

DESCRIPTIONS OF TWO NEW GENERA AND SIXTEEN  
NEW SPECIES OF MAMMALS FROM THE PHILIPPINE  
ISLANDS.

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Of the sixteen new Philippine mammals described in this paper, thirteen are contained in a large collection made by Dr. Edgar A. Mearns during the years 1905 to 1907, and now in the United States National Museum. The three others form part of a collection submitted to me for determination by the authorities of the Philippine Bureau of Science.

*CROCIDURA HALCONUS*, new species.

*Type-specimen*.—Young adult female (skin and skull), Cat. No. 144652, U.S.N.M. Collected on spur of main ridge of Mount Halcon, Mindoro (altitude 6,300 feet), November 18, 1906, by Dr. Edgar A. Mearns. Original number, 6316.

*Diagnosis*.—Like *Crocidura grayi* Dobson of Luzon, but with unicuspid teeth much more contrasted in size.

*Color*.—Entire animal dark sepia, blackening on posterior half of back, the underparts tinged with broccoli-brown; feet and tail blackish, the long hairs on tail a slightly contrasted brown.

*Skull*.—The skull does not differ appreciably from that of *Crocidura grayi*, though the interorbital region seems inclined to be narrower and the braincase less deepened than in the Luzon animal. The size and general appearance of the skull is also very similar to that of the European *Crocidura russula*; but the Philippine species are at once distinguishable from *russula* and its near allies by their greater depth of skull, a difference readily appreciable when the braincases are compared in posterior view.

*Teeth*.—On comparison of specimens of *Crocidura grayi* and *C. halconus* with perfectly unworn teeth it is immediately seen that there is much more contrast in size among the upper unicuspids of the Mindoro animal. This appears to be due to a slight increase in the size of the first and a reduction in the size of the second, the third remaining unchanged. Though especially noticeable in lateral view, these pecul-

iarities are also appreciable in the outlines of the crowns. The large premolar and first molar also exceed the corresponding teeth in *C. grayi*.

*Measurements*.—Type: Head and body 74 mm.; tail, 54; hind foot (dry), 13; skull (teeth not worn), condylobasal length, 19.0; breadth of braincase, 9.0; depth of braincase at middle, 5.0; mandible, 10.2; maxillary toothrow (entire), 8.8; mandibular toothrow (entire), 8.2.

*Specimens examined*.—Four, all from the type-locality.

CROCIDURA BEATUS, new species.

*Type-specimen*.—Adult male (skin and skull), Cat. No. 144647, U.S.N.M. Collected on summit of Mount Bliss (altitude 5,750 feet), Mindanao, May 28, 1906, by Dr. Edgar A. Mearns. Original number, 6173.

*Diagnosis*.—Similar to *Crocidura grayi* and *C. halconus*, but color darker and skull slightly less robust.

*Color*.—The elements of the color are the same as in *Crocidura halconus*, but the blackish suffusion on back is more extensive, involving nearly the entire dorsal surface.

*Skull and teeth*.—Except that it is less robust, a peculiarity not appreciable except on direct comparison, the skull resembles that of the other small Philippine *Crociduras*. The teeth in the type are somewhat injured, but they apparently resemble those of *C. halconus*.

*Measurements*.—Type: Head and body, 77 mm.; tail, 55; hind foot (dry), 14.4; skull (teeth slightly worn), condylobasal length, 19.2; breadth of braincase, 9.0; depth of braincase, 5.0; mandible, 10.4; maxillary toothrow (entire), 8.8; mandibular toothrow (entire), 8.2.

*Specimen examined*.—The type.

CROCIDURA MINDORUS, new species.

*Type-specimen*.—Young adult male (skin and skull), Cat. No. 144651, U.S.N.M. Collected on summit of main ridge of Mount Halcon (altitude 6,300 feet), Mindoro, November 19, 1906, by Dr. Edgar A. Mearns. Original number, 6321.

*Diagnosis*.—Color and general appearance as in *Crocidura grayi* and its allies, but size noticeably greater; hind foot about 16 mm. instead of about 13 mm., condylobasal length of skull about 22 mm. instead of about 19 mm.

*Color*.—The color so exactly resembles that of *Crocidura halconus* and *C. grayi* as to need no special description. The blackish suffusion on back is, however, apparently a little less evident than in *C. halconus*.

*Skull and teeth*.—Though at once distinguishable by its conspicuously larger size the skull shows no peculiarities of form as compared

with that of *C. grayi*. Teeth essentially as in the smaller Philippine species, but second and third unicuspid more nearly equal in size, the discrepancy scarcely noticeable in side view, though the crown area is rather notably greater in third than in second.

*Measurements*.—Type: Head and body, 91 mm.; tail, 72; hind foot (dry) 16.4; skull (teeth slightly worn), condylobasal length, 21.6; breadth of braincase, 10.0; depth of braincase, 5.8; mandible, 12.0; maxillary toothrow (entire), 9.8; mandibular toothrow (entire), 9.0.

*Specimen examined*.—The type.

CROCIDURA GRANDIS, new species.

*Type-specimen*.—Adult male (skin and skull), Cat. No. 144648, U.S.N.M. Collected on Grand Malindang Mountain, Mindanao (altitude, 6,100 feet), June 3, 1906, by Dr. Edgar A. Mearns. Original number, 6181.

*Diagnosis*.—Like *Crocidura mindorus* but larger; hind foot 19.5 (18.6), condylobasal length of skull about 23 mm.

*Color*.—Though essentially like that of *Crocidura mindorus* the color differs from that of the other Philippine members of the genus in the presence of a slight but evident slaty tinge throughout the pelage. The exact shade is perhaps best described as intermediate between hair-brown and mouse-gray but darker than either; feet and tail an indefinite dark brown obviously different from the blackish of the same parts in the other species.

*Skull and teeth*.—Aside from its larger size the skull resembles that of *C. mindorus*. Second unicuspid distinctly smaller than third. Teeth otherwise as in the related large species.

*Measurements*.—Type: Head and body, 95 mm.; tail, 67; hind foot, 18.6; skull (teeth slightly worn), condylobasal length, 23.0; breadth of braincase, 10.2; depth of braincase, 6.0; mandible, 12.8; maxillary toothrow (entire), 10.2; mandibular toothrow (entire), 9.4.

*Specimen examined*.—The type.

TUPAIA CUYONIS, new species.

*Type-specimen*.—Adult male (skin and skull), No. 26, P.B.S. Collected on the Island of Cuyo, January 15, 1903, by R. C. McGregor and A. Celestino.

*Diagnosis*.—In general like *Tupaia möllendorffi* Matschie, but underparts a grizzled buffy-brown scarcely different from color of sides.

*Color*.—Upperparts and sides a fine nearly uniform grizzle of black and buff, the shorter hairs slate-gray at base (5 mm.), then light buff (3 mm.), black (2 mm.), brownish buff (1 mm.), and black (the extreme tip), the longer hairs without the brownish-buff annulation, the general effect something between wood-brown and clay-color, with a greenish cast on back and shoulders and a tinge of russet on sides, flanks, and rump; face and crown with hairs shorter and more

finely grizzled than those of neck; shoulder stripe ill-defined (in some specimens practically absent), light buff; underparts a brownish buff, tinged with ochraceous posteriorly and with dull cream buff on chest and throat, the slate-gray bases of the hairs appearing irregularly at surface and producing a slight grizzled appearance so that the general effect is not noticeably different from that of sides; feet slightly paler than back, the actual color an indefinite brownish buff; tail essentially like back above but more coarsely grizzled and slightly paler, the hair dark at extreme base and at tip, the median portion with four buff and three blackish annulations, below with median region a nearly clear brownish buff essentially like that of feet.

*Skull and teeth.*—The skull and teeth do not differ appreciably from those of *Tupaia möllendorffi*. As in the Culion animal the skull essentially resembles that of *Tupaia ferruginea* except for its smaller size, and the hypocone of  $m^1$  and  $m^2$  tends to be less developed than in the larger species.

*Measurements.*—Type: Head and body, 154 mm.; tail, 166; hind feet (dry), 39.6; skull (teeth moderately worn), condylobasal length, 43.0; zygomatic breadth, 24.4; breadth of braincase, 17.8; mandible, 31.0; maxillary toothrow (alveoli), 23.6; mandibular toothrow (alveoli), 19.1. Average and extremes of nine adults: Head and body, 156.4 (145–166); tail, 163.3 (152–175); hind foot, 39.9 (39–40.6).

*Specimens examined.*—Nine, all from the island of Cuyo.

PTEROPUS PUMILUS, new species.

*Type-specimen.*—Adult male, teeth slightly worn (skin and skull). Cat. No. 144758, U.S.N.M. Collected on Palmas Island, southeast of Mindanao, January 21, 1906. Original number, 6019.

*Diagnosis.*—Essentially like *P. speciosus* Andersen, from Malanipa Island off the southwest point of Mindanao, but with smaller skull, feet, and claws.

*Color.*—Body hair-brown or broccoli-brown, the back irregularly suffused with dull, light buff, the underparts tinged with ochraceous; mantle and head dull buff, the middle of neck both above and below strongly suffused with light ochraceous; face, chin, and interramia inconspicuously sprinkled with dark-brown hairs.

*Skull and teeth.*—Aside from their smaller size the skull and teeth agree with those of *Pteropus speciosus*.

*Measurements.*—Type: Forearm, 109 mm.; third finger, 199; skull (teeth slightly worn); condylobasal length, 49.8 (56.6);<sup>a</sup> zygomatic breadth, 29.6 (30.0); mastoid breadth, 16.6 (19.0); breadth of braincase, 19.6 (20.4); postorbital constriction, 7.8 (7.6); interorbital constriction, 7.2 (7.2); depth of braincase at middle, 17.8 (19.2);

<sup>a</sup>Crural measurements in parentheses are those of an adult female topotype of *P. speciosus* (teeth moderately worn), Cat. No. 144743, U.S.N.M.

mandible, 39.2 (45.2); maxillary toothrow (exclusive of incisors), 18.2 (21.2); mandibular toothrow (exclusive of incisors), 21.0 (23.8).

*Specimens examined*.—Two, both from Palmas Island.

CHILOPHYLLA, new genus (Hipposideridæ).

*Type*.—*Chilophylla hirsuta*, new species.

*Characters*.—Noseleaf consisting of an ill-differentiated horseshoe and lancet, the former produced anteriorly as a pair of conspicuous lappets separated by a deep median sinus and projecting noticeably beyond margin of upper lip, each lobe formed largely by an elongated supplemental leaflet which continues forward the outline of the obliquely truncate horseshoe proper; the upper lip very low, much less noticeable than lappets, with small upright median process and two ill-defined cross-flutings; nostril at inner border of a pit, the raised edges of which form a somewhat diamond-shaped figure; a freely projecting ligulate process at outer corner of diamond; a projecting wart within pit directly over opening of nostril; space between nostrils occupied by a freely projecting, somewhat bilobate process, rather broader than high (faintly suggesting a rudimentary "sella" without connecting process); below this process is another, somewhat smaller and deeply bilobate, each lobe connected by a ridge with inner edge of corresponding lappet of horseshoe; a low slightly curved ridge above nostril at a distance about equal to vertical diameter of diamond; outer extremity of this ridge approaching, but not actually reaching, a wart-like excrescence situated near margin of horseshoe; ear very large, the inferior lobe greatly developed and producing a funnel-like general form, the substance of ear everywhere thin and pellucid, with no trace of ridges in region of meatus. Thumb with metacarpal about one-fourth as long as that of third finger, the phalanges and claw short, their combined length only about one-third that of metacarpal; leg and foot slender, but with no special peculiarities of form; calcar reduced to a mere tubercle; wing membrane inserted at ankle; antebrachial membrane extending outward as a broad fold to include entire metacarpal of thumb, its width so great as to form a conspicuous pouch at bases of metacarpals; interfemoral membrane narrow, barely extending to rudimentary calcar; tail very short, its length about half that of femur. Skeletal and dental characters not known.

CHILOPHYLLA HIRSUTA, new species.

Plate IS.

*Type-specimen*.—Adult female (skin only <sup>a</sup>), Cat. No. 144821, U.S.N.M. Collected on Alag River opposite mouth of Egbert River,

<sup>a</sup>The entire body was preserved in alcohol but I have thus far been unable to find it among Doctor Mearns' Philippine specimens.

Mindoro, December 2, 1906, by Dr. Edgar A. Mearns. Original number, 6337.

*Diagnosis.*—A small, delicately formed bat with very large, funnel-shaped ears and unusually long soft fur; noseleaf inconspicuous except for the two lappets projecting over upper lip, its median portion essentially bare, its margins densely haired, especially at sides; general color light brown.

*External characters.*—The more important external characters have been described in the account of the genus. Fur long and loose, the hairs at middle of back about 11 mm. in length, those on belly about 7 mm. in length. On wing membranes the fur extends to a line joining middle of humerus with basal third of femur. Ear thickly sprinkled on both surfaces with loosely spreading hairs, those along inner border about 4 mm. in length. Hairs on edge of noseleaf and on neighboring portion of muzzle radiating stiffly outward, the longest, near middle of noseleaf, about 5 mm. in length.

*Color.*—Entire animal a uniform light brown, between the wood brown and fawn color of Ridgway, the middle of belly faintly tinged with light buff at tips of hairs; under color very dark brown with a slaty tinge; ears translucent light brown; membranes an indefinite dark brown.

*Measurements.*—Head and body, 33 mm.; tail, 7; femur, 14.2; tibia, 13.6; foot, 6.4; forearm, 33.8; thumb, 8.2, its metacarpal, 6.2; second finger, 32; third finger: metacarpal, 24.2, first phalanx, 6.2, second phalanx, 22; fourth finger: metacarpal, 25.4, first phalanx, 7.8, second phalanx, 8.6; fifth finger: metacarpal, 27.4, first phalanx, 8.4, second phalanx, 10.2; ear from meatus, 12; ear from crown, 10; ear from extreme lower margin, 16; greatest width of ear, 11.6; greatest length of noseleaf, 8.2; greatest width of horseshoe, 5.2; height of lancet above muzzle, 2.2; length of free portion of lappet, 2.

*Specimen examined.*—The type.

TAPHOZOUS PLUTO, new species.

*Type-specimen.*—Adult female (skin and skull), Cat. No. 144812, U.S.N.M. Collected at Mercedes, 9 miles east of Zamboanga, Mindanao, March 28, 1906, by Dr. Edgar A. Mearns. Original number, 6054.

*Diagnosis.*—Similar to *Taphozous saccolaimus* Temminck of Java, but smaller; adult female: forearm 69 to 72 mm. instead of 74 to 76 mm., condylobasal length of skull about 21 mm. instead of about 23 mm.

*Measurements.*—Type: Forearm, 71.4 mm.; third finger, 116; fifth finger, 67; tibia, 25.5; foot 17.3; skull, condylobasal length (to front of alveolus of canine) 21.2 (23.0);<sup>a</sup> zygomatic breadth, 15.8

<sup>a</sup>Measurements in parentheses are those of an adult female *Taphozous saccolaimus* from Buitenzorg, Java (Cat. No. 154609, U.S.N.M.).

(16.8); mastoid breadth, 13.2 (14.0); breadth of brain case, 11.0 (11.2); postorbital constriction, 5.0 (5.0); interorbital constriction, 8.0 (8.8); mandible, 18.6 (19.8); maxillary tooth row, 10.6 (11.2); mandibular tooth row 12.0 (12.8).

*Specimens examined*.—Three, one from Mindanao, the others from Pandon, Albay, Luzon (collected by D. B. Mackie).

EPIMYS TYRANNUS, new species.

Plate 19.

*Type-specimen*.—Adult male (skin and skull), No. 8, P. B. S., Ticao, May 15, 1902. R. C. McGregor and A. Celestino, collectors.

*Diagnosis*.—Size essentially as in *Epimys imperator* Thomas, of the Solomon Islands, the largest known member of the genus, but skull not differing conspicuously from that of *Epimys norvegicus* in form.

*External character*.—General external form, including size of ear, relative lengths of tail and head and body, lengths of palm and sole, of digits, and claws, about as in *Epimys norvegicus*. Tail essentially naked, sparsely sprinkled with stiff hairs about 2 mm. in length which nowhere form any approach to a hairy covering; annulations well defined, about 7 to the centimeter at middle of tail, their distal margins closely appressed. Palm and sole naked, the tubercles essentially as in *Epimys norvegicus*, but slightly larger in proportion to area of region which they occupy: a small but well-developed secondary wart at outer side of the plantar tubercle at base of both first and fifth toes; postero-external plantar tubercle long, its greatest diameter about  $2\frac{1}{2}$  times that of sixth. Fur coarse, harsh, and stiff, though nowhere actually spinous; the underfur thin, the longer hairs for the most part slender grooved bristles, those of middle of back about 15 mm. in length; rump and lumbar region with rather conspicuous growth of coarse terete hairs about 60 to 75 mm. long.

*Color*.—Whole animal a dull indefinite brown somewhat intermediate between the wood brown and broccoli brown of Ridgway, the median dorsal region from between eyes to base of tail with a darker tinge (about Mars brown), the sides of shoulders suffused with drab, the underparts tinged with dull buff; a faintly indicated dark area around eyes; cheeks and muzzle dull fawn color; whiskers black in rather noticeable contrast; feet a dull, indefinite brown not contrasting with body; tail blackish through basal half, then whitish to tip.

*Skull*.—Except for its much greater size the skull does not differ conspicuously from that of *Epimys norvegicus*. Supraorbital bead well developed, perhaps relatively higher than in *Epimys norvegicus*, continued backward as a conspicuous lateral ridge along side of brain case to outer margin of interparietal, where it joins lambdoid crest; lateral ridges converging posteriorly, the distance between them at point of crossing suture between frontal and parietal greater

than that at outer borders of interparietal, a condition the reverse of that in *Epimys norregicus*. Suture between premaxillary and maxillary relatively further forward in front of antorbital foramen than in *Epimys norregicus*.

*Teeth.*—The teeth in the only known specimen are slightly too worn to show the exact details of the enamel folding. In general they appear to represent a stage of reduction of the outer side of upper molars corresponding to that of *Epimys rattus*. Fourth tubercle in both  $m^1$  and  $m^2$  with distinct outer reentrant angle.

*Measurements.*—Type: Head and body, 310 mm.; tail, 270; hind foot (dry), 57 (53.6); skull, condylobasal length, 62.2; nasal, 28.0; diastema, 19.6; zygomatic breadth, 31.0; mastoid breadth, 24.2; greatest breadth across lateral ridges, 16.8; breadth across lateral ridges posteriorly, 12.8; interorbital constriction, 9.6; depth of braincase at middle, 15.8; least depth of rostrum behind incisors, 12.4; mandible, 38.8; maxillary toothrow (alveoli), 11.0; mandibular toothrow (alveoli), 10.0.

*Specimen examined.*—The type.

*Remarks.*—This rat conspicuously exceeds the largest hitherto known Philippine species in size. In this respect it can only be compared with *Epimys imperator* of the Solomon Islands; but it shares none of the peculiar cranial character of the latter.

#### EPIMYS GALA, new species.

*Type-specimen.*—Adult male (skin and skull), Cat. No. 144633, U.S.N.M. Collected on the Alag River, Mindoro, November 30, 1906, by Dr. Edgar A. Mearns. Original number 6334.

*Diagnosis.*—A dark local form of the *Epimys everetti* group; color of underparts not conspicuously contrasted with that of sides; feet blackish. Skull and teeth essentially as in *Epimys everetti*, but audital bullæ smaller and molars larger.

*Color.*—Back and sides a coarse grizzle of black and dull, light ochraceous-buff, the lighter color in excess everywhere except on rump; shoulders with a slight grayish tinge; sides, cheeks, and outer surface of legs somewhat lighter than back; underparts dull ochraceous-buff, not conspicuously contrasted with sides, the line of demarcation scarcely indicated; feet blackish brown, in noticeable contrast with legs; tail blackish through somewhat less than basal half, the distal portion yellowish.

*Skull and teeth.*—In all general features the skull agrees with that of *Epimys everetti*, but the audital bulla is noticeably smaller, its longitudinal diameter decidedly less than distance between bases of paroccipital processes. Teeth more robust than in the Luzon animal, the width of  $m^1$  equal to fully three-quarters the least distance between tooth rows.

*Measurements.*—Type: Head and body, 269 mm.; tail, 241; hind foot (dry), 43.4; skull, condylobasal length, 48.0; zygomatic breadth, 24.8; interorbital constriction, 7.4; breadth of brain case over roots of zygomata, 19.0; depth of brain case at middle, 14.6; nasal, 20.4; diastema, 14.2; mandible, 31.2; maxillary toothrow (alveoli), 9.6; mandibular toothrow (alveoli), 9.4.

*Specimens examined.*—Two, the type and a half-grown individual, both from the Alag River.

TRYPHOMYS, new genus (Muridæ).

*Type.*—*Tryphomys adustus*, new species.

*Characters.*—External form murine, the tail about as long as body without head; hind foot with outer digits so reduced that neither extends beyond level of base of three median digits; fur of back coarse and harsh, the tips of the shorter hairs tending to curve forward, giving the pelage a peculiar scorched aspect; skull rather short and broad, with widely spreading zygomata and unusually large antorbital foramina; outer alveolar wall swollen into a noticeable protuberance at level of  $m^1$ ; bony palate terminating in a broad median ridge bounded by lateral vacuities, the resulting form superficially like that of the same region in certain Murine genera; teeth robust, their structure apparently not differing widely from those of *Epimys*.

TRYPHOMYS ADUSTUS, new species.

Plate 20.

*Type-specimen.*—Old female (skin and skull) Cat. No. 151511, U.S.N.M. Collected at Hights-in-the-Oaks, Benguet, Luzon, July 26, 1907, by Dr. Edgar A. Mearns. Original number 6457.

*Diagnosis.*—Size medium; form robust; tail about as long as body without head, coarsely and conspicuously ringed (8 rings to the centimeter at middle); thumb with a small, appressed nail; sole naked throughout, the five tubercles well developed, the fifth large; inner toe extending to base of three middle digits, the outer toe about to middle of inner; claws well developed, those on hind foot the largest; general color coarsely grizzled yellowish brown above, buffy gray below; tail uniform dark brown; mammae, p. 2-2, v. 1-1, i 2-2=10.

*Color.*—Back and sides a coarse grizzle of wood-brown and black, the brown everywhere in excess, particularly on sides, where the black merely produces a slight effect of "lining;" median dorsal region abruptly more grizzled than sides, the recurved hairs showing an evident grayish cast in certain lights; bases of hairs slate-gray streaked by the lighter gray of the very slender grooved bristles; head and face essentially like back but with grayish cast somewhat more evident; underparts and cheeks buffy white dulled by the slate-gray under

color, the general effect a yellowish smoke-gray; line of demarcation rather evident; feet like underparts but with a decided tinge of brocoli-brown; tail uniform dark brown, the minute hairs with which it is sprinkled brownish or silvery according to light.

*Skull*.—The skull is robust and heavily built, its size and general outline when viewed from above much as in Thomas's figure of *Carpomys phæurus*,<sup>a</sup> but zygomata less widely spreading, outer wall of antorbital foramen so greatly developed that orifice is more conspicuous in dorsal view than when skull is seen from in front; margin of interorbital region conspicuously but narrowly beaded, the ridge continued backward to about middle of parietal, where it abruptly disappears. In lateral view the resemblance to *Carpomys phæurus* is less evident, as the depth at anterior base of zygoma is relatively much greater, so that the dorsal profile is evenly convex; the very wide outer wall of antorbital foramen is also conspicuous in this view; lower portion of anterior border of this plate vertical, upper portion strongly convex. Palate much narrower between anterior molars than posteriorly; incisive foramina long and narrow, their hinder border extending to level of anterior root of *m*<sup>1</sup>; posterior border of palate at level of posterior margin of alveoli, its median region partly isolated by two lateral perforations, the resulting form superficially resembling that in certain *Microtinae*; audital bullæ moderate, evenly inflated. Mandible deep and short, the coronoid process rising noticeably above condyle.

*Teeth*.—The teeth in the single known specimen are too worn to show the details of enamel folding. Apparently they do not differ essentially from those of members of the *Epimys rattus* group. Upper tooth rows strongly converging anteriorly.

*Measurements*.—Type: Head and body, 174 mm.; tail, 150; hind foot (dry), 33; skull, condylobasal length, 37.2; zygomatic breadth, 20.4; interorbital constriction, 5.2; mastoid breadth, 15.0; depth of brain case at middle, 13.0; nasal, 15.2; diastema, 10.4; mandible, 24.0; maxillary toothrow (alveoli), 7.6; mandibular toothrow (alveoli), 7.6.

BATOMYS DENTATUS, new species.

Plate 20.

*Type-specimen*.—Adult male (skin and skull) Cat. No. 151506, U.S.N.M. Collected at Hights-in-the-Oaks, Benguet, Luzon (altitude 7,000 feet), July 31, 1907, by Dr. Edgar A. Mearns. Original number 6484.

*Diagnosis*.—Size and general appearance as in *Batomys granti* Thomas, but under parts more buffy and terminal half of tail white; no bare area around eye; skull with much deeper brain case than in the related species; crowns of upper molars fully as wide as palate.

<sup>a</sup>Trans. Zool. Soc. London, vol. 14, pl. 26, fig. 7.

*External characters.*—General external features agreeing with the description and figure of *Batomys granti*, except that the region immediately surrounding eye is normally furred, and the hairy covering of tail is so thin that the annulations are plainly visible (about 12 to the centimeter at middle).

*Color.*—Entire upper parts a uniform light-brown, slightly more yellow than the wood-brown of Ridgway, the face tinged with drab, the lumbar region and rump with russet, the entire area finely and inconspicuously varied by the blackish tips to the longer hairs and subterminal annulations on those of under fur; sides and flanks suffused with ochraceous buff, this color covering the entire under parts, except chin and throat, which are a pale cream-buff much darkened by the slate-gray under color; the general effect in this region a dull buffy drab; feet a dull buffy gray, the metapodials clouded with sepia; ears an indefinite dark brown; whiskers black; tail a uniform blackish brown through a little more than basal half, then abruptly white to tip.

*Skull.*—The skull of *Batomys dentatus* is about the same size and general form as that of *B. granti*, the dorsal and ventral views agreeing in all important characters with the figures published by Thomas.<sup>a</sup> In lateral view, however, it differs conspicuously in the greater depth of brain case over front of parietals and the much more marked angle at which the posterior portion slopes toward the low occiput; depth at posterior margin of alveolar of  $m^3$  contained about three times in condylobasal length instead of  $3\frac{1}{2}$  times as in *B. granti*.

*Teeth.*—The disproportionately large teeth of *Batomys dentatus* is the most conspicuous feature of ventral aspect of skull. The width of crowns slightly exceeds that of palate at its narrowest point, while the length of tooth row measured along alveoli exceeds distance from alveolus of  $m^1$  to front of incisive foramen by about 1.5 mm. (in *B. granti* it falls short of anterior extremity of foramen by about the same distance). The teeth of the type of *B. dentatus* are less worn than those of the type of *B. granti*, but allowance being made for this fact, the enamel pattern seems to be alike in the two animals. The actual differences are as follows:  $m^1$ : second and third laminae completely separated, each with a well defined reentrant angle on anterior margin, partly isolating a small inner tubercle, this angle rather better defined than that of first lamina as figured by Thomas;  $m^2$ : antero-internal tubercle distinct, not indicated by an enamel island as in the figure of *B. granti*; second and third laminae separate and of essentially the same form as in the preceding tooth;  $m^3$ : elements as in  $m^2$  and equally distinct, but inner tubercles of second and third laminae less well defined (the reentrant angles shallower), and median lobe narrower;  $m_4$  with three transverse laminae, the second and third

<sup>a</sup>Trans. Zool. Soc. London, vol. 14, pl. 36, fig. 8.

completely separated, deeply bilobate from behind, the first smaller, simple, joined to second at middle; terete postero-median lobe distinct, not forming an island as in the type of *B. granti*;  $m_2$  essentially like  $m_1$ , except for absence of anterior lamina;  $m_3$  with two distinct laminae, the first like that of  $m_2$ , the second elliptical in outline, with no indication of reentrant angle on posterior border.

*Measurements*.—Type: Head and body, 195 mm.; tail, 185; hind foot (dry), 36; skull, condylobasal length, 42.2; zygomatic breadth, 23.0; interorbital constriction, 6.0; mastoid breadth, 15.4; greatest depth of brain case, 12.4; nasal, 18.8; diastema, 12.2; mandible, 28.2; maxillary tooth row (alveoli), 9.6; mandibular tooth row (alveoli), 9.8; width of crown of  $m^1$ , 2.8; least width of bony palate, 2.8.

*Specimen examined*.—The type.

APOMYS BARDUS, new species.

*Type-specimen*.—Adult male (skin and skull), Cat. No. 144582, U.S.N.M. Collected at summit of Mount Bliss, Mindanao (altitude 5,750 feet) May 28, 1906, by Dr. Edgar A. Mearns. Original number 6166.

*Diagnosis*.—Size and general appearance as in the forms inhabiting Mount Apo, but skull differing noticeably in the much narrower, less inflated brain case.

*Color*.—The color is so essentially like that of *Apomys insignis* Mearns<sup>a</sup> as to require no special description.

*Skull and teeth*.—In general form the skull is much as in *Apomys insignis*, but the brain case differs from that of all three of the forms described from Mount Apo in its narrower more elongated form, the greatest breadth contained about  $2\frac{1}{2}$  times in upper length of skull instead of about  $2\frac{1}{3}$  times or less. Teeth with no special peculiarities.

*Measurements*.—Type: Head and body, 113 mm.; tail, 162; hind foot (dry), 33. Average and extremes of six adults: Head and body, 109 (98–118); tail, 156.3 (146–162); hind foot (dry), 31.4 (30–33). Skull of type (teeth moderately worn): Condylobasal length, 28.8; zygomatic breadth, 14.2; interorbital constriction, 4.8; breadth of brain case over roots of zygomata, 13.2; depth of brain case at middle, 9.4; nasal, 11.8; diastema, 7.8; mandible, 16.8; maxillary tooth row (alveoli), 5.8; mandibular tooth row (alveoli), 5.2.

*Specimens examined*.—Nine, all from the summit of Mount Bliss. Other specimens from Grand Maliundang (9,000 feet) are probably referable to the same form.

APOMYS MAJOR, new species.

*Type-specimen*.—Adult female (skin and skull), Cat. No. 151513, U.S.N.M. Collected at Hights-in-the-Oaks, Benguet, Luzon (altitude 7,000 feet), August 2, 1907, by Dr. Edgar A. Mearns. Original number, 6531.

<sup>a</sup>Proc. U. S. Nat. Mus., vol. 27, p. 459, May 13, 1905.

*Diagnosis*.—Size noticeably greater than in the Mindanao species (hind foot 32.2, condylobasal length of fully adult skull about 35 mm.); underparts grayish instead of buffy.

*Color*.—Upper parts wood-brown, a little darker than that of Ridgway, clearer and less dark on shoulders, cheeks, and sides of neck, darker and with a rusty tinge posteriorly; face and crown to between ears grayish though not in evident contrast; underparts pale smoke gray with a buffy cast, wrists and ankles hair-brown; forefeet dull whitish; hind feet whitish mixed with hair-brown; tail dusky throughout, lighter below than above.

*Skull and teeth*.—Except for their noticeably greater size the skull and teeth do not differ appreciably from those of *Apomys insignis*.

*Measurements*.—Type: Head and body, 143 mm.; tail, 144; hind foot (dry), 32.2; skull (teeth moderately worn), condylobasal length, 34.8; zygomatic breadth, 17.2; interorbital constriction, 6.0; breadth of brain case over roots of zygomata, 14.8; depth of brain case at middle, 10.0; nasal, 15.0; diastema, 10.2; mandible, 21.4; maxillary tooth row (alveoli), 6.2; mandibular tooth row (alveoli), 6.0.

*Specimens examined*.—Four, all from the type-locality.

APOMYS MUSCULUS, new species.

Plate 19.

*Type-specimen*.—Adult female (skin and skull), Cat. No. 145770, U.S.N.M. Collected at Camp John Hay, Baguio, Benguet, Luzon (altitude 5,000 feet), May 6, 1907, by Dr. Edgar A. Mearns. Original number, 6409.

*Diagnosis*.—Size much less than in any of the other known species (hind foot about 20 mm., condylobasal length of skull about 22.5 mm.); color essentially as in the buff-bellied Mindanao forms.

*Color*.—Entire body and head ochraceous-buff, clear and rather light on sides; cheeks and under parts tinged with ochraceous-rufous and slightly clouded with black above; face slightly grayish; feet buffy gray, not conspicuously different from underparts; tail obscurely bicolor, brownish above, whitish below.

*Skull and teeth*.—Aside from its much smaller size the skull differs from that of other known members of the genus in its relatively somewhat larger and more globular brain case, more abruptly constricted interorbital region, and more nearly vertical anterior border of plate forming outer wall of infraorbital canal. Other features of skull strictly as in the larger species. The teeth show no peculiarities apart from their small size.

*Measurements*.—External measurements of type: Head and body, 86 mm.; tail (imperfect), 89; hind foot (dry), 19.6. Young adult male from the type locality: Hind foot (dry), 21. Cranial measurements of type (teeth moderately worn): Condylobasal length, 22.6; zygomatic breadth, 13.0; interorbital constriction, 4.0; breadth of

brain case over roots of zygomata, 12.0; depth of brain case at middle, 8.0; nasal, 9.0; diastema, 6.0; mandible, 13.8; maxillary tooth row (alveoli), 4.6; mandibular tooth row (alveoli), 4.2.

*Specimens examined*.—Two, both from Baguio.

TARSIUS FRATERCULUS, new species.

*Type-specimen*.—Adult female (skin and skeleton) No. 94, P. B. S., Sevilla, Bohol, April 9, 1906. A. Celestino and M. Canton, collectors.

*Diagnosis*.—Like *Tarsius philippensis* of Mindanao but smaller. Hind foot about 60 mm.; greatest length of skull about 38 mm.

*Color*.—Upper parts, sides of body, and outer surface of limbs dull ochraceous buff, more yellowish posteriorly and on legs, more grayish anteriorly and on arms; the posterior half of back clouded with a slight irregular wash of dark brown; under color light slaty gray (about gray No. 6 of Ridgway); chin and throat essentially naked, the short, scant hairs dull buffy gray; chest and belly slaty gray, washed with dull buff anteriorly and with pale cream-buff posteriorly; pubic region and inner surface of thighs clear buff; tail blackish, the hairs on terminal third mixed brownish and buffy; ears light brown at base, blackening distally.

*Skull and teeth*.—Except for their uniformly smaller size the skull and teeth resemble those of *T. philippensis*.

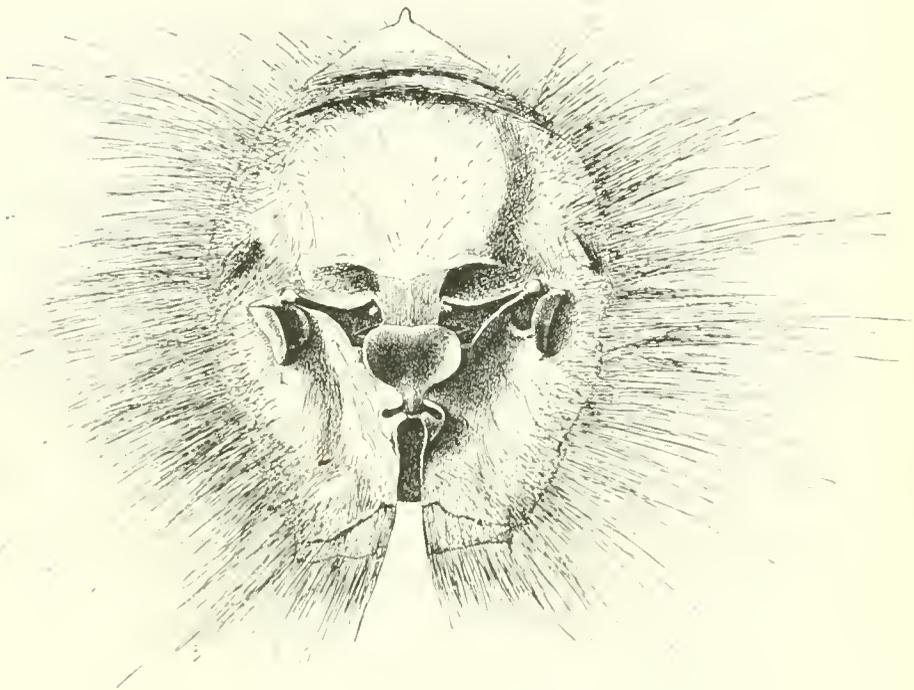
*Measurements*.—Type (from skeleton): Head and body, 120 mm.; tail vertebrae, 210; hind foot, 60 ±. A second specimen (also female) from the type-locality: Hind foot (dry), 61. Cranial measurements of the two specimens (those of type first): Greatest length, 38.0, 38.0 (39.8);<sup>a</sup> condylobasal length, 30.5, 30.8 (32.4); zygomatic breadth, 26.5, 27.2 (27.4); greatest orbital breadth, 31.2, 31.6 (33.4); least interorbital breadth, 1.5, 1.8 (1.8); breadth of brain case over roots of zygomata, 21.9, 22.3 (23.0); depth of brain case at middle, 16.0, 15.3 (17.6); breadth of rostrum over roots of canines, 6.6, 6.2 (6.4); mandible, 25.0, 24.9 (26.4); maxillary tooth row (entire), 16.6, 16.5 (17.0); mandibular tooth row (entire), 13.8, 13.9 (15.4).

*Specimens*.—Two from Bohol, both females, with teeth beginning to wear.

<sup>a</sup> Measurements in parentheses are those of a female *Tarsius philippensis* of the same age, from Zamboanga, Mindanao (Cat. No. 144643, U.S.N.M.).



CHILOPHYLLA HIRSUTA X 3.



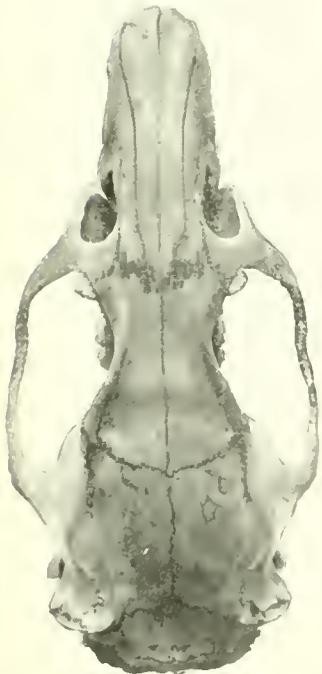
CHILOPHYLLA HIRSUTA. NOSELEAF GREATLY ENLARGED.

FOR EXPLANATION OF PLATE SEE PAGE 395.





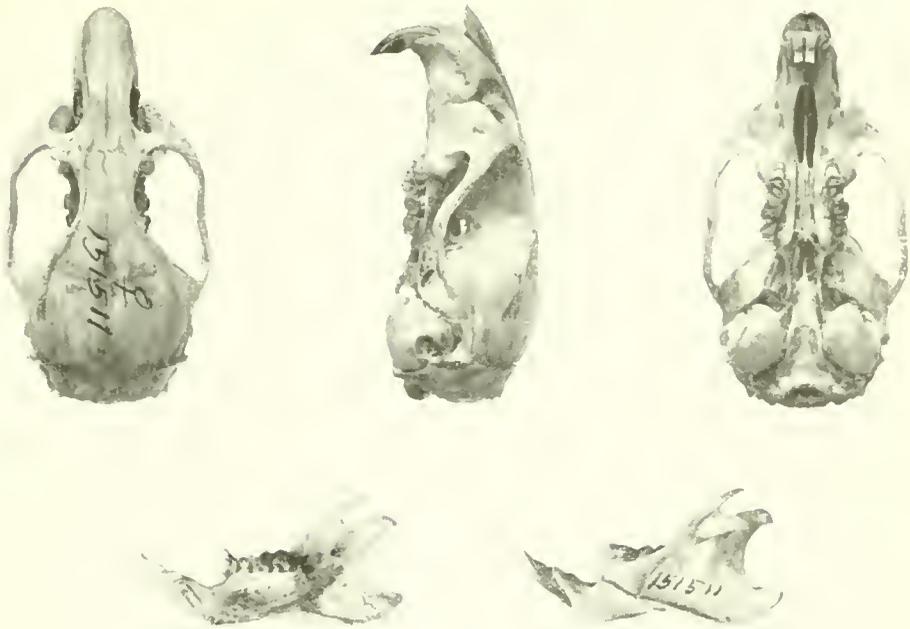
APOMYS MUSCULUS, TYPE. (NATURAL SIZE.)



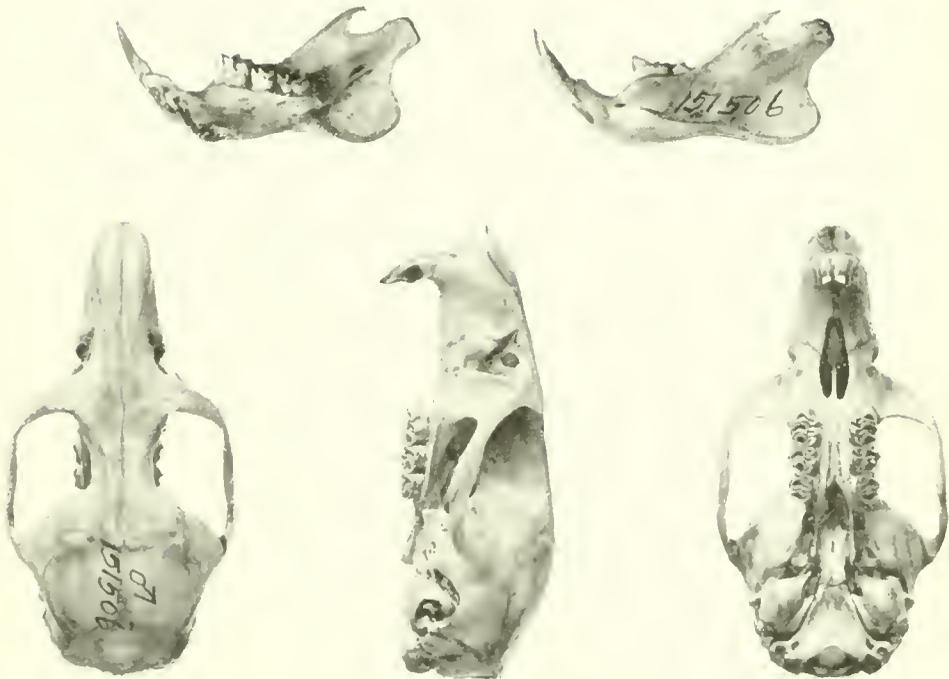
EPIMYS TYRANNUS, TYPE. (NATURAL SIZE.)

FOR EXPLANATION OF PLATE SEE PAGES 397 AND 403.





TRYPHOMYS ADUSTUS, TYPE. (NATURAL SIZE.)



BATOMYS DENTATUS, TYPE. (NATURAL SIZE.)

FOR EXPLANATION OF PLATE SEE PAGES 399 AND 400.