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ON A FOURTH COLLECTION OF SIAMESE MAMMALS.

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The present contribution deals with parts of the collections obtained in Western Siam by Mr. K. G. Gairdner, and in North Siam by Messrs. Williamson and Smith's collectors; and my thanks are also due to Dr. Malcolm Smith, Messrs. W. L. Williams, H. C. St. J. Yates, A. J. Irwin, W. J. F. Williamson and J. J. McBeth for sending various specimens for examination.

As to some of the more obscure localities mentioned:—Sikawtur and Me Taw are in Western Siam, 40-50 miles N.W. of Raheng, and cut off from the main Me Ping river valley by a big mass of hills from 3,000 ft. to 4,000 ft. in height.

All the following are N.N.E. of Nakon Lampang, North Siam:—

Me Puan. A right bank tributary of the Me Wang: the collection was made in evergreen jungle between 1,500-2,000 ft.

Pa Meang, Me Nga. One side of this hill drains into the Me Kong: Pa Meang is a tea-garden at about 2,000 ft.

Ban Phong Tham and Ban Me Yen are in the Me Wang forest at no great height.

1. *Macaca irus* CUVIER.

1 ♀ juv. from Paknambo, Central Siam [No. 2689/CBK.].
Collected by Mr. K. G. Gairdner. Orig. No. 487.

Head-skin and skull only, but evidently a very dull-coloured young animal. A few black hairs on the forehead. A small tuft on the crown.

2. *Macaca assamensis*.

Macacus assamensis, McClelland, P. Z. S. 1839, p. 148; Anderson. Anat. and Zool. Res., p. 64 (1878); Blanford, Fauna Brit. Ind. Mamm., p. 15 (1881).

1 ♀ subad. from Me Puan, N.N.E. of Lakon Lampang, North Siam, 1,500-2,000 ft. Messrs. Williamson and Smith's collectors. September 1917. [No. 2671/CBK.].

This animal just falls short of being adult, in that the last molars, though well up and with the anterior cusps worn by contact with the teeth in front of them, do not yet engage with each other.

The species was very shortly described by McClelland and the type is now lost, but before it disappeared it was examined by Anderson who fortunately published a good account of it.

I think this specimen is undoubtedly an example of *M. assamensis* but am unable to say whether it is truly typical. One feature shown is curious; the tail, which does not appear to be either mutilated or malformed, is not only merely an inch and three-quarters long, but is only a quarter of an inch in diameter; it is thickly clothed with hair and thus in no way resembles the naked stump-tails of *arctoides* and *rufescens*. In being thus well clad it resembles that of *assamensis*, but the typical animal has the tail about half the length of head and body and about an inch in diameter.

There is no whorl or ridge of hair on the top of the head; the hair, quite short in front and longer on the nape, grows quite smoothly backwards and sideways from the forehead. Pelage slightly wavy.

The upper parts of the body are light mummy brown, very indistinctly annulated with golden ochraceous, the latter colour increasing in amount on the shoulders; sides and limbs paler, arms suffused externally with golden ochraceous like the shoulders, the legs tinged with drab: crown and nape a little paler than the back: sides of neck and under-parts thinly clad with pale greyish buffy fur lightest on throat and chest. Tail paler than the rump and golden buff above; hands and feet like the limbs. Face thinly clad with short pale hairs. Buttocks covered to the edges of the callosities.

Native collector's external measurements:—head and body, 465; tail, 44; hind foot, 131. Skull:—greatest length, 118.5; condylo-basal length, 85; basal length, 76; palatal length, 44; upper molar row

(alveoli), 33.5; m^2 — m^2 (alveoli), 21; breadth of rostrum across canines (alveoli), 28; occipito-nasal length, 98; breadth of braincase, 58; external biorbital breadth, 61; zygomatic breadth, 71; mastoid breadth, 59; orbits, 22×23 ; greatest length of mandible, 80; length of lower molar series (alveoli), 40; height of coronal process, 33; horizontal breadth of ramus through condyle, 27.

The skull resembles that of a female from near Bhamo figured by Anderson in the "Researches" (fig. 7, p. 66) as *M. assamensis*, but later referred by him to *M. leoninus** (= *andamanensis*).

It is to be hoped that residents in North Siam will succeed in obtaining further examples of this animal to prove whether the tail of the present specimen is natural or not; males are particularly desired. This species may be distinguished from *M. siamica* by its more uniform brown colour; the latter (more specimens of which are also wanted) having dark grey shoulders contrasting with a bright ochraceous rump.

3. *Nycticebus coucang cinereus* M-EDW.

Nycticebus cinereus, Kloss, Journ. N. H. S. Siam, II, pp. 77, 289 (1916-7).

A juvenile example from Wang Pong, S. W. Siam [No. 2672/CBK.]. Collected by Dr. Malcolm Smith.

This young animal has the face, nape, forelimbs and hind feet almost white and the hind legs very much frosted; there are isolated dark rings round the eyes and a dark stripe commences at the occiput and continues to the beginning of the rump; the back and sides are snuff brown, slightly frosted on the sides, strongly along the dark line and on the rump; the hair of the under-surface is brownish white.

Like all young animals of this species the fur is much longer and denser than in the adult.

Head and body, 190; tail, 10; hindfoot, 56; ear, 12 mm.

4. *Felis bengalensis*.

Felis bengalensis, Kerr, Animal Kingdom, p. 151 (1792); Flower, P.Z.S., 1900, p. 325; Gyldenstolpe, Arkiv för Zoologi, 8, No. 23, p. 25 (1914).

1 ♂ ad. skin and skull from Chiengmai, N. Siam [No. 2673/CBK.]. Collected by Mr. W. L. Williams.

* Cat. Mamm. Indian Mus., 1, p. 72.

Flat skin from north of Chiengmai [No. 2674/CBK.]. Collected by Mr. H. C. St. J. Yates.

The first specimen represents a dull coloured animal; ground colour of upper parts greyish buff; the markings are large and dark and are indistinctly bordered by ochraceous tawny patches. Very different is the brilliantly coloured skin sent by Mr. Yates, in which the ground colour of the upper surface is ochraceous buff much suffused with bright tawny mesially where there are broken black stripes; the other markings mostly take the form of triangular tawny patches with, generally, a blackish apex or border. This specimen apparently resembles Blanford's *pardichroa* Hodgs., from the Himalayas (Fauna Brit. Ind., Mamm., p. 80) which seems to have been based on a brightly coloured example of this variable cat.

Skull:—greatest length, 99; basal length, 82; greatest breadth, 67; upper sectorial, 9.8×3.6 ; lower molar row (alveoli), 18.5 mm.

5. *Viverra zibetha pruinosa*.

Wroughton, Journ. Bombay N. H. S., XXIV, p. 64 (1915); Kloss, Journ. N. H. S. Siam, II, p. 292 (1917).

Adult skin and skull from a little south of Sriracha, on the Inner Gulf of Siam [No. 2675/CBK.]. Collected by Mr. A. J. Irwin.

Mr. Wroughton distinctly states that there is in the ground colour of this race a total absence (which distinguishes it from other forms) of any yellow tinge; but the present specimen is decidedly suffused with buff on the lower parts of the flanks, thighs, head and sides of neck: to a less degree, an example from Patani, Peninsular Siam, is tinged with buff in the same way (Kloss, *l. c. s.*). The type came from Thagata on the Little Tenasserim River, and the subspecies is said to extend north to the Shan States and south into the Malay Peninsula. This specimen comes from a locality so near the range indicated, that it would be unwise to separate it without more material and topotypes for comparison. It is not, as Mr. Wroughton states, in the tips of the hairs that the colour difference occurs, for they are blackish, but in the pale subterminal annulations.

Mr. Irwin's specimen is a fine adult with a broad, heavy skull and large teeth. Siamese name, *Sua preng* (maned tiger).

Measurements of the skull:—greatest length, 140; basal length,

128; zygomatic breadth, 72.5; breadth of braincase, 42; maxillary tooth-row exclusive of incisors (alveoli), 55; greatest length of upper sectorial, 16.6; interorbital breadth, 27; postorbital constriction, 21.3; breadth of basi-occipital, 17.5; mastoid breadth, 45.

6. *Arctictis binturong binturong* (RAFFLES).

Arctictis gairdneri, Thomas, Ann. and Mag. Nat. Hist. (8) XVII, p. 270 (1916).

Arctictis binturong binturong, Kloss, Journ. N. H. S. Siam, II, p. 293 (1917).

1 ♀ juv. from Sikawtur, N. W. of Raheng, W. Siam, 1,500 ft. 25 May 1917 [No. 2656/CBK.]. Collected by Mr. K. G. Gairdner. Orig. No. 444.

General colour above black with the base of the hairs dirty white, this colour much exposed on shoulders, sides and thighs; head and limbs grizzled with whitish; front of ears white; a few coarse buffy annulations on the rump; underparts of body dirty white, many hairs with black tips. Tail black, the hairs with dirty white bases much exposed below at the root. The longer whiskers yellowish.

Head and body, 658; tail, 695; hind foot, 125; ear, 48 mm. The skull is that of a young animal with milk dentition, the penultimate molars having just come into place. Length, 136; zygomatic breadth, 72 mm.

7. *Tupaia glis belangeri* (WAGN.)

Tupaia belangeri, Wroughton (partim), Journ. Bombay N. H. S., XXIII, p. 707 (1915) [Tenasserim village; Banlaw and Tagoot, 75 miles up the Tenasserim river]; Kloss, Journ. N. H. S. Siam, II, p. 9 (1916) [Patiyu, S.W. Siam]; Gyldenstolpe, Kungl. Sv. Vet. Akad. Handl., 57, No. 2, p. 18 (1917) [Koh Lak, S.W. Siam].

1 ♂ ad. from Pa Meang, Me Nga, N. N. E. of Lakon Lampang, N. Siam [No. 2669/CBK.]. Obtained by Messrs. Williamson and Smith's collectors. 24th Sept., 1917.

1 ♂ ad., 1 ♀ vix ad., 1 ♀ ad. from Sikawtur, N.W. of Raheng, W. Siam [Nos. 2657-9/CBK.]. Collected by Mr. K. G. Gairdner.

1 ♂ ad. from Hua Hin, Pran, S.W. Siam [No. 2453/CBK.]. Obtained by Messrs. Williamson and Smith's collectors. 21 June 1917.

1 ♀ vix ad. from Pran River mouth [No. 2544/CBK.]. Messrs. Williamson and Smith's collectors. 26 June, 1917. Mammæ 3-3=6.

All these specimens seem to me to belong to the same race, and I would call them *T. g. belangeri*: the animal from Me Nga is perhaps beginning to show some approach towards *T. laotum* Thomas (Ann. & Mag. Nat. Hist. (8) XIII, p. 224, 1914) from Nan, as there is a very slight darkening of the rump. Some of them, however, probably represent *T. siamensis* Gyldenstolpe (*op. cit. supra*, p. 20) from Koh Lak and *T. g. tenaster* Thomas (Journ. Bombay N. H. S., XXV, p. 201 (1917) from Tagoot to Tenasserim town.

(For measurements see table *postea*).

8. *Tupaia glis clarissa*.

Tupaia clarissa, Thomas, Journ. Bombay N. H. S., XXV, p. 200 (1917) [Victoria Point, S. Tenasserim].

Tupaia belangeri, Wroughton (partim) Journ. Bombay N. H. S., XXIII, p. 707 (1915) [Victoria Point and Bankachon].

1♂ subad., 1♂ ad. from Chumporn river mouth, S. W. Siam. [Nos. 2552,3/CBK.]. Obtained by Messrs. Williamson and Smith's collectors. July 1917.

The material is unsatisfactory but the long muzzle of the adult points to its being an example of *clarissa*.

The younger animal has the rump blackish and throughout the grizzling is rather fine. The adult is in very worn pelage, the saddle is black and there is a black patch on the rump: the fur (probably old) of the head and shoulders is ferruginous, much deeper in colour than the silky hair of the rump where the fur is very thin.

This Tree-shrew seems to me to link up those of the Malay Peninsula and some of the islands with those of Indo-China. The animals of the former region (*ferruginea* group) have backs markedly more rufous, longer snouts and, in females, two pairs of mammae only. Northern animals (*belangeri* group) have little or no rufous suffusion above, shorter snouts and three pairs of mammae.

The description of *clarissa* indicates that it is intermediate in colour between *belangeri* of Pegu and Tenasserim, and *wilkinsoni* of Trang, Peninsular Siam, being brighter and clearer than the first but less richly coloured than the latter; the muzzle, from tip to orbit, is as long as in *wilkinsoni* but the mammae are as in *belangeri*, i. e., 3 pairs; or when only four or five mammae are present, as happens, their spacing and position are as in the latter.

Tupaia clarissa was described as a full species but it appears to be merely an intermediate, but very interesting form completely connecting northern animals with southern ones and showing that all tupaia of this kind belong to races of one species, *T. glis* (Diard) of Penang, and not to several distinct species.

(For measurements see table *postea*).

9. *Hylomys suillus siamensis*.

Hylomys siamensis, Kloss, Journ. N. H. S. Siam, II, p. 10 (1916).

1 ♂ ad. Me Taw, N.W. of Raheng, W. Siam, 1,500 ft. [No. 2660/CBK.]. Collected by Mr. K. G. Gairdner on 2 Feb. 1917. Orig. No. 352.

1 ♂ ad. Sikawtur, N. W. of Raheng, 1,500 ft. [No. 2661/CBK.]. Collected by Mr. K. G. Gairdner on 15 March 1917. Orig. No. 409.

The second specimen of this rare insectivore exactly agrees in colour with the immature type; the first is rather brighter above, being more ochraceous on the rump. The tail is pale beneath.

Measurements:—Head and body, 138, 132; tail, —, 22; hind-foot, 23.5, 23; ear, 17, 15.5.

Skulls:—Greatest length, 34.7, 34.9; condylo-basal length, 33.8, 33.1; basal length, 31.4,—; palatal length, 18.5, 18; upper tooth row (alveoli), 18, 17.2; p^1-m^3 (alveoli), 8, 8.1; median nasal length, 12.2, 12; interorbital constriction, 8, 8.6; zygomatic breadth, 18.2, 18.8; length of mandible, 25, 25 mm.

10. *Petaurista lylei* BONHOTE.

Kloss, Journ. N. H. S. Siam, II, p. 302 (1917); Gyldenstolpe, Kungl. Sv. Vet. Akad. Handl., 57, No. 2, p. 30 (1917).

2 ♂ ad. from Sikawtur, N. W. of Raheng, W. Siam, 1,500 ft. [Nos. 2652-3/CBK.]. Collected by Mr. K. G. Gairdner, 28 May 1917. Orig. Nos. 452-3.

1 ♂ ad. Pa Meang, Me Nga, N. N. E. of Lakon Lampang, North Siam, 2,000 ft. [No. 2663/CBK.]. Messrs. Williamson and Smith's collectors. 3 Nov. 1917.

I have already given a description of this animal in the Journal; in two of the specimens the black behind the ears and on the limbs and tail is browner and less intense than in the others, and the under body of the Me Nga specimen is altogether paler, being whitish on the axillae, sides, abdomen and base of tail.

The nasals vary considerably; their combined breadths in the three specimens are respectively 13, 16.6, 15.4 mm.

(For measurements see table *postea*.)

11. *Hylopetes phayrei phayrei*.

Sciuropterus phayrei, Blyth, Journ. Asiat. Soc. Bengal, XXVIII, p. 278 (1859).

1 ♀ aged, from Kanburi district, Western Siam [No. 2670/CBK.]. Obtained by Dr. Malcolm Smith's collectors.

This flying-squirrel appears to be an example of *H. p. phayrei* (type locality, Rangoon) though it is practically of the same size as the next race which Mr. Thomas says is larger than the typical form.

Above, base of fur deep neutral grey, middle portion of hairs dusky drab, tips cinnamon buff, the upper sides of the limbs and membranes browner and less overlaid with the latter colour and the hair less grey at the base. Muzzle greyish; cheeks, sides of neck, edge of membranes and entire under surface of body and limbs white or creamy-much of the fur pale grey at base. Hands and feet dusky drab grizzled above with buffy, pale buffy along the sides. Tail dusky drab through, out above and below at the tip, but much paler beneath basally.

(For measurements see table below).

12. *Hylopetes phayrei laotum*.

Sciuropterus phayrei laotum, Thomas, Journ. Bombay N. H. S., XXIII, p. 28 (1914) [North Siam].

Sciuropterus phayrei, Bonhote, P. Z. S. 1900, p. 193 [Nan].

1 ♀ ad. from Raheng town, W. Siam, 450 ft. [No. 2614/CBK.] Collected by Mr. K. G. Gairdner on 25 Jan. 1917. Orig. No. 353.

1 ♂ ad., 1 ♀ imm. from Me Taw, N. W. of Raheng, 1,500 ft. [Nos. 2613, 2651/CBK.]. Collected by Mr. K. G. Gairdner on 13 June 1917. Orig. Nos. 455, 454.

The appearance of these specimens is as follows:—

Adult female: Upper parts grey at base and dusky drab towards the tips which are orange-cinnamon on the top of muzzle and head, middle line of nape and on the back; on the limbs and membranes the light tips are much less numerous and become paler or albescent. Cheeks, lower sides of neck, a line beneath the ears towards the back of the nape, entire under-parts of body and limbs white or creamy, very slightly greyish at the base of the hair in places.

Hands and wrists buffy white, feet buffy on the digits and half-way towards the ankles. Tail cinnamon tinged with brown, paler below at the base. Mammæ 3-3=6.

Adult male: Like the preceding but much duller; the upper parts washed with pale cinnamon-buff instead of orange-cinnamon; muzzle greyish buff; limbs and membranes blackish brown instead of dusky drab. Hands and feet darker, the white confined to the edges and the digits. Tail dull brown above, darkest at the end; brown and buff below.

Immature female: Like the male but much darker (as in all young flying squirrels apparently) owing to the fewer buffy tips to the hairs; the grey bases on the belly are more pronounced and the feet are much darker throughout.

Mr. Thomas has also described (*t. c. s.*, p. 27) another race, *H. p. probus*, from Mt. Popa, Central Burma, from which *H. p. laotum* is stated to differ in having the hands and feet less extensively white and the under parts less pure white and more mixed with slaty: it is also larger. The adult female so closely accords in these respects that one would be inclined to refer it to the Burmese form, if it had not been obtained so near the type locality of *H. p. laotum*, with which race the male from Me Taw agrees.

Measurements of *H. p. phayrei* and *H. p. laotum* in millimetres.

No.	...	...	...	2670 ♀	2614 ♀	2613 ♂	2651 imm.
Head and body	...	...	...	166	167	165	—
Tail	...	...	...	158	151	150	—
Hind foot	...	...	...	31	35	33.5	32
Ear	...	...	...	24	25	25	—
Skull	...	...	...	
greatest length	...	...	...	41.3	42	41.5	—
condylo-basilar length	...	...	...	34.7	35	34.7	—
basilar length	...	...	...	31.9	32.1	31.1	—
palatilar length	...	...	...	18	18.1	18.5	17
diastema	...	...	...	8.8	8.5	8.9	7.1
upper molar row (alveoli)	...	...	...	8.7	8.9	8.6	9
nasals	...	...	...	11.2 × 6.9	12 × 6	12 × 6.4	10.3 × 5.8
interorbital breadth	...	...	...	9.4	8.9	8.5	8.9
zygomatic breadth	...	...	...	25.5	25	25	22.2
mastoid breadth	...	...	...	19	20	18.7	—

13. *Ratufa gigantea*.

Sciurus giganteus, McClelland, P.Z.S. 1839, p. 150.

Ratufa gigantea, Bonhote, P.Z.S. 1900, p. 193 (Nan).

1 ♂ ad. from Me Puan, N. N. E. of Lakon Lampang, N. Siam 1,500-2,000 ft. [No. 2664/CBK.]. Messrs. Williamson and Smith's collectors. 26 Nov. 1917.

This animal differs from *Ratufa melanopepla* and its allies, *phaeopepla* and *leucogenys*, which are more common in Siam, in having tufted ears, while the buff of the forelimb is confined to the inner side, instead of extending over the upper surface behind the wrist. Typically it is also larger.

The black upper parts of the present specimen are slightly tinged with dark brown on the occiput and thighs, and there are about a dozen white hairs at the tip of the tail.

Originally from Assam, *R. gigantea* has already been obtained from North Siam* and is known from the North-Shan states and Northern Burma.† Under *Ratufa bicolor* (P.Z.S. 1900, p. 355) Flower states that he thought he could distinguish through field-glasses tufted ears on an animal near Krabin, Bangpakong River, but it is unlikely that *R. gigantea* extends so far south. A local form, *R. g. lutrina* Thos. & Wr. (Journ. Bombay N. H. S., XXIV, 1916, p. 226) occurs opposite Kindat on the Upper Chindwin, Burma.

(For measurements see table *postea*.)

14. *Sciurus caniceps caniceps* GRAY.

Sciurus caniceps, Kloss, Journ. N. H. S. Siam, II, pp. 18,83 (1916).

1 ♂ subad. from Me Wang, N. N. E. of Lakon Lampang, North Siam [No. 2677/CBK.]. Obtained by Mr. W. J. F. Williamson's collectors. 29 Oct. 1917.

This specimen is assuming the winter pelage; the grizzled grey nape, back and sides are tinged with yellow, and there are present some spots and patches of orange ochraceous; the tail is suffused with yellow and tapers towards the end where there is a large tuft of black hair; the limbs are grey, hands and feet whitish and the under parts greyish white with a grey median stripe.

(For measurements see table *postea*.)

* Vide Wroughton, Journ. Bombay N. H. S., XIX, p. 890 (1910)

† Wroughton, op. cit. XXIII, p. 462 (1915).

15. *Sciurus atrodorsalis* thai.

Kloss, Journ. N. H. S. Siam, II, p. 285 (1917).

1 ♀ ad., 1 ♂ ad., from Sikawtur, N. W. of Raheng, W. Siam, 1500 ft. [Nos. 2646,7/CBK.] Collected by Mr. K. G. Gairdner, 3 Feb. and 16 May 1917. Orig. Nos. 350, 427.

These two specimens differ from the type series in having the muzzles more buffy than ochraceous, and the ears and the ring round the eyes paler. One is similar below but the other has the throat and foreneck grey and the chest yellow, while the middle abdomen is suffused with yellow and there are stripes of the same colour on the front of the hind legs between the grizzled and rufous areas; its tail is a deeper buff distally. A trace of yellow is also present on the chest of an animal of the typical series.

The type female, though an adult with worn teeth, is a little below the average in size.

(For measurements see table *postea*).

16. *Sciurus nox* WROUGHTON.

Kloss, Journ. N. H. S. Siam, II, p. 17 (1916).

2 ♂ ad. from Nong Khor near Sriracha, S. E. Siam [Nos. 2520,1/CBK.] Obtained by Mr. W. J. F. Williamson's collector on 13 and 14 July, 1916.

Practically topotypes of the jet-black Siamese squirrel. No measurements have been recorded in the field and the skulls have been damaged by cutting away the backs.

17. *Sciurus bocourti bocourti* M-EDW.

Kloss, Journ. N. H. S. Siam, II, pp. 17, 309 (1916-7).

1 ♂ ad. from Bang Pa In near Ayuthia, Central Siam [No. 2678/CBK.]. Collected by Dr. Malcolm Smith. 1 Feb. 1918.

Above a grizzle of black and buff, warmest on the nape, darkest on rump and tail. Ears, top and sides of muzzle, cheeks and above eyes, sides of neck, sides of forelimbs and upper surface of forearms, lower sides and ankles white; fore and hind feet greyish. Entire under parts including base of tail white. Tail above coarsely grizzled black and buff with numerous white hairs, below pale greyish.

(For measurements see table *postea*).

18. *Sciurus finlaysoni folletti*.

Kloss, Journ. N. H. S. Siam, I, p. 159 (1915).

3 ♂, 5 ♀ ad. from Koh Phai, Inner Gulf of Siam [No. 2522-9/CBK.]. Obtained by Mr. W. J. F. Williamson's collector on 16-18 July 1916.

These specimens exactly agree with the typical series collected in February, showing that no seasonal change in colour takes place. In one example there are marked chestnut areas on axillae, groin and along the sides of the abdomen; in the others the reddish patches are very faint and confined to axillae and groin.

No external dimensions have been recorded and as the backs of the skulls have been cut away by the collector I have not taken any measurements of these either. For the size of this race see table, Vol. 1, p. 162.

19. *Tamiops macclellandi kongensis* (BONHOTE)

Tamiops barbei kongensis, Kloss, Journ. N.H.S. Siam, II, pp. 84, 310, (1916-7).

1 ♀ aged. Lakon Lampang town, N. Siam [No. 2679/CBK.]. Obtained by Dr. Malcolm Smith's collector. March 1917.

1 ♀ vix ad. Ban Phong Tham, N. N. E. of Lakon Lampang, N. Siam [No. 2680/CBK.]. Obtained by Messrs. Williamson and Smith's collectors. 2 Sept. 1917.

1 ♂ imm. Ban Me Yen, N. N. E. of Lakon Lampang, N. Siam. [No. 2665/CBK.]. Obtained by Dr. Malcolm Smith's collector. Sept. 1917.

The specimens from Lampang town and Ban Phong Tham (March and September) are in the dull winter pelage described in Vol. II, p. 310; that from Ban Me Yen is in the brighter summer phase (vide Vol. II, p. 84).

The animal from Lampang town is an old individual with well worn teeth and is by far the palest and largest specimen I have seen.

Immature animals seem much more richly coloured below than adults, the under parts being salmon-buff to pinkish cinnamon.

(For measurements see table *postea*).

20. *Rattus lepidus*.

Epimys lepidus, Miller, Smithsonian Miscellaneous Collections, 61, p. 20 (1913). [Bok Pyin near Victoria Point, S. Tenasserim].

1 ♀ ad. from Meh Lem near Muang Prae, N. Siam [No.

2092/CBK.] Obtained by Messrs. Williamson and Smith's collectors on 11 April 1916.

Some of the lesser known spiny rats, with upper parts varying between tawny and clay colour and with sharply margined white under parts, are not easy to identify without reliably determined material to compare them with and therefore—though this specimen appeared to be *Rattus lepidus*, known hitherto from one adult only—I sent it to Mr. Gerrit S. Miller, in whose charge the type is, with a request for his opinion; at the same time drawing attention to the size of the ears. Mr. Miller has very kindly replied as follows:—

“I have compared the specimen with the type of *Rattus lepidus* and find that the two are virtually identical in all important characters. All the differences, except perhaps that in length of ear, are such as might be expected to be shown by individuals of one species from one locality. Dr. M. W. Lyon looked at the specimens with me and is of the same opinion.

“The differences are:—(a) ear; yours measures now a little over 21 mm., while ours are about 17.5, but the treatment of the two specimens was so different (the ears of yours having been spread out while drying while those of ours were allowed to shrink) that without more material I should not lay stress on these 3 or 4 mm; (b) fur; yours is less spiny (might be described as having spines mixed with the hairs, while ours has hairs mixed with the spines); (c) colour; underparts just perceptibly more yellow, the differences more noticeable on the throat than elsewhere; sides and upper parts identical except that in the type of *lepidus* the more abundant spines give a “horny” cast; (d) braincase and ante-orbital plate, a hair's-breadth narrower in your specimen; (e) bullae of your specimen slightly more inflated so that the beak is less prominent. There are no others that I can detect”.

The present specimen has the following appearance:—upper-parts ochraceous tawny darkened on the back by the tips of the spines and rather greyish on the sides and limbs through exposure of the base of the fur; cheeks buffy. Below cream colour throughout. Hands and feet white, the latter separated from the creamy part of the hind leg by a hair-brown area above the ankle. Tail dark above and white below, the hair in agreement except at the tip where it is pale

all round. Base of hair on upper parts neutral grey, of dorsal spines pale with a greenish tinge.

Native collector's external measurements:—head and body, 134 (140)*; tail, 164 (159); hind foot, s.u., 29 (26); ear 24.

Skull:—greatest length, 36; condylo-basal length, 31.4 (31.4); condylo-basilar length, 29.8; palatilar length, 15.2; diastema, 9.1 (8.3); upper molar row, alveoli, 6 (6); nasal length, 13.4 (13) breadth combined nasals, 4; palatal foramina, 6×2.3 ; greatest breadth of rostrum 6 (6.2); length of rostrum from upper rim of ante-orbital foramen, 11.8 (11.4); interorbital breadth 5.3 (5.8); zygomatic breadth, 16 (16.3).

The palatal foramina fall short of the molar roots by nearly a millimetre.

Rattus marinus mihi, from Koh Chang and Koh Kut, Chantabun Archipelago, S. E. Siam,† will probably prove to be a subspecies of *lepidus* when more of the latter have been compared with it. A series only differs from the present animal in having the feet less completely white, while in the skulls, the nasals are narrower posteriorly and the diastema is longer (*lepidus* 8.3—9: *marinus* 9.2—10.1 mm.).

Rattus lepidus and *marinus* are members of a group of rats easily separated from other species of the same general colour by the pale green bases of the dorsal spines. Some other continental animals belonging to it are *R. bukit* (Bonh.) and *R. orbus* (Robinson and Kloss) from Peninsular Siam and *R. cremoriventer* (Miller) from the same area with its subspecies *R. c. tenaster* (Thomas) from Muleyit, Tenasserim; the two last, however, form a distinct section of the group as the tail is more hairy and brown throughout, not white below.

21. *Rattus concolor*.

Mus concolor, Blyth, Journ. Asiat. Soc. Bengal, XXVIII, p. 295 (1859); Bonhote, P. Z. S. 1900, p. 195; id. op. cit. 1902, vol. 1, p. 39; Gyldenstolpe, Arkiv för Zoologi, 8, No. 23, p. 18 (1914).

Epimys concolor, Kloss, P. Z. S. 1916, p. 57.

Rattus concolor, Gyldenstolpe, Kungl. Sv. Vet. Akad. Handl. 57, No. 2, p. 45, pl. VI, figs. 5, 8 (1917).

1 ♂, 1 ♀ vix ad. from Raheng town, Western Siam, 450 ft. [Nos. 2680, 1/CBK.]. Collected by Mr. K. G. Gairdner.

Two large specimens with unworn teeth of the little spiny

* Measurements in parentheses those of the type—also an adult female

† *Epimys jerdoni marinus* Kloss, P. Z. S. 1916, pp. 50, 72.

house-rat: underparts much washed with buffy in both.

Measurements:—head and body, 115, 115; tail, 147, 141; hind foot, s.u., 27, 25; ear, 15, 16. Skull (male only):—greatest length, 31; condylo-basal length, 27; palatilar length, 14.4; diastema, 8.4; upper molar row (alveoli) 4.9; length of palatal foramina, 5.2; length of nasals, 13; interorbital breadth, 4.8; breadth of braincase, 13.3; zygomatic breadth, 15 mm.

22. *Rattus rattus* *thai*.

Rattus rattus *thai*, Kloss, Journ. N.H.S. Siam, II, p. 286 (1917).

Mus rattus, Bonhote, P. Z. S. 1900, p. 194; id. op. cit. 1901, vol. I, p. 56.

2 ♂ ad, 3 ♂ subad., 3 ♀ ad., 2 ♀ subad. from Sikawtur and Me Taw, N. W. of Raheng, W. Siam, 1500 ft [Nos 2639-45, 2666-8/CBK.]. Collected by Mr. K. G. Gairdner between 3 Feb. and 3 July 1917. Orig. Nos. 355, 6; 360, 1; 375, 390, 458.

A typical series of the Northern Siamese common rat, rather brighter above than *R. r. neglectus* of the south and with twelve, instead of ten, mammae in the females.

"The rutting season seems to be January—February." Of July examples Mr. Gairdner notes: "Reappeared after the hot weather."

(For measurements see table *postea*).

23. *Tautatus* *thai*.

Kloss, Journ. Nat. Hist. Soc. Siam, II, p. 280 (1917).

1 ♂ ad. from Me Taw, 1500 ft, 40 miles N. W. of Raheng, Western Siam [No. 2617/CBK.] Collected on 9 Feb. 1917, by Mr. K. G. Gairdner. Orig. No. 369.

Pelage spineless, composed above of coarse and fine hairs, the stiffer tipped with black, the softer with bright ochraceous-buff; the general colour effect of the upper parts being ochraceous-buff finely streaked and lined with black, the latter diminishing in quantity on the sides: base of upper pelage deep neutral grey. Hands and wrists, feet and entire under-parts white apparently fairly clearly margined, the fur of the under-parts distinctly dark grey at base. Tail dark above and paler below, the hair clothing it in agreement.

Nasals extending just within the line of the orbital spaces and not exceeded posteriorly by the præmaxillaries. Anteorbital plate markedly convex, the lower part of the edge vertical. Palatal for-

amina narrow and elongate with their greatest breadth in front of their mid-length, pointed posteriorly and terminating (as in *Mus*) within the line joining the anterior roots of the molars which are nearly vertical in front: tooth rows parallel. Mesopterygoid space falling short of the last molars by nearly a millimetre and apparently very narrow (but base of braincase and the bullæ missing).

Measurements: Head and body, 89; tail, 85; hindfoot, 19; ear, 14.5 mm.

Skull:—palatilar length, 11.0; diastema, 6.7; upper molar row (alveoli), 4.0; length of palatal foramina, 4.6; nasals, 8.1×2.5 ; zygomatic breadth, 11.9 mm.

Remarks. This second example of *Tautatus thai* is older and larger than the type and more ochraceous above. Its advent shows that in respect of the incisors the genus does not differ from *Mus*, as stated, since distinct notches are present. It is otherwise distinguished as recorded (*t. c. s.*, p. 279) while, further, in *Mus* the posterior branches of the præmaxillaries are continued beyond the ends of the nasals.

24. *Nyctocleptes sumatrensis cinereus* (McClelland).

Nyctocleptes cinereus, Kloss, Journ. N. H. S. Siam, II, p. 314 (1917).

1 ♂ skin and skull, Chiengmai, N. Siam [No. 2683/CBK.].

Obtained by Mr. W. J. F. Williamson's collector.

1 ♀ skull, Sikawtur, N. W. of Raheng, W. Siam, 1,500 ft. [No. 2654/CBK.]. Collected by Mr. K. G. Gairdner. Orig. No. 464.

General colour of body and limbs pale dull buff, many of the hairs, especially on the back, with a dark brown subterminal annulation and a pale shining tip. Fore and hind feet dull brown. Top of head with a broad blackish brown stripe disappearing on the nape; throat buffy, foreneck dull brown; rest of head ferruginous or ochraceous. Tail naked.

In colour this race seems much more nearly to resemble the young of *N. s. sumatrensis* of the south of the Malay Peninsula than it does adults of that form which become a dirty buff with a dark mark on the crown.

Collector's external measurements of the Chiengmai specimen:—Head and body, 395; tail 130; hind foot 64 mm.

Skulls:—greatest length (*i. e.* condylo-basal), 77.5, 71; basilar length, 68, 61; palatilar length, 42.3, 37; diastema, 27, 23; upper molar row (alveoli), 15.4, 14; width of posterior nares, 5, 6.1; breadth of combined nasals, 12.8, 10; greatest breadth of frontals, 27, 23; inter-orbital constriction, 14.8, 12.8; zygomatic breadth, 60, 53 mm.

In the smaller animal the occipital plane is much further from the perpendicular than in the other and the bullae are more dilated.

25. *Acanthion brachyurus klossi*.

Acanthion klossi, Thomas, Ann. & Mag. Nat. Hist. (8) XVII, p. 136 (1916); Kloss P. Z. S. 1916, p. 60.

2 ♀ subad. purchased in Bangkok by Mr. J. J. McBeth and stated to have come from south-west of Ratburi on the Meklong River. [Nos. 2684, 5/CBK.].

A narrow crest of long slender bristles, white for half their length, extending from the crown to behind the shoulders; an oblique white stripe on the neck from the back of the throat to front of shoulder and a few whitish annulations on the nape. Posterior parts of back and sides and upper surface of tail clothed with white quills having a single black ring of varying width, and also with a few slender flexible quills white throughout. Tail whitish below. All the remaining parts dark brown, blackish on the limbs. Rattle at end of tail consisting of slender stems each bearing a single hollow capsule.

Both specimens are in perfect condition externally but unfortunately neither is full grown.

Collector's external measurements:—head and body, 660, 400; tail, 135, 115; hind foot, 87, 82; ear 32, 32 mm.

Skulls:—upper length (\pm) 126, 119; condylo-basilar length, 113, 109; diastema, 32, 30; upper molar row (alveoli), 28.6, 26.2; length of nasals, 63, 63; breadth of combined nasals, 35.5, 35; length of frontal suture, 30, 27; zygomatic breadth, 67, 66.5 mm.

26. *Manis javanica*.

Manis javanica, Desm., Mamm., p. 377 (1822); Blanford, Fauna Brit. Ind., Mamm., p. 599 and fig. 199 (1891).

1 ♂ ad. stated to have come from south-west of Ratburi, Meklong River. Collected by Mr. J. J. McBeth. [No. 2686/CBK.].

An exceptionally fine aged example with an unusual number of longitudinal scales.

Longitudinal rows of scales round the body, 23; total number of scales in the longitudinal line, 63; number of scales in the upper median line of the tail only, 28.

Measurements:—head and body 570; tail 523; greatest length of skull, 109; basal length of skull, 103; greatest breadth of skull, 41 mm.

Immature example: captive animal in Bangkok. Obtained by Dr. Malcolm Smith [No. 2687/CBK.].

Scales round body, 19; total number in longitudinal line, 60; scales above tail only, 28.

Measurements of Siamese *Tupaia*s in Millimetres.

Species and Locality.	Sex	Head and body	Tail	Hind foot s. u.	Ear	SKULL									No.	Remarks
						Greatest length	Basal length	Palatal length	Tip of pre-maxillaries to lachrymal notch	Upper molar series (alveoli)	Rostral breadth at diastema	Inter-orbital breadth	Zygomatic breadth			
<i>Tupaia glis belangeri</i>																
Me Nga, N. Siam	♂	170	174	39	15*	51	43.8	26.2	20	15	6.9	14	26.3	2669	Adult.	
Sikawtur, W. Siam	♂	183	165	41	15	51	...	27	21	15	7	13.8	25	2657	"	
" "	♀	...	184	41	15	47.8	...	25.8	19.2	15.2	6.2	12.9	25	2658	Vix ad.	
" "	♀	181	180	42.5	17	49	43.6	25.3	19.5	15.2	6.7	12.9	24.9	2659	Adult.	
Hua Hin, S. W. Siam	♂	161	156	41	16*	48.4	42.5	25.8	19	14.9	6	13.4	25	2543	"	
Pran River Mouth, "	♀	170	155	40	14*	47	40.3	24.2	18	14.6	6.1	13	24	2544	Vix ad.	
<i>Tupaia glis clarissa</i>																
Chumporn River Mouth, S. W. Siam	♂	160	175	45	14*	49	42	25.2	21	14.9	7	13.1	24	2552	"	
" "	♂	170	155	43	*	...	...	27.8	23.5	15.1	6.8	14	24.2	2553	Adult.

* External measurements by native collector.

Measurements of Siamese Rats in millimetres.

Species and Locality	Sex	Head and body	Tail	Hind-foot s. u.	Ear	SKULL.									No.	Remarks	
						Greatest length	Condylor-basilar length	Palatilar length	Diastema	Upper molar row (alveoli)	Length palatal foramina	Nasals	Zygomat-ic breadth				
<i>Rattus rattus thai</i>																	
Sikawtur and Me Taw,																	
W. Siam	...	♂	34	21	44	...	21	10.9	7.4	8.6	17 × 4.4	20.5	2639	Adult.	
"	"	...	♂	174	171	31	22.5	40.2	35.5	19.3	10.4	7.5	7.7	14.2 × 4.3	20.2	2640	Subad.
"	"	...	♂	186	195	32	22	...	...	...	...	...	...	...	2641	"	
"	"	...	♀	172	193	33	21.5	41	35.5	19.2	10.8	7.1	7	15 × 4.8	19.8	2643	"
"	"	...	♂	173	173	31.5	22.5	41.3	35.8	19.1	10.9	7.2	8.7	15 × 4.6	19.8	2645	Adult.
"	"	...	♀	43.8	...	20	11	8	7.3	15.2 × 5	22	2666	"
"	"	...	♀	42.3	37.8	21.1	11.6	7	7.9	14.6 × 4.6	20.2	2667	"
"	"	...	♀	20.1	11	8	7.9	16.1 × 5	21	2668	"	

