

Article XX.— A PRELIMINARY STUDY OF THE SOUTH
AMERICAN OPOSSUMS OF THE GENUS
DIDELPHIS.

By J. A. ALLEN.

INTRODUCTORY.

About a year since, I published 'A Preliminary Study of the North American Opossums of the Genus *Didelphis*.' Shortly after, I had opportunity to study the material relating to this genus contained in the British Museum, through the kindness of Mr. Oldfield Thomas, the Curator of Mammals. The present paper is based almost wholly on the material thus generously placed at my disposal. It includes specimens from many different and widely separated localities, some of which are represented by a considerable number of specimens. Among them are practically topotypes of Azara's 'Micouré premier,' and of the forms described by Lund and von Ihering from Southern Brazil. I also had the pleasure of examining the types of Bennett's *Didelphis californica* and *D. breviceps*.

In a group so notoriously subject to variation due to age and individual differentiation, it is necessary to examine a very large amount of material in order to reach satisfactory results. That now available is only sufficient for a preliminary survey of the field, and the conclusions reached are necessarily tentative, and are presented with some hesitation, although the material studied by me at the British Museum, combined with that in the American Museum of Natural History, is probably greatly in excess of that examined by any previous investigator of the group. Having in my former paper considered in some detail the subject of sexual and individual variation, and variations due to age, it is sufficient in the present connection to say that the South American forms, as would be expected, vary in these respects

¹ This Bulletin, XIV, pp. 149-188, pll. xxii-xxv, June 15, 1901.

in the same manner and to the same degree as the northern members of the group.

HISTORICAL RÉSUMÉ AND NOMENCLATURE.

As in the case of the North American forms, the South American present puzzling questions of synonymy, some of which have already in part been considered.¹ The first name applied as a species name to any member of the restricted genus *Didelphis* was *marsupialis* (Linnæus, Syst. Nat., 1758, p. 54), given to a group of forms comprising all the large opossums then known. Owing to this fact various writers, from Temminck and Waterhouse down to the present time, have treated the name as indeterminate. There is no doubt, however, of its exclusive relation to the large opossums of the restricted *Didelphis* group; the trouble is satisfactorily to fix the name upon some one of the several components of the original *marsupialis*.

At one time I favored restricting the name *marsupialis* to the Virginia opossum (this Bulletin, XIII, 1900, p. 187), on the ground that the reference to Tyson was the first of the citations given by Linnæus that was positively identifiable.

Later (*op. cit.*, XIV, 1901, p. 164), through the application of the principle of elimination, I favored fixing the name on the large Mexican species, on the basis of the Linnæan reference to Hernandez, the large Guiana form having been taken out of the group by Zimmermann in 1780, the Virginian species by Kerr in 1792, the Paraguayan and South Brazilian respectively in 1816 and 1826, leaving only *californica* of Bennett of the members originally composing it. Mr. Oldfield Thomas, however, has objected to this (*Amer. Nat.* XXXV, Feb. 1901, p. 144; *Ann. and Mag. Nat. Hist.* (7) VIII, Aug. 1901, p. 153), on the ground that Linnæus's only reference in the sixth edition of the 'Systema Naturæ,' and the first in order of sequence in the tenth edition, is to Seba, and that Seba's animal is beyond doubt the ordinary large dark opossum of northeastern South America, subsequently named *Didelphis karkinophaga*. Although at one time I was

¹ Cf. this Bulletin, XIII, 1900, pp. 185-187.

not convinced that Seba's animal (pl. xxxix) was identifiable a reëxamination of the case leads me to accept Mr. Thomas's conclusion.¹

The *Didelphis marsupialis* case being settled, the next names in order of time for the South American large opossums are *D. karkinophaga* Zimmermann, 1780, *D. carcinophaga* Boddaert, 1784, and *D. cancrivora* Gmelin, 1788, all of which were based on Buffon's 'le Crabier' from Cayenne, and are therefore all synonyms of *D. marsupialis* as now restricted. Next in order of date are Oken's names for the large opossums of both North and South America, of which he recognized five species, giving new names to four of them, as follows:

(1) *Did[elphys] cancrivora* (Lehrbuch der Naturgeschichte, Theil III, Abt. ii, 1816, p. 1146). Based on Buffon's 'le Crabire,' and hence = *Didelphis cancrivora* Gmelin.

(2) *Did. paraguayensis* (l. c., p. 1147). Based primarily on the 'Micouré premier' of Azara, with which he correctly associates the 'Tai-ibi Brasiliensibus' of Marcgrave. = *Didelphis azaræ* Temminck, 1825.

(3) *Did. austro-americana* (l. c., p. 1148). Relates mainly to the large South American opossums of the *Didelphis* group, but also includes references to species of *Metachirus* and *Caluromys*. = *Didelphis marsupialis* Linn. mainly.

(4) *Did. mes-americana* (l. c., p. 1152). Relates primarily to the Mexican 'Tlaqatzin,' or to the "Tlaqatzin in Neu Spanien (nördl. Mexico), auch in andern Gegenden Amerikas unter verschiedenen Namen." These other names and regions include the "Çarigueya an der Küste von Brasilien, Jupatiima im Innern, Taibi in Paraguay," etc., of South America, and the 'Manicu' of the lesser Antilles, with references also to Florida and Darien. Although *D. mes-americana* is thus composite,

¹ Mr. Thomas says (Ann. and Mag. Nat. Hist. (7) VIII, Aug. 1901, p. 153): "The evidence of the sixth edition of the 'Systema,' where Seba, and Seba only, is quoted, shows what animal Linnæus had in his mind when speaking of *marsupialis*." This statement can hardly be taken strictly, as in the sixth edition (p. 10), Linnæus did not use the name *marsupialis*, but simply *Didelphis*, of which he recognized two groups (species?), namely, "1. *Didelphis mammis intra abdomen*," and "2. *Didelphis mammis extra abdomen*," citing Seba only under each. Under the first he gives "Seb. thes. I, t. 36, f. 1, 2 & t. 39." The first plate reference here cited later became the exclusive basis of Linnæus's *Didelphis opossum* (cf. Thomas, Cat. Marsup. and Monotr., 1888, p. 329), while the other became in part the basis of his *D. marsupialis*. He thus, in the tenth edition, made two species of his No. 1 of the sixth edition, citing of Seba's plates only pl. xxxix under his *D. marsupialis*, and in so doing restricted his *marsupialis*, so far as Seba is concerned, to pl. xxxix.

he first describes at length the large *Didelphis*, or 'Tlaqatzin,' of Mexico, with which he constantly compares the other forms described with equal fulness later, showing that the Mexican 'Tlaqatzin' was the animal he 'had in his mind' when describing *mes-americana*. Hence there seems to be no good reason for not applying the usual rule to the present case and restrict the name *mes-americana* to the large opossum of 'northern Mexico' ("nördl. Mexico"), since it long antedates Bennett's and other later names for the same animal.

(5) *Did. boreo-americana* (l. c., p. 1158). Relates exclusively to the opossum of the eastern United States ("nur in Virginien, Lusiana, Kanada"; also "im Lande der Illiner"). Hence = *Didelphis virginiana* Kerr.

The first intelligent account of the large opossums, based on the comparison of considerable material, was published by Temminck in 1825 (*Mon. Mamm.*, 1825-1827, *Deux. Mon.*, 1825, pp. 27-35), who clearly distinguished three species, and properly allocated their principal synonyms. The first is his *Didelphis virginiana*, correctly characterized and properly assigned to North America "depuis le Mexique jusque dans les provinces septentrionales des États-Unis." The second is his *Didelphis azaræ*, described from specimens seen in European museums, and identified with the 'Micouré premier, ou Micouré proprement dit' of Azara, and which he says is found "à Brésil, où il est très-répendu," and, of course, in Paraguay. His third species is *Didelphis cancrivora*, which he identifies with "le Grand Philander oriental de Seba, *Thes. Vol. I*, p. 64, tab. 38, fig. 1 [*lege* tab. 39];" he says it is found over a great part of South America, but especially in "le Guiane et le Brésil." It is Buffon's 'le Crabier,' which he cites, as also Boddaert's and Gmelin's names based thereon; but he makes no reference, under any of his species, to *D. marsupialis* Linn. Yet in citing Seba, he cites the primary basis, according to Thomas (*cf. antea*, p. 251, footnote), of Linnæus's *marsupialis*.

In his otherwise creditable notice of this group of opossums Temminck makes the singular mistake of reversing the colors of the ears of his *D. azaræ*, which he says are yellow at

the base with the rest black,¹ whereas just the opposite is true, as noted by Wagner and Hensel.

In 1826 Wied (Beitr. zur Naturg. von Brasilien, II, 1826, pp. 387-400) recognized what he considered to be two species of true *Didelphis* from southern Brazil, one of which he identified with *D. marsupialis* Linn., and the other he provisionally described as new, under the name *Didelphys aurita*, on the basis of a single female specimen from Villa Viçosa, Rio Peruhype, in southeastern Brazil. Here is named for the first time the large black-eared opossum of southern Brazil, to which both these names relate.

In 1841 Lund (Kongl. Dansk. Vidensk. Selsk. Afhandl., VIII, 1841, p. 236) described the *azaræ* type of opossum occurring at Lagoa Santa as *Didelphis albiventris*, and a year later Wagner (Arch. f. Naturg. 1842, i, 358) renamed the same animal, from practically the same region, *Didelphys pæcilotis*, which latter name has been generally taken instead of Lund's, especially by German writers. In 1844 Schinz (Syn. Mamm., 1844, p. 504), based the name *Didelphys pæcilonota* on Rio Grande do Sul specimens, while Ihering has recently given the name *Didelphys lechei* to the dark phase of the *azaræ* type from the same region, and the name *Didelphys koseritzi* to the dark phase of the *aurita* type of the same region.

In 1900 I described (this Bulletin, XIII, pp. 192, 193) two subspecies of the *marsupialis* group from, respectively, eastern and western Colombia, under the names *D. karkino-phaga colombica* and *D. k. caucaë*; and also (*l. c.*, p. 191) a black form of the *D. azaræ* (= *paraguayensis*) group, from southeastern Peru, under the name *Didelphis pernigra*. At this time I had not previously seen specimens of the *D. azaræ* group, and was hence strongly impressed with its distinctness from any of the forms of *Didelphis* then known to me. I was therefore greatly surprised, a year later, to find it only a form of the so-called *D. azaræ*.

SPECIES AND SUBSPECIES OF DIDELPHIS.

The South American forms of *Didelphis* are separable

¹ See *op. cit.*, footnote to p. 27, and the text, pp. 30 and 31.

into two distinct groups, through well-marked differences of size, coloration, and cranial characters, namely, the *D. marsupialis* group and the *D. 'azaræ'* or *paraguayensis* group. The first ranges from Panama southward, extending down the Pacific coast as far, at least, as northern Peru, and also across northern South America from western Colombia to Trinidad, and southward east of the Andes, to Bolivia, northern Argentina, Uruguay, and southern Brazil. It is not, however, the same throughout this vast range, but is separable into a number of well-marked forms, the extremes of which, while widely diverse, are connected by intergradation. The smallest forms of this group are considerably larger than the largest forms of the *paraguayensis* group. The coloration is also notably different, the *marsupialis* group having wholly black ears¹ and very indistinct head markings, while in the *paraguayensis* group the ears are either wholly or in large part flesh-colored, and the black head markings are generally very sharply defined on a white ground. In the latter the skull is relatively shorter and less attenuated, the 4th premolar in both jaws is relatively much larger and thicker or more peg-shaped, and the superior border of the zygoma is formed posteriorly by the squamosal instead of in part by the posterior extension of the malar. This character alone is so constant and well marked as to readily differentiate the skulls of the two forms.

The *paraguayensis* group is found from the Rio de la Plata northward to central Minas Geraes, Matto Grosso, and western Bolivia, and thence northward in the Andean region through Peru and Ecuador, reaching the coast at Callao and probably elsewhere in Peru, and thence ranging eastward through the Eastern Cordillera in Colombia and Venezuela to Merida. It appears to be absent from western and northern Colombia, northern and eastern Venezuela, including the Orinoco basin, and from the whole Amazonian region east of the Andean foothills, and hence from all of central and northern

¹ By 'ear' is meant, in this connection, the external ear or pinna only, exclusive of the meatus, which latter often varies individually in specimens from the same locality in all the forms of the *marsupialis* and *mes-americana (californica)* groups, in which the external meatus may be yellowish while the pinna is wholly black.

Brazil. It is thus an animal of the Cordilleras, the mountainous portion of southern Brazil, and the more southern pampas. This, at least, is the evidence afforded by the present material and the literature of the subject. The two groups thus overlap each other geographically only in southern Brazil, northern Argentina, and in parts of Bolivia, and again at the northward over limited portions of Colombia and Venezuela.

In respect to the distribution of these two groups in Ecuador and Peru, it is of interest to note that the late Mr. P. O. Simons, on his collecting trip for the British Museum during the years 1898-1901, from the coast region of Ecuador southward and eastward to southeastern Peru and the adjoining part of Bolivia, sent only specimens of the *marsupialis* group from the low coast region west of the Andes, from the Department of Piura in Peru northward to Guayaquil, and only specimens of the *paraguayensis* group from the interior of Ecuador, Peru, and Bolivia.

The *marsupialis* group is not very sharply separable from the large opossums of Mexico and the United States. Neither intergradation between the North American and South American forms, nor the reverse, has as yet been established, owing to the lack of material from large portions of Central America. It is evident, however, that the relationship is close among all these forms, in comparison with their sharp differentiation from all the members of the *paraguayensis* group.

The extraordinary amount of variation in individuals of the same subspecies, from even the same locality, in respect to size and coloration, in the relative length of the tail and in cranial characters, combined with dimorphic conditions in coloration, renders the discrimination of local forms a very difficult matter, and at best, with the limited material as yet available for examination, exceedingly unsatisfactory. Beginning at the northward, we have, first, the large *virginiana* type, white-headed, short-tailed, and light-colored, with the margin of the ears and the tips of the toes and much the greater part of the tail white, and never, so far as known, running into a melanistic phase; in its southern subspecies, *pigra*, the underfur is more extensively tipped with black,

the tail becomes slightly longer, the white on the ears, tail and toes is reduced, and on the latter is of irregular presence, and there is a decided tendency to melanism. A very similar dichromatic form occurs in southern Texas, with, however, differently shaped nasals. In Mexico the same general type prevails, but the head is much darker, the tail is generally, but not always, much longer, the size varies with locality, as also do other features. This same general style, with local variations, ranges over Central and northern South America, being everywhere dichromatic, and over eastern South America to Uruguay, with, however, over this last area, a tendency to a better-defined pattern of head markings. Adopting the changes in nomenclature for the Mexican and Paraguayan types proposed above, the members of the genus *Didelphis* will stand as follows:

List of the Species and Subspecies.

I. MARSUPIALIS GROUP.

1. *Didelphis virginiana* Kerr. — Eastern United States, except the Gulf coast.
2. *Didelphis virginiana pigra* Bangs. — Southeastern Georgia, Florida, and the Gulf coast region to Texas.
3. *Didelphis mes-americana* Oken.
Didelphis marsupialis ALLEN, Bull. Am. Mus. Nat. Hist. XIV, 1901, 166. Not *D. marsupialis* Linn. restr.
 Mexico, from Puebla and Guerrero northward. Probably should be separated into several local forms.¹
4. *Didelphis mes-americana texensis* Allen. — Rio Grande region of Texas and Mexico.

¹ In this connection it may be of interest to note the results of an examination of the types, so far as they are extant, of Bennett's *Didelphis californica* and *D. breviceps*. A skull in the British Museum of one of the two specimens on which *D. californica* Bennett was based (the skins are not extant) resembles, in the character of the nasals, the Vera Cruz type of Mexican opossum, named by me *D. m. tabascensis*. As, however, Mr. Bennett's material, described as "from that part of California which adjoins Mexico," of which this formed a part, appears to have been unquestionably Sonoran, it seems better not to disturb the name already bestowed upon the east Mexican form; especially in view of the inconstancy of the form of the nasals in all the forms. The alleged type skull is labelled: "Taken from one of the *Types of D. californica* Bennett, P. Z. S. 1833, p. 40. No. 1141a. Brit. Mus. Reg. 55-12-26-190. *Didelphys marsupialis*, L. Loc. California. Ex. Coll. Zool. Soc."

The type of *D. breviceps* Bennett, still extant in the British Museum, is a rather young specimen. On removal of the skull from the skin for examination it was found to agree in the form of the nasals with Sinaloa specimens of corresponding age.

5. *Didelphis mes-americana tabascensis* Allen. — Southern Mexico and Guatemala.
6. *Didelphis yucatanensis* Allen. — Yucatan.
7. *Didelphis yucatanensis cozumelæ* Merriam. — Cozumel Island, Yucatan.
8. *Didelphis richmondi* Allen. — Nicaragua.
9. *Didelphis marsupialis* Linn. (restr.). — Guiana and eastern Venezuela.
10. *Didelphis marsupialis insularis*, subsp. nov. (p. 259). — Island of Trinidad and Lesser Antilles.
11. *Didelphis marsupialis colombica* Allen. — Eastern Colombia and (probably) northern Venezuela.
12. *Didelphis marsupialis caucae* Allen. — Southwestern Colombia.
13. *Didelphis marsupialis etensis*, subsp. nov. (p. 262). — Pacific coast region, west of the Andean chain, from northern Peru to Panama.
14. *Didelphis marsupialis battyi* Thomas. — Coiba Island, Panama.
15. *Didelphis marsupialis aurita* Wied. — Southern Brazil.

II. PARAGUAYENSIS GROUP.

16. *Didelphis paraguayensis* Oken. — Northern Argentina, Paraguay, and southern Brazil.
17. *Didelphis paraguayensis pernigra* Allen. — Southeastern Peru, into Bolivia.
18. *Didelphis paraguayensis andina*, subsp. nov. (p. 272). — Andean region of northern Peru and Ecuador.
19. *Didelphis paraguayensis meridensis*, subsp. nov. (p. 274). — The eastern Cordilleras of Colombia and Venezuela.

DESCRIPTIONS OF THE SOUTH AMERICAN SPECIES AND SUBSPECIES.

Didelphis marsupialis Linn.

Philander, maximus, orientalis, SEBA, Thesaurus, I, 1734, 64, pl. xxxix. "Amboine," in error = Guiana.

Didelphis mammis intra abdomen LINN., Syst. Nat. ed. 6, 1748, 10 = Philander of Seba, pll. xxxvi, figs. 1, 2, xxxix (part).

[August, 1902.]

- Didelphis marsupialis* LINN., Syst. Nat. ed. 10, I, 1758, 54 (part); ed. 12, I, 1776, 72 (part). — ERXLEBEN, Syst. Reg. Anim. 1777, 73 (part). — GMELIN, Syst. Nat. I, 1788, 105, ex Schreber. — THOMAS, Amer. Nat. XXXV, Feb. 1901, 144, (nomenclature); Ann. and Mag. Nat. Hist. (7) VIII, Aug. 1901, 153 (British Guiana, nomenclature).
- *Didelphys marsupialis* SCHREBER, Säug. III, 1778, 536 (mainly; not pl. cxlv*, which is *D. virginiana*.)— Also in part of most later compilers.
- Didelphys marsupialis* var. *typica* THOMAS, Cat. Marsup. and Monotr. 1888, 323 (part).
- Le Crabier, BUFFON, Hist. Nat. Suppl. III, 1776, 272, pl. liv. Cayenne.
- Didelphis karkinophaga* ZIMMERMANN, Geogr. Gesch. II, 1780, 266 = Le Crabier, Buffon. — ALLEN & CHAPMAN, Bull. Am. Mus. Nat. Hist. IX, 1897, 30 (part). — ALLEN, Proc. Biol. Soc. Wash. XIV, 92, June 19, 1901 (nomenclature); Bull. Am. Mus. Nat. Hist. XIV, 1901, 151, 153 (in text).
- Didelphis cancrivora* GMELIN, Syst. Nat. I, 1788, 108 = Le Crabier, Buffon. — DESMAREST, Nouv. Dict. d' Hist. Nat. VI, 1803, 458. — TEMMINCK, Mon. Mamm. 2° Mon. 1825, 32, pl. v, skull and skeleton.
- Didelphys cancrivora* WAGNER, Schreber's Säug. Suppl. III, 1843, 41; V, 1855, 225. — WATERHOUSE, Nat. Hist. Mamm. I, 1846, 473. — CABANIS, Schomburgk's Reisen Brit.-Guiana, III, 1848, 777.

Type Locality.—Guiana.

Geographical Distribution.—Guiana, eastern Venezuela, and probably southward into northern Brazil. Exact range not known.

Above yellowish white, varied with black; underfur yellowish white, the tips of the longer fibres blackish; overhair stiff, bristly, white basally, black on apical half. A narrow blackish eyering, but no other facial markings, the whole head being dingy yellowish white with the tips of the hairs blackish, giving a slight general dusky wash. Ventral surface yellowish white, with a slight dusky brown wash, formed by the tips of the longer hairs. Fore and hind limbs, including upper surface of feet, deep brownish black. Ears large, wholly black. Tail black for the basal two-thirds of the naked portion, apical third light flesh-color.

Measurements.— Two males from the Kanuka Mountains, British Guiana, measure: Total length, 762 and 775 mm.; head and body, 381 and 381; tail, 381 and 394; hind foot, 57; ear, 57. A female (same locality) measures: Total length, 712; head and body, 330; tail, 382; hind foot, 51; ear, 51. Another female from Mapures, Venezuela, measures: Total length, 776; head and body, 357; head and body, 419; hind foot, 54; ear, 52. *Skull:* Three males, total length, 101 (95-107); basal length, 92 (86-98); nasals, 48 (45-50); zygomatic breadth, 51 (48-55); postorbital breadth, 22 (20-24.5); postorbital con-

striction, 11 (11-11.5); occipital breadth, 29; breadth at canines, 18.7 (17-20); upper toothrow, 33.9 (33-35.3); molar series, 19.3 (19-20).

The above description is based on an adult male, from Better Hope, Demerara. Three other specimens from the Kanuka Mountains (alt. 300 feet), Guiana, agree in coloration and skull characters, except that one is in the gray phase with whitish overhairs, the others being in the black phase. A specimen from Mapures, Venezuela, is also similar, but has the underfur stained basally with ochraceous brown or gamboge, and the long overhair is mostly white, but some of it is apically black, as in the black phase.

Specimens examined:

Guiana: Better Hope, Demerara, 1 specimen; Kanuka Mountains, altitude 300 feet, British Guiana, 3 specimens.

Venezuela: Mapures, 1 specimen.

Total, 5 specimens, coll. British Museum.

The true *marsupialis* of Guiana and the Lower Orinoco region differs markedly—through its lighter coloration, absence of decided markings on the head, and its generally whitish color, smaller size, and longer tail—from any of the forms of northern South America, and still more from *D. aurita* of southern Brazil, as will be noticed later.

***Didelphis marsupialis insularis*, subsp. nov.**

Didelphis marsupialis THOMAS, Journ. Trinidad Field Nat. Club, I, April, 1893, 11.

Didelphis marsupialis ALLEN & CHAPMAN, Bull. Am. Mus. Nat. Hist. V, 1893, 230.

Didelphis karkinophaga ALLEN & CHAPMAN, Bull. Am. Mus. Nat. Hist. IX, 1897, 23 (Trinidad), 30 (Dominica).—ALLEN, *ibid.* XIV, 1901, 186 (measurements).

Type, No. $\frac{7140}{1144}$, ♂ ad., Caparo, Trinidad, March 19, 1894; coll. Frank M. Chapman.

Head almost wholly yellowish white to nape, with a very narrow brownish eyering; in fresh long pelage the hairs on top of head slightly tipped with dusky, giving a slight dingy tone, and sometimes tending to form a dusky median band over the top of the head. Underfur almost wholly yellowish white, a few of the coarser fibres tipped with blackish, mainly along the middle of the back; at base over nape and shoulders brownish ochraceous; long stiff overhair wholly white in some individuals, wholly black in others, or black and white mixed in still others. Below pale yellow or yellowish white, the tips of a few of the longest hairs blackish, but so few as scarcely to affect the general coloration. Fore limbs from elbows, and hind limbs from knees, blackish brown, proximal portion like the body. Ears blackish

brown; proximal third of naked portion of tail blackish brown, apical two-thirds flesh-color or whitish. Facial markings reduced to a very narrow eyering; head as light as in *D. virginiana*.

Measurements.— Four males measure: Total length, 874 mm. (810-955); head and body, 452 (385-500); tail, 446 (425-465); hind foot, 60.5 (55-66); ear, 60 (55-65). Three females measure: Total length, 807 (740-850); head and body, 406 (350-468); tail, 401 (382-430); hind foot, 57 (55-58); ear, 53 (52-53). *Skull:* Three males, total length, 107 (101-110); basal length, 97 (91-101); length of nasals, 49 (47-50); zygomatic breadth, 63 (61-63.5); postorbital breadth, 22.3 (21-24); occipital breadth, 31.3 (30-32); breadth at canines, 19.7 (19-20); upper tooththrow, 34.3 (33-36).

Specimens examined:

Trinidad: Princetown, Caparo and Caura, 10 specimens.

Island of Dominica: 3 specimens.

Island of Grenada, 2 specimens.

Island of St. Vincent, 2 specimens.

Total, 17 specimens,— 11 coll. Amer. Museum, 6 coll. Brit. Museum.

A series of ten specimens from various near-by localities in Trinidad (Princetown, Caura, and Caparo) are very uniform in coloration and other characters, and are readily distinguishable from true *marsupialis* from Guiana by their much lighter coloration and larger size. They vary chiefly among themselves in the color of the stiff overhair, which may be either white or black, or variously mixed in the same individual. St. Vincent, Grenada, and Dominica specimens are similar, and were most likely derived from the Trinidad stock, having doubtless been introduced into these islands from Trinidad.

***Didelphis marsupialis colombica* Allen.**

Didelphis karkinophaga BANGS, Proc. N. Engl. Zool. Club, 1, 89, Feb. 23, 1900. Santa Marta region, Colombia.

Didelphis karkinophaga colombica ALLEN, Bull. Am. Mus. Nat. Hist. XIII, 1900, 193, Oct. 23, 1900 (Santa Marta, Colombia); *ibid.* XIV, 1901, 186 (measurements).

Type locality, Santa Marta, Colombia.

Geographical Distribution.— Eastern Colombia, south to Bogota, and probably into northern Venezuela.

Similar to true *D. marsupialis* but larger, with smaller ears, and very much darker in coloration; head much darker with a tendency to indistinct median and eye stripes, the latter more distinctly developed behind the eyes; whole upper surface of head with a general blackish grizzled effect; ventral surface buffy, overlaid with a black-

ish grizzle produced by the longer black-tipped hairs; ears and feet wholly brownish black; basal half of naked portion of tail black, the rest yellowish white or flesh-color.

Measurements. — Five males, all from near Santa Marta, Colombia, measure: Total length, 822 mm. (710-980); head and body, 417 (355-456); tail, 405 (330-483); hind foot, 60 (57-68). Two females: Total length, 768 (673-863); head and body, 377 (318-406); tail, 406 (355-457); hind foot, 56 (54-57). *Skull:* 4 males, total length, 98 (94-107); basal length, 90 (85-99); nasals, 15 (14.5-16); zygomatic breadth, 52 (48.5-57); postorbital breadth, 21; postorbital constriction, 11.1 (10-12); occipital breadth, 29 (28-31); breadth at canines, 19 (16-21); upper toothrow, 35 (34-36); molar series, 19.4 (19-20).

Specimens examined:

Colombia: Santa Marta and vicinity, 8 specimens, coll. Amer. Museum. Also additional specimens in coll. H. H. Smith. Near Bogota, 2 specimens, coll. British Museum.

Total, 15 specimens.

This form, based originally on a series of 8 specimens from the immediate vicinity of Santa Marta, Colombia, is intermediate in size between *D. marsupialis* and *D. m. insularis*, being very much larger than the former and considerably smaller than the latter, with much smaller ears. It is very much darker in coloration than true *marsupialis*, which in turn is very much darker than *insularis*, with which latter comparison is unnecessary. As in the other forms of the *marsupialis* group, the long stiff overhair may be either all white, or the apical portion all black, or the two kinds of hair may be combined in various degrees of abundance in the same individuals.

***Didelphis marsupialis caucæ* Allen.**

Didelphis karkinophaga caucæ ALLEN, Bull. Am. Mus. Nat. Hist. XIII, 1900, 192, Oct. 23, 1900 (Cali, Upper Cauca Valley, Colombia); *ibid.* XIV, 1901, 186 (measurements).

Type locality, Cali, Upper Cauca Valley, southwestern Colombia.

Geographical distribution. — Southwestern Colombia, east of the Western Cordillera.

Similar to *D. m. colombica*, but much darker throughout; a rather distinct blackish eyering, and often a well-defined median black stripe on the head, running from the nape forward, narrowing and terminating at a point on a line a little behind the eyes; rest of the head

dingy yellowish white, strongly washed with blackish; ventral surface buffy white, washed, often strongly, with blackish. Size and proportions about as in *colombica*, except that the ears are much larger.

Measurements. — Two adult males from the type locality measure, respectively: Total length, 770 and 740 mm.; head and body, 410 and 370; tail, 360 and 370; hind foot, 53 and 58. A female from the same locality measures: Total length, 740; head and body, 370; tail, 370; hind foot, 58. *Skull:* 4 adult male skulls from Cali measure as follows: Total length, 102.5 (94–107); basal length, 90.3 (85–99); nasals, 45 (42–50); zygomatic breadth, 52 (48.5–57); postorbital breadth, 20.5 (19–21); postorbital constriction, 11 (10–12); occipital breadth, 29.1 (28–31); breadth at canines, 19 (16–21); upper toothrow, 35 (34–36); molar series, 19.6 (19–20).

Specimens examined:

Colombia: 17 specimens, mostly immature, from Cali, Upper Cauca Valley; coll. Amer. Museum.

This subspecies is represented by 17 specimens, all from the vicinity of Cali, Cauca Valley, Colombia, of which 11 are adult and 6 immature. The immature specimens have the ears either wholly flesh-color (in the very young) or part-colored, black at base and tipped more or less broadly with flesh-color, according to age. Unfortunately only a few of the specimens were measured in the flesh. The adults are mostly in the black phase, five being wholly black, two mostly black, and four gray; of the young, three are black and three gray.

***Didelphis marsupialis etensis*, subsp. nov.**

? *Didelphis karkinophaga caucæ* BANGS, Amer. Nat. XXXV, 1901, 633. San Miguel Island, Panama.

Type, No. 18986 (formerly No. 0-3-1-86, Br. Mus.), ♂ ad., Eten, Piura, Peru (alt. 50 feet), Oct. 2, 1899; coll. P. O. Simons, No. 628.

Geographical Distribution. — The low coast-belt of Ecuador and Peru, bordering the Gulf of Guayaquil, and probably northward, near the coast, to Panama.

Similar in general coloration to *D. m. caucæ*, but larger and blacker. In fresh pelage the rostral region, as far back as the eyes, is dingy brownish white, the hairs being tipped with blackish; a whitish streak over each eye, the two meeting in front of the eyes; cheeks dingy whitish; middle of the head, from between the eyes posteriorly, blackish, the pelage whitish basally with long black tips; a blackish

eyering, continued both in front and behind the eyes as an ill-defined blackish spot; ears and feet black, as usual in the group; naked part of the tail black for the basal third, the rest yellowish white. Coloration in general as in all of the darker forms of the *marsupialis* group.

Measurements. — Four adult males from Eten measure as follows: Total length, 829 (730-930); head and body, 425 (390-480); tail, 399 (330-450); hind foot, 61 (56-67); ear, 56 (52-60). A female from the same locality measures: Total length, 769; head and body, 395; tail, 374; hind foot, 57; ear, 54. *Skull:* Six adult male skulls measure as follows: Total length, 110.5 (102-122); basal length, 102.4 (92-118); nasals, 53 (45-57.5); zygomatic breadth, 59.5 (58-64); postorbital breadth, 24.2 (23-28); postorbital constriction, 11.5 (11-12); occipital breadth, 33.8 (31-35.5); breadth at canines, 21.8 (19-25); upper toothrow, 35.5 (34.5-36); molar series, 19.4 (19-20).

Specimens examined:

Peru: Eten and Piura, Depart. of Piura, 8 specimens; coll. Brit. Museum.

Ecuador: Puna Island, 2 specimens; Guayaquil, 2 specimens; St. Javier, 1 specimen; Jambilar, 1 specimen; coll. Brit. Museum.

Colombia: Boqueron, Chiriqui, 33 specimens; Boquete, Chiriqui, 5 specimens; coll. Amer. Mus. and J. H. Batty.

Total, 52 specimens.

The above description is based on a series of 14 specimens, of which 7 are from Eten, Peru, two from Puna Island, and three from neighboring coast localities in Ecuador. In size they greatly exceed the series of *cauca* from Cali, Colombia, and have the incipient face markings better defined. The tail about equals the head and body in length, as in that form. The total length of the animal, however, is about one eighth greater in *etensis* than in *cauca*, and the length of the skull is also much greater—110.5 mm. as against 102.5 in *cauca*. In size it approaches *D. m. richmondi* from Nicaragua, which, however, is not only much larger than *etensis* but has a relatively much longer tail, in *etensis* the length of the tail being a little less than that of head and body, and in *richmondi* considerably more than the head and body length.

A large series from the Department of Chiriqui, State of Panama, Colombia, is similar in size and proportions, and is not apparently distinguishable. This series includes 33 specimens from Boqueron, and 5 from Boquete, of which measure-

ments are given below (p. 277). These specimens are provisionally referred to *etensis*.

***Didelphis marsupialis battyi* Thomas.**

Didelphis marsupialis battyi THOMAS, Novit. Zool. IX, 137, April, 1902.

Type locality, Coiba Island, Panama, Colombia.

Geographical Distribution. — Coiba Island.

"Closely allied to *D. m. caucae* Allen, and agreeing with it in most details; but the face uniformly dark, with distinct white spots, about $\frac{1}{4}$ in. in diameter, round the roots of the supraorbital and malar tufts of bristles. These white spots are clearly the remnants of the usual light frontal and cheek patches, the lower cheeks and lips being in the present animal no lighter than the rest of the head. No light dorsal bristles present in any of the specimens. Tail white for rather less than half its length, its basal fifth being like the body.

"Skull rather narrow, the muzzle long and the zygomata little expanded.

"Dimensions of the type, measured in the skin: Head and body 430 mm.; tail 390; white part of tail, 180; hind foot (wet), s.u. 57, c.u. 63; ear (wet), 50; skull, greatest length in middle line, 108; basal length, 100; greatest breadth, 52.5; combined length of three anterior upper molariform teeth, 18.4.

"*Type*: Old female. Original number, 106. Collected 6 May, 1901. Four specimens.

"The four specimens are all exactly similar in size and colour, and no doubt represent an insular form of the Colombian *D. m. caucae*."—THOMAS, *l. c.*

Compared with a large series of specimens from the mainland, *D. m. battyi* seems to represent a small insular race, as shown by several topotypes kindly presented by the collector, Mr. J. H. Batty, to this Museum. I am also indebted to Mr. Batty's kindness for a transcript from his note-book of the measurements of the specimens taken before skinning. I am thus able to supplement Mr. Thomas's description with the flesh measurements of not only his type, but also of 7 additional specimens, given in the subjoined table (see p. 278). The four females, rather strangely, happen to range rather larger than the four males, doubtless owing to the fact that the females had reached a greater maturity than the males. If the females of the Coiba Island series and the females of the Boqueron and Boquete series be taken

as the basis of comparison, the apparent difference in size practically vanishes.

***Didelphis marsupialis aurita* (Wied).**

Didelphis marsupialis WIED, Beitr. zu Naturg. Bras. II, 1826, 387 (not of Linnæus).

Didelphis aurita WIED, Beitr. zu Naturg. Bras. II, 1826, 393. "Villa Viçosa am Flusse Peruhype." Gray phase. — BURMEISTER, Thiere Bras. III, 1854, 130, gray phase; Erläut. zur Fauna Bras. 1856, 64, pl. iii, animal, pl. v, fig. 3 and pl. vi, fig. 1, skull (not the reference to *D. azaræ* Temminck, etc.). — PELZELN, Verh. z.-b Gesell. Wien, XXXIII, Anh. 1883, 109, part; southern Brazil. — GOELDI, P. Z. S. 1894, 457. Serra dos Orgãos, Brazil.

Didelphis marsupialis aurita COPE, Am. Nat. Feb. 1889, 129, 149. São João do Monte Negro, Rio Grande do Sul.

Didelphis azaræ WAGNER, Schreber's Säug. Suppl. III, 1843, 38 (mainly); *ibid.* V, 1855, 223 (part).

Didelphis cancrivora BURMEISTER, Thiere Bras. III, 1854, 129 = *D. marsupialis* Wied, (non Linn). Dark phase. — HENSEL, Phys. Abhandl. Akad. Wiss. Berlin, 1872 (1873), 114, pl. i, figs. 2 and 5. Rio Grande do Sul. — PELZELN, Verh. z.-b Gesell. Wien, XXXIII, Anh. 1883, 110 (Sapitiba). — WINGE, Jordfunde og nulevende Pungdyr (Marsupialia) fra Lagoa Santa, etc., E. Museo Lundii, II, 1892, 8, pl. i, figs. 9, 9b; pl. iii, fig. 4; pl. iv, fig. 10.

Didelphis koseritzi IHERING, Mamm. do Rio Grande do Sul, 1892, 99 (p. 6 of separates). Black phase.

Type locality. — Villa Viçosa, Rio Peruhype, southeastern Brazil. Based on a single specimen, in the gray phase.

Geographical Distribution. — Southeastern Brazil, from Bahia (?) south to Rio Grande do Sul, and westward to Matto Grosso, Paraguay, northern Argentina, and eastern Bolivia.

Adult. — Dichromatic, with a gray phase and a black phase. An average adult in gray phase (Brit. Mus. No. 1-2-7-61, ♀ ad., Cruzeiro, alt. 530 m., San Paulo, Brazil, A. Robert, Nov. 14, 1900) may be described as follows:

Above soiled white, strongly varied with black; long overhair white to base, 80-100 mm. long on lower back; underfur clear yellowish white to base on middle of back, dirty yellowish brown at extreme base on sides, apical third to half black, coarser, almost bristly; below pelage much shorter and more woolly, brownish white basally, and tipped with blackish brown, with a sprinkling of yellowish white hairs; woolly hairs at edge of pouch dark brown or blackish chestnut; an indistinct spot of clear white on middle of chest; lower throat

more buffy yellow; chin and upper throat similar, but with the hairs tipped with dark brown, giving a darker effect. Head pattern quite well-defined, the light areas buff (not white) and the dark areas blackish or blackish brown. The central head stripe begins on a line opposite the front border of the eyes, and gradually widens posteriorly to the nape; the loreal stripes begin about half-way between the nose and the eyes, and extend back, enclosing the eyes, nearly to the base of the ears, but less well defined and broader behind than in front of the eyes; sides of head below the ears buffy yellow. The head markings are generally indistinct in adults, well defined in young specimens and in exceptional adults. The light areas on each side of the median dark stripe form a distinctly lighter oval spot above and behind the posterior half of the eyes. Ears very large, *wholly black*. Fore and hind limbs black, including the toes, which (as usual in the genus) are semi-nude. Tail a little shorter than head and body, covered as usual at the extreme base by long hair like that of the adjoining part of the body, the rest naked, the basal half or more black, the remainder flesh-color.

This is the usual style, which varies on the dorsal surface to practically black, and to much darker below.¹ The light face markings are often nearly obsolete, being reduced to a dark buffy round spot over the eyes, with another on the posterior part of the cheeks. The under-fur is often strongly yellowish white on the back and bright buff below, the extreme base being ochraceous buff, as in nearly all of the members of the *marsupialis* group, due apparently to a sebaceous secretion.

Young. — The nursing young are similar to the adults in coloration, both in the gray and black phases, except that the head markings are more pronounced, and the ears are white or flesh-color, more or less blotched with dusky, chiefly towards the base. In very young specimens the ears are doubtless wholly white to the base, as in the other members of the genus. In a series of 15 specimens from Piqueté and Cruziero, São Paulo (coll. A. Robert), the 9 adults have wholly black ears and the 6 young have particolored ears, the apical half or more being flesh-colored and the basal portion dusky or mottled with dusky. There is also rather less black at the base of the naked portion of the tail in the young than in the adult. The toes are wholly black in all, although Burmeister has described the toes as pinkish or flesh-color.

In the young (less than one-sixth grown) of this species the head markings are almost as distinct as in the young of corresponding age of *D. paraguayensis*, but the dark and light areas are less sharply contrasted, the light areas being buffy white instead of clear white, and the dark areas brown-black instead of deep black.

¹ Hensel (*l. c.*) states that of 40 individuals of which he had noted the color, 15 were black and 25 were white.

Measurements. — As shown in the subjoined table (p. 278), 3 adult males from São Paulo measure: Total length, 778 mm. (745–806); head and body, 417 (405–426); tail, 349 (340–380); hind foot, 58 (48–61); ear, 48 (46–50). Six adult females average somewhat less. *Skull:* Total length, 7 males, 106 (96–109); basal length, 95.3 (94–100); nasals, 50.4 (47–54.5); zygomatic breadth, 55.5 (52.5–60); postorbital breadth, 23.4 (20–26.5); postorbital constriction, 11 (10–12); occipital breadth, 31 (30–32); breadth at canines, 19.7 (17.5–20.5); upper toothrow, 33 (31–36); molar series, 19 (18–20).

Specimens examined:

Brazil: Rio Rodeio, Serra do Mar, near Rio de Janeiro, 1 specimen; Rio de Janeiro, 1 specimen; Cruziero, São Paulo, 8 specimens; Piqueté, São Paulo, 7 specimens; Taquara, Rio Grande do Sul, 4 specimens, including paratypes of *D. koseritzii* Ihering; Rio Grande do Sul, 6 specimens.

Total, 27 specimens, coll. British Museum.

D. m. aurita of southern Brazil is smaller than true *marsupialis* of northern Brazil, much darker in coloration, and with much better-defined head markings. It more resembles the dark forms of northern and northwestern South America, but has the head markings more distinct and is very much smaller. In exceptionally strongly marked specimens the head markings sometimes approach in distinctness those of *D. paraguayensis*, but in such cases the light markings are deep buffy instead of clear white, and the dark areas are more brownish black and not nearly so sharply defined. Authors, however, have sometimes failed to distinguish these two very distinct forms, which seem to occur together over quite a large area.

***Didelphis paraguayensis* Oken.**

Carigueya brasiliensibus, MARCGRAVE, Bras. 1648, 222 (*apud* Lund, l.c.).

Tai-ibi brasiliensibus, MARCGRAVE, Bras. 1648, 223.

Micouré premier, ou Micouré proprement dit, AZARA, Quad. Parag. I, 1801, 244.

Didelphys] *paraguayensis* OKEN, Lehrb. der Naturg. Theil III, Abt. ii, 1816, 1147. Based primarily on Azara (*cf. antea*, p. 251).

Didelphis azaræ TEMMINCK, Mon. Mamm., 2^o Mon. 1825, 30.—RENGGER, Naturg. Thiere Parag. 1830, 223. Grand Chaco and Provinces of Entre-Rios and Banda Oriental. — MARTIN, P. Z. S. 1834, 101, anatomy. — THOMAS, Ann. and Mag. Nat. Hist. (7) VIII, Dec. 1901, 536. Rio Jordão, southwestern Minas Geraes.

- Didelphys azaræ* WATERHOUSE, Nat. Hist. Mamm. I, 1846, 470 (except ref. to *D. aurita* Wied). Brazil, Paraguay, Bolivia, etc. — BURMEISTER, Erläut. Faun. Bras. 1856, 61, pl. i, animal. — WAGNER, Schreber's Säug. Suppl. III, 1843, 38 (part); *ibid.* V, 1855, 223 (part). — HENSEL, Phys. Abhandl. Akad. Wiss. Berlin, 1872 (1873), III, pl. i, figs. 1 and 4. Rio Grande do Sul. — THOMAS, Ann. Mus. Civ. Stor. Nat. Genova, XX, 1900, — (p. 4 of separates). Province of Parana, Brazil.
- Didelphys marsupialis azaræ* COPE, Am. Nat. Feb. 1889, 129, 149. São João do Monte Negro, Rio Grande do Sul, and Chapada, Matto Grosso, Brazil.
- Didelphys albiventris* LUND, Kongl. Dansk. Vidensk. Selsk. Afhandl. VIII, 1841, 236. Lagoa Santa, Brazil. — BURMEISTER, Erläut. Faun. Bras. 1856, pl. ii, animal; pl. v, figs 4 and 5, and pl. vi, fig. 4, skull.
- Didelphys pæcilotis* WAGNER (ex Natterer, MS.) Arch. f. Naturg. 1842, i, 258, Cuyaba, Matto Grosso, Brazil; Abhandl. Akad. Wiss. München, V, 1847 (1850), 126; Schreber's Säug. Suppl. V, 1855, 219 (identified with *D. albiventris* Lund, of earlier date). — PELZELN, Verh. z.-b. Gesell. Wien, XXXIII, Anh. 1883, 109.
- Didelphys leucotis* WAGNER, Abhandl. Akad. Wiss. München, V, 1847 (1850), 127. (in text); Schreber's Säug. Suppl. V, 1855, 223 (Azara's Micouré premier renamed).
- Didelphys pæcilonota* SCHINZ, Syn. Mamm. I, 1844, 504. Rio Grande do Sul, Brazil.
- Didelphys lechii* IHERING, Mamm. do Rio Grande do Sul, 1892, 95 (p. 5 of separates) Dark phase, from south of the Rio Grande do Sul.
- Didelphys marsupialis* var. *albiventris* WINGE, Jordf. og nulev. Pungdyr (Marsupialia) fra Lagoa Santa, etc., E. Mus. Lundii, II, 7, pl. iii, fig. 3; pl. iv, fig. 9. Lagoa Santa.
- Type locality*, Asuncion, Paraguay.
- Geographical Distribution.* — Uruguay, northern Argentina, eastern Bolivia, and northward to central Matto Grosso, and Minas Geraes, Brazil.
- Adult.* — Above varied black and white, through the presence of a more or less abundant coat of long overhair, which is wholly clear white to the base in fresh pelage, soiled dingy white in old pelage; underfur clear white or yellowish white, the apical third deep black, the black-tipped portion very long and much coarser than the basal white portion, the pelage of the ventral surface having the character of woolly underfur tipped with black hairs, especially over the median area. The amount of white overhair above varies from being abundant, and forming a conspicuous feature of the pelage, to a scanty sprinkling or, in the black phase, its entire absence. Below the general color varies from nearly pure white to deep buff, with or

without black tips to the longer hairs. Face markings white and black, strongly contrasted and sharply defined; the V-shaped median black stripe begins about opposite the anterior corner of the eyes and runs back to the occiput, merging on the nape with the black-tipped underfur of the dorsal region. The lateral face marks begin at base of whiskers, midway between nose and eye, running back to enclose the eye, but terminating just behind it as a well-defined spot; sides of the head behind the eye-streak more or less suffused with dusky, forming an ill-defined band for about half the distance from eye to ear, produced by the tips of the hairs being tinged with blackish; a broad white band behind this dusky extension of the eye-streak joins the white of the cheeks with the broad supraloral white band. Ears apically white, the basal third more or less dusky but not black. Fore and hind limbs and basal half (or more) of tail black; the apical portion of tail white or very light flesh-color.

Young. — Similar to the adult, except that the eye-stripe runs posteriorly to the base of the ear, where it becomes somewhat expanded vertically.

Measurements. — An adult male, Goya, Argentina (R. Perrens): Total length, 673 mm.; head and body, 378; tail, 295; hind foot, 41; ear, 55. An adult female, Chaco, near Ascuncion, Argentina (Messrs. Swan): Total length, 653; head and body, 378; tail, 311; hind foot, 43; ear, 52. *Skull:* Old female, total length, 85; basal length, 77; zygomatic breadth, 43.5; length of nasals, 38; postorbital processes, 19.5; postorbital constriction, 9.6; occipital breadth, 26; breadth at canines, 15; upper toothrow, 29; molar series, 16. Another old female skull and an adult male skull, same locality, both more or less imperfect, present practically the same measurements.

An adult female from southern Minas Geraes (Rio Jordão, A. Robert) gives the following external measurements: Total length, 650; head and body, 360; tail, 290; hind foot, 40; ear, 53.

Specimens examined:

Argentina: Chaco, near Asuncion, 5; Tucuman, 1; Goya, 10, mostly half grown or younger.

Brazil: Lagoa Santa 1 (topotype of *D. albiventris* Lund); Rio Grande do Sul, 3 (including topotypes of *D. lechii* Ihering); Rio Jordão, southwestern Minas Geraes, 3.

Total, 23; coll. British Museum.

So far as the material at present available indicates, the south Brazilian animal may well be referred to true *paraguayensis*. Lund's *D. albiventris* was based on the light phase with a white belly, with which Wagner has himself identified his later-described *D. pacilotis*. Wagner's *D. leucotis* is a new name for *D. azarae* Rengger, which is the true *paraguayensis*.

Ihering's *D. lechii* was based on dark specimens from São Paulo.

The Chaco specimens are practically topotypes of Azara's Micouré premier, Azara's headquarters when he wrote his 'Quadrupeds du Paraguay' having been Asuncion, from which the Chaco localities are only about 50 to 70 miles distant. Goya is about 200 miles to the southward. The Chaco specimens are either wholly black, or have only a few scattered white hairs, while none of the Goya series is black.

Respecting the relative proportion of specimens of the two color phases, light and dark, it is of interest to note that Hensel (*l. c.*) states that of 57 specimens (the sexes equally represented), of which he noted the color, 11 were black, 45 white, and 1 intermediate; and that in a litter of 9 young found in the pouch of a white female, one was black, two had a few white hairs, and the rest were of the white phase. This affords conclusive evidence, if any were needed, that the dimorphism has no relation to sex or age.

There is little doubt that Temminck's name, *azaræ*, properly relates to this animal, which he identified with Azara's Micouré premier.¹ His description is pertinent to this in every respect except one, and not at all to the black-eared opossums of the *marsupialis* group. Throughout his description he reverses the color of the ears, as though writing from memory rather than with the specimens before him; describing them as yellowish at the base and all the rest black ("le plus souvent jaunâtres à la base seulement, et noires sur tout le reste"). Owing to this error Wagner (Abhandl. Akad. Wiss. München, V, 1847 [1850], 127) re-named Azara's Micouré premier *D. leucotis*, and applied the name *azaræ* to the black-eared species of southern Brazil, which Wied had named *D. aurita*. While it may be held that Temminck's name is clearly identified by his description as being applicable, as he intended it to be, to the animal described by Azara under the name Micouré premier, it is perhaps not an unmixed evil that an earlier name for the

¹ Cf. Thomas, Cat. Marsup. and Monotr., 1888, p. 328, footnote.

species is found in the *Didelphis paraguayensis* of Oken. (Cf. *antea*, p. 251.)

***Didelphis paraguayensis pernigra* (Allen).**

Didelphis azarae TSCHUDI, Fauna Peruana, I, 1844-1846, 143, 151 (part; not the description and only part of the references).

Didelphis pernigra ALLEN, Bull. Am. Mus. Nat. Hist. XIII, 191, Oct. 23, 1900; Inca Mines, Peru; *ibid.* 219; *ibid.* XIV, 1901, 41, 176, 186 (measurements). — THOMAS, Ann. and Mag. Nat. Hist. (7) VII, Feb. 1901, 190 (southeastern Peru).

Type locality, Inca Mines, Department of Puno, on the upper Inambari River, southwestern Peru.

Geographical Distribution. — Central and southern Peru, into Bolivia. At the northward represented by a larger form, the *D. p. andina*.

Entire upper parts, except the head, intense shining black, the long thick overhair being wholly black, abundant, and not very stiff; basal half of the soft woolly underfur pale yellowish white, the tips black, the white basal portion wholly concealed by the thick, heavy coat of black overhair; head white, with three prominent, sharply defined black bands, one median and two lateral; the median stripe begins in a narrow point and rapidly expands posteriorly to the nape, where it merges with the black of the dorsal surface; the lateral stripe extends from the base of the whiskers to a little behind the eyes and then continues as an ill-defined dusky patch nearly to the ears; cheeks and throat rusty buff; rest of lower surface, except around the abdominal pouch, buffy white, the tips of the longer hairs black, giving a dusky tinge to the ventral surface; ears thickly haired for their basal half, *entirely white*, in striking contrast with the intense black of the whole upper surface of the body; feet black, the toes seminude; tail black for the basal two thirds of the naked portion, the rest white.

The young are similar in coloration to the adults.

Measurements. — Seven adults from Inca Mines, Peru, the type locality, seem to indicate very little sexual difference in size; the females average rather larger than the males, which may be due to their being obviously older, as shown by the skulls; yet the same is true of 9 other specimens from other localities as shown in the subjoined tables of measurements (see p. 279). *Skull*: For measurements of the skulls of the specimens from Inca Mines, see this Bulletin, XIV, 1901, p. 186. A series of 6 skulls from other localities agree in proportions, but range rather larger, the total length running from 91 to 102 mm., with the other measurements in proportion.

Specimens examined:

Peru: Inca Mines, altitude about 5000 feet, Depart. of Puno, 8 specimens, mostly 'young adults' (coll. Am. Mus.); Callao, altitude 60

feet, 4 specimens; Huacapistona and Perene, Depart. of Junin, altitude, 6000–7000 feet, 3 specimens; Limbona, Depart. of Puno, altitude 6700 feet, 1 specimen; Surco and San Mateo, Depart. of Lima, altitude 7000 to 9000 feet, 2 specimens; Carao, Depart. of Cajamarca, altitude 6000 to 7000 feet, 2 specimens (coll. Brit. Mus.).

Bolivia: Depart. of La Paz, altitude 4000–9000 feet, 3 specimens (coll. Brit. Mus.).

Total, 23 specimens, nearly all from altitudes above 5000 feet. All are in the wholly black phase except one.

D. paraguayensis pernigra differs from true *paraguayensis* in the greater extent of the black face markings, the median stripes beginning further forward, and the eye-stripes being broader and extending forward almost to the naked muzzle. The ears are, in the typical phase, entirely flesh-color; a few specimens from other localities, here referred to this form, show a tendency to dusky mottling at the base. The general size of the animal is rather larger, and the tail relatively longer than in *paraguayensis*, while the ears are smaller and much more hairy.

This appears to be the only form of *Didelphis* inhabiting central and southern Peru. Tschudi also mentions only one species of true *Didelphis* as occurring in Peru, which he says is found in all parts, but especially in western Peru. He speaks of it as reaching an altitude of 12,500 feet, but as being absent from the hot forest region, and rare on the eastern slope of the Coast Range at 6000 feet. His description of the species, however, is obviously compiled from Temminck and not based on Peruvian specimens, he even copying Temminck's erroneous description of the ears — "schwartz-braun, an der Basis smutzig weiss."

***Didelphis paraguayensis andina*, subsp. nov.**

Didelphis azarae TOMES, P. Z. S. 1860, 268. Cuenca, Ecuador.

Type, No. 99-12-7-6, British Museum, ♂ ad. Loja, Ecuador, June 2, 1899; coll. P. O. Simons; original number 352.

Geographical Distribution. — Andes of Ecuador, from 6000 feet to 12,000 feet altitude, and probably southward into northern Peru.

Gray phase. — Above varied black and white; long bristly over-hair abundant, pure white; underfur white, very broadly tipped with intense black, involving about the apical third of the longer fibres;

below yellowish white, washed with grayish brown, due to the brown tipping of the longer hairs; limbs and feet wholly black, the former with a few scattered white hairs; head white with the dark markings very broad; the median stripe begins somewhat in front of the eyes and extends as a narrow band to the nape; the lateral stripe begins a little behind the eye, extends forward to the nose, and abruptly widens on the upper side, opposite the middle of the eye, so as to occupy nearly the whole of the side of the nose in front of the eye, where the two lateral stripes nearly meet, being separated by a light median space only about half as wide as the dark eye-stripe; the lower edge of the black eye-stripe forms a straight line running a few millimeters below the eye; immediately surrounding the eye and in front of it the dark stripe is intense black, but more anteriorly passes into brown-black, and immediately behind the eye quite disappears, leaving the space between the eye and ear dusky grayish white, through a slight dusky tipping to the hairs. The light area on the head begins on the nose as a narrow whitish band, dividing some distance in front of the eyes and passing, as a V-shaped mark on either side of the pointed median black band, back to the ears, spreading out laterally behind the eyes till it joins the white cheek-band, with, as already said, the tips of the hairs between the eyes and ears slightly obscured with dusky. The usual broad white cheek-band occupies the whole area below the eyes, from the nose to the side of the neck, which is superficially obscured with dusky, and often suffused basally with yellowish brown or gamboge. Ears hairy at the base, usually wholly light or flesh-color, but of a deeper, browner (not dusky) tint basally than apically; some specimens show dusky blotches basally. Tail black basally for about one third to one half the length of the naked portion, the rest light or flesh-color, but the relative extent of light and dark portions very variable.

Black phase. — Wholly without the long white overhairs, but otherwise similar to the gray phase. In the black phase the ears seem to show less tendency to dusky blotching at the base than in the gray phase.

The color of the ventral surface varies greatly in different individuals, in both phases. In some specimens the chin, throat, and breast are dull grayish or buffy white, while the rest of the ventral surface is superficially black, the whitish underfur showing only on parting the pelage. In other specimens the whole ventral surface is whitish, just as in the so-called *albiiventris* phase of true *paraguayensis*.

Young. — Four very young specimens, in first pelage, from Cuenca, Ecuador, are dull black above profusely lined with white, the future white overhair; below thinly clothed with short hairs of a dull soiled white. Eye-stripe merely an oval ring enclosing the eye, its future extension, both anteriorly and posteriorly, outlined by a dusky tinge. Ears wholly flesh-color, very hairy on both surfaces.

[August, 1902.]

Measurements. — The fine series of adults with measurements taken in the flesh by the late Mr. P. O. Simons include 7 specimens of each sex, which indicate the usual sexual difference in size found in the members of the genus *Didelphis*, and which doubtless obtains in all. (See subjoined tables of external measurements, p. 279.) The skulls belonging to these skins show that nearly all were middle-aged adults. The male skulls range in total length from 92 to 104 mm., and the females from 87 to 97, and thus considerably exceed in size specimens of corresponding age of the more southern *D. p. pernigra*.

Specimens examined:

Ecuador: Cañar, altitude 9000 feet, 3 specimens; Cayambe, altitude about 9000 feet, 1 specimen; Cuenca, altitude about 7500 feet, 4 specimens; Ibarra, altitude about 7500 feet, 2 specimens; Loja, altitude about 7000 feet, 2 specimens; Quito, altitude about 9500 feet, 5 specimens; Riobamba, altitude about 9000 to 12,000 feet, 5 specimens.

Total, 22 specimens, coll. British Museum.

This form differs from *pernigra* in being much larger, and in having the dark lateral head stripes much broader, especially in front of the eyes.

***Didelphis paraguayensis meridensis*, subsp. nov.**

Type, No. 98-7-1-14, British Museum, ♂ juv., Merida, Venezuela, altitude about 6500 feet.

Geographical Distribution. — Eastern Cordillera of Colombia and Venezuela. The only localities represented are Bogota and Merida.

Black phase. — Long overhair black for apical two thirds, basal half white; underfur pale yellowish white, broadly tipped with black; below pale yellowish white, the tips of the hairs pale grayish brown; median face stripe much shorter and narrower than in *pernigra* and *andina*; eye-stripes greatly reduced, narrow, and extending but little beyond the eye either in front or posteriorly, forming a small oval eye-spot, about three times longer than wide. Ears wholly pale yellow; limbs and feet black; tail black for the basal third, the rest pale yellow.

Gray phase (No. 42-4-12-20, Brit. Mus., Sta. Fé do Bogota, Colombia, ♂ juv.). — Similar in face markings and general coloration to the black phase, except that the bristly overhair is white instead of black.

This subspecies is based on the two specimens above described, neither of which is full-grown, nor are the skulls available for examination. It is strikingly different from the two Andean forms through the great reduction in extent of

the black face markings, which are even more restricted than in true *paraguayensis*. Although the material for examination is so scanty, it suffices to indicate a very distinct form, the geographical range of which appears to include the Eastern Cordillera region of Colombia and Venezuela. It is evidently cut off in its distribution from true *paraguayensis* of southern Brazil by the great Amazonian basin, where no form of this group appears to have been reported. Probably in southern Colombia its range connects with that of *D. p. andina*. In the character and extent of the head markings it, however, much more resembles the Argentina and south Brazilian type than it does either of the Andean forms.

Tables of the external measurements of the above described forms of *Didelphis* follow (pp. 276-279).

EXTERNAL MEASUREMENTS OF SPECIES AND SUBSPECIES OF DIDELPHIS.

	Mus. No.	Locality.	Sex.	Total length.	Head and body.	Tail.	Hind foot.	Ear.
<i>Didelphis marsupialis marsupialis</i> , ¹	1-6-4-125	Kanuka Mts., Br. Guiana,	♂	762	381	381	57	57
	1-6-4-126	" "	♂	775	381	394	57	57
	1-6-4-127	" "	♂	712	330	382	51	51
	99-9-11-50	Mapures, Venezuela,	♀	776	357	419	54	52
		Average, 4 specimens.....		756	362	394	55.4	54
<i>Didelphis marsupialis insularis</i> , ²	6061	Princetown, Trinidad, March 27, 1893	♂	810	385	425	55	—
	6063	" " " " 6, 1893	♂	920	455	465	66	—
	7734	Caura, " " April 6, 1894	♂	955	500	455	64	55
	7740*	Capero, " " March 26, 1894	♂	910	470	440	57	65
	6062	Princetown, " " 9, 1893	♂	740	350	390	55	—
	7732	Capero, " " 22, 1894	♂	830	400	430	57	52
7733	Caura, " " April 9,	♂	850	468	382	58	53	
		Average, 4 ♂♂.....		874	452	446	60.5	60
		" " 3 ♀♀.....		807	406	401	57	52.5
<i>Didelphis marsupialis colombica</i> , ²	14613	Bonda, Santa Marta, Colombia, Jan. 19, 1899	♂	710	355	385	57	—
	15456	" " " " " " Aug. 5, "	♂	880	497	483	68	—
	15453*	" " " " " " April 19, "	♂	944	371	453	57	—
	14615	" " " " " " Jan. 14, "	♂	780	450	330	57	—
	14914	" " " " " " Dec. 20, 1898	♂	803	406	457	54	—
	15452	" " " " " " April 5, 1899	♂	812	406	400	57	—
	15455	" " " " " " July 24, "	♀	673	318	355	57	—
		Average, 4 ♂♂.....		825	420	405	60	—
		" " 3 ♀♀.....		378	377	406	50	—

¹ Specimens in British Museum.

² " " American

* Type.

EXTERNAL MEASUREMENTS, ETC.—Continued.

	Mus. No.	Locality.	Sex.	Total length	Head and body.	Tail.	Hind foot.	Ear.
<i>Didelphis marsupialis etensis</i> , ¹	0-3-1-85	Eten, Piura, Peru,	♂	730	400	330	58	52
	0-3-1-86	" "	♂	850	430	420	64	58
	0-3-1-87	" "	♂	930	480	450	67	60
	0-3-1-25	Piura, Piura, Peru,	♂	890	450	440	64	62
	99-8-1-49	Guayaquil, Ecuador,	♂	785	390	395	56	53
	99-8-1-18	Puna Island,	♂	855	430	425	60	55
0-3-1-88	Eten, Piura, Peru,	♀	769	395	374	57	54	
Average, 6 ♂♂								
				840	430	410	61.5	56.6
<i>Didelphis marsupialis etensis</i> ²	381	Boqueron, Chiriqui, Colom.,	♂	880	450	430	70	45
	750	" " " " " "	♂	890	500	440	65	55
	004	" " " " " "	♂	920	510	420	60	50
	026	" " " " " "	♂	880	410	400	60	50
	034	" " " " " "	♂	788	485	440	60	58
	1024	" " " " " "	♂	900	470	400	60	55
	1027	" " " " " "	♂	785	400	385	55	45
	1082	" " " " " "	♂	910	450	400	50	50
	338	" " " " " "	♂	950	510	440	65	50
	370	" " " " " "	♂	765	345	430	55	50
	630	" " " " " "	♂	785	390	395	50	50
	640	" " " " " "	♂	990	340	350	55	45
	893	" " " " " "	♂	850	380	370	50	43
	922	" " " " " "	♂	800	430	430	60	50
	984	" " " " " "	♂	780	400	380	55	50
	990	" " " " " "	♂	845	410	435	50	45
	1005	" " " " " "	♂	810	410	400	60	50
	1050	" " " " " "	♂	780	400	380	50	45
	223	Boquete,	♂	930	500	430	60	55
	270	" " " " " "	♂	935	495	440	60	60
	187	" " " " " "	♂	885	455	380	70	55
	214	" " " " " "	♂	865	470	415	58	50
274	" " " " " "	♂	995	345	350	52.5	50	
			745	360	385	55	45	
Average, 10 ♂♂, from Boqueron								
			866	440	426	58.8	50	
			805	485	400	54.5	48.3	

¹ Specimens in British Museum.
² Original No., coll. J. H. Batty.

EXTERNAL MEASUREMENTS, ETC.—Continued.

	Mus. No.	Locality.	Date.	Sex.	Total length.	Head and body.	Tail.	Hind foot.	Ear.
<i>Didelphis marsupialis battyi</i> , ¹	104	Coiba Island, Colombia,	April 15, 1901	♂	715	355	360	55	50
	105	" "	May 14, "	♂	845	430	415	00	50
	107	" "	" 17, "	♂	808	405	403	00	43
	110	" "	" 18, "	♂	815	425	390	53	50
	103	" "	April 11, "	♂	835	430	405	00	55
	106*	" "	May 14, "	♂	838	445	393	05	45
	108	" "	" 11, "	♂	820	425	395	00	55
109	" "	" 18, "	♀	825	405	420	00	50	
		Average, 4 ♂♂		706	404	392	57	48.2	
		4 ♀♀		829.5	426	403	61	51	
<i>Didelphis marsupialis aurita</i> , ²	1-2-7-55	Piqueté, São Paulo, Brazil,	Nov. 16, 1900	♂	806	426	380	61	50
	1-2-7-57	" "	Dec. 4, "	♂	745	405	340	54	46
	1-2-7-56	" "	Nov. 30, "	♂	782	420	362	48	48
	1-6-6-80	Cruzeiro, "	Feb. 7, 1901	♂ juv.	600	310	290	46	49
	1-6-6-81	" "	Jan. 27, "	♂ juv.	770	410	360	55	52
	1-6-6-90	" "	" 23, "	♀	—	410	—	61	51
	1-2-7-60	Piqueté "	Nov. 13, 1900	♀	770	410	360	58	60
	1-2-7-62	" "	Dec. 8, "	♀	750	410	340	53	52
	1-2-7-61	" "	Nov. 14, "	♀	678	358	320	41	39
	92-5-9-1	Rio Rodeiro, Serra do Mar, Brazil,	Sept. 8, 1897	♀	753	365	388	55	55
		Average, 3 ♂♂ ad			778	417	394	54.7	48
	6 ♀♀ ad			744	410	354	54	51.5	

* Type.

¹ Original No., coll. J. H. Batty.
² Specimens in British Museum.

