *Cook, First Voy. (Ed. Hawkesw.)* iii. p. 182 (1773).

*Didelphis peregrinus*, *Bodd. Elench. Anim.* i. p. 78 (1785).

*Didelphis caudivolvula*, *Kerr, Linn. An. K.* p. 196 (1792); *Turt. Linn. S. N.* i. p. 66 (1806).

*Didelphis novæ-hollandiæ*, *Bechst. Uebers. vierf. Thiere*, ii. pp. 348, 685 (1800).

*Phalangista convolutor*, *Schinz, Cuv. Thierr.* i. p. 258 (1821).

*Phalangista cooki*, *Ogilb. (nec Desm.) P. Z. S.* 1835, p. 192; *Waterh. Cat. Mamm. Z. S.* p. 67 (1838); *Schinz, Syn. Mamm.* i. p. 527 (1844); *Gould, Mamm. Austr.* i. pl. xviii. (animal) (1856); *Gieb. Säug.* p. 698 (1859); *Krefft, Cat. Mamm. Austr. Mus.* p. 36 (1864); *Gieb. Z. ges. Nat.* xxvii. p. 393 (1866); *Krefft, Mamm. Austr.* pl. vii. (animal) (1871); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 704 (1884).

*Phalangista banksii*, *Gray, Ann. Mag. N. H.* i. p. 107 (1838).

*Phalangista (Pseudochirus) cooki*, *Waterh. Jard. Nat. Libr., Mamm.* p. 274, pl. xxv. (animal) (1841); *id. N. H. Mamm.* i. p. 299, pl. xix. fig. 2 (skull) (1846).

*Trichosurus cooki*, *Less. N. Tabl. R. A., Mamm.* p. 189 (1842).

*Phalangista lanuginosa*, *Gould, Mamm. Austr.* i. pl. xx. (animal) (1858); *Krefft, Cat. Mamm. Austr. Mus.* p. 37 (1864); *id. Mamm. Austr.* text to pl. vii. (1871).

*Pseudochirus cooki*, *Jent. Notes Leyd. Mus.* vi. p. 108 (1884).

*Pseudochirus caudivolvulus*, *Jent. Notes Leyd. Mus.* vii. p. 22 (1884); *Thos. Encycl. Brit.* (9) xviii. p. 728 (1885); *Lyd. Cat. Foss. Mamm. B. M.* v. p. 189 (1887); *Coll. Zool. Jahrb.* ii. p. 920 (1887); *Jent. Cat. Ost. Leyd. Mus.* p. 315 (1887).

#### COMMON RING-TAILED PHALANGER.

Fur shorter than in the previous species. General colour very variable, made up of grey or rufous in varying proportions. Face grey or rufous, the region round the eyes often prominently more rufous than the centre line between them. Ears (Pl. XVII. fig. 4) comparatively large for the genus, nearly naked inside, hairy outside, where they are as a rule grey anteriorly, with a distinct patch of white on their posterior edges, but occasionally they are wholly deep rufous behind. Back grizzled grey, sides of body grey or rufous. Chin, chest, and belly white, and belly white, greyish white, or deep uniform rufous. Outer sides of arms and legs rufous, inner sides like belly. Hands and feet white or pale rufous. Tail furry like the body for

three or four inches, beyond which the hairs are straighter and shorter and more adpressed; its colour at base following that of the body in its proportions of grey and rufous, but its middle third nearly or quite black, and its tip for from one to four inches pure white. Naked part below tip about three or four inches in length, not sharply defined from the hairy part, smooth, transversely striated, not shagreened.

*Skull* (Pl. XVIII. fig. 5 and Pl. XIX. fig. 2) elongated, its outlines evenly oval. Nasals flattened, not vaulted above, reaching nearly as far forwards as the premaxillæ; nasal notch medium, much deeper than in *Ps. herbertensis*, shallower than in *Ps. cooki*, the projection of the bones about 5 or 6 millim. beyond their junction with the premaxillæ. Naso-premaxillary much exceeding nasomaxillary suture in length, owing to a narrow projecting process being thrown back from the upper edge of the premaxillæ, and running along between the nasals and maxillæ, and reducing the actual suture between these bones to about 4 millim. Interorbital region much constricted, slightly concave above; its edges square, sharp, not round and inflated. Anterior palatine foramina extending backwards to the level of the diastema between p.<sup>1</sup> and p.<sup>3</sup> Posterior palate with one or two pairs of small vacuities. Bullæ swollen, transparent.

*Teeth* (Pl. XVIII. fig. 5). Upper i.<sup>1</sup> comparatively small and short, not exceeding i.<sup>2</sup> by an amount equal to the height of that tooth. Canine about equal to i.<sup>3</sup> and twice the size of p.<sup>1</sup> P.<sup>3</sup> about half the size in section of p.<sup>4</sup> Molars large and heavy (see skull dimensions). Upper m.<sup>4</sup> comparatively short, its internal antero-posterior length about 3 or 3.5 millim., rarely amounting to 4. Lower intermediate teeth one, two, or three; seldom all aborted.

#### Dimensions.

	♀. h (stuffed). Adult. millim.
Head and body . . . . .	390
Tail . . . . .	340
Lower leg . . . . .	(c.) 80
Hind foot . . . . .	42
Ear . . . . .	37

Skull, see p. 185.

*Hab.* Queensland, New South Wales, Victoria, and South Australia.

*Type* not in existence.

The interpretation of the relations between this and the next two species is a matter of considerable doubt. On the whole it appears to be most convenient to recognize the Tasmanian form as distinct, and consequently the Western Australian as well, the latter being apparently more nearly allied to the Tasmanian than to the Eastern Australian animal. The differences it is true are slight,

but they appear to be constant, at least in fully adult specimens, and intermediate individuals are the less likely to occur, as the three species are sharply separated geographically, *Ps. occidentalis* being as absolutely isolated by the (to a Phalanger) impassable treeless desert north of the Great Australian Bight as *Ps. cooki* is by Bass's Straits.

The South Victorian specimen *r* does not, so far as its skull is concerned, show any approximation to the Tasmanian species, a fact that tends to prove the essential distinctness of the two forms.

<i>a.</i>	{ Ad. sk. } { Skull. }	♂ .	Flats, Upper Hunter R., N. S. W. ( <i>J. G.</i> ).	Gould Coll.
			( <i>Type of P. lanuginosa</i> , Gould.)	
<i>b.</i>	{ Imm. sk. } { Skull. }	♀ .	North of Hunter R., N. S. W. ( <i>J. G.</i> ).	Zool. Soc.
<i>c.</i>	{ Ad. sk. } { Skull. }	♀ .	Upper Hunter R., N. S. W. ( <i>J. G.</i> ).	Gould Coll.
<i>d-e.</i>	Yg. st.		Upper Hunter R., N. S. W. ( <i>J. G.</i> ).	Gould Coll.
<i>f, g.</i>	Ad. st.,	♂ ♀ .	Yarrundi, N. S. W. ( <i>J. G.</i> ).	Gould Coll.
<i>h-j.</i>	Ad. st.,	♀ .	Liverpool Range, N. S. W. ( <i>J. G.</i> ).	Gould Coll.
<i>k.</i>	{ Yg. sk. } { Skull. }	♂ .	Liverpool Range, N. S. W. ( <i>J. G.</i> ).	Gould Coll.
<i>l.</i>	{ Ad. sk. } { Skull. }	♀ .	Clarence R., N. S. W. ( <i>J.</i> <i>G.</i> ).	Gould Coll.
<i>m*, n.</i>	{ Ad. sks. } { Skulls. }	♂ ♀ .	New South Wales ( <i>J. G.</i> ).	Gould Coll.
<i>o.</i>	{ Ad. sk. } { Skull. }	♀ .	New South Wales.	Zool. Soc.
<i>p.</i>	{ Ad. sk. } { Skull. }		Australian Alps, N.E. Victoria.	Dr. Lhotsky [P.].
<i>q.</i>	{ Ad. sk. } { Skull. }		Australian Alps.	Purchased.
<i>r.</i>	{ Ad. sk. } { Skull. }	♂ .	Western Port, Victoria.	Purchased.
<i>s.</i>	Imm. al.,	♀ .		Mr. J. Beazley [C.].

#### 4. *Pseudochirus occidentalis*.

##### WESTERN RING-TAILED PHALANGER.

General colour deep smoky grey, very variable in tone, but without any tinge of rufous. Ears thinly hairy, the white spot on the posterior border of their backs scarcely occupying one third of the whole posterior margin. Sides not more rufous than back, smoky grey. Chin, chest, and belly white, the bases of some or most of the hairs grey. Limbs like back; hands and feet dark reddish brown or black, usually markedly darker than the rest of the limbs. Tail short-haired and white for a longer distance than in

\* Partially melanistic. Ears without white patches.

*Ps. peregrinus*, the white extending over about the terminal 5 or 6 inches; the basal part dark brown; naked part below tip about 4 inches long, smooth, not shagreened.

*Skull* (Pl. XVIII. fig. 6 and Pl. XIX. fig. 3). Nasal notch shallow, the tips of the nasals only projecting about 5 or 6 millim. beyond their junction with the premaxillæ. Naso-premaxillary much longer than naso-maxillary suture. Upper surface of nasals flat, not vaulted. Interorbital region slightly concave in the middle line; less markedly constricted than in *Ps. peregrinus*; its edges smoothly rounded and inflated, but less so than in *Ps. cooki*. Anterior palatine foramina reaching to the level of the hinder edge of p.<sup>1</sup> Posterior palate with large vacuities. Bullæ large and transparent.

*Teeth* apparently quite similar to those of the last species, except that they are rather larger and heavier throughout. Internal antero-posterior length of m.<sup>4</sup> about 4 millim.

#### Dimensions.

	♀. e (skin). Adult. millim.
Head and body . . . . .	335
Tail . . . . .	310
Lower leg . . . . . (c.)	85
Hind foot . . . . .	48
Ear . . . . .	25
Skull, see p. 185.	

*Hab.* Western Australia.

*Type* in collection.

a.	{ Ad. sk. } ♀.	Perth, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
	{ Skull. }		
b.	Yg. sk., ♂.	Perth, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
c.	{ Ad. sk. } ♀.	Swan R., W. A. ( <i>J. Gil-</i>	Gould Coll.
	{ Skull. }	<i>bert</i> ).	
d.	{ Imm. sk.* } ♂.	Swan R., W. A. ( <i>J. Gil-</i>	Gould Coll.
	{ Skull. }	<i>bert</i> ).	
e.	{ Ad. sk. } ♀, 27/2/40.	King George's Sound, W.	Gould Coll.
	{ Skull. }	A. ( <i>J. Gilbert</i> ).	( <i>Type</i> of species.)
f.	{ Ad. sk. } ♀, 27/2/40.	King George's Sound, W.	Gould Coll.
	{ Skull. }	A. ( <i>J. Gilbert</i> ).	
g.	{ Imm. sk. } ♂, 20/2/58.	King George's Sound,	F. M. Rayner,
	{ Skull. }	W. A. ( <i>Voy. 'Herald'</i> ).	Esq. [P.&C.].

\* Melanistic; apparently the specimen referred to by Gould, Mamm. Austr. i. text to pl. xviii. p. 2.

5. *Pseudochirus cooki*.

- Opossum, *Cook, Third Voyage*, i. p. 109, pl. viii. (animal) (1784).  
*Phalangista cooki*, *Desm. N. Dict. d'H. N.* (2) xxv. p. 476 (1817);  
*id. Mamm.* i. p. 268 (1820); *Schinz, Cuv. Thierr.* i. p. 258 (1821);  
*Temm. Mon. Mamm.* i. p. 7 (1827); *Gray, Griff. Cuv. An. K.* v  
 p. 198 (1827); *Less. Man. Mamm.* p. 218 (1827); *id. Dict. Class.*  
*d'H. N.* xiii. p. 334 (1828); *J. B. Fisch. Syn. Mamm.* p. 277  
 (1829); *Gunn, Ann. Mag. N. H.* i. p. 102 (1838); *Gray, Ann.*  
*Mag. N. H.* i. p. 107 (1838); *Wagn. Schr. Saug. Supp.* iii. p. 78  
 (1843), v. p. 274 (1855); *Owen, Odontogr.*, Atl. pl. c. fig. 2  
 (teeth) (1845); *Gunn, P. Roy. Soc. Tasm.* ii. p. 84 (1852); *Gieb.*  
*Odontogr.* p. 42, pl. xviii. fig. 2 (teeth) (1855); *Schleg. Dierent.*  
 p. 166 (1872).  
*Petaurus cooki*, *F. Cuv. Dents Mamm.* pp. 129, 253 (1825); *id.*  
*Dict. Sci. Nat.* xxxix. p. 417 (1826).  
*Trichosurus cooki*, *Less. H. N. Mamm. (Compl. Buff.)* iv. p. 471  
 pl. xxviii. (animal) (1830).  
*Phalangista viverrina*, *Ogilb. P. Z. S.* 1837, p. 131; *Waterh. Cat.*  
*Mamm. Mus. Z. S.* p. 67 (1838); *Schinz, Syn. Mamm.* i. p. 529  
 (1844); *Hombr. & Jacq. Voy. Pôle Sud, Zool.* iii. pp. 31, 33, *Atl.*  
*pls.* xiv. (animal and skull), xv. (animal, albino, and skull)  
 (1845-53); *Gould, Mamm. Austr.* i. pl. xix. (animal) (1856);  
*Gerrard, Cat. Bones Mamm. B. M.* p. 122 (1862); *Kreffl, Cat.*  
*Mamm. Austr. Mus.* p. 37 (1864); *id. Notes Faun. Tasm.* p. 4  
 (1868); *id. Mamm. Austr.* text to pl. vii. p. 2 (1871).  
*Hepoona cooki*, *Gray, Grey's Austr., App.* ii. p. 402 (1841); *id.*  
*List Mamm. B. M.* p. 84 (1843); *Gerrard, Cat. Bones Mamm.*  
*B. M.* p. 121 (1862).  
*Phalangista (Pseudochirus) viverrinus*, *Waterh. Jard. Nat. Libr.,*  
*Mamm.* xi. p. 277, pl. xxiv. (animal) (1841).  
*Trichosurus viverrinus*, *Less. N. Tabl. R. A., Mamm.* p. 189 (1842).  
*Phalangista incana*, *Schinz, Syn. Mamm.* i. p. 530 (1844).

## TASMANIAN RING-TAILED PHALANGER.

Fur very thick, close and woolly. General colour dark smoky brown, sometimes with a tinge of deep rufous on the limbs. Face brown, cheeks rather paler. Ears large, rounded, well-haired behind, where the hairs are brown anteriorly; but, as a rule, they are prominently white along the whole posterior margin of the ear, the white patch often extending downwards on to the sides of the head below the ear. Whole of back uniform deep brown, with longer straight black-tipped hairs interspersed among the brown and woolly ones. Chin, chest, and belly white, the line of demarcation generally rather sharply defined; the hairs mostly slaty grey basally. Outsides of limbs brown, sometimes deep rufous, but never the bright rufous found in *Ps. peregrinus*. Hands and feet dark brown or black. Tail closely furry, evenly tapering, dark brown, deepening to black basally, white terminally for from two to four inches; the naked part beneath the end from three to five inches in length, smooth, not shagreened.

*Skull* (Pl. XVIII. fig. 7 and Pl. XIX. fig. 4). Nasal notch very deep, the tip of the nasals projecting always more than seven, often

eight or nine, millim. beyond their junction with the premaxillæ; naso-premaxillary but little longer than naso-maxillary suture, nasal bones flat above, not vaulted. Interorbital region concave above in the centre, much constricted, its edges smoothly rounded, much inflated\*. Anterior palatine foramina reaching to the level of the back of p.<sup>1</sup> Posterior palate comparatively perfect, without or with only a few small and irregular vacuities. Bullæ medium in size, transparent.

*Teeth* as in *Ps. occidentalis*, and only differing from those of *Ps. peregrinus* by their greater size. Internal antero-posterior length of m.<sup>4</sup> about 4.0 millim.

*Dimensions.*

	♂. a (stuffed). Adult.
Head and body .....	350
Tail .....	340
Lower leg..... (c.)	90
Hind foot).....	55
Ear .....	28
Skull, see p. 185.	

*Hab.* Tasmania.

*Type* not in existence.

a. Ad. st., ♂.	Tasmania.	Purchased.
b. { Ad. sk. } ♀.	Tasmania.	Zool. Society.
{ Skull. }		
c, d. Ad. sks., ♂ ♀.	Tasmania.	Capt. Ross [P. & C.].
e-h. { Ad. sks. } { Skulls of e, } 2♂, 2♀. { f, & g. }	Tasmania.	Gould Coll.
i. Yg. sk., ♂, 27/10/38.	Tasmania.	Gould Coll.
j, k. { Yg. sks. } { Skull of j. }	Tasmania.	Gould Coll.
l. Skeleton, ♂.		Purchased.
m. Skull.	(Voy. H.M.S. 'Fly.')	J. B. Jukes, Esq. [P. & C.].

6. *Pseudochirus archeri*.

Phalangista (*Pseudochirus*) *archeri*, *Coll. P. Z. S.* 1884, p. 381, pl. xxix. (animal), figs. 1 & 2 (skull); *Lumholtz, P. Z. S.* 1884, p. 407 (habits).

*Pseudochirus archeri*, *Coll. Zool. Jahrb.* ii. p. 912 (1887).

YELLOW PHALANGER.

The following is drawn up from the original description and

\* In the specimen figured (specimen *m*) this inflation is at its maximum, and is therefore more pronounced than usual. It is, however, always very considerable.

figures, and from a cast of the typical skull which Dr. Collett kindly permitted me to have prepared:—

Fur soft, close, and thick. General colour grizzled yellowish green. Face grey, passing into greenish yellow on the crown. Eye with distinct crescentic pale yellow spots above and below it. Ears very short, rounded, hairy, their posterior edges and a large spot beneath their bases prominently white. Nape with a distinct black central line passing down it on to the back. Back greenish yellow, with two whitish lines margining the black central one, and these again with two indistinct darker ones outside them. Chin greyish white, chest and belly pure white, the line of demarcation rather sharply marked. Limbs like back, but rather greyer. Tail thick basally, rapidly tapering; its basal two thirds coloured like the back, its tip white. Naked part beneath tip less than half the length of the tail.

*Skull* and *teeth* essentially the same as those of *Ps. albertisi*, and therefore very different from those of any of the previous species. The teeth, however, are rather larger and stouter than in the Papuan animal (see skull dimensions, p. 185), and the bullæ appear to be less swollen.

#### Dimensions.

	♂.
	Type (skin).
	Adult.
Head and body . . . . .	(c.) 350
Tail . . . . .	330
Ear ("measured along the inner margin") . . . . .	18
Skull, see p. 185.	

*Hab.* Central Queensland (Herbert River district).

*Type* in the Christiania Museum.

#### 7. *Pseudochirus albertisi*.

*Phalangista* (*Pseudochirus*) *albertisi*, *Peters, Ann. Mus. Genov.* vi. p. 303 (1874); *id. & Doria, op. cit.* xvi. p. 674, pl. viii. fig. 2, pl. ix. fig. 2 (skull), and pl. xi. (animal) (1881).

*Pseudochirus albertisi*, *Jent. Notes Leyd. Mus.* vi. p. 109 (1884); *id. Cat. Ost. Leyd. Mus.* p. 315 (1887).

#### D'ALBERTIS'S PHALANGER.

Form stout and clumsy. Fur very long, soft and thick. General colour shining coppery brown. Face grizzled greyish brown, no lighter markings either above or below eye, or behind or below ear. Whiskers numerous, long and coarse, black; whisker-like bristles also growing from tufts placed one just above each eye, and another on the side of the cheek behind and below the posterior canthus. Ears short and rounded, their substance thick and fleshy; with three

distinct tragoid projections on their inner surfaces, these projections each covered with long shining black hairs; back of ears covered with short soft reddish fur. Back glistening coppery brown; grizzled with black, the hairs dark brownish grey basally, shining orange terminally; centre of back with a distinct narrow black mesial line extending from the nape to between the hips. Chin greyish, chest and belly pure white along the middle line, grey mixed laterally. Outsides of limbs like back, inner sides greyish. Tips of fingers and toes black. Palm- and sole-pads large, rounded, finely striated. Tail thick, tapering, the hairs woolly to the tip; coloured like the back, but duller in tone, gradually darkening to the end, where there is no trace of a white tip. Naked part below (Pl. XVII. fig. 8) extending for nearly half the length of the tail, sharply defined from the hairy part, about 5 millim. in breadth all along; its surface, especially proximally, coarsely shagreened, but smother in less aged specimens.

*Skull* (Pl. XX. fig. 1) remarkable for its great width across the orbital region, and for its very short, narrow, and pointed muzzle. Nasal notch shallow, rounded. Naso-premaxillary about equal to naso-maxillary suture. Nasal bones narrow in front, much expanded behind, their upper surface slightly convex anteriorly, concave posteriorly. Interorbital region deeply concave in the centre, its edges raised up into high prominent sharp-edged ridges, projecting vertically from two to three millim. above the level of the concave part between them. Orbits very large and round, their outer walls so much expanded as to make the greatest zygomatic breadth of the skull come opposite their centres. Anterior palatine foramina short, extending backwards to the level of p.<sup>1</sup> Posterior palate with a pair of small irregular vacuities. Bullæ inflated, decidedly larger than in *Ps. archeri*.

*Teeth* (fig. cit.) stout and heavy, the upper series continuous, not interrupted by marked diastemata. Upper i.<sup>1</sup> short, thick, sharply pointed, its extreme tip slightly diverging from that of its fellow. I.<sup>2</sup> short vertically, very long and broad horizontally, the cutting-edge of the lower i.<sup>1</sup> biting on to its top instead of between it and its fellow; its posterior edge projecting downwards (in the natural position) much more than its anterior. I.<sup>3</sup> small, cylindrical; canine and p.<sup>1</sup> close to each other and to the other teeth, conical, pointed, about equal in height. P.<sup>3</sup> about one third the size in cross section of the large and powerful p.<sup>4</sup> Lower i.<sup>1</sup> curved upwards at the tip, and with a marked upward projection proximally which sharply separates the enamel-covered cutting-portion from the root, and causes the upper cutting-edge to be decidedly concave in outline. Diastema between i.<sup>1</sup> and p.<sup>3</sup> very short, the single minute tooth (probably i.<sup>2</sup>) nearly filling it up. P.<sup>3</sup> longer and heavier than usual, and with its anterior cusp more strongly developed.

*Dimensions.*

		♂.
		Type (skin in spirit).
		Adult.
Head and body	.....	(c.) 340
Tail	.....	316
Hind foot	.....	48
Ear	.....	17.2
Skull, see p. 185.		

*Hab.* N.W. New Guinea (Arfak district).

*Type* in the Museo Civico, Genoa.

a.	} Ad. sk. {	♂.	Mori, Arfak Mts., New Guinea.	A. A. Bruijn.
	} Skull. {			
b.	Ad. sk.		Prafi, Hatam, Arfak Mts.	A. A. Bruijn.
c.	} Ad. sk. {		New Guinea.	Purchased.
	} Skull. {			

### 8. *Pseudochirus schlegeli.*

*Pseudochirus schlegeli*, *Jent. Notes Leyd. Mus.* vi. p. 110 (1884);  
*id. Cat. Ost. Leyd. Mus.* p. 315 (1887).

#### SCHLEGEL'S PHALANGER.

Size comparatively small. General colour dull silvery grey. Fur thick and woolly. Face grey, like the back, not paler as in the allied species; its centre without any trace of a darker longitudinal line. Ears small and rounded, their backs thickly hairy, nearly black, except their edges which are rufous; a patch round their bases pale yellowish white, with an indistinct darker mark posterior to it. Back grey, with a faint rufous tinge; a very indistinct darker mark running along its centre. Chin, chest, and belly pale yellow, with a tinge of rufous, the bases of the hairs slate-coloured. Arms and legs like back; hands rather paler basally, but the fingers black; feet nearly white. Tail evenly tapering, short-haired terminally, its colour basally like that of the back, but without the rufous tinge; thinly hairy below to the end (except about 4 millim. at the extreme tip, where it is naked all round), and therefore differing in this respect from that of every other member of this genus.

*Skull* rather more heavily built than in the two allied species next following, but still markedly lighter and more delicate than in any of the previous species. Nasals but little expanded behind. Interorbital space narrow, parallel-sided, concave above, its edges ridged, but faintly inflated and rounded anteriorly; no trace of postorbital processes. General frontal outline evenly convex above. Palate rather imperfect behind, ending behind opposite the posterior edge of m.<sup>4</sup> Bullæ large and transparent.

*Teeth.* Upper i.<sup>1</sup> long and strong, i.<sup>2</sup> smaller than i.<sup>3</sup>, the crown of the latter about 1.8 millim. in horizontal length. Canine about as long vertically as i.<sup>3</sup> P.<sup>1</sup> touching p.<sup>3</sup>, small and conical; p.<sup>3</sup> and p.<sup>4</sup> oval, the latter about twice the size in section of the former. Molars larger and heavier than in *Ps. forbesi* and *canescens*, though smaller

than in any of the previous species. Diastema between lower i.<sup>1</sup> and p.<sup>4</sup> long, with (in the type) a single intermediate tooth (probably i.<sup>2</sup>) present on each side.

*Dimensions.*

	♂.
	Type (stuffed).
	Adult.
	millim.
Head and body .....	260
Tail .....	250
Hind foot .....	30
Ear .....	13

Skull, see p. 185.

*Hab.* N.W. New Guinea (Arfak Mountains).

*Type* in the Leyden Museum.

The above description is drawn up from the typical specimen, which, by the kindness of Dr. F. A. Jentink, I have had the opportunity of examining in the museum under his charge.

9. *Pseudochirus canescens.*

Phalanger grisonnant, *Hombr. & Jacq. Voy. Pôle Sud, Atl. Zool.* pl. xvi. (animal and skull) (1845).

Phalangista (*Pseudochirus*) canescens, *Waterh. N. H. Mamm.* i. p. 305 (1846); *Hombr. & Jacq. Voy. Pôle Sud, Zool.* iii. p. 33 (1853); *Wagn. Schr. Säug. Supp.* v. p. 275 (1855); *Gieb. Säug.* p. 698 (1859).

Phalangista bernsteini, *Schleg. Ned. Tijdschr. Dierk.* iii. p. 357 (1866); *id. Dierent.* p. 166 (1872); *Peters & Doria, Ann. Mus. Genov.* xvi. p. 676, pl. xii. (animal) (1881); *Jent. Cat. Ost. Leyd. Mus.* p. 315 (1887).

Phalangista griseus, *Peters, Ann. Mus. Genov.* vi. p. 303 (1874).

*Pseudochirus* bernsteini, *Jent. Notes Leyd. Mus.* vi. p. 109 (1884).

HOARY PHALANGER.

Size small, form slender; the head and limbs especially small in proportion to the size of the body. Fur short and close; underfur thick and woolly, brown. General colour silvery grey. Face and cheeks pale brownish yellow, much paler than the body; centre of face with a sharply marked dark longitudinal line, commencing in front of the eyes and running down the nape on to the back, where it broadens into an indistinct darker band nearly an inch in breadth. Ear (Pl. XVII. fig. 5) very small, laid forward (in spirit-specimens) it does not reach halfway to the eye; its outline nearly circular, its interior surface naked, without extra tragoid projections additional to the metatragus; its back thickly hairy, dark brown, which colour is continued downwards on to the sides of the head as a marked black patch, not margined anteriorly by a paler spot. No tufts of longer hairs round or on the ears. Chin brown, chest and belly

dirty yellowish grey. Arms and legs silvery grey; fingers (Pl. XVII. fig. 6) with the "pseudochirous" arrangement unusually strongly marked, the first and second together widely opposable to the third, fourth, and fifth. Palms with five broad striated pads. Upper surface of both fingers and toes brown, rather darker than the general colour of the limbs. Tail evenly tapering, silvery grey basally, becoming black distally; its under surface short-haired all along, becoming gradually naked in its distal third, the naked part (Pl. XVII. fig. 7) smooth, transversely wrinkled, not shagreened.

*Skull* very small and light. Nasals slender, little expanded behind, their tips projecting about 2 or  $2\frac{1}{2}$  millim. beyond their junction with the ascending processes of the premaxillæ; posterior nasal region convex upwards, rather vaulted. Interorbital space narrow, concave, but less so than in the next species; its edges sharply ridged, but the ridges not forming postorbital processes. Palatine foramina oval, reaching past the level of the back of the canine. Posterior palate almost or quite perfect, back edge of palate some distance behind m.<sup>4</sup> Bullæ swollen and transparent, but less so than in the last species.

*Teeth* small and weak, their series interrupted by wide diastemata. Upper i.<sup>1</sup> about twice the length of i.<sup>2</sup>; i.<sup>3</sup> slightly shorter horizontally than i.<sup>2</sup> Canine rather longer than either of the posterior incisors, unusually long diastemata present both in front of and behind it. P.<sup>1</sup> slightly separated from p.<sup>3</sup>, short and conical; p.<sup>3</sup> and p.<sup>4</sup> narrow, oval in outline, the former about one half the size of the latter in section. Molars very small and light. Lower teeth as usual, except that there are no minute intermediate teeth at all in either of the specimens examined.

#### Dimensions.

	♀. *(in spirit). Adult. millim.
Head and body .....	260
Tail .....	205
Lower leg .....	53
Hind foot .....	32
Ear .....	12

Skull, see p. 185.

*Hab.* N.W. New Guinea (Salawatti, Ramoi, &c.).

*Type* in the Paris Museum.

Of this, the oldest known species of the present group, I have had the advantage of examining all the specimens as yet brought to Europe, namely, the type of the species, preserved in the Paris Museum, that of *Ps. bersteini* in the Leyden Museum, and a spirit-specimen belonging to the Genoa Museum, which latter, by the kindness of the Marquis G. Doria, I have had lent me for purposes

\* Specimen in the Genoa Museum.

of comparison and description. The skull measurements given in the table on p. 185 are taken from the typical skull, for the loan of which I have to thank Prof. Pouchet of the Paris Museum.

### 10. *Pseudochirus forbesi*. (PLATE I.)

*Pseudochirus forbesi*, *Thos. Ann. Mag. N. H.* (5) xix. p. 146 (1887).

#### FORBES'S PHALANGER.

Size rather smaller than in *Ps. canescens*, general proportions as in that species. Sexes differing markedly in size\*. Fur short, close and velvety. General colour dull silvery grey. Muzzle blackish brown; crown and cheeks pale rufous, without any trace of a central darker line. Ears (so far as can be judged from a dried skin) small and rounded as in *Ps. canescens*, their backs hairy, dull rufous, a prominent blackish patch in front of and above them, and another below and behind them, while between the two black marks, round their posterior bases, the fur is pale yellowish white, connected below with the pale colour of the throat. The whole region of the ears markedly tufted with long fine hairs. Back grey, the rufous of the crown of the head gradually disappearing on the fore-quarters; an indistinct dark band running down the centre of the posterior back, not continued forwards on the head. Chin brown, chest and belly dirty white, the bases of the hairs slate; hairs on the scrotum wholly pale rufous. Outsides of limbs like body, the anterior more rufous than the posterior. Hands and feet nearly white, except that the backs of the metacarpals are brown. Tail, both in colour and distribution of hair, similar to that of *Ps. canescens*, except that the underside of the basal third is scarcely less hairy than the upper, and the hairs themselves are everywhere rather shorter. Surface of naked portion below tip rather rougher than in that species.

*Skull* (Pl. XX. figs. 1-3) small and lightly built. Nasals projecting rather more than 3 millim. beyond their junction with the ascending processes of the premaxillæ, the nasal notch therefore deeper than in the allied species; posterior part of nasals but little expanded, flattened, not vaulted above. Interorbital region very markedly concave along its centre, its edges sharply ridged, the outline of these ridges forming a sharp angle with that of the nasals when viewed laterally. Rudimentary postorbital processes present, and the corresponding projections on the malar bones unusually well developed. Anterior palatine foramina extending to past the level of the canines. Posterior palate with numerous minute vacuities. Bullæ small, scarcely swollen at all.

*Teeth* remarkably reduced, both in size and number. Upper  $i^1$  thick, about three times the height of  $i^2$ ;  $i^2$  very small;  $i^3$  entirely absent. Canine minute, situated a very considerable distance behind the incisors.  $P^1$  absent;  $p^3$  small, oval in outline;  $p^4$  about

\* Judging from one specimen only of each.

three times the size of p.<sup>3</sup> in section, its outline triangular. Molars small and narrow. Lower i.<sup>1</sup> slender; diastema between it and p.<sup>4</sup> shorter than in *Ps. canescens*, and (in the typical and only known skull) a minute intermediate tooth present on one side only of the jaw; p.<sup>4</sup> narrow, tricuspid, nearly 3 millim. in length; lower molars as usual.

*Dimensions.*

	♂. a (skin). Adult. millim.	♀. b (in spirit). Adult. millim.
Head and body . . . . . (c.)	280	(c.) 225
Tail . . . . .	230	152
Lower leg . . . . . (c.)	60	44
Hind foot . . . . .	30	28
Ear . . . . . (c.)	13	..

Skull, see next page.

*Hab.* S.E. New Guinea (Sogere).

*Type* in collection.

This very handsome species, the smallest of the genus, is the only one that has as yet been discovered anywhere in New Guinea except in the north-west. While agreeing very closely with *Ps. canescens* in many of its characters, and forming, with that species and *Ps. schlegeli*, a very well-defined section of the genus, it yet differs remarkably from all in the total suppression of its posterior incisors and anterior premolars. Most unfortunately, the second specimen received from Mr. Forbes (specimen *b*) has had its head entirely destroyed by shot, and therefore no information can be gained from it as to the constancy with which these teeth are absent in the species.

a. { Ad. sk. } ♂, 2/86.	Sogere, S.E. New Guinea, 2000 feet.	H. O. Forbes, Esq. [C.]
{ Skull. }		(Type of species.)
b. Ad. al., ♀ & yg., 19/10/85.	Sogere, 1750 feet.	H. O. Forbes, Esq. [P. & C.].

## 10. TRICHOSURUS.

*Trichosurus*, *Less. Dict. Class. d' H. N.* xiii. p. 333 (1828) *Type.* T. vulpecula.  
*Psilogrammurus*, *Gloger, Handb. Naturg.* p. 85 (1842) . . T. vulpecula.  
*Trichurus*\*, *Wagn. Schr. Säug. Supp.* iii. p. 74 (1843) . . T. vulpecula.

Size large. Fur close and woolly. Ears medium or short, more or less hairy behind. Flanks without a flying-membrane. Fore toes subequal, their lengths in the following order—4, 3, 2, 5, 1. Claws large and strong. Palms naked, with large rounded and

\* This, the natural form of the word, from *θριξ*, is preoccupied among Lepidoptera (Hübner, 1816), but if the derivation be taken as from *τριχωσις*, the generic name may be left as Lesson originally formed it.

*Skull Dimensions of Petauroides and Pseudochirus.*

	<i>Petauroides</i>		<i>Pseudochirus</i>									
	<i>volans</i> , var. <i>typicus</i> , ♂. f. adult.	<i>volans</i> , var. <i>minor</i> , ♂. a. adult.	<i>temurooides</i> , ♀. (†) adult.	<i>kerbert- ensis</i> , ♀. Co-type, adult.	<i>peregrin- us</i> , ♀. l. adult.	<i>occiden- talis</i> , ♀. e. adult.	<i>cooki</i> , ... m. adult.	<i>archeri</i> , ♂. (†) adult.	<i>albertsi</i> , ♂. a. adult.	<i>schlegeli</i> , ♂. Type. adult.	<i>canescens</i> , ♀. Type †. adult.	<i>forbesi</i> , ♂. a. adult.
Species .....												
Sex .....												
Specimen .....												
Age .....												
Basal length .....	56	50	51.3	66	60	(c.) 64	65	62	(c.) 51	50.4	47.7	
Greatest breadth .....	38	36	37.5	37	37.5	38	39.5	41	30	31.2	30	
Nasals, length .....	16.5	14	14	27	23.1	27	28.4	(c.) 20	16	18.5	17.7	
" greatest breadth .....	11.1	9.6	...	10	9.2	11.7	12.7	11	7.1	8.1	8	
" least breadth .....	6.7	6.5	...	4.1	5.3	6.6	7.8	5	4	4.2	4.5	
Constriction, breadth .....	8.8	6.7	7.2	7.2	6	7.4	7.5	7.1	5.5	7	5.5	
Palate, length .....	32	29.3	29.2	38.5	34	37.5	38.8	35	27	28	26.7	
" breadth outside m. <sup>2</sup> .....	18	16.2	18	18.5	18.6	20	20	18	14.7	14.6	14.3	
" " inside m. <sup>2</sup> .....	11.5	10.8	11.2	12.7	11.9	12.5	12.7	12.4	9.9	10	9.7	
Palatal foramen .....	5	6.3	...	6.2	6.5	6.8	7.5	(c.) 4.7	4.2	4.2	5	
Basiscranial axis .....	20.5	18.4	...	23.5	22.5	...	23.7	21.4	20	19	17.7	
Basifacial axis .....	35.7	31.8	...	42.7	37.6	...	41.5	40.7	31	31.4	30	
Facial index .....	17.4	17.2	...	182	167	...	175	190	155	165	169	
Teeth—horizontal length of i. <sup>2</sup> .....	2.3	1.6	(c.) 1.3	1.6	1.8	1.9	2	(c.) 3	...	1.5*	1.2	
" height of canine .....	1.8	1.2	(c.) 2	2	2.3	2.6	2.2	(c.) 1.8	...	1.4*	1	
" length of p. <sup>4</sup> .....	3	2.6	(c.) 2.8	3.1	3.1	3.5	3.5	(c.) 4.4	...	2.4*	2.4	
" length of ms. <sup>1-3</sup> .....	11.8	10.6	12	11.2	12.5	13.1	13.3	(c.) 14	10	8.5	8.8	
" diastema between i. <sup>3</sup> and c. <sup>1</sup> .....	2.1	1.8	1.5	4.2	1.6	1.9	2	nil.	1.7	2.7*	...	
" " c. and p. <sup>1</sup> .....	1.3	1.7	1.2	2.6	1.6	1.7	2.2	0.8	1.4	1.9*	...	
" " p. <sup>2</sup> and p. <sup>3</sup> .....	1	1	0.9	1	0.9	1	0.5	nil.	...	0.6*	...	
" length of lower i. <sup>1</sup> .....	9.5	8.7	(c.) 6.5	10	9.5	9	9	(c.) 7.5	8	6.4*	6.8	

† Taken from casts of the typical skulls, and not therefore to be trusted in minute details.

‡ The tooth measurements marked with an asterisk were taken from the Genoa-Museum specimen.

§ Between i.<sup>2</sup> and c. 4.2; between c. and p.<sup>2</sup>.

striated pads; soles thickly hairy under the heels; the rest naked, with low rounded pads, not sharply defined. Tail thick, evenly bushy to its end, not tapering, its terminal third or half with a naked line beneath; its extreme tip naked all round. A gland present on the chest.

*Skull* stout and heavily built. Nasal notch shallow. Forehead flattened. Supraorbital edges ridged, not inflated. Palate imperfect. Bullæ low and flattened, scarcely inflated. Base of masseteric fossa with no trace of an opening into the inferior canal.

*Dentition*:—I.  $\frac{1.2.3}{1.2.0}$ , C.  $\frac{1}{0}$ , P.  $\frac{1^*.0.0.4}{0.0.3^{**}.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4}$  = (at most)  $16 + 2 \times 2 = 36$ .

Upper incisors very uniform in length;  $i^1$  exceeding the others at most by about a millimetre, its anterior surface flattened; its inner terminal corner touching that of its fellow of the other side. Canine situated some way from the back of  $i^3$ , emerging from the bone partly or even wholly in front of the premaxillo-maxillary suture; its length generally less than, at most barely equalling, that of  $i^3$ .  $P^1$  present or absent; if present, sufficiently large to be functional;  $p^3$  wholly absent;  $p^4$  large, obliquely set, its anterior end turned outwards, its cutting-edge indistinctly ridged, as in the *Macropodidæ*, but these ridges only visible when the tooth is unworn. Molars quadricuspid, the cusps tending to form transverse ridges. Lower anterior incisors large, less spatulate and less horizontal than in the previous genera.  $I^2$  proportionally larger than usual, and apparently always persistent; other intermediate teeth generally altogether absent, sometimes represented by a single minute one (probably  $p^3$ ).  $P^4$  large, obliquely placed, and ridged, not dissimilar to that of *Hypsiprymnodon*. Molars similar in character to those in the upper jaw.

*Range*. Australia and Tasmania.

This genus, while widely different from *Pseudochirus* in its cranial and dental characters, is yet not easily definable externally. Its fore feet, however, appear to be of more normal construction than in that genus, its tail is more densely haired terminally, although in this character it is approached by *Pseudochirus lemuroides*, and, in most specimens, the discoloration of the fur caused by the chest-gland forms an easy method of recognizing its members.

### *Synopsis of the Species.*

#### I. EXTERNAL CHARACTERS.

- A. Ears long and narrow, much longer than broad . . . . . 1. *T. vulpecula*, p. 187.  
 B. Ears short and rounded, not so long as broad . . . . . 2. *T. caninus*, p. 191.

## II. CRANIAL CHARACTERS.

- A. Size small, ms. 1-3 less than  
 14.5 millim. . . . . 1 a. *T. vulpecula* (*typicus*), p. 187.
- B. Size large, ms. 1-3 more than }  
 14.5 millim. . . . . } 1 b. *T. vulpecula* (var. *fuliginosus*),  
 2. *T. caninus*, p. 191. [p. 190.]

1. *Trichosurus vulpecula*\*.a. *Trichosurus vulpecula*, var. *typicus*.

- Vulpine Opossum, *Phillips, Voy. Bot. Bay*, p. 150, pl. xvi. (animal) (1789).
- Didelphis vulpecula*, *Kerr, Linn. An. K.* p. 198 (1792); *Turt. Linn. S. N.* i. p. 68 (1806).
- Didelphis vulpina*, *Meyer, Uebers. Zool. Entd. Neuholl.* p. 23 (1793); *Shaw, Gen. Zool.* i. pt. ii. p. 503 (1800); *Bechst. Uebers. vierf. Thiere*, ii. pp. 348 & 685 (1800).
- Didelphis tapouaru*, *Meyer, Uebers. Zool. Entd. Neuholl.* p. 24 (1793).
- Didelphis lemurina*, *Shaw, Gen. Zool.* i. pt. ii. p. 487, pl. cx. (animal) (1800).
- Ursus novæ-hollandiæ*, *Bechst. Uebers. vierf. Thiere*, ii. pp. 337 & 683 (1800).
- Phalangista lemurina*, *G. Cuv. R. A.* i. p. 179 (1817).
- Phalangista vulpina*, *Desm. N. Dict. d'H. N.* (2) xxv. p. 475 (1817); *id. Mamm.* i. p. 267 (1820); *Schinz, Cuv. Thierr.* i. p. 258 (1821); *F. Cuv. Dict. Sci. Nat.* xxxix. p. 414 (1826); *Gray, Griff. Cuv. An. K.* iii. p. 41, pl. (animal); v. p. 197 (1827); *Temm. Mon. Mamm.* i. p. 5 (1827); *Less. Man. Mamm.* p. 218 (1827); *J. B. Fisch. Syn. Mamm.* p. 277 (1829); *Less. H. N. Mamm. (Compl. Buff.)* iv. p. 475 (1830); *Martin, P. Z. S.* 1836, p. 2 (anat.); *Waterh. Cat. Mamm. Mus. Z. S.* p. 67 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 265, pl. xxiii. (animal) (1841); *Gray, Grey's Austr., App.* ii. p. 401 (1841); *Less. N. Tabl. R. A., Mamm.* p. 188 (1842); *Gray, List Mamm. B. M.* p. 86 (1843); *Wagn. Schr. Säug. Supp.* iii. p. 74 (1843), v. p. 269 (1855); *Schinz, Syn. Mamm.* i. p. 526 (1844); *Owen, Odontogr. Atl.* pl. c. fig. 1 (teeth) (1845); *Gieb. Odontogr.* p. 42, pl. xviii. figs. 8 & 11 (teeth) (1855); *Gould, Mamm. Austr.* i. pl. xvi. (animal) (1856); *Gieb. Säug.* p. 697 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 122 (1862); *Krefft, Cat. Mamm. Austr. Mus.* p. 37 (1864); *Gieb. Z. ges. Nat.* xxvii. p. 392 (1866); *Flow. Phil. Trans.* 1867, p. 634, pl. xxix. figs. 5 & 6 (tooth-change); *Krefft, Notes Faun. Tasm.* p. 4 (1868); *id. Mamm. Austr.* pl. viii. (animal) (1871); *Schleg. Dierent.* p. 165 (1872); *Tauber, Naturh. Tidsskr.* (3) viii. p. 163, pl. xi. fig. 6 (tooth-change) (1872); *Gulliver, P. Z. S.* 1875, p. 491; *Brehm, Thierl.* ii. p. 577 (1880); *Dobs. J. Anat. Phys.* xvii. p. 151 (1882); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 701 (1884); *De Vis, P. Linn. Soc. N. S. W.* (2) i. p. 1129 (1887).
- Phalangista cooki*, *F. Cuv. (nec Desm.) H. N. Mamm. (fol.)* iii. livr. xlv. (animal) (1824).
- Phalanger de Bougainville*, *G. Cuv. R. A.* (ed. 2) i. p. 183 (1829).
- Phalangista bougainvillei*, *J. B. Fisch. Syn. Mamm.* p. 583 (mis-

\* a. Size smaller. Continental.....Var. *typicus*.b. Size larger. Tasmanian. ....Var. *fuliginosus*, p. 190.

- printed 383) (1829); *Less. N. Tabl. R. A., Mamm.* p. 188 (1842); *Wagn. Schr. Säug. Supp.* iii. p. 82 (1843).
- Phalangista (*Trichosurus*) *vulpina*, *Less. Dict. Class. d'H. N.* xiii. p. 335 (1828); *Waterh. N. H. Mamm.* i. p. 284, pl. ix. fig. 1 (animal) & xix. fig. 1 (skull) (1846).
- Balantia vulpina*, *Wagl. Syst. Amph. Säug.* p. 25 (1830).
- Phalangista *xanthopus*, *Ogülb. P. Z. S.* 1831, p. 135; *Waterh. Cat. Mamm. Mus. Z. S.* p. 67 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 269 (1841); *Gray, Grey's Austr., App.* ii. p. 401 (1841); *Wagn. Schr. Säug. Supp.* iii. p. 77 (1843); *Schinz, Syn. Mamm.* i. p. 529 (1844); *Waterh. N. H. Mamm.* i. p. 294 (1846).
- Balantia bougainvillei*, *Kaup, Thierr.* i. p. 240 (1835).
- Phalangista *cuvieri*, *Gray, Grey's Austr., App.* ii. p. 401 (1841); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 268 (1841); *Gray, List Mamm. B. M.* p. 86 (1843).
- Trichosurus xanthopus*, *Less. N. Tabl. R. A., Mamm.* p. 189 (1842).
- Phalangista *melanura*, *Wagn. Schr. Säug. Supp.* iii. p. 81 (1843).
- Trichosurus vulpinus*, *Gerv. H. N. Mamm.* ii. p. 275 (1855).
- Phalangista *hypoleucus*, *Wagn. Schr. Säug. Supp.* v. p. 273, pl. xxii. (animal) (1855).
- Phalangista *vulpecula*, *Thos. Ann. Mag. N. H.* (5) iv. p. 397 (1879); *id. Encycl. Brit.* (9) xviii. p. 728 (1885); *Coll. Zool. Jahrb.* ii. p. 910 (1887).
- Trichosurus vulpecula*, *Jent. Notes Leyd. Mus.* vii. p. 21 (1884); *id. Cat. Ost. Leyd. Mus.* p. 314 (1887).

#### COMMON PHALANGER.

Size comparatively small in the present, larger in the Tasmanian variety (see p. 190).

Fur close, thick and woolly. General colour clear grizzled grey. Face pale grey, darker round the eyes and on the sides of the snout. Ears long and narrow, tapering towards their tips, nearly naked inside and terminally outside; proximal portion outside anteriorly brown, posteriorly white. Whole of back and sides uniform grizzled grey, sometimes markedly suffused with rufous, especially on the forequarters. Chin more or less blackish; throat, chest, and belly white or dirty yellow, the hairs generally grey basally; a longitudinal patch on the centre of the chest deep rusty red in old specimens, more pronounced in males than in females, and, presumably, indicating the presence of a sternal gland. Outer sides of limbs like back, inner sides like belly. Hands and feet white, grey, or brown. Tail thick, cylindrical, bushy, its terminal half or two thirds grey, its end black, the extreme tip occasionally white, especially in West-Australian specimens; naked part below tip extending for from three to six inches, its surface transversely wrinkled, not shagreened.

*Skull* smaller and lighter than in the Tasmanian variety or in *T. caninus*. Nasals smoothly convex above. Interorbital region narrow, concave along its centre, its edges sharply ridged. Anterior palatine foramina running back to the level of the middle of the canines. Posterior palatal vacuities extending from the back of m.<sup>1</sup>

nearly to the hinder edge of the palate, only bounded behind by a narrow transverse strip of bone.

*Teeth* as described above. P.<sup>1</sup> when present placed about equidistant from the canine and from p.<sup>4</sup>, cylindrical, pointed, from one half to three fourths the height of the canine, but frequently altogether absent. P.<sup>4</sup>, comparatively light and delicate, its diameter at right angles to its longer axis about 3 or 3.2 millim. Lower i.<sup>2</sup> oval in section, persistent, sometimes set back some little way from i.<sup>1</sup> P.<sup>4</sup> narrow, sharp-edged.

*Dimensions.*

	♂. g (skin). Adult. millim.	♀. s (stuffed). Adult. millim.
Head and body .....	450	450
Tail .....	(c.) 270	270
Lower leg .....	95	93
Hind foot .....	58	54
Ear .....	42	49

Skull, see p. 208.

*Hab.* The whole of Australia, with the exception of the Cape York Peninsula.

*Type* not in existence.

a, b. { Ad. st. } ♂ ♀.	Port Essington, Northern Territory.	Gould Coll.
c. { Ad. sk. } ♂.	Port Essington, N. T.	Gould Coll.
d. Skull.	Port Essington, N. T.	Gould Coll.
e. Imm. sk., ♂, 21/2/56.	(North Australian Expedition.)	Dr. J. R. Elsey [P. & C.].
f, g. { Ad. sks. } { Skull of f. }	Port Darwin, N. T.	R. G. S. Buck- land, Esq. [C.].
h, i. Ad. st., ♂ ♀.	Namoi R., N. S. W. (J. G.).	Gould Coll.
j, k. Ad. & yg. sks., ♂.	Yarrundi, N. S. W. (J. G.).	Gould Coll.
l. Fœtus, ♂ (about 60 millim. long).	New South Wales.	J. Brenchley, Esq. [P.].
m. Fœtus, ♂ (about 22 millim. long).	New England, N. S. W.	G. E. Adlard, Esq. [P. & C.].
n. Ad. sk.	Adelaide.	C. D. E. Fortnum, Esq. [P. & C.].
o. { Ad. sk. } ♀.	South Australia.	Sir G. Grey [P. & C.].
p. { Imm. st. } { Skull. }	South Australia.	Sir G. Grey [P. & C.].
q. { Ad. sk. } ♂.	Kangaroo Id., S. A.	Gould Coll.
r. Ad. sk., ♂.	King George's Sound, W. A. (J. Gilbert).	Gould Coll.

s. Ad. st., ♀, 11/39.	Perth, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
t. Ad. sk., ♂, 9/85.	Perth, W. A.	Govt. of Western Australia [P.].
u. } Ad. sk. { ♂, 24/9/42.	Moore's R., W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
v. Ad. st., ♀, 9/6/39.	Northam, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
w. Yg. sk.	Toodyay, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
x. Skull.	Point Leschenault, W. A.	W. E. Bates, Esq. [P.].
y. Ad. sk., ♂.	Western Australia.	Purchased.
z. } Ad. sk. { ♂.		Purchased.
a'. Skeleton.		Purchased.

**b. *Trichosurus vulpecula*, var. *fuliginosus*.**

*Phalangista fuliginosa*, *Ogib. P. Z. S.* 1831, p. 135; *Gunn, Ann. Mag. N. H.* i. p. 102 (1838); *Waterh. Cat. Mamm. Mus. Z. S.* p. 67 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 267 (1841); *Gray, Grey's Austr., App.* ii. p. 401 (1841); *Less. N. Tabl. R. A., Mamm.* p. 188 (1842); *Gray, List Mamm. B. M.* p. 85 (1843); *Wagn. Schr. Säug. Supp.* iii. p. 77 (1843); *Schinz, Syn. Mamm.* i. p. 527 (1844); *Gould, Mamm. Austr.* i. pl. xv. (animal) (1849); *Gunn, P. Roy. Soc. Tasm.* ii. p. 83 (1852); *Gerrard, Cat. Bones Mamm. B. M.* p. 121 (1862); *Krefft, Cat. Mamm. Austr. Mus.* p. 38 (1864); *id. Notes Faun. Tasm.* p. 4 (1868); *id. Mamm. Austr.* pl. ix. (animal) (1871).

*Phalangista fuliginosa*, var. *grisea*, *Gray, Grey's Austr., App.* ii. p. 401 (1841).

*Phalangista felina*, *Wagn. Schr. Säug. Supp.* iii. p. 76 (1843), v. p. 270 (1855); *Schinz, Syn. Mamm.* i. p. 527 (1844).

**TASMANIAN PHALANGER.**

Size markedly larger and form stouter and heavier than in the typical variety. Fur longer and thicker. General colour all over either a grey like that of the Continental form, but darker and more suffused with rufous, or a deep umber-brown tinged with rufous, paler on the forequarters, sides and below, darker along the posterior back. Ears with little or no white on the posterior part of their hinder surfaces. Tail very thick and bushy, nearly wholly black.

*Skull* only differing from that of the typical form by its greater size, and, in correlation with this, by its larger and earlier developed crests and ridges.

*Teeth.* Upper p.<sup>4</sup> broad and stout, its diameter, at right angles to its long axis, generally attaining 4 millim. Molars large, the combined lengths of the three anterior 15 or 16 millim.

*Dimensions.*

	♂.	♀.
	<i>f</i> (stuffed).	<i>h</i> (stuffed).
	Adult.	Adult.
	millim.	millim.
Head and body . . . . .	580	615
Tail . . . . .	380	370
Lower leg . . . . .	(c.) 104	(c.) 110
Hind foot . . . . .	71	75
Ear . . . . .	50	50

Skull, see p. 208.

*Hab.* Tasmania.

*Type* in collection.

<i>a.</i> Ad. st.	Launceston, Tasmania.	Ronald Gunn, Esq. [P. & C.].
<i>b.</i> Ad. sk.	Launceston.	Ronald Gunn, Esq. [P. & C.].
<i>c.</i> { Ad. sk. } { Skull. }	(*)	Zool. Soc. ( <i>Type</i> of variety.)
<i>d.</i> Yg. st.	Hobart Town ( <i>J. G.</i> ).	Gould Coll.
<i>e.</i> Yg. sk., 7/11/38.	Hobart Town ( <i>J. G.</i> ).	Gould Coll.
<i>f, g.</i> Ad. st., ♂.	Tasmania ( <i>J. G.</i> ).	Gould Coll.
<i>h.</i> Ad. st., ♀.	Circular Head, Tasmania ( <i>J. G.</i> ).	Gould Coll.
	( <i>Type</i> of <i>Ph. fuliginosa</i> , var. <i>grisea</i> , Gray.)	
<i>i-l.</i> { Ad. sks. } { Skull of <i>l.</i> }	♂. Tasmania ( <i>J. G.</i> ).	Gould Coll.
<i>m.</i> Ad. sk.	Tasmania.	Capt. Ross [P.].
<i>n.</i> Ad. sk.	Tasmania.	Purchased.
<i>o.</i> Ad. st. (albino).	Tasmania.	Purchased.
<i>p.</i> Ad. sk. (albino).		Purchased.
<i>q.</i> { Ad. sk. } { Skull. }		Purchased.
<i>r, s.</i> Skeletons.		Purchased.
<i>t.</i> Skull.		Zool. Soc.

2. *Trichosurus caninus*.

*Phalangista canina*, *Ogilb. P. Z. S.* 1835, p. 191; *Waterh. Cat. Mamm. Mus. Z. S.* p. 67 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 271 (1841); *Gray, Grey's Austr., App.* ii. p. 401 (1841); *id. List Mamm. B. M.* p. 85 (1843); *Wagn. Schr. Säug. Supp.* iii. p. 78 (1843), v. p. 274 (1855); *Schinz, Syn. Mamm.* i. p. 528 (1844); *Waterh. N. H. Mamm.* i. p. 296 (1846); *Gould, Mamm. Austr.* i. pl. xvii. (animal) (1856); *Gieb. Säug.* p. 698 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 122 (1862); *Kreffft, Cat. Mamm. Austr. Mus.* p. 38 (1864); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 704 (1884).

## SHORT-EARED PHALANGER.

\* Originally recorded as from Sydney, but no similar specimens having ever been found on the Continent, this locality is no doubt erroneous.

General appearance very similar to that of *T. vulpecula*, var. *fuliginosus*. Fur comparatively short, very thick and woolly. Colour dark grey or deep umber-brown, the two styles of coloration closely corresponding to those found in the Tasmanian Phalanger. Muzzle short and blunt. Ears quite short, evenly rounded, barely half the length of those of equally large specimens of *T. vulpecula*. Other external characters as in the Tasmanian variety of the common species.

*Skull* broad and stout, with a short heavy muzzle. Nasals short, less expanded behind than is usual in *T. vulpecula*. Supraorbital edges sharply ridged. Bullæ very slightly inflated, opaque.

*Teeth.* Incisors and canines as in the last species. P.<sup>1</sup> present or absent, if present about half the size of the canine; p.<sup>4</sup> generally shorter in proportion to its breadth than in *T. vulpecula*. Molars also shorter and more square, their longitudinal exceeding their transverse diameters markedly less than in that species. Lower teeth as usual.

*Dimensions.*

	♂.	♀.
	c (skin).	a (skin).
	Adult.	Adult.
	millim.	millim.
Head and body .....	550	515
Tail .....	350	370
Lower leg.....(c.)	105	(c.) 108
Hind foot .....	71	72
Ear .....	23	25

Skull, see p. 208.

*Hab.* S. Queensland and New South Wales.

*Type* in collection.

This species is certainly very closely allied to the previous one, and, curiously enough, to the Tasmanian form of that species, but the marked difference in the size of the ears necessitates its recognition as a distinct species. Mr. De Vis is kind enough to inform me that it is looked upon in Queensland as quite a different animal from *T. vulpecula*, and that it inhabits the "scrub" only, never being found in the open forest with that species.

a.	{ Ad. sk. }	♀.	Richmond R., N. S. W.	Gould Coll.
	{ Skull. }		(J. G.).	
b.	{ Ad. sk. }		Liverpool Plains, N. S. W.	Gould Coll.
	{ Skull. }		(J. G.).	
c.	{ Ad. sk. }	♂.	Hunter R., N. S. W. (C.	Zool. Soc. (Gould Coll.).
	{ Skull. }		Coven).	(Type of species.)

## 11. PHALANGER.

	Type.
Phalanger, <i>Storr, Prodr. Meth. Mamm.</i> p. 33 (1780) ..	Ph. orientalis.
Phalangista, <i>E. Geoff. Bull. Soc. Philom.</i> i. p. 106 (1796) .....	Ph. orientalis.
Coescoes, <i>Lacép. Mém. Inst.</i> iii. p. 491 (1801) .....	Ph. orientalis.
Balantia, <i>Ill. Prodr. Syst. Mamm.</i> p. 77 (1811) .....	Ph. orientalis.
Sipalus, <i>G. Fisch. Zoogn.</i> ii. p. 581 (1813) .....	Ph. orientalis.
Cuscus (emend.), <i>Less. Voy. Coquille, Zool.</i> p. 150 (1826)	Ph. orientalis.
Ceonyx, <i>Temm. Mon. Mamm.</i> i. p. 10 (1827) ( <i>nom.</i> <i>prov.</i> ) .....	Ph. ursinus.
Ailurops, <i>Wagl. Syst. Amph. Säug.</i> p. 26 (1830) ....	Ph. ursinus.
Eucuscus ( <i>subg.</i> ), <i>Gray, P. Z. S.</i> 1861, p. 316 .....	Ph. ursinus.
Spilocuscus ( <i>subg.</i> ), <i>id. l. c.</i> .....	Ph. maculatus.
Strigocuscus ( <i>subg.</i> ), <i>id. t. c.</i> p. 319 .....	Ph. celebensis.

Size large or medium, form stout and clumsy. Fur thick and woolly. Ears medium or short, hairy externally and also in some species internally. Flanks without a flying-membrane. Fore toes subequal, their lengths in the following relative order—4, 3, 5, 2, 1. Claws long, stout, and curved. Palms and soles naked, striated, the pads large, low, scarcely defined. Tail strong, its proximal portion furry like the body, its terminal part naked all round, smooth or granulated, coarsely wrinkled, markedly prehensile. Mammæ 4.

*Skull* stout and strong. Muzzle very short and broad. Nasal notch shallow or obsolete. Interorbital region variable. Palate with large posterior vacuities. Bullæ unswollen, opaque. No opening from masseteric fossa into inferior dental canal.

*Dentition* (generally):—I.  $\frac{1.2.3^*}{1.2.0}$ , C.  $\frac{1}{0}$ , P.  $\frac{1.0.3^*.4}{1^*.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4}$   
= 16 + 4 × 2 = 40.

Upper  $i^1$  nearly circular in section, not, or little, flattened in front. Canine either closely touching  $i^3$ , or, at most, projecting from the bone about a millimetre behind it; situated partly in front of the premaxillo-maxillary suture; its length always exceeding that of  $i^2$ , nearly invariably that of  $i^1$ , and often in old individuals twice that of the latter tooth.  $P^1$  well-developed, double-rooted in *Ph. ursinus*, single-rooted, as in all the allied genera, in the other species.  $P^3$  minute, single-rooted, often absent altogether.  $P^4$  large and broad, obliquely placed, with a sharp laterally grooved cutting-edge. Molars quadricuspid, the pairs of cusps more or less united, and so forming, on each tooth, two indistinct transverse ridges. Lower  $i^1$  thick and strong; minute intermediate teeth ranging from 0 to five in number, usually two (presumably  $i^2$  and  $p^3$ ) in *Ph. ursinus*, *maculatus*, and *celebensis*, and three (probably  $i^2$ ,  $p^1$ , and  $p^3$ ) in *Ph. orientalis* and *ornatus*.  $P^4$  with an oblique cutting-edge, produced anteriorly into a high pointed cusp, considerably higher than the molars. Molars with distinct transverse ridges.

Tooth-change well developed, the milk  $p^4$  large and long-persistent.

*Range.* Austro-Malayan subregion, from Celebes to North Queensland.

An excellent monograph\* of the present genus has been written by Dr. F. A. Jentink, of the Leyden Museum. This author, basing his work on the magnificent series there preserved, has made many new and important observations on the distribution, sexual characters, and the variability in size, colour, and dentition of the species. His careful record of the individual variations in the numbers and situations of the premolars has been of special service to me in my efforts to unravel their complicated homologies. On one point only I am constrained to differ from him, namely, as to the distinctness of *Ph. ornatus*, united by him with *Ph. orientalis*, but which, having due regard both to the Leyden series and our own, I feel should be admitted as a separate species.

### Synopsis of the Species.

#### I. EXTERNAL CHARACTERS.

- A. Ears thickly furry internally as well as externally.
- a. Base of tail like body. Sexes alike. General colour dark brown or black. Ears white . . . 1. *Ph. ursinus*, p. 195.
- b. Base of tail yellow. Sexes usually different.
- |   |                                      |
|---|--------------------------------------|
| <p>{ Males, and Wai-giu females, spotted with red, yellow, black, and white.</p> <p>{ Other females hoary grey or black, with a paler head and rump. Belly pale yellow, edged with black.</p> | } 2. <i>Ph. maculatus</i> , [p. 197. |
|---|--------------------------------------|
- B. Ears nearly or quite naked internally.
- c. Back more or less white-spotted. Dorsal line distinct. Males becoming, in old age, brilliantly rufous on the forequarters, neck, and belly.—*Hab.* Gilolo group . . . 4. *Ph. ornatus*, p. 205.
- d. Back not spotted. Males only occasionally rufous below neck.
- |  |   |
|--|---|
| <p>a<sup>1</sup>. Dorsal line distinct, except in albinos, and, occasionally, in var. <i>breviceps</i>.—<i>Hab.</i> Timor and Bouru to Solomon Is. . . . .</p> <p>b<sup>1</sup>. Dorsal line absent.—<i>Hab.</i> Sanghir and Celebes . . . . .</p> | <p>3. <i>Ph. orientalis</i>, [p. 201.</p> <p>5. <i>Ph. celebensis</i>, [p. 206.</p> |
|--|---|

#### II. CRANIAL CHARACTERS.

- A. Supraorbital edges smooth, not ridged. Teeth large, ms.<sup>1-3</sup> 18 millim. or more. Lower intermediate teeth usually two.
- a. Interorbital region not or little convex upwards. I.<sup>3</sup> as large in section as i.<sup>2</sup>, and but little shorter than the canine, which is more or less separated from it. . . 1. *Ph. ursinus*, p. 195.

\* Notes Leyd. Mus. vii. p. 87 (1885).

- b. Interorbital region very convex upwards.  $i^3$  much smaller in section than  $i^2$ , and much shorter than the canine, which is closely pressed against it . . . . . 2. *Ph. maculatus*, p. 197.
- B. Supraorbital edges sharply ridged. Teeth small,  $ms^{1-3}$  less than, or barely, 16.5 millim.
- c. Canine long, its tip reaching much beyond a line drawn from the tip of  $i^1$  to that of  $p^4$ , closely pressed against  $i^3$ . Nasal notch very shallow. Lower intermediate teeth usually three . . . . . 3. *Ph. orientalis*, p. 201.
- d. Canine short, not or scarcely exceeding  $i^1$  and  $p^4$  in height, more or less separated from  $i^3$ .
- a<sup>1</sup>. Canine touching  $i^3$  basally, although separated distally; nasal notch deep. . . . . 4. *Ph. ornatus*, p. 205.
- b<sup>1</sup>. Canine altogether separated from  $i^3$ ; nasal notch shallow. . . . . 5. *Ph. celebensis*, p. 206.

1. *Phalanger ursinus*.

*Phalangista ursina*, *Temm. Mon. Mamm.* i. p. 10, pl. i. figs. 1-3, and pl. ii. figs. 1-5 (skull) ("1827" \*); *F. Cuv. Dict. Sci. Nat.* xxxix. p. 415 (1826); *Gray, Griff. Cuv. An. K.* v. p. 197 (1827); *J. B. Fisch. Syn. Mamm.* p. 275 (1829); *Less. H. N. Mamm. (Compl. Buff.)* iv. p. 460 (1830); *Wagn. Schr. Säug. Supp.* iii. p. 69 (1843), v. p. 268 (1855); *Schinz, Syn. Mamm.* i. p. 523 (1844); *Gieb. Säug.* p. 695 (1859); *Schleg. Dierent.* p. 165 (1872); *Jent. Notes Leyd. Mus.* v. p. 181 (1883).

*Cuscus ursinus*, *Less. Man. Mamm.* p. 219 (1827); *id. Dict. Class. d'H. N.* xiii. p. 332 (1828); *id. Cent. Zool.* p. 40, pl. x. (animal and skull) (1830); *id. N. Tabl. R. A., Mamm.* p. 188 (1842); *Gray, P. Z. S.* 1858, p. 103; *Gerrard, Cat. Bones Mamm. B. M.* p. 122 (1862); *Jent. Notes Leyd. Mus.* vii. p. 118 (1885); *id. Cat. Ost. Leyd. Mus.* p. 313 (1887).

*Ailurops ursina*, *Wagl. Syst. Amph. Säug.* p. 26 (1830).

*Balantia ursina*, *Kaup, Thierr.* i. p. 240 (1835).

*Phalangista (Cuscus) ursina*, *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 259 (1841); *id. N. H. Mamm.* i. p. 267 (1846).

*Cuscus (Eucuscus) ursinus*, *Gray, P. Z. S.* 1861, p. 316.

## BLACK CUSCUS.

Fur coarse and harsh. General colour dark brown or black. Rhinarium naked, the naked part running upwards and backwards in a wedge-shaped form on the top of the muzzle almost or quite to the level of the anterior canthus of the eye. Face blackish, but the tips of the hairs, especially on the cheeks and snout, tipped with dirty white; a whitish patch round each eye. Ears rounded, projecting but little from the fur, their surfaces both outside and inside

\* The first part of this work, although dated 1827, must have appeared at least as early as 1826, as it is quoted in that year both by Frédéric Cuvier and Prince Maximilian von Wied.

thickly covered with short coarse hairs; those inside and along the margins dirty white; those at the back black. Nape and back dark brown or, generally, black, the centre line slightly darker than the rest. Hairs of sides, posterior back, and hairy part of tail prominently grizzled with dirty white. Chin, chest, and belly greyish, the hairs black basally, dirty yellowish white terminally. Arms and legs black; fingers and toes naked above, the hairs of the limbs ceasing generally on the metacarpus and metatarsus, their skin also black, coarsely granulated. Palms and soles broadly striated. Tail furry like the body for about half its length, the fur extending on the upper for about two or three inches further than on the lower side.

*Skull* very stout and powerful. Anterior nares broader and lower than in the other species; nasal notch scarcely marked, the anterior edge of the nasal bones passing smoothly into that of the ascending process of the premaxilla. Nasals contracted in the centre, expanded both anteriorly and posteriorly. Interorbital region comparatively broad, smooth above, flat or slightly convex, its edges evenly rounded. Temporal ridges low, thick and rounded. Anterior palatine foramina extending to the level of the back of the canines.

*Teeth.* Upper incisors more uniform in size than in the other species;  $i.^3$  as large in section as, and longer vertically than,  $i.^2$ . Canine more or less separated from  $i.^3$ , not or but slightly longer vertically than that tooth. Anterior premolar narrow, double-rooted, but little separated from the canine in front, and touching  $p.^4$  behind; the latter tooth broadly rounded, rather less powerful than in *Ph. maculatus*. Molars stout and heavy, the three anterior from 19 to 21 millim. in horizontal length. Lower anterior incisors shorter, set rather more upright, and the diastema between them and  $p.^4$  markedly less in extent than in any of the other species. Lower intermediate teeth usually two in number\*.  $P.^4$  oval, much longer than broad, set but little obliquely.

#### Dimensions.

	♀. a (stuffed). Adult. millim.
Head and body .....	650
Tail .....	525
Lower leg .....	(c.) 116
Hind foot .....	104
Ear .....	18

Skull, see p. 208.

*Hab.* Celebes.

*Type* in the Leyden Museum.

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\* Three on the right side in specimen *d*. The Leyden Museum series are all normal.

a.	{ Ad. st. Skeleton (mounted). }	{ ♀.	North Celebes.	Dr. A. B. Meyer [C.].
b.	{ Ad. st. Skull. }	{ ♀.	Celebes.	Purchased.
c.	{ Yg. st. Skull. }	{ ♂.	Celebes.	Purchased.
d.	{ Imm. sk. Skull. }		Celebes.	Zoological Society.

2. *Phalanger maculatus*.

- Phalangista maculata*, *E. Geoff. Cat. Mus.* p. 149 (1803); *Desm. N. Dict. d'H. N.* (2) xxv. p. 472 (1817); *id. Mamm.* i. p. 266 (1820); *Quoy & Gaim. Voy. Uranie, Zool.* p. 59, Atl. pls. vii. (animal, ♂) and viii. (skull) (1824); *F. Cuv. Dict. Sci. Nat.* xxxix. p. 413 (1826); *Temm. Mon. Mamm.* i. p. 14, pl. iii. (skull) (1827); *Gray, Griff. Cuv. An. K.* v. p. 196 (1827); *J. B. Fisch. Syn. Mamm.* p. 275 (1829); *Less. H. N. Mamm. (Compl. Buff.)* iv. p. 456 (1830); *Wagn. Schr. Säug. Supp.* iii. p. 71 (1843), v. p. 269 (1855); *Schinz, Syn. Mamm.* i. p. 524 (1844); *Gerv. H. N. Mamm.* ii. p. 274 (1855); *Gieb. Säug.* p. 696 (1859); *id. Z. ges. Nat.* xxvii. p. 391 (1866); *Schleg. Dierent.* p. 165 (1872).
- Phalangista variegata* (*Oken*), *Schinz, Cuv. Thierr.* i. p. 258 (1821).
- Phalangista papuensis*, *Desm. Mamm. Supp.* ii. p. 541 (1822); *Gray, Griff. Cuv. An. K.* v. p. 196 (1827).
- Phalangista quoy*, *Gaim. Bull. Sci. Nat.* i. p. 271 (1824); *Quoy & Gaim. Voy. Uranie, Zool.* p. 58, Atl. pl. vi. (animal, ♀) (1824); *Less. H. N. Mamm. (Compl. Buff.)* iv. p. 459 (1830).
- Cuscus maculatus*, *Less. & Garn. Voy. Coquille, Zool.* i. p. 150, pl. iv. (animal and skull) (1826); *Less. Man. Mamm.* p. 219 (1827); *id. Dict. Class. d'H. N.* xiii. p. 330 (1828); *id. N. Tabl. R. A., Mamm.* p. 188 (1842); *Gray, Zool. Voy. Samarang, Vert.* p. 32 (1850); *id. P. Z. S.* 1858, pp. 101, 108; *Gerrard, Cat. Bones Mamm. B. M.* p. 122 (1862); *Kreffl, Mamm. Austr.* text to pl. vi. p. 2 (1871); *Rams. P. Linn. Soc. N. S. W.* ii. p. 11 (1878); *Brehm, Thierl.* ii. p. 575 (1880); *Dobs. J. Anat. Phys.* xvii. p. 152 (1882); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 701 (1884); *Jent. Notes Leyd. Mus.* vii. p. 107 (1885); *id. Cat. Ost. Leyd. Mus.* p. 311, pl. xii. figs. 1-4 (skull, different ages) (1887).
- Cuscus macrourus*, *Less. & Garn. Voy. Coquille, Zool.* i. p. 156, Atl. pl. v. (animal, ♀) (1826); *Less. Man. Mamm.* p. 220 (1827); *id. N. Tabl. R. A., Mamm.* p. 188 (1842).
- Phalangista chrysorrhous*, *Temm. Mon. Mamm.* i. p. 12, pl. i. figs. 4-6 (skull) (1827); *F. Cuv. Dict. Sci. Nat.* xxxix. p. 415 (1826); *Gray, Griff. Cuv. An. K.* v. p. 197 (1827); *J. B. Fisch. Syn. Mamm.* p. 276 (1829); *Less. H. N. Mamm. (Compl. Buff.)* iv. p. 461 (1830); *Wagn. Schr. Säug. Supp.* iii. p. 70 (1843), v. p. 268 (1855); *Schinz, Syn. Mamm.* i. p. 423 (1844); *Gieb. Säug.* p. 695 (1859).
- Cuscus quoyi*, *Less. Man. Mamm.* p. 220 (1827); *id. Dict. Class. d'H. N.* xiii. p. 331 (1828); *Gerrard, Cat. Bones Mamm. B. M.* p. 123 (1862).
- Cuscus chrysorrhos*, *Less. Man. Mamm.* p. 220 (1827); *id. Dict. Class. d'H. N.* xiii. p. 332 (1828); *id. N. Tabl. R. A., Mamm.* p. 188 (1842); *Hombr. & Jacq. Voy. Pôle Sud, Zool.* iii. p. 31, Atl. pl. xiii. (animal) (1845-46).
- Phalangista macroura*, *Less. Dict. Class. d'H. N.* xiii. p. 332 (1828);

- J. B. Fisch. Syn. Mamm.* p. 276 (1829); *Less. H. N. Mamm. (Compl. Buff.)* iv. p. 462 (1830); *Wagn. Schr. Säug. Supp.* iii. p. 72 (1843); *Schinz, Syn. Mamm.* i. p. 525 (1844).
- Balantia maculata*, *Kaup, Thierr.* i. p. 241 (1835).
- Phalangista* (*Cuscus*) *chrysoorrhos*, *Waterh. Jurd. Nat. Libr., Mamm.* xi. p. 261 (1841); *id. N. H. Mamm.* i. p. 271 (1846).
- Phalangista* (*Cuscus*) *maculata*, *Waterh. Jurd. Nat. Libr., Mamm.* xi. p. 262 (1841); *id. N. H. Mamm.* i. p. 274 (1846); *Peters & Doria, Ann. Mus. Genov.* xvi. p. 681 (1881).
- Phalangista* (*Pseudocheirus*) *nudicaudata*, *Gould, P. Z. S.* 1849, p. 110.
- Pseudocheirus nudicaudatus*, *Macgillivray, Voy. 'Rattlesnake,'* i. p. 129 (1852).
- Phalangista nudicaudata*, *Wagn. Schr. Säug. Supp.* v. p. 276 (1855); *Gieb. Säug.* p. 699 (1859).
- Cuscus brevicaudatus*, *Gray, P. Z. S.* 1858, p. 102; *Gould, Mamm. Austr.* i. pl. xxi. (animal, ♀) (1860); *Gerrard, Cat. Bones Mamm. B. M.* p. 123 (1862); *Krefft, Mamm. Austr.* text to pl. vii. p. 2 (1871); *Rams. P. Linn. Soc. N. S. W.* ii. p. 12 (1878).
- Cuscus* (*Eucuscus*) *brevicaudatus*, *Gray, P. Z. S.* 1861, p. 316.
- Cuscus* (*Spilocuscus*) *chrysoorrhous and maculatus*, *Gray, P. Z. S.* 1861, pp. 317, 318.
- Cuscus maculatus, var. ochropus*, *Gray, P. Z. S.* 1866, p. 220.
- Cuscus chrysoorrhous, var. goldiei*, *Rams. P. Linn. Soc. N. S. W.* i. p. 395 (1877), iii. p. 243 (1879).

## SPOTTED CUSCUS.

Size large; females attaining a greater size than males. Fur soft, thick and woolly. General colour mottled white, black, and red in very various combinations; females generally grey and black, not spotted with white. Top of muzzle above rhinarium thinly hairy, not naked as in *Ph. ursinus*. Ears (Pl. XXI. fig. 2) thickly covered inside and out with soft woolly hairs, similar in character, and usually in colour, to those of the crown. Back and limbs coloured as described below. Belly white, generally tinged with yellow or rufous; in the male passing gradually into the colour of the back, but in the female sharply separated from the dark-coloured flanks, especially on the two sides of the pouch, where a sharp black line runs along the edge of the darker colour. (In an erythristic female specimen, however, the belly is similar to that of the male.) Tail furry like the body for from one half to three fourths its length above, and from one third to one half below, its colour on the furry portion nearly invariably, both in males and females, deep yellow, but sometimes tinged with greyish or white.

The colour of the upper surface and limbs seems to have been originally that only now found in the *female*, viz., a deep hoary grey, paler on the head (where it is sometimes replaced by rufous), forequarters, and limbs; darker, sometimes quite black, across the lumbar region, a darkness that is usually strongly contrasted with the yellow of the base of the tail. In rare cases, however, the female, like the male, is completely affected by erythrisms, the lumbar region and the hands and feet being then deep rufous, and the head, forequarters, sides, and belly very pale rufous white, or

even pure white. Females from the island of Wai-giu, and those alone, are exactly like the strongly spotted and generally semi-erythristic males found in the same island\*.

The *males*, by a striking but essentially simple combination of white spotting with erythrisms, have developed the remarkable series of colour-variations characteristic of the species. The most simple form is that where the male is almost exactly like the ordinary grey female, except that it has a few inconspicuous white spots on the back and sides. These spots may then gradually increase in extent until the animal is nearly wholly white with a few small dark spots upon it. Again, by a greater or less degree of erythrisms, the head alone, the margins of the ears, the feet, the forequarters, or, finally, the whole of the darker-marked parts of the animal, may be deep rufous, the usually white parts either remaining pure white or being also slightly tinged with rufous.

*Skull* large, stout, and heavy. Muzzle broad and stout. Nasals slightly projecting anteriorly, with a shallow but well-marked nasal notch; much expanded behind, their combined posterior edges running backwards in the centre and forming a sharp point between the orbits. Interorbital region narrow in proportion to the size of the skull, very prominently convex upwards, the convexity increasing with the age of the individual, its edges smoothly rounded, not ridged, except posteriorly in old specimens; no trace of postorbital processes. Anterior palatine foramina extending backwards beyond the level of the back of the canines.

*Teeth.* Upper  $i.^1$  and  $i.^2$  about equal in transverse section, the former about twice as long vertically as the latter;  $i.^3$  about equal to  $i.^2$  vertically, but far smaller in section, crushed in between the latter and the canine, and often altogether absent. Canine large and strong, pressed closely against the posterior incisor, and situated so that the premaxillo-maxillary suture descends at about its centre.  $P.^1$  long, conical, single-rooted, about as high vertically as  $p.^4$ ;  $p.^3$  generally absent, if present quite minute;  $p.^4$  very large and broad, with a prominent grooved ridge running obliquely along it. Molars stout and heavy, the three anterior varying in length from 18.5 to 23 millim. Lower intermediate teeth usually only two in number ( $i.^2$  and  $p.^3$ );  $p.^4$  and molars large and stout, as in the upper jaw.

*Dimensions.*

	♂.	♀.
	<i>j</i> (stuffed).	<i>b</i> (stuffed).
	Adult.	Adult.
	millim.	millim.
Head and body .....	620	650
Tail .....	480	(c.) 470
Lower leg .....	127	(c.) 128
Hind foot .....	71	70
Ear .....	13	12

Skull, see p. 208.

\* This most remarkable characteristic of the Wai-giu females was first noticed and described by Dr. Jentink in the monograph above referred to.

*Hab.* Austro-Malayan subregion from Saleyer eastwards and southwards to New Guinea and North Australia. Not as yet certainly known from the mainland of Celebes, from the Gilolo group, from any of the Southern Moluccas (Flores, Timor, &c.), or from the New Britain group.

*Type* in the Paris Museum.

a. Yg. sk., ♂.	(Celebes) *	Purchased.
b. Ad. st., ♀.	Moluccas.	Purchased.
c. { Ad. sk. } ♂.	Wai, Amboina.	H. O. Forbes, Esq.
{ Skull. }		[P. & C.].
d, e. Ad. and imm. sks., ♀.	Ceram.	A. R. Wallace, Esq.
		[C.].
f. Ad. sk., ♂.	Banda.	Voy. H.M.S. 'Challenger.'
		Purchased.
g. Ad. st., ♂.	Waigiü.	A. R. Wallace, Esq.
h, i. { Ad. sks. } ♂ ♀.	Waigiü.	[C.].
{ Skulls. }		A. R. Wallace, Esq.
j. { Ad. st. } ♂.	Aru Is.	[C.].
{ Skull. }		A. R. Wallace, Esq.
k. Ad. sk.	Aru Is.	[C.].
		A. R. Wallace, Esq.
l. Imm. al., ♂.	Port Moresby, New Guinea.	K. Broadbent, Esq.
		[C.].
m-o. { Ad. sks. } 2 ♂, 1 ♀.	Port Moresby, New Guinea.	K. Broadbent, Esq.
{ Skulls. }		[C.].
p. Ad. sk., ♂.	Sogere, S.E. New Guinea, 1750 ft.	H. O. Forbes, Esq.
		[P. & C.].
q. { Imm. st. } ♀.	S. coast New Guinea (Voy. H.M.S. 'Fly').	J. B. Jukes, Esq. [P. & C.].
{ Skull. }		
r. Ad. sk., ♂.	New Guinea.	Purchased.
s. Ad. sk., ♂.	New Guinea (Voy. H.M.S. 'Rattlesnake').	Zoological Society.
t. Imm. sk., ♂.	New Guinea.	H. H. Romilly, Esq.
		[P. & C.].
u. { Ad. st. } ♀, 9/49.	Dufour Isl., S.E. New Guinea (Voy. H.M.S. 'Rattlesnake').	J. Macgillivray, Esq.
{ Skull. }		[P. & C.].
v. Ad. sk., ♂, 14/12/40.	Darnley Isl. †, Torres Straits (Voy. H.M.S. 'Rattlesnake').	J. Macgillivray, Esq.
		[P. & C.].
w. { Yg. sk. } ♀.	Cape York (Voy. H.M.S. 'Rattlesnake').	J. Macgillivray, Esq.
{ Skull. }		[P. & C.].
(Type of <i>Phalangista nudicaudata</i> , Gould, and <i>Cuscus brevicaudatus</i> , Gray.)		
x, y. Ad. sks., ♂ ♀.	Port Albany, Cape York.	C. Coxen, Esq. [C.].
	(Co-types of <i>C. maculatus</i> , var. <i>ochropus</i> , Gray.)	
z. Yg. sk., ♀.	N.E. coast of Australia.	Purchased.
a'. Skeleton (mounted).	N. Australia.	Purchased.
b'. Skull.		Voy. H.M.S. 'Challenger.'

\* So stated on a dealer's label, but the occurrence of the species in Celebes has not as yet been confirmed.

† "Brought from the S. Coast of New Guinea."

## 3. Phalanger orientalis\*.

## a. Phalanger orientalis, var. typicus.

- Didelphis orientalis*, *Pall. Misc. Zool.* p. 59 (1766); *Erxl. Syst. R. A.* p. 79 (1777); *Schreb. Säug.* iii. p. 550, pl. clii. (animal) (1778); *Zimm. Geogr. Gesch.* ii. p. 228 (1780); *Bodd. Elench. Anim.* i. p. 77 (1785); *Gmel. Linn. S. N.* i. p. 108 (1789); *Donnd. Zool. Beytr.* i. p. 353 (1792); *Kerr, Linn. An. K.* p. 196 (1792); *G. Cuv. Tabl. Elém.* p. 125 (1798); *Shaw, Gen. Zool.* i. pt. ii. p. 481 (1800); *Turt. Linn. S. N.* i. p. 67 (1806).
- Didelphis indica*, *Müll. Linn. Naturs. Supp.* vii. p. 35 (1776).
- Phalanger orientalis*, *Storr, Prodr. Meth. Mamm.* p. 33 (1780); *Bechst. Uebers. Vierf. Thiere*, ii. p. 685 (1800).
- Didelphis molucca*, *Gmel. Linn. S. N.* i. p. 106 (1789); *Kerr, Linn. An. K.* p. 192 (1792); *Donnd. Zool. Beytr.* i. p. 348 (1792).
- Coescoes amboinensis*, *Lacép. Mém. Inst.* iii. p. 491 (1801); *Desm. N. Dict. d'H. N.* (1) xxiv. *Tabl. Meth.* p. 20 (1804); *Tiedem. Zool.* p. 432 (1808).
- Phalangista alba*, *E. Geoff. Cat. Mus.* p. 148 (1803); *Less. Dict. Class. d'H. N.* xiii. p. 333 (1828); *id. H. N. Mamm. (Compl. Buff.)* iv. p. 463 (1830).
- Phalangista rufa*, *E. Geoff. Cat. Mus.* p. 149 (1803); *Desm. N. Dict. d'H. N.* (2) xxv. p. 473 (1817); *id. Mamm.* i. p. 266 (1820); *F. Cuv. Dents Mamm.* p. 130, pl. xli. (teeth) (1825); *id. Dict. Sci. Nat.* xxxix. p. 414 (1826); *Gray, Griff. Cuv. An. K.* v. p. 196 (1827).
- Phalangista orientalis*, *Desm. N. Dict. d'H. N.* (1) xvii. p. 380 (1803); *Gieb. Säug.* p. 696 (1859); *id. Z. Ges. Nat.* xxvii. p. 392 (1866); *Schleg. Dierent.* p. 165 (1872).
- Balantia orientalis*, *Ill. Prodr. Syst. Mamm.* p. 77 (1811); *Goldf. Zool.* ii. p. 450 (1820); *Burm. Lehrb. Naturg.* p. 548 (1830).
- Sipalus orientalis*, *G. Fisch. Zoogn.* ii. p. 582 (1813).
- Phalangista minor and fusca* (*Oken*) *Schinz, Cuv. Thierr.* i. p. 258 (1821).
- Cuscus albus*, *Less. Man. Mamm.* p. 221 (1827); *id. N. Tabl. R. A., Mamm.* p. 188 (1842).
- Phalangista cavifrons*, *Temm. Mon. Mamm.* i. p. 17, pl. i. figs. 7-9, & pl. ii. figs. 7-10 (skull) (1827); *J. B. Fisch. Syn. Mamm.* p. 276 (1829); *Quoy & Gaim. Voy. Astrolube, Zool.* i. p. 104, pls. xvii. & xviii. (animal and anatomy) (1830); *Wagn. Schr. Säug. Supp.* iii. p. 73 (1843), v. p. 269 (1855); *Schinz, Syn. Mamm.* i. p. 525 (1844); *G. Cuv. Anat. Comp.* ii. pls. clxxvii.-clxxix. (myology) (1849); *Gieb. Odontogr.* p. 42, pl. xviii. fig. 1 (teeth) (1855).
- Cuscus cavifrons*, *Waterh. Cat. Mamm. Mus. Z. S.* p. 67 (1838).
- Phalangista* (*Cuscus*) *cavifrons*, *Waterh. Jard. Nat. Libr., Mamm.* p. 263 (1841).
- Cuscus orientalis*, *Gray, List Mamm. B. M.* p. 84 (1843); *id. P. Z. S.* 1858, pp. 104 & 109, pl. lxi. (animal); *id. P. Z. S.* 1861, p. 320;

- \* a. Size larger; p.<sup>4</sup> large, its longer, oblique diameter about 5 millim.—New Guinea and Islands to the westward .....
- b. Size less; p.<sup>4</sup> small, its oblique diameter less than 4.5 millim.—New Britain and Solomon groups of islands .....

Var. *typicus*.Var. *breviceps*, p. 204.

- Jent. Notes Leyd. Mus.* vii. p. 93 (1885); *Thos. Encycl. Brit.* (9) xviii. p. 728, fig. 1 (skull) (1885); *Jent. Cat. Ost. Leyd. Mus.* p. 307, pl. xi. figs. 1, 2, & 4 (skull, different ages) (1887).  
*Phalangista (Cuscus) orientalis*, *Waterh. N. H. Mamm.* i. p. 279 (1846); *Peters & Doria, Ann. Mus. Genov.* xvi. p. 681 (1881).  
*Phalangista (Cuscus) gymnotis*, *Peters & Doria, Ann. Mus. Genov.* vii. p. 543 (1875); *id. op. cit.* xvi. p. 679, pl. viii. fig. 3, pl. ix. fig. 3 (skull), & pl. xiv. (animal) (1881).  
*Cuscus vestitus*, *M.-Edw. C. R.* lxxxv. p. 1080 (1877).

#### GREY CUSCUS.

Size rather less than in the last species; females smaller than males. Fur soft and woolly, extremely variable in length. General colour grey, but varying from nearly white to dark greyish brown; pure white, albino, individuals proportionally numerous, but nearly invariably males. Upper surface quite uniform in tint, the head, outer sides of limbs, back, and base of tail all of the same colour, which is, as a rule, markedly paler in males than in females. Muzzle naked along the upper surface for about half the distance towards the eyes. Ears (Pl. XXI. fig. 3) small, rounded, naked inside and along their margins, furry, like the rest of the head, over the greater portion of their backs. Chin, chest, and belly ordinarily pale grey or white, the line of separation from the darker colour of the flanks variable in distinctness; throat and neck, however, in many individuals, generally males, strongly suffused with yellow or rufous\*. Tail hairy for about its basal half above and quarter below, but the extent of the hairy portion very variable.

*Skull* stout and strong, with marked ridges and crests, which are, however, much more developed in males than in females. Nasals short, not projecting forwards nearly to the level of the anterior point of the premaxillæ, and only extending some two or three millimetres in front of their junction with the ascending processes of the premaxillæ; the nasal notch therefore very shallow (see Pl. XX. fig. 5). Interorbital region more or less concave, not or very slightly inflated; its edges strongly ridged, the ridges forming, in old males, marked supraorbital ledges. Temporal ridges uniting in old age, and forming a prominent central crest, highest over the middle of the brain-case, but usually low and undeveloped at the point where the two ridges first meet, so that there is at this point a marked concavity in the general upper outline of the skull. Anterior palatine foramina reaching to between the canine and p.<sup>1</sup>

*Teeth.* Upper i.<sup>1</sup> but little longer than the others; i.<sup>2</sup>, in section, larger than i.<sup>1</sup>; i.<sup>3</sup> very slender, crushed in between i.<sup>2</sup> and the canine, which it touches throughout its length (Pl. XX. fig. 5). Canine long, strong and pointed, situated on the premaxillo-maxillary suture. P.<sup>1</sup> single-rooted, about halfway between the canine and p.<sup>4</sup>; p.<sup>3</sup> minute, absent on one or both sides in about one

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\* This colour is probably only assumed during the rutting-season.

specimen in ten; p.<sup>4</sup> large and powerful, with a notched cutting-edge running obliquely across it. Molars small and narrow, the combined length of the three anterior from 14 to 16 millim. Lower intermediate teeth usually three in number (presumably i.<sup>2</sup>, p.<sup>1</sup>, and p.<sup>3</sup>), less than this in about one in eight or nine individuals, and occasionally, though very rarely, more\*, up to five.

*Dimensions.*

	♂. d' (stuffed). Adult. millim.	♀. d (in spirit). Adult. millim.
Head and body .....	550	525
Tail .....	425	400
Lower leg .....	..	102
Hind foot .....	64	62
Ear .....	15	22

Skull, see p. 208.

*Hab.* Timor, Bouru, Sula, Guebeh, and the islands eastwards to New Guinea.

*Type* not in existence.

a. Imm. sk., ♀ ( <i>albino</i> †).	Bouru.	A. R. Wallace, Esq. [C.]
b, c. Ad. ♂ & yg. sks., 10/8/70.	Bouru.	Dr. A. B. Meyer [C.]
d. Ad. al., ♀ & 2 yg.	Wai, Amboina.	H. O. Forbes, Esq. [C.]
e, f. } Ad. sks. { } Skulls. { ♂ ( <i>albinos</i> ).	Wai, Amboina.	H. O. Forbes, Esq. [C.]
g. Yg. al., ♂.	Amboina.	Sir E. Belcher [P. & C.]
h. Ad. sk., ♂ ( <i>albino</i> ).	Amboina.	Leyden Museum[E.]
i. Yg. sk., 11/10/70.	(Received as typical of Amboina.	<i>Ph. cavifrons</i> , Temm.) Dr. A. B. Meyer [C.]
j. Ad. sk., ♂.	Ceram.	A. R. Wallace, Esq. [C.]
k. Yg. st.	Mysol.	Purchased.
l-o. Ad. ♂ ♀ & 2 yg. sks.	Waigiü.	A. R. Wallace, Esq. [C.]
p. } Ad. sk. { } Skull. { ♂.	Waigiü.	Purchased.
q. Yg. st.	Waigiü.	Purchased.
r. Yg. st.	Aru Is.	A. R. Wallace, Esq. [C.]
s. Ad. sk., ♂.	N.W. New Guinea.	A. R. Wallace, Esq. [C.]

\* See Jentink, *l. c.*

† This specimen presents the only recorded instance of albinism in the *female* of this species, while in the male it is unusually frequent. Thus, of rather more than 50 males in the Leyden Museum, ten are albinos, and in the Museum series there are four albinistic males in addition to this female.

<i>t</i> , u. Yg. sks.	Huon Gulf, New Guinea.	P. Comrie, Esq. [C.].
<i>v-z</i> . { Ad. sks. { 2 ♂, 3 ♀. { 4 skulls. }	Port Moresby.	K. Broadbent, Esq. [C.].
<i>a'</i> . Ad. sk.	Sogere, S.E. New Guinea, 1750 ft.	H. O. Forbes, Esq. [P. & C.].
<i>b'</i> . Ad. al., ♀ & 2 yg.		Lidth de Jeude Coll.
<i>c'</i> . Yg. skull.		Lidth de Jeude Coll.
<i>d'</i> . Ad. st., ♂ ( <i>albino</i> ).		Purchased.

***b. Phalanger orientalis*, var. *breviceps*.**

*Cuscus albus*, *Less. & Garn. Voy. Coquille, Zool.* i. p. 158, pl. vi. (animal) (1826) (*nec Ph. alba, E. Geoff.*).

*Cuscus celebensis*, *Gray, P. Z. S.* 1858, pl. lxii. (animal) (*nec descr. t. c. p. 105*).

*Cuscus (Strigocuscus) celebensis*, *Gray, P. Z. S.* 1861, p. 319, figs. (skull).

*Cuscus orientalis*, *Rams. P. Linn. Soc. N. S. W.* iii. p. 243 (1877); *Alst. P. Z. S.* 1877, p. 126, and 1878, p. 274.

Size markedly smaller than in the typical variety (see skull dimensions, p. 208), especially in the eastern (Solomon Island) individuals. Colour as a rule similar, but slightly darker than in that form, and the dorsal stripe not quite so constant in its presence. In the islands of Rubiana and Guadalcanar there is also a dark umber-brown race living side by side with the grey one, and not differing from it structurally in the slightest degree; in this race especially the dark dorsal stripe is quite invisible, being lost in the general dark colour of the back.

*Skull* only differing from that of the typical variety by its smaller size.

*Teeth* also similar, except that *p*<sup>4</sup>, both above and below, is very considerably smaller and lighter, its diameter, measured obliquely in the direction of the cutting-ridge, averaging about a millimetre less than in the true *Ph. orientalis*. The small upper *p*<sup>3</sup> and the lower intermediate teeth are also more often reduced in number, very few individuals possessing the complete set normally present in *Ph. orientalis*.

*Dimensions.*

	♂. s* (stuffed). Adult. millim.	♀. p (in spirit). Adult. millim.
Head and body . . . . .	480	360
Tail . . . . .	330	240
Lower leg . . . . .	..	77
Hind foot . . . . .	(c.) 50	52
Ear . . . . .	19	20
Skull, see p. 208.		

\* Selected as the type of the variety.

*Hab.* New Britain group, and Solomon Islands as far east as San Christoval.

*Type* in collection.

<i>a-h.</i> { Ad. & yg. sks. } ♀ { 3 skulls. }	Duke of York Isl. and neighbouring shores of New Britain and New Ireland.	Rev. G. Brown [C.].
<i>i-l.</i> Imm. al., ♀ & 3 yg.	Duke of York Isl.	Rev. G. Brown [C.].
<i>m, n.</i> { Ad. ♀ & yg. sk. } 4/86. { Skull of <i>n.</i> }	Alu, Shortland Isl., Solomons.	C. M. Woodford, Esq. [C.].
<i>o.</i> Skull (♂).	Alu, Shortland Isl.	C. M. Woodford, Esq. [C.].
<i>p.</i> Ad. al. ♀, 7/3/87. (Dark race.)	Rubiana, Solomons.	C. M. Woodford, Esq. [C.].
<i>q, r.</i> { Ad. sks. } { Skull of <i>r.</i> } ♂ ♀, 4/87. ( <i>r.</i> , dark race.)	Aola, Guadalcanar.	C. M. Woodford, Esq. [C.].
<i>s.</i> { Ad. st. } { Skull. } ♂.	San Christoval ( <i>Voy. H.M.S. 'Herald'</i> ).	John Macgillivray, Esq. [P. & C.]. ( <i>Type of variety.</i> )
<i>t, u.</i> Ad. sks., ♂ ♀, 12/54.	San Christoval ( <i>Voy. H.M.S. 'Herald'</i> ).	F. M. Rayner, Esq. [P. & C.].
<i>v, w.</i> Skeleton & skull, ♀. (Skull of <i>v</i> figured by Gray, <i>l. c.</i> )	San Christoval ( <i>Voy. H.M.S. 'Herald'</i> ).	John Macgillivray, Esq. [P. & C.].
<i>x.</i> Imm. skull (bones separated).	San Christoval ( <i>Voy. H.M.S. 'Herald'</i> ).	John Macgillivray, Esq. [P. & C.].

#### 4. Phalanger ornatus.

*Cuscus ornatus*, Gray, *P. Z. S.* 1860, pp. 1 & 374, pl. lxxiv. (animal); *id.* *P. Z. S.* 1861, p. 320, figs. (skull); *Gerrard, Cat. Bones Mamm. B. M.* p. 123 (1862).

*Cuscus orientalis* (*nec Pall.*), *Jent. Notes Leyd. Mus.* vii. p. 93 (1885) (in part); *id.* *Cat. Ost. Leyd. Mus.* p. 307, pl. xi. fig. 3 (skull) (1887).

Size smaller and form lighter than in *Ph. orientalis*; females smaller than males. Fur short and close. General colour grey, spotted with white, the males rufous anteriorly. Muzzle naked along the top nearly to the eyes. Ears short, naked internally. Head and forequarters deep grey, uniform with the back in the female, but in the males the forequarters are bright orange-rufous, a colour that sometimes spreads over the whole of the head and neck. Black dorsal streak distinct and well defined. Back and sides more or less spotted with white, the spots very variable in number and position. Chin almost naked, greyish; chest and belly white in the female, becoming greyer round the pouch, bright orange in the males; a mesial pure white stripe, however, often present. Limbs outside like the back, their inner sides like the belly. Tail

furry for about half its length, the difference in extent of the fur above and below only about an inch; the colour of the fur grey, more or less white-spotted, as on the back.

*Skull* in most respects similar to that of *Ph. orientalis*. Nasals long, projecting forwards nearly as far as the level of the anterior point of the premaxillæ, and extending about 4 or 5 millim. in front of their junction with the ascending processes, and forming a deep nasal notch (Pl. XX. fig. 6). Lacrymal bones with a strongly marked ridge running along their upper edge. Interorbital region ridged as in the last species, but the supraorbital ridges more definitely continuous with the temporal ones, and not interrupted just at their junction; the upper outline of the skull therefore evenly convex.

*Teeth*. Upper  $i^1$  decidedly longer than  $i^2$ ;  $i^3$  in section about one fifth the size of  $i^2$ , not crushed in between it and the canine, but only touching the latter tooth just at its base (Pl. XX. fig. 6). Canine short and small, its tip barely reaching as far down as a line connecting those of  $i^1$  and  $p^4$ .  $P^1$  about half the size of the canine, and  $p^3$ , which is present in all the five individuals examined, about one third its size.  $P^4$  large, rounded in section, its oblique diameter about 5 millim. Molars as in *Ph. orientalis*. Lower intermediate teeth three in number.

#### Dimensions.

	♂. <i>a</i> (skin). Adult. millim.	♀. <i>b</i> (skin). Adult. millim.
Head and body . . . . .	550	410
Tail . . . . .	375	330
Lower leg . . . . .	93	(c.) 80
Hind foot . . . . .	47	43
Ear . . . . .	12.5	10
Skull, see p. 208.		

*Hab.* Gilolo group of islands: Morty, Ternate, Batchian, and Gilolo.

*Type* in collection.

<i>a.</i> { Ad. sk. } ♂	Morty Id.	A. R. Wallace, Esq. [C.]
{ Skull. } ♂		
<i>b-d.</i> { Ad. & yg. sks. } ♀	Ternate.	A. R. Wallace, Esq. [C.]
{ Skull of <i>b.</i> } ♀		
<i>e.</i> { Ad. sk. } ♂	Batchian.	A. R. Wallace, Esq. [C.]
{ Skull. } ♂		(Type of species.)

#### 5. *Phalanger celebensis*.

*Cuscus celebensis*, Gray, *P. Z. S.* 1858, p. 105 (description, but not the plate); Gerrard, *Cat. Bones Mamm. B. M.* p. 123 (1862); Jent. *Notes Leyd. Mus.* vii. p. 104 (1885); *id.* *Cat. Ost. Leyd. Mus.* p. 311 (1887).

*Phalangista celebensis*, Jent. *Notes Leyd. Mus.* v. p. 181 (1883).

CELEBEAN GREY CUSCUS.

Size markedly smaller than in the other species. Fur thick and soft. Colour all over a uniform grey, with a certain tinge of coppery. No trace of a dark central line. Top of muzzle naked nearly to the level of the anterior canthus. Ears (Pl. XXI. fig. 4) larger than in any of the preceding species; laid forward (in spirit-specimens) they reach just to the posterior canthus of the eye; their backs uniformly covered with soft fawn-grey hairs, their margins and internal surfaces naked. Chin, chest, and belly white or yellowish white, the anal region and underside of base of tail sometimes deep chestnut. Outsides of limbs like back, but rather paler; inner sides like belly. Tail furry for about one half above and two fifths below, the difference in extent of the hair from about one to two inches; distal part of tail with more fine hairs scattered over its upper and lateral surfaces than usual, and with its lower surface unusually contrasted in colour with the upper.

*Skull* light and delicate. Nasal notch very shallow, the nasals projecting scarcely 2 millim. in front of their junction with the premaxillæ; their posterior portions but little expanded. Inter-orbital region concave, its edges sharply ridged. Anterior palatine foramina extending to the level of the middle of the canines.

*Teeth.* Upper  $i.^3$  cylindrical, nearly half the size of  $i.^2$  in section; a distinct diastema between it and the canine, so that the two teeth do not touch at all. Canine about as long vertically as  $i.^1$  and  $p.^4$ .  $P.^1$  about halfway between the canine and  $p.^4$ , and about half their height;  $p.^3$  absent in all the specimens known;  $p.^4$  very similar to that of *Ph. orientalis*, var. *breviceps*, its oblique diameter about 4 millim. Molars small and rounded. Lower intermediate teeth two in number in all the specimens known.

*Dimensions.*

	♂.	
	<i>a</i> (in spirit). Barely adult. millim.	<i>c</i> (skin). Adult. millim.
Head and body .....	270	390
Tail .....	240	..
Lower leg .....	64	(c.) 75
Hind foot .....	43	48
Ear .....	20	15

Skull, see next page.

*Hab.* Celebes and Sanghir Islands.

*Type* in collection.

a. Ad. al., ♂.	Menado, Celebes.	Dr. A. B. Meyer [C.].
b. { Imm. sk. { ♂.	Macassar.	A. R. Wallace, Esq.
{ Skull. {		[C.]. ( <i>Type</i> of species.)
c. { Ad. sk. { ♂.	Sanghir Isl.	Dr. A. B. Meyer [C.].
{ Skull. {		
d. Yg. sk.		Old Collection.



## Subfamily III. PHASCOLARCTINÆ.

No tail. Muzzle short; tongue not extensile. Cheek-pouches present. Cæcum large, complicated. Stomach with a cardiac gland.

Bullæ very high and prominent, narrow transversely.

Teeth large. No premolars additional to  $p.^4$  above, or any teeth at all between  $i.^1$  and  $p.^4$  below.

## 12. PHASCOLARCTUS.

Type.

Phascolarctus, <i>Blainv. Bull. Soc. Philom.</i> 1816, p. 116 (misprinted 108) .....	Ph. cinereus.
Lipurus, <i>Goldf. Isis</i> , p. 271 (1819) .....	Ph. cinereus.
Morodactylus, <i>Goldf. Zool. ii.</i> p. 445 (1820) .....	Ph. cinereus.

Size large; form very stout and clumsy. Fur thick and woolly. Ears large, thickly furry outside and in; metatragus almost obsolete. Flanks without a flying-membrane. Fore toes subequal, their lengths in the following relative order—4, 3, 5, 2, 1; the first and second opposable to the other three; palms and soles granulated, without striated pads. Claws thick, strong, and sharply pointed. Tail rudimentary, only represented externally by a low rounded projection. Mammæ 2.

*Skull* oblong, parallel-sided, the zygomata running straight backwards from their broadest point at the orbits, not curved outwards. Nasals short and very broad, scarcely projecting in front beyond the ascending processes of the premaxillæ. Interorbital region smooth and flat, its edges rounded, and forming rudimentary blunt postorbital processes, supported in old age upon large rounded inflations. Anterior palate deeply concave; the short palatine foramina placed at the bottom of the concavity opposite the canines. Posterior palate with a pair of large smoothly rounded vacuities confined to the palatine bones. Bullæ remarkably high and prominent, not unlike those of a pig in general shape, their height above the basi-occipital slightly exceeding their antero-posterior, and about twice their transverse diameter, their prominence increasing markedly with age. Lower jaw generally with a minute foramen from the masseteric fossa to the inferior dental canal.

Ribs only 11 in number, the total number of thoraco-lumbar vertebræ being still, however, 19 as usual.

*Dentition*:—I.  $\frac{1.2.3}{1.0.0}$ , C.  $\frac{1}{0}$ , P.  $\frac{0.0.0.4}{0.0.0.4}$ , M.  $\frac{1.2.3.4^*}{1.2.3.4} \times 2 = 30$ .

Upper incisors cylindrical;  $i.^1$  long, more parallel to its fellow, and more rodent-like than in the previous genera; crown of  $i.^2$  in youth nearly equal to  $i.^1$  in section, but in adult life the crown is

\* Dr. Collett has recorded the presence of a fifth lower molar on both sides of a specimen obtained in Queensland by Dr. Lumholtz (*loc. infra cit.*).

worn off, and then  $i.^2$  and  $i.^3$  are both about equal, and about one third the size of  $i.^1$  in cross section. Canine thick and strong, its dentinal root becoming much elongated and swollen in old age.  $P.^4$  evenly oval, its antero-posterior diameter about equal to that of  $m.^2$ , with a central ridge and a distinct postero-internal basal ledge. Molars very broad, about as broad as long, each with four sharp pointed cusps with curved ridges radiating from them, their structure, in fact, very like that found in *Petauroides* and *Pseudochirus*. Lower incisors narrow, deep antero-posteriorly. Lower  $p.^4$  sharp-edged, its central ridge bifurcated posteriorly. Molars with sharp curved crests, their convexity outwards.

Tooth-change nearly obsolete, the milk- $p.^4$ , both above and below, reduced to a minute rudiment, apparently quite functionless.

*Range.* That of the only species.

### 1. *Phascolarctus cinereus*.

- Koala, *G. Cuv. R. A. i.* p. 184, iv. pl. i. fig. 5 (animal) (1817); *Desm. N. Dict. d'H. N. (2)* xvii. p. 110 (1817).  
*Lipurus cinereus*, *Goldf. Isis*, 1819, p. 274; *Schinz, Cuv. Thierr. i.* p. 265 (1821); *Burm. Lehrb. Naturg.* p. 547 (1830); *Owen, P. Z. S.* 1838, p. 154.  
*Morodactylus cinereus*, *Goldf. Zool.* ii. p. 445 (1820).  
*Phascolarctus fuscus*, *Desm. Mamm. i.* p. 276 (1820); *id. Dict. Sci. Nat.* xxxix. p. 448 (1826); *J. B. Fisch. Syn. Mamm.* p. 284 (1829); *Martin, P. Z. S.* 1836, p. 109 (anat.); *Waterh. Cat. Mamm. Mus. Z. S.* p. 68 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 295, pl. xxxi. (animal) (1841); *Less. N. Tabl. R. A., Mamm.* p. 192 (1842); *Wagn. Schr. Säug. Supp.* iii. p. 94 (1843), v. p. 281 (1855); *Owen, Odontogr. Atl.* pl. c. fig. 6 (teeth) (1845).  
*Phascolarctus koala*, *Gray, Griff. Cuv. An. K.* p. 205 (1827); *Gerv. H. N. Mamm. ii.* p. 273, pl. (animal) (1855).  
*Phascolarctus flindersi*, *Less. Mam. Mamm.* p. 221 (1827).  
*Phascolarctus cinereus*, *J. B. Fisch. Syn. Mamm.* p. 285 (1829); *Gray, List Mamm. B. M.* p. 87 (1843); *Wagn. Schr. Säug. Supp.* iii. p. 95 (1843); *Schinz, Syn. Mamm. i.* p. 537 (1844); *Waterh. N. H. Mamm. i.* p. 259, pl. ix. fig. 2 (animal), and pl. xx. fig. 5 (skull) (1846); *Hombr. & Jacq. Voy. Pôle Sud, Zool.* p. 35, Atl. pls. xvii. & xvii. A. (animal, skull, and skeleton) (1845-53); *Gould, Mamm. Austr. i.* pls. xiii. & xiv. (animal) (1854); *Gerv. H. N. Mamm. ii.* p. 273 (1855); *Gieb. Säug.* p. 693 (1859); *Benn. P. Z. S.* 1862, p. 85; *Gerrard, Cat. Bones Mamm. B. M.* p. 123 (1862); *Kreffl, Cat. Mamm. Austr. Mus.* p. 44 (1864); *id. Mamm. Austr.* pl. vi. (animal) (1871); *Schleg. Dierent.* p. 167 (1872); *Young, J. Anat. Phys.* xiii. p. 305 *et seqq.* pl. xviii. (anat.) (1879); *Slater, P. Z. S.* 1880, p. 355; *Brehm, Thierl.* ii. p. 579 (1880); *Forbes, P. Z. S.* 1881, p. 181 *et seqq.* figs. 1-6 (anat.); *Dobs. J. Anat. Phys.* xvii. p. 151 (1882); *Flow. Encycl. Brit.* (9) xv. p. 382, figs. 25 (skull) & 32 (bones of foot) (1883); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 699 (1884); *Thos. P. Z. S.* 1887, p. 338, fig. 1 (tooth-change); *Coll. Zool. Jahrb.* ii. p. 935 (1887); *Jent. Cat. Ost. Leyd. Mus.* p. 307 (1887).

KOALA.

Fur thick, close and woolly. General colour dark grey. Rhinarium extending upwards along the top of the muzzle halfway to the eye; this part apparently naked, but, especially in youth, thinly clothed with minute hairs. Rest of head thickly hairy. Face uniform in colour with the back, dark grey. Ears rounded, laid forward (in a half-grown spirit-specimen) they reach just to the posterior canthus of the eye; the thick hair on their backs black, tipped with dirty white, and that on their edges and internal surface white, with or without grey bases. Back and outsides of limbs uniform dark grey, turning on the rump to dirty yellowish white, the line of demarcation sometimes irregularly spotted. Cheeks and sides of chin grey; centre of chin, whole of chest, and inner sides of fore limbs pure white or yellowish white; centre line of belly white, its sides greyish white; scrotum and region over pouch whitish, outside of which the groin and the inner sides of the hind legs are deep chestnut-rufous to the ankles. Anal region and the posterior line of the hind legs white. Hands and feet white.

*Skull and teeth* as described above.

*Dimensions.*

	♂. <i>i</i> (skin). Adult. millim.	♀. <i>h</i> (stuffed). Adult. millim.
Head and body . . . . .	810	750
Lower leg . . . . .	(c.) 158	(c.) 136
Hind foot . . . . .	96	98
Ear . . . . .	62	58

Skull, see next page.

*Hab.* Eastern Australia from Queensland to Victoria.

*Type* not in existence.

<i>a.</i> Ad. skeleton, ♂ (mounted).	Brisbane.	Purchased.
<i>b.</i> Fœtus in al., ♀.	Queensland.	Purchased.
<i>c.</i> Yg. al., ♀.	Port Stephens, N.S. W.	Dr. G. Bennett [P. & C.].
<i>d.</i> Yg. skeleton.	New South Wales.	Dr. G. Bennett [P. & C.].
<i>e.</i> Fœtus in al., ♀.	New South Wales.	J. Brenchley, Esq. [P. & C.].
<i>f.</i> Yg. sk.	New South Wales.	Zoological Society.
<i>g.</i> { Ad. sk. } ♀ { Skull. }	Geelong, Victoria.	E. Towle, Esq. [P. & C.].
<i>h.</i> { Ad. st. } ♀ { Skull. }		Purchased.
<i>i.</i> Ad. sk., ♂.		Purchased.
<i>j.</i> Yg. sk.		Linnean Society.
<i>k, l.</i> Yg. sks.		Purchased.
<i>m.</i> Yg. skeleton.		Purchased.
<i>n.</i> Skull.		Lidth de Jeude Coll.

*Skull Dimensions of Phascolarctus cinereus.*

Sex .....	♂.	♀.
Specimen.....	a.	b.
Age .....	aged.	adult.
Basal length .....	149	128
Greatest breadth .....	88	75
Nasals, length .....	48	39
" greatest breadth .....	43	38.5
" least breadth .....	29	23.5
Constriction, breadth .....	25	25.6
Palate, length .....	80	67
" breadth outside m. <sup>2</sup> .....	39	36
"    "    inside m. <sup>2</sup> .....	23.3	20.5
Palatal foramen .....	6.7	6.3
Basi-cranial axis .....	47.6	44
Basi-facial axis.....	102	84
Facial index .....	214	191
Teeth—horizontal length of p. <sup>4</sup> .....	7.4	7.5
" length of ms. <sup>1-3</sup> .....	24.5	21.7
" length of lower i. <sup>1</sup> .....	13.2	14

## Family III. PHASCOLOMYIDÆ.

Diprotodont Marsupials, adapted for a fossorial rhizophagous life. Body stout and clumsy. Limbs subequal, very thick and strong. Fore feet with five subequal toes, each with a stout digging-claw; hind feet with a short nailless hallux and four well-developed toes, the second and third showing a slight tendency towards syndactyly; all four with long curved claws. Tail rudimentary. Stomach simple, but with a cardiac gland. Cæcum present, short, provided with an *appendix vermiformis*. Pouch present.

*Dentition*:—I.  $\frac{1.0.0}{1.0.0}$ , C.  $\frac{0}{0}$ , P.  $\frac{0.0.0.4}{0.0.0.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 24$ .

All the teeth rootless, with persistent pulps. Incisors large and strong, the enamel restricted to their front and lateral surfaces. The single premolar small, single-lobed, close to the molars. Molars bilobed, strongly curved, their convexity internal above, external below.

Tooth-change aborted; milk-p.<sup>4</sup> absent, or at least not yet discovered; if ever present, shed or absorbed in infancy. Bullæ imperfect, open behind, their anterior wall formed by a downwardly projecting process of the squamosal, instead of by the alisphenoid as usual.

*Range*. Australian Region, south of the Tropics.

## 1. PHASCOLOMYS.

	Type.
Phascolomys, <i>E. Geoff. Ann. Mus.</i> ii. p. 364 (1803) . . . .	Ph. ursinus.
Vombatus, <i>E. Geoff. Bull. Soc. Philom.</i> iii. p. 185 (1803)	Ph. ursinus.
Wombatus, <i>Desm. N. Dict. d' H. N.</i> (1) xxiv. p. 20 (1803)	Ph. ursinus.
Amblotus, <i>Ill. Prodr. Syst. Mamm.</i> p. 77 (1811) . . . . .	Ph. ursinus.
Lasiorhinus, <i>Gray, Ann. Mag. N. H.</i> (3) xi. p. 458 (1863)	Ph. latifrons.

Characters, habits, and range as those of the family, of which this is the only genus.

*Synopsis of the Species.*

## I. EXTERNAL CHARACTERS.

- A. Rhinarium quite naked, black. Fur coarse and harsh.
- a. Size large. Australian . . . . . 1. *Ph. mitchelli*, p. 213.
- b. Size small. Tasmanian . . . . . 2. *Ph. ursinus*, p. 215.
- B. Rhinarium hairy, white. Fur soft and silky. . . . . 3. *Ph. latifrons*, p. 217.

## II. CRANIAL CHARACTERS.

- A. Postorbital processes rudimentary or absent. Greatest breadth of nasals considerably less than their length. (Ribs 15.)
- a. Size large, basal length more than 155 millim. 1. *Ph. mitchelli*, p. 213.
- b. Size smaller, basal length less than 155 millim. . . . . 2. *Ph. ursinus*, p. 215.
- B. Postorbital processes strong and well developed. Greatest breadth of nasals equal to or greater than their length. (Ribs 13.) . . . . . 3. *Ph. latifrons*, p. 217.

1. *Phascolomys mitchelli*.

*Phascolomys mitchelli*, *Owen, Mitchell's Exped. Austr.* ii. p. 362, pl. xxx. figs. 4 to 7 (jaws and teeth) (1838); *Gieb. Säug.* p. 670 (1859); *Owen, Phil. Trans.* 1872, pp. 177 & 245 et seqq. pls. xvii. to xix. & xxi. (parts of skull); *Lydekker, Cat. Foss. Mamm. B. M.* v. p. 152 (1887).

*Phascolomys platyrhinus*, *Owen, Cat. Ost. Coll. Surg.* i. p. 334 (1853); *Murie, P. Z. S.* 1865, p. 853, fig. 3 (skull); *id. P. Z. S.* 1867, p. 798 et seqq. pl. xxxv. (animal); *McCoy, Tr. Roy. Soc. Victoria*, viii. p. 267, fig. c (nasals) (1868); *Kreffl, Mamm. Austr.* text to pl. v. (1871); *id. P. Z. S.* 1872, p. 796; *Owen, Phil. Trans.* 1872, pp. 173 & 241 et seqq. figs. 3, 5, & 7, pls. xix. to xxiii. & xxxiii. (skull, &c.); *id. Tr. Z. S.* viii. p. 345 et seqq. pls. l. to lvii. (skull) (1872); *id. tom. cit.* p. 483 et seqq. pls. lxxix. to lxxiv. (skeleton) (1874); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 698 (1884); *Lyd. Cat. Foss. Mamm. B. M.* v. p. 155 (1887).

*Phascolomys latifrons*, *Gould, Mamm. Austr.* i. pls. lvii. & lviii. (animal) (1859) (*nec Owen*).

*Phascolomys niger*, *id. op. cit.* text to pl. lx. (1863).

*Phascalomys angasi and setosus*, Gray, *Ann. Mag. N. H.* (3) xi. pp. 458 & 459 (1863).

*Phascalomys setosus*, McCoy, *Tr. Roy. Soc. Victoria*, viii. p. 270, fig. D (nasals) (1868).

*Phascalomys assimilis*, Krefft, *P. Z. S.* 1872, p. 796.

#### COMMON AUSTRALIAN WOMBAT.

Size largest of the genus. Rhinarium large, quite naked, more or less pentagonal in shape, its edges sharply defined from the hairy parts of the muzzle. Fur fairly long, but coarse, harsh, and hispid; underfur almost or entirely absent. *Colour* all over either yellow, grizzled yellow and black, or black, the colour in each case quite uniformly distributed all over the head, body, and limbs; no special markings anywhere. Ears short, rounded, well-haired.

*Skull* large and powerful. Muzzle broad, its sides laterally expanded; infraorbital foramen narrow, slit-like. Nasals large, expanded behind, their greatest breadth about three fourths of their length, their posterior margins bowed backwards in the centre; naso-premaxillary three or four times as long as nasomaxillary suture. Interorbital region smooth, evenly convex, its edges sharp, well-defined, and continued backwards as distinct temporal ridges to the occiput; postorbital processes rudimentary, the distance between their tips not exceeding the interorbital breadth by more than from 4 to 6 millim. Anterior palatine foramina long, fairly well defined behind, the palate not markedly concave round them, except slightly anteriorly. Posterior palatine vacuities triangular, about equal in size to one of the molars.

Ribs, both in this species and the next, 15 in number; these being, with the exception of the 11 found in the Koala, the only instances in which the usual Marsupial number of 13 is departed from.

*Teeth*. Upper incisors comparatively narrow, deep antero-posteriorly, their anterior surfaces nearly or quite smooth, with scarcely any trace of grooves. Lower incisors rounded in section, about as broad as deep. Molars as usual.

#### *Dimensions.*

	♂. g (stuffed). millim.
Head and body . . . . .	1100
Hind foot . . . . .	100
Ear . . . . .	45

Skull, see p. 219.

*Hab.* New South Wales, Victoria, and South Australia.

*Type* (fossil) in the Museum of the Geological Society of London.

After a careful comparison of the recent with the fossil specimens in the Museum collection, I have no hesitation in following Dr. Murie and Mr. Lydekker in looking upon "*Ph. platyrhinus*" as identical with *Ph. mitchelli*, and consequently in adopting the latter and earlier name for the present species.

There appears to be no reason to distinguish specifically or even varietyally the black, yellow, and grizzled forms of this species, the latter being quite intermediate between the other two, and all of them being apparently due only to individual, and not to geographical variation.

- a. Ad. skull. New South Wales. Allan Cunningham, Esq.  
[P.]
- b. { Ad. sk. } ♂. Gippsland. Purchased.  
{ Skull. }  
(Grizzled variety.)
- c. Yg. al., ♂. Gippsland. Purchased.
- d, e. Skulls. Mt. Gambier, S. A. F. G. Waterhouse, Esq.  
[P.]
- f. Skull. Lake Alexander, mouth of Murray R., S. A. F. G. Waterhouse, Esq.  
[P.]
- g. Ad. st., ♂. Purchased.  
(Yellow variety. Type of *Ph. setosus*, Gray. Figured by Gould as *Ph. latifrons*.)
- h. { Ad. sk. } Zool. Soc.  
{ Skeleton, mounted. }  
(Black variety. Probably type of *Ph. niger*, Gould.)
- i. { Ad. sk. } ♀. Purchased.  
{ Skull. }  
(Yellow variety.)
- j. Skeleton. Zool. Soc.
- k. Skeleton. Purchased. }

## 2. *Phascolomys ursinus*.

- Wombat, *Collins, New South Wales*, ii. p. 153, plate (animal) (1802); *Home, Phil. Trans.* 1803, p. 304, pl. ix. (anat.)
- Didelphis ursina*, *Shaw, Gen. Zool.* i. pt. 2, p. 504 (1800).
- Wombatus fossor*, *Desm. N. Dict. d'H. N.* (1) xxiv. p. 20 (1803); *Sevast. Mém. Ac. Pétersb.* i. p. 445 (1807); *Tiedem. Zool.* p. 433 (1808); *G. Fisch. Zoogn.* iii. p. 15 (1814).
- Phascolomys fusca* (*Geoff.*), *Ill. Prodr. Syst. Mamm.* p. 78 (1811); *Desm. N. Dict. d'H. N.* (2) xxv. p. 500 (1817); *Owen, Cyclop. Anat. Phys.* iii. p. 267, figs. 93, 94, & 105 (skull & skeleton) (1840).
- Amblyotis fossor*, *Ill. Prodr. Syst. Mamm.* p. 77 (1811).
- Opossum hirsutum*, *Perry, Arcana*, letterpress & plate (animal) (1811).
- Phascolomys wombatus*, *Leach, Zool. Misc.* ii. p. 102, pl. xvi. (animal) (1815); *Owen, Odontogr.* pl. c. fig. 9 (teeth) (1845); *Gray, P. Z. S.* 1847, p. 41; *Owen, Tr. Z. S.* iii. p. 303, pl. xxxvii. figs. 1-3 (skull) (1849); *id. Cat. Ost. Coll. Surg.* i. p. 330 (1853); *id. Phil. Trans.* 1872, pp. 173 & 241 et seqq. figs. 1 & 2, pls. xix., xxi. to xxiii., & xxxix. (skull, teeth, &c.); *id. Tr. Z. S.* viii. p. 345 et seqq. pls. 1. to lvii. (skull) (1872); *id. Tr. Z. S.* viii. p. 483 et seqq. (1874)
- Phascolomys wombat*, *Pér. & Les. Voy. Terr. Austr.* ii. p. 13, Atl. pl. xxviii. (animal) (1816); *Desm. Mamm.* i. p. 276 (1820); *id. Dict. Sci. Nat.* xxxix. p. 450 (1826); *Gray, Griff. Cuv. An. K.* v. p. 206 (1827); *Less. Dict. Class. d'H. N.* xiii. p. 352 (1828); *Fisch. Syn. Mamm.* p. 285 (1829); *Less. H. N. Mamm. (Compl. Buff.)* iv. p. 500, pl. xxxvii. (1830); *Owen, P. Z. S.* 1836, p. 49

- (anat.); *Benn. Cat. N. H. Austr. Mus.* p. 2 (1837); *Waterh. Cat. Mamm. Mus. Z. S.* p. 68 (1838); *Gunn, Ann. Mag. N. H.* (1) i. p. 103 (1838); *Gulliver, P. Z. S.* 1841, p. 51; *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 302, pl. xxxii. (animal) (1841); *Owen, Tr. Z. S.* ii. p. 408, pl. lxxviii. (skeleton) & pl. lxxi. fig. 6 (skull) (1841); *Less. N. Tabl. R. A., Mamm.* p. 192 (1842); *Schinz, Syn. Mamm.* i. p. 568 (1844); *Waterh. N. H. Mamm.* i. p. 246, pl. iii. fig. 1 (skull) and pl. xii. fig. 7 (sole) (1846); *Gerv. Dict. Univ. d' H. N.* ix. p. 723 (1849); *Gunn, P. Roy. Soc. Tasm.* ii. p. 85 (1852); *Gould, Mamm. Austr.* i. pls. lv. & lvi. (animal) (1855); *Gerv. H. N. Mamm.* ii. p. 267, fig. (animal & teeth) (1855); *Gieb. Odontogr.* p. 43, pl. xix. figs. 4, 6, & 7 (teeth) (1855); *Schleg. Dierk.* p. 144 (1857); *Angas, P. Z. S.* 1861, p. 269; *Kreffl, Cat. Mamm. Austr. Mus.* p. 54 (1864); *Murie, P. Z. S.* 1865, p. 853, fig. 2 (skull); *id. P. Z. S.* 1867, p. 798 *et seq.*; *McCoy, Tr. Roy. Soc. Victoria*, viii. p. 267, fig. B (nasals) (1868); *Kreffl, Notes Faun. Tasm.* p. 4 (1868); *id. Mamm. Austr.* pl. v. (animal) (1871); *Schleg. Dierent.* p. 172, fig. (animal) (1872); *Gulliver, P. Z. S.* 1875, p. 491, pl. lv. fig. 50 (blood-corpuscle); *Schmidt, P. Z. S.* 1880, p. 305; *Higg. & Pett. P. Roy. Soc. Tasm.* 1883, p. 196; *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 696 (1884); *Lyd. Cat. Foss. Mamm. B. M.* v. p. 147, fig. 26 (dentition) (1887); *Jent. Cat. Ost. Leyd. Mus.* p. 307 (1887).
- Phascolomys ursinus*, *G. Cuv. R. A.* i. p. 185 (1817); *F. Cuv. H. N. Mamm.* (fol.) livr. x. (animal) (1819); *Schinz, Cuv. Thierr.* i. p. 266 (1821); *F. Cuv. Dents Mamm.* p. 139, pl. xliv. (teeth) (1825); *Burm. Lehrb. Naturg.* p. 547 (1830); *Gray, Grey's Austr., App.* ii. p. 404 (1841); *id. List Mamm. B. M.* p. 95 (1843); *Gerrard, Cat. Bones Mamm. B. M.* p. 131 (1862); *Gray, Ann. Mag. N. H.* (3) xi. p. 458 (1863).
- Phascolomys bassii*, *Less. Man. Mamm.* p. 229 (1827).
- Phascolomys fossor*, *Wagn. Schr. Säug. Supp.* iii. p. 132 (1843), v. p. 333 (1855); *Gieb. Säug.* p. 669 (1859); *id. Bronn's Kl. u. Ordn.* vi. Abth. v. pl. xxi. figs. 1-3 (skull) (1874); *Brehm, Thierl.* ii. p. 601, fig. (animal and skeleton) (1880).

## TASMANIAN WOMBAT.

Similar in every respect to *Ph. mitchelli*, except that its size is about one fourth smaller. Colour uniform dark grizzled greyish brown, as in the grizzled or intermediate variety of that species.

*Skull* with a basal length of from 130 to 150 millim., as compared to about from 160 to 185 millim. in *Ph. mitchelli*.

## Dimensions.

	♂. a (stuffed). millim.	♀. b (stuffed). millim.
Head and body .....	900	950
Hind foot .....	80	74
Ear .....	40	50

Skull, see p. 219.

*Hab.* Tasmania and islands in Bass's Straits.

*Type* not in existence.

This species, the oldest known of the group, presents a remarkable exception to the usual rule of size in Tasmanian animals, these being generally larger instead of smaller than their continental allies. The species seems to be well distinguished from *Ph. mitchelli* by this one character of size, but otherwise there appears to be no difference of importance between the two.

- |                        |   |                                      |
|------------------------|---|--------------------------------------|
| a. Ad. st., ♂.         | Circular Head, Tasmania ( <i>J. G.</i> ). | Gould Collection.                    |
| b. Ad. st., ♀.         | Tasmania.                                 | Gen. Hardwicke [P.].                 |
| c. Yg. st., ♂.         |   | Zoological Society.                  |
| d. Yg. st.             | Tasmania.                                 | Ronald Gunn, Esq. [P. & C.].         |
| e. Skull.              | Tasmania.                                 | Ronald Gunn, Esq. [P. & C.].         |
| f. Yg. sk.             | Tasmania.                                 | (Specimen figured by Leach in 1815.) |
| g. Skull.              | Tasmania ( <i>Voy. 'Fly'</i> ).           | J. B. Jukes, Esq. [P.].              |
| h. Skull.              |   | W. Yarrell, Esq. [P.].               |
| i. Skeleton.           | (Antarctic Expedition.)                   | Lords of the Admiralty [P.].         |
| j. Skeleton (mounted). |   | Zoological Society.                  |

### 3. *Phascolomys latifrons*.

*Phascolomys latifrons*, Owen, *P. Z. S.* 1845, p. 82; *Waterh. N. H. Mamm.* i. p. 252 (1846); Owen, *Tr. Z. S.* iii. p. 303, pl. xxxvii. figs. 4 & 5 (skull) (1849); *id. Cat. Ost. Coll. Surg.* i. p. 334 (1853); *Wagn. Schr. Säug. Supp.* v. p. 333 (1855); *Gieb. Säug.* p. 670 (1859); *Angas, P. Z. S.* 1861, p. 268; *Gerrard, Cat. Bones Mamm. B. M.* p. 131 (1862); *Murie, P. Z. S.* 1867, p. 778 *et seqq.*; *McCoy, Tr. Roy. Soc. Victoria*, viii. p. 267, fig. A (nasals) (1868); *Kreffft, Mamm. Austr.* text to pl. v. (1871); *id. P. Z. S.* 1872, p. 795; *Schleg. Dierent.* p. 172 (1872); *Macalister, P. Z. S.* 1872, p. 497, figs. 1-3 (skull and hyoid); Owen, *Phil. Trans.* 1872, pp. 173, 241 *et seqq.* figs. 4, 6, 8, pls. xix.-xxiii., xxxii., xxxviii. (skull, teeth, &c.); *id. Tr. Z. S.* viii. p. 345 *et seqq.* pls. l.-lvii. (skull) (1872); *id. tom. cit.* p. 483 *et seqq.* pls. lxix.-lxxiv. (skeleton) (1874); *Brehm, Thierl.* ii. p. 601, fig. (animal) (1880); *Flou. & Gars. Cat. Ost. Coll. Surg.* ii. p. 699 (1884); *Lyd. Cat. Foss. Mamm. B. M.* v. p. 151 (1887); *Jent. Cat. Ost. Leyd. Mus.* p. 307 (1887).

*Phascolomys lasiorhinus*, Gould, *Mamm. Austr.* i. pls. lix., lx. (animal) (1863); *Kreffft, P. Z. S.* 1872, p. 796.

*Lasiorhinus m'coyi*, Gray, *Ann. Mag. N. H.* (3) xi. p. 458 (1863).

*Phascolomys (Lasiorhinus) latifrons*, *Murie, P. Z. S.* 1865, p. 854, pl. xlvi. (animal), fig. 1 (skull).

*Phascolomys niger*, *Kreffft, Mamm. Austr.* text to pl. v. (1871) (*nec Gould*).

*Phascolomys lasiorhinus, var. niger*, *Kreffft, P. Z. S.* 1872, p. 796.

### HAIRY-NOSED WOMBAT.

Size intermediate between that of the other two species. Rhinarium wholly hairy, the hairs on this part short, close, and velvety. Fur of body straight, soft, and silky. General colour mottled grey, less uniform than in the other species. Face grey, tip of muzzle sharply defined, white; a spot above and below eye also white. Ears comparatively long, narrow, pointed; their backs

thinly clothed with black hairs, their inner sides naked; tufts round their bases behind white. Back mottled grey, darkest above the forequarters; the hairs brown at base, then, white, with brown tips; a few longer hairs black throughout. Chin black; sides of cheeks, throat, and chest glistening white; rest of underside dirty grey. Limbs dark outside, whitish in.

*Skull* broad and flattened. Muzzle short, its sides compressed; infraorbital foramen triangular or oval. Nasals short, broad, extremely expanded behind, their greatest breadth posteriorly equal to or greater than their length, their posterior margin directly transverse, except that the frontals generally project forwards in the centre; naso-premaxillary only about equal to, or even less than, naso-maxillary suture. Frontal and interorbital region broad, markedly flattened, or even concave in the centre. Post-orbital processes prominent, strong, and triangular, the distance between their tips exceeding the interorbital breadth by from 10 to 20 millim. Temporal ridges but little developed, even in old age. Anterior palatine foramina short, vaguely and irregularly defined posteriorly; the palate round them raised so as to form a deep, concavity in which they are situated; the raised edges of the concavity continued backwards as sharp ridges. Posterior palatal vacuities much as in the other species. Anterior wall of bullæ smaller and lower than in *Ph. mitchelli*.

Ribs 13 in number, as in other Marsupials.

*Teeth*. Upper incisors broad, thin antero-posteriorly; their anterior surface with numerous shallow vertical grooves. Lower incisors oblong in section, their breadth decidedly less than their depth. Molars as usual.

#### Dimensions.

	♂. b (stuffed). millim.
Head and body . . . . .	870
Hind foot . . . . .	91
Ear . . . . .	66

Skull, see next page.

*Hab.* South Australia.

*Type* in the Museum of the Royal College of Surgeons.

a. { Ad. st. } { Skeleton. }		Zoological Society.
	(Type of <i>Lasiorhinus m'coyi</i> , Gray, and of <i>Phascalomys lasiorhinus</i> , Gould.)	
b. { Ad. sk. } { Skeleton, mounted. }		♂. Zoological Society.
c-f. Skulls.	Port Lincoln, South Australia.	F. G. Waterhouse, Esq. [P.].
g, h. Skulls.	Port Augusta, S. A.	F. G. Waterhouse, Esq. [P.].
i, j. Skulls.	R. Murray, S. A.	F. G. Waterhouse, Esq. [P.].

k. Skull.	R. Light, S. A.	F. G. Waterhouse, Esq. [P.].
l. Skull (bisected).	South Australia.	F. G. Waterhouse, Esq. [P.].
m. Skeleton.		Zoological Society.

*Skull Measurements of Phascolomys.*

Species .....	<i>Ph. mitchelli.</i>		<i>Ph. ursinus.</i>	<i>Ph. latifrons.</i>
	Specimen.....	Age .....	g. adult.	i. aged.
Basal length .....	185	161	143	167
Greatest breadth .....	145	135	125	144
Nasals, length .....	81	70	62	65
" greatest breadth .....	55	49	46	67
" least breadth .....	18	15	17	29
Interorbital breadth .....	63	55	50	69
Breadth between tips of postorbital processes.....	67	60	52.5	90
Intertemporal constriction.....	47.5	49	40	46
Palate, length .....	125	106	93.5	110
Diastema, length .....	48.5	40	31.5	46.5
Palatal foramen .....	14	11	10	10
Basi-cranial axis .....	57	50	48	58
Basi-facial axis.....	130	113	96.5	110
Facial index .....	228	226	201	190
Teeth, length of whole tooth-series.	57	51	47	50

## Suborder II. POLYPROTODONTIA.

Incisors numerous, four or five above and three or four below, subequal; small, much exceeded by the long pointed canines. Molars generally sharply cuspidate.

Carnivorous and insectivorous; rarely omnivorous.

Australian and American\*.

### Family IV. PERAMELIDÆ.

Polyprotodont Marsupials, adapted for a fossorial insectivorous or omnivorous life. Hind limbs decidedly longer than fore. Fore feet with two or, generally, three of the middle toes long, functional, and clawed, the other toes rudimentary or absent. Hind feet syndactylous, with four or five toes, very unequal in size; hallux

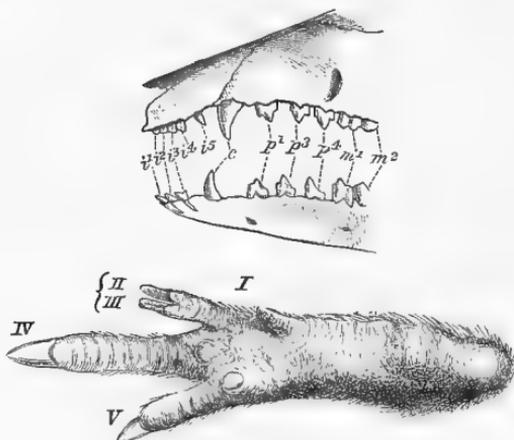
\* European as late as the Lower Miocene period.

rudimentary or absent, second and third toes slender, united; fourth the largest, long, and with a large claw; fifth small, but always present and clawed. Ungual phalanges cleft, as in *Manis*. Clavicles absent. Tail long, hairy, not prehensile\*. Stomach simple. Cæcum present. Pouch present, opening backwards.

*Dentition*:—I.  $\frac{1.2.3.4.5 \text{ or } 0}{1.2.3.}$ , C.  $\frac{1}{1}$ , P.  $\frac{1.0.3.4}{1.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2$   
=46 or 48.

*Teeth* rooted, sharp, cutting, insectivorous†. Upper incisors flattened, subequal. Lower incisors proclivous, the roots of  $i^1$  and  $i^3$  not covered by bone. Canines slender and pointed. Premolars narrow, simply pointed. Molars quadrate or triangular, multi-cuspid. Tooth-change always present, the milk-p.<sup>4</sup> functional and long-persistent.

Fig. 5.



*Perameles obesula*.—Jaws and hind foot, showing combination of polyprotodont dentition with syndactyly.

*Range*. Papuan and Australian subregions.

This family is a very distinct and sharply-defined one, its only ally being the *Dasyuridæ*, from which it differs in many important respects. Owing to the syndactyly of the hind feet of its members, it has been commonly considered as forming a connecting link between the Polyprotodonts and Diprotodonts; but, judging from the wholly Polyprotodont character of the rest of their organization, even down to the structure of their carpal and tarsal bones, all of which show far greater resemblances to the *Dasyuridæ* than to the *Phalangeridæ*, it seems probable that this presumption is wrong, and that their syndactyly has arisen entirely independently of that of the Diprotodonts, a view under which we should look upon the

\* Said to be slightly prehensile in *Perameles broadbenti* only.

† The molars rounded and semi-rooted in *Peragale lagotis* only.

*Peramelidæ* as an offshoot of the *Dasyuridæ*, with no special genetic relationship to the Diprotodonts whatever.

Difficult of acceptance as this view may appear, it is probably the only one which will explain the extraordinary combination of characters presented by the *Peramelidæ*, since it seems equally improbable either that the earliest Marsupials could have been syndactylous, or that the *Peramelidæ* could have been originally Diprotodont, and have independently assumed a Polyprotodont dentition, in default of one or other of which alternatives the view above put forward must be adopted.

### Synopsis of the Genera.

#### I. EXTERNAL CHARACTERS.

- A. Fore limbs with the second, third, and fourth digits large and functional, and the first and fifth present, although small and clawless.
- a. Hallux absent. Ears enormously long. Tail crested ..... 1. PERAGALE, p. 221.
- b. Hallux present, though clawless. Ears medium or short. Tail not crested ..... 2. PERAMELES, p. 227.
- B. Fore limbs with the second and third digits only functional, the fourth rudimentary, and the first and fifth entirely absent.
- c. Hallux absent. Ears long. Tail slightly crested ..... 3. CHÆROPUS, p. 250.

#### II. CRANIAL CHARACTERS.

- A. Skull long and narrow, its length more than double its breadth. Lower rim of orbit not flattened horizontally.
- a. Bullæ very large, double, their posterior (mastoid) portion swollen. Muzzle abruptly contracted opposite p.<sup>3</sup> P.<sup>4</sup> smaller than or barely equal to p.<sup>3</sup> ..... 1. PERAGALE, p. 221.
- b. Bullæ variable in size, single, their posterior (mastoid) portion unswollen. Muzzle evenly tapering. P.<sup>4</sup> larger than p.<sup>3</sup> .... 2. PERAMELES, p. 227.
- B. Skull short and broad, its length less than double its breadth. Lower rim of orbit broadly expanded horizontally.
- c. Bullæ small, single. P.<sup>4</sup> larger than p.<sup>3</sup> Muzzle contracted opposite p.<sup>3</sup> ..... 3. CHÆROPUS, p. 250

#### 1. PERAGALE.\*

Type.

Macrotis, *Reid*, *P. Z. S.* 1836, p. 131 (*nec Dejean, Cat.*

*Coleopt.* 1833) ..... P. lagotis.

Peragalea, *Gray, Grey's Austr., App.* ii. p. 401 (1841) .. P. lagotis.

\* Blyth (*Cuv. An. K.* p. 104, 1840) states that Prof. Owen had separated off "The Philander; *Perameles lagotis*," as a genus under the name of *Thyla-*

General form light and delicate. Muzzle long and narrow. Rhinarium narrow, apparently less deeply grooved below than in *Perameles*. Ears enormously long, reaching, when laid forward, nearly to or even beyond the end of the muzzle; funnel-shaped, their base tubular. Metatragus duplicated, the upper portion long and broad, and even the lower one projecting at its centre. Pouch well developed, opening backwards\*, but less distinctly so than in *Perameles*. Mammæ 8. Fore feet with the three centre toes long and with powerful curved claws; first and fifth toes short, rudimentary, clawless. Hind limbs much longer than fore. Hallux entirely absent externally, although its metatarsal bone is present in the skeleton; other digits as usual. Sole hairy, except just at the base of the toes, where there are one or two small circular pads. Tail long, conspicuously crested along the upper side of its terminal half.

*Skull* large, broad and strong posteriorly, but with a long and narrow muzzle, the narrow part commencing abruptly opposite p.<sup>3</sup> Nasals narrow, parallel-sided. Interorbital region not ridged, except on the lacrymal bone. Palate with very large conjoined vacuities. Bullæ very large and swollen, their anterior, alisphenoid, portion pear-shaped; their posterior, mastoid, portion also inflated.

*Dentition*:—I.  $\frac{1.2.3.4.5}{1.2.3}$ , C.  $\frac{1}{1}$ , P.  $\frac{1.0.3.4}{1.0.3.4}$  M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 48$ .

Upper incisors broad and flattened, i.<sup>5</sup> like the rest, and standing close to them. Premolars subequal, but on the whole rather decreasing in size backwards. Molars quadrangular or rounded in section, their structure differing very markedly in the two species. Lower incisors as in *Perameles*. P.<sup>1</sup> and p.<sup>3</sup> subequal, the latter slightly the largest; p.<sup>4</sup> decidedly smaller than p.<sup>3</sup> Milk-p.<sup>4</sup> present, functional, and long-persistent; as large as, or larger than, any of the upper incisors.

*Habits*. Terrestrial; fossorial; omnivorous.

*Range*. Australia.

### *Synopsis of the Species.*

#### I. EXTERNAL CHARACTERS.

- a. Size large. Tail black for its middle third . . . . 1. *P. lagotis*, p. 223.  
 b. Size small. Tail wholly white . . . . . 2. *P. leucura*, p. 225.

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*comys*. I am, however, quite unable to find any distinction of the genus in Prof. Owen's papers, and therefore retain the well-known name given to the genus by Gray. Blyth's statement was, perhaps, based on a confused account of Gray's *Thylamys elegans* (= *Didelphys elegans*), a member of the group of Opossums to which the latter author applied the name of "Philander."

\* At least in *P. lagotis*.

## II. CRANIAL CHARACTERS.

- a. Molars long-crowned, their cusps blunt, rounded, and nearly obsolete. Length of molars <sup>1-3</sup> 12 millim. or more ..... 1. *P. lagotis*, p. 223.
- b. Molars short-crowned, with numerous sharp-pointed cusps. Length of molars <sup>1-3</sup> about 10 millim. .... 2. *P. leucura*, p. 225.

1. *Peragale lagotis*.

*Perameles* (*Macrotis*) *lagotis*, *Reid*, *P. Z. S.* 1836, p. 129; *Waterh. N. H. Mamm.* i. p. 360, pl. xiii. fig. 1 (animal), pl. xx. fig. 1 (skull) (1846); *Gieb. Säug.* p. 720 (1859); *Schmidt, Zool. Gart.* viii. pp. 1, 41, & 181, & plate (animal) (1867).

*Perameles lagotis*, *Waterh. Cat. Mamm. Mus. Z. S.* p. 65 (1838); *Gulliver, P. Z. S.* 1841, p. 50; *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 153, pl. xii. (animal) (1841); *Owen, Tr. Z. S.* ii. pp. 320 & 380, pl. lxxi. fig. 1 (skull) (1841); *Less. N. Tabl. R. A., Mamm.* p. 191 (1842); *Wagn. Schr. Säug. Supp.* iii. p. 61 (1843), v. p. 210 (1855); *Schinz, Syn. Mamm.* p. 517 (1844); *Owen, Odontogr. Atl.* pl. xcvi. fig. 5 (teeth) (1845); *id. Todd's Cyclop. Anat.* iii. p. 260, fig. 96 (skull) (1845); *Desm. Dict. Univ. d'H. N.* ix. p. 579 (1849); *Gieb. Odontogr.* p. 40, pl. xviii. figs. 6 & 8 (teeth) (1855); *Schleg. Dierk.* p. 138 (1857); *Owen, Anat. Vert.* ii. p. 346, fig. 222 (skull) (1866); *Schleg. Dierent.* p. 163 (1872).

*Perameles* (*Peragalea*) *lagotis*, *Gray, Grey's Austr., App.* ii. p. 401 (1841).

*Peragale lagotis*, *Gray, List Mamm. B. M.* p. 96 (1843); *Gould, Mamm. Austr.* i. pl. vii. (animal) (1845); *Gerv. H. N. Mamm.* ii. p. 279 (1855); *Gerrard, Cat. Bones Mamm. B. M.* p. 133 (1862); *Kreff, Cat. Mamm. Austr. Mus.* p. 33 (1864); *id. Mamm. Austr.* text to pl. xi. p. 5 (1871); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 736 (1884); *Lyd. Cat. Foss. Mamm. B. M.* p. 257 (1887).

*Macrotis lagotis*, *Jent. Cat. Ost. Leyd. Mus.* p. 305 (1887).

## RABBIT-BANDICOOT.

Size large; form light and delicate. Fur very long, soft and silky, nearly wholly composed of underfur, a few longer hairs only mixed with it. General colour fawn-grey. Head very long, muzzle narrow; naked rhinarium extending back for about three quarters of an inch along the top of the muzzle, pointed behind. Face pale brown, the underfur white, and the longer hairs brown-tipped, the hairs considerably shorter and stiffer than on the body. Cheeks and bases of ears white or pale fawn. Ears very long, nearly naked, their edges finely fringed and the anterior part of their backs thinly clothed with pale brown hairs. Metatragus, so far as can be judged from dried specimens, apparently similar to that of *P. leucura*. Back hairs long, the underfur slaty grey with rather paler tips, the longer hairs fawn or brown-tipped. Sides of rump with an indistinct darker band running vertically downwards from the back, bordered before and behind by white or pale fawn-coloured bands running upwards. Chin, chest, and

belly pure white. Outer sides of fore and backs of hind limbs dark grey, grizzled with white. Rest of limbs white. Hands white, the fingers sometimes partially brown. Palms naked, wrinkled, the pads very indistinct. Hind feet white above. Soles thickly hairy, except just at the heel and at the bases of and underneath the fingers, black or dark brown for their posterior half, white distally, but the latter colour replaced by black in very old specimens. Tail about the length of the body without the head, thickly hairy throughout, its basal third furred and coloured like the body, its middle third black or dark brown, the hairs hispid and rather longer above than below, its terminal third sharply contrasted pure white, the hairs on the upper surface much elongated, and forming a prominent white crest.

*Skull* (Pl. XXII. fig. 1) large and powerful. Premaxillaries each with a small spicule of bone directed forwards below and parallel to the tip of the nasals; the tip of the muzzle being therefore, when viewed from the side, trifid. Nasals long and narrow, their greatest breadth going about 6 to  $6\frac{1}{2}$  times in their length. Interorbital region flat, markedly constricted, its edges rounded. Lacrymals forming sharp overhanging ridges externally, separating sharply their orbital from their facial surfaces. Zygomata stout and wide-spreading, markedly more so in the male than in the female. Anterior palatine foramina extending to about halfway between  $i.^5$  and the canine. Palate with a single large vacuity extending from about  $p.^3$  to  $m.^3$ , not divided by a bony septum down the centre; extreme back of palate with smaller irregular vacuities. Walls of *foramen rotundum* tubular, prolonged forwards, the opening just below instead of behind that of the combined *foramen lacerum anterius* and *foramen opticum*. Bullæ large, much prolonged outwards, backwards, and downwards.

*Teeth* large and strong. *Upper* incisors broad, flattened,  $i.^1$  about half the size of the succeeding teeth,  $i.^2$ ,  $i.^3$ , and  $i.^4$ , which are subequal;  $i.^5$  slightly pointed, separated from  $i.^4$  by a narrow diastema. Canine long and strong, and becoming exceedingly large in old specimens; its distance from  $i.^5$  about 4, and from  $p.^1$  about 3 or 4 millim.  $P.^1$  and  $p.^3$  narrow, unicuspid, the former very slightly larger than the latter, but the difference scarcely appreciable;  $p.^4$  broader transversely than the others, but distinctly shorter both horizontally and vertically. Molars rounded in section, fitting closely together, without V-shaped spaces between them; their crowns very long, and their roots only closing up quite late in life, so that they present a decided approach to continuously growing teeth; their cusps, when unworn, blunt and rounded. *Lower* canine not or scarcely longer than the premolars.  $P.^3$  slightly longer horizontally than  $p.^1$ , and decidedly longer than  $p.^4$ ; the latter tooth inconspicuously broadened behind basally. Molars as in the upper jaw. Milk- $p.^4$  above and below oval, equal in size, nearly twice as long as broad, their shape and size in section very similar to those of the lower  $i.^3$ .

*Dimensions.*

	♂. f (stuffed). Adult. millim	♀. * (in spirit). Adult. millim.
Head and body.....	(e.) 440	400
Tail .....	(c.) 220	..
Hind foot .....	98	103
Muzzle to eye .....	61	..
Ear .....	90	115

Skull, see p. 227.

*Hab.* South and West Australia.

*Type* in collection.

a. Ad., skull.	Gawler Plains, S. A.	Purchased.
b. Imm. sk., ♂.	South Australia.	Purchased.
c. Yg. skull.	Port Leschenault, W. A.	W. E. Bates, Esq. [P.].
d. { Ad. sk. } ♀. { Skull. } ♀.	Swan R., W. A.	Zool. Soc. (A. Gordon, Esq. [P.]). ( <i>Type</i> of species.)
e Ad. skull, ♂.	Swan R., W. A.	Purchased.
f. Ad. st., ♂, 6/39.	Northam, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
g. Yg. st., 5/43.	Northam, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
h. Ad. skeleton (♀).		Dr. G. Bennett [P.].
i. Ad. skull.		Sir R. Owen [P.].

## 2. *Peragale leucura*. (PLATE II.)

*Peragale leucura*, *Thos. Ann. Mag. N. H.* (5) xix. p. 397 (1887).

The following description is drawn up from the only specimen as yet known, a very young male, with its milk-teeth still in place, and may therefore have to be modified when fully adult individuals are obtained.

Size small, form slender. Fur long, soft and silky. General colour uniform pale yellowish fawn. Head long, muzzle narrow; naked rhinarium confined to the extreme tip of the snout, and not extending backwards along the top of the muzzle (unless the latter part wears bare as life advances). Ears when laid forward reaching beyond the tip of the muzzle, evenly thinly clothed with fine silvery hairs, which form a delicate fringe round their edges; their substance yellowish flesh-colour, except for their posterior half distally, where it is slaty grey. Metatragus large, oblong, its edges slightly concave, its tip broadly rounded, hairy; the long secondary lower fold also with a small triangular projection at its centre. Top of head and back fawn, suffused with slaty grey, the hairs slate-

\* Preserved in the Berlin Museum.

coloured at their bases and tipped with brown. Chin, chest, sides, and belly pure white. Limbs wholly white throughout. Palms (Pl. XXI. fig. 9) hairy on their centres and fringed round their edges, naked only along the undersides of the toes and on the pads, of which there is one single well-defined circular one at the bases of each of the second, third, fourth, and fifth fingers, and another below the middle phalanx of the second, third and fourth. Soles (Pl. XXI. fig. 10) similarly hairy and fringed, only naked on the compound terminal projection, on which there are two small round pads, and on the underside of the fourth and fifth toes. Tail about as long as the body without the head, wholly white, slender, tapering, short-haired except along its terminal third above, where a prominent white crest is formed, of which some of the hairs attain to about one inch in length.

*Skull* small and delicate, its general characters apparently very similar to those of *P. lagotis*, except that the bullæ are more evenly hemispherical in their shape, and are not so prominently bulbous postero-externally.

*Teeth* much smaller than those of *P. lagotis*, but of quite similar shapes and relative proportions. Molars small, quadrangular, with low crowns and early-formed roots, their summits with numerous sharp-pointed cusps as in *Perameles*, their general structure therefore much more distinctly insectivorous than in *P. lagotis*. Milk-premolars, both above and below, much shorter than in *P. lagotis*, their shape in section circular or triangular, and their size barely half that of one of the lower third incisors.

#### Dimensions.

	♂. a (in spirit). Very young. millim.
Head and body .....	142
Tail .....	116
Hind foot .....	55
Ear .....	63

Skull, see next page.

*Hab.* Unknown (probably Central or Northern Central Australia).

*Type* in collection.

This species, of which unfortunately the type is as yet the only specimen known, presents an interesting approximation, in the structure of its molars, to the genus *Perameles*, all its other characters, however, being quite those of *Peragale*. It is much to be hoped that more, and especially adult, specimens of this handsome animal may soon be obtained, and that its true locality may thus be exactly determined.

a. { Yg. al. } ♂.  
    { Skull. }

Mr. J. Beazley.  
(*Type* of species.)

## Skull Dimensions of Peragale.

Species.....	<i>P. lagotis.</i>		<i>P. leucura.</i>
	Sex .....	♂.	♀.
Specimen .....	<i>e.</i>	<i>d.</i>	♂.
Age .....	aged.	aged.	very young.
Basal length .....	(c.) 94	92	45
Greatest breadth .....	50	42	22.5
Nasals, length .....	47	46	18
"  greatest breadth .....	8	7	4.5
Intertemporal breadth .....	11.8	11	10
Palate, length .....	61.5	61	27.7
"  breadth outside m. <sup>3</sup> .....	28.5	26	...
"  "  inside m. <sup>3</sup> .....	17	15.3	...
Palatal foramen .....	9.7	10	5.2
Basi-cranial axis .....	(c.) 26.5	24	13
Basi-facial axis.....	67.6	68.3	32
Facial index .....	255	284	246
Teeth—distance from front of canine to back of m. <sup>4</sup> .....	44	42.5	...
"  horizontal length of p. <sup>3</sup> .....	4.2	4.2	3
"  "  "  p. <sup>4</sup> .....	3.6	3.9	...
"  "  "  ms. 1-3 .....	13.7	13	10

## 2. PERAMELES.

Type.

- Perameles, *Geoff. Bull. Soc. Philom.* iii. no. 80, p. 249  
(misprinted 149) (1803) ..... *P. nasuta.*  
 Thylacis, *Ill. Prodr. Syst. Mamm.* p. 76 (1811) ..... *P. obesula.*  
 Isodon, *Is. Geoff. Desm. N. Dict. d'H. N.* (2) xvi.  
 p. 409 (1817) ..... *P. obesula.*  
 Echymipera, *Less. N. Tabl. R. A., Mamm.* p. 192  
 (1842) ..... *P. doreyana.*  
 Brachymelis, *Mikl.-Macl. P. Linn. Soc. N. S. W.* ix.  
 p. 715 (1884) ..... *P. cockerelli.*

General build low, stout and clumsy. Muzzle long, pig-like, a rudimentary nasal ossicle sometimes present. Naked rhinarium passing down to the lip and backwards for some distance along the top of the muzzle, but not sharply defined behind, sharply grooved along its centre below. Ears very variable in size, but never so long as to reach, when laid forward, beyond just in front of the eye; a small open pouch situated at the base of their inner margin, and the lower fourth of their outer margin duplicated, so as to form a second pouch-like hollow between the two portions. Metatragus either large, oblong, and partially twisted, or small and triangular, a second deep transverse fold also present below it, so as to form a deep hollow between the two (see Pl. XXI. fig. 5). Pouch well developed, opening downwards and backwards. Mammæ 6 or 8, placed in two parallel rows. Fore feet with the three centre toes long, subequal, and provided with strong curved fossorial claws; first and fifth digits short and clawless, but always present. Hind feet with five digits, the hallux short and clawless, the united second

and third with flattened twisted nails, the fourth long, powerful, and with a strong pointed claw, and the fifth similar but smaller. Soles naked or partially hairy; pads either reduced to two small ones at the bases of the larger digits or entirely absent. Tail present, tapering, uniformly short-haired or nearly naked.

*Skull* much elongated, with a long and generally slender muzzle. Nasals long and narrow, not markedly expanded behind. Inter-orbital region rounded, not ridged above, except sometimes anteriorly in the lacrymal region. Palate always with one, and often with two pairs of vacuities. Bullæ variable, either large and boldly inflated, or small and partially imperfect, their posterior, mastoid, portion never swollen.

*Dentition* :—I.  $\frac{1.2.3.4.5 \text{ or } 0}{1.2.3}$ , C.  $\frac{1}{1}$ , P.  $\frac{1.0.3.4}{1.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2$   
= 46 or 48.

*Teeth*. Upper incisors flattened, vertical, subequal, the first four close together, the fifth either absent or standing some way behind the rest. Premolars either evenly increasing in size backwards, or  $p^1$  and  $p^3$  subequal, but  $p^4$  always larger and heavier than the other two;  $p^1$  with diastemata both in front of and behind it. Molars multicuspidate, either triangular or quadrangular, the anterior ones with four minute cusps along their outer edges.  $M^4$  small, placed transversely, generally with a distinct posterior talon. Lower teeth more or less similar in character to upper;  $i^3$  with a distinct posterior secondary cusp; roots of  $i^1$  and  $i^3$  entirely uncovered by bone antero-inferiorly.  $P^1$  placed some way from canine, and nearer to  $p^3$ .  $M^4$  with a distinct posterior talon, which in some species is large and bicuspid, in others small and simple.

Milk-premolars always present, functional and persistent until the animal is about half-grown.

*Habits*. Terrestrial, fossorial, omnivorous.

*Range*. Papuan and Australian subregions.

This genus contains the great mass of the members of the family, animals to which the name of Bandicoot is commonly applied. The species are common and widely distributed, and are well known to the colonists on account of the damage done by them in gardens and cultivated fields. Their food consists of roots, bulbs, berries, fallen fruit, and other vegetable substances, in addition to insects and earthworms, on which latter they probably chiefly live, judging by the large amount of comminuted earth that is generally to be found in their stomachs.

The Australian species of *Perameles* fall into two very distinct groups, of which *P. obesula* and *P. gunni* are respectively typical, and these would probably deserve to be generically separated from one another were it not that in New Guinea many of the intermediate links between the two have been preserved. This division into groups was fully recognized by Mr. Gould, who states (Mamm. Austr. i. text to pl. xi.) that the members of the first one "inhabit low swampy grounds covered with dense vegetation," and those of the second live on "the stony ridges of the hotter and more exposed parts."

*Synopsis of the Species.*

## I. EXTERNAL CHARACTERS.

- A. Centre of sole, in adults, naked nearly or quite to the heel. Ear short, when laid forwards not, or barely, reaching to the eye; its tip rounded, not pointed.
- a. Sole wrinkled, with distinct pads at the bases of the digits. Metatragus oblong, longer than broad, its end twisted. Fur spiny, but the spines not exceeding about  $\frac{1}{3}$  millim. in breadth. Mammæ 8.
- a<sup>1</sup>. Rump grizzled yellow, uniform with anterior back.
- a<sup>2</sup>. South and West Australian . . . . . 1. *P. obesula*, p. 231.
- b<sup>2</sup>. North Australian . . . . . 2. *P. macrura*, p. 234.
- b<sup>1</sup>. Rump grizzled orange, darker than the yellow-grizzled anterior back. Papuan . . . . . 3. *P. moresbyensis*, p. 235.
- b. Sole finely granulated, without or with very indistinct and rudimentary pads. Metatragus small, triangular, or rudimentary. Papuan only.
- c<sup>1</sup>. Tail short, not, or scarcely, longer than the head. Fur excessively spiny, the spines from  $\frac{1}{2}$  to  $\frac{7}{8}$  millim. in breadth.
- c<sup>2</sup>. Size large. Muzzle long, the distance from nose to eye more than 45 millim. Mammæ 8 . . . . . 4. *P. doreyana*, p. 236.
- d<sup>2</sup>. Size smaller. Muzzle short, the distance from nose to eye less than 45 millim. Mammæ 6 . . . . . 5. *P. cockerelli*, p. 238.
- d<sup>1</sup>. Tail long, twice the length of the head. Fur scarcely spiny at all.
- e<sup>2</sup>. Size large. Distance from nose to eye more than 45 millim.; hind foot more than 65 millim. long. Mammæ 8.
- a<sup>3</sup>. Hind foot less than 85 millim. long. Tail simple . . . . . 6. *P. raffrayana*, p. 239.
- b<sup>3</sup>. Hind foot more than 85 millim. long. Tail transversely ribbed below; prehensile . . . . . 7. *P. broadbenti*, p. 240.
- f<sup>2</sup>. Size small. Distance from nose to eye less than 45 millim. Hind foot less than 65 millim. long. Mammæ 6 . . . . . 8. *P. longicaudata*, p. 241.
- B. Posterior half of sole hairy\*. Ear long, when laid forward reaching beyond eye; its tip pointed. Mammæ 8.
- c. Rump unstriped. Tail dark above for its whole length. Hind foot more than 65 millim. long . . . . . 9. *P. nasuta*, p. 242.

\* The heel is occasionally worn bare in old specimens.

- d.* Sides of rump more or less distinctly striped.
- e*<sup>1</sup>. Tail only dark above for its basal inch. Hind foot more than 65 millim. long . . . . . 10. *P. gunni*, p. 245.
- f*<sup>1</sup>. Tail dark above for its whole length. Hind foot less than 60 millim. long. 11. *P. bougainvillei*, p. 246.

## II. CRANIAL CHARACTERS.

- A. Bullæ large, pear-shaped. Incisors  $\frac{5}{3}$ .
- a.* Molars small and narrow; molars <sup>1-3</sup> 11 millim. or less; m.<sup>4</sup> without or with a very small posterior heel. Coronoid process slanting markedly backwards . . . . . 1. *P. obesula*, p. 231
- b.* Molars large and broad; molars <sup>1-3</sup> more than 11 millim.; m.<sup>4</sup> with a large and distinct posterior heel. Coronoid process upright.
- a*<sup>1</sup>. Molars very large and square, filling up the V-shaped spaces between them . . . . . 2. *P. macrura*, p. 234.
- b*<sup>1</sup>. Molars more triangular in section, with V-shaped spaces between them. 3. *P. moresbyensis*, p. 235.
- B. Bullæ small, hemispherical, often more or less imperfect.
- c.* Incisors  $\frac{4}{3}$ . Bullæ minute, generally imperfect. Coronoid process broad, its edge convex in front. Lacrymal bone rounded externally.
- c*<sup>1</sup>. Tip of premaxillæ to orbit more than 38 millim. I.<sup>4</sup> about equal to i.<sup>2</sup> and i.<sup>3</sup> Molars light, triangular in section . . . . . 4. *P. doreyana*, p. 236.
- d*<sup>1</sup>. Tip of premaxillæ to orbit less than 36 millim. I.<sup>4</sup> decidedly narrower than i.<sup>2</sup> or i.<sup>3</sup> Molars broad and rounded . . . . . 5. *P. cockerelli*, p. 238.
- d.* Incisors  $\frac{5}{3}$ .
- e*<sup>1</sup>. Lacrymal bone rounded externally. Coronoid process broad, its edge convex in front.
- a*<sup>2</sup>. Basal length more than 65, palatal length more than 45, molars <sup>1-3</sup> more than 11 millim.
- a*<sup>3</sup>. Molars <sup>1-3</sup> from 12 to 13 millim. Palatal length less than 60 millim. . . . . 6. *P. raffrayana*, p. 239.
- b*<sup>3</sup>. Molars <sup>1-3</sup> 14 millim. or more. Palatal length more than 60 millim. . . . . 7. *P. broadbenti*, p. 240.
- b*<sup>2</sup>. Basal length less than 65, palatal length less than 45, and molars <sup>1-3</sup> less than 11 millim. 8. *P. longicaudata*, p. 241.

- f*<sup>1</sup>. Lacrymal bone forming a sharp overhanging ledge postero-externally. Coronoid process narrow and weak, its anterior edge concave.
- e*<sup>2</sup>. Molars <sup>1-3</sup> more than 11 millim.
- c*<sup>3</sup>. Palate (in adults) perfect between anterior premolars . . . . . 9. *P. nasuta*, p. 242.
- d*<sup>4</sup>. Palate with a pair of additional vacuities between the anterior premolars . . . . . 10. *P. gunni*, p. 245.
- d*<sup>2</sup>. Molars <sup>1-3</sup> less than 11 millim.
- e*<sup>3</sup>. Palate with vacuities between the anterior premolars . . . . . 11. *P. bougainvillei*, p. 246.

1. *Perameles obesula*.

- Didelphis obesula*, *Shaw, Nat. Misc.* viii. pl. 298 (animal) (circa 1793); *id. Gen. Zool.* i. pt. ii. p. 490 (1800); *Turt. Linn. Syst. Nat.* i. p. 68 (1806).
- Perameles obesula*, *Geoff. Ann. Mus.* iv. p. 64, pl. xlv. (animal and skull) (1804); *G. Fisch. Zoogn.* iii. p. 13 (1814); *Desm. Mamm.* i. p. 265 (1820); *Schinz, Cuv. Thierr.* i. p. 256 (1821); *Gray, Griff. Cuv. An. K.* v. p. 195 (1827); *Less. Man. Mamm.* p. 217 (1827); *id. Dict. Class. d'H. N.* xiii. p. 200 (1828); *J. B. Fisch. Syn. Mamm.* p. 274 (1829); *Less. H. N. Mamm. (Compl. Buff.)* iv. p. 487 (1830); *Waterh. Cat. Mamm. Mus. Z. S.* p. 65 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 159, pl. xiv. (animal) (1841); *Gray, Grey's Austr., App.* ii. p. 401 (1841); *Owen, Tr. Z. S.* ii. p. 320 (1841); *Wagn. Arch. f. Nat.* vii. pt. i. p. 290 (1841); *Less. N. Tabl. R. A., Mamm.* p. 191 (1842); *Gray, List. Mamm. B. M.* p. 96 (1843); *Wagn. Schr. Säug. Supp.* iii. p. 59 (1843), v. p. 211 (1855); *Schinz, Syn. Mamm.* i. p. 516 (1844); *Waterh. N. H. Mamm.* i. p. 368, pl. xx. fig. 2 (skull) (1846); *Gunn, P. Roy. Soc. Tasm.* ii. p. 83 (1852); *Gieb. Odontogr.* p. 40, pl. xviii. fig. 7 (teeth) (1855); *Gould, Mamm. Austr.* i. pl. xii. (animal) (1856); *Schleg. Dierk.* p. 138 (1857); *Gieb. Säug.* p. 721 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 132 (1862); *Krefft, Cat. Mamm. Austr. Mus.* p. 34 (1864); *id. Notes Faun. Tasm.* p. 1 (1868); *id. Mamm. Austr.* text to pl. xi. p. 6 (1871); *Schleg. Dierent.* p. 164 (1872); *Gieb. Bronn's Kl. u. Ord.* vi. Abth. v. pl. xix. fig. 7 & pl. xvii. fig. 30 (skull & teeth) (1874-76); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 736 (1884); *Lyd. Cat. Foss. Mamm. B. M.* p. 256 (1887); *Jent. Cat. Ost. Leyd. Mus.* p. 306 (1887).
- Thylacis obesula*, *Ill. Prodr. Syst. Mamm.* p. 76 (1811).
- Isoodon obesula*, *Desm. N. Dict. d'H. N.* (2) xvi. p. 409 (1817); *F. Cuv. Dict. Sci. Nat.* xxxviii. p. 416 (1825); *Desm. Dict. Univ. d'H. N.* ix. p. 579 (1849).
- Perameles fusciventer*, *Gray, Grey's Austr., App.* ii. p. 407 (1841); *id. List. Mamm. B. M.* p. 96 (1843); *Gerrard, Cat. Bones Mamm. B. M.* p. 132 (1862).
- Perameles affinis*, *Gray, List. Mamm. B. M.* p. 96 (1843).

## SHORT-NOSED BANDICOOT.

Form rather thick and stout. Fur short, coarse and spiny, the spines flattened, and averaging where shortest rather less than

one third of a millimetre in breadth. Underfur rather sparse, slate-coloured, with yellowish tips. General colour all over coarsely grizzled yellow and black, the longer, coarser hairs either with a yellowish tip and a subterminal black band, or wholly black. Face quite uniform with body. Ears (Pl. XXI. fig. 5) short, broad, when laid forward only reaching to within about 5 millim. of the posterior canthus of the eye; their backs brown, narrowly margined with white. Metatragus long, its length about twice its breadth, its tip twisted upwards and backwards, closely covered with fine soft hairs; the transverse ridge below it deeper than usual, and slightly thickened in the centre. Chin, chest, and belly white or yellowish white, generally sharply separated from the darker colour of the back and sides. Outer sides of limbs brown, inner sides white, hands and feet brown or mixed brown and white. Soles naked, except, in immature specimens, under the calcaneum, their surface coarsely wrinkled or reticulated; a single large smooth pad at the base of each of the fourth and fifth toes, and a smaller and more indistinct one at the base of the conjoined second and third. Tail of medium length, evenly tapering, brown above and white below. Mammæ 8.

*Skull* short and strongly built; muzzle short, broad, evenly tapering. Nasals parallel-sided, their greatest breadth about one fifth or one sixth of their length. Interorbital region evenly convex, supra-orbital edges rounded; lacrymal bones small, but with a distinct sharp-edged ridge separating each of them into an orbital and a facial portion. Zygomata not much more markedly expanded in the male than in the female. Palate comparatively imperfect; anterior palatine foramina reaching to just behind  $i^4$ ; a second pair of small vacuities present between the two front premolars; posterior vacuities large, opposite  $ms.^1 \& 2$ ; extreme back of palate with other smaller vacuities. *Foramen rotundum*\* directed forwards, partially tubular externally. Bullæ very large and inflated, completely ossified, pear-shaped, the larger end lying postero-externally. Lower jaw thin and slender, its posterior portion comparatively weak, and the coronoid process slanting considerably backwards, its anterior edge forming a very obtuse angle ( $110^\circ$  to  $120^\circ$ ) with a line drawn along the tops of the teeth.

*Teeth* small and weak. Upper  $i^5$  placed about 1 millim. from  $i^4$ , its tip cylindrical, sharply pointed, quite different from the broad, flat-edged anterior incisors.  $P.^1$  about equidistant from the canine and  $p.^3$  and about equal in size to the latter;  $p.^4$  larger than either and considerably thickened internally, its outline in section oval, or rounded triangular. Molars small, narrow, rounded, their cusps low and soon worn off; the combined length of the first three from 9 to 10.5 millim.;  $m.^4$  without, or with a very small and in-

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\* This is the second of the large foramina in the base of the brain-case, the first or most anterior being homologous with the *foramen lacerum anterius* + the optic foramen of the normal placental mammals. (See Flower, 'Osteol. Mamm.' ed. 3, p. 240.)

conspicuous, posterior talon. Lower incisors small; premolars evenly increasing in size backwards; diastemata in front of and behind canine about 2 millim. each.

## Dimensions.

	♂. <i>i</i> (in spirit). Adult. millim.	♀. <i>e</i> (skin). Adult. millim.
Head and body .....	275	330
Tail.....	133	(c.) 100
Hind foot .....	59	53
Muzzle to eye.....	41	41
Ear.....	21	(c.) 15
Skull, see p. 249.		

*Hab.* Eastern, South-eastern, South and Western Australia, and Tasmania.

*Type* not in existence.

<i>a.</i> Imm. al., ♀.	Richmond R., N. S. W.	Mr. A. P. Goodwin [C.].
<i>b.</i> Ad. sk., ♂.	New South Wales.	Sir T. L. Mitchell [P. & C.].
<i>c.</i> Yg. st.	Sydney, N. S. W. ( <i>J. G.</i> ).	Gould Coll.
<i>d.</i> Ad. st., ♂.	Port Arthur, Tas- mania ( <i>J. G.</i> ).	Gould Coll.
<i>e.</i> { Ad. sk. } { Skull. } ♀, 4/12/38.	Bushy Park, New Norfolk, Tas- mania ( <i>J. G.</i> ).	Gould Coll.
<i>f.</i> Yg. sk.	Kangaroo Point, near Hobart Town.	Gould Coll.
<i>g.</i> Ad. sk., ♀.	Tasmania.	( <i>Type</i> of <i>P. affinis</i> , Gray.) Purchased.
<i>h.</i> { Yg. sk. } { Skull. }	Tasmania.	W. F. Petterd, Esq. [C. & E.].
<i>i.</i> Ad. al., ♂.	S. Australia.	Purchased.
<i>j.</i> Ad. sk., ♂.	Adelaide, S. A.	C. D. E. Fortnum, Esq. [P. & C.].
<i>k, l.</i> { Ad. ♂ & imm. sks. } { Skulls. }	S. Australia.	Sir G. Grey [P. & C.].
<i>m.</i> Yg. st.	S. Australia.	Sir G. Grey [P. & C.].
<i>n.</i> { Ad. sk. } { Skull. }	K. George's Sound, W. A. ( <i>Type</i> of <i>P. fusciventer</i> , Gr.)	Gould Coll.
<i>o.</i> Yg. st.	K. George's Sound, W. A.	Gould Coll.
<i>p.</i> Ad. skeleton.	Port Leschenault, W. A.	W. E. Bates, Esq. [P.].
<i>q, r.</i> Ad. st., ♂ ♀.	Perth, W. A. ( <i>J.</i> <i>Gilbert</i> ).	Gould Coll.
<i>s, t, u.</i> Skulls.	Perth, W. A. ( <i>J.</i> <i>Gilbert</i> ).	Gould Coll.
<i>v, w, x.</i> Skulls.		Gould Coll.
<i>y.</i> Ad. skeleton (mounted).		Purchased.

2. *Perameles macrura*.

*Perameles macrura*, Gould, *P. Z. S.* 1842, p. 41; Gray, *List Mamm. B. M.* p. 96 (1843); Schinz, *Syn. Mamm.* i. p. 519 (1844); Waterh. *N. H. Mamm.* i. p. 366 (1846); Wagn. *Schr. Säug. Supp.* v. p. 211 (1855); Gieb. *Säug.* p. 721 (1859); Gerrard, *Cat. Bones Mamm. B. M.* p. 132 (1862); Gould, *Mamm. Austr., Introd.* i. p. xxiv (1863); Jent. *Cat. Ost. Leyd. Mus.* p. 306 (1887); Coll. *Zool. Jahrb.* ii. p. 871 (1887).

*Perameles macrura*, var. *torosus*, Rams. *P. Linn. Soc. N. S. W.* ii. p. 12 (1878).

*Perameles auratus*, Rams. *P. Linn. Soc. N. S. W.* (2) ii. p. 551 (1887).

## NORTH-AUSTRALIAN BANDICOOT.

Almost indistinguishable externally from *P. obesula*. The tail, however, is rather longer, the feet, as a rule, are larger and heavier, and the general colour is darker, especially on the head.

*Skull* large and stout, generally more heavily built than that of *P. obesula*, especially in the male. Nasals, structure of interorbital region, lacrymals, anterior palatine foramina, foramina rotunda, and bullæ as in *P. obesula*. Zygomata much more expanded in the male than in the female. Palate more completely ossified than in *P. obesula*, the vacuities opposite p.<sup>1</sup> absent, those opposite m.<sup>3</sup> and m.<sup>2</sup> smaller, and the extreme back of the palate without or with scarcely any minute vacuities. Lower jaw much heavier and thicker than in *P. obesula*, and the ascending process not nearly so much slanting backwards, the line of the teeth meeting its anterior edge at an angle but little more than a right angle (91°-100°).

*Teeth* large and strong. Upper i.<sup>5</sup> scarcely separated from i.<sup>4</sup>, nearly as broad and flat as the other incisors, although pointed at its tip. P.<sup>1</sup> about 2 millim. from the canine, and 1 millim. from p.<sup>3</sup>; p.<sup>5</sup> rounded in section, but little longer (horizontally) than broad. Molars large, square and heavy, the combined lengths of the three first from 11.5 to 12.5 millim., their inner halves nearly as long, antero-posteriorly, as their outer, so that the usual V-shaped spaces between them are closed up; m.<sup>4</sup> with a large and conspicuous posterior talon. Lower i.<sup>3</sup> about 1 or 2 millim. from the canine, behind which there is a diastema of 2 or 3 millim.; p.<sup>1</sup> about 1 millim. from p.<sup>3</sup>. Molars large and strong, as in the upper jaw.

*Dimensions.*

	♂. <i>b</i> (skin). Adult. millim.	♀. <i>c</i> (stuffed). Adult. millim.
Head and body.....	410	335
Tail .....	(c.) 180	..
Hind foot .....	70	56
Muzzle to eye .....	46	36
Ear .....	22*	21
Skull, see p. 249.		

\* 20 millim. in a very large head preserved in spirit in the Genoa Museum. In this specimen the ear, when laid forward, only reaches to within about 10 or 12 millim. of the eye.

*Hab.* Northern Australia, from west to east.

*Type* in collection.

a.	{ Ad. sk. } { Skull. }	♀, 12/40.	Cape York.	Voy. 'Rattlesnake.'
b.	{ Ad. sk. } { Skull. }	♂.	Port Essington, Northern Territory.	Gould Coll. ( <i>Type</i> of species.)
c.	{ Ad. st. } { Skull. }	♀.	Port Essington, N. T.	Gould Coll.
d.	{ Ad. sk. } { Skull. }	♂, 11/44.	Port Essington, N. T. ( <i>Dr. J. Macgillivray.</i> )	Lord Derby [P.].
e.	Yg. sk.		Victoria R., N. T. ( <i>North Australian Ex- pedition.</i> )	Dr. J. R. Elsey [P.].
f.	Yg. al., ♂.		( <i>North Australian Ex- pedition.</i> )	Dr. J. R. Elsey [P.].
(?) g.	Imm. al., ♀.			Mr. J. Beazley [C.].

### 3. *Perameles moresbyensis*.

*Perameles moresbyensis*, *Rams. P. Linn. Soc. N. S. W.* ii. p. 14 (1878), iii. p. 244 (1878), iv. p. 88 (1879).

General external characters as in *P. obesula* and *P. macrura*, except that the fur is coarser and more spiny, the colour of the crown of the head is darker, and the posterior back, instead of being uniform with the forequarters, is a dark grizzled orange, the part of the hairs that is elsewhere yellow becoming gradually a deep orange posteriorly, and the terminal halves of many of the hairs of the rump being wholly orange.

*Skull* (Pl. XXII. fig. 2) in all its essential characters identical with that of *P. macrura*, except that the nasals appear to be broader behind and more tapering forwards, their greatest breadth going about  $4\frac{1}{2}$  or 5 times in their length.

*Teeth* (see fig. *cit.*) intermediate in size between those of *P. obesula* and *P. macrura*, but nearer to those of the latter. Upper  $i^5$  as in *P. macrura*, but standing further from  $i^4$ . Cheek-teeth also as in that species, but the inner halves of the molars are shorter antero-posteriorly, so that there are narrow V-shaped spaces between them;  $m^4$  with a posterior talon. Lower teeth as in *P. macrura*.

#### *Dimensions.*

	♂. a (skin). Adult. millim.	♀. b (skin). Adult. millim.
Head and body .....	400	260
Tail .....	..	126
Hind foot.....	64	55
Ear .....	(c.) 18	(c.) 17
Skull, see p. 249.		

*Hab.* South-eastern New Guinea.

*Type* in the Sydney Museum.

I have had considerable hesitation in retaining this species as distinct from *P. macrura*; but the differences between the two, although slight, seem to be constant, and their respective localities being definitely separated by sea, intermediate specimens are not very likely to occur. It is, however, worthy of note that specimen *c* of the present species, externally quite identical with *a* and *b* and collected with it, has its teeth small and rounded, very much as in *P. obesula*, thus showing how large a range of variation must be allowed between the different species of *Perameles*.

<i>a-c.</i>	{ Ad. sks. } { Skulls. }	♂ ♀.	Aleya, S.E. New Guinea.	Dr. James [C.].
<i>d.</i>	Yg. sk.		Port Moresby, N. G.	Dr. Turner [C.].
<i>e.</i>	{ Ad. sk. } { Skull. }	♀.	S.E. New Guinea (O. C. Stone).	Leicester Museum [E.].
<i>f.</i>	Ad. al., ♀ & yg.,		Kalo, S.E. New Guinea,	H. O. Forbes, Esq.
	10/11/85.		1750 ft.	[C.].

#### 4. *Perameles doreyana*.

*Perameles doreyana*, Quoy & Gaim. *Voy. Astrolabe, Zool.* i. p. 100, pl. xvi. (animal, skull, &c.) (1830); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 373 (1836); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 161 (1841); *Wagn. Schr. Säug. Supp.* iii. p. 60 (1843), v. p. 214 (1855); *Schinz, Syn. Mamm.* i. p. 516 (1844); *Waterh. N. H. Mamm.* i. p. 386 (1846); *Gray, Zool. Voy. Samarang, Vert.* p. 32 (1850); *Gray, P. Z. S.* 1858, p. 113; *Gieb. Säug.* p. 723 (1859); *Schleg. Ned. Tijdschr. Dierk.* iii. p. 353 (1866); *id. Dierent.* p. 164 (1872); *Peters & Doria, Ann. Mus. Genov.* xvi. p. 670 (1881); *Jent. Cut. Ost. Leyd. Mus.* p. 306 (1887).

*Perameles rufescens*, *Peters & Doria, Ann. Mus. Genov.* vii. p. 541 (1875), xvi. p. 671 (1881).

*Perameles aruensis*, *Peters & Doria, Ann. Mus. Genov.* vii. p. 542 (footnote) (1875); xvi. p. 671, pl. viii. fig. 1, & pl. ix. fig. 1 (skull) (1881)\*.

Size large, muzzle long, limbs short. Fur exceedingly coarse and spiny, the flattened bristles channelled on each side, from one half to seven eighths of a millimetre in breadth, and even the slenderer underfur coarse and hispid. General colour of body dark coppery brown, coarsely grizzled with orange, the flattened bristles uniformly brown, the thinner hairs grey, with their tips yellow anteriorly and orange posteriorly, the latter often exceedingly

\* The following synonymy refers either to *P. doreyana* or *P. cockerelli*, but, in addition to the fact that the name "*Kalubu*" was not at first applied binomially, it is impossible to determine to which of the two it should be assigned, the type having been lost and the description being equally applicable to young specimens of either.

— *Kalubu*, *Less. Voy. Coquille*, i. pt. i. p. 123 (1826).

*Perameles* (?) *Kalubu*, *Less. Dict. Class. d'H. N.* xiii. p. 200 (1828); *Fisch. Syn. Mamm.* p. 274 (1829).

*Echymipera kalubu*, *Less. N. Tabl. R. A., Mamm.* p. 192 (1842); *Desm. Dict. Univ. d'H. N.* ix. p. 579 (1849).

bright and glistening, but sometimes almost obsolete. Top of head dark brown, owing to the greater proportion of bristly hairs present there. Muzzle long and narrow, the distance from the tip of the nose to the anterior canthus of the eye considerably exceeding that from the latter to the ear. Ears small, laid forward they do not reach halfway to the eye, their inner margin evenly convex, their outer nearly straight for its upper two thirds, then markedly convex; metatragus about 3 millim. in length, triangular, pointed, its tip thinly haired. Chin, chest, and belly variable, either white, mixed brown and white, or brown and yellow. Arms, legs, and feet brown, hands white. Hind feet (Pl. XXI. fig. 6) very variable in size, but generally in the male 60 millim. or more, and in the female from 50 to 60 millim. long; soles wholly naked, their surface without separated pads, uniformly coarsely granulated. Mammaræ 8.

*Skull* (Pl. XXII. fig. 3) large, long and narrow, but strongly built. Muzzle very long, the distance from the tip of the premaxillæ to the front of the orbit from 38 to 45 millim. Nasals long, their greatest breadth going  $5\frac{1}{2}$  or 6 times in their length. Interorbital space smooth, rounded, parallel-sided, its edges evenly rounded. Lacrymal bone smoothly rounded externally, not ridged. Zygomatic arches but little expanded. Palate comparatively perfect, the only vacuities, besides the anterior palatine foramina, being a single pair opposite the first two or three molars. Walls of *foramen rotundum* prolonged into a distinct bony tube, opening forwards. Bullæ exceedingly small, generally imperfect, the tympanic ring not ossified to the bullæ, and therefore usually lost in cleaned and dried skulls. Lower jaw long and slender, but the ascending process convex forwards as usual.

*Teeth* small and delicate. Upper incisors only 4 in number;  $i^5$  always absent; the others broad and flat;  $i^4$  not markedly shorter than  $i^2$  and  $i^3$ . Canine very short and small, never longer than and rarely as long as  $p^4$ ; its distance behind  $i^4$  from  $6\frac{1}{2}$  to  $7\frac{1}{2}$  millim., and in front of  $p^1$  about 3 millim. Premolars light and slender, evenly increasing in size backwards; diastema between  $p^1$  and  $p^3$  about 2 millim.;  $p^4$  with an internal basal thickening. Molars light, triangular, their internal portion very much shorter antero-posteriorly than their external, so that broad V-shaped gaps are left between them. Lower teeth as usual; canine about the length of  $p^1$ .

#### *Dimensions.*

	♂.	♀.
	c (in spirit).	a (in spirit).
	Adult.	Adult.
	millim.	millim.
Head and body . . . . .	(c.) 450	380
Tail . . . . .	120	83
Hind foot . . . . .	75	56
Muzzle to eye . . . . .	58	48
Ear . . . . .	23	24

Skull, see p. 249.

*Hab.* New Guinea and neighbouring islands, including the Kei and Aru groups.

*Type* in the Paris Museum.

a. Ad. al., ♀.	Sorong, N.W. New Guinea ( <i>D'Albertis</i> ).	Genoa Museum [E.].
b. Ad. sk., ♀, 20/4/75.	Sorong, N. G. ( <i>Bruijn</i> ).	Genoa Museum [E.].
c. Ad. al., ♂.	Huon Gulf, N. G.	P. Comrie, Esq. [C.].
d. { Ad. sk. } ♂.	Huon Gulf, N. G.	P. Comrie, Esq. [C.].
{ Skull. }		
e. { Ad. sk. } ♀.	Aru Islands.	A. R. Wallace, Esq. [C.].
{ Skull. }		
f. Ad. skull, ♀.	Giabu Lengan, Aru Is.	Kowalevski Coll. Mr. J. Beazley [C.].
g. Yg. al., ♀.		

### 5. *Perameles cockerelli*.

*Perameles cockerelli*, *Rams. P. Linn. Soc. N. S. W.* i. pp. 310 & 378 (1877).

*Perameles myoides*, *Günth. Ann. Mag. N. H.* (5) xi. p. 247 (1863).

*Perameles* (*Brachymelis*) *garagassi*, *Mikl.-Macl. P. Linn. Soc. N. S. W.* ix. p. 715, pl. xxxviii. (animal, skull, &c.) (1884).

Size markedly smaller, and muzzle shorter than in *P. doreyana*. Quality of fur as in that species. General colour of back coarsely grizzled black and yellow. Muzzle short and broad, the distance from the nose to the anterior canthus of the eye less than, or barely, 40 millim. Face and crown dark brown, scarcely grizzled; sides of face, below eyes, sharply contrasted white. Ears small, but, owing to the general shortness of the head, reaching, when laid forward, to within only 2 or 3 millim. of the posterior canthus of the eye. Metatragus triangular, pointed. Spines of back grey, with their tips black; thinner hairs yellow-tipped anteriorly, this colour becoming gradually darker posteriorly until on the rump it is bright orange. Chin, chest, and belly sharply defined white. Arms and legs brown, hands white, feet grey. Hind feet only about 50–55 millim. long in the male and from 40 to 45 millim. in the female; soles wholly naked, finely granulated, without pads. Mammaræ 6.

*Skull* as in *P. doreyana*, except that it is smaller and the muzzle is shorter, the distance from the tip of the premaxillæ to the front of the orbit being only from 30 to 35 millim. Greatest breadth of nasals going from  $4\frac{1}{2}$  to  $5\frac{1}{2}$  times in their length.

*Teeth* (Pl. XXII. fig. 4). Upper  $i^5$  wholly absent;  $i^4$  decidedly shorter antero-posteriorly than  $i^2$  and  $i^3$ , about equal to  $i^1$ . Canine very small, about the length of  $p^1$ , its distance behind  $i^4$  from  $4\frac{1}{2}$  to  $5\frac{1}{2}$  millim., and in front of  $p^1$  about 2 millim. Premolars evenly increasing in size backwards,  $p^4$  with a distinct postero-internal basal ledge. Molars broader and more quadrangular than in *P. doreyana*, their outer sides shorter in proportion to their

inner, and the internal V-shaped spaces between them therefore nearly or quite closed up.

*Dimensions.*

	♂. b (skin). Adult. millim.	♀. * (in spirit). Adult. millim.
Head and body . . . . .	300	270
Tail . . . . . (c.)	85	71
Hind foot . . . . .	52	45
Muzzle to eye . . . . .	38	32.5
Ear . . . . .	17	18

Skull, see p. 249.

*Hab.* North coast of New Guinea, and islands (Salawatti, Misori, and New Britain group).

*Type* in Sydney Museum.

- a. Imm. al., ♀. New Britain (*Kleinschmidt*). Godeffroy Museum.  
(*Type* of *P. myoides*, Günth.)
- b. { Ad. sk. { ♂. Duke of York Island. Rev. G. Brown [C.]  
  { Skull. {

6. *Perameles raffrayana*.

*Perameles raffrayana*, *A. M.-Edw. Ann. Sci. Nat.* (6) vii. (Art. xi.) pl. viii. (animal) (1878).

Size rather large, form light and delicate; head long and slender. Fur thick and close, although hispid, slightly spinous locally, but never so spinous as in the members of the *P. obesula* group; rather more as in *P. nasuta*. General colour of back coarsely grizzled rufous or umber-brown, the stiffer semi-spinous hairs black, the thinner ones dark orange or rufous tipped. Head dark brown, sides of face paler. Muzzle very long and slender, top and sides of nose naked. Ears longer and narrower than in any of the preceding species, but, owing to the length of the head, they do not, when laid forward, quite reach to the eye; their tip evenly rounded; metatragus small, but little more than a simple ridge, sometimes with a low triangular projection at its centre. Chin and chest white; belly brown or mixed white and brown. Limbs uniformly brown wherever hairy, but the fingers nearly naked. Hind soles quite naked, coarsely granulated; with indistinct and rudimentary pads at the bases of the fourth and fifth digits. Tail long, cylindrical, uniformly clothed with short fine black hairs, above and below. Mammæ 8.

*Skull* narrow, with a very long slender muzzle. Nasals much elongated, their greatest breadth going 6 or 7 times into their length. Interorbital region smooth and rounded, lacrymal bones

not ridged. Zygomata but little expanded. Palate with the anterior foramina reaching nearly to the level of the front of the canines; and with a single pair of vacuities opposite m.<sup>2</sup> and m.<sup>3</sup> *Foramen rotundum* with its walls produced forwards into a bony tube, as in *P. doreyana*. Bullæ minute and very incomplete.

*Teeth* large and strong. Upper incisors 5 in number; the anterior four broad and spatulate, i.<sup>5</sup> rather less than a millimetre distant from i.<sup>4</sup>, pointed, narrower than the rest. Canine of about the vertical height of p.<sup>4</sup>, distant about 3 millim. from i.<sup>1</sup> and 4 millim. from p.<sup>1</sup> Premolars long and strong, diastema between p.<sup>5</sup> and p.<sup>3</sup> about 3 millim.; p.<sup>4</sup> but little thickened postero-internally. Molars large and strong, broadly triangular in outline, with shallow, widely open V-shaped spaces between them. Lower teeth similar in character to the upper; canine about as long as p.<sup>1</sup>

#### Dimensions.

	♂ (?). h (stuffed): Adult. millim.	♀. a (skin in spirit). Adult. millim.
Head and body.....	410	330
Tail .....	185	172
Hind foot .....	82	74
Muzzle to eye .....	53	48
Ear :.....	25	26

Skull, see p. 249.

*Hab.* New Guinea (Amberbaki, Huon Gulf, Goldie's R.).

*Type* in the Paris Museum.

a.	{ Ad. al. } ♀.	Huon Gulf, E. New Guinea.	P. Comrie, Esq. [C.].
	{ Skull. }		
b.	{ Ad. st. } ♂ (?).	Goldie's R., S.E. New Guinea.	A. Goldie, Esq. [C.].
	{ Skull. }		

#### 7. *Perameles broadbenti*.

*Perameles broadbenti*, *Rams. P. Linn. Soc. N. S. W.* iii. p. 402, pl. xxvii. (animal, skull, &c.), 1878 (pub. 1879).

Size very large; head long and slender. Fur comparatively smooth, not so harsh as in *P. nasuta*, the longer black hairs flattened, stiff, but not spiny, the longest about an inch in length. General colour blackish brown. Head ashy, pencilled with blackish. Ears rather small for the size of the animal, narrow, rounded at their tips; metatragus low, not markedly projecting. Back hairs dark brown tipped with fawn, the longer, stiffer hairs wholly black. Throat, sides, and under surface fawn-colour, a little brighter on the sides and chest. Limbs where hairy brown or fawn-coloured, the hands almost naked. Feet roughened below, with flattish scales; (pads apparently not present). Tail long, scaly above, covered with transverse flattish scaly tubercles below, to the very tip, blackish

above for about two thirds of its length, from thence fawn-colour to the tip, sparingly clothed with short hair.

*Skull* and *teeth* apparently precisely similar to those of *P. raffrayana*, except that both are larger. (See measurements p. 249.)

#### Dimensions.

	♂.
	Type (skin in spirit).
	Aged.
	millim.
Head and body .....	508
Tail .....	200
Hind foot .....	98
Muzzle to eye .....	68
Ear .....	(c.) 25
Skull, see p. 249.	

*Hab.* S.E. New Guinea.

*Type* in the Sydney Museum.

The distinction of this species from *P. raffrayana* appears to be somewhat doubtful, judging merely from the original description and figures, to which alone I have had access, and from which the above account has been drawn up. The size alone is scarcely enough to distinguish the species, as the type specimen is a very old male, and may therefore be abnormally large. The peculiar structure and apparently prehensile nature of the tail, however, induce me for the present to retain the species as distinct, at least until I have been able to examine specimens of it.

### 8. *Perameles longicauda*.

*Perameles longicauda*, *Peters & Doria, Ann. Mus. Genov.* viii. p. 335 (1876); xvi. p. 672, pl. x. (animal). (1881).

Size small, form light and slender. Fur much as in *P. raffrayana*, close, coarse, and hispid, but not spiny. General colour of head and body dull greyish brown, the stiffer hairs uniformly brown, the thinner ones tipped with dull yellow or grey. Ears rather small, broader in proportion than in *P. raffrayana*, laid forward they reach to within about 7 or 8 millim. of the eye; metatragus low, triangular, bluntly pointed. Chin greyish brown, chest and belly white or yellowish. Limbs brown externally, yellowish internally. Hairs on hands brown, but the fingers naked; backs of feet white. Hind soles wholly naked, finely granulated, with minute rudimentary pads at the bases of the digits. Tail as long as the body without the head, tapering, thinly haired, its terminal two inches and its under-side white, the remainder brown. Mammæ 6.

*Skull* very small and delicate, its proportions very much as in *P. raffrayana*. Breadth of nasals going about  $5\frac{1}{2}$  times in their length. Interorbital region, lacrymal bones, *foramen rotundum*, and

bullæ as in *P. raffrayana*. Anterior palatine foramina only reaching to the level of  $i^6$ . Bony palate with two small irregular vacuities opposite  $p^3$ , as well as the usual large pair opposite the molars.

*Teeth* very light and weak. Upper  $i^6$  slender, styliform, standing more than a millimetre from  $i^4$ . Canine barely as long as  $p^1$ , 2 millim. from  $i^6$ , and about  $1\frac{1}{2}$  millim. from  $p^1$ . Premolars small and delicate. Diastema between  $p^1$  and  $p^3$  about  $1\frac{1}{2}$  millim.;  $p^4$  triangular in section. Molars shaped as in *P. raffrayana*, but very much smaller. Lower teeth like upper; diastemata in front of and behind canine each about  $2\frac{1}{2}$  millim. Premolars small, about equal in height, separated from each other and from  $m^1$  by diastemata of about 1 millim. each.

#### Dimensions.

	♀. Type* (in spirit).
	Adult.
	millim.
Head and body.....	272
Tail .....	197
Hind foot .....	54
Muzzle to eye .....	38
Ear .....	19

Skull, see p. 249.

*Hab.* Arfak Mountains, N.W. New Guinea.

*Type* in the Musco Civico, Genoa.

The above description has been drawn up from the typical and only known specimen, for the loan of which I am indebted to the Marquis G. Doria.

#### 9. *Perameles nasuta*.

*Perameles nasuta*, *Geoff. Ann. Mus.* iv. p. 62, pl. xlv. (animal & skull) (1804); *G. Fisch. Zoogn.* iii. p. 13 (1814); *G. Cuv. R. A.* i. p. 177 (1817); *Desm. N. Dict. d'H. N.* (2) xxv. p. 183 (1817); *id. Mamm.* i. p. 265 (1820); *Schinz, Cuv. Thierr.* i. p. 256 (1821); *F. Cuv. Dict. Sci. Nat.* xxxviii. p. 416 (1825); *Gray, Griff. Cuv. An. K.* iii. p. 39, fig. (animal), v. p. 195 (1827); *Less. Man. Mamm.* p. 216 (1827); *id. Dict. Class. d'H. N.* xiii. p. 199 (1828); *Lacép. Œuvr. Buff.* xxvi. p. 224 (1828); *Fisch. Syn. Mamm.* p. 273 (1829); *Burm. Lehrb. Naturg.* p. 548 (1830); *Less. H. N. Mamm. (Compl. Buff.)* iv. p. 483 (1830); *Grant, Mem. Wern. N. H. Soc.* vi. p. 184 (1832) (anat.); *Waterh. Cat. Mamm. Mus. Z. S.* p. 65 (1838); *Gray, Grey's Austr., App.* ii. p. 401 (1841); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 155, pl. xiii. (animal) (1841); *Owen, Tr. Z. S.* ii. p. 320 (1841); *Less. N. Tabl. R. A., Mamm.* p. 191 (1842); *Gray, List Mamm. B. M.* p. 96 (1843); *Wagn. Schr. Säug. Supp.* iii. p. 57, pl. clv. A. c (animal) (1843), v. p. 213 (1855); *Schinz, Syn. Mamm.* p. 515 (1844); *Owen, Todd's Cyclop. Anat.* iii. p. 260, fig. 84 (skull) (1845); *Waterh. N. H.*

\* No. 40 of the Genoa Museum.

*Mamm. i.* p. 374 (1846); *Desm. Dict. Univ. d'H. N. ix.* p. 578 (1849); *Gould, Mamm. Austr. i.* pl. xi. (animal) (1855); *Schleg. Dierk.* p. 138 (1857); *Gieb. Säug.* p. 721 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 132 (1862); *Kreff, Cat. Mamm. Austr. Mus.* p. 33 (1864); *id. Austr. Vert.* p. 13 (1871); *Schleg. Dierent.* p. 164 (1872); *Brehm, Thierl. ii.* p. 565 (1880); *Dobs. J. Anat. Phys.* xvii. p. 162 (anat. foot) (1882); *Poulton, P. Z. S.* 1883, p. 599 (anat. tongue); *id. Q. J. Micr. Sci.* xxxiii. p. 69, pl. i. (1883) (anat. tongue); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 738 (1884); *Lyd. Cat. Foss. Mamm. B. M. v.* p. 255 (1887); *Jent. Cat. Ost. Leyd. Mus.* p. 306 (1887); *Coll. Zool. Jahrb.* ii. p. 874 (1887).

*Thylacis nasuta, Ill. Prodr. Syst. Mamm.* p. 76 (1811).

*Perameles lawsoni, Quoy & Gaim. Voy. Uranie,* pp. 57 & 711 (1824); *id. Ann. Sci. Nat.* v. p. 489 (1825); *Fisch. Syn. Mamm.* p. 274 (1829); *Less. N. Tabl. R. A., Mamm.* p. 191 (1842); *Schinz, Syn. Mamm. i.* p. 520 (1844); *Desm. Dict. Univ. d'H. N. ix.* p. 579 (1849).

"*Perameles aurita, Mus. Paris,*" *Waterh., Gray, et al.*

#### LONG-NOSED BANDICOOT.

Size large, proportions slender. Fur coarse, hispid, and slightly spinous, resembling in this respect that of *P. obesula* and the great mass of the species, and differing from that of *P. gunni*; underfur thin and sparse, pale slaty grey. General colour all over dull olivaceous brown, without markings or stripes anywhere. Muzzle very long and slender. Ears long, narrow, pointed, laid forward they reach, in spirit-specimens, in front of the anterior canthus of the eye; metatragus about as long as broad, evenly rounded; back of ears brown, rather darker anteriorly, and paler basally. Rump quite without stripes or bands. Sides of body, chin, chest, and belly white. Outsides of limbs like back, inner sides and feet white. Soles of feet granulated, black and thinly hairy posteriorly, white and naked anteriorly. Tail rather longer than the head, brown above for its whole length, paler below.

*Skull* (Pl. XXII. figs. 5 & 6) with a short cranial and very long facial portion. Nasals very long and narrow, their greatest breadth going about seven times into their length. Orbital region short, the supraorbital edges not parallel for any distance, but evenly concave. Lacrymal bones with a marked ante-orbital ridge, more or less overhanging the orbit, and sharply dividing the bone into orbital and frontal surfaces; the posterior corner of the ridge forming an indistinct supraorbital projection. Brain-case very short in proportion to the muzzle. Palate comparatively perfect; anterior palatine foramina reaching to the level of  $i^5$ ; no vacuity opposite the anterior premolars, at least in fully adult specimens; posterior vacuities small, opposite  $m^1$  and  $m^2$ . *Foramen rotundum* very large and open, its edges not produced into a bony tube. Bullæ (fig. 5) very small, hemispherical, transparent, often slightly incomplete at their junction with the tympanic rings, their antero-external but little greater than their antero-internal diameter. Lower jaw long, light and slender, especially posteriorly; the coronoid process

slender, styloid, its anterior edge slightly concave at about the level of the condyle.

*Teeth.* Upper incisors 5 in number, the fifth about 4 millim. distant from the fourth. P.<sup>1</sup> and p.<sup>3</sup> about equal, long and narrow; p.<sup>4</sup> about twice the size of either, with a slight postero-internal basal thickening. Molars light, triangular, their internal considerably less than their external longitudinal diameter; m.<sup>4</sup> with a strongly marked posterior talon. Lower incisors succeeded by a considerable diastema, nearly or quite equal to their combined length. Premolars and molars small and delicate.

Milk-p.<sup>4</sup>, both above and below, small, of about the size of the upper i.<sup>6</sup>, shorter and blunter than in *P. obesula*, but not otherwise more molariform in character than in that species.

#### Dimensions.

	♂. b (stuffed). millim.
Head and body.....	(c.) 390
Tail .....	(c.) 125
Hind foot.....	73
Muzzle.....	57
Ear .....	35
Skull, see p. 249.	

*Hab.* Eastern Australia.

*Type* in the Paris Museum.

This species, although clearly belonging to the group of which *P. gunni* is the most typical member, yet presents many characters in common with the other species of the genus, and especially with certain of the Papuan Bandicoots, such as *P. raffrayana*, *broadbenti*, &c. Thus, while its long ears, the proportions of its skull, the structure of its interorbital region and lacrymal bones, and the form of its lower jaw, ally it to *P. gunni* and *P. bougainvillei*, its spiny fur, unstriped rump, comparatively complete palate, and very small and partially imperfect bullæ are characters that show so much approach to the other less specialized species as to prevent any definite separation of the *gunni* section from the other Bandicoots.

a. Imm. al., ♂.	Richmond R., N. S. W.	Mr. A. P. Goodwin [C.].
b. Ad. st., ♂.	New South Wales ( <i>J. G.</i> )	Gould Coll.
c. } Ad. sk. {	New South Wales ( <i>J. G.</i> )	Gould Coll.
} Skull. {		
d. } Yg. sk. { ♂.	New South Wales.	Sir T. L. Mitchell [P. & C.].
} Skull. {		
e. Skeleton (mounted).	New South Wales.	Purchased.
f-h. Skulls.	New South Wales.	Purchased.
i. Ad. sk.	Australian Alps.	Purchased.
j. Skull.		Zool. Soc.

10. *Perameles gunni*.

*Perameles gunni*, Gray, *P. Z. S.* 1838, p. 1; *id. Ann. Mag. N. H.* i. p. 107 (1838); Gunn, *Ann. Mag. N. H.* i. p. 102 (habits) (1838); Owen, *Tr. Z. S.* ii. p. 320 (1841); Gray, *Gray's Austr., App.* ii. p. 401 (1841); *Waterh. Jard. Nat. Labr., Mamm.* xi. p. 156, pl. xv. (animal) (1841); Less, *N. Tabl. R. A., Mamm.* p. 191 (1842); Gray, *List Mamm. B. M.* p. 95 (1843); *Wagn. Schr. Säug. Supp.* iii. p. 61 (1843), v. p. 214 (1855); Schinz, *Syn. Mamm.* i. p. 517 (1844); *Waterh. N. H. Mamm.* i. p. 376 (1846); *Desm. Dict. Univ. d'H. N.* ix. p. 579 (1849); Gunn, *P. Roy. Soc. Tasm.* ii. p. 83 (1852); *Schleg. Dierk.* p. 138 (1857); Gould, *Mamm. Austr.* i. pl. ix. (animal) (1859); Gieb, *Säug.* p. 722 (1859); Gerrard, *Cat. Bones Mamm. B. M.* p. 132 (1862); Krefft, *Notes Faun. Tasm.* p. 4 (1868); *id. Austr. Vert.* p. 13 (1871); *Schleg. Dierk.* p. 163 (1872); Jent, *Cat. Ost. Leyd. Mus.* p. 306 (1887).

## GUNN'S BANDICOOT.

Size and proportions as in *P. nasuta*. Fur soft, not spiny, except slightly on the sides of the body; underfur abundant, dark slaty grey except on the white rump-bands. General colour grizzled yellowish brown, rump banded. Muzzle long, rather shorter than that of *P. nasuta*. Ears long and pointed, laid forward they reach beyond the eye; their backs yellowish brown, with a darker blotch on their anterior half terminally; metatragus about twice as long as broad, its end tufted with short hairs. Top of head and anterior half of back coarsely grizzled yellowish brown, some of the hairs black- and others yellow-tipped, their bases all grey. Behind the shoulders an indistinct whitish band passes downwards and backwards to join the light colour of the belly. Sides of rump with four more or less distinct pale vertical bands running downwards from near the middle line, the spaces between them brown or black; these stripes and their dark interspaces much more prominent in young than in old specimens. Chin, chest, and belly white or yellowish white. Outsides of forearms and backs of legs dark slaty grey, remainder of limbs white. Soles black and hairy posteriorly, white and naked anteriorly; a small round striated pad at the base of both the fourth and fifth toes. Tail very short, slender, thinly haired, its upper side dark for only its basal half or three quarters of an inch, the remainder white.

*Skull* very similar to that of *P. nasuta* with the following exceptions:—The nasals, although still very long and narrow, are rather shorter, their greatest breadth going only about  $5\frac{1}{2}$  or 6 times in their length. The palate is more incomplete; the anterior palatine foramina extend nearly to the level of the front of the canines; there is a second pair of vacuities opposite p.<sup>1</sup> and p.<sup>3</sup>, and the posterior palatine vacuities are rather larger. In other respects the description given under *P. nasuta* is equally applicable to the skull of this species.

*Teeth* precisely similar to those of *P. nasuta* except that the canines, both above and below, are decidedly smaller.

*Dimensions.*

	♂.	♀.
	<i>d</i> (skin). millim.	<i>e</i> (stuffed). millim.
Head and body.....	(c.) 380	(c.) 400
Tail .....	(c.) 80	(c.) 90
Hind foot.....	72	70
Muzzle to eye .....	(c.) 60	65
Ear .....	31	34
Skull, see p. 249.		

*Hab.* Tasmania, and possibly Southern Victoria (see footnote).  
*Type* in collection.

<i>a, b.</i> Ad. sks., ♂ ♀.	Port Phillip, Victoria* (?).	Gould Coll.
<i>c.</i> Yg. sk.	Northern Tasmania.	W. F. Petterd, Esq. [E. & C.].
<i>d.</i> Ad. sk., ♂.	Tasmania.	Ronald Gunn, Esq. [P. & C.].
<i>e.</i> Ad. st., ♀.	Tasmania.	( <i>Type</i> of species.) Ronald Gunn, Esq. [P. & C.].
<i>f.</i> Yg. al., ♂.	Tasmania.	Ronald Gunn, Esq. [P. & C.].
<i>g.</i> { Ad. sk. } ♀.	Tasmania.	Gen. Hardwicke [P.].
{ Skull. }		
<i>h.</i> { Ad. sk. } ♂.	Tasmania.	Gould Coll.
{ Skull. }		

11. *Perameles bougainvillei*.*a. Perameles bougainvillei*, var. *typica* †.

*Perameles bougainvillei*, *Quoy & Gaim. Voy. Uranie, Zool.* p. 56, *Atl. pl. v.* (animal and skull) (1824); *Gaim. Bull. Sci. Nat.* i. p. 270 (1824); *Gray, Griff. Cuv. An. K. v.* p. 195 (1827); *Less. Man. Mamm.* p. 217 (1827); *id. Dict. Class. d'H. N.* xiii. p. 199 (1828); *Fisch. Syn. Mamm.* p. 273 (1829); *Less. H. N. Mamm. (Compl. Buff.)* iv. p. 484, pl. xxvii. (animal) (1830); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 162 (1841); *Less. N. Tabl. R. A., Mamm.* p. 191 (1842); *Waterh. N. H. Mamm.* i. p. 385 (1846); *Desm. Dict. Univ. d'H. N.* ix. p. 578 (1849); *Lyd. Cat. Foss. Mamm. B. M.* v. p. 256 (1887).

*Perameles myosura*, *Wagn. Arch. f. Nat.* vii. pt. i. p. 293 (1841); *id. Schr. Säug. Supp.* iii. tab. clv. A. d (animal) (1843), v. p. 215 (1855); *Schinz, Syn. Mamm.* i. p. 519 (1844); *Gould, Mamm. Austr.* i. pl. x. (animal) (1845); *Waterh. N. H. Mamm.* i. p. 381, pl. xx. fig. 3 (skull) (1846); *Schleg. Dierk.* p. 138 (1857); *Gieb. Säug.* p. 722 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 132

\* Specimens referred to by Gould, *Mamm. Austr.* i. text to pl. ix. The occurrence of this species in Victoria is by no means improbable, considering the number of Tasmanian species recently discovered in that colony.

† *a.* Sides of rump indistinctly striped.—*Hab.* W.

Australia ..... Var. *typica*.

*b.* Sides of rump with well-defined stripes.—*Hab.* S.

and E. Australia ..... Var. *fasciata*, p. 248.

(1862); *Kreffl, Austr. Vert.* p. 13 (1871); *Schleg. Dierent.* p. 164 (1872).

*Perameles arenaria*, *Gould, P. Z. S.* 1844, p. 104.

#### STRIPED BANDICOOT.

Size small, form light and delicate. Fur coarse, but not spiny, except very slightly on the sides of the body. Underfur thick and close, slaty grey. General colour grizzled olive-grey; rump more or less striped. Muzzle long and slender. Ears (Pl. XXI. fig. 7) long, narrow, pointed, laid forward they reach from 6 to 8 millim. beyond the anterior canthus of the eye, their backs greyish flesh-colour, slightly darker on the anterior part of their terminal half; metatragus broadly triangular, about as long as broad, its tip thinly haired. Head and back grizzled grey, the hairs tipped either with black or dull orange. Sides of rump with a tendency to a similar striping to that of *P. gunni*, but this, in the present variety, very indistinct, only a single darker, bounded by two lighter vertical bands generally visible. Chin, chest, and belly white. Outsides of forearms and backs of legs dark grey; rest of limbs white. Soles (Pl. XXI. fig. 8) hairy, black posteriorly; naked, granulated, flesh-coloured anteriorly; well-defined round pads at the bases of the fourth and fifth toes. Tail nearly half the length of the head and body, rather thick at its base, but contracting abruptly in the middle, distinctly bicolor, brown above and white below for its whole length. Mamme 8.

*Skull* light and delicate; muzzle long and narrow, tapering less evenly than usual, more abruptly contracted opposite p.<sup>1</sup> Length of nasals from 5 to 6 times their greatest width. Interorbital region as in *P. nasuta*. Anterior portion of zygoma broadened and partially twisted outwards. Palate imperfect as in *P. gunni*, the anterior palatine foramina extending to halfway between i.<sup>5</sup> and the canine; middle pair of vacuities running from just behind the canine to p.<sup>3</sup>; posterior pair large and open, opposite p.<sup>4</sup> to the end of m.<sup>2</sup> In addition the palate opposite m.<sup>3</sup> and m.<sup>4</sup> is perforated with numerous small irregular vacuities. *Foramen rotundum* partially tubular behind. Bullæ rounded, hemispherical, transparent, completely ossified; their antero-external rather greater than their antero-internal diameter.

*Teeth* small and light, their proportions as in *P. nasuta*, except that the canines are small and feeble as in *P. gunni*.

#### Dimensions.

	♂.	♀.
	a (in spirit).	b (in spirit).
	Adult.	Adult.
	millim.	millim.
Head and body . . . . .	222	216
Tail . . . . .	106	108
Hind foot . . . . .	52	52
Muzzle to eye . . . . .	42	41
Ear . . . . .	34	34

Skull, see p. 249.

*Hab.* Western Australia.

*Type* in the Paris Museum.

- |    |                         |  |                     |
|----|-------------------------|--|---------------------|
| a. | { Ad. al. } ♂.          | Mouth of Salt R., W. A.                | Gerard Krefft, Esq. |
|    | { Skull. }              | ( <i>W. Masters</i> ).                 | [P.].               |
| b. | Ad. al., ♀.             | Mongap, Salt R., W. A.                 | Gerard Krefft, Esq. |
|    |                         | ( <i>W. Masters</i> ).                 | [P.].               |
| c. | Ad. skeleton (mounted). | Salt R., W. A. ( <i>W. Masters</i> ).  | Gerard Krefft, Esq. |
|    |                         |  | [P.].               |
| d. | { Ad. sk. } ♂.          | York, W. A. ( <i>J. Gilbert</i> ).     | Gould Coll.         |
|    | { Skull. }              | ( <i>Type of P. arenaria</i> , Gould.) |                     |
| e. | { Ad. sk. } ♀.          | York, W. A. ( <i>J. Gilbert</i> ).     | Gould Coll.         |
|    | { Skull. }              |  |                     |
| f. | Skull.                  | West Australia ( <i>J. Gilbert</i> ).  | Gould Coll.         |

**♂. *Perameles bougainvillei*, var. *fasciata*.**

*Perameles fasciata*, Gray, *Gray's Austr.*, App. ii. p. 407 (1841); *id. List Mamm. B. M.* p. 95 (1843); *Waterh. N. H. Mamm.* i. p. 379 (1846); *Gould, Mamm. Austr.* i. pl. viii. (animal) (1849); *Schleg. Dierk.* p. 138 (1857); *Gieb. Säug.* p. 722 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 132 (1862); *Krefft, Cat. Mamm. Austr. Mus.* p. 34 (1864); *id. Austr. Vert.* p. 13 (1871); *Schleg. Dierent.* p. 165 (1872); *Brehm, Thierl.* ii. p. 565 (1880); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 737 (1884).

Similar in every respect to the typical variety, except that the dark and light patches on the back of the ears are more strongly contrasted, and the stripes on the sides of the rump are well defined and conspicuous, their arrangement being precisely as in *P. gunni*, with young specimens of which this variety might easily be confused. Young individuals of that species, however, are always distinguishable by their white tails, and their very much larger molars.

Dimensions similar to those of the true *P. bougainvillei*.

*Hab.* South-eastern and South Australia.

*Co-types* in collection.

- |    |                |  |                                    |
|----|----------------|--|------------------------------------|
| a. | { Ad. sk. } ♂. | Liverpool Plains, N.S.W.                       | Gould Coll.                        |
|    | { Skull. }     |  |                                    |
| b. | Ad. sk., ♂.    | New South Wales.                               | Sir T. L. Mitchell [P. & C.].      |
| c. | { Ad. sk. } ♂. | Murray R., S. A. ( <i>J. G.</i> ).             | Gould Coll.                        |
|    | { Skull. }     |  |                                    |
| d. | Ad. sk., ♂.    | South Australia.                               | Sir George Grey [P. & C.].         |
|    |                | ( <i>a, c, &amp; d. Co-types of variety.</i> ) |                                    |
| e. | { Ad. st. } ♂. | South Australia.                               | Sir George Grey [P. & C.].         |
|    | { Skull. }     |  |                                    |
| f. | Yg. sk.        | South Australia.                               | Sir George Grey [P. & C.].         |
| g. | Yg. sk.        | South Australia.                               | Gould Coll.                        |
| h. | Skull.         | Adelaide.                                      | C. D. E. Fortnum, Esq. [P. & C.].  |
| i. | Yg. al., ♀.    | ( <i>Voy. 'Fly.'</i> )                         | John Macgillivray, Esq. [P. & C.]. |

*Skull Measurements of Perameles.*

Species .....	<i>P. obesa</i> .		<i>P. macrura</i> .		<i>P. moreleti</i> .		<i>P. doreyana</i> .		<i>P. cockerelli</i> .		<i>P. rufifragana</i> .		<i>P. broadbentii</i> .		<i>P. longicaudata</i> .		<i>P. nasuta</i> .		<i>P. gunni</i> .		<i>P. bougainvilliei</i> .	
	♂. s. ad.	♂. b. aged.	♂. a. aged.	♂. b. ad.	♂. a. aged.	♂. b. ad.	♂. f. ad.	♂. b. ad.	♂. f. ad.	♂. b. ad.	♂. f. ad.	♂. b. ad.	♂. Type. aged.	♀. Type. ad. lib.	(?) ♂. f. aged.	♀. g. ad.	♂. a. ad.	♀. h. ad.	var. <i>typicus</i> , var. <i>fasciata</i> .	♂. a. ad.	♀. h. ad.	
Sex .....	♂.	♂.	♂.	♂.	♂.	♂.	♂.	♂.	♂.	♂.	♂.	♂.	♂.	♀.	(?) ♂.	♀.	♂.	♀.	var. <i>typicus</i> .	♂.	♀.	
Specimen .....	s.	b.	a.	b.	a.	b.	f.	b.	f.	b.	f.	b.	Type.	Type.	f.	g.	a.	h.	var. <i>fasciata</i> .	a.	h.	
Age .....	ad.	aged.	aged.	ad.	aged.	ad.	ad.	ad.	ad.	ad.	ad.	ad.	aged.	ad. lib.	aged.	ad.	ad.	ad.	ad.	ad.	ad.	
Basal length .....	67	75	(c.) 72	60.5	77	69	32.6	32.6	28	28	28	38	98I	56.5	87	(c.) 74	56.4	56	56.4	26.5	26	
Greatest breadth .....	31	36	35.6	29	32	28	27.6	27.6	24	24	24	32	43	23	37	32	26.5	26	26.5	26	26	
Nasals, length .....	30	31	31	26	37	32.6	32.6	28	28	28	28	38	52	25	41	37	26	26	26	26	26	
" greatest breadth .....	5.5	5.6	6.8	6	7.2	5.5	5.4	5.4	5	5	5	5.1	8	4.7	5	6.5	4.9	5.2	4.9	4.9	5.2	
Intertemporal breadth .....	12	12.7	12	11.5	13.5	13	12.1	12.5	12.5	12.5	12.5	15.1	14	13.	14	16.5	13	14.5	13	13	14.5	
Palate, length .....	41	46.6	46	40	51	45	38.8	38.5	38.5	38.5	38.5	51.3	65.5	36.3	57	50	37	37	37	37	37	
" breadth between outer corners of m. 3 }	20.2	22	22.6	19.8	21.9	18	19.4	16.2	16.2	16.2	16.2	19	25	14	24	19	15.4	15	15.4	15	15	
" breadth inside m. 3 ...	12.2	15.7	14.1	12	13.9	10.8	11	10	10	10	10	12.1	16.7	9	16	11.5	9	9.8	9	9	9.8	
Palatal foramen .....	6	7.4	5.7	5.8	6.5	7	6.7	4.6	4.6	4.6	4.6	8.8	10	5.6	9.5	10.8	6.1	6.5	6.1	6.1	6.5	
Basal-cranial axis .....	21.7	25	(c.) 23	18	21.4	18.5	(c.) 15.5	14.2	(c.) 18.3	14.2	(c.) 18.3	...	...	14.5	23.7	...	14.1	15.2	14.1	14.1	15.2	
Basal-facial axis .....	45.5	50.2	50	42.5	55.7	51	43.3	38	38	38	38	58.5	...	42	64	...	42.5	41	42.5	42.5	41	
Facial index .....	209	227	217	286	260	276	279	268	268	268	268	311	...	290	278	...	301	270	301	301	270	
Teeth—distance from front of canine to back of m. 4 }	27.5	30.2	31.5	28.7	31.6	28.5	28.4	24.5	24.5	24.5	24.5	35.5	44	28.5	37	32.5	25.2	27.8	25.2	25.2	27.8	
" length of p. 4 .....	2.6	3.5	3.5	3.4	3.8	2.4	3.9	2.5	2.5	2.5	2.5	4	5	2.1	4	3	2.9	2.8	2.9	2.9	2.8	
" " ms. 1-3 .....	9.7	12.3	11.8	12	11.4	11.5	10.8	9.5	9.5	9.5	9.5	12.6	14.3	9.5	13	12.2	10.5	9.6	10.5	10.5	9.6	

\* No. 60 of the Museo Civico, Genoa. This specimen seems to be so far beyond the usual size that the measurements of an ordinary specimen are given in the following column.  
 † No. 59 of the Museo Civico, Genoa. † Approximate, calculated from the other dimensions given by the describer.

3. **CHÆROPUS.**

Type.

Chæropus, *Ogilb. P. Z. S.* 1838, p. 25 ..... Ch. castanotis.

Form light and slender. Muzzle short but narrow. Nose sharp and pointed, the naked rhinarium confined to the extreme tip. Ears very long; metatragus duplicated as in *Perameles*, the projection on the upper ridge short but broad. Pouch opening backwards; mammae 8. Fore limbs long and slender. Fore feet with the first and fifth digits entirely suppressed, the fourth minute, rudimentary, and only reaching to the middle of the metacarpus of the third, and the second and third toes alone fully developed. Hind limbs long and thin; hallux entirely absent, fifth toe short and rudimentary, the whole bulk of the foot made up of the large fourth toe. Soles hairy, a small naked projection at the base of the fourth toe. Tail present, cylindrical, slightly crested along its upper surface.

*Skull* broad and flattened, with a short narrow muzzle. Nasals of medium length, not markedly expanded behind. Interorbital region flat and square-edged; lacrymal bones much expanded and ridged postero-externally. Anterior, orbital part of zygomata broadened and twisted outwards, so as to form broad horizontal ledges beneath the orbits. Palate very imperfect, with two pairs of large irregular vacuities. Bullæ small, rounded, hemispherical, completely ossified.

*Dentition*:—I.  $\frac{1.2.3.4.5}{1.2.3}$ , C.  $\frac{1}{1}$ , P.  $\frac{1.0.3.4}{1.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 48$ .

Upper incisor series forming a widely open even curve; incisors flattened, pointed, closely touching one another. Canine small, sometimes double-rooted. Premolars increasing in size backwards. Molars large, heavy, quadrangular, multicuspid, standing slightly apart from one another. Lower teeth much as in *Perameles*, but the molars broader and squarer.

Milk-p.<sup>4</sup> present, functional.

*Habits*. Terrestrial; omnivorous.

*Range*. Australia.

This genus, both in its general external appearance and in its cranial characters, is very markedly led up to by the members of the last, or *P. gunni*, section of the genus *Perameles*, *P. bougainvillei* especially showing many points of resemblance to it. Its distinction as a genus, however, is unquestionable, even were it not for the unique and peculiar structure of its fore feet, which have such a striking resemblance to those of the pig as to have gained for the only species its common English name of Pig-footed Bandicoot.

1. **Chæropus castanotis.**

*Chæropus ecaudatus* \*, *Ogilb. P. Z. S.* 1838, p. 25; *Mitch. Exped. Austr.* ii. p. 131, pl. xxxviii. (animal) (1838); *Gray, Grey's Austr.*,

\* This name, founded upon an accidentally mutilated specimen, has been generally and properly discarded as inappropriate for an animal with a well-developed tail.

- App.* ii. p. 401 (1841); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 163 (1841); *Less. N. Tabl. R. A., Mamm.* p. 191 (1842); *Gerv. Dict. Univ. d'H. N.* iii. p. 614 (1849); *Gieb. Säug.* p. 723 (1859); *Brehm, Thierl.* ii. p. 567, fig. (animal) (1880).
- Chceropus castanotis*, *Gray, Ann. Mag. N. H.* (1) ix. p. 42 (1842); *id. List Mamm. B. M.* p. 96 (1843); *Schinz, Syn. Mamm.* i. p. 521 (1844); *Gould, Mamm. Austr.* i. pl. vi. (animal) (1845); *Waterh. N. H. Mamm.* i. p. 391, pl. xiii. fig. 2 (animal), pl. xx. fig. 4 (skull) (1846); *Wagn. Schr. Säug. Supp.* v. p. 218 (1855); *Gerv. H. N. Mamm.* ii. p. 279 (1855); *Schleg. Dierk.* p. 138 (1857); *Gerrard, Cat. Bones Mamm. B. M.* p. 133 (1862); *Kreffl, Cat. Mamm. Austr. Mus.* p. 35 (1864); *id. Mamm. Austr.* text to pl. xi. p. 6 (1871); *Schleg. Dierent.* p. 164 (1872); *Flow. Encycl. Brit.* (9) xv. p. 381, fig. 29 (bones of pes) (1883); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 738 (1884); *Jent. Cat. Ost. Leyd. Mus.* p. 306 (1887).
- Chceropus occidentalis*, *Gould, Mamm. Austr.* i. text to pl. vi. (1845) (provisional name).

#### FIG-FOOTED BANDICOOT.

Size small, form delicate. Fur coarse and straight, but not in the least spiny, very much as in *Perameles bougainvillei*. Underfur abundant, slaty grey at base, dull yellow at tip. General colour of head and body uniform coarsely grizzled grey, with a tinge of fawn. Ears long and narrow, their outer margin slightly concave just beneath the tip; thinly haired; their backs dull chestnut-brown, darkening towards the tip. Metatragus short and broad. Longer hairs of head and back brown-tipped, underfur yellow-tipped, the latter more orange in Western Australian specimens. Chin, chest, and belly white, the line of demarcation on the sides not sharply marked. Limbs long and slender, short-haired, pale grey or white, with a yellowish tinge. Palms wholly hairy, except on the terminal pads of the two functional digits; these latter with long slender claws; the rudimentary fourth toe entirely clawless, reaching only to the middle of the metacarpus of the third. Hind feet very long and thin, hairy except just below the heel, on the small circular pad at the base of the fourth toe, along the underside of that toe, and on its very large terminal pad; united second and third toes only reaching to the base of the fourth, and the fifth toe again falling just short of their base. Tail about half as long as the body, grey below and on the sides, black above, where there is a short and inconspicuous crest.

*Skull* as described above. Nasals with their posterior (maxillary) half evenly broader than their anterior (premaxillary), but not markedly expanded at their extreme back. Forehead peculiarly broad and flat; supraorbital edges square; lacrymals strongly ridged. Anterior palatine foramen reaching just to the front of the canine. A pair of irregular reticulated vacuities reaching from p.<sup>1</sup> to p.<sup>3</sup>, and a second pair, often united in the centre, opposite the molars. Extreme back of palate also with vacuities. Opening of foramen magnum partially closed in below.

*Teeth.* Upper i.<sup>5</sup> about half the size of i.<sup>4</sup>, pointed, touching the

latter. Canine with a small anterior secondary cusp. P.<sup>1</sup> with diastemata in front of and behind it of about 2 or 3 millim. each. P.<sup>4</sup> triangular in section, with a distinct postero-internal secondary cusp. Molars very large, broad and square. Lower i.<sup>3</sup> with a large posterior cusp. Canine very small, with an anterior secondary cusp. P.<sup>3</sup> larger than p.<sup>1</sup>; p.<sup>4</sup> smaller than either. Lower milk-p.<sup>4</sup> small, circular, about equal in size to the posterior talon of i.<sup>3</sup>

*Dimensions.*

	♀. ♂. b (stuffed). Adult. millim.
Head and body .....	250
Tail .....	(c.) 100
Hind foot .....	69
Muzzle to eye .....	39
Ear .....	52

Skull, see below.

*Hab.* Western New South Wales and Victoria; South and West Australia; (Northern Territory?).

*Type* in collection.

a. Imm. skull.	(North Australian Expedition.)	Dr. J. R. Eusey [P. & C.].
b, c. { Ad. st. {	Muda, N. S. W.	Sir T. L. Mitchell [P. & C.].
{ Skulls. {		
d. { Ad. sk. {	Murray R., S. A.	Sir G. Grey [P. & C.].
{ Skull. {		(Type of species.)
e. { Ad. sk. { ♀, 10/43.	Boorda, Kirltana, W. A.	Gould Coll.
{ Skull. {	(J. Gilbert).	(Type of <i>Ch. occidentalis</i> , Gould.)

*Skull Dimensions of Chœropus.*

Species .....	<i>Ch. castanotis.</i>
Sex .....	♀.
Specimen.....	b.
Age .....	adult.
Basal length .....	53
Greatest breadth .....	31
Nasals, length .....	22.5
" greatest breadth .....	5
Intertemporal breadth .....	9
Palate, length .....	36.5
" breadth outside m. <sup>3</sup> .....	16.5
" " inside m. <sup>3</sup> .....	10
Palatal foramen .....	5.5
Basi-cranial axis .....	15
Basi-facial axis .....	38.4
Facial index .....	256
Teeth—distance from front of canine to back of m. <sup>4</sup> .....	26.5
" horizontal length of p. <sup>4</sup> .....	2.8
" " " ms. <sup>1-3</sup> .....	10.8

Family V. DASYURIDÆ.

Polyprotodont Marsupials adapted for a predatory, carnivorous or insectivorous life. Limbs subequal; fore feet with five toes; hind feet not syndactylous, with four or five toes, the hallux either small and clawless, or altogether absent, the other toes subequal. Tail long, hairy, not prehensile. Stomach simple. No cæcum\*. Pouch, if present, opening forwards or downwards, sometimes absent.

*Dentition*:—I.  $\frac{1.2.3.4}{1.2.3}$ , C.  $\frac{1}{1}$ , P.  $\frac{1.0.3.4 \text{ or } 0}{1.0.3.4 \text{ or } 0}$ , M.  $\frac{1.2.3.4}{1.2.3.4}$  (also  $\frac{5.0}{5.6 \text{ or } 0}$  in *Myrmecobiinæ*). Total, 42 or 46 in *Dasyurinae*, and 50 or 52 in *Myrmecobiinæ*.

*Teeth* rooted, sharp, cutting, carnivorous. Incisors small. Canines large and trenchant. First and third premolars always present, second always and fourth sometimes absent. Molars with pointed cusps.

Tooth-change generally present, except in the forms in which the permanent p.<sup>4</sup> has been itself reduced or aborted; not yet found in *Myrmecobiinæ*.

*Range*. Papuan and Australian subregions.

This family, as a whole, presents one of the most generalized types found among the Marsupials, its members being simple predaceous animals in no way markedly specialized, and retaining, especially in the case of *Myrmecobius*, many of the characteristics of the earliest known fossil Marsupials. The larger species are flesh-eaters pure and simple, catching their prey themselves, and not feeding upon carrion; the smaller ones are mostly insectivorous.

*Synopsis of the Genera.*

I. EXTERNAL CHARACTERS.

- A. Tongue short, not extensile. Lower lip rounded in front, not produced forwards . . . . . **Dasyurinae.**
- a. Back transversely banded with black. Form dog-like . . . . . 1. THYLACINUS, p. 255.
- b. Back not cross-banded.
- a<sup>1</sup>. Body blotched or spotted with white. Size large, form stout.
- a<sup>2</sup>. Form very thick and powerful. Body with a few white blotches . . . . . 2. SARCOPHILUS, p. 258.
- b<sup>2</sup>. Form slenderer. Body profusely spotted with white . . . . . 3. DASYURUS, p. 261.

\* I can find no trace, either in *Phascologale flavipes* or any other species, of the "small hemispherical projection" corresponding to a cæcum, said by Waterhouse (N. H. Mamm. i. p. 424) to occur in that animal.

- b*<sup>1</sup>. Body not white-spotted. Size small, form slender.
- c*<sup>2</sup>. Hind foot broad; soles smooth, naked. Hallux present ..... 4. PHASCOLOGALE, p. 273.
- d*<sup>2</sup>. Hind foot narrow; soles granulated or hairy.
- a*<sup>3</sup>. Hallux present. Limbs of ordinary proportions ..... 5. SMINTHOPSIS, p. 298.
- b*<sup>3</sup>. Hallux absent. Limbs unusually elongated ..... 6. ANTECHINOMYS, p. 309.
- B. Tongue long, extensile. Lower lip pointed, projecting far in front of the teeth .. **Myrmecobiinæ.**
- c*. Back transversely banded with white. Hallux absent ..... 7. MYRMECOBIUS, p. 311.

## II. CRANIAL CHARACTERS.

- A. Posterior teeth large and strong. Molars  $\frac{4}{4}$ .
- Bony palate short ..... **Dasyurinae.**
- a*. Lower molars sharp-edged, the main cusp without internal secondary cusps.
- a*<sup>1</sup>. Premolars  $\frac{3}{3}$ . Muzzle long and slender 1. THYLACINUS, p. 255.
- b*<sup>1</sup>. Premolars  $\frac{2}{2}$ . Muzzle short and broad 2. SARCOPHILUS, p. 258.
- b*. Lower molars multicuspidate, with prominent internal secondary cusps.
- c*<sup>1</sup>. Premolars  $\frac{2}{2}$  ..... 3. DASYURUS, p. 261.
- d*<sup>1</sup>. Premolars  $\frac{3}{3}$  (rarely  $\frac{3}{2}$ ).
- a*<sup>2</sup>. Nasals much expanded behind. Lower p.<sup>4</sup> usually decidedly smaller than p.<sup>3</sup> ..... 4. PHASCOLOGALE, p. 273.
- b*<sup>2</sup>. Nasals not expanded behind. Lower p.<sup>4</sup> nearly as large as or larger than p.<sup>3</sup>.
- a*<sup>3</sup>. Bullæ small, their mastoid portion not swollen ..... 5. SMINTHOPSIS, p. 298.
- b*<sup>3</sup>. Bullæ disproportionally large, their mastoid portion swollen 6. ANTECHINOMYS, p. 309.
- B. Posterior teeth small and delicate. Molars more than  $\frac{4}{4}$ . Palate elongated ..... **Myrmecobiinæ.**
- c*. Premolars  $\frac{3}{3}$ . Molars  $\frac{5}{5 \text{ or } 6}$  ..... 7. MYRMECOBIUS, p. 311.

### Subfamily I. DASYURINÆ.

Tongue short, simple, not extensile. No gland on the chest. Premaxillæ united or closely applied to each other in front. Palate not unusually produced backwards. Molars large, four in number above and below, the lower ones with the outer series of cusps sometimes alone developed, and always larger than the inner.

## 1. THYLACINUS.

Type.

- Peracyon\*, *Gray, Ann. Philos.* (2) x. p. 340 (1825) Th. cynocephalus.  
 Thylacinus, *Temm. Mon. Mamm.* i. p. 60 (1827) .. Th. cynocephalus.  
 Lycaon, *Wagl. Syst. Amph. Säug.* p. 24 (1830)  
 (*nec Brookes*) ..... Th. cynocephalus.  
 Peralopex, *Gloger, Handb. Naturg.* i. p. 82 (1842) Th. cynocephalus.

Size large; general build dog-like. Muzzle long and slender. Ears of medium size. Tail well developed, short-haired, very thick at its root. Limbs very much as in *Canis*, but rather shorter in proportion to the size of the animal, markedly digitigrade. Toes subequal, with short, thick, conical claws; hallux entirely wanting. Pouch opening backwards †. Mammæ 4.

*Skull* broad and strong posteriorly, with a long narrow muzzle. Frontal region with large air-sinuses above and external to the olfactory chamber. Infraorbital foramen large, oval, generally divided into two unequal parts by a small bar of bone. One large posterior palatal vacuity. Bullæ small, transparent, scarcely inflated. Coronoid process of lower jaw much slanted backwards. Axis vertebra very long. Humerus with an entepicondyloid foramen. Marsupial bones minute, unossified, represented by two small pieces of fibro-cartilage.

*Dentition*:—I.  $\frac{1.2.3.4}{1.2.3}$ , C.  $\frac{1}{1}$ , P.  $\frac{1.0.3.4}{1.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 46$ .

Teeth sharp and cutting. I.<sup>1</sup> not differentiated from the other incisors. Premolars narrow, much longer than broad, separated from one another by marked diastemata; p.<sup>4</sup> present, twice as large as p.<sup>3</sup> Molars light and delicate, the main central cusp without any smaller subsidiary cusp on its outer slope; m.<sup>4</sup> with a marked central posterior talon. Lower teeth narrow and slender, not crowded; molars simple, cutting, each with a large central, medium anterior, and small posterior cusp, but entirely without accessory internal cusps (see Pl. XXIV. fig. 1). Posterior heel of m.<sup>2</sup> and m.<sup>3</sup> broad, its outer side raised into a small cusp, its inner side flat. Heel of m.<sup>4</sup> small and simple, but distinct.

Milk-tooth minute, rudimentary, shed during infancy.

*Range*. Tasmania only ‡. (Found fossil in New South Wales.)

1. *Thylacinus cynocephalus*.

*Didelphys cynocephala*, *Harris, Tr. Linn. Soc.* (1) p. 174, pl. xix. fig. 1 (animal) (1808).

*Dasyurus cynocephalus*, *Geoff. Ann. Mus.* xv. p. 304 (1810); *G. Cuv. R. A.* i. p. 175 (1817); *Desm. N. Dict. d'H. N.* (2) ix. p. 136

\* This name has no claim to adoption, as its original mention is unaccompanied not only by a diagnosis, but also by any indication of what species it is intended to contain, although its author afterwards assigned it to the Thylacine.

† *Fide* Owen.

‡ The occurrence in Queensland of an animal allied to the Thylacine has been several times reported, but as yet these reports have not been confirmed by the capture of specimens (see Scott, *P. Z. S.* 1872, p. 355).

- (1817); *Geoff. Dict. Sci. Nat.* xii. p. 510 (1818); *Desm. Mamm.* i. p. 262 (1820); *Desmoul. Dict. Class. d'H. N.* v. p. 338 (1824); *Gray, Griff. Cuv. An. K.* v. p. 192 (1827).
- Thylacinus harrisi*, *Temm. Mon. Mamm.* i. p. 63, pl. vii. figs. 1-4 (skull) (1827); *Less. Man. Mamm.* p. 216 (1827); *id. Cent. Zool.* p. 14, pl. ii. (animal and skull) (1830); *Kaup, Thierf.* i. p. 239 (1835); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 367, pl. xxvi. (animal) (1836); *Waterh. Cat. Mamm. Mus. Z. S.* p. 64 (1838); *Owen, P. Z. S.* 1838, p. 121 *et seqq.*; *id. Tr. Z. S.* ii. pp. 317 & 408, pl. lxx. fig. 1 (skull) (1841); *id. P. Z. S.* 1843, p. 148; *id. Odontogr.*, Atl. pl. xcvi. fig. 1 (teeth) (1845); *id. Todd's Cyclop. Anat. Phys.* iii. p. 258, fig. 80 (teeth) (1847); *Less. N. Tabl. R. A., Mamm.* p. 190 (1842).
- Thylacinus cynocephalus*, *Fisch. Syn. Mamm.* p. 270 (1829); *Pearson, J. A. S. B.* iv. p. 572, pl. xlvi. fig. 49 (dentition) (1835); *Gunn, Ann. Mag. N. H.* (1) i. p. 101 (1838) (habits); *Gray, Grey's Austr., App.* ii. p. 400 (1841); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 123, pl. v. (animal) (1841); *Wagn. Schr. Säug. Supp.* iii. p. 19 (1843), v. p. 193 (1855); *Schinz, Syn. Mamm.* i. p. 489 (1844); *Waterh. N. H. Mamm.* i. p. 456, pl. xvii. fig. 2 (animal), & xxi. fig. 3 (skull) (1846); *Gunn, P. Z. S.* 1850, p. 90, pl. xviii. (animal); *Gould, Mamm. Austr.* i. pls. liii, liv. (animal) (1851); *Gunn, P. Roy. Soc. Tasm.* ii. p. 80 (1852); *Crisp, P. Z. S.* 1855, p. 188 (anat.); *Gerv. H. N. Mamm.* ii. p. 280, figs. (skeleton, teeth, & animal) (1855); *Gieb. Odontogr.* p. 39, pl. xviii. fig. 10 (teeth) (1855); *Schleg. Dierk.* p. 134 (1857); *Gieb. Säug.* p. 734 (1859); *Gunn, P. Z. S.* 1863, p. 103 (habits); *Kreff, Notes Faun. Tasm.* p. 4 (1868); *id. Austr. Vert.* p. 14 (1871); *Schleg. Dierent.* p. 157 & fig. (animal) (1872); *Scott, P. Z. S.* 1872, p. 355; *Gieb. Bronn's Kl. u. Ordn.* vi. Abth. v. pl. xix. figs. 2 & 3 (skull) (1874); *Cunningham, J. Anat. Phys.* xii. p. 427 (1878) (anat. limbs); *id. Rep. Voy. 'Challenger,' Zool.* v. pt. 2, pls. i.-xiii. (1882) (anat.); *Brehm, Thierl.* ii. p. 545 & figs. (skeleton & animal) (1880); *Dobs. J. Anat. Phys.* xvii. p. 154 (1882) (anat. feet); *Flow. Encycl. Brit.* (9) xv. p. 380, fig. 26 (animal) (1883); *Higg. & Pett. P. Roy. Soc. Tasm.* 1883, p. 197; *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 745 (1884); *Jent. Cat. Ost. Leyd. Mus.* p. 305 (1887).
- Lycan cynocephalus*, *Wagl. Syst. Amph. Säug.* p. 24 (1830).
- Dasyurus lucocephalus*, *Grant, Glean. Sci.* iii. p. 175 (1831).
- Thylacinus striatus*, *Warlow, J. A. S. B.* ii. p. 97 (1833).
- Peracyon cynocephalus*, *Gray, List Mamm. B. M.* p. 97 (1843); *Gerrard, Cat. Bones Mamm. B. M.* p. 133 (1862).
- Thylacinus briveps*, *Kreff, Ann. Mag. N. H.* (4) ii. p. 296, pl. xvii. (skull) (1868); *id. Notes Faun. Tasm.* p. 4 (1868); *id. Austr. Vert.* p. 14 (1871).

#### THYLACINE OR TASMANIAN WOLF.

Fur short, close and crisp. General colour pale finely grizzled grey-brown, with a faint yellowish or tawny tinge; the head, back of ears, body, limbs, and greater part of tail being of this colour. Round eyes, edges and a spot at base of ears paler, nearly white. Posterior back with about 16 or 17 dark blackish-brown bands, contrasting prominently with the pale ground-colour of the back; bands on rump descending outside the hips nearly to the knee; bands on middle back becoming shorter and narrower anteriorly

and disappearing just behind the shoulders. Chin, chest, and belly paler than back, but the difference not very strongly marked. Soles naked, coarsely granulated, without defined foot-pads. Tail shorter than body, very thinly haired, except just at base, coloured like back, but its tip blackish and provided both above and below with indistinct crests of longer hairs. *Mammæ* 4\*.

*Skull* with the nasals long, slightly expanded behind. Interorbital space broad, swollen, its edges rounded, but forming prominent thickened postorbital projections. Sagittal and lambdoid crests well developed, even in immature specimens. Anterior palatine foramina long and narrow, ending rather behind the centre of the canine. One pair of large posterior palatine vacuities, opposite *ms.*<sup>2-4</sup>. Palate ending just behind the level of *m.*<sup>4</sup> Skull of female distinguishable from that of male by its smaller size, shorter muzzle, less expanded zygomata, and, so far as regards the dentition, by the actually smaller but proportionally larger teeth, and especially by the much smaller size of the last molar, which in the male is about 13 or 14 millim. in its transverse diameter, as compared to 10 or 11 in the female.

*Teeth* delicate, not large in proportion to the size of the animal. Incisors forming an evenly bowed transverse series; *i.*<sup>1</sup> quite in series with the rest, separated at its base from its fellow of the opposite side, occasionally converging to meet it at its crown; *i.*<sup>4</sup> nearly twice as large in section as any of the others, which are about equal. *P.*<sup>1</sup> slightly smaller than *p.*<sup>3</sup>; *p.*<sup>4</sup> about twice the size of *p.*<sup>1</sup>

*Dimensions.*

	♀. <i>a</i> (stuffed). millim.
Head and body .....	1080
Tail .....	530
Hind foot .....	150
Ear .....	57

Skull, see p. 261.

*Hab.* Tasmania.

*Type* not in existence.

Kreff's *Th. breviceps* is evidently based merely on the female of this species, the characters he gives being precisely those that separate the two sexes, which differ in their cranial and dental characters far more than do the sexes of any other Marsupial.

<i>a, b.</i> Ad. st., ♀.	Tasmania.	Ronald Gunn, Esq. [P. & C.]. Zool. Soc.
<i>c.</i> { Ad. sk. Skeleton. } ♂.		

\* *Apud* Owen, P. Z. S. 1843, p. 148.

d.	{ Skeleton & anatomical preparations in al. } ♂.	Tasmania.	H.M.S. 'Challenger.'
e.	{ Pelvis, sternum, & anatomical preparations in al. } ♀.	Tasmania.	H.M.S. 'Challenger.'
(The specimens described by Dr. R. Cunningham, <i>l. c.</i> )			
f.	{ Yg. sk. } ♂.	Tasmania.	W. F. Petterd, Esq. [C. & E.]
g, h.	Imm. skeletons, ♂ ♀.	Launceston, Tasmania.	Zool. Soc. [R. Gunn & J. Grant, Esqs. [P.].]
(Specimens mentioned and figured P. Z. S. 1858, p. 90, pl. xviii.)			
i.	Skeleton, ♀.	Tasmania.	Zool. Soc.
j.	Imm. skeleton (imperfect), ♀.	Tasmania.	Zool. Soc. [C. Barclay, Esq. [P.].]
k.	Skull (bisected), ♀.	Tasmania.	F. G. Waterhouse, Esq. [P.].
l, m.	Skulls, ♀.	Tasmania.	Ronald Gunn, Esq. [P. & C.].
n.	Skull, ♂.	Tasmania.	Haslar Hospital.
o.	Skull, ♂.	Tasmania.	Gould Coll.
p.	Skull, ♂.	No history.	

## 2. SARCOPHILUS.

Type.

*Sarcophilus, F. Cuv. H. N. Mamm. (fol.) iv. livr. lxx. (1837)* ..... *S. ursinus.*  
*Diabolus, Gray, Grey's Austr., App. ii. p. 400 (1841)* .... *S. ursinus.*

Form thick and powerful. Muzzle short and broad. Ears broad and rounded, the lower part of their outer margin very convex, and their actual tip so broadly rounded off as to be scarcely marked at all; metatragus as in *Dasyurus*. Tail of medium length, evenly hairy. Feet plantigrade. Toes subequal, with well-developed curved claws; hallux wanting; soles entirely naked, without defined sole-pads.

*Skull* remarkably broad and strong, with a short thick muzzle. Palatal vacuities of medium size. Bullæ prominent, inflated. Coronoid process of lower jaw vertical. Axis vertebra very short and broad. Humerus with an entepicondylloid foramen.

*Dentition*:—I.  $\frac{1.2.3.4}{1.2.3}$ , C.  $\frac{1}{1}$ , P.  $\frac{1.0.3.0}{1.0.3.0}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 42$ .

*Teeth* blunt and rounded. Upper  $i^1$  not differentiated from the other incisors. Premolars rounded, broader than, or at least as broad as, long, closely pressed against each other and against the canine in front and  $m^1$  behind;  $p^4$  entirely absent. Molars broad and heavy, the main central cusp of  $m^1$  and  $m^2$  with a small subsidiary cusp on its outer slope;  $m^4$  without a marked posterior talon. Lower teeth rounded, strong, closely crowded together; molars simple, much as in *Thylacinus*, but each with a small additional postero-internal secondary cusp, most largely developed on

\* Preserved in the "Index" portion of the Museum.

m.<sup>3</sup> M.<sup>1</sup> with the small anterior cusp almost or wholly aborted.  
M.<sup>4</sup> with scarcely a trace of a posterior heel.

Milk-premolar entirely absent, as well as the tooth (p.<sup>4</sup>) it would have preceded.

*Habits.* Fossorial; carnivorous.

*Range.* Tasmania only. (Found fossil in New South Wales.)

This genus, on account of the number of its teeth, has been nearly invariably either confounded with *Dasyurus*, or at most only doubtfully kept distinct; but there can be no question, judging by the structure instead of the mere number of the teeth, that it is more nearly allied to *Thylacinus* than it is to *Dasyurus*.

### 1. *Sarcophilus ursinus*.

- Didelphys ursina*, *Harris, Tr. Linn. Soc.* ix. p. 176, pl. xix. fig. 2 (animal) (1808) (*nec Shaw*).
- Dasyurus ursinus*, *Geoff. Ann. Mus.* xv. p. 305 (1810); *G. Cuv. R. A.* i. p. 175 (1817); *Desm. N. Dict. d'N. H.* (2) ix. p. 137 (1817); *Geoff. Dict. Sci. Nat.* xii. p. 510 (1818); *Desm. Mamm.* i. p. 263 (1820); *Desmoul. Dict. Class. d'H. N.* v. p. 338 (1824); *Gray, Griff. Cuv. An. K.* v. p. 192 (1827); *Temm. Mon. Mamm.* i. p. 68, pl. viii. figs. 1-5 (skull) (1827); *Less. Man. Mamm.* p. 214 (1827); *Fisch. Syn. Mamm.* p. 271 (1829); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 372 (1836); *Gunn, Ann. Mag. N. H.* i. p. 103 (1838) (*habits*); *Owen, P. Z. S.* 1838, p. 121 *et seqq.*; *id. Tr. Z. S.* ii. pp. 389 & 408, pl. lxx. fig. 5 (skull) (1841); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 128 (1841); *Wagn. Schr. Säug. Supp.* iii. p. 22 (1843), v. p. 193 (1855); *Schinz, Syn. Mamm.* i. p. 490 (1844); *Owen, Odontogr.*, Atl. pl. xcvi. fig. 2 (teeth) (1845); *id. Todd's Cyclop. Anat. Phys.* iii. p. 259, fig. 81 (teeth) (1847); *Gunn, P. Roy. Soc. Tasm.* ii. p. 81 (1852); *Gieb. Odontogr.* p. 39, pl. xvii. fig. 6 (teeth) (1855); *Schleg. Dierk.* p. 135 (1857); *Gieb. Säug.* p. 732 (1859); *Flow. P. Geol. Soc.* 1868, p. 313, figure (skull); *Schleg. Dierent.* p. 159 (1872); *Brehm, Thierl.* ii. p. 547, fig. (animal) (1880); *Flow. Encycl. Brit.* (9) xv. p. 379, fig. 24 (skull) (1883); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 743 (1884); *Jent. Cat. Ost. Leyd. Mus.* p. 305 (1887).
- Sarcophilus ursinus*, *F. Cuv. H. N. Mamm.* (fol.) iv. livr. lxx. (animal) (1837); *Less. N. Tabl. R. A., Mamm.* p. 190 (1842); *Mayer, D'Alton's Zeitschr. Zool. Pat.* i. p. 181 (1849) (*anat.*); *Gould, Mamm. Austr.* i. pl. xlvi. (animal) (1851); *Gerv. H. N. Mamm.* ii. p. 282 (1855); *Kreff, Cat. Mamm. Austr. Mus.* p. 25 (1864); *id. Notes Faun. Tasm.* p. 4 (1868); *id. Austr. Vert.* p. 14 (1871); *Chatin, Bull. Soc. Philom.* (6) xii. p. 54 (anatomy of anal glands) (1877); *Higg. & Pett. P. R. Soc. Tasm.* 1883, p. 197.
- Diabolus ursinus*, *Gray, Grey's Austr., App.* ii. p. 400 (1841); *id. List Mamm. B. M.* p. 97 (1843); *Gerrard, Cat. Bones Mamm. B. M.* p. 134 (1862).
- Dasyurus (Sarcophilus) ursinus*, *Waterh. N. H. Mamm.* i. p. 448, pl. xxi. fig. 4 (skull) (1846); *Vrolik, Tijdschr. Wis. & Natuurk. Wet. Amsterd.* iv. p. 153 (1851) (*anat.*).

#### TASMANIAN DEVIL.

Fur thick and close, consisting largely of the soft woolly underfur,

which is nearly as long as the longer, straighter fur. General colour black or dark blackish brown all over, the head, body, limbs, and tail being all uniformly of that colour, which is only relieved by a small and variable number of pure white patches about the region of the neck, shoulders, and rump, one on the chest between the fore limbs being the only one which seems to be constantly present. Rhinarium large, entirely naked. Ears rounded, hairy, with well-marked tufts of hairs at their base. Soles quite naked; sole-pads absent, but in the usual position of these there is a broad prominence on each foot, not subdivided into three, its surface and that of the whole sole and underside of toes uniformly and coarsely granulated; the tip of each toe, just beneath the claw, with a small transversely striated pad. Tail about half the length of the head and body, uniformly thickly hairy.

*Skull* broad, evenly converging forwards. Nasals narrow, but little expanded behind. Interorbital space very broad, rounded; postorbital processes strongly developed, and corresponding processes on the malars; intertemporal constriction strongly marked, in old specimens its breadth less than one third of the interorbital breadth, the latter increasing and the former decreasing very markedly as age advances. Sagittal and lambdoid crests much developed. Anterior palatine foramina short. Palatal vacuities each a little larger than one of the largest molars. Posterior edge of palate about a centimetre behind the level of the last molar; its edges much thickened, and with a central projecting point. Bullæ pear-shaped, much inflated.

*Teeth* as described above. I.<sup>1</sup> touching its fellow of the other side of the jaw; p.<sup>3</sup> above about three times and below about twice the bulk of p.<sup>1</sup>; m.<sup>4</sup> with no posterior and a much smaller internal talon than in the Thylacine.

*Dimensions.*

	♂*. (Stuffed). Adult. millim.	♂†. (Stuffed). Adult. millim.
Head and body . . . . .	670	660
Tail . . . . .	222	280
Hind foot . . . . .	88	86
Ear . . . . .	36	26

Skull, see next page.

*Hab.* Tasmania.

*Type* not in existence.

a. } Yg. al. { ♂.	Tasmania.	Ronald Gunn, Esq. [P. & C.].
} Skull. {		
b. Imm. st.	Tasmania.	Ronald Gunn, Esq. [P. & C.].

\* In the Vienna Museum.

† In the Munich Museum.

c. Imm. st.	Tasmania.	Purchased.
d. { Imm. sk. }	Tasmania.	Purchased.
{ Skull. }		
e. Skeleton (mounted).		Zool. Soc.
f. Skeleton.	Tasmania.	Purchased.
g, h. Skeletons.		Zool. Soc.
i. Skull (♂).	Tasmania.	Dr. Milligan [P. & C.].
j. Imm. skull.		Haslar Hospital.
k. Skull.		Zool. Soc.

*Skull Dimensions of Thylacinus and Sarcophilus.*

Species .....	<i>Thylacinus cynocephalus.</i>		<i>Sarcophilus ursinus.</i>
	♂. o.	♀. l.	[♂]. i.
Basal length .....	221*	188†	123
Greatest breadth .....	139.5	115	104
Nasals, length .....	90	75	51
" greatest breadth .....	35	27	20
Constriction, breadth .....	36	32	17.5
Palate, length .....	124	106	75
" breadth between outer corners of m. <sup>3</sup> .....	61	59	62
Palatal foramen .....	14.5	12.5	6.7
Basi-cranial axis .....	56.7	49	38
Basi-facial axis.....	164.3	139	85
Facial index .....	290	284	224
Teeth—length of p. <sup>3</sup> .....	...	...	6.8
" " of p. <sup>4</sup> .....	11	10	...
" " of ms. 1-3 .....	38.5	36.7	35.2
" breadth of m. <sup>4</sup> .....	14.4	10†	9.5

## 3. DASYURUS.

Type.

*Dasyurus*, *E. Geoff. Bull. Soc. Philom.* i. p. 106 (1796).. *D. viverrinus*.

General form very viverrine, much as in the Genets. Rhinarium well defined, quite naked, with a deep groove running down to the upper lip. Ears long and narrow, their tips well defined, and the lower half of their outer margins only slightly and evenly convex; metatragus large and broad, folded downwards, its edges thickened and bent outwards before and behind. Body grey or brown, profusely spotted with white. Tail long, evenly and thickly hairy throughout. Feet plantigrade. Toes subequal, with sharp curved claws; hallux either very small or altogether wanting; soles granulated, nearly or wholly naked. Pouch opening vertically

\* Range from 205 to 226.

† Range from 179.

‡ 11.0 in two other females.

downwards, its walls of about equal depth all the way round. Mammæ 6 or 8, arranged in two outwardly curved series.

*Skull* of medium proportions; palatal cavities large. Bullæ large and inflated, rounded, transparent. Axis vertebra of medium length. No entepicondylloid foramen on humerus.

*Dentition*:—I.  $\frac{1.2.3.4}{1.2.3}$ , C.  $\frac{1}{1}$ , P.  $\frac{1.0.3.0}{1.0.3.0}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 42$ .

*Teeth* more insectivorous in their character than in *Thylacinus* and *Sarcophilus*. Upper i.<sup>1</sup> pointed, cylindrical, not flattened at its tip, as are the other three, separated from its fellow of the opposite side. Premolars pointed, much longer than broad, separated from each other and from m.<sup>1</sup> by the gaps caused by the missing p.<sup>2</sup> and p.<sup>4</sup> Molars multicuspidate; ms.<sup>1-3</sup> with their anterior and central secondary cusps nearly or quite as long as the main central one; m.<sup>4</sup> without a marked posterior, but with a large internal talon. Lower teeth narrow, laterally compressed, their general characters corresponding to those of the upper jaw. Molars (except m.<sup>1</sup>) with a prominent secondary cusp on the inner side of the main central one (see Pl. XXIV. fig. 3) and with a small extra cusp on the internal corner of the posterior basal ledge. M.<sup>1</sup> with scarcely a trace of the small anterior secondary cusp found in *Thylacinus* and generally in *Phascologale*.

Milk-premolars absent, as in *Sarcophilus*.

*Habits*. Arboreal; carnivorous and insectivorous.

*Range*. Whole of Papuan and Australian subregions.

The Dasyures or "Native Cats" are among the best known of the Marsupials, as they render themselves notorious and obnoxious to the settlers by their serious depredations in poultry-yards and similar places. In fact, their habits would seem to be almost precisely similar to those of the Martens, whose position they clearly occupy in the Australian fauna, living in trees and feeding largely upon birds and their eggs. It seems probable that the species (*D. viverrinus* and *D. geoffroyi*) which, like the Thylacine and Tasmanian Devil, have no distinct striated pads on their feet are less exclusively arboreal than those so provided, judging from the analogy of other forms in which the climbing-powers and habits vary in precisely the same ratio as the development of these distinctly climbing-organs.

### *Synopsis of the Species.*

#### I. EXTERNAL CHARACTERS.

- A. Size large. Tail spotted. Foot-pads distinct, transversely striated . . . . . 1. *D. maculatus*, p. 263.
- B. Size medium or small. Tail not spotted.
- a. Foot-pads tuberculated like rest of sole.
- a<sup>1</sup>. No hallux; tail white at end (except in black variety) . . . . . 2. *D. viverrinus*, p. 265.
- b<sup>1</sup>. A hallux; tail becoming black at end 3. *D. geoffroyi*, p. 268.
- b. Foot-pads distinct, transversely striated.
- c<sup>1</sup>. Fur straight, not woolly. Ears large 4. *D. hallucatus*, p. 269.
- d<sup>1</sup>. Fur short and woolly. Ears small. . . . . 5. *D. albopunctatus*, p. 271.

## II. CRANIAL CHARACTERS.

- A. Bullæ obliquely oval, their lesser barely half their greater diameter. Molars 1-3 18 millim. or more . . . . . 1. *D. maculatus*, p. 263.
- B. Bullæ spherical. Molars 1-3 not reaching 18 millim.
- a. Molars 1-3 more than 14 millim. Zygomatic breadth more than 40 millim.
- a<sup>1</sup>. Posterior palate comparatively perfect 2. *D. viverrinus*, p. 265.
- b<sup>1</sup>. Posterior palate with large vacuities 3. *D. geoffroyi*, p. 268.
- b. Molars 1-3 less than 14 millim. Zygomatic breadth less than 38 millim.
- c<sup>1</sup>. Muzzle not abnormally short. Palate-length about 35 millim. Nasals about 20 millim. long . . . . . 4. *D. hallucatus*, p. 269.
- d<sup>1</sup>. Muzzle very short. Palate-length about 28 millim. Nasals about 17 millim. long . . . . . 5. *D. albopunctatus*, p. 271.

1. *Dasyurus maculatus*.

- Spotted Marten, *Phillip, Voy. Botany Bay*, p. 276, pl. xlvi. (animal) (1789).
- Viverra maculata*, *Kerr, Linn. An. K.* p. 170 (1792); *Shaw, Gen. Zool.* i. pt. ii. p. 433 (1800); *Turton, Linn. S. N.* i. p. 56 (1806).
- Mustela novæ-hollandiæ*, *Meyer, Syst. Uebers. Zool. Entd.* p. 27 (1793).
- Dasyurus macrourus*, *Geoff. Ann. Mus.* iii. p. 358 (1804); *Tiedem. Zool.* p. 423 (1808); *Péron, Voy. Terres Austr.* (2) pl. xxxiii. (animal) (1811); *Desm. N. Dict. d'H. N.* (2) ix. p. 138 (1817); *G. Cuv. R. A.* i. p. 175 (1817); *Geoff. Dict. Sci. Nat.* xii. p. 510 (1818); *Desm. Mamm.* i. p. 263 (1820); *Desmoul. Dict. Class. d'H. N.* v. p. 338 (1824); *F. Cuv. Dents Mamm.* p. 75, pl. xxxiii. B (teeth) (1825); *Gray, Griff. Cuv. An. K.* v. p. 193 (1827); *Less. Man. Mamm.* p. 214 (1827); *Temm. Mon. Mamm.* i. p. 69 (1827); *Fisch. Syn. Mamm.* p. 271 (1829); *Burm. Lehrb. Naturg.* p. 548 (1830); *Owen, P. Z. S.* 1835, p. 7 (anat.); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 372, x. p. 366 (1836); *Waterh. Cat. Mamm. Mus. Z. S.* p. 65 (1838); *Owen, P. Z. S.* 1838, p. 121 et seqq.; *id. Tr. Z. S.* ii. pp. 389, 408, pl. lxx. fig. 4 (skull) (1841); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 130, pl. vi. (animal) (1841); *Less. N. Tabl. R. A., Mamm.* p. 190 (1842); *Wagn. Schr. Säug. Supp.* iii. p. 23, pl. clii. B. a (animal) (1843), v. p. 196 (1855); *Schinz, Syn. Mamm.* i. p. 490 (1844); *Gieb. Odontogr.* p. 39, pl. xvii. figs. 1 & 3 (teeth) (1855); *Dobs. J. Anat. Phys.* xvii. p. 153 (1882) (anat. feet).
- Dasyurus maculatus*, *G. Fisch. Zoogn.* ii. p. 584 (1813), *Gray, Grey's Austr., App.* ii. p. 400 (1841); *id. List Mamm. B. M.* p. 98 (1843); *Waterh. N. H. Mamm.* i. p. 439, pl. xxi. fig. 2 (skull) (1846); *Gould, Mamm. Austr.* i. pl. xlix. (animal) (1851); *Gunn, P. Roy. Soc. Tasm.* ii. p. 81 (1852); *Schleg. Dierk.* p. 135 (1857); *Gieb. Säug.* p. 731 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 135 (1862); *Krefft, Cat. Mamm. Austr. Mus.* p. 25 (1864); *id. Notes Faun. Tasm.* p. 4 (1868); *id. Austr. Vert.* p. 14 (1871); *Schleg. Dierent.* p. 158 (1872); *Higg. & Pett. P. Roy. Soc. Tasm.*

1883, p. 197; *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 741 (1884); *Jent. Cat. Ost. Leyd. Mus.* p. 304 (1887); *Coll. Zool. Jahrb.* ii. p. 854 (1887).

*Dasyurus ursinus*, *Gieb. Bronn's Kl. u. Ordn.* vi. Abth. v. pl. xviii. figs. 4 & 5 (skull) (1874) (*nec Harris*).

#### SPOTTED-TAILED DASYURE.

Size comparatively large; form thicker and heavier than in the other species. Fur thick and close; underfur abundant, dark smoky brown. General colour brownish, with a marked rufous or orange tinge. Face covered with very coarse stiff hairs, pale grizzled brown. Ears rather shorter than in the other species, very thinly haired, the bases of their inner margins tufted with yellow-tipped hairs. Body grizzled brown, the longer, coarser hairs with a broad subterminal band of rufous or orange. White body-spots large, many of them from 20 to 25 millim. in diameter, mostly confined to the sides of the neck and body and to the outsides of the limbs, the back being almost or quite without them. Chin, chest, and belly white or pale yellow, the bases of the hairs slate, except on certain scattered spots corresponding to the lateral body-spots. Inner sides of limbs, the feet, and toes coloured on the whole like the belly; claws large and powerful. Tail very long, brown or rufous brown, largely spotted, like the body, with white. Mammæ 6.

*Skull* considerably larger than in the following species. Nasals long, narrow, but little expanded behind, their greatest not twice their least width. Interorbital space broad and smooth, its edges produced outwards into a blunt, rounded postorbital projection, behind which comes the strongly marked intertemporal constriction. Sagittal and lambdoid crests strongly developed. Palate unusually complete, with only a few small and irregular vacuities. Bullæ swollen, elongated along a line running from the edge of the palate outwards and backwards, their diameter along this line nearly or quite twice that in the direction at right angles to it.

*Teeth* as usual, only distinguishable from those of the other species by their larger size. Combined lengths of first three molars from 18 to 20 millim.

#### *Dimensions.*

	♂. e (skin): Adult. millim.
Head and body . . . . .	620
Tail . . . . .	470
Hind foot . . . . .	76
Ear . . . . .	(c.) 24

Skull, see p. 272.

*Hab.* Eastern and South-eastern Australia, from Central Queensland to Tasmania; most common in the latter.

*Type* not in existence.

The commonness of this species in Tasmania and its great rarity on the continent are of interest as showing that it is approaching the condition now exhibited by the Thylacine and Tasmanian Devil, namely complete extermination in Australia, where both once lived, and continued preservation in the island of Tasmania. Why the small island of Tasmania should be able to support in considerable numbers the three largest carnivorous Marsupials, competing probably, to a certain extent, with each other, while they have been almost or wholly unable to survive on the mainland, is a problem which much requires elucidation. The presence of the Dingo in Australia is no doubt one of the causes that have tended to produce this remarkable state of affairs.

a. Ad. skeleton.	Herbert Vale, Queens- land ( <i>Dr. Lunnholtz</i> ).	Christiania Museum [E.].
b. Ad. sk., ♂.	Gippsland, Victoria.	Purchased.
c. Ad. st., ♂.	Tasmania.	Gould Coll.
d. Imm. st., ♂.	Tasmania.	Purchased.
e, f. { Ad. & imm. sk. } ♂.	Tasmania.	Gen. Hardwicke [P.].
{ Skull of e. }		
g. { Ad. sk. } *	Tasmania.	Gould Coll.
{ Skull }		
h. Skeleton, mounted.	Tasmania.	Purchased.
i. Skull (♂).	Launceston, Tasmania.	Purchased.
j. Skull (♂).		Haslar Hospital.

## 2. *Dasyurus viverrinus*.

- Spotted Opossum, *Phillip, Voy. Botany Bay*, p. 147, pl. xv. (1789).  
 Tapoa tafa, spotted variety, *White, Journ. Voy. N. S. W.* p. 285,  
 pl. lix. (1790).  
*Didelphis maculata*, *Kerr, Linn. An. K.* p. 199 (1792) (*nec Viverra maculata*, *id. op. cit.* p. 170); *G. Cuv. Tabl. Elém.* p. 125 (1798); *Wiedem. Cuv. Naturg. Thiere*, i. p. 179 (1800); *Turton, Linn. Syst. Nat.* i. p. 68 (1803).  
*Didelphis viverrinus*, *Shaw, Gen. Zool.* i. pt. ii. p. 491, pl. cxi. (1800).  
*Dasyurus viverrinus*, *E. Geoff. Ann. Mus.* iii. p. 360 (1804); *Sevast. Mém. Ac. Pétersb.* i. p. 443 (1807); *Ill. Prodr. Syst. Mamm.* p. 77 (1811); *G. Fisch. Zoogn.* ii. p. 585 (1813); *G. Cuv. R. A.* i. p. 176 (1817); *Desm. N. Dict. d'H. N.* (2) ix. p. 139 (1817); *Geoff. Dict. Sci. Nat.* xii. p. 511 (1818); *Desm. Mamm.* i. p. 263 (1820); *Desmoul. Dict. Class. d'H. N.* v. p. 339 (1824); *Gray, Griff. Cuv. An. K.* v. p. 193 (1827); *Less. Man. Mamm.* p. 215 (1827); *Temim. Mon. Mamm.* i. p. 72 (1827); *J. B. Fisch. Syn.*

\* This specimen presents the remarkable anomaly of having an additional molar inserted between the m.<sup>3</sup> and m.<sup>4</sup> of ordinary Dasyures on the left side of the upper and on both sides of the lower jaw. In size also it is dwarfed, the combined lengths of its first three molars being only 15 millim., and therefore no longer than in *D. viverrinus*. The skull is asymmetrical in the temporal region, where it has perhaps been injured by a blow, an injury which, if done in its mother's pouch before the formation of its teeth, may, by affecting the nervous system, have caused the anomaly in its dentition.

- Mamm.* p. 272 (1829); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 373, pl. xxv. (1836); *Waterh. Cat. Mamm. Mus. Zool. Soc.* p. 65 (1838); *Gunn, Ann. Mag. N. H.* (1) i. p. 104 (1838); *Gould, P. Z. S.* 1840, p. 151; *Owen, Tr. Z. S.* ii. p. 408, pl. lxx. fig. 2 (skull) (1841); *Gray, Grey's Austr., App.* ii. p. 400 (1841); *Less. N. Tabl. R. A., Mamm.* p. 190 (1842); *Gray, List Mamm. B. M.* p. 97 (1843); *Wagn. Schr. Säug. Supp.* iii. p. 33, 1843, v. p. 194 (1855); *Waterh. N. H. Mamm.* i. p. 442, pl. xii. fig. 1 (soles of feet) (1846); *Gould, Mamm. Austr.* i. pl. 1. (animal) (1851); *Gunn, P. Roy. Soc. Tasm.* ii. p. 81 (1852); *Gerv. H. N. Mamm.* ii. p. 282 (1855); *Schleg. Dierk.* p. 135 (1857); *Gieb. Säug.* p. 731 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 134 (1862); *Kreff, Cat. Mamm. Austr. Mus.* p. 26 (1864); *id. Notes Faun. Tasm.* p. 4 (1868); *id. Austr. Vert.* p. 14 (1871); *Schleg. Dierent.* p. 159 (1872); *Brehm, Thierl.* ii. p. 549 (1880); *Higg. & Pett. P. Roy. Soc. Tasm.* 1883, p. 197; *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 742 (1884); *Jent. Cat. Ost. Leyd. Mus.* p. 304 (1887); *Thos. Phil. Trans.* clxxvii. p. 461, pl. xxvii. fig. 5 (teeth) (1887); *Lyd. Cat. Foss. Mamm. B. M.* v. p. 268 (1887).
- Dasyurus maugei*, *Geoff. Ann. Mus.* iii. p. 359 (1804); *Tiedem. Zool.* p. 429 (1808); *G. Fisch. Zoogn.* ii. p. 584 (1813); *Desm. N. Dict. d'H. N.* (2) ix. p. 138 (1817); *Geoff. Dict. Sci. Nat.* xii. p. 511 (1818); *Desm. Mamm.* i. p. 263 (1820); *Goldf. Handb. Zool.* ii. p. 449 (1820); *Desmoul. Dict. Class. d'H. N.* v. p. 339 (1824); *F. Cuv. H. N. Mamm.* (fol.) iii. livr. xliv. (animal) (1824); *Quoy & Gaim. Voy. Uranie*, p. 54, pl. iv. (animal & skull) (1824); *Gray, Griff. Cuv. An. K.* v. p. 193 (1827); *Temm. Mon. Mamm.* i. p. 71, pl. vii. figs. 5-8 (skull) (1827); *Less. Man. Mamm.* p. 214 (1827); *J. B. Fisch. Syn. Mamm.* p. 271 (1829); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 373, pl. xxxvi. (animal) (1836); *Benn. Cat. N. H. Austr. Mus.* p. 2 (1837); *Owen, P. Z. S.* 1838, p. 121 *et seqq.*; *Waterh. Cat. Mamm. Mus. Zool. Soc.* p. 65 (1838); *Gould, P. Z. S.* 1840, p. 151; *Owen, Tr. Z. S.* ii. pp. 397, 408, pl. lxx. fig. 3 (skull) (1841); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 133, pl. vii. (animal) (1841); *Less. N. Tabl. R. A., Mamm.* p. 190 (1842); *Wagn. Schreb. Säug. Supp.* iii. p. 24, pl. clii. B. b (animal) (1843); *Schünz, Syn. Mamm.* i. p. 491 (1844); *Gieb. Odont.* p. 39, pl. xvii. fig. 8 (teeth) (1855).
- Dasyurus guttatus*, *Desm. N. Dict. d'H. N.* (1) xxiv. p. 10 (1804).

## COMMON DASYURE.

Size medium, about that of a Marten; form slender. Fur thick and soft; underfur long and abundant, dark slaty grey, nearly black in parts. General colour either pale olive-grey or deep black, profusely spotted with white. In the black melanistic variety every part of the body is deep black, except for the white body-spots. In the grey, or normal, variety the face, back, and sides of neck and body are all of a pale yellowish grey, the longer hairs everywhere with a subterminal yellow band. Ears large, their backs and edges internally covered with pale yellow hairs. Body-spots generally distributed, larger ones from about 12 to 15 millim. in diameter. Belly and limbs like back, but paler and greyer, the tips of the hairs white instead of yellow. Soles of feet granulated, without marked pads. No trace of a hallux. Tail bushy, with a tendency towards a distichous arrangement of the hairs; its proximal three-

fourths coloured like the back, but wholly without white spots; its tip white, forming a prominent white pencil. Mammæ 6.

*Skull* rather lightly built, with a narrow slender muzzle. Nasals evenly broadening backwards, their greatest about twice their least breadth. Interorbital space rounded, depressed in the middle line, its edges thickened, but not forming postorbital projections. Intertemporal constriction usually less marked than in *D. maculatus*. Palatal foramen extending backwards to the centre of the canine. Posterior palate usually fairly perfect, the vacuities mostly very small. Bullæ large and prominent, hemispherical.

*Teeth* as usual. Combined lengths of first three molars from 15 to 17 millim. Upper m.<sup>4</sup> usually broader and heavier antero-posteriorly than in *D. geoffroyi*.

*Dimensions.*

	♂. a (stuffed). Adult. millim.	♀. k. Adult. millim.
Head and body . . . . .	440	(c) 400
Tail . . . . .	290	210
Hind foot . . . . .	65	60
Ear . . . . .	28	27

Skull, see p. 272.

*Hab.* Colonies of South Australia, New South Wales, Victoria, and Tasmania.

*Type* not in existence.

The great frequency with which black semi-melanistic specimens occur in this species is a very remarkable and noteworthy fact, especially as the black colour does not affect the body-spots, which are present in their usual position and number as much in the black as in the ordinary specimens. The tuft at the end of the tail, however, usually white, is, like the rest of that organ, wholly black.

The two forms were long, and perhaps naturally, thought to represent two distinct species, but Mr. Gould in 1840 satisfactorily proved their identity by stating that he had himself found specimens of both the black and grey varieties in the same litter.

a. *Ad. st., ♂.	Liverpool Plains, N. S. W.	Gould Coll.
b. *Imm. sk.	Maitland, N. S. W.	Gould Coll.
c. Yg. st.		Gould Coll.
d. Skeleton.	Garden Island, Port Jackson, N. S. W. ( <i>Voy.</i> 'Herald').	F. M. Rayner, Esq.
e. Skull.	New South Wales.	Purchased.
f, g. Ad. ♂ & yg. st.	South Australia.	Sir George Grey [P. & C.].
h. Yg. st.	South Australia.	Purchased.
i. *Ad. sk., ♀, 14/11/38.	Richmond, near Hobart, Tasmania.	Gould Coll.

\* Specimens marked with an asterisk belong to the black melanistic form.

<i>j, k.</i>	} Ad. sks. } } Skull of <i>j.</i> } ♂ ♀.	Tasmania.	Capt Ross [P. & C.].
<i>l.</i>		*Ad. sk.	Tasmania.
<i>m.</i>	Ad. sk.	Tasmania.	Mrs. Gillies [P.].
<i>n.</i>	*Yg. st.	Tasmania.	
<i>o.</i>	Heart in al.	(Voy. H.M.S. 'Challenger.')	Dr. Cunningham.
<i>p.</i>	Pouch with 5 fetuses.	Tasmania.	No history.
<i>q, r.</i>	Skeletons.		Purchased.
<i>s-u.</i>	Skulls.		Purchased.

### 3. *Dasyurus geoffroyi*.

*Dasyurus geoffroyi*, *Gould, P. Z. S.* 1840, p. 151; *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 132 (1841); *Gray, Grey's Austr., App.* ii. p. 400 (1841); *Less. N. Tabl. R. A., Mamm.* p. 190 (1842); *Gray, List Mamm. B. M.* p. 98 (1843); *Schinz, Syn. Mamm.* i. p. 491 (1844); *Waterh. N. H. Mamm.* i. p. 437 (1846); *Gould, Mamm. Austr.* i. pl. li. (animal) (1851); *Wagn. Schreb. Säug. Supp.* v. p. 194 (1855); *Schleg. Dierk.* p. 135 (1857); *Gieb. Säug.* p. 731 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 134 (1862); *Kreffl, Cat. Mamm. Austr. Mus.* p. 27 (1864); *id. Austr. Vert.* p. 14 (1871); *Schleg. Dierent.* p. 159 (1872); *Jent. Cat. Ost. Leyd. Mus.* p. 304 (1887); *Coll. Zool. Jahrb.* ii. p. 856 (1887).

#### BLACK-TAILED DASYURE.

Size, form, and quality of fur as in *D. viverrinus*. General colour olive-grey with a tinge of rufous, darker than in *D. viverrinus*, profusely spotted with white. Face pale grey. Top of head, back, sides of body, limbs, and basal third of tail all rufous olive-grey. Ears (Pl. XXIII. fig. 1) large, with a prominent metatragus; their backs brown, but the edges both internally and externally white. Body-spots smaller than in *D. viverrinus*, the diameter of the larger ones from about 9 to 12 millim. Chin, chest, and belly white, the bases of the hairs slate. Palms and soles naked, granulated; the usual positions of the foot-pads marked by rounded granulated prominences, but there are no distinct striated pads developed (see Pl. XXIII. fig. 2). Hallux distinct, about 5 millim. long. Tail long, less bushy than in *D. viverrinus*, the hairs arranged distichously; its basal half above and fourth below coloured like the back, but wholly unspotted; end and greater part of underside black. Palate with seven continuous but rather irregular palate-ridges, between which are other minute and rudimentary ones. Mammeæ 6.

Skull almost identical with that of *D. viverrinus*, but rather more strongly built, with the anterior palatal foramina rather shorter, and with two large posterior palatal vacuities, these latter being as a rule covered in by a thin bony network in *D. viverrinus*.

Teeth as in *D. viverrinus*. Upper m.<sup>4</sup> usually narrower antero-posteriorly than in that species.

\* Specimens marked with an asterisk belong to the black melanistic form.

## Dimensions.

	♂.	♀.
	<i>c</i> (stuffed).	<i>a</i> (in spirit).
	Adult.	Adult.
	millim.	millim.
Head and body . . . . .	400	360
Tail . . . . .	310	270
Hind foot . . . . .	63	60
Ear . . . . .	31	31

Skull, see p. 272.

*Hab.* All Australia except the extreme north; in the east living chiefly in the interior rather than the coast districts, where it is superseded by *D. viverrinus*. Not found in Tasmania.

*Type* in collection.

Judging by the relative sizes of the skulls (see p. 272) the western race of this species seems somewhat to exceed the eastern, the males of the latter little more than equalling in size the females of the former. The difference is not, however, by any means sufficient to found nominal distinction upon.

a.	{ Ad. al., ♀ & 5 fetuses. }	Peak Downs, Queensland.	Godeffroy Museum.
b.	{ Ad. sk. Skull. } ♂.	Liverpool Plains, N. S. W.	Gould Coll. ( <i>Type</i> of species.)
c.	Ad. st., ♂.	New South Wales.	Gould Coll.
d, e.	{ Ad. sks. Skulls. } ♂ ♀.	Brushes of Murray R., S. A.	Gould Coll.
f.	{ Ad. sk. Skull. } ♂.	South Australia.	Sir George Grey [P. & C.].
g.	Ad. sk., ♀, 21/12/42.	Vasse R., W. Australia ( <i>J. Gilbert</i> ).	Gould Coll.
h.	{ Ad. st. Skull. } ♀.	Perth, W. A.	Purchased.
i, j.	Imm. sks.	Perth, W. A.	Government of W. Australia [P.].
k.	Skull.	C. Leschenault, Twiss, W. A.	Purchased.
l-n.	Skulls (2 ♂, 1 ♀).	Shark's Bay, W. A. ( <i>Voy.</i> ' <i>Herald</i> ').	F. M. Rayner, Esq. [P.].
o.	Skull, ♂.		Gould Coll.

4. *Dasyurus hallucatus*.

*Dasyurus hallucatus*, *Gould, P. Z. S.* 1842, p. 41; *Gray, List Mamm. B. M.* p. 98 (1843); *Schinz, Syn. Mamm.* p. 492 (1844); *Waterh. N. H. Mamm.* i. p. 434 (1846); *Gould, Mamm. Austr.* i. pl. lii. (animal) (1851); *Wagn. Schr. Säug. Supp.* v. p. 195 (1855); *Gieb. Säug.* p. 730 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 134 (1862); *Krefft, Austr. Vert.* p. 14 (1871); *Coll. Zool. Jahrb.* ii. p. 857 (1887).

## NORTH-AUSTRALIAN DASYURE.

Size small, not more than half the bulk of *D. viverrinus*; form slender. Fur short and coarse; underfur thin, pale slaty grey.

General colour yellowish brown, white-spotted. Face grizzled yellowish grey. Ears large and leafy, very thinly covered with fine yellow hairs; metatragus large, not so thick and fleshy as in *D. geoffroyi*. Back brown, the longer hairs with a subterminal band of dull yellow and a long rufous-brown tip. Sides of neck and body paler, either grey or yellow, the darker tips to the hairs here disappearing. Body-spots generally distributed, the larger ones about 10 millim in diameter. Chin, chest, and belly pale grey or yellow, the bases of the hairs generally slate, but sometimes white. Limbs coloured outside like back, inside like belly. Feet thickly covered with short coarse yellow hairs; hallux present; soles smooth, naked, with three anterior, one long postero-external, and two postero-internal pads, all distinctly defined and transversely striated; the last two pads corresponding to the long and often double hallucal pad of *Phascologale*. Tail long, much shorter-haired than in the other species, its base coloured like the body, the remainder black. Palate with seven continuous evenly curved ridges, between which, in the middle line, there are minute supplementary ones. Mammæ 8.

*Skull* similar to, although much smaller than, that of *D. viverrinus*, but, as is usual with smaller species, the crests and ridges on the skull are much less developed, the occipital crest quite low even in aged specimens. Nasals long, evenly expanded backwards. Interorbital space broad and flat, its edges rounded; intertemporal constriction not strongly marked. Two large posterior palatal vacuities opposite the second and third molars. Bullæ much inflated, transparent.

*Teeth* as usual. Upper m.<sup>4</sup> with a projecting posterior angle, and therefore rather broader antero-posteriorly than in the other species.

#### Dimensions.

	♂. b (stuffed). Nearly adult. millim.	♀. a (skin). Adult. millim.
Head and body . . . . .	270	300
Tail . . . . .	210	215
Hind foot . . . . .	44	42
Ear . . . . .	20	21

Skull, see p. 272.

*Hab.* North Australia, within the tropics.

*Type* in collection.

This species shows a certain approach to *Phascologale* in its small size, slender build, and in the structure of its hind feet; but its skull, dentition, and coloration are all distinctly those of the present genus.

a.	{ Ad. sk. { ♀.	Port Essington, Northern Territory.	Gould Coll.
	{ Skull. {		(Type of species.)
b.	{ Ny. ad. st. { ♂.	Port Essington.	Gould Coll.
	{ Skull. {		

- c, d.* Imm. al., ♂ ♀. Port Darwin, Arnhem Land. R. G. S. Buckland, Esq. [C.]  
*e.* Skull (♂). Cape York (*J. Macgillivray*). Voy. 'Rattlesnake.'  
*f.* Ad. sk., ♀. Sir George Grey [P.]

5. *Dasyurus albopunctatus*.

- Dasyurus albopunctatus*, *Schleg. Notes Leyd. Mus.* ii. p. 51 (Jan. 1880);  
*Jent. Cat. Ost. Leyd. Mus.* p. 304 (1887).  
*Dasyurus fuscus*, *M.-Edwards, C. R.* xc. p. 1518 (June 1880); *id.*  
*Ann. Mag. N. H.* (5) vi. p. 172 (1880).

## NEW GUINEA DASYURE.

Size as in *D. hallucatus*, form rather stouter. Fur short, close and soft, much shorter than in the other species; underfur very thin, dark brown. General colour dark grizzled rufous-brown, white-spotted. Head short and broad, dark fulvous. Ears short, rounded, nearly naked. Neck, anterior back, sides and outsides of limbs dark grizzled fulvous or rufous; hind back darker, nearly black. Body-spots very small, the larger ones only from 5 to 7 millim. in diameter. Chin, chest, and belly pale yellow or rufous. Feet dark brown; hallux present; soles naked, pads distinct, transversely striated. Tail long, rather short-haired, black or dark brown, its tip not pencilled.

*Skull* short and thickly built; muzzle much shorter and broader in proportion than in the other species. Nasals short, broad, much expanded behind. Interorbital region broad, flat, not hollowed in the middle line, its edges well marked. Palatal foramina short, barely reaching to the level of the front of the canines.

*Teeth* small in proportion, their form as usual.

*Dimensions.*

	♀. Type (stuffed). Adult. millim.
Head and body . . . . .	270
Tail . . . . .	230
Hind foot . . . . .	42
Ear . . . . .	16

Skull, see next page.

*Hab.* N.W. New Guinea (Mt. Arfak).

*Type* in the Leyden Museum.

This species, as is the case with so many of the Papuan Marsupials, is very closely allied to one of the North-Australian representatives of the genus, namely to *D. hallucatus*, from which, however, it may be distinguished by its shorter muzzle and ears, shorter woollier fur, and by the rufous or fulvous tinge in the general colour of its back.

## Skull Dimensions of Dasyurus.

Species .....	<i>D. maculatus.</i>		<i>D. viverrinus.</i>	<i>D. geoffroyi.</i>			<i>D. hallucatus.</i>	<i>D. albopunctatus.</i>
	♂. ad.	♀. * ad.		Eastern. ♂. d. ad.	Western. ♂. l. ad.	♀. m. ad.		
Sex .....	♂.	♀.	?	♂.	♂.	♀.	(?)	♀.
Specimen .....	1/2	*	e.	d.	l.	m.	e.	a.
Age .....	ad.	ad.	ad.	ad.	ad.	ad.	aged.	ad.
Basal length .....	104	84	75	65.5	77	63.5	60	60
Greatest breadth .....	67	58	47	45	50	41	36	35
Nasals, length .....	37	35	31	23	27	25	22	21
" greatest breadth .....	14	11	12	9	11.4	9.1	8.8	9.5
" least breadth .....	9	7	5.6	4.1	5.4	4	4.5	4.4
Intertemporal constriction .....	10.3	11	12	9.5	9	9.8	9.5	9.2
Palate, length .....	54.5	51	45	39	46	39.3	35	35
" breadth between outer corners of m. <sup>3</sup> .....	33	30.4	27	25	26	23.5	20	19.7
Palatal foramen .....	6.5	6.2	5.2	4	5	4.1	5.4	4.4
Basal-cranial axis .....	37	28	23.3	23.7	25.6	20.8	20.5	20.5
Basal-facial axis .....	67	56	51	42	51.6	43	39.5	39.5
Facial index .....	181	200	210	177	202	207	193	193
Teeth—length of p. <sup>3</sup> .....	4	4.5	3.5	3.3	3.3	3.4	3.2	3.2
" of ms. <sup>1-2</sup> .....	18.9	18.7	16.8	16	14.5	14.2	13.4	13.2
" breadth of m. <sup>4</sup> .....	6.5	6.1	5	5.3	5.1	5	4.1	4.3

\* From Herbert Vale, Central Queensland (Lumbeke); kindly lent to me by Dr. R. Collett of the Christman Museum.  
 † From specimen b.

## 4. PHASCOLOGALE.

	Type.
Phascogale, <i>Temm. Mon. Mamm.</i> i. p. 56 (1827) ..	Ph. penicillata.
<i>Antechinus, Macleay, Ann. Mag. N. H.</i> (1) viii. p. 241 (1841) .....	Ph. flavipes.
<i>Tapoa, Less. N. Tabl. R. A., Mamm.</i> p. 190 (1842) ..	Ph. penicillata.
Ascogale, <i>Gloger, Handb. Naturg.</i> i. p. 83 (1842) ..	Ph. penicillata.
<i>Myoictis, Gray, P. Z. S.</i> 1858, p. 111 .....	Ph. wallacei.
<i>Chætocercus, Krefft, P. Z. S.</i> 1866, p. 434 .....	Ph. cristicaudata.
<i>Dasyercus, Peters, SB. Ges. nat. Freunde,</i> 1875, p. 73 .....	Ph. cristicaudata.

Size small compared to *Dasyurus*; general form slender and graceful. Rhinarium naked, deeply grooved below, where it passes into the upper lip. Ears rounded, more convex below and less pointed than in *Dasyurus*; metatragus large, thin, its terminal part showing scarcely a trace of the folding found in *Dasyurus*. Tail long, very variable in its covering, either bushy, crested or nearly naked. Feet broad and short; toes subequal, with sharp curved claws; hallux always present, but short and clawless; palms and soles granulated, entirely naked, with five transversely striated pads on each, but the postero-internal one (pollical or hallucal) often subdivided into two, making six in all (see Pl. XXIII. fig. 3). Pouch practically obsolete, its walls represented merely by low folds of skin. Mammæ 4, 6, 8, or 10.

*Skull* much as in *Dasyurus*, but smaller, slenderer, less ridged, and more flattened, especially in the frontal region. Nasals markedly expanded behind. Interorbital region broad. Palatal vacuities variable, generally present. Bullæ hemispherical, transparent.

*Dentition*:—I.  $\frac{1.2.3.4}{1.2.3}$ , C.  $\frac{1}{1}$ , P.  $\frac{1.0.3.4}{1.0.3.4^*}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 46$ .

All the teeth very much as in *Dasyurus*, but smaller and more acutely cuspidate. Upper  $i^1$  markedly distinguished from the other incisors, conical, pointed, projecting forwards; lateral incisors flattened. Upper  $p^1$  and  $p^3$  as in *Dasyurus*;  $p^4$  present, generally very similar in shape to  $p^1$  and  $p^3$ , occasionally small and single-rooted, its size varying very much within the genus, but very constant in each species, and therefore affording excellent specific characters. Lower teeth similar to upper;  $p^4$  corresponding very much in its variations to its fellow above, but never exceeding  $p^3$  in size, and sometimes altogether wanting.

Milk-premolar (Pl. XXIV. fig. 4) varying in size and persistency according to the development of the permanent  $p^4$ . Well developed and long persistent in the species with large  $p^4$ ; small or altogether absent in the others.

*Habits.* Arboreal, insectivorous.

*Range.* Whole of Papuan and Australian subregions.

The members of this genus evidently take the place in the Australian region filled in the Oriental by the *Trupaia* and in the

\* Absent in *Ph. cristicaudata* and (generally) in *Ph. thorbeckiana*.

Neotropical by the smaller Opossums. They are strictly arboreal in their habits, and therefore cannot be said to be comparable to the terrestrial and fossorial Shrews, whose position is rather more exactly filled in Australia by the members of the next genus, *Sminthopsis*.

*Synopsis of the Species.*

I. EXTERNAL CHARACTERS.

- A. Back not striped. (Australian, rarely Papuan.)
- a. Tail short-haired, or crested on the terminal part of the upperside only.
- a<sup>1</sup>. Tail prominently crested terminally. 1. *Ph. cristicaudata*, p. 276.
- b<sup>1</sup>. Tail not crested.
- a<sup>2</sup>. Tail tapering gradually, hairs on proximal much longer than on terminal half, and variegated like those on back . . . . . 2. *Ph. apicalis*, p. 277.
- b<sup>2</sup>. Tail cylindrical, evenly short-haired from close to its base, its hairs unicolor.
- a<sup>3</sup>. Tail less than 130 millim. long.
- a<sup>4</sup>. Size medium. Hind foot more than 14 millim. long.
- a<sup>5</sup>. Fore claws very long and strong. Muzzle long. Ears short.
- a<sup>6</sup>. Colour uniform dark grizzled umber-brown, not yellow on rump and hips. . . . . 7. *Ph. swainsoni*, p. 285.
- b<sup>6</sup>. Colour grey, becoming more or less yellow on rump, hips, and belly. 8. *Ph. minima*, p. 287.
- b<sup>5</sup>. Fore claws medium. Muzzle short. Ears large. Colour as in b<sup>6</sup> . . . . . 9. *Ph. flavipes*, p. 289.
- b<sup>4</sup>. Size very small. Hind foot less than 13 millim. long. . 10. *Ph. minutissima*, p. 292.
- b<sup>3</sup>. Tail more than 150 millim. long 11. *Ph. longicaudata*, p. 293.
- b. Tip of tail evenly tufted all round.
- c<sup>1</sup>. Size large, hind foot above 30 millim. long. Base of tail grey . . . . . 12. *Ph. penicillata*, p. 294.
- a<sup>7</sup>. Size medium, hind foot less than 25 millim. long. Base of tail red. 13. *Ph. calura*, p. 296.
- B. Back striped. (Papuan only.)
- c. Tail long-haired above and laterally, except at tip; reddish or orange, not white-tipped. Mammæ 6. Back with three stripes.
- e<sup>1</sup>. Back, sides of neck, and tail chestnut or maroon. Hallucal pad continuous. Mesial stripe distinct on head. . . . . 3. *Ph. thorbeckiana*, p. 278.

- f*<sup>1</sup>. Neck and tail bright rufous. Hal-  
lucal pad divided. Mesial stripe  
indistinct or absent on head . . . . 4. *Ph. wallacei*, p. 280.
- d*. Tail comparatively short-haired; black,  
its extreme tip generally white.  
Mammæ 4. Back with a single  
well-defined stripe.
- g*<sup>1</sup>. Back-hairs orange-tipped; belly  
dull orange-rufous. Hind foot  
in adult animals more than 29  
millim. . . . . 5. *Ph. doriæ*, p. 282.
- h*<sup>1</sup>. Back-hairs white-tipped; belly rich  
chestnut. Hind foot less than 29  
millim. . . . . 6. *Ph. dorsalis*, p. 283.

## II. CRANIAL CHARACTERS.

- A. Upper p.<sup>4</sup> minute, single-rooted.
- a*. Lower m.<sup>1</sup> narrowed in front, without  
an anterior secondary cusp. Lower  
p.<sup>4</sup> minute, single-rooted, or wholly  
absent . . . . . { 1. *Ph. cristicaudata*, p. 276.  
2. *Ph. apicalis*, p. 277.
- B. Upper p.<sup>4</sup> well developed, two-rooted.
- b*. Upper p.<sup>4</sup> smaller than, or barely equal  
to, p.<sup>3</sup> Lower m.<sup>1</sup> narrowed in front,  
generally without an anterior secondary  
cusp.
- a*<sup>1</sup>. Molars <sup>1-3</sup> more than 8 millim. An-  
terior secondary cusp on lower m.<sup>1</sup>  
small or absent.
- a*<sup>2</sup>. Lower p.<sup>4</sup> quite minute, single-  
rooted, or altogether absent. . . . 3. *Ph. thorbeckiana*, p. 278.
- b*<sup>2</sup>. Lower p.<sup>4</sup> two-rooted, distinct.
- a*<sup>2</sup>. Skull stout and strong. Lower  
p.<sup>4</sup> smaller than p.<sup>1</sup> . . . . . 4. *Ph. wallacei*, p. 280.
- b*<sup>3</sup>. Skull slender. Lower p.<sup>4</sup>  
larger than p.<sup>1</sup> . . . . . 5. *Ph. doriæ*, p. 282.
- b*<sup>1</sup>. Molars <sup>1-3</sup> less than 8 millim. A  
small anterior secondary cusp on  
lower m.<sup>1</sup> . . . . . 6. *Ph. dorsalis*, p. 283.
- c*. Upper p.<sup>4</sup> larger than p.<sup>3</sup> Lower m.<sup>1</sup>  
with a distinct anterior secondary  
cusp.
- c*<sup>1</sup>. Lower p.<sup>4</sup> nearly as large as or  
larger than p.<sup>1</sup> Lower incisors  
subequal.
- c*<sup>2</sup>. First three molars less than 7  
millim. long. Palate-length  
less than 20 millim.
- c*<sup>3</sup>. Upper premolars evenly in-  
creasing backwards. First  
three molars more than 5  
millim.
- a*<sup>4</sup>. Upper i.<sup>1</sup> short, flattened  
laterally, touching and  
nearly parallel to i.<sup>2</sup>

- a*<sup>5</sup>. Anterior palatine foramina long, reaching at least to posterior end of *p*<sup>1</sup> . . . . . 7. *Ph. swainsoni*, p. 285.
- b*<sup>5</sup>. Anterior palatine foramina short, not extending past front of *p*<sup>1</sup>. . . . . 8. *Ph. minima*, p. 287.
- b*<sup>4</sup>. Upper *i*<sup>1</sup> long, cylindrical, boldly curved forwards away from *i*<sup>2</sup>. . . . . 9. *Ph. flavipes*, p. 289.
- d*<sup>3</sup>. Upper *p*<sup>4</sup> twice the size of the small subequal *p*<sup>1</sup> and *p*<sup>3</sup>. First three molars less than 4 millim. long . . . . . 10. *Ph. minutissima*, p. 292.
- d*<sup>2</sup>. First three molars more than 7 millim. long. Palate-length more than 20 millim. . . . . 11. *Ph. longicaudata*, p. 293.
- d*<sup>1</sup>. Lower *p*<sup>4</sup> much smaller than *p*<sup>1</sup>. Lower *i*<sup>1</sup> very much larger than *i*<sup>2</sup> or *i*<sup>3</sup>.
- e*<sup>2</sup>. Basal length more than 40 millim. Molars<sup>1-3</sup> more than 8 millim. . . . . 12. *Ph. penicillata*, p. 294.
- f*<sup>2</sup>. Basal length about 30 millim. Molars<sup>1-3</sup> not exceeding 7 millim. . . . . 13. *Ph. calura*, p. 296.

### 1. *Phascologale cristicaudata*.

*Chætocercus cristicauda*, *Kreffft*, *P. Z. S.* 1866, p. 435, pl. xxxvi. (animal); *id. Austr. Vert.* p. 14 (1871).  
*Phascologale cristicaudata*, *Thos. Ann. Mus. Genov.* (2) iv. p. 509 (1887).

#### CREST-TAILED PHASCOLOGALE.

Size medium. General colour uniform reddish or sandy brown, the head, body, limbs, and greater part of tail being of this colour. Ears short and little projecting. Tail shorter than head and body, mostly short-haired, the upperside of its terminal half with a prominent crest of black hairs, which increase in length to the tip.

*Skull* short, broad, and strong; bullæ large and swollen.

*Teeth*. Upper *p*<sup>4</sup> minute, tubercular. Lower *i*<sup>1</sup> larger than *i*<sup>2</sup> and *i*<sup>3</sup>. Canine slender, not broadened posteriorly at its base. Lower *p*<sup>4</sup> wholly absent. *M*<sup>1</sup> with scarcely an indication of the anterior secondary cusp.

#### *Dimensions.*

	Type. millim.
Head and body . . . . .	121
Tail . . . . .	83
Hind foot . . . . .	28

*Hab.* South Australia.

*Type* in the Sydney Museum.

The above description is extracted from Mr. *Kreffft*'s original account of the species, no specimen of which has come under my observation. It is evidently very closely allied to *Ph. apicalis*,

from which it may be distinguished by its crested tail and more uniform coloration. The absence of its lower p.<sup>4</sup> is a character which is probably variable, as in the case of *Ph. thorbeckiana*; if ever present, the tooth would no doubt be similar to that of *Ph. apicalis*.

## 2. Phascologale apicalis.

*Phascogale apicalis*, *Gray, Ann. Mag. N. H.* ix. p. 518 (1842); *Schinz, Syn. Mamm.* i. p. 496 (1844); *Wagn. Schr. Säug. Supp.* v. p. 199 (1855); *Schleg. Dierk.* p. 137 (1857); *Gieb. Säug.* p. 727 (1859); *Schleg. Dierent.* p. 162 (1872); *Jent. Cat. Ost. Leyd. Mus.* p. 303 (1887); *Thos. Ann. Mus. Genov.* (2) iv. p. 508 (1887); *id. Phil. Trans.* clxxviii. p. 461, pl. xxvii. fig. 4 (teeth) (1887).

*Antechinus apicalis*, *Gray, List Mamm. B. M.* p. 99 (1843); *Gould, Mamm. Austr.* i. pl. xxxix. (animal) (1845); *Gerrard, Cat. Bones Mamm. B. M.* p. 136 (1862); *Kreffl, Cat. Mamm. Austr. Mus.* p. 31 (1864); *id. P. Z. S.* 1866, p. 432; *id. Austr. Vert.* p. 15 (1871); *Gray, Voy. Ereb. Terr., Mamm.* p. 12 c, pl. xxvii. fig. 3 (animal) (1875)\*.

*Phascologale (Antechinus) apicalis*, *Waterh. N. H. Mamm.* i. p. 413 (1846).

### FRECKLED PHASCOLOGALE.

Size medium. Fur coarse; underfur long, soft and close, its terminal fourth rufous, its base slate. General colour a peculiar freckled reddish grey, the head, back, outsides of limbs, and proximal half of tail being of this colour, which is made up by the longer hairs being black with a white subterminal band, below which the rufous tips of the underfur show through. Eyes surrounded by a more or less distinct white ring. Ears short, not reaching, if laid forward, more than half the distance towards the eye, rounded; their substance thick and opaque, covered inside and out with short grey hairs. Chin, chest, and belly dull white or yellowish, the hairs within the pouch dark rufous. Front and outside of forearm rufous; rest of outsides of limbs dull grey, the freckled appearance of the back gradually disappearing both there and on the sides of the body. Hands and feet grey; palms with six pads, the pollical one distinctly subdivided into two; soles hairy just below the heel, the rest naked, granulated; hallucal pad long, rarely subdivided; hallux barely reaching to the proximal end of the anterior pads. Tail short, not so long as the body without the head, evenly tapering, covered above with hairs variegated like those on the back, except at the extreme end, where they are black; underside uniformly grey or yellowish grey. Mammæ 8.

*Skull* (Pl. XXIV. fig. 5) stout and strong; muzzle short and broad, its breadth across outside the canines going about three times into the palate-length. Nasals long, very little expanded behind, their greatest only about once and a half their least breadth.

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\* The plates of this work were prepared in 1845, but although they were seen privately and quoted by several authors long before, their real publication only took place in 1875.

Interorbital space broad and smooth, its edges rounded, parallel. Anterior palatine foramen short, barely reaching to the level of the front of the canines. Posterior palate with a pair of large vacuities opposite  $m.^2$  and  $m.^3$ , and with a second much smaller pair behind them, halfway towards the back of the palate. Bullæ evenly rounded, prominent, their mastoid portion not much swollen.

*Teeth* (Pl. XXV. fig. 1). Upper incisors slender, cylindrical, the lateral ones subequal, scarcely flattened.  $P.^3$  twice the size of  $p.^1$ .  $P.^4$  very small, cylindrical, single-rooted. Lower incisors subequal;  $i.^1$  and  $i.^3$  of about the same size, slightly larger than  $i.^2$ . Canine without a posterior basal ledge. Relative proportions of lower premolars like those of upper.  $M.^1$  narrowed in front, with scarcely a trace of the antero-internal secondary cusp.

Milk-premolar not known, but, if present at all, certainly very soon deciduous.

*Dimensions.*

	♂. a (in al.) Barely adult. millim.	♀. e (skin). Adult. millim.
Head and body . . . . .	111	(c.) 120
Tail . . . . .	89	85
Hind foot . . . . .	23.5	21
Ear . . . . .	8.8	8

Skull, see p. 299.

*Hab.* Queensland\* and Western Australia.

*Type* in collection.

In their dental characters this species and its close ally *Ph. cristicaudata* stand somewhat apart from the rest, and show an approach towards *Dasyurus*. There does not, however, seem to be sufficient reason for the foundation of a separate genus for their reception, as was done by Krefft, since several of the Papuan species, notably *Ph. thorbeckiana* and *Ph. dorice*, form connecting-links between them and the remainder of the genus.

a. Imm. al., ♂.	Albany, West Australia.	Purchased.
b. { Ad. st. } ♂.	Victoria Plains, W. A. (J. Gilbert).	Gould Coll.
c. Ad. sk., ♀.	Victoria Plains, W. A. (J. Gilbert).	Gould Coll.
d. Ad. skull.	West Australia (J. Gilbert).	Gould Coll.
e. { Ad. sk. } ♀.		Purchased.
		(Type of species.)

### 3. *Phascologale thorbeckiana*.

*Phascogale melas*, *Schleg. & Müll. Verh. Nat. Ges. Ned.* p. 149, pl. xxv. (animal & skull) (1839-44); *Wagn. Schr. Säug. Supp.* iii.

\* Krefft records the species from Rockhampton, and two young specimens from Queensland, sent to me for determination by Mr. De Vis, appear certainly to belong to it.

- p. 36 (1843), v. p. 199 (1855); *Schunz, Syn. Mamm.* i. p. 493 (1844); *Waterh. N. H. Mamm.* i. p. 429 (1846); *Gray, Voy. Samarang, Vert.* p. 32 (1850); *Schleg. Dierk.* p. 137 (1857); *Gray, P. Z. S.* 1858, p. 106; *Gieb. Säug.* p. 727 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 135 (1862); *Schleg. Dierent.* p. 161 (1872); *Jent. Cat. Ost. Leyd. Mus.* p. 304 (1887).
- Phascogale thorbeckiana*, *Schleg. Ned. Tijdschr. Dierk.* iii. p. 257 (1866); *id. Dierent.* p. 162 (1872); *Jent. Cat. Ost. Leyd. Mus.* p. 304 (1887); *Thos. Ann. Mus. Genov.* (2) iv. p. 505 (1887); *id. Phil. Trans.* clxxviii. p. 461, pl. xxvii. fig. 3 (teeth) (1887).
- Chaetocercus bruijnii*, *Peters, Ann. Mus. Genov.* vii. p. 420 (1875).
- Dasycercus bruijnii*, *Peters, SB. Ges. nat. Freunde*, 1875, p. 73.
- Phascogale* (*Chaetocercus*) *thorbeckiana*, *Peters & Doria, Ann. Mus. Genov.* xvi. p. 667, pl. v. (animal), pl. vi. figs. 1-4 (skull) (1881).

## CHESTNUT-NECKED PHASCOLOGALE.

Size large, general build comparatively stout. Fur coarse and harsh, underfur thin and sparse. General colour richly variegated chestnut, black and yellow; back black-striped. Head dark yellowish rufous, a central black stripe commencing on the muzzle and passing backwards along the neck and back to the rump. Ears small, when laid forward barely reaching to the centre of the eye, thick and fleshy, their backs thinly covered with black hairs. Crown, all the region behind the ears, top and sides of neck (except along the median black stripe) rich chestnut-red. Back coarsely grizzled black and yellow, the hairs black with a yellow or orange subterminal band, becoming more rufous on the rump; on the fore-back there are, commencing just above the shoulders, two more black lines, less prominent than the central one, and making three in all, the space between the lateral and central lines anteriorly white or pale yellow, sometimes very prominent and sometimes indistinct, according as the hairs are wholly, or only ringed with, yellow. Sides of body grizzled black and yellow, becoming gradually paler and duller below. Chin and chest pale rufous; belly dull yellowish grey; hairs in pouch dark brown. Forearms rich rufous like the neck; hands brown; palms with six pads, the pollical distinctly separated into two. Hind legs like fore, but darker red; feet brown or yellowish brown; soles wholly naked, with five pads, the hallucal not, or only very indistinctly, divided in the centre. Tail evenly tapering, long-haired above and on the sides, quite short-haired below, the long hairs above, and the rump, deep maroon-red; upperside of tip black; underside rufous or brownish, but the hairs not hiding the dark-coloured scales. Mammæ 6.

*Skull* strongly built; muzzle broad and heavy. Nasals long, widely and abruptly expanded behind. Interorbital space broad and smooth, its edges square, thickened, and in old specimens forming rudimentary postorbital processes. Anterior palatine foramina extending backwards to the level of the front of the canines. Posterior palate comparatively perfect; a pair of rather small vacuities opposite the junction of  $m.^2$  and  $m.^3$ . Bullæ swollen, trans-

parent, rather more angular and less smoothly rounded than usual.

*Teeth.* Upper lateral incisors flattened, subequal,  $i^4$  slightly the largest. Canines proportionally very slender.  $P^4$  double-rooted, rather smaller than  $p^1$ . Lower incisors small, spatulate, almost exactly equal in size. Canines with a tendency to a posterior basal broadening.  $P^1$  and  $p^3$  large, not touching each other;  $p^4$  quite minute, single-rooted, or, very commonly, altogether absent.  $M^1$  narrowed in front, without, or with scarcely a trace of, an anterior secondary cusp.

*Dimensions.*

	♂. * (in al.). Adult. millim.	♀. b (in al.). Adult. millim.
Head and body . . . . .	215	190
Tail . . . . .	201	173
Hind foot . . . . .	43	39
Ear . . . . .	18	15

Skull, see p. 299.

*Hab.* N.W. New Guinea (Salawatti, Andai, Jobi I., &c.).

*Type* in the Leyden Museum.

This species is by far the most brilliantly coloured of the family, if not indeed of the whole Order, and affords, with its almost equally handsome allies *Ph. wallacei*, *dorice*, and *dorsalis*, a striking example of the characteristic beauty commonly exhibited by the coloration of Papuan animals†.

It is unfortunate that the first discovered specimen of this species should have been a melanistic one, and that, therefore, the name then applied to it (*Ph. melas*) should be untenable. A personal examination of this typical specimen in the Leyden Museum proves that it is incontestably specifically identical with *Ph. thorbeckiana*, of which the type is also there preserved.

a. { Ad. sk. } ♂.	Sailolo, Salawatti	Leyden Museum [E.].
{ Skull. }	(Bernstein).	
b. Ad. al., ♀, 6/75.	Salawatti ( <i>Bruijn</i> ).	Genoa Museum [E.].

#### 4. *Phascologale wallacei*.

*Myoictis wallacei*, Gray, *P. Z. S.* 1858, p. 112, pl. lxxv. (animal) and woodcut of skull; *id. Ann. Mag. N. H.* (3) ii. p. 223, figs. 6-8 (skull) (1858); *Gerrard, Cat. Bones Mamm. B. M.* p. 137 (1862). *Phascologale wallacei*, Schleg. *Ned. Tijdschr. Dierk.* iii. p. 355 (1866);

\* Specimen in the Genoa Museum. In connection with this I must again record my special obligations to the Marquis G. Doria, of that Museum, for the loan of the whole of the Papuan specimens of *Phascologale* there preserved, a loan without which it would have been almost impossible satisfactorily to work out this most difficult genus.

† Cf. Wallace, *Geogr. Distr. Anim.* i. p. 413 (1876).

*id. Dierent.* p. 162 (1872); *Jent. Cat. Ost. Leyd. Mus.* p. 304 (1887); *Thos. Ann. Mus. Genov.* (2) iv. p. 505 (1887).  
 Phascogale (*Chaetocercus*) *pilicauda*, *Peters & Doria, Ann. Mus. Genov.* xvi. p. 668 (1881).

## RED-TAILED PHASCOLOGALE.

Size large. Fur coarse and harsh; underfur thin, soft. General colour variegated rufous, black and chestnut; back black-striped. Head rufous yellow, the mesial dark stripe not or scarcely visible until the occiput. Ears short, laid forward only just reaching the eye, thick and fleshy, their backs very thinly clothed with brown hairs. Back and sides of neck and anterior back bright grizzled orange, the hairs dark with a subterminal yellow band; a patch on each side behind ears rich rufous. Back with three black stripes, the lateral ones commencing above the shoulders; general colour of back coarsely grizzled black and yellow, becoming more rufous on rump; intervals between stripes anteriorly not prominently lighter than rest of back. Chin, chest, and belly pale rufous or yellowish, the bases of the hairs grey; hairs of pouch brown. Fore limbs and hands rufous or yellow, the fingers brown; palms with six pads. Rump, and hind limbs outside, rich grizzled chestnut-rufous in mainland, dull grizzled yellow in Aru-Island specimens; hind feet mixed red and brown; soles (Pl. XXIII. fig. 3) naked, with six pads, the hallucal one broadly divided into two. Tail long, tapering, very long-haired above and at the sides for its whole length; the hairs 14 or 15 millim. in length, rich chestnut mixed with black; underside covered with shorter, paler, adpressed hairs, hiding the scales. Mammæ 6.

*Skull* smaller and lighter than that of *Ph. thorbeckiana*. Muzzle narrow, conical. Nasals long, not unusually expanded behind. Interorbital space broad and flat, its edges not forming rudimentary postorbital processes. Anterior palatal foramina reaching to about the centre of the canines. Bullæ transparent, rather lower and less swollen than in *Ph. thorbeckiana*.

*Teeth* as in *Ph. thorbeckiana*, except that p.<sup>4</sup> above is decidedly larger than p.<sup>1</sup> and nearly as large as p.<sup>3</sup>, that the lower p.<sup>1</sup> and p.<sup>3</sup> are rather smaller and touch each other, and that p.<sup>4</sup> below is well developed, two-rooted, and nearly or quite half the size of p.<sup>1</sup> Milk-p.<sup>4</sup> not known, probably minute and early deciduous.

*Dimensions.*

	♂. a (in al.). Adult. millim.	♀. Type of <i>Ph. pilicauda</i> (in al.). Imm. millim.
Head and body.....	185	175
Tail .....	168	144
Hind foot .....	39	34
Ear .....	12	12.5

Skull, see p. 299.

*Hab.* S. New Guinea (Fly R. district) and Aru Islands.

*Type* in collection.

This species is closely allied and very similar to *Ph. thorbeckiana*, but may be easily distinguished externally by its generally less rich coloration, paler head and neck, on which the mesial dark stripe is much less prominent, much bushier tail, and by its divided hallucal foot-pad. In its skull it also differs markedly by the much greater development of its p.<sup>4</sup>, both above and below.

The identity of the Papuan *Ph. pilicauda* with *Ph. wallacei* has not been previously recognized, partly owing to the immaturity of the type of the latter\* ; but there can be no question that the two only represent one species, the insular form merely differing by the somewhat duller and less rufous coloration of its posterior back and hind limbs.

- |    |              |      |                              |                            |
|----|--------------|------|------------------------------|----------------------------|
| a. | { Ad. al. }  | { ♂. | Katau, S. New Guinea         | Genoa Museum [E.].         |
|    | { Skull. }   |      | ( <i>L. M. D'Albertis</i> ). |                            |
| b. | { Imm. sk. } | { ♂. | Aru Islands.                 | A. R. Wallace, Esq. [C.].  |
|    | { Skull. }   |      |                              | ( <i>Type</i> of species.) |

### 5. *Phascologale doriæ*.

*Phascologale doriæ*, *Thomas, Ann. Mus. Genov.* (2) iv. p. 208 (1886);  
*id. tom. cit.* p. 507 (1887).

#### ORANGE-BELLIED PHASCOLOGALE.

Size medium, form thin and slender. Fur thick, close and soft ; underfur abundant, dark slaty grey. General colour dark grizzled orange-brown. Head long and slender. Face and crown uniform finely grizzled yellowish grey, the tips of the hairs dark yellow. Ears short, not reaching the eye when laid forward, their substance thick and fleshy, black ; uniformly but sparsely covered inside and out with very short shining rufous hairs. Behind ears, back and sides of neck dull rufous. Back with a well-defined mesial black line commencing on the occiput and running to the base of the tail ; hairs of back black, with a shining orange subterminal band, the general grizzled colour resulting being not unlike that of the common Water-Vole. Colour of back passing quite gradually into that of belly, where, as also on the chin and chest, the orange band on the hairs becomes terminal, and therefore appears brighter and more rufous ; all the hairs slaty grey basally. Fore and hind limbs to wrists and ankles like body ; hands and feet black ; palms and soles each with six pads, the pollical and hallucal ones distinctly divided ; claws long and strong. Tail about as long as the head and body, its basal inch furred like the body ; the rest comparatively short-haired throughout, but the hairs on the upperside for the proximal half rather

\* I have to thank my friend Dr. F. A. Jentink, of the Leyden Museum, for several details about the adult Aru-Island specimen of *Ph. wallacei* described by Prof. Schlegel.

longer than below, although not forming a distinct crest. Colour of tail uniformly black above and below except on the terminal half-inch, which is white. Mammæ 4.

*Skull* lightly and slenderly built, with a long narrow muzzle. Nasals long, evenly expanded behind. Interorbital space evenly rounded, its edges square, not ridged. Anterior palatine foramina extending to the centre of the canines. Posterior palate with a pair of rather small vacuities opposite  $m.^2$  and a second smaller pair behind them near the centre line, as in *Ph. apicalis*. Bullæ small, rounded, transparent.

*Teeth*. Upper lateral incisors flattened, evenly increasing in size backwards. Premolars small, sharp and pointed, standing quite apart from one another;  $p.^3$  about twice the size of  $p.^1$ ;  $p.^4$  rather smaller than  $p.^3$ . Lower incisors subequal, their upper surfaces broader and flatter than usual;  $i.^3$  distinctly triangular. Canines short, thick, with a small posterior basal broadening. Premolars separate from each other;  $p.^3$  about twice the size of  $p.^1$ ;  $p.^4$  equal to or even larger than  $p.^3$ .  $M.^1$  narrowed in front, with a rudimentary anterior secondary cusp. Milk- $p.^4$  present, but quite minute, functionless, and early deciduous.

#### Dimensions.

	♀. * (in al.) Adult. millim.
Head and body . . . . .	152
Tail . . . . .	152
Hind foot . . . . .	32.5
Ear . . . . .	10

Skull, see p. 299.

*Hab.* N.W. New Guinea (Mt. Arfak).

*Co-types* in Genoa Museum and in collection.

a. { Imm. sk. } Mori, Mt. Arfak Genoa Museum [E.]  
 { Skull. } ♂, 13/5/75. (O. Beccari). (Co-type of species.)

#### 6. Phascologale dorsalis.

*Phascogale dorsalis*, Peters & Doria, *Ann. Mus. Genov.* viii. p. 335 (1876); *Thos. Ann. Mus. Genov.* (2) iv. p. 506 (1887); *id. Phil. Trans.* clxxviii. p. 447, pl. xxvii. figs. 7 & 8, teeth (1887).

*Phascogale* (*Chætocercus*) *dorsalis*, Peters & Doria, *Ann. Mus. Genov.* xvi. p. 667, pl. vii. (animal) (1881).

CHESTNUT-BELLIED PHASCOLOGALE.

*Size* medium, form slender. Fur rather shorter and coarser than

\* From the co-type in the Genoa Museum.

in *Ph. doriæ*; underfur thick and soft, dark slaty grey. General colour coarsely grizzled grey-brown. Head grizzled, with a tinge of orange or rufous; mesial streak of back commencing on the muzzle, although not very prominent. Ears small, laid forward they just reach the eye, their substance thinner than in *Ph. doriæ*, finely clothed with short brown hairs, a patch of dark rufous at their bases behind. Back coarsely grizzled, the centre black line well defined, the hairs generally black with a subterminal band of white or pale yellow. Cheeks, bases of ears, chin, chest, belly, and inner sides of limbs rich chestnut-red, the transition from the colour of the upperside rather abrupt; bases of hairs everywhere slate except the pouch-hairs, which are entirely rufous. Fore and hind limbs dark red to the wrists and ankles; hands and feet brown; palm- and sole-pads as in *Ph. doriæ*. Tail short-haired, except at base, its upper not longer-haired than its lower side, rufous or brown for its basal inch, then all black except the extreme tip, which is white. Mammæ 4.

*Skull* (Pl. XXIV. fig. 6) small, slenderly built. Nasals long and narrow, expanded behind. Interorbital space smooth, rounded, its edges square, not beaded. Anterior palatine foramina reaching to centre of canines. Posterior palate with a pair of large vacuities, and sometimes with a smaller posterior pair. Bullæ small, rounded, transparent.

*Teeth* (Pl. XXV. fig. 2) light and delicate. Upper incisors small, the lateral ones flattened, slightly increasing in size backwards. Canines with minute rudimentary anterior and posterior basal cusps. Premolars separated from one another, sharp and pointed,  $p^3$  about half as large again as  $p^1$ ;  $p^4$  about equal to  $p^1$ . Lower incisors small, flattened vertically, about equal in size. Canines with a small posterior basal projection.  $P^3$  nearly twice the size of  $p^1$ ;  $p^4$  quite minute, scarcely higher than the posterior basal secondary cusp of  $p^3$ , single-rooted.  $M^1$  narrowed in front, but with a distinct anterior secondary cusp.

#### Dimensions.

	♂. (in al.). Adult. millim.	♀. (in al.). Adult. millim.
Head and body . . . . .	167	134
Tail . . . . .	149	147
Hind foot . . . . .	26	27
Ear . . . . .	14	12

Skull, see p. 299.

*Hab.* N.W. New Guinea (Mt. Arfak).

*Co-types* in Genoa and Berlin Museums and in collection.

It was in specimen *a* of this species that the remarkable instance

of the recurrence of the lost  $p.^2$ , described by the present author\*, took place, a recurrence that settled the important point as to which of the original four premolars had been lost in this family, and therefore presumably in the other Polyprotodonts. Without the indications furnished by this specimen the complete dental formulæ given in the present work could not have been made out, and would have had to be drawn up merely on the old system of notation.

a.	{ Ad. al. }	♀, 6/75.	Hatam, Mt. Arfak (O. Beccari).	Genoa Museum [E.]. (Co-type of species.)
	{ Skull. }			
b.	{ Ad. sk. }	♂.	Mt. Arfak.	A. A. Bruijn [C.].
	{ Skull. }			

### 7. Phascologale swainsoni.

*Phascogale swainsoni*, *Waterh. Mag. N. H.* (2) iv. p. 299 (1840); *Wagn. Schr. Säug. Supp.* iii. p. 36 (1843), v. p. 199 (1855); *Schinz, Syn. Mamm.* i. p. 493 (1844); *Gieb. Säug.* p. 727 (1859); *Jent. Cat. Ost. Leyd. Mus.* p. 303 (1887).

*Phascogale* (*Antechinus*) *swainsoni*, *Waterh. N. H. Mamm.* i. p. 411 (1846); *Gunn, P. Roy. Soc. Tasm.* ii. p. 82 (1852).

*Antechinus swainsoni*, *Gould, Mamm. Austr.* i. pl. xxxiv. (animal) (1854); *Gerrard, Cat. Bones Mamm. B. M.* p. 136 (1862); *Kreffl, Cat. Mamm. Austr. Mus.* p. 30 (1864); *id. Notes Faun. Tasm.* p. 4 (1864); *id. P. Z. S.* 1866, p. 432; *id. Austr. Vert.* p. 15 (1871); *Gray, Voy. Ereb. Terr., Mamm.* p. 12 c, pl. xxv. fig. 1 (animal) (1875); *Dobs. J. Anat. Phys.* xvii. p. 153 (1882); *Higg. & Pett. P. Roy. Soc. Tasm.* 1883, p. 196.

*Antechinus niger*, *Higg. & Pett. P. Roy. Soc. Tasm.* 1882, p. 172.

*Antechinus moorei*, *Higg. & Pett. op. cit.* 1883, p. 182, and var. *assimilis*, *t. c.* p. 185.

#### SWAINSON'S POUCHED MOUSE.

Size medium. Fur very long, soft and thick; underfur abundant, forming the greater part of the fur, slaty blue for five sixths of its length, its extreme tip brown or yellow. General colour deep rufous or umber-brown. Muzzle long. Head dark grizzled grey-brown, uniform with the back. Ears short but broad, scarcely projecting beyond the fur, laid forward they reach to about the centre of the eye, closely covered with short dark brown hairs, the hair round their bases often rufous. Neck and back uniform dark finely grizzled brown, the forequarters sometimes greyer than the rump, but the whole generally quite uniform; rump and front of hips brown, not yellow or rufous. Chin, chest, and belly dull brownish grey, the bases of the hairs slate, their tips white or pale grey, not yellow; hairs of pouch dark red. Limbs to wrists and ankles like back; hands and feet uniform dark brown; palms and soles each with five pads, the hallucal not or only indistinctly divided; fore claws very long and strong, extending for from three to four millim. beyond the tips of the fingers. Tail about as long as the body without

\* *Phil. Trans. l. c.*

the head; its hairs short throughout, uniformly dark brown. Mammæ 10\* (?).

*Skull* (Pl. XXIV. fig. 7) light and slender, muzzle long and narrow. Nasals long, evenly expanding backwards. Interorbital region very broad, smooth and rounded, its edges without any trace of ridges or beading. Sagittal crests not at all, and lambdoid crests but little developed. Palate as a whole remarkably unossified, the anterior palatine foramina widely open, reaching backwards at least to the level of the back of p.<sup>1</sup>, and sometimes of the back of p.<sup>3</sup>; posterior vacuities large, extending the whole length of the molars, the actual bony palate being therefore reduced to a narrow bridge of bone extending across from one p.<sup>4</sup> to the other. Bullæ small, their substance thin and papery. Lower jaw with the coronoid process strong and broad antero-posteriorly; the greatest breadth of the masseteric fossa attaining about 4·6 or 4·7 millim. internally.

*Teeth* (Pl. XXV. fig. 4) on the whole short and thick. Upper i.<sup>1</sup> short, not more than twice the height of i.<sup>2</sup>, and not projecting so much forward as in *Ph. flavipes* and the larger species, its posterior edge nearly or quite touching i.<sup>2</sup>; lateral incisors flattened, subequal, i.<sup>4</sup> slightly the largest. Canines short, barely surpassing a line drawn from the tip of i.<sup>1</sup> to that of p.<sup>4</sup> Premolars evenly increasing in size backwards; p.<sup>4</sup> about three times the size of p.<sup>1</sup>. Lower incisors small, spatulate, subequal. Canines small, with a broad posterior basal heel, from which the ascending line of the tooth behind starts nearly at a right angle. Premolars long antero-posteriorly, but low vertically, with broad posterior talons; p.<sup>3</sup> about twice the size of p.<sup>1</sup>; p.<sup>4</sup> intermediate in size between the two. M.<sup>1</sup> with a well-marked antero-internal secondary cusp.

Milk-p.<sup>4</sup> not yet known, but no doubt well developed and long persistent, as in the allied species.

#### Dimensions.

	♂. a (in spirit). Adult. millim.	♀. b (in spirit). Adult. millim.
Head and body .....	130	124
Tail .....	102	92
Hind foot .....	21	19·5
Ear .....	11·5	9·5
Skull and teeth, see p. 299.		

*Hab.* S.E. Victoria and Tasmania.

*Type* in collection.

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\* Judging only from specimen *b*, which presents, however, the curious anomaly of having only 4 on one side and 5 on the other. The abnormal suppression of a mamma being more likely than the addition of one, the usual number may be put down provisionally as 10.

a, b.	{ Ad. al. Skull of a. }	♂ ♀.	Gippsland.	Purchased.
c.	{ Ad. sk. Skull. }	♂.	Tasman's Peninsula, Tasmania.	Gould Coll.
d.	Ad. sk., ♂.		Table Cape, Tasmania.	W. F. Petterd, Esq. [C. & E.].
e.	Ad. st., ♂.		Tasmania.	Lieut. A. Smith [P. & C.].
f.	{ Ad. sk. Skull. }	♂.	Tasmania.	W. Swainson, Esq. (Type of species.)
g.	{ Ad. sk. Skull. }	♀.		G. R. Waterhouse, Esq. [P.].

8. *Phascogale minima*.

*Dasyurus minimus*, *Geoff. Ann. Mus.* iii. p. 362 (1804); *Tiedem. Zool.* p. 429 (1808); *G. Fisch. Zoogn.* ii. p. 586 (1813); *Desm. N. Dict. d'H. N.* (2) ix. p. 140 (1817); *Geoff. Dict. Sci. Nat.* xii. p. 511 (1818); *Desm. Mamm.* i. p. 264 (1820); *Desmoul. Dict. Class. d'H. N.* v. p. 338 (1824); *Gray, Griff. Cuv. An. K.* v. p. 194 (1827); *J. B. Fisch. Syn. Mamm.* p. 273 (1829).

*Phascogale minima*, *Temm. Mon. Mamm.* i. p. 59 (1827); *Less. Man. Mamm.* p. 215 (1827); *id. H. N. Mamm. (Compl. Buff.)* v. p. 371 (1836); *Gray, Grey's Austr., App.* ii. p. 401 (1841); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 140 (1841); *Less. N. Tabl. R. A., Mamm.* p. 191 (1842); *Wagn. Schr. Säug. Supp.* iii. p. 38, pl. clii. B. e (animal) (1843), v. p. 202 (1855); *Schinz, Syn. Mamm.* i. p. 495 (1844); *Schleg. Dierk.* p. 137 (1857); *Jent. Cat. Ost. Leyd. Mus.* p. 304 (1887).

*Didelphys minima*, *Wagl. Syst. Amphib. Säug.* p. 25 (1830).

*Phascogale affinis*, *Gray, Grey's Austr., App.* ii. p. 406 (1841); *id. List Mamm. B. M.* p. 99 (1843).

*Antechinus minimus*, *Gray, List Mamm. B. M.* p. 99 (1843); *Higg. & Pett. P. Roy. Soc. Tasm.* 1883, p. 196.

*Phascogale (Antechinus) minima*, *Waterh. N. H. Mamm.* i. p. 419 (1846); *Gunn, P. Roy. Soc. Tasm.* ii. p. 82 (1852).

*Antechinus affinis*, *Gerrard, Cat. Bones Mamm. B. M.* p. 136 (1862); *Krefft, P. Z. S.* 1866, p. 432; *Gray, Voy. Ereb. Terr., Mamm.* p. 12 b, pl. xxv. fig. 3 (animal) (1875).

*Antechinus rolandensis*, *Higg. & Pett. P. Roy. Soc. Tasm.* 1882, p. 171.

*Antechinus concinnus*, *Higg. & Pett. op. cit.* 1883, p. 184.

## LITTLE POUCHED MOUSE.

Size rather small, general form murine. Fur thick and close, but rather harsh, especially anteriorly; underfur abundant, soft, fine, slaty grey, with yellowish tips. General colour grey, strongly suffused with yellow or rufous, paler on the head and forequarters, darker and more orange on the rump and hips. Longer hairs all black, the yellowish colour proceeding entirely from the tips of the underfur. Ears short and rounded, nearly naked, but their bases generally with tufts of yellowish fur. Chin white; chest and belly dirty grey, more or less suffused with yellow, the bases of the hairs slate-colour, the tips white or yellow. Limbs like back, but greyer, except that there is generally a well-marked patch of yellow on the

front and outside of the hips. Hands and feet variable—grey, yellowish, or brown; palms and soles smooth, naked, each generally with only five pads, the pollical and hallucal usually continuous, but the latter one sometimes divided, making a total of six pads. Claws, especially the anterior, very long and strong, extending beyond the tips of the fingers by from 3 to 4 millim., horn-coloured. Tail short, uniformly closely hairy, the hairs just long enough to hide the scales; brown above, rather paler beneath.

*Skull* light and slender, with a long narrow muzzle. Nasals, interorbital and occipital regions, and bullæ as in *Ph. swainsoni*. Palate more complete than in that species, the anterior foramina narrow, and only extending backwards to the level of the back of the canines, and the posterior vacuities also slightly smaller. Lower jaw with the coronoid process slenderer than in *Ph. swainsoni*, the greatest breadth of the masseteric fossa not exceeding 4.1 or 4.2 millim.

*Teeth* very similar to those of *Ph. swainsoni*. Upper incisors short, flattened laterally,  $i^1$  not twice the length of, and with its posterior edge touching,  $i^2$ . Three lateral incisors subequal. Premolars evenly increasing backwards. Lower incisors nearly equal in size; canine short, its posterior basal ledge well developed, but not so broad as in *Ph. swainsoni*. Premolars more nearly equal than usual,  $p^4$  slightly smaller than  $p^3$  and larger than  $p^1$ , but the differences not great; all with well-developed posterior basal heels.  $M^1$  with a distinct antero-internal secondary-cusp.

Milk- $p^4$  well developed, triangular, long-persistent.

#### Dimensions.

	♂. <i>d</i> (in al.) Adult. millim.
Head and body . . . . .	135
Tail . . . . .	85
Hind foot . . . . .	19
Ear . . . . .	10

Skull, see p. 299.

*Hab.* Tasmania and the adjoining islands.

*Type* in the Paris Museum.

a. { Ad. sk. } { Skull. } ♂, 1/58.	Hummock Island, Bass's Straits ( <i>Voy. 'Herald'</i> ).	F. M. Rayner, Esq. [P. & C.].
b. { Ad. sk. } { Skull. }	Tasman's Peninsula, Tasmania. ( <i>Type</i> of <i>Ph. affinis</i> , Gray.)	Gould Coll.
c. Ad. sk.	Scottsdale, Tas- mania.	W. F. Petterd, Esq. [E.].
<i>d-g.</i> { 3 ad. & 1 imm. al. } { Skull of <i>d.</i> } ♂.	Tasmania.	Ronald Gunn, Esq. [P. & C.].
h. Skeleton (mounted).	Tasmania.	Ronald Gunn, Esq. [P. & C.].

## 9. Phascologale flavipes.

## a. Phascologale flavipes, var. typica\*.

Phascogale flavipes, *Waterh. P. Z. S.* 1837, p. 75; *id. Cat. Mamm. Mus. Zool. Soc.* p. 65 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 138, pl. ix. (animal) (1841); *Gray, Grey's Austr., App.* ii. p. 401 (1841); *Wagn. Schr. Säug. Supp.* iii. p. 37 (1843), v. p. 200 (1855); *Less. N. Tabl. R. A., Mamm.* p. 191 (1842); *Schinz, Syn. Mamm.* i. p. 494 (1844); *Gieb. Säug.* p. 728 (1859); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 740 (1884); *Jent. Cat. Ost. Leyd. Mus.* p. 303 (1887); *Coll. Zool. Jahrb.* ii. p. 860 (1887).

(?) *Myrmecobius rufus*, *Mitch. Exp. Austr.* i. p. xvii (1838).

Phascogale rufogaster, *Gray, Grey's Austr., App.* ii. p. 407 (1841).

*Antechinus stuarti*, *Macleay, Ann. Mag. N. H.* (1) viii. p. 241, pl. vii. (animal) (1841); *id. t. c. p.* 337 (1842); *Kreffft, Austr. Vert.* p. 15 (1871).

*Antechinus flavipes*, *Gray, List Mamm. B. M.* p. 99 (1843); *Gould, Mamm. Austr.* i. pl. xl. (animal) (1854); *Gerrard, Cat. Bones Mamm. B. M.* p. 136 (1862); *Gould, Mamm. Austr. Introd.* i. p. xxvii (1863); *Kreffft, Cat. Mamm. Austr. Mus.* p. 31 (1864); *id. P. Z. S.* 1866, p. 432; *id. Austr. Vert.* p. 15 (1871); *Gray, Voy. Ereb. Terr., Mamm.* p. 12 b, pl. xxvi. fig. 2 (animal) (1875); *Brehm, Thierl.* ii. p. 553, fig. (animal) (1880).

Phascogale (*Antechinus*) flavipes, *Waterh. N. H. Mamm.* i. p. 415 (1846).

## YELLOW-FOOTED POUCHED MOUSE.

Size small or medium, unusually variable; form stout. Fur close, rather crisp in texture. Underfur abundant, soft and silky, slaty blue with yellow tips. General colour grey, suffused with yellow or rufous. Head and neck clear grey, generally markedly different from the yellow or rufous of the back and rump. Ears rather large, projecting beyond the fur, laid forward (in spirit-specimens) they reach to the anterior canthus of the eye; naked above, but their bases tufted externally with yellow or grey. Sides of body, chin, chest, and belly yellow, which sometimes deepens to deep rufous and spreads over the whole body, including the head ("*A. unicolor*," Gould), or is, on the other hand, especially in immature specimens, almost obsolete; bases of belly-hairs always dark slaty grey; pouch-hairs red, yellow, or white. Limbs and feet more or less like belly. Palms and soles naked, each with six pads; the pollical and hallucal both, as a rule, divided; claws small and delicate, usually only surpassing the tips of the toes by from  $1\frac{1}{2}$  to 2 millim. Tail uniformly short-haired throughout, the hairs just hiding the scales, brown or yellow above, paler below, the terminal inch sometimes black. Mammæ 8.

*Skull* stout, broad, and flattened, with a short conical muzzle.

\* a. Belly and inner sides of limbs more or less yellow.—*Hab.* Eastern Australia ..... *Var. flavipes.*

b. Belly and inner sides of limbs white.—*Hab.* Western and North-western Australia ..... *Var. leucogaster*, p. 291.

Nasals distinctly broadened behind. Interorbital space broad, flat, its edges square but not beaded. Occipital region not crested. Anterior palatine foramina short, extending only about to the centre of the canines. Posterior palatine vacuities extending nearly the whole length of the molars. Bullæ small, rounded, their substance thin and papery.

*Teeth* (Pl. XXV. fig. 5). Upper incisors slender, long. I.<sup>1</sup> very long, cylindrical, not, or very slightly, flattened laterally, boldly curved forwards away from the other incisors; lateral incisors slightly flattened, subequal. Premolars evenly increasing in size backwards; p.<sup>4</sup> about twice the size of p.<sup>1</sup>. Lower incisors small, i.<sup>1</sup> rather larger than i.<sup>2</sup>, which in turn is a little larger than i.<sup>3</sup>, but the differences small and unimportant. Canine short and thick, with a small but distinct posterior basal ledge. Premolars short vertically, broad, p.<sup>3</sup> about once and a half or twice the size of p.<sup>1</sup>; p.<sup>4</sup> a little smaller than p.<sup>1</sup>. M.<sup>1</sup> generally with a distinct antero-internal secondary cusp.

*Dimensions.*

	♂. <i>n</i> (skin). Adult. millim.	♀. <i>u</i> (in al.). Adult. millim.
Head and body . . . . . (c.)	130	108
Tail . . . . .	90	84
Hind foot . . . . .	19	17
Ear . . . . .	10	10.5

Skull, see p. 299.

*Hab.* Eastern Australia; not found in Tasmania; replaced in the west by var. *leucogaster*\*.

*Type* in collection.

This and the two preceding species are very closely allied, and, owing to their variability in colour, they have each caused the creation of several nominal species. I cannot, however, distinguish more than three species, and specimens sometimes occur to a certain extent intermediate between even these. The two Tasmanian species agree with each other very closely in the characters of their claws, skull, and dentition, while *Ph. flavipes*, different in these particulars, precisely agrees with *Ph. minima* in its colour, on which account it has been very commonly confounded with the latter.

The two subspecies of *Ph. flavipes* do not differ by any important character from each other, but the difference in the coloration

\* The ranges of the two subspecies seem to meet in Northern Central Queensland, Dr. Lumholtz having obtained specimens of each of them in the Herbert River district (see Collett, *l. c.*). These specimens, by the courtesy of Hr. Collett, I have myself examined and verified. Although obtained together their difference in colour is very striking, but in all their more essential characters they are entirely identical.

of the belly seems to be so constant as to deserve recognition by name.

a.	{ Ad. al. } ♀ (& 8 { Skull. } fœtuses).	"New Guinea and Islands" ( <i>Capt. Stanley</i> ).	Mrs. Stanley [P.].
b, c.	Ad. sks., ♀.	Liverpool Plains, N. S. W.	Gould Coll.
d.	Ad. sk., ♂.	North of Hunter R., N. S. W.	Zool. Soc. Museum. ( <i>Type of species.</i> )
e.	Imm. sk.	Salamanca R., N. S. W.	Sir T. L. Mitchell [P. & C.].
f, g.	Ad. sks., ♂.	New South Wales.	Sir T. L. Mitchell [P. & C.].
h, i.	{ Ad. sks. } ♂. { Skulls. }	New South Wales. ( <i>Co-types of Ant. unicolor</i> , Gould.)	Gould Coll.
j.	Yg. sk.	New South Wales.	Gould Coll.
k.	Ad. sk.	Australia (figured in <i>Voy.</i> 'Erebus' and 'Terror').	
l.	Ad. al., ♂.	Gippsland.	Purchased.
m.	{ Ad. sk. } ♂. { Skull. }	Adelaide.	C. D. E. Fortnum, Esq. [P. & C.].
n.	Ad. sk., ♂.	S. Australia.	Sir G. Grey [P. & C.].
o-s.	{ Ad. & yg. sks. } { Skulls of o, p. }	S. Australia.	Sir G. Grey [P. & C.].
t.	Ad. sk., ♂, 6/39.	S. Australia.	Gould Coll.
u.	Ad. al., ♀ (& 7 fœtuses).		Purchased.
v.	{ Ad. al. } ♀ (& 8 { Skull. } fœtuses).		Australian Mu- seum [E.].

#### b. *Phascologale flavipes*, var. *leucogaster*.

*Phascogale leucogaster*, *Gray, Grey's Austr., App.* ii. p. 407 (1841); *Wagn. Schr. Säug. Supp.* v. p. 201 (1855); *Gieb. Säug.* p. 728 (1859); *Jent. Cat. Ost. Leyd. Mus.* p. 303 (1887).

*Antechinus leucogaster*, *Gray, List Mamm. B. M.* p. 99 (1843); *Gould, Mamm. Austr.* i. pl. xxxviii. (animal) (1854); *Gerrard, Cat. Bones Mamm. B. M.* p. 136 (1862); *Kreffl, P. Z. S.* 1866, p. 432; *Gray, Voy. Ereb. Terr., Mamm.* p. 12 c, pl. xxv. fig. 2 (animal) (1875).

*Phascogale (Antechinus) leucogaster*, *Waterh. N. H. Mamm.* i. p. 417 (1846).

Similar to the typical variety in every respect, except that the whole underside and the limbs, instead of being yellow, are nearly or quite pure white; the bases of the hairs, however, being still slaty grey.

*Hab.* Western and Northern Australia.

*Type* in collection.

a.	{ Ad. st. } ♀. { Skull. }	Victoria Plains, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
b.	Ad. sk., 9/4/39.	Canning R., W. A. ( <i>J. Gilbert</i> );	Gould Coll. ( <i>Type of variety.</i> )
c.	{ Ad. sk. } ♂, 3/7/43. { Skull. }	Perth, W. A. ( <i>J. Gil- bert</i> ).	Gould Coll.

d. } Ad. st. }	Perth, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
e, f. } Skull. }	King George's Sound, W. A.	G. R. Waterhouse, Esq. [P.]
g. } Yg. sk. }	Port Essington, Northern Territory.	Gould Coll.

### 10. *Phascologale minutissima*.

- Antechinus minutissimus*, *Gould, P. Z. S.* 1851, p. 284; *id. Mamm. Austr. i. pl. xlv. (animal)* (1852); *Gerrard, Cat. Bones Mamm. B. M.* p. 137 (1862); *Krefft, Cat. Mamm. Austr. Mus.* p. 31 (1864); *id. P. Z. S.* 1866, p. 432; *id. Austr. Vert.* p. 15 (1871); *Günth. P. Z. S.* 1876, p. 274.
- Antechinus maculatus*, *Gould, P. Z. S.* 1851, p. 284; *id. Mamm. Austr. i. pl. xlv. (animal)* (1851); *Krefft, P. Z. S.* 1866, p. 432; *id. Austr. Vert.* p. 15 (1871).
- Phascogale maculata*, *Wagn. Schr. Säug. Supp. v.* p. 202 (1855); *Gieb. Säug.* p. 728 (1859).
- Phascogale minutissima*, *Wagn. Schr. Säug. Supp. v.* p. 203 (1855); *Gieb. Säug.* p. 728 (1859); *Thos. Ann. Mus. Genov. (2) iv.* p. 510 (1887); *Collett, Zool. Jahrb. ii.* p. 863 (1887).

#### PIGMY POUCHED MOUSE.

Size very small, general appearance exceedingly mouse-like. Fur short, soft and fine, mainly composed of the underfur. General colour finely grizzled mouse-grey, the head, back, outsides of limbs, and upper side of tail all uniformly of this colour, which is strikingly similar to that of *Mus musculus*. Ears of medium size, laid forwards just reaching to the centre of the eye, thinly clothed with short pale brown hairs. Lips and chin white; chest, belly, inner sides of limbs, and lower side of tail like back, but rather paler, the hairs slate at their bases and pale grey at their tips. Hairs of pouch pale shining grey. Hands and feet pale brown; palms and soles quite naked, the former with six pads and the latter with seven, owing to the development of a minute supplementary pad on the outer side of the foot halfway between the pad of the fifth toe and the postero-external pad. Tail rather shorter than the head and body, uniformly short-haired throughout, its scales very small, averaging about 25 to the centimetre. Pouch much more developed than is usual in the genus, its anterior and lateral walls from 4 to 6 millim. high, its posterior lower, so that as a whole it opens backwards. Mammæ 8.

*Skull* (Pl. XXIV. fig. 8) smooth and round, muzzle short and conical. Nasals narrow in front, considerably expanded behind. Interorbital region smooth, its edges evenly rounded. Occipital crests little developed. Anterior palatine foramina reaching about to the centre of the canines. Posterior palate comparatively perfect, vacuities either small or absent. Bullæ small, transparent, their posterior, mastoid, portion approaching their anterior in size.

*Teeth* (Pl. XXV. fig. 3). Upper lateral incisors minute, cylin-

dricul, about equal in size. Canines thick and strong. P.<sup>1</sup> and p.<sup>3</sup> very small, about equal in size, or p.<sup>1</sup> even exceeding p.<sup>3</sup>; p.<sup>4</sup> large, twice the height and four times the bulk of p.<sup>3</sup> Lower incisors small and slender, evenly but slightly decreasing in size backwards. Canines short, with a small posterior basal ledge. P.<sup>1</sup> small, p.<sup>3</sup> about twice its bulk, p.<sup>4</sup> very small, barely equalling p.<sup>1</sup> M.<sup>1</sup> with a distinct antero-internal secondary cusp. Milk-p.<sup>4</sup> proportionally large and well developed.

*Dimensions.*

	♂. a (in al.). Adult. millim.	♀. b (in al.). Adult. millim.
Head and body .....	72	67
Tail .....	65	59
Hind foot .....	11·2	10·4
Ear .....	7·7	6·8

Skull, see p. 299.

*Hab.* Central and Southern Queensland.

*Type* in collection.

a, b.	{ Ad. al. } { Skull of b. }	{ ♂ ♀ (&7 } { fetuses).	Peak Downs, Queensland.	Godeffroy Museum.
c.	{ Ad. sk. } { Skull. }	{ ♂.	Cressbrook, Moreton Bay ( <i>J. Strange</i> ).	Gould Coll. ( <i>Type</i> of species.)
d.	{ Ad. sk. } { Skull. }		Clarence R., Moreton Bay ( <i>J. Strange</i> ).	Gould Coll. ( <i>Type</i> of <i>Antechinus maculatus</i> , Gould.)

### 11. Phascologale longicaudata.

*Phascogale longicaudata*, Schleg. *Ned. Tijdschr. Dierk.* p. 356 (1866);  
*id. Dierent.* p. 162 (1872); *Jent. Cat. Ost. Leyd. Mus.* p. 303  
(1887); *Thos. Ann. Mus. Genov.* (2) iv. p. 509 (1887).

#### LONG-TAILED POUCHED MOUSE.

Size medium, form light and slender. Fur short, close and velvety; underfur very thin, slaty blue. General colour dull, finely grizzled grey-brown or mouse-colour, the head, neck, fore back, and fore limbs all uniformly of this colour; posterior back, rump, and hind limbs suffused with rufous, deepest at the base of the tail. Ears small, naked, a rufous mark on the neck just behind them. Chin, chest, and belly white, the hairs grey at their bases. Hands and feet dark brown; soles naked, with five pads, the hallucal one being continuous. Tail longer than head and body, its basal inch hairy and coloured like the rump, its remainder uniformly short-haired all round, rat-like, the hairs very thin, not hiding the scales; dark brown or black both above and below.

*Skull* strongly built. Nasals narrow, slightly expanded behind,

convex above. Interorbital space rounded, its edges not ridged or beaded. Anterior palatine foramina extending to opposite the centre of the canines.

*Teeth.* Upper lateral incisors subequal, slender,  $i^2$  and  $i^3$  cylindrical,  $i^4$  slightly flattened.  $P^4$  much longer and larger than  $p^3$ , its point projecting beyond the tips of the molars. Lower  $p^4$  about the size of  $p^1$ .

*Dimensions.*

	♀ (stuffed). Adult. millim.
Head and body . . . . .	146
Tail . . . . .	172
Hind foot . . . . .	24
Ear . . . . .	(c.) 9
Skull, see p. 299.	

*Hab.* Aru Islands.

*Type* in the Leyden Museum.

12. *Phascogale penicillata.*

"*Tapoa tafa*" \*, *White, Journ. Voy. N. S. W.* p. 281, pl. lviii. (animal) (1790).

*Didelphis penicillata*, *Shaw, Gen. Zool.* i. pt. ii. p. 502 (1800).

*Dasyurus penicillatus*, *Geoff. Ann. Mus.* iii. p. 361 (1804); *G. Fisch. Zoogn.* ii. p. 585 (1813); *Desm. N. Dict. d'H. N.* (2) ix. p. 139 (1817); *Cuv. R. A.* i. p. 176 (1817); *Geoff. Dict. Sci. Nat.* xii. p. 511 (1818); *Desm. Mamm.* i. p. 264 (1820); *Kuhl, Beitr. Zool.* i. p. 62 (1820); *Desmoul. Dict. Class. d'H. N.* v. p. 339 (1824); *Gray, Griff. Cuv. An. K.* v. p. 194 (1827); *J. B. Fisch. Syn. Mamm.* p. 272 (1829); *Benn. Cat. N. H. Austr. Mus.* p. 2 (1837).

*Dasyurus tafa*, *Geoff. Ann. Mus.* iii. p. 360 (1804); *Triedem. Zool.* p. 429 (1808); *G. Fisch. Zoogn.* ii. p. 585 (1813); *Desm. N. Dict. d'H. N.* (2) p. 139 (1817); *Geoff. Dict. Sci. Nat.* xii. p. 511 (1818); *Desm. Mamm.* i. p. 264 (1820); *Desmoul. Dict. Class. d'H. N.* v. p. 339 (1824); *Gray, Griff. Cuv. An. K.* v. p. 194 (1827); *Less. Man. Mamm.* p. 215 (1827); *Fisch. Syn. Mamm.* p. 272 (1829); *Less. N. H. Mamm. (Compl. Buff.)* v. p. 373 (1836).

*Phascogale penicillata*, *Temm. Mon. Mamm.* i. p. 58, pl. vii. figs. 9-12 (skull) (1827); *Less. Man. Mamm.* p. 215 (1827); *id. H. N. Mamm. (Compl. Buff.)* v. p. 371 (1836); *Waterh. Cat. Mamm. Mus. Zool. Soc.* p. 65 (1838); *Gray, Grey's Austr., App.* ii. p. 400 (1841); *Less. N. Tabl. R. A., Mamm.* p. 191 (1842); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 136, pl. viii. (animal) (1841); *Gray, List Mamm. B. M.* p. 98 (1843); *Wagn. Schr. Säug. Supp.* iii. p. 35, pl. clii. B. d (animal) (1843), v. p. 198 (1855); *Schinz, Syn. Mamm.* i. p. 493 (1844); *Gould, Mamm. Austr.* i. pl. xxxi. (animal) (1845); *Owen, Odontogr. Atl.* pl. xcvi. fig. 3 (teeth) (1845); *Waterh. N. H. Mamm.* i. p. 407, pl. xii. fig. 2 (feet), xxi.

\* Used as a native name.

fig. 5 (skull) (1846); *Owen, Todd's Cyclop. Anat.* iii. p. 259, fig. 82 (teeth) (1847); *Gieb. Odontogr.* p. 39, pl. xvii. fig. 4 (teeth) (1855); *Gerv. H. N. Mamm.* ii. p. 283 (1855); *Schleg. Dierk.* p. 137 (1857); *Gieb. Säug.* p. 726 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 135 (1862); *Kreffft, Cat. Mamm. Austr. Mus.* p. 27 (1864); *id. P. Z. S.* 1866, p. 431; *id. Austr. Vert.* p. 15 (1871); *Schleg. Dierent.* p. 161 (1872); *Gieb. Bronn's Kl. u. Ordn.* vi. Abth. v. pl. xix. fig. 9 (skull) (1874); *Brehm, Thierl.* ii. p. 551, and fig. (animal) (1880); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 739 (1884); *Jent. Cat. Ost. Leyd. Mus.* p. 303 (1887); *Thos. Ann. Mus. Genov.* (2) iv. p. 504 (1887); *id. Phil. Trans.* clxxviii. p. 461, pl. xxvii. figs. 2 and 4 (teeth) (1887); *Coll. Zool. Jahrb.* ii. p. 859 (1887).

*Tapoa tafa* \*, *Less. N. Tabl. R. A., Mamm.* p. 190 (1842).

#### BRUSH-TAILED PHASCOLOGALE.

Size large, form stout and strong. Fur short and coarse, underfur thick and close. General colour uniform finely grizzled pale grey, the head, back, outsides of limbs, and base of tail all of this colour. Face with an indistinct darker stripe down the muzzle. Ears very large, laid forward they entirely cover the eye, thin, nearly naked. Hairs of back black, with a broad subterminal white band. Chin white; chest, belly, and inner sides of limbs white or pale grey, not sharply defined; pouch-hairs dull rufous, with white tips. Feet and hands grey, becoming paler on the fingers and toes; palms and soles (Pl. XXIII. fig. 4) quite naked, the former with six, the latter with five unusually long primary pads, the hallucal one being undivided, but there is a minute supplementary pad behind the ordinary postero-external pad, making six in all; claws long and strong. Tail long and thick, its basal fourth or fifth furred and coloured all round like the back, its next fourth or fifth shorter-haired, paler above, brown below, and its terminal half or three fifths thickly clothed all round with long black hairs, forming a prominent brush. Mammæ 10 †.

*Skull* stout and strong, markedly flattened above, swollen and broadened across in front of the orbits; muzzle short and conical. Nasals evenly expanded behind. Interorbital region broad and flat, its edges square, more or less converging backwards. Occipital crests very little developed. Anterior palatine foramina broad and open, extending backwards to about the centre of the canines. Posterior palate with a pair of large vacuities reaching from about the middle of  $m.^1$  to  $m.^4$ . Bullæ very large and swollen, transparent, the mastoid nearly one third the size of the tympanic portion.

*Teeth* (Pl. XXIV. fig. 4). Upper incisors thick and strong, especially  $i.^1$ ;  $i.^2$  with a large pointed crown, flattened antero-externally, in section twice the size of either  $i.^3$  or  $i.^4$ , which are about equal. Premolars evenly increasing in size backwards,  $p.^4$  about twice the size of  $p.^1$ . Lower incisors broadened and flattened antero-posteriorly, their relative sizes in section about expressed by

\* Used as a binomial under the heading of the genus "*Tapoa*."

† Apud Krefft, *l. c.*

the numbers 5, 2, and 1 respectively. Canines short, thick, with a broad posterior basal ledge. Premolars broad and heavy,  $p^3$  but little larger than  $p^1$ ;  $p^4$  small, broadly oval in section, about half the size of  $p^1$ .  $M^1$  large, quadrangular, with a well-marked antero-internal secondary cusp. Milk- $p^4$  triangular, well developed and long persistent, both above and below.

*Dimensions.*

	♂. j (skin). Adult. millim.
Head and body .....	240
Tail .....	225
Hind foot .....	41
Ear .....	24

Skull, see p. 299.

*Hab.* All Australia, except the extreme North; not found in Tasmania.

*Type* not in existence.

a. Skeleton.	(N. Australian Expedition.)	Dr. J. R. Eelsey [P. & C.].
b. Ad. sk., ♂.	Moreton Bay, S. Queensland ( <i>J. Strange</i> ).	Gould Coll.
c. { Ad. sk. } ♂. { Skull. }	Upper Hunter R., N. S. W.	Gould Coll.
d. { Imm. sk. } ♂. { Skull. }	Peel R., N.S.W.	Gould Coll.
e. Imm. al., ♂.	Port Stephens, N. S. W.	Dr. Bennett [P. & C.].
f. { Ad. st. } ♀. { Skull. }	South Australia.	Sir G. Grey [P. & C.].
g, h. Ad. sks., ♂.	Adelaide.	C. D. E. Fortnum, Esq. [P. & C.].
i. { Ad. sk. } ♀. { Skull. }	Barassa Range, S. A.	G. French Angas, Esq. [P. & C.].
j. { Ad. sk. } ♂. { Skull. }	West Australia.	Gould Coll.
k. Ad. sk., ♂.	Perth, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
l. Ad. sk., ♂.	Northam, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
m. Skeleton, ♂.	Guildford, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
n, o. Ad. & yg. skulls.		Gould Coll.

13. *Phascogale calura*.

*Phascogale calura*, *Gould*, *P. Z. S.* 1844, p. 104; *id.* *Mamm. Austr.* i. pl. xxxii. (animal) (1845); *Waterh. N. H. Mamm.* i. p. 409, pl. xiv. fig. 2 (animal) (1846); *Wagn. Schr. Säug. Supp.* v. p. 198 (1855); *Ger. H. N. Mamm.* ii. p. 283 (1855); *Schleg. Dierk.* p. 137 (1857); *Gieb. Säug.* p. 727 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 135 (1862); *Kreffl, Cat. Mamm. Austr. Mus.* p. 29 (1864); *id.* *P. Z. S.* 1866, p. 431; *id.* *Austr. Vert.* p. 15

(1871); *Schleg. Dierent.* p. 161 (1872); *Gray, Voy. Ereb. Terr., Mamm.* p. 12 c, pl. xxvi. fig. 3 (animal) (1875); *Cunningham, J. Anat. Phys.* xii. p. 427 (1878); *id. Rep. Voy. Challenger, Zool.* v. pt. 2, pp. 1-192 (anat.) (1882); *Flow. & Gars. Cat. Ost. Coll. Surg.* p. 740 (1884); *Thos. Ann. Mus. Genov.* (2) iv. p. 504 (1887).

#### LESSER BRUSH-TAILED PHASCOLOGALE.

Size medium, form slender and graceful. Fur long, soft and fine, nearly wholly composed of underfur. General colour grey, with a faint tinge of rufous. Head finely grizzled grey, the hairs with a nearly white subterminal band. Ears very large, leafy, almost naked except at their bases, where at the origins of both outer and inner margins there are well-marked tufts of bright red hair. Whole of back and outsides of limbs uniformly grey, the slaty bases of the hairs scarcely showing; sides with a faint rufous tinge. Chin, chest, belly, and inner sides of limbs sharply defined white, the greater part of the hairs white to their roots. Hands and feet white; palms with five or six pads, the pollical doubtfully divided into two; soles quite naked, with five pads, the hallucal and postero-external very long, undivided; claws small and weak. Tail long, for its basal half above short-haired, rich rufous, below sharply defined dark brown; terminal half evenly, but slightly, bushy all round, uniformly black.

*Skull* (Pl. XXIV. fig. 9) strongly built, flattened and broadened anteriorly, as in *Ph. penicillata*; muzzle short and conical. Nasals small, narrow, but little expanded behind. Interorbital region broad, flat, its edges square. Occipital ridges but little developed. Anterior palatine foramina reaching to the centre of the canines. Posterior palate with a pair of large vacuities opposite the first three molars. Bullæ very large and rounded, their mastoid portion decidedly inflated.

*Teeth.* Upper (Pl. XXV. fig. 6)  $i^1$  proportionally large and strong.  $I^2$  flattened antero-externally, twice as large in cross section as  $i^3$  or  $i^4$ , the latter small, cylindrical, subequal. Premolars evenly increasing in size backwards,  $p^4$  about twice the height of  $p^1$ . Lower incisors broad above, very unequal in size,  $i^1$  more than twice as large as  $i^2$ , and the latter larger than the very small  $i^3$ . Canine with a marked posterior basal broadening.  $P^3$  but little larger than  $p^1$ ;  $p^4$  small, from one half to two thirds the size of  $p^1$ .  $M^1$  with a prominent antero-internal secondary cusp.

#### Dimensions.

	♂.
	<i>a</i> (skin in al.).
	Adult.
	millim.
Head and body . . . . .	(c.) 125
Tail . . . . .	147
Hind foot . . . . .	24
Ear . . . . .	20

Skull, see p. 299.

*Hab.* South and West Australia.

*Type* in collection.

- |    |                                     |  |   |
|----|-------------------------------------|--|---|
| a. | } Ad. sk. in al. } ♂.               | Adelaide.  | Purchased.                                |
|    |                                     |  |   |
| b. | } Ad. sk. } ♂.                      | Williams R., Western<br>Australia ( <i>J. Gilbert</i> ). | Gould Coll.<br>( <i>Type</i> of species.) |
|    |                                     |  |   |
| c. | Ad. st., ♂.                         |  | Purchased.                                |
| d. | Anatomical prepara-<br>tions in al. | (Voy. H.M.S. 'Challen-<br>ger.')                         | Dr. R. Cunningham.                        |

### 5. SMINTHOPSIS.

*Type.*

- Podabrus, *Gould, Mamm. Austr.* Letterpress to  
pl. xlvii. (1845): *nec (Fisch. de Waldh.) Westw.*  
*Introd. Insect.* ii. Synopsis, p. 27 (1840) . . . . . S. crassicaudata.  
Sminthopsis, *Thomas, Ann. Mus. Genov.* (2) iv.  
p. 503 (1887) . . . . . S. crassicaudata.

Size very small; build slender and delicate. Ears large, broad and rounded; metatragus large and thin, its end slightly folded. Tail well developed, short-haired, sometimes incrassated. Feet slender and delicate; tarsus and metatarsus very long in comparison to the toes. Toes subequal, with small delicate claws; hallux present, but short and clawless; palms and soles naked or partially hairy, the naked part uniformly granulated; hind pads either wholly absent or, at most, four in number (see Pl. XXIII. fig. 6). Pouch well developed. Mammæ 8 or 10.

*Skull* generally slender and delicate, not flattened vertically. Nasals differing from those of all the preceding genera by their not being markedly expanded behind, their transverse diameter only very slightly and gradually increasing backwards. Interorbital region proportionally much narrower than in *Phascologale*. Palatal vacuities but little variable in their number and position; one large pair opposite the first three molars, and a second smaller pair nearer the middle line opposite m.<sup>4</sup> Bullæ small, transparent, hemispherical, the posterior, mastoid, portion not swollen.

*Dentition*:—I.  $\frac{1.2.3.4}{1.2.3}$ , C.  $\frac{1}{1}$ , P.  $\frac{1.0.3.4}{1.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 46$ .

*Teeth* very constant in their characters. Upper incisors small, slender, i.<sup>1</sup> separated from the others and projecting forwards, cylindrical; lateral incisors but little flattened, slightly increasing in size backwards. Canines, especially the lower ones, generally small and weak. P.<sup>4</sup> large and strong, its point projecting beyond any of the molars. Molars as in *Phascologale*. Lower incisors subequal. Premolars increasing in size backwards, p.<sup>4</sup> rarely a very little smaller, generally decidedly larger than p.<sup>3</sup> M.<sup>1</sup> always with a small antero-internal secondary cusp.

Milk-premolar large, triangular, long persistent.

*Habits.* Terrestrial; insectivorous.

*Range.* Australia and Tasmania.

## Skull Dimensions of Phascogale.

Species .....	Ph. apicalis.	Ph. thorbeckiana.	Ph. waltzei.	Ph. doriae.	Ph. dorsalis.	Ph. suavis.	Ph. minima.	Ph. flavipes.	Ph. minutissima.	Ph. longicaudata.	Ph. penicillata.	Ph. caetura.
Sex .....	d.	*	a.	*	a.	c.	d.	v.	b.	Type.	i.	a.
Specimen .....	ad.	ad.	ad.	ad.	ad.	ad.	ad.	ad.	ad.	ad.	ad.	ad.
Age .....												
Basal length .....	31	49.5	45	38.5	32.7	31.4	29.5	27	18	...	45	29.6
Greatest breadth .....	20	30	26.6	21	18	17.7	16.7	16	10.4	21	29	19.5
Nasals, length .....	11.2	19	18.5	16	13.3	13	12	11	6	14	17.3	9.6
"    greatest breadth .....	3.6	8.3	7	6	4.6	4.5	4.5	3.8	3	4.8	6.6	4
"    least breadth .....	2.3	3.4	3.3	2.4	2.5	2	2	1.9	1.7	2.2	2.5	2.3
Intertemporal breadth .....	7	10	11	9.5	8	7.9	7.5	6.5	4.5	7.1	8.3	6.8
Palate, length .....	18.1	29	25.6	24.5	20	18.5	17	15.8	9.2	21.5	26	17
"    breadth between outer corners of m. <sup>3</sup> .....	11.4	17	14.6	13.5	11	9.5	9.2	9.4	6.9	11.5	16.2	11.3
Palatal foramen .....	2.4	3.7	3.7	3.5	3	7	3.2	3	1.3	4	4.2	2.6
Basi-cranial axis .....	11	17	15	11.8	10.5	9.5	9.6	8.8	6.8	...	15.4	10.9
Basi-facial axis .....	20.3	32.5	30	27	22.5	22.2	20	18.7	11.2	25.5	29.7	19
Facial index .....	185	191	200	229	214	234	209	212	165	...	...	174
Teeth—horizontal length of p. <sup>4</sup> .....	0.7	1.8	2	1.7	1.4	1.6	1.3	1.3	0.7	...	...	1.5
"    length of ms. <sup>1-3</sup> .....	7	10	9.2	9	7	6	5.5	5.6	3.6	7.4	9.2	6.3
"    breadth of m. <sup>4</sup> .....	2.1	3.6	3	3	2.6	2	2	2	1.4	2.7	3.1	2.2

\* Belonging to the Genoa Museum.

The smaller species of this genus present unusual difficulty in their discrimination, and the present arrangement must be looked upon as merely provisional until a larger number of specimens properly preserved in spirit are available for examination.

*Synopsis of Species.*

I. EXTERNAL CHARACTERS.

- A. Face with well-defined dark stripes. Size large, head and body, and tail, each more than 110 millim. long . . . . . 1. *S. virginia*, p. 300.
- B. Face not, or very indistinctly striped. Size smaller, neither head and body, nor tail, attaining 110 millim.
- a.* Soles with distinct transversely striated pads . . . . . 2. *S. leucopus*, p. 302.
- b.* Soles without striated pads; with granulated projections only.
- a*<sup>1</sup>. Tail thin, not incrassated. Mammæ 8. Sole naked and granulated nearly to the heel . . . . . 3. *S. murina*, p. 303.
- b*<sup>1</sup>. Tail short, incrassated. Mammæ 10. Distal half of sole only naked and granulated . . . . . 4. *S. crassicaudata*, p. 306.

II. CRANIAL CHARACTERS\*.

- A. Skull broad and stout. Canines long. Rudimentary postorbital processes present . . . . . 1. *S. virginia*, p. 300.
- B. Skull long and narrow. Canines short. No trace of postorbital processes.
- a.* Premolars separate; upper p.<sup>4</sup> disproportionately larger than the subequal p.<sup>1</sup> and p.<sup>3</sup> . . . . . 2. *S. leucopus*, p. 302.
- b.* Premolars touching one another, the upper ones evenly increasing in size backwards.
- a*<sup>1</sup>. Skull larger and stouter. Canines of medium size . . . . . 3. *S. murina*, p. 303.
- b*<sup>1</sup>. Skull smaller and more delicate. Canines very small . . . . . 4. *S. crassicaudata*, p. 306.

1. *Sminthopsis virginia*.

*Phascologale virginia*, *De Tarragon, Rev. Zool.* 1847, p. 177; *Collett, P. Z. S.* 1886, p. 548, pl. lx. (animal, skull, and teeth); *Thos. Ann.*

\* Owing to the close resemblance existing between the skulls and teeth of the different species of *Sminthopsis* it has been found impossible to make this synopsis very definite in its details, but it is nevertheless thought useful to draw attention to such characters as, by reference to the fuller descriptions, will assist in the identification of specimens.

*Mus. Genov.*(2) iv. p. 507 (1887); *id. Phil. Trans.* clxxviii. p. 461, pl. xxvii. fig. 1 (teeth) (1887).  
*Phascologale (Sminthopsis) virginiaë*, *Coll. Zool. Jahrb.* ii. p. 866 (1887).

Largest of the genus. Fur rather short, very soft and silky, apparently all of one sort. General colour of body grizzled grey, Face sandy rufous, ornamented with three black longitudinal lines, a single central one running along the top of the muzzle, and a pair of less distinct ones running from the nose to the eyes. Cheeks, sides of neck, and tufts at base of ears bright rufous. Ears very large, transparent, nearly naked; their backs with the anterior margins rather, but not prominently, darker than the rest. Back uniform finely grizzled grey, the hairs slate-coloured for two thirds of their length, then black, and with a white subterminal band, the extreme tip black. Chin, chest, and belly white, or pale yellow, the bases of the hairs grey. Outside of upper arms and of thighs like back; rest of limbs white; claws very small and delicate, white or yellow. Sole-pads, so far as can be made out in the single dried specimen available, precisely like those of *Sm. leucopus* (q. v.). Tail about as long as the head and body, uniformly short-haired, the hairs dark brown above, paler below.

*Skull* short and strongly built; muzzle conical. Nasals scarcely broader behind than in front. Interorbital space unusually narrow, its edges square, and forming two distinct, though rudimentary, postorbital processes. Sagittal and lambdoidal crests well defined. Anterior palatine foramina reaching to the level of the centre of the canines. Posterior palate with a pair of ill-defined vacuities. Bullæ small, hemispherical, transparent, their posterior portion unswollen.

*Teeth.* Upper incisors small, cylindrical,  $i.^4$  slightly larger than  $i.^2$  and  $i.^3$ . Canine very long and slender. Premolars (see Collett's figures, *l. c.*) disproportionate in size— $p.^1$  and  $p.^3$  very small, the latter but slightly the larger of the two, and  $p.^4$  very large and heavy, many times the size of  $p.^3$ .  $M.^4$  slender, narrow antero-posteriorly. Lower incisors small, about equal in size. Canine with a slight posterior basal broadening. Premolars evenly increasing in size backwards,  $p.^4$  twice the size of  $p.^1$ .

#### Dimensions.

	♂. * (stuffed). millim.
Head and body . . . . .	125
Tail . . . . .	125
Hind foot . . . . .	22
Ear . . . . .	13
Skull, see p. 308.	

*Hab.* Central Queensland.

*Type* not in existence.

\* From Dr. Lumholtz's specimen, preserved in the Christiania Museum.

This interesting species has only recently been properly described, the type specimen, of which the locality was unknown, having disappeared, and nothing more being known about the species than was contained in the original description. In 1883, however, the animal was rediscovered at Herbert Vale, Central Queensland, by Dr. C. Lumholtz, and by him transmitted to the Christiania Museum, to whose director, Hr. R. Collett, I am indebted for the opportunity of examining the specimen from which his description and figures were taken.

## 2. *Sminthopsis leucopus*.

*Phascogale leucopus*, *Gray, Ann. Mag. N. H.* x. p. 261 (1842); *Schinz, Syn. Mamm.* i. p. 496 (1844).

*Antechinus leucopus*, *Gray, List Mamm. B. M.* p. 100 (1843); *Gould, Mamm. Austr.* pl. xxxv. (animal) (1860); *Gerrard, Cat. Bones Mamm. B. M.* p. 136 (1862); *Gray, Voy. Ereb. Terr., Mamm.* p. 12 b, pl. xxvii. fig. 2 (animal) (1864); *Higg. & Pett. P. Roy. Soc. Tasm.* 1883, p. 196.

*Phascogale (Antechinus) leucopus*, *Waterh. N. H. Mamm.* i. p. 423 (1846); *Gunn, P. Roy. Soc. Tasm.* ii. p. 82 (1852).

*Antechinus ferrugineifrons*, *Gould, Mamm. Austr.* i. pl. xxxvi. (animal) (1854); *Krefft, Cat. Mamm. Austr. Mus.* p. 32 (1864); *id. P. Z. S.* 1866, p. 432.

*Podabrus leucopus*, *Krefft, P. Z. S.* 1866, p. 433.

*Podabrus mitchelli*, *Krefft, P. Z. S.* 1866, p. 433; *id. Austr. Vert.* p. 15 (1871).

*Podabrus ferrugineifrons*, *Krefft, Austr. Vert.* p. 15 (1871).

*Antechinus leucogenys*, *Higg. & Pett. P. Roy. Soc. Tasm.* 1882, p. 172.

### WHITE-FOOTED POUCHED MOUSE.

Size larger than in the following species; form slender. Fur close, fine and straight, composed almost wholly of underfur. General colour above uniform dark greyish brown or mouse-colour, sometimes suffused with orange-rufous on the head; no prominent markings anywhere. Ears (Pl. XXIII. fig. 5) large and broad, laid forwards they reach just to the anterior canthus of the eye; very thinly clothed with short grey hairs; their backs uniform slaty grey. Hairs of back slaty blue for nine tenths of their length, their extreme tips fawn or brown, the few longer hairs black. Chin pure white, chest and belly white, but with the bases of the hairs slaty grey; the passage on the sides from the colour of the back gradual. Limbs to wrists and ankles like back, hands and feet pure white. Palms finely granulated, with six pads. Soles (Pl. XXIII. fig. 6) finely hairy posteriorly, naked and coarsely granulated anteriorly, the naked part reaching backwards in the centre to about halfway between the heel and the base of the hallux; sole-pads present, but small, four in number, three anteriorly at the bases of the toes, one at the base of the hallux; all finely striated transversely. Tail slender, generally rather shorter than the head and

body, but longer in extreme northern specimens, uniformly short-haired, the hairs just hiding the scales, grey or brown above, white beneath.

*Skull* (see Pl. XXV. figs. 8 & 9) slender, delicate; muzzle longer and narrower than in the other species. Interorbital space smooth, its edges not beaded. Anterior palatine foramina extending backwards to the level of the back of the canines. Posterior palate with a pair of large irregular vacuities opposite the first three molars, and a second pair of much smaller and more regular ones opposite m.<sup>4</sup> Bullæ small.

*Teeth* (Pl. XXV. fig. 7) as described above. Canines very short as in *S. crassicaudata*. Premolars, owing to the comparatively greater length of the muzzle, not touching one another. Upper p.<sup>3</sup> not much larger than p.<sup>1</sup>; p.<sup>4</sup> disproportionately larger than either. Lower p.<sup>4</sup> quite equal to or even exceeding p.<sup>3</sup>

*Dimensions.*

	♂.	
	c (in al.).	From Cape York* (in spirit).
	Adult. millim.	Adult. millim.
Head and body .....	96	80
Tail .....	86	101
Hind foot .....	19·3	18·7
Ear.....	14	13

Skull, see p. 308.

*Hab.* Eastern Australia, from Cape York to Tasmania.

*Type* in collection.

a, b.	} Ad. sks. } ♂.	New South Wales.	Gould Coll.
c.	} Ad. al. } ♂.	Gippsland.	Purchased.
d.	} Ad. sk. } ♂.	Tasmania.	Purchased.
e.	Ad. al. ♂.	Tasmania.	Ronald Gunn, Esq. [P. & C.].
f.	Ad. skeleton.	Tasmania.	Ronald Gunn, Esq. [P. & C.].

### 3. *Sminthopsis murina*.

*Phascogale murina*, *Waterh. P. Z. S.* 1837, p. 76; *id. Cat. Mamm. Mus. Zool. Soc.* p. 65 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 143, pl. x. (animal) (1841); *Gray, Grey's Austr., App.* ii. p. 401 (1841); *Less. N. Tabl. R. A., Mamm.* p. 191 (1842); *Wagn. Schr.*

\* Belonging to the Brisbane Museum, and kindly lent me for examination by Mr. De Vis.

- Säug. Supp.* iii. p. 38 (1843), v. p. 204 (1855); *Schinz, Syn. Mamm.* i. p. 494 (1844); *Gieb. Säug.* p. 729 (1859).
- Phascogale albipes*, *Waterh. P. Z. S.* 1842, p. 48; *Schinz, Syn. Mamm.* i. p. 495 (1844); *Wagn. Schr. Säug. Supp.* v. p. 203 (1855); *Gieb. Säug.* p. 728 (1859).
- Phascogale (Antechinus) albipes and murina*, *Waterh. N. H. Mamm.* i. pp. 421, 425 (1846).
- Antechinus fuliginosus*, *Gould, Mamm. Austr.* i. pl. xli. (animal) (1852).
- Antechinus albipes*, *Gould, Mamm. Austr.* i. pl. xlii. (1852); *Gerrard, Cat. Bones Mamm. B. M.* p. 137 (1862); *Kreff, Cat. Mamm. Austr. Mus.* p. 30 (1864); *Gray, Voy. Ereb. Terr., Mamm.* p. 12 c, pl. xxvii. fig. 1 (animal) (1875); *Higg. & Pett. P. Roy. Soc. Tasm.* 1883, p. 196.
- Antechinus murinus*, *Gould, Mamm. Austr.* i. pl. xliii. (animal) (1852).
- Phascogale fuliginosa*, *Wagn. Schr. Säug. Supp.* v. p. 205 (1855).
- Podabrus fuliginosus, murinus, and albipes*, *Kreff, P. Z. S.* 1866, p. 433; *id. Austr. Vert.* p. 15 (1871).

#### COMMON POUCHED MOUSE.

General proportions slender and delicate. Fur soft and fine, with very few longer hairs. General colour finely grizzled mouse-grey, rather variable in tone according to the amount of the longer darker hairs present. Face with an indistinct darker mark in front of and round the eyes, and sometimes with a faint darker mesial stripe along the muzzle. Ears very variable in size; laid forward (in spirit-specimens) they reach to, and in some specimens beyond, the anterior canthus of the eye; their backs uniformly slaty flesh-colour. Chin white; chest and belly mixed grey and white, the degree to which the slaty grey of the bases of the hairs shows though very variable; line of demarcation on sides generally sharply marked. Hands and feet, and sometimes forearms, pure white; palms naked, granulated. Soles (Pl. XXIII. fig. 7) hairy under the calcaneum and along the edges, the remainder naked, finely granulated, the projections at the bases of the toes without distinct transversely striated pads, although on their summits several of the granulations sometimes coalesce and form small irregular and smooth pads. Tail just about the length of the head and body, slender, not incrassated, evenly short-haired, brown above, grey or white below. Mammæ 8.

*Skull* smaller and with rather a shorter broader muzzle than in *S. leucopus*, but otherwise quite similar.

*Teeth* as usual. Upper p.<sup>3</sup>, as a rule, proportionally more developed than in *S. leucopus*, so that the three premolars increase evenly in size; but even this character is not always constant.

Upper milk-p.<sup>4</sup> (still in position in specimen *o*) of considerable size, about equal in cross-section to the canine, triangular, multicupid, very much as in *Phascologale*.

## Dimensions.

	♂. e (in spirit). Adult. millim.	♀. j (in al.). Adult. millim.
Head and body .....	81	84
Tail .....	90	83
Hind foot .....	16	16
Forearm and hand .....	..	25
Ear .....	11.5	13

Skull, see p. 308.

*Hab.* Australia south of the tropics.

*Type* in collection.

Kreffit has stated that the eastern specimens of this species (the true *S. murina*) have ten mammæ, and that therefore the western ones ("*S. fuliginosa*") should be distinguished specifically from it. Since, however, specimen *h* from South Australia has, like the western species, only eight mammæ, and no other differences are observable between the two forms, I am constrained to consider that Kreffit was mistaken, and that the two species are identical.

a. { Ad. sk. } ♂ { Skull. }	Darling Downs, Queensland.	Gould Coll.
b, c. Ad. sks.	Severn R., N. S. W.	Gould Coll.
d. Ad. sk., ♂.	Hunter R., N. S. W.	Zool. Soc.
e. Ad. al., ♂.		( <i>Type of species.</i> ) Leyden Museum [E.]
f. Ad. skull.	South Australia* ( <i>J.</i> <i>B. Harvey, Esq.</i> ).	G. R. Waterhouse, Esq. [P.]
g. Ad. sk.	(From <i>type of Ph. albipes</i> , South Australia.	Waterh.) Sir G. Grey [P. & C.]
h. Ad. al., ♀.	South Australia.	Purchased.
i. { Ad. st. } ♂ { Skull. }	Albany, King George's Sound.	Purchased.
j. Ad. al., ♀.	King George's Sound ( <i>G. Masters</i> ).	G. Kreffit, Esq. [P.]
k. Ad. st., ♂, 2/7/43.	Perth, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
l. Ad. sk., ♂.	R. Avon, W. A. ( <i>J. Gil- bert</i> ).	Gould Coll.
m. { Ad. sk. } ♂ { Skull. }	Toodyay, W. A. ( <i>J. Gil- bert</i> ).	( <i>Type of A. fuliginosus</i> , Gould.) Gould Coll.

\* The "South Australia" here referred to appears only to mean the southern part of Australia, *i. e.* Victoria.

*n*, o. Ad. & imm. al., ♂. J. Beazley [C.]  
 West Australia. Purchased.  
*p*. { Ad. st. } ♂.  
 { Skull. }

#### 4. *Sminthopsis crassicaudata*.

- Phascogale crassicaudata*, *Gould, P. Z. S.* 1844, p. 105; *Wagn. Schr. Säug. Supp.* v. p. 206 (1855); *Schleg. Dierk.* p. 137 (1857); *Gieb. Säug.* p. 729 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 135 (1862); *Schleg. Dierent.* p. 162 (1872).
- Podabrus crassicaudatus*, *Gould, Mamm. Austr.* pl. xlvii. (animal) (1845); *Krefft, Cat. Mamm. Austr. Mus.* p. 32 (1864); *id. P. Z. S.* 1866, p. 433; *id. Austr. Vert.* p. 15 (1871).
- Podabrus macrurus*, *Gould, P. Z. S.* 1845, p. 79; *id. Mamm. Austr.* i. pl. xlvii. (animal) (1849); *Krefft, Cat. Mamm. Austr. Mus.* p. 32 (1864); *id. P. Z. S.* 1866, p. 433; *id. Austr. Vert.* p. 15 (1871).
- Phascogale (Antechinus) macrura and crassicaudata*, *Waterh. N. H. Mamm.* i. pp. 426 & 428, pl. xv. fig. 2 (animal) (1846).
- Phascogale macrura*, *Wagn. Schr. Säug. Supp.* v. p. 205 (1855); *Schleg. Dierk.* p. 137 (1857); *Gieb. Säug.* p. 729 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 136 (1862); *Schleg. Dierent.* p. 162 (1872); *Jent. Cat. Ost. Leyd. Mus.* p. 303 (1887).
- Antechinus crassicaudatus*, *Gray, Voy. Ereb. Terr.* p. 12 b, pl. xxvi. fig. 1 (animal) (1864).
- Antechinus (Podabrus) froggatti*, *Rams. P. Linn. Soc. N. S. W.* (2) ii. p. 552 (1887).

#### FAT-TAILED POUCHED MOUSE.

Size very small, form light and delicate. Fur very soft and fine, composed almost wholly of underfur, without any admixture of longer, coarser hairs. General colour clear ashy grey. Face with a yellowish tinge, especially between the eyes and ears. Ears very large, pointed or narrowly rounded off, laid forward they reach considerably beyond the eye; their backs dark brown anteriorly, then yellowish flesh-colour, and posteriorly slaty grey, the anterior dark band contrasting markedly with the rest; inside of ear with a few short yellowish hairs along the edges. Back uniform grey, more or less tinged with yellow, the hairs dark slate for their basal four fifths and their tips pale grey or yellow. Chin white, chest and belly greyish white. Hands and feet white. Palms naked, coarsely granulated with fine projections, on which the pads are vague and rudimentary, without transverse striations. Soles (Pl. XXIII. fig. 8), except the anterior fourth, and a narrow line extending backwards down the centre, thickly clothed with velvety hairs; naked part coarsely granulated, the large trefoil-shaped projection without distinct striated pads. Tail generally short, rather variable in length, incrassated, tapering, grey above and white beneath. Mammæ 10.

*Skull* very similar to that of *S. murina*, except that it is slenderer and more slightly built.

*Teeth* (Pl. XXV. fig. 10) as usual; the canines very small, the upper premolars evenly increasing in size backwards. Lower p.<sup>4</sup> very slightly smaller than p.<sup>3</sup>

*Dimensions.*

	♂. e (in spirit). millim.	♀. a (in spirit). millim.
Head and body .....	85	75
Tail .....	53	52
Hind foot .....	14.6	14.5
Ear.....	14	12.5

Skull, see next page.

*Hab.* Whole of Australia (not yet recorded from the extreme north).

*Type* in collection.

a. Ad. al., ♀.	Queensland.	Purchased.
b. Ad. sk., ♀.	Darling Downs ( <i>J. Gilbert</i> ).	Liverpool Museum [E.], (Gould Coll.)
c. Skull.	Darling Downs ( <i>J. Gilbert</i> ).	Gould Coll.
	(b and c, co-types (with ♂ in Liverpool Museum) of <i>S. macrura</i> .)	
d. { Ad. sk. } ♂.	Darling R., N. S. W.	Capt. Sturt [P. & C.].
e, f. Ad. al., ♂ ♀.	Melbourne.	Purchased.
g. Ad. sk., ♂.	S. Australia.	Sir G. Grey [P. & C.].
h. Ad. sk., ♂.	Williams R., W. A. ( <i>J. Gilbert</i> ).	Gould Coll. (Type of species.)
i. Ad. sk., ♀.	West Australia.	Purchased.
j. { Ad. al. } ♀.	No history.	

6. ANTECHINOMYS.

Type:

Antechinomys, *Kreff*, *P. Z. S.* 1866, p. 434 ..... A. laniger:

Size small, general build slender, jerboa-like. Ears very large. Metatragus large and thin, projecting backwards distally. Tail very long, tufted. Limbs unusually elongated, the forearm, lower leg, and hind foot being all disproportionally long; toes short, subequal; hallux entirely absent; palms and soles without distinct pads, the latter hairy for the greater part of their length.

*Skull* much as in *Sminthopsis*, but broader in proportion to its length, and, in correlation to the increase in size of the ear, the bullæ are very much larger and more swollen, and their mastoid portion is also inflated.

Skull Dimensions of *Sminthopsis* and *Antechinus*.

Species	Sex Specimen Age	<i>Sminthopsis</i>	<i>S. leucopus.</i>	<i>S. murina.</i>	<i>S. crassicaudata.</i>		<i>Antechinus</i> <i>lamiger.</i>
		<i>virginica.</i>	♂. c. adult.	♂. c. adult.	♀. f. adult.	♀. c. adult.	
Basal length		29.5	26	25	23.5	21.8	(c.) 24.8
Greatest breadth		19	16	15.3	14.5	13.3	14.5
Nasals, length		11	11	9.8	9	8	9
" greatest breadth		3.1	2.8	2.6	2.1	1.9	2.6
" least breadth		2.3	2.2	1.8	1.3	1.2	1.5
Intertemporal breadth		6.1	5.8	5.4	5	4.3	5.8
Palate, length		16	14.8	13.9	13.3	12	13
" breadth between outer corners of m. <sup>3</sup>		10.5	9.1	8.1	8.5	8	8.3
Palatal foramen		3.1	3.5	2.9	3	3.2	4
Basio-orbital axis		10.6	8.8	8.8	8	8	(c.) 8.9
Basio-facial axis		19	17.3	16.4	15.6	13.9	16
Facial index		179	196	186	195	174	179
Teeth—vertical height of upper canine		3.5	1.5	2.4	2	1.3	1
" horizontal length of p. <sup>4</sup>		1.5	1.4	1.3	1.3	1.1	1.4
" length of ms. <sup>1-3</sup>		5.3	4.6	4.7	4.9	4.6	4.4
" breadth of m. <sup>4</sup>		2.3	2	1.9	1.8	1.6	2

\* In Christiania Museum.

*Dentition*:—I.  $\frac{1.2.3.4}{1.2.3}$ , C.  $\frac{1}{1}$ , P.  $\frac{1.0.8.4}{1.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 46$ .

The teeth with the essential characters of those of *Sminthopsis*. Upper incisors small and delicate, cylindrical, not flattened;  $i^1$  separated from the rest, but not markedly raked forwards. Canines very small and short, scarcely projecting beyond the general level of the tooth-series. Premolars evenly, but slightly, increasing in size backwards. Lower incisors subequal. Canine very short, about the same length as  $p^3$ ;  $p^1$  and  $p^4$  about equal, slightly shorter than  $p^3$ .  $M^1$  with a distinct antero-internal secondary cusp.

Milk-dentition not known, but no doubt as in *Sminthopsis*.

*Habits*. Terrestrial; saltatory; insectivorous.

*Range*. That of the only species.

This genus evidently bears the same relationship to *Sminthopsis* that the Rodent *Hapalotis*, also Australian, does to *Mus*, being specialized in precisely the same manner for a saltatory method of progression, a method apparently peculiarly favourable in the sandy country inhabited both by *Hapalotis* and *Antechinomys*.

### 1. *Antechinomys laniger*.

- Phascogale lanigera*, Gould, *Mamm. Austr.* i. pl. xxxiii. (animal) (1856); *Gerrard, Cat. Bones Mamm. B. M.* p. 135 (1862); *Krefft, Cat. Mamm. Austr. Mus.* p. 29 (1864).  
*Antechinomys laniger*, *Krefft, P. Z. S.* 1866, p. 434; *id. Austr. Vert.* p. 16 (1871); *Alston, P. Z. S.* 1880, p. 454 *et seqq.* (anat.) pl. xlv. (animal).

#### JERBOA POUCHED MOUSE.

Size small, form very slender and graceful. Fur long, soft and fine, composed almost wholly of underfur. General colour pale grizzled grey. Head grey, the bases of the hairs dark slate, their tips pale fawn, the colour lighter on the cheeks, muzzle, and above and behind the eyes, and darker on the crown, from which a darker median patch passes backwards along the back of the neck; a large patch behind each ear pale fawn, contrasting markedly with the darker occiput. Ears very large, ovoid; laid forward they reach to halfway between the muzzle and the anterior canthus of the eye; covered nearly entirely with short, fine, fawn-coloured hairs. Back-hairs very long and fine, slaty grey except at their extreme tips, which are pale fawn; the few longer hairs black. Chin white, chest and belly grey at their bases, with broad white tips; change of colour on sides rather abrupt. Limbs coloured and like the body only as far as the elbows and the middle of the tibiae; the remainder, with the hands and feet, pure white. Palms naked, closely granulated all over, provided with a trefoil-shaped anterior and a smaller posterior prominence, but without distinct trans-

versely striated pads; soles (Pl. XXIII. fig. 9) closely hairy all along the much elongated metatarsus, the only naked part being a trefoil-shaped prominence at the base of the toes, which is covered with fine granulations, but is without separate pads; centre line of sole rather darker in colour than rest of foot. Tail much longer than head and body, thin, uniformly short-haired and fawn-coloured, with the exception of the terminal inch, where there is a prominent pencil of black hairs, each from 7 to 9 millim. in length. Mammæ unknown; those of specimen *a* unfortunately not distinguishable.

*Skull* (Pl. XXV. figs. 11 & 12) broad, but slightly built, the bones thin and delicate. Nasals not expanded behind. Inter-orbital space flat and smooth, its edges square but not beaded, diverging backwards. Anterior palatal foramina reaching to the centre of p.<sup>1</sup> Posterior palate with two pairs of vacuities, as in *Sminthopsis*. Bullæ very large and swollen, the mastoid portion also swollen.

*Teeth* as described above.

*Dimensions.*

	♀. <i>a</i> (in spirit). Adult. millim.
Head and body . . . . .	84
Tail . . . . .	121
Hind foot . . . . .	28
Head . . . . .	29
Muzzle to eye . . . . .	14
Forearm and hand . . . . .	31
Lower leg . . . . .	31
Heel to front of large sole-pad. .	23
Ear . . . . .	17·5

Skull, see p. 308.

*Hab.* S. Queensland and New South Wales.

*Type* in collection.

An excellent account of the anatomy, habits, and relationships of this rare species has been published by the late Mr. E. R. Alston (*l. c.*).

<i>a.</i> Ad. ad., ♀.	Queensland.	Purchased.
<i>b.</i> { Ad. sk. { ♂.	New South Wales.	Sir T. L. Mitchell [P. & C.].
		( <i>Type</i> of species.)
<i>c.</i> Ad. st.		Purchased.

## Subfamily II. MYRMECOBIINÆ.

Tongue long, cylindrical, extensile. Premaxillæ separate in front. Bony palate much produced backwards. Molars small and delicate, more than four, both above and below, the lower ones with the outer series of cusps aborted, and the inner alone well developed.

## 7. MYRMECOBIUS.

Myrmecobius, *Waterh. P. Z. S.* 1836, p. 69 . . . . . Type.  
M. fasciatus.

Form graceful, squirrel-like. Nose long, rhinarium naked, grooved below; lower lip produced forwards into a long pointed projection, which fits into the groove below the rhinarium. Palate with about fourteen transverse ridges. Tongue very long, slender, tapering, extensile, its surface quite smooth. Ears long and narrow; metatragus small, thick, triangular, rounded at its tip, not folded distally. Chest with a peculiar complex gland, opening on the surface by several large and distinct apertures\*. Back transversely banded with white. Toes 5—4, provided with long fossorial claws; hallux altogether wanting externally, although its metatarsus is present in the skeleton; palms and soles smooth, naked, the pads small and granulated. Tail long and bushy. Pouch entirely obsolete; mammæ 4.

*Skull* broad and unridged, the bones thin and delicate. Muzzle conical. Nasals much expanded behind. Interorbital space very broad and smooth, its edges forming prominent overhanging ledges, interrupted by a deep supraorbital notch. Postorbital processes long. Palate complete, without vacuities, produced very far backwards. Bullæ swollen. Lower jaw long and slender, its angle but little inflected.

*Dentition* :—I.  $\frac{1.2.3.4}{1.2.3.0\dagger}$ , C.  $\frac{1}{1}$ , P.  $\frac{1.0.3.4}{1.0.3.4}$ , M.  $\frac{1.2.3.4.5.0\dagger}{1.2.3.4.5.6\text{ or }0}$   
(usually  $\frac{5.0}{5.6}$ )  $\times 2 = 50$  to 52.

Teeth small, insectivorous, chiefly remarkable for their striking resemblance to those of the Mesozoic Polyprotodont Marsupials, such as *Phascolotherium* and others. *Upper* incisors thin and conical,  $i^1$  slightly smaller than the others. Canines but little longer than the premolars, scarcely projecting beyond them. Premolars very variable in size and shape; as a rule  $p^1$  is narrow and unicuspid,  $p^3$  is similar, but has in addition rudimentary secondary cusps on its anterior and posterior edges, while in  $p^4$  the central cusp is shortened and the secondary cusps are more developed, so

\* For an account of the minute structure of this remarkable gland, see *Beddard, P. Z. S.* 1887, p. 527.

† Normally, but two specimens in the collection possess, through atavism, a fourth incisor on one side, and thereby prove which of the original four lower incisors has been lost by the modern three-toothed forms.

‡ I can find no satisfactory evidence for the common statement that there are sometimes six upper molars, all the specimens that I know of having only five

that the tooth is distinctly tricuspid. Molars small and delicate, the middle ones of the series the largest;  $m.^1$  very small and narrow, its edge indistinctly serrate;  $m.^2$ ,  $m.^3$ , and  $m.^4$  triangular or oval, very variable in size and shape, generally with from three to five small pointed cusps;  $m.^5$  smaller than the others, generally similar to them in character, but sometimes minute and styliform.

Lower teeth very like the upper. Incisors slender,  $i.^1$  markedly the largest. Canine proportionally larger than in the upper jaw. Premolars almost precisely like the upper ones, but the anterior secondary cusp less developed. First molar very small, but variable in size, sometimes minute and unicuspid, generally bi- or tricuspid, but sometimes still larger and quadricuspid. Other molars each with three marked subequal internal cusps, but with the outer row of cusps suppressed and reduced to a mere roughened cingulum, which is carried on backwards behind the last internal main cusp, and forms a low extra posterior cusp or heel.

Milk-premolar as yet unknown, the determination of the premolars and molars depending upon form and upon the relative times of appearance of the different teeth.

*Habits.* Terrestrial and arboreal; insectivorous.

*Range.* That of the only species.

This exceedingly remarkable genus differs from all the rest of the family to such a degree that it is very doubtful if a special family ought not to be made for it. Its chief interest lies in its close resemblance and, presumably, relationship to the Mesozoic Polyprotodont Marsupials of the English Jurassic beds, the resemblance being so close as to suggest that *Myrmecobius*, like *Ceratodus*, is actually an unmodified survivor from Mesozoic times, and therefore from a time long before the *Didelphyidæ*, *Peramelidæ*, and *Dasyuridæ* were differentiated one from the other. As to its family distinction, however, it seems better for the present to retain all the simple-footed predaceous Marsupials in one large family, with which further discoveries will probably show that the *Amphitheriidæ* and their allies should be amalgamated, rather than to split up the living forms in such a way as to increase the difficulty of assigning their proper family positions to the fossil ones.

### 1. *Myrmecobius fasciatus*.

*Myrmecobius fasciatus*, *Waterh. P. Z. S.* 1836, pp. 69, 131; *id. Cat. Mamm. Mus. Zool. Soc.* p. 65 (1838); *Gerv. C. R.* vii. p. 672 (1838); *Owen, P. Z. S.* 1838, p. 121; *Waterh. Tr. Z. S.* ii. p. 149, pls. xxvii. (animal), xxviii. (skull &c.) (1841); *id. Jard. Nat. Libr., Mamm.* xi. p. 145, pl. xi. (animal) (1841); *Gray, Grey's Austr., App.* ii. p. 401 (1841); *Less. N. Tabl. R. A., Mamm.* p. 191 (1842); *Gray, List Mamm. B. M.* p. 100 (1843); *Wagn. Schr. Säug. Supp.* iii. p. 33 (1843), v. p. 209 (1855); *Schinz, Syn. Mamm.* i. p. 513 (1844); *Owen, Odontogr.* p. 377, *Atl.* pl. xcvi. fig. 4 (teeth) (1845); *Gould, Mamm. Austr.* i. pl. iv. (animal) (1845); *Waterh. N. H. Mamm.* i. p. 396, pl. xiv. fig. 1 (animal), and pl. xxi. fig. 1 (skull) (1846); *Gieb. Odontogr.* p. 40, pl. xvii. fig. 2 (teeth)

(1855); *Schleg. Dierk.* p. 137 (1857); *Gieb. Säug.* p. 725 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 137 (1862); *Kreff, P. Z. S.* 1868, p. 3; *id. Austr. Vert.* p. 16 (1871); *Schleg. Dierent.* p. 162 (1872); *Gieb. Bronn's Kl. u. Ordn.* vi. Abth. v. pl. xix. figs. 4 & 5 (skull) (1874); *Brehm, Thierl.* ii. p. 555, fig. (animal) (1880); *Flow. Encycl. Brit.* (9) xv. p. 381, fig. 27 (animal) (1883); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 739 (1884); *Beddard, P. Z. S.* 1887, p. 527, figs. 1-3 (anat. chest-gland); *Thos. Phil. Trans.* clxxviii. p. 448, pl. xxvii. fig. 9 (lower teeth) (1887); *Jent. Cat. Ost. Leyd. Mus.* p. 303 (1887).

*Myrmecobius diemenensis*, *Waterh. (apud Less. N. Tabl. R. A., Mamm.* p. 191, 1842; and *Gray, List Mamm. B. M.* p. 100, 1843).

#### MARSUPIAL ANTEATER.

Fur short, close, and hispid, almost spinous. Underfur thin and sparse, pale grey. General colour bright rufous darkening to black posteriorly, broadly banded with white. Muzzle, forehead, and crown dark grizzled rufous, a white stripe over each eye, succeeded below by a brown or black band passing from the side of the muzzle through the eye to the base of the ear. Below this the cheeks and lips are pale yellow, but there is generally an indistinct rufous band running backwards from the angle of the mouth. Ears long, narrow, and pointed, laid forwards they reach to just beyond the anterior canthus of the eye, uniformly clothed with short closely-set hairs, dull rufous behind, yellowish internally. Fore back rich rufous, coarsely freckled with white, the hairs black for their basal half and at their extreme tip, red or white on the intermediate part. Passing backwards the white-banded hairs become so arranged as to form prominent transverse stripes passing right across the back, the stripes of opposite sides, however, often not exactly meeting in the centre line, but overlapping and interdigitating. Ground-colour of rump gradually darkening to black. Chin almost hairless, flesh-colour. Throat, chest, and belly clear pale yellow \*, the hairs not darker at their bases; a darker central streak on the throat of old males, due to and surrounding the opening of the sternal gland; no darker colour in females or young males. Out-sides of limbs like back; inner sides, front, and back of legs, and whole of hands and feet uniform pale yellow. Claws long and strong, dark horn-colour. Pollex short, not reaching to the base of the index. Second and fourth fingers equal, but the middle one absolutely shorter than either, its first phalanx especially shortened, very broad and strong; fifth digit reaching to the middle of the first phalanx of the fourth. Palms naked, smooth, with five small, round, finely granulated pads, situated one just below the wrist, one each at the bases of the first and fifth digits, and two close together at the bases of the three middle fingers. Second hind toe reaching to the end of the second phalanx of the third, fifth to the middle of the first phalanx of the third. Soles (Pl. XXIII. fig. 10) hairy

\* This becomes white in specimens exposed to light.

along the sides and under the calcaneum, the rest smooth and naked, with only three granulated pads, one each at the base of the second and fifth toes, and one at the base of the combined third and fourth; there is also a thickening of the skin opposite the metatarsal of the hallux, but no definite pad is there found. Tail rather shorter than the head and body, evenly long-haired above and on the sides, shorter-haired below; above coarsely grizzled pale yellow and black, rich rufous below. Mammæ 4.

*Skull and dentition* as described above.

*Dimensions.*

	♂. c (in spirit). Adult. millim.	♀. *(in spirit). Adult. millim.
Head and body . . . . .	220	240
Tail . . . . .	175	(c.) 160
Hind foot . . . . .	50	48
Ear . . . . .	24	23

Skull, see next page.

*Hab.* Western and Southern Australia.

*Type* not in existence.

a. { Ad. sk. } ♂.	South Australia.	Sir G. Grey [P. & C.].
b. Ad. st., ♂.	King George's Sound, W. A.	Sir G. Grey [P. & C.].
c. Ad. al., ♂.	King George's Sound, W. A. ( <i>W. Master</i> ).	G. Krefft, Esq. [P.].
d. { Ad. sk. } { Skull.† }	Swan R., W. A.	Zool. Soc. (A. Gordon, Esq. [P. & C.]).
( <i>Type</i> of " <i>M. diemenensis</i> , Waterh.")		
e, f. { Ad. st. } { Skull of e. }	Swan R., W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
g, h. { Yg. st. & sk. } { Skull of h. }	Swan R., W. A.	Purchased.
i. { Imm. sk. } { Skull. }	Toodyay, W. A. ( <i>J. Gilbert</i> ).	Gould Coll.
j. Skeleton (mounted).	West Australia.	Purchased.
k. Ad. sk., ♀.		Haslar Hospital.
l. Skull.†		G. R. Waterhouse, Esq. [P.].
m. Skull.		Charles Falconer, Esq. [P.].

\* Belonging to the Biological Laboratory of the Royal School of Mines, and kindly lent me for examination. The measurements of this specimen are not quite so trustworthy as those of the male, owing to its being in somewhat bad condition.

† The skull figured, Tr. Z. S. ii. pl. xxviii.

‡ Figured in N. H. Mamm. i. pl. xxi.

Skull Measurements of *Myrmecobius*.

Species .....	<i>M. fasciatus</i> .
Specimen .....	j.
Age .....	adult.
Basal length .....	53
Greatest breadth .....	31·5
Nasals, length .....	21·5
" greatest breadth .....	12·7
" least breadth .....	4·2
Intertemporal breadth .....	20
Palate, length .....	38
" breadth outside m. <sup>4</sup> .....	12
Palatal foramen .....	3·1
Basi-cranial axis .....	17
Basi-facial axis .....	36
Teeth—height of canine .....	2·4
" length of m. <sup>3</sup> .....	2·1

## Family VI. DIDELPHYIDÆ.

Polyprotodont Marsupials adapted for an arboreal, predatory, omnivorous, or insectivorous life. *Metatragus* variable in size. Limbs subequal; fore and hind feet each with five toes, the latter not syndactylous, but with a very large and widely opposable nail-less hallux. Tail generally very long, naked, scaly, prehensile, sometimes short, and more or less hairy. Stomach simple. Cæcum small or moderate. Pouch generally absent, sometimes merely composed of two lateral folds of skin separate at each end; rarely complete.

*Dentition*:—I.  $\frac{1.2.3.4.5}{1.2.3.4}$ , C.  $\frac{1}{1}$ , P.  $\frac{1.0.3.4}{1.0.3.4}$ , M.  $\frac{1.2.3.4}{1.2.3.4} \times 2 = 50$ .

Teeth rooted, sharp, cutting, carnivorous. Upper incisors small and conical, the first larger than and separated from the others. Upper premolars generally increasing in size backwards, and with, as a rule, a marked diastema between p.<sup>1</sup> and p.<sup>3</sup> Lower premolars well developed, their relative sizes variable. Molars multicuspid; with only three cusps visible externally.

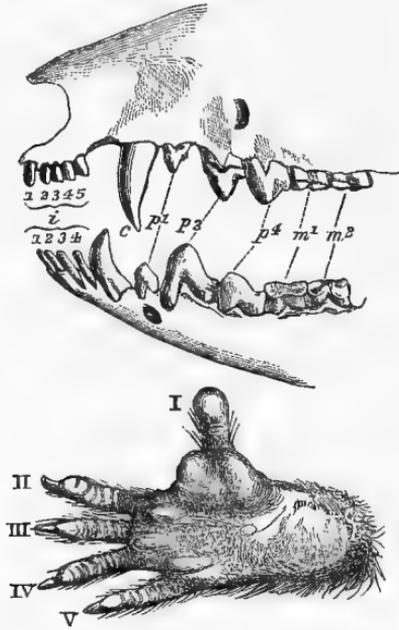
Tooth-change always present, the milk-premolar large and long-persistent.

*Range*. North and South America, from the United States to La Plata. Also found fossil in Europe:

This family is an exceedingly homogeneous one, its members presenting a very small range of differentiation. It is, on the whole, very closely allied to the *Dasyuridæ*, from which, were it not for its isolated geographical position, it would be very doubtfully separable.

The Opossums take the place in the Neotropical region of the Insectivora of other parts of the world, the great majority being arboreal, and to this extent corresponding to *Tupaia*, while a few

Fig. 6.



*Didelphys marsupialis*.—Jaw and hind foot, showing combination of polyprotodont dentition with a non-syndactylous foot.

(subgenus *Peramys*) are more or less terrestrial, and strongly resemble the Shrews both in appearance and habits. One single species, *Chironectes minimus*, is aquatic.

*Synopsis of Genera*.\*

- A. Hind toes quite free . . . . . 1. DIDELPHYS, p. 316.
- B. Hind toes webbed to their extremities . . . . . 2. CHIRONECTES, p. 366.

1. DIDELPHYS.

Type.

*Didelphys* †, *Linn. Syst. Nat.* (10) i. p. 54 (1760) . . . . D. marsupialis.

\* It is impossible to find any single cranial character by which *Chironectes* may be distinguished from all the species of *Didelphys*, but in order to assist in its recognition a reference is made to its skull in the cranial synopsis of the species of that genus.

† For the full recent synonymy of the genus see *infra* under the different subgeneric headings, and for the fossil synonyms see Lydekker, *Cat. Foss. Mamm. B. M.* v. p. 278 (1887).

Size varying from that of a large cat to that of a mouse. Ears generally large and well developed, with several supplementary folds of skin around and in front of their bases; their inner margins frequently produced forwards into a prominent pointed projection (see Pl. XXVI. fig. 1). Hind feet short, modified for grasping; with a widely opposable clawless hallux, and broad rounded pads. Tail in most of the species longer than the head and body, practically naked, except at its base, and distinctly prehensile; in one species hairy throughout, and in several (subgenus *Peramys*) shorter than the head and body, and doubtfully prehensile. Pouch only present in the larger species, generally rudimentary or absent. Mammæ uneven in number, varying from about 7 to 25, arranged not in two parallel rows, as in the *Dasyuridæ*, but in two series—an inner and an outer, the outer consisting of a variable number of symmetrical pairs, the inner generally of one single mamma placed in the middle line posteriorly, but sometimes of three or five, the odd one in each case placed mesially (see Pl. XXVIII. figs. 3 and 6).

*Skull* stout and strongly built, with, at least in the larger species, well-developed ridges and crests. Nasals long, almost always widely and abruptly expanded behind. Anterior palatine foramina short. Palate generally slightly imperfect behind. Bullæ rudimentary, often almost obsolete.

*Dentition* as described above.

*Range.* That of the family.

The systematic arrangement of the Opossums has formed the subject of an unusually large number of memoirs, of which the best have been written by Temminck, Waterhouse, and Burmeister. These and all other authors appear, however, to have erred in the admission of by far too great a number of species, formed on the most trivial characters of colour and size, and therefore a large reduction has been found to be necessary in the present work. With the exception of the Short-tailed Opossums (subgenus *Peramys*), the series available for examination in the European Museums seems to be fairly complete, but in the case of these more specimens are urgently needed before the species can be at all satisfactorily worked out; and the present arrangement of that, the most difficult, group must be looked upon as merely tentative in its nature.

In this genus alone of the Marsupials I have found it necessary to use subgeneric names, since the groups are so natural in themselves, and at the same time pass so gradually into one another, that it is impossible either, on the one hand, to ignore them altogether, or, on the other, to give them each full generic rank.

Owing to the shortness of the hind feet in this genus it has been found inadvisable to use their length as a standard of size, and therefore, as in the *Phalangeridæ*, the length of the lower leg has been used as the chief guide to the general size.

## Synopsis of Subgenera and Species.

## I. EXTERNAL CHARACTERS.

- A. Tail very long; generally scaly, naked, and markedly prehensile.
- a. Size large (lower leg more than 90 millim.). Fur with long bristle-hairs intermixed with it. Fifth hind toe much shorter than the subequal second, third, and fourth. . . . . I. Subgenus DIDELPHYS, p. 322.
- a<sup>1</sup>. Anterior edge of ear with scarcely a trace of the basal projection . . . . 1. *D. marsupialis*, p. 323.
- b. Size medium or small (lower leg less than 80 millim.). Fur of one sort only, without longer piles intermixed.
- b<sup>1</sup>. Toes as in *a*. Anterior base of ear with a well-marked projection. Size medium. (Lower leg 50 to 75 millim.) . . . . . II. Subgenus METACHIRUS, p. 329.
- a<sup>2</sup>. Ears very large, naked. White spots present over eyes. Tail slender, naked, scaly.
- a<sup>3</sup>. Pouch present. Base of tail furry for two inches or more. 2. *D. opossum*, p. 329.
- b<sup>3</sup>. Pouch absent. Base of tail furry for barely one inch . . . . 3. *D. nudicaudata*, p. 332.
- b<sup>2</sup>. Ears quite small, hairy. Colour uniform, no eye-spots. Tail thick, nearly entirely hairy.
- c<sup>3</sup>. Pouch absent. Tail furry for half its length . . . . . 4. *D. crassicaudata*, p. 334.
- c<sup>1</sup>. Fifth hind toe nearly equalling third, and longer than second; fourth the longest.
- c<sup>2</sup>. Size medium, as in *Metachirus*. Fur woolly. Face with a brown central streak . . . . . III. Subgenus PHILANDER, p. 336.
- d<sup>3</sup>. Base of tail furry for about two or three inches, the fur ending at the same level all round. Body uniformly coloured. . . . 5. *D. philander*, p. 337.
- e<sup>3</sup>. Base of tail furry for about six inches above, but only for about three below. Body more or less variegated with white . . . . . 6. *D. lanigera*, p. 339.
- d<sup>2</sup>. Size small: lower leg less than 45 millim. Fur generally straight. Face without a dark central streak. . . . . IV. Subgenus MICOURÆUS, p. 340.
- f<sup>3</sup>. Tail slender, cylindrical, not incrassated. Foot-pads low and rounded, the sole between them generally smooth, rarely granulated.

- a*<sup>4</sup>. Anterior basal projection of ear long, prominent, triangular.
- a*<sup>5</sup>. Ear large, when laid forward easily covering eye.
- a*<sup>6</sup>. Size larger: lower leg about 40 millim. Colour grey. Base of tail more or less furry . . . . . 7. *D. cinerea*, p. 342.
- b*<sup>6</sup>. Size smaller: lower leg 32 to 38 millim. Colour rufous. Base of tail not furry . . . . . 8. *D. murina*, p. 343.
- b*<sup>5</sup>. Ear small, when laid forward reaching at most to centre of eye.
- c*<sup>6</sup>. Size very small: lower leg 24 millim. Colour bright rufous . . . . . 9. *D. lepida*, p. 347.
- b*<sup>4</sup>. Anterior basal projection of ear short, rounded, often obsolete.
- c*<sup>5</sup>. General colour rufous.
- d*<sup>6</sup>. Size very small: lower leg 20-25 millim. Tail very long . . . . . 10. *D. pusilla*, p. 348.
- d*<sup>5</sup>. General colour grey.
- e*<sup>6</sup>. Size larger. Tail longer than head and body. Belly pure white . . . 11. *D. grisea*, p. 349.
- f*<sup>6</sup>. Size smaller. Tail shorter than head and body. Belly greyish white . . 12. *D. velutina*, p. 351.
- g*<sup>3</sup>. Tail more or less incrasated in basal half. Foot-pads high and prominent, the sole between them markedly granulated.
- c*<sup>4</sup>. Ears very long, their anterior basal projection almost obsolete. Lower leg about 27 millim. . . . . 13. *D. elegans*, p. 351.
- B. Tail short, about half the length of the head and body; not or scarcely prehensile. Size small: lower leg less than 35 millim.
- c*. Fur short, straight, and crisp. Anterior basal projection of ear well developed . . . . . V. Subgenus PERAMYS, p. 353.
- d*<sup>1</sup>. Back not lined or spotted.
- e*<sup>2</sup>. Size large: lower leg exceeding 25 millim.
- h*<sup>3</sup>. Mammæ not known. Ears very short. Sides orange . . . . . 14. *D. dimidiata*, p. 355.
- i*<sup>3</sup>. Mammæ one in centre, four or five lateral pairs. Ears large. Sides red . . . . . 15. *D. brevicaudata*, p. 356.

- j*<sup>3</sup>. Mammæ three in centre, five lateral pairs. Ears large. Sides grey . . . . . 16. *D. domestica*, p. 358.
- k*<sup>3</sup>. Mammæ not known. Ears large. Head, rump, and tail red; fore-back and belly grey 17. *D. scalops*, p. 359.
- f*<sup>3</sup>. Size medium: lower leg 20-25 millim.
- l*<sup>3</sup>. Mammæ five in centre, and about ten lateral pairs. Ears small. Back grey; sides red . . . . . 18. *D. henseli*, p. 360.
- g*<sup>3</sup>. Size small: lower leg less than 20 millim.
- m*<sup>3</sup>. Mammæ not known. Ears medium. Sides rufous . . . . 19. *D. sorex*, p. 362.
- e*<sup>1</sup>. Back lineated or spotted.
- h*<sup>3</sup>. Back with dark longitudinal lines.
- n*<sup>3</sup>. Back with three lines.
- d*<sup>4</sup>. Size medium. Head and body more than 100 millim; lower leg about 23 millim. 20. *D. americana*, p. 363.
- e*<sup>4</sup>. Size small. Head and body less than 100 millim.; lower leg about 18 millim. . . . . 21. *D. iheringi*, p. 364.
- o*<sup>3</sup>. Back with a single central line. 22. *D. unistriata*, p. 365.
- i*<sup>3</sup>. Back spotted with white. Size small . . . . . 23. *D. alboguttata*, p. 366.

## II. CRANIAL CHARACTERS.

- A. Size and cranial characters variable.  
Lower *p*<sup>4</sup> generally shorter than *p*<sup>3</sup>.
- a*. Brain-case small and narrow, its most constricted point some way behind the postorbital processes. Temporal crest present, at least in old age.
- a*<sup>1</sup>. Size large, basal length more than 75 millim. Temporal crest very large, early developed . . . . . I. Subgenus DIDELPHYS, p. 322.
- a*<sup>2</sup>. . . . . I. *D. marsupialis*, p. 323.
- b*<sup>1</sup>. Size medium, basal length between 60 and 75 millim. Temporal crest smaller and later developed. II. Subgenus METACHIRUS, p. 329.
- b*<sup>2</sup>. Muzzle long, the distance from postorbital processes to nasal tip greater than that to occiput. Orbito-temporal fossæ short and broad, their length much less than the distance between the zygomata. *P*<sup>3</sup> much larger and heavier than *p*<sup>1</sup>, markedly separated from it\*.

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\* *P*<sup>3</sup> not disproportionately larger than, and nearly or quite touching *p*<sup>1</sup>. *Ms.*<sup>1-3</sup> 12 to 14 millim. . . . . *Chironectes minimus*, p. 368.

- a*<sup>3</sup>. Postorbital processes sharp, pointed, prominent. Palate imperfect, a second pair of vacuities opposite or behind *m*<sup>4</sup>.
- b*<sup>3</sup>. Postorbital processes small or absent. Palate comparatively perfect . . . . .
- c*<sup>2</sup>. Muzzle short, the distance from postorbital processes to nasal tip less than to occiput. Orbito-temporal fossæ very long, their length about equal to the distance between the zygomata.
- c*<sup>3</sup>. Top of muzzle very convex upwards. Crests and processes much developed . . . . .
- b*. Brain-case large, its most constricted part close behind, or even hidden beneath the postorbital processes. No temporal crests, the temporal ridges widely separate.
- c*<sup>1</sup>. Size medium, basal length more than 45 millim. *P*<sup>1</sup> minute. Canines very long. Broadest point of palate at front corner of *m*<sup>3</sup> . . . .
- d*<sup>2</sup>. Molars small and rounded. Lower jaw sharp-edged below . . . . .
- d*<sup>1</sup>. Size small, basal length less than 45 millim. *P*<sup>1</sup> not minute. Canines medium or small. Broadest point of palate at back corner of *m*<sup>3</sup> . . . .
- e*<sup>2</sup>. Nasals expanded behind.
- d*<sup>3</sup>. Supraorbital ledges well developed, even in immature animals. Upper *p*<sup>3</sup> and *p*<sup>4</sup> about equal.
- a*<sup>4</sup>. Upper *ms*<sup>1-3</sup> more than 7 millim. Basal length about 40 millim. . . . .
- b*<sup>4</sup>. Upper *ms*<sup>1-3</sup> about 6 or 6.5 millim. Basal length about 30 to 36 millim. . . . .
- c*<sup>4</sup>. Upper *ms*<sup>1-3</sup> about 5 millim. Basal length about 25 millim. . . . .
- e*<sup>3</sup>. No supraorbital ledges at any age.
- d*<sup>4</sup>. Upper *ms*<sup>1-3</sup> about 5 millim. Basal length about 24 millim. Palatal foramen reaching to the level of the back of the canines . . . . .
- e*<sup>4</sup>. Upper *ms*<sup>1-3</sup> about 6 millim. Basal length about 30 millim. Palatal foramen reaching to the level of the back of *p*<sup>1</sup> . . . . .
- f*<sup>4</sup>. (Cranial characters unknown.)
2. *D. opossum*, p. 329.
3. *D. nudicaudata*, p. 332.
4. *D. crassicaudata*, p. 334.
- [p. 336.
- III. Subgenus PHILANDER,
5. *D. philander*, p. 337.
6. *D. lanigera*, p. 339.
- IV. Subgenus MICOUREUS,
- [p. 340.
7. *D. cinerea*, p. 342.
8. *D. murina*, p. 343.
9. *D. lepida*, p. 347.
10. *D. pusilla*, p. 348.
11. *D. grisea*, p. 349.
12. *D. velutina*, p. 351.

- f*<sup>2</sup>. Nasals not expanded behind.
- f*<sup>3</sup>. Supraorbital edges square.  
Upper ms.<sup>1-3</sup> about 5 or 5·5 millim. .... 13. *D. elegans*, p. 351.
- B. Size small, basal length not exceeding about 40 millim. Lower p.<sup>4</sup> as large as or larger than p.<sup>3</sup>
- c*. Nasals much expanded behind. Supraorbital edges rounded. Temporal ridges touching, sometimes forming crests in old age ..... V. Subgenus PERAMYS, p. 353.
- e*<sup>1</sup>. Interorbital region narrow, parallel-sided; postorbital processes and temporal crests formed in adult life.
- g*<sup>2</sup>. Size large, basal length exceeding 32 millim.
- g*<sup>3</sup>. Teeth small. Upper ms.<sup>1-3</sup> about 5·2 millim. .... 14. *D. dimidiata*, p. 355.
- f*<sup>1</sup>. Interorbital region smoothly rounded, generally broad; no postorbital processes at all, and temporal crests only formed in extreme old age.
- h*<sup>2</sup>. Size large, basal length more than 31 millim.
- h*<sup>3</sup>. Skull broad and strong; teeth large. Upper ms.<sup>1-3</sup> more than 5·5 millim.
- g*<sup>4</sup>. Upper ms.<sup>1-3</sup> 5·8 to 6·5 millim. 15. *D. brevicaudata*, p. 356.
- h*<sup>4</sup>. Upper ms.<sup>1-3</sup> 6·2 to 7·7 millim. 16. *D. domestica*, p. 358.
- i*<sup>3</sup>. Skull narrower; teeth small, upper ms.<sup>1-3</sup> about 4·6 millim. 17. *D. scalops*, p. 359.
- i*<sup>2</sup>. Size medium, basal length 25-31 millim. Ms.<sup>1-3</sup> about 5 millim.
- j*<sup>3</sup>. Interorbital breadth less than 6 millim. .... 18. *D. henseli*, p. 360.
- k*<sup>3</sup>. Interorbital breath 6 millim. or more ..... 20. *D. americana*, p. 363.
- j*<sup>2</sup>. Size very small, basal length less than 25 millim.
- i*<sup>3</sup>. Muzzle flattened, broad. Zygomatic breadth more than 12 millim. .... 21. *D. iheringi*, p. 364.
- m*<sup>3</sup>. Muzzle rounded, narrow. Zygomatic breadth less than 12 millim. .... 19. *D. sorex*, p. 362.
- g*<sup>1</sup>. (Cranial characters unknown) .... } 22. *D. unistriata*, p. 365.  
23. *D. alboguttata*, p. 366.

### I. Subgenus DIDELPHYS.

Size large. Fifth hind toe markedly shorter than the second, third, and fourth, which are subequal. Pouch present, well developed. Fur of two sorts, the ordinary short fur mixed with long coarse bristles.

*Skull* with a small narrow brain-case, its most constricted point

some distance behind the postorbital processes. Temporal crests large and very early developed.

Upper premolars evenly increasing in size backwards. Lower p.<sup>3</sup> larger than p.<sup>4</sup> Upper molars increasing in size backwards to the third, lower ones to the fourth.

### 1. *Didelphys marsupialis* \*.

#### a. *Didelphys marsupialis*, var. *typica*.

*Philander maximus orientalis*, *Seba, Thesaurus*, i. p. 64, pl. xxxix. (animal) (1734).

*Didelphys marsupialis*, *Linn. Syst. Nat.* (10) i. p. 54 (1760); *Müll. Linn. Naturs.* i. p. 288 (1773); *Erl. Syst. R. A.* p. 73 (1777); *Schreb. Säug.* iii. p. 536, pl. cxlv. (animal) (1778); *Blumenb. Handb. Naturg.* p. 87 (1779); *Zimm. Geogr. Gesch.* ii. p. 221 (1780); *Bodd. Elench. Anim.* i. p. 76 (1785); *Gmel. Linn. S. N.* i. p. 105 (1789); *Kerr, Linn. An. K.* p. 191 (1792); *Donnd. Zool. Beytr.* i. p. 341 (1792); *G. Cuv. Tabl. Elém.* p. 124 (1798); *Desm. N. Dict. d'H. N.* (2) xxiv. *Tabl.* p. 19 (1804); *Turt. Linn. S. N.* i. p. 65 (1806); *Blumenb. Abbild. nat. Gegenst.* pl. liv. (animal) (1810); *Ill. Prodr. S. M.* p. 76 (1811); *G. Fisch. Zoogn.* ii. p. 576 (1813); *Ill. Abh. Ak. Berl.* 1811, p. 107 (1815); *G. Cuv. R. A.* i. p. 173 (1817); *Schinz, Cuv. Thierr.* i. p. 251 (1821); *Wied, Beitr. Nat. Bras.* ii. p. 387 (1826); *J. B. Fisch. Syn. Mamm.* p. 264 (1829); *Kaup, Thierr.* p. 237 (1835); *Less. N. Tabl. R. A., Mamm.* p. 186 (1842).

*Didelphis karkinophaga*, *Zimm. Geogr. Gesch.* ii. p. 226 (1780).

*Didelphis carcinophaga*, *Bodd. Elench. Anim.* i. p. 77 (1785); *G. Cuv. Tabl. Elém.* p. 124 (1798).

*Didelphys caucrivora*, *Gmel. Linn. S. N.* i. p. 108 (1789); *Kerr, Linn. An. K.* p. 195 (1792); *Donnd. Zool. Beytr.* i. p. 352 (1792); *Shaw, Gen. Zool.* i. pt. ii. p. 482 (1800); *Bechst. Uebers. Vierf. Thiere*, ii. p. 684 (1800); *E. Geoff. Cat. Mus.* p. 139 (1803); *Desm. N. Dict. d'H. N.* (1) vi. p. 458 (1803); *Turt. Linn. S. N.* i. p. 66 (1806); *Ill. Abh. Ak. Berl.* 1811, p. 107 (1815); *Desm. N. Dict. d'H. N.* (2) ix. p. 422 (1817); *id. Mamm.* i. p. 255 (1820); *Desmoul. Dict. Class. d'H. N.* v. p. 490 (1824); *F. Cuv. Dents Mamm.* p. 73, pl. xxiii. c (teeth) (1825); *Gray, Griff. Cuv. An. K.* v. p. 187 (1827); *Temm. Mon. Mamm.* i. p. 32, pl. v. (skull & skeleton) (1827); *Less. Man. Mamm.* p. 210 (1827); *Desm. Dict. Sci. Nat.* xlvii. p. 386 (1827); *Waterh. Cat. Mamm. Mus. Z. S.* p. 64 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 85 (1841); *Wagn. Schr. Säug. Supp.* iii. p. 41 (1843), v. p. 225 (1855); *Schinz, Syn. Mamm.* i. p. 499 (1844); *Waterh. N. H. Mamm.* i. p. 473 (1846); *Cabanis, Schomb. Brit. Guiana*, iii. p. 777 (1848); *G. Cuv. Anat. Comp.* ii. pls. 174-176 (myology) (1849); *Burm. Thierr. Bras.* i. p. 129 (1854); *Gerv. H. N. Mamm.* ii. p. 286 (1855); *Burm. Erl. Faun. Bras.* p. 66, pl. iv. (animal), pl. v. fig. 2 & pl. vi.

\* a. Face without, or with indistinctly defined, black and white markings .....

Var. *typica*.

b. Face with sharply defined black and white markings .....

Var. *azarae*, p. 328.

- fig. 2 (skull) (1856); *Gieb. Säug.* p. 707 (1859); *Tomes, P. Z. S.* 1860, p. 268; *Gerrard, Cat. Bones Mamm. B. M.* p. 138 (1862); *Hens. Abh. Ak. Berl.* 1872, p. 114, pl. i. fig. 2 (teeth); *Schleg. Dierent.* p. 160 (1872); *Gulliver, P. Z. S.* 1875, p. 491; *Alia, Bull. Soc. Philom.* (7) ii. p. 148 (anat.) (1879); *Brehm, Thierl.* ii. p. 561 (1880); *Natt. Pelz. Bras. Säug., Verh. z.-b. Wien,* xxxiii. Anh. p. 110 (1883); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 749 (1884); *Jent. Cat. Ost. Leyd. Mus.* p. 300 (1887).
- Didelphys virginiana*, *Kerr, Linn. An. K.* p. 193 (1792); *G. Cuv. Tabl. Elem.* p. 124 (1798); *Shaw, Gen. Zool.* i. pt. ii. p. 473, pl. cvii. (animal) (1800); *Bechst. Uebers. Vierf. Th.* ii. p. 684 (1800); *E. Geoff. Cat. Mus.* p. 140 (1803); *Desm. N. Dict. d'H. N.* (1) xx. p. 147 (1803); *G. Fisch. Zoogn.* ii. p. 577 (1813); *Desm. N. Dict. d'H. N.* (2) ix. p. 420 (1817); *G. Cuv. R. A.* i. p. 172 (1817); *Desm. Mamm.* i. p. 254 (1820); *Desmoul. Dict. Class. d'H. N.* v. p. 489 (1824); *F. Cuv. Dents Mamm.* p. 75 (1825); *Gray, Griff. Cuv. An. K.* v. p. 186 (1827); *Temm. Mon. Mamm.* i. p. 27 (1827); *Less. Man. Mamm.* p. 209 (1827); *Desm. Dict. Sci. Nat.* xlvii. p. 383 (1827); *J. B. Fisch. Syn. Mamm.* p. 263 (1829); *Burm. Lehrb. Naturg.* p. 548 (1830); *Waterh. Cat. Mamm. Mus. Z. S.* p. 64 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 79 (1841); *Gulliver, P. Z. S.* 1842, p. 49; *Less. N. Tabl. R. A.* 3, *Mamm.* p. 186 (1842); *De Kay, N. H. New York, Zool.* i. p. 3, pl. xv. fig. 2 (animal) (1842); *Gray, List Mamm. B. M.* p. 100 (1843); *Wagn. Schr. Säug. Supp.* iii. p. 37, pl. cxlv.\* (animal) (1843), v. p. 219 (1855); *Schinz, Syn. Mamm.* i. p. 497 (1844); *Waterh. N. H. Mamm.* i. p. 465 (1846); *Aud. & Bach. Quadr. N. A.* ii. p. 107, pl. lxvi. (animal) (1854); *Gerv. Casteln. Am. Sud. Mamm.* p. 100, pl. xx. fig. 7 (teeth) (1855); *id. H. N. Mamm.* ii. p. 286 (1855); *Gieb. Odontogr.* p. 41, pl. xvii. fig. 12 (teeth) (1855); *Burm. Erläut. Faun. Bras.* p. 60, pl. v. fig. 1 & pl. vi. fig. 3 (skull) (1856); *Baird, Mamm. N. A.* p. 232 (1859); *id. Zool. Mex. Bound. Surv.* p. 31 (1859); *Gieb. Säug.* p. 708 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 137 (1862); *Flower, Phil. Trans.* 1867, p. 635, pl. xxx. figs. 3-5 (milk & permanent dentitions); *Coues, P. Ac. Philad.* 1871, p. 15; *id. Mem. Bost. Soc. N. H.* ii. pp. 41-149, figs. 1-35 (1872) (osteology & myology); *Wyman, Mem. Bost. Soc. N. H.* ii. p. 151 (1872) (anat. brain); *Schleg. Dierent.* p. 160 (1872); *Gulliver, P. Z. S.* 1875, p. 491; *Brehm, Thierl.* ii. p. 558 (1880); *Alst. Biol. Cent.-Am., Mamm.* p. 196 (1881); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 747 (1884); *Selenka, Biol. Centralbl.* v. p. 294 (1885); *Jent. Cat. Ost. Leyd. Mus.* p. 300 (1887).
- Philander virginianus*, *Tiedem. Zool.* p. 427 (1808).
- Didelphys aurita*, *Wied. Beitr. Nat. Bras.* ii. p. 395 (1826); *Schinz, Syn. Mamm.* i. p. 500 (1844); *Burm. Thierte Bras.* i. p. 130 (1854); *id. Erläut. Faun. Bras.* p. 64, pl. iii. (animal), pl. v. fig. 3 & pl. vi. fig. 1 (skull) (1856); *Gieb. Säug.* p. 709 (1859); *Hens. Zool. Gart.* viii. p. 290 (1867); *Frantz. Arch. f. Nat.* xxxv. p. 315 (1869); *Alst. Biol. Cent.-Am., Mamm.* p. 197 (1881); *Natt. Pelz. Bras. Säug., Verh. z.-b. Wien,* xxxiii. Anh. p. 109 (1883); *Jent. Cat. Ost. Leyd. Mus.* p. 301 (1887).
- Didelphys californica*, *Benn. P. Z. S.* 1833, p. 40; *Less. H. N. Mamm. (Compl. Buff.)* v. p. 364 (1836); *Waterh. Cat. Mamm. Mus. Z. S.* p. 64 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 87 (1841); *Wagn. Schr. Säug. Supp.* iii. p. 40 (1843), v. p. 223 (1855); *Schinz, Syn. Mamm.* i. p. 498 (1844); *Aud. & Bach. Quadr. N.*

*Am.* iii. p. 331 (1854); *Burm. Erläut. Faun. Bras.* p. 63 (1856); *Baird, Mamm. N. A.* p. 233 (1859); *id. Zool. Mex. Bound. Surv.* p. 32, pl. iii. (animal) (1859); *Gieb. Säug.* p. 709 (1859); *Tomes, P. Z. S.* 1861, p. 287; *Gerrard, Cat. Bones Mamm. B. M.* p. 138 (1862).

*Didelphys breviceps*, *Benn. P. Z. S.* 1833, p. 40; *Less. H. N. Mamm. (Compl. Buff.)* v. p. 364 (1836); *Waterh. Cat. Mamm. Mus. Z. S.* p. 64 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 88 (1841); *Wagn. Schr. Säug. Supp.* iii. p. 40 (1843), v. p. 224 (1855); *Schinz, Syn. Mamm.* i. p. 498 (1844); *Waterh. N. H. Mamm.* i. p. 478 (1846); *Aud. & Bach. Quadr. N. A.* iii. p. 330 (1854); *Gieb. Säug.* p. 709 (1859); *Jent. Cat. Ost. Leyd. Mus.* p. 301 (1887).

*Micoureus californicus* and *breviceps*, *Less. N. Tabl. R. A., Mamm.* p. 186 (1842).

*Didelphys pruinosa*, *Wagn. Schr. Säug. Supp.* iii. p. 40 (1843); *Schinz, Syn. Mamm.* i. p. 499 (1844).

*Didelphys pilosissima* and *illinensium* \*, *Link, apud Gray, List Mamm. B. M.* p. 100 (1843), and other authors.

*Philander marsupialis*, *Gray, List Mamm. B. M.* p. 101 (1843); *Gerrard, Cat. Bones Mamm. B. M.* p. 139 (1862).

#### COMMON OPOSSUM.

Size large, from three to five times the bulk of any other species. Fur long, coarse and thick, and consisting of two quite distinct kinds, namely, a short soft underfur, some 15 to 30 millim. in length, extending uniformly all over the body, and a much longer upper fur, composed of a large number of coarse elongated bristles, more or less confined to the upper surface, and most numerous along the centre of the back. General colour varying from white to black, through all the intermediate degrees of mixture of the two, the individual bristle-hairs either white, black, or parti-coloured; the underfur invariably white at its base, but its tip either also white or shining black, the latter colour often of such an extent as nearly or quite to hide the white. Colour of face also made up of different degrees of black and white; the northern forms ("*D. virginiana*") as a rule with a nearly wholly white face, only relieved by a darker mark running through the eye, and another longitudinal one on the crown; southern specimens ("*D. cancrivora*") altogether darker, often nearly black; the variety *azaræ* with the face marked with sharply contrasted black and white lines. Rhinarium broad, naked, with one central vertical groove, and a single pair of distinct lateral notches in the upper lip on each side of its lower border. Ears (Pl. XXVI. fig. 1) large and leafy, broadly oval in outline, laid forward (in spirit specimens) they reach to the middle or front of the eye; their inner edges with scarcely a trace of the basal projection so prominent in many of the smaller species; their outer edges with a small secondary fold; their colour very variable, either wholly black, wholly white, parti-coloured, white basally and black distally, or *vice versa*; generally black with white edges in "*D. virginiana*,"

\* Names obviously taken from Buffon's "Sarigues à longs poils et des Illinois," but to which I can find no original reference.

wholly black in "*D. cancrivora*," and white or parti-coloured in var. *azaræ*, but in all exceedingly variable. Sides of neck often yellowish or rufous, especially in old specimens, a coloration apparently due to some form of unctuous secretion in this region. Underside with but few longer hairs, its colour dirty white, but the tips of the hairs often more or less black. Pouch large and well developed. Mammæ from 5 to 13\*, one single central, and from two to six lateral ones. Arms and hands, legs and feet always darker than the body, brown or black. Foot-pads 6—5, the pads very large, rounded, little prominent, their surfaces coarsely striated; the two hallucal pads touching one another. Second, third, and fourth toes subequal, fifth toe considerably shorter, barely reaching to the end of the second phalanx of the fourth. Tail very long, distinctly prehensile, its base covered, for from one to four inches, with hairs like that on the body, the hairy part most extended in the variety *azaræ*, least in "*D. virginiana*;" the remainder scaly, the scales large, averaging from 6 to 8 to the centimetre; practically naked, a few fine hairs only between the scales; proximal half black, distal half white or yellow.

*Skull* very large and powerful, with strong and early developed muscular ridges and crests; noticeable also for the enormous increase of size which may take place in it after fully adult age is reached (compare the measurements on p. 341). Nasals long, much expanded behind. Supraorbital edges rounded, not beaded, but with distinct conical postorbital processes, immediately above which the prominent temporal crest commences. Brain-case small and narrow, a considerable interval occurring between the post-orbital processes and the intertemporal constriction. Palate rather imperfect behind, with two large and several small vacuities opposite the molars; its posterior edge much thickened. Posterior nares contracted laterally, the opening nearly two thirds as high as broad.

*Teeth* large and strong, but all, and especially the premolars, very variable in their size. P.<sup>1</sup> about one third the size of p.<sup>3</sup>; p.<sup>4</sup> slightly larger than p.<sup>3</sup> M.<sup>4</sup> much broader than long, from two thirds to three fourths the size of m.<sup>3</sup> Lower p.<sup>1</sup> about one fifth the size of p.<sup>3</sup>, and almost or quite touching it; the latter decidedly larger, and projecting from 2 to 3 millim. higher than p.<sup>4</sup>

#### Dimensions.

	♂. x (in spirit). millim.	♀. e' (in spirit). millim.
Head and body . . . . .	470	460
Tail . . . . .	430	400
Lower leg . . . . .	105	104
Hind foot . . . . .	62	57
Ear . . . . .	41	40

Skull, see p. 341.

\* There are only five mammæ in the only adult female in spirit available to me, but Dr. Coues records thirteen in his paper on "*D. virginiana*."

*Hab.* America, from the United States to Chili and South Brazil.  
*Type* not in existence.

This widely spread species, owing to its remarkable variability in colour, has been made the basis of a very considerable number of nominal species, of which the most commonly recognized are the North-American "*D. virginiana*," the Brazilian "*D. cancrivora*," and the striped-faced variety *D. azaræ*. I find, however, such a considerable amount of variability in the specimens from every locality, and such an entire absence of constancy in any character or set of characters, that I am constrained to unite the whole of this group of Opossums into a single species, to which the Linnean name of "*D. marsupialis*" is of course applicable. The striped-faced form, *D. azaræ*, I leave, however, for the present as a recognizable geographical variety, although not worthy of specific separation.

a. Ad. st., ♀.	Florida.	E. Doubleday, Esq. [P.].
b. Imm. st.	N. America.	Purchased.
c. { Ad. sk. } ♂.	Texas.	Mr. Drummond [P.].
{ Skull. }		
d. Ad. sk., ♂.	Texas.	Purchased.
e. Yg. al., ♀.	San Diego, S. Texas.	W. Taylor, Esq. [C.].
f. Ad. sk.	California.	Zool. Soc.
		( <i>Type</i> of <i>D. breviceps</i> , Benn.)
g. Ad. skull.	California.	Zool. Soc.
		(From <i>type</i> of <i>D. californica</i> , Benn.)
h-j. { Ad. sks. } 3/82.	Presidio, Mazatlan.	A. Forrer [C.].
{ Skulls. }		
k. { Ad. sk. } 3/88.	Teapa, Tabasco, S.E.	Messrs. Salvin &
{ Skull. }	Mexico ( <i>H. H.</i>	Godman [P.].
	<i>Smith</i> ).	
l, m. Ad. & imm. sks., 5/85.	Cozumel I., Yucatan	Messrs. Salvin &
	( <i>F. Gaumer</i> ).	Godman [P.].
n. Ad. sk.	Vera Paz, Guatemala.	O. Salvin, Esq. [P. &
		C.].
o, p. Ad. sks.	Concordia, Medellin.	J. K. Salmon [C.].
q. Ad. sk., ♂.	Venezuela.	Purchased.
r. Imm. sk.	Trinidad.	Dr. H. Denny [P. &
		C.].
s, t. Yg. al., 8/86.	Annandale, I. of Grenada	G. R. M. Murray,
	( <i>Grenada Eclipse Ex-</i>	Esq. [P. & C.].
	<i>pedition</i> ).	
u, v. { Ad. sks. }	Better Hope, Demerara.	Rev. W. Y. Turner
{ Skull of u. }		[C.].
w. Yg. al.	Better Hope, Demerara.	Rev. W. Y. Turner
		[C.].
x. Ad. al., ♂.	Santarem.	Mr. Wickham [C.].
y, z. Yg. al., ♀.	Moyobamba, Peru.	Herr Roff [C.].
a'. { Ad. st. } ♂.	Brazil.	Purchased.
{ Skull. }		
b'. { Ad. st. }	Brazil.	Purchased.
{ Skull. }		
c'. Yg. sk.	Brazil.	Purchased.
d'. Ad. sk., ♂.	Rio de Janeiro.	Purchased.

e'. { Ad. al. ♀ } { & two young. }	Purchased.
f'. Ad. sk., ♂ (albino).	Purchased.
g'. Skeleton (mounted).	Zool. Soc.
h'. Skeleton.	Zool. Soc.

*b. Didelphys marsupialis*, var. *azaræ*.

Micouré premier, ou Micouré proprement dit, *Azara, Ess. Quadr. Parag. i. p. 244* (1801).

*Didelphys azaræ*\*, *Temm. Mon. Mamm. i. p. 30* (1827); *Desm. Dict. Sci. Nat. xlvii. p. 384* (1827); *Gray, Griff. Cuv. An. K. v. p. 186* (1827); *Less. Man. Mamm. p. 209* (1827); *Schinz, Nat. Abbild., Säug. p. 173, pl. lxvi. (animal)* (1827); *J. B. Fisch. Syn. Mamm. p. 264* (1829); *Rengg. Säug. Parag. p. 223* (1830); *Mart. P. Z. S. 1834, p. 101* (anat.); *Less. H. N. Mamm. (Compl. Buff.) v. p. 263* (1836); *Waterh. Cat. Mamm. Mus. Z. S. p. 64* (1838); *id. Zool. Vog. 'Beagle,' Mamm. p. 93* (1839); *id. Jard. Nat. Libr., Mamm. xi. p. 83, pl. i. (animal)* (1841); *Less. N. Tabl. R. A., Mamm. p. 186* (1842); *Gray, List Mamm. B. M. p. 100* (1843); *Wagn. Schr. Säug. Supp. iii. p. 38* (1843), v. p. 223 (1855); *Tsch. Faun. Peruana, Mamm. p. 143* (1844); *Schinz, Syn. Mamm. i. p. 498* (1844); *Waterh. N. H. Mamm. i. p. 470, pl. xviii. fig. 2* (animal) (1846); *Gieb. Odontogr. p. 41, pl. xvii. fig. 10* (teeth) (1855); *Gerv. Casteln. Am. Sud. Mamm. p. 100, pl. xx. fig. 8* (teeth) (1855); *Burm. Erläut. Faun. Bras. p. 61, pl. i. (animal)* (1856); *Gieb. Säug. p. 709* (1859); *Tomes, P. Z. S. 1860, p. 268*; *Burm. Reise La Plata ii. p. 412* (1861); *Gerrard, Cat. Bones Mamm. B. M. p. 138* (1862); *Hens. Zool. Gart. viii. p. 290* (1867); *id. Abh. Ak. Berl. 1872, p. 111, pl. i. fig. 1* (teeth); *Schleg. Dierent. p. 160* (1872); *Burm. Republ. Argent. iii. p. 189* (1879); *Flou. & Gars. Cat. Ost. Coll. Surg. ii. p. 749* (1884); *Jent. Cat. Ost. Leyd. Mus. p. 300* (1887); *Lyd. Cat. Foss. Mamm. B. M. v. p. 280* (1887).

*Didelphys albiventris*, *Lund, Blök Bras. Dyr., Dansk. Afh. viii. p. 236* (1841); *Schinz, Syn. Mamm. i. p. 500* (1844); *Burm. Thiere Bras. i. p. 132* (1854); *id. Erläut. Frun. Bras. p. 62, pl. ii. (animal), pl. v. figs. 4 & 5, & pl. vi. fig. 4* (skull) (1856); *Gieb. Säug. p. 710* (1859).

*Didelphys pœcilotis*, *Wagn. Arch. f. Nat. viii. p. 358* (1842); *id. Abh. Ak. Münch. v. p. 126* (1847); *id. Schr. Säug. Supp. v. p. 219* (1855); *Natt. Pelz. Bras. Säug., Verh. z.-b. Wien, xxxiii. Anh. p. 109* (1883).

*Didelphys pœcilonota*, *Schinz, Syn. Mamm. i. p. 504* (1844).

*Didelphys leucotis*, *Wagn. Abh. Ak. Münch. v. p. 127* (1847); *id. Schr. Säug. Supp. v. p. 223* (1855).

**AZARA'S OPOSSUM.**

Similar to *D. marsupialis* in all essential characters and equally

\* Although the specimens in the Leyden Museum marked *D. azaræ* by Temminck are unquestionably the ordinary dark-coloured *D. marsupialis*, his name was given to Azara's "Micouré premier," identified rightly by Burmeister as the present form, and I therefore retain the name under which the variety is figured in the latter author's beautiful work.

variable in its general coloration; but distinguishable by the prominence and sharp definition of the darker marks on the face, these forming strongly contrasted black stripes on a white ground, one running through each eye, and a median one passing from between the eyes backwards on to the crown and back of the neck. Specimens with these markings are generally smaller in size, and have, *as a rule*, white or parti-coloured ears, more hairy tails, and smaller teeth than the ordinary form, but no one of these characters is entirely constant.

*Dimensions.* Skull, see p. 341.

*Hab.* The countries bordering the Amazonian Region on the west and south: Colombia, Ecuador, Peru, Bolivia, Chili, Paraguay, and S. Brazil.

*Type* not in existence.

a. Imm. sk., ♂.	Santa Fé de Bogota, Colombia.	Purchased.
b. { Yg. st. { Skull. {	Bolivia.	Mr. T. Bridges [C.]
c. Yg. sk.	Bolivia.	Mr. T. Bridges [C.]
d. Ad. skull.	Bolivia.	Mr. T. Bridges [C.]
e, f. Imm. st., ♂ ♀.	Chili.	Purchased.
g, h. Imm. & yg. al., ♂.	Taquara, Rio Grande do Sul.	Dr. H. von Ihering [C.]
i-m. Skulls.	Taquara.	Dr. H. von Ihering [C.]
n. Skeleton.		

## II. Subgenus METACHIRUS.

Type.

*Metachirus*, *Burm. Thiere Bras.* i. p. 135 (1854) . . . . *D. nudicaudata*.

Size medium. Proportions of hind toes as in the subgenus *Didelphys*, *i. e.* with the three central toes subequal, all much longer than the fifth. Pouch either well developed or rudimentary. Fur short, straight, of one sort only, without longer bristles intermixed.

*Skull* with a very small narrow brain-case, its most constricted point some distance behind the postorbital processes. Temporal crests and ridges generally well developed. *Teeth* as in *Didelphys*.

### 2. *Didelphys opossum*.

- Philander opossum *seu* Carigueja, *Seba, Thesaur.* i. pp. 56 & 57, pl. xxxvi. figs. 1-3 (animal) (1734).  
*Didelphys opossum*, *Linn. Syst. Nat.* (10) i. p. 55 (1760); *Müll. Linn. Natur.* i. p. 292 (1773); *Schreb. Säug.* iii. p. 537, pls. cxlvi. A & B (animal) (1778); *Zimm. Geogr. Gesch.* ii. p. 222 (1780); *Bodd. Elench. Anim.* i. p. 77 (1785); *Gmel. Linn. Syst. Nat.* i. p. 105 (1785); *Kerr, Linn. An. K.* p. 192 (1792); *Donnd. Zool. Beytr.* i. p. 345 (1792); *G. Cuv. Tabl. Élém.* p. 124 (1798); *Lacép. Mém. Inst.* iii. p. 491 (1801); *E. Geoff. Cat. Mus.* p. 141

- (1803); *Desm. N. Dict. d'H. N.* (1) xx. p. 146 (1803); *Blumenb. Man. d'H. N.* (Trad. Artaud.) i. p. 108 (1803); *Turt. Linn. S. N.* i. p. 65 (1806); *Fisch. Zoogn.* ii. p. 577 (1813); *Ill. Abh. Ak. Berl.* 1811, p. 107 (1815); *G. Cuv. R. A.* i. p. 173 (1817); *Desm. N. Dict. d'H. N.* (2) ix. p. 423 (1817); *id. Mamm.* i. p. 256 (1820); *Schinz, Cuv. Thierr.* i. p. 251 (1821); *Desmoul. Dict. Class. d'H. N.* v. p. 491 (1824); *Gray, Griff. Cuv. An. K.* v. p. 187 (1827); *Temm. Mon. Mamm.* i. p. 41 (1827); *Desm. Dict. Sci. Nat.* xlvii. p. 388 (1827); *Less. Man. Mamm.* p. 210 (1827); *J. B. Fisch. Syn. Mamm.* p. 265 (1829); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 92 (1841); *Less. N. Tabl. R. A., Mamm.* p. 186 (1842); *Wagn. Schr. Säug. Supp.* iii. p. 44 (1843), v. p. 226 (1855); *Tsch. Faun. Peruana*, p. 144 (1844); *Schinz, Syn. Mamm.* i. p. 501 (1844); *Waterh. N. H. Mamm.* i. p. 485 (1846); *Gerv. Casteln. Am. Sud, Mamm.* p. 100, pl. xx. fig. 6 (teeth) (1855); *Gieb. Säug.* p. 711 (1859); *Schleg. Dierent.* p. 160 (1872); *Jent. Cat. Ost. Leyd. Mus.* p. 301 (1887).
- Didelphis marsupialis*, *Shaw, Gen. Zool.* i. pt. ii. p. 476, pl. cviii. (animal) (1800) (*nec Linn.*).
- Didelphys quica*, *Temm. Mon. Mamm.* i. p. 36 (1827); *Desm. Dict. Sci. Nat.* xlvii. p. 387 (1827); *Gray, Griff. Cuv. An. K.* v. p. 187 (1827); *Less. Man. Mamm.* p. 210 (1827); *J. B. Fisch. Syn. Mamm.* p. 265 (1829); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 364 (1836); *Waterh. Cat. Mamm. Mus. Z. S.* p. 64 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 90 (1841); *Less. N. Tabl. R. A., Mamm.* p. 186 (1842); *Wagn. Schr. Säug. Supp.* iii. p. 42 (1843), v. p. 225 (1855); *Schinz, Syn. Mamm.* i. p. 500 (1844); *Waterh. N. H. Mamm.* i. p. 480 (1846); *Cabanis, Schomb. Reis. Brit. Guiana*, iii. p. 777 (1848); *Gieb. Säug.* p. 710 (1859); *Tomes, P. Z. S.* 1861, p. 287; *Gerrard, Cat. Bones Mamm. B. M.* p. 139 (1862); *Frantz. Arch. f. Nat.* xxxv. p. 317 (1869); *Alst. Biol. Cent.-Am., Mamm.* p. 198 (1881); *Poulton, P. Z. S.* 1883, p. 617 (anat. tongue); *Natt. Pelz. Bras. Säug., Verh. z.-b. Wien*, xxxiii. Anh. p. 110 (1883); *Jent. Cat. Ost. Leyd. Mus.* p. 301 (1887).
- Philander opossum*, *Gray, List Mamm. B. M.* p. 101 (1843).
- Didelphys (Metachirus) quica*, *Burm. Thiere Bras.* i. p. 136 (1854).
- Metachirus opossum and quica*, *Burm. Erläut. Faun. Bras.* pp. 69 & 70, pls. vii. & viii. (animal), pl. xi. figs. 1 & 2 (skull) (1856); *Hens. Abh. Ak. Berl.* 1872, p. 120.

### QUICA OPOSSUM.

Size medium. Fur short, straight, rather crisp. General colour above a clear glistening slaty grey, variable in its exact tone, darker on the head, lighter on the flanks. Muzzle long and slender. Face dark brown or black, a pair of very prominent white spots situated just above the eyes, often so large as to reduce the dark space between them to a mere narrow line. Lower part of rhinarium with a single pair of lateral notches cutting the upper lip. Ears large, leafy, rounded, their substance very thin, laid forward (in spirit-specimens) they reach to the anterior canthus of the eye; their colour white basally, black terminally (when dried apparently wholly black); a whitish spot often present behind them at their bases. Belly yellowish, greyish, or pure white, not very sharply

defined. Pouch well developed. Mammæ 3-1-3 = 7\*. Front of fore and outsides of hind limbs like back. Hands and feet brown or brown and white. Pads large and rounded as usual, the pollical and hallucal each more or less subdivided into two. Tail with its basal two or three inches furry, the change to the scaly part rather abrupt, its tip gradually lightening to white.

*Skull* stout and strong, flattened as compared with that of *D. crasicaudata*, with a long facial and a small and narrow cranial portion, the distance from between the postorbital processes to the tip of the nasals exceeding that from the same point to the occiput. Zygomata widely expanded, the combined orbito-temporal fossæ short and broad, the distance from the lacrymal foramen to the anterior edge of the glenoid fossa not equal to that from one zygoma to the other. Nasals long, abruptly expanding behind. Interorbital space but little rounded, an indistinct concavity along its centre. Supra-orbital edges square or rounded, not overhanging. Postorbital processes sharp and well defined, with marked ridges running inwards and backwards from them and uniting to form the long and prominent temporal crest. Anterior palatine foramina reaching rather past the middle of the canines. Palate long and narrow, with two pairs of vacuities, the anterior elongated, opposite  $m^2$  and  $m^3$ , the posterior small, behind level of  $m^4$ . Posterior nares small and narrow.

*Teeth*. Upper  $p^1$  about one third the size of  $p^3$ ; a small diastema between them.  $M^4$  triangular, its antero-posterior diameter about one half its breadth.

*Dimensions.*

	♀. <i>m</i> (in spirit). millim.
Head and body .....	275
Tail .....	270
Lower leg .....	71
Hind foot .....	38
Ear .....	28
Muzzle to eye .....	34
Skull, see p. 341.	

*Hab.* Neotropical Region, from Mexico to La Plata.

*Type* not in existence.

<i>a.</i> { Ad. sk. } ♂.	Vera Paz, Guatemala.	O. Salvin, Esq. [P. & C.].
{ Skull. } ♂.		
<i>b, c.</i> { Ad. sks. } ♂.	Coban, Guatemala.	Purchased.
{ Skull of <i>b.</i> } ♂.		
<i>d.</i> Ad. st., ♂.	Coban, Guatemala.	Purchased.

\* In four specimens. In this formula the middle figure represents the number of central mammæ, and the first and third those of the outer parallel series.

e. { Ad. sk. } ♂.	Better Hope, Deme- rara.	Rev. W. Y. Turner [C.].
f. Head in al.	Surinam.	Mr. Bartlett [C.].
g. { Ad. al. } ♀.	Guayaquil, Ecuador.	Sir E. Belcher [P. & C.].
h, i. { Ad. ♀ & yg. sks. } { Skull of. }	Santa Cruz de la Sierra, Bolivia.	T. Bridges, Esq. [C.].
j. Ad. skull.	Chico, Argentina.	Zool. Soc. (C. Friend, Esq. [P.]).
k. Ad. al., ♂.	Taguara, Rio Grande do Sul.	Dr. H. von Ihering [C.].
l. Ad. skull, ♂.	Taguara, Rio Grande do Sul.	Dr. H. von Ihering [C.].
m. Ad. al., ♀.	(Described by	Mr. Waterhouse, l. c.)
n. Ad. al., ♀.	No history.	
o-g. Imm. ♀ & yg. ♂, al.		Lidth de Jeude Coll.
r, s. Skulls.		Lidth de Jeude Coll.
t. { Ad. st. } ♂.		Purchased.
{ Skull. }		
u-w. Skeletons (mounted).		Purchased.

### 3. *Didelphys nudicaudata*.

- Didelphys nudicaudata*, *E. Geoff. Cat. Mus.* p. 142 (1803); *Desm. N. Dict. d'H. N.* (2) ix. p. 424 (1817); *id. Mamm.* i. p. 257 (1820); *Schinz, Cuv. Thierr.* i. p. 887 (1821); *Desmoul. Dict. Class. d'H. N.* v. p. 491 (1824); *Desm. Dict. Sci. Nat.* xlvii. p. 390 (1827); *Gray, Griff. Cuv. An. K.* v. p. 189 (1827); *Less. Man. Mamm.* p. 212 (1827); *J. B. Fisch. Syn. Mamm.* p. 265 (1829); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 364 (1836); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 94, pl. ii. (animal) (1841); *Less. N. Tabl. R. A., Mamm.* p. 186 (1842); *Waterh. N. H. Mamm.* i. p. 482 (1846); *Gieb. Säug.* p. 710 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 139 (1862); *Thos. P. Z. S.* 1882, p. 111; *Lyd. Cat. Foss. Mamm. B. M.* v. p. 281 (1887).
- Didelphys myosurus*, *Temm. Mon. Mamm.* i. p. 38 (1827\*) (descr. orig.); *Wied, Beitr. Nat. Bras.* ii. p. 400 (1826); *Less. Man. Mamm.* p. 210 (1827); *Wagn. Schr. Säug. Supp.* iii. p. 43 (1843), v. p. 225 (1855); *Tsch. Faun. Peruana, Mamm.* p. 145 (1844); *Schinz, Syn. Mamm.* i. p. 501 (1844); *Frantz. Arch. f. Nat.* xxxv. p. 317 (1869); *Natt. Pelz. Bras. Säug., Verh. z.-b. Wien*, xxxiii. Anh. p. 111 (1883).
- Didelphys frenata*, *Licht. apud Wagn. Schr. Säug. Supp.* iii. p. 44 (footnote) (1843).
- Philander nudicaudus*, *Gray, List Mamm. B. M.* p. 100 (1843).
- Didelphys* (*Metachirus*) *myosurus*, *Burm. Thiere Bras.* i. p. 135 (1854).
- Metachirus myosurus*, *Burm. Erläut. Faun. Bras.* p. 69, pl. x. (animal) (1856).

#### RAT-TAILED OPOSSUM.

Size barely equalling that of *D. opossum*, but form slenderer and extremities much longer in proportion. Fur very short, straight and

\* See above, p. 195 (footnote).

crisp. General colour greyish brown, more or less suffused, especially on the sides, with yellowish or rufous. Face brown or rufous brown, darker round the eyes; a prominent white or pale yellow spot above each eye, much smaller in area than in *D. opossum*. Rhinarium with one pair of lateral notches below. Ears (Pl. XXVI. fig. 2) very large, broad and rounded, naked, translucent, laid forward (in spirit-specimens) they reach beyond the anterior canthus of the eye; their anterior base with a well-marked projection, their inner margin unusually convex in its lower half; their colour uniform dark slaty grey. Metatragus small. Belly pale yellowish white, rather sharply defined from the dark upper colour, a more or less distinct yellow line running along the junction of the two colours. Pouch rudimentary or absent. Mammæ 4-1-4=9\*. Front of fore and outsides of hind limbs, inner side of lower leg, hands and feet pale brown. Feet narrower and more elongated than in *D. opossum*; pads (Pl. XXVI. fig. 3) very distinctly defined, the pollical and hallucal generally continuous, undivided. Fifth hind toe barely reaching to the middle of the second phalanx of the fourth. Tail unusually long in proportion; about one inch of its base alone furry, the remainder scaly, with a few short hairs between the scales; its colour brown, changing to white terminally.

*Skull* with very much the same general proportions as in *D. opossum*, but the interorbital region is broader, and the postorbital processes are reduced to mere faint excrescences on the supraorbital ridges, and even these do not appear until advanced age. The temporal crests are also much later developed than in the other allied species. Palate more perfect than in *D. opossum*, the posterior smaller pair of vacuities being, as a rule, absent, and the anterior pair smaller. Posterior nares comparatively broad.

*Teeth* as in *D. opossum*, except that they are, as a whole, lighter and more delicate; the upper premolars especially are markedly thinner transversely than in that species.

#### Dimensions.

	♀. a (in spirit). millim.
Head and body .....	240
Tail .....	300
Lower leg .....	67
Hind foot .....	43.5
Ear .....	25
Muzzle to eye.....	28

Skull, see p. 341.

*Hab.* Neotropical Region, from Costa Rica to Brazil.

*Type* in the Paris Museum.

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\* One adult female in spirit only examined.

<i>a, b.</i>	{ Ad. ♀ & yg. al. } 7/80.	Chirimoto, N. Peru ( <i>J. Stolzmann</i> ).	Warsaw Museum [P.].
<i>c.</i>	Ad. st.	Bahia.	Zool. Soc.
<i>d.</i>	Ad. sk., ♂.	Brazil.	Lord Stuart de Rothe- say [P.].
<i>e, f.</i>	{ Ad. sks. } { Skull of <i>e.</i> } ♀.	Brazil.	Purchased.
<i>g.</i>	{ Ad. st. } { Skull. } ♂.	Brazil.	Purchased.

#### 4. *Didelphys crassicaudata*.

- Micouré à queue grosse, *Azara, Quadr. Parag.* i. p. 284 (1801).  
*Didelphys crassicaudata*, *Desm. N. Dict. d'H. N.* (1) xxiv. *Tabl.* p. 19 (1804); *id. op. cit.* (2) ix. p. 425 (1817); *id. Mamm.* i. p. 257 (1820); *Schinz, Cuv. Thierr.* i. p. 887 (1821); *id. Dict. Sci. Nat.* xlvii. p. 394 (1827); *Gray, Griff. Cuv. An. K.* v. p. 189 (1827); *Less. Man. Mamm.* p. 213 (1827); *J. B. Fisch. Syn. Mamm.* p. 267 (1829); *Rengg. Säug. Parag.* p. 226 (1830); *Waterh. Cat. Mamm. Mus. Z. S.* p. 64 (1833); *id. Zool. Voy. Beagle, Mamm.* p. 94, pl. xxx. (animal) (1839); *id. Jard. Nat. Libr., Mamm.* xi. p. 100 (1841); *Wagn. Schr. Säug. Supp.* iii. p. 46 (1843); *Schinz, Syn. Mamm.* i. p. 506 (1844); *Waterh. N. H. Mamm.* i. p. 497 (1846); *Cabanis, Schomb. Reis. Brit. Guiana*, iii. p. 777 (1848); *Burm. Erläut. Faun. Bras.* p. 88 (1856); *Gieb. Säug.* p. 718 (1859); *id. Zeitschr. gesamm. Nat.* xxvii. p. 396 (1866); *Durnford, P. Z. S.* 1877, p. 32; *Lyd. Cat. Foss. Mamm. B. M.* v. p. 280 (1887).  
*Didelphis crassicaudis*, *Ill. Abh. Ak. Berl.* 1811, p. 107 (1815).  
*Didelphis macroura*, *Ill. Abh. Ak. Berl.* 1811, p. 107 (1815) (?); *Desmoul. Dict. Class. d'H. N.* v. p. 492 (1824).  
*Peramys crassicaudata*, *Less. N. Tabl. R. A., Mamm.* p. 187 (1842).  
*Didelphis mustelina*, *Geoff. apud Waterh. N. H. Mamm.* i. p. 497 (1846).  
*Micoureus crassicaudatus*, *Gerv. H. N. Mamm.* ii. p. 287 (1855).  
*Philander crassicaudatus*, *Gerrard, Cat. Bones Mamm. B. M.* p. 139 (1862).  
*Metachirus crassicaudatus*, *Hens. Abh. Ak. Berl.* 1872, p. 121; *Burm. Republ. Argent.* iii. p. 190 (1879).  
*Didelphys turneri*, *Günth. Ann. Mag. N. H.* (5) iv. p. 108 (1879).

#### THICK-TAILED OPOSSUM.

Size as in *D. opossum*; form long, low, and singularly weasel-like. General appearance very like that of *Putorius sibiricus*. Fur straight, thick and soft. General colour a rich soft yellow, greyer down the centre of the back, brighter on the sides and belly. Face like back, but some of the hairs pencilled with brown; no eye-spots or other prominent markings. Rhinarium as in *D. nudicaudata*, but its upper edge with a rounded projection backwards, sharply defined from the hairy part of the face. Ears (Pl. XXVI. fig. 4) very short and rounded, hardly projecting above the general level of the fur, laid forward they reach barely one half of the distance towards the eye; their inner edges with a long conical basal pro-

jection; their substance thick and fleshy, thickly covered, except at the edges, with dark yellow hairs; metatragus well developed, rounded. Whole of underside a rich golden or sulphur-yellow. Pouch entirely undeveloped; mammæ 4-1-4=9\*. Limbs very short, coloured like the body, hands and feet rather browner. Feet short, fifth hind toe only reaching to the middle of the first phalanx of the fourth; pads small and narrow. Tail very different from that of any other member of the genus, extremely thick at its base, the body appearing to taper quite gradually into the tail; its basal half thickly furred like the body, then short-haired, proximally brown or black, terminally white; some two inches only of the under surface of the tip naked, although sometimes all the terminal half is thinly haired enough to show the scales.

*Skull* very different from that of other Opossums in its general outlines, owing to its very long and narrow cranial and zygomatic region compared to its unusually short muzzle. Nasals short, evenly expanded behind. Forehead contracted, very convex upwards. Interorbital space narrow, smoothly rounded. Postorbital processes prominent, conical, the temporal ridges running inwards and backwards from them as in *D. opossum*. Space between the level of the processes and the most contracted point of the brain-case usually long and narrow. Zygomata long, high and strong, but not very widely expanded, the distance from the lacrymal canal to the anterior edge of the glenoid fossa equal to or exceeding the distance from one to the other. Palate imperfect, as in *D. opossum*; posterior nares very narrow, scarcely or not broader than high.

*Teeth* as usual. Upper m.<sup>4</sup> much elongated transversely, its antero-posterior diameter about one third of its width.

#### Dimensions.

	♂. a (in spirit). Adult. millim.	♀. g (skin). Adult. millim.
Head and body .....	260	395
Tail .....	212	270
Lower leg .....	50	(c.) 63
Hind foot .....	36	44
Ear .....	13	—
Muzzle to eye .....	22	(c.) 24
Skull, see p. 341.		

*Hab.* Guiana and South Brazil; not as yet recorded between these very distant localities.

*Type* not in existence.

The variation in size of this species is very remarkable, some specimens, fully adult, being only half the size of others of the same sex. This is well shown by the two sets of skull dimensions given

\* One specimen only.

in the table on p. 341. As a rule the southern specimens are markedly larger than those from Guiana, but specimen *d* from Maldonado has a skull exactly matching in every way that of specimen *a* from Demerara. The type of *D. turneri* differed from all the known species in having only four upper incisors on each side, but specimens since received from the same locality show this to have been an abnormality.

<i>a.</i>	{ Ad. al. } ♂.	Better Hope, Demerara.	Rev. W. Y. Turner
	{ Skull. }		[C.].
<i>b.</i>	{ Ad. sk. } ♀.	Better Hope, Demerara.	Rev. W. Y. Turner
	{ Skull. }		[C.].
		(Type of <i>D. turneri</i> , Günth.)	
<i>c.</i>	Ad. al., ♀.	San Lorenzo, Rio Grande do Sul.	Dr. H. von Ihering
		Maldonado ( <i>C. Darwin</i> ).	[C.].
<i>d.</i>	{ Ad. sk. } { Skull. }		Zool. Soc. (Voy. Beagle).
		(Figured in Zool. Voy. Beagle.)	
<i>e.</i>	Skeleton.	La Plata.	Bravard Coll.
<i>f.</i>	Ad. sk. ♂, 18/6/76.	Belgrano, Buenos Ayres.	H. Durnford, Esq.
			[C.].
<i>g.</i>	{ Ad. sk. } ♀, 5/3/77.	Belgrano.	H. Durnford, Esq.
	{ Skull. }		[C.].
<i>h.</i>	{ Yg. sk. } ♂, 25/2/77.	Belgrano.	H. Durnford, Esq.
	{ Skull. }		[C.].
<i>i.</i>	Yg. sk., ♂, 4/85.	Morino, Buenos Ayres ( <i>F. Withington</i> ).	P. L. Sclater, Esq.
			[P.].
<i>j.</i>	Ad. st., ♂.		Sir J. Richardson
			[P.].
<i>k.</i>	{ Ad. st. } { Skull. }		Purchased.
<i>l.</i>	Skeleton.		Zool. Soc.

### III. Subgenus PHILANDER.

Philander, *Tiedem. Zool.* p. 427 (1808) \* ..... D. philander. Type.

Size medium. Proportions of hind toes as follows:—4th the longest, 3rd and 5th next, about equal, 2nd the shortest, but only slightly so. Pouch rudimentary. Fur soft, thick and woolly.

*Skull* with a large broad brain-case, its most constricted point close behind, or even hidden beneath, the large triangular postorbital processes. Temporal ridges not uniting to form a median crest, even in old specimens. Palate complete. Ramus of lower jaw beneath the cheek-teeth peculiarly high, thin transversely, and sharp-edged below.

*Teeth.* Upper canines unusually long and little curved. P.<sup>1</sup> minute; p.<sup>3</sup> smaller than p.<sup>2</sup> Molars small, rounded, decreasing in size backwards, the posterior upper ones bowed inwards, so that the broadest point of the palate is at the anterior corner of m.<sup>3</sup>, instead of the posterior.

\* Originally used for all the Opossums, but restricted by Burmeister (*Erläut. Faun. Bras. p. 74, 1856*) to the species now included in this subgenus.

5. *Didelphys philander*.

- Tlaquatzin, *Seba, Thes.* i. p. 57, pl. xxxvi. (animal) (1734).  
*Didelphys philander*, *Linn. Syst. Nat.* (10), i. p. 54 (1760); *Müll. Linn. Naturs.* i. p. 291 (1773); *Erxl. Syst. R. A.* p. 78 (1777); *Schreb. Säug.* iii. p. 541, pl. cxlvii. (animal) (1778); *Zimm. Geogr. Gesch.* ii. p. 224 (1780); *Bodd. Elench. Anim.* i. p. 77 (1785); *Gmel. Linn. S. N.* i. p. 105 (1789); *Kerr, Linn. An. K.* p. 191 (1792); *Donnd. Zool. Beytr.* i. p. 344 (1792); *Shaw, Gen. Zool.* i. pt. ii. p. 483 (1800); *Turt. Linn. S. N.* i. p. 65 (1806); *Ill. Abh. Ak. Berl.* 1811, p. 107 (1815); *Temm. Mon. Mamm.* i. p. 43, pl. vi. (skull and skeleton) (1827); *Gray, Griff. Cuv. An. K.* v. p. 188 (1827); *Less. Man. Mamm.* p. 211 (1827); *J. B. Fisch. Syn. Mamm.* p. 265 (1829); *Waterh. Cat. Mamm. Mus. Z. S.* p. 64 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 102 (1841); *Less. N. Tabl. R. A., Mamm.* p. 186 (1842); *Wagn. Schr. Säug. Supp.* iii. p. 45 (1843), v. p. 226 (1855); *Schinz, Syn. Mamm.* i. p. 502 (1844); *Waterh. N. H. Mamm.* i. p. 487 (1846); *Wagn. Abh. Ak. Münch.* v. p. 130 (1847); *Cabanis, Schomb. Reis. Brit. Guiana,* iii. p. 777 (1848); *Gerv. Casteln. Am. Sud, Mamm.* p. 100, pl. xx. fig. 5 (teeth) (1855); *Gieb. Säug.* p. 711 (1859); *Natt. Pelz. Bras. Säug., Verh. z.-b. Wien,* xxxiii. Anh. p. 111 (1883); *Jent. Cat. Ost. Leyd. Mus.* p. 301 (1887).  
*Didelphys dichrura*, *Wagn. Arch. f. Nat.* viii. p. 358 (1842); *Schinz, Syn. Mamm.* i. p. 504 (1844); *Wagn. Abh. Ak. Münch.* v. p. 134 (1847); *id. Schr. Säug. Supp.* v. p. 230 (1855); *Burm. Erläut. Faun. Bras.* p. 76, pl. xiii. (animal) (1856); *Natt. Pelz. Bras. Säug., Verh. z.-b. Wien,* xxxiii. Anh. p. 112 (1883).  
*Didelphys affinis*, *Wagn. Arch. f. Nat.* viii. p. 358 (1842); *Schinz, Syn. Mamm.* i. p. 506 (1844); *Wagn. Abh. Ak. Münch.* v. p. 136 (1847); *id. Schr. Säug. Supp.* v. p. 237 (1855); *Burm. Erläut. Faun. Bras.* p. 88 (1856); *Gieb. Säug.* p. 712 (1859); *Natt. Pelz. Bras. Säug., Verh. z.-b. Wien,* xxxiii. Anh. p. 111 (1883).  
*Philander cayopollin*, *Burm. Erläut. Faun. Bras.* p. 76, pl. xiv. (animal), and pl. xi. fig. 5 (skull) (1856) (*nec Schreb.*).  
*Didelphys macrura* (*nec Ill.*) and *longicaudata*, *Natt. Pelz. Bras. Säug., Verh. z.-b. Wien,* xxxiii. Anh. p. 111 (1883).

## PHILANDER OPOSSUM.

Size rather smaller and form slenderer than in the preceding species. Fur thick, soft and woolly. General colour a dull yellowish or rufous grey. Face pale grey, a distinct narrow brown line running down its centre between the eyes; area round the eyes also brown. Rhinarium (Pl. XXVI. fig. 5) large, naked, slightly projecting backwards in the centre above; its lower edge with two distinct notches on each side of the central groove. Ears large and naked, laid forward (in spirit specimens) they reach to the middle of the eye; anterior basal projection well developed; metatragus small, inconspicuous. Underside either deep or pale yellow, with no line of demarcation from the colour of the back. Pouch incomplete, only developed laterally. Mammæ 3-1-3=7\*. Arms and legs dull grey; hands and feet short, nearly naked, brown; sole-pads (Pl. XXVI. fig. 6) very large, rounded, little prominent, a minute extra hind pad generally present halfway between the heel and the

\* Two specimens.

back of the long external pad. Tail longer than head and body, its furry part from two to three inches long, ending abruptly at the same level all round; remainder absolutely naked, without any minute hairs, very smooth, the scales scarcely perceptible; its colour dull grey proximally, white terminally, the two colours intergrading by a series of coarse and prominent grey and white mottlings.

*Skull* short and broad, with a short and conical muzzle and widely expanded zygomata. Nasals much expanded behind. Interorbital space broad, rather hollowed in the centre, its edges square; post-orbital processes forming large flat triangular projections over the orbits, the temporal ridges running backwards from their tips, but not meeting to form a median crest. Palate almost perfect, a single small pair of vacuities only present opposite  $m.^2$ . Posterior nares very wide and low. Lower jaw very high vertically, and very thin transversely, its lower margin quite sharp-edged, and its angle unusually slightly inflected.

*Teeth* (Pl. XXVII. fig. 1). Upper canines very long and straight, scarcely curved at all, their length vertically about equal to that of the three posterior molars taken together horizontally.  $P.^1$  close to the canine, minute, probably almost functionless, barely one tenth the size of  $p.^2$ .  $P.^3$  decidedly smaller than  $p.^2$ . Molars small and rounded, decreasing in size backwards, the last about one quarter the size of  $m.^3$ . Lower  $p.^1$  about one fifth the size of  $p.^2$ , the latter decidedly larger than  $p.^4$ . Molars as in the upper jaw, decreasing backwards;  $m.^4$  about two thirds the size of  $m.^3$ .

*Dimensions.*

	♂. <i>b</i> (in spirit). Adult. millim.	♀. <i>g</i> (in spirit). Adult. millim.
Head and body.....	245	290
Tail .....	320	360
Lower leg.....	56	58
Hind foot.....	36	35.5
Ear .....	23	29
Muzzle to eye .....	22.5	25
Skull, see p. 341.		

*Hab.* North-eastern South America (Guiana, Brazil).

*Type* not in existence.

<i>a.</i> Ad. al., ♀.	British Guiana.	Purchased.
<i>b.</i> Ad. al., ♂.	Surinam.	E. Bartlett [C.].
<i>c.</i> Ad. al., ♀.	Manaos, Brazil.	A. Peixoto [C.].
<i>d, e.</i> { Ad. sks. } ♂.	Brazil.	Purchased.
<i>f.</i> Ad. sk., ♀.	Brazil.	Zool. Soc.
<i>g-l.</i> Ad. ♀, imm. & yg. al.		Lidth de Jeude Coll.
<i>m.</i> Skeleton, ♀.		Lidth de Jeude Coll.
<i>n.</i> Ad. al., ♂.	(Described by Waterhouse.)	
<i>o.</i> Imm. st.		Lord Derby [P.].

6. *Didelphys lanigera*.

- Micouré laineux, *Azara, Quadr. Parag. i. p. 275 (1801)*.  
*Didelphys lanata, Ill. Abh. Ak. Berl. 1811, p. 107 (1815) (sine descr.)*.  
*Didelphys lanigera, Desm. Mamm. i. p. 258 (1820)*; *Schinz, Cuv. Thierr. i. p. 887 (1821)*; *id. Dict. Sci. Nat. xlvii. p. 399 (1827)*; *Gray, Griff. Cuv. An. K. v. p. 190 (1827)*; *Less. Man. Mamm. p. 213 (1827)*; *J. B. Fisch. Syn. Mamm. p. 269 (1829)*; *Reנגg. Säug. Parag. p. 225 (1830)*; *Less. H. N. Mamm. (Compl. Buff.) v. p. 366 (1836)*; *Waterh. Jard. Nat. Libr., Mamm. xi. p. 98 (1841)*; *Wagn. Schr. Säug. Supp. iii. p. 46 (1843), v. p. 233 (1855)*; *Schinz, Syn. Mamm. i. p. 507 (1844)*; *Waterh. N. H. Mamm. i. p. 495 (1846)*; *Wagn. Abh. Ak. Münch. v. p. 139 (1847)*; *Burm. Erläut. Faun. Bras. p. 88 (1856)*; *Gieb. Säug. p. 712 (1859)*; *Natt. Pelz. Bras. Säug., Verh. z.-b. Wien, xxxiii. Anh. p. 113 (1883)*; *Jent. Notes Leyd. Mus. ix. p. 225, pl. iii. (skull) (1887)*; *id. Cat. Ost. Leyd. Mus. p. 302 (1887)*.  
*Didelphys derbiana, Waterh. Jard. Nat. Libr., Mamm. xi. p. 97, pl. ii.\* (animal) (1841)*; *Schinz, Syn. Mamm. i. p. 503 (1844)*; *Waterh. N. H. Mamm. i. p. 493 (1846)*; *Gerv. Casteln. Am. Sud, p. 100, pl. xx. fig. 4 (skull & teeth) (1855)*; *Gieb. Säug. p. 711 (1859)*; *Thos. P. Z. S. 1880, p. 403*; *Alst. Biol. Cent.-Am., Mamm. p. 199, pl. xxii. (animal) (1881)*.  
*Micoureus laniger, Less. N. Tabl. R. A., Mamm. p. 186 (1842)*; *Gerv. H. N. Mamm. ii. p. 287 (1855)*.  
*Didelphys ochropus, Wagn. Arch. f. Nat. viii. p. 359 (1842)*; *Schinz, Syn. Mamm. i. p. 504 (1844)*; *Wagn. Abh. Ak. Münch. v. p. 141 (1847)*; *id. Schr. Säug. Supp. v. p. 236 (1855)*; *Burm. Erläut. Faun. Bras. p. 88 (1856)*; *Natt. Pelz. Bras. Säug., Verh. z.-b. Wien, xxxiii. Anh. p. 113 (1883)*.  
*Didelphys ornata, Tsch. Faun. Peruana, Mamm. p. 146, pl. vii. (animal) (1844)*; *Wagn. Schr. Säug. Supp. v. p. 231 (1855)*; *Burm. Erläut. Faun. Bras. p. 88 (1856)*; *Tomes, P. Z. S. 1860, p. 268*.

## WOOLLY OPOSSUM.

Size rather larger than in the last species. Fur thick, soft and very woolly, more so even than in *D. philander*. General colour varying from a beautiful rich dark rufous to a pale bright fawn, more or less variegated with white. Face greyish white, the central dark stripe generally well defined, in some of the pale-coloured specimens, however, hardly distinguishable. Area round eyes reddish. Centre of anterior back with a longitudinal white or greyish-white line, which sometimes extends the whole length of the back to the tail, but is on the other hand often entirely absent; sides of neck and back bright red. Underside greyish white, more or less tinged with rufous; the area round the scrotum or pouch generally purer white. Arms and legs grey or pale rufous. Characters of rhinarium, ears, hands and feet, pouch, number of mammæ, &c., apparently, so far as can be judged from skins, quite as in *D. philander*. Tail very long, its base furry on the upper side for from one third to one half its length, but below the fur ends at a point from one to three inches short of where it ends above, the edge of the fur therefore forming a long slant across the sides of the tail.

Naked part of tail grey proximally, yellow terminally, coarsely mottled with the two colours at their junction.

*Skull* and *teeth* apparently identical in every respect with those of *D. philander*.

*Dimensions.*

	♂. e (skin). Adult. millim.	♀. i (skin). Adult. millim.
Head and body . . . . .	310	270
Tail . . . . .	380	390
Hind foot . . . . .	(c.) 40	(c.) 38
Ear . . . . .	—	—
Muzzle to eye . . . . .	28	26

Skull, see next page.

*Hab.* Neotropical region, from South-eastern Mexico to Paraguay (Guiana, Colombia, Ecuador, Peru, Mato Grosso).

*Type* not in existence.

a. { Ad. sk. } { Skull. } 1 to 4/88.	Teapa, Tabasco, S.E. Mexico ( <i>H. H. Smith</i> ).	Messrs. Salvin & Godman [P.].
b. Yg. sk.	Chepo, Isthmus of Pan- ama ( <i>E. Arcé</i> ).	Salvin Coll.
c. { Ad. st. } { Skull. } ♂.	Colombia.	Purchased.
d. Ad. sk.	Medellin, Colombia.	J. K. Salmon, Esq. [C.].
e. Ad. sk., ♂.	Sarayacu, Ecuador.	Mr. C. Buckley, [C.].
f, g. { Ad. sks. } { Skull of f. } ♂ ♀.	Balzar Mountains, Ecu- ador.	Mr. Illingworth, [C.].
h. Ad. sk.	Ecuador.	Mr. L. Fraser [C.].
i. Ad. sk., ♀, 6/9/67.	Chamicuros, Peruvian Amazons.	Mr. E. Bartlett [C.].
j. Ad. st., ♀.		Purchased.

IV. Subgenus MICOUREUS.

*Micoureus*, *Less. N. Tabl. R. A., Mamm.* p. 186 (1842). . . . *D. cinerea*.  
*Asagis & Notagogus, Gloger, Handb. Naturg.* i. p. 82 (1842) *D. murina*.  
*Thylamys, Gray, List Mamm. B. M.* p. 101 (1843) . . . . *D. elegans*.  
*Grymæomys, Burm. Thiere Bras. i.* p. 135 (1854) . . . . . *D. murina*.

Size small. Form slender; tail long, generally much longer than the head and body. Proportions of hind toes as in *Philander*, but the fifth in some species not exceeding the second. Pouch absent. Fur straight, rarely slightly woolly.

*Skull* with a large broad brain-case. Supraorbital ledges present or absent. Palate generally more or less incomplete. Ramus of lower jaw simply rounded as usual.

*Teeth* large and strong, canines of ordinary length. P.<sup>1</sup> generally about one-quarter the size of p.<sup>3</sup>, never minute. Upper p.<sup>3</sup> and p.<sup>4</sup> generally about equal in size. Molars increasing in size backwards, as usual.

## Skull Measurements of Didelphys (subgenera Didelphys, Metachirus, and Philander) and Chironectes.

Species	<i>Didelphys marsupialis</i> .		<i>D. opossum</i> .	<i>D. nudicaudata</i> .		<i>D. crassicaudata</i> .		<i>D. philander</i> .		<i>D. lamigera</i> .	<i>Chironectes minimus</i> .
	var. <i>typicus</i> .	var. <i>azarae</i> .		♂. <i>a.</i> adult.	♀. <i>a.</i> adult.	♂. <i>a.</i> adult.	♀. <i>a.</i> adult.	♂. <i>d.</i> adult.	♀. <i>m.</i> adult.		
Sex.....	♂. <i>c.</i> aged.	♂. <i>h.</i> adult.	♀. <i>g.</i> adult.	♂. <i>g.</i> adult.	♀. <i>a.</i> adult.	♂. <i>a.</i> adult.	♀. <i>g.</i> adult.	♂. <i>d.</i> adult.	♀. <i>m.</i> adult.	♂. <i>f.</i> adult.	♂. <i>a.</i> adult.
Specimen .....	133	111	63.5	(c.) 61	54.7	56.5	72	55	48	55	67
Age .....	75	61	36	32	28	30	41.5	32.5	31	34.4	42.3
Basal length .....	65	50	31	30	28	20.5	25.5	24.8	21.5	23.2	34
Greatest breadth .....	21.5	18.5	8.9	10	8.5	6.9	9.1	7.5	6.8	8.3	9.5
Nasals, length .....	7.8	8	4.4	4.7	3.5	3.8	5.6	3.5	3.3	4	4.7
" greatest breadth .....	30	30	13.9	11	11	12	14.5	16.5	16	...	17
" least breadth .....	11.5	11.5	8.4	9.1	9.6	8	8.5	8	9.5	8.5	8
Postorbital processes, tip to tip .....	81	68	39.5	36	34	33	41	30	28	32	46
Intemporal constriction .....	32	31	21	21	17.5	18.9	21.5	17	16.5	17.5	24.5
Palate, length .....	20	19	12.3	13	10.5	10	13	12.2	11.5	12.8	13.1
" breadth outside m. <sup>3</sup> .....	13	10.8	7	6.3	5.7	5.6	6.2	5	4	5.5	4
" " inside m. <sup>3</sup> .....	41	34.5	21.2	21	17.5	22	28.5	20.5	17.7	20	20
Palatal foramen.....	92	77	42	41.5	38	34.8	44	34.6	30.6	35.3	47.4
Basal-cranial axis.....	223	223	198	(c.) 213	222	158	154	169	173	176	237
Basal-facial axis .....	7	5.2	4	3.5	3	3	3.6	2.5	2.3	2.7	4.2
Facial index .....	17.8	16.8	12.2	10.5	9.1	10.4	10.8	8.6	8	8.2	14
Teeth—horizontal length of p. <sup>4*</sup> .....											
" length of ms. <sup>1-3</sup> .....											

\* At level of cingulum.

7. *Didelphys cinerea*.

- Didelphys cinerea*, *Temm. Mon. Mamm. i. p. 46* ("1827" \*); *Wied, Beitr. Nat. Bras. ii. p. 406* (1826); *Desm. Dict. Sci. Nat. xlvii. p. 394* (1827); *Gray, Griff. Cuv. An. K. v. p. 188* (1827); *J. B. Fisch. Syn. Mamm. p. 267* (1829); *Less. H. N. Mamm. (Compl. Buff.) v. p. 365* (1836); *Waterh. Jard. Nat. Libr., Mamm. xi. p. 103* (1841); *Wagn. Schr. Säug. Supp. iii. p. 47* (1843), v. p. 239 (1855); *Schinz, Syn. Mamm. i. p. 507* (1844); *Waterh. N. H. Mamm. i. p. 501* (1846); *Gieb. Säug. p. 712* (1859); *Thos. P. Z. S. 1880, p. 403*; *Alst. Biol. Cent.-Am., Mamm. p. 199, pl. xxi.* (animal) 1881; *Thos. P. Z. S. 1882, p. 111*; *Nat. Pelz. Bras. Säug., Verh. z.-b. Wien, xxxiii. Anh. p. 114* (1883); *Lyd. Cat. Foss. Mamm. B. M. v. p. 281* (1887).
- Micoureus cinereus*, *Less. N. Tabl. R. A., Mamm. p. 186* (1842).
- Philander cinereus*, *Gray, List Mamm. B. M. p. 101* (1843); *Gerward, Cat. Bones Mamm. B. M. p. 139* (1862).
- Didelphys noctivaga*, *Tschudi, Faun. Peruana, Mamm. p. 148, pl. viii.* (animal) (1844); *Wagn. Schr. Säug. Supp. v. p. 239* (1855); *Gieb. Säug. p. 714* (1859).
- Didelphys (Metachirus) cinerea*, *Burm. Thiere Bras. i. p. 137* (1854).
- Grymæomys cinereus and scapulatus*, *Burm. Erläut. Faun. Bras. pp. 78 & 79, pl. xii.* (animal) (1856).
- Didelphys waterhousei*, *Tomes, P. Z. S. 1860, pp. 58, 217 & 307* (fig. skull), pl. lxxvi. (animal).

## ASHY OPOSSUM.

Size largest of the present group, although considerably smaller than in any of the foregoing species. Fur soft, close and slightly woolly. General colour clear grey, washed with yellowish on the sides; often slightly suffused with rufous. Rhinarium as in *D. philander*, its lower edge with two notches on each side. Face grey, a more or less prominent black band passing through and round the eye. Ears (Pl. XXVI. fig. 7) large and rounded, laid forward (in spirit-specimens) they reach to the anterior canthus of the eye; naked, flesh-coloured, their anterior margins with a long pointed basal projection; metatragus narrow, rounded. Chin, chest, and belly pale yellowish white, the bases of the hairs grey; the line of demarcation not sharply defined. Pouch absent; mammæ 4-1-4=9, or 5-1-5=11†. Arms and legs grey; feet nearly naked, whitish or pale brown. Pads (Pl. XXVI. fig. 8) large, rounded, finely striated, the sole between them smooth; six well-defined anterior, and five or six posterior, the hallucal doubtfully divided into two, their positions and sizes as in the figure. Tail furry at its base for from half an inch to two inches, then (not very abruptly) becoming naked and scaly, a few minute hairs only present between the scales; its colour slaty grey proximally, white or yellow terminally, the two colours passing gradually into one another without prominent mottlings.

*Skull* (Pl. XXVII. fig. 2) strongly built, the zygomata widely expanded, the nasals markedly expanded behind. Interorbital region

\* See note, p. 195.

† Two specimens only examined, each showing one of these numbers.

flat, its edges with strong triangular projecting ledges, their tips forming conical postorbital processes, from which the temporal ridges run backwards along the brain-case without meeting in the centre line. Palatine foramina small, only reaching backwards to about the level of the middle of the canines. Posterior palate comparatively perfect; a pair of small narrow vacuities opposite  $ms.^1$  &  $2.$

*Teeth.* Upper canines rather thick and short.  $P.^1$  from one sixth to one third the size of  $p.^3$ ; the latter and  $p.^4$  about equal. Molars as usual. Lower  $p.^1$  about one third and  $p.^4$  about three quarters the size of  $p.^3$

*Dimensions.*

	♂. i (in spirit). Adult. millim.
Head and body . . . . .	175
Tail . . . . .	248
Lower leg . . . . .	40
Hind foot . . . . .	24.5
Ear . . . . .	21
Muzzle to eye . . . . .	17
Skull, see p. 351.	

*Hab.* Neotropical region from Costa Rica to Brazil; apparently not found in North-eastern South America.

*Type* in the Vienna Museum.

a. { Ad. sk. } ♂.	Costa Rica.	J. Carmiol [C.].
{ Skull. }	(Figured by Alston, <i>l. c.</i> )	
b. Yg. sk.	Upper Amazons.	Purchased.
c. Skeleton, ♀ (mounted).	Peruvian Amazons.	Mr. E. Bartlett [C.].
d, e. { Ad. sks. } ♂ ♀.	Sarayacu, Ecuador.	Mr. C. Buckley [C.].
{ Skull of d. }		
f. { Ad. st. }	Santa Cruz de la Sierra,	Mr. T. Bridges [C.].
{ Skull. }	Bolivia.	
g. { Ad. st. }	Bolivia.	Mr. T. Bridges [C.].
{ Skull. }		
h. { Imm. sk. }	Bolivia.	Purchased.
{ Skull. }		
i. { Ad. al. }		(Described by Waterhouse.)
{ Skull. }	♂ (& 5 young).	
j. { Imm. sk. }		(Type of <i>D. waterhousei</i> , Tomes.)
{ Skull. }		

8. *Didelphys murina.*

*Mus sylvestris americanus*, *Seba, Thesaurus*, i. pp. 48 & 49, pl. xxxi. figs. 1-5 (animal) (1734), and ii. p. 90, pl. lxxxiv. fig. 4 (1735).  
*Didelphys murina*, *Linn. Syst. Nat.* (10) i. p. 55 (1760); *Müll. Linn. Naturs.* i. p. 293 (1773); *Erxl. Syst. R. A.* p. 80 (1777); *Schreb. Säug.* iii. p. 545, pl. cxlix. (animal) (1778); *Zimm. Geogr. Gesch.* ii. p. 225 (1780); *Bodd. Elench. Anim.* i. p. 77 (1785); *Gmel. Linn. S. N.* i. p. 107 (1789); *Kerr, Linn. An. K.* p. 194 (1792);

- Donnd. Zool. Beytr.* i. p. 349 (1792); *G. Cuv. Tabl. Elém.* p. 125 (1798); *Shaw, Gen. Zool.* i. pt. ii. p. 484 (1800); *Bechst. Syst. Uebers. vierf. Thiere*, ii. p. 684 (1800); *E. Geoff. Cat. Mus.* p. 143 (1803); *Desm. N. Dict. d'H. N.* (1) xx. p. 147 (1803); *Turt. Linn. S. N.* i. p. 66 (1806); *Ill. Prodr. Syst. Mamm.* p. 76 (1811); *G. Fisch. Zoogn.* ii. p. 578 (1813); *G. Cuv. R. A. i.* p. 174 (1817); *Desm. N. Dict. d'H. N.* (2) ix. p. 427 (1817); *id. Mamm.* i. p. 259 (1820); *Desmoul. Dict. Class. d'H. N.* v. p. 492 (1824); *Wied, Beitr. Nat. Bras.* ii. p. 411 (1826); *Temm. Mon. Mamm.* i. p. 50 (1827); *Gray, Griff. Cuv. An. K. v.* p. 188 (1827); *Desm. Dict. Sci. Nat.* xlvii. p. 396 (1827); *Less. Man. Mamm.* p. 212 (1827); *J. B. Fisch. Syn. Mamm.* p. 268 (1829); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 105 (1841); *Wagn. Schr. Säug. Supp.* iii. p. 49 (1843), v. p. 241 (1855); *Tschudi, Faun. Peruana, Mamm.* p. 146 (1844); *Schinz, Syn. Mamm.* i. p. 508 (1844); *Waterh. N. H. Mamm.* i. p. 508 (1846); *Wagn. Abh. Ak. Münch.* xv. p. 143 (1847); *Gieb. Säug.* p. 713 (1859); *Frantz. Arch. f. Nat.* xxxv. p. 318 (1869); *Schleg. Dierent.* p. 160 (1872); *Thos. P. Z. S.* 1880, p. 403; *Alst. Biol. Cent.-Am., Mamm.* p. 200 (1881); *Thos. Biol. Cent.-Am., Mamm.* (Supp.) p. 212 (1881); *id. P. Z. S.* 1882, pp. 111 & 372; *Lyd. Cat. Foss. Mamm. B. M.* p. 282 (1887); *Jent. Cat. Ost. Leyd. Mus.* p. 302 (1887).
- Didelphys dorsigera*, *Linn. Syst. Nat.* (10) i. p. 55 (1760); *Müll. Linn. Naturs.* i. p. 293 (1773); *Erxl. Syst. R. A.* p. 83 (1777); *Schreb. Säug.* iii. p. 546, pl. cl. (animal) (1778); *Blumenb. Handb. Naturg.* p. 87 (1779); *Zimm. Geogr. Gesch.* ii. p. 226 (1780); *Bodd. Elench. Anim.* i. p. 77 (1785); *Gmel. Linn. S. N.* i. p. 107 (1789); *Kerr, Linn. An. K.* p. 194 (1792); *Donnd. Zool. Beytr.* i. p. 351 (1792); *Shaw, Gen. Zool.* i. pt. ii. p. 485, pl. cviii. (animal) (1800); *Bechst. Syst. Uebers. vierf. Thiere*, ii. p. 685 (1800); *Turt. Linn. S. N.* i. p. 66 (1806); *Ill. Abh. Ak. Berl.* 1811, p. 107 (1815); *Temm. Mon. Mamm.* i. p. 48 (1827); *Gray, Griff. Cuv. An. K. v.* p. 189 (1827); *Desm. Dict. Sci. Nat.* xlvii. p. 395 (1827); *Less. Man. Mamm.* p. 211 (1827); *J. B. Fisch. Syn. Mamm.* p. 267 (1829); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 365 (1836); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 104 (1841); *Wagner, Schr. Säug. Supp.* iii. p. 48 (1843), v. p. 239 (1855); *Schinz, Syn. Mamm.* i. p. 508 (1844); *Waterh. N. H. Mamm.* i. p. 507, pl. xviii. fig. 1 (animal) (1846); *Cab. Schomb. Brit. Guiana*, iii. p. 777 (1848); *Gieb. Säug.* p. 713 (1859); *Schleg. Dierent.* p. 160 (1872); *Burm. Republ. Argent.* iii. p. 192 (1879); *Jent. Cat. Ost. Leyd. Mus.* p. 302 (1887).
- Didelphys cayopollin*, *Schreb. Säug.* iii. p. 544, pl. cxlviii. (animal) (1778); *Bodd. Elench. Anim.* i. p. 77 (1785); *Gmel. Linn. S. N.* i. p. 106 (1789); *Müll. Linn. Naturs. Supp.* vii. p. 35 (1789); *Donnd. Zool. Beytr.* i. p. 348 (1792); *Kerr, Linn. An. K.* p. 193 (1792); *G. Cuv. Tabl. Elém.* p. 125 (1798); *Bechst. Syst. Uebers. vierf. Thiere*, ii. p. 684 (1800); *Shaw, Gen. Zool.* i. pt. ii. p. 478 (1800); *E. Geoff. Cat. Mus.* p. 142 (1803); *Desm. N. Dict. d'H. N.* (1) iv. p. 444 (1803); *Turt. Linn. S. N.* i. p. 66 (1806); *G. Fisch. Zoogn.* ii. p. 578 (1813); *Ill. Abh. Ak. Berl.* 1811, p. 187 (1815); *Desm. N. Dict. d'H. N.* (2) ix. p. 426 (1817); *id. Mamm.* i. p. 257 (1820); *Gray, Griff. Cuv. An. K. v.* p. 188 (1827); *Less. Man. Mamm.* p. 213 (1827).
- Didelphis guianensis*, *Kerr, Linn. An. K.* p. 194 (1792).
- Philander murinus*, *Tiedem. Zool.* p. 427 (1808).
- Didelphys macrotarsus* (*nec Schreb.*) *and* *microtarsus*, *Wagn. Arch.*

- f. Nat.* viii. p. 359 (1842); *Schinz, Syn. Mamm.* i. pp. 504 & 505 (1844); *Wagn. Abh. Ak. Münch.* v. pp. 145 & 147 (1847); *id. Schr. Säug. Supp.* v. pp. 242 & 243 (1855); *Natt. Pelz. Bras. Säug., Verh. z.-b. Wien*, xxxiii. Anh. p. 114 (1883).
- Micoureus murinus and dorsigerus*, *Less. N. Tabl. R. A., Mamm.* p. 186 (1842); *Gerv. H. N. Mamm.* ii. p. 287 (1855).
- Philander murinus and dorsigerus*, *Gray, List Mamm. B. M.* p. 101 (1843); *Gerrard, Cat. Bones Mamm. B. M.* p. 140 (1862).
- Didelphys impavida*, *Tschudi, Faun. Peruana*, p. 149, pl. ix. (animal) (1844); *Wagn. Schr. Säug. Supp.* v. p. 240 (1855); *Gieb. Säug.* p. 714 (1859).
- Didelphys musculus*, *Cabanis, Schomb. Brit. Guiana*, iii. p. 778 (1848); *Wagn. Schr. Säug. Supp.* v. p. 245 (1855).
- Didelphys (Grymæomys) murina*, *Burm. Thiere Bras.* i. p. 138 (1854).
- Grymæomys murinus, dorsiger, and impavidus*, *Burm. Erläut. Faun. Bras.* pp. 80 & 81 (1856).

## MURINE OPOSSUM.

Size markedly smaller than in *D. cinerea*; form slender and delicate. Fur thick and close, straight, not woolly. General colour deep dull rufous, exact tone very variable. Rhinarium with two notches on each side below. Face greyer and paler than the back, the dark stripes through the eyes generally very conspicuous, and contrasting markedly with the paler colour between them. Ears (Pl. XXVI. fig. 9) much as in *D. cinerea*; laid forward (in spirit-specimens) they reach beyond the anterior canthus of the eye; their internal basal projection very long and prominent. Back deep greyish rufous, sides brighter and clearer. Chin white; chest and belly yellowish white, the hairs generally grey-based laterally, and pure white down the median line, lines of demarcation quite vague and undefined. Outsides of limbs like back, inner sides white. Pouch absent; mammæ, one ventral and from 4 to 7 lateral, total 9 to 15\*. Hands and feet white or pale grey. Pads as in *D. cinerea*. Tail long; slender, cylindrical, furry for barely half an inch at its base; the remainder with only a few fine scattered hairs upon it; its colour grey, sometimes gradually lightening terminally.

*Skull and teeth* in all respects similar to those of *D. cinerea*, but very materially smaller (see dimensions, p. 351). Correlated with this reduction in size there is also a marked reduction in the development of the supraorbital ledges, which are, however, always present, even in immature specimens, being present at the least in the form of a narrow but distinct beading along the supraorbital margins.

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\* I am as yet unable to make out what degree of local constancy obtains in the number of the mammæ. In the present series, specimens *o* and *p*, from the Island of Grenada, both have 7-1-7=15 mammæ; specimens *e-g*, from Central America, 6-1-6=13; and all the rest, South American, either 5-1-5=11, or 4-1-4=9. No other differences of any kind can be found between the specimens from these various localities. It is unfortunate that the number of mammæ in the Mexican and Tres Marias specimens cannot be determined.

*Dimensions.*

	♂. <i>d</i> (in spirit). Adult. millim.	♀. <i>p</i> (in spirit). Adult. millim.
Head and body .....	142	147
Tail .....	213	177
Lower leg.....	38	35
Hind foot.....	23	21
Ear .....	17	20
Muzzle to eye .....	15.5	15.5

Skull, see p. 351.

*Hab.* Neotropical region, from Central Mexico southwards to Brazil.

*Type* not in existence.

<i>a, b.</i> Yg. al., ♂ ♀, 9/81.	Ventanas, Durango, Central Mexico.	Mr. A. Forrer [C.].
<i>c.</i> Ad. al., ♂, 4/81.	Tres Marias Islands ( <i>A. Forrer</i> ).	Messrs. Salvin & Godman [P.].
<i>d, e.</i> { Ad. al. } { Skull of <i>d.</i> } ♂ ♀.	Cajabon, Alta Vera Paz.	F. C. Sarg, Esq. [C.].
<i>f.</i> Ad. sk., ♀.	Coban, Vera Paz ( <i>F. C. Sarg</i> ).	Salvin Coll.
<i>g.</i> Ad. al., ♀.	Coban.	O. Salvin, Esq. [C.].
<i>h.</i> { Ad. sk. } { Skull. } ♀, 7/62.	San Gerónimo ( <i>E.</i> <i>Arce</i> ).	Salvin Coll.
<i>i.</i> Ad. sk.	Veragua, Panama ( <i>E. Arce</i> ).	Salvin Coll.
<i>j.</i> Ad. sk., ♀.	Medellin, Colombia.	J. K. Salmon, Esq. [P.].
<i>k.</i> Ad. sk.	Balzar Mts., Ecuador.	Mr. Illingworth [C.].
<i>l.</i> Ad. sk., ♂.	Ecuador.	Mr. L. Fraser [C.].
<i>m, n.</i> Ad. & imm. al., ♀.	Tumbez and Tam- billo, N. Peru ( <i>J. Stolzmann</i> ).	Warsaw Museum [P.].
<i>o, p.</i> { Ad. al. } { Skull of <i>o.</i> } ♂ ♀, 8/86.	Annandale, Island of Grenada ( <i>Grenada</i> <i>Eclipse Expedition</i> ).	G. R. M. Murray, Esq. [P.].
<i>q.</i> Ad. al., ♀, 9/6/87.	Annandale, Grenada.	W. R. Elliott, Esq. [P. & C.].
<i>r.</i> Imm. al., ♀, 11/86.	Plantation Hope, Deme- rara.	W. L. Sclater, Esq. [P. & C.].
<i>s.</i> Yg. al., ♀.	Surinam.	Mr. E. Bartlett [C.].
<i>t.</i> { Ad. sk. } { Skull. }	Para.	R. Graham, Esq. [P. & C.].
<i>u.</i> Yg. al., ♀.	Pebas.	H. W. Bates, Esq. [C.].
<i>v, w.</i> { Ad. st. } { Skull of <i>v.</i> } ♂.	Brazil.	Purchased.

*x-e'*. { Ad. al. } 1 ♂, 7 ♀.  
 { Skull of *y.* }

Lidth de Jeude  
 Coll.

*f'*. Ad. st., ♂ & 7 yg.

Lidth de Jeude  
 Coll.

*g'*. Ad. al., ♀.

(Described by Waterhouse.)

9. *Didelphys lepida*. (PLATE III. fig. 1.)

*Didelphys* (*Micoureus*) *lepida*, *Thos. Ann. Mag. N. H.* (6) 1. p. 158 (1888).

Size very small. Fur soft, close and straight. General colour deep rich rufous, much deeper than in the allied species. Rhinarium apparently as in *D. murina*. Centre of face pale rufous; crown deep rufous, like back; black patches round eyes strongly marked, continued forwards on the sides of the muzzle nearly to the rhinarium, but not continued backwards towards the ear. Chin, chest, and belly dirty white, with a faint rufous tinge, the line of demarcation not at all strongly marked. Ears very small, laid forward they reach to the posterior canthus or at most to the centre of the eye, their internal basal projection well developed. Pouch absent; mammae 3-1-3=7\*. Feet and their pads as in *D. murina*, but the fifth hind toe only just equalling the second. Tail very long, slender, cylindrical, slightly furry at its base, the remainder with numerous scattered fine hairs, white or pale brown.

*Skull* (Pl. XXVII. fig. 3) as in *D. murina*, except that it is only about two thirds as large; supraorbital ledges well developed, even in young specimens.

*Teeth* small and delicate. Canines short and thick. Upper p.<sup>1</sup> about one third the size of p.<sup>3</sup>; p.<sup>4</sup> about equal to or slightly smaller than the latter. Lower teeth as in *D. cinerea* and *murina*.

*Dimensions.*

	♀.	
	a (skin). Adult. millim.	† (in spirit). Adult. millim.
Head and body . . . . .	105	93
Tail . . . . . (more than)	105	143
Lower leg . . . . .	24	—
Hind foot . . . . .	—	15·7
Ear . . . . .	9	12
Muzzle to eye . . . . .	10·5	—

Skull, see p. 351.

*Hab.* Amazonian subregion, from the Peruvian Amazons to Surinam.

*Type* in collection.

\* In two specimens, but very indistinct in both; perhaps more would become visible in the breeding-season.

† From a specimen preserved in the Stuttgart Museum.

This beautiful little species is readily distinguished from *D. murina* by its smaller size and shorter ears, from *D. pusilla* by its possession of supraorbital ledges and of anterior basal ear-projections, and from both by its smaller number of mammæ and its more brilliant coloration.

- a. { Ad. sk. } ♀, 31/5/68. Santa Cruz, Huallaga Mr. F. Bartlett [C.]  
 { Skull. } R., Peruvian Amazons. (Type of species.)  
 b. { Imm. sk. } Bolivia. Mr. T. Bridges [C.]  
 { Skull. }  
 c, d. Yg. al., ♂ ♀. Lidth de Jeude Coll.

### 10. *Didelphys pusilla*.

Micouré nain, *Azara, Quadr. Parag.* i. p. 304 (1801).

*Didelphys pusilla*, *Desm. N. Dict. d'H. N.* (1) xxiv. *Tabl.* p. 19 (1804); *id. op. cit.* (2) ix. p. 430 (1817); *id. Mamm.* i. p. 261 (1820); *Desmoul. Dict. Class. d'H. N. v.* p. 493 (1824); *Gray, Griff. Cuv. An. K.* v. p. 191 (1827); *Less. Man. Mamm.* p. 213 (1827); *Desm. Dict. Sci. Nat.* xlvii. p. 399 (1827); *J. B. Fisch. Syn. Mamm.* p. 269 (1829); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 366 (1836); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 112 (1841); *Wagn. Schr. Säug. Supp.* iii. p. 50 (1843), v. p. 245 (1855); *Schinz, Syn. Mamm.* i. p. 510 (1844); *Waterh. N. H. Mamm.* i. p. 514 (1846); *Burm. Thiere Bras.* i. p. 140 (1854); *Tomes, P. Z. S.* 1853, p. 548; *Gieb. Säug.* p. 715 (1859); *Lyd. Cat. Foss. Mamm. B. M.* v. p. 282 (1887).

*Didelphys nana*, *Ill. Abh. Ak. Berl.* 1811, p. 107 (1815); *Schinz, Cuv. Thierr.* i. p. 252 (1821).

*Peramys pusilla*, *Less. N. Tabl. R. A., Mamm.* p. 187 (1842).

*Didelphys elegans*, *Lund, Blik. Bras. Dyrev., Dansk. Afhandl.* ix. p. 135 (1842) (*nec Waterh.*).

*Didelphys* (*Grymæomys*) *agilis*, *Burm. Thiere Bras.* i. p. 139 (1854).

*Micoureus pusillus*, *Gerv. Custeln. Am. Sud, Mamm.* p. 103, pl. xx. fig. 2 (teeth) (1855).

*Grymæomys agilis*, *Burm. Erläut. Faun. Bras.* p. 82, pl. xv. fig. 1 (animal), pl. xi. fig. 6 (skull) (1856); *Hens. Abh. Ak. Berl.* 1872, p. 124.

*Didelphys agilis*, *Gieb. Säug.* p. 714 (1859).

#### PIGMY OPOSSUM.

Size very small, much as in *D. lepida*. Fur soft, thick, and straight. Rhinarium with two distinct notches on each side of the median line below. General colour bright rufous, rather paler and less rich than in *D. lepida*. Centre of face pale rufous; black mark round eyes very prominent, continued forwards to the sides of the muzzle nearly to the nose. Ears (Pl. XXVIII. fig. 2) large, laid forward (in spirit-specimens) they reach to or beyond the anterior canthus of the eye; their internal basal projection short, rounded, often almost obsolete, their metatragus large and broad. Back very uniform rufous, becoming gradually paler on the sides, and white, or whitish rufous on the belly, the bases of the hairs mostly slate, except just on the chin; the whole of the underside, however, sometimes pure white. Pouch absent. Mammæ (Pl. XXVIII. fig. 3) 6-1-6 or 7-1-7 = 13

or 15, the anterior ones almost level with the elbows, the central one opposite the most posterior pair but one. Outer sides of limbs like back, inner sides like belly; hands and feet white or pale brown, nearly naked; fifth hind toe shorter, though very slightly so, than the second; pads (Pl. XXVIII. fig. 1) low, rounded, little prominent. Tail long, slender, tapering, its base scarcely furry; uniformly pale grey, rather lighter below.

*Skull* as in the preceding species, except that the supraorbital edges are smoothly and evenly rounded, not developing any trace of ridges, even in old specimens.

*Teeth* as usual. Canines and premolars short vertically, broad and strong longitudinally. P.<sup>1</sup> both above and below nearly filling up the space between the canine and p.<sup>3</sup>

#### Dimensions.

	♂. i (in spirit). Adult. millim.	♀. e (in spirit). Adult. millim.
Head and body . . . . .	83	92
Tail . . . . .	102	117
Lower leg . . . . .	21	24
Hind foot . . . . .	13	16
Muzzle to eye . . . . .	10·5	11
Ear . . . . .	13·5	14·5

Skull, see p. 351.

*Hab.* Brazil, from Santarem to Rio Grande do Sul.

*Type* not in existence.

a. {	Skin of head. {	Santarem.	Purchased.
	Skull. }		
b. {	Ad. sk. {	Rio Janeiro.	Earl of Derby [P.].
	Skull. }		
c. Ad. st.		Santa Catherina.	Purchased.
d. {	Ad. sk. {	Santa Catherina.	Purchased.
	Skull. }		
			♂.
e. {	Ad. al. {	Taquara, Rio Grande	Dr. H. von Ihering [C.].
	Skull. }	do Sul.	
			♀.
f, g. Ad. & imm.		San Lorenzo, Rio	Dr. H. von Ihering [C.].
		Grande do Sul.	
			al., ♂.
h. Ad. al., ♀, 16/11/86.		San Lorenzo.	Dr. H. von Ihering [C.].
i. Ad. al., ♂.		(Described by Waterhouse.)	

#### 11. *Didelphys grisea*.

Micouré à queue longue, Azara, *Quadr. Parag.* i. p. 290 (1801).  
*Didelphys grisea*, Desm. *Dict. Sci. Nat.* xlvii. p. 393 (1827); J. B. Fisch. *Syn. Mamm.* p. 266 (1829); Less. *H. N. Mamm.* (*Compl. Buff.*) v. p. 364 (1836); id. *N. Tabl. R. A., Mamm.* p. 186 (1842); Schanz, *Syn. Mamum.* i. p. 509 (1844); Waterh. *N. H. Mamm.* i. p. 504 (1846); Lyd. *Cat. Foss. Mamm. B. M.* v. p. 281 (1887).  
*Didelphys incana*, Lund, *Blik. Bras. Dyr., Dansk. Afh.* viii. p. 237

(1841); Schinz, *Syn. Mamm.* i. p. 503 (1844); *Waterh. N. H. Mamm.* i. p. 503 (1846); *Burm. Thiere Bras.* i. p. 137 (1854).  
*Micoureus griseus*, *Gerv. H. N. Mamm.* ii. p. 287 (1855).

## GREY OPOSSUM.

Size about as in *D. murina*. Fur close, soft and rather fluffy. General colour above uniform deep grey, with scarcely a tinge of rufous. Face rather paler grey, the dark eye-markings confined to the front of the eye, and comparatively inconspicuous. Ears very large, leafy, laid forward (in spirit-specimens) they reach halfway between the anterior caudus and the tip of the nose, their anterior basal projection small and rounded. Chin, chest, and belly pure sharply defined white, the line of demarcation, especially on the neck, with a slight rufous or fulvous wash. Front of fore and out-sides of hind limbs grey, back of fore limbs white, a white ring sometimes running right round them at the elbow. Back of hands pale brown, of feet white. Toes and pads as in *D. murina*. Pouch absent\*. Tail long, slender, tapering, its basal half-inch furry, the remainder practically naked; grey above, whiter below.

*Skull* long and narrow, with a very long and slender muzzle, the facial index therefore unusually high (see measurements). Nasals distinctly expanded behind. Supraorbital region narrow, its edges smoothly rounded, without trace of ridges. Zygomatica but little expanded laterally. Anterior palatine foramina unusually long, reaching nearly or quite to the level of the back of p.<sup>1</sup> Posterior palate with the usual pair of long narrow vacuities.

*Teeth.* Canines short and thick. P.<sup>1</sup> both above and below about one fourth the size of p.<sup>3</sup>; and in each case p.<sup>3</sup> and p.<sup>4</sup> about equal, but if they differ the latter is slightly larger above and smaller below.

*Dimensions.*

	♀. † (in spirit). Adult. millim.
Head and body .....	129
Tail .....	175
Hind foot.....	19.5
Muzzle to eye .....	16.5
Ear .....	21.5

Skull, see next page.

*Hab.* Central and Eastern Brazil.

*Type* not in existence.

a, b.	{ Ad. sks. {	Rio Janeiro.	Purchased.
	{ Skull of a. }		

\* Mammæ not visible in the only spirit-specimen examined.

† From a specimen preserved in the Berlin Museum.

## Skull Measurements of Didelphys (Subgenus Micoureus).

Species .....	<i>D. cinerea.</i>		<i>D. murina.</i>		<i>D. lepida.</i>	<i>D. pusilla.</i>	<i>D. grisea.</i>	<i>D. elegans.</i>
	♂. i. adult.	♂. o. adult.	♀. y. adult.	♀. a. adult.	♀. e. adult.	♀. e. adult.	♂. a. adult.	♂. d. adult.
Sex .....								
Specimen .....								
Age .....								
Basal length .....	41	33	29.5	(c.) 24	25	32	28	
Greatest breadth .....	26	20.3	18.6	15	15	17.5	16.5	
Nasals, length .....	18.5	15	14	10	11.9	14.5	12.2	
" greatest breadth .....	6.2	4.1	4.4	3.4	3.6	4	2.1	
" least breadth .....	3.2	2.6	2.5	2	1.9	2.4	1.9	
Postorbital processes, tip to tip .....	10	7.2	7.5	7	(none)	(none)	(none)	
Inter-temporal constriction .....	6.7	6.3	6.4	6.2	5.1	6.5	5	
Palate, length .....	23.7	20	17.5	14.8	14.7	20	16.5	
" breadth outside m. <sup>3</sup> .....	14	12.3	10.1	8.5	8.5	10.9	9.5	
" " inside m. <sup>3</sup> .....	8.7	7.5	6.1	5	5	6.1	5.1	
Palatal foramen .....	3	2.6	2.6	2.4	2.4	5.5	2.1	
Basi-cranial axis .....	14.2	11	10	...	8.1	9.4	9.2	
Basi-facial axis .....	27	22	19.8	16.7	17	23	19	
Facial index .....	190	200	198	...	210	245	205	
Teeth—length (horizontal) of p. <sup>4</sup> .....	2.1	2.1	1.8	1.5	1.3	2.1	1.8	
" length of molars 1-3 .....	7.1	6.4	5.6	4.7	4.6	6.5	5	

12. *Didelphys velutina*.

*Didelphys velutina*, *Wagn. Arch. f. Nat.* viii. p. 360 (1842); *Schinz, Syn. Mamm.* i. p. 505 (1844); *Wagn. Abh. Ak. Münch.* v. p. 155 (1847); *Burm. Thiere Bras.* i. p. 142 (1854); *Wagn. Schr. Säug. Supp.* v. p. 247 (1855); *Gieb. Säug.* p. 718, (1859); *Natt. Pelz. Bras. Säug., Verh. z.-b. Wien, xxxiii. Anh.* p. 115 (1883).  
*Microdelphys velutina*, *Burm. Erläut. Faun. Bras.* p. 86, pl. xiv. fig. 2 (animal), pl. xi. fig. 8 (skull) (1856).

## VELVETY OPOSSUM.

The following description is taken from the type specimen, which, by the kindness of Dr. von Pelzeln, I have had the opportunity of examining in the Vienna Museum.

Size small. Fur peculiarly soft, crisp, and velvety. General colour soft mouse-grey, with a dull rusty-brown suffusion along the sides, from the cheeks to the hips. Face paler grey, the eye-mark somewhat indistinct. Ears large, a very slightly convex projection at their anterior bases. Chin yellowish white, chest rusty-fawn; belly pale cream-colour, the hairs dark slaty at their bases; line of demarcation of colours rather sharply defined. Forearms and hands, inner sides of legs, and feet like belly; outsides of legs like back. Tail shorter than the head and body, its basal half-inch thickly furry like the back. Fifth hind toe reaching to the end of the second phalanx of the fourth.

*Skull* still in the skin.

*Teeth*. Lower p.<sup>4</sup> about equal to, or very slightly smaller than p.<sup>3</sup>

*Dimensions.*

	♂. Type (stuffed). ? Adult. millim.
Head and body . . . . .	(c.) 86
Tail . . . . .	73
Hind foot . . . . .	11·3
Ear . . . . .	9 (contracted).

*Hab.* São Paulo, Brazil.

*Type* in the Vienna Museum.

The separation of this species from *D. grisea* is, I think, very doubtful, but the remarkable shortness of the tail, apparently quite complete in the type, prevents me at present from definitely uniting the two. The species, on account of the same peculiarity, has always been placed in the subgenus *Peramys*, but there can be no question that its natural place is in the present group.

13. *Didelphys elegans*.

*Didelphys hortensis*, *Reid, P. Z. S.* 1837, p. 4 (nom. nudum); *Waterh. Cat. Mamm. Mus. Z. S.* p. 64 (1838).

- Didelphys elegans*, *Waterh. Zool. Voy. Beagle, Mamm.* p. 95, pl. xxxi. (animal) (1839); *id. Jard. Nat. Libr., Mamm.* xi. p. 106 (1841); *Schinz, Syn. Mamm.* i. p. 502 (1844); *Bridges, P. Z. S.* 1844, p. 154; *Waterh. N. H. Mamm.* i. p. 515, pl. xvi. fig. 1 (animal) (1846); *Gay, Hist. Chile, Zool.* i. p. 84 (1847); *Baird, Gilhiss' U. S. Astron. Exp.* ii. p. 155 (1855); *Wagn. Schr. Säug. Suppl.* v. p. 246 (1855); *Gieb. Säug.* p. 715 (1859); *Burm. Reise La Plata,* ii. p. 412 (1861); *Schleg. Dierent.* p. 160 (1872); *Burm. Republ. Argent.* iii. p. 193 (1879); *Jent. Cat. Ost. Leyd. Mus.* p. 302 (1887); *Lyd. Cat. Foss. Mamm. B. M.* p. 282 (1887).
- Micoureus elegans*, *Less. N. Tabl. R. A., Mamm.* p. 186 (1842); *Gerv. H. N. Mamm.* ii. p. 287 (1855).
- Thylamys elegans*, *Gray, List Mamm. B. M.* p. 101 (1843); *Gerrard, Cat. Bones Mamm. B. M.* p. 140 (1862).
- Didelphys pimelura*, *Reinh. Vid. Medd. 1849, Oversight*, p. v.
- Gymnæomys elegans*, *Burm. Erläut. Faun. Bras.* p. 83, pl. xv. fig. 2 (animal) (1856).

## CHILIAN OPOSSUM.

Size about the same as in *D. grisea*, or rather smaller. Fur long, soft and silky. General colour a soft pale grey, finely grizzled with reddish brown. Muzzle long and pointed, lower edge of rhinarium with only a single notch on each side of the central groove below. Centre of face pale grey, the dark eye-mark forming a distinct ring round the eye and extending very little forwards on the sides of the muzzle. Ears very large, unusually narrow, oval, their anterior basal projections almost or quite obsolete, their metatragus large and well developed. Hairs of back with a greyish-white subterminal band and a reddish-brown tip. Chin, chest, and belly pure white, at least along the centre; line of demarcation not very sharply defined. Forearms pale grey outside, white inside. Hind legs coloured like the back outside, white internally and in front; feet pale brown; fifth hind toe slightly shorter than second. Fore and hind pads (Pl. XXVIII. fig. 4) each six in number, very high and prominent, the sole between them distinctly granulated. Tail very peculiar in shape; its basal half-inch quite thin, its next two inches markedly incrassated; its terminal half rapidly tapering to a point; its colour grey, with minute white hairs scattered over it.

*Skull* stout and strong, with a narrow pointed muzzle. Nasals long, slender, parallel-sided, not expanded behind. Interorbital region narrow, its edges rounded, or with very slight and inconspicuous beadings. Anterior palatine foramina reaching to the level of the centre of the canines. Posterior palate with one pair of long narrow vacuities opposite  $ms.^{1-3}$ , and another pair of small circular ones close to its posterior border.

*Teeth* long and sharp. Upper premolars evenly increasing in size backwards, their cusps long, slender, and pointed. Lower  $p.^1$  about one third the size of  $p.^3$ ;  $p.^4$  slightly taller than  $p.^3$  vertically, but rather shorter antero-posteriorly.

*Dimensions.*

	♂.
	<i>d</i> (in spirit).
	Adult.
	millim.
Head and body . . . . .	95
Tail . . . . .	119
Lower leg . . . . .	27
Hind foot . . . . .	14.5
Muzzle to eye . . . . .	13
Ear . . . . .	17
Skull, see p. 351.	

*Hab.* South Brazil and Chili.

*Type* in collection.

<i>a-c.</i> } Ad. st. {	Aconcagua, Chili.	Mr. T. Bridges [C.].
} Skulls. }		
<i>d.</i> Ad. al., ♂.	Aconcagua.	Mr. T. Bridges [C.].
<i>e.</i> Ad. sk., ♂.	Valparaiso ( <i>C. Darwin</i> , <i>Esq.</i> ).	Zool. Soc. (Voy. 'Beagle'). ( <i>Type</i> of species.)
<i>f, g.</i> Ad. sks., ♂	Valparaiso ( <i>C. Darwin</i> , <i>Esq.</i> ).	Zool. Soc. (Voy. 'Beagle').
<i>h.</i> Skull.	Valparaiso ( <i>C. Darwin</i> , <i>Esq.</i> ).	Zool. Soc. (Voy. 'Beagle'). (Figured by Waterhouse, Voy. 'Beagle.')
<i>i, j.</i> Skeletons.	Chili.	Mr. T. Bridges [C.].
<i>k.</i> Skull.	Chili.	Mr. T. Bridges [C.].

## V. Subgenus PERAMYS.

	Type.
Peramys, <i>Less. N. Tabl. R. A., Mamm.</i> p. 187 (1842)	D. brevicaudata.
Hemimurus, <i>Gerv. Casteln. Amér. Sud, Mamm.</i> p. 101 (1855)	D. brevicaudata.
Microdelphys, <i>Burm. Erläut. Faun. Bras.</i> p. 83 (1856)	D. americana.

Size small. Tail short, generally about half the length of the head and body, more or less covered with fine short hairs, but little, or not at all, prehensile. Fifth hind toe considerably shorter than the second; third and fourth but little longer than the second, subequal.

*Skull* very variable in size and shape; generally broad, rounded, and flattened above. Palate without a second posterior pair of vacuities.

*Teeth.* Upper p.<sup>1</sup> not disproportionally smaller than the others, the upper premolars generally evenly increasing in size backwards. Lower p.<sup>4</sup> generally larger than, but sometimes only just equalling, p.<sup>3</sup>

This subgenus forms a very natural group, and might almost be admitted to generic rank, were it not that certain species of other subgenera—as, for example, *D. (Micoureus) velutina*—approach it in shortness of tail, and that neither in skull nor dentition does there appear to be any single character absolutely peculiar to it.

The habits of the species are as yet undescribed, but they are probably far less arboreal than the other Opossums.

14. *Didelphys dimidiata*.

*Didelphys brachyura*, *Waterh. Cat. Mamm. Mus. Z. S.* p. 64 (1838) (*nec Schreb.*); *id. Zool. Voy. Beagle, Mamm.* p. 97, pl. xxxii. (animal) (1839); *id. Jard. Nat. Libr., Mamm.* xi. p. 111 (1841); *id. N. H. Mamm.* i. p. 522, pl. xvi. fig. 2 (animal) (1846); *Burm. Thiere Bras.* i. p. 141 (1854); *id. Republ. Argent.* p. 194 (1879).  
*Didelphys dimidiata*, *Wagn. Abh. Ak. Münch.* v. p. 151 (footnote) (1847).

*Microdelphys brachyura*, *Burm. Erläut. Faun. Bras.* p. 86 (1856); *Hens. Abh. Ak. Berl.* 1872, p. 122.

## YELLOW-SIDED OPOSSUM.

Size large. Fur short, coarse and harsh. General colour pale grizzled grey along the crown and upper side of the back, rich orange-yellow on the sides and belly. Muzzle long and slender; rhinarium with a short backwardly projecting extension in the centre of its postero-superior border. Ears rounded, very short, their length not equal to their breadth, and, when laid forward, not nearly reaching to the eye; antero-internal basal projection and meta-tragus large and well developed. Colour of body as already described. Chest (in males) with a gland, in the same position as in *Myrmecobius* (see *suprà*, p. 311), but without the larger and more prominent apertures. Arms and legs yellow, hands and feet greyer. Skin of soles rough and coarse; hind pads not so sharply defined as in the other species, five in number, the usual small postero-external pad absent. Tail only about half the length of the head and body, thick, evenly tapering, clothed all along with numerous short fine hairs, brown above, yellowish below.

*Skull* (Pl. XXVII. fig. 4) very differently shaped to that of the other species. Muzzle narrow, very convex upwards, not flattened. Orbito-temporal region exceedingly narrow, parallel-sided; the brain-case also very narrow in proportion to the boldly expanded zygomata. Postorbital processes present although small in adults, and becoming well-marked in old individuals, such as the specimen figured. Temporal crest early developed, becoming very high and prominent in old age. Palate with a single pair of vacuities opposite  $m.^2$  and  $m.^3$ .

*Teeth.* Canines, both upper and lower, very long and strong. Upper premolars not touching each other,  $p.^4$  very much larger than either of the others. Molars small and delicate, the combined lengths of the first three about 5 or 5.2 millim. Lower premolars rapidly increasing in height backwards. Lower molar series about 6.6 millim.

*Dimensions.*

	♂.	
	a (in spirit). Aged. millim.	b (in spirit). Adult. millim.
Head and body..	151	135
Tail .....	80	66

	♂	
Lower leg . . . . .	28	24·5
Hind foot . . . . .	17	15·5
Muzzle to eye ..	15·5	15
Ear . . . . .	7·6	7·1

Skull, see p. 367.

*Hab.* South Brazil and Uruguay.

*Type* in collection.

a.	Aged al., ♂.	Taquara, Rio Grande do Sul.	Dr. H. von Ihering [C.].
b.	{ Ad. al. } ♂.	San Lorenzo, Rio Grande do Sul.	Dr. H. von Ihering [C.].
	{ Skull. }		
c.	{ Ad. sk. } ♂.	Maldonado (C. Darwin).	Zool. Soc. (Voy 'Beagle'). (Type of species.)
	{ Skull. }		
d.	{ Ad. sk. } ♂.		Haslar Hospital Collection.
	{ Skull. }		

### 15. *Didelphys brevicaudata*.

*Mus sylvestris americanus*, *Seba, Thesaurus*, i. p. 50, pl. xxxi. fig. 6 (animal) (1734).

*Didelphys brevicaudata*, *Erxl. Syst. Regn. An.* p. 80 (1777)\*; *Zimm. Geogr. Gesch.* ii. p. 227 (1780); *Bodd. Elench. Anim.* i. p. 77 (1785).

*Didelphys brachyura*, *Schreb. Säug.* iii. p. 548, pl. cli. (animal) (1778); *Pall. Act. Ac. Petrop.* 1780, ii. p. 235, pl. v. (animal); *Gmel. Linn. S. N.* i. p. 108 (1789); *Kerr, Linn. An. K.* p. 196 (1792); *Donnd. Zool. Beytr.* i. p. 353 (1792); *G. Cuv. Tabl. Elém.* p. 125 (1798); *Bechst. Syst. Uebers. vierf. Thiere*, ii. p. 685 (1800); *Shaw, Gen. Zool.* i. pt. ii. p. 479 (1800); *E. Geoff. Cat. Mus.* p. 145 (1803); *Desm. N. Dict. d'H. N.* (1) xx. p. 147 (1803); *Turt. Linn. S. N.* i. p. 67 (1806); *G. Cuv. R. A.* i. p. 174 (1817); *Desm. N. Dict. d'H. N.* (2) ix. p. 429 (1817); *Desmoul. Dict. Class. d'H. N.* v. p. 492 (1824); *Temm. Mon. Mamm.* i. p. 53 (1827); *Gray, Griff. Cuv. An. K.* v. p. 190 (1827); *Less. Man. Mamm.* p. 212 (1827); *Desm. Dict. Sci. Nat.* xlvii. p. 398 (1827); *J. B. Fisch. Syn.*

\* This species has been commonly known as *D. brachyura*, *Schr.*, but, apart from the dates on the title-pages of Schreber's third volume and of Erxleben's work, *D. brevicaudata* is shown to be the earlier name by a reference to the quotations in each book. Both works appear to have been published in parts, whose issue went on concurrently.

In Schreber references to Erxleben begin on p. 457 and refer to as late a page as 448 of the latter's work. Everything after p. 457 of Schreber is therefore later in date than all before p. 448 of Erxleben. On the other hand, in Erxleben the references to the text of Schreber begin with the genus *Canis*, p. 533, after which page, therefore, Erxleben would have to give way to Schreber up to and including the latter's genus *Canis*, ending on p. 374. The question is further complicated by the separate publication of Schreber's lettered plates, which would of themselves give priority to his names whenever their earlier appearance is shown by Erxleben's references to them.

In the case of the present species, no reference to the other being made by either author, the general rule as to pagination comes into operation, and Erxleben (p. 80) clearly takes precedence over Schreber (p. 548).

- Mamm.* p. 269 (1829); *Wagn. Schr. Säug. Supp.* iii. p. 51 (1843), v. p. 251 (1855); *Schinz, Syn. Mamm.* i. p. 519 (1844); *Gieb. Säug.* p. 716 (1859); *Jent. Cat. Ost. Leyd. Mus.* p. 302 (1887).
- Sorex surinamensis*, *Gmel. Linn. S. N.* i. p. 114 (1789); *Kerr, Linn. An. K.* p. 206 (1792).
- Viverra touan*, *Shaw, Gen. Zool.* i. pt. ii. p. 432 (1800).
- Mustela touan*, *Bechst. Syst. Uebers. vierf. Thiere*, ii. pp. 358 & 687 (1800).
- Didelphys tricolor*, *E. Geoff. Cat. Mus.* p. 144 (1803); *Desm. Mamm.* i. p. 260 (1820); *Temm. Mon. Mamm.* i. p. 52 (1827); *Desm. Dict. Sci. Nat.* xlvii. p. 397 (1827); *Less. Man. Mamm.* p. 212 (1827); *J. B. Fisch. Syn. Mamm.* p. 268 (1829); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 365 (1836); *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 109 (1841); *Wagn. Schr. Säug. Supp.* iii. p. 50 (1843), v. p. 256 (1855); *Schinz, Syn. Mamm.* i. p. 509 (1844); *Waterh. N. H. Mamm.* i. p. 520 (1846); *Gieb. Säug.* p. 716 (1859); *Schleg. Dierent.* p. 160 (1872); *Jent. Cat. Ost. Leyd. Mus.* p. 302 (1887).
- Philander brachyurus*, *Tiedem. Zool.* p. 428 (1808).
- Didelphys breviceaudis and tuan*, *Ill. Abh. Ak. Berl.* 1811, p. 107 (1815).
- Didelphys sebæ*, *Gray, Griff. Cuv. An. K.* v. p. 190 (1827).
- Didelphys hunteri*, *Waterh. Jard. Nat. Libr., Mamm.* xi. p. 110 (1841); *id. N. H. Mamm.* i. p. 524 (1846).
- Peramys tricolor and brachyurus*, *Less. N. Tabl. R. A., Mamm.* pp. 186-7 (1842).
- Didelphys glirina*, *Wagn. Arch. f. Nat.* viii. p. 359 (1842); *id. Abh. Ak. Münch.* v. p. 150 (1847); *id. Schr. Säug. Supp.* v. p. 253 (1855); *Gieb. Säug.* p. 717 (1859); *Natt. Pelz. Bras. Säug., Verh. z.-b. Wien*, xxxiii. Anh. p. 117 (1883).
- Hemiuirus brachyurus and tricolor*, *Gerv. H. N. Mamm.* ii. p. 287 (1855).
- Microdelphys tricolor*, *Burm. Erläut. Faun. Bras.* p. 85, pl. xvi. fig. 1 (animal) (1856).

## RED-SIDED OPOSSUM.

Size large for the group; form thick and clumsy. Fur straight, rather hispid. General colour of upper surface and sides deep chestnut-rufous, sometimes wholly uniform, sometimes slightly and sometimes wholly grizzled grey along the upper surface of the head and back. Lower edge of rhinarium with one lateral notch on each side of the central groove; postero-superior edge transverse, not, or but little, projecting backwards in the centre. Ears rather large for this group, laid forward (in spirit-specimens) they reach to the centre of the eye. Back and sides as already described; chin, chest, and belly dirty white, more or less mixed with grey or rufous. Pouch absent; mammae 4-1-4 or 5-1-5=9 or 11. Arms and legs deep rufous, hands and feet above dirty white or brown. Fifth hind toe barely reaching to the end of the second phalanx of the fourth; pads small, very distinct, hallucal pad distinctly subdivided into two, minute postero-external pad present or absent. Tail about two thirds the length of the head and body, its furry portion ceasing after about half an inch below, but tapering gradually backwards on the upper side for about half the length of the tail.

*Skull* large and strongly built, with a broad conical muzzle. Interorbital region broad, unridged, its edges gently rounded; no

trace of postorbital processes. Palate with a pair of very narrow vacuities opposite the two anterior molars.

*Teeth* large and strong. Upper canines short and thick. Premolars large, evenly increasing in size backwards, p.<sup>1</sup> nearly or quite filling up the space between the canine and p.<sup>3</sup> Molars large, triangular, the combined lengths of the three anterior ranging from 5·8 to 6·8 millim. Lower p.<sup>3</sup> and p.<sup>4</sup> about equal in size. Lower molar series about 8 to 8·8 millim.

*Dimensions.*

	♂. * (in spirit). Adult. millim.	♀. b (in spirit). Adult. millim.
Head and body .....	150	130
Tail .....	87	70
Lower leg .....	—	28
Hind foot .....	23	19
Ear.....	12	11·5
Muzzle to eye .....	—	16

Skull, see p. 367.

*Hab.* Guiana and Brazil.

*Type* not in existence.

a.	{ Ad. sk. { ♂.	Bahia.	Purchased.
	{ Skull. }		
b, c.	{ Ad. al., { ♀.		Lidth de Jeude Coll.
	{ Skull of b. }		
d.	{ Ad. al. { ♂.		Lidth de Jeude Coll.
	{ Skull. }		
e.	{ Ad. st. {		H. W. Bates, Esq. [C.].
	{ Skull. }		
f.	{ Ad. al. { ♀.		Royal College of Surgeons [E.].
	{ Skull. }		( <i>Type</i> of <i>D. hunteri</i> , Waterh.)

16. *Didelphys domestica*.

*Didelphys domestica*, *Wagn. Arch. f. Nat.* viii. p. 359 (1842); *Schinz, Syn. Mamm.* i. p. 506 (1844); *Wagn. Abh. Ak. Münch.* v. p. 153 (1847); *id. Schr. Säug. Supp.* v. p. 255 (1855); *Gieb. Säug.* p. 717 (1859); *Natt. Pelz. Bras. Säug., Verh. z.-b. Wien*, xxxiii. Anh. p. 117 (1883).

*Hemiuscus hunteri*, *Gerv. Casteln. Am. Sud, Mamm.* p. 101, pls. xvi. fig. 2 (animal), and xx. fig. 1 (skull) (1855) (*nec Waterhouse*)†.

*Hemiuscus concolor*, *Gerv. op. cit.* lettering to pl. xvi. (1855).

Size large. Fur thick, straight and soft. General colour pale grey. Face uniformly grey, no darker mark round the eye. Ears large and rounded, laid forward (in spirit-specimens) they reach just to the anterior canthus of the eye. Crown and whole of back

\* In the Stuttgart Museum.

† This determination is based on the authority of specimen *a*, received from the same collection as Prof. Gervais's individual.

uniform finely grizzled grey or mouse-colour, cheeks and sides with a paler or more yellowish tinge (but not the distinct orange-colour of *D. dimidiata*). Chin, chest, and belly white or greyish white, sometimes with a tinge of yellow. Mammæ 5-3-5=13\*. Arms and legs, hands and feet grey. Fifth hind toe reaching to the middle of the second phalanx of the fourth. Tail little more than half the length of the head and body, its basal half-inch furry, grey, the remainder short-haired, dark brown.

*Skull* very strong and thickly built. Interorbital region broad and flattened, its edges rounded. Temporal crests absent, or only formed in extreme old age; no postorbital processes.

*Teeth* thick and powerful. Upper premolars evenly increasing in size backwards. Molars very variable in size, the length of the three anterior ranging from 6.2 to 7.7 millim. Lower p.<sup>3</sup> and p.<sup>4</sup> about equal. Length of lower molar series 9 to 10 millim.

*Dimensions.*

	♀. †(in spirit). Adult. millim.
Head and body . . . . .	131
Tail . . . . .	75
Hind foot . . . . .	18
Muzzle to eye . . . . .	17.3
Ear . . . . .	15

Skull, see p. 367.

*Hab.* Brazil.

*Co-types* in the Vienna and Munich Museums and in collection.

a.	{ Imm. sk. } ♂.	Goyaz, Brazil.	Count de Castelnau
	{ Skull. }		[P. & C.].
b.	{ Ad. st. } ♂.	Brazil.	Purchased.
	{ Skull. }		
c.	{ Ad. sk. } ♀, 21/4/24.	Cuyaba, São Paulo	Vienna Museum [E.].
	{ Skull. }	(Natterer).	

(One of the *co-types* of the species.)

17. *Didelphys scalops*. (PLATE III. fig. 2.)

*Didelphys* (*Peramys*) *scalops*, *Thos. Ann. Mag. N. H.* (6) i. p. 158 (1888).

Size as in the preceding species, but form rather slenderer and lighter. Fur short, straight and crisp. General colour rufous and grey, arranged as detailed below. Whole of head, both face, cheeks, and chin, bright rusty or orange-rufous. Ears large and rounded, with well-marked anterior basal projections. Back and shoulders finely grizzled grey, the hairs mixed black and white. Rump and

\* In four specimens.

† Preserved in the Vienna Museum.

hips deep rich chestnut. Chin rufous; chest and belly grizzled olive-grey, only slightly paler than the back. Front of arms and out-sides of legs rufous, contrasting with the grey of the lower surface; hands and feet dark brown. Tail about half the length of the head and body; only furry at its extreme base, the remainder closely covered with short fine hairs, uniformly deep rufous in colour.

*Skull* (Pl. XXVII. figs. 5 & 6) long and slender; muzzle very narrow, especially in the region just anterior to the orbits. Nasals unusually long in proportion, not markedly flattened posteriorly. Interorbital space rather narrow, its edges smoothly rounded; no trace of postorbital processes or temporal ridges. Palate with a single pair of narrow vacuities opposite p.<sup>4</sup>, m.<sup>1</sup>, and m.<sup>2</sup>.

*Teeth* small, light and delicate. Canines long and thin. Upper premolars increasing in size backwards, p.<sup>4</sup> rather disproportionately larger than p.<sup>3</sup> Molars very small and delicate, the length of the three anterior about 4.7 millim. Lower p.<sup>4</sup> about equal to p.<sup>3</sup> Range of lower molars about 6.2 millim.

#### Dimensions.

	♂.
	a (skin).
	Adult.
	millim.
Head and body	133
Tail	71
Lower leg	(c.) 33
Hind foot	(c.) 19
Muzzle to eye	15
Ear	8 (dried)
Skull, see p. 367.	

#### *Hab.* Brazil.

*Type* in collection.

Whether the peculiar coloration of this Opossum will be found to be constant or not it is impossible to decide, but the species is quite distinct from any other merely by the characters of the skull and dentition. The two specimens in the collection agree with each other in all essential respects.

a.	{ Ad. sk. } ♂.	Brazil.	Lord Derby [P.]
	{ Skull. }		(Type of species.)
b.	{ Ad. sk. } ♀.	No history.	
	{ Skull. }		

#### 18. *Didelphys henseli*. (PLATE IV. fig. 1.)

*Didelphys* (*Peramys*) *henseli*, *Thos. Ann. Mag. N. H.* (6) i. p. 159 (1888).

#### HENSEL'S OPOSSUM.

Size markedly smaller than in any of the preceding species, about equal to that of *D. americana*. Fur short, straight and crisp. General colour much as in the grey-backed specimens of *D. brevi-*

*caudata*. Rhinarium naked, projecting backwards in the centre on the top of the muzzle. Ears very small and rounded, laid forward they reach only about halfway towards the eye; their internal basal projection and metatragus both well developed. Centre of face, crown, nape, and whole of the centre of the back uniform finely grizzled olive-grey. Cheeks, a narrow ring round eye, sides of neck, shoulders, flanks, hips, and base of tail bright rufous. Chin clear reddish; chest and belly with the hairs basally grey, terminally red. Mammæ (Pl. XXVIII. fig. 6) exceedingly numerous, the two lateral series sometimes running the whole way from just behind the axillæ backwards nearly to the vulva, and the median set consisting of five, arranged as shown in the Plate, the formula varying from 6-5-6=17 to 11-5-11=27\*. Whole of arms and legs, all round, bright red; hands and feet pale brown. Hind pads (Pl. XXVIII. fig. 5) small, rounded, and prominent, the two parts of the hallucal pad widely separated. Tail about equal in length to head and body, its base alone furry, the remainder scaly, nearly naked; a few fine thinly scattered hairs only present, brown above, red below.

*Skull* (Pl. XXVII. fig. 7) short and stoutly built. Interorbital space evenly rounded; no postorbital processes or temporal ridges.

*Teeth* narrow and delicate. Upper premolars markedly increasing backwards,  $p^3$  rather disproportionately smaller than  $p^4$ . Length of the three anterior upper molars about 4.3 millim. Lower  $p^4$  rather longer than  $p^3$ . Lower molar series about 6 millim. in length.

*Dimensions.*

	♂. (†). — millim.	♀. a (in spirit). Adult. millim.
Head and body . . . . .	108	106
Tail . . . . .	55	62
Lower leg . . . . .	..	22
Hind foot . . . . .	..	15.5
Muzzle to eye . . . . .	..	13
Ear . . . . .	..	5.3

Skull, see p. 367.

*Hab.* Entre Rios and Rio Grande do Sul.

*Type* in collection.

This species is no doubt that referred to, but not named, by Hensel in his paper on the Mammals of South Brazil ‡.

\* The type has 11 on one side and 9 on the other, *i. e.* 11-5-9=25. Specimen *b* is in too bad a condition for the exact number to be made out. On the other hand, a specimen of this species from Entre Rios, preserved in the Genoa Museum, and kindly lent to me by the Marquis G. Doria, has only 6-5-6=17; thus showing that while the outer series are variable in number, the middle set are fairly constant.

† From Hensel, *loc. infra cit.*

‡ Abh. Ak. Berl. 1872, p. 123.

<i>a-e.</i>	{ 2 ad. ♀ & 3 yg. al. }	{ Taquara, Rio Grande do Sul.	Dr. H. von Ihering [C.]. ( <i>a.</i> <i>Type</i> of species.)
	{ Skull of <i>a.</i>		

19. *Didelphys sorex*.

*Microdelphys sorex*, *Hens. Abh. Ak. Berl.* 1872, p. 122.

## SHREW OPOSSUM.

Size very small, form slender and delicate. Fur straight and crisp. General colour grey above, rufous on sides. Muzzle long, narrow and pointed, the whole head unusually slender. Rhinarium smooth and naked, its central groove and the lateral notches in its lower edge almost obsolete. Ears of medium size, laid forward (in spirit-specimens) they fall short of the posterior canthus of the eye by about 2 or 3 millim. Centre of face grizzled grey, continuous with the grey of the back; an ill-defined rufous spot above each eye, and a prominent rufous patch in front of each ear; whole of cheeks, flanks, and outersides of hips pale rufous. Chin clear yellowish rufous; chest and body similar, but the hairs slate-coloured basally. Arms and legs like belly. Tail from one half to two thirds the length of the head and body, thinly hairy, brown above, pale rufous below, its basal third of an inch furry like the body.

*Skull* very light and delicate. Muzzle long and narrow, not flattened posteriorly. Interorbital region narrow, its edges smoothly rounded, but a minute inflation present on each side in the usual position of the postorbital processes, the result being that the intertemporal is greater than the interorbital width. Zygomata thin and weak, little expanded, the greatest zygomatic breadth scarcely more than half the basal length of the skull.

*Teeth.* Upper canines short. P.<sup>3</sup> and p.<sup>4</sup> about equal in size. Combined lengths of the three anterior molars 4.5 to 5 millim. Lower p.<sup>4</sup> distinctly smaller than p.<sup>3</sup> Length of lower molar series about 6 millim.

*Dimensions.*

	♂. * (in spirit). — millim.	♀. a (in spirit). Adult. millim.
Head and body .....	72	67
Tail .....	46	45
Lower leg .....	..	16
Hind foot .....	..	12
Muzzle to eye .....	..	9
Ear .....	..	5.2
Skull, see p. 367.		

*Hab.* Rio Grande do Sul.

*Type* in the Berlin Museum.

\* From Hensel, *loc. cit.*

a, b.	} Ad. al. } ♀.	Taquara, Rio Grande do Sul.	Dr. H. von Ihering
		Skull of a.	[C.]
c.	} Ad. sk. } } Skull. }	San Lorenzo, Rio Grande do Sul.	Dr. H. von Ihering
			[C.]
d.	Imm. skull.	San Lorenzo, Rio Grande do Sul.	Dr. H. von Ihering
			[C.]

20. *Didelphys americana*.

*Sorex americanus*, Müll. *Linn. Natursyst. Supp.* vii. p. 36 (1776).

*Sorex braziliensis*, *Erxl. Syst. Regn. An.* i. p. 127 (1777); *Schreb. Säug.* iii. p. 577 (1778); *Zimm. Geogr. Gesch.* ii. p. 386 (1780); *Bodd. Elench. Anim.* i. p. 125 (1785); *Gmel. Linn. S. N.* i. p. 115 (1789); *Kerr, Linn. An. K.* p. 206 (1792); *Shaw, Gen. Zool.* i. pt. ii. p. 535 (1800).

*Didelphys tristriatus*, *Ill. Abh. Ak. Berl.* 1811, pp. 107, 112 (1815); *Kuhl, Beitr. Zool.* i. p. 63 (1820); *Schinz, Cuv. Thierr.* i. p. 252 (1821); *J. B. Fisch. Syn. Mamm.* p. 269 (1829); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 365 (1836); *Waterh. Cat. Mamm. Mus. Z. S.* p. 64 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 107, pl. iii. (animal) (1841); *Wagn. Schr. Säug. Supp.* iii. p. 52 (1843), v. p. 250 (1855); *Schinz, Syn. Mamm.* i. p. 511 (1844); *Waterh. N. H. Mamm.* i. p. 518 (1846); *Burm. Thiere Bras.* i. p. 140 (1854); *Gieb, Säug.* p. 716 (1859); *Natt. Pelz. Bras. Säug., Verh. z.-b. Wien*, xxxiii. Anh. p. 116 (1883); *Jent. Cat. Ost. Leyd. Mus.* p. 302 (1887).

*Didelphys trilineata*, *Lund, Blök. Bras. Dyrev., Dansk. Afh.* viii. p. 237 (1841) (nom. nudum).

*Peramys tristriata*, *Less. N. Tabl. R. A., Mamm.* p. 187 (1842).

*Hemimurus tristriatus*, *Gerv. H. N. Mamm.* ii. p. 287 (1855).

*Microdelphys tristriatus*, *Burm. Erläut. Faun. Bras.* p. 84, pl. xvi. fig. 2 (animal), pl. xi. fig. 7 (skull) (1856).

## COMMON THREE-STRIPED OPOSSUM.

Size medium. Fur short, straight and crisp. General colour grey or rufous, dark-striped dorsally. Face grey, a dark central stripe commencing between the eyes, and continued down the centre of the neck and back; cheeks more or less rufous. Ears of medium size. Ground-colour of back olive-grey anteriorly, gradually passing into deep rufous on the rump and hips, the three dark lines generally very prominent, the median one, as already noted, commencing between the eyes, the lateral ones on the shoulders. Some specimens, however, have the whole back nearly uniform rufous, the stripes scarcely darker than the rest\*. Chin pale rufous; chest and belly rufous or whitish olive-grey. Mammæ 5-5-5=15, the outer series placed in such a curve that the anterior pair are in line with those of the inner set, and might almost be reckoned as belonging to them. Arms and legs reddish grey. Fifth hind toe reaching

\* This may be a question of season, as there is in the Paris Museum a specimen with the anterior half of the body indistinctly rufous-striped, and the posterior half black-striped as usual; the specimen would be therefore in process of change.

to the end of the second phalanx of the fourth; no trace of the minute postero-external hind foot-pad present in most of the species.

*Skull* smoothly rounded above. Interorbital space broad, convex upwards, a faint projection in the usual position of the postorbital processes, but the intertemporal less than the interorbital breadth, as usual.

*Teeth.* Upper premolars large, evenly increasing in size backwards. Length of three anterior upper molars about 5 millim., and of the lower molar series 6·5 to 7 millim. Lower p.<sup>4</sup> slightly larger than p.<sup>3</sup>

*Dimensions.*

	♂. (*).	♀. † (in spirit). Adult.
	— millim.	— millim.
Head and body . . . . .	130	107
Tail . . . . .	59	61
Hind foot . . . . .	20	18
Muzzle to eye . . . . .	..	14·5
Ear . . . . .	9	..

Skull, see p. 367.

*Hab.* Brazil.

*Type* not in existence.

a.	{ Ad. sk. }	{ ♀.	Brazil.	Zool. Soc. Coll.
	{ Skull. }			
b.	{ Ad. sk. }	{ ♂.	Brazil.	
	{ Skull. }			

21. *Didelphys iheringi.* (PLATE IV. fig. 2.)

*Didelphys* (*Peramys*) *iheringi*, *Thos. Ann. Mag. N. H.* (6) i. p. 159 (1888).

LESSER THREE-STRIPED OPOSSUM.

Size very small. Fur very short and crisp. Coloration exactly as in the ordinary form of *D. americana*, *i. e.* olive-grey on head and fore back, bright rufous on rump and hips; with three black longitudinal bands running down the back, the median one from between the eyes, and the lateral pair from just above the shoulders. Ears (Pl. XXVIII. fig. 7) of medium size, broadly rounded, laid forward (in spirit-specimens) they just reach the posterior canthus of the eye. Chin, chest, and belly pale rufous, the bases of the hairs grey. Arms and legs reddish brown. Hind pads small, distinct, and prominent; a minute postero-external pad present. Tail about

\* *Apud* Burmeister, Erläut. Faun. Bras. p. 84.

† From a spirit-specimen preserved in the Berlin Museum.

half the length of the head and body; nearly naked, the few fine hairs brown above, paler below.

*Skull* (Pl. XXVII. fig. 8) stout and strongly built. Muzzle broad, markedly flattened above. Interorbital region flat, its edges almost square, but not beaded; a slight inflation present in the usual position of the postorbital processes. Zygomata boldly expanded.

*Teeth.* Upper premolars evenly increasing in size backwards. Length of three anterior upper molars about 4.2 millim., and of the lower molar series 5.5 millim. Lower p.<sup>4</sup> about equal to p.<sup>3</sup>

#### Dimensions.

	♂. a (in spirit). Adult. millim.
Head and body .....	77
Tail .....	43
Lower leg .....	18
Hind foot .....	14
Muzzle to eye .....	11
Ear .....	6.3
Skull, see p. 367.	

*Hab.* South Brazil.

*Type* in collection.

This species appears externally to be merely a dwarf form of *D. americana*, but it may always be distinguished not only by its much smaller size, but by the different shape of the skull, and especially by the marked flattening of the frontal region.

a.	{ Ad. al. } ♂.	Taguara, Rio Grande	Dr. H. von Ihering.
	{ Skull. } ♂.	do Sul.	(Type of species.)
b, c.	{ Ad. sks. } ♂ ♀.	Brazil.	Purchased.
	{ Skulls. } ♂ ♀.		

## 22. *Didelphys unistriata*.

*Didelphys unistriata*, *Wagn. Arch. f. Nat.* viii. p. 360 (1842); *Schinz, Syn. Mamm.* i. p. 505 (1844); *Wagn. Abh. Ak. Münch.* v. p. 148 (1847); *id. Schr. Säug. Supp.* v. p. 249 (1855); *Gieb. Säug.* p. 717 (1859); *Natt. Pelz. Bras. Säug., Verh. z.-b. Wien*, xxxiii. Anh. p. 116 (1883).

### ONE-STRIPED OPOSSUM.

Fur unusually short and coarse. General colour of upper surface pale grizzled grey, the hairs tipped with rufous; a narrow dark reddish-brown line running down the centre of the back from behind the shoulders to the rump. Flanks and whole of underside bright orange, the hairs orange to their bases; the line of demarca-

tion not sharply marked. Ears very short and rim-like, almost naked. Arms and legs, metacarpus and metatarsus orange; fingers and toes naked. Tail with its basal half-inch furry, gradually passing into the short-haired part, brown above, yellowish below.

*Teeth.* Upper p.<sup>4</sup> apparently disproportionally larger than p.<sup>1</sup> and p.<sup>3</sup>. Distance from the back of p.<sup>4</sup> to the front of the upper canines 8 millim.

#### *Dimensions.*

	♂. Type (stuffed). Adult. millim.
Head and body . . . . .	140
Tail . . . . .	63
Hind foot . . . . .	13·4
Ear . . . . .	5·5

*Hab.* São Paulo, Brazil.

*Type* in the Vienna Museum.

By the kindness of Dr. von Pelzeln I have been enabled to examine and describe the type, which, so far as I am aware, still remains the only specimen known of this interesting species.

### 23. *Didelphys alboguttata.*

*Microdelphys alboguttata*, *Burm. Thiere Bras.* i. p. 340 (1854); *id. Erläut. Faun. Bras.* p. 87 (1856).

#### WHITE-SPOTTED OPOSSUM.

Rather smaller than *D. americana*; mouse-grey, with many rows of white spots on its back.

*Hab.* Brazil (forest region).

*Type* in the Museum of Rio Janeiro.

The above is the only information as yet published about this species, of which I have never seen a specimen.

### 2. *CHIRONECTES.*

<i>Chironectes</i> , <i>Ill. Prodr. Syst. Mamm.</i> p. 76 (1811) . . . .	Type. Ch. minimus.
<i>Memina</i> , <i>G. Fisch. Zoogn.</i> iii. p. 611 (1814) . . . . .	Ch. minimus.

Form and general structure as in *Didelphys* (especially the subgenus *Metachirus*), the only generic differences being contained in the following characters:—Fore feet with the pisiform bone much enlarged, and forming a prominent accessory tubercle, bearing very much the appearance of a sixth digit. Hind feet webbed to the ends of the toes, the terminal toe-pads alone extending beyond the webbing; hallux also involved in the webbing, less distinctly opposable than in *Didelphys*.

*Skull* and *dentition* as described below; not generically definable from those of *Didelphys* (*Metachirus*).

*Skull Measurements of Didelphys (Subgenus Peramys).*

Species	<i>D. dimidiata.</i>		<i>D. breviscaudata.</i>	<i>D. domestica.</i>	<i>D. scalops.</i>	<i>D. henseli.</i>	<i>D. socer.</i>	<i>D. americana.</i>	<i>D. theringi.</i>
	♂. c. aged.	♂. b. adult.	♀. b. adult.	♀. c. old.	♂. a. adult.	♀. a. adult.	♀. a. adult.	♂. b. adult.	♂. a. adult.
Sex .....									
Specimen .....									
Age .....									
Basal length .....	38	32.7	34.5	35.7	33	27	21	(c.) 28	22.2
Greatest breadth .....	22.3	19	19	19.8	17.5	15.5	11.1	16	12.4
Nasals, length .....	17.3	14.8	15.8	17.8	17	12.8	10	(c.) 13.3	10
" greatest breadth .....	5.3	4.2	5.8	4.6	5	4.6	3	4.8	3.6
" least breadth .....	3	2.5	2.7	2.3	2.3	2	2	2	1.5
Intertemporal constriction .....	4.4	5	5.5	6	6.1	5.4	5.1	5.2	4.7
Palate, length .....	21.5	19	20	20.3	18.3	15.4	12.7	17.5	12.8
" breadth outside m. <sup>s</sup> .....	10.6	10	11.7	12.1	9	8.8	7.2	8.8	7.2
"    " inside m. <sup>s</sup> .....	7	6	7	7.1	5.7	5.2	3.7	5.2	3.9
Palatal foramen .....	2.8	2.6	2.5	2.9	2.6	1.7	1.6	...	1.7
Basal-cranial axis .....	13	11.5	12	12.6	11.3	9	6.6	...	7.3
Basal-facial axis .....	25.3	21.6	23	23.2	22	18.2	14.4	...	15
Facial index .....	195	197	192	184	195	202	218	...	205
Teeth—length of ms. <sup>1-3</sup> .....	5.2	5	6.2	6.6	4.9	4.4	4.7	...	4.2

*Range* that of the only species.

*Habits*. Aquatic; feeding on freshwater insects and crustaceans.

### 1. *Chironectes minimus*.

- Petite Loutre d'eau douce de Cayenne, *Buff. Hist. Nat., Supp.* iii. p. 159, pl. xxii. (animal) (1776).  
*Lutra minima*, *Zimm. Geogr. Gesch.* ii. p. 317 (1780); *Bodd. Elench. Anim.* p. 168 (1785).  
*Mustela (Lutra) paraguensis and guianensis*, *Kerr, Linn. An. K.* pp. 172 & 174 (1792).  
*Didelphis memina*, *G. Cuv. Tabl. Elém.* p. 125 (1798); *E. Geoff. Cat. Mus.* p. 146 (1803).  
*Lutra saricovienna*, *Shaw, Gen. Zool.* i. pt. ii. p. 447 (1800).  
*Lutra memmina*, *Desm. N. Dict. d'H. N.* (1) xxiii. p. 503, xxiv. p. 19 (1804).  
*Chironectes minimus*, *Ill. Prodr. Syst. Mamm.* p. 76 (1811); *Gieb. Säug.* p. 706 (1859); *Lyd. Cat. Foss. Mamm. B. M.* v. p. 289 (1887); *Jent. Cat. Ost. Leyd. Mus.* p. 302 (1887).  
*Chironectes variegatus*, *Ill. Abh. Ak. Berl.* 1811, p. 107 (1815); *Schinz, Cuv. Thierr.* i. p. 253 (1821); *Wagn. Schr. Säug. Supp.* iii. p. 54 (1843), v. p. 260 (1855); *Schinz, Syn. Mamm.* i. p. 512 (1844); *Waterh. N. H. Mamm.* i. p. 532 (1846); *Wagn. Abh. Ak. Münch.* v. p. 157 (1847); *Cabanis, Schomb. Reis. Brit. Guiana*, iii. p. 778 (1848); *Gerv. Casteln. Am. Sud, Mamm.* p. 101, pl. xx. fig. 3 (teeth) (1855); *id. H. N. Mamm.* ii. p. 286 (1855); *Burm. Erläut. Faun. Bras.* p. 74, pl. ix. (animal), and pl. xi. figs. 3 & 4 (skull) (1856); *Gerrard, Cat. Bones Mamm. B. M.* p. 140 (1862); *Frantz, Arch. f. Nat.* xxxv. p. 318 (1869); *Sclater, P. Z. S.* 1871, p. 702; *Schleg. Dierent.* p. 161 (1872); *Brehm, Thierl.* ii. p. 562 (1880); *Alst. Biol. Centr.-Am., Mamm.* p. 201 (1881); *Natt. Pelz. Bras. Säug., Verh. z.-b. Wien*, xxxiii. Anh. p. 118 (1883); *Flou. & Gars. Cat. Ost. Coll. Surg.* ii. p. 750 (1884); *Sidebotham, P. Z. S.* 1885, p. 6 (myology).  
*Chironectes palmata*, *Cuv. R. A.* i. p. 174 (1817); *Temm. Mon. Mamm.* i. (Introd.) p. xxiii (1827); *Gray, Griff. Cuv. An. K.* v. p. 191 (1827); *Kaup, Thierr.* p. 238 (1835); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 366 (1836); *id. N. Tabl. R. A., Mamm.* p. 187 (1842); *Hens. Abh. Ak. Berl.* 1872, p. 121.  
*Chironectes yapock*, *Desm. Mamm.* i. p. 261 (1820); *id. Dict. Sci. Nat.* xvii. p. 400 (1827); *Less. Man. Mamm.* p. 214 (1827); *Schinz, Nat. Abbild., Säug.* p. 174, pl. lxvi. (animal) (1827); *Ogilb. P. Z. S.* 1836, p. 56; *Waterh. Cat. Mamm. Mus. Z. S.* p. 64 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 112, pl. iv. (animal) (1841).  
*Chironectes memina*, *F. Cuv. Dents Mamm.* pp. 75 & 252 (1825).  
*Didelphis palmata*, *Geoff. J. B. Fisch. Syn. Mamm.* p. 266 (1829).  
*Didelphys (Chironectes) palmata*, *Burm. Thiere Bras.* i. p. 133 (1854).

#### WATER OPOSSUM.

Size about as in *Didelphys opossum*. Fur very thick, close and woolly, a few rather longer straight hairs intermixed with it. General colour greyish white, marbled with deep brown. Rhinarium with a short backward extension on the top of the muzzle. Ears large and rounded, their anterior basal projections almost obsolete and their metatragus very small. Facial bristles very

stout and long, placed in tufts, of which there is one above each eye, one on each cheek below and in front of the base of the ears, and a single median one on the throat between the rami of the lower jaw; all these in addition to the usual whiskers on the sides of the muzzle. Whole of muzzle, a band running through the eye to below ear, and top of crown deep blackish brown, a prominent greyish-white crescentic band passing from the front of one ear to the other round just above the eyes. Arrangement of back marblings fairly constant, and consisting of a single black line running from the crown to the base of the tail, and expanding laterally into four broad well-defined transverse patches placed respectively over the shoulders, centre of back, loins, and rump, the ground-colour between them pale slaty grey. Chin, chest, and belly pure white. Arms and legs white inside, greyish out, but the legs with a continuation of the posterior dark body-band running down their backs to the heel. Hands and feet nearly naked, brown proximally, silvery grey on the digits. Palms and soles (Pl. XXVIII. fig. 8) with scarcely a trace of pads, uniformly finely granulated. Tail long and strong, furry for the basal inch or two inches, the fur ceasing sooner in the median line above and below than on the sides; the remainder nearly naked, coarsely scaly; deep black proximally, yellowish terminally.

*Skull* much resembling that of *Didelphys (Metachirus) opossum*, with which its measurements have been placed for the sake of comparison (*suprà*, p. 341). Nasals markedly expanded behind. Interorbital space broad, flattened, square-edged. Postorbital processes prominent, early developed; temporal ridges soon coalescing and forming a crest in old age. Zygomata strong, widely expanded laterally. Posterior palate with a single pair of large vacuities opposite the molars, but without the smaller central pair behind. Posterior nares narrow, as in *D. opossum*.

*Teeth* in structure and size quite as in *Didelphys*, except that p.<sup>1</sup>, both above and below, is larger in proportion, filling up the gap between the canines and p.<sup>2</sup>. Upper premolars evenly increasing backwards, p.<sup>1</sup> about half the bulk and three fourths the height of p.<sup>4</sup>. Lower p. as long horizontally, and two thirds as high as p.<sup>4</sup>; the latter rather less than p.<sup>3</sup> in each direction.

#### Dimensions.

	♀. h (stuffed). Adult. millim.
Head and body ..	325
Tail .....	395
Lower leg .....	74
Hind foot .....	72
Muzzle to eye ..	(c.) 32
Ear .....	22 (dried and contracted)
Skull, see p. 341.	

*Hab.* Guatemala to South Brazil.

*Type* not in existence.

a.	{ Ad. sk. } ♂	Medellin.	R. B. White, Esq. [C.].
	{ Skeleton. }		
b.	Skeleton (mounted).	Ecuador.	— Bollaert, Esq. [P.].
c.	Imm. skull, ♂.	Guiana.	Prof. Kowalevsky.
d.	{ Yg. sk. } ♂	Para.	Purchased.
	{ Skull. }		
e, f.	Yg. sk. & st.	Rio Janeiro.	Earl of Derby [P.].
g.	Imm. al., ♀.	San Lorenzo, Rio Grande do Sul.	Dr. H. von Ithering [C.].
h.	Ad. st., ♀.	Brazil.	Purchased.
i.	{ Ad. sk. } ♀	Brazil.	Mrs. Delaney [P.].
	{ Skull. }		
j.	{ Imm. st. } ♂	Brazil.	Purchased.
	{ Skull. }		

The following names of Marsupials have also been referred to, but no information is obtainable as to the real species for which they stand:—

*Macropus psilopus*, Gould; Owen, Anat. Vert. iii. p. 291 (1868).

*Perameles grisea*, Owen, P. Z. S. 1838, p. 147.

*Perameles radiata*, Owen, P. Z. S. 1839, p. 10.

*Perameles novæ-guinææ*, Rams. Proc. Linn. Soc. N. S. W. i. p. 395 (1877).

*Didelphys superciliaris*, Ill. Abh. Ak. Berl. 1811, p. 107 (1815).

*Didelphys bicolor*, "Tschudi," and *lehmanni*, Schinz, Syn. Mamm. i. pp. 503 & 509 (footnotes) (1844).

And, finally, one animal, referred to this Order, has been so insufficiently described that no idea of its proper position can be gained, nor have any further specimens of it been collected. This is—

*Hyracodon fuliginosus*, Tomes, P. Z. S. 1863, p. 50, pl. viii. (animal).

*Hab.* Ecuador.





# CATALOGUE

OF

# MONOTREMATA.

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## MONOTREMATA.

TERRESTRIAL or aquatic Mammals, bringing forth their young ovi-  
parously, and nourishing them after their exit from the egg with a  
lacteal fluid expressed from the mammary glands into a temporary  
abdominal pouch. The ducts of these glands do not open upon the  
summits of projecting mammæ, but merely upon the surface of the  
bottom of the pouch, into which the head of the young is inserted  
and retained. The oviducts open separately into a cloaca, to which  
there is but a single external orifice for the passage both of the  
fæcal and reproductive elements. The muzzle is produced forwards  
into a beak, either flattened or cylindrical. The opening of the  
external ear is without a conch. The limbs are subequal in length,  
short and powerful, and are modified in one of the two families  
into swimming-paddles. In both families the male possesses a per-  
forated horny spur on the inner side of the heel, supported on a  
special ossicle attached partly or wholly to the distal end of the  
tibia. The spur is connected by a duct with a gland situated at  
the back of the thigh. The tail is either short and broad, or rudi-  
mentary.

In the skeleton clavicles, large and functional coracoids, epicora-  
coids, and epipubic bones are present in both families, and, in  
addition, there is a large T-shaped interclavicle, a bone without  
any homologue in other Mammals.

The skull has a large, smoothly rounded cranial portion and a  
long muzzle modified to support the horny beak. The zygomata  
are complete. The bony palate is much produced backwards, the  
posterior nares being about on a level with the middle of the cranial

cavity. There are no isolated palatal vacuities, although the median line of the palate posteriorly is often more or less imperfect; there are also as a rule large condyloid vacuities. Auditory bullæ are never developed.

True functional teeth are now wholly absent in the Order; but as, in the young of the *Ornithorhynchidæ*, rudimentary teeth are developed beneath the gum, only to be reabsorbed before being cut, it is evident that the ancestors of the Monotremes had functional teeth at no very distant date.

In the *Ornithorhynchidæ* the teeth have been replaced, so far as function is concerned, by horny plates developed from the palatoidges, while in the *Echidnidæ*, just as in the ant-eating Edentates, they have been lost without leaving any functional successors.

Owing to the very numerous accounts of the anatomy and embryology of the Monotremes already existing, it is thought better that no attempt should here be made to describe in detail the many important and essential characteristics of the members of the group; but fairly full bibliographies of the literature of the subject are given below. For the same reason the references to the anatomical and embryological papers have been separated from the ordinary systematic synonyms, and placed together under the headings of the families to which they belong.

### *Synopsis of the Families, Genera, and Species.*

#### I. EXTERNAL CHARACTERS.

- |  |                                       |
|--|---------------------------------------|
| A. Beak cylindrical. Fur mixed with spines. Toes not webbed . . . . .  | I. <i>Echidnidæ</i> , p. 375.         |
| <i>a.</i> Claws 5—5. Beak comparatively short . . . . .  | 1. <i>ECHIDNA</i> , p. 377.           |
| <i>a</i> <sup>1</sup> . Head and body about 350 to 450 millim. Tip of snout to eye about 40 to 55 millim. . . . .  | 1. <i>E. aculeata</i> , p. 377.       |
| <i>b.</i> Claws normally 3—3. Beak very long, curved downwards . . . . .   | 2. <i>PROECHIDNA</i> , p. 382.        |
| <i>b</i> <sup>1</sup> . Head and body about 450 to 600 millim. Tip of snout to eye about 90 to 130 millim. . . . . | 1. <i>P. bruijnii</i> , p. 383.       |
| B. Beak broad and flattened. Fur without spines. Toes webbed. . . . .  | II. <i>Ornithorhynchidæ</i> , p. 385. |
| <i>c.</i> Claws 5—5 . . . . .  | 1. <i>ORNITHORHYNCHUS</i> , p. 387.   |
| <i>c</i> <sup>1</sup> . Head, body, and tail about 400 to 650 millim. in length . . . . .                          | 1. <i>O. anatinus</i> , p. 388.       |

#### II. CRANIAL CHARACTERS.

- |   |                               |
|---|-------------------------------|
| A. Muzzle slender, premaxillæ not expanded in front. No dental organs of any sort present . . . . . | I. <i>Echidnidæ</i> , p. 375. |
|---|-------------------------------|

- a. Muzzle comparatively short, straight or slightly curved upwards. (Dorso-lumbar vertebræ 16-3=19.) . . . . . 1. ECHIDNA, p. 377.  
 a<sup>1</sup>. Basal length about 90 to 120 millim. . . . . 1. *E. aculeata*, p. 377.
- b. Muzzle very long, curved downwards. (Dorso-lumbar vertebræ 17-4=21.) . . . . . 2. PROECHIDNA, p. 382.  
 b<sup>1</sup>. Basal length about 150 to 190 millim. . . . . 1. *P. bruijnii*, p. 383.
- B. Muzzle broad and flat, premaxillæ widely expanded anteriorly. Teeth represented functionally by horny plates . . . . . II. ORNITHORHYNCHIDÆ, p. 385.
- c. Horny plates  $\frac{2}{2} \times 2 = 8$  . . . . . 1. ORNITHORHYNCHUS, p. 387.  
 c<sup>1</sup>. Basal length about 80 to 110 millim. . . . . 1. *O. anatinus*, p. 388.

## . Family I. ECHIDNIDÆ.

Monotremes adapted for a terrestrial and fossorial ant-eating life. Sexes not markedly different in size. Muzzle in the form of a slender cylindrical beak, modified to protect the long, vermiform, and extensile tongue. Fur thickly mixed with stout spines. Tail rudimentary. Limbs short, subequal; claws very broad and strong; toes not webbed. Palms and soles forming broad, soft, and fleshy cushions, without distinct pads.

*Skull* with a large rounded brain-case and a long tapering rostrum, the premaxillæ not expanded anteriorly. Squamosals large; zygomata slender, arising far forward on the brain-case. Palate smooth, concave anteriorly; without vacuities, but generally imperfect in the median line posteriorly. Pterygoids flattened horizontally, and forming part of the floor and inner wall of the tympanic cavity. Tympanic ring slender, incomplete, not ankylosed to the other bones. Mandibles slender, styliform; coronoid process and angle rudimentary; condyles small, longer than broad.

*Teeth* wholly absent.

*Range.* Papuan and Australian subregions.

### *References to Literature bearing on the Anatomy, Embryology, Reproduction, Physiology, &c. of the Echidnidæ.*

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 D'ALTON, Osteol. Zahnlosen Thiere, pls. iii. & iv. (skeleton) (1824).  
 DUVERNOY, Mém. Soc. Strasb. i., Art. F, figs. A-C (1830) (tongue).  
 OWEN P. Z. S. 1832, p. 179 (mammary glands)

- G. CUVIER, Oss. Foss., Atl. pl. 214 (skeleton) (1836).
- EYDOUX and LAURENT, Mag. Zool. 1838, pp. 141-175, pl. xxx., and Voy. Favorite, v. (Zool.), p. 157, pl. ix. (1839) (brain).
- OWEN, Cyclop. Anat. Phys. iii., art. Monotremata, pp. 366-407, figs. 168-202 (1842).
- MAYER, Arch. f. Nat. xv. p. 83 (1849):
- VLACOVIC, SB. Ak. Wien, ix. p. 152, pl. xxv. (1852) (reproductive organs).
- HYRTL. (See under Ornithorhynchidæ.)
- FLOWER, P. Z. S. 1864, p. 18 (brain); *id.* Phil. Trans. clv. p. 633, pl. xxviii. figs. 7-8 (1865) (brain).
- OWEN, Phil. Trans. clv. pp. 671-686, pls. xxxix.-xli. (1865) (pouches, mammary glands, &c.).
- MIVART, Tr. Linn. Soc. xxv. p. 379, pls. lii. & liii. (1866) (myology).
- OWEN, Anat. Vert. vols. ii. & iii. (1866-68).
- PETERS, MB. Ak. Berl. 1867, p. 779 (tympanic bones &c.).
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- HUXLEY, P. Z. S. 1869, p. 404 (malleus, incus, &c.).
- MARTINS, Ann. Sci. nat. (5) xix. Art. 6 (1874) (osteology of fore limbs).
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- CREIGHTON. (See under Ornithorhynchidæ.)
- GERVAIS, Ostéogr. Monotr. (1877) (*Proechidna* only).
- MURIE, J. Linn. Soc. xiv. p. 413 (1878) (skull).
- FEWKES, Bull. Essex Inst. ix. pp. 111-136, pls. i. & ii. (1878) (myology).
- HUXLEY, P. Roy. Soc. xxviii. p. 395, pl. viii. fig. 5 (1879) (pelvis).
- VIALLANES, C. R. lxxxix. p. 910 (1879); *id.* Ann. Sci. Nat. (6) x. Art. 2 (1879) (salivary glands).
- OWEN, P. Roy. Soc. xxx. p. 407 (1880) (ova).
- DOBSON, J. Anat. Phys. xvii. p. 149 (1882) (flexor muscles of foot).
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- HAACKE, Zool. Anz. vii. p. 647 (1884).
- Id.* P. Roy. Soc. xxxviii. p. 72 (1885) (egg, pouch, and mammary glands).
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- BEDDARD, P. Roy. Phys. Soc. Edinb. viii. p. 354, pls. xvi. & xvii. (1885) (ovary).
- GULDBERG, SB. Jenaisch. Ges. 1885, p. 113 (ova).
- FLOWER, Osteol. Mamm. (ed. 3) p. 242, fig. 74 (skull), p. 263, fig. 84 (shoulder-girdle) (1885).
- LENDENFELD, Zool. Anz. ix. p. 9 (1886) (temperature).
- CHAPMAN, P. Ac. Philad. 1887, p. 334, pl. xiv. (tongue and brain).
- MIVART. (See under Ornithorhynchidæ.)
- CALDWELL, Phil. Trans. clxxviii. p. 463, pls. xxix.-xxxi. (1887) (embryology).

## 1. ECHIDNA.

Type.

Echidna, *G. Cuv. Tabl. Elém.* p. 143 (1798), nec *J. R.*  
*Forst. Enchirid. Hist. Nat.* p. 81 (1788 \*) (Pisces) . . . . *E. aculeata.*  
*Tachyglossus, Ill. Prodr. Syst. Mamm.* p. 114 (1811) . . . . *E. aculeata.*  
*Echinopus, G. Fisch. Zoogn.* iii. p. 691 (1814) . . . . . *E. aculeata.*

Toes 5—5, all provided with claws, of which the anterior are broad, little curved, and directed forwards, that of the pollex similar to the others although smaller; the posterior are slenderer, curved outwards; the second, or second and third, very long, much exceeding the fourth and fifth; that of the hallux short, blunt, and rounded. Beak about as long as the rest of the head; straight or slightly curved upwards.

*Skull* smooth, rounded, depressed. Anterior nares situated on the upper surface of the tip. Supraorbital edges rounded, without trace of ridges, but with a blunt conical process marking the junction of the orbital and temporal fossæ. Surface of brain-case not ridged. Palate (compared to that of *Proechidna*) broad and but slightly concave, imperfect in the middle line posteriorly. Length of anterior palatine foramina about one fourth the whole length of the palate.

Vertebrae:—Cervical 7, dorsal 16, lumbar 3, sacral 3, caudal 12; total 41.

*Habits.* Terrestrial, fossorial, myrmecophagous.

*Range.* That of the only species.

The animals belonging to this genus have been divided into several different species; but a careful consideration of their characters shows that, although the range of variation is very large, yet all the intermediate stages appear to exist between the most widely separated forms. Three geographical races, however, seem to deserve recognition by name—a northern, central, and southern; but their distinguishing characters are too slight and too inconstant to justify their specific distinction. A fuller and more detailed account of these characters and their probable origins has been given by the present writer (*P. Z. S.* 1885, p. 329).

1. *Echidna aculeata* †.*a. Echidna aculeata, var. lawesi.*

*Echidna (Tachyglossus) lawesi, Rams. P.' Linn. Soc. N. S. W.* ii. p. 32 (1877); *id. op. cit.* iii. p. 244 (1879).

\* No species being mentioned as the type of Forster's genus, and the description being unrecognizable, his name is of no more validity than a "*nomen nudum*," and cannot therefore prevent the use of Cuvier's name for the present animal.

† *a.* Spines of back nearly or quite hiding the hair. Fur of head, belly, and legs mainly composed of flattened bristles. Third hind claw much

*Tachyglossus lawesi*, *Dubois, Bull. Soc. Zool.* vi. p. 268 (1881); *Peters & Doria, Ann. Mus. Genov.* xvi. p. 688 (1881).  
*Echidna aculeata lawesi*, *Thom. P. Z. S.* 1885, p. 338, pl. xxiii. fig. A (skull), and pl. xxiv. fig. D (claws).

PORT MORESBY ECHIDNA.

Very similar to the typical variety (see next page) in all respects, but differing by its smaller size, shorter dorsal spines, which allow the hair to be seen between them, the more spinous character of the covering of its head, belly, and limbs, and by its lighter and narrower skull and proportionally longer muzzle.

*Dimensions.*

	♀ a (skin). millim.
Head and body .....	350
Tip of muzzle to eye .....	52
Second hind claw .....	32
Third hind claw .....	11·8
Skull, see p. 384.	

*Hab.* S.E. New Guinea (as yet only known from Port Moresby).  
*Type* in the Sydney Museum.

This Papuan variety of *Echidna aculeata* differs much less from the common Australian form than the Tasmanian one does, agreeing with it in the relative lengths of the hind claws and in the absence of condyloid vacuities in the skull. Its small size, bristle-covered head and belly, and narrow skull, however, combined with its different locality, seem to justify its provisional retention as a distinct geographical race.

a. { Ad. sk. } ♀ Port Moresby (*Rev. W. G. Prof. H. N. Moseley*  
 { Skull. } *Lawes*). [P.]

- shorter than second, and scarcely longer than fourth. Condyloid vacuities generally absent.
- a<sup>1</sup>. Size smaller. Hairs of back partly visible between spines. Skull very narrow.—Papuan ..... a. *Var. lawesi*.
  - b<sup>1</sup>. Size larger. Hairs of back quite hidden by spines. Skull broader.—Australian ..... b. *Var. typica*, p. 379.
  - b. Spines of back not hiding the fur. Head, belly, and legs clothed with hair. Third hind claw but little shorter than second. Condyloid vacuities generally present.
  - c<sup>1</sup>. Size larger. Skull broad.—Tasmanian ..... c. *Var. setosa*, p. 381.

b. *Echidna aculeata*, var. *typica*.

- Myrmecophaga aculeata*, *Shaw, Nat. Misc.* iii. pl. cix. (animal) (1792); *id. Gen. Zool.* i. pt. i. p. 175, pl. liv. (animal) (1800); *Bechst. Uebers. vierf. Thiere*, ii. p. 571 (1800); *Turt. Linn. S. N.* i. p. 30 (1806).
- Ornithorhynchus hystrix*, *Home, Phil. Trans.* 1802, p. 348 *et seqq.*, pls. x.-xii. (animal and anat.).
- Echidna hystrix*, *E. Geoff. Cat. Mus.* p. 224 (1803); *id. Bull. Soc. Philom.* iii. "no. 77," p. 226 (misprinted 126), pl. xiv. (animal) (1803); *Desm. N. Dict. d'H. N.* (1) xxiv., *Tabl. Méth.* p. 27 (1804); *id. op. cit.* (2) x. p. 53 (1817); *G. Cuv. R. A.* i. p. 226 (1817); *Schinz, Cuv. Thierr.* i. p. 339 (1821); *Desm. Mamm.* ii. p. 378 (1822); *F. Cuv. Dict. Sci. Nat.* xxxvi. p. 448 (1825); *Gray, Griff. Cuv. An. K.* v. p. 284 (1827); *J. B. Fisch. Syn. Mamm.* p. 401 (1829); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 384 (1836); *Waterh. Cat. Mamm. Mus. Z. S.* p. 68 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 303, pl. xxxiii. (animal) (1841); *Less. N. Tabl. R. A., Mamm.* p. 196 (1842); *Gray, List Mamm. B. M.* p. 192 (1843); *Owen, P. Z. S.* 1845, p. 80 (habits); *Gould, Mamm. Austr.* i. pl. ii. (animal) (1852); *Gieb. Säug.* p. 399 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 289 (1862); *Kreffl, Cat. Mamm. Austr.* p. 55 (1864); *id. Vert. Lower Murray*, p. 23 (1865); *id. Mamm. Austr.* pl. xiv. (animal) (1871); *G. F. Benn. P. Z. S.* 1881, p. 737 (habits).
- Echidna longiaculeata*, *Tiedem. Zool.* i. p. 592 (1808).
- Tachyglossus aculeatus*, *Ill. Prodr. Syst. Mamm.* p. 114 (1811); *Goldf. Handb. Zool.* p. 409 (1820); *Wagl. Syst. Amph. Säug.* p. 59 (1830); *Lütken, P. Z. S.* 1885, p. 150.
- Echinopus hystrix*, *G. Fisch. Zoogn.* iii. p. 692 (1814).
- Echidna aculeata*, *Garnot, N. Bull. Soc. Philom.* 1825, p. 45 (habits); *Waterh. N. H. Mamm.* i. p. 41 (1846); *Gray, P. Z. S.* 1865, p. 386; *id. Handl. Edentates*, p. 31 (1873); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 751 (1884); *Coll. Zool. Jahrb.* ii. p. 937 (1887).
- Echidna australiensis*, *Less. Man. Mamm.* p. 318 (1827).
- Tachyglossus hystrix*, *Kaup, Thierr.* i. p. 255 (1835); *Glog. Handb. Naturg.* i. p. 116 (1842); *Wagn. Schr. Säug. Supp.* iv. p. 242 (1844); *Schinz, Syn. Mamm.* ii. p. 329 (1845); *Armit, J. Linn. Soc.* xiv. p. 411 (1878).
- Echidna australis*, *Less. H. N. Mamm. (Compl. Buff.)*, v., lettering to pl. lii. (1836).
- Echidna acanthion*, *Coll. Forh. Vid. Selsk.* 1884, no. 13 (1885); *id. P. Z. S.* 1885, p. 150.
- Echidna aculeata typica*, *Thos. P. Z. S.* 1885, p. 333, pl. xxiii. fig. B (skull).

## COMMON ECHIDNA.

Size intermediate between the Papuan and Tasmanian varieties. Beak long in proportion. Covering of face and area round ears made up either wholly or largely of flattened bristles. Bristles on face extending forwards on to the beak in front of each eye, leaving a naked backward projection in the central line above, and another on each cheek below the level of the eye. Colour of head not, or scarcely, lighter than that of back. Spines of back long, stout, and strong, often attaining a length of two inches or more, and generally

quite hiding the hairs growing between them. Their colour is pale yellow basally, gradually darkening to orange on their middle portion, and finally to black at their tips; some few, however, are wholly yellow. The hair of the back is black or deep brown, darker than in the Tasmanian variety; this hair is, however, often almost entirely absent, while, on the other hand, it occasionally (perhaps seasonally) exceeds the spines in length on the middle of the posterior back. Limbs and whole of underside clothed with dark brown fur, thickly mixed with flattened bristles. Anterior claws broad, stout, and straight, evenly increasing in length from the sides to the centre of each foot. Palms quite naked, the skin smooth, not granulated or striated, and without pads. On the hind feet the hallux is provided with a short blunt nail, the second toe has a very long and powerful curved claw twisted outwards and backwards, and the third, fourth, and fifth have quite small and feeble claws, disproportionally smaller than the second and apparently of but little functional importance. The tail is about half an inch long, conical, smoothly rounded, quite naked terminally.

*Skull* with a narrow flattened brain-case (capacity 22 to 27 c. cm.) and a long slender rostrum, which is, as a rule, just about as long as the brain-case\*. Posterior basal region of the skull generally without condyloid vacuities.

*Dimensions.*

	♂. l (skin). Adult. millim.
Head and body (approximate).....	390
Tip of muzzle to eye .....	53
Second hind claw .....	38
Third hind claw .....	19
Skull, see p. 384.	

*Hab.* The whole of Australia.

*Type* not in existence.

a. { Imm. al. } ♂, 10/65. Queensland.	Sir D. Cooper [P.]
{ Skull. }	
b. { Ad. sk. } Liverpool Range, N. S. W.	Gould Coll.
{ Skull. } (J. G.)	
c. { Imm. al. } ♂. Port Stevens, N. S. W.	Dr. G. Bennett [P. & C.].
{ Skull. }	
d. { 15 anatomical prepa- } New South Wales. (Dis-	G. F. Bennett, Esq.
{ rations in al. }        sected by Sir R. Owen.)	[P.].
e-g. Ad. al., ♂ ♀. South Australia.	Purchased.
h. Ad. sk., ♂. York, W. A. (J. Gilbert).	Gould Coll.

\* For series of exact measurements, averages, and indices see P. Z. S. 1885, p. 335.

i. Ad. sk.	West Australia.	Baron von Müller [P.].
j. Skeleton.	W. Australia.	Purchased.
k. Ad. st., ♂.		Rev. F. W. Hope [P.].
l-n. } Ad. & imm. sks. }		Haslar Hospital
		Collection.
o. Skeleton.		Purchased.

c. *Echidna aculeata*, var. *setosa*.

"Another species of *Ornithorhynchus*," *Home, Phil. Trans.* 1802, p. 364, pl. xiii. (animal).

*Echidna setosa*, *E. Geoff. Cat. Mus.* p. 226 (note) (1803) (ex *Home*); *id. Bull. Soc. Philom.* iii. "no. 77," p. 226 (misprinted 126), pl. xv. (animal) (1803); *Desm. N. Dict. d'H. N.* (1) xxiv., *Tabl. Méth.* p. 27 (1804); *id. op. cit.* (2) x. p. 53 (1817); *G. Cuv. R. A. i.* p. 226 (1817); *Schinz, Cuv. Thierr.* i. p. 339 (1821); *Desm. Mamm.* ii. p. 379 (1822); *F. Cuv. Dict. Sci. Nat.* xxxvi. p. 448 (1825); *Gray, Griff. Cuv. An. K.* v. p. 284 (1827); *Quoy & Gaim. Voy. Astrolabe, Zool.* i. p. 118, *Atl.* pl. xxi. (beak, &c.) (1830); *Less. N. Tabl. R. A., Mamm.* p. 196 (1842); *Gray, List Mamm. B. M.* p. 192 (1843); *Waterh. N. H. Mamm.* i. p. 47, pl. i. figs. 7-9 (beak and feet) (1846); *Gould, Mamm. Austr.* i. pl. iii. (animal) (1849); *Gunn, P. Roy. Soc. Tasm.* ii. p. 89 (1852); *Gieb. Säug.* p. 399 (1859); *Gerrard, Cat. Bones Mamm. B. M.* p. 289 (1862); *Kreffl, Cat. Mamm. Austr. Mus.* p. 55 (1864); *Gray, Handl. Edentates*, p. 31 (1873); *Jent. Cat. Ost. Leyd. Mus.* p. 326 (1887).

*Echidna breviaculeata*, *Tiedem. Zool.* i. p. 592 (1808).

*Tachyglossus setosus*, *Ill. Prodr. Syst. Mamm.* p. 114 (1811); *Goldf. Zool.* p. 409 (1820); *Glog. Handb. Naturg.* i. p. 116 (1842); *Wagn. Schr. Säug. Supp.* iv. p. 244 (1844).

*Echinopus setosus*, *G. Fisch. Zoogn.* iii. p. 694 (1814).

"*Echidna brevicaudata*, *Tiedem.*," *Gray, P. Z. S.* 1865, p. 386.

*Echidna aculeata setosa*, *Thos. P. Z. S.* 1885, p. 338, pl. xxiii. figs. C & D (skull), and pl. xxiv. figs. A, B, C, & E (skull and claws).

HAIRY ECHIDNA.

Size averaging larger than in the typical variety. Fur covering head, sides, belly, and limbs, composed of hairs only, not mixed with bristles. Colour of head generally markedly paler than that of the rest of the body. Dorsal spines short and stout, exceeded in length and more or less hidden by the hairs growing between them, those of the shoulders, flanks, and hips, however, still remaining longer than the fur. Hairs of back dark brown, those of the belly rather paler; chest commonly with a variable patch of white hairs. Claws of hind feet markedly different in their proportions from those of the typical variety, the third claw being very nearly as long and strong as the second, and much exceeding the fourth and fifth. Exceptions and intermediate conditions occur, however, in this as in the other distinguishing characters of the variety.

*Skull*, especially the brain-case, very large and broad (cranial capacity 27 to 37 c. cm.). Rostrum comparatively short and stout. Condylloid vacuities generally present.

## Dimensions.

	♂. <i>i</i> (stuffed). Old. millim.	♀. <i>e</i> (stuffed). Adult. millim.
Head and body . . . . .	490	410
Tip of muzzle to eye . . . . .	60	53
Second hind claw . . . . .	49	45
Third hind claw . . . . .	41	33

Skull, see p. 384.

*Hab.* Tasmania\*.

*Type* not in existence †.

<i>a.</i> Ad. al., ♀.	Tasmania.	Capt. Mangles [P.].
<i>b.</i> } Ad. sk.	Tasmania.	Capt. Mangles [P.].
} Skeleton (mounted). }		
<i>c, d.</i> } Ad. al.	Tasmania.	Purchased.
} Skull of <i>c.</i> } ♂.		
<i>e, f.</i> Ad. ♀ & imm. st.	Tasmania ( <i>J.G.</i> ).	Gould Coll.
<i>g.</i> } Imm. sk. } ♂.	Tasmania.	Gen. Hardwicke [P.].
} Skulls. }		
<i>h.</i> Ad. st.	Tasmania.	
<i>i.</i> Ad. st., ♂.		H. Farley, Esq. [P.].
<i>j, k.</i> } Ad. al. } ♂ ♀.		Baron von Müller [P.].
} Skulls. }		
<i>l.</i> Yg. al. (28 mm. long).		Baron von Müller [P.].
<i>m, n.</i> } Ad. sks. }		
} Skull of <i>m.</i> }		
<i>o.</i> Skeleton.		Zool. Soc.

## 2. PROECHIDNA.

Type.

Acanthoglossus, <i>Gerv. C. R.</i> 1877, p. 838, nec <i>Kraatz</i> ,	
<i>Arch. f. Nat.</i> 1859, pt. i. p. 144 (Coleopt.) . . . . .	P. bruijnii.
Proechidna, <i>Gerv. Ostéogr. Monotr.</i> p. 43 (1877) . . . . .	P. bruijnii.
Bruijnina, <i>Dubois, Bull. Soc. Zool.</i> vi. p. 267 (1882) . . . . .	P. bruijnii.

Claws normally 3—3 only, but the first and fifth toes, both before and behind, are represented in the skeleton by several phalanges, and in some cases claws are functionally developed on these, so that the number of the claws may equal that found in *Echidna*. Claws of hind feet evenly and slightly decreasing in length from that of the second to that of the fourth digit. Beak nearly twice as long as the rest of the head, curved downwards.

*Skull* less depressed than in *Echidna*. Palate very concave anteriorly, narrower posteriorly than in *Echidna*, and its extreme back less imperfect in the middle line.

\* Specimens agreeing with this rather than with the typical variety may also not improbably be found to occur in Victoria, judging by the resemblance that the climate and fauna of that colony bear to those of Tasmania.

† Geoffroy's name was distinctly founded upon Home's figure and not on any specimen.

Vertebræ:—Cervical 7, dorsal 17, lumbar 4, sacral 3, caudal 12; total 43.

*Range.* That of the only species.

This genus is only doubtfully distinguishable from *Echidna*, agreeing with it in nearly every essential respect. One of its chief characters, moreover, has lately been shown to be inconstant by the description by Dr. Max Weber, under the heading of "Een nieuwe Soort van Proechidna," of a specimen with five anterior and four posterior claws. The agreement of Dr. Weber's animal with *P. bruijnii* in other respects induces me to look upon it as an abnormal individual in which the first and fifth anterior, and the fifth posterior, claws have been developed atavistically, an occurrence that might naturally have been expected sometimes to take place, considering the normally nearly complete development of the digits corresponding to these claws. On the other hand, however, as the external claws show no tendency towards disappearance in *Echidna*, and as there are differences both in the number of the vertebræ and in the structure of the beak, I have thought it advisable to retain, at least for the present, a genus so generally recognized as *Proechidna*.

### 1. *Proechidna bruijnii*.

- Tachyglossus bruijnii*, *Peters & Doria, Ann. Mus. Genov.* ix. p. 183, fig. (skull) (1876); *id. op. cit.* xvi. p. 687 (1881).  
*Acanthoglossus bruijnii*, *Gerv. C. R.* 1877, pp. 837 & 990; *id. Journ. Zool.* vi. p. 375 (1877); *id. Ostéogr. Monotr.* p. 41, *Atl. pl.* vi. (animal), pls. vii.-ix. (skull & skeleton) (1877); *Flow. Encycl. Brit.* (9) xv. p. 378, fig. 22 (animal) (1883).  
*Proechidna bruijnii*, *Gerv. Ostéogr. Monotr.* p. 43 (1877); *Murie, J. Linn. Soc.* xvi. p. 417 (1878); *Thos. P. Z. S.* 1885, p. 339; *Jent. Cat. Ost. Leyd. Mus.* p. 326 (1887).  
*Bruijnina tridactyla*, *Dubois, Bull. Soc. Zool.* vi. p. 266, pls. ix. (skull) & x. (limb-bones) (1882).  
*Echidna bruijnii*, *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 753 (1884).  
*Proechidna villosissima*, *Dubois, Bull. Mus. Belg.* iii. p. 110, pl. iv. (animal & skull) (1884) (juv.).  
 "Een nieuwe Soort van Proechidna," *Weber, Bijd. tot de Dierk., Feest-Nummer.* Art. 5, pl. i. (skull & feet) (1888).

### THREE-TOED ECHIDNA.

General size of body about equalling that of the largest forms of *Echidna*. Fur of head, body, and limbs thick, coarse, and woolly, not or scarcely intermixed with flattened bristles; colour of the fur uniform dark brown or black, the head sometimes nearly white. Spines of back much fewer in number and much shorter than in *Echidna*; their colour generally wholly white, but their bases sometimes brown.

*Skull* as above described; cranial capacity of specimen *a*, 44 c. cm. Condylloid vacuities usually present.

## Skull Measurements of Echidnidae.

Species or variety .....	<i>Echidna oculata.</i>				<i>Proechidna bruijnii.</i>	
	Var. <i>lanesi.</i>	Var. <i>typica.</i>	Var. <i>setosa.</i>		♂ <i>a.</i>	♀ <i>b.</i>
Sex .....	♀ <i>a.</i>	(♂) <i>a.</i>	♂ <i>f.</i>	♀ <i>k.</i>	♂ <i>a.</i>	♀ <i>b.</i>
Specimen .....	adult.	adult.	adult.	adult.	adult.	adult.
Age .....						
Basal length .....	100	112.4	101.3	103.7	156	182
Greatest breadth .....	39.7	49	49	45.7	53.5	60
Length of brain-case * .....	48	55.5	52.3	52	58	58.5
"    rostrum † .....	52.5	57.2	49	52	100	126.5
Rostral index † .....	109	103	94	100	172	216
Interorbital breadth .....	15.2	16.8	14.2	16.4	17	19
Palate, length .....	92	104	92.5	94.5	141	170
"    least breadth below orbital fossæ .....	12.5	15.1	13.5	13.9	12	14.4
Anterior palatine foramen .....	20.4	25	25.4	24.6	34	40

\* From the basion to a point on the palate level with the anterior edge of the lacrymal foramen.

† From the same point to the gnathion.

‡ Deduced from the two preceding measurements.

*Dimensions.*

	♂. <i>a</i> (stuffed). Adult. millim.	♀. <i>b</i> (skin). Adult. millim.
Head and body .....	480	505
Tip of muzzle to eye .....	94 (contracted)	126
Second hind claw .....	47	50
Third hind claw .....	36	35
Fourth hind claw .....	23	29

Skull, see last page.

*Hab.* N.W. New Guinea.

*Type* in the Museo Civico, Genoa.

<i>a.</i>	{ Ad. sk. Skeleton (mounted). }	♂.	New Guinea.	M. Leon Laglaize [C].
<i>b.</i>	{ Ad. sk. Skull. }	♀.	New Guinea.	Purchased.

## Family II. ORNITHORHYNCHIDÆ.

Monotremes adapted for an aquatic fluviatile life. Sexes markedly different in size. Muzzle in the form of a broad, flattened, horny beak, singularly similar to that of a duck. Tongue not extensile. Fur composed of two sorts of hairs; not mixed with spines. Tail well developed, broad and flattened. Limbs short, subequal; hands and feet modified as swimming-organs, the toes broadly webbed. Palms and soles smooth, finely wrinkled, without pads. Horny spur of male much larger than in the *Echidnidæ*.

Skull with a smaller and more flattened brain-case than in the last family; muzzle elongated; premaxillary bones four in number, an external and an internal one on each side, the internal ones, which correspond to that part of the ordinary mammalian premaxillæ lying between the two anterior palatine foramina, fusing together in the median line into a single bone, known as the "dumbbell-shaped bone"; external premaxillaries widely expanded anteriorly, separated both from the internal premaxillaries between them and from each other in front. Squamosals comparatively small; zygomata broad vertically, thin transversely, arising very far back on the skull. Palate smooth, flat, without vacuities. Mandibles comparatively stout, flattened, and twisted outwards in front; base of masseteric fossa hollowed out into a deep cavity communicating with the inferior dental canal, just in the manner so characteristic of the *Macropodidæ* among the Marsupials (*suprà*, p. 4). Condyles large, broader than long.

*Teeth* rudimentary, only found in young animals, and never cutting the gum. These teeth are multicuspid, but there is as yet no evidence as to their individual homologies with the teeth of the Marsupials or other Mammals, although their form and position

both indicate a relationship to premolars or molars rather than to incisors or canines. Their number, so far as is at present known, is probably four in each jaw above and below, making sixteen in all\*.

Functionally, however, teeth are represented in this family by strong horny plates developed from the palate-ridges, and serving, by their power of continuous growth, to make up for the rapid wear caused by the gritty nature of the food.

*Range.* Australian subregion.

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 E. GEOFFROY, Philos. Anat. pp. 114 & 126, pl. ii. fig. 19 (1818) (respiratory organs).  
 JAMIESON, Tr. Linn. Soc. xii. p. 584 (1818) (poisonous effects of blow from spur).  
 HOME, Phil. Trans. 1819, p. 234, pls. xvi.-xix. (ovaries and ova).  
 RUDOLPH, Abh. Ak. Berl. 1820-21, p. 232 (spur).  
 HILL, Tr. Linn. Soc. xiii. p. 622 (1822) (poison-gland, habits, &c.).  
 JAFFÉ, De Ornithorhyncho paradoxo, Diss. Univ. Berol. pls. i. & ii. (1823) (osteology).  
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 E. GEOFFROY, Ann. Sci. Nat. ix. p. 457 (1826).  
 MECKEL, Ornithorhynchi paradoxo, Descriptio anatomica, pls. i.-vii. (1826).  
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 I. GEOFFROY, Dict. Class. d'H. N. xii. p. 592 (1827).  
 E. GEOFFROY, Ann. Sci. Nat. (1) xviii. p. 157, pl. iii. fig. 4 (egg) (1829).  
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 BLAINVILLE, N. Ann. Mus. ii. p. 369, pl. xii. (1833) (reproduction).  
 E. GEOFFROY, P. Z. S. 1833, pp. 28 & 91 (abdominal glands).  
 OWEN, P. Z. S. 1834, p. 43; *id.* Tr. Z. S. i. p. 221, pls. xxxii. & xxxiii. (animal, young, and viscera) (1834).  
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\* This account is taken from the following paper, in which all that is as yet known about the teeth of *Ornithorhynchus* is contained:—Poulton, E. B., "The True Teeth and the Horny Plates of *Ornithorhynchus*," Q. J. Micr. Sci. xxix. p. 9 (1888).

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- PETERS. (See under Echidnidæ.)
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- GIEBEL, Z. ges. Nat. l. p. 96 (1877) (shoulder-gland).
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- GEGENBAUR, Zur Kenntniss der Mammaorgane der Monotremen (1886).
- OWEN, P. Roy. Soc. xlii. p. 391 (1887) (newly born young).
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- POULTON, P. Roy. Soc. xliii. p. 353 (1887) (true teeth).
- MIVART, P. Roy. Soc. xliiii. p. 372 (1887) (dual origin of Monotremes and other Mammals).
- SEELEY, P. Roy. Soc. xliv. p. 131 (1888) (horny plates described as teeth).
- POULTON, Q. J. Micr. Sci. xxix. p. 9, pls. ii.-iv. (1888) (true teeth and horny plates).

## 1. ORNITHORHYNCHUS.

Type.

- Platypus, *Shaw, Nat. Misc.* x. letterpress to pl. 385 (1799); *nec Herbst, Natursyst. Insekt.* v. p. 128 (1793) (Coleopt.)..... O. anatinus.
- Ornithorhynchus, *Blumenb. Voigt's Mag. Naturk.* ii. p. 205 (1800)..... O. anatinus.
- Dermipus, *Wiedem. Zool. Arch.* i. pt. i. p. 180 (1800) .. O. anatinus.

Form elongate, depressed. Toes 5—5, broadly webbed, the membrane anteriorly considerably surpassing the tips of the claws, but posteriorly only reaching to their bases; all the toes with long

claws, the anterior broad and blunt, the posterior compressed and pointed. Beak smooth, evenly rounded, its junction with the head marked, both above and below, by a projecting leathery flap, evidently developed to save the face from injury when the head is plunged in mud or gravel. Beak, excluding the flap, rather shorter than the rest of the head.

*Skull* as already described.

Horny plates two in number on each side of each jaw; but the anterior are far less prominent and markedly specialized than the posterior. The former are long and narrow, and each forms a single longitudinal horny ridge, some 13 to 18 millim. in length, which is placed on the side of the palate about 10 or 15 millim. from its fellow, and with its anterior point about level with the hinder end of the dumbbell-shaped bone. The surface of the bone beneath these plates is quite smooth, and not modified in any way for their support. The posterior plates are situated just below the level of the orbits, and each consists of a single broad horny and cuspidate plate, subdivided by transverse ridges into a small antero-internal and two large posterior portions. In the lower jaw the plates have the same shapes as in the upper, except that the anterior are longer, and that the posterior have their smallest subdivision behind instead of in front. The bone below the posterior plates, both above and below, is broadened and excavated for the reception of their projecting cuspidate bases.

Vertebrae:—Cervical 7, dorsal 17, lumbar 2, sacral 2, caudal 20 or 21; total 48 or 49.

*Habits.* Aquatic, fossorial; feeding on water-insects, crustacea, mollusca, &c.

*Range.* That of the only species.

There appears to be no reason to suppose that there is more than a single species of *Ornithorhynchus*, the marked difference in size between the sexes and a certain variability in colour and texture of fur being apparently responsible for the considerable number of names that the common species bears.

### 1. *Ornithorhynchus anatinus*.

- Platypus anatinus*, *Shaw, Nat. Misc.* x. pls. 385 & 386 (animal, beak, &c.) (1799); *id. Gen. Zool.* i. pt. i. p. 229, pls. 66 & 67 (animal &c.) (1800); *Turt. Linn. S. N.* i. p. 30 (1806); *Gerrard, Cat. Bones Mamm. B. M.* p. 288 (1862); *Gray, P. Z. S.* 1865, p. 385; *id. Handl. Edentates*, p. 29 (1873).
- Ornithorhynchus paradoxus*, *Blumenb. Voigt's Mag. Naturk.* ii. p. 205 (1800); *Home, Phil. Trans.* 1800, p. 432, pls. xviii. & xix. (beak, skull, &c.); *id. op. cit.* 1802, p. 67, pls. ii.-iv. (anat.); *Calcoen, Nat. Verh. Bat. Maatsch-Wet.* ii. pt. i. p. 177 (1803); *Dessn. N. Dict. d'H. N.* (1) xxiv., *Tabl. Méth.* p. 27 (1804); *Blumenb. Abbild. Nat. Gegenst.* no. 41 (animal) (1810); *G. Fisch. Zoogn.* iii. p. 689 (1814); *G. Cuv. R. A. i.* p. 227 (1817); *F. Cuv. Dents Mamm.* p. 202, pl. lxxxiii. (horny plates) (1825); *E. Geoff.*

- Ann. Sci. Nat.* ix. p. 451 (1826); *id. Meckel's Arch. f. Nat.* x. p. 14 (1827); *Gray, Griff. Cuv. An. K.* iii. p. 265 (1827); *Less. Man. Mamm.* p. 319 (1827); *J. B. Fisch. Syn. Mamm.* p. 402 (1829); *Wagl. Syst. Amph. Säug.* p. 59 (1830); *Maule, P. Z. S.* 1832, p. 145 (habits); *Benn. P. Z. S.* 1834, p. 141; *id. Tr. Z. S.* i. p. 229, pl. xxxiv. (animal) (1834) (habits); *Kaup, Thierr.* i. p. 251 (1835); *Less. H. N. Mamm. (Compl. Buff.)* v. p. 386, pl. liii. (animal) (1836); *Waterh. Cat. Mamm. Mus. Z. S.* p. 68 (1838); *id. Jard. Nat. Libr., Mamm.* xi. p. 309, pl. xxxiv. (animal) (1841); *Glog. Handb. Naturg.* i. p. 115 (1842); *Less. N. Tabl. R. A., Mamm.* p. 196 (1842); *Wagn. Schr. Säug. Supp.* iv. p. 262 (1844); *Gieb. Odontogr.* p. 62, pl. xxv. figs. 4 & 8 (dental plates) (1855); *id. Säug.* p. 392 (1859); *G. F. Benn. P. Z. S.* 1877, p. 161 (habits); *Armit, J. Linn. Soc.* xiv. p. 413 (1878).
- Dermipus anatinus*, *Wiedem. Arch. Zool.* i. pt. i. p. 180, pl. iii. (animal) (1800).
- Ornithorhynchus rufus et fuscus*, *Pér. & Les. Voy. Terres Austr., Atl.* pl. xxxiv. (animal) (1807); *Tiedem. Zool.* p. 589 (1808); *Ill. Prodr. Syst. Mamm.* p. 115 (1811); *Leach, Nat. Misc.* ii. p. 136, pl. cxi. (animal) (1815); *Desm. N. Dict. d'H. N.* xxiv. p. 131 (1818); *Goldf. Handb. Zool.* p. 408 (1820); *Schinz, Cuv. Thierr.* i. pp. 340 & 341 (1821); *Desm. Mamm.* ii. p. 380 (1822); *Van der Hoeven, N. Act. Acad. Leop.* xi. p. 361, pl. xlvi. (animal, beak, &c.) (1823); *F. Cuv. Dict. Sci. Nat.* xxxvi. p. 443 (1825); *Gray, Griff. Cuv. An. K.* pp. 284 & 285; *Schinz, Syn. Mamm.* ii. p. 327 (1845).
- Ornithorhynchus brevirostris*, *Ogilb. P. Z. S.* 1831, p. 150; *Schinz, Syn. Mamm.* ii. p. 327 (1845).
- Ornithorhynchus crispus et lævis*, *Macgillivray, Mem. Wern. Soc.* vi. pp. 128 & 132 (1832).
- Ornithorhynchus anatinus*, *Gray, List Mamm. B. M.* p. 191 (1843); *Waterh. N. H. Mamm.* i. p. 25, pl. i. figs. 1-6 (beak, feet, &c.); *Gunn, P. Roy. Soc. Tasm.* ii. p. 89 (1852); *Gould, Mamm. Austr.* i. pl. i. (animal) (1855); *Bennett, P. Z. S.* 1859, p. 213, pl. lxxi. (beak); *Kreffl, Cat. Mamm. Austr. Mus.* p. 56 (1864); *id. Vert. Lower Murray*, p. 22 (1865); *id. Mamm. Austr.* pl. xv. (animal) (1871); *Flow. & Gars. Cat. Ost. Coll. Surg.* ii. p. 753 (1884); *Jent. Cat. Ost. Leyd. Mus.* p. 325 (1887); *Coll. Zool. Jahrb.* ii. p. 940 (1887).

#### DUCK-BILLED PLATYPUS.

Male markedly larger than female. Fur of two sorts, the longer fur crisp, shining, sometimes curly, the underfur short, soft and woolly. General colour above deep umber-brown, sometimes redder, and sometimes blacker. Leathery covering of bill black above, yellow and black below. A spot round each eye white or yellowish. Chin, chest, and belly dirty greyish white, the hairs grey basally and white terminally; patches of dull chestnut, however, often present on the chin, round the insertions of the limbs, in the anal region, and along the posterior part of the centre of the belly. Tail coloured above like the back, below generally naked in adults; but if hairy it is whiter than the rest of the animal.

Other characters as described above.

## Dimensions.\*

	♂. <i>t</i> (in spirit). Adult. millim.	♀. <i>j</i> (in spirit). Adult. millim.
Head and body . . . . .	420	330
Tail . . . . .	143	112
Beak, length (excluding flap) . . . .	61	53
„ breadth . . . . .	46	41
Depth of flap in centre above . . . .	20	15
„ „ „ below . . . . .	18	14
Lower leg . . . . .	82	63
Hind foot . . . . .	62	45

Skull, see next page.

*Hab.* Queensland southwards of 18° S. lat., New South Wales, Victoria, South Australia, and Tasmania.

*Type* in collection.

<i>a.</i> Ad. sk., ♂.	Namoi R., New South Wales ( <i>J. G.</i> ).	Gould Coll.
<i>b-d.</i> ♂ & 2 imm. ♀, al.	Shoalhaven R., N. S. W.	Sir D. Cooper [P.].
<i>e.</i> Skull, ♂.	Shoalhaven R.	Dr. J. Macgillivray [P. & C.].
<i>f-h.</i> Imm. al., ♂ & 2 ♀.	New South Wales.	Dr. G. Bennett [P. & C.].
<i>i-m.</i> Ad. al., ♂ & 4 ♀, 11 & 12/79.	Coranderk Aboriginal Station, Victoria.	Sir R. Owen [P.].
<i>n.</i> { Ad. sk. } ♂. { Skull. }	Victoria.	J. Thies, Esq. [P.].
<i>o.</i> Ad. st., ♂.	South Australia.	Sir G. Grey [P. & C.].
<i>p.</i> Ad. st., ♂, 11/38.	New Norfolk, Tasmania ( <i>J. G.</i> ).	Gould Coll.
<i>q.</i> Ad. sk., ♂.	Tasmania.	Gen. Sir J. H. Lefroy [P.].
<i>r.</i> Ad. sk., ♀.	Tasmania.	Capt. Ross [P.].
<i>s.</i> { Imm. sk. } ♂. { Skull. }		R. Latham, Esq. [P.]. ( <i>Type</i> of species.)
<i>t.</i> Ad. al., ♂.		Sir R. Owen [P.].
<i>u, v.</i> Yg. al., 55 & 90 mm. long respectively.	[Figured by Owen.]	Zool. Soc.
<i>w.</i> Ad. al., ♂.		
<i>x.</i> Ad. st., ♂.		Miss Reeves [P.].
<i>y.</i> Ad. sk., ♀.		Purchased.
<i>z.</i> Yg. st., ♂.		Purchased.
<i>a'.</i> Yg. sk., ♂.		
<i>b'.</i> Ad. skeleton, ♀ (mounted).		
<i>c'.</i> Ad. skeleton, ♂.		Mantell Coll.
<i>d'.</i> Imm. skeleton.		Sir R. Owen [P.].
<i>e'.</i> Ad. skull, ♂.		Yarrell Coll.

\* The largest skins in the collection considerably exceed these dimensions; thus specimen *q* (♂) has a total length (including tail) of 650 millim., and specimen *y* (♀) of 570, but they may, in each case, have been stretched in the skinning.

*Skull Dimensions of Ornithorhynchus.*

Species .....	<i>O. anatinus.</i>	
Sex .....	♂.	♀.
Specimen.....	<i>e'</i> .	<i>θ'</i> .
Age .....	adult.	adult.
Basal length .....	108	81·8
Greatest breadth .....	52	38
Breadth across expanded premaxillæ .....	33·2	25·2
Interorbital breadth .....	15	12·4
Palate, length (from front of premaxillæ) ...	92·5	70
„ breadth outside dental plate .....	37·8	29·5
Posterior dental plate, length (obliquely).....	18·5	13·6
„ „ „ breadth at central transverse ridge .....	9	7·3



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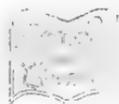
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J. Smit del et lith

Mint. err. Proc. imp

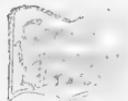
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2. *Didelphys (Peromys) scalops*.



2



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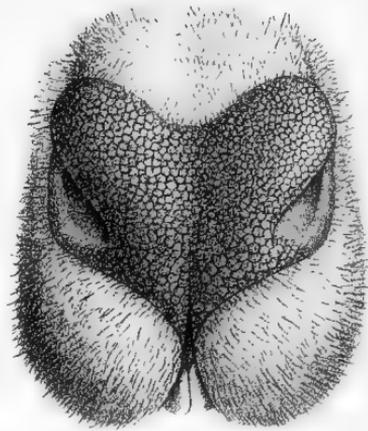


J. Smit del. et lith.

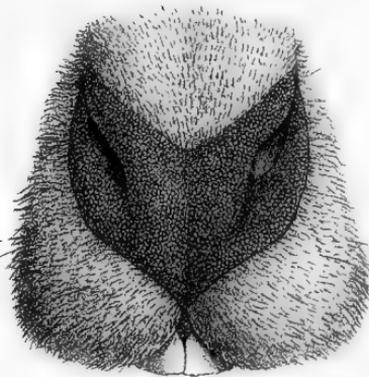
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Mintern Bros. imp.





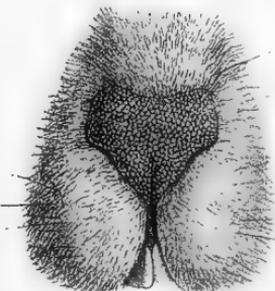
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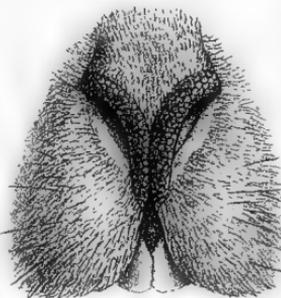
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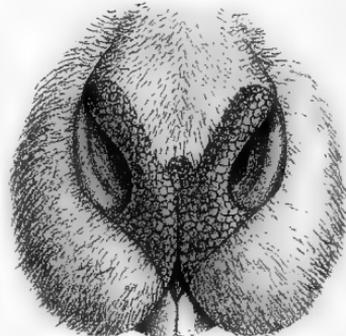
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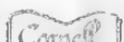
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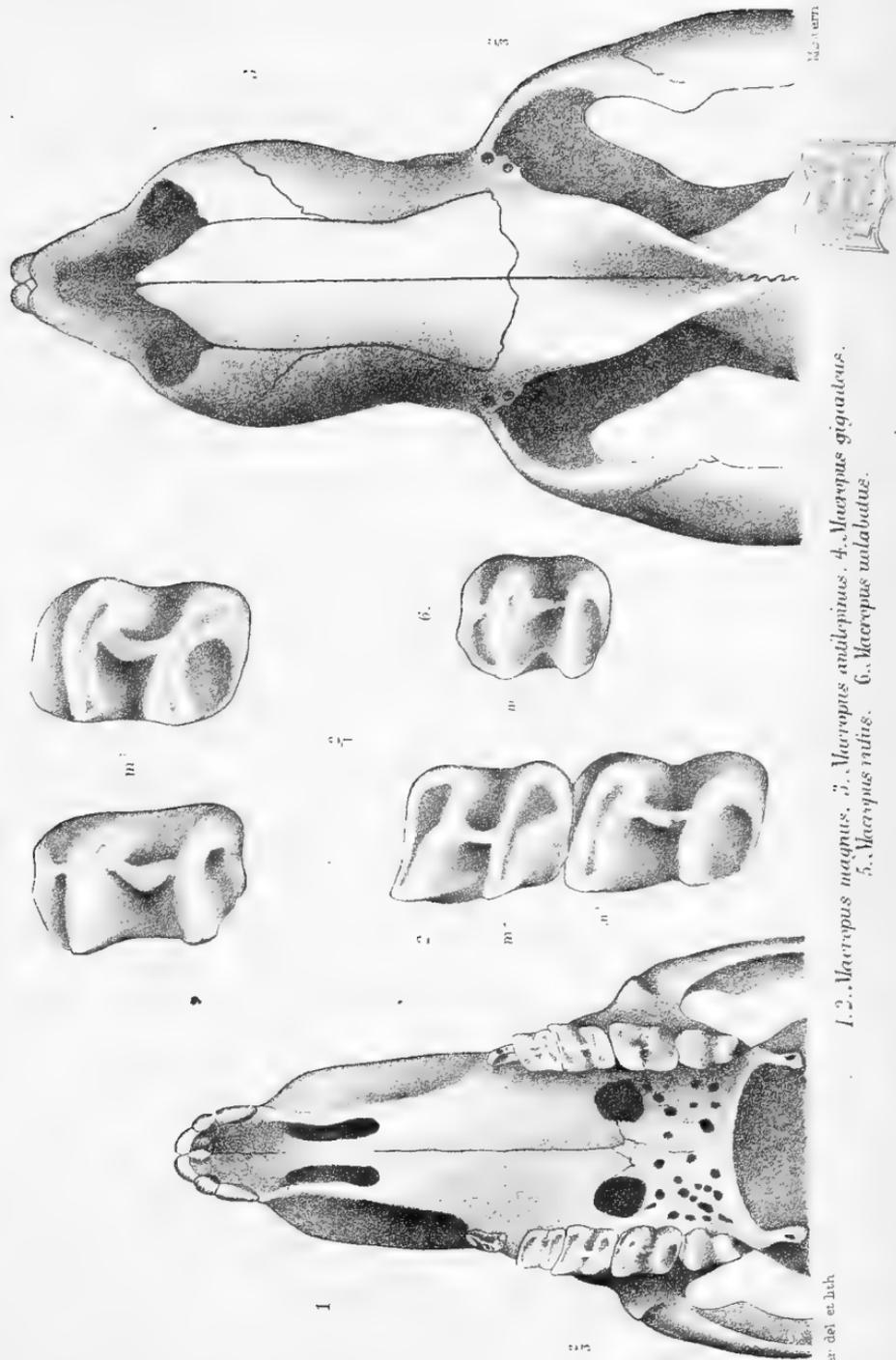
F. Marten del et lith

1. *Macropus giganteus*. 2. *M. robustus*. 3. *M. rufus*.  
4. *M. ruficollis* 5. *M. dorsalis* 6. *M. irma*. 7. *M. agilis*

M. Stern Bros. ...





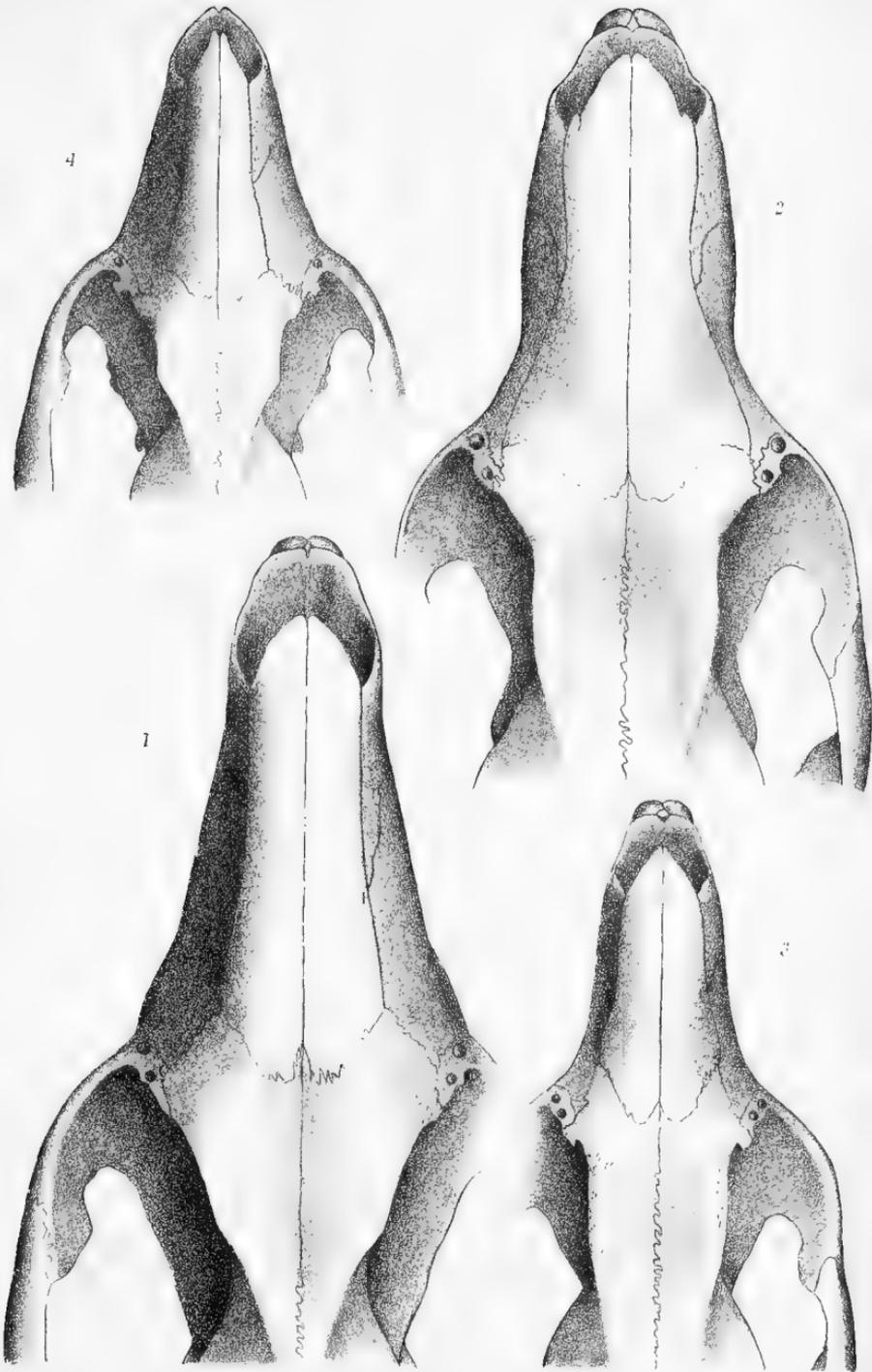


1. 2., *Macropsus inaquus*, 3., *Macropsus antilepinus*, 4., *Macropsus gigalocus*,  
 5., *Macropsus rufus*, 6., *Macropsus volabatus*.

Manum Boesley

M. H. Fisher del. et lith.





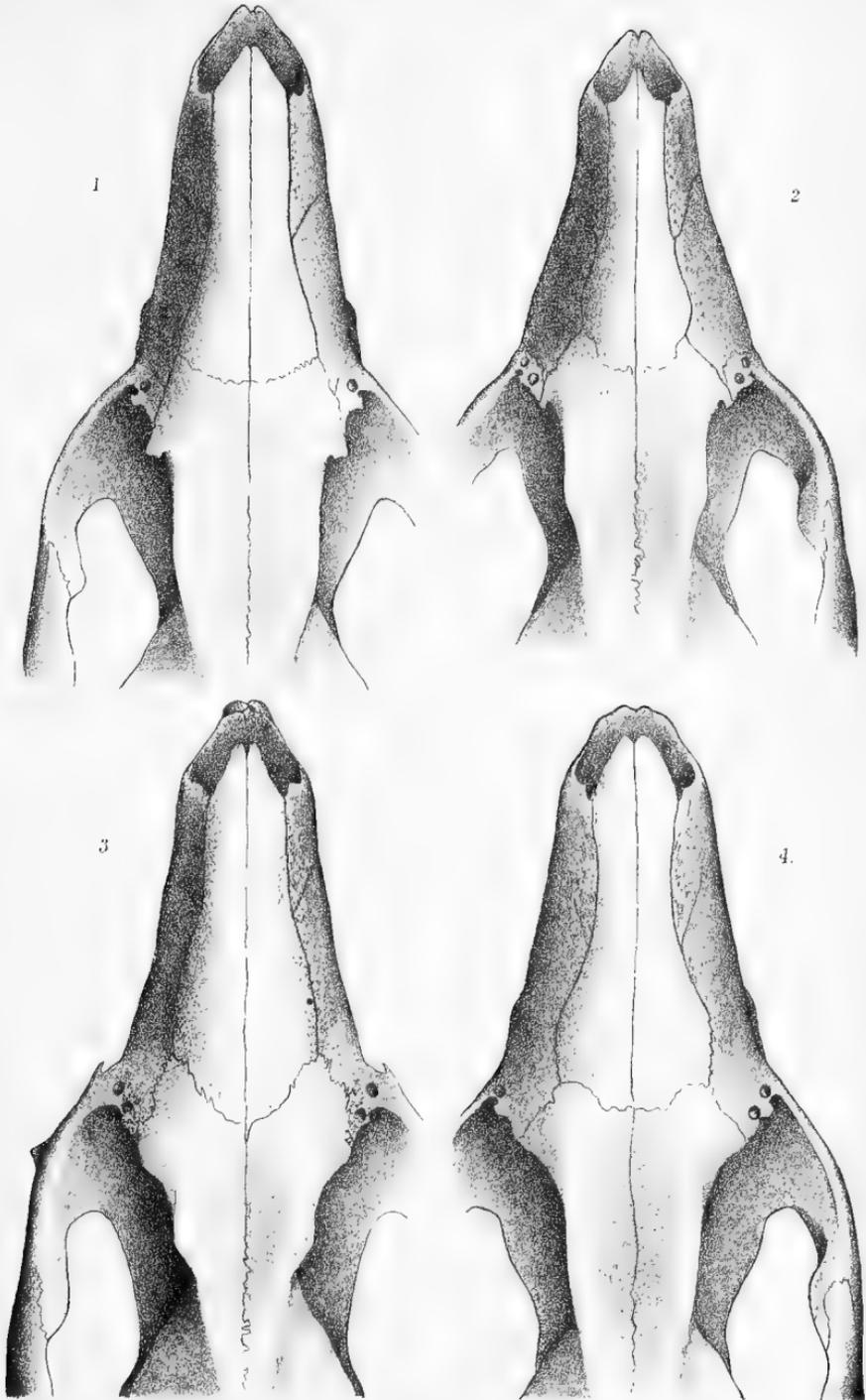
M H Fisher del et lith.

1. *Macropus agilis*. 2. *Macropus greyi*.  
3. *Macropus eugenii*. 4. *Macropus brachyurus*.

Mirdern Bros. imp







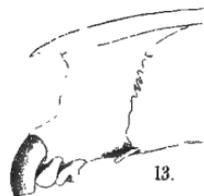
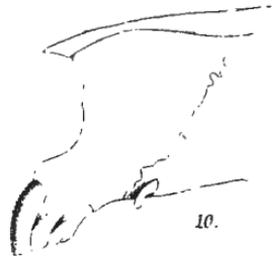
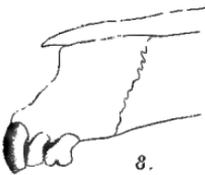
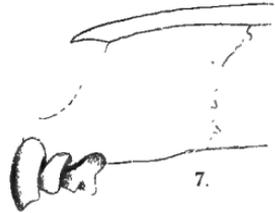
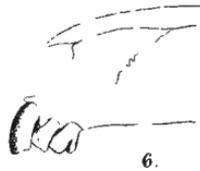
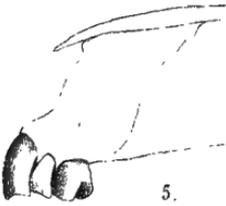
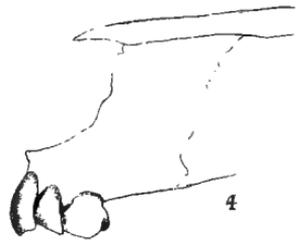
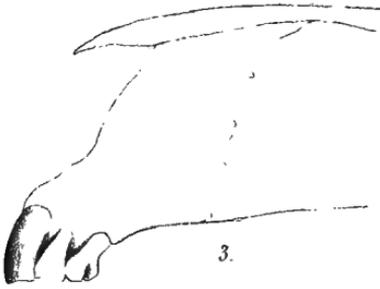
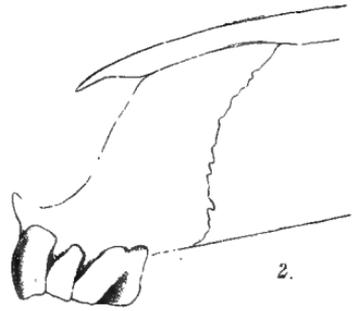
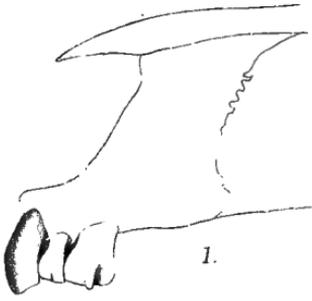
M H Fisher del et lith.

1. *Macropus coxeni*. 2. *Macropus wilcoxi*.  
3. *Macropus thetidis*. 4. *Macropus brunii*.

Mintern, Bros. imp.







M.H. Fisher del. et lith.

Mintern. Br. u. inn.

1. *Macropus ualabatus*. 2. *M. ruficollis*. 3. *M. greyi*. 4. *M. thetidis*.  
 5. *M. parma*. 6. *M. brachyurus*. 7. *Petrogale penicillata*. 8. *P. lateralis*.  
 9. *P. concinna*. 10. *Onychogale unguifera*. 11. *O. lunata*.  
 12. *Lagorchestes conspicillatus*. 13. *L. leporoides*.





1.



2.



3.



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— 11 —



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13.



14.



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16.

Mintern Bros. lith.

1. *Macropus ualabatus*. 2. *M. ruficollis*. 3. *M. dorsalis*. 4. *M. parryi*.

5. *Magilis*. 6. *Moxeni*. 7. *M. stigmaticus*. 8. *M. wilcoxi*.

9. *M. thetidis*. 10. *M. eugenii*. 11. *M. parma*. 12. *M. billardieri*.

13. *M. brachyurus*. 14. *Petrogale penicillata*. 15. *P. lateralis*. 16. *Lagorchestes conspicillatus*.



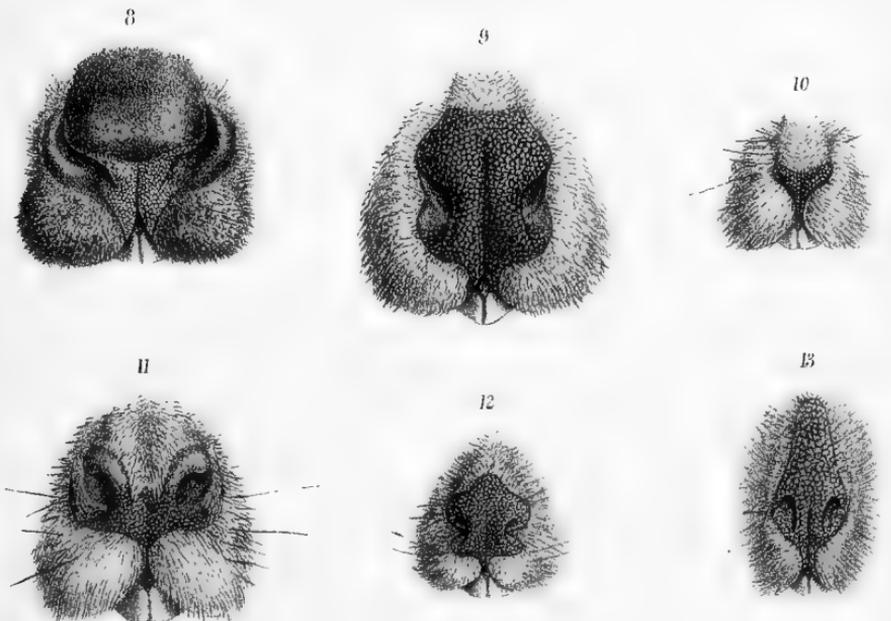
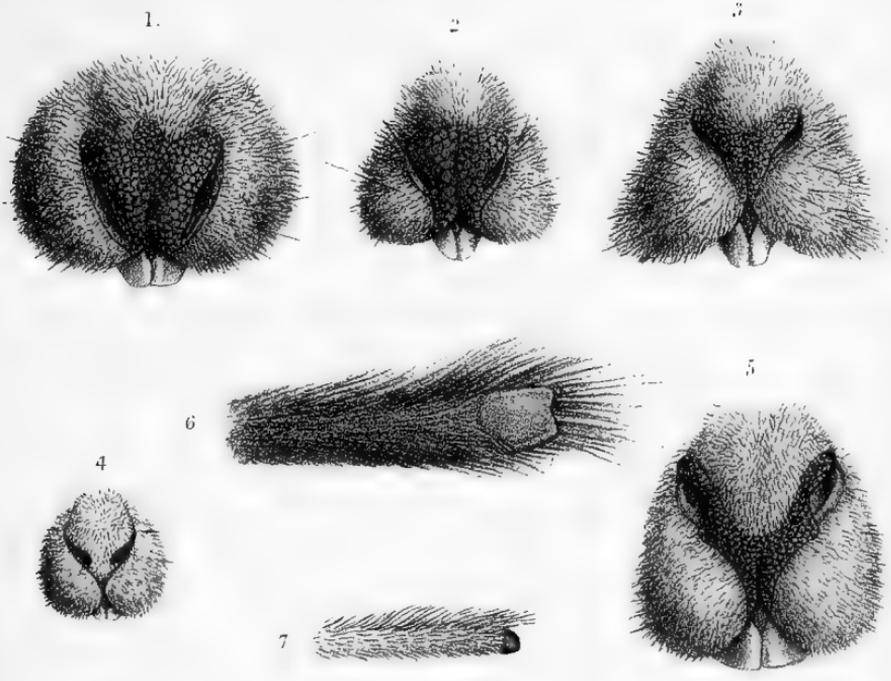


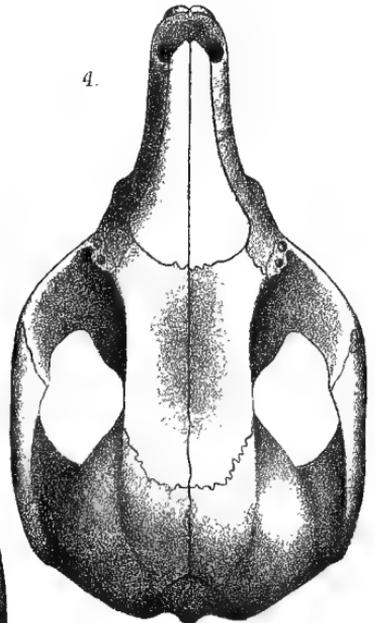
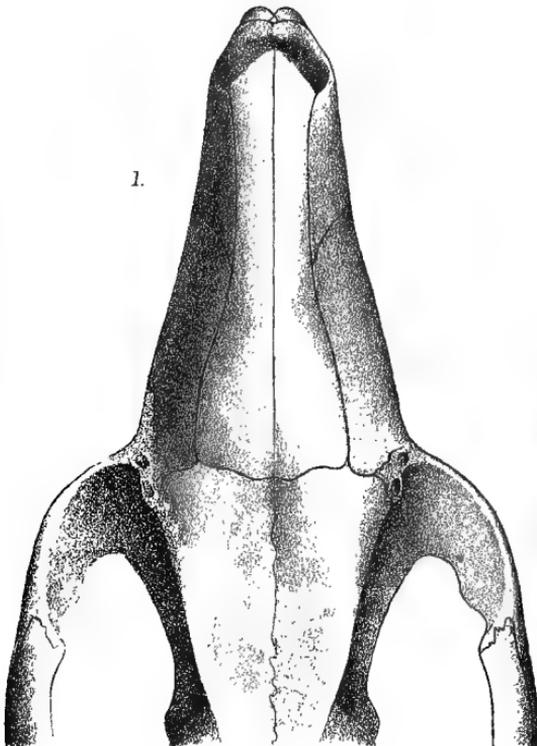
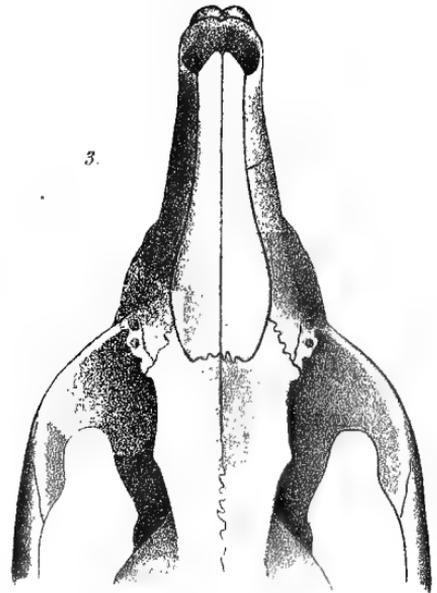
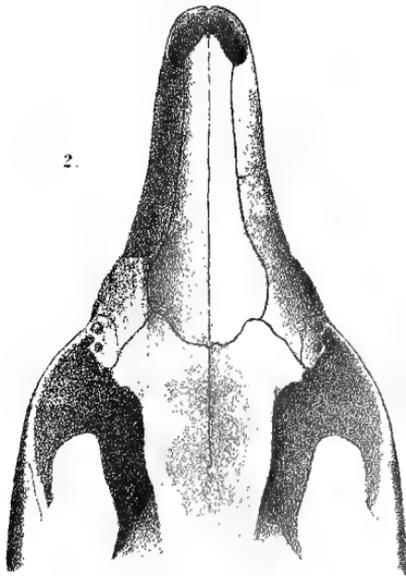
Illustration del. et lith.

Minterz Brca. imp

1. *Macropus coxeni*. 2. *M. thetidis*. 3. *M. eugenii*.  
 4. *Lagorchestes leporoides*. 5, 6. *Onychogale unguifera*. 7. *O. frenata*.  
 8. *Dendrolagus ursinus*. 9. *Dorcopsis mülleri*. 10. *Lagostrophus fasciatus*.  
 11. *Eucosmops uropygialis*. 12. *Pellonura versicolor*. 13. *Potorous tridactylus*.

m.





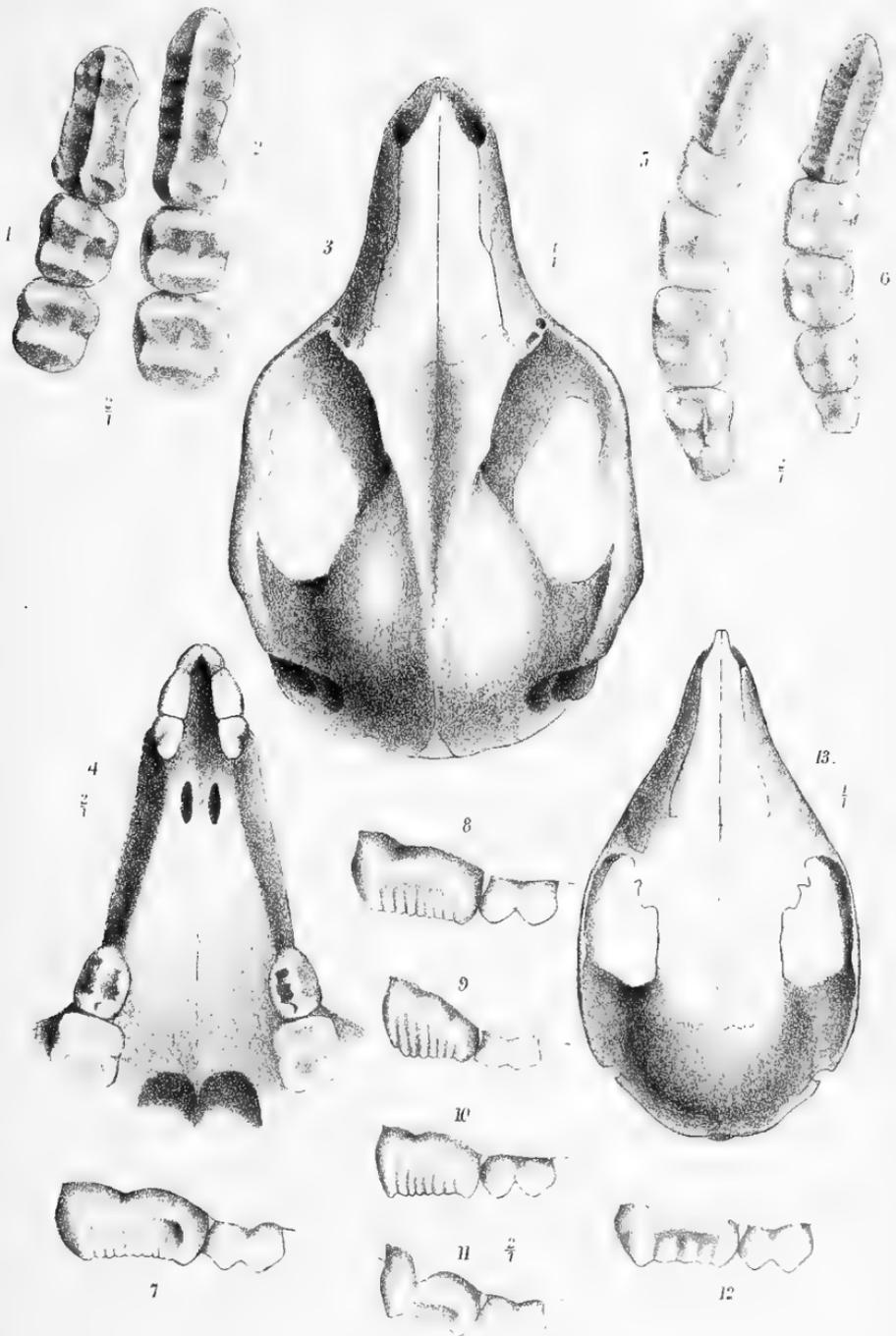
M. H. Fisher del. et lith.

Mintern Bros. imp.

1. *Petrogale xanthopus*. 2. *Petrogale brachyotis*.  
3. *Petrogale lateralis*. 4. *Petrogale concinna*.







M.H. Fisher del et lith

Mirumers Bros. imp

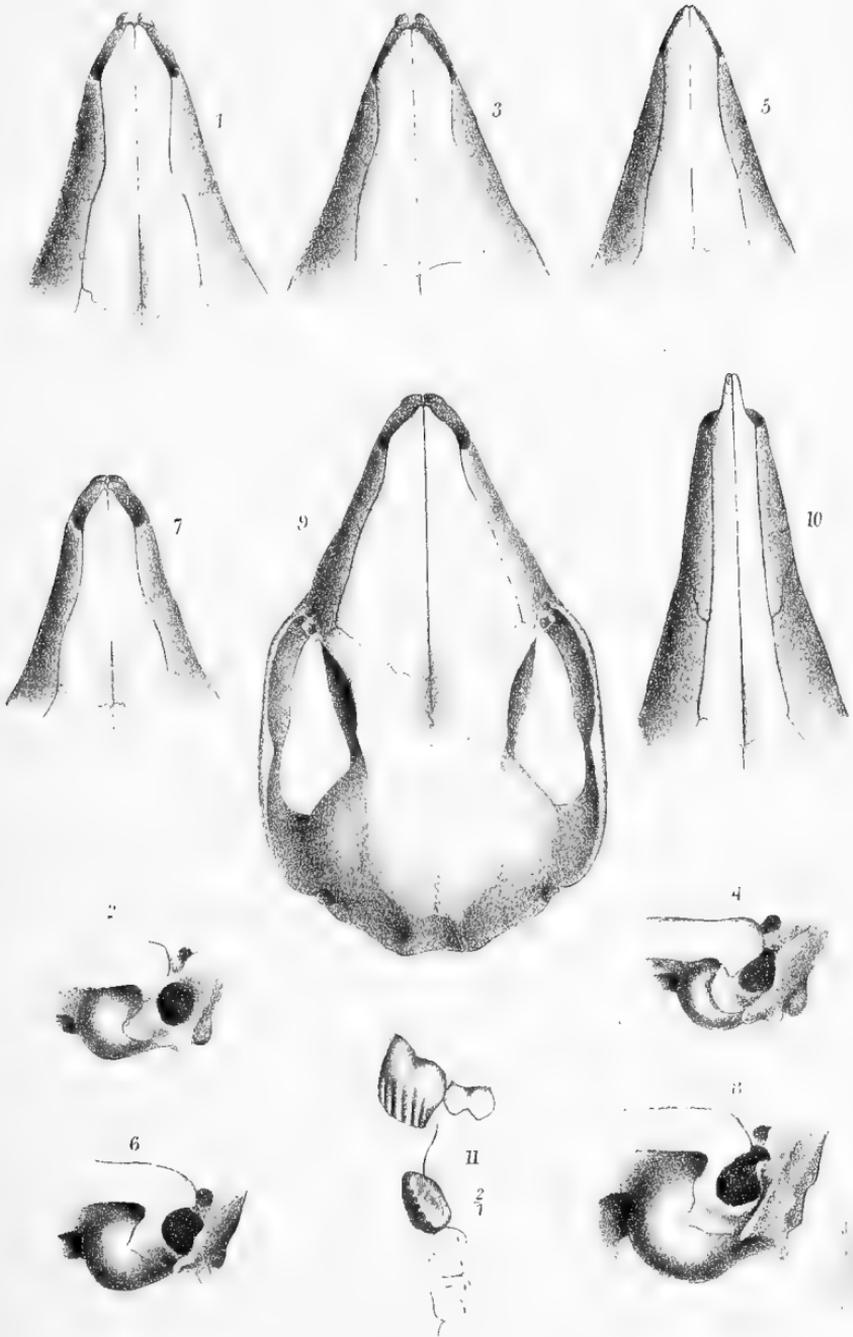
1. *Dendrolagus lunholtzi*. 2. *Dorcopsis luctuosa*. 3. *Lagorchestes conspicillatus*.

4. *Lagostrophus fasciatus*. 5. *Aepyprymnus rufescens*

6, 7. *Bettongia lesueuri*. 8. *B. cuniculus*. 9. *B. penicillata*. 10. *B. gaimardi*.

11. *Caloprymnus campestris*. 12. *Pteropus tridactylus*. 13. *P. platyops*.





M. H. Fisher del. et lith.

Minterr. Bros. imp

1, 2. *Bettongia cuniculus*. 3, 4. *B. gaimardi*. 5. 6. *B. penicillata*. 7, 8. *B. lesueuri*.  
 9. *Caloprymnus campestris*. 10. *Putorius tridactylus*. 11. *Hypsiprymnodon moschatus*.

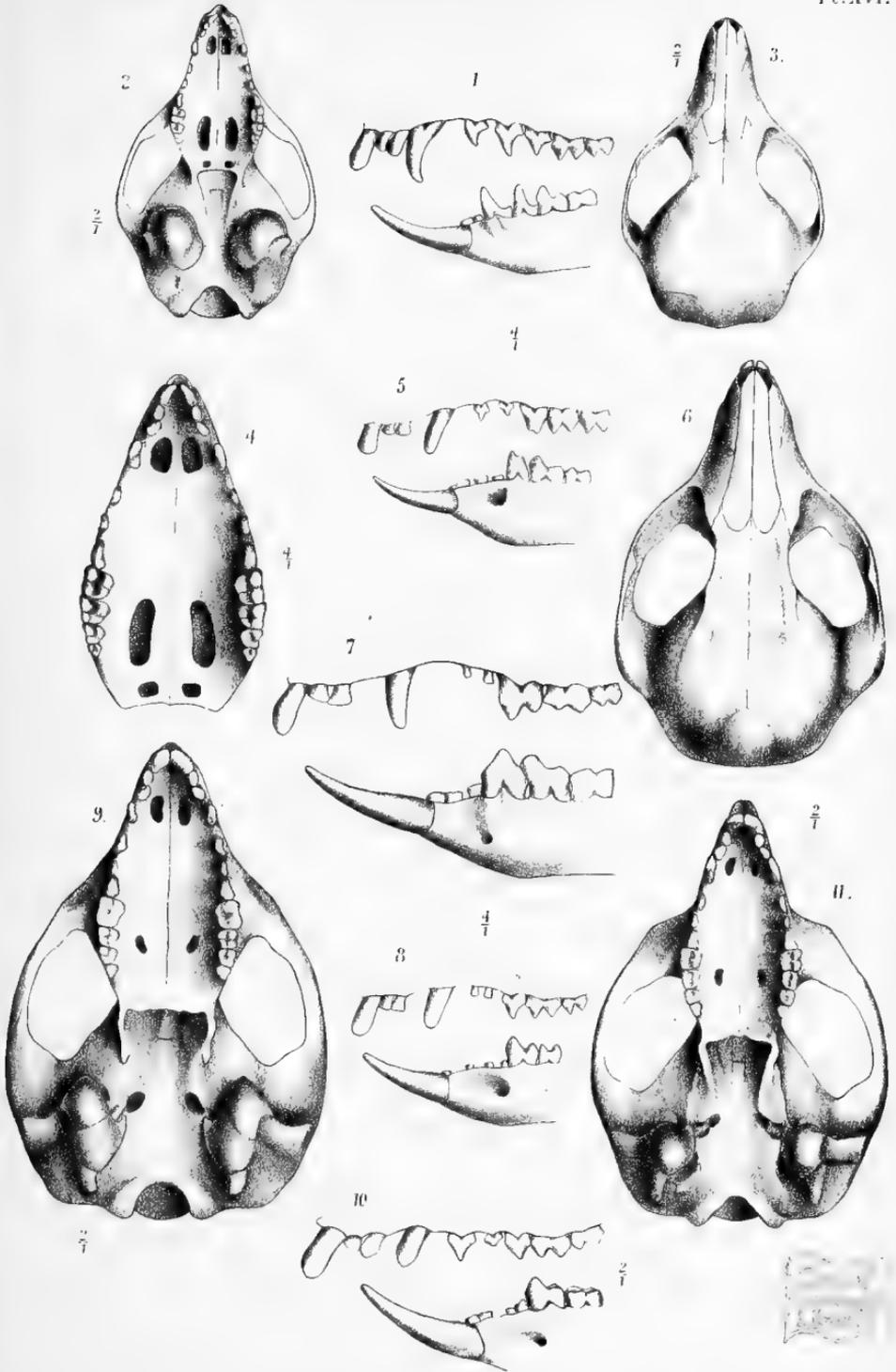




R. Minterm del. et lith.

1. *Hypsiprymnodon moschatus*. 2, 3, 4. *Acrobates pygmaeus*. 5. 6. 7. *Dromicia nana*.  
 8. *D. lepida*. 9. *Petaurus breviceps*. 10. *P. breviceps* var. *papuanus*.  
 11. *P. australis*.



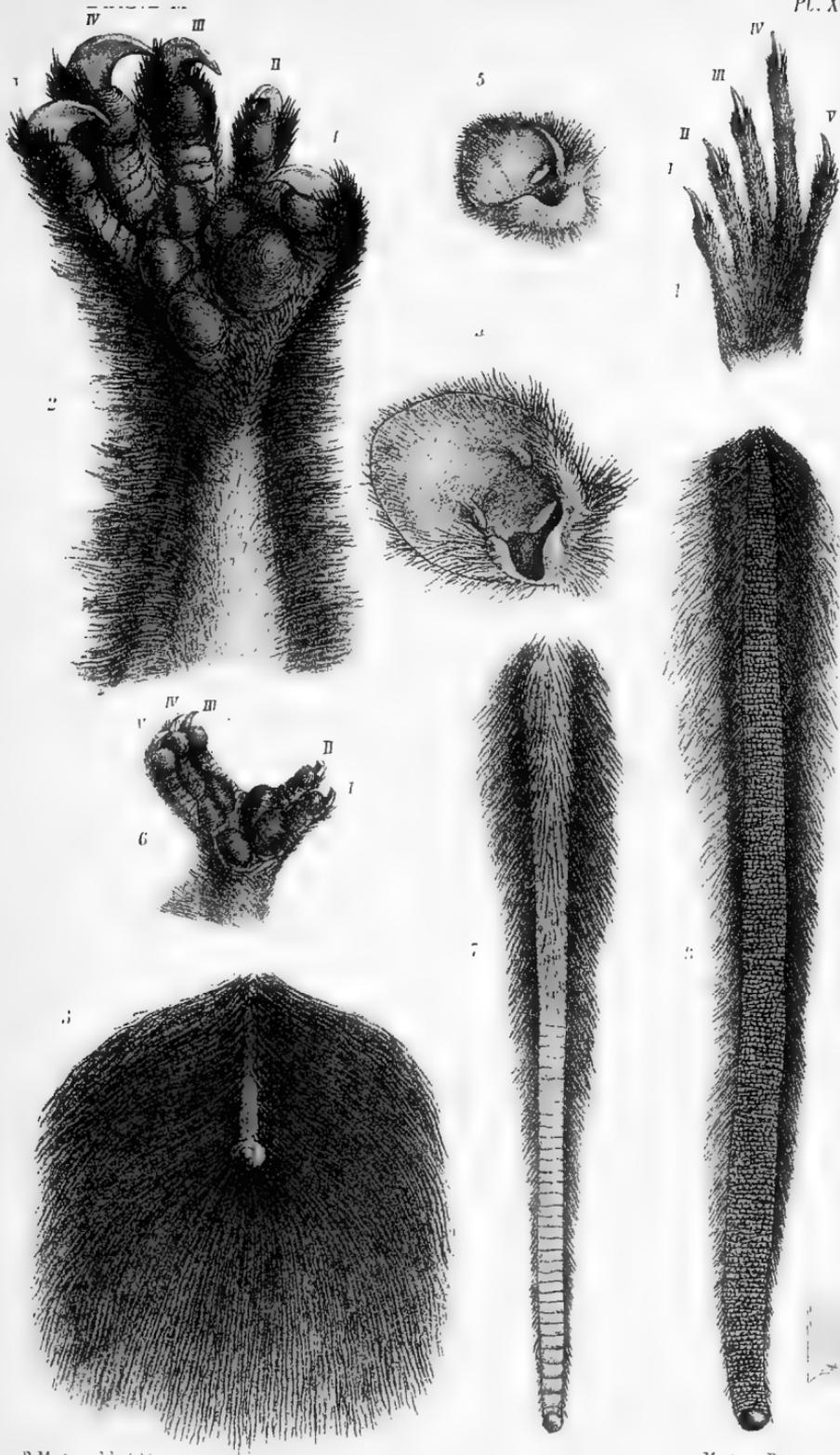


M H Fisher del. et lith.

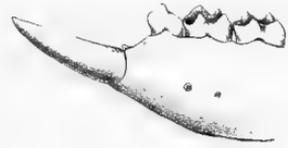
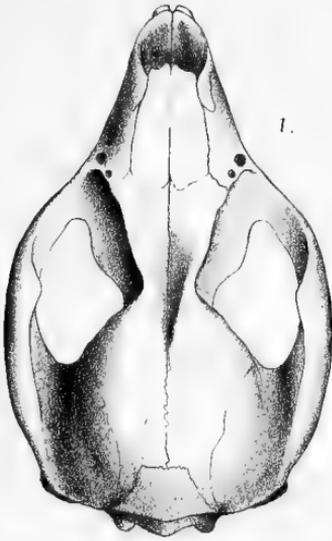
Mintern Bros. imp.

1. *Acrobates pygmaeus*. 2, 3, 4, 5. *Dromicia lepida*. 6, 7. *D. narva*.  
 8. *D. concinna*. 9, 10. *Petaurus breviceps*. 11. *P. breviceps* var. *papuanus*.

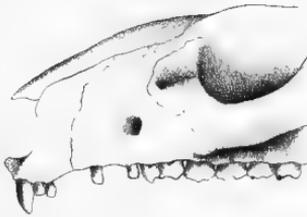








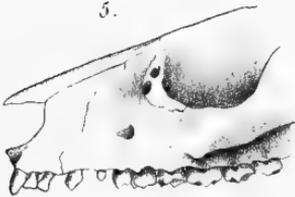
4



6



5

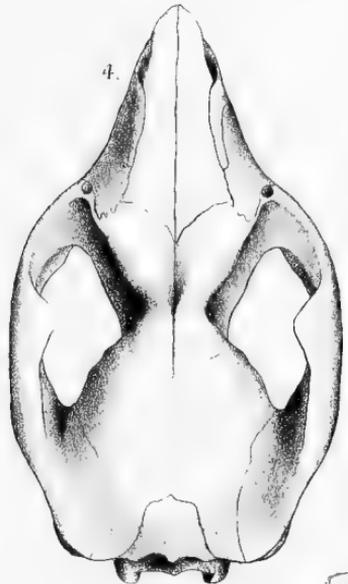
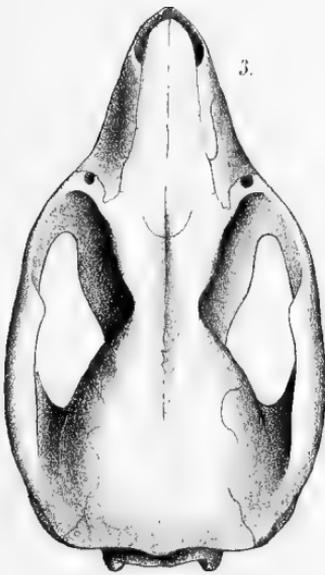
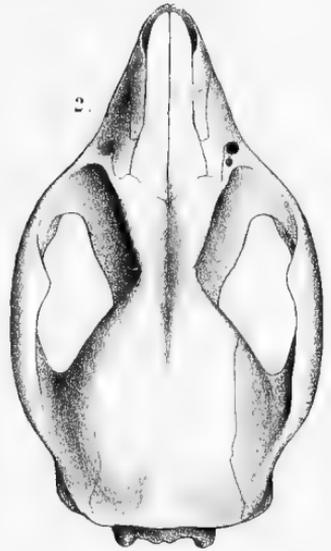
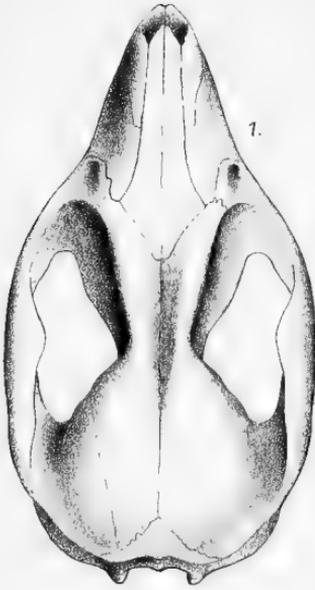


7



1, 2. *Petauroides volans*. 3. *P. volans* var. *minor*.  
 4. *Pseudorhynchus herbertensis*. 5. *Ps. nectararius*. 6. *Ps. occidentalis*. 7. *Ps. cooki*.

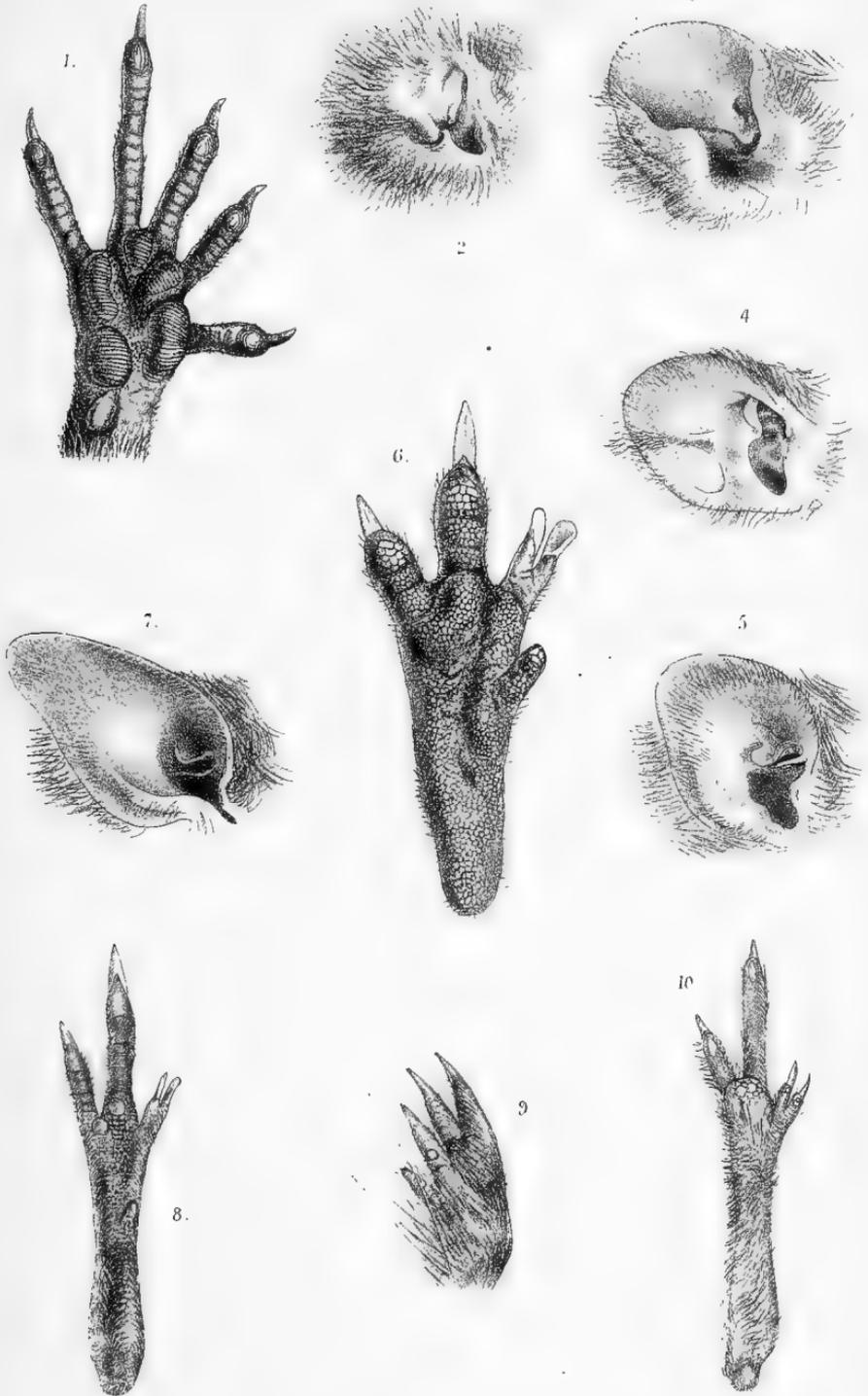












Peter Sarrat del. et lith.

Mintern Bros. imp.

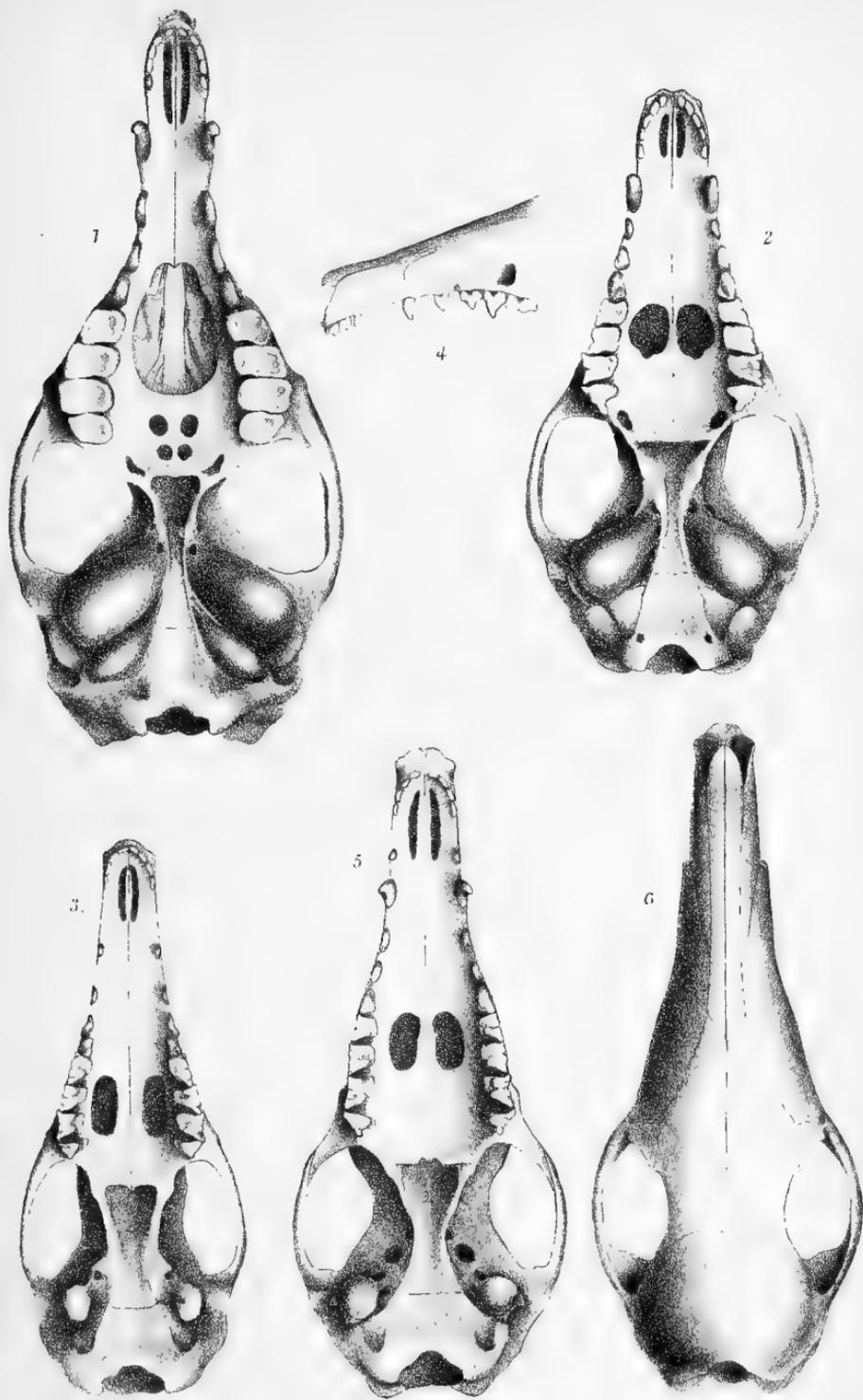
1. *Dactylopsila trivirgata*. 2. *Phalanger maculatus*. 3. *Ph. orientalis*.

4. *Ph. celebensis*. 5. *Perameles obesula*. 6. *P. doreyana*.

7. 8. *P. harrisi*. 9. 10. *Perogale leucura*.







M. H. Fisher del. et lith.

Mintern. Proc. imp.

1. *Peragule lagotis*. 2. *Perameles moreshbyensis*.  
 3. *P. doveyana*. 4. *P. cockerelli*. 5, 6. *P. nasuta*.







1.



2.



3.



5.



8.



4.



6.



7.



9.



10.

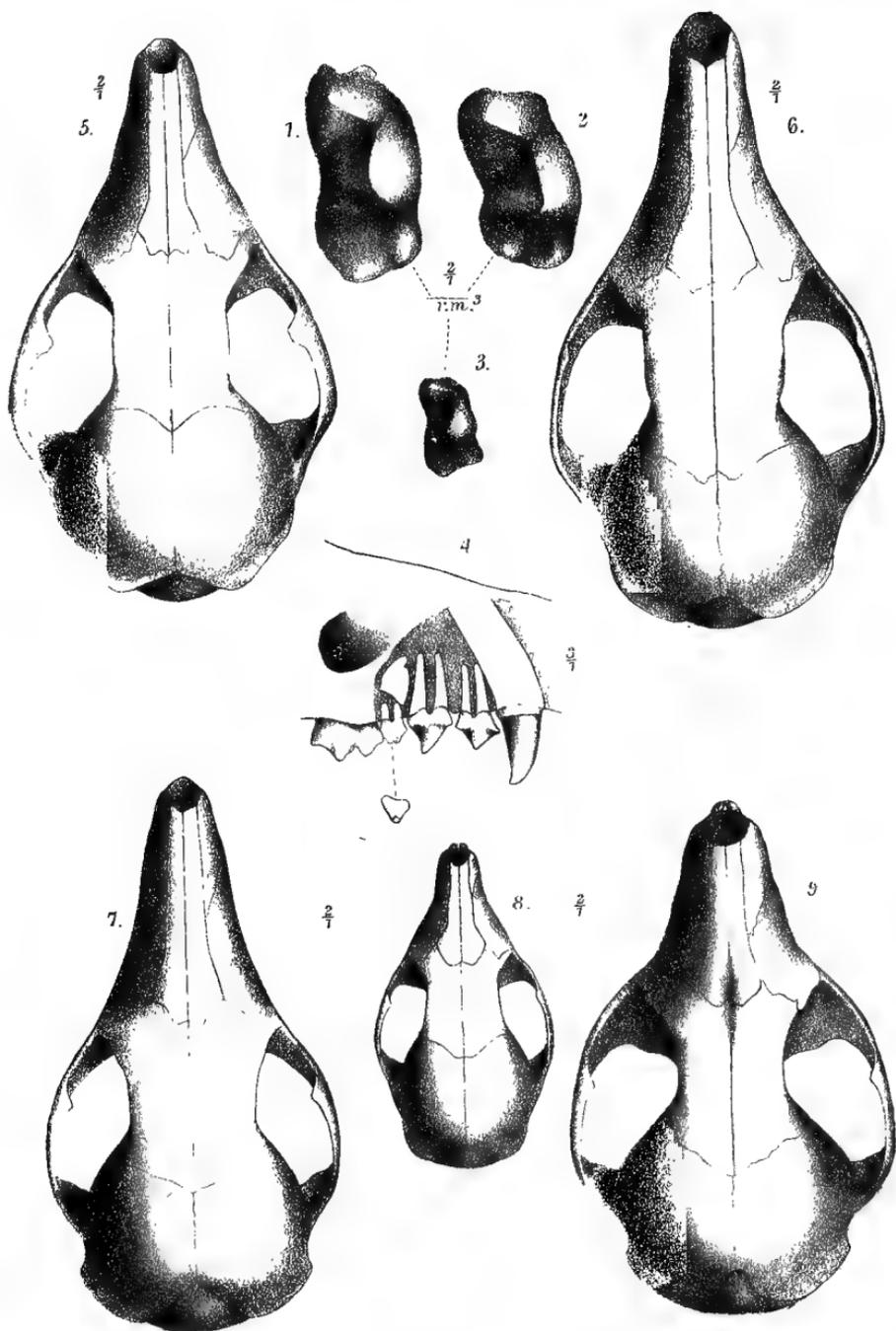
Peter Smit del et lith.

Mintern Bros. imp.

1, 2. *Dasyurus geoffroyi*. 3. *Phascogale wallacei*. 4. *Ph. penicillata*.  
5, 6. *Sminthopsis leucopus*. 7. *S. murina*. 8. *S. crassicaudata*.  
9. *Antechinomys luniger*. 10. *Myrmecobius fasciatus*.





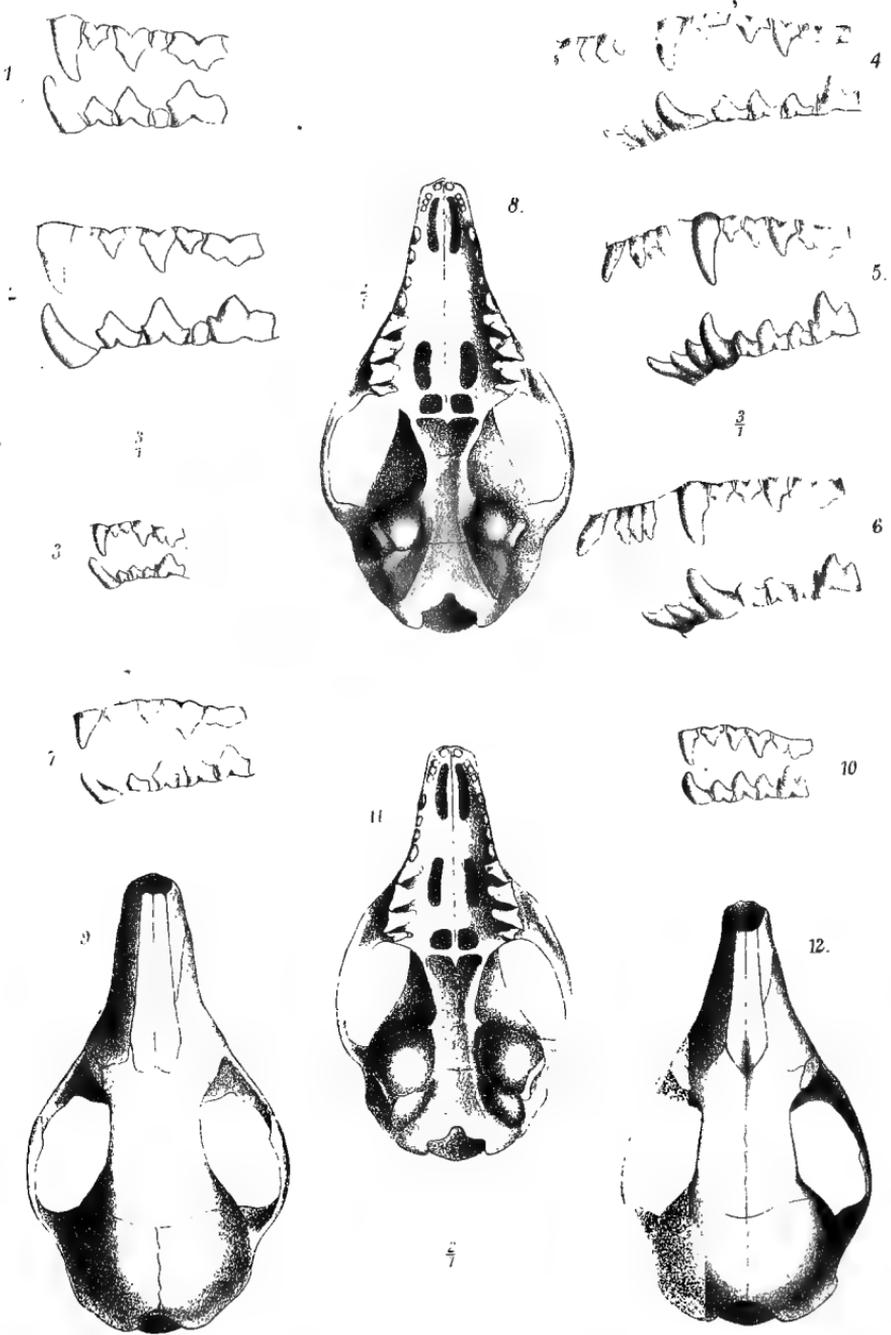


M. H. Fisher del. et lith.

1. *Thylacinus cynocephalus*. 2. *Sarcophilus ursinus*. 3. *Dasyurus maculatus*.  
 4. *Phascologale penicillata*. 5. *Ph. apicalis*. 6. *Ph. dorsalis*.  
 7. *Ph. swainsoni*. 8. *Ph. minutissima*. 9. *Ph. calura*.

Mintern Bros. imp.





M. H. Fisher del. et lith.

Mintern Bros. imp.

1. *Phascogale apicalis*. 2. *Ph. dorsalis*. 3. *Ph. minutissima*. 4. *Ph. swainsoni*.  
 5. *Ph. flavipes*. 6. *Ph. calura*. 7, 8, 9, *Sminthopsis leucopus*.  
 in *Sminthopsis leucopus*. 10. *Amphibionomys laniger*.

5. *Ph. flavipes*  
 6. *Ph. calura*





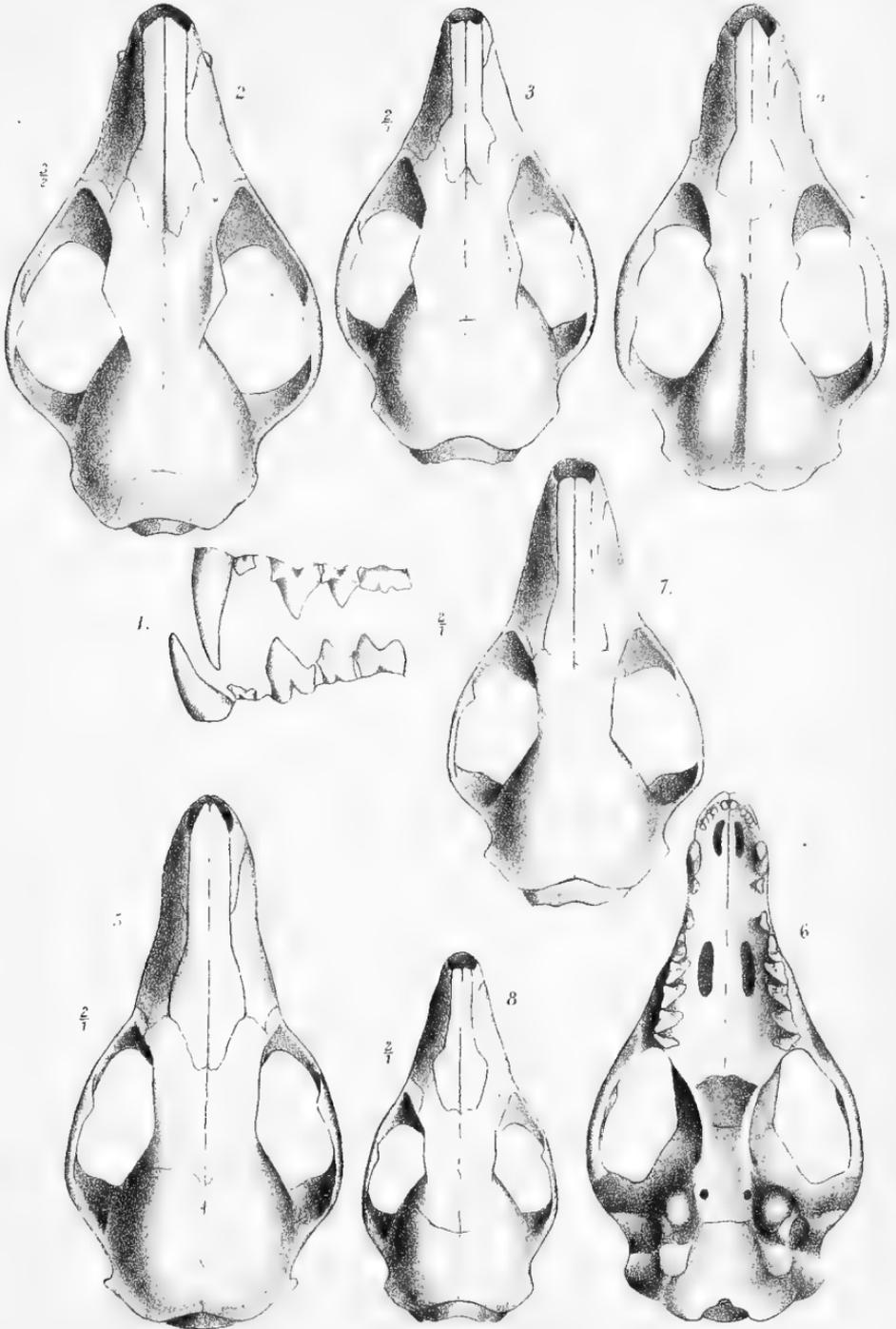


Peter Smut del et lith.

Mintern Bros. imp.

1. *Didelphys marsupialis*. 2, 3. *D. (Metachirus) nudicaudata*.  
 4. *D. (Metachirus) crassicaudata*. 5, 6. *D. (Philander) philander*.  
 7, 8. *D. (Micoureus) cinerea*. 9. *D. (Micoureus) murina*.





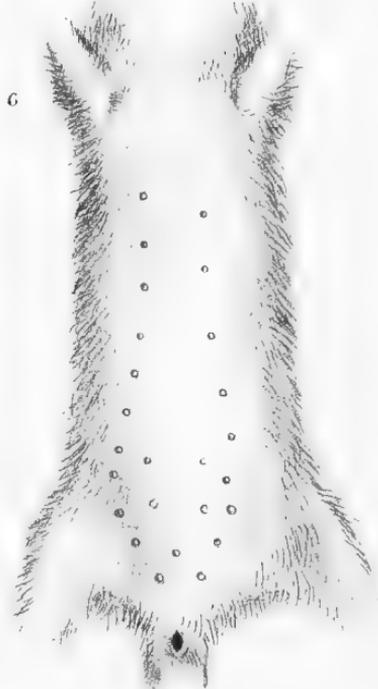
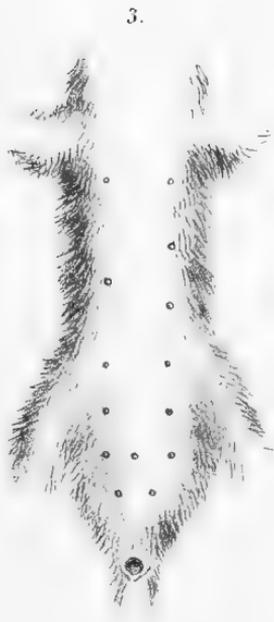
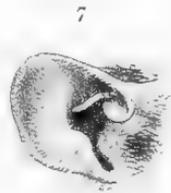
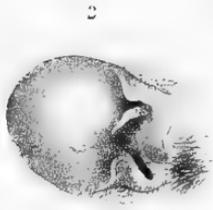
M. H. Fisher del. et lith.

Mintern Bros. imp.

1. *Didelphys (Philander) philander*. 2. *D. (Micoureus) cinerea*.  
 3. *D. (Micoureus) lepida*. 4. *D. (Peramys) dimidiata*. 5. 6. *D. (Peramys) scalops*.  
 7. *D. (Peramys) henseli*. 8. *D. (Peramys) iheringi*.







Peter Smit del. et lith.

Muttern Bros. imp

1, 2, 3. *Didelphys (Micoureus) pusilla*. 4. *D. (Micoureus) elegans*.  
5, 6. *D. (Peramys) henseli*. 7. *D. (Peramys) iheringi*. 8. *Chironectes minimus*.











