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FROM PANAMA AND MEXICO

BY

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DESCRIPTIONS OF NEW MAMMALS FROM PANAMA AND MEXICO¹

By E. A. GOLDMAN

Further study of the collection of mammals taken by the writer while detailed from the Biological Survey, U. S. Department of Agriculture, to the Smithsonian Biological Survey of the Panama Canal Zone has resulted in the discovery of eleven new species and subspecies in addition to those already published.² In comparing the specimens from Panama with other Middle American material a new form of the genus *Agouti* and two new forms of the genus *Dasyprocta* were found in the collection of the Biological Survey, all from Mexico. The new species and subspecies from both regions are described below.

For the loan of types and topotypes for comparison, my thanks are due to Dr. J. A. Allen, of the American Museum of Natural History.

BRADYPUS IGNAVUS, new species

Type from Marragantí (about 2 miles above Real de Santa Maria), near the head of tide-water on the Rio Tuyra, Eastern Panama. No. 179551, female adult, U. S. National Museum (Biological Survey Collection), collected by E. A. Goldman, April 6, 1912. Original number 21596.

General characters.—Somewhat similar to *B. griseus* in color, but upper parts more distinctly spotted with white; ruff grayish brown across forehead (black in *B. griseus*); skull differing in detail, especially the shorter, anteriorly concave or emarginate nasals.

Color.—General color of upper parts brownish or grayish drab, irregularly spotted, mottled, or marbled with nearly pure white, the white predominating on the rump; abdomen and inner sides of limbs very pale drab gray; chin blackish; throat and anterior part of chest rusty brown; orbital areas and usual lines extending posteriorly

¹ The present paper is the eighteenth dealing with the results of the Smithsonian Biological Survey of the Panama Canal Zone.

² Smithsonian Misc. Coll., vol. 56, No. 36, pp. 1-11, Feb. 19, 1912; and Smithsonian Misc. Coll., vol. 60, No. 2, pp. 1-18, Sept. 20, 1912.

along sides of cheeks black; rest of face clothed with short whitish or yellowish hairs; frontal roll, or ruff, narrowly edged with rusty brown.

Skull.—Similar in general form to those of *B. castaneiceps* and *B. griseus*, but nasals shorter, with anterior border concave or emarginate, the emargination deepest at median suture; squamosal arm of zygoma broader, more rounded, less acutely pointed anteriorly; palate less deeply grooved posteriorly; symphysis of mandible less produced anteriorly beyond plane of first molars.

Measurements.—Type: Total length, 641 millimeters; tail vertebrae, 47; hind foot, 132. *Skull* (type): Greatest length (occipital condyle to anterior point of nasals), 78.5; zygomatic breadth, 47.5; interorbital breadth, 21.8; palatal bridge, 21.5; maxillary tooth-row, 25.5.

Remarks.—This form, based on specimens from Eastern Panama and the adjacent part of Colombia, differs markedly from *B. castaneiceps* and *B. griseus*, and in color pattern as well as cranial details is more like some of the South American species. It appears to be unlike those described, but its exact relationship to some of the South American members of this unrevised genus cannot be determined at present, owing to lack of knowledge of their real characters. While the wide range of variation seen in a series of specimens from a given locality would include many of the characters used as specific by Gray, this variation is shown by examination of the Middle American forms to be within definite limits, and when ample material is available the distinctive characters of the species will become better known.

Specimens examined.—Total number, 3, as follows:

Panama: Marraganti: (type), 1.

Colombia: Atrato River, 2.

MAZAMA TEMA REPERTICIA, new subspecies

Type from Gatun, Canal Zone, Panama. No. 171673, male adult, U. S. National Museum (Biological Survey Collection), collected by E. A. Goldman, June 21, 1911. Original number 21178.

General characters.—Similar to *Mazama tema tema* of Mexico, but somewhat larger; color duller, much less rufescent. Similar in size to *M. pandora*, but color decidedly darker, and skull differing in various details. Differing from *M. bricenii* of Venezuela in larger size, shorter pelage (very short on neck), and less rich rufescent general coloration, the dark facial area more restricted.

Color.—General color of upper parts dull cinnamon rufous, darkest along the broad median line and becoming paler on the sides; middle of face, top of head and upper side of neck, blackish; cheeks and under side of neck drab gray; chest and anterior part of abdomen near cinnamon or fawn color; chin, throat and posterior part of abdomen, white, this color extending a short distance down inner side of thighs; ears dusky, except a buffy spot near edge of anterior base; supraorbital area, including lateral border of frontal tufts, rusty reddish; a white spot on upper lip near rhinarium as usual in the group; feet drab brownish; tail, cinnamon rufous above, white below.

Skull.—Size slightly larger than that of *M. t. tema*; frontal and parietal regions broader; audital bullæ smaller; foramen ovale more elongated; lachrymal depressions and dentition about the same. Approaching in size that of *M. pandora*; frontal region similarly broad, but more inflated near posterior border of nasals; rostrum narrower, the maxillæ less swollen outward; lachrymals less broadly depressed; squamosal arm of zygoma with superior border more everted; foramen ovale more elongated; audital bulke decidedly smaller.

Measurements.—Type: Total length, 1,114 millimeters; tail vertebrae, 130. *Skull* (type): Greatest length, 185; condylobasal length, 175.7; zygomatic breadth, 81.2; nasals, 59.5; interorbital breadth, 41; palatal length, 107.4; maxillary toothrow, 50.2; upper premolars, 23.4.

Remarks.—The type specimen is a rather young male with very short antlers, but with permanent dentition in place and slightly worn. Another specimen, also a male, is much younger. They appear to represent a rather well marked form related to *M. tema* as shown by comparison with seven Mexican specimens of the latter. Five of these are from Mirador, Vera Cruz, the type locality of *Cervus sartorii* Saussure, a name now regarded as synonymous with *Mazama tema* Rafinesque. Upper canines are present in one of the Mirador specimens, a young male with the third upper molars not yet in place. *M. pandora* possesses very distinctive characters, but is apparently a member of the same group. Besides the pallid coloration and cranial peculiarities, the type and a specimen from Apazote, Campeche, lack of the usual hair whorl near the middle of the face, and the hair is directed upward from an indistinct whorl very near the upper border of the rhinarium. A specimen of *Mazama bricenii* Thomas from the high mountains near Merida, Venezuela, has much longer pelage and is very different in color, the entire face, including

the orbital areas, being very dark brown or blackish. In the Middle American brockets the orbital areas and much of the face are rusty reddish.

Specimens examined.—Total number, 3, from localities as follows:

Canal Zone: Gatun (type locality), 2.

Panama: Cana, 1.

SCIURUS VARIABILIS CHOCO,¹ new subspecies

Type from Cana (altitude 3,500 feet), Eastern Panama. No. 179561, male adult, U. S. National Museum (Biological Survey Collection), collected by E. A. Goldman, May 28, 1912. Original number 21752.

General characters.—Closely allied to *S. v. morulus*, but general color darker; a deep black median dorsal stripe usually continuous from near shoulders posteriorly over upper base of tail (this stripe absent or only faintly indicated in *S. v. morulus*); under parts ochraceous rufous instead of tawny ochraceous; under side of tail with broader, more distinct black submarginal stripe. Perhaps similar to *S. gerrardi*, but shoulders less rufous, back darker, and under parts not normally white; mammæ 3 pairs as in *S. v. morulus*.

Color.—Upper parts varying from pale ochraceous buff to tawny ochraceous, finely lined with black, becoming blackish on top of head and along a conspicuous median dorsal stripe usually continuous from near shoulders posteriorly over upper base of tail; shoulders usually a slightly richer ochraceous tone than sides; outer sides of forearms ochraceous rufous mixed with black; outer sides of hind legs like sides of back; under parts, including inner sides of limbs, usually nearly uniform ochraceous rufous, but varied in two specimens by pure white areas in armpits, on pectoral and inguinal regions, and along median line of abdomen; chin and lips pale buff; sides of muzzle and cheeks brownish buffy; ears dark brownish or blackish; feet clothed with short, mixed blackish and buffy or tawny hairs; upper side of tail blackish on proximal fourth, becoming pure, rich ochraceous rufous to near black tip, under side coarsely mixed buff and black, with a distinct black submarginal stripe and ochraceous rufous edging along median portion.

Skull.—As in *S. v. morulus*.

Measurements.—Type: Total length, 444 millimeters; tail vertebræ, 209; hind foot, 61. Average of 3 adult topotypes; 443 (430-

¹From Choco, the name of the Indians inhabiting the region of the type locality.

455); 214 (299-223); 60 (60-61). Skull (type): Greatest length, 55.3; condylobasal length, 50.7; zygomatic breadth, 22.7; nasals, 18.8; interorbital breadth, 18; palatal length, 29.7; maxillary tooth-row, 9.8.

Remarks.—The common squirrel of the Darien region, Panama, is closely allied to *S. v. morulus* from the Canal Zone, but is distinguished by darker color throughout. *S. milleri* from the mountains of southwestern Colombia has the same general pattern of coloration, but differs in darker, more rusty reddish general color, the darkening due in part to the much narrower subterminal bands of the hairs on the shoulders and flanks. In the Darien form the median dorsal stripe is pure glossy black in some specimens, and usually extends well down over the upper base of the tail. Variation from the usual ochraceous rufous coloration of the under parts is shown in one individual by limited areas of pure white near the armpits, on the pectoral and inguinal regions, and a very narrow stripe along the median line of the abdomen; in another the white is reduced to a few hairs near the armpits and on the sides of the lower part of the abdomen. These white areas may indicate gradation of this subspecies toward the South American forms of the *S. variabilis* group in which the under parts are normally white. Specimens from 800 to 2,500 feet altitude, on Cerro Azul, are somewhat intermediate between *S. v. morulus* and the Darien form, the dorsal stripe being somewhat indistinct, but in the rich coloration of the under parts they agree with the latter form.

These squirrels are generally distributed throughout the region visited, ranging upward in the forest from sea level in the Tuyra Valley to over 5,000 feet altitude on the summits of the Pirri Range.

Specimens examined.—Total number, 18, from Eastern Panama, as follows: Cana (type locality), 5; Boca de Cupe, 1; Cerro Azul, 3; Marragantí, 3; Mount Pirri, 6.

ORYZOMYS PIRRENSIS, new species¹

Type from near head of Rio Limon (altitude 4,500 feet), Mount Pirri, Eastern Panama. No. 178993, male adult, U. S. National Museum (Biological Survey Collection), collected by E. A. Goldman, April 29, 1912. Original number 21662.

General characters.—A large member of the *O. meridensis* group, similar in size to *O. devius*, of Western Panama; color slightly darker; metatarsus dark brown instead of flesh color; under parts without the pure white patches usual in the group; skull large and

angular, with moderately developed supraorbital ridges and small audital bullæ.

Color.—Upper parts near Mars brown of Ridgway, darkened along the broad median line from top of head to base of tail, becoming lighter, more rufescent on cheeks, shoulders and sides; throat grayish, rest of under parts usually overlaid with dark ochraceous buff, but varying to dull white, the basal color of the fur everywhere deep plumbeous; nose and ears blackish; outer sides of limbs dark brownish, except a light buffy line extending from outer sides of wrists posteriorly along lower edge of forearms; fore feet blackish, becoming lighter on the toes; hind feet dark brown and thinly clothed with short hairs to toes, the toes dark flesh color and nearly naked, but with rather conspicuous tufts of silvery hairs projecting beyond claws of four longest digits; tail dark brown above, usually somewhat paler below.

Skull.—Similar in size to that of *O. devius*, but more angular, the zygomata more widely spreading, and supraorbital and temporal ridges distinct; audital bullæ decidedly smaller; dentition about the same. Differing from those of *O. meridensis* and *O. maculiventer* in much larger size and greater angularity.

Measurements.—Type: Total length, 340 millimeters; tail vertebrae, 185; hind foot, 38. Average of five adult topotypes, 314 (309-322); 164 (159-170); 35.7 (34-37). *Skull* (type): Greatest length, 37.8; condylobasal length, 34.5; zygomatic breadth, 20; nasals, 14; interorbital breadth, 6; interparietal, 11.8 x 5; incisive foramina, 6; length of palatal bridge, 7.8; maxillary toothrow, 5.9.

Remarks.—Like the allied species—*O. devius*, *O. meridensis* and *O. maculiventer*—this large rice rat is an inhabitant of the mountains. It was found only in the heavy forest at about 4,500 feet altitude where precipitous slopes border the narrow canyon of the Rio Limon. The animals live in holes under logs and rocks along steep overhanging banks of the stream. The skull of *O. pirrensis* combines the large general size of that of *O. devius* with the small audital bullæ of *meridensis* and *maculiventer*; it differs from both in the development of the supraorbital and temporal ridges. *O. meridensis* and *O. maculiventer* are evidently very nearly related, but comparison of three skulls of the former with four of the latter seems to show that *O. maculiventer* differs in the smaller size of the interparietal and heavier maxillary arm of zygoma.

Specimens examined.—Eight, all from the type locality.

NECTOMYS ALFARI EFFICAX, new subspecies

Type from Cana (altitude 1,800 feet), Eastern Panama. No. 178627, male adult, U. S. National Museum (Biological Survey Collection), collected by E. A. Goldman, March 12, 1912. Original number 21498.

General characters.—Closely allied to *Nectomys alfari alfari* (*Sigmodontomys alfari* Allen); general color of upper parts richer, more tawny ochraceous; skull with narrow braincase and massive rostrum. Somewhat similar to *N. esmeraldarum*, but larger; color decidedly paler, more ochraceous; skull more elongated.

Color.—Upper parts rather pale tawny ochraceous mixed with black, the ochraceous predominating especially on cheeks, shoulders, flanks and outer sides of hind limbs; top of head and face darkened by more abundant admixture of black-tipped hairs; under parts dull white, usually more or less distinctly washed with pale buff; feet flesh colored, thinly clothed with short grayish hairs; tail brownish above and below.

Skull.—Similar in general to that of *N. a. alfari*, but braincase narrower; rostrum more massive; nasals shorter and broader posteriorly; frontal region narrower, but with similarly developed supraorbital and temporal ridges; interparietal smaller; interpterygoid fossa narrower; maxillary toothrow shorter. Contrasted with that of *N. esmeraldarum* the skull is relatively narrower and more elongated, the rostrum and frontal region being decidedly longer.

Measurements.—Type: Total length, 305 millimeters; tail vertebrae, 179; hind foot, 36.5. Average of five adult topotypes: 314 (304-320); 178 (168-196); 36.1 (35.5-37). *Skull* (type): Greatest length, 36.2; condylobasal length, 23.8; zygomatic breadth, 19.7; nasals, 14.2; interorbital breadth, 7.2; interparietal, 8.2 x 3.2; incisive foramina, 5.5; length of palatal bridge, 8.5; maxillary toothrow, 5.4.

Remarks.—This form seems to be more closely allied to the species described as *Sigmodontomys alfari* than to any of the small South American members of the genus *Nectomys*. It may be not very unlike *N. russulus* Thomas, from Valdivia, Colombia, specimens of which I have not seen, but judging from the description the latter is darker in general color, with less contrast between upper and under parts.

Specimens examined.—Total number, 23, all from the type locality.

RHIPIDOMYS SCANDENS, new species

Type from near head of Rio Limon (altitude 5,000 feet), Mount Pirri, Eastern Panama. No. 178937, female old adult, U. S. National Museum (Biological Survey Collection), collected by E. A. Goldman, April 25, 1912. Original number 21640.

General characters.—Similar to *R. venezuelæ*, but upper parts darker colored; under parts pure white as in *venezuelæ*; skull with broad braincase and narrow frontal region. Somewhat like *R. cocalensis*, but color less tawny, and skull differing especially in narrower more depressed frontal region.

Color.—Upper parts pale cinnamon rufous lined with black, becoming paler on the cheeks, shoulders and sides where the black-tipped hairs are less numerous; pelage of under parts, including lips and inner sides of limbs, pure white to roots; feet white except the usual clouded metapodial areas; tail brownish above and below, scantily clothed with short hairs to near tip which is slightly tufted.

Skull.—In general form closely resembling that of *R. venezuelæ*, but braincase decidedly broader; inner sides of parietals longer; frontal region narrower posteriorly as in *R. venezuelæ*. Compared with the skull of *R. cocalensis* the braincase is similarly broad, but the frontal region is depressed anteriorly and much narrower, especially posteriorly, the maxillary arm of the zygoma is heavier, and the interparietal is larger.

Measurements.—Type: Total length, 330 millimeters; tail vertebrae, 198; hind foot, 32. *Skull* (type): Condylbasal length, 32.3; zygomatic breadth, 19.2; interorbital breadth, 5.3; interparietal, 10.2 x 4.8; incisive foramina, 7.3; length of palatal bridge, 5; maxillary toothrow, 5.7.

Remarks.—This form is closely allied to *R. venezuelæ*, and the two may intergrade, but until the various forms of this unrevised group are better known it seems preferable to treat the Panama representative of the genus as a distinct species.

Specimens examined.—One, the type.

HETEROMYS AUSTRALIS CONSCIUS, new subspecies

Type from Cana (altitude 2,000 feet), Eastern Panama. No. 178699, male adult, U. S. National Museum (Biological Survey Collection), collected by E. A. Goldman, March 8, 1912. Original number 21468.

General characters.—Closely allied to *H. australis australis* and *H. a. lomitensis*, but darker colored than the former and with the

slender hairs among the bristles grayer than in the latter; skull differing from those of both in various details, especially the greater breadth of ascending branches of premaxillæ.

Color.—Ground color of upper parts dark blackish slate or slaty black, the slender grayish hairs among the darker bristles giving the dorsum a finely lined appearance; under parts, including lips and inner sides of limbs, pure white; forearms whitish, more or less mixed with grayish, especially along outer sides; ankles dusky all round; feet grayish to toes, the toes white; tail brownish above, somewhat lighter below, becoming dark all round toward tip.

Skull.—Closely resembling that of *H. a. australis*, but more elongated; ascending branches of premaxillæ broader. Contrasted with that of *H. a. lomitensis* the upper surface of maxillary arm of zygoma is broader, and the ascending branches of premaxillæ are broader posteriorly and more nearly conterminous with nasals (nasals reaching farther posteriorly in *H. a. lomitensis*).

Measurements.—Type: Total length, 260 millimeters; tail vertebrae, 133; hind foot, 32. Average of 2 adult topotypes: 245 (240-251); 125 (120-131); 32.2 (31-33.5). *Skull* (type): Greatest length, 34.7; zygomatic breadth, 16.5; interorbital breadth, 8.3; nasals, 14.4; width of braincase at anterior border of auditory meatus, 14.7; interparietal, 8.7 x 5.3; maxillary toothrow, 5.4.

Remarks.—This pocket mouse and the two South American forms described as *H. australis* and *H. lomitensis* are all very closely allied and may stand subspecifically as follows:

Heteromys australis australis Thomas, San Javier, Ecuador.

Heteromys australis lomitensis Allen, Las Lomitas, Cauca, Colombia.

Heteromys australis conscius Goldman, Cana, Panama.

The form here described was the only pocket mouse found on the lower slopes of the Pirri Range at from 1,800 to 2,000 feet altitude; the upper slopes above 4,500 feet are inhabited by the very different species, *H. crassirostris*.

Specimens examined.—Five, all from the type locality.

AGOUTI PACA NELSONI, new subspecies

Type from Catemaco, southern Vera Cruz, Mexico. No. 65952, male adult, U. S. National Museum (Biological Survey Collection), collected by E. W. Nelson and E. A. Goldman, April 30, 1894. Original number 6135.

Distribution.—Coastal plains and mountain slopes from the vicinity of Jalapa, Vera Cruz, eastward and southward through Tabasco, Chiapas and the peninsula of Yucatan to eastern Guatemala and western Honduras.

General characters.—Similar to *A. paca virgata*, but general color more rusty or reddish brown; dark stripe below lower lateral white stripe obsolescent (broad and distinct in *virgata*); pelage longer and denser; molariform toothrows narrower. Differing from typical *A. paca paca* in the obliteration of the lower lateral stripes.

Color.—Ground color of upper parts varying from dark cinnamon rufous to dark chestnut, interrupted along sides by white arranged in narrow stripes or lines of spots; two lateral white lines begin as rows of spots along sides of neck, become stripes near shoulders, curve downward along lower part of sides, rise again toward hips, and break into spots over sides of rump; above the upper lateral white stripe and separated from it by a broad dark stripe a line of spots reaches from neck to rump, and above this a shorter parallel row extends along posterior part of back; lower lateral white stripe bounded below by a narrow and rather indistinct dark line; a third white stripe, continuous and distinct in *A. p. paca*, is indicated posteriorly near the thigh where it merges with the white of the under parts; under parts, usually including inner sides of limbs, dull white, cheeks grayish brown; outer sides of fore limbs pale fawn color; hind limbs similar to back.

Skull.—Closely resembling that of *A. p. virgata*, but rostrum longer; frontals more inflated along maxillary borders; molariform teeth narrower.

Measurements.—Type: Total length, 794 millimeters; tail vertebrae, 29; hind foot, 127. *Skull* (type): Greatest length, 154.8; condylobasal length, 147.5; zygomatic breadth, 111.7; interorbital breadth, 43.3; nasals, 55.7; palatal length, 93.7; maxillary toothrow, 30; width of crown of second upper molar, 6.5.

Remarks.—In the Mexican *paca* the encroachment of the white color of the under parts along the sides and the consequent obliteration of stripes, a character separating *virgata* from typical *paca*, has proceeded still farther and the dark stripe below the lower of the two lateral white stripes is reduced to a very narrow line, or may be absent entirely.

Specimens examined.—Total number, 16, from the following localities:

Vera Cruz: Catemaco (type locality), 5; Chichicaxtle, 1.

Tabasco: (Exact locality unknown), 1.

Chiapas: Palenque, 1; Teopisca (20 miles southeast), 1.

Campeche: Apazote, 1.

Guatemala: Puerto Barrios, 1; exact localities unknown, 4.

Honduras: San Pedro Sula, 1.

DASYPROCTA PUNCTATA DARIENSIS, new subspecies

Type from near head of Rio Limon (altitude 5,200 feet), Mount Pirri, Eastern Panama. No. 179056, female adult, U. S. National Museum (Biological Survey Collection), collected by E. A. Goldman, April 24, 1912. Original number 21637.

General characters.—Closely allied to *D. punctata isthmica*, but size larger and general color darker; top of head blacker; long hairs on rump lacking basal annulations usually present in *D. p. isthmica*, the tips very pale buff or silvery gray in contrast with orange buffy back (rump and back more nearly uniform in *D. p. isthmica*). Somewhat similar to *D. colombiana*, but general color much more ochraceous, less grayish.

Color.—Top of head, nape and shoulders black coarsely mixed with varying shades of pale buff or ochraceous, the black predominating on top of head; back heavily overlaid with rich orange buff, the long hairs here dark and without rings below the broad orange buff tips; long hairs of rump dusky basally and tipped with pale buff or silvery gray, the general color thus contrasting with the richer tints of back; under parts in general mixed black and varying shades of buff, becoming grayish on throat, and white or silvery gray on lips, chin, inguinal region and along median line of abdomen where the hairs are pure white to roots; feet black with a few buffy banded hairs on proximal portion of metatarsus.

Skull.—Similar to that of *D. p. isthmica*, but larger; palate with a short posterior median projection, absent in *D. p. punctata* and the more northern forms of the group, but sometimes present in *D. p. isthmica*. Differing from that of *D. colombiana* in more slender rostrum and lesser vertical extent of anterior part of jugal (in *D. colombiana* the jugal, more developed upward along the orbital border, approaches the lachrymal).

Measurements.—Type: Total length, 610 millimeters; tail vertebrae, 25; hind foot, 133. Average of two adults from Cana (near type locality): 579 (572-586); 25.5 (21-30); 128.5 (127-130). Skull (average of three adults from type locality and vicinity): Greatest length, 115.3 (113-117.8); condylobasal length, 112.8 (105.6-118.8); zygomatic breadth, 53.3 (51.5-55.5); nasals, 45.5 (44.5-47.2); interorbital breadth, 31.5 (29-34); palatal length, 58.9 (57.2-60); maxillary toothrow, 19.3 (18.5-20.8).

Remarks.—Contrasted with *D. p. isthmica* of the Canal Zone the Darien representative of the *D. punctata* group differs in characters which seem to set it off as a fairly well marked geographic race. It

may be not very unlike *D. variegata* Tschudi,¹ from Peru, but is very different from Tschudi's figure, and compared with an Ecuadorean specimen in the National Museum, assumed to be near *D. variegata*, is decidedly larger and darker colored. *D. colombiana* of the Santa Marta region of northern Colombia is doubtless a form of the *D. punctata* group characterized by grayish coloration and cranial details pointed out.

In the Darien region the agouti ranges in the unbroken forest from sea level to over 5,000 feet altitude on the summits of the higher mountains. As elsewhere, the animals are shy and apparently mainly nocturnal in habits, but if carefully searched for may be found abroad early in the morning or late in the evening, and occasionally during the middle of the day, especially in wet weather. They become alarmed at the slightest noise and scamper away, often giving the characteristic squeak or short bark, rapidly repeated several times, as they go. The usual method of hunting them is to proceed slowly and cautiously, mainly along trails through the forest, or to wait in the vicinity of their holes until they come out. One day, during the dry season, I heard a rustling noise in the dry leaves, and remaining motionless soon saw an agouti which came rapidly nearer and was shot as it stopped suddenly about 20 yards away. The Indians and native colored population hunt the agouti for its flesh, and it is one of the favorite game animals of the region.

Native name *ñequi*.

Specimens examined.—Total number, 8, from localities in Panama as follows: Aruza, 1; Cana, 6; Mount Pirri, 1 (type).

DASYPROCTA PUNCTATA YUCATANICA, new subspecies

Type from Apazote (near Yohaltun), Campeche, Mexico. No. 108293, male adult, U. S. National Museum (Biological Survey Collection), collected by E. W. Nelson and E. A. Goldman, December 22, 1900. Original number 14347.

Distribution.—Campeche and northern Yucatan.

General characters.—Similar to *D. punctata punctata*, but color decidedly paler and grayer, less yellowish or rufescent, and pelage rather more coarsely annulated; audital bullæ large.

Color.—Upper parts in general varying from pale buff to pale tawny ochraceous coarsely mixed with black, the buff or tawny element predominating; an indistinct annulated effect, especially on rump, resulting from the alternating light and dark rings of hairs;

¹ Fauna Peruana (Mammals), pp. 190-192, Taf. 16, 1844-1846.

top of head usually somewhat more rufescent than back; under parts, including under side of neck, chest and sides of abdomen, similar to back but paler and grayer; chin, lips, inner sides of fore and hind legs, inguinal region and median line of abdomen, buffy white; feet blackish, more or less irregularly lined with buffy-ringed hairs.

Skull.—Closely resembling that of *D. p. punctata*, but audital bullæ usually larger, and more inflated anteriorly.

Measurements.—Type: Total length, 522 millimeters; tail vertebrae, 35; hind foot, 120. An adult male topotype: 487; 25; 126. An adult female from La Vega, northeastern Yucatan; 555; 29; 130. *Skull* (type): Greatest length, 108; condylobasal length, 100.5; zygomatic breadth, 49.8; nasals, 44.5; interorbital breadth, 30.5; palatal length, 53.7; maxillary toothrow, 19.

Remarks.—The range of this pale form in the Yucatan peninsula marks the extreme northern limit of the *D. punctata* group. It is a rather common animal in the arid or semi-arid, low-lying forested sections of the region.

Specimens examined.—Total number, 7, from localities as follows:

Campeche: Apazote (type locality), 4; La Tuxpana, 1.

Yucatan: La Vega, 2.

DASYPROCTA PUNCTATA CHIAPENSIS, new subspecies

Type from Huehuetán, southern Chiapas, Mexico. No. 77997, female adult, U. S. National Museum (Biological Survey Collection), collected by E. W. Nelson and E. A. Goldman, February 26, 1896. Original number 9430.

Distribution.—Southern Chiapas, from sea level to at least 3,500 feet altitude, and probably adjacent parts of Guatemala.

General characters.—Similar to *D. punctata punctata* in size and color, but differing in well marked cranial details; premaxillæ broader posteriorly; sphenopalatine vacuities larger; audital bullæ smaller. Differing from *D. punctata yucatanica* in decidedly richer, more rufescent coloration and in important cranial characters.

Color.—Upper parts varying from tawny ochraceous to ochraceous rufous rather finely mixed with black, the hairs annulated about as in *D. p. punctata*; under parts in general similar to back, but paler; chin and armpits, inner sides of hind legs and median line of abdomen varying from pale or yellow buff to pale orange buff; feet blackish, with a few tawny hairs encroaching on metatarsus.

Skull.—Size and general form about as in *D. p. punctata*; ascending branches of premaxillæ much broader posteriorly, the broadening

being at the expense of the maxillæ which are correspondingly reduced; sphenopalatine vacuities larger; vertical arm of maxilla between jugal and antorbital vacuity broader; audital bullæ smaller. Compared with that of *D. p. yucatanica* the skull has posteriorly broader premaxillæ, larger sphenopalatine vacuities and much smaller audital bullæ.

Measurements.—Type: Total length, 492 millimeters; tail vertebrae, 30; hind foot, 120. An adult female topotype: 565; 27; 124. *Skull* (type): Greatest length, 102.8; condylobasal length, 95.2; zygomatic breadth, 48.2; nasals, 38.5; interorbital breadth, 28.5; palatal length, 52; maxillary toothrow, 19.5.

Remarks.—An arm of the general range of the *D. punctata* group extends northward near the Pacific coast, and along the west slope of the high mountains of the interior, to southern Chiapas, Mexico. The specimens from the coastal slope in Chiapas closely approach typical *D. p. punctata* in color, but depart from it in the well marked cranial details pointed out. In the region of the type locality this agouti ranges in the forest from near sea level to at least 3,500 feet altitude on the western slope of the mountains.

Specimens examined.—Six, all from Chiapas, Mexico, as follows: Huehuetán (type locality), 4; Chicharras, 2.

POTOS FLAVUS ISTHMICUS, new subspecies

Type from near head of Rio Limon (altitude 5,200 feet), Mount Pirri, Eastern Panama. No. 179042, female adult, U. S. National Museum (Biological Survey Collection), collected by E. A. Goldman, April 21, 1912. Original number 21631.

General characters.—Size and general color of *P. f. chiriquensis*, but with a distinct black dorsal stripe; skull with narrow interorbital region; dentition heavy as in *P. f. chiriquensis*, much heavier than in *P. f. meridensis* and other South American forms.

Color.—General color of upper parts varying from wood brown to tawny yellow or yellowish tawny slightly darkened by blackish-tipped hairs; a narrow but distinct black median stripe extending from near shoulders to base of tail; under parts varying from buff to brownish yellow, becoming abruptly rusty brown on the abdominal and gular spots usual in the group; muzzle, ears and toes more or less blackish; upper side of tail similar to back in color but usually becoming somewhat darker toward tip, the under side paler and more like abdomen.

Skull.—Similar to that of *P. f. chiriquensis*, but interorbital region narrower, the lateral borders of frontals more concave; postorbital

processes stouter, broader and more gradually tapering toward base, not so peg-like as in *P. f. chiriquensis*; dentition about the same. Compared with that of *P. f. meridensis* the skull has similarly broad postorbital processes and narrow interorbital space, but the molars are decidedly heavier.

Measurements.—Type: Total length, 910 millimeters; tail vertebrae 455; hind foot, 93. An adult female topotype: 885; 448; 91. *Skull* (type): Greatest length, 89.7; condylobasal length, 83; zygomatic breadth, 57; interorbital breadth, 18.2; palatal length, 36.5; upper molariform toothrow, 19; alveolar length of first upper molar, 4.2.

Remarks.—The specimens from Mount Pirri and Cana vary considerably in intensity of color as usual in the group, but are externally distinguishable from *P. f. chiriquensis* by the distinct black median dorsal stripe. They apparently represent a race combining the general color pattern of some South American forms with the heavier dentition of Middle American forms.

Specimens examined.—Total number, 8, all from the mountains of Eastern Panama as follows: Mount Pirri (type locality), 2; Cana, 6.

EUPROCYON CANCRIVORUS PANAMENSIS, new subspecies

Type from Gatun, Canal Zone, Panama. No. 171669, female adult, U. S. National Museum (Biological Survey Collection), collected by E. A. Goldman, June 21, 1911. Original number 21174.

General characters.—Similar in size to *E. cancrivorus protus*, but general color less tawny; skull with very long palate and anteriorly broad nasals. Differing from *E. cancrivorus cancrivorus* in darker general color, the upper parts being blacker, and under parts and sides more ochraceous buffy or yellowish; black facial area more extended posteriorly across cheeks.

Color.—Ground color over dorsum varying from ashy gray to ochraceous buffy or yellowish ochraceous, heavily overlaid with black; top of head grizzled black and gray, the black predominating; sides of muzzle and rather restricted supraorbital streaks white or grayish white; facial area, including orbits, interorbital space and lower part of cheeks nearly clear black; under parts, including base of tail, varying from pale ochraceous buff to yellowish ochraceous, becoming more or less grayish white on throat, chin and lips; ears well clothed with whitish or yellowish hairs, darkening gradually on upper base by encroachment of body color; outer sides of hind

legs and ankles all round deep, glossy black; fore legs black or dark brownish all round; feet thinly clothed with short hairs varying from brownish to grayish; tail with seven or eight alternating black and grayish or yellowish rings and a black tip, the proximal rings more or less interrupted along median line below.

Skull.—In general form closely resembling that of *E. c. cancrivorus*, but palate more elongated, lower surface of basioccipital more convex, the lateral margins turning downward and partly covering audital bullæ; nasals broader; audital bullæ broader, more inflated posteriorly; dentition about the same. Contrasted with that of *E. c. proteus*, the skull differs in longer palate, and anteriorly broader, posteriorly narrower nasals.

Measurements.—Type: Total length, 950 millimeters; tail vertebrae, 350; hind foot, 142. *Skull* (type): greatest length, 130; condylobasal length, 125.8; zygomatic breadth, 83.3; length of nasals, 32; greatest breadth of nasals anteriorly, 14.3; greatest breadth of nasals posteriorly, 13; interorbital breadth, 25.7; palatal length, 75.8; upper molariform toothrow, 40.3.

Remarks.—Comparison of the Panama series and South American material from various localities, including a specimen from northern Brazil assumed to be near typical *E. c. cancrivorus* of Cayenne, and the type and two topotypes of *E. c. proteus* of northern Colombia, shows that the species is represented in Panama by an apparently well-marked geographic race. The close agreement in dentition and the more essential characters, however, point to a probable intergradation of the forms of this group, which may now stand as follows:

Euprocyon cancrivorus cancrivorus (Cuvier), Cayenne.

Euprocyon cancrivorus proteus (Allen), Bonda, Colombia.

Euprocyon cancrivorus brasiliensis (Von Ihering), Southern Brazil.

Euprocyon cancrivorus panamensis Goldman, Gatun, Canal Zone, Panama.

The South American raccoon currently known as *Procyon cancrivorus* was placed in the subgenus *Euprocyon* by Gray in 1864 (type *Ursus cancrivorus* Cuvier), and this division of the genus has been accepted by some later authors. The two sections of the genus differ, however, in characters so important that *Euprocyon* seems entitled to full generic recognition. Besides the characters pointed out by Gray *Euprocyon* is distinguished by the shorter, more rounded condition of the cusps in the molariform teeth and the general obliteration of the rugosity seen in *Procyon*. This is well shown in the upper carnassial where the trenchant commissure of the median outer cusp and the postero-internal cusp present in *Procyon*, is

absent. The third upper incisor lacks the internal division commonly developing a short, independent cusp in *Procyon*. The length of the palate behind the posterior molars is less than one-fourth the total length of the palate, while in *Procyon* the reverse is true. Externally *Euprocyon* differs from *Procyon* in the reversed direction of the pelage on the neck;¹ from the hair-whorl on the median line between the shoulders the pelage is inclined forward, meeting the opposing pelage of the head along a V-shaped line between the ears, the apex of the V directed backward; on the under side of the neck the arrangement is similar, but the apex of the V points forward. In addition the claws, especially of the hind feet, are straighter, broader, more bluntly pointed, instead of being laterally compressed, strongly curved and sharply pointed as in *Procyon*. The general non-sectorial character of the dentition, the form of the upper carnassial, and the posterior shortening of the palate in *Euprocyon* suggest gradation toward the ancestral Miocene genus *Phlaocyon*.

Euprocyon differs from *Procyon* in its blunt claws, indicating a non-arboreal habit, and its short powerful molariform cusps, adapted for crushing hard substances, seems to fit it for a life, where crabs, fish and mollusks are common foods.

In Panama this raccoon inhabits the lowlands along the Caribbean coast from the northern end of the Canal Zone easterly toward Colombia. Mr. P. L. Sclater² recorded specimens from Colon in 1875. One of the specimens obtained by me was killed as it emerged from some tall *papyrus* grass near the edge of a swamp whence it had been driven by a pack of hounds. Others were shot at night along the banks of the Chagres River, where they were located. The stomachs examined contained fragments of fish and crabs.

Specimens examined.—Total number, 5, from the following localities:

Canal Zone: Gatun (type locality), 3.

Panama: Cana, 1; Porto Bello, 1.

ALOUATTA PALLIATA INCONSONANS, new subspecies

Type from Cerro Azul (altitude 2,500 feet), near the headwaters of the Chagres River, Panama. No. 171068, male adult, U. S. National Museum (Biological Survey Collection), collected by E. A. Goldman, March 23, 1911. Original number 20995.

¹ Von Ihering mentions this character in describing the south Brazilian subspecies, *Procyon cancrivorus brasiliensis* (Revista do Museu Paulista, vol. 8, p. 229, May 10, 1911).

² Proc. Zool. Soc. Lond., 1875, p. 421.

General characters.—Similar to *A. palliata palliata*, but general color purer black, less suffused with brownish or rufous, especially on flanks, rump, and posterior part of back; pelage of forehead, anterior part of cheeks and chin inclined backward, and that of upper side of neck directed forward, forming a ruff about face as in *A. p. palliata*; skull with broad braincase and narrow premolars. Differing from *A. coibensis* in decidedly larger size, and from *A. p. mexicana* in much darker body color as well as larger size.

Color.—Upper parts varying from pure black to black finely and usually rather inconspicuously mixed with buff over most of dorsum, leaving head and rump pure black; under parts in general thinly haired, black or dark brownish, becoming lighter through varying shades from burnt umber of Ridgway to brownish ochraceous on the long hairs overhanging lower part of sides; chin, arms, legs and tail pure glossy black.

Skull.—Size and general form similar to that of *A. p. palliata*, but braincase broader posteriorly; frontal profile in male rising more abruptly from rostrum; zygomata usually more squarely spreading posteriorly, the superior border of squamosal root more strongly curved inward over auditory meatus; supraoccipital protuberance stouter, more projecting; interpterygoid fossa broader; audital bullæ flatter; premolars narrower. Skull differing from those of *A. coibensis* and *A. p. mexicana* in decidedly larger size.

Measurements.—Type: Total length, 1,272 millimeters; tail vertebræ, 715; hind foot, 143. An adult male topotype; 1,267; 685; 142. Average of 5 adult female topotypes: 1,262 (1,123-1,552): 657 (603-710); 140 (135-142). *Skull* (type): Greatest length, 123.5; condylobasal length, 103.7; zygomatic breadth, 87.2; length of nasals, 21.8; anterior width of nasals, 10.5; width of nasals at median constriction, 8; interorbital breadth, 12.2; palatal length, 46.8; maxillary toothrow, 29.4; width of crown of third upper premolar, 7.7; antero-posterior extent of supraoccipital protuberance (measured from lambdoid suture) 14.1.

Remarks.—*Myctes palliatus* Gray was described and figured from specimens supposed to be from Caracas, Venezuela, and that place has been republished as the type locality of the species in several recent lists. Mr. Sclater¹ and Mr. Alston,² however, have shown that the specimens really came from the shores and islands of Lake Nicaragua. Comparison of series of specimens from various localities

¹ Proc. Zoöl. Soc. Lond., 1872, p. 7.

² Biología Centrali-Americana, Mammalia, p. 5, 1879.

shows that *A. p. palliata* of Nicaragua ranges southward through Costa Rica as far as Talamanca, and is replaced in Eastern Panama by the new form here described. Unaware of the real type locality of *A. p. palliata* Dr. Allen,¹ in publishing *Alouatta palliata matagalpæ* from Lavala, Nicaragua, renamed the typical form,² using Panama examples assumed to be *A. p. palliata* for comparison. Farther north this group of howlers is represented by *A. palliata mexicana* whose range appears to extend from Tabasco, Mexico, southeastward to northern and eastern Honduras. *A. p. mexicana* is characterized by smaller general size, and by having more buffy ochraceous suffusion of upper parts than *A. p. palliata*. The long-haired, black howler currently recognized as *A. villosa* (Gray) is a very distinct species, ranging from Guatemala into the lowlands of Campeche, Tabasco and northern Chiapas, Mexico, where it occurs at the same elevations and perhaps the same localities as *A. p. mexicana*. It is distinguished from *A. p. mexicana* by long pure black pelage, and elongated, flattened skull.

In Eastern Panama howling monkeys are generally distributed from near the coasts well up toward the summits of the higher mountains. They occur in small numbers near Gatun in the northern end of the Canal Zone. Several parties were met with on the mountains near the headwaters of the Chagres River. On Cerro Azul a troop of about twelve was found in a group of very tall trees. The troop included several full grown males, females, and young. A very young individual was seen clinging to the lower part of its mother's back as she climbed into the topmost branches along with other females and the younger animals. The older males gave the usual roar when shots were fired, jumping about, looking down, and showing signs of anger rather than fear, as they made no effort to escape. The so-called howling of these monkeys was heard soon after daylight nearly every morning not far from camp on the Cascajal River near Cerro Brujo, and at intervals during the day. Near the summit of the Pirri Range sudden showers of rain often brought forth deep-toned notes during the night. The voice of this animal, as it reverberates through the forest, is wonderfully impressive, but seems better described as a series of deep growls, becoming a prolonged roar when given by several in unison, than as howling. Although the howler can pass rapidly through the tree tops, its

¹ Bull. Amer. Mus. Nat. Hist., vol. 24, p. 670, Oct. 13, 1908.

² Dr. Allen directs attention to this error (Bull. Amer. Mus. Nat. Hist., vol. 28, p. 114, Apr. 30, 1910).

movements seem sluggish when compared with those of *Ateles* or even *Cebus*. The flesh is eaten by the natives, but is less prized than that of *Ateles* and *Cebus*. It is commonly cut in strips and after being smoked over a fire may be kept for several days without salting. All of the specimens obtained carried numerous large larvæ of flies, mainly in the skin on the throat, which added materially to their repugnant appearance. These larvæ were not found on the spider monkeys taken in the same vicinity. Perhaps the greater activity of the latter may not permit the deposition of eggs.

Native name *mono negro*.

Specimens examined.—Nine, all from the type locality.