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Article XXIX.— NEW SOUTH AMERICAN BATS AND A NEW OCTODONT.

By J. A. Allen.

Plate XXVIII.

In determining the bats recently collected in northern South America by recent American Museum expeditions the following forms have been discovered in the American Museum collections which appear to be undescribed.

I am indebted to Mr. Wilfred H. Osgood, of the Field Museum of Natural History, for the loan of specimens of *Amorphochilus*, and to Mr. Gerritt S. Miller, Jr., of the United States National Museum, for valued assistance in a preliminary examination of most of the material here described, through direct comparison with the National Museum collection.

Amorphochilus schnablii osgoodi subsp. nov.

Amorphochilus schnablii Osgood (not of Peters), Field Mus. Nat. Hist., Zool., X, No. 12, p. 180, April 20, 1914.

Type, No. 19684, Field Mus. Nat. Hist., ♂ ad., Hacienda Limon (altitude 3000 ft.), near Balsas, Peru; Wilfred H. Osgood and M. P. Anderson.

Similar in size and general features to *A. schnablii* but coloration much lighter throughout. Upperparts dark smoke gray, instead of deep mouse gray washed with blackish ("dunkelbraun," Peters) as in *schnablii*; a slight buffy suffusion over the top and front of the head, as in *schnablii;* underparts slightly paler than the back. External measurements and proportions nearly as in *schnablii*. Skull measurements practically the same, but braincase less inflated.

Based on two specimens, a type (♂ skin) and a topotype (♀ in alcohol), already fully described by Osgood (*l. c.*).

Three specimens in the American Museum from Puna Island, Ecuador, are practically topotypes of *schnablii*, which was based on a specimen from Tumbez, Peru, in the arid coast belt less than 50 miles south of Puna Island. The Puna Island specimens have a strong blackish wash, both above and below, in contrast with the drab tinge in the Balsas specimens, from the humid interior east of the main Andean chain in northern Peru.

I am greatly indebted to Mr. Osgood for kindly placing his specimens at my disposal in the present connection.

As Peters's description of *A. schnablii*[1] is not very detailed in respect to coloration and measurements, the following description of the Puna Island specimens is submitted:

Upperparts deep mouse gray (Ridgway), the tips of the hairs blackish; front and top of head with a pale buffy suffusion; underparts nearly of the same color as the upper; ears light brown; membranes a little darker than the ears. Forearm (♂ ad.), 35; third metacarpal, 34; third finger, 58; tibia, 15.5; foot, 6.5; calcaneum, 11. Skull, total length, 12; length of braincase, 7.5; breadth of braincase, 6; length of upper toothrow (with canine), 5; breadth of palate from outside to outside of m^3, 5.

Eptesicus andinus sp. nov.

Type, No. 33807, ♂ ad., Valle de las Papas (alt. 10,000 ft.), Central Andes, Huila, Colombia, March 26, 1912; Arthur A. Allen and Leo E. Miller.

Similar in coloration to *E. fuscus miradorensis* (H. Allen) but much smaller (compared only with Chiriqui, Panama, specimens). Skull (in volume) less than half the size of the skull of *miradorensis*. Coloration above as in *E. hilarii* (I. Geoffroy), but very much darker on underparts (in comparison with specimens from Rio Yuruan, Venezuela).

Upperparts (type) uniform dark seal brown, the extreme tips of the hairs slightly lighter than the basal portion; underparts dark wood brown, slightly lighter posteriorly; ears and membranes blackish. Collector's measurements: Expanse, 300; head and body, 65; tail, 35; hind foot, 8. Forearm (in skin), 42.5; third metacarpal, 40; tibia, 18; foot, 8; calcaneum, 11. Another specimen from Almaguer (a nearby locality, alt. 10,300 ft.), is similar in coloration and measurements, as is a specimen from El Roble (alt. 7200 ft., Central Andes), also referred to this species.

Skull (type), total length, 16.5; zygomatic breadth, 10; breadth of braincase, 8; interorbital breadth, 4.3; upper toothrow (including canine), 6.

In size this species agrees closely with *E. propinquus* and *E. hilarii*, but the coloration is very much darker, especially below. It is larger than *E. dorianus* and differs from it in color of ventral surface.

A specimen (skin without skull) from Fusugasuga (alt. 6000 ft.), near Bogotá, is similar in size but the coloration above has a reddish tone (about walnut brown) and the underparts are deeper yellowish brown (about ochraceous tawny of Ridgway, 1912).

Dasypterus ega punensis subsp. nov.

Type, No. 36271, ♀ ad., Puna Island, Ecuador, April 3, 1913; W. B. Richardson.

Similar to *D. ega fuscatus* but more heavily washed with black, both above and below. Upperparts (type) grayish pale buff with the tips of the hairs black, the

[1] Monatsber. K. Pr. Akad. Wiss. Berlin, 1877, p. 185.

black forming, in some specimens, the predominant tone; face blackish; upper surface of interfemoral membrane like the back; throat and breast blackish brown; abdomen and anal region pale buffy gray, much paler than the upperparts.

Forearm (type), 45. Forearm, 5 specimens (type and 4 topotypes), 46.5 (45–49).

Skull (type), greatest length, 16; zygomatic breadth, 11; interorbital breadth, 5: upper toothrow (including canine), 5.5.

Nearest related to *D. ega fuscatus* but general coloration much paler; black tips of the hairs of the dorsal pelage longer and more predominant over the ground color, face darker and foreneck and chest distinctly blackish brown in contrast with the pale abdominal area. Doubtless peculiar to Puna Island and the adjacent arid coast district of Ecuador and Peru. Represented by five specimens, all from Puna Island, with which a topotype of *D. ega fuscatus* is available for comparison.

Myotis ruber keaysi subsp. nov.

Type, No. 15814, ♂ ad., Inca Mines (altitude 6000 feet), Peru (lat. 13° 30′ S., long. 70° W.), Dec. 2, 1899. Coll. H. H. Keays, for whom the form is named.

Upperparts auburn, the basal half of the hairs darker; underparts Saccardo's umber (Ridgway), becoming abruptly buff yellow on the lower abdomen and basal third of interfemoral membrane; ears and membranes nearly black. Cranial characters and dentition as in typical *Myotis;* pelage short and thick; basal third of interfemoral membrane hairy on both surfaces.

Collector's measurements: Extent, 266; head and body, 49; tail, 40. Forearm (in skin), 39; third metacarpal, 35; third finger, 62; tibia, 16; foot, 7.2. Skull (imperfect, lacking the occipital portion), total length, —; interorbital breadth, 3.3; breadth of braincase, 6.2; upper toothrow (with canine), 5; breadth of rostrum at canines, 3.5; breadth of palate from outside to outside of m^3, 5.3.

Resembles *M. ruber ruber* (Geoffroy) of Paraguay in size and other general features,[1] but with longer pelage and darker and less rufescent coloration above, with the lower abdomen and ventral surface of the interfemoral membrane much paler.

Myotis punensis sp. nov.

Type, No. 36263, adult (♂?), Puna Island, Ecuador, April 8, 1913; W. B. Richardson.

Similar in coloration to *Myotis albescens* (Geoffroy) and *M. oxyotus* (Peters) but very much smaller. Upperparts light mouse gray, the tips of the hairs pale grayish olivaceous; underparts, surface color pale grayish white with a slight buffy tinge; ears and membranes dusky brown or fuscous.

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[1] *Cf.* Thomas, Ann. and Mag. Nat. Hist. (7), X, p. 493, Dec. 1902.

Forearm, 32; third metacarpal, 29; third finger, 52; tibia, 13; foot, 6; calcaneum, 10. Skull, total length, 13; zygomatic breadth, 8; breadth of braincase, 6.4; interorbital breadth, 3.6; upper toothrow (including canine), 4.8. The skull has a high, rounded braincase, rising abruptly from the base of the rostrum.

A topotype is similar in coloration but smaller, being a young adult. One other specimen from Daule, Ecuador, and two from Barbacoas, Colombia, are provisionally referred to this species. They agree with the type in size, color and cranial characters, but are slightly more buffy below, and may prove subspecifically separable from the insular type form from arid Puna Island, on the basis of coloration.

The difference in size and the markedly different form of the skull in *M. punensis* readily distinguish it from either *M. oxyotus* or *M. albescens*, in which the forearm has a length respectively of 36–40 and 43 mm. as compared with 32 in *punensis*, and in the braincase rising abruptly instead of gently from the rostrum.

Myotis bondæ sp. nov.

Type, No. 14587, adult, Bonda, Santa Marta, Colombia, June, 1898; coll. H. H. Smith.

Upperparts sepia brown; underparts drab washed with pale buff; ears and membranes dark brown. Forearm (type, skin), 32.6; third metacarpal, 30; third finger, 56; ear, 6; tibia, 13; foot, 7; calcaneum, 11. The forearm in 11 adult topotypes averages 33 (32–34).

Skull, total length (type), 13; breadth of braincase, 6.2; average of 4 topotypes, total length, 13.2 (13–13.5); breadth of braincase, 6.2 (all 6.2).

Represented by 25 specimens, all taken at Bonda, but only about 12 are fully adult, while four or five are less than half grown. The adults are very uniform in coloration; the immature specimens are darker.

It has been suggested that the name *Vespertilio concinnus* H. Allen (1886), based on two alcoholic specimens from Salvador, Central America, may be applicable to a small bat of the *nigricans* group " occurring in Columbia and Mexico," but there is not much evidence of its possible application to the present form.[1] *Myotis nespotus* Miller, Curaçoa Island, while of the same size as *bondæ* is very different from it in coloration.

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[1] *Cf.* Miller, Proc. Biol. Soc. Washington, XIII, p. 154, June 13, 1900. Referring to the Salvador specimens, Miller says: "Though much faded in color they are clearly referable to *Myotis nigricans* (Maximilian), or at least to a form of the species occurring in Columbia and southern Mexico. The name *concinnus* is therefore a synonym of *nigricans* unless the bat to which it was applied should eventually prove to be distinct from the true *nigricans* of Brazil, specimens of which I have not seen." Later (List of North American Land Mammals, p. 58, 1912) the name *Myotis nigricans concinnus* (H. Allen) is employed for a bat ranging "From Colombia north to extreme southern Mexico." I have as yet seen no bats from southern Mexico to which the Bonda specimens can be referred.

Osgood (Field Mus. Nat. Hist., Zool., X, p. 65, Jan. 12, 1912) has referred also a specimen from El Panarama, Venezuela, to *concinnus*.

Myotis maripensis sp. nov.

Type, No. 17069, ♀ ad., Maripa, Venezuela, Dec. 13, 1909; S. M. Klages.

Similar in size to *Myotis bondæ*, but coloration different. Upperparts Saccardo brown (Ridgway, 1912) shading toward sepia; underparts drab, tips of the hairs lighter; ears and membranes dark brown. Forearm, 33; third metacarpal, 31; third finger, 54; ear, 8; tibia, 10; foot, 6. The forearm in 15 adult topotypes averages 33 (32–34.2).

Skull (type), total length (including incisors), 13; breadth of braincase, 6.2. Total length of skull in 10 adult topotypes, 13.1 (13–13.3); breadth of braincase, 6.2 (6–6.3).

Represented by 38 specimens (skins and skulls) from Maripa, Rio Caura, Venezuela, nearly all fully adult.

Myotis maripensis is similar to *M. bondæ* in size and cranial characters, but differs from it decidedly in coloration, the upper parts being less dark and much more fulvous, and the lower parts less dark and the hair tips more extensively pale buffy, giving a very different color effect for both surfaces.

Myotis nigricans (Wied) has been employed as a 'blanket name' for the small dark brown *Myotis* bats of tropical America, with a range from southeastern Brazil to central Mexico. On bringing together for comparative study the hundred or more specimens of these bats in the American Museum, from widely distant localities, it is at once evident that quite a number of strongly marked geographic forms have heretofore been included under the name *Myotis nigricans*, forms which vary quite widely in both size and coloration. Thus the present series of about 40 specimens from the Caura River (Venezuela) are very uniform in coloration and size, and agree practically in size with another series of some 20 specimens from Bonda, Santa Marta district, Colombia, but differ constantly from them in coloration. Both of these series differ again in coloration from two other distinct phases from, respectively, the coast regions of Ecuador and Colombia, but all four phases agree essentially in size. One of these west coast forms is from the arid Puna Island district of Ecuador, described above as *Myotis punensis*; the other is from the humid coast region further north and may be called

Myotis esmeraldæ sp. nov.

Type, No. 33239, ♂ ad., Esmeraldas, Ecuador, Nov. 5, 1912; W. B. Richardson.

Similar in size to *M. bondæ* and *M. maripensis* but very different from either in coloration and cranial characters, agreeing in the latter respect with *Myotis simus* Thomas from Sarayacu, Peru.

Upperparts cinnamon brown (Ridgway, 1912); underparts similar but somewhat lighter; ears and membranes dark brownish black. Forearm (type), 34; third metacarpal, 32.5; third finger, 55; tibia, 11.5; foot, 9.

Skull, total length, 13.5; zygomatic breadth, 8.5; interorbital breadth, 3.5; breadth of braincase, 6.2; upper toothrow (with canine), 5; breadth across palate from outside to outside of m^2, 5.3. Skull with the rostrum broad and heavy, braincase low and broad, length of upper toothrow less than breadth of palatal region at m^2.

Represented, in addition to the type, by a topotype from Esmeraldas, by a single specimen from Manavi and another from Narinjo (Ecuador), and 3 from Buenavista, Noriña Dept., Colombia. The last mentioned five specimens agree in size, coloration and skull characters with the type and topotype.

Myotis caucensis sp. nov.

Type, No. 32787, ♂ ad., Rio Frio (altitude 3500 feet), Cauca River, Colombia, Nov. 29, 1911; Leo E. Miller.

Upperparts fuscous-black (Ridgway, 1912); underparts fuscous, or a little lighter than the upperparts; ears and membranes black. Collector's measurements: Expanse, 254; head and body, 81; tail, 39; foot, 8. Forearm (in skin), 37; third metacarpal, 34; third finger, 63; tibia, 15; foot, 7.5. Skull, total length, 14; zygomatic breadth, 9; interorbital breadth, 3.3; breadth of braincase, 6.2; upper toothrow (with canine), 5.2; palate, outside to outside of m^2, 5.6. Interorbital region and rostrum very broad, anterior slope of the braincase gentle, not abrupt.

In addition to the type, three specimens from Inca Mines, Peru, and five specimens from Juntas da Tamaná, Chocó district, Colombia, are referred to this species. The latter are skins without skulls, but agree with the type in all external features. The Inca Mines specimens agree in cranial characters as well as in size and coloration.

Myotis caucensis is much larger than any of the other *Myotis* species described in the present paper, except *M. ruber keaysi*, from which it differs too much in coloration, in the character of the pelage, and in the naked instead of hairy interfemoral membrane, to require further comparison. It agrees, however, with *M. r. keaysi* in the form of the skull, the rostrum being broad, and the braincase rising therefrom by a gentle slope instead of abruptly as in the other species of *Myotis* here described.

Nyctinomus æquatorialis sp. nov.

Type (and only specimen), No. 34383, Chone, Manavi, Ecuador, Feb. 2, 1913; Wm. B. Richardson.

Upperparts Prout's brown, basal half of hairs white; underparts similar but a little paler; ears, feet and membranes black. Ears very large, reaching far beyond the nose (length 24 mm. in dry skin). Tragus short and narrow, antitragus small.

Forearm, 58; third metacarpal, 63; third finger, 110; foot, 11. Skull, total length, 24; zygomatic breadth, 13; interorbital breadth, 4; breadth of braincase, 10; mastoid breadth, 12; lacrymal breadth, 6; upper toothrow (with canine), 6.2.

This species is nearly related to *Nyctinomus affinis* (Allen), from Santa Marta, Colombia, and *N. depressus* Ward, from Mexico, having practically the same external and cranial measurements. It is, however, paler, with thinner, less stiff and leathery ears, heavier dentition, narrower interorbital region, squarer braincase (more angular in front), and larger lacrymal processes. *N. depressus* differs from both *N. affinis* and *N. æquatorialis* in the shape of p^4. The ear of the latter is narrower and longer than in either *affinis* or *depressus*, and the thumb larger.

Mormopterus peruanus sp. nov.

Type, No. 16075, ♀ ad., Inca Mines (altitude 6000 feet), Peru (lat. 13° 30′ S., long. 70° W.), March 14, 1900; H. H. Keays.

Upperparts between Prout's brown and mummy brown, the hairs uniformly colored to the base; underparts buffy brown; ears and membranes black. Collector's measurements: Extent, 330; total length, 105; head and body, 60; tail, 45. Forearm (in skin), 43.5; third metacarpal, 43.5; third finger, 80; foot, 10. Skull, total length, 17; zygomatic breadth, 10; interorbital breadth, 4; lacrymal breadth, 6; breadth of braincase, 8.5; mastoid breadth, 9.3; upper toothrow (with canines). 6.2. A male topotype is exactly similar to the type in coloration and nearly of the same size, being only slightly larger in some measurements.

This species is allied to *Mormopterus kalinowskii* (Thomas),[1] but is larger (forearm 43.5, in *kalinowskii* 34.5) and much darker, and the wing membranes are *not* " edged posteriorly with white."

Premolars $\frac{2}{2}$ in both specimens; no lacrymal process,[2] the lacrymal border being merely thickened. Represented by two specimens, collected by H. H. Keays in 1900.

Thrinacodus apolinari sp. nov.

Plate XXVIII.

Type (and only specimen), No. 36245, ad. (♂?), Tomeque (altitude 6500 feet), Bogotá district, Colombia, March 7, 1914; collected and presented by Brother Apolinar Maria, for whom the species is named.

Pelage long and soft, longest hairs on the back about 30 mm. in length. Upperparts yellowish brown, lighter and more fulvous on the sides and strongly lined with black on the back, the hairs ashy gray for the basal half; nose and front of head grayish lined with black, passing gradually on the top of the head into the color of the back, with the black hair tips long and conspicuous; cheeks, inside of limbs and underparts yellowish white, separated from the upperparts by a pale yellowish lateral

[1] Proc. Zool. Soc. London, 1893, p. 334, pl. xxix, fig. 10.

[2] *Cf.* Miller, Bull. Amer. Mus. Nat. Hist., 1899, pp. 173–176, fig. 1, *Mormopterus minutus* (Miller).

line; outer surface of limbs like the flanks, the toes grayish; soles naked, dark brown; ears pale brown, short, broad, and evenly rounded above, thinly haired on both surfaces; whiskers numerous, black, very long (the longest about 80 mm. in length) and conspicuous; tail long, pale brown above and on the sides, paler below but not sharply bicolor, hairy, the hairs not wholly concealing the annulations for the basal two-thirds but increasing in abundance apically, and ending in a thick pencil, the hairs pale brownish and lustrous.

Total length (approximate from dry skin), 340; head and body, 80; tail vertebræ, 260; hind foot, 40; ears from crown, 13; breadth of ears, 16. Skull, occipitonasal length, 57; zygomatic breadth, 26.8; interorbital breadth, 11.6; breadth of braincase, 20; mastoid breadth, 19; maxillary toothrow, 14; diastema, 11; palatal foramina, 1.8×3.

Thrinacodus apolinari closely resembles in pattern of coloration the colored figure of Günther's *Thrinacodus albicauda* (P. Z. S., 1879, pp. 144, 145, pl. X), the heretofore only known species of the genus, except that in *T. albicauda* the terminal half of the tail is white instead of concolor with the basal half, the upper parts are suffused with rufous instead of yellow, the underparts are white instead of yellowish white, and the animal is smaller, even allowing for its immaturity. Günther's specimen was from "the vicinity of Medellin," Colombia, and is apparently the only specimen of the genus heretofore recorded. It was a young animal with an imperfect skull, and only the front half with two molariform teeth (p^4 and m^1) is figured (see text-figure, *l. c.*, p. 145). The present specimen, from the eastern slope of the Eastern Andes, near Bogotá, is an adult (apparently male) with a perfect skull, and affords an opportunity to more fully illustrate the cranial characters of the genus (see Plate XXVIII).

Thrinacodus is intermediate in its structural relations between *Kannabateomys* and *Isothrix* on the one hand and *Dactylomys* on the other. It is similar in size and color pattern to *Kannabateomys* and *Isothrix*, but the feet are relatively much narrower than in *Isothrix* and the toes much slenderer. The form of the skull, as seen from above, is in general similar to that of *Isothrix*, both having the interorbital border straight and not convex outwardly as in *Dactylomys* and *Kannabateomys*; but in *Thrinacodus* the general form of the skull is narrower and more elongate anterior to the braincase, the rostrum being relatively narrower and more tapering and the interorbital region also much narrower. The zygomata, on the other hand, are very much broader and heavier in *Thrinacodus* than in *Isothrix*. The differences in the form of the skull, as seen from below, are equally marked through the very different form of the orbital fossæ, which are narrower and oval in front in *Thrinacodus* and wider and not narrowed anteriorly in *Isothrix*. In *Thrinacodus* the prepalatal foramina are very small and subcircular, in *Isothrix* much larger and twice as long as broad. But the radical difference is in the maxillary toothrows, which are twice sa

broad and converge anteriorly till they nearly meet, instead of diverging both anteriorly and posteriorly, with the point of least separation at the middle of the toothrows as in *Isothrix*. But the most important difference is in the structure of the teeth, which differ radically in enamel pattern, while the teeth themselves are low (brachyodont) and very broad in *Thrinacodus* and high (hypsodont) and narrow in *Isothrix*. Hence notwithstanding the external similarity and the superficial resemblances in the skulls of the two genera they have no very close genetic relationship.

On the other hand, while the external resemblances of *Thrinacodus* to *Dactylomys* are remote, and the general form of the skull in the two genera is quite different, the form and structure of the teeth are practically the same in both genera. In both the teeth are broad, heavy and brachyodont, with an exactly similar enamel pattern, and a similar convergence anteriorly of the maxillary toothrows. There are numerous minor cranial differences in the two genera, but these alone are hardly of sufficient importance to warrant the generic separation of the two groups. They are therefore genetically more closely related than is either to any other genus of the Octodontidæ, but their divergence in external characters (denoting very different habits), taken with the cranial differences, affords sufficient basis for the recognition of *Thrinacodus* as separable generically from *Dactylomys*. In *Dactylomys* digits 3 and 4 of the fore foot are of practically equal length and size, with digit 5 very short, and digit 2 about half the length of 3 and 4. In *Thrinacodus* digits 2, 3, and 4 are subequal in length and digit 5 is relatively longer than in *Dactylomys*. In the hind foot in *Dactylomys* digits 3 and 4 are longest and subequal, digit 2 is much shorter, digit 1 is greatly reduced, and digit 5 is a little shorter than digit 2. In *Thrinacodus* digits 2, 3, and 4 are longest and subequal, digit 5 is about one third shorter than digits 2–4, with digit 1 well developed.

In *Thrinacodus* the tail is heavily haired throughout its length, without extension of the body pelage on to the extreme base; in *Dactylomys* the tail is naked and heavily scaled throughout its length except at the extreme base, which for 45 mm. is covered with an extension of the body pelage, as in *Philander* and some other genera of the smaller opossums.

It remains to be noted that my *Dactylomys peruanus* is intermediate in many features between *D. dactylinus* and *Thrinacodus apolinari*. In coloration and size *T. apolinari* is very similar to *D. peruanus*, but the digital formula is different, and the tail in *D. peruanus* is heavily furred for the basal fourth, as in *D. dactylomys*, and well haired (not naked and heavily scaled as in *D. dactylomys*) for the rest of its length. While *D. peruanus* thus approaches *Thrinacodus* in external characters, it agrees wholly with *D. dactylomys* in cranial features, in foot structure and in furred tail-base.