

Article IX.— ADDITIONAL MAMMALS FROM NICARAGUA.

BY J. A. ALLEN.

The present paper is a further report on the mammals collected by Mr. William B. Richardson in Nicaragua for this Museum, his work there now having been brought to a close, at least for the present. In my former paper¹ 50 species were recorded,² based on the 400 specimens received from Mr. Richardson up to that date. About the same number of specimens has since been received, increasing the number of species to 82, 28 being now added. In order to give in the present paper a full list of the species of mammals collected by Mr. Richardson in Nicaragua, those of the first paper are here listed, whether or not they are represented in the later collections, with a cross-reference to the earlier paper and mention of the localities from which they were previously received.

Mr. Richardson's collection naturally lacks many species that undoubtedly occur in Nicaragua. Although he covered a wide range of country, many parts of the Republic were not visited, his explorations being confined mainly to the central and northern part. A little collecting was done on the west coast, at Chinandega (altitude 700 feet), in May, 1907, and at Volcan de Chinandega (altitude 5000 feet) in August, 1908, and along the inner border of the low east coast region at Savala³ and Rio Grande, at altitudes respectively of 800 and 700 feet, and at Tuma and Chontales, at 1000 feet. The greater part of the specimens were obtained, however, in the highlands, from Matagalpa (2000 feet) north to the border of Honduras at altitudes of 4000 feet (Ocotal) to 5000 feet (San Rafael del Norte). Thus the lowlands, including the borders of Lakes Managua and Nicaragua and the southern and coast regions below 500 feet, were not visited. The following revised list of the principal localities and their altitudes is based on a sketch map received from Mr. Richardson since the publication of the former paper on his collection.

¹ See 'Mammals from Nicaragua,' this Bulletin, Vol. XXIV, 1908, pp. 647-670, Oct. 13, 1908.

² Reduced in the present paper to 54, through the elimination of three unidentified supposed species of *Reithrodontomys* (*l. c.* p. 654), and the reduction of two subspecies to synonyms (see below pp. 100 and 114).

³ Incorrectly given in my former paper as Lavala.

1. *Highlands of Northern Nicaragua.*

Jalapa, Honduras border, 3000 feet.
 Ocotal and Yali, near Honduras border, 4000 feet.
 Quilali, 1800 feet.
 San Juan Telpaneca, 3500 feet.
 San Rafael del Norte, 5000 feet.
 Matagalpa, 2000 feet.
 All of these localities are north of Matagalpa.

2. *West Coast, near Corinto.*

Chinandega, 700 feet.
 Volcan de Chinandega (or Volcan El Viejo), 5000 feet, with pine forest above 3000 feet.

3. *East Slope of the Highlands.*

Rio Coco, 800 feet
 Tuma, 1000 feet.
 Uluce, about 1000 feet.
 Savala, 800 feet.
 Rio Tuma (at a rubber hunter's camp), 500 feet.
 Rio Grande, 700 feet.
 Chontales, 1000 to 1500 feet.
 Pena Blanca, a high point in the low Atlantic coast forests, having an elevation of 1500 feet.
 Muy Muy and Vijagua are on the eastern slope of the highland in Malagalpa Province; altitude probably 1500 to 2000 feet.

The immediate coast regions, both east and west, were practically unvisited and still offer an inviting field for future exploration, only sporadic work, mainly in the vicinity of Bluefields, having as yet been undertaken.

As would be expected, the mammalian fauna of Nicaragua consists of two principal elements, a northern, in the highlands of the central and northern districts, and a southern or tropical in the lowlands. There are no peculiar genera, but many distinctively tropical genera range north not only to Nicaragua but to Honduras, Guatemala, and the lowlands of southern Mexico. These include, among others, three genera of monkeys (*Ateles*, *Alouatta*, and *Cebus*), the sloths (both *Cholæpus* and *Bradypus*), three genera of anteaters (*Myrmecophaga*, at least to Honduras, *Tamandua*, and *Cyclopes*), the smaller opossums (*Marmosa*, *Metachirus*, *Chironectes*, and *Caluromys*, the last two only to Nicaragua), various genera and subgenera of rodents, of which the following do not appear to extend much beyond Nicaragua, except in the low east coast region, namely: *Agouti*, *Proechimys*, *Hoplomys*, *Macrogeomys*, *Nectomys*, *Melanomys*, *Akodon*, *Guerlinguetus*,

and *Microsciurus*; other tropical rodent genera, like *Coëndou*, *Dasyprocta*, and *Tapeti*, reach the hot lowlands of southern Mexico. Among carnivores the genera *Nasua*, *Bassariscus*, *Potos*, *Tayra*, and *Grison*, reach southern Mexico, while *Bassaricyon* is not known beyond Nicaragua. *Tapirella*, *Trichechus*, and *Mazama* have been recorded north to Mexico. A very large number of tropical genera of bats range from South America to southern Mexico.

On the other hand, several northern genera extend southward from the highlands of Mexico and Guatemala to the higher portions of northern and central Nicaragua, as *Baiomys*, *Neotoma*, *Urocyon*, *Mephitis*, *Spilogale*, *Sorex*, *Blarina*, *Nycteris* (= *Lasiurus*), *Eptesicus*, etc., exclusive of such genera as are common to both North America and South America.

As already intimated, the collections made by Mr. Richardson, while so large and important, represent probably less than two-thirds of the species of mammals that actually occur in Nicaragua, since, as noted above, he did very little work below the 700 feet contour line, and did not explore any part of the east coast region below 500 feet elevation, in which area doubtless many species not obtained by him extend northward from the lowlands of Panama and Costa Rica, and where doubtless undescribed forms remain to be discovered. Furthermore, he obtained only a relatively small number of species of bats. Previous work in Nicaragua had been extremely limited and desultory, yet 13 species had been based, prior to Mr. Richardson's work, on specimens obtained in Nicaragua. But the literature dealing directly with the mammals of this Republic is exceedingly scanty.

Alston's 'Mammalia' (1879-1882) of the 'Biologia Centrali-Americana,' contains 177 species (excluding 4 introduced species of *Mus*), of which only 18 are definitely recorded¹ from Nicaragua; these are given in part on the basis of previously published records and in part on specimens in the British, Paris, and Berlin museums. From this number two should be subtracted as resting on records which prove to have been erroneous, leaving 16 species as the number explicitly recorded from Nicaragua. Various species had since been added, raising the number authentically established prior to 1908 as Nicaraguan to 34. It seems desirable to present in this connection a tentative list of the mammals of Nicaragua, based on actual records, so far as they go, and in part on the known range of the species here included.

As said above, the literature relating to Nicaragua mammals is extremely scanty. Indeed, I have been able to find only a single paper on mammals which contains in its title a reference to Nicaragua. This is by Mr. Oldfield

¹ That is, in the text, but three others, making 21, are given as occurring in Nicaragua in the table of 'General Distribution of Central American Mammals' (pp. iv-ix).

Thomas,¹ and records 4 species, one of them being not only new but the type of a new genus. Dr. F. W. True² has made brief mention of a small collection made by Dr. L. F. H. Birt in the vicinity of Greytown. It consists of a nominal list of 7 species, with special mention of another (*Echinomys semispinosus* Tomes = *Hopломys truei* Allen), the seven species being *Mycetes palliatus*, *Dicotyles labiatus*, *Sciurus hypopyrrhus*, *Bradypus castaneiceps*, *Cycloturus didactylus*, *Tatusia novemcincta*, and *Didelphis opossum*. Later Mr. G. H. Miller, Jr., described a small bat (*Micronycteris microtis*) from apparently the same collection.

Dr. True has also given an account³ of a small collection of mammals made by Mr. Charles W. Townsend on the Segovia River, the boundary between Honduras and Nicaragua.⁴ Besides describing a new form of *Capromys* (*C. brachyurus thoracicus*) from Little Swan Island, in the Bay of Honduras, he gives an annotated list of 13 species of mammals collected along the Segovia River "and the vicinity of Truxillo." This collection furnished the original material on which was based True's *Cariacus clavatus* (= *Odocoileus truei* Merriam), and the type of *Ectophylla alba* H. Allen, described sometime later.

In 1892, Dr. Charles W. Richmond made a considerable collection of mammals at Greytown and on the Escondido River, 50 miles above Bluefields, which has furnished the types of a number of new species,⁵ but no general account of the collection appears to have been published.

Doubtless much mammal material from Nicaragua exists in other museums, in this country and in Europe, to which only casual and incomplete reference has hitherto been published, and is thus unavailable as a source of information in the present attempt to compile a list of the species of Nicaragua mammals; doubtless some of the published incidental references to such material have been overlooked in the present connection, yet the tentative list here presented may serve a useful purpose as the nucleus for future additions and corrections.

¹ On small Mammals from Nicaragua and Bogota. By Oldfield Thomas. Ann. and Mag. Nat. Hist. (6), XVI, July, 1895, pp. 56-60. *Lichonycteris obscurus* gen. et sp. nov., p. 56.

² On the Occurrence of *Echinomys semi-spinosus* Tomes in Nicaragua. By Frederick W. True. Proc. U. S. Nat. Mus., XI, 1888 (1889), pp. 467, 468.

³ On Mammals collected in Eastern Honduras in 1887 by Mr. Charles W. Townsend, with a description of a new subspecies of *Capromys* from Little Swan Island [Bay of Honduras]. By Frederick W. True. Proc. U. S. Nat. Mus., XI, 1888 (1889), pp. 469-472.

⁴ In reply to my inquiries regarding the localities at which he collected Mr. Townsend has kindly given the following information. He says, in a letter dated April 11, 1910: "I started in from Cabo Gracias á Dios. Most of my camps were in the open pine woods above Soohée, where there is but little elevation. I did not reach the hill country and was seldom more than a few miles from the river. All collecting done at Truxillo on the Nicaragua coast, was within a few miles of the town. . . . The whole region along the river is a jungle with open pine forests adjacent."

⁵ *Didelphis richmondi* Allen, *Sciurus richmondi* Nelson, *Sciurus boothiae belti* Nelson, and *Oryzomys richmondi* Merriam.

Notwithstanding the comparatively infrequent mention of Nicaragua mammals in literature, 34 species and subspecies have been based on Nicaragua specimens, including the 4 described in the present paper. Of these 17, or just one half, have been based on the Richardson collections. Four of these 34 forms are shown in the following pages to hold at present only the rank of synonyms. The names of the four forms described below are printed in heavy-faced type in the following list.

List of Species and Subspecies based on Nicaragua Specimens.

- Marmosa cinerea nicaraguae* Thomas (1905), Bluefields.
 [Metachirus fuscogriseus Allen (1900). Type locality unknown but presumed to be Colon, yet quite as likely to have been either Bluefields or Greytown.]
Didelphis richmondi Allen (1901), Greytown.
Arctopithecus castaneiceps Gray = *Bradypus griseus* (Gray), 1871, Chontales.
Cariacus clavatus True, 1889 [preoccupied = *Odocoileus truei* Merriam, 1898], Segovia River (northeastern boundary of Nicaragua).
Sylvilagus gabbi tumacus (Allen, 1908), Tuma.
Hoplomys truei Allen (1908), Savala.
Heteromys fuscatus Allen (1908), Tuma.
Heteromys vulcani Allen (1908), Volcan de Chinandega.
Macrogeomys matagalpæ Allen (infra, p. 97, 1910), Matagalpa.
Neotoma chrysomelas Allen (1908), Matagalpa.
Reithrodontomys modestus Thomas (1907), Jinotega.
Oryzomys alfaroi incertus Allen (1908 = *O. alfaroi*, cf. infra, p. 100), Rio Grande.
Oryzomys ochraceus Allen (1908), Rio Grande.
Oryzomys richardsoni Allen (1910, infra, p. 99), Rio Grande.
Oryzomys nicaraguae Allen (1910, infra, p. 100), Vijagua.
Sigmodon hispidus griseus Allen (1908), Chontales.
Otodylomys fumeus Allen (1908), Matagalpa.
Nectomys dimidiatus Thomas (1905), near Rama.
Peromyscus nicaraguae Allen (1908 = *P. mexicanus saxatilis* Merriam, cf. infra, p. 100), Matagalpa.
Sciurus boothiae belti Nelson (1899), Escondido River.
Macroxus adolphei, Lesson (1842 = *Sciurus variegatoides adolphei*, infra, p. 103), Realejo.
Sciurus richmondi Nelson (1898), Escondido River.
Sciurus deppei matagalpæ Allen (1908), San Rafael del Norte.
Lutra latidens Allen (1908), Savala.
Tayra barbara inserta Allen (1908), Uluce.
Conepatus nicaraguae Allen (1910, infra, p. 106), San Rafael del Norte.
Bassaricyon richardsoni Allen (1908), Rio Grande.
Blarina olivacea Allen (1908), San Rafael del Norte.
Micromycteris microtis Miller (1898), Greytown.
Lichonycteris obscurus Thomas (1895), Managua.
Ectophylla alba H. Allen (1898), Segovia River.
Artibeus jamaicensis richardsoni Allen (1908), Matagalpa.

Mycetes palliata Gray (1842), banks and islands of Lake Micaragua.

Alouatta palliata matagalpæ Allen (1908), Savala (= *Mycetes palliata* Gray, cf. infra, p. 114).

LIST OF NICARAGUA MAMMALS.

In the following list the names of the species and subspecies represented in the Richardson collections are printed in heavy-face type and are consecutively numbered.¹ The names of those not represented in the Richardson collections (50 species) are in italic type. One star prefixed to a name indicates that the species has been recorded from Nicaragua; two stars thus prefixed indicates that the species was originally based on Nicaragua specimens. The absence of such marks indicates that the species is included on the basis of its general range, as now understood: in some instances, on records from Costa Rica and either Honduras or Guatemala; in others on the general fact that it is a more or less common tropical species with a recognized range extending from Brazil to southern Mexico. This gives a list 122 species as of known or of practically certain occurrence. Twelve other species are referred to [in brackets] as of probable or possible occurrence.

The species obtained by Richardson number 82, of which only 13 are bats; of the 50 additional species here recognized provisionally as Nicaraguan, 38 are bats, showing that the chief deficiencies in the Richardson collection are in the Chiroptera, of which apparently not less than 50 species should occur in Nicaragua.

I am indebted to Dr. C. Hart Merriam, Chief of Biological Survey, for the loan of specimens for use in the present connection, and to Mr. E. W. Nelson and Mr. Gerrit S. Miller, Jr., for aid in determining some of the squirrels and bats.

1. **Marmosa murina** (*Linnæus*). (Bull., XXIV, 1908, p. 648: San Rafael del Norte.)

Six specimens, mostly immature: Ocotal, May 9; Matagalpa, Oct. 11; Rio Coco, Nov. 11 and Dec. 1, 1908; Vijagua, March 21 and 30, 1909.

2. **Marmosa murina mexicana** *Merriam*. (Bull., XXIV, 1908, p. 648: Volcan de Chinandega.)

* * *Marmosa cinerea nicaraguæ* *Thomas*. (Ann. and Mag. Nat. Hist., (7), XVI, Sept. 1905, p. 313). Type locality, "Bluefields, Nicaragua: sea-level."

3. **Caluromys laniger pallidus** *Thomas*. (Bull., XXIV, 1908, p. 648: Matagalpa.)

¹ Those additional to the species given in the first paper are indicated by an obelisk (†) prefixed to the current number.

4. *Metachirus fuscogriseus* Allen. (Bull., XXIV, 1908, p. 648: Matagalpa, San Rafael del Norte, Savala, and Tuma.)

Fourteen specimens: Volcan de Chinandega (1), Aug. 22; Rio Coco (8), Nov. 15, 18, 19, 25, Dec. 1-3, 1908; San Juan (2), Jan. 3, 5; San Rafael del Norte (1), Feb. 3; Vijagua (1), March 19; Pena Blanca (1), June 6, 1909.

Three specimens in worn pelage are much paler than the others, in which the back is strongly varied with blackish, and the whole upper surface of the head, except the white supraocular patches, is blackish brown, the coronal region black.

5. *Metachirus nudicaudatus colombianus* Allen. (Bull., XXIV, 1908, p. 648: Chontales.)

6. *Didelphis mesamericana tabascensis* Allen. (Bull., XXIV, p. 648: Matagalpa and Savala.)

Twelve specimens, mostly immature: Matagalpa (6), June 5, Oct. 10, 11, 28, Dec. 10; Rio Coco (3), Nov. 9-14, 1908; Jalapa (1), Jan. 23; Pena Blanca (2), June 6, 1909. Only three are in the black phase.

* * *Didelphis richmondi* Allen. Greytown, Nicaragua. Not represented in the present collection.

Chironectes minima (Zimmermann). Recorded from both Guatemala and Costa Rica on apparently good authority, and hence may be supposed to occur in Nicaragua.

7. *Cholœpus hoffmanni* Peters. (Bull., XXIV, 1908, p. 648: Matagalpa.)

Three specimens: Matagalpa (2), Dec. 21, 1908; Uluce (1), July 30, 1909. One of the Matagalpa specimens is a young one in the first pelage (total length, 220 mm.); it is dark wood brown above, somewhat lighter below, the pelage fine and soft.

8. *Bradypus griseus* (Gray). (Bull. XXIV, 1908, p. 648: Chontales).

Arctopithecus griseus GRAY, Ann. and Mag. Nat. Hist. (4), VII, April, 1871, 302; P. Z. S., 1871, 446, pl. xxxvi (animal), text fig. 6 (young skull). Costa Rica.

Arctopithecus castaneiceps GRAY, P. Z. S., 1871, 444, pl. xxxv (animal), text fig. 5 (adult skull). Chontales, Nicaragua.

Bradypus griseus ALLEN, Bull. Am. Mus. Nat. Hist., XXIV, 648 (Chontales).

Represented by three specimens, two adult females and a young specimen in first pelage. Two of them are from the type locality of *Arctopithecus castaneiceps* Gray, but they lack the chestnut color on the forehead and sides of the neck shown in Gray's colored plate of this species, thus closely resembling in this respect his plate of *A. griseus*, and also in the dorsal patch of the male being blotched externally with black. The other specimen is from Rio Coco, collected Nov. 19, 1908. Both are sexed as females, but one

of them, said to be the mother of the young one, has the black dorsal stripe (bordered with dull orange), while the other shows no trace of such markings.

As Costa Rica and Nicaragua specimens do not seem to differ essentially, the name *griseus* is adopted as having slight priority.

9. ***Cyclopes dorsalis*** (Gray). (Bull., XXIV, 1908, p. 648: Rio Grande.)

10. ***Tamandua tetradactyla chiriquensis*** Allen. (Bull., XXIV, 1908, p. 648: Ocotal).

Three specimens, an adult female and a young one about a week old, Muy Muy, July 28, 1908; half-grown male, Vijagua, March 25, 1909.

Myrmecophaga tridactyla centralis Lyon. Mentioned by Richardson in letters as occurring in the forest lowlands of the east coast. Recorded by Salvin as taken "near Punta Gorda, on the coast of the Bay of Honduras."

11. ***Tatu novemcinctus*** (Linnæus). (Bull., XXIV, 1908, p. 649: Savala.)

Two adult females: Rio Coco, Nov. 8, 1908; Pena Blanca, June 7, 1909.

Cabassous centralis (Miller). The type of this species came from Honduras, to which a specimen from Costa Rica is referred by the describer,¹ who says: "The Costa Rican and Honduras specimens are precisely alike in all important characters. . . ." I know of no Nicaragua record for this species, where, however, it would seem that it must occur.

Trichechus manatus Linnæus. Well known to have been formerly abundant along the eastern coast.

†12. ***Tayassu crusnigrum*** Bangs.

Six specimens, 3 adult males, 3 young adult females: Matagalpa, adult male and young adult female, June 19 and 23, 1908; Rio Coco, adult male, Nov. 19, and young female, Nov. 25, 1908; San Rafael del Norte, adult male, Feb. 8, 1909; Pena Blanca, young female, June 4, 1909.

The collector's measurements of total length (the only measurements taken) are as follows: ♂ 1150, ♂ 1170, ♀ 1200; ♀ juv., 970. (Measurements are lacking for one of the males).

The three adult male skulls measure as follows:

No.	Basal length.	Occipito-basal.	Palatal.	Zyg. b'dth.	Upper molars.
28954.	198 mm.	222 mm.	143 mm.	99 mm.	62 mm.
29442.	192 "	330 "	135 "	100 "	62 "
29443.	195 "	330 "	142 "	—	62 "

These specimens agree closely in size, coloration, and cranial characters with Bangs's *Tayassu crusnigrum*, and hence differ widely from any of the known forms of the *Tayassu augulatus* group. I also refer a specimen in the

¹ G. S. Miller, Jr., Proc. Biol. Soc. Washington, XIII, Jan. 31, 1899, p. 4.

Museum collection from the Rio Sixola, Costa Rica, collected by M. A. Carriker, Jr., to *T. crusnigrum*; this is a male; total length, 870 mm.

**Tayassu pecari* (Fischer). A white-lipped peccary has been recorded from Nicaragua by Alston (Biol. Cent. Amer., I, 1879-1882, p. 109), on the authority of Belt, and by True (Proc. U. S. Nat. Mus., XI, 1888 (1889), p. 467). Whether the form occurring in Nicaragua is the true *T. pecari* or *T. p. ringens* Merriam, is impossible to decide in the absence of specimens.

†13. ***Odocoileus truei* Merriam.**

Four specimens, three adult females and a fawn in spotted coat: Muy Muy (fawn), July 28; Rio Coco, Nov. 30, 1898; Rafael del Norte, Feb. 7, 1909.

[In a paper on mammals from Chiriqui, Panama, collected by the late J. H. Batty, which I published in 1904,¹ I referred certain specimens to *Odocoileus costaricensis* Miller. A reëxamination of this and other material, in part received since 1904, has shown that the Chiriqui specimens are not referable to *O. costaricensis*, but represent merely a mainland form of *O. rothschildi* from Coiba Island. As indicated in my former paper, the specimens from Boqueron, Chiriqui, represent a somewhat larger and paler form than the Coiba Island species, from which it is only subspecifically separable. For this form I propose the name ***Odocoileus rothschildi chiriquensis***, with No. 18957 (♀ ad., Boqueron, Chiriqui, Dec. 4, 1901) as the type. The series of antlers already figured (*l. c.*, fig. 17, p. 64) illustrate not only the form of the antlers in adults but also their variations with age.]

14. ***Mazama tema Rafinesque* (= *sartorii* Saussure).** (Bull., XXIV, 1908, p. 649: Tuma).

Two specimens: adult female, San Juan Telpaneca, Jan. 4, 1909; another adult female, label lost. The January specimen, in winter coat, compared with worn specimens, has the pelage much longer, darker, and more lustrous.

†15. ***Mazama pandora* Merriam.**

An adult female, Pena Blanca, June 8, 1909.

†16. ***Tapirella dowi* (Gill).**

Four specimens, three old adults and one young adult, Rio Tuma, July 10, 1908, and March, June, and October, 1909.

**Tapirella bairdi* (Gill). Recorded by Selater (P. Z. S., 1871, p. 626) from "Nicaragua."

17. ***Sylvilagus floridanus chiapensis* (Nelson).** (Bull., XXIV, 1908, p. 649: Leon, Chontales, and Ocotal).

According to Mr. Nelson (N. Amer. Fauna, No. 29, 1909, p. 190), these specimens "are perfectly typical *chiapensis* in color, but are smaller, with

¹ This Bulletin, Vol. XX, 1904, pp. 63-66, fig. 17 (horns).

shorter ears and hindfeet." Three additional specimens were received during 1909, as follows: San Rafael del Norte, adult male and female, Jan. 1 and 2, 1909; an adult male, Jalapa, Jan. 25, 1909.

18. *Sylvilagus (Tapeti) gabbi tumacus* (Allen). (Bull., XXIV, 1908, p. 649: Tuma and Ocotal).

Five additional specimens of this well-marked form have been received since the publication of the original description in 1908 (*l. c.*), based on two examples. The months represented are January, March, June, and December; the localities are Matagalpa, Ocotal, Vijagua, Jalapa, and Pena Blanca. Compared with a series of 9 specimens from Costa Rica and Panama, collected in December, April, September, and October, the contrast in coloration is striking, and obviously not due to season, the Nicaragua specimens having the prevailing color of the dorsal surface black (in two the greater part of the back is wholly black), instead of fulvous as in the Costa Rica-Panama series. Only one of the Nicaragua series, a greatly worn June specimen, approaches the average of the other series, but is still much darker than the darkest example of the Costa Rica-Panama series. The buffy gray throat band is also very much darker in the Nicaragua series than in the other series. I cannot help feeling therefore that Mr. Nelson's recent statement¹ that "*Sylvilagus gabbi tumacus* Allen is typical *gabbi* in rich unworn pelage. . . ." is open to reconsideration.

†19. *Agouti paca virgata* Bangs.

Four specimens, adult male and female and two young adults: Rio Coco, Dec. 1, 1908; Vijagua, March 23, 1909.

20. *Dasyprocta punctata* Gray. (Bull., XXIV, 1908, p. 649: Matagalpa and Savala).

Five specimens, all females: Matagalpa, June 22; Rio Coco, Nov. 25, 1908; Vijagua, March 18; Rio Tuma, April 17; Pena Blanca, May 17, 1909.

21. *Coendou mexicanus* (Kerr). (Bull., XXIV, 1908, p. 649: Volcan de Chinandega, Chontales, and Ocotal.)

A young specimen in first pelage, Uluce, July 25, 1909. General color reddish chestnut, slightly paler on the ventral surface of the body, but underside of tail nearly black. The spines are wholly concealed by the fine, soft, short reddish fur, wholly in contrast with the black pelage of the adult animal.

22. *Proechimys centralis* (Thomas). (Bull., XXIV, 1908, p. 649: Rio Grande).

23. *Hopiomys truei* Allen. (Bull., XXIV, 1908, pp. 650-652, figs. 1-4: Savala).

Five specimens, three adult, two about one-third grown: Rio Coco, Dec. 1 and 2, 1908 (young); Vijagua, March 17 and 18, 1909 (adult).

¹ N. Amer. Fauna, No. 29, p. 261, August 31, 1909.

24. *Heteromys vulcani* Allen. (Bull. XXIV, 1908, p. 652: Volcan de Chinandega).

25. *Heteromys fuscatus* Allen. (Bull., XXIV, 1908, p. 652: Tuma, Chontales, and Matagalpa).

Twenty-nine specimens: Vijagua (2), March 24; Rio Tuma (2), April 1; Uluce (12), July 18-31; Matagalpa (1), Oct. 16; Rio Coco (7), Nov. 10-13 and Dec. 1 and 2; Quilali (2), Nov. 1 and Jan. 1; 2 without labels.

[*Heteromys desmarestianus* Gray, described from Coban, Guatemala, and *Heteromys nigrescens* Thomas, described from "Costa Rica," may occur in Nicaragua, particularly the latter.]

†26. *Macrogeomys matagalpæ* sp. nov.

Type, No. 28964, ♂ ad., Pena Blanca, Matagalpa, Nicaragua, June 19, 1908; William B. Richardson.

Similar in general features to *M. cherriei* from Costa Rica, but smaller, the rostrum narrower, and the coloration much darker.

Above very dark brown, considerably darker than seal brown of Ridgway; ventral surface drab; top of head with a large spot of clear white about 20 by 37 mm., a little narrower in front than posteriorly; front and sides of nose buff-drab; a small anal area whitish; feet and tail naked; incisors orange.

Collector's measurements: Total length, 320 mm.; tail, 80; hind foot, 40. Skull, (of type) imperfect, lacking the postorbital portion. Greatest breadth of rostrum, 14; length of nasals, 23. An adult female skull gives the following: Total length, 56; zygomatic breadth, 35.5; mastoid breadth, 29; breadth of rostrum, 13; least inter-orbital breadth, 9; length of nasals, 21.

In this specimen the mammæ are 4, one pair pectoral and one pair in front of thighs, too lateral in position to be called inguinal.

Represented by five specimens, an adult male (the type), an adult female, two young adult males, and one half-grown male; three are from Matagalpa and two are from Pena Blanca. They are very uniform in coloration, all having the conspicuous large white patch on the top of the head; the white anal area, however, is variable, being well marked in three, less distinct in two.

Macrogeomys cherriei (Allen)¹ was originally described from a single specimen, of which it was said: "The white patch on the crown is possibly albinism, but if normal is a striking feature." In a later notice of this species,² based on five additional specimens, it was added: "They all possess the prominent squarish or subtriangular white patch on the top of the head noted in the type, and thought possibly due to albinism. It proves, however, to be a normal and striking feature of the coloration." The five

¹ Bull. Amer. Mus. Nat. Hist., V, 1893, pp. 337, 338.

² *Ibid.*, VIII, 1896, pp. 45, 46, pl. i.

specimens of *M. matagalpæ* are all similarly marked, the white patch being even larger than in *M. cherriei*. In 1895 Dr. Merriam¹ described another member of this group from Costa Rica as *M. costaricensis*, which also has a white spot on the top of the head. This striking feature is thus known to occur in three species of the genus *Macrogeomys*.

As already noted, *M. matagalpæ* is readily distinguishable from *M. cherriei* through its much darker coloration, both above and below, and by its somewhat smaller size. Both are separated from *M. costaricensis* by the structure of the zygomatic arch, as pointed out by Merriam.

27. ***Neotoma chrysomelas* Allen.** (Bull., XXIV, 1908, p. 653: Matagalpa.)

Two specimens: Matagalpa, adult female, April 11; Rio Tuma, young male, April 1, 1909.

28. ***Akodon teguina* (Alston).** (Bull. XXIV, 1908, p. 654: San Rafael del Norte.)

Two specimens: Rio Coco, Nov. 11; San Rafael del Norte, Feb. 3.

29. ***Reithrodontomys modestus* Thomas.** (Bull., XXIV, p. 654: San Rafael del Norte and Savala.)

Eight specimens, mostly without skulls, all taken at San Rafael del Norte, Dec. 31 and Feb. 2-7, 1909. These, in addition to the 7 previously recorded from San Rafael del Norte and Savala, appear to comprise all of the specimens that are positively referable to this species. Those previously recorded (*l. c.*, p. 654) as probably referable (they were without skulls) to this genus are now regarded as young examples of *Oryzomys*.

30. ***Oryzomys (Melanomys) chrysomelas* Allen.** (Bull., XXIV, p. 654: Savala, Tuma, Chontales, and Rio Grande.)

Fourteen specimens: Vijagua (3), March 19-24; Rio Tuma (5), March 26-April 4; Pena Blanca (3), May 25-27; Rio Coco (3), Nov. 11 and 20.

31. ***Oryzomys couesi* Thomas (ex Alston).** (Bull., XXIV, p. 655: Chontales, Ocotal, San Rafael del Norte, and Tuma.)

Thirty-two specimens: San Juan (1), Jan. 1; Quilali (1), Jan. 14; Rio Tuma (3), April 6; Pena Blanca (6), May 24-June 5; Uluce (1), Oct. 16; Matagalpa (5), Oct. 28 and Jan. 21-25; Rio Coco (12), Nov. 15-Dec. 3; and 3 with illegible labels.

***Oryzomys richmondi* Merriam, Proc. Washington Acad. Sci., III, p. 284, July 26, 1901. "Type from Escondido River (50 miles above Bluefields), Nicaragua." Very near to, if not the same as, the species recorded in this paper as *Oryzomys couesi*.

32. ***Oryzomys alfaroi* Allen.** (*O. alfaroi* and *O. alfaroi incertus*, Bull. XXIV, p. 655: Chontales, Tuma, and Rio Grande.)

¹ North Amer. Fauna, No. 8, Jan. 31, 1895, p. 192.

Twenty-three specimens: San Juan (6), Jan. 5-8; Jicaro (1), Jan. 16; Jalapa (2), Jan. 22; Pena Blanca (2), June 26, 27; Uluce (2), July 27, 28; Rio Coco (6), Nov. 8-Dec. 3, 1909.

The receipt of this additional material affords evidence that the specimens previously made the basis of *O. alfaroi incertus* may be safely referred to *O. alfaroi*, *O. alfaroi incertus* having been founded on an exceptional and inconstant phase of pelage.

33. ***Oryzomys ochraceus* Allen.** (Bull., XXIV, p. 655: Rio Grande.)

One specimen, Rio Tuma, April 4.

†34. ***Oryzomys richardsoni* sp. nov.**

Type, No. 29800, ♂ ad., Pena Blanca, Nicaragua, June 25, 1909; William B. Richardson, for whom the species is named.

Pelage fine, soft and velvety, especially on the ventral surface.

General color above fulvous gray, darker over the median dorsal area, where the prevailing tint is dusky, the blackish-tipped hairs predominating over the pale fulvous tint; below grayish white, the tips of the hairs being whitish, to which the basal gray portion of the pelage imparts a faint tinge of gray. Top and sides of head gray, the tips of the hairs blackish, rendering the head distinctly darker than the back; median dorsal area mixed fulvous and dusky; sides of body less dusky and more fulvous, pale fulvous prevailing; sides of nose, lower part of cheeks, and the whole ventral surface dull white, slightly tinged with gray, but without trace of any buffy tinge; fore arms and hind limbs like adjoining parts of body; feet dull grayish white; ears of medium size, externally dusky like the head, internally pale fulvous; tail dull pale brown, slightly lighter below.

Collector's measurements: Total length, 270 mm.; tail, 150; hind foot, 32.5; ear (dry skin), 13. Skull, total length, 31; length of nasals, 12; upper toothrow, 5; width of brain case, 13; interorbital breadth, 5; zygomatic breadth, 17 (partly estimated, one zygoma being broken). The skull is slender and narrow, with weak dentition, the teeth small for the size of the skull.

Oryzomys richardsoni has no close relationship with any hitherto described species from either Mexico or Central America. In texture of pelage it resembles species from northern South America, *e. g.*, *O. mollipilosus*, *O. magdalenæ*, *O. velutina*, etc., with which, however, it requires no close comparison, owing to obvious differences in size and coloration. Unfortunately the species is represented by only the type and a specimen (No. 29544) from Vijagua, a young adult in rather poor condition. This is much smaller, but so similar in color and skull characters that it is provisionally referred to this species.

†35. *Oryzomys (Oligoryzomys) nicaraguæ* sp. nov.

Type, No. 29543, ♂ ad., Vijagua, Nicaragua, March 24, 1909; William B. Richardson.

Upper parts similar in coloration to that of the upper parts in young-adult examples of *O. fulvescens* and *O. costaricensis* but the general tone much paler, or less rufous and more fulvous; under parts nearly white,—clear white over the pectoral region, grayish white over the abdominal area, where the dusky underfur tinges the surface; feet appreciably lighter and less fulvous; tail darker, nearly black above, slightly paler below.

Collector's measurements: Total length, 180; tail, 110; hind foot, 20. Skull, total length, 21.3; zygomatic breadth, 11; width of braincase, 10; upper premolar-molar series, 3.4.

A second specimen, from San Rafael del Norte, without skull, and referred in my former paper (*l. c.*, p. 654, No. 26) to a supposed (but unnamed) new species of *Reithrodontomys*, seems to belong here.

36. *Sigmodon hispidus griseus* Allen. (Bull. XXIV, p. 657: Chontales.)

Seven specimens: Jalapa (1), Jan. 27; Rio Coco (6), Nov. 30–Dec. 2.

†37. *Tylomys nudicaudatus* Peters.

An imperfect skin and two skulls, Rio Coco.

38. *Otodylomys fumeus* Allen. (Bull., XXIV, p. 658; Matagalpa, Ocotal, and Volcan de Chinandega.)

Four specimens: Uluce (3), July 26–31; Pena Blanca (1), May 17.

***Nectomys dimidiatus* Thomas, Ann. and Mag. Nat. Hist. (7), XV, June, 1905, p. 586. "Escondido River, 7 miles below Rama, Nicaragua."

39. *Rhipidomys salvini* (Tomes). (Bull., XXIV, p. 658: Ocotal.)

40. *Peromyscus mexicanus saxatilis* (Merriam). (*Peromyscus nicaraguæ*, Bull., XXIV, p. 658: Matagalpa, San Rafael del Norte, Chontales, and Volcan de Chinandega.)

Twenty-nine specimens: Pena Blanca (1), July 7; Uluce (4), July 24–27; Matagalpa (5), Oct. 1–16; Rio Coco (9), Nov. 10–18; San Rafael del Norte (5), Dec. 28–31 and Feb. 5.

This subspecies has a wide range in Nicaragua, extending from the low humid region on both coasts to the highlands of central northern Nicaragua and northward to northwestern Guatemala and adjacent parts of Mexico. Specimens from Jacaltenango, Guatemala, loaned to me for examination from the collection of the Biological Survey, prove on comparison to be indistinguishable from the Nicaragua series and show that Osgood¹ very properly referred *P. nicaraguæ* to *P. mexicanus saxatilis*.

¹ North Amer. Fauna, No. 28, 1909, p. 203.

†41. **Peromyscus (Baiomys) musculus nigrescens** *Osgood.*

Two specimens: Matagalpa, Feb. 17; San Rafael del Norte, Feb. 7.

These agree satisfactorily with Osgood's description of this form. They extend the known range of the subgenus *Baiomys* from northwestern Guatemala to the highlands of Nicaragua.

42. **Epimys¹ rattus** (*Linnaeus*). (Bull., XXIV, p. 659: Matagalpa and Savala.)

Two specimens, Matagalpa, March 11.

†43. **Mus musculus** *Linnaeus.*

Four specimens, Matagalpa, Oct. 11 and 20. They are very dark colored, agreeing very closely in color with *M. m. jalapæ* Allen and Chapman, to which they are perhaps referable.

†44. **Sciurus boothiæ** *Gray.*

Fifteen specimens, 6 of which are typical *boothiæ*, and 9 intermediate between *boothiæ* and *belti* but nearer the former than the latter. The 6 typical *boothiæ* specimens were taken near the boundary of Honduras, at altitudes of 3000 to 3500 feet, as follows: San Juan (alt. 3500 ft.), Jan. 17; Jicaro (near San Juan), Jan. 16; Jalapa, on the boundary line of Nicaragua and Honduras (alt. 3000 ft.), Jan. 19-24, 1909. These all have the ventral surface pure white, and are otherwise quite uniform in coloration and closely resemble the type of *boothiæ*.²

The 9 specimens which grade toward *belti* are all from the Rio Coco, at an altitude of about 800 feet. They differ from the first series in having the suffusion of the dorsal pelage more yellowish, and the white of the ventral surface mainly restricted to the breast and lower abdomen, which regions are mainly white, these two white areas being usually connected by a narrow median line of white. In one adult and one young example the ventral surface, exclusive of the usual white areas, is grizzled dark rufous gray. They were collected November 9, 20, 22, and 30, and December 1, 1908.

45. **Sciurus boothiæ beltii** *Nelson.* (Bull., XXIV, p. 659: Chontales, Savala, and Matagalpa.)

Seven specimens: Pena Blanca (2) May 25 and 30; Uluce (5) July 25-31. In all of these specimens the ventral surface is deep rufous with irregular patches of white on the breast, axillæ, and lower abdomen. The hind feet vary from black to rufous. Thus in two specimens from Uluce, taken respectively July 25 and July 29, one has the upper surface of the hind feet black with merely a tinge of rufous on the outer edge, while in the other the feet are wholly deep rufous with a small spot at the base of the toes grizzled

¹ Cf. Miller, Proc. Biol. Soc. Washington, p. 58, April 19, 1910.

² This series has been examined by Mr. E. W. Nelson and pronounced by him to be "typical *boothiæ*."

with black. Two specimens from Matagalpa and one from Chontales, recorded in my former paper (*l. c.*), have the ventral surface almost entirely deep rufous, and the hind feet mixed rufous and black, in varying proportions in different specimens.

While these specimens are much nearer *belti* than *boothia*, they do not apparently represent the extreme development of the *belti* phase.

46. **Sciurus variegatoides** *Ogilby*. (*Sciurus griseoflavus*, Bull., XXIV, p. 659; in part,— the Matagalpa and San Rafael del Norte specimens.)

In addition to the two specimens from San Rafael del Norte, and the three from Matagalpa previously recorded (*l. c.*), three additional specimens have been since received from San Rafael del Norte, collected Dec. 29, 1908, and Jan. 1, 2, 1909.

The series of five specimens from San Rafael presents a wide range of individual color variation, especially of the feet and ventral surface. The upper surface of both fore and hind feet varies in general tone from silvery white to blackish, the two extremes having been collected respectively in December and April. A specimen taken January 1 has the hind feet blackish, washed over most of the upper surface with grayish fulvous; another taken January 2 has them fulvous tinged with dusky, the blackish basal portion of the hairs showing more or less at the surface; a specimen taken September 28 has the toes and both edges of the feet fulvous, with the upper surface fulvous varied with dusky. This wide range of variation may be largely seasonal, the upper surface of the feet being more or less blackish immediately after the moult and fulvous or whitish in the later fully developed pelage of fall and winter.

This cannot, however, be the case with the ventral surface, which (including inside of limbs) varies from pure white to pale rufous. One of the five San Rafael specimens has the ventral surface entirely clear white; in two others it is white with a narrow pale fulvous lateral line separating the dorsal and ventral areas; in a fourth the inside of the fore limbs is fulvous with a white median line proximally; the throat, fore neck, most of the pectoral region, most of the lower abdomen, and a narrow median ventral line are white; the rest of the ventral surface is fulvous, with irregular patches of pale fulvous on the sides of the pectoral area. The fifth specimen is deep fulvous or pale rufous over the whole ventral surface and inside of limbs except small irregular patches of white on the inguinal and pectoral areas (the latter extending down the inside of the upper arm) and a narrow median ventral line of white.

The two Matagalpa specimens have the feet grizzled grayish fulvous, the toes clear pale fulvous; the ventral surface is white bordered laterally on each side by a narrow band of pale fulvous at the edge of the abdominal

area; the white, however, occupies the inner surface of the hind limbs and the proximal two-thirds of the inner surface of the fore limbs.

The dorsal surface in all is gray varied with black, the gray faintly suffused with buff in six of the specimens, strongly so in the other. The post-auricular patches vary from buffy white (in two specimens) to yellowish buff.

None of these specimens is quite typical of *S. variegatoides*, although the one having the underparts dull yellowish rufous closely approaches Nelson's description (*l. c.*, p. 80) of a specimen which had been compared with the type and pronounced (by Oldfield Thomas) as "identical" with it. The type locality is given by Nelson, on this basis, as San Carlos, Salvador, which is also the type locality of *Macroxus pyladei* Lesson, which Nelson synonymizes (doubtless correctly) with *S. variegatoides*. They appear, however, to agree better with this little-known form than with any other.

†47. ***Sciurus variegatoides adolphei***¹ (*Lesson*). (*Sciurus griseoflavus*, Bull. XXIV, p. 659, in part — the two Chinandega specimens only).

Volcan de Chinandega, two specimens, ♂ and ♀, March 12, 1907.

These two squirrels do not agree in all particulars with the type specimens of *adolphei*, described by Lesson from Realejo, a locality only about ten miles south of Chinandega, but they agree with *adolphei* in the salient points that distinguish *adolphei* from *pyladei* (true *variegatoides*), from San Carlos, Salvador, the post-auricular patches being pure white instead of reddish buff, and the ventral surface white instead of dark intense buff. The hind feet in one have the upper surface black varied with gray, in the other with pale rufous, instead of brown varied with gray as in *adolphei*; but, as has been shown above, the color of the feet is extremely variable in all the squirrels of this general region, giving to such differences slight significance. Besides, the two Chinandega specimens are practically topotypes of *adolphei*.

Mr. Nelson in his "Revision of the Squirrels of Mexico and Central America"² treats *adolphei* as a full species, basing his description (*l. c.*, p. 73) on a specimen from the "west coast of Nicaragua," without definite locality (at least none is stated), in which he gives the fore legs all around and adjacent part of shoulders and underparts as "dark reddish chestnut" (except chin, throat, axillar and inguinal regions which are white), which is quite at variance with Lesson's description ("Toutes les parties inférieures, le dedans des membres, à partir du menton jusqu'à l'anus, sont d'un blanc pur"). As implied above, the large squirrels of this general region are

¹ *Macroxus adolphei* Lesson, Nouv. Tabl. du Règne Anim., 1842, 112. Realejo, Nicaragua, Central America.

² Proc. Washington Acad. Sci., I, pp. 15-110, May 9, 1909.

very unstable in respect to coloration, but it may be noted that the two Chinandega specimens agree better with Lesson's original description than with that given by Nelson, and much better than with the description of *S. variegatoides* as given by Nelson and by Lesson (under *Macroxus pyladei*), these having the post-auricular patches snowy white and the dorsal surface very much more strongly varied with black.

48. *Sciurus (Baiosciurus) deppei matagalpæ* Allen. (Bull. XXIV, p. 600: Matagalpa and San Rafael del Norte.)

Seven specimens: Pena Blanca (3), May 19, 30, and June 7; Rio Coco (2), Nov. 7, 18; San Rafael del Norte (2), Dec. 29, Feb. 5.

In this form the small premolar is often wanting, on one or both sides; when absent its alveolus usually can be recognized, but in several specimens no trace of the former existence of a second premolar remains, as unfortunately is the case with the specimen selected for the type, this fact at the time being overlooked.

49. *Sciurus (Guerlinguetus) richmondi* Nelson. (Bull., XXIV, p. 660: Chontales and Rio Grande.)

Three specimens: Vijagua (1), March 21; Rio Tuma (2), March 25 and April 6.

[*Sciurus (Microsciurus) alfari* Allen. Ranges to northeastern Costa Rica and probably into the adjacent parts of Nicaragua.]

50. *Lutra latidens* Allen. (Bull., XXIV, p. 660: Savala.)

One specimen, adult male, Pena Blanca, June 9, 1909. The collector's measurements are: Total length, 1240 mm.; tail, 500; hind foot, 120. In coloration and in other features it closely resembles the type.

The skull, in perfect condition, measures as follows: Condylbasal length, 117; palatal length, 52; zygomatic breadth, 76.5; interorbital breadth, 25; postorbital breadth, 19; postorbital processes, 36; mastoid breadth, 75; upper premolar-molar series, 32.2; lower premolar-molar series, 36.5; p^4 , length on outside, 13; oblique length (antero-internal angle to postero-external border), 14.6; p_4 , length, 15; lower jaw, length 72; angle to coronoid, 35; angle to condyle, 13. The specimen is middle-aged, with the sutures closed but the teeth unworn and the sagittal crest undeveloped; in old age the skull would have been somewhat broader and longer.

The present specimen is of special interest through the presence of a supernumerary tooth on the middle of the palatal area just behind the anterior palatal foramina. It is a slender spicule with an enamel crown, about one-third as large as p^1 .

†51. *Lutra annectens Forsyth-Major*.

One specimen adult male, Rio Tuma, June 15, 1909.

This is of about the age of the specimen recorded under *L. latidens*, but

it is much smaller and otherwise very different. The general color is much lighter throughout, especially below, the chin and throat being grayish fulvous white, much lighter than the rest of the ventral surface; there is, however, a whitish pectoral spot, and a narrow but conspicuous median line of white on the posterior third of the abdomen. The nose pad is pointed or V-shaped on the posterior margin, not straight as in *L. latidens*. The skull also shows marked differences in all the minor details of structure, rendering the specific distinctness of the two forms unquestionable. The external and skull measurements indicate a much smaller animal, while p^4 has the point of the internal cusp about opposite the middle of the tooth instead of much anterior to the middle.

The collector's measurements are: Total length, 1010 mm.; tail, 430; hind foot, 100. The skull measures (*cf.* corresponding measurements of *L. latidens* above): Condylbasal length, 113; palatal length, 45; zygomatic breadth, 68; interorbital breadth, 21; postorbital breadth, 18.5; postorbital processes, 32; mastoid breadth, 65; upper premolar-molar series, 29; lower premolar-molar series, 33.5; p^4 , length on outside, 12; oblique length, 13; p_4 , length, 13; lower jaw, 62.5; angle to coronoid, 31; angle to condyle, 13.

The type locality of *Lutra annectens* is "Terro Tepic, Rio de Tepic, Jalisco, Mexico. Coll. Dr. A. C. Bullen [= Buller], Jan. 1891."¹ There are two skulls in this Museum collected by Dr. Buller in Jalisco, Mexico, so near the type locality as to be in effect topotypes. One is that of an adult male of large size, the other is younger. Comparison of the Nicaragua specimen with these skulls leaves no doubt of their specific identity.

52. ***Putorius tropicalis perdis* Merriam.** (*Putorius tropicalis* Allen, Bull., XXIV, 1908, 661 (not of Merriam.)

Two specimens, both adult males, Matagalpa, July 19, 1908, and San Rafael del Norte, Feb. 2, 1909.

From examination of this and other additional material it is evident that all the Nicaragua specimens should be referred to *P. tropicalis perdis*.

53. ***Tayra barbara inserta* Allen.** (Bull., XXIV, p. 662: Savala, Uluce.)

Five specimens, 2 males and 3 females, all adult: Rio Coco, 1 female, Nov. 13, 1908; Rio Tuma, 2 males, March 11 and April 7; Pena Blanca, 3 females, May 28 and June 6, 1909.

Two agree with former specimens in lacking the throat spot; one (male) has a large prepectoral bright yellow spot, and also a small spot of yellow on the withers; another (female) has a small V-shaped spot of yellow on the throat. Of the 8 specimens received from Nicaragua (all from the lowlands of the east coast) 6 are entirely without the yellow spot on the fore neck.

¹ Ann. and Mag. Nat. Hist. (6), XIX, pp. 618-620, June, 1897.

[The genus *Grisson* is represented in Yucatan by *G. canaster* Nelson. As it is a tropical group, probably some hitherto overlooked form occurs in Nicaragua.]

54. ***Spilogale angustifrons elata* Howell.** (Bull., XXIV, p. 662, Matagalpa.)

One specimen, adult female, Jalapa (alt. 4000 feet), on the Honduras boundary, Jan. 24, 1909.

55. ***Mephitis macroura vittata* Lichtenstein.** (Bull., XXIV, p. 662: Matagalpa.)

Five specimens: San Rafael del Norte, 3 males and 1 female, Dec. 31, 1908, and Jan. 1 and 30, 1909; Matagalpa, 1 female, Sept. 27, 1908.

†56. ***Conepatus nicaraguæ* sp. nov.**

Type, No. 29282, ♂ ad., San Rafael del Norte, Nicaragua, Jan. 1, 1909; W. B. Richardson.

Black, with a single broad dorsal white band and a white tail. The white band begins on the forehead at a point in line with the posterior border of the eyes (in two specimens) or considerably posterior to this point (nearly an inch behind in the type specimen). Base of tail black beneath for about an inch, the rest white.

Collector's measurements: total length, ♂ 690 mm. (type), ♂ 600, ♀ 630; tail vertebrae, ♂ 270, ♂ 210, ♀ 260; hind foot, ♂ 80, ♂ 70, ♀ 70.

Skull (type), total length, 79; condylobasal, 68; palatal, 31; zygomatic breadth, 47 (estimated, one zygoma being broken); interorbital, 23; postorbital, 21; mastoid, 39.5; breadth at base of canines, 20; length of upper toothrow (including canine), 23; length of last molar (outside), 9.3. Adult ♀, total length, 79; condylobasal, 62; palatal, 31; zygomatic breadth, 47; interorbital, 23; postorbital, 21; mastoid, 38.6; breadth at base of canines, 20; upper toothrow, 23; length of last molar (outside), 9.

The ascending branch of the premaxilla is prominent, and in the female expands posteriorly, being bulb-shaped, with a width near its proximal end of 3 mm.

This species, represented by three specimens, all from the type locality, differs from its geographically nearest known allies, *C. felipensis* and *C. pediculus* Merriam, of southern Mexico, in its much larger size, and especially in the larger size of the last molar, which has a length of 9 mm. on the outer border, instead of 7 and 7.5, respectively, as in the forms from southern Mexico.

57. ***Potos flavus aztecus* Thomas.** (Bull., XXIV, p. 662: Ocotlal.)

Seven specimens: Rio Tuma, 1 adult male, April 7; Matagalpa, male and female, April 30; Pena Blanca, 2 males, June 6; Uluce, 2 males, July 20 and 31, 1909.

58. ***Bassaricyon richardsoni* Allen.** (Bull., XXIV, pp. 662-668: Rio Grande, alt. 700 ft.)

No additional specimens have been received, although Mr. Richardson has made special effort to obtain them.

[*Bassariscus sumichrasti* (Saussure), or *B. variabilis* (Peters), if different from *sumichrasti*, doubtless occurs in parts of Nicaragua.]

†59. ***Procyon lotor hernandezi*** (Wagler).

Five specimens, all adult: Jalapa, male and female, Jan. 14 and 23; San Rafael del Norte, 2 males, Jan. 2 and Feb. 4; Vijagua, 1 female, March 22, 1909.

60. ***Nasua narica molaris*** Merriam. (*Nasua narica bullata* Allen, Bull., XXIV, 1908, p. 668 (not of Allen, 1904): Savala and Tuma.)

Eight specimens: Vijagua, 1 male, March 24; Rio Tuma, male and female, April 7; Pena Blanca, male, June 9; Matagalpa, male and female, June 10 and 22; Rio Coco, female, Nov. 9.

These specimens, like the three old males previously received from Nicaragua, are all of the extreme dark phase, except an old female which is light colored throughout. A second female has the top of the head and nape golden rufous, with the dark hairs of the dorsal surface slightly tipped with this tint. A young specimen in first pelage is dark brown above, lighter below.

This series is now referred to *N. n. molaris* rather than to *N. n. bullata*, since the audital bullæ in all are rather smaller than the average size in the *N. narica* group, instead of larger as in *N. n. bullata*. There is, however, a wide range of individual variation in the size and form of the bullæ in all of the forms of *N. narica*. The size of the molariform teeth in the Nicaragua specimens agrees closely with specimens from western Mexico.

61. ***Urocyon cinereoargenteus guatemalæ*** Miller. (Bull., XXIV, p. 668; Matagalpa.)

Four specimens, all adult: Matagalpa, 2 males, Feb. 28 and June 9; San Rafael, 1 (sex and date not given); San Juan, Jan. 5, 1909.

These specimens are larger than the one previously recorded (*l. c.*), and cited as one of the smallest specimens of *Urocyon* on record. One of the male skulls in the present series agrees almost exactly with the measurements of the type of *guatemalæ*; some of the principal measurements are the same, and rarely is the difference in corresponding measurements more than a millimeter. The specimen first recorded of the Nicaragua series is not only markedly smaller than the others, but is white below, the black hairs on the back are more conspicuous, and the color of the ears and adjacent parts is lighter and more golden — apparently all features of individual variation.

†62. ***Felis onca centralis*** Mearns.

Three specimens: Uluce, skin only, July 27; San Rafael del Norte, skin and skull, Feb. 7; also an imperfect flat skin without definite locality.

The three specimens vary considerably in the intensity of the ground color, being brightest (doubtless exceptionally intense) in the flat skin obtained from a hunter. It consists of only the posterior two-thirds of the body portion.

**Felis bangsi costaricensis* Merriam. Some form of Puma occurs in Nicaragua, as it is mentioned by Mr. Richardson in one of his letters as one of the species he was unable to procure. It is very likely referable to *P. b. costaricensis*.

†63. **Felis pardalis mearnsi** Allen. (*Felis costaricensis* Mearns; not *Felis bangsi costaricensis* Merriam.)

Two specimens, adult male and female, collected as follows:

No. 29444, Rio Coco, Nov. 19, 1908, very old male. No external measurements. Ground color of dorsal surface tawny, the markings deep black. Skull with strongly developed sagittal and occipital crests. The skull measures: Condylbasal length, 137; basilar length, 126; zygomatic breadth, 103; interorbital breadth, 30; breadth at postorbital constriction, 28.5; mastoid breadth, 58; upper tooththrow (including canine), 43; length of p^4 , 15.5.

No. 29843, Pena Blanca, June 6, 1909; middle-aged female, in the gray phase of coloration; ground color of the dorsal surface dull buffy gray instead of tawny as in the male. The skull is badly broken and hence not available for general measurements. It is somewhat smaller than the very old male skull, as would be expected, the length of the upper tooththrow being 38, and the length of p^4 15.1. Collector's external measurements: total length, 1170; tail vertebræ, 360; hind foot, 160.

†64. **Felis** sp. indet.

One specimen, No. 28957, adult male, skin and skull, Volcan de Chinandega, Sept. 20, 1908.

Ground color of head, nape, shoulders, middle of dorsal region and fore limbs tawny, sharply marked by stripes and spots of black. Collector's measurements: total length, 1260 mm.; tail vertebræ, 510; hind foot, "60" (doubtless 160). Skull: condylbasal length, 101; basilar length, 90; zygomatic breadth, 72; interorbital breadth, 20; postorbital breadth, 32.5; width of braincase, 48; mastoid breadth, 45; upper tooththrow (including canine), 32; length of p^4 , 12. The skull is that of a middle-aged adult, with sagittal crest absent.

This specimen is clearly different from the two referred above to *Felis pardalis mearnsi*. Although the coloration and markings are similar, it is a very much smaller animal, with the tail relatively about twice the length of this member in the other specimens.

† 65. *Felis* sp. indet.

One specimen, No. 29596, adult female, skin and skull. Matagalpa, April 11, 1909.

Ground color of top of head, nape and shoulders pale tawny, fading to still paler behind the withers and on the fore limbs; other parts pale creamy white, in contrast with the usual pattern of intense black stripes and spots. Collector's measurements: total length, 970 mm.; tail vertebræ, 390; hind foot, 110. Skull: condylobasal length, 89; basilar length, 79; zygomatic breadth, 65.5; interorbital breadth, 26.5; postorbital constriction, 35; width of braincase, 47; mastoid breadth, 41; upper toothrow (including canine), 27.5; length of p^4 , 11.

This specimen is a middle-aged female, practically of the same age as the male specimen (apparently a little older) from Volcan de Chinandega (No. 28957), and resembles it in the relative length of the tail, but it is much paler colored throughout, while the skull is much shorter and broader, with the braincase greatly expanded, as wide as in the much larger Chinandega specimen, while the condylobasal length is nearly one-eighth less.

The last five specimens of Cats above recorded seem unquestionably to represent three distinct species; the first three are short-tailed, the last two long-tailed. In the shape of the skull and general coloration, the Chinandega specimen agrees with the two above identified as *Felis pardalis mearnsi*, but is much smaller; the Matagalpa specimen is still smaller, long-tailed, and has a very short, broad skull. The comparative size is well shown by the length of the upper toothrow and length of p^4 , as follows: *mearnsi*, toothrow, ♂, 43, ♀ 38; p^4 ♂, 15.5, ♀ 15.1; Chinandega specimen, toothrow, ♂, 32, p^4 , 12; Matagalpa specimen, toothrow ♀, 27.5, p^4 , 11. The Matagalpa specimen might be considered as the female of the species represented by the Chinandega specimen were it not for the radical difference between the two in the shape of the skull.

In view of our present very imperfect knowledge of the small spotted cats of tropical America, and the many complications of nomenclature involved, it seems unwise to increase the number of names that has already been applied to these little-known cats. The Matagalpa specimen may be specifically the same as the specimen from Realejo, Nicaragua, imperfectly described by Dr. Joseph Wilson under the name *Felis pardalis minutus*.¹ The name *minutus*, however, is preoccupied by *Felis minuta* Temminck (1827). Probably both of the two forms here left unnamed are covered by the name *Felis tigrina* auct., of which the range is commonly given as Mexico and Honduras to Paraguay. Neither of them can be

¹ Proc. Acad. Nat. Sci. Philadelphia, 1860, p. 82.

referred to *Felis pardinoides oncilla* Thomas, described from a Costa Rica specimen (a skin without skull), as they have the nape hairs "reversed," as is usual in ocelots.

Felis eyra Fischer and *Felis jaguarundi* Fischer (of authors). Both have a reputed range extending from Texas to Paraguay. Some form of each probably occurs in Nicaragua.

[Two species of *Sorex* (*S. salvini* Merriam and *S. godmani* Merriam) have been described from the high mountains of western Guatemala (9000 to 10,200 feet altitude) which may range into the highlands of Nicaragua.]

66. **Blarina olivaceus** Allen. (Bull. XXIV, p. 669: San Rafael del Norte.)

[Other species of *Blarina* occur in Guatemala and Costa Rica, some of which may range into Nicaragua.]

67. **Rhynchiscus naso** (Wied). (Bull. XXIV, p. 669: Tuma.)

Ten specimens, Pena Blanca, May 29-31, 1909.

†68. **Saccopteryx bilineata centralis** Thomas.

Two specimens, Muy Muy, July 18 and 27, 1908.

69. **Peropteryx canina** (Wied). (Bull., XXIV, p. 669: Savala.)

Sixteen specimens: San Juan (13), Jan. 7-9, 1909; Pena Blanca (2), May 21, 24, 1909; Muy Muy (1), July 30, 1909.

Balantiopteryx plicata Peters. This species, according to Thomas, "ranges northwards from Costa Rica to Sinaloa, W. Mexico."¹

[*Balantiopteryx* to Thomas. Described from "Rio Dolores, near Coban, Guatemala."]

**Diclidurus virgo* Thomas. Type locality, Escazu, Costa Rica; "other specimens from Guatemala," etc. Recorded by Salvin from Pueblo Nuevo, Nicaragua, as *D. alba*.

**Chilonycteris rubiginosa* Wagner. Recorded by Miller² from Chontales, Nicaragua.

Chilonycteris personata Wagner. Described from southern Brazil; recorded from Venezuela and Guatemala (Peters).

Mormoops megalophylla Peters. Southern Mexico south to northern South America. Dueñas, Guatemala, is the nearest recorded locality.

†70. **Micronycteris microtis** Miller.

Seven specimens: Rio Coco, Nov. 8, 1908.

Micronycteris megalotis mexicana Miller. Described from Platinar, Jalisco, Mexico. Anderson has recorded³ specimens from Bogota, Colombia, Dueñas, Guatemala, and Bay of Honduras.

¹ Ann. and Mag. Nat. Hist. (6), XX, Dec. 1897, p. 546.

² Proc. Acad. Nat. Sci. Philadelphia, 1902, p. 402.

³ Ann. and Mag. Nat. Hist. (7), XVIII, July, 1906, p. 54.

Phyllostomus hastatus panamensis Allen. Described from Boqueron, Chiriqui, Panama. Miller gives the range of the *P. hastatus* group as "Tropical America, north to Honduras."¹

Trachops cirrhosus (Spix). Recognized as ranging from Mexico southward to Brazil.

Chrotopterus auritus (Peters). Described from Mexico and since recorded from Colombia, Brazil, etc., so that Nicaragua is included in its known range.

†71. *Vampyrus spectrum* (Linnæus).

One specimen, Volcan de Chinandega, Aug. 30, 1908.

†72. *Glossophaga soricina* (Pallas).

Eight specimens: Volcan de Chinandega (2), Aug. 23, 31, 1908; San Juan (5), Jan. 9; Quilali (1), Jan. 1, 1909.

Glossophaga mutica Merriam. Described from the Tres Marias Islands, Jalisco, Mexico, and later recorded from Costa Rica.

Anoura geoffroyi Gray. This tropical American species ranges from Brazil north to southern Mexico and is therefore of probable occurrence in Nicaragua.

Cheronycteris godmani Thomas. "Guatemala." Perhaps from Champerico, where the collector (Champion) obtained *Dichlidurus albus*. (Cf. *Biologia Centr.-Amer.*, Vol. I, p. 207.

[*Cheronycteris mexicana* (Tschudi). Southwestern Mexico and southern Guatemala (Dueñas).]

[*Hylonycteris underwoodi* Thomas. Type locality, Rancho Redondo, Costa Rica.]

Leptonycteris nivalis (Saussure). Nicaragua is included within the known range of the species.

**Lichonycteris obscurus* Thomas. Type locality, Managua, Nicaragua.

73. *Hemiderma perspicillatum aztecum* (Saussure). (Bulletin, XXXV, p. 669: Matagalpa.)

Twenty-three specimens: Matagalpa (13), June 16–21, 1908; Chinandega (1), Aug. 31, 1908; San Juan (5), Jan. 16–21, 1909; Quilali (3), Jan. 14, 15, 1909; Jalapa (1), Jan. 22.

[*Hemiderma castaneum* (H. Allen). Described from Costa Rica and may occur in Nicaragua.²]

Sturnira lilium (Geoffroy). This species has an accredited range ex-

¹ Families and Genera of Bats, 1907, p. 130.

² In Central American and Mexican specimens of *Hemiderma* the forearm averages about 1 mm. longer, and the metacarpal of the third finger about 2 mm. longer than in specimens from northern Colombia, Venezuela, and Trinidad (true *perspicillatum*), and the coloration averages decidedly brighter and more rufous. *Hemiderma castaneum* (H. Allen) and *H. subrufum* Hahn do not seem to me to be satisfactorily established.

tending from Paraguay to southern Mexico, and without doubt is to be regarded as a Nicaraguan species. There are recent records for Panama and for Mexico.

Vampyrops helleri Peters. Described from "Mexico," and since recorded from Chiriqui, Panama, by both Bangs and Allen.

Vampyrops vittatus (Peters). Described from Costa Rica and doubtless ranges into Nicaragua.

†74. **Vampyroides caracciolæ** (Thomas).

One specimen, without definite locality, the label having been detached in shipment. This specimen, with others, was submitted to Mr. Gerrit S. Miller, Jr., for identification, who kindly replied as follows: "The larger one [the present specimen] is a *Vampyroides*, and I can see no way to separate it from *V. caracciolæ*. But we have no Trinidad material. Perhaps you are more fortunate." As there is no specimen of this rare species in this Museum, I gratefully accept Mr. Miller's provisional identification.

†75. **Gen. et sp. indet.** A skin, without skull, No. 28336, from Volcan de Chinandega, May 12, 1907.

This bat has also been kindly examined by Mr. Miller, who writes that he does not recognize it, and states that without the skull, he would "not care to hazard a guess." It is a small bat with a simple noseleaf and rather striking coloration, the throat and chest being deep ochraceous and the rest of the lower parts yellowish, brighter on the anal region than on the belly. It doubtless represents an undescribed species and possibly an undescribed genus.

Chiroderma salvini Dobson. The type locality of this species is "Costa Rica." It is quite probable that it ranges into Nicaragua.

**Ectophylla alba* H. Allen. Described from Segovia River, Honduras, and later recorded by the same author¹ from San Emilio, Lake Nic-Nac, Nicaragua.

76. **Artibeus jamaicensis richardsoni** Allen. (Bulletin, XXIV, p. 669: Matagalpa).

**Artibeus jamaicensis jamaicensis* Leach. Andersen² gives the mainland range of this species as "Central America and S. Mexico, as far north as Morelos, and exclusive of Yucatan." He records a specimen from Greytown and another from the "Escondido River, 50 miles from Bluefields," Nicaragua. To this species he will probably refer my recently described *Artibeus jamaicensis richardsoni*, recorded above, with the other forms of this group it seems to have been my misfortune to describe!

**Artibeus watsoni* Thomas. A specimen of this species is recorded from the Escondido River, Nicaragua, by Andersen (*l. c.*, p. 290).

¹ Trans. Amer. Phil. Soc., n. s., Vol. XIX, 1898, pp. 267-272, pl. xvi.

² Proc. Zool. Soc. London, 1908, I, p. 267.

**Artibeus toltecus toltecus* (Saussure). A specimen is recorded by Andersen (*l. c.*, p. 300) from Jinotega, Nicaragua, and others from Costa Rica, Guatemala, and southern and central Mexico.

Ptygoderma bilabiatum (Wagner). Said to range from Mexico to Brazil.

Centurio senex Gray. There are records of the capture of this rare species, according to Rehn,¹ from Cartago, Costa Rica, and from Guatemala, in addition to localities in the State of Vera Cruz, Mexico. It is therefore of probable occurrence in Nicaragua.

77. *Desmodus rotundus* (Geoffroy). (Bulletin, XXIV, p. 670: Volcan de Chinandega.)

Two specimens: San Juan, Jan. 10; Jalapa, Jan. 20, 1909.

Diphylla ecaudata Spix. Has a recognized range extending from tropical America north to southern Mexico.

Natalus stramineus Gray. Recognized as ranging from Brazil to Central Mexico.

**Thyroptera discifera* (Lichtenstein & Peters). Recorded from Bluefields by Miller,² who gives its range as Puerto Caballos, Honduras, to Bluefields, Nicaragua.

Myotis nigricans Schinz. Ranges north to southern Mexico; undoubtedly occurs in Nicaragua.

Eptesicus fuscus miradorensis (H. Allen). Recorded from Panama, Costa Rica, and Guatemala (Miller), and hence should be found in Nicaragua.

**Eptesicus fuscus propinquus* (Peters). Recorded from Greytown, Nicaragua by Miller.³

†78. *Rhogeessa tumida* H. Allen.

Four specimens: Chinandega (1), Aug. 28, 1908; Uluce (3), July 1, 25, 27, 1909.

Rhogeessa parvula H. Allen. Described originally from the Tres Marias Islands, west coast of Mexico, and since recorded from Costa Rica.

*Nycteris*⁴ *borealis mexicanus* (Saussure = *frantzii* Peters). Doubtless has a continuous distribution from southern Mexico to Costa Rica and Panama.

Dasypterus ega panamensis Thomas. Described from Chiriqui, Panama; probably extends north in the lowlands of Nicaragua, in view of the known distribution of the *D. ega* group.

Nyctinomus brasiliensis Geoffroy. The *Nyctinomus brasiliensis* group

¹ Proc. Acad. Nat. Sci. Philadelphia, 1901, p. 298.

² Proc. Biol. Soc. Washington, Vol. X, pp. 109-112, pl. vii and text figs. 1-3, July 26, 1896.

³ N. Amer. Fauna, No. 13, p. 100, Oct. 16, 1897.

⁴ On *Nycteris* vs. *Lasiurus* cf. Miller, Proc. Biol. Soc. Washington, XXII, p. 90, April 17, 1909.

ranges from tropical South America to the southern border of the United States, and evidently some form of it must occur in Nicaragua.

Nyctinomus gracilis (Wagner). Recognized as ranging from southern Brazil to Guatemala.

Eumops abraxus (Temminck). Guatemala to Brazil.

Promops nasutus (Spix). Guatemala to Brazil.

79. **Molossus rufus** (Geoffroy). (Bulletin, XXIV, p. 670: Volcan de Chinandega.)

Molossus obscurus Geoffroy. Guatemala to Bolivia and Paraguay.

80. **Alouatta palliata** Gray. (*Alouatta palliata matagalpæ* Allen, Bull., XXIV, p. 670; Savala.)

Four specimens: Matagalpa, adult male, June 20, 1908; Uluce, adult male, July 25; Pena Blanca, adult female and young male, June 10, 1909.

Since describing the Nicaragua form as a subspecies of *palliata*, I have found that Sclater states that *Mycetes palliatus* Gray "was originally described from examples procured by M. Sallé (as he himself told me) in Nicaragua, where the animal is found in the islands and on the banks of the lake Nicaragua" (Proc. Zoöl. Soc. London, 1872, p. 7). This renders my *A. p. matagalpæ* a synonym of *A. palliata*. Gray, however, originally gave the type locality as Caraccas, Venezuela.

[*Aotus rufipes* (Sclater, Proc. Zoöl. Soc. London, 1872, p. 3, pl. i). The type was a specimen received alive at the menagerie of the London Zoölogical Society, June 12, 1871, and was said to have "been obtained at San Juan del Norte, Nicaragua." The locality was unquestionably erroneous since the genus *Aotus* (= *Nyctipithecus*) is not known to occur north of Panama, while the alleged locality is in the highlands of northern Nicaragua at an elevation of 5000 feet.]

[*Saimiri ærstedii* Reinhardt. Sclater has recorded a specimen (P. Z. S., 1874, p. 495), received alive at the menagerie of the London Zoölogical Society, September 5, 1874, as having been "obtained in the Department of Solola, Guatemala, which he says "is a more northern locality than has yet been recorded for the species." This specimen was probably originally from some locality much further south, as there is no other record for the species for Guatemala, nor any from Nicaragua where it was *not* obtained by Mr. Richardson. It may, however, extend from Costa Rica into the low coast districts of Nicaragua.]

81. **Ateles geoffroyi** Kuhl. (Bull., XXIV, p. 670: Savala, Tuma, and Uluce.)

Three specimens: Matagalpa, adult male, June 11; Pena Blanca, 2 adult males, June 1 and 4, 1909.

82. **Cebus capucinus** (Linnæus). (*Cebus hypoleucus*,¹ Bull., XXIV, p. 670: Savala, Chontales, and Ocotal.)

Two specimens: Muy Muy, adult female, July 18, 1908; Rio Tuma, adult male, March 25, 1909.

ERRATA.

Antea, p. 6, for **Ursus americanus kenaiensis** read **Ursus americanus perniger**, the name *kenaiensis* being preoccupied by *Ursus kenaiensis* Merriam, 1902.

Antea, p. 13, for *Muntiacus* and **Muntiacus** read *Tragulus* and **Tragulus**.

“ p. 15, for **Arctitis** read **Arctictis**.

“ p. 16, for *Arctitis* read *Arctictis*.

¹ *Cebus hypoleucus* (Humboldt) of authors = *Simia capucina* Linnæus, apud Elliot, this Bulletin, XXVI, 1908, pp. 227-229.