

**Article XXX.—MAMMALS COLLECTED ON THE ROOSEVELT  
BRAZILIAN EXPEDITION, WITH FIELD NOTES  
BY LEO E. MILLER.**

By J. A. ALLEN.

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INTRODUCTION.

In 'Through the Brazilian Wilderness'<sup>1</sup> Colonel Roosevelt has given a most enlightening account of the country traversed by his expedition, with valuable natural history field notes, while Leo E. Miller, mammalogist of the expedition, has supplemented this account with a brief but most interesting description<sup>2</sup> of the country where most of the mammals were collected, namely, the vicinity of Trinidad and the Grand Chaco in Paraguay, and the country bordering the upper Rio Paraguay and the Rio Gy-Paraná in western Matto Grosso. The following is a list of the localities at which the mammals were collected, and the dates of collecting, as recorded in Mr. Miller's field register.

*Localities at which Mammals were collected.*

Rio de Janeiro, Brazil.

Trinidad, near Asuncion, Paraguay. Nov. 9-11 and 17, 1913.

Rio Negro, up the Rio Pilcomayo from Asuncion, Paraguay. Nov. 13-15.

Urucúm, near Corumbá, Matto Grosso. Nov. 26-Dec. 15.

Rancho Palmiras, Rio Taquary, Matto Grosso. Dec. 16-27.

São João, fazenda, on the Rio Cuyubá. Dec. 28-30.

Rio São Lorenzo. Dec. 31-Jan. 2, 1914.

Porto Campo, on the Rio Sepotuba. Jan. 7-10.

Tapiropan, on the Rio Sepotuba. (The starting point for the overland trip through Matto Grosso). Jan. 16-25.

Rio Mandioco, Matto Grosso. Jan. 26.

<sup>1</sup> Through the Brazilian Wilderness. By Theodore Roosevelt. With illustrations from photographs by Kermit Roosevelt and other members of the Expedition. New York: Charles Scribner's Sons. 1914. 8vo., pp. xiv + 383, 49 full-page half-tone plates and 2 maps.

<sup>2</sup> The Roosevelt-Rondon Scientific Expedition, a review of its movements in South America in 1913-14 and of some of its zoölogical achievements. American Museum Journal, Vol. XV, Feb., 1915, pp. 49-63, with numerous half-tone illustrations.

- Utiarity, Matto Grosso. Jan. 29–Feb. 5.  
 Guatsué, Matto Grosso. Feb. 7.  
 Maracana, Matto Grosso. Feb. 8.  
 Campos Novos, Matto Grosso. Feb. 16.  
 Vilhena, Matto Grosso. Feb. 18.  
 Tres Burity, Matto Grosso. Feb. 22–23.  
 José Bonefacio, Matto Grosso. Feb. 24.  
 Rio da Dúvida, Matto Grosso (= Rio Roosevelt). Feb. 27.  
 Barão Melgaço, Matto Grosso. (The end of the overland trip and the beginning of the trip down the Gy-Paraná.) March 3–8.  
 Urupá, Rio Gy-Paraná, Amazonas. March 15.  
 Calama, Rio Madeira, Amazonas (opposite the mouth of the Gy-Paraná). March 24–April 5.  
 Lower Solimoens, Amazonas (about fifty miles above the mouth of the river). April 16–30.

The collection of mammals includes nearly 450 specimens, representing 97 species. As indicated by the above list of localities, they were collected over a wide area, about 75 having been obtained in Paraguay, about 175 in what may be roughly designated as the Chapada region, about 40 at the junction of the Rio Gy-Paraná with the Rio Madeira, and about 50 on the lower Rio Solimoens.

The principal previous collections made within the same area are those of Johann Natterer, during the years 1825–1829, from which many new species were briefly described by Andreas Wagner in 1845,<sup>1</sup> and more fully elaborated in 1847–48.<sup>2</sup> In 1883 August von Pelzeln published a formal report on Natterer's collection of mammals,<sup>3</sup> as he had previously done (in 1868) for the birds.

In 1882–86, Herbert H. Smith spent several years at Chapada, Matto Grosso, making extensive collections of vertebrates and insects. The birds and most of the insects were later purchased by the American Museum of Natural History, but the mammals, reptiles and batrachians were purchased by Professor Cope and are now in the Museum of the Philadelphia Academy of Natural Sciences. Cope published a report on the mammals in 1889.<sup>4</sup>

<sup>1</sup> Arch. für Naturg., 1845, I, pp. 145–149.

<sup>2</sup> Beiträge zur Kenntniss der Säugethiere Amerika's. Abhandl. d. math.-phys. Classe d. k.-b. Akad. d. Wissens., V. pp. 119–208, pll. ii–iv, 1847; pp. 269–332, pll. vi–viii, 1848; pp. 405–480, pl. xiv, 1848.

<sup>3</sup> Brasilische Säugethiere. Resultate von Johann Natterer's Reisen in den Jahren 1817 bis 1835. Verhandl. d. k.-k. z.-b. Gesells. in Wien, XXXIII, Beiheft, pp. 1–140, 1883.

<sup>4</sup> On the Mammalia obtained by the Naturalist Exploring Expedition to Southern Brazil. By E. D. Cope. Amer. Nat., XXIII, pp. 128–150, Feb., 1889.

Records 51 species from Chapada and 15 additional species from São João do Monte Negro. The following five forms are described as new: 1, *Myrmecophaga bivittata straminea*, p. 132; 2, *Myrmecophaga sellata*, p. 133; 3, *Tatusia megalolepis*, p. 134; 4, *Sphingurus sericeus*, p. 136; 5, *Dasyprocta aurea*, p. 138 (respecting this species see this Bull., XXXIV, p. 633, Dec. 30, 1915); 6, *Felis braccata*, p. 144.

In 1902 another collection was made at Chapada by A. Robert, in the interest of the natural history department of the British Museum, which was reported upon by Oldfield Thomas in 1903.<sup>1</sup> The number of specimens contained in either of these collections is not stated.

The present collection of mammals is especially important to the American Museum, it forming the first, and thus far practically the only, mammal material it has received from either Brazil or Paraguay. Its identification has therefore been extremely difficult, owing to the almost entire absence of authentically determined mammal material from this portion of South America in the museums of the United States. Under ordinary world conditions it would have been taken abroad for identification, but at the present time this was impracticable. The types of the Natterer collection are presumably still in the Vienna museum of natural history, and the collections studied by Lund, Winge and Hensel are in other European museums, while the British Museum is rich in historic mammal material relating to eastern and southern Brazil and allied faunal areas. A number of the Murids have been left undetermined, in view of the uncertainty of their identification in the absence of pertinent comparative material.

In the course of my recent work on the mammals of other parts of South America a number of supposed new forms from the Roosevelt Expedition have been described, as follows:

1. *Dasyprocta variegata urucuma*, XXXIV,<sup>2</sup> p. 634, Dec. 30, 1915. Urucúm.
2. *Proechimys kermi*, XXXIV, p. 629, Dec. 30, 1915. Lower Rio Solimoens.
3. *Ecomys milleri*, XXXV, p. 523, July 24, 1916. Barão Melgaço.
4. *Oryzomys (Oligoryzomys) microtis*, XXXV, p. 525, July 24, 1916. Lower Rio Solimoens.
5. *Oryzomys (Oligoryzomys) utiaritensis*, XXXV, p. 527, July 24, 1916. Utiarity.
6. *Oryzomys (Oligoryzomys) mattogrossæ*, XXXV, p. 528, July 24, 1916. Utiarity.
7. *Zygodontomys tapirapoanus*, XXXV, p. 528, July 24, 1916. Tapirapoan.
8. *Eptesicus chapmani*, XXXIV, p. 632, Dec. 30, 1915. Lower Rio Solimoens.
9. *Molossus cherriei*, XXXV, p. 529, July 24, 1916. Tapirapoan.
10. *Cacajao roosevelti*, XXXIII, p. 651, Dec. 14, 1914. Barão Melgaço.
11. *Ateles longimembris*, XXXIII, p. 651, Dec. 14, 1914. Barão Melgaço.

<sup>1</sup> On the Mammals collected by Mr. A. Robert at Chapada, Matto Grosso (Percy Sladen Expedition to Central Brazil). By Oldfield Thomas, F. R. S. Proc. Zool. Soc. London, 1903, II, pp. 232-244, pl. xxvii (*Canis sladeni*).

Thirty-seven species are recorded, the following described as new: 1, *Canis sladeni*, p. 235, pl. xxvii; 2, *Rhipidomys roberti*, p. 237; 3, *Nectomys squamipes mattensis*, p. 238; 4, *Neacomys amenus*, p. 239; 5, *Coendu centralis*, p. 240; 6, *Sylvilagus minensis chapadæ*, p. 241; 7, *Marmosa constantiæ*, p. 243.

<sup>2</sup> Reference is in all cases to Bull. Amer. Mus. Nat. Hist.

This important accession to the resources of the American Museum is due to the initiative and the generosity of Theodore Roosevelt, by nature an ardent naturalist, who invited the museum authorities to send a couple of naturalists with him into Brazil to make a collecting trip for the museum, defraying their travelling and field expenses; their salaries being contributed by Cleveland H. Dodge, a trustee of the Museum. For this important work the museum selected George K. Cherrie and Leo E. Miller, both collectors and explorers of wide experience in tropical America. To Mr. Cherrie was assigned the bird work and to Mr. Miller the mammal work. Both are still in the service of the Museum, Mr. Miller, with his assistant H. S. Boyle, being at present in Argentina. He left in manuscript the field notes given in the second part of the present paper, it seeming better to segregate these notes than to insert them in the Systematic List, with which they are, however, connected by proper cross-references.

The report on the birds of the Roosevelt Expedition has been prepared by Mr. Cherrie, who has now returned for further field work along that part of the Rio Paraguay traversed by the Roosevelt Expedition, for which enterprise Mr. Roosevelt has again generously provided the means. The publication of the report on the birds is therefore postponed, so as to include the results of Mr. Cherrie's present expedition.

#### SYSTEMATIC LIST.

##### DIDELPHIIDÆ.

#### 1. *Didelphis marsupialis marsupialis* Linné.

One specimen, adult male, lower Rio Solimoens, Brazil.

#### 2. *Didelphis paraguayensis paraguayensis* Oken.

Five specimens: Rio Negro, Paraguay, 2; Trinidad, Paraguay, 2; Utiarity, Matto Grosso, 1.

#### 3. *Metachirus nudicaudatus* (E. Geoffroy).

One specimen, Tapirapoan, Rio Sepotuba, Matto Grosso.

#### 4. *Metachirus opossum quica* (Temminck).

*Didelphis quica* TEMMINCK (ex Natterer MS.) Mon. Mammal., p. 36, 1826.  
*D[idelphys] Quica* Natt., WAGNER, Schreber's Säug., Suppl., III, p. 42, 1843.

*Didelphys Quica* PELZELN, Verhandl. zool.-botan. Gesells. Wien, XXXIII, Beiheft, p. 110, 1883 = "*Didelphys Quica* Natt. Nr. 6" (MS.).

*Metachirus Quica* BURMEISTER, Erläut. Faun. Bras., p. 70, pll. vii and viii, 1856.

Five specimens, of which four are adult, and 1 a half-grown young. Uru-cúm, Dec. 4-10.

As stated by Thomas,<sup>1</sup> *Didelphis opossum* Linné, 1758, was based exclusively on Seba, for which reason he has indicated ("suggested") Surinam as the type locality of the species, a suggestion here accepted. The earliest name for the southeastern form of this widely distributed group is *Didelphis quica* Temminck, 1826, which was based primarily on specimens collected by Natterer at Sapatiba, near Rio de Janeiro, Brazil, in March, 1818. Sapatiba, Province of Rio de Janeiro, Brazil, should therefore be taken as the type locality of *quica*. The name also was a manuscript name of Natterer's adopted from him by Temminck, a fact further indicating the propriety of making Sapatiba the type locality of this form.

#### 5. *Peramys* sp. indet.

One specimen, young in first pelage, Uru-cúm, Matto Grosso. Too young for satisfactory determination.

#### BRADYPODIDÆ.

#### 6. *Bradypus tridactylus* Linné.

One specimen, adult female, lower Rio Solimoens.

#### MYRMECOPHAGIDÆ.

#### 7. *Myrmecophaga tridactyla* Linné.

Two specimens, Las Palmieras, Rio Taquary (T. and K. Roosevelt). Both are large old males with perfect skulls.

#### DASYPODIDÆ.

#### 8. *Dasypus novemcinctus* Linné.

One specimen, Uru-cúm.

<sup>1</sup> Proc. Zool. Soc. London, 1911, p. 143.

9. **Priodontes giganteus** (*Desmarest*).

One specimen, Corumbá, a weathered skull, in good condition except that the teeth, the nasal bones, and the lower jaw are lacking (Cherrie).

10. **Euphractus sexcinctus gilvipes** (*Lichtenstein*).

One specimen, adult female, Urucúm.

Field measurements: Total length, 700 mm.; tail, 246; hind foot, 90. Skull, total length, 113; zygomatic breadth, 69.5. Four fully adult skulls from Chapada (sex not indicated), collected by H. H. Smith, show a wide range of individual variation, as follows: Total length, 107–123 (116.2); zygomatic breadth, 62–65 (63.2).

11. **Cabassous loricatus** (*Pelzeln*, ex Natterer MS.).

One specimen, young adult male, Utiarity, Rio Papagaio (Col. Roosevelt). Field measurements, total length 410 mm.; tail, 110, hind foot, 57.

## TAYASSUIDÆ.

12. **Tayassu**<sup>1</sup> **pecari pecari** *Fischer*.

Three adult specimens, 1 male, 2 females, Porto Campo, Rio Sepotuba, Matto Grosso, Jan. 7, 1914 (Colonel Roosevelt).

Mr. Miller's notes give the following measurements: Length, ♂ 1140, ♀ 1050, ♀ 1090; tail, ♂ 40, ♀ 70, ♀ 60; hind foot, ♂ 90, ♀ 100, ♀ 90; ear, ♂ 70, ♀ 90, ♀ 70.

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<sup>1</sup> The generic names *Tayassu* and *Pecari* illustrate the absurdity of results that may sometimes arise from the strict enforcement of the rule of tautonymy in the determination of genotypes. Fischer, in founding *Tayassu*, to which he referred two species, placed *Sus tajassu* Gmelin under his species *Tayassu pecari*, which is the white-lipped peccary, thereby making the white-lipped peccary the type of the genus *Tayassu*, since this species "possessed" the tautonym *Sus tajassu*. However, *Sus tajassu* was a composite species, equal to Fischer's genus *Tayassu*. As a result the name *Tayassu*, previously restricted to the collared peccary group, became transferred to the white-lipped peccary group, in disregard of previous type determinations based on nomenclatural rules that were valid prior to the adoption of the rule of tautonymy by the International Zoological Congress in 1907. Furthermore, the *Sus tajacu* Linné, of earlier date than *Sus tajassu* Gmelin (a variant of the same name), is the so-called "Mexican" collared peccary, and has for generations been almost universally used for the collared peccaries, and as universally other names have been employed for the white-lipped peccaries. As a result of the application of the tautonymy principle to *Tayassu* the following confusing combinations obtain in the specific names of the peccary group, now commonly recognized as comprising two genera: *Tayassu pecari* and *Pecari tajacu*!

13. **Pecari tajacu**<sup>1</sup> (*Linné*).

Four specimens, all adult, 3 males, 1 female: Uruçúm, 1 (Miller); Porto Campo, Rancho Palmiras, São Lourenço, 1 each (Roosevelt). There is also a young pig, in first pelage (yellowish rufous, with a broad black dorsal band), too young for positive identification as to the species, from Calama, Rio Madeira, Amazonas (Miller).

Mr. Miller's measurements of the three males from Matto Grosso: Total length, 920, 920, 920; tail, 30, —, 30; hind foot, 80, 80, 80.

## CERVIDÆ.

14. **Hippocamelus bisulcus** (*Molina*).

A flat skin, without data, but doubtless from Patagonia.

15. **Blastocerus dichotomus** (*Illiger*).

*Cervus dichotomus* ILLIGER, Abhand. d. k. Akad. zu Berlin, 1811 (1815), p. 108 (nom. nud.), p. 117 = *Gouazoupoucou* Azara.

*Cervus paludosus* DESMAREST, Mamm., II, 1822, p. 443 = *Gouazoupoucou* Azara.

Two specimens, adult male and female, Palmira, Matto Grosso, Dec. 17 (K. Roosevelt).

16. **Blastocerus bezoarticus**<sup>2</sup> **campestris** (*F. Cuvier*).

Two specimens, adult and semi-adult males, Tapirapoan, Jan. 23 (K. Roosevelt).

<sup>1</sup> The type locality of *Sus tajacu* Linné was fixed by Cope in 1889 (Amer. Nat., XXIII, p. 141), when he retained this name for the Paraguay animal in describing a new species of peccary from Texas. (Cf. Hollister, Proc. Biol. Soc. Washington, XXVIII, p. 70, March 12, 1915). In 1902, I also considered Paraguay as the type locality of both *Sus tajacu* Linné and of *Sus albirostris* Illiger (= *labiatus* Cuvier). As stated by Hollister, Linné's citation of Tyson is inadequate for the determination of the type locality of *Sus tajacu*, as Tyson makes no reference to the geographical origin of the specimen he dissected beyond calling it "*Aper Mexicanus Moschiferus* or Mexican Musk Hog."

<sup>2</sup> Lydekker (Deer of all Lands, 1898, p. 289) and Thomas (Proc. Zool. Soc. London, 1911, p. 151) believe that *Cervus bezoarticus* Linné (Syst. Nat., 1758, p. 67 = *Cervus cuguapara* Kerr, 1792) should be adopted for the pampas deer of Brazil, this name having been based on the Cuguacu-apara of Marcgrave (type locality, Pernambuco). Until, however, the deer of this group are better known it seems well to employ the name *campestris*, based on the Gouazoute of Azara, as a subspecific designation for the southern form, which can hardly be the same as the pampas deer of the Pernambuco district.

17. **Mazama rufa rufa** (*Illiger*).

Seven specimens: Urucúm, 3 specimens (Miller and Cherrie); Porto Campo, 4 specimens (T. and K. Roosevelt). (Cf. this Bull., XXXIV, p. 538, 1915.)

18. **Mazama simplicicornis** (*Illiger*).

One specimen, Rio Negro (near Asuncion), Paraguay (Miller). (Cf. this Bull., XXXIV, p. 547, 1915.)

## TAPIRIDÆ.

19. **Tapirus terrestris** (*Linné*).

Three adult specimens, skins and skulls, Porto Campo, Rio Sepotuba, Matto Grosso, Jan. 10, 1914 (Roosevelt).

Mr. Miller's measurements of a male and female: Total length, ♂ 2070, ♀ 2000 mm.; tail, ♂ 60, ♀ 100; hind foot, ♂ 140, ♀ 140; ear, ♂ 120, ♀ 120. The skulls of the two males have the braincase badly shattered; the female skull, very old and with the teeth greatly worn, has the total length, 360; condylobasal length, 348; zygomatic breadth, 163; interorbital breadth, 74; postorbital breadth, 58; mastoid breadth, 103; breadth of rostrum at canines, 49; palatal breadth at p<sup>2</sup>, 34.5, at m<sup>3</sup>, 49; maxillary tooththrow, 122; m<sup>1</sup>-m<sup>3</sup>, 58.5; length of lower jaw, 293; height at condyle, 125.5; height at coronoid process, 152.5; lower tooththrow, 112.

A large perfect young adult skull (probably male) from British Guiana (L. E. Miller) is much larger than either of the male skulls from Matto Grosso. Its measurements are, total length, 415; condylobasal length, 390; zygomatic breadth, 195; interorbital breadth, 93 (84.5 in Matto Grosso male skull of comparable age); postorbital breadth, 70.3 (64 in M. G. ♂); mastoid breadth, 121.5; diastema, 45 (51 in M. G. ♂); maxillary tooththrow, 145.5 (126.5 in M. G. ♂); m<sup>1</sup>-m<sup>3</sup>, 70 (61 in M. G. ♂); lower jaw length, 345 (305 in M. G. ♂); height at condyle, 133.5 (113 in M. G. ♂); height at coronoid, 177 (146 in M. G. ♂); lower tooththrow, 137 (117 in M. G. ♂); m<sub>1</sub>-m<sub>31</sub> 51.5.

The contrast in massiveness between the Guiana skull and the three from Matto Grosso is striking but there is very little difference in details of structure. The great difference in size, however, seems nomenclaturally noteworthy, and mainly on this basis the Guiana form may be designated as **Tapirus terrestris guianæ**, with No. 36198 (skull only) Tumatumari,



British Guiana, collected by Leo E. Miller, as type. As the type locality of *Tapirus terrestris* is Pernambuco (cf. Thomas, P. Z. S., 1911, p. 155), it is probable that both the Matto Grosso and Guiana forms will prove sub-specifically separable from true *terrestris*.

## LEPORIDÆ.

20. *Sylvilagus paraguensis* Thomas.

Two specimens, Paraguay: Trinidad, near Asuncion, adult female; Rio Negro, up the Pilcomayo from Asuncion, young adult male.

## VISCACCIIDÆ.

21. *Viscaccia cuscus* Thomas.

Two flat skins, without head, limbs or tail, purchased of a furrier at Buenos Aires, are provisionally referred to this form. Locality of capture unknown.

## CAVIDÆ.

22. *Cavia* (*Cavia*) *rufescens pamparum* Thomas.

Three specimens (young adult male, adult female, young female in first pelage), Rio Negro, Paraguay, about 100 miles north of Asuncion.

External measurements (young male and adult female): Total length, ♂ 280, ♀ 330 mm.; tail, 15, 15; hind foot 40, 45. Skull (same specimens), total length, ♂ 64, ♀ 63; zygomatic breadth, 34.5, 36. These measurements slightly exceed those of the type, from Corrientes, as given by Thomas.

23. *Cavia* (*Galea*) *boliviensis* (subsp. indet.).

One specimen, Tapirapoan, Rio Sepotuba (Cherrie).

24. *Dolichotis salinicola* Burmeister.

Two flat skins, without limbs, purchased of a furrier at Buenos Aires. Locality of capture unknown.

## HYDROCHÆRIDÆ.

25. **Hydrochæris hydrochæris** (*Linné*).

Three specimens: Palmiras, 1 (adult female); San Juan, 1 (adult male); São Lourenço, 1 (young female), December, 1913 (Roosevelt).

Measurements of adult male: Total length, 1220 mm.; tail, 40; hind foot, 240; ear, 50. Skull, total length, ♂ 226, ♀ 214; occipitonasal length, ♂ 210, ♀ 212; condylobasal length, ♂ 215, ♀ 200; zygomatic breadth, ♂ 128, ♀ 125; length of nasals on midline, ♂ 79, ♀ 80; maxillary tooth-row, ♂ 87, ♀ 74.5; diastema, ♂ 68, ♀ 66.

The three specimens vary greatly in color, the male being purplish red brown, the old female pale yellowish brown, and the young female intermediate between the other two, or dull ruddy yellowish brown.

26. **Dasyprocta agouti leptura** *Wagner*.

One young specimen, lower Rio Solimoens.

This specimen differs from Guiana specimens of *D. agouti agouti*, and from a specimen of corresponding age from Pará, in being much darker, the whole back being much blacker, and the sides and belly dark chestnut red.

27. **Dasyprocta croconota croconota** *Wagler*.

Two specimens, Calama, lower Rio Madeira. (Cf. this Bulletin, XXXV, p. 628, Dec. 30, 1915.)

28. **Dasyprocta fuliginosa fuliginosa** *Wagler*.

Five specimens, Calama (near Borba), lower Rio Madeira, hence practically topotypes of *D. fuliginosa* *Wagler*. (Cf. this Bulletin, XXXIV, p. 626, Dec. 30, 1915.)

29. **Dasyprocta variegata urucuma** *Allen*.

One specimen, Urucúm (near Corumbá), Matto Grosso. (Cf. this Bulletin, XXXIV, p. 634, Dec. 30, 1915.)

30. **Dasyprocta azaræ** *Lichtenstein*.

Two specimens, Tapirapoan and Utiarity, Matto Grosso.

31. ***Dasyprocta (Myoprocta) exilis exilis*** *Wagler.*

*Dasyprocta exilis* WAGLER, Isis, 1831, p. 621. "Brasilia ad flumen Amazonum."  
*Dasyprocta pratti* POCKOCK, Ann. and Mag. Nat. Hist. (8), VII, p. 110, July, 1913.  
 Type said to have been brought "from the Amazons."

One specimen, Calama, Lower Rio Madeira.

*Dasyprocta exilis* Wagler has usually been synonymized as a young specimen of *D. acouchy*. The type was obtained by Spix on the Rio Amazon, presumably near the mouth of the Rio Negro, which it seems proper to designate as the type locality of *D. exilis*. It had no tail,<sup>1</sup> but this slender appendage in the *Myoprocta* group easily becomes detached in dry skins.

*D. exilis* belongs evidently to the olivaceous and not to the rufous section of the genus. Pocock's *Myoprocta pratti* agrees well with Wagler's description of *exilis* and with my Calama specimen. The type locality is as indefinite as the type locality of *exilis*. It seems perfectly safe to assume that both came from that portion of the Amazon drainage which includes the lower Rio Negro and the lower Rio Madeira.

OCTODONTIDÆ.

32. ***Ctenomys nattereri*** *Wagner.*

One specimen, José Bonifacio, Matto Grosso.

Total length, 290 mm.; head and body, 218; tail, 72; hind foot, 46.

33. ***Proechimys longicaudatus*** (*Rengger*).

Five specimens: Urucúm, 2; Utiarity, 1; Tapirapoan, 2.

An old male from Utiarity measures, total length, 450 mm.; head and body, 250; tail, 200; hind foot, 55. This is the largest and much the oldest of the series.

34. ***Proechimys kermiti*** *Allen.*

One specimen, lower Rio Solimoens. (Cf. this Bull., XXXIV, p. 629, Dec. 30, 1915.)

MURIDÆ.

35. ***Epimys rattus rattus*** (*Linné*).

One specimen, Calama.

<sup>1</sup> Wagler says: "Caudam non observo."

36. **Epimys rattus alexandrinus** (*Geoffroy*).

Eight specimens, Urucúm, 6; Calama, 2.

37. **Epimys norvegicus** (*Erzleben*).

Two specimens, Trinidad (near Asuncion), Paraguay.

38. **Neacomys spinosus amœnus** *Thomas*.

Two specimens: Barão Melgaço, 1; Utiarity, 1.

39. **Rhipidomys** sp. indet.

One specimen, Barão Melgaço. In bad condition, lacking ears and tail, and the skull lacks the palatal region.

40. **Ɖcomys milleri** *Allen*.

Six specimens: Barão Melgaço, 5; Urupa, 1. (Cf. this Bull., XXXV, p. 523, July 24, 1916.)

41. **Oryzomys laticeps** (*Lund*).

One specimen, Maracana.

42. **Oryzomys angouya** (*Desmarest*).

One specimen, Trinidad, Paraguay.

43. **Oryzomys** sp. indet.

One specimen (in bad condition), Rio da Dúvida (Rio Roosevelt).

44. **Oryzomys** sp. indet.

Seven specimens: Tapirapoan, 3; São João, 4.

These specimens have the same character of pelage and somewhat similar coloration as *Oryzomys laticeps* but are about one half smaller. They apparently include two species, one specimen being quite different from the others.

45. **Oryzomys** sp. indet.

One specimen, Tapirapoan, an adult female without tail. Belongs to the *O. xantheolus* group.

46. **Oryzomys (Oligoryzomys) microtus** Allen.

Nine specimens, lower Rio Solimoens. (Cf. this Bull., XXXV, p. 525, July 24, 1916).

47. **Oryzomys (Oligoryzomys) utiaritensis** Allen.

Two specimens, Rio Papagaio. (Cf. this Bull., XXXV, p. 527, July 24, 1916.)

48. **Oryzomys (Oligoryzomys) mattogrossæ** Allen.

Two specimens: Utiarity, 1; Guatsué, 1. (Cf. this Bull., XXXV, p. 528, July 24, 1916.)

49. **Zygodontomys tapirapoanus** Allen.

Thirty-four specimens: Tapirapoan, 11; Utiarity, 16; Urucúm, 2; Tres Burity, 2; São João, 2; Volhena, 1. (Cf. this Bull., XXXV, p. 528, July 24, 1916.)

50. **Holochilus amazonicus** Osgood.

Six adult specimens, 3 males, 3 females, lower Rio Solimoens.

Collector's measurements: Total length, 3 males, 371 (370-373) mm., 3 females, 361 (345-370); head and body, 3 males, 195 (185-203), 3 females, 196 (190-202); tail, 3 males, 176 (170-185), 3 females, 165 (155-172); hind foot, 3 males, 42.7 (40-45), 3 females, 41.3 (40-42).

51. **Holochilus vulpinus** (Brants).

One specimen, adult male, Urucúm. Total length, 340 mm.; head and body, 170; tail, 170; hind foot, 40.

52. **Nectomys squamipes** (Brants), subsp.

One specimen, Urupá, Rio Gy-Paraná.

An adult female (without skull), referable to the *N. squamipes* group.

53. **Oxymycterus rufus** (*Desmarest*).

One specimen, immature, Campos Novos.

## SCIURIDÆ.

54. **Urosciurus langsdorffi urucumus** (*Allen*).

*Sciurus langsdorffi urucumus* ALLEN, Bull. Amer. Mus. Nat. Hist., XXXIII p. 595, Sept. 8, 1914.

*Urosciurus langsdorffi urucumus* Allen, *ibid.*, XXIV, p. 278, May 17, 1915.

Eleven specimens: Urucúm, 8; Tapiropan, 3.

55. **Urosciurus pyrrhonotus pyrrhonotus** (*Wagner*).

One specimen, Calama, practically a topotype. (*Cf.* this Bull, XXXIV, p. 275, 1915.)

## MUSTELIDÆ.

56. **Tayra barbara gulina** (*Schinz*).

Two specimens: an old female, skin with skull, Rio Negro, Paraguay; a flat skin without skull, Curumbá, Matto Grosso.

Collector's measurements of the Rio Negro specimen: Total length, 1040 mm.; head and body, 610; tail vertebræ, 430; hind foot, 100. The skull measures, total length, 110; condylobasal length, 109.3; zygomatic breadth, 70; interorbital breadth, 26; postorbital breadth, 24; breadth of braincase, 45.2; mastoid breadth, 51.7; length of maxillary toothrow, outer border, 19.3.

*Mustela gulina* Schinz was based on specimens in Wied's collection, and the name was obviously from Wied, as the latter says (*Beitr. Naturg. Bras.*, II, 1826, p. 310): "Dieses Thier habe ich früher mit dem Namen *Mustela gulina* belegt, . . ." The only locality definitely mentioned for the species is (*l. c.*, p. 318) Morro d'Arara, on the northern border of Espiritu Santo, Brazil, which may be taken as the type locality.

The head and nape in the present specimens are grayish dark brown, passing on the middle of the back insensibly into the darker blackish brown of the posterior third of the body. The skull is heavy, and relatively broad and short in comparison with some of the western and northern forms of the *barbara* group.

57. **Grison furax** *Thomas.*

One specimen, a flat skin without skull, Curumbá, Matto Grosso.

58. **Conepatus suffocans** (*Illiger*).

A flat skin, from "Terra del Fuego." Another flat skin from Chubut is apparently referable to this species, though not typical.

59. **Conepatus feuillei** (*Eydoux and Souleyet*).

*Conepatus mapurito monzoni* APLIN, Proc. Zool. Soc. London, 1894, p. 302, Soriano, Uruguay.

A flat skin, Paraná, Entre Rios, Argentina.

60. **Conepatus proteus** *Thomas.*

A flat skin from Cordova, Argentina.

## PROCYONIDÆ.

61. **Procyon (Euprocyon) cancrivorus nigripes** (*Mivart*).

*Black-footed Raccoon*, SCLATER, Proc. Zool. Soc. London, 1875, p. 421, "probably S. E. Brazil and Paraguay."

*Procyon nigripes* MIVART, *ibid.*, 1885, p. 347. = *Black-footed Raccoon* of Sclater, as above. Paraguay may be assumed as the type locality.

*Procyon cancrivorus brasiliensis* IHERING, Arch. für Naturg., 1910, Heft 2, p. 167, Oct., 1910; Revis. Mus. Paulista, VIII, p. 228, Sept., 1910. (Cf. Hollister, Biol. Soc. Washington, XXVII, p. 215, Oct. 31, 1914.

Two specimens, flat skins, from Province of Corrientes, Argentina.

62. **Nasua nasua solitaria** *Schinz* (ex Wied, MS.).

Six specimens: Urucúm, 5 (2 males, 3 females, all adult); São Lourenço, 1, (adult male). Four are in the so-called 'gray' phase and two are in the 'red' phase. The two red specimens are both from Urucúm, and are, respectively, male and female.

The four specimens in the 'gray' phase are remarkably uniform in coloration; the prevailing color of the upperparts is blackish, the hairs being subapically pale yellowish gray with long black tips, which dominate the

coloration. The two specimens in the red (erythrysmal) phase also agree in coloration, the upperparts being yellowish red, the dark tail-rings red and the alternating light rings yellowish white.

It is quite probable, on both faunal and geographic grounds, that the southern Matto Grosso animal is subspecifically separable from true *solitaria* of the southeast coast region of Brazil; lack of material in the present connection, however, renders impossible direct comparison of the coats of these two regions.

The earliest identifiable names for the *Nasua* of southeastern Brazil are *Nasua solitaria* and *N. sociabilis* Schinz<sup>1</sup> (ex Wied MS.), 1821, which are the same, respectively, as *Nasua solitaria* and *N. socialis* Wied, 1826,<sup>2</sup> *N. solitaria* being based on old males and *N. socialis* on females and young males, as stated by Wied, who regarded his *N. solitaria* as very doubtfully distinct from his *N. socialis*. Unfortunately, through Schinz's prior publication of these names, both have the same standing, except that *solitaria* has page precedence over *sociabilis* (= *socialis* Wied), and therefore requires acceptance.

### 63. *Potos flavus* (subsp.?)

Three pelts without feet, purchased at a furrier's in Buenos Aires; not satisfactorily identifiable.

## CANIDÆ.

### 64. *Chrysocyon jubatus* (*Desmarest*).

Two specimens: Urucúm, adult male, skin and skull, Dec. 9, 1913; Curumbá, hunter's pelt, imperfect.

### 65. *Cerdocyon thous azaræ* (*Wied*).

Five specimens (skins with skulls), 2 males, 3 females, all adult, Trinidad (near Asuncion), Paraguay.

Collector's measurements, total length, 966 (940-1010) mm.; head and body, 708 (680-740); tail vertebrae, 258 (240-270); hind foot, 132 (120-140). The largest of the series is a female.

<sup>1</sup> *Thierreich*, I, 1821, p. 199.

<sup>2</sup> *Beitr. zur. Naturg. von Brasilien*, II, 1826, pp. 292 and 283.



66. *Lycalopex vetulus* (Lund).

Two imperfect skins, without skulls, are provisionally referred to this species. One is labeled "North Patagonia," the other "Brazil," the latter being probably from Matto Grosso.

67. *Panthera*<sup>1</sup> *paraguensis* (Hollister).

*Felis paraguensis* HOLLISTER, Proc. U. S. Nat. Mus., LVIII, No. 2069, p. 169, Dec. 16, 1914 ("Collected in Paraguay." Not *Panthera paraguayensis* Oken, 1816, a species of ocelot.

Seven skins and 6 skulls (2 old males, 3 adult females, 2 kittens a few months old), all from the immediate vicinity of Curumbá, Matto Grosso. One of the specimens, an old male, was killed by Colonel Roosevelt, and the others were received from Mr. J. G. Ramsay through the Roosevelt Expedition. All the skulls and four of the skins are in the Museum collection of mammals; two of the skins were only loaned for examination.

The skins vary greatly in coloration; in all the dark markings are very heavy, greatly restricting the area of the ground color. The markings vary with each specimen. There is a tendency to a triple row of black spots along the midline of the back, the middle row of spots being solid black and the outer rows with open centers; in one specimen the spots of all three rows are nearly solid black; in other specimens there is a broad central area of tawny, with one to three small dots of black. In one specimen the median line of heavy elongate black spots is divided into two narrow lines of solid black spots for the posterior half of the dorsal line. The ground color, except on the ventral surface, where it is white, is deep golden tawny, but the depth of tone varies greatly in different specimens.

Three of the adult skins (soft tanned) measure as follows: Total length, ♂ 2500 mm.; ♀ 2200, ♀ 2185; length of tail (excluding the hair at the tip), ♂ 825; ♀ 580, ♀ 540; tip to tip of outstretched fore limbs, ♂ 1740, ♀ 1480, ♀ 1450. These measurements greatly exceed those of comparable specimens from Amazonas, Venezuela, and Central America.

Five adult skulls (2 males, 3 females, all from Curumbá) measure as follows, in comparison with the type (male) skull of *paraguensis*:

<sup>1</sup> *Panthera* OKEN, Lehrbuch der Naturgeschichte, Th. 3, Abth. 2, 1816, p. 1052. Type, by tauonomy, *Panthera vulgaris* Oken, = *Felis pardus* Linné = *Felis panthera* Pallas.

*Jaguarius* (subgenus of *Panthera*) SEVERTZOW, Rev. et Mag. de Zool., Sér. 2, X, pp. 386, 390, Sept., 1858. Type, by monotypy, *Felis onca* Linné.

	37503 ♂	36950 ♂	37550 ♀	37549 ♀	36949 ♀	4128N <sup>1</sup> ♂
Total length	305	300	262	255	240	303
Condylbasal length	280	260	241	232	219	265
Zygomatic breadth	208	196	170	166	163	196
Nasals (on median line)	74	65	60	65	59	63
Audital bullæ, length	47.5	48	49	41	40	40.5
"    "    breadth	33	34	31	27	30	37
Carnassial, length	28	28	27	28.2	27	28.8
"    breadth	15.1	14	15	15	15	15.2
Length of p <sup>2</sup> and p <sup>3</sup>	48	46.5	46.6	46.5	45	48.3

The two old male skulls agree very closely in measurements with the type (No. 4128, U. S. Nat. Mus., old ♂) of *Felis paraguensis* Hollister, which, through Mr. Hollister's kindness, is before now me, rendering possible its direct comparison with the Curumbá material. The female skulls from Curumbá are naturally much smaller than the males, and two of them are also somewhat younger. The type locality of *paraguensis* is given as "collected in Paraguay by Capt. T. J. Page, United States Navy." It does not differ in any essential particular from the male skulls from Curumbá. This type skull was studied by me, with other jaguar material, in 1906 (*cf.* Bull. Amer. Mus. Nat. Hist., XXII, pp. 214-218), when the large size of the jaguars of southern Brazil, in comparison with those of Central America, Venezuela, and Amazonas, was noted, but the material at hand seemed insufficient to serve as the basis for a revision of the group. The present Curumbá material confirms the conclusions then reached and shows conclusively the occurrence of a very large form of jaguar in southern Brazil and Paraguay.

My material, however, does not indicate that distinctions based on the size and shape of the audital bulla and surrounding parts afford very

*Description of Figures 1-6 (p. 577).*

Fig. 1. *Panthera paraguensis* Hollister. Type, No. 4128, U. S. Nat. Mus. Adult male, Paraguay. †.

Fig. 2. *Panthera paraguensis*, No. 37503, Amer. Mus. Adult male, Curumbá, Matto Grosso, Brazil. †.

Fig. 3. *Panthera paraguensis*. No. 36950, Amer. Mus. Adult male, Curumbá, Matto Grosso, Brazil. †.

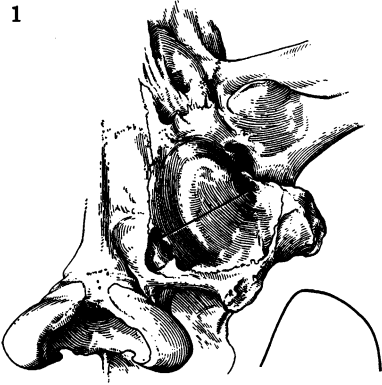
Fig. 4. *Panthera paraguensis*. No. 36949, Amer. Mus. Adult female, Curumbá, Matto Grosso, Brazil. †.

Fig. 5. *Panthera paraguensis*. No. 37550, Amer. Mus. Adult female, Curumbá, Matto Grosso, Brazil. †.

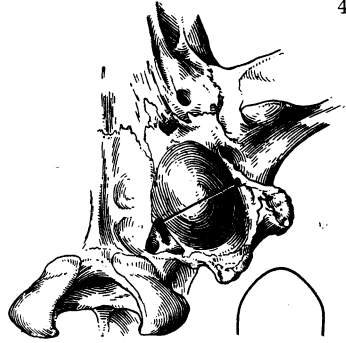
Fig. 6. *Panthera paraguensis*. No. 37549, Amer. Mus. Adult female, Curumbá, Matto Grosso, Brazil. †.

<sup>1</sup> Type of *Felis paraguensis* Hollister.

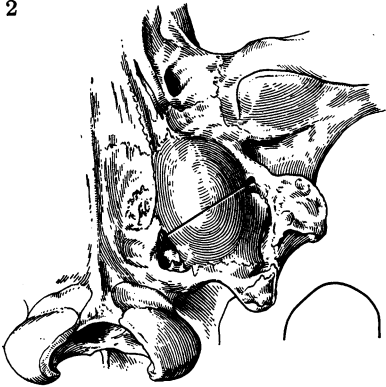
1



4



2



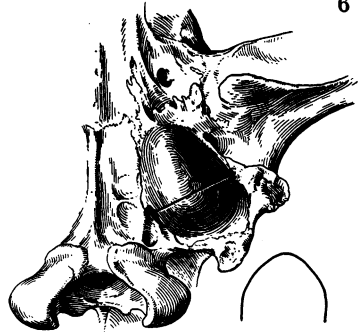
5



3



6



(For description of Figures see opposite page.)

trustworthy characters. The bullæ in my series present a wide range of variation, being sometimes quite unlike on the two sides of the same skull. The extremes in this respect are presented by No. 37503, ♂ ad., and No. 36950, ♂ ad. In No. 37503 the left bulla (the right one is lacking) is small, evenly elliptical in outline, evenly convex, with the highest part of the convexity mesial; in No. 36950 the bullæ are much broader, expanded posteriorly and narrowed anteriorly, with the highest point of the convex surface nearer the inner border. The bullæ in this specimen agree quite closely with the bullæ of the type skull of *paraguensis*, except that in the latter the front portion is more swollen and ends more abruptly. The left bulla of the type of *paraguensis* and of five adult skulls from Curumbá are shown in the accompanying illustrations (Figs. 1-6) and well illustrate the variability of this feature in jaguars referable to *paraguensis*. The difference in transverse contour is shown diagrammatically by cross-sections.

The range of *Panthera paraguensis* is at present very imperfectly known, but it evidently includes Paraguay and southwestern Brazil. Two skins (without skulls) from Paraná, recently presented to the American Museum by Miss Eliza Kuhl Hughes, seem referable to this form, but they differ from the Curumbá skins in the much paler tone of the ground color and the smaller areal extent of the black markings, which are narrower and less heavily developed. A female skull from Chapada, Matto Grosso, collected by H. H. Smith, in January, 1885, agrees, as would be expected, in size and in all essential features with old skulls of females from Curumbá.

The name *Panthera paraguensis* is here adopted provisionally, in view of the earlier *Panthera paraguayensis* Oken (1816), given to an ocelot. Oken in his 'Lehrbuch der Naturgeschichte' (dritter Theil, zweite Abtheilung) consistently employed "Paraguay" for Paraguay, and in using it as the basis of specific names added the suffix *-ensis*, giving the form *paraguayensis*, instead of taking "Paraguay" for the stem. The opinions of authorities at present appear to differ as to whether *paraguayensis* (Oken's name in full is [*Felis*] *Panthera paraguayensis*, *Panthera* being merely a section of his genus *Felis*) will render untenable a later *Felis paraguensis*. Both names are etymologically identical.

#### 68. *Panthera onca* (Linné).

The Roosevelt collection contains a tanned skin of a black jaguar and two skulls without skins, from at present unknown localities. The skulls are strictly of the *onca* type, and are, respectively, male and female. The principal measurements of the skulls are as follows: greatest length, No. 36240, ♂ ad., 225 mm., No. 36241, ♀ ad., 206; condylobasal length, ♂ 201,

♀ 188; zygomatic breadth, ♂ 150, ♀ 139; nasals (on median line), ♂ 54, ♀ 47; audital bullæ, ♂ 39 × 25, ♀ 31 × 19; carnassial (length), ♂ 22.5, ♀ 23.5; length of p<sup>2</sup> and p<sup>3</sup>, ♂ 38, ♀ 39. (The teeth are larger in the female than in the male.)

The melanistic skin is black with a slight brownish cast, of an apparently uniform tone, but on close examination the usual deep black markings can be recognized.

Two hunter's pelts of kittens, without exact locality, are also provisionally referred to *onca*.

#### 69. *Puma puma concolor* (Linné).

Skin with skull (No. 37505, ♀ ad.), from Curumbá, Matto Grosso, received from J. G. Ramsay (through the Roosevelt Expedition). Also a skull (No. 36242) from an at present unknown locality.

The skin has a broad median dorsal band of dull red, extending from the crown to near the end of the tail, in strong contrast with the paler color of the sides of the body; inside of the limbs white; ventral surface pale buff; tip of tail dull black for the terminal 60 mm., preceded by a half ring of dull white on the dorsal side.

The two skulls agree in size and in all other features, and both are probably females. Yet it is evident that they represent a small form of the puma group, doubtless referable to *P. p. concolor*. The principal measurements of these skulls are: No. 37505, ♀ ad., greatest length, 186, No. 36242, ♀ ad., 184.5 mm.; condylobasal length, 167, 165; zygomatic breadth, 123.5, 123.5; nasals (on median line), 44, 43; audital bullæ, 33 × 20, 32 × 17; upper carnassial, 21.6 × 12, 21 × 11; length of p<sup>2</sup> and p<sup>3</sup>, 36.3, 35.3.

#### 70. *Puma pearsoni* (Thomas).

A tanned skin of an old female, in excellent condition but without skull, from "Patagonia," represents the gray phase of *pearsoni*.

#### 71. *Herpailurus*<sup>1</sup> *jaguarundi jaguarundi* (Fischer).

One specimen, a tanned skin without skull, in the dark or 'yaguarundi' phase, vicinity of Curumbá.

<sup>1</sup> *Herpailurus* Severtzow, Rev. et Mag. Zool. (2), X, 1858, pp. 385, 390. Species, "*Felis yaguarundi* Azara" and "*F. eyra* Azara."

72. *Lynchailurus pajeros pajeros* (Desmarest).

An imperfect hunter's pelt, without skull, from the pampas of central Argentina.

73. *Oncoides pardalis chibigouazou* (Griffith).

*Felis chibigouazou* GRIFFITH, Animal Kingdom, II, 1827, p. 167, No. 431.—MEARNS (ex Griffith), Proc. U. S. Nat. Mus., XXI, No. 1286, p. 246, Sept. 17, 1902. Redescribed from specimens from Chapada, Matto Grosso, Brazil.

Six pelts, without skulls, from Curumbá, presented to the Roosevelt Expedition by the Brazilian Land, Cattle and Packing Company of Curumbá, through the superintendent, Mr. J. G. Ramsay.

*Felis chibigouazou* of Griffith is here taken as restricted by Dr. Edgar A. Mearns in his important paper on the Ocelots published in 1902.<sup>1</sup> His description is based on a specimen from Chapada, Matto Grosso, not far from where the present series was collected, and near the region (Paraguay) of Azara's Chibigouazou. Mearns's description applies satisfactorily to the specimens here in hand.

74. *Margay*<sup>2</sup> *tigrina*<sup>3</sup> *wiedi* (Schinz).

One specimen (No. 36980, ♂ ad.), Urucúm, Nov. 30, 1913, skin and skull in fine condition.

Collector's measurements: Total length, 950 mm.; head and body, 560; tail vertebræ, 390; hind foot, 130.

<sup>1</sup> The Ocelot Cats. By Edgar A. Mearns, Major and Surgeon, U. S. A., Proc. U. S. Nat. Mus., XXI, No. 1286, pp. 237-249, Sept. 17, 1902. *Felis chibigouazou*, p. 246.

<sup>2</sup> *Margay* GRAY, Proc. Zool. Soc. London, 1867, p. 271 (subgenus of *Felis*; species, *Felis macroura* Wied, *F. mitis* F. Cuvier, *F. tigrina* Schreber. *Felis macroura* Wied (= *Felis wiedi* Schinz) is here designated as the type. The group will also include *Felis geoffroyi* D'Orbigny, *Felis guttula* Hensel, *F. glaucula* Thomas.

<sup>3</sup> *Felis tigrina* SCHREBER, Säug., Th. III, pl. cvi, 1775 (fide Sherborn, P. Z. S., 1891, p. 588); *Die Maraguay*, in text, p. 396, 1777. Based on *Le Margay* of Buffon, Hist. Nat., XIII, 1765, pp. 248-253, pl. xxxvii, described and figured from a specimen taken in Cayenne.—(Cf. Thomas, Ann. and Mag. Nat. Hist. (7), XII, p. 235, footnote, August, 1903.)

*Felis tigrina* ERXLEBEN, Syst. Reg. Anim., 1777, p. 517. — Erxleben cites Schreber's work, the text as well as the plate. The name *Felis tigrina* Schreber has two years priority over *Felis tigrina* Erxleben.

*Felis wiedi* SCHINZ, Tierreich, I, 1821, p. 235. Based on specimens in the Wied Coll.

*Felis macroura* WIED, Beiträge zur Naturg. Brasilien, II, 1826, pp. 371-379; Abild., Lief. 3 (plate and text not numbered). Type locality, northern Espirito Santo, Brazil. No definite type locality is mentioned by the author, but he says: "In den grossen Urwäldern zu Morro d'Arara am Mucuri erhielt ich auf diese Art in Zeit von vierzehn Tagen drei solche Katzen; eine vierte shoss einer meiner Jäger am Espirito Santo von einem hohen Baume herab. . . ." As the Rio Mucury forms the northern boundary line of Espirito Santo, it seems desirable to designate northern Espirito Santo as the type locality of *Felis macroura* Wied (= *Felis wiedi* Schinz of earlier date), and therefore of *F. wiedi*.

Skull, total length, 94; condylobasal length, 88; zygomatic breadth, 64.7; greatest length of nasals, 23.5; postorbital breadth, 34; interorbital breadth, 17; breadth of braincase, 43.3; mastoid breadth, 44; maxillary toothrow, 20; carnassial,  $11 \times 5$ . Although the skull is very old and the muscular scars are strong, there is no tendency whatever to a sagittal crest. The orbit is nearly closed behind; the postorbital and malar processes meet but are not fused.

### 75. *Margay guttula* (Hensel):

One specimen (No. 36948), without skull, São Lourenço, collected by Kermit Roosevelt.

This specimen is very dark, both above and below, with a dark yellowish ground color, nearly as deep on the ventral surface as above, the black markings profuse on the ventral surface. Black rings on the tail quite distinct for the whole length.

Another specimen (No. 36225) from "Paraná," a flat skin without skull or definite locality, presented by Miss Eliza Kuhl Hughes, is similar in markings, including the broad complete black rings on the tail, but the ground color is much lighter.<sup>1</sup>

*Felis pardinoides* GRAY, Proc. Zool. Soc. London, 1867, p. 400. "*Hab. India (Capt. Innes: from Zool. Soc. Mus.)*"; Cat. Carn. Pachy. and Edent. Mamm., 1869, p. 27 (same as above). Referred to *Felis geoffroyi* by Elliot (P. Z. S., 1872, p. 203).

"*Felis pardinoides* Gray" THOMAS, Ann. and Mag. Nat. Hist. (7), XII, pp. 236, 237, Aug. 1903, "... description of two fresh specimens [from Espirito Santo, Brazil, collected by A. Robert] apparently assignable to the little-known *F. pardinoides*, Gray."

? *Felis mitis* F. CUVIER, Hist. nat. Mamm., livr. XVIII (plate and four pages of text), July, 1820; *ibid.*, suppl. note, livr. XXI, Oct. 1820. Based on a living animal from an unknown locality. Later identified (in the supplemental note) as similar to another living specimen known to have been brought from Brazil.

*Felis mitis* DESMAREST, Mamm., I, 1820, p. 221 (part) = *Felis mitis* F. Cuvier, plus the *Chibigouazou* of Azara = *Felis chibigouazou* Mearns (ex Griffith).

? *Felis elegans* LESSON, Cent. Zool., 1830, pp. 69-72, pl. xxi. "Brésil," without definite locality. Unidentifiable, but probably referable to some form of the *tigrina* group.

<sup>1</sup> The following forms of the *Margay* group are represented in the American Museum collection:

#### *Margay glauclula* (Thomas).

*Felis glauclula* THOMAS, Ann. and Mag. Nat. Hist. (7), XII, p. 235, Aug. 1903. Type locality, Beltran, Jalisco, Mexico.

#### *Margay tigrina oncilla* (Thomas).

*Felis tigrina* ALSTON, Biol. Centr.-Am., Mamm., p. 61, Nov. 1879. Central America, including Volcan de Irazú.

*Felis pardinoides oncilla* THOMAS, Ann. and Mag. Nat. Hist. (7), XII, p. 237, Aug. 1903. Type locality, Volcan de Irazú, Costa Rica.

#### *Margay tigrina andina* (Thomas).

*Felis tigrina* THOMAS, Proc. Zool. Soc. London, 1880, p. 396, Andoas, Ecuador, Buckley Coll.

*Felis pardinoides andina* THOMAS, Ann. and Mag. Nat. Hist. (7), XII, p. 238, Aug. 1903. Type locality Jima, Province of Azuay, Ecuador, Buckley Coll.

## EMBALLONURIDÆ.

76. **Rhynchiscus naso** (*Wied.*).

Twenty-five specimens: Calama, 9 skins and skulls and 5 specimens in alcohol; Porto Campo, 1 skin and 10 in alcohol.

Collector's measurements of 14 Calama specimens: Head and body, 56.3 (50-60) mm.; tail, 14 (12-15); foot, 7 (6-8); ear, 9.3 (9-10); expanse, 245.3 (235-260).

77. **Sacropteryx bilineata** (*Temminck*).

One specimen, Barão Melgaço.

## PHYLLOSTOMIDÆ.

78. **Mormon bennetti** (*Gray*).

Two specimens, Urucúm.

79. **Glossophaga soricina microtis** *Miller*.

Nine specimens, all from Urucúm.

Collector's measurements: Head and body, 64.6 (59-70) mm.; tail, 10 (8-12); foot, 10.1 (10-11); ear (from crown), 10.6 (10-12); expanse, 257 (245-270).

80. **Vampyrops lineatus** (*E. Geoffroy*).

Thirty-two specimens: Urucúm, 30 skins and skulls and 4 in alcohol; Trinidad, Paraguay, 2.

Collector's measurements of 28 adult Urucúm specimens: head and body, 71 (70-75) mm.; foot, 11.4 (12-13); ear, 14.8 (13-15); expanse, 350 (330-370).

*Margay tigrina emerita* (Thomas).

*Felis pardinoides emerita* THOMAS, Ann. and Mag. Nat. Hist. (8), X, p. 43, July, 1912. Type locality, Montes de la Culata, Merida, Venezuela.

*Margay tigrina elenzæ* Allen.

*Margay tigrina elenzæ* ALLEN, Bull. Amer. Mus. Nat. Hist., XXXIV, p. 631, Dec. 30, 1915. Type locality, Santa Elena, Antioquia, Colombia.

It seems to me quite doubtful whether these forms are all conspecific, especially *emerita* and *andina*.



81. **Artibeus jamaicensis lituratus** (*Illiger*).

Five specimens: Rio de Janeiro, 4; Urucúm, 1.

82. **Artibeus concolor** (*Peters*).

A skin, without skull, from Calama, is provisionally referred to this species.

## VESPERTILIONIDÆ.

83. **Eptesicus chapmani** *Allen*.

Five specimens, Lower Solimoens. (Cf. this Bull., XXXIV, p. 632, 1915.)

## MOLOSSIDÆ.

84. **Molossops temmincki** (*Burmeister*).

Seven specimens: Tres Burity, 2; Lower Solimoens, 5 (including 2 in alcohol).

Collector's measurements of 3 adults from the Solimoens: Head and body, 86 (84-90) mm.; tail, 28.3 (25-30); foot, 10 (all 10); ear from crown, 9 (8-10); expanse, 238 (235-240).

85. **Molossus obscurus** *E. Geoffroy*.

Five specimens, all from Calama.

Collector's measurements of 4 specimens: Head and body, 110 (105-120) mm.; tail, 43.7 (40-50); foot, 10 (all 10); ear from crown, 9 (8-10); expanse, 309 (300-320).

86. **Molossus cherriei** *Allen*.

One specimen, Tapirapoan (Cherrie). (Cf. this Bull., XXXV, p. 529, July 24, 1916.)

## CALLITHRICIDÆ.

87. **Callithrix argentata melanura** (*E. Geoffroy*).

*Jacchus melanurus* E. GEOFFROY, Ann. du Mus. d'Hist. nat., XIX, 1812, p. 120 ("Le Bresil?").—DESMAREST, Mamm., I, 1820, p. 93. Description based on Geoffroy's type.

*Hapale melanura* KUHLE, Beitr. Zool. u. Comp. Anat., 1820, p. 49. Description based on Geoffroy's type.—WAGNER, Schreber's Säugt., Suppl., I, 1840, p. 244; Abhandl. m.-p. Classe, k.-b. Akad. Wissen. München, V, 2 Abtheil., 1848, p. 469; Schreber's Säugt., Suppl. V, 1855, p. 127 (part).—SCLATER, Proc. Zool. Soc. London, 1875, p. 419 (part, not the plate).—PELZELN, Verhandl. k.-k. b.-z. Gesells. Wien, XXIII, Beiheft, 1883, p. 23, Matto Grosso, Brazil.

*Callithrix argentata* ELLIOT, Primates, I, 1912 (1913), p. 221 (part; description, but not the plate).

Four specimens, 2 adult males, 1 adult female, 1 young male in first pelage, all from Urucúm, Matto Grosso, Nov. 27, 1913.

Collector's measurements of adults: Total length, ♂♂, 565, 560, ♀ 580 mm.; tail vertebræ, 340, 340, ♀ 340; hind foot, 70, 68, ♀ 70.

Skull, occipitonasal length, ♀ 44.6, ♂♂, 43.5, 44.6; zygomatic breadth, ♀ 30, ♂♂, 29.7, 30.3; orbital breadth, ♀ 27, ♂♂, 26.5, 26; postorbital breadth, ♀ 21.5, ♂♂, 21, 22; breadth of braincase, ♀ 25.4, ♂♂ 25, 26.

These specimens agree with Wagner's (*l. c.*, 1848 and 1855) and Natterer's (Pelzeln, *l. c.*, 1883) descriptions of specimens collected by Natterer at Cuyubá and Caiçara, Matto Grosso.

Geoffroy's *Jacchus melanurus* was based on a single specimen without definite locality but supposed to have come from Brazil. His diagnosis comprised seven words, as follows: "Pelage brun; fauve en dessous: queue noire"; to which he added, "Habite . . . le Bresil?" In 1820 Desmarest and Kuhl each gave a fuller description based on Geoffroy's type in the Paris Museum.<sup>1</sup> This description agrees well with Matto Grosso specimens, and Cuyubá is here designated as type locality for the species, which was first fully described by Wagner in 1848 and in 1855 from Natterer's large series of Cuyubá and Caiçara specimens.

*Simia argentata* Linné (Mantissa, 1771, pt. 2, p. 521) was based primarily on the Mico of Buffon (Hist. nat., XV, 1767, pp. 121-124, pl. xviii), which in turn was described from a dried skin, formerly for a time preserved in spirits,<sup>2</sup> obtained at Para, Brazil, by Condamine, and apparently full-grown (about "huit pouces de longueur depuis le bout du museau jusqu'à l'origine de la queue"). It is described as "de couleur grise-blanchâtre & tres-légèrement teinte de jaunâtre" upon all the body, "excepté sur la queue, dont le poil est court & de couleur de marron ou noirâtre." Buffon says he had been assured by Condamine, who had seen the species alive,

<sup>1</sup> This type was still in existence in 1851, and is entered in I. Geoffroy's 'Catalogue' of the Mammals (p. 60) as follows: "♂ Type de l'espèce. Du Brésil; du Voyage de M. Geoffroy Saint-Hilaire en Portugal, 1808."

<sup>2</sup> Cf. Audebert, Hist. nat. des Singes et des Makis, 1800, Fam. VI, Sect. II, p. 3, pl. ii.

that the ears and face were of the color of vermilion, and they are so represented in Audebert's plate (*l. c.*). The color of the face and ears is doubtless much less bright, even in life, than is here represented. It seems probable that Sclater's colored plate<sup>1</sup> (*P. Z. S.*, 1875, p. 419, pl. 1), from a living animal in the menagerie of the London Zoölogical Society, from an unknown locality, and identified by him as *Hapale melanura*, represents the normal coloration of true *argentatus*.

It may be here noted that I. Geoffroy<sup>2</sup> believed that *Simia argentata* Linné, *Le Mico* of Buffon, and the *Jacchus*, or *Hapale, argentatus* of E. Geoffroy and of later authors, is merely "une variété albine de l'Ouistiti." A specimen in the Paris Museum from Brésil, presented by Count Hoffmansegg, he believed was also "un *H. melanurus* albinos."

A specimen of the *melanurus* group taken in Bolivia, was presented to the Paris Museum as early as 1834, and another was collected there a little later by Bridges, which became the basis of Gray's *Jacchus leucomerus*,<sup>3</sup> and which should probably now stand as *Callithrix argentata leucomerus* (Gray).

Since the above was written the American Museum of Natural History has received three specimens of the *Callithrix argentata* group, two of which are from the Lower Amazon region, one being from Cameté, on the Rio Tocantins, the other from Tamacurú, Amazonas. The first has the upperparts and limbs faintly washed with silvery gray; the other similarly washed with a dusky tone of gray; the tail in both is black with a slight mixture of white hairs, most abundant near the tip. These specimens closely resemble the type specimen of *argentata*, except that the tail is deep black instead of "marrou ou noirâtre." The third specimen is from Pimental, Rio Tapajos, and is white with a faint suffusion of yellow, strongest on the hind limbs and tail. This specimen agrees perfectly with the description of *Hapale chrysoleucos* Wagner (ex Natterer MS.), based on specimens from Borba, on the lower Rio Madeira. Of Natterer's seven specimens, one is noted as having traces of black on the upper side of the tail. *Hapale chrysoleucos* is probably merely a local form of *Callithrix argentata*, which is apparently an unstable group, as yet not well understood.

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<sup>1</sup> Well reproduced by Elliot in his 'Primates,' Vol. I, pl. 8.

<sup>2</sup> Cat. méth. Coll. des Mammifères du Mus. d'Hist. nat. de Paris, 1851, p. 60.

<sup>3</sup> Ann. and Mag. Nat. Hist., XVIII, p. 212, Sept. 1846.

## CEBIDÆ.

88. ***Alouatta caraya*** (*Humboldt*).

Four adult specimens: Urucúm, 2, male and female; Rancho Palmiras, Rio Taquary, 2 males.

Collector's measurements: total length, male and female, Urucúm, ♂ 1260, ♀ 1100 mm.; head and body, 610, 500; tail vertebræ, 650, 600; hind foot, 145, 140. (The external measurements of the Rancho Palmiras specimens are not available.)

Skulls of the same specimens, total length,<sup>1</sup> ♂ 121, ♀ 102; occipito-nasal length, 110, 85; basal length, 102, 84; zygomatic breadth, 79, 67; orbital breadth, 59, 53; interorbital breadth, 11, 9; postorbital breadth, 38, 38; breadth of braincase, 48, 48; breadth of rostrum at canines, 28, 22; palatal length, 41, 36; palatal length at m<sup>1</sup>, 23, 20; nasals, 22 × 13, 17 × 10; maxillary toothrow, 34, 30. Two old male skulls from Rancho Palmiras: Total length, 127, 128; occipitonasal length, 111, 112; basal length, 107, 105; zygomatic breadth, 85, 85.5; orbital breadth, 61, 64; interorbital breadth, 11, 14; postorbital breadth, 39, 40.5; breadth of braincase, 54, 53; breadth of rostrum at canines, 29, 30; palatal length, 46, 43; palatal breadth at m<sup>1</sup>, 23, 23; nasals, 24 × 11, 23 × 11; maxillary toothrow, 37, 36.5.

89. ***Saimiri cassaquiarensis*** (*Humboldt*).

Two specimens: Calama, lower Rio Madeira, 1, adult female; lower Rio Solimoens, 1, adult female.

Collector's measurements: Total length, 750, 700 mm.; head and body, 290, 335; tail vertebræ, 460, 405; hind foot, 90, 80; ear from crown, 20.

90. ***Saimiri ustus*** *I. Geoffroy*.

One specimen, adult male, Calama, lower Rio Madeira.

Collector's measurements: Total length, 750 mm.; head and body, 310; tail vertebræ, 440; hind foot, 90; ear from crown, 30.

Skull, total length, 65; occipitonasal length, 60; zygomatic breadth, 38; orbital breadth, 35; postorbital breadth, 31; breadth of braincase, 36.5; maxillary toothrow, 12.2; depth of skull at bullæ, 33.

<sup>1</sup> To end of occipital spine, which in males projects about 8 mm. beyond the occipital plane.

91. *Ateles longimembris* Allen.

Two specimens, Barão Melgaço, Matto Grosso. (Cf. this Bull., XXXIII, p. 651, 1914.)

92. *Aotus azaræ* (Humboldt).

Four specimens: 2 adult females and a very young specimen, Rio Pilcomayo, at mouth of Rio Negro, about 100 miles west of Asuncion, Nov. 13, 1913; 1 flat skin, Province of Buenos Ayres, Argentina.

Collector's measurements, total length, 750, 730 mm.; head and body, 360, 330; tail vertebræ, 390, 400; hind foot, 100, 105.

Skulls, occipitonasal length, 59, 58; total length, 63, 60; zygomatic breadth, 33.9, 41; orbital breadth, 44, 43; postorbital breadth, 31, 32; breadth of braincase, 34.5, 34; maxillary toothrow, 14.3, 14.7.

One of these specimens has the pelage of the upperparts much more heavily suffused with fulvous than the other, and the underparts are also paler. In the heavily suffused specimen the base of the tail above is deep ochraceous, in the other the base of the tail has a paler tone of ochraceous and the ochraceous area is much more restricted.

93. *Aotus roberti* Dollman.

Two specimens, adult male and female, Rio São Lourenço, Upper Paraguay, Matto Grosso, Jan. 1, 1914.

Collector's measurements, total length, ♂ 790, ♀ 760 mm.; head and body, ♂ 360, ♀ 360; tail vertebræ, ♂ 430, ♀ 400; hind foot, ♂ 100, ♀ 100.

Skulls, occipitonasal length, ♂ 59, ♀ 58.7; total length, ♂ 61, ♀ 60; zygomatic breadth, ♂ 39.2, ♀ 39.6; orbital breadth, ♂ 44, ♀ 45; postorbital breadth, ♂ 31, ♀ 33; breadth of braincase, ♂ 33, ♀ 34.5; maxillary toothrow, ♂ 14, ♀ 14.5.

*A. roberti*, on the basis of these specimens, has the upperparts a much darker, clearer gray, without any marked fulvous suffusion, than *A. azaræ*, with a distinct blackish superciliary streak, absent in *azaræ*. The skulls of these two species have practically the same size and general proportions, but the interorbital region is much broader, with a correspondingly wider palatal region, in *azaræ*. Also the dentition is heavier and the maxillary toothrows are more convergent anteriorly, and the audital bullæ much less inflated than in *roberti*. In *roberti* the bullæ are not only much smaller, but the inner face is concave, instead of flat as in *azaræ*. The lower jaw is also much heavier in *roberti*, the angular portion being especially broader and heavier.

94. **Cacajao roosevelti** *Allen*.

Three specimens, Barão Melgaço, Matto Grosso, head of the Rio Gy-Paraná. (Cf. this Bull., XXXIII, p. 651, 1914.)

95. **Lagothrix cana** (*Humboldt*).

Two specimens, adult male and female, Calama, lower Rio Madeira.

In these specimens the pelage is very short, with no very long hairs on the limbs, tail, or chest. The general coloration above is dull olivaceous gray, with a well defined dark brown crown-patch; ventral surface and inside of limbs dark brownish black, lighter on chin, throat and chest, darker, nearly black, on the lower abdomen.

Collector's measurements of the female: Total length, 1140 mm.; head and body, 480; tail vertebræ, 660; hind foot, 140. The male was not measured.

96. **Cebus macrocephalus** *Spix*.

Two specimens, adult male and female, Calama, lower Rio Madeira.

Collector's measurements, total length, ♂ 945, ♀ 860 mm.; head and body, 465, 430; tail vertebræ, 490, 430; hind foot, 135, 115. Skulls, total length, ♂ 99, ♀ 88; basal length, 71, 62; zygomatic breadth, 71, 60; orbital breadth, 56, 45; interorbital breadth, 6, 4; postorbital breadth, 36, 37; breadth of braincase, 52, 51; breadth of rostrum at canines, 30, 28; palatal length, 34, 30; breadth of palate at  $m^1$ , 19, 16; nasals, —  $\times$  16, 18  $\times$  9; maxillary toothrow, 23, 22.

97. **Cebus azaræ azaræ** *Rengger*.

Seven specimens: Urucúm, 5, Dec. 7-12, 1913; San Lourenço, 2, Dec. 31 and Jan. 1, 1913-14. Four of the specimens are adult, the others are immature, one of them apparently not more than a week or two old.

Four adults, 2 males, 2 females: total length, San Lourenço, ♂ 880, Urucúm, ♂ 920 mm.; Urucúm, 2 ♀ ♀, 890, 870; head and body, ♂ ♂ 450, 420; ♀ ♀ 420, 440; tail vertebræ, ♂ ♂ 470, 460; ♀ ♀ 470, 430; hind foot, ♂ ♂ 130, 110; ♀ ♀ 120, 110.

An adult male and an adult female skull measure as follows: Total length, ♂ 96, ♀ 89; basal length, 66, 59; zygomatic breadth, 67, 58; orbital breadth, 53, 46; interorbital breadth, 5, 4; postorbital breadth, 38, 35; breadth of braincase, 53, 50; breadth of rostrum at canines, 28, 25; palatal length, 33, 30; breadth of palate at  $m^1$ , 17, 15; nasals, 19  $\times$  11, 15  $\times$  9; maxillary toothrow, 22.3, 21.5.

FIELD NOTES. BY LEO E. MILLER.<sup>1</sup>2. **Didelphis paraguayensis.** PARAGUAY OPOSSUM.

Very abundant in the tall forests and in swampy country. No. 57, taken on the Rio Negro, Paraguay, was carrying fourteen young. The specimens trapped in the Paraguayan Chaco had almost buried themselves beneath the leaves and earth. It is possible that this may have been done as protection against the mosquitoes which swarmed in clouds. The tip of the tail of one of the trapped animals, protruding above the leaves, was covered with these insects. They are nocturnal in habits, spending the day in hollow trees and in hollow logs. Their food consists of both fruits and flesh, and they seem to be fond of carrion and fish. The former is effective as bait in trapping them, and they frequently visited camp in search of the latter, attracted by the drying mammal skulls.

4. **Metachirus opossum quica.** QUICA OPOSSUM.

This small species of opossum is found in the deep forests. I have never known it to venture near houses for the purpose of robbing hen-roosts and nests, like its larger relative, although it may do so. When trapped it does not feign death, but fights viciously, biting at any object within reach, and holding on until its strength fails. They do not hesitate to bite iron bars or steel trap, even though it may break the teeth. Very tenacious of life and will frequently recover from the effects of a blow after having been apparently lifeless for some time. As a general rule opossums cannot stand great heat, and will soon die if left exposed to the direct rays of the tropical sun. The number of young is usually small, between three and eight, and they are carried in a pouch.

5. **Peramys sp.?** PYGMY OPOSSUM.

Not abundant. The single specimen was taken in a native hut at Uru-cúm, where it was prowling about much in the manner of a mouse. The natives could not distinguish between it and the common house mouse, and insisted that it was the latter.

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<sup>1</sup>[The numbers at the left of the systematic names are those used in the preceding 'Systematic List,' and serve as cross-references.—J. A. A.]

### 7. *Myrmecophaga tridactyla*. GIANT ANT-EATER.

We found the giant ant-eater, or tamanduá bandeira, not rare, although far from being abundant, on the Rio Taquary (fazienda Las Palmeiras). This occasioned, some surprise as the district is in the heart of the great pantanal country, and termites are comparatively scarce. As the great creature gallops clumsily along, the enormous flattened tail is thrown up, and doubtless aids in balancing the animal. One was running in several inches of water. When pursued by dogs, it runs until closely pressed, when it will turn and, rearing, make short dashes at them. We saw them in broad day-light, although they are supposed to be nocturnal in habits. Lydecker<sup>1</sup> says its habits are nocturnal and that it has "usually a regular lair. . . . generally situated among tall grass, where it spends the day in slumber. . . ." In the same paragraph he speaks of the animal tearing open the hillocks of termites with the powerful claws of the forefeet. And "as soon as the light of day is let into their domicile, the ants or termites rush to the surface. . . ."

Without commenting on the inconsistency, I believe the giant ant-eater is at least partially diurnal. The stomachs of the specimens collected by Col. Roosevelt and Kermit Roosevelt contained ants and termites, a quantity of earth, and bits of dry and green leaves. Col. Roosevelt expressed the opinion that the earth and leaves were picked up with ants. The walls of the stomach are thick and muscular, like the gizzard of a fowl. In captivity they thrive upon finely chopped meat.

### 8. *Dasyus novemcinctus*. NINE-BANDED ARMADILLO.

In some parts of South America the nine-banded armadillo furnishes a regular supply of food, and is on sale in the village markets. They are hunted at dusk as they come out of their burrows in quest of food, although they are frequently met with in the daytime, bounding across fields or so engrossed in digging under a stump or root that they may be taken up in the hand. When captured, the animal struggles violently and is capable of inflicting serious injury with its great claws. It must be held by the tail, and so great is its strength that it frequently escapes from its captor and bounds away at great speed. Four young are produced at a time.

### 10. *Euphractus sexcinctus gilvipes*. HAIRY ARMADILLO.

Very abundant about the plantations where they do a great deal of damage to sprouting corn. The method of catching them is to dig pits for

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<sup>1</sup> Royal Natural History, Sect. V, p. 212.



them to fall into. At Urucúm we cleared a path 1000 meters long and 1 meter wide, along one side of a corn field, and sunk four salt barrels at equal distances apart in this cleared space. The tops of the barrels used were covered with dry grass. Grains of corn were scattered along the trail and a liberal amount sprinkled on the grass covering the pits. The armadillos in their excursions to and from the corn fields, in crossing the trails, were attracted by the corn, and in following its line plunged down into the barrel. We caught several in this manner. Don Cesar, our host, had at one time owned a live jaguar who subsisted entirely on the armadillos caught for him in this manner. This hairy armadillo is vicious and fights with both teeth and claws. Probably mostly nocturnal in habits, spending the day in holes in the ground, but I have seen them out as late as 9 A.M.

#### 11. **Cabassous loricatus.** SOFT-TAILED ARMADILLO.

Collected by Col. Roosevelt who encountered the animal one morning while following a trail through the forest.

#### 13. **Pecari tajacu.** COLLARED PECCARY.

Collared peccaries seem to be much more abundant and more widely distributed than the white-lipped species.<sup>1</sup> Where they are plentiful, great areas of the forest floor is uprooted, and they leave behind them a trail of partially eaten fruits. They seem to travel continually. If a female with young is shot, the young will not leave and may easily be caught. They become tame immediately and follow at the heels of their master all day long, keeping up a shrill squealing. Even when grown they remain tame, and always return to the huts from the forest where they go to feed. They move silently, like a shadow, and keep up a deep, moaning grunt that is hardly audible. I have known them to attack strangers and dogs.

#### 15. **Blastocerus dichotomus.** SWAMP DEER.

The largest deer found in South America, and apparently quite abundant in the vast pantanal country of southwestern Brazil, where its long hoofs enable it to walk on the boggy soil and penetrate into the dense swamps. Seen singly and in pairs, and all I saw were very tame. One, a doe that had just emerged from a papyrus swamp, permitted my companion and myself to ride to within twenty yards of her before stalking slowly away.

[<sup>1</sup> Both species are represented in the Roosevelt Collection, but Mr. Miller's notes relate only to the collared peccary.—J. A. A.]

We made no attempt to follow her, but it is possible that she may have had a fawn concealed nearby.

The scent gland in the fore-feet is highly developed, and the antlers are large and exceedingly heavy.

16. **Blastocercus bezoarticus campestris.** PAMPAS DEER.

While riding through the great Chapadón, we frequently came upon this beautiful little creature, singly and in small parties. There were no fawns at this season (February). The vast stretches of grass-covered country, with its thin growth of gnarled, stunted trees seemed to furnish the ideal home for this species. Usually we first saw them slowly pacing back and forth, watching us with alert eyes. As we drew nearer, to within two hundred yards, they would make off at a great pace, the white tail flickering, in the most suspicious manner possible.

The flesh of this species is of an exceedingly delicious flavor, being much better than that of the various other species of South American deer with which I am acquainted.

17. **Mazama rufa.** RED BROCKET.

Fairly abundant around Urucúm. They spend the day in the forest or dense low thickets and wild banana brakes. At dusk they come out of cover and devastate the plantations. They are particularly fond of growing beans, of which deer will destroy a great quantity in one night. The native way of ridding themselves of the plunderer is to erect a high platform on poles, in the center of the field, commanding a view of all sides, and as the animal emerges, it is shot. They also feed in the early morning.

18. **Mazama simplicicornis.** BROWN BROCKET.

Abundant in the deep swamps. Found early in the morning, feeding in the open country. They probably travel a great deal, or at least move about over a large area, as the vast open spaces are covered with tracks. Sometimes these lead to human habitations as if the animal had been attracted by curiosity.

19. **Tapirus terrestris.** BRAZILIAN TAPIR.

About the base of Mount Duida tapirs were fairly abundant. While waiting for squirrels, I saw them moving singly through the forest and ford-

ing the shallow Rio Sina like shadows, so quietly did they move. If disturbed, they crash through the forest at a quick trot and even gallop.

I do not believe that tapirs are nocturnal, as I have seen them at nearly all hours of the day. When undisturbed they leave the forest and feed on the succulent mosses that cover the rocks along the rivers.

It is said that the tapir trails lead under vines and dense brush, so that if the animal is attacked by a jaguar it can rush through the "tunnel" and scrape off its assailant. But it seems as if trails of any length must lead through such thickets anyway, on account of the very nature of the tropical vegetation, so these 'tunnels' may not be made designedly after all.

The tapir swims and dives well, and often takes to the water when pursued. It is said that before diving, the tapir thrusts its long, flexible nose into its mouth in order to exclude the water. Should one be shot in deep water, it sinks, but rises to the surface in a few hours.

The skin is tough and thick, with a sparse covering of hair. Usually the animals are infested with vast numbers of ticks. The flesh is greatly esteemed as food.

I have seen traces of tapirs up to an altitude of 13,000 ft., although I have never collected one at that altitude. But the trails that led from the low dense brush growth on to the grassy paramo were trampled like broad cow tracks. They were said (by the Indians) to descend to the salt springs lower down, at certain regular intervals during the year. I have seen numerous "wallows" where they had lain.

In Colombia the tapir is called Danta; in Venezuela, Maipure; in British Guiana, Bush Cow; in Brazil, Tapiro or Anta.

Along the Sepotuba we found two apparently different species.<sup>1</sup> One species, of which we took two specimens (apparently adult ♂ and ♀), was much smaller and lighter in color than the female of the larger species shot by Col. Roosevelt.

The stomachs I examined contained mostly palm nuts with seeds the size of hens' eggs. The pulp surrounding the seed had been masticated but the hard, large seeds were entire. There was also grass.

Col. Roosevelt called our attention to the fact that in the Old World (except the Malays) the horse (coming from the north?) completely replaced the old ungulates, even in North America. In South America, the tapir survived while the horse became extinct.

## 20. *Sylvilagus paraguensis*. RABBIT.

Not abundant. Found in the mandioca fields, near Trinidad, Paraguay.

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[<sup>1</sup> There proved to be only one.—J. A. A.]

22. **Cavia rufescens pamparum.** CAVIA.

Early each morning and at dusk, these animals appeared in considerable numbers on the edge of a great meadow of tall grass. Numerous trails had been tramped through the grass, and the ground was covered with their footprints and excrement. At the edge of the meadow a space had been cleared in building a small railway, and to this open spot they came apparently to play. Usually seen in small parties, often consisting of young and old. There were individuals of all sizes, from very small to adult. One morning, in sneaking around a corner at the edge of the field, I came face to face with a large ocelot, engaged in a like manner. Evidently the cavies were being stalked and killed by the big cat. I later discovered a wide patch through the field, near the edge of the forest, down which the ocelots seemed to come regularly for their supply of food.

25. **Hydrochœrus hydrochœrus.** CAPYBARA.

Inhabits eastern South America and extends into Peru and Bolivia. Abundant in the Cauca Valley, Colombia. Fond of the grassy river banks, thickets, and brush-dotted marshes. Also found along the edges of swamps and in wild cane jungles.

It may be seen at all hours of the day, but more often in the early morning and late afternoon, apparently keeping to the thick cover during the hottest part of the day. On moonlight nights they can be found swimming in the water, and diving from the high banks. Only the nose is visible when they swim, and frequently they swim a long distance under water.

The food consists entirely of vegetable matter and in many places the animals are very destructive to crops, especially sugar cane. Wide lanes are felled in the cane-fields, and much that is not eaten is trampled upon and ruined. If persistently persecuted they become wary, and emerge from their hiding places only during the darkest part of the night.

The flesh, as a general rule, is not eaten by the natives. It possesses an exceedingly disagreeable odor, and the taste is said to be unpleasant. In the vicinity of the Rio Suaza, Colombia, it is claimed that persons partaking of the flesh will break out with sores and ulcers, but I cannot vouch for the truth of the statement.

26. **Dasyprocta agouti leptura.** AGOUTI.

A shy, nervous little creature that is said to live only in the higher country some distance from the water, on the dry hillsides.

29. **Dasyprocta variegata urucuma.** AGOUTI.

I have invariably found the agouti more plentiful in low, wet country than in the dry forests. Also met with along the grassy banks of streams, and in the thick brush at the edge of the forests. In British Guiana agouti are hunted from canoes. Dogs are sent into the forest to start the animals, which take to the water, swim a short distance, then scramble back up the bank. They are shot upon leaving the water. The flesh is greatly esteemed as food.

31. **Dasyprocta (Myoprocta) exilis.**

Not abundant on the Rio Negro and Rio Solimoens. In the Caquetá I found them [*Dasyprocta (M.) exilis milleri*] apparently living in colonies, in wet forests. They were out and about in the mornings, and took refuge in holes in the river bank. The flesh is white and possesses a delicious flavor.

32. **Ctenomys nattereri.** CURURÚ.

The first indications of the cururú were seen at Tapiropoan where several of their mounds were scattered about through a strip of sandy country. After that we came across their work but two or three times in all the five hundred mile ride across the state. Then, near the end of our long overland trip, at José Bonefacio, we struck a strip of sandy country in which the animal seemed to be comparatively numerous. The mounds were thrown up at irregular intervals of from a few feet to ten yards apart, and some were very large, being all of three feet across and eighteen inches high. The country was treeless, with a growth of grass and patches of wild pine-apples.

We had no trap suitable for this class of animal, so with six Nhambequara Indians, I proceeded to dig for one. At first the Indians, guided by the mounds and aided by a sharpened stick, followed the galleries, which were about a foot beneath the surface, and at intervals of ten yards blocked them by stamping down the earth into the hole. We returned a half hour later and found that the plug between two of these sections had been opened so knew just where the creature was bottled up.

The Indians now opened the entire section of the gallery, and found a hole going almost straight down, which they explained led to the nest. A soldier was now called with a hoe, and the work of excavation was begun. In order that the hole might not be filled up, a long, pliable stick was inserted, and this served as a guide. The Indians worked with pointed sticks,

and threw out the loose earth with their hands. Frequently they relieved each other. And when, near the end of the work, the animal could be felt with the stick, they became greatly excited and worked in feverish haste, as a fox terrier might after a rat, and kept up a continuous yelling. They were covered with earth from head to foot; ears, eyes, nose and hair were caked with sand and clay, and the naked bodies looked as if they had just emerged from a mud wallow. Finally one threw away his stick, inserted his arm into the hole, and with a yell of triumph jumped up, holding aloft the kicking little creature by the tail. Then he flung it from him into the grass. The animal seemed bewildered above ground and could not run fast.

The hole after leaving the upper gallery descended eight feet, then ran in a horizontal direction fifteen feet. At the end was a small cavity, but no nest. Small bunches of grass were found in the gallery which had been pulled down by the roots.

The excavation measured 15 feet long, 8 feet deep and 3 feet wide, and it required half a day for the Indians to complete the work.

The Indians are fond of the animal's flesh, and often dig them out to eat.

33. **Proechimys longicaudatus.** SPINY RAT.

Apparently an inhabitant of the dense forest where the ground is covered with thick layers of leaves and brush.

34. **Proechimys kermiti.** LARGE SPINY RAT.

Only one individual of this species was observed. Taken on the edge of the virgin forest, in a corn field.

36. **Epimys rattus alexandrinus.** ROOF RAT.

Abundant in native huts, together with *Epimys rattus*.

38. **Neacomys spinosus amœnus.** SPINY MOUSE.

Apparently arboreal, and numerous. Taken at the base of a tree.

42. **Oryzomys angouya.** FIELD RAT.

Frequents the bromelia and wild pineapple thickets of the dry country surrounding Asuncion, Paraguay. Not abundant.

**48. *Oryzomys (Oligoryzomys) mattogrossæ.***

Taking the place of the common house mouse, this mouse<sup>1</sup> was found in the huts of the Indians. But it was more abundant in unused houses, and in the store houses in the fields containing corn used in making mandioca. Seems to live in the thatched roofs.

**49. *Zygodontomys tapirapoanus.* FIELD RAT.**

Plentiful in the native corn fields. At least partially diurnal. Lives in holes that have been dug beside stumps, under logs, and more often beneath low clumps of dense bushes.

**52. *Nectomys squamipes.* LARGE FIELD RAT.**

At the rubber camp Urupá, I found this species numerous in the buildings. But one day below, at a camp known as La Pena, it was apparently replaced by the black rat and the common brown rat. I could not ascertain whether either species penetrated into the domains of the other or not, as my stops were too short.

**56. *Tayra barbara gulina.* TAYRA.**

An inhabitant of the tree tops. Said to be fairly abundant, but rarely met with.

**62. *Nasua nasua solitaria.* COATI.**

An animal of the heavy forest, spending much of its time in the trees, but being also partially terrestrial, especially at night. Omnivorous, feeding upon insects, young birds, fruits, and apparently upon fish and crabs as their tracks are frequently seen along water-ways. I have found them frequently at an altitude of 10,000 feet, and in the cold, lofty Valle de las Papas, they had well-worn trails across the open patches of grass between the tree clumps. The trails were stained almost black and had a decided, unpleasant odor. Hunted with dogs, the coati fights savagely, and often fatally injures its canine pursuers. The claws are its most effective weapons. They are easily domesticated and become very tame but are more or less of a nuisance on account of their mischievous and unclean habits.

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[<sup>1</sup> These remarks probably apply to the small, long-tailed mice of the subgenus *Oligoryzomys* collectively, of which three species were collected by Mr. Miller in Matto Grosso.—J. A. A.]

**64. *Chrysocyon jubatus*. RED WOLF.**

Of all the larger South American mammals, the great "guaraguasú" is probably the rarest, and the least often met with. Very little is known of its habits, even by the natives and Indians who are usually so prolific with stories about the wild creatures coming under their observation. My own experience is limited to hearing the strange, weird cry at night-fall, and seeing the tracks along the trail as we rode through the Chapadon of Matto Grosso.

They are said to live singly, frequenting the chapadon and papyrus marshes, and to travel great distances in quest of the rabbits, cavies and other small mammals that form their principal items of food.

**65. *Cerdocyon thous azaræ*. GRAY WOLF.**

Found singly, and rarely in pairs, in the vicinity of Asuncion, Paraguay, along the Paraguay River, although its range is doubtless more extensive. Inhabits both the forest and brush-dotted plains.

**73. *Oncoides pardalis chibigouazou*. OCELOT.**

A series of six skins was presented to the mammal collection by the Brazilian Land, Cattle and Packing Co. All were taken on the Upper Paraguay where it is quite abundant. The variation in the pattern of the coloration is very great.

The ocelot is of a rather bold disposition, coming to native huts at night, and robbing the hen roosts. They are said to fight viciously when driven to close quarters.

In the Paraguayan Chaco I came upon one not more than twenty feet away. It made no attempt to move, but looked defiantly until shot. Being wounded by a first shot, it attempted to escape.

In the Caquetá (Colombia) region one that was seen climbing through the forest not far away did not increase its speed nor manifest fear at sight of man.

**74. *Margay tigrina wiedi*. TIGER CAT.**

Probably not very abundant. The specimen collected [near Urucúm] was surprised along the trail on the mountainside, and immediately started up a tree, rapidly climbing about twenty-five feet, and clinging quietly to the side of the tree, permitting me to walk to within a short distance of the base of the tree.



76. **Rhynchiscus naso.** NOSE BAT.

This small bat is found in considerable numbers along rivers and in swamps. They cling flat against the tree trunks or stems of shrubbery, usually not far above the water. There may be from two to fifteen or more in a colony of both sexes. One may approach quietly in a canoe to within a few yards, when they will suddenly take wing and dart swiftly away among the dense vegetation. Usually they do not fly far and often come back to the same tree they left, but they invariably light on the far side and remain concealed. They rest close together, and are easily distinguished by their unusual shape, which does not in the least resemble growths of fungi or natural excrescences on the tree trunk.

77. **Saccopteryx bilineata.** BLACK-AND-WHITE BAT.

Not very abundant. Only seen occasionally about the native huts. Flight rather slow.

78. **Mimon bennetti.**

A number of tunnels have been bored into the sides of the low mountains in the vicinity of Urucúm, in search of iron ore. These supply sleeping places to which numbers of bats resort to spend the hours of daylight. Several species are found, each species seeming to occupy a different space from the others. Of the above-described species there were only three individuals, one of which escaped and did not return. The method employed in collecting was to enter a tunnel with a lighted candle in one hand and a stick in the other, and to knock down the bats as they flew by. At first they were loath to leave their hiding places in the crevices among the rocks. But after a few days' persecution, large numbers rushed from the tunnel and disappeared over the top of the mountain at the mere sight of the lighted candle in the entrance.

80. **Vampyrops lineatus.** STRIPED BAT.

With the break of day, these bats, in large numbers, came to a grove of mango trees beside the house [in Urucúm], and with much chirping and fluttering sought their resting places for the day. Usually small clumps of three to ten gathered in the clusters of leaves in the top of the trees, but on windy or rainy days they cling to the branches about half-way up. Us-

ally the sexes were separate, and females with young were several times found clinging to the thick branches, ten to fifteen feet above the ground. Females without young were usually accompanied by males, in separate pairs.

The "leaf," nose and face, including the tips of the ears were tinged with delicate green.<sup>1</sup> If this was intended as protective coloration, it was of little or no value as the color could not be seen until the animal was held in the hand.

Other specimens of the same species were collected in the iron mountains at Urucúm. While similar to the striped bats taken in the mango trees, they showed only a very faint, or no trace of the green coloring on the face. I am convinced that the green color is not a vegetable stain, but that the pigment exists in the skin. It fades soon after death.

#### 81. *Artibeus jamaicensis lituratus*. FRUIT BAT.

Found in palm trees in the botanical gardens of Rio de Janeiro. The two immature specimens were still clinging to the parent, and when shaken loose fluttered to the ground like a young bird. It is remarkable how the mother, encumbered with her offspring fully three-fourths as large as herself, can get about and procure food enough for the two, successfully competing with other individuals of the species which are free and unhampered and have only one mouth to feed. Perhaps the abundance of fruit in the tropics may account for this particular species' success in life. But it does not explain why the female of insectivorous species, catching their food on the wing, should not be at a great disadvantage while carrying large young, compared to the members of the opposite sex. It is true, nocturnal insects are plentiful in the tropics. On the Upper Orinoco I saw countless thousands of bats issue from the cracks between the great granite ledges, in a steady stream like smoke. Spruce<sup>2</sup> records that on one occasion he saw not less than a million, leaving a similar place. It does not seem probable that the individual range is very great, which would result in tremendous numbers being distributed over a comparatively limited area. Under such conditions there should be more or less of a struggle for existence, and an elimination of those individuals which are handicapped, or weak, in their competition with those strong and unhampered in their movements.

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[<sup>1</sup> Probably the green color here referred to was really fortuitous.— J. A. A.]

<sup>2</sup> Richard Spruce, 'Notes of a Botanist on the Amazon and Andes,' Vol. I, pp. 389-390.

**Hemiderma perspicillatum.** FRUIT-EATING BAT.<sup>1</sup>

On the Rio Pescador, Colombia, fruit-eating bats of a small species are so plentiful as to be decidedly destructive to the plantains and other fruits cultivated by the natives. Bananas and plantains had to be cut while still green. Upon showing the slightest traces of ripening, they are immediately devoured by the hungry hordes. Even when they are stored in tightly closed rooms, the bats would worm their way through crevices in the mud walls and do a great deal of damage.

By placing a few ripe bananas in my room, I attracted great numbers, that kept up a constant roar with their wings; occasionally one would alight with a thud, and then ensued much squeaking, fluttering, fighting and gnashing of teeth. Finally the turmoil would subside, and I could hear only a steady chorus of smacking and chewing. The next morning, only the skins of the bananas remained.

One night I placed a large bunch of ripe bananas in the center of the room, and suspended a circular throw-net above it from the ceiling. The sides of the net were drawn out and tacked to the floor, so that it formed a conical tent, in which lay the bananas. Soon bats began to pour through the open door and window in a steady stream, and circling around a few times landed on the net. Their attempts to get to the fruit through the small meshes of fine twine entangled them so that they could not escape. I brought in a lamp and sat down to watch. Many left the now lighted room, but others remained and continued their frantic efforts to reach the feast. In a short time I had trapped sixty. With the removal of the light, their numbers greatly increased again. In the darkened room I could stand close to the net, quietly removing the captives without disturbing the newcomers. They were all of one species, of both sexes, and I did not see or catch a single female carrying young.

**84. Molossops temmincki.**

While setting traps in a strip of woods near Tres Burity, my attention was attracted by a number of chirps or squeaks. To trace up the sound I burrowed into the rotten, crumbly log and discovered the two bats buried in the decayed wood. They were not under the bark, but buried deep in the heart of the tree, which was not hollow, and about three feet from the

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[<sup>1</sup> Not represented in the present collection, but many specimens were collected in Colombia by Mr. Miller.—J. A. A.]

end of the log. When uncovered they made no attempt to fly, but tried to crawl further in through the soft, spongy wood. It is possible that the log may have stood as a decayed stump, and fallen recently, and that the bats entered before it fell to the ground.

#### 85. *Molossus obscurus*. MASTIFF BAT.

At Calama, on the Madeira, a large colony of mastiff bats lived in the tile roof that covered the house. Frequently during the day we heard them scrambling along the tiles fluttering and squeaking. If we tried to poke them out with long poles, they hastily crawled to some inaccessible crevice. At dusk they issued forth in a broken stream, with a great deal of noise, and fluttered around the house and trees. There seemed to be a constant coming and going. Frequently they entered my room through the open doors and windows, and often in climbing about in a bewildered manner would invariably alight on the white lace curtains. The bright light seemed to stupify them, and I could take them in my hand. Occasionally one would drop through the tiles in the daytime in the course of a scuffle, but would invariably scramble back before we could get at it.

#### *Desmodus rotundus*. BLOOD-SUCKING BAT.<sup>1</sup>

I have found blood-sucking bats fairly common in parts of South America. On the Rio Agancho, Colombia, they bled our mules to such an extent that they were perceptibly weakened. The wounds were inflicted in the neck or shoulder, and bled considerably even after the bats had gone, as streaks of blood had run down to the ground and clotted. The natives said they had to keep their cattle and mules in another valley some distance away, or the bats would kill them. Fowls were provided with sleeping quarters screened with fine-meshed wire. I could not help wondering how wild birds and mammals escaped these pests, and it seems more than probable they do suffer to some extent.

Many instances of natives being attacked have come to my notice. The point from which the blood was withdrawn was a toe, finger-tip or the nose. Each stated that he had not been awakened by the onslaught, and that the wound had bled freely afterwards.

An acquaintance in British Guiana described how he had been bled repeatedly, and finally decided to lie awake and kill the creature. After awhile he heard a flutter, and something strike the covers some distance

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<sup>1</sup> Not represented in the present collection, but collected elsewhere by Mr. Miller.— J. A. A.]

from his feet. He could feel the animal slowly working its way across the sheets, and when it reached his foot, he struck at it but missed. It fluttered about the room for some time, then returned. This was repeated a number of times, and always the bat alighted some distance away and crawled toward the point of attack. In one of the intervals he dozed for a few minutes, and awakened with a start to find that his assailant had taken advantage of the lapse of vigilance, and gorged itself at his expense.

It is said that blood-sucking bats vary their diet with insects. Also that they will not enter a room containing a lamp or burning candle.

87. ***Callithrix argentatus melanura.*** BLACK-TAILED SILVERY  
MARMOSET.

These marmosets appear to be exceedingly rare, at least in the region where the present specimens were taken, as only one troop was observed. This consisted of about a dozen adult individuals. Three adults collected were two males and one female. One of the males was carrying two very small young, one of which was killed, the other living about a week. It took diluted sweetened milk from a spoon, but doubtless the change of diet caused its death. If placed upon a rough surface which afforded a hold for hands and feet, it would climb and run rapidly; but if placed on a smooth surface such as a table it trembled and was unable to move. The young 'chirped' frequently; but we heard no sound in the forests that could be attributed to the adults of this species.

88. ***Alouatta caraya.*** CARAYA HOWLER.

The howlers constitute one of the most interesting groups of South American monkeys. I have found them abundant throughout Colombia, in British Guiana, down through Brazil, usually in the heavy forest, and in Colombia extending up in the mountains to at least 7000 feet. Along the Paraguay River we saw numbers of the black species in the thin, disconnected fringe of smallish trees along the river. There were pairs, or small troops of four to seven individuals. The howler travels rather slowly, and I have seen them walk to the end of a limb and deliberately drop into the top of a tree twenty or thirty feet below, without a moment's hesitation, followed by the other members of the troop in single file.

The red howler [*Alouatta seniculus caucensis*<sup>1</sup>] was particularly abun-

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[<sup>1</sup> For a systematic account of the red howlers (*Alouatta seniculus* group) see *antea*, pp. 228-231.—  
J. A. A.]

dant along the Rio Cauca (Colombia) and the Potaro River (British Guiana). On the Cauca I frequently saw them asleep in the tree tops, long after the sun was up. These I saw were not huddled together, but were sleeping some distance apart, where the rays of the sun could strike them. Of course it is possible that they may have assumed these exposed positions after daybreak in order to take advantage of the warmth of the morning sun.

In the late afternoon they were often found in the bamboos or other thick, low brush on the water's edge, possibly coming to drink.

The hoarse, reverberating roar may be heard at almost any hour of the day or night, though most often in the early morning or late afternoon. I believe that they do not travel at night, as a general rule, unless disturbed, when they may move off slowly and cautiously, roaring the while doubtless to intimidate their enemies. The roaring is begun by one individual, with a series of short, gruff barks, the others joining in the long-drawn cry that begins very low, rises rapidly in tone and volume, and then falls to the beginning note and stops abruptly.

When shot at they may run back and forth along the larger branches of the tree, or may make off rapidly. When wounded, they often attempt to conceal themselves in the clusters of leaves, or in the tops of palms. Sometimes they will simply grasp the bare branches for support and quietly await the end.

Should they fall to the ground, and be still living, they will fight savagely, and reach for their slayer with their hands. They are capable of inflicting severe bites with their strong teeth.

I have heard it said by the Indians, and have myself observed it in a few instances, that females with male young were separate from their mates and travelled alone, although the single male of the troop was somewhere in the neighborhood. The adult males are said to kill the young males if the latter are too small to care for themselves. I have taken females with small female young, accompanied by an adult male, or in a troop composed of both sexes. My observations are too few as yet to say that the above always is true. I do not know, and simply give the facts as I have noticed them. Only one young one seems to be produced at the time, but I know an instance where a female was shot with two small young.

The food consists mainly of fruits. They are fond of wild figs and wild cocoa.

In captivity they are sullen and usually soon die. I had one for a week at Riofrio, Colombia. It was tied to a sapling in front of our tent. One afternoon a large troop of its species were attracted to the spot, coming so silently that we did not know of their presence until small dry branches began to drop upon the fly of the tent. A few shots sent all but an old male

scampering away. He took up a threatening attitude in a crotch sixty feet up, apparently intent upon rescuing the young which called lustily. We could not drive him away, so I shot him. He was the largest howler I ever saw and must have weighed forty pounds.

In British Guiana I kept a small red howler two months. It thrived on condensed milk, well diluted, and bread. In the daytime I usually gave her the range of the room, but she was never very playful or mischievous. The little face always looked sad and pathetic. It grew very tame, could be handled, would never attempt to bite, and came to take its food. At first it was fed from a fountain pen filler thrust through the wires of its box, to which it came of its own accord, sucking the milk from the glass point.

Afterward it sat many minutes looking at its reflection in a washbasin filled with water. If I stooped to talk to it, it would caress my face with its little black hands, the pitiful expression on its face never changing. Often it raised its voice in feeble imitation of the terrific howlings of its elders; when approached suddenly by a stranger, it shrank into a corner and screamed. Unfortunately just as I was about to leave the country it discovered the arsenic used in preserving bird skins, ate a quantity and died.

Howlers are troubled a great deal by a species of bot-fly. I have frequently counted a dozen or more of the large grubs in a single animal.

#### 89-90. **Saimiri cassaquiarensis** and **S. ustus**. SQUIRREL MONKEYS.

These dainty little creatures were commonly met with in the huts of the natives, they being greatly esteemed as pets. In the forest I saw them in large troops, travelling rapidly high up in the trees. On account of their small size, they are difficult to see. In captivity they become very tame and confiding, and on account of their cleanliness and cunning, graceful ways, are very much sought for. They are very active, spending the entire day running back and forth, jumping after flies and mosquitoes, at catching which they are very adept, and exploring cracks and crevices for insects. I have kept them repeatedly, and found that they required water frequently during the day. They are very delicate and die if left out in the hot sun.

#### 91. **Ateles longimembris**. LONG-LIMBED SPIDER MONKEY.

Spider monkeys were not rare in the vast forests of the upper Gy-Paraná, and I saw them occasionally, singly, in pairs and in small troops, in the trees, although one member of our party reports having found one on the ground. It lost no time in climbing a tree when it saw him. Usually they are travel-

ling rather low down on the larger branches, swinging from one to the other rather than running and making the great leaps characteristic of other species. The speed with which they travel, at least all I saw, was not very great.

Occasionally they are found high up in the tallest trees, and will remain in a crotch quietly looking down upon the hunter. When wounded they utter a harsh cry. A large specimen, that had been wounded, hung suspended from a high branch by only the tail. As I waited for it to fall, it repeatedly reached for handfuls of leaves, which it plucked with one hand, and pressed to its breast, then dropped. The leaves fell near me and were found to be stained with blood. The other hand was clasped to its breast. As the shot from a second charge struck the creature, the shock caused it to throw out all four limbs, and something fell at my feet. It was a small young one, dead. On seeing me pick it up the old one immediately let go her hold and came crashing down after it. It is possible, even probable, that she had been compelled to let go on account of weakness; but she was by no means dead, and reached for me with her long slender arms, uttering deep, spiteful howls.

The spider monkey is hideous in appearance. The pinched, wrinkled face and fringe of bangs that extends straight over the eyes give it an aged, long-suffering appearance. The largest specimen I ever shot measured 1868 mm. from tip of fingers to tip of tail.

They are easily tamed and are interesting though grotesque pets.

#### 92. *Aotus azaræ*. AZARA'S NIGHT MONKEY.

The clumps of heavy forest that dot the Paraguayan Chaco are the home of this species of night monkey. While nocturnal, the small family parties were still out feeding very early on dark cloudy mornings. The two individuals were taken from a family of four, consisting of adult male adult female, and two young male and female which were being carried by the female. The only other species of monkey observed in the same locality (Rio Negro, an affluent of the Pilcomayo) was the black howler.

#### 93. *Aotus roberti*. NIGHT MONKEY.

Owing to its nocturnal habits this monkey is only rarely met with. Occasionally, however, it remains out to feed and play late into the day. While camping in the forest I have frequently heard troops of them gamboling in the treetops throughout the night, but they uttered no sound. Near San Augustin, in the Upper Magdalena, I found night monkeys



spending the day in closely huddled bunches in the bamboos and dense brush along the rivers.

94. **Cacajao roosevelti.** WHITE-FACED MONKEY.

Two specimens were taken from a troop of fifteen or twenty that were feeding in the top of a tall tree, in a ravine near the Rio Commemoração, and although they returned daily to the same tree, at about 4 P.M., it was impossible to ever again get within range of them. They travel through the trees rapidly, and make great jumps, at the same time giving vent to a short whistling whine. When feeding they are quiet. A large troop passing through the trees produces something of the effect of a strong wind.

This monkey is very rare. None of the natives on the Machado could recall having seen it before. All of the individuals of the large troop which I saw almost daily were of the same uniform black color; and the young female described below was also black.

Col. Rondon presented me with a small one that was given him by a Nhambiquara woman. The Indian's method of carrying it was to keep it on her head where it lay flat with arms and legs extending down. It looked exactly like a cap, for which we at first mistook it.

It was a tame and affectionate little creature, no larger than a half-grown squirrel. Its nose was bare and of a pink color. When caressed, it puckered its face in the most comical way, and shrieked with laughter. I have never seen another monkey of any species do this. Even when approached by a stranger it invariably laughed, and so ridiculous, yet amusing, was the expression of its face that no one failed to fall in love with it immediately. When I called it, even from a distance, it always answered with a prompt *cheep*, and continued answering as long as I called. Upon my approaching it, it tugged violently at its string, and was impatient to be played with. At night it grew impatient and restless. It called continuously and if I took it, it immediately snuggled about my neck and purred like a cat; when put back into its bed, which was a snug sheep-skin, it cried and wailed for some minutes, with a most pitiful inflection. Occasionally, during its restless moods at dusk, it would bite if taken by a stranger, but never hard enough to draw blood. If punished, it assumed the most startled and surprised expression, and sometimes ended with an attempt to laugh that never failed to make the person feel thoroughly ashamed of himself. It was very cleanly in habits. In picking up or taking things, it never used the thumb and fingers opposite to each other, as a person does, but the thumb always moved with the fingers so that the object was picked up awkwardly with the whole inner edge of the hand. I kept the little ani-

mal several months, feeding it upon rice, fruits, nuts, corn, bits of boiled meat or whatever we happened to have, and it thrived well. Reaching the Madeira River, I was given several other monkeys which required a part of my attention, although my first pet was always cared for first, and received the choicer and major portions of everything. Its disposition gradually changed, and it became sad and disconsolate. Finally, in Manãos other duties took up so much of my time that I had to turn all the animals over to an attendant. A week later I was told that my most highly prized pet was dead. It had refused food, and refused to leave the dark corner of the cage it had occupied. The keeper expressed the opinion, and I fully agree with it, that the little animal had grieved itself to death.

95. *Lagothrix cana*. BARRIGUDO MONKEY.

Of all the numerous species of South American monkeys which I have kept as pets, the woolly monkeys were undoubtedly the most amicable and the most interesting. I saw them frequently in the great lake-swamp on the Solimoens, feeding in the low berry bushes. Upon being approached they moved off rapidly. Where the great trees were some distance apart, they clambered to the end of the branches and then dropped to the cushion of shrubbery below, a distance of thirty feet or more, and scrambled on to the next tree. They are strongly built, with a prominent stomach, hence their local name of "barrigudo."

While working at Calama, a one-third grown specimen was given to me by a Bolivian woman. She was an invalid and could no longer care for it. Often it managed to free itself, when it would immediately enter her room, climb up the bed and, putting its arms around her neck, weep bitterly. It would also cry if spoken to in a soft, sympathetic tone, sniffing and wiping the tears with its hands.

I kept it in the same room with several other pets, including a kitten, a squirrel monkey and a small peccary, and the amount of abuse it endured from the three, without even losing its temper, is unbelievable. The kitten loved to jump at it and claw and bite its tail. If it slept, the peccary invariably came and, dropping on it, used it as a pillow. The squirrel monkey used it for its steed, and the hens stole his food; but it was always the same happy, leisurely little fellow. It was very proud of a necklace of large red beads that it wore constantly. If given a spoon or rubber ball it would play in the same spot a great length of time. It was very fond of rocking itself in a rocking chair, by standing upright, holding to the back with its hands and tail, and then "pumping." In eating, eggs and juicy fruits were held high above its head and the contents sucked out from below without spilling a drop.

They seem to be very hardy. Two that I brought to the States and which are now in the Bronx Park withstood the long trip well, and arrived in splendid condition.

The flesh of this species, known as "churuco" in Colombia, is said by native epicures to exceed that of any other kind in flavor.

The woolly monkeys [*Lagothrix lugens*] found in the vicinity of La Palma, near San Augustin, in the Upper Magdalena Valley seemed to attain a much larger development, with longer, thicker fur; this latter is not to be wondered at as the altitude is 5500 feet and the cold winds sweeping down from the nearby high mountains result in a very low temperature at night.

#### 97. *Cebus azaræ*. AZARA'S CAPUCHIN MONKEY.

This is the species of monkey most often met with in captivity in the country it inhabits. The young are easily tamed and show affection toward their keeper, but they invariably set up a loud screeching and crying if approached by strangers. Its call, when undisturbed and feeding, is a quick series of bird-like chirps. When pursued it moves rapidly through the tree-tops, uttering a plaintive whine like that of a chained-up dog. It frequently attempts to hide in the dense foliage in the tree tops, and sits so quietly, that in spite of its large size it can not be seen. If one has the patience to wait, concealed in the undergrowth, the curiosity of the hiding animal may overcome its discretion, and it may move its head and be instantly revealed.

While hunting at Urucúm, I came upon a female and a two-thirds grown young that were feeding in different parts of a wild fig on the mountains. I saw the young first and wounded it with the first shot. It began screaming, and in a few leaps the mother reached its side, snatched it up and disappeared. She was not to be seen anywhere, so I fired the 'aux' into the tree-tops, knowing that the report would start her, which it did. It was necessary to do this a number of times. As each report rang out she dashed from one clump of cover to another; when the opportunity for a shot finally presented itself, both fell to the ground dead.

The habits of this species are disgusting and extremely obscene.

#### *Callicebus lugens duida*. MOUNT DUIDA MARMOSET.<sup>1</sup>

One of the first sounds that reached our ears after we had left the Rio Orinoco and were paddling slowly against the strong current of the Rio

<sup>1</sup>[It seems desirable to record here some field notes by Mr. Miller, originally prepared for use in another connection, on a new subspecies of marmoset discovered by him at the base of Mount Duida, Venezuela. For the description of this new form see this Bulletin, Vol. XXXIII, p. 647, Dec. 14, 1914.—J. A. A.]

Cunucunumá, was a loud chorus of frantic, anguished little *oh's* coming from the tree-tops. The canoemen said the sound was produced by a "monito negro," and I was eager for a glimpse of the creatures; but it was not until some weeks later that I saw a troop of half a dozen moving rapidly through the trees. They travelled at a good rate of speed and made long leaps from the top of one tree into the branches of another. At frequent intervals during the early morning and late afternoon, they gave voice to their feelings in a series of fifteen to twenty *oh's* uttered in a high pitch, at first long drawn and plaintive, but ending short and jerky so that they sounded almost as if they were uttering one long wail while they covered the mouth with the hands and withdrew them alternately in rapid succession. The cry was very penetrating, all the individuals of a troop seemed to participate, and occasionally it could be heard at midday, but I do not recall that we ever heard it after sundown.

This species seemed to be very abundant. I saw them daily in pairs and in small troops of five or six. One pair which I collected had a one-third grown young which the male was carrying. At first the young was shy and frightened but did not attempt to bite. It ate greedily of rice, raisins, sugar, and wild fruits, preferring a small red berry of insipid taste (a species of fig) which grew abundantly on tall trees and upon which the adults feed regularly. After a few days it played about the tent cheerfully and could be picked up and carried about. Sometimes it assumed a most serious expression and uttered a few feeble little *oh's* in imitation of its wild brethren. A slight shot-wound, which a thorough examination had failed to reveal, became infected after about ten days and the little animal died. It was quite cheerful to the end and ate heartily a few hours before it died.

At about four in the afternoon these marmosets could be found in the trees near the river, but I could never find them actually drinking, although once I saw two low down in the branches.

When a troop was disturbed they made off in a body. If surprised suddenly with a shot, they scattered in all directions and sat in the tree-tops, concealed, some little distance away and uttered short whining grunts, evidently to prevent the individuals of the troop from straying too far and becoming permanently separated. The first time I heard this sound I mistook it for the low grunt of a herd of suspicious peccaries.