

ADDITIONAL NOTES ON MAMMALS OF THE RHIO-LINGA ARCHIPELAGO, WITH DESCRIPTIONS OF NEW SPECIES AND A REVISED LIST.

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Since the publication of the very complete list of the mammals of the Rhio-Linga Archipelago, by Mr. Gerrit S. Miller, jr.,<sup>a</sup> and a short paper by me on the mammals of Batam Island, collected by Mr. C. Boden Kloss,<sup>b</sup> Dr. W. L. Abbott has presented to the U. S. National Museum mammals from five other islands of the Rhio-Linga Archipelago. These specimens are mentioned in detail below, among them being three species hitherto undescribed. The islands recently visited by Dr. W. L. Abbott are Bulan (or Bulang), Jombol (or Chombol), Galang, Setoko, and Penjait Layer. The first three are shown on the map of the Rhio-Linga Archipelago published with Mr. Miller's paper. Setoko appears on the map lying just northeast of Rempang, but is not named. Penjait Layer is a small island not shown on the map, but lies to the south of Setoko, from which it is separated by a strait about one-third mile wide.

At the conclusion of this paper is given a list of all the mammals known to occur on the islands of the Rhio-Linga Archipelago based upon the present material and the two papers mentioned.

MANIS JAVANICA Desmarest.

1822. *Manis javanica* DESMAREST, Mammalogie, Pt. 2, p. 37.

Skin and skull of an adult male, from Pulo Bulan, Cat. No. 144418, U.S.N.M. Measurements: Head and body, 600 mm.; tail from anus, 505; hind foot, 99; weight, 9 kilos (20 pounds); greatest length of skull, 101; zygomatic width, 31.5. The zygomatic arch is complete and bony on each side. On the right side the posteriorly directed zygomatic process of the maxilla has met the anteriorly directed process of the squamosal. On the left side a similar condition exists, but the ossification has taken place in such a manner that a distinct

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<sup>a</sup> Proc. U. S. Nat. Mus., XXXI, No. 1485, pp 247-286, Sept. 11, 1906.

<sup>b</sup> Idem, XXXI, No. 1502, pp. 653-657, Jan. 16, 1907.

bony segment is intercalated between the process of the maxilla and that of the squamosal, presenting the appearance of a true jugal or malar bone.

"Caught a *Manis* in Bulan. It was up a small tree about 20 feet and I could not at first tell what it was. I cut the sapling down and seized the *Manis* by the tail as he was running away." W. L. A.

SUS RHIONIS Miller.

1906. *Sus rhionis* MILLER, Proc. U. S. Nat. Mus., XXX, No. 1466, p. 749, June 13, 1906. (Type-locality, Pulo Ungar.)

The skins and skulls of two pigs collected on Pulo Jombol are clearly referable to this species, agreeing in all essential respects with the original series from the islands of Ungar, Sugi Bawa, and Great Karimon.

For external and cranial measurements see table below.

SUS VITTATUS Müller and Schlegel.

1839-44. *Sus vittatus* MÜLLER and SCHLEGEL, Verh. Natur. Gesch. Nederl. Bezitt. Zool., p. 172, pls. 29, 32. (Type-locality, Sumatra, restriction by Jentink, Notes Leyden Museum, XXVI, p. 175, Oct. 16, 1905.)

The skin and skull of an adult male from Pulo Penjait Layer is indistinguishable from the Sumatran *Sus vittatus* and is quite distinct from *Sus rhionis* Miller, found elsewhere on the Rhio-Linga Archipelago.

For external and cranial measurements see table below.

External and cranial measurements of *Sus rhionis* and *Sus vittatus*.

Dimensions.	Cat. No. 144380, adult male, Pulo Jombol, <i>Sus rhionis</i> .	Cat. No. 144379, nearly adult female, Pulo Jombol, <i>Sus rhionis</i> .	Cat. No. 144421, adult male, Pulo Penjait Layer, <i>Sus vittatus</i> .
Head and body $a$ , mm.....	1,150	1,025	1,160
Tail $a$ .....	255	195	220
Hindfoot $a$ .....	259	244	250
Height at shoulder $a$ .....	560	490	500
Weight in pounds (in kilos) $a$ .....	95(43)	58(26)	94(43)
Upper length of skull, mm.....	297	270	311
Basal length.....	265	241	272
Basilar length.....	250	225	256
Palatal length.....	187	166	192
Width of palate at $pm^1$ .....	30	27	31
Least width of palate at front of $m^3$ .....	21	21	27
Width of palate including $m^3$ .....	58	56	63
Zygomatic breadth.....	124	107	136
Least interorbital breadth.....	62	53	65
Parietal constriction.....	25	-----	36
Nasal breadth at posterior extremity of premaxilla.....	29	26	31
Length of nasals.....	142	128	142
Occipital depth to basion.....	82	71	91
Mandible.....	232	206	239
Maxillary toothrow, exclusive of canine.....	97	( $b$ )	95
Second upper molar.....	18×15.5	20×17	19×16
Third upper molar.....	28×18.5	( $b$ )	29×18.5
Mandibular toothrow, excluding anterior $pm$ .....	90	( $b$ )	92
Second lower molar.....	17×12.5	19×14	16.5×12
Third lower molar.....	27.15	( $b$ )	30×15.5

$a$  Collector's measurements.

$b$  Last molars not entirely through alveoli.

TRAGULUS PERFLAVUS Miller.

1906. *Tragulus perflavus* MILLER, Proc. U. S. Nat. Mus., XXXI, No. 1485, p. 251, Sept. 11, 1906. (Batam Island.)

1907. *Tragulus perflavus* LYON, Proc. U. S. Nat. Mus., XXXI, No. 1502, p. 635, Jan. 16, 1907. (Batam and Galang islands.)

Twenty-seven specimens of this well-marked species of mouse-deer have now been sent to the National Museum. At the time it was described it was known by but a single specimen taken by Mr. C. Boden Kloss on Batam Island. Since then Mr. Kloss has collected 9 additional specimens on Batam, and 3 from Gong Hill, Pulo Galang. Doctor Abbott has recently collected 6 on Pulo Setoko and 8 on Pulo Bulan. The amount of individual variation in this large series is not great so far as color and markings are concerned, consisting chiefly in the intensity of the yellow color on the upper parts of the body behind the shoulders. In some individuals the black tips of the hairs on the back are quite conspicuous, thus obscuring the yellow color. The neck, however, in all the specimens is always strongly yellowish, without admixture of darker colors, and in none of the specimens does it make any approach to the neck coloration found in *Tragulus flavicollis* Miller from Pulo Sugi. The type-specimen of *T. perflavus* is about the average of the series so far as color is concerned.

In external and cranial measurements there is more individual variation in the series than there is in the color and markings. See table.

External and cranial measurements of *Tragulus perflavus*.

Locality.	Cat. No. U.S.N.M.	Sex.	Age.	Head and body.	Tail vertebra.	Hind foot, including hoof.	Weight.	Weight.	Basal length of skull.	Zygomatic breadth.	Maxillary tooth-row (alveoli).	Mandibular tooth-row (alveoli).
				mm.	mm.	mm.	lbs.	kilos.	mm.	mm.	mm.	mm.
Pulo Galang.....	143196	Male	Immature...	465	75	130	4	1.8	84.9	43.0	.....	.....
Do.....	143197	Female	Adult.....	535	80	137	7	3.2	96.0	49.5	35.0	41.5
Do.....	143199	do	do.....	525	85	137	5½	2.5	92.3	45.5	34.6	43.0
Pulo Setoko.....	144422	do	Young.....	430	81	121	4	1.8	80.0	41.5	.....	.....
Do.....	144426	do	Nearly adult	490	80	135	5¼	2.4	89.0	45.5	37.0	40.5
Do.....	144427	do	Adult.....	495	75	132	6¾	3.1	93.5	47.7	37.0	42.0
Do.....	144423	Male	do.....	482	80	129	5	2.3	90.0	44.5	37.0	43.7
Do.....	144424	do	do.....	480	80	131	5½	2.5	89.0	47.0	34.5	41.6
Do.....	144425	do	do.....	484	90	130	5	2.3	88.5	45.4	36.0	41.0
Pulo Bulan.....	144394	Female	Young.....	412	60	117	.....	.....	73.5	41.0	.....	.....
Do.....	144400	do	do.....	467	75	134	4½	1.9	83.4	42.0	.....	.....
Do.....	144395	do	Nearly adult	510	80	131	5¾	2.6	89.8	45.9	37.4	41.7
Do.....	144401	do	Adult.....	503	70	125	6	2.7	92.6	47.5	34.8	39.5
Do.....	144396	do	do.....	530	84	136	7	3.2	.....	48.0	38.0	43.0
Do.....	144397	do	do.....	532	85	137	6½	3.0	100.0	49.4	35.5	41.0
Do.....	144399	Male	do.....	475	67	130	5	2.3	91.5	49.5	39.0	42.6
Do.....	144398	do	do.....	.....	.....	135	.....	.....	93.7	51.0	35.6	41.6
Pulo Batam.....	143200	Female	do.....	.....	.....	120	.....	.....	92.0	48.0	37.4	44.0
Do.....	143205	do	do.....	635	78	137	7½	3.5	96.8	47.2	38.0	43.2
Do.....	144139	do	do.....	.....	.....	127	.....	.....	89.7	48.2	36.3	41.4
Do.....	142125 <sup>a</sup>	do	do.....	620	85	137	5½	2.5	97.6	48.8	37.0	41.3
Do.....	143202	Male	Nearly adult	583	82	131	4½	2.2	89.0	46.0	37.0	40.5
Do.....	143203	do	Adult.....	585	77	130	5½	2.5	91.7	47.3	37.0	42.0
Do.....	144138	do	do.....	.....	.....	128	.....	.....	91.8	47.9	36.5	42.0

<sup>a</sup> Type.

## SCIURUS PENINSULARIS Miller.

1903. *Sciurus peninsularis* MILLER, Smiths. Misc. Coll., XLV, p. 10, Nov. 6, 1903. (Type-locality Pahang.)

Six squirrels of the *vittatus* group from Pulo Bulan are referable to *Sciurus peninsularis* Miller. This is the same species that I have elsewhere called *Sciurus vittatus vittatus*.<sup>a</sup>

For measurements see table, page 483.

## RATUFA BULANA, new species.

*Type*.—Skin and skull of adult female, Cat. No. 144412, U.S.N.M., collected on Pulo Bulan, Rhio-Linga Archipelago, March 23, 1907, by Dr. W. L. Abbott. Original number, 5130.

*Diagnostic characters*.—Very similar to *Ratufa insignis* Miller,<sup>b</sup> from Pulo Sugi, but differing in having the naso-frontal suture shorter and the foramen leading from the orbital fossa into the posterior nares distinctly smaller.

*Color*.—Type: General effect of upper parts of body isabella color; posterior portion of upper part of head same, but finely grizzled by lighter annulations of similar color of the hairs; anterior portion of upper surface of head dark hair brown, slightly and finely grizzled with whitish; outer surfaces of thighs, forelegs, and a narrow line along sides of body russet; tail generally similar in color to the back; the hairs both above and below with lighter bases and the under side of the tail in the middle line with short appressed cream-colored hairs; under parts of body, throat, chin, inner side of fore and hind legs and sides of head beneath ears whitish; upper surface of hands and feet whitish, but irregularly suffused with a bright russet color, especially about the toes; sides of head and nose whitish, but darkened by brownish tips to the hairs; ears in general blackish brown, but with many lighter hairs on the inside.

*Series*: The series of *Ratufa bulana* is quite uniform in color and none of the specimens depart much from the color of the type. One specimen, an adult female, Cat. No. 144408, U.S.N.M., is rather lighter in color, being generally clay-color above.

*Skull and teeth*.—The skulls of *Ratufa bulana* differ from those of *R. insignis*, its nearest ally, in two very constant features, the relatively short naso-frontal suture and the small size of the foramen leading from the orbital fossa into the posterior nares. In *R. insignis* the nasals taken both together have an hourglass constriction just posterior to the middle, which is lacking in *R. bulana* owing to the

<sup>a</sup> Smiths. Misc. Coll., XLVIII, p. 278, Feb. 4, 1907; Proc. U. S. Nat. Mus., XXXI, p. 653, Jan. 16, 1907; Proc. U. S. Nat. Mus., XXXIV, p. 626, Sept. 14, 1908.

<sup>b</sup> Smiths. Misc. Coll., XLV, p. 4, Nov. 6, 1903.

shorter naso-frontal suture. I can detect no differences between the teeth of the two species.

*Measurements.*—See table below.

*Specimens examined.*—Five, all from Pulo Bulan.

*Remarks.*—*Ratufa bulana* is very closely related to *R. insignis*. The skins of the type-specimens appear sufficiently distinct, but the type of *R. insignis* is evidently in an unworn and unbleached pelage, while the pelage of the series of *R. bulana* is much bleached. One of the paratypes of *R. insignis*, Cat. No. 115532, U.S.N.M., is practically indistinguishable externally from Cat. No. 144410, one of the paratypes of *R. bulana*. All of the specimens of the latter species, however, have the forelegs and thighs more russet than does the series of *R. insignis*. The cranial characters serve to separate the two forms instantly.

*External and cranial measurements of squirrels.*

Name.	Locality.	Cat. No., U.S.N.M.	Sex.	Age.	Head and body. <sup>a</sup>	Tail vertebra. <sup>a</sup>	Hind foot with claws. <sup>b</sup>	Greatest length of skull.	Zygomatic width.	Interorbital constriction.
<i>Ratufa bulana</i> .....	Pulo Bulan.	144411	Male....	Adult...	<i>mm.</i> 347	<i>mm.</i> 403	<i>mm.</i> 80	<i>mm.</i> 65	<i>mm.</i> 41	<i>mm.</i> 27
Do.....	do.....	144408	Female...	do.....	330	385	72	64.5	39.3	26.7
Do.....	do.....	144409	do.....	do.....	328	405	79	64	39.5	27.6
Do.....	do.....	144410	do.....	do.....	342	413	82	66.5	40.2	27
Do.....	do.....	144412	do.....	do.....	327	400	84	65.3	39	26.8
<i>Sciurus peninsularis</i> .....	do.....	144402	do.....	do.....	218	197	51	50.9	31.3	18.4
Do.....	do.....	144403	do.....	do.....	210	190	54	50.3	31.2	17.9
Do.....	do.....	144404	do.....	do.....	222	200	53	52.3	31.3	18.3
Do.....	do.....	144405	do.....	do.....	220	( <i>d</i> )	50	.....	.....	.....
Do.....	do.....	144406	Male.....	do.....	226	196	51	51.4	31.8	19.6
Do.....	do.....	144407	do.....	do.....	220	190	52	50	31.3	18.7

<sup>a</sup> Collector's measurements.

<sup>b</sup> Measured by writer after relaxing feet in water.

<sup>c</sup> Type.

<sup>d</sup> Defective.

MUS ASPER Miller.

1900. *Mus asper* MILLER, Proc. Biol. Soc. Washington, XIII, p. 145, Apr. 21, 1900.

One specimen, skin and skull of an adult female, from Pulo Setoko. This is the second specimen of the *Mus asper* group of rats known from the Rhio-Linga Archipelago. The other is the type of *Mus batamanus* from Pulo Batam, which I wrongly referred in the original description <sup>a</sup> to the *Mus jerdoni* group. A reexamination shows it to be a member of the *Mus asper* group. The infrequency with which rats of this group have been taken in the Rhio-Linga Archipelago is surprising, in view of their common occurrence on the Malay Peninsula, Sumatra, Banka, and Billiton.

For measurements of the Setoko specimen, see table, page 485.

<sup>a</sup> Proc. U. S. Nat. Mus., XXXI, No. 1502, p. 654, January 16, 1907.

## MUS LINGENSIS Miller.

1900. *Mus lingensis* MILLER, Proc. Washington Acad. Sci., II, p. 206, Aug. 20, 1900.

Of this rat, which is so widely distributed in the Rhio-Linga Archipelago, Doctor Abbott secured 10 individuals (8 skins and skulls, and 2 in alcohol) on Pulo Jombol.

For external and cranial measurements, see table, page 485.

## MUS FIRMUS Miller.

1902. *Mus firmus* MILLER, Proc. Acad. Nat. Sci., Philadelphia, 1902, p. 155, June 11, 1902.

Two specimens from Pulo Setoko do not differ from *Mus firmus* as found elsewhere in the Rhio-Linga Archipelago.

For measurements, see table, page 485.

## MUS CHOMBOLIS, new species.

*Type*.—Skin and skull of adult female, Cat. No. 144393, U.S.N.M., collected on Pulo Jombol, Rhio-Linga Archipelago, March 10, 1907, by Dr. W. L. Abbott. Original number, 5100.

*Diagnostic characters*.—Similar to *Mus firmus* Miller,<sup>a</sup> but slightly darker in color, smaller in size, and with distinctly smaller skull.

*Color*.—Upper parts and sides of head and body, a coarse grizzle of brownish black and pale ochraceous buff, the brownish black in excess along the dorsal line. Along the sides the slate gray of the underfur shows through on the surface. Underparts and inner surfaces of legs dirty cream color; feet dull brownish, tail and ears dull dark brownish.

*Pelage, etc*.—The pelage consists of three types of hair—the relatively short, dark, gray underfur; soft, weak hairs, with dark-gray bases, light ochraceous buff subterminal rings, and short blackish-brown apices; relatively long, soft, grooved, brownish-black bristles. Tail concolor, dark brownish, 10 scales to the centimeter in the middle portion; each scale subtended by 3 hairs, each of which is equal to about 1 scale in length.

*Skull and teeth*.—The skull of *Mus chombolis* in general resembles that of *M. firmus*, but is distinctly smaller and lighter throughout, especially noticeable in the rostral portion, which is much shorter and narrower and much less deep; the bullæ are smaller; the incisive foramina shorter; the anterior nares smaller. The maxillary tooth row is distinctly shorter in *M. chombolis* than it is in *M. firmus* and the individual teeth smaller; the incisors are also smaller and weaker.

<sup>a</sup> Proc. Acad. Nat. Sci. Phila., 1902, p. 155, June 11, 1902; Proc. U. S. Nat. Mus., XXXI, No. 1485, p. 266, Sept. 11, 1906.

*Measurements.*—External: Head and body, 195 mm. (245)<sup>a</sup>; tail, 230 (255); hind foot with claws, 45 (47.5). Cranial: Greatest length of skull, 46.8 (52.7); length of nasals in middle line, 17.9 (20.5); basal length, 41 (47); zygomatic width, 23.5 (26.2); width of rostrum at antorbital foramen, 8.5 (10.3); width of brain case above roots of zygomata, 19 (21.2); least depth of rostrum, 8.7 (10.3); maxillary tooth row (alveoli), 8.2 (10).

*Specimens examined.*—One, the type.

*Remarks.*—Although the rats of the *Mus firmus* group hitherto known from the various islands of the Rhio-Linga Archipelago are referable to typical *firmus* (type-locality, Linga Island), the single known rat of this group from Pulo Jombol appears too different to be regarded as belonging to the same species as the others. That its small size is not due to immaturity is shown by a considerable amount of wear of the teeth, the closure of skull sutures, which remain open in young animals, and the perfect development of angles and ridges on the skull. An examination of many skulls of *Mus firmus* from the islands of the Rhio-Linga Archipelago fails to show any that approach the skull of *M. chombolis* in its general small size, short rostrum, and smaller teeth. The somewhat darker color of *M. chombolis* can not be considered as characteristic, and externally, aside from its smaller size, it can scarcely be differentiated from *M. firmus*.

*External and cranial measurements of rats.*

Name.	Locality.	Cat. No. U.S.N.M.	Sex.	Age.	Head and body. <sup>a</sup>	Tail vertebrae. <sup>a</sup>	Hind foot with claws.	Greatest length of skull.	Zygomatic width.	Maxillary tooth row.
<i>Mus lingensis</i> .....	Pulo Jombol	144384	Female	Adult...	mm. 204	mm. 148	mm. 39	mm. 44.5	mm. 22	mm. 6.6
Do.....	do.....	144385	do.....	do.....	214	160	41	46.8	22	6.7
Do.....	do.....	144386	do.....	do.....	216	171	42	47	21.6	6.9
Do.....	do.....	144390	do.....	do.....	210	.....	41	46.5	20.3	7
Do.....	do.....	144383	Male	do.....	220	178	44	48.2	.....	6.6
Do.....	do.....	144387	do.....	do.....	220	171	45	48.6	21.7	7.2
Do.....	do.....	144388	do.....	do.....	214	164	44	47.7	22.8	6.8
Do.....	do.....	144389	do.....	do.....	207	151	44	47	20.2	6.8
<i>Mus chombolis</i> .....	do.....	144398	Female	do.....	mm. 195	mm. 255	mm. 45	mm. 46.8	mm. 23.5	mm. 8.2
<i>Mus firmus</i> .....	Pulo Setoko.	144428	do.....	do.....	226	242	50	52	25.7	9.7
Do.....	do.....	144429	Male	do.....	247	241	51	56.5	26	9.3
<i>Mus asper</i> .....	do.....	144430	Female	do.....	135	99	31	.....	15.8	5.8

<sup>a</sup> Collector's measurements.

AONYX CINEREA (Illiger).

1815. *Lutra cinerea* ILLIGER, "Abh. Akad. Berlin, 1811, p. 99, 1815." (Type-locality near Batavia, Java.)

Skin and skull of an adult female, Cat. No. 144434, U.S.N.M., from Pulo Setoko. The size of the teeth in the specimens of clawless

<sup>a</sup> Measurements in parentheses are those of the type of *Mus firmus*.

otters in the U. S. National Museum is quite variable. The above specimen and one from Great Karimon Island, Cat. No. 122840, U.S.N.M., have remarkably large and heavy teeth as compared with a skull from Tapanuli Bay, Sumatra, and a skull from northern Borneo. A very young skull from Pulo Sebang, Rhio Linga Archipelago, has small teeth about like those of the Sumatran skull. The significance of this variation in the size of teeth is not clear. It is not sexual. A similar variation in the shape of the ascending ramus of the mandible is seen, no two of them being exactly alike. See Plate 39.

*Measurements.*—Head and body, 495 mm.; tail, 290; hind foot, 95; weight, 6 pounds (2.7 kilos); basal length of skull, 82; zygomatic width, 57.5; maxillary tooth row (alveoli), 29.

"The morning I left Setoko the natives brought me a fine female clawless otter which they had hit over the head with a paddle while swimming across the s'lat [strait]. One day a large otter swam across the s'lat close ahead of the schooner, but my men were too slow for him. \* \* \* They doubtless feed upon shell fish, among other things, and I know they eat crabs."

W. L. ABBOTT.

ARCTOGALIDIA FUSCA Miller.

1906. *Arctogalidia fusca* MILLER. Proc. U. S. Nat. Mus., XXXI, No. 1485, p. 269, Sept. 11, 1906. (Type-locality, Pulo Kundur.)

An immature male from Pulo Bulan, Cat. No. 144420, U.S.N.M., is indistinguishable from *Arctogalidia fusca* Miller.

External measurements by collector: Head and body, 475 mm.; tail, 545; hind foot, 90; weight, 1.6 kilos (3½ pounds). Cranial measurements: Greatest length, 99.4; basal length, 93.5; zygomatic breadth, 53; postorbital constriction, 19; width of brain-case above roots of zygomata, 33; maxillary tooth row (alveoli), 34.6.

GALEOPTERUS CHOMBOLIS. new species.

*Type.*—Skin and skull of adult female, Cat. No. 144375, U.S.N.M., collected on Pulo Jombol, Rhio-Linga Archipelago, March 3, 1907, by Dr. W. L. Abbott. Original number, 5091.

*Diagnostic characters.*—A medium-sized member of the genus, closely related to *Galeopterus tuaneus* (Miller),<sup>a</sup> but having wider zygomata, more inflated mastoids, and smaller first upper incisors.

*Color.*—The color of the type and two adult female paratypes differs in no essential respects from that of flying-lemurs in the gray pelage phase from the Malay Peninsula, being, perhaps, a trifle paler in general color effect. Another paratype, an adult male, is in the "red" phase, having the general color effect of cinnamon-rufous,

<sup>a</sup> Smiths. Misc. Coll., XLV, p. 53, Nov. 6, 1903.



very light and clear on the under parts, darker and mixed with blackish above. The usual white flecks are found on the feet and legs and a few on the back.

*Skull and teeth.*—The skull and teeth of *Galeopterus chombolis* are very similar to those of *G. tuancus* in general appearance. There are, however, several minor constant differences found in the animal from Jombol. The zygomata are wider, the lateral area of the mastoid much greater, the first upper incisor distinctly smaller, the third upper incisor somewhat larger, and the notch at the superior end of anterior border of premaxilla much larger and more angular.

*Measurements.*—See table below.

*Specimens examined.*—One adult male and 3 adult females, all from Pulo Jombol.

*Remarks.*—Aside from *G. tuancus*, the only other species with which *G. chombolis* needs to be compared is *G. tellonis* (Lyon).<sup>a</sup> Unfortunately, I have not been able to make a direct comparison between the two species, but the description of *G. tellonis* shows that the mastoid inflation is even less than in *G. tuancus*, and consequently much less in *G. chombolis*.

*Measurements of Galeopterus.*

Name.	Locality.	Cat. No., U.S.N.M.	Sex.	Age.	Head and body. <sup>a</sup>	Tail. <sup>a</sup>	Hind foot with claws. <sup>b</sup>	Greatest length of skull.	Zygomatic width.	Interorbital constriction.	Upper tooth-row (all teeth), alveoli.
<i>G. tuancus</i> .....	Pulo Tuanku.	114375	Female..	Adult...	mm. 385	mm. 235	mm. 62	mm. 68.4	mm. 44.3	mm. 19	mm. 32.4
<i>G. chombolis</i> .....	Pulo Jombol.	144372	Male.....	...do.....	370	220	60.5	65.9	42	16.6	30.4
Do.....	do.....	144373	Female.....	...do.....	390	260	62	69.7	42.9	18.7	31.8
Do.....	do.....	c144375	...do.....	...do.....	400	250	61	69.3	43.4	17.8	32.3
Do.....	do.....	144377	...do.....	...do.....	370	250	61	68.1	41	18	31

<sup>a</sup> Collector's measurements.

<sup>b</sup> Measured by writer from dried skin.

<sup>c</sup> Type.

CYNOPTERUS MONTANOI Robin.

1881. *Cynopterus montanoi* ROBIN, Bull. Soc. Phil. Paris, 7th ser., V, p. 90. (Type-locality, Malacca.)

One specimen each from Pulo Bulan and Pulo Jombol, and two from Setoko. This species appears to be widely distributed throughout the archipelago.

For measurements, see table, page 488.

<sup>a</sup>Ann. Mag. Nat. Hist., 8th ser., I, p. 139, February, 1908.

## EMBALLONURA PENINSULARIS Miller.

1898. *Emballonura peninsularis* MILLER, Proc. Acad. Nat. Sci. Philadelphia, 1898, p. 323, July 25, 1898. (Type-locality, Trong, Lower Siam.)

Four specimens from Pulo Bulan. For measurements see table below.

This species is probably identical with *Emballonura monticola* Temminck.<sup>a</sup> Temminck's standard of measurement was probably the *ped du roi*. His 1 inch and 7 lines as length of forearm then equals nearly 43 mm. Mr. Miller in describing *E. peninsularis* converted 1 inch and 7 lines on the basis of the English inch, which gave the length of forearm as 40 mm. and made all the other measurements correspondingly smaller. In the absence of specimens from Java for actual comparison, I have used the name *peninsularis*.

## MYOTIS MURICOLA (Gray).

1841. *Vespertilio muricola* HODGSON, Journ. Asiat. Soc. Bengal, X, p. 908 (*Nomen nudum*)

1846. *Vespertilio muricola* GRAY, Cat. Spec. Draw. Mamm. Birds Nepal and Thibet, presented by Hodgson to Brit. Mus., p. 4.

One specimen, an adult female, preserved in alcohol, from Pulo Setoko.

For measurements see table below.

## Measurements of bats.

Name.	Locality.	Cat. No., U.S.N.M.	Sex and age.	Head and body.					Ear from crown.	Greatest length of skull.	Maxillary tooth row, including canine.
				Tail.	Forearm.	Tibia.	Foot.				
<i>Cynopterus montanoi</i>	Pulo Bulan.	144417	Male adult..	mm. 82	mm. 7	mm. 61	mm. 23	mm. 13	mm. 15	mm. 28.6	mm. 9.5
Do.....	Pulo Jombol	144381	Female adult	75	7	59	23	13	15.5	26.6	8.9
Do.....	Pulo Setoko.	144431	Male adult..	84	11	64	24	13	15	30	9.5
Do.....	do.....	144432	do.....	83	10	62	24	14	14.5	28.5	9.2
<i>Emballonura peninsularis</i> .	Pulo Bulan.	144413	do.....	40	11	43	16	7	9	.....	.....
Do.....	do.....	144414	do.....	40	11	41	15	7	10	.....	.....
Do.....	do.....	144415	Female adult	43	10	42	15	7.5	10.5	13.7	5
Do.....	do.....	144416	do.....	45	12	44	17	8	12	13.9	4.6
<i>Myotis muricola</i> .....	Pulo Setoko.	144433	do.....	40	34	34.5	16	7	11	8.7	5.3

## MACACA FASCICULARIS (Raffles).

1822. *Simia fascicularis* RAFFLES, Trans. Linn. Soc. London, XIII, p. 246.

1822. (Type-locality, Sumatra.)

Skin and skull of an adult male, Cat. No. 144419, U.S.N.M., collected on Pulo Bulan. This specimen is grayer and less reddish than the majority of examples of this species.

<sup>a</sup> Tydschr. Natuur. Gesch. Physiol. Leiden, V, p. 25, 1838, type-locality, Java.

Measurements by collector: Head and body, 472 mm.; tail, 530; hind foot, 126; weight,  $10\frac{3}{4}$  pounds, 4.9 kilos. Cranial measurements: Basal length, 83; zygomatic width, 75.3; maxillary tooth row (alveoli), 35.6.

PRESBYTIS CRISTATA (Raffles). .

1822. *Simia cristata* RAFFLES. Trans. Linn. Soc. London, XIII, p. 244, 1822.  
(Type-locality, Sumatra.)

Skin and skull of an adult male, Cat. No. 144371, U.S.N.M., collected on Pulo Jombol.

Measurements by collector: Head and body, 510 mm.; tail, 660; hind foot, 151; weight, 15 pounds, 6.8 kilos. Cranial measurements: Basal length, 66.8; zygomatic width, 71.4; maxillary tooth row (alveoli), 32.

LIST OF MAMMALS OF THE RHIO-LINGA ARCHIPELAGO.

The name of each species is followed by the names of the islands on which it occurs. When the species is not represented by actual specimens in the U. S. National Museum collection, but is noted as occurring on certain islands by Dr. W. L. Abbott or Mr. C. Boden Kloss, the name of the island is printed in italics.

*Manis javanica*. Bulan, *Kundur*, *Penuba*, *Sanglar*, *Sinkep*.

*Tragulus flavicollis*. Sugi.

*Tragulus formosus*. Bintang.

*Tragulus* sp., *kauchil* group. *Batam*, *Little Karimon*?, *Penuba*.

*Tragulus lutescens*. Sugi Bawa, Jan.

*Tragulus* sp., *napu* group. *Durian*?, *Little Karimon*?, *Moro Kechil*, *Penuba*.

*Tragulus nigricollis*. *Sinkep*.

*Tragulus nigrocinctus*. *Kundur*, *Great Karimon*.

*Tragulus perflacus*. *Batam*, *Bulan*, *Galang*, *Setoko*.

*Tragulus pretiellus*. *Bakong*, *Sebang*.

*Tragulus pretiosus*. *Linga*.

*Tragulus rubeus*. *Bintang*.

*Tragulus subrufus*. *Linga*, *Sinkep*.

*Sus oi*. *Batam*, *Kundur*, *Ungar*.

*Sus rhionis*. *Bakong*, *Batam*, *Durian*, *Great Karimon*, *Jombol*, *Little Karimon*, *Moro Kechil*, *Sanglar*, *Sugi*, *Sugi Bawa*, *Ungar*.

*Sus vittatus*. *Penjait Layer*. (Some of the islands listed under *Sus rhionis*, from which there are no specimens, may possibly have on them the present species instead of *S. rhionis*.)

*Ratufa bulana*. *Bulan*.

*Ratufa carimonensis*. *Great Karimon*.

- Ratufa condurensis*. Kundur.  
*Ratufa confinis*. Sinkep.  
*Ratufa conspicua*. Bintang.  
*Ratufa insignis*. Sugi.  
*Ratufa notabilis*. Linga.  
*Sciurus carimonensis*. Great Karimon.  
*Sciurus condurensis*. Kundur.  
*Sciurus peninsularis*. Batam, Bintang, Bulan, Little Karimon,  
 Linga, Penuba, Sanglar, Sebang, Sinkep, Sugi.  
*Sciurus tenuis*. Batam, Linga.  
*Rhinosciurus laticaudatus*. Linga.  
*Sciuropterus amœnus*. Kundur.  
*Nannosciurus pulcher*. Sinkep.  
*Mus asper*. Setoko.  
*Mus batamanus*. Batam.  
*Mus chombolis*. Jombol.  
*Mus concolor*. Batam.  
*Mus firmus*. Bakong, Batam, Great Karimon, Linga, Moro Besar,  
 Sebang, Setoko, Sugi, Sugi Bawa.  
*Mus fremens*. Linga, Sinkep.  
*Mus lingensis*. Bakong, Batam, Bintang, Great Karimon, Jombol,  
 Linga, Moro Besar, Moro Kechil, Penuba, Sebang, Sin-  
 kep, Sugi, Sugi Bawa.  
*Mus "rattus."* Bakong, Batam, Great Karimon, Kundur, Moro  
 Kechil, Sugi, Sugi Bawa.  
*Felis "tigris."* Bintang, Penjait Layer, Setoko.  
*Paradoxurus brunneipes*. Kundur.  
*Paradoxurus "hermaphroditus."* Batam.  
*Arctogalidia fusca*. Bintang, Bulan, Kundur.  
*Arctogalidia simplex*. Batam, Linga, Sinkep.  
*Viverra tangalunga*. Bintang, Linga, Kundur.  
*Arctictis binturong*. Bintang, Kundur.  
*Lonyx cinerea*. Great Karimon, Sebang, Setoko.  
*Tupaia castanea*. Bintang.  
*Tupaia ferruginea batamana*. Batam.  
*Tupaia malaccana*. Linga, Sinkep.  
*Tupaia phaura*. Sinkep.  
*Tupaia tana*. Linga.  
*Galeopterus chombolis*. Jombol.  
*Galeopterus temminckii*. Bakong, Batam, Bintang, Great Kari-  
 mon, Kundur, Penuba, Sebang, Sugi.  
*Pteropus campyrus malaccensis*. Linga.  
*Cynopterus montanoi*. Bulan, Jombol, Kundur, Penuba, Sanglar,  
 Setoko, Sugi.

*Emballonura peninsularis*. Bintang, Bulan, Karimon Anak, Sanglar.

*Myotis muricola*. Setoko.

*Macaca fascicularis*. Bakong, Batam, Bintang, Bulan, Durian, Great Karimon, Kundur, Linga, Moro Kechil, Sebang, Sugi.

*Macaca nemestrina*. Batam.

*Presbytis cana*. Batam, Kundur.

*Presbytis cristata*. Bakong, Batam, Bintang, Jombol, Linga, Sebang, Sugi.

*Presbytis rhionis*. Bintang.

#### EXPLANATION OF PLATE 39.

View of under side of skulls and left half of mandibles of *Aonyx cinerea*, about  $\frac{2}{3}$  natural size.

Fig. 1. Cat. No. 14434, U.S.N.M., adult female, Pulo Setoko, Rhio-Linga Archipelago.

2. Cat. No. 11466, U.S.N.M., adult female, Tapanuli Bay, west coast of Sumatra.

3. Cat. No. 34904, U.S.N.M., Kinabatagan River, British North Borneo.

4. Cat. No. 122840, U.S.N.M., Great Karimon, Rhio-Linga Archipelago.

[NOTE.—Since the page proofs of this paper have been made up, Messrs. Oldfield Thomas and R. C. Wroughton have published in the *Annals and Magazine of Natural History*, eighth series, Volume III, pages 439–441, May, 1909, descriptions of the following six new mammals from the Rhio Archipelago:

*Presbytis cristata pullata*, p. 439, Batam, Bintang.

*Sciurus vittatus nesiotes*, p. 439, Batam.

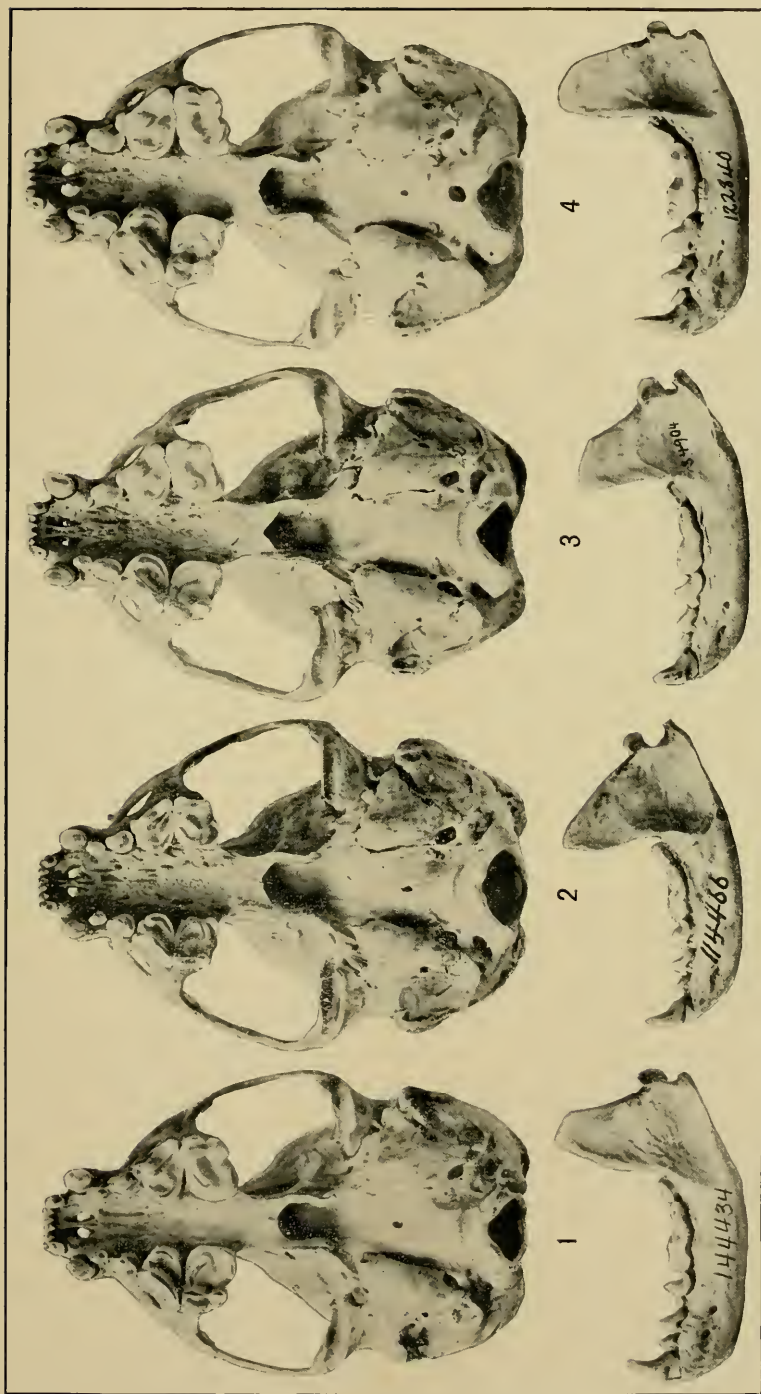
*Sciurus scimandi*, p. 440, Kundur.

*Rhinosciurus leo rhionis*, p. 440, Karimon, Kundur, Batam, Bintang.

*Mus rattus rhionis*, p. 441, Bintang, Batam.

*Sus andersoni*, p. 441, Batam.—M. W. L., Jr.]





SKULLS OF CLAWLESS OTTERS.  
FOR EXPLANATION OF PLATE SEE PAGE 491.

