

MAMMALS COLLECTED BY DR. W. L. ABBOTT IN THE REGION OF
THE INDRAGIRI RIVER, SUMATRA.

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During August and September, 1901, Dr. W. L. Abbott visited the Indragiri river, eastern Sumatra, and the two large islands opposite its mouth, Linga and Sinkep. The valuable collections which he secured were all presented to the United States National Museum. This paper contains an account of the mammals, and is published here by permission of the Secretary of the Smithsonian Institution.

Linga Island was visited by Dr. Abbott and Mr. C. Boden Klott in July, 1899. At this time nine species of mammals were obtained:¹ *Tragulus* "napu" (= *T. pretiosus*), *Sciurus tenuis*, *S. notatus*, *Mus lingensis*, *Tupaia tana*, *T. malaccana*, *Pteropus vampyrus*, *Macacus* "cynomolgus," and *Semnopithecus maurus*. In 1901 the list was nearly doubled by the addition of *Tragulus javanicus*, *Sus vittatus*, *Ratufa notabilis*, *Rhinosciurus laticaudatus*, *Mus fremens*, *Mus firmus*, *Viverra tanglunga* and *Arctogalidia simplex*. The presence of all of these, except the *Rhinosciurus* and the two rats, was, however, suspected during the earlier visit.

Hitherto the mammal fauna of Sinkep Island has been quite unknown; and I cannot find that any of the accounts of the mammals of Sumatra refer specifically to the region of the Indragiri river.

Manis javanica Desmarest.

An adult female was dug from a burrow in a hillside on Sinkep Island, September 1, 1901. Total length, 440; head and body, 220; tail, 220. Weight, 4.7 kg. The uterus contained a fetus 92 mm. in length. In this specimen the tail measures only 25 mm. The outlines of the scale are clearly marked on head, body and tail, but very indistinctly on the legs.

Tragulus javanicus (Gmelin).

Five skins from Sinkep Island and eleven skins and three specimens in formalin from Linga. Traguli of this and the two follow-

¹ Miller, *Proc. Washington Acad. Sci.*, II, p. 242, August 20, 1900.

ing species were trapped in the jungle by natives and brought in considerable numbers for sale.

The series from the two islands show very little individual variation. The constancy of coloring in this species as compared with the extreme plasticity of the *napu* is very striking, particularly when it is remembered that the ranges of the two coincide, and that the animals are everywhere exposed to like conditions of environment.

Tragulus pretiosus sp. nov.

1900. *Tragulus napu* Miller, Proc. Washington Acad. Sci., II, p. 227, August 20, 1900. Not of F. Cuvier.

Type.—Adult male (skin and skull), No. 113,031 United States National Museum. Collected on Linga Island, South China Sea, August 27, 1901, by Dr. W. L. Abbott. Original number 1,238.

Characters.—A richly colored yellowish member of the *napu* group. Throat markings normal, the anterior white stripes not elongated or margined with black, the dark stripes brown. Neck yellowish-brown with narrow median black stripe. Belly heavily shaded with yellowish-brown.

Color.—Upper parts orange-ochraceous darkening toward ochraceous-rufous on sides of neck and outer surface of legs, and lightening to orange-buff on sides of body, the hairs everywhere ecru-drab at base and black at tip. The black tips are most conspicuous over middle of back, where they produce a heavy dark shading slightly in excess of the orange-ochraceous. On sides of body they are much less noticeable, and on sides of neck and head and outer surface of legs would readily pass unnoticed. Crown and median line of neck black, the latter noticeably sprinkled with ochraceous-rufous. Throat markings normal, the hairs of the dark bands blackish at base and heavily annulated with dull ochraceous-rufous. Collar narrow but distinct, its color like that of sides of body. Under parts behind throat markings mostly orange-buff mixed with drab. There is always, however, a pure white patch on chest between front legs, and another in hypogastric region between hind legs, the former generally continuous with narrow white line on inner side of leg, the latter always so. The two white patches occasionally spread toward each other so that they meet along median line. Tail rather dull ochraceous-rufous above, pure white below and at tip.

Skull and Teeth.—The skull and teeth are similar to those of *Tragulus canescens*. The supposed peculiarities² of the first specimen obtained by Dr. Abbott prove to be merely the result of senile changes.

Measurements.—External measurements of type: Total length, 625; head and body, 545; tail vertebræ, 80; hind foot, 142; hind foot without hoofs, 125. Weight, 3.4 kg. Average of five specimens from the type locality: Total length, 654 (625–670); head and body, 566 (545–580); tail vertebræ, 88 (80–95); hind foot, 141 (140–142); hind foot without hoofs, 126 (125–127); weight, 3.7 (3.1–4.3).

Specimens Examined.—Ten (one in alcohol), all from Linga Island.

Remarks.—Examination of the extensive series of *Tragulus* in Dr. Abbott's second Linga collection convinces me that I was wrong in referring the specimen obtained during his first visit to the island to *T. napu*.³ The reasons are briefly as follows: The animal described and figured by F. Cuvier was much more gray than the Linga species; the outermost of the white throat stripes was considerably longer, extending "beyond the cheeks;" and both of the lateral white stripes were bordered with black. The throat pattern is now known to be so constant in each local form of this group that the very striking characters mentioned by Cuvier cannot be regarded as due to mere individual variation. Finally, the marked differences between the napu of Linga and that of the neighboring island of Sinkep furnish additional ground for the belief that a third form occurs in Sumatra.

Tragulus nigricollis sp. nov.

Type.—Adult male (skin and skull), No. 113,121 United States National Museum. Collected on Sinkep Island, South China Sea, September 6, 1901, by Dr. W. L. Abbott. Original number 1,292.

Characters.—Similar to *Tragulus pretiosus* but slightly larger; color of body lighter, but neck and dark throat markings black, inconspicuously speckled with brown.

Color.—General color as in *Tragulus pretiosus*, but ground tint everywhere a shade less yellow, that of the sides scarcely darker

² See *Proc. Biol. Soc. Washington*, XIII, p. 186, December 21, 1900.

³ *Proc. Washington Acad. Sci.*, II, p. 227, August 20, 1900.

than the cream-buff of Ridgway. The black clouding of the back is never in excess of the orange-ochraceous. As if to compensate for the relative lack of black on the body, the entire neck is of this color, as in *Tragulus bunguranensis*, its uniformity scarcely broken by an inconspicuous speckling due to the presence of a narrow yellowish-brown annulation on many of the hairs. These annulations are more numerous at sides of neck, but a few may be found even along median line. Throat markings normal and exactly similar to those of *Tragulus pretiosus*, except that the dark streaks are black, speckled with yellowish-brown to about the same extent as sides of neck. Collar well defined and coarsely grizzled, its light ground color nearly the same as that of sides of body though a trifle more yellow.

Skull and Teeth.—Except for their slightly greater size the skull and teeth of *Tragulus nigricollis* do not differ appreciably from those of *T. pretiosus*, though there appears to be a tendency toward greater narrowness in the general form of the skull.

Measurements.—External measurements of type: Total length, 620; head and body, 540; tail vertebrae, 80; hind foot, 138; hind foot without hoofs, 123. Weight, 4 kg. Average of five specimens from the type locality: Total length, 647 (620–670); head and body, 566 (540–590); tail vertebrae, 81.6 (77–85); hind foot, 142 (138–147); hind foot without hoofs, 126 (123–130). Weight, 4.4 kg. (4–4.6).

Cranial measurements of type: Greatest length, 116 (108);⁴ basal length, 109 (101); basilar length, 104, (95); occipito-nasal length, 103 (99); length of nasals, 34 (33.6); diastema, 11 (10); zygomatic breadth, 50 (49); least interorbital breadth, 31 (29); mandible, 92 (88); maxillary toothrow (alveoli), 40 (36); mandibular toothrow (alveoli), 45.4 (42).

Specimens Examined.—Five, all from Sinkep Island.

Remarks.—In general appearance *Tragulus nigricollis* more closely resembles the black-necked *T. bunguranensis* than it does *T. pretiosus*. It is readily separable from the Bunguran animal by its somewhat paler general coloration and by its normal throat markings. The series shows no individual variation worthy of note, except that in one specimen (⁷, No. 113,124) the white

⁴Measurements in parentheses are those of the type of *Tragulus pretiosus*.

throat stripes are interrupted by the brown, producing a pattern suggestive of that of *T. bunguranensis*.

Sus vittatus Müller and Schlegel.

A female pig from Linga Island and a similar specimen from the Indragiri river, Sumatra, appear to be referable to the Sumatran representative of *Sus vittatus*. They are small animals, scarcely exceeding *Sus nieobarensis* in size, therefore quite distinct from *Sus cristatus*.

Sus oi Miller.

1902. *Sus oi* Miller, Proc. Biol. Soc. Washington, XV, p. 51, March 5, 1902.

The discovery of the nang-oi, the Sumatran representative of *Sus barbatus* and *Sus longirostris*, is one of the most interesting results of Dr. Abbott's work in the East Indies. The animal is among the largest of wild pigs, the type specimen, an adult but not aged boar, weighing 113 kg. (250 lbs.). Its measurements are as follows: Total length, 1,870; head and body, 1,575; tail, 295; height at shoulder, 850; height at rump, 800; ear from meatus, 88; ear from crown, 97; width of ear, 75. Skull: Greatest length, 480; basal length, 405; zygomatic breadth, 162. Although only one specimen was secured, the nang-oi is abundant in the forests and sago plantations along the banks of the Indragiri river. Its footprints may always be distinguished from those of *Sus vittatus* by their much greater size.

Ratufa palliata sp. nov.

Type.—Adult male (skin and skull), No. 113,162 United States National Museum. Collected on the Indragiri river, eastern Sumatra, September 23, 1901, by Dr. W. L. Abbott. Original number 1,327.

Characters.—In general similar to *Ratufa bicolor* of Java, but yellow areas less bright, blackish of tail appearing conspicuously at surface, and whole back from shoulders to hips light yellowish brown in striking contrast with blackish thighs, neck and outer surface of front legs. Skull with nasals shorter and broader than in the Javan animal.

Color.—Back and sides uniform cream-buff a little tinged with clay color, especially along median dorsal region. Posteriorly this darkens abruptly through dull ochraceous-rufous to the clear blackish-brown of thighs and outer surface of hind legs. In

median line the dull ochraceous-rufous extends between thighs to cover about 100 mm. of base of tail. Anteriorly the light mantle darkens much more gradually through the same dull ochraceous-rufous to the dark reddish-brown neck and blackish outer surface of front legs. Forehead and anterior portion of crown like mantle. At region just in front of ears the abrupt change takes place to color of neck. Under parts, checks, sides of neck and inner surface of limbs light yellow. The exact shade is very nearly the cream-buff of Ridgway (like that of mantle, but without the tinge of clay color), except on chest, throat and inner surface of front legs, where it brightens to buff. On belly the cream-buff is somewhat obscured by the appearance at surface of the dark slate-gray basal portion of hairs. Feet blackish-brown, the cream-buff of inner surface spreading conspicuously over wrist and forearm, and slightly just below ankle and on outer edge of sole. Tail (except proximal 100 mm.) dark bistre throughout, the hairs everywhere with whitish cream-buff tips, 10-15 mm. in length. These tips nowhere conceal the bistre, which by contrast appears nearly black. On under surface they are so arranged as to form a grizzled yellowish-white border to the clear bistre median stripe. Above they cover the surface almost uniformly, producing a frosted appearance, through which may be detected a faint indication of dark cross bars, ten of which are distinguishable in favorable light.

Skull and Teeth.—Skull similar to that of *Ratufa bicolor*, but braincase more arched and rostrum shorter. The nasals are distinctly broader posteriorly, and as a result the nasal branches of the premaxillaries are narrower. Teeth as in *Ratufa bicolor* and *R. melanocephala*.

Measurements.—External measurements of type: Total length, 770; head and body, 345; tail vertebrae, 425; hind foot, 84 (78).

Cranial measurements of type: Greatest length, 68 (69);⁵ basal length, 57 (58); basilar length, 53 (54); length of nasals (along median suture), 21 (23); breadth of both nasals together anteriorly, 12 (13); breadth of both nasals together posteriorly, 9 (5); least interorbital breadth, 29 (27); zygomatic breadth, 42 (43); mandible, 42 (45); maxillary molar series (alveoli), 12.8 (13); mandibular molar series (alveoli), 13.8 (14).

⁵ Measurements in parentheses are those of an adult female *Ratufa bicolor* from western Java.

Specimens Examined.—Three, the type; also two other specimens from Sumatra, exact locality not known.

Remarks.—The three specimens show no marked variation in color. The type is rather lighter than either of the others, both of which are in somewhat worn pelage. Both of these have the base of the tail nearly black, and in one the pale mantle is divided by an indistinct dark-brown dorsal line about 30 mm. in breadth. In *Ratufa bicolor* the back is black, thickly sprinkled with yellowish-white hair tips, particularly on posterior half. There is thus no indication of the pale mantle of *R. palliata*. The tail in the Javan animal is clear buff above, the black bases of the hairs not appearing at surface except at tip. The Javan and Sumatran forms are, therefore, readily distinguishable.

Ratufa affinis (Raffles).

Twelve specimens from Sinkep Island. These are not distinguishable from true *Ratufa affinis*, but the material representing the latter is not wholly satisfactory and the Sinkep form may eventually prove to be distinct.

Ratufa hypoleuca (Horsfield).

1824. *Sciurus hypoleucus* Horsfield, Zoological Researches in Java and the neighboring islands (pages not numbered).

Three adults (♂, No. 113,163; ♂, No. 113,164, and ♀, No. 113,165) were taken in heavy forest on the banks of the Indragiri river, September 24, 1901. They represent a whitish-bellied species closely related to *Ratufa affinis*, but readily distinguishable by the darker ground color of the upper parts (approximately cinnamon in *hypoleuca*, isabella color in *affinis*) and by the grayish-white cheeks and face which form a strong contrast with the crown and sides of neck. As the type of Horsfield's *Sciurus hypoleucus* was obtained by Raffles, it was probably taken near Bencoolen, on the southwest coast of Sumatra. It is not improbable, therefore, that the Indragiri form may prove to be distinct, though so far as can be determined from the original description Dr. Abbott's specimens closely resemble those examined by Horsfield. The measurements of the three individuals are as follows (arranged in order as above): Total length, 705, 700 and 700; head and body, 330, 320 and 330; tail vertebrae, 375, 380 and 370; hind foot, 77, 78 and 79; hind foot without claws, 70, 71 and 73. Cranial measurements of adult male (No. 113,163): Greatest length, 62

(61);⁶ basal length, 52.4 (52); basilar length, 49 (49); length of nasals, 19.6 (19.8); least interorbital breadth, 26 (26); zygomatic breadth, 39 (39); mandible, 38.4 (37); maxillary molar series (alveoli), 12 (12.8); mandibular molar series (alveoli), 13 (14).

Ratufa notabilis sp. nov.

Type.—Adult male (skin and skull), No. 113,064 United States National Museum. Collected on west coast of Linga Island, August 24, 1901, by Dr. W. L. Abbott. Original number 1,210.

Characters.—Size large, fully equal to that of *R. bicolor* and *R. melanopepla*. Upper parts uniform rich dark-brown; under parts, feet, checks and face yellowish-white in conspicuous contrast.

Color.—Upper parts and outer surface of legs burnt umber, slightly variegated by the faint tawny annulations which are present on most of the hairs. These annulations are less distinct than in *R. pyrsonota*, but nevertheless quite evident, particularly on neck and shoulders. On middle of back and in lumbar region many of the hairs are buffy white, producing a faint lighter cast. Under parts, feet, checks and inner surface of legs clear cream-buff, more yellow over middle of belly. Muzzle and face somewhat less yellowish, but distinctly grizzled by a fine admixture of brown, particularly on anterior portion of crown and in region between eyes. Tail with the hairs everywhere whitish cream-buff at base. On dorsal and lateral surfaces of tail the terminal half is burnt umber, but ventrally the cream-buff is clear, except for the darker line caused by the appressed short hairs, many of which are brown.

Skull and Teeth.—The skull resembles that of *Ratufa melanopepla* in size, but in form appears to be slightly less elongate, a difference which may readily prove to be inconstant. Teeth as in *R. melanopepla*.

Measurements.—External measurements of type: Total length, 780; head and body, 345; tail vertebrae, 435; hind foot, 82 (73).

External measurements of an adult female from the type locality: Total length, 770; head and body, 335; tail vertebrae, 435; hind foot, 80 (72).

Cranial measurements of type: Greatest length, 68; basal length,

⁶ Measurements in parentheses are those of an adult male *Ratufa affinis* from Singapore, the type locality.

58; basilar length, 55; length of nasals, 22; least interorbital breadth, 27.4; zygomatic breadth, 44; mandible, 45; maxillary molar series (alveoli), 13; mandibular molar series (alveoli), 15.

Specimens Examined.—Two, both from the type locality.

Remarks.—*Ratufa notabilis* is such a conspicuous, easily recognizable species that it requires no comparison with its allies. The Javan squirrel described by Desmarest under the name *Sciurus albiceps* has a similar whitish face; but Desmarest's animal was much smaller than *Ratufa notabilis*, and will doubtless prove to be the Javan representative of *R. hypoleuca*.

The two specimens are in all respects similar to each other, except that the tail of the female is just beginning to change from the bleached pelage to the fresh coat of the breeding season. On the body the change is completed. The annulations on the hairs of the back are more distinct in the female than in the male, but the latter has the more noticeable sprinkling of whitish hairs over the lumbar region.

***Sciurus vittatus* Raffles.**

Two skins from Linga Island, four from Sinkep Island, and six from the Indragiri river, Sumatra. The Sinkep specimens are slightly paler than the others, and the black lateral stripe is a little less well defined. The characters, however, are too inconstant to be regarded as of much importance.

***Sciurus tenuis* Raffles.**

An adult male and female from the Indragiri river, Sumatra. They are in every respect indistinguishable from the Singapore animal.

***Sciurus melanops* sp. nov.**

Type.—Adult female (skin and skull), No. 113,152 United States National Museum. Collected on Indragiri river, eastern Sumatra, September 15, 1901, by Dr. W. L. Abbott. Original number 1,307.

Characters.—A member of the *S. prevostii* group. Color exactly as in *S. humei* (Bonhote), except that the cheeks are black, scarcely grizzled with gray.

Color.—Tail and entire dorsal surface of head and body clear shining black. Cheeks and sides of neck black, but the color dulled by a very faint admixture of gray and red. This grizzling

is so inconspicuous as to be scarcely noticeable when a specimen is held at arm's length. A faint grayish patch immediately behind ear. The whiskers spring from a sharply defined grayish white area about 15 mm. in diameter. A similar whitish patch, 3 mm. in diameter, surrounds roots of suborbital bristles. Lateral stripe buffy white. As in *S. humei* it extends from axillary region to heel and includes entire outer surface of hind leg. Under parts, feet, inner surface of hind legs and entire lower portion of front legs a bright brownish-red, intermediate between the chestnut and rufous of Ridgway. On outer side of hind leg the red comes in contact with the white lateral stripe, but on inner side it is separated from the white by a line of black about 10 mm. in diameter, which extends as far as heel. Shoulder and outer surface of humerus orange-ochraceous, sharply defined from the black contiguous area, but fading gradually through various shades of ochraceous into the buffy white of the lateral stripe.

Skull and Teeth.—The skull is similar to that of *Sciurus humei*, but the auditory bullæ are slightly smaller and the interpterygoid space is a trifle narrower. Molars uniformly smaller than in the species from the Malay Peninsula, the difference particularly noticeable in the posterior lower tooth.

Measurements.—External measurements of type: Total length, 505; head and body, 255; tail vertebrae, 250; hind foot, 60; hind foot without claws, 58. Two other adults measure: Total length, ♂ 535, ♀ 500; head and body, ♂ 270, ♀ 255; tail vertebrae, ♂ 265, ♀ 245; hind foot, ♂ 64, ♀ 60; hind foot without claws, ♂ 60, ♀ 56.

Cranial measurements of type: Greatest length, 57 (60);¹ basal length, 51 (53); basilar length, 48 (50); palatal length, 26 (26.6); length of nasals, 18.8 (19.4); interorbital breadth, 23 (24.4); zygomatic breadth, 34 (37); mandible, 38 (41); maxillary toothrow (alveoli), 11 (11.8); mandibular toothrow (alveoli), 11.4 (14).

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

Remarks.—This squirrel is so readily distinguishable from its allies by the coloration of the cheeks that no further comparisons are necessary. The three specimens show no individual variations worthy of note.

¹ Measurements in parentheses are those of an adult female *Sciurus humei* from Trong, lower Siam.

Nannosciurus pulcher sp. nov.

Type.—Adult female (skin and skull), No. 113,131 United States National Museum. Collected on Sinkep Island, South China Sea, September 4, 1901, by Dr. W. L. Abbott. Original number 1,274.

Characters.—Like *Nannosciurus melanotis* Müller and Schlegel, but back paler, belly more ochraceous, and light nuchal patch very distinct.

Color.—The colors of this squirrel are difficult to describe, as they cannot be exactly matched in Ridgway's *Nomenclature*. The back, sides, and outer surface of legs rather closely resemble wood-brown, with a tinge of olive and a scarcely perceptible grizzle caused by the black tips of the hairs, but the brown itself is more nearly a pale raw umber. Crown similar to back, but strongly tinged with russet. Nape whitish, in strong contrast with surrounding parts, the hairs faintly tipped with black. Inner surface of ear rather thickly sprinkled with hairs in color similar to back. These extend over anterior border of outer side of ear, but the remainder of the outer surface is black, continuous with an elongated black patch which lies behind ear and sends back a narrow, ill-defined border to whitish nape patch. Side of head with yellowish white line about 3 mm. in width, beginning at side of muzzle just above nostril and extending back to a point slightly behind posterior border of ear. This stripe includes lower eyelid. From inner canthus of eye to muzzle it is faintly bordered with black. The stripes of the opposite sides are separated on muzzle by a space of about 2 mm. Under parts, feet, and inner surface of legs a pale tawny, closely approaching the ochraceous-buff of Ridgway, but somewhat more yellow. Tail a uniform coarse grizzle of tawny, black and white, each hair with six color bands. These are as follows, beginning at base: (1) Tawny, 2 mm.; (2) slate-gray, 1.5 mm.; (3) tawny, 4 mm.; (4) black, 5 mm.; (5) white, 3 mm.; (6) black, 1 mm. At tip the pattern changes to 10 or 11 alternating bands of black and tawny, the black terminal area increasing to 7–10 mm. As a result the white element of the grizzle is absent in this region.

Skull and Teeth.—The skull and teeth apparently resemble those of *N. whiteheadi* rather closely, except that the rostrum is less elongate and the upper incisors less projecting forward. The specimens of both species at hand are, however, in poor condition. The

skull is readily distinguished from that of *N. exilis* by its larger size.

Measurements.—External measurements of type: Total length, 165; head and body, 88; tail vertebræ, 77; hind foot, 25 (23).

Specimens Examined.—One, the type.

Remarks.—In all probability this is the Sumatran form of *Nannosciurus melanotis* described and figured by Temminck and Schlegel.⁸ It is not impossible, however, that the Sinkep animal may prove to be distinct from that of the larger island. *Nannosciurus pulcher* is readily distinguishable from *N. melanotis*, as well as from all other known members of the genus, by the conspicuous, sharply defined, whitish nape patch.

Rhinosciurus laticaudatus (Müller and Schlegel).

A very old male was taken on Linga Island, August 28, 1901. It was brought in by Malays, who had secured it in a jerot or snare. As compared with a young female from Sirbassen Island, South Natunas, this specimen is darker above and less yellowish below.

Mus lingensis Miller.

Seventeen specimens (seven skulls without skins) from Linga Island, and thirty-three (eight in alcohol and twelve skulls without skins) from Sinkep Island. The two series agree well with each other in bearing out the characters of the species—that is, in less yellow coloration and narrower, more elongate palate, as compared with *Mus surifer*.

Mus sp.

The imperfect skull of a small brown rat taken on Linga Island, August 30, 1901 (♂, No. 113,053), represents a species closely related to *Mus asper*. Its exact identification is impossible.

Mus fremens sp. nov.

Type.—Adult male (skin and skull), No. 113,087 United States National Museum. Collected on Sinkep Island, South China Sea, September 4, 1901. Original number 1,273.

Characters.—A member of the *sabanus-voeiferans* group, but color less tawny than in any of the forms hitherto known.

Color.—Back and sides a fine grizzle of drab, ochraceous-buff, and blackish horn color, the latter much in excess everywhere except

⁸ Verhandel. over de Natuurlijke Geschiedenis der Nederl. overzeesche Bezittingen, p. 98, Pl. XIV, fig. 5.

on lower part of sides, where it gives place to the ochraceous-buff and drab. The general effect is drab, much overlaid with blackish on back and lightened by the ochraceous-buff on sides, shoulders, neck and flanks. Outer surface of front legs drab, darkening to hair-brown. Outer surface of hind legs similar but distinctly suffused with ochraceous-buff. Top of head like back, but more finely grizzled, sides of head dull ochraceous-buff. Muzzle hair-brown. A blackish ill-defined eye ring. Under parts whitish cream-buff. Feet the same, but metapodials heavily shaded with hair-brown. Ears and tail dark brown, the latter indistinctly whitish beneath and throughout distal third.

Skull and Teeth.—The skull and teeth appear to be essentially similar to those of *Mus vociferans*.

Measurements.—External measurements of type: Total length, 558; head and body, 234; tail, 324; hind foot, 47 (44.6). External measurements of an adult female from Linga Island: Head and body, 234; hind foot, 46 (44).

Specimens Examined.—Two, one from Sinkep and one from Linga.

Remarks.—In coloration *Mus fremens* is unlike any of the members of the group to which it belongs. The general pattern is the same, but the yellowish tints are greatly reduced, both in extent and brightness, while there is a corresponding increase in the drab and black. In *Mus strepitans* there is as much black on the back, but in this species the yellow tints retain all their brightness, and the drab is scarcely visible. Both specimens of *Mus fremens* are in fresh, unworn pelage. The Linga skin differs somewhat from the type in the paler color of its head and more yellowish outer surface of the limbs. Whether these differences are due to anything more than individual variation it is, of course, impossible to determine without more material.

Mus firmus sp. nov.

Type.—Adult female (skin and skull), No. 113,038 United States National Museum. Collected on Linga Island, August 25, 1901, by Dr. W. L. Abbott. Original number 1,215.

Characters.—Similar to *Mus integer* from Sirhassen Island, South Natunas, but size slightly greater and color much less yellow. Mammæ 8.

Color.—Back and sides a fine grizzle of blackish-brown and

pale, dull buff, the two colors nearly equally mixed on back, but the buff in excess on sides, where, however, it is clouded by the appearance at surface of the gray (very nearly Ridgway's No. 6) of the under fur. The longer hairs show a distinct bluish metallic lustre. Under parts and inner surface of legs buff to base of hairs. Head similar to back, but grizzle much less coarse, and cheeks washed with buff. Lips and chin whitish. Feet dull dark brown. Ears and tail dark brown.

Fur and Other External Characters.—As in *Mus integer*.

Skull and Teeth.—The skull and teeth closely resemble those of *Mus integer*, except that the interpterygoid space is wider and the first upper molar somewhat larger.

Measurements.—External measurements of type: Total length, 500; head and body, 245; tail, 255; hind foot, 50 (48.6); ear from meatus, 24; width of ear, 18.

Cranial measurements of type: Greatest length, 53; basal length, 46; basilar length, 43; length of nasals, 21.4; diastema, 15; zygomatic breadth, 27; mandible, 32.4; maxillary toothrow (alveoli), 9.4; mandibular toothrow (alveoli), 10.

Specimens Examined.—Seven (one skull without skin, and one entire animal in alcohol), all from Linga Island.

Remarks.—Two specimens of *Mus firmus* have been compared with the type of *Mus mülleri* by Dr. F. A. Jentink, of the Leyden Museum. They prove to represent a larger animal with more black on the back, and differing also in certain cranial peculiarities, which, however, Dr. Jentink does not specify.

***Viverra tangalunga* Gray.**

An adult female was trapped on Linga Island by Malays, August 27, 1901. The uterus contained three embryos.

***Aretogalidia simplex* sp. nov.**

Type.—Adult male (skin and skull), No. 113,069 United States National Museum. Collected on Linga Island, South China Sea, August 30, 1901, by Dr. W. L. Abbott. Original number 1,254.

Characters.—Size and general appearance as in *Aretogalidia inornata*, of Bunguran Island, North Natunas, but color distinctly darker and median dorsal line plainly visible.

Color.—Back, sides and outer surface of legs a rather dark, finely grizzled, silvery-gray, the elements of which are as follows:

Under fur dark broccoli-brown, the shorter hairs tipped with dull, light cream-buff, the longer with black, and all showing a distinct gloss in certain lights. The general effect is darker and less yellow than in *Arctogalidia inornata*. A distinct trace of the median dorsal line extends from shoulders to lumbar region, but the lateral lines are absent. Head, ears, feet, lower portion of front legs and distal half of tail blackish, the forehead, crown and cheeks finely and inconspicuously grizzled with gray. Basal half of tail like back, but slightly darker. Under parts dirty gray, slightly but distinctly tinged with yellow, particularly on throat and under surface of neck. Sides of neck buff (a little less yellow than that of Ridgway), forming a rather conspicuous contrast with surrounding parts.

Skull and Teeth.—The skull and teeth are essentially as in *Arctogalidia inornata*, but the premolars appear to be more robust.

Measurements.—External measurements of type: Total length, 1,050; head and body, 515; tail, 535; hind foot, 81 (77).

Cranial measurements of type: Greatest length, 106; basal length, 98; basilar length, 94; median palatal length, 56; breadth of palate between anterior molars, 14.6; zygomatic breadth, 58; constriction in front of postorbital processes, 17; constriction behind postorbital processes, 14; mandible, 78; maxillary tooththrow (exclusive of incisors), 37; mandibular tooththrow (exclusive of incisors), 41.

Specimens Examined.—Two, the type from Linga Island and an immature male from Sinkep.

Remarks.—By its small size and obsolete dorsal markings this species is readily distinguishable from *Arctogalidia leucotis* and *A. stigmatica*. Its relationship with the small *A. inornata* of Bunguran Island is much more close; but the two small species differ very considerably in general coloration.

Tupaia malaccana Anderson.

An adult male from Linga Island, two adult females from Sinkep Island, and an adult male from the Indragiri river.

Tupaia phæura sp. nov.

Type.—Adult male (skin and skull), No. 113,148 United States National Museum. Collected on Sinkep Island, South China Sea, September 4, 1901, by Dr. W. L. Abbott. Original number 1,275.

Characters.—Like *Tupaia ferruginea* from Singapore, but with much darker tail, its upper and lower sides concolor with corresponding surfaces of body.

Color.—Dorsal surface of head, body and tail a fine grizzle of seal-brown and dark ferruginous, the ferruginous in excess on head, shoulders and anterior portion of back, the seal-brown in excess on tail and posterior half of back. The color is most dark on rump, lumbar region, flanks and basal third of tail. Chest, throat, chin, cheeks, muzzle, sides of neck and front legs olive-buff, rather darker than that of Ridgway, brightest along middle of throat. On the thinly haired posterior half of the ventral surface the olive disappears, leaving a dull tawny, which extends over inner surface of hind legs, and, somewhat brightened, forms the light element of the grizzle of under side of tail, where it is distinctly in excess of the seal-brown. Feet dusky brown.

Skull and Teeth.—The skull and teeth do not differ appreciably from those of *Tupaia ferruginea*.

Measurements.—External measurements of type: Total length, 335; head and body, 195; tail vertebrae, 140; hind foot, 46 (43.6). Two adult females from the type locality (Nos. 113,147 and 113,149) measure respectively: Total length, 325 and 335; head and body, 185 and 195; tail vertebrae, 140 and 140; hind foot, 43 (40) and 44 (41).

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

Remarks.—*Tupaia phaura* is closely related to true *T. ferruginea* the type locality of which may be assumed to be Singapore, though easily recognizable by its much darker tail.

Macacus "cynomolgus" Auct.

This monkey was common on the banks of the Indragiri river, Sumatra. An adult male taken on September 21, 1901, does not differ appreciably from specimens from the Malay Peninsula.

Semnopithecus maurus (Schreber).

Two were shot from a drove of twenty or more in a sago plantation on Linga Island, August 25, 1901. Along the banks of the Indragiri river the animal was plentiful. Four specimens were secured. In the Linga skins the gray tips of the hairs on back and shoulders are less conspicuous than in those from the Indragiri river.

Semnopithecus sumatranus Müller and Schlegel.

1830. *Semnopithecus femoralis* Horsfield, Appendix to Memoir of Life of Raffles, p. 642. *Nomen nudum*.

1839-44. *Semnopithecus sumatranus* Müller and Schlegel, Verhandl. over de natuurlijke Geschiedenis der Nederl. overzecsche bezittingen, p. 73.

1851. *Semnopithecus femoralis* Horsfield, Catal. Mamm. Mus. Hon. East Ind. Company, p. 10.

This monkey was met with on the banks of the Indragiri river, where it was less numerous than *S. maurus*. Native name, káhka. Two specimens taken.

Hylobates hoolock (Harlan).

Five gibbons taken on the banks of the Indragiri river appear to be referable to this species. They agree perfectly with the description given by Blanford, and are evidently distinct from *H. lar*, numerous specimens of which have been collected by Dr. Abbott on the Malay Peninsula.