

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

TWENTY NEW MAMMALS COLLECTED BY H. C.
RAVEN IN CELEBES.

BY GERRIT S. MILLER, JR. AND N. HOLLISTER.

[Published here by permission of the Secretary of the Smithsonian Institution.]

Further study of the mammals collected in Celebes by Mr. H. C. Raven and presented to the U. S. National Museum by Dr. W. L. Abbott has resulted in the discovery of eighteen new forms in addition to those recently described.¹

Melasmothrix, gen. nov. (Murinæ).

Type.—*Melasmothrix naso*, sp. nov.

Characters.—A small rat with elongated snout, dense velvety fur, and short ears; feet scantily haired, the claws on fore feet longest, the thumb reduced to a small tubercle with a flattened nail; tail considerably shorter than head and body, densely and closely haired (the annulations scarcely visible), apparently without pencil (tip imperfect). Skull resembling that of *Echiothrix* in its general elongated form and the slender mandible, but interorbital region smooth, external pterygoid normally developed, zygomatic plate lying directly over m^1 , and premaxillaries extending forward sufficiently to form the lower border of a short nasal tube in front of incisors. Teeth (much worn) apparently not different from those of *Echiothrix*, but upper toothrows not distinctly converging posteriorly and root of lower incisor not forming a capsule on outer surface of mandible.

Remarks.—This genus appears to be very distinct from any hitherto described. Externally the animal shows no striking peculiarities other than the lengthened muzzle and the large claws on the fore feet. The skull has the slender elongated form seen in *Echiothrix*, but the details of structure, particularly the unusual position of the anterior zygomatic root, entirely behind the level of the anterior border of m^1 , and the normal, unreduced condition of the ectopterygoid readily distinguish it. The resemblance to *Echiothrix* appears to be purely superficial and may indicate no intimate relationship.

¹Miller and Hollister, Descriptions of sixteen new murine rodents from Celebes, *Proc. Biol. Soc. Wash.*, vol. 34, pp. 67-76, March 31, 1921.

Melasmothrix naso, sp. nov.

Type from Rano Rano, Middle Celebes. Skin and skull of old ♂ (teeth much worn); No. 219,752, U. S. National Museum; collected January 2, 1918, by H. C. Raven; original number 3368.

Characters.—Size, color, quality of fur and general appearance apart from the long fore claws much as in the South American *Melanomys caliginosus*. General coloration a rich blackish-bay; hairs with underfur broadly slate color and tips of golden brown; mixed throughout are some slightly longer hairs wholly of glossy black. Underparts scarcely differing from back and sides, glossy like upperparts but slightly less dark. Hands, feet, ears, and tail brownish black.

Skull.—In general form the skull resembles that of *Echiothrix leucura*, but the braincase is relatively larger, the rostrum less elongate, and the contours are all smoother and more rounded. The anterior border of the zygomatic plate is scarcely visible when the skull is viewed from above, while in *Echiothrix* it is a conspicuous feature. The dorsal surface of the nasals, essentially flat in *Echiothrix*, is noticeably concave at a level slightly behind that of the incisors. Glenoid surface not carried forward as a distinct shelf projecting into posterior region of the temporal fossa, and posterior zygomatic root not standing abruptly out from side of braincase. Auditory bullæ relatively larger than in *Echiothrix*, their form broad and low rather than narrow and high. Mandible resembling that of *Echiothrix* but with coronoid process more posterior in position relatively to angular process, and masseteric ridge crossing jaw obliquely and terminating beneath middle of tooththrow, the position of the ridge obviously correlated with that of the zygomatic plate.

Measurements.—Type: Head and body, 124; tail, 90; hind foot (dry), 28; hind foot without claws, 26; middle hind claw, 2; middle fore claw, 5. Skull: Condylbasal length, 31.0; condyloincisive length, 28.6; zygomatic breadth, 12.4; interorbital constriction, 6.2; breadth of braincase, 14.2; depth of braincase at middle, 8.6; nasal, 12.5; diastema, 7.8; width of palate at middle of m^1 , 2.8; width of palate at middle of m^3 , 3.8; mandible, 17.2; maxillary tooththrow (alveoli), 5.0; greatest width of m^1 , 1.8; greatest width of m^3 , 1.0; mandibular tooththrow (alveoli), 4.6.

Specimen examined.—One, the type.

Remarks.—Mr. Raven's field catalogue states that this specimen was caught in a trap set under rotten, moss-covered logs. The superficial resemblance in the structure of the head to *Echiothrix* was noted by him.

Eropeplus, gen. nov. (Murinæ).

Type.—*Eropeplus canus* sp. nov.

Characters.—Like *Lenomys* but cheekteeth distinctly hypsodont (the crown of m^1 about as high as wide), and enamel pattern simplified in the direction of separate transverse plates; tubercles at outer side of maxillary teeth reduced in size and not sufficiently elevated to form a longitudinal groove between the outer and middle series; m^2 with only two tubercles on outer side; m^1 without trace of x-cusp, the two inner tubercles tending to become isolated from the median tubercles.

Remarks.—The genus *Eropeplus* apparently represents a hypsodont stock which occupies much the same position toward *Lenomys* as the Philippine genus *Bullimus* toward *Rattus*.

***Eropeplus canus*, sp. nov.**

Type from Goenoeng Lechio (southwest from Lake Lindoe), Middle Celebes; above 6,000 feet altitude. No. 218,707 U. S. National Museum; skin and skull of female (teeth slightly worn); collected January 12, 1917, by H. C. Raven; original number 3079.

External characters.—A large gray rat with terminal third or half of tail white; general appearance as in *Lenomys longicaudus* but fur more silky and less wooly in texture; hairs of underfur on back 25–28 mm., the longer piles, abundant on posterior half of back and on flanks, 35–45 mm. General coloration above brownish gray, the hairs uniformly pale slate except at tip (3–5 mm.), where they become pale buff; long hairs black usually with buffy tips; the slaty under color appears everywhere at surface but more noticeably on sides than on back; underparts light gray in evident contrast with sides, but without sharp line of demarcation, a combination of the slaty under color and the pale buffy hair tips; feet thinly clothed with short blackish hairs; whiskers black.

Skull and teeth.—In all essential characters the skull resembles that of *Lenomys longicaudus*, but the size is noticeably less, the upper zygomatic root is narrower, the interparietal is relatively wider, and the auditory bullæ are less smoothly inflated. Teeth similar to those of *Lenomys* in their large size relatively to the narrow palate, but differing as already described in their conspicuously greater height and in the simplified enamel pattern.

Measurements.—Type: head and body, 195; tail, 265; hind foot (dry) 46 (43); greatest length of skull, 46.7; condylobasal length, 44.0; zygomatic breadth, 22.0; interorbital breadth, 5.6; nasal, 17.2; diastema, 11.6; mandible, 27.6; maxillary tooththrow (alveoli), 10.0; mandibular tooththrow (alveoli), 10.0.

Specimens examined.—Two, one from Goenoeng Lechio and one from Rano Rano (altitude about 1,800 m).

Remarks.—The two specimens differ slightly from each other and may represent distinct local forms. In the skin from Rano Rano (a male, slightly older than the type) the pale area on the underparts is narrower and strongly buffy, and the white portion of the tail is much longer (175 mm. instead of 100 mm.). Comparison of the skulls and teeth shows various small differences which further material might prove to be important.

***Lenomys longicaudus*, sp. nov.**

Type from Gimpoe, Middle Celebes; No. 219,712, U. S. National Museum; skin and skull of adult ♀ (teeth moderately worn); collected September 1, 1917, by H. C. Raven; original number 3203.

Diagnosis.—Like *Lenomys meyeri* (Jentink) of Menado, North Celebes, but more grayish, less tawny in coloration; middle underparts yellowish buff; tail longer than head and body; teeth smaller; inner tubercles of first and second laminae so drawn backward that each is more nearly in line with

the outer tubercle of the succeeding lamina than with that of its own lamina; x-cusp small, and no corresponding cusp on inner tubercle of first lamina; no small postero-external cusp in m^2 .

Measurements.—Type: Head and body, 235 mm.; tail, 280; hind foot, 45. Skull of type: Greatest length, 53.6; condylobasal length, 52.0; palatal length, 29.5; zygomatic breadth, 27.0; interorbital breadth, 7.4; mastoid breadth, 18.8; mandible, 33.8; maxillary toothrow, alveoli, 11.5; mandibular toothrow, alveoli, 10.8.

Specimen examined.—One, the type.

Remarks.—The Middle Celebesian form of *Lenomys* appears to be specifically distinct from *Lenomys meyeri* and *Lenomys callitrichus* (Jentink), both from Menado. The two northern species have the tail described as shorter than head and body.

***Rattus dominator camurus*, subsp. nov.**

Type from Pinedapa, Middle Celebes. No. 219,566, U. S. National Museum; skin and skull of adult ♂ (teeth moderately worn); collected January 15, 1918, by H. C. Raven; original number 3384.

Diagnosis.—Like *Rattus dominator dominator* Thomas, of North Celebes, but more grayish, less brownish, in color; skull with smaller auditory bullæ.

Measurements.—Type: Head and body, 235 mm.; tail, 257; hind foot, 51. Skull of type: Greatest length, 59.1; condylobasal length, 55.3; zygomatic breadth, 27.2; interorbital breadth, 7.7; mastoid breadth, 20.4; mandible, 34.7; maxillary tooth row, alveoli, 10.2; mandibular toothrow, alveoli, 9.1.

Specimens examined.—Seven, all from Middle Celebes: Laboea Sore, 2; Pinedapa, 4; Toware, Bada, 1.

Remarks.—This is the Middle Celebesian race of *Rattus dominator* Thomas. It is very much like the typical form, which is represented in the Raven collections by large series from North Celebes, but averages grayer in color. The skull is like that of true *dominator* but with considerably smaller auditory bullæ.

***Rattus facetus*, sp. nov.**

Type from Goenoeng Lechio (southwest of Lake Lindoe), Middle Celebes; above 6,000 feet altitude. No. 218,677, U. S. National Museum; skin and skull of adult ♀ (teeth moderately worn); collected January 15, 1917, by H. C. Raven; original number 3092.

Diagnosis.—Like *Rattus marmosurus* Thomas, of Mount Masarang, Minahassa, but much smaller, with more hairy tail. Skull as in *marmosurus* but smaller, with much smaller auditory bullæ; and smaller, more slender, incisor teeth.

Measurements.—Type: Head and body, 135 mm.; tail, 175; hind foot, 33. Skull of type: Condylobasal length, 32.5; zygomatic breadth, 16.4; interorbital breadth, 5.3; mandible, 21.2; maxillary toothrow, alveoli, 6.8; mandibular toothrow, alveoli, 7.1.

Specimen examined.—One, the type.

Remarks.—Except for minor differences, as enumerated above, this

species is almost an exact miniature of *Rattus mamosurus* of the mountains of northeastern Celebes.

***Rattus hamatus*, sp. nov.**

Type from Goenoeng Lechio, Middle Celebes. No. 218,680, U. S. National Museum; skin and skull of adult ♂ (teeth moderately worn); collected January 16, 1917, by H. C. Raven; original number 3095.

Diagnosis.—A medium-sized rat superficially resembling the darker members of the *Rattus chrysocomus* group, but with skull and teeth wholly unlike those species; apparently not belonging in any of the recognized species-groups of *Rattus*. Size about as in *Rattus mamosurus* Thomas; but tail much shorter and with only the distal half whitish. Pelage soft and full, but shorter than in *mamosurus*, and without the long overlying hairs of that species. Coloration above, dark gray, finely flecked with buff; sides like back; underparts buffy-gray, the hairs gray at bases and yellowish buff at tips; hands and feet dusky, the digits whitish. Vibrissæ long, reaching back to shoulders.

Skull resembling in general shape that of *Rattus dominator*, but much smaller; antorbital plate extending well forward, about as in *R. norvegicus*; rostrum long, much longer than in *norvegicus* or *rattus*; supraorbital ridges distinct over frontals, faintly indicated on parietals; auditory bullæ small and angular; palatal foramina reaching just back of anterior plane of first molars; palate projecting only slightly beyond plane of posterior edge of last molars. Pattern of molar teeth essentially as in *Rattus norvegicus*, but m^1 more elongated, the anterior column especially projecting far forward, with small supplementary tubercle; and the crown length of m^1 more than half the length of entire toothrow. Upper toothrows converging anteriorly; spreading posteriorly; incisors narrow, opisthodont (less so than in *R. dominator*).

Measurements.—Type: Head and body, 183; tail, 185; hind foot, 42; ear from notch, dry, 18.6. Skull of type: Greatest length, 46.1; condylobasal length, 41.3; palatal length, 25.0; zygomatic breadth, 22.6; interorbital breadth, 6.5; mastoid breadth, 7.3; nasals, 18.4 x 5.0; antorbital notch to end of premaxilla, 15.8; mandible, 26.6; upper toothrow, alveoli, 8.8; lower toothrow, alveoli, 8.3; m^1 , crown, 4.6; m^2 – m^3 , crown, 4.4.

Specimens examined.—Two from the type locality.

Remarks.—This peculiar rat resembles externally some of the darker, white-tailed members of the *chrysocomus* group. The characters of the skull and teeth, however, show it to be not a member of that group. The skull mostly resembles, in general characteristics, skulls of *Rattus dominator*, but is much smaller. The pattern of the molar teeth differs considerably from that of either *dominator*, *celebensis*, or *mamosurus*, and agrees well with the pattern normal to *Rattus norvegicus* and its allies. Except for the strictly *norvegicus*-like molar pattern and the projecting antorbital plate, the skull resembles in no other character skulls of *norvegicus*, and it is easy to believe that the relationship is not particularly close with the *norvegicus* group. The general characters of the skull would seem to throw the species in the composite "*xanthurus*" group, regardless of the external resemblance

to the darker species of *chrysocomus*, and the extreme *norvegicus*-like first molar. The species is one of the peculiar forms apparently restricted to the higher mountains of Middle Celebes.

***Rattus punicans*, sp. nov.**

Type from Pinedapa, Middle Celebes. No. 219,625, U. S. National Museum; skin and skull of adult ♀ (teeth little worn); collected February 7, 1918, by H. C. Raven; original number 3501.

Diagnosis.—A rather large, reddish brown rat, not referable to any of the recognized species-groups. Pelage comparatively short and scant, inclined to be wavy, and without spinous hairs. Upperparts and sides chestnut or rich reddish brown, the longer hairs tipped with black; underfur and bases of all hairs light slate or brownish gray (a much older individual has the hairs of rump, lower back, and sides uniform reddish brown to bases). Underparts ochraceous, the bases of hairs pale grayish. Hands and feet brown. Tail shorter than head and body, uniform blackish brown, thinly haired.

Skull resembling in general characters skulls of *Rattus dominator*, but with antorbital plate extending still farther forward; bony palate not extending back of posterior plane of last molars; and incisors orthodont. Pattern of molar teeth essentially as in *Rattus celebensis*, but anterior lamina of m^1 with outer tubercle so reduced as to be practically absent (outer tubercles of second and third laminae well developed).

Measurements.—Type, and a much older female, with teeth much worn, measurements of the latter in parentheses: Head and body, 185 (207); tail, 156 (185); hind foot with claws (dry), 45 (47); hind foot without claws (dry), 42.5 (43.5); ear from notch, dry, 17.4 (19.6). Skull of type: Greatest length, 46.0; condylobasal length, 41.5; palatal length, 22.8; mastoid breadth, 18.3; interorbital breadth, 6.4; mandible, 26.5; maxillary tooththrow, alveoli, 8.9; mandibular tooththrow, alveoli, 8.8.

Specimens examined.—Two from the type locality.

Remarks.—Externally this rat is distinguished from other Celebesian species by its rich chestnut brown coloration. It is possibly related to *Rattus celebensis*, but differs conspicuously from that species, not only in color, but by its short, blackish tail, without white tip; the extended antorbital plate; and the peculiar structure of the first upper molar.

***Sciurus murinus necopinus*, subsp. nov.**

Type from Goenoeng Lehió (southwest from Lake Lindoe), Middle Celebes. No. 218,712, U. S. National Museum; skin and skull of adult ♂ (teeth moderately worn); collected January 20, 1917, by H. C. Raven; original number 3107.

Diagnosis.—Like *Sciurus murinus murinus* Müller and Schlegel, from Menado, North Celebes, but skull with decidedly smaller auditory bullae.

Measurements.—Type: Head and body, 105 mm.; tail, 107; hind-foot, 29. Skull of type: Greatest length, 32.9; condylobasal length, 28.1; zygomatic breadth, 19.4; interorbital breadth, 11.8; mandible, 18.5; maxillary tooththrow, 6.0.

Specimens examined.—Nine, all from Middle Celebes, as follows: Goengeng Lehiu, 1; Koelawi, 1; Pinedapa, 5; Rano Rano, 2.

Remarks.—This subspecies reaches its extreme form in the high mountains of the interior of Middle Celebes. Specimens from Pinedapa near the coast of the Gulf of Tomini, near Mapane, show an approach toward the typical race of North Celebes.

***Sciurus evidens*, sp. nov.**

Type from Pulo Lembeh, off the shore of northeastern Celebes. No. 217,814, U. S. National Museum; skin and skull of adult ♀ (teeth moderately worn); collected January 16, 1916, by H. C. Raven; original number 2525.

Diagnosis.—Like *Sciurus murinus* Müller and Schlegel, from the mainland of Celebes, but paler, decidedly more yellowish or rusty brown.

Measurements.—Type: Head and body, 125 mm.; tail, 107; hind foot, 33. Skull of type: Greatest length, 36.3; condylobasal length, 31.8; zygomatic breadth, 21.9; interorbital breadth, 13.7; nasals, 11.2; mandible, 22.6; maxillary toothrow, 6.2.

Specimens examined.—Six from the type locality.

Remarks.—The paler, more yellowish brown coloration of this form makes the animal conspicuously different from the dark, richly colored *Sciurus murinus* of the neighboring mainland of Celebes.

***Harpyionycteris celebensis*, sp. nov.**

Type from Gimpoe, Middle Celebes, No. 219,349, U. S. National Museum; skin and skull of adult ♀ (sagittal crest well developed); collected August 23, 1917, by H. C. Raven; original number 3176.

Diagnosis.—Like *Harpyionycteris whiteheadi* Thomas, of Mindoro, but molars with crowns lower and cusps relatively higher, and pm² with a conspicuous secondary cusp on each side of main outer cusp.

Measurements.—Head and body, 153; tibia, 30; foot 29 (24); forearm, 90; thumb (with claw), 39; third finger, 170; its metacarpal, 63; greatest length of skull, 43.0; condylobasal length, 41.6; zygomatic breadth, 24.0; interorbital constriction, 7.0; postorbital constriction, 6.2; mandible 35.0; upper toothrow (exclusive of incisors), 16.6; mandibular toothrow, 17.8.

Specimen examined.—The type.

Remarks.—The Celebesian specimen of *Harpyionycteris* differs chiefly from the type of *H. whiteheadi*, hitherto the only known representative of the genus, in the obvious dental peculiarities just described. The external measurements, particularly thumb and foot, indicate a larger animal than *H. whiteheadi*, but the skulls of the two species are essentially identical in size. There are no evident differences in color, but the hairs are lighter basally than at tip in *H. celebensis*, while in the Philippine specimen they are uniform brown throughout.

Mr. Oldfield Thomas has kindly compared the type of *Harpyionycteris celebensis* with that of *H. whiteheadi*.

***Pteropus arquatus*, sp. nov.**

Type from Koelawi, Middle Celebes. No. 218,612, U. S. National Museum; skin and skull of adult male (teeth slightly worn); collected January 5, 1917, by H. C. Raven; original number, 3067.

External characters.—A medium sized animal related to the members of the *alecto* and *conspicillatus* groups (Andersen, p. 96); forearm 133–141 mm.; ear essentially as in *Pteropus alecto*; general color both above and below a variegated golden brown; a dark area extending from muzzle to eyes and ears and across chin and throat; a faint whitish mark over eye; back sharply contrasted dark auburn in young individuals, this area in adults sprinkled to a varying degree with yellowish hairs which often become dominant and in some instances almost completely obscure the brown.

Skull and teeth.—The skull differs from that of *Pteropus alecto* (represented by a large series collected by Mr. Raven at Sigi, Middle Celebes), which it approaches in size, in its broader, more robust general form (zygomatic breadth in type 37 mm., greatest length 66.2; in an adult male *alecto* with the same zygomatic breadth the greatest length is 71.6), and especially in the reduced length of the rostrum (distance from anterior rim of orbit to tip of nasal in the two specimens just mentioned 19.6 and 25.4 mm. respectively), a peculiarity which makes it closely resemble the much smaller skull of *Pteropus capistratus*. Teeth resembling those of *Pteropus alecto* and *P. aterrimus* but m^1 and m_1 not conspicuously different from the preceding premolar, and m^2 with essentially the same structure as m^1 .

Measurements.—Type: Head and body, 230; tibia, 64; foot, 42 (34); forearm, 138; thumb, 60; longest finger, 260; third metacarpal, 93; ear from crown (dry), 26; greatest length of skull, 66.2; condylobasal length, 64.0; zygomatic breadth, 37.0; interorbital constriction, 9.0; postorbital constriction, 7.2; breadth of braincase above zygomatic roots, 24.2; mandible, 52.2; maxillary tooththrow, exclusive of incisors (alveoli), 24.8; crown of m^1 5.0 x 3.6; maxillary tooththrow exclusive of incisors (alveoli), 28.6.

Specimens examined.—Twenty-nine, all from Middle Celebes: Koelawi, 11; Sigi, 18.

***Cheiromeles parvidens*, sp. nov.**

Type from Pinedapa, Middle Celebes. No. 219,350, U. S. National Museum; skin and skull of adult female (teeth not worn); collected February 20, 1918, by H. C. Raven; original number 3547.

Characters.—Like *Cheiromeles torquatus* but general size slightly less and teeth disproportionately smaller.

Measurements.—Type: Head and body, 123; tail, 59; tibia, 28.4; foot, 22; forearm, 72; thumb, 19; third finger, 170; third metacarpal, 74; greatest length of skull, 30.0; condylobasal length, 27.2; zygomatic breadth, 20.0; interorbital constriction, 8.2; lachrymal breadth, 12.2; breadth of braincase, 15.0; mandible, 21.6 (24.2);¹ maxillary tooththrow exclusive of incisors (alveoli), 10.0 (11.2); combined length of m^1 and m^2 , 5.8 (6.6); width of m^1 at middle, 3.2 (3.6) mandibular tooththrow (alveoli), 11.4 (12.8); combined length of m_1 and m_2 , 5.8 (6.6).

¹Measurements in parentheses are those of an adult female *Cheiromeles torquatus* from Borneo (No. 102,463).

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

***Crocidura elongata*, sp. nov.**

Type from Temboan (southwest from Tondano Lake), northeastern Celebes. No. 217,534, U. S. National Museum; skin and skull of adult ♂ (basal suture obliterated, teeth moderately worn); collected August 1, 1916, by H. C. Raven; original number 2790.

Description.—A very long tailed species apparently related to *Crocidura lepidura* Lyon from eastern Sumatra; but lighter colored, with longer tail and larger, light-colored feet. Upperparts grayish sepia; underparts lighter, washed with rusty. Hands and feet flesh color, thinly haired, the hairs of fingers and toes whitish. Tail longer than head and body; dark brown, lighter along underside and at tip; thinly haired, a very few longer hairs near base. Skull long, high, and narrow, with weak maxillary processes. Teeth essentially as in *lepidura*, the second unicuspid smaller than third, and unicuspid all with distinct encircling cingulum shelves.

Measurements.—Type: Head and body, 94; tail, 120; hind foot, 22. Skull: Condylbasal length, 24.1; breadth of braincase, 10.1; maxillary breadth, 7.4; maxillary tooththrow, entire, 11.1; mandibular tooththrow, entire, 10.3.

Specimens examined.—Two from the type locality and two from Pinedapa, eastern Middle Celebes. The latter are young (basal sutures not entirely closed), but appear inseparable from the specimens from the type locality.

***Crocidura nigripes*, sp. nov.**

Type from Temboan (southwest from Tondano Lake), northeastern Celebes. No. 217,545, U. S. National Museum; skin and skull of adult ♂ (basal suture obliterated); collected August 4, 1916, by H. C. Raven; original number 2866.

Description.—A medium sized, dark colored, blackish footed species; externally very closely resembling *Crocidura beatus* Miller from Mindanao. Skull larger than that of *beatus*, with heavier maxillary processes and larger teeth. Glossy blackish sepia above, very slightly browner below; hands, feet and tail blackish; the tail with a few longer hairs, especially on basal half, of a lighter color. Unicuspid teeth rather crowded, the second smaller than third.

Measurements.—Type: Head and body, 80; tail, 51; hind foot, 14. Skull: Condylbasal length, 20.9; breadth of braincase, 9.9; maxillary breadth, 7.3; maxillary tooththrow, entire, 10.1; mandibular tooththrow, entire, 9.2.

Specimens examined.—Eleven, all from northeastern Celebes: Ajermaididi, 1; Temboan, 10.

***Crocidura nigripes lipara*, subsp. nov.**

Type from Gimpoe, Middle Celebes. No. 219,444, U. S. National Museum; skin and skull of adult ♂ (basal suture obliterated; teeth moderately worn); collected September 2, 1917, by H. C. Raven; original number 3207.

Diagnosis.—Like *Crocidura nigripes nigripes* of North Celebes, but larger; the tail and hind foot longer; skull larger.

Measurements.—Type: Head and body, 82; tail, 60; hind foot, 15. Skull: Condylbasal length, 22.5; breadth of braincase, 10.4; maxillary breadth, 7.8; maxillary tooth row, entire, 10.6; mandibular toothrow, entire, 9.8.

Specimens examined.—Sixteen, all from localities in Middle Celebes: Gimpoe, 3; Koelawi, 1; Lake Lindoe, 1; Pinedapa, 1; Toware, 10.

Remarks.—This subspecies attains its extreme size in the mountains of the interior of western Middle Celebes. Specimens from Toware and Pinedapa are slightly smaller, thus less distinct from the typical race of North Celebes.

Crocidura rhoditis, sp. nov.

Type from Temboan, northeastern Celebes. No. 217,550, U. S. National Museum; skin and skull of adult ♂ (basal suture obliterated); collected August 3, 1916, by H. C. Raven; original number 2834.

Description.—A medium-sized, dark brownish species with light-colored feet, the hairs of fingers and toes whitish. Tail longer than in *Crocidura nigripes*, thinly clothed with dark brown hair and with a whitish tip; a few long, light-colored hairs on basal half. Underparts distinctly lighter than back, washed with pale cinnamon brown. Skull larger and higher than that of *Crocidura nigripes nigripes*, with relatively heavier rostrum and much wider narial opening. Teeth essentially as in *nigripes*, the second unicuspid smaller than third.

Measurements.—Type: Head and body, 83; tail, 70, hind foot, 17. Skull: Condylbasal length, 21.7; breadth of braincase, 10.2; maxillary breadth, 8.4; maxillary toothrow, entire, 10.2; mandibular toothrow, entire, 9.8.

Specimens examined.—Eleven from the type locality.

Crocidura lea, sp. nov.

Type from Temboan, northeastern Celebes. No. 217,553, U. S. National Museum; skin and skull of adult ♂ (basal suture obliterated); collected August 3, 1916, by H. C. Raven; original number 2837.

Description.—A small, dark species; much smaller than *Crocidura nigripes* from the same locality, with relatively much longer tail. Upperparts dark fuscous; underparts paler. Feet thinly haired, the toes flesh color; tail thinly haired with blackish brown, a few long, light colored hairs near base. Skull small and delicate, flat, with weak maxillary processes. Second unicuspid smaller than third.

Measurements.—Type: Head and body, 60; tail, 51, hind foot, 14. Skull: Condylbasal length, 17.2; breadth of braincase, 8.1; maxillary breadth, 5.4; maxillary toothrow, entire, 7.8; mandibular toothrow, entire, 7.3.

Specimen examined.—One the type.

Remarks.—Among the four species of *Crocidura* inhabiting northeastern Celebes, this is conspicuous by its small size.

Crocidura levicula, sp. nov.

Type from Pinedapa, Middle Celebes. No. 219,450, U. S. National Museum; skin and skull of adult ♀ (basal suture obliterated); collected February 13, 1918, by H. C. Raven; original number 3521.

Description.—Related to *Crocidura lea* of northeastern Celebes, but rich bistre in color, with shorter tail, smaller hind foot, and smaller skull. Tail more heavily haired and with many more of the soft, longer hairs on basal half. Skull smaller than in any other known Celebesian species; toothrow crowded, the molars squarish and set closely together; second unicuspid smaller than third.

Measurements.—Type: Head and body, 64; tail, 44; hind foot, 11. Skull: Condylbasal length, 16.1; breadth braincase, 7.8; maxillary breadth, 5.3; maxillary toothrow, entire, 7.2; mandibular toothrow, entire, 6.7.

Specimen examined.—One, the type.

Following is a key to the species of *Crocidura* known from Celebes:

Tail longer than head and body.....*C. elongata*.

Tail shorter than head and body.

Very small; head and body under 65; skull under 18; maxillary processes weak.

Color brownish (rich bistre).....*C. levicula*.

Color blackish (dark sepia).....*C. lea*.

Larger; head and body over 65; skull over 20; maxillary processes heavy.

Hands and feet flesh color; tail white tipped.....*C. rhoditis*.

Hands and feet blackish; no white tip on tail.

Smaller; skull 20.9 (North Celebes).....*C. nigripes nigripes*.

Larger; skull 22.5 (Middle Celebes).....*C. nigripes lipara*.

Tarsius fuscus dentatus, subsp. nov.

Type from Laboea Sore (north of Parigi), Celebes. No. 218,071, U. S. National Museum; skin and skull of adult ♂ (teeth slightly worn); collected November 15, 1916, by H. C. Raven; original number 2956.

Diagnosis.—Like specimens of *Tarsius fuscus fuscus* from northeastern Celebes, but more grayish in color, with longer tail, and larger skull. Teeth larger.

Measurements.—Type: Head and body, 120; tail, 270; hind foot, 65. Skull: Greatest length, 38.2 (37.6);¹ condylbasal length, 31.4 (30.6); greatest breadth, 29.6 (29.1); mandible, 24.2 (24.3); maxillary tooth row, entire, 16.0 (15.7); upper molar-premolar series, 13.3 (13.0); mandibular tooth row, entire, 14.8 (14.5).

Specimens examined.—Three from the type locality and one from Parigi.

Tarsius pumilus, sp. nov.

Type from Rano Rano, Middle Celebes. No. 219,454, U. S. National Museum, skin and skull of adult ♀ (teeth considerably worn); collected December 31, 1917, by H. C. Raven; original number 3366.

¹Measurements in parentheses are those of an adult female topotype (No. 218,070).

