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ON A COLLECTION OF MAMMALS FROM SIAM.

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I am indebted to Messrs. E. G. Herbert and Malcolm Smith for the opportunity of examining a collection of mammals made at various localities in Siam. Though these gentlemen are primarily interested in birds and reptiles, at my suggestion they have been good enough to instruct their collectors to preserve examples of such mammals as might be met with by them while in pursuit of their proper duties. The result is a small but illuminating consignment which includes several interesting specimens, amongst which are a new *Hylomys* or Lesser *Gymnura* and new races of langur and forest rat, while the discovery, just north of the Isthmus of Kra, of *Phoniscus atrox*, a genus of bat known hitherto by only two specimens from Sumatra, is also very noteworthy.

I have given descriptions of the specimens (which will not however, always serve to distinguish the races listed here from other subspecies occurring in neighbouring areas) in order that they may be recognised without consultation of the references which, with one exception, are probably not accessible to residents in Siam. Blanford's

volume in the Fauna of British India Series is likely to be available to most people interested in mammals, but it must be remembered that most of his species are "blanket" or "portmanteau" species and that the description given often covers and includes a number of forms which are regarded to-day as perfectly distinct from each other sub-specifically.

The following are the localities at which the animals were obtained :—

In Central Siam: Sam Kok, just south of Ayuthia; Krabin, on the Bangpakong River.

In Eastern Siam: Hinlap, Pak Jong, Chan Teuk, stations on the railway crossing the Dong Rek range between the towns of Saraburi and Korat.

In South-Eastern Siam: Hup Bon, about 12 miles E. of Sriracha.

In Peninsular Siam: Klong Wang Hip (Nakon Sitamarat), a stream at the foot of the hills about 8 miles to the N. E. of Tung Sawng. Khao Wang Hip, the hill near by and part of the main range, altitude about 2,500 feet. From the "Lower Camp," the country at the foot of the hill and the lower slopes of the same were worked; from the "Upper Camp," the summit and the upper slopes.

Maprit, a new station on the Southern railway, due W. of Patiyu. Klong Bang Lai, an uninhabited portion of country, 10 miles N. W. of Maprit and close to the hills.

Koh Lak, in the province of Pran.

The names of colours used are generally those of Ridgway's second publication "Colour Standards and Nomenclature," 1912.

1. *Macaca andamanensis*.

Macaca andamanensis, Bartlett, Land and Water, VIII, p. 57 (1869); Kloss, P.Z.S., 1916, p. 30.

Macacus leoninus, Blyth, Cat. Mamm., Mus., Asiatic Soc., Bengal, p. 7, (1863); Selater, P.Z.S., 1870, p. 663, pl. XXXV; Anderson, Anat. and Zool. Res., p. 52, (1878); Blanford, Faun. Brit. Ind., Mamm., p. 18 (1888).

1 ♀ adult Pak Jong, Eastern Siam, 900 ft. Dec. 1915,

[No. 2057].

Owing to the lack of good descriptions of the females of these monkeys it is by no means easy to settle their identity and one cannot pronounce on them with certainty unless provided with males

taken in association.

To the present example Anderson's description of a female *leoninus* (= *andamanensis*), seems best to apply; and with it also agrees a female which I have recently recorded from the extreme South-east of Siam.

It is with some hesitation that I have placed these two Siamese specimens under *andamanensis*, and have done so only because descriptions of that animal, rather than of any other, seem best to apply to them. The question can only be settled by comparing them with other authentic specimens and as our knowledge of the monkeys of this group is still very indefinite and incomplete it may be some time before that can be done. It may well be that the Siam-Cambodia region possesses a race of pig-tailed macaque still to be recognised: for the type locality of *andamanensis* is Arakan or Pegu—a considerable distance away.

Macaca adusta,¹ Miller, founded on specimens from South Tenasserim, must not be overlooked when dealing with Siamese short-tailed Macaques, but no description of the female is given. It is reported however that the upper parts are without annulations (Elliot, Review of the Primates, II (1913), p. 207), but in the Pak Jong animal these are very marked.

The latter is mummy-brown annulated with buffy on crown, lumbar region, rump and forearms; and is suffused with ochraceous on nape, shoulders, upper arms and, to a less degree, on the sides; the rump is darkest but not approaching black anywhere. The legs are pale mummy-brown, unannulated; and the hairs round the ears, on sides of neck, lower surface of body and inner sides of limbs, which are all an indefinable pale buffy drab, are also unspeckled. The face, indistinctly grizzled dull whitish-buff and brown, has ear-tufts and cheeks tinged with ochraceous; the lower lip and feet are mummy-brown and the tail is black above and like the buttocks below. There are a few stiff black hairs below the front edge of the sharply defined crown.

Native collector's external measurements²:— total length, 649;

1. Proc. U. S. Nat. Mus., xxix, p. 559, pls xiii—xvii (1906).

2. The external measurements were taken from the animals while in the flesh by a trained native collector and though there is little reason to doubt their correctness they must necessarily be accepted with some reserve.

tail, 160 ; hind foot, 154 mm.

Measurements of skull :— greatest length, 114 ; basal length, 79.5 ; zygomatic breadth, 76 ; maxillary tooth-row exclusive of incisors, 37.7 : these dimensions are almost exactly identical with those of the two females mentioned above.

2. *Presbytis obscura flavicauda*.

Pygathrix flavicauda, Elliot, Proc. U. S. Nat. Mus., XXXVIII, p. 352 (1910) ; id., Review of the Primates, III, p. 50 (1912).

Semnopithecus obscurus, Blanford (partim), Faun. Brit. Ind., Mamm., p. 41 (1888).

Presbytis obscura subsp., Robinson and Kloss, Journ. Fed. Malay States Mus., V., p. 113 (1914).

1 ♀ adult, 1 ♂ adult, Khao Wang Hip (Lower camp), Peninsular Siam, Sept. 1915 [Nos. 2022, 2023].

To examples of *P. obscura* from Trang, in Peninsular Siam, and from South Tenasserim, Elliot gave the name *flavicauda*, but though I have examined a number of langurs from the range allotted, including paratypes and topotypes of *flavicauda*, I have seen no individual to which the distinguishing characters completely apply¹ : they are, however paler on hind limbs and tail than typical *obscura* and therefore the name may stand : there is a good deal of individual variation and the cream-coloured tail attributed to the type is perhaps abnormal.

The appearance of the Nakon Sritamarat specimens is as follows :—Hairs of crown growing backward and forming a flat pad, longest on the occiput. No upstanding crest.

Male: Cap on head conspicuously buffy drab grey. General colour above and on sides, brownish-black to black,² paler on the median line : underside of body paler and browner. Fore limbs at elbows hair-brown, hind-limbs and tail smoke grey. Frontal fringe, side of head, hands and feet black : lips and chin with whitish hairs. Skin of eyelids, lips and chin in life whitish to bluish pink.

The female differs considerably in having the limbs, tail and other pale areas notably washed with russet and ochraceous ; the median dorsal area and the rump paler and the cap more buffy.

The extent to which individual variation may be carried in the

1. Legs from hips pale smoke-grey, tail cream-coloured.

2. In living animals there is often a purplish tone in the pelage which it is impossible to describe exactly.

direction shown by this female is well illustrated by an abnormal male from Bandon in which the colour of the pelage ranges from café-au-lait to snuff-brown (cf. Robinson and Kloss, *l.c.s.*).

(For measurements see table p. 7.)

3. *Presbytis obscura smithi*, subsp. nov.

Type. Adult female (skin and skull) Author's No. 2080/CBK. Collected at Klong Bang Lai, Patiyu, Peninsular Siam on 21st January 1916.

Characters. Most resembling *P. o. flavicauda*, Elliot,* from Trang, Peninsular Siam, but tail, ears, and limbs lighter in colour, the grey of the thighs extending farther on to the rump and contrasting sharply with the black body and feet; occipital cap less yellowish.

Colour. Back and sides brownish-black to black; frontal fringe, sides of head, hands and feet, black; lips and chin with whitish hairs, the skin of these parts and of the eyelids being pinkish-white in life.

Cap pale smoke-grey; shoulders, and anterior median line of back hair-brown, the latter bronzed; fore-limbs a variable hair-brown lightening to grey on the elbows and darkening on the forearm to the black of the hands; chest pale hair-brown; abdomen smoke-grey; buttocks, hind-limbs and entire tail very pale silvery grey sharply contrasting with the black feet and trunk; the inner side of the thighs neutral grey; ears thinly clad and fringed with silvery hairs.

Skull and Teeth. Like those of *P. o. flavicauda* but with rostrum and palate decidedly broader.

Measurements. External biorbital breadth, 63.5; orbit to gnathion, 29.0; breadth of rostrum above middle of pm¹, 32.0; palatal breadth at middle of m¹, 20.8; palatal length, 38.0. For other measurements see p. 7.

Specimens examined. One, the type.

Remarks. The intensely black feet in sharp contrast with the silvery leg and the paler limbs and cap very well differentiate this race from the more southern form. With it, however, may probably be associated the langurs from Kisseraing and Sir William James islands

*. *Ante* p. 4.

in the Mergui Archipelago cited by Elliot who wrote of them¹: "The legs are even paler than those of the type (of *P. o. flavicauda*), hands and feet jet black, strongly contrasted with the arms and legs, and the skulls have a flatter brain case and broader rostrum." The rostral breadth in the present animal is 32 mm. while the same measurement in similarly adult males from Trang and Perlis varies from 30 to 28: the flattening of the occiput mentioned is probably merely due to age.

One does not normally expect to find skull differences between the subspecies of a langur, and the Patiyu form can, if necessary, be ranked as a local race on colour features alone. I have named it in honour of Dr. Malcolm Smith in recognition of the part he has taken in bringing together the present collection and also of the active interest he takes in the general zoology of Siam.

4. *Presbytis neglecta keatii*.

Presbytis neglecta keatii, Robinson and Kloss, Journ. Fed. Malay States Mus., IV, p. 174 (1911); id., op. cit., V, p. 111 (1914); Wroughton, Journ. Bombay Nat. Hist. Soc. XXIII, p. 701 (1915).

Semnopithecus femoralis, Blanford (partim), Faun. Brit. Ind., Mamm., p. 42 (1882).

1 ♀ adult, Khao Wang Hip (Upper camp), Peninsular Siam, Sept. 1915 [No. 2029].

A median vertical crest and an upstanding occipito-nuchal pad.

General colour clear blackish-brown to clove-brown. Frontal fringe, temporal tufts, sides of head and neck, hands and feet extending some distance up the backs of the limbs; tip of tail, black. The inner side of the thighs broadly, of the lower leg narrowly, white (this colour generally extends on to the lower part of the abdomen and is sometimes found occurring on the inner side of the upper arm).

The range of this langur which inhabits Peninsular Siam is not fully known but it has been obtained as far south as Taiping, Perak and north as far as the Isthmus of Kra.

(For measurements see table p. 7.)

1. Proc. U. S. Nat. Mus., vol. 38, p. 352 (1910).

Measurements of Siamese Langurs in Millimetres.

		P. obscura flavicauda, Female, 2022.	P. obscura flavicauda, Female, 2023.	P. obscura smithi, Male, 2028.	P. neglecta keatii, Female, 2029.
Collector's external measurements :—					
Head and body	...	460	491	562	546
Tail	...	774	698	783	706
Hind foot	...	156	149	167	168
Skull :—					
Greatest length	...	90.0	98.3	100.0	93.0
Basal length	...	65.5	69.0	73.0	62.0
Zygomatic breadth...	...	71.0	74.0	78.0	70.4
Maxillary tooth row exclusive of incisors	...	31.0	33.0	35.0	29.3

5. *Paguma leucomystax robustus*.

Paradoxurus robustus, Miller, Proc. Biol. Soc. Washington, XIX, p.26 (1906).

Paguma leucomystax robustus, Robinson and Kloss, Journ. Fed. Malay States, Mus., V, p.113 (1915), Wroughton, Journ. Bombay Nat. Hist. Soc. XXIII, p.710 (1915).

1 ♂ adult, 1 ♀ juv. Klong Wang Hip, Tung Sawng, Peninsular Siam. Oct. 1915. [Nos. 2031, 2032].

This palm-civet inhabits Peninsular Siam but has not been recorded north of the Isthmus of Kra.

Above it is pale buff annulated with blackish, the woolly hair-brown under-fur very visible and the median dorsal region and rump strongly suffused with ochraceous. The greater part of the lower surface is pale buffy and there are large buffy areas on the head. The sides of the muzzle to the eyes and the distal part of the tail are dark brown; the toes are blackish.

Dimensions of the adult male :—Native collector's external measurements: head and body, 697; tail, 573; hind foot, 107. Skull: greatest length, 127; basal length, 119; zygomatic breadth, 74; maxillary tooth row exclusive of incisors, 43.8.

6. *Arctonyx dictator*.

Arctonyx dictator, Thomas, Ann. and Mag. Nat. Hist., Ser. 8, V, p.424 (1910).

Arctonyx collaris, Blanford (partim), Faun. Brit. Ind., Mamm. p. 179 (1888); Kloss, Journ. Straits Branch Roy. Asiat. Soc. No. 53, p.52 (1909); Gairdner, Journ. Nat. Hist. Soc. Siam I, p.253 (1915).

1 ♂ juv. Klong Wang Hip, Tung Sawng, Peninsular Siam. Oct. 1915. [No. 2034].

This is a young example, still retaining in part its milk dentition, of the largest of Asiatic badgers hitherto only known by three examples from Trang, Peninsular Siam (the type locality), and one from Si-sa-wat, Western Siam. The species is reported to occur in Upper Perak but its northern limit, where it meets the smaller form *A. collaris*, is unknown.

In this young example the top of the muzzle to beyond the crown, the upper edges of the ears, an elongate patch beneath the eye, chin, throat and fore-chest, sides of the neck to shoulders and the tail are buffy-white. The rest of the long coarse pelage is black, slightly tipped in places with buffy on the head and shoulders and thence gradually changing to buffy annulated with black posteriorly.

The dimensions of the type, an old female, are as follows:—head and body, 1025; tail, 235; hindfoot, 122. Skull: condylo-basal length, 166; greatest breadth, 99.

7. *Tupaia glis wilkinsoni*.

Tupaia ferruginea wilkinsoni, Robinson and Kloss, Journ. Fed. Malay States Mus., IV, p. 173 (1911).

Tupaia glis wilkinsoni, id., op. cit., V, p. 113 (1911).

Tupaia ferruginea, Blanford (partim), Faun. Brit. Ind., Mamm., p. 210 (1888).

1 ♂ adult. Khao Wang Hip, (Lower Camp), Peninsular Siam. Sept 1915. [No. 2024].

This specimen of Tree-shrew agrees with others from Bandon which, as I have elsewhere pointed out (*op. cit.*, *supra*, p. 113), are much more ferruginous on the shoulders than typical *wilkinsoni* from Trang: at the same time they do not approach, in intensity of colour, the Southern race *ferruginea*.

Above, a speckle of black and ochraceous suffused posteriorly with ferruginous: a buff stripe from the neck to the shoulder. Under surface buff, deepest on the median line. Tail annulated black and buffy.

This race inhabits Peninsular Siam: in the rest of that country other species are met with. For measurements see below.

8. *Tupaia belangeri*.

Cladobates belangeri, Wagner, Schreb. Saugth., Suppl., II, p. 42 (1841).

Tupaia peguana, Lesson, Nouv. Tabl. Reg. Anim. Mamm., p. 93 (1842).

Tupaia belangeri, Anderson, Anat. and Zool. Res., 1878, p. 126, pl. 7, figs. 6 and 7; Lyon, Proc. U. S. Nat. Mus., 45, p. 59, pl. 8, fig. 2 (1913); Gyldenstolpe Arkiv för Zoologi, Stockholm, 8, No. 23 p. 9 (1914); Wroughton, Journ. Bombay Nat. Hist. Soc. XXIII p. 707 (1915).

Tupaia ferruginea, Blanford (partim), Faun. Brit. Ind., Mamm., p. 210 (1888).

1 ♂ adult 1 ♀ adult. Maprit, Patiyu, Peninsular Siam. Jan. 1915. [Nos. 2075, 2077].

This species differs from the last in having three pairs of mammæ instead of two pairs only; in rather smaller size; relatively shorter skull, the length between the tip of the premaxillaries and the lachrymal notch in particular being less; and in paler, duller colouration, lacking the rich ferruginous wash on the posterior part of the body where it is replaced by an ochraceous tinge, while the tail is nearly the same colour as the back.

T. belangeri belangeri, ranges over Western and Central Siam and is found also in Tenasserim, Pegu and Arakan. In Northern Siam *T. b. laotum*, Thomas, occurs while another species *T. concolor*, Bonhote, inhabits the South-East. For measurements see below.

Measurement of Siamese Tree-shrews in Millimetres.				<i>T. glis wil-</i> <i>kinsoni</i> , Male, 2024.	<i>T. belan-</i> <i>geri</i> , Male, 2075.	<i>T. belan-</i> <i>geri</i> , Female, 2077.
Collector's external measurements						
Head and body	...	...	...	176	187	185
Tail	...	...	...	169	176	187
Hind-foot	...	...	...	44	41	42
Skull :—						
Greatest length	...	...	...	53.2	49.3	50.5
Basal length	...	...	...	46.0	43.2	44.0
Palatal length	...	...	...	28.8	26.9	26.2
Tip of premaxillaries to lachry-						
mal notch	...	...	...	23.0	20.2	19.6
Upper molar row	...	...	...	16.2	15.0	15.6
Inter-orbital breadth	...	...	...	15.0	15.0	13.1
Zygomatic breadth	...	...	...	25.3	26.6	24.3

9. *Hylomys siamensis*, sp. nov.

Type. Immature female (skin and skull), Author's No. 2065/CBK. Collected at Hinlap, Eastern Siam, 900ft, on 7th December 1915.

Characters. Differs from *H. suillus*, Müller and Schlegel, in having paler, more buffy colouration, and rather narrower nasals.

Colour. Above a speckle of black and buff slightly tinged with ochraceous on the head and rump, the hairs with neutral grey bases. Below silvery tinged with buff. Hind feet blackish, partly clad with short buffy hairs. Tail bicolored and clothed with hairs only visible through a lens.

Skull and Teeth. The skull does not appear to differ from skulls of *H. suillus* from the Malay Peninsula except in rather narrower nasals. Several milk teeth are still present.

Measurements. Native collector's external measurements:—head and body, 112 (121)*; tail, 22 (15); hind foot, 21 (23). Skull:—greatest length, 32 (32); basal length, 28.2 (27.6); palatal length, 17 (16); upper tooth row, 16.8 (16); p^a-m^s 8 (8); zygomatic breadth, (16.9); length of mandible 23 (22.9).

Specimens examined. One, the type,

Remarks. I would not venture to separate the Siamese animal on an immature individual were it not that there are fortunately available for comparison several immature specimens of the older species from the Malay Peninsula. Three of them are younger and one (judged by the state of the dentition) is practically of the same age as the present animal. They exactly agree in colour with adults from the same region which, in turn, I am unable to distinguish from topotypes from Sumatra: in all of these the upper surface is mingled ferruginous and black, the hairs having plumbeous black bases: the underparts are darkish grey generally strongly suffused with buffy.

It may be fairly assumed from the above that the colour of *Hylomys* does not differ with age and therefore the present specimen may be taken as representative of the local animal.

The type of *H. peguensis*, Blyth, from Shwegyin, Lower Burma, has been available for examination. It is now quite impossible to draw any

* Measurements in parentheses those of an immature female of *H. suillus* from Kedah Peak, Malay States; F.M.S. Mus. No. 961/16.

conclusions from its colour as dried from spirit, but Blyth stated that the only difference between it and *H. suillus* lay in its rather longer tail. Certainly no differences in the skulls are ascertainable and the tail in *H. suillus*, though short, is very variable. Anderson's specimen from the Khayyen Hills was described as rusty brown above, the hairs with black tips, and this ranks it also with *H. suillus* from which the Siamese specimen is instantly separable by its markedly paler colour.

10. *Pteropus vampyrus intermedius*.

Pteropus intermedius, Andersen, Ann. and Mag Nat. Hist., Ser. 8, 11, p. 368 (1908); id., Cat. Chiroptera Brit. Mus., 1912, p. 341.

Pteropus medius, Blanford (partim) ? Faun. Brit. Ind., Mamm., p. 256 (1891).

1 ♀ subadult. Krabin, Central Siam. Nov. 1915. [No. 2041].

This species of fruit-bat has not yet been recorded from Siam proper and as the present example appears to differ somewhat from the type, which came from Moulmein and was the only specimen available for description, I append a full account of it here.

Back seal-brown plentifully sprinkled with grey-white hairs and washed with ferruginous on the rump and interfemoral membrane. Breast and belly with underside of forearm and membranes black, slightly sprinkled with dull whitish hairs; the anal region tipped ferruginous and the flanks and membranes tinged with seal-brown.

Mantle Mars-yellow gradually deepening through fulvous on the sides of the neck to bay beneath where this colour occupies a depth of about 55 mm., in strong contrast to the throat and breast. Hairs of the mantle and sides of neck with narrow blackish bases. Crown mingled black and fulvous. Muzzle including eyes, cheeks, chin and throat black.

Native collector's measurements taken in the flesh :— head and body, 281; hind foot, 51; ear, 42. Other external measurements :— Forearm, 170; Pollex :—total length, c.u., 76; metacarpal, 17.8; 1st phalanx, 40.

2nd digit :—metacarpal, 84.5; 1st phalanx, 22; 2nd—3rd phalanx, c.u., 21.5.

3rd digit :—metacarpal, 114; 1st phalanx, 85; 2nd phalanx, 127.

4th digit :—metacarpal, 110; 1st phalanx, 71; 2nd phalanx, 68.5.

5th digit :—metacarpal, 115.5 ; 1st phalanx, 57.6 ; 2nd phalanx, 56.

Depth of interfemoral in centre, 13*. Lower leg, 83. Foot, c. u., 54*. Calcar, 28.5* Ear, 35*.

Skull :—total length to gnathion, 68.7 ; palation to incisive foramina, 34 ; front of orbit to tip of nasals, 23.8 ; width of brain case at zygomata, 27.5 ; zygomatic width, 35 ; width across m^1 externally, 17.2 ; lachrymal width, 12 ; width across canines externally, 12.1 ; postorbital constriction 11.3 ; interorbital constriction, 10.3, width of mesepterygoid fossa, 8.5 ; width between p^+ — p^+ internally, 12.1 ; breadth between cingula of canines, 6.5 ; orbital diameter, 14.8 ; length of mandible, 53.2 ; coronoid height 14.8.

Upper teeth, $c-m^2$, 26 4. Lower teeth, $c-m^3$, 29.7. Upper incisors, combined width, 6.7. p^3 , 5.1×3.7 ; p^4 , 4.8×4 ; m^1 , 6.1×3.8 ; m^2 , 3.3×2.5 . p_1 , 2.6×2.3 ; p_3 , 5×3 ; p_4 , 5×3.3 ; m_1 , 5.4×3.8 ; m_2 , 4.5×3.1 ; m_3 , 2.5×2 .

Two other flying-foxes occur in Siam ; *P. lylei* which is considerably smaller than *P. vampyrus intermedius*, and *P. vampyrus malaccensis*, which is markedly larger ; the latter is only known locally from the extremities of Peninsular and South Eastern Siam.

11. *Phoniscus atrox*.

Phoniscus atrox, Miller, Proc. Biol. Soc. Washington, XVIII, p. 229 (1905) ; id., The Families and Genera of Bats, U. S. Nat. Mus., Bull. 57, p. 233 (1907).

1 ♂ adult, 1 ♀ adult, in alcohol. Klong Bang Lai, Patiyu, Peninsular Siam. Jan. 1916. [Nos. 2089, 2090].

The discovery of this bat in Siam is an occurrence of much interest, for the genus and species have rested hitherto on two unique females which were obtained by Dr. W. L. Abbott in an abandoned bird's nest on the banks of the Kateman River, Western Sumatra, in September 1903. I am now able to describe the male, previously unknown, and of rather brighter colour than the female.

Ears : Laid forward reach only to the upper incisor. Inner margin markedly convex Outer margin straight for about 3 mm. below the rounded tip, then, where the ear bends sharply forward,

* Approximate measurements from dried skin.

comes an emargination followed for about 5 mm. by another convexity when a second shallow emargination occurs, between which point and its junction with the cheek the border of the ear is markedly convex and projects forward from the base.

Tragus. White, long and tapering to a point (length on the inner side 7 mm.): inner edge slightly convex, outer edge concave and broadening towards the base near which there is a deep sharply-defined emargination but no projection.

Membranes. Dark brown, unicoloured, naked. Wings, from the base of toes.

Fur. Long and soft. Colour from specimens dried from spirit:— male: hairs fuscous at base, then wood-brown followed by a dark brown subterminal annulation, the tips being ochraceous. The latter colour is most distinct on the extremity of the rump and on the head where the top of the muzzle and the area between the ears are markedly golden. Muzzle, except on the median line, and chin naked.

Thumbs, feet, edge of wing along the second to the end of the middle finger; the dorsal side of the forearm, femur near the knee, lower tibia, ankles, calcanea and tail, thinly but conspicuously clad with shining ochraceous hairs.

The female has the body pelage duller and darker than the male, the wood-brown being replaced by dirty whitish, while the ochraceous tips on the trunk are perhaps less pronounced and numerous.

The characters of the skull and teeth appear to exactly agree with those of the type, the cranium being higher in the middle than at the occipital region, the rostrum broad and heavy; the upper canine is very large and deeply grooved on the outer side with a posterior cutting edge, and the lower lip is pitted to receive it; the inner lower incisors are four-cusped.

Measurements. External dimensions from spirit specimens:— Head and body, 40 (42.5)*; tail, 40 (38); tibia, 14.2 (15.2); forearm, 32.3 (32.6); 2nd finger, 33 (30.5); 3rd finger, $33.2 + 15.0 + 18.5 = 66.7$ ($33.0 + 14.4 + 19.7 = 67.1$); 4th finger, $32.0 + 11.0 + 9.0 = 52.0$ ($31.3 + 11.0 + 9.5 = 51.8$); 5th finger, $30.5 + 9.2 + 7.5 = 47.2$ ($29.5 + 8.8 + 8.0 = 46.3$). Skull of male example:

* Measurements in parentheses those of the female.

greatest length, 15.5; occipito-sinual length, 13.5; basi-sinual length, 11.1; palatal length, 7.9; greatest rostral breadth, 4.7; cranial breadth, 8.0; zygomatic breadth, 9.5; maxillary tooth row exclusive of incisors, 6.1; $m^2 - m^2$ externally, 5.6; $c - c$ externally, 3.8; lower mandible, 10.9 mm.

Though direct comparison of specimens may elicit some differences, the continental animals appear to agree completely with the description of the Sumatran individuals. There is a slight divergence in size in favour of the latter but when we have more examples from the type region this may prove to be well within the limits of local variation.

12. *Rhinolophus trifolius*.

Rhinolophus trifolius, Temm. Mon. Mamm., p.27, pl. XXXI (1835); Blanford, Faun. Brit. Ind., Mamm., p.272 (1891).

2 ♂ adults in alcohol. Khao Wang Hip (Lower camp), Peninsular Siam. Oct. 1915 [No. 2086, 2087.]

Forearm 52 millimetres.

13. *Petaurista petaurista cicur*.

Petaurista nitida cicur, Robinson and Kloss, Ann. and Mag. Nat. Hist., Ser. 8, XIII, p.224 (1914); id., Journ. Fed. Malay States Mus. V, p.117 (1914).

1 ♂ adult. Klong Wang Hip, Tung Sawng, Peninsular Siam, Oct. 1915. [No.2035].

This handsome flying-squirrel is rich chestnut above, all the hairs having black tips except on the head which is largely ochraceous. The nose, whisker patches, a ring round the eye, inner side of ears, metectote, hands, feet and the tip of the tail are black, as are the edge of the antibrachial and interfemoral membranes and the parachute near the extremities. The undersurface of the body and the distal half of the tail are ochraceous orange.

Collector's external measurements:—head and body, 434; tail, 582; hind foot, 79 mm.

Skull: greatest length, 70.2; condylo-basilar length, 62; palatilar length, 31.6; diastema, 15; upper tooth row, 15.8; greatest length of nasals, 22.5; greatest breadth of nasals, 12.3; interorbital breadth, 15.2; width between tips of postorbital processes, 35.3; zygomatic breadth, 45.3 mm.

14. *Ratufa melanopepla leucogenys*.

Ratufa melanopepla leucogenys, Kloss, P.Z.S., 1916, p. 43.

Sciurus bicolor, Blanford (partim), Faun. Brit. Ind., Mamm., p.373 (1891).

Ratufa melanopepla, Gyldenstolpe, Arkiv för Zoologi, Stockholm, 8, No. 23, p.15 (1914).

1 ♀ adult, Krabin, Central Siam. Nov. 1915 [No. 2050].

1 ♂ adult, Hinlap, Eastern Siam, 900ft. Dec. 1915 [No. 2066].

One of these is without the patches of buff hair on the hind feet which occurs in all the other specimens I have examined.

Upper surface and entire tail, brownish black, the hairs with glistening black tips; a russet patch on the nape. Undersurface, pale orange-yellow, chin, black. Cheeks, sides of neck, upper side of forelimbs in part, and generally a patch on the top of the hind-feet, creamy.

Native collector's external measurements*:—head and body, 383, 411; tail, 469, 482; hind foot, 79, 83 mm.

Skull: greatest length, 73, 73; condylo-basilar length, 61.3 61.2; palatilar length, 28, 27; diastema, 14.3, 14.7; greatest length of nasals, 23.3, 26; greatest breadth of nasals, 14, 14; interorbital breadth, 28, 28.7; zygomatic breadth, 45.2, 45.1 mm.

15. *Ratufa pyrrsonota*.

Ratufa pyrrsonota, Miller, Proc. Biol. Soc. Washington, II, p. 75, (1900).

1 ♂ aged. Khao Wang Hip (Upper camp), Peninsular Siam. Sept. 1915. [No. 2030].

This speckled giant-squirrel inhabits Peninsular Siam, but extends as far south as Taiping, Perak: to the north I have seen it near Victoria Point, Tenasserim, but obtained no specimens, nor is it included in the list of mammals collected there by Mr. G. C. Shortridge (Wroughton, Journ. Bombay Nat. Hist. Soc., XXIII, p. 695).

The general colour above is a fine speckle of ochraceous and dark brown, more tawny but less speckled on the limbs: the under-

* The measurements are those of the female and male respectively.

surface is clear ochraceous. Top of muzzle, dark brown, sides of muzzle, whitish, cheeks and chin, grizzled dark brown. Tail, dark brown, the bases of the hairs buffy; the latter colour most conspicuous on the under side, where the short hairs clothing the caudal bones are dark brown. There is a large buffy-white patch on the outer side of the thighs.

Native collector's external measurements :—head and body, 358; tail, 399; hind-foot, 71 mm.

Skull:—Greatest length, 64.2; condylo-basilar length, 55.3; palatilar length, 25; diastema, 14; upper molar row, 12.7; greatest length of nasals, 21; greatest breadth of nasals, 12; least inter-orbital breadth, 25.2; zygomatic breadth, 40 mm.

16. *Sciurus finlaysoni*.

Sciurus finlaysoni, Horsfield, Zool. Res. Java, 1824; Anderson, Anat. and Zool. Res., 1878, p.244; Flower (partim) P.Z.S., 1900, p.355; Bonhote (partim) P.Z.S., 1901, pt. 1, p.53; Wroughton (partim) Ann. and Mag. Nat., Hist., Ser. 8, II, pp. 394, 396 (1908); Gyldenstolpe (partim), Arkiv for Zoologi, Stockholm, vol. 8, No. 23, p.11 (1914); Kloss, Journ. Nat. Hist. Soc. Siam, I, pp 157, 225 (1915).

1 ♀ subadult, Chan Teuk, Eastern Siam. Aug. 1915.

3 ♂, 2 ♀ adults, Krabin, Central Siam. Nov. 1915. [Nos. 2020, 2037, 2038, 2046, 2047, 2048].

I have already contributed some notes on the "white" squirrel of Siam to this Journal, but this well-preserved series furnishes opportunity for a few additional details.

Each animal ranges in colour from white to cream, and in several the rump and the greater part of the tail is a warm buff, while some have patches of similar colour on the hands and feet. The whiskers are black or white or a mixture of the two, and wherever the skin is exposed or only thinly clad with hair, as on the ears, sides of face, and undersides of limbs, it is black or blackish.

That the difference between this, the mainland race, *S. f. finlaysoni*, and *S. f. portus, mihi*, of Koh Si Chang is only one of size is fully confirmed by this series, which bears out my suggestion that mainland animals would run considerably larger than examples already recorded.

(For measurements see table p. 30).

17. *Sciurus nox*.

Sciurus nox, Wroughton, Ann. and Mag. Nat. Hist. Ser. 8, II, p. 396 (1908); Gyldenstolpe, Arkiv för Zoologi, vol. 8, No. 23, p. 13 (1914).

1♂, 1♀ adult, Hup Bon, South-east Siam. July 1915. [Nos. 2014, 2016].

We want more information as to the range of this entirely coal-black squirrel which is yet only known from the neighbourhood of Sriracha.

(For measurements see table p. 30).

18. *Sciurus bocourti bocourti*.

Sciurus bocourti, M-Edw., Rev. Zool., p. 193 (1867); Anderson, Anat. and Zool. Res., 1878, p. 244; Wroughton, Ann. and Mag. Nat. Hist., Ser. 8, II, p. 395, 399, (1908); Kloss, Journ. Nat. Hist. Soc. Siam, I, p. 227 (1915).

Sciurus leucogaster, M-Edw., op. cit., p. 196; Anderson, op. cit., p. 245. *Sciurus finlaysoni*, Thomas, P.Z.S. 1898, p. 245; Flower (partim), P.Z.S., 1900, p. 355.

Sciurus leucocephalus, Bonhote, P.Z.S. 1901, pt. I, p. 54.

Sciurus floweri, Bonhote, Ann. and Mag. Nat. Hist., Ser. 7, VII, p. 455 (1901); Kloss, tom. cit., p. 228.

1♂ adult, Sam Kok, Central Siam. June 1915. [No. 2013].

Just as Anderson in 1878 regarded nearly all Siamese squirrels as varieties of *Sc. ferrugineus*, so to-day we include under *S. b. bocourti*, no doubt more correctly, a number of animals of varied appearance inhabiting Central Siam, all of which we regard as aberrations of that race.

Wroughton has defined three subspecies from more northern areas, but at present the southern animals are all considered to be members of the very changeable typical race.

In colour the present specimen is grizzled black and warm buff above, the latter colour deepening to ochraceous on the nape and head. The undersurface is white, this colour spreading over the muzzle and thence projecting backwards to surround the eyes, and also extending over much of the upper sides of the hands and feet: excepting the throat and forelimbs, it is thickly sprinkled with chestnut hairs, which suggest that the lower parts are in a state of change between that colour and white. The ears are partly white and partly ochraceous.

The basal two-thirds of the tail is like the back but much more coarsely annulated, the terminal third is annulated black and chestnut with the base of the hairs black and ochraceous¹.

S. floweri has the same type of colouration as *S. bocourti*, and the measurements so closely agree with those of the present specimen (and with Wroughton's dimensions for *bocourti*), except in the matter of greatest length of skull alone, that I now think the figure given (44 mm.) is probably a misprint and therefore have placed Bonhote's name amongst other synonyms of the typical race.

(For measurements see table p. 30).

19. *Sciurus erythræus rubeculus*.

Sciurus rubeculus, Miller, Smithsonian Miscellaneous Collections, vol. 45, p. 22 (1903).

Sciurus erythræus, Blanford (partim), Faun. Brit. Ind., Mamm., p. 377 (1891); Flower, P.Z.S., 1900, p. 356.

Sciurus erythræus rubeculus, Robinson and Kloss, Journ. Fed. Malay States Mus., V., p. 118 (1914).

1 ♀ adult, Khao Wang Hip (Upper camp), Peninsular Siam. Sept. 1915. [No. 2026].

This squirrel is a member of a group or species of which a number of forms have been distinguished from the Indo-Chinese sub-region.

Colour above, and including entire tail which is coarsely annulated, a grizzle of black and ochraceous, the latter colour being in excess on the head and ears while the terminal half of the tail is suffused with golden orange. Below, the grizzled area is duller; and extending between the fore and hind limbs, divided by a median grizzled line, are two broad stripes of mahogany red; but the extent of the latter colour is very variable in animals from the same locality.

(For measurements see table p. 31).

20. *Sciurus caniceps*.

Sciurus caniceps, Gray, Ann. and Mag. Nat. Hist., X, p. 236 (1842); Thomas, P.Z.S., 1886, p. 68; Bonhote P.Z.S., 1900, p. 195; id. op. cit. 1901, pt I, p. 55; id. op. cit., 1902, pt I, p. 39; Gyldenstolpe, Arkiv. för Zoologi, Stockholm, vol. 8, No. 23, p. 10 (1914); Blanford (partim), Faun. Brit. Ind., Mamm. p. 380 (1891).

¹ *S. bocourti* as represented by this example is not, as I conjectured elsewhere, a possible phase of *S. finlaysoni*, but quite a distinct species.

Sciurus chrysonotus, Blyth, Journ. Asiat. Soc. Bengal, XVI, p.873, pl. XXXVII, fig 1 (1847); Peters, P.Z.S., 1866, p. 429.

2 ♀ adults, 1 ♀ juv., Krabin, Central Siam. Nov. 1915. [Nos. 2043, 2044, 2049].

This squirrel, which in its summer pelage somewhat resembles races of *S. concolor* from Peninsular Siam, is represented in this collection by individuals in slightly varying stages of the very striking winter coat.

The whole of the upper surface is rich Mars yellow, the hairs slightly tipped with black except on the limbs, muzzle and ears. The yellow extends some distance down the base of the tail and less strongly over the head and sides of the neck. The limbs are grizzled black and white, muzzle and fore-feet are greyish white and the hind-feet silvery white. The undersurface varies from whitish to pale grey, and there is a median stripe of yellowish grey. The tail is coarsely banded black and white with a sharply defined pure black tip.

The young animal is rather interesting, for though it retains in part its milk dentition, it yet possesses the winter pelage though not quite to the same complete degree as do the adults.

The winter coat first shows about the end of September as yellow patches on the back; while the summer pelage commences about March with grey patches in the golden area until a coat of uniform grizzled grey, lighter on the under parts, top of head and feet, is arrived at.

These squirrels are Blyth's *S. chrysonotus* of Tenasserim, with the types of which I have compared them, and though Gray's *S. caniceps* was said to have come from Bhutan (where no such squirrel occurs), there is no doubt but that the name should apply to these animals and, being the oldest, must therefore be used.

I would venture the suggestion (though I have not seen them) that the squirrels from North Siam described by Robinson and Wroughton (Journ. Fed. Malay States Mus., IV (1911), p.233) under the name of *S. epomophorus fluminalis* are individuals of this species in dull summer pelage.

(For measurements see table p. 30).

21. *Sciurus concolor milleri*.

Sciurus epomophorus milleri, Robinson and Wroughton, Journ. Fed. Malay States Mus., IV, p. 233 (1911).

Sciurus concolor milleri, Robinson and Kloss, op. cit. supra, V, p. 118 (1914).

Sciurus caniceps, var. 2, Blanford (partim), Faun. Brit. Ind., Mamm., p. 380 (1891).

1 ♀ adult. Klong Wang Hip, Tung Sawng, Peninsular Siam. Oct. 1915. [No. 2033].

This race is one of those into which *S. concolor* of the Malay Peninsula has been split. In true *S. concolor*, occurring south of about Sungkla, there are no yellowish neck and flank patches, and the black tip of the tail is not sharply defined, while, if an ochraceous suffusion is present on the back, it is strongest on the rump.

In the Tenasserim and Siamese races, *S. c. davisoni* from South Tenasserim and *S. c. milleri* from Trang, both the former features are present but the last, if it occurs, is either general or deepest on the shoulders. Animals from these localities vary very much among themselves and it is possible that there is very little marked difference between the two races.

The present example has the head and limbs grizzled grey, the remainder of the body above being a speckle of black and ochraceous-buff. The sides of the neck, and the flanks extending below to the inguinal region, are ochraceous-orange; the rest of the under parts being neutral grey. The tail is coarsely annulated buff and black, the hairs having whitish tips towards the extremity which is clear black, sharply defined.

The various grey squirrels from the Malay Peninsula and its islands which do not have a change to a definite form of winter pelage should all, I think, be regarded as races of *S. concolor*. In summer coat *caniceps* and *concolor* are very similar, but the latter is somewhat the smaller of the two.

(For measurements see table p. 30).

22. *Sciurus vittatus miniatus*.

Sciurus notatus miniatus, Miller, Proc. Acad. Nat. Sci., Washington, II, p. 79 (1900).

Sciurus notatus, Bonhote (partim), P. Z. S. 1900, p. 879.

Sciurus vittatus, Bonhote, Fasciculi Malayenses, Zool., Pt. 1, p.22 (1903.)

Sciurus vittatus miniatus, Robinson and Kloss, Journ. Fed. Malay States Mus., V, p.115 (1914).

1 ♂ adult. Khao Wang Hip (Lower camp), Peninsular Siam. Sept. 1915. [No. 2025.]

This is a Malayan species of squirrel which in Tung Sawng nearly reaches its northern limit. Its appearance may be shortly described as a grizzle of black and buff above, with the under-surface, except on the chin, nearly "burnt sienna". Separating these two colours on either side are broad stripes of buff and black. The tail is like the back, but the annulations are much coarser and the tip and the distal half of the under side are fulvous like the belly.

(For measurements see table p. 31).

23. *Sciurus tenuis surdus*.

Sciurus tenuis surdus, Miller, Proc. Acad. Nat. Sci., Washington, II, p.80 (1900); Bonhote, Fasciculi Malayenses, Zool., Pt. 1, p. 21 (1903).

Robinson and Kloss, Journ. Fed. Malay States Mus., V, p.119 (1914), *Sciurus tenuis*, Bonhote, P. Z. S., 1900, p. 878.

1 ♂ adult. Khao Wang Hip (Lower camp), Peninsular Siam; Sept. 1915. [No. 2021].

A Malayan species not extending much further north.

Above, a grizzle of black and buff, tinged with ochraceous on head, shoulders and thighs: the under surface grey tinged with buff and not sharply separated from the colour of the sides: tail coarsely annulated, the hairs with whitish tips.

A second race of *S. tenuis* (*S. t. gunong*, Robinson and Kloss, loc. cit. supra) inhabits the mountains of Bandon and doubtless other hill ranges of Peninsular Siam: it differs from *S. t. surdus* in larger size, darker upper parts and more buffy under side.

(For measurements see table p. 31).

24. *Tamias rodolphi*.

Sciurus rodolphi, Milne-Edwards, Rev. and Mag. de Zool. XIX, p.227 (1867).

Tamias rodolphi, Kloss, P.Z.S. 1916, p. 47.

1 ♂ adult. Krabin, Central Siam. Nov. 1915. [No. 2040].

This species was described from Cochin-China and I have recently recorded it from the vicinity of Krat, S. E. Siam, where its

presence was not unexpected, but it is something of a surprise to find that it extends as far as Krabin and western examples should be compared with topotypes.

The general upper colour of this specimen is buffy-grey, the hairs having grey bases and very pale buff tips. There are four buffy stripes on the back, the outer pair, which are slightly paler than the inner, extending from the base of the tail to the ears and thence less distinctly to the muzzle; the inner pair, richer in tint, only just reaching the shoulders. The areas between the buff stripes are grizzled black and ochraceous, darkest posteriorly, while anteriorly the ochraceous tone is continued to the crown: the median dorsal line is the blackest of the three. The under-parts are buff-yellow. The tail is coarsely annulated ochraceous and black, the hairs with whitish terminations, but the tip of the tail is nearly entirely black. Upper side of ears black, their tips with long tufts of hair which are white to their bases.

(For measurements see table p. 31).

The other species of *Tumioys* occurring in Siam is *T. barbei*, first known from Ye on the Tenasserim Coast, of which one race *T. b. kongensis* (Bonhote) has been met with from Raheng northwards while a second, *T. b. novemlineatus* (Miller), occupies the Malay Peninsula. Perhaps the most marked difference between the two species is that while in *rodolphi* the median stripe is distinctly the blackest of the three dark dorsal stripes, in *barbei* all three are about equally black. It would be interesting to know where the two species meet and whether the lower course of the Menam forms the boundary between their ranges.

25. *Lariscus insignis jalorensis*.

Funambulus insignis jalorensis, Bonhote, Fasciculi Malayenses, Zool, Pt. 1, p. 25 (1903).

Funambulus peninsulæ, Miller, Smithsonian Miscellaneous Collections, vol. 45, p. 25 (1903).

Lariscus insignis jalorensis, Robinson and Kloss, Journ., Fed. Malay States Mus., V, p. 120 (1914).

1 ♂ adult. Khao Wang Hip (Upper camp), Peninsular Siam. Sept. 1915. [No. 2058.]

This is another Malayan species which nearly reaches its northern limit in Nakon Sritamarat. It is a ground-squirrel which ascends low bushes in its search for food.

In colour the upper side is a grizzle of ochraceous-buff and blackish and there are three clearly defined black stripes from the shoulders to the base of the tail, which is like the upper parts but more coarsely annulated. The under parts of the body are white or creamy.

Native collector's external measurements:—head and body, 167; tail, 96 (imperfect); hind foot, 42 mm.

Dimensions of a skull from Bandon:—greatest length 49.1; condylo-basilar length, 40.3; interorbital breadth, 13.5; zygomatic breadth, 27.7 mm.

26. *Dremomys rufigenis belfieldi*.

Funambulus rufigenis belfieldi, Bonhote, Journ. Fed. Malay States Mus., III, p. 9, pl. 1 (1908).

Dremomys rufigenis belfieldi, Robinson and Kloss, op. cit. supra, V, p. 122 (1914).

1 ♂ adult. Khao Wang Hip (Upper camp), Peninsular Siam, Sept. 1915. [No. 2057].

Compared with *D. rufigenis rufigenis*, Blanford, of Muleyit, Tenasserim, this race which inhabits the mountains of Peninsular Siam, is darker above with the cheeks and muzzle less bright and the hind feet like the back instead of being bright tawny.

Above, a dark grizzle of black and buff: sides of muzzle and cheeks Mars yellow. Under surface white, the grey bases of the hairs very conspicuous except on throat, and on the thighs where the white is bordered with ochraceous. Tail annulated black and white except the lower surface which is almost entirely orange-rufous. A large patch of pure white on the back of, and behind, the ear.

Another form, *D. r. adamsoni*, Thomas, occurs at Maymo, Burma, and in the Southern Shan States and probably will be found to occur in Northern Siam. The species is Chinese and Indo-Chinese.

(For measurements see table p. 31).

27. *Menetes berdmorei berdmorei*.

Sciurus berdmorei, Blyth, Journ. Asiat. Soc. Bengal, XIII, p. 603, (1849).

Menetes berdmorei, Robinson and Kloss, Journ. Fed. Malay States Mus., IV, p. 121 (1914).

1 ♂, Krabin, Central Siam. Nov. 1915. [No. 2045].

1 ♂, 1 ♀, Hup Bon, South-east Siam, 500 ft. July 1915. [Nos. 2015, 2019].

1 ♂, 1 ♀, Klong Bang Lai, Patiyu, Peninsular Siam. Jan. 1916. [Nos. 2079, 2081].

The specimens from Krabin and Hup Bon, N. E. and S. E. of Bangkok, closely resemble examples of *M. b. berdmorei* from Mergui, Tenasserim, taken in January, and also a series from Bandon, Peninsular Siam, collected in July, which I regard as members of the same subspecies; the only constant differences being that the muzzles are paler, being annulated with buff instead of ochraceous while, on the whole, the three black dorsal stripes are a little less defined.

The Patiyu specimens, coming from a locality intermediate between the more northern places and Bandon and taken in January, show greater differences; the upper surface, except the muzzle, being of a paler tone as, the annulations there and the yellow lateral stripes are Naples yellow or creamy rather than rich buff, while the median portion of the back between the light stripes is less ferruginous, being Sudan brown in colour. The white under surface is strongly washed with light orange-yellow instead of being white or washed with ochraceous.

In view of their provenance (surrounded by the others) it is impossible to rank them as a local race so—though they were taken in the same month as the Mergui specimens, which are old and perhaps discoloured—I think we must regard them as evidence that this race of *Menetes* undergoes some seasonal change, though this is a thing that is not so usual in the more equatorial portion of this region as it is farther north. The genus is Indo-Chinese with several races occurring in Siam or on its borders.

Menetes berdmorei is a squirrel with a speckled upper and white or yellowish under-surface and may be recognised by a pair of yellow stripes on each side. Black (or dark) dorsal, sub-dorsal and lateral stripes are also generally present but they vary much in intensity according to locality and to season. The back from shoulders to root of tail is much richer and redder in colour between the inner light stripes than is the rest of the upper surface.

(For measurements see table p. 31).

28. *Epimys vociferans vociferans*.

Mus vociferans, Miller, Proc. Biol. Soc. Washington, XIII, p. 138, pls. III and IV, fig. 3 (1901),

Epimys vociferans, Robinson and Kloss, Journ. Fed. Malay States Mus., V, p. 124 (1914); Wroughton, Journ. Bombay Nat. Hist. Soc., XXIII, p. 715 (1915).

1 ♂ adult. Maprit, Patiyu, Peninsular Siam. Dec. 1915. [No. 2069].

Exactly agrees with topotypes from Trang. Colour above mingled ochraceous and brownish-black, the pelage harsh and wiry but not spiny: below white extending broadly to the wrists but not reaching the hind feet, which are white with distinct brown centres above. Tail bicolored with a white tip and clad with white hair except on the dark portion.

(For measurements see table p. 32).

29. *Epimys vociferans herberti*, subsp. nov.

Type. Adult male (skin and skull). Author's No. 2053/CBK. Collected at Pak Jong, Eastern Siam, 900 ft., on Dec. 1st, 1915.

Characters. Differs from *E. vociferans* of Peninsular Siam in being duller above with the white of the under surface extending on to the muzzle and up the cheeks to the eyes.

Colour. Above clay-colour streaked with black by the tips of the hairs, this grizzling most pronounced dorsally; the limbs duller and browner; top of muzzle and a ring round the eye pale clove-brown. Under surface white, this colour extending over the upper lip to include the tip of the nose and part of the vibrissae roots and projecting upwards to reach the dark eye-ring. Hands and feet white with brown centres. Tail bicolored, the distal half white: the pale area clad with white hairs.

Remarks. I have compared the type, the only example obtained, with a large series from Trang and the differences are so marked that it is necessary to recognise it as representing a distinct race, which I have named after Mr. E. G. Herbert, whose collector was principally responsible for the excellent condition of the specimens in this collection.

(For measurements see table p. 32).

30. *Epimys surifer surifer*.

Mus surifer, Miller, Proc. Biol. Soc. Washington, XIII, p. 148, pl. IV, figs 4, 4a, 4b (1900).

Epimys surifer, Robinson and Kloss, Journ. Fed. Malay States Mus., V, p. 125 (1914); Wroughton, Journ. Bombay Nat. Hist. Soc., XXIII, p. 714 (1915).

1 ♂ adult, 1 ♀ sub-adult. Maprit, Patiyu, Peninsular Siam. Dec.-Jan. 1915-6. [Nos. 2074, 2070].

Very typical examples but with the white of the underparts continued to the hind foot. Above mingled ochraceous and brownish-black, pelage very stiff and wiry; below white. Hands and feet white. Tail bicolored with a white tip.

One of the commonest of spiny forest-rats and originally described from Trang.

(For measurements see table p. 32).

31. *Epimys surifer finis*.

Epimys surifer finis, Kloss, P. Z. S., 1916, p. 51.

2 ♂, 3 ♀, Pak Jong; 3 ♂, 3 ♀, Hinlap, Eastern Siam, 900 ft. Nov.-Dec. 1915. [Nos. 2051, 2052, 2054, 2055, 2056, 2058-2064].

This race differs from *E. s. surifer* in being rather duller in colour above while the white of the undersurface is usually continued to the hind foot, the contrary being generally the case with that form. The series from Hinlap is even duller and more blackened than paratypes from the extremity of South-east Siam, but several of the specimens are somewhat immature.

(For measurements see table p. 32).

32. *Epimys rattus*, subsp.

Mus rattus, Linn. Syst. Nat. I, p. 83 (1766); Blanford (partim), Faun. Brit. Ind., Mamm., p. 106 (1891); Flower (partim), P. Z. S., 1900, p. 361.

1 ♂ imm. 1 ♀ adult. Krabin, Central Siam. Nov. 1915. [Nos. 2039, 2042].

1 ♂ adult. Maprit, Patiyu, Peninsular Siam. Dec. 1915. [No. 2068]

These specimens are evidently the same as Flower's Bangkok rats, and also seem to agree with *E. r. portus, mihi*, from Koh Si Chang, but the material is insufficient for satisfactory determination.

(For measurements see table p. 32).

33. *Epimys validus*.

Mus validus, Miller, Proc. Biol. Soc. Washington, p. 141, pls. III and IV, fig. 1 (1900).

Epimys validus, Robinson and Kloss, Journ. Fed. Malay States Mus., V, p. 125 (1914); Wroughton, Journ. Bombay Nat. Hist. Soc., XXIII, p. 715 (1915).

1 ♂ adult. Klong Bang Lai, Patiyu, Peninsular Siam. Jan. 1915. [No. 2078].

This is a large, coarsely-furred, jungle rat, the upper parts mingled black and buff and the underside buffy; nearly everywhere the grey base of the fur shows through and modifies the above colouration. The tail is black throughout and the hind feet are thinly clad with dark hair.

The skull is strongly and heavily built and is distinguished from all other local species of *Epimys* by the marked protuberance (mandibular tubercle) on the outer side of the ascending ramus of the mandible, a feature which occurs in the bandicoot rats (some of which *E. validus* superficially resembles) in a still more exaggerated degree.

(For measurements see table p. 32).

34. *Epimys ferreocanus*.

Mus ferreocanus, Miller, Proc. Biol. Soc. Washington, XIII, p. 140, pls. III & IV, fig. 3 (1900); Robinson and Kloss, Journ. Fed. Malay States Mus., IV, p. 124 (1909).

Epimys ferreocanus, Robinson and Kloss, op. cit. VI, p. 238 (1916).

1 ♂ imm. Maprit, Patiyu, Peninsular Siam. Jan. 1916. [No. 2076].

This rat was described from Trang and extends as far south as Perak: the present specimen is the most northerly example I have seen and the youngest, and the only one with the tail dark throughout.

The fur is largely composed of fine pliable spines and is a lustrous purplish-brown above in adults, nearly always frosted by whitish tips. The under parts are pure white and there is generally a little patch of white hair immediately below the orifice of the ear. The feet are brown or parti-coloured, and the tail in full-grown animals has the sharply defined terminal half to fourth of a yellowish-white colour.

The upper incisors are pale orange-yellow, while the lower are ivory-white and unusually long and slender.

Dimensions of an adult specimen:—head and body, 250; tail, 270; hind foot, 53; ear, 30 mm.

Skull:—greatest length, 53; diastema, 17; upper molar row, 10; length of palatal foramina, 8.7; median nasal length, 22; zygomatic breadth, 26 mm.

35. *Muntiacus muntjak* subsp.

Cervulus muntjac. Blanford (partim), Faun. Brit. Ind., Mamm., p. 532 (1891).

1 ♂ imm. Klong Wang Hip, Tung Sawng, Peninsular Siam. Oct. 1915. [No. 2036].

This is the skull and head-skin of a young buck barking-deer, which still retains part of its milk dentition. It is impossible to say to what race it belongs.

36. *Cervus unicolor equinus*.

Cervus equinus, Cuv., Ossements Fossiles, ed. 2, IV, p. 45, pl. V, figs 37 and 38 (1823).

Cervus unicolor, Blanford (partim), Faun. Brit. Ind., Mamm., p. 543 (1891).

Cervus unicolor equinus, Gairdner, Journ. Nat. Hist. Soc. Siam, I, p. 117 and plate (1914); Gyldenstolpe, Arkiv för Zoologi, Stockholm, vol. 8, No. 23, p. 30 (1914); Lydekker, Cat. Ungulates, Brit. Mus., IV, p. 78 (1915).

Rusa unicolor, Wroughton, Journ. Bombay Nat. Hist. Soc., XXIII, p. 718 (1915).

1 ♂ juv., 1 ♂ imm. Maprit, Patiyu, Peninsular Siam. Jan. 1916. [Nos. 2073, 2071].

2 ♀ adult. Klong Bang Lai, Patiyu, Peninsular Siam. Dec.-Jan. 1915-6. [Nos. 2083, 2082].

These specimens not only illustrate the feature in Sambur that has been called the "blood-spot," but they also show the extent to which consequent denudation of hair on the neighbouring parts may be carried.

In the first example, a male fawn, there is no bare area at all on the throat but in the next, an immature male, there is a circular bare space about six inches in diameter, the centre of which is superficially granulated and was apparently slightly raw in life: this "blood-spot" is situated where a whorl of hair occurs in the youngest animal and is

quite small, about an inch as a half in diameter. It is present in both the adult females and, while in one there is a ring of bare skin 9-12 inches broad right round the neck, in the last the neck is entirely devoid of hair from the ears to the shoulders—a depth of 20—24 inches! The blood-spot is apparently still in the same place and is quite small in area.

Both Major G. P. Evans¹ and Mr. P. R. Kemp² have dealt with this curious development at some length and offered various explanations to which I am unable to add: that the sore occurs where the smoothness of the pelage is broken on the throat and that the resulting bareness may extend over the entire neck are the only unnoted details I can contribute.

Evans says that the sore occurs both on Indian and Burmese Sambur, and Wroughton (l.c.s.) records it from South Tenasserim, but Kemp has not found it on animals from Pitsanulok, Central Siam, nor from Peninsular Siam: it is found, though not always, in *Rusa* of the Malay States, but is not accompanied by the large areas of bare skin exhibited by the present animals. Nobody seems to have noticed it in captive deer.

37. *Tragulus kanchil ravus*.

Tragulus ravus, Miller, Proc. Biol. Soc. Washington, XV, p. 173, (1902); Robinson and Kloss, Journ. Fed. Malay States Mus., V, p. 127 (1914).

Tragulus kanchil ravus, Wroughton, Journ. Bombay Nat. Hist. Soc., XXIII, p. 717 (1915).

Tragulus javanicus, Blanford (partim), Faun. Brit. Ind., Mamm., p. 556 (1891).

1 ♀ imm. Maprit, Patiyu, Peninsular Siam. Jan. 1916.
[No. 2092].

This is an example of the Malayan Lesser Mouse-deer with the broad black nuchal stripe which differentiates it from *T. k. affinis* of the more eastern portion of Siam. Head and body, 459; tail, 73; hind-foot, 127; ear, 39 mm. The milk dentition is partially retained and the last molars are not up.

¹ Big-game Shooting in Upper Burma, pp. 144-8 (1911).

² Journ. Nat. Hist. Soc. Siam, I, p. 51 (1914).

Measurements of Siamese Squirrels in Millimetres.

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JOURN. NAT. HIST. SOC. SIAM.

	Sex	Head and Body	Tail	Hind foot	SKULL.								No.	Remarks
					Greatest length	Condylor-basilar length	Palatilar length	Diastema	Upper Molar row	Median nasal length	Inter-orbital breadth	Zygomat-ic breadth		
<i>Sciurus finlaysoni</i>														
Krabin, Central Siam	♂	237	204	55	56.2	47.5	23.0	12.9	10.7	16.5	...	33.0	2037	
" "	♀	254	242	54	54.5	46.0	22.1	12.6	10.4	16.0	21.0	31.3	2038	
" "	♀	233	213	51	53.5	44.8	21.6	11.6	10.4	16.0	19.2	31.0	2046	
" "	♂	258	246	55	57.0	48.2	23.0	12.9	11.0	16.1	20.9	33.5	2047	
" "	♂	227	221	52	56.4	47.2	23.2	13.0	10.4	16.4	21.0	33.0	2048	
<i>Sc. nor.</i>														
Hup Bon, S. E. Siam	♂	235	224	48	55.0	46.8	23.0	12.2	10.7	17.0	20.4	32.2	2014	
" "	♀	229	223	48	55.0	45.8	22.9	12.1	10.7	16.3	20.9	...	2016	
<i>Sc. bocourti</i>														
Sam Koh, Central Siam	♀	192	171	43	48.8	40.5	19.7	10.8	9.7	13.3	17.2	29.4	2013	
<i>Sc. caniceps</i>														
Krabin, Central Siam	♀	262	224	45	58.0	49.0	24.0	13.1	11.0	17.0	20.2	32.5	2043	
" "	♀	243	242	52	57.0	48.0	24.0	13.0	11.6	17.0	19.5	32.0	2044	
Tenasserim*	57.0	48.8	23.4	12.8	11.1	16.3	20.6	33.0	*	
<i>Sc. concolor milleri</i>														
Klong Wang Hip, Pear. Siam	♀	226	238	46	55.0	46.4	22.7	12.5	10.6	16.0	19.0	30.6	2033	

* One of the type of *S. chrysonotus*, Blyth : Indian Museum Registered No. 9476, *S. caniceps* c^a of Selater in Cat. Mamm. Ind. Mus. II.

MR. C. BODEN KLOSS ON

Measurements of Siamese Squirrels in Millimetres.

	Sex	Head and Body	Tail	Hind-foot	SKULL								No	Remarks
					Greatest length	Condylor-basilar length	Palatilar length	Diastema	Upper molar row	Median nasal length	Inter-orbital breadth	Zygomantic breadth		
<i>Sciurus erythraeus rubeculus</i>														
Khao Wang Hip, Penr. Siam	♀	240	214	48	53.2	45.0	22.0	11.8	10.8	13.6	19.5	30.3	2026	Sub-adult
<i>Sc. vittatus miniatus</i>														
Khao Wang Hip, Penr. Siam	♂	229	189	43	49.0	41.8	20.5	11.6	9.0	14.1	18.2	29.7	2025	
<i>Sc. tenuis surdus</i>														
Khao Wang Hip, Penr. Siam	♂	147	101	31	37.3	31.2	15.5	8.3	7.0	11.9	12.4	22.8	2021	
<i>Tamiops rodolphi</i>														
Krabin, S. E. Siam	♂	138	119	29	32.6	27.8	13.2	7.6	5.9	10.7	8.0	20.8	2040	
<i>Dremomys rufigenis belfieldi</i>														
Khao Wang Hip, Penr. Siam	♂	220	161	46	55.4	45.0	23.2	12.4	10.5	16.0	18.3	28.5	2027	
<i>Menetes berdmorei berdmorei</i>														
Hup Bon, S. E. Siam	♂	192	127	43	48.0	41.4	22.3	12.3	10.1	11.5	13.2	24.3	2015	
" "	♀	186	146	42	48.2	40.7	22.0	12.4	10.0	12.0	13.0	25.0	2019	
Krabin, Central Siam	♂	201	153	41	50.0	43.0	24.0	13.7	10.0	12.2	13.0	25.6	2045	
Klong Bang Lai, Penr. Siam	♂	203	94	41	49.3	42.6	23.2	12.4	10.3	13.2	15.0	26.3	2079	
" "	♀	196	136	44	51.0	44.0	25.0	14.2	10.0	13.0	14.5	26.4	2081	

Measurements of Siamese Rats in Millimetres.

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MR. C. BODEN KLOSS ON MAMMALS FROM SIAM.

	Sex	Head and Body	Tail	Hind-foot	SKULL								No	Remarks
					Greatest length	Condylor-basilar length	Diastema	Upper tooth row	Length Palatal Foramina	Median nasal length	Breadth combined nasals	Zygomastic breadth		
<i>Epimys cociferans cociferans</i> Maprit, Patiyu, Penr. Siam.	♂	236	314	41	54.0	46.2	13.6	10.2	7.1	20.4	6.0	25.0	2069	Type
<i>Epimys cociferans herberti</i> Pak Jong, E. Siam	♂	231	335	45	54.0	45.0	13.2	9.6	7.1	21.0	6.1	24.0	2053	
<i>Epimys surifer surifer</i> Maprit, Patiyu, Penr. Siam.	♂	200	216	...	45.0	37.4	13.0	6.8	6.2	17.6	5.1	19.0	2074	
<i>Epimys surifer finis</i> Pak Jong, E. Siam	♀	186	172	35	46.4	38.8	12.2	7.7	6.7	17.2	5.0	21.3	2051	
" "	♂	183	190	37	45.0	37.8	11.8	7.3	6.3	18.0	4.8	19.3	2054	
" "	♀	168	175	36	43.0	36.0	11.3	7.0	6.1	17.6	4.5	19.6	2055	
" "	♂	188	imp.	38	45.2	38.0	12.2	7.1	7.0	17.1	4.8	20.0	2056	
Hinlap "	♀	183	imp.	37	44.0	37.0	11.8	6.2	6.4	17.8	4.8	19.6	2058	
" "	♀	172	183	36	44.0	36.9	12.0	7.1	6.1	16.6	4.8	19.5	2062	
<i>Epimys rattus, subsp.</i> Krabin, Central Siam	♀	183	189	31	41.6	36.0	11.4	7.2	8.7	15.4	4.7	20.0	2042	
Maprit, Patiyu, Penr. Siam.	♂	164	194	32	42.1	35.7	11.2	7.0	7.9	16.0	4.6	19.1	2068	
<i>Epimys calidus</i> Klong Bang Lai, Penr. Siam.	♂	269	309	52	60.0	51.8	16.3	10.5	11.1	25.1	6.3	29.2	2078	