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THE FLORA OF THE TELÔM AND BATANG PADANG VALLEYS.

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IN giving an account of the plants met with in these districts, I must premise that this portion of Perak was visited by Mr. Wray in 1888, who collected largely in the Batang Padang valley and on a hill known as Gunong Berumban, but which is not the mountain described in this account. He does not seem to have got to Telôm, where the greater part of the novelties were obtained, nor apparently did Father Scortechini, who got to the main range somewhere in the Batang Padang district. I have retained the name "Telôm" for the camp and country round, and "Telôm River" for the river at the head of which the camp was situated; but the proper name of the camp appears to be Lubok Tanam and of the river Sungei Bertang or Berotang. The other names, however, have appeared on maps, and are perhaps more identifiable.

The final point reached was well on the central mountain chain of the Peninsula, and the important thing shown by the botany of this region is the prevalence of a strong Himalayan element, pushing down along the main chain towards the south. This will be dilated on a little later.

During the period when I was awaiting the arrival of the rest of the expedition at Tapah, I was enabled to make a fairly good collection of the plants of that district, the flora of which is that of the low country, but containing many elements which are distinct from the low country districts of Selangor or Johore. This flora continues to the 12th mile on our route and alters slowly as we pass into the Batang Padang valley, where the flora completely changes, resembling, to a considerable extent, the flora of Ginting Bidei in Selangor. Bamboos become very abundant, not only in number of specimens but in species, though as too often happens few plants could be found in flower and so identified. The flora differs strikingly from that of the other Perak Hills, noticeably in the paucity of *Didymocarpi*, *Pandani* and *Mapaniæ*; *Anonaceæ*, abundant at Tapah, are scarce; *Dipterocarpeæ* are hardly seen anywhere. At one point in the Batang Padang valley we came upon the characteristic limestone-rock plant *Monophyllea*, together with *Forrestia monosperma*, which I have rarely, if ever, seen away from the limestone formation, although there are no signs of limestone anywhere in the district. Noticeable, too, is the

Javanese *Zippelia*, a herb belonging to the *Piperaceæ* with burr-like fruit, and *Desmodium megaphyllum*, a handsome shrub with violet flowers, also a Javanese type; these and a few other plants occurring in Java and not as yet known from the Himalayas, though distinctly mountain types, certainly suggest an invasion of a flora from Java.

Crossing a tributary of the Batang Padang, we come to the ridge, which is the boundary line of Pahang, and immediately the flora alters, *Balanophoras* are abundant, the golden balsam, *Impatiens oncidioides*, the violet, *Sanicle*, *Disporum*, Begonias, Rhododendrons, *Dichroa*, several species of *Strobilanthes*, and other *Acanthaceæ* appear. A strong Himalayan element prevails, which is, to a certain extent, accentuated on the higher ridges, such as Gunong Berumban, where we meet with *Pentapterygium*, *Carex*, *Gaultheria*, etc.

Noticeably absent from this region are *Anonaceæ*, *Dipterocarpeæ*, *Myristicaceæ*, and the characteristic plants of our other mountain ranges, *Tristania*, *Bæckia*, *Leptospermum* and *Matonia*. These genera, except *Matonia*, are rather Australian types, and this element seems to be wanting on the main chain, though abundant on the hills nearer the coasts.

On these hill ridges we find a number of plants common to the Semangko Pass on the borders of Selangor and Pahang, but absent from our other mountain ranges, such are *Didymocarpus venustus*, *Æschynanthus longicalyx*, *Psychotria brachybotrys*, *Filetia Ridleyi*, *Rhododendron Wrayi*, *Labisia longistyla*, *Strobilanthes scabridus*, *Nepenthes ramispina* and *Bambusa elegans*. But none of the Himalayan types have been met with there as yet.

The Himalayan types, of which so many were added to our flora by this expedition, seem to be centred in the main range, and most of them also occur in Java. They include the following: *Viola serpens*, *Sanicula europea*, *Ophiopogon intermedia*, *Castanopsis argentea*, *Begonia Roxburghii*, *Desmodium scalpe*, *Disporum*, *Dichroa febrifuga*, *Balanophora*, several species; *Gaultheria*, *Pentapterygium*, *Talauma mutabilis* and *Tricalistra*, belonging to the group *Tupistreæ*, which is Indo-Chinese. The *Tupistreæ* are represented in the Peninsula by two species of *Tupistra*, which, it is noteworthy, have hitherto been met with almost exclusively on Bujang Malacca, a hill at no great distance from Telôm. The genus is otherwise Himalayan and Burmese only. It would take too long and perhaps (till further researches have been made in the highlands of the Peninsula) would be premature to discuss fully the relations of the Himalayan, and, one may say, the Palæarctic element of the flora, and its distribution in our area. But it may be noted that it is almost confined to the main chain of the Peninsula, and where species of genera belonging to it do occur in the lowlands or on the out-lying hills away from the main chain, there are connecting stations for these plants with the main chain. Furthermore that this element re-appears in Java, but is remarkably absent

from Borneo and apparently (though the flora has not yet been adequately examined) from Sumatra also; none of these Himalayan plants have been met with on Matang in Sarawak nor on Kinabalu, the only high mountains of Borneo, which have been thoroughly explored. It is interesting, too, to note that, according to Mr. Robinson, the birds of the Telôm valley are also Himalayan in type.

I have only to add some notes as to the kind of country in which the Telôm district lies; the whole country consists, generally speaking, of heavily-forested hills, between which run streams of various sizes. The rock of which these hills consist is a mixture of slates and schists. At the Telôm Camp and further on towards Gunong Berumban are patches of perfectly flat ground, low-lying and muddy; these are of some size, and rather to the north of Gunong Berumban lies a similar flat area, apparently much more extensive, which is presumably the plateau described many years ago by Cameron and known by his name. In these plains the flora is different from that of the surrounding country, the forest is comparatively thin, the trees scattered, the characteristic ones being *Saurauja* and *Pyrenaria*; I have seen no similar flat lands anywhere else in the Peninsula. The highest land we visited is much less xerophytic than is usual at such altitudes in the Peninsula, and the xerophytic flora was met with chiefly on the ridges connecting the higher points. This may, perhaps, be the cause of the absence of such plants as *Baeckia*, *Leptospermum* and *Malouia*, so abundant on all our other hills. A ridge behind the camp, called Telôm Ridge in this paper, was a good example of these somewhat drier ridges; the flora was poor in species, it being mainly covered with bushes of a new species of *Pinanga*, *Pandanus collinus* and *Allomorphia rosea*, and the ground between these was remarkably poor in herbaceous plants, ferns, etc., such as one usually finds abundant at these altitudes and on similar ridges elsewhere. It is possible that these bush palms may have something to do with the poverty of herbaceous plants, for one could not but compare the flora with that of the *bertam* hills of Tapah. To a botanist nothing could be more barren than these hills; between the great clumps of the *bertam* (*Eugeissona tristis*) hardly a fern or a herb was to be seen, although the ground was quite bare and there was plenty of light and room.

Palms were by no means so abundant and as varied in the Telôm woods as they are on the Taiping Hills and other hill ranges in the Peninsula, and as we travelled from the Tapah road to Telôm, one could note the circumscribed areas of the different species, which marked distinctly the complete changes of flora. At the 12th mile from Tapah *Eugeissona* was abundant, and *Orania macrocladus*, the Ibol, appeared as the *Eugeissona* began to get scanty, but only continued for a mile or so, when both disappeared. In the Batang Padang valley *Arenga Westerhouti*, the Langkap, was the prevailing palm till at the upper end, *Livistona cochinchinensis* and a *Caryota*, apparently *obtusa*, were the

prominent palms. As soon as the Pahang boundary ridge was crossed all of them completely disappeared (I saw a single seedling of the *Livistona* near the camp but no more, and young *Caryotas* of some species were seen beyond the Telôm Camp). Beyond the boundary ridge *Pinangas* and *Areca*, with a few *Calameæ*, were the only palms. *Licualas*, *Iguanuras* and *Oncosperma*, abundant in most hill forest, were not seen anywhere after leaving Tapah. As will be seen by the list which follows the collections made were very extensive, considering the comparatively short time at our disposal and the season. I have succeeded in identifying most of the plants collected, but in addition a large collection of Mosses and Hepaticas was made, which have not as yet been worked out. Mr. H. C. Robinson and Mr. C. B. Kloss assisted very materially in adding to the collections in every possible way. In an expedition from Telôm to Gunong Irau they brought back a number of specimens, some of which prove to be of great importance, and Mr. Kloss also obtained plants on the track from Telôm to Kuala Medang, after he and Mr. Robinson parted from me.

LIST OF FLORA.

MAGNOLIACEÆ.

1. Illicium cambodianum, *Hance.*

   A small bushy tree, with rose-pink flowers, rather a large-leaved form.

   Telôm, banks of the river above the water-fall and also on Gunong Berumban.

   Distrib.—Cambodia.

2. Talauma mutabilis, *Bl.*

   A shrub in fruit, on low swampy ground beyond Gunong Berumban.

   Distrib.—Java, Moulmein.

3. Kadsura lanceolata, *King.*

   A climber in fruit only.

   Telôm, in the forest. Endemic.

ANONACEÆ.

4. Popowia nervifolia, *Maingay.*

   Small tree in young fruit. Endemic.

MENISPERMACEÆ.

5. Pericampylus incanus, *Miers.*

   Telôm, about Sakai clearings, in flower and fruit. Common all over the Peninsula.

   Distrib.—India, Java, Sumatra.

VIOLACEÆ.

6. Viola serpens, *Wall.*

The Violet was very abundant in open parts of the wood at Telôm on the river banks and in old clearings of the Sakais, which had been abandoned by them and were overgrown with small trees. The flowers were of a pale lavender colour (rarely white), the lower petals streaked with darker violet purple. The form is var. *glabra*.

Distrib.—India, Java, China.

POLYGALACEÆ.

7. Polygala venenosa, *Juss.*

This large herb or half-shrub is very abundant at Telôm, and also in the Ulu Batang Padang. It is usually about 4 feet tall. The light green leaves have the midrib and veins on the back of the leaf violet purple. The sepals are translucent, tipped with pink. The petals translucent white, the keel brilliant chrome yellow; on withering the petals become of a violet-pink, darkest in colour at the tip, the keel becomes crimson lake.

This plant does not occur "in all the provinces at low elevations," as King states in the "Materials." It is only met with in damp shady woods from 1,000 feet elevation upwards to about 4,000 feet, rarely below this. I have met with it below 1,000 feet only at Pulau Tawar in Pahang and Tambun near Ipoh in Perak, and at elevations of about 1,000 feet and upwards at Ginting Bidei and Semangko Pass in Selangor and in the Larut Hills in Perak, and in Penang. It is also a native of Java and Sumatra.

8. Xanthophyllum affine, *Korth.*

A small but wide-spreading tree hanging over the river. Flowers white. The commonest species in the Peninsula. It is often a bush only; but, as King says, it is really otherwise very constant and cannot conveniently be broken up, even into varieties.

Banks of Telôm River, in flower and fruit.

Distrib.—Tenasserim to the Philippines.

GUTTIFERÆ.

9. Garcinia, *sp.*

Some very lofty trees on the high ridges round Telôm, with large yellow flowers, and the stamens numerous in four broad obcuneate masses were probably *G. diversifolia*, King, but specimens were unprocurable.

10. G. Maingayi, *Hook. fil.*

Ulu Batang Padang, near the Batang Padang River, in flower. Endemic.

TERNSTRŒMIACEÆ.

11. Eurya acuminata, *Dc.*

Common at Telôm Camp.

Distrib.—India, Malaya, Fiji.

12. Ternstrœmia Scortechinii, *King.*

On Gunong Berumban at 6,000 feet altitude.

I only found this in fruit, but I believe it is the plant intended by the description, although the fruit is much smaller than that described. The fruit is black, with the seed enclosed in a bright red aril. Endemic.

13. Pyrenaria Kunstleri, *King.*

A branching tree about 30 or 40 feet tall. The leaves, when dry, were not pustulate, and the nerves were more conspicuous than in the type specimens and others I have seen. The fruit is globose yellow and covered with rather stiff hairs. Abundant in low swampy ground near Telôm Camp. It was in fruit only, and the ground, in many places, was thickly strewn with the fruit. Endemic.

14. Gordonia, *sp.*

Very large trees of a *Gordonia* were seen on the upper ridges all over this district. It was impossible to get specimens, owing to their great height, and only fallen corollas could be secured; it is probably *G. excelsa*, Bl.

15. Saurauja tristyla, *Dc.*

In flower, with its small pink flowers, at Jor. Common in all the higher woods of the Peninsula.

16. S. nudiflora, *Dc.*

A fairly big tree, with rosy white flower buds. Common at Telôm, up to about 4,000 feet elevation.

Distrib.—Java and Sumatra.

17. Saurauja grandis, *n. sp.*

A large tree about 60 feet or more tall, young parts hairy. Leaves elliptic, subacute, base broad, 9-12 inches long, 5-5½ inches wide, above dark green, beneath nearly white (young red): nerves 12 pairs, elevated beneath, reticulations prominent, margins undulate, subserrate; young leaves above sprinkled with pale hairs; adults glabrous beneath, in young leaves hairy, especially on the nerves, beneath glabrous or nearly so scurfy; petioles 1½ inch long, glabrous panicles, usually pendent from the ends of the branches, occasionally on the trunk; peduncle about 4 inches long, branches 1 inch long, covered with short pale lanceolate, acuminate hairs, as are the pedicels. Calyx hairy, sepals four, orbicular ⅓ inch

long. Corolla glabrous, 1 inch across, petals oblong obtuse, white (occasionally rose). Stamens over 30, numerous, glabrous, opening by terminal pores. Styles five, free to the base.

Telôm River banks. One of the commonest trees here; a very conspicuous tree, with large flowers for the genus. Allied to *S. cauliflora*, but a bigger plant with different leaves; it was well in flower at the time of our visit, and the ground was strewn with its blossoms.

MALVACEÆ.

18. Urena lobata, *L.*

Abundant in Sakai clearings. Telôm.

19. Hibiscus Abelmoschus, *L.*

A weed in Sakai clearings.

20. H. macrophyllus, *Roxb.*

Big trees seen in Ulu Batang Padang.

21. Bombax malabaricum, *De.*

This tree was very common as far as Jor in the Batang Padang valley. No specimens could be procured, but the fallen flowers were picked up and were light yellow.

STERCULIACEÆ.

22. Sterculia rostrata, *n. sp.*

Small tree about 20 feet tall. Leaves obovate, oblong acute, with a short cusp narrowed towards the rounded base: nerves 12 pairs, elevated beneath, reticulations also elevated, 8 inches long, 3 inches wide, above dull green, beneath yellowish when alive, glabrous, except a few rusty hairs on the midrib and nerves above, beneath hairy on the nerves and with stellate hairs on the leaf surface: petiole hairy, 2 inches long. Panicle from an upper axil few branched, 6 inches long, branches few and short at the top, hairy; male flowers, $\frac{1}{10}$ inch long, red, lobes lanceolate not tailed connate at the tips, hairy, campanulate, tube very short anthers, about five on a very short column; female flowers not seen. Fruit carpels four, elongate, lanceolate, acuminate, narrowed at the base into a stalk, $\frac{1}{2}$ inch long, and ending in a long terete curved beak, $\frac{1}{2}$ inch long, whole carpel 4 inches long, and 2 inches across, when flattened. Seeds six, $\frac{1}{2}$ inch long, black. Telôm River bank.

A very distinct species in its very small flowers, and curious long-beaked carpels.

23. S. ensifolia, *Mast.*

Plants of this were seen near Jor.

23*a*. Leptonychia glabra, *Parez.*

Common round Telôm. A common hill jungle tree, all over the Peninsula, and occurring also in Burmah and the Malay islands.

TILIACEÆ.

24. Triumfetta pilosa, *Roth*

Abundant along the track to Jor, not at all a common plant as would appear from King in the "Materials."

GERANIACEÆ.

25. Impatiens oncidioides, *Ridl., Kew Bull.*, 1909, 11.

A succulent herb about 2-4 feet tall. Stem fuscous brown succulent, $\frac{1}{4}$ inch through, ascending. Leaves plain green, ovate lanceolate to lanceolate acuminate, acute, narrowed to the base, margin crenulate with short processes in the crenulations, fleshy (thin and flaccid when dry), dark green above, paler beneath, $1\frac{1}{2}$-6 inches long, 1-2 inches wide; nerves (primary) about 18 pairs, (secondary) hardly less distinct; petiole 1-$1\frac{1}{2}$ inch long. Racemes subterminal, with two flowers or more. Bracts, lanceolate, acuminate, $\frac{1}{4}$ inch long, green. Pedicels 1 inch long. Flowers, opening singly or occasionally two together, large and showy, bright yellow. Sepals three, two laterals, ovate, cuspidate, $\frac{3}{10}$ inch long, pale green keeled, posterior ovate, yellow, darker above, $\frac{1}{2}$ inch long, $\frac{1}{3}$ inch wide; spur slender, $1\frac{1}{2}$ inch long. Petals, anterior, hooded, ovate, yellow, with a green rounded keel, $\frac{1}{4}$ inch long; laterals, with a short narrow base limb, three, lobed on the outer margin, upper lobe linear, oblong, horizontal, obtuse, tip rounded, middle large but no longer, semi-circular, terminal lobe short, oblong, obtuse, inner margin straight, the two petals together forming a lip $1\frac{1}{2}$ inch across—all pure chrome yellow. In one form the upper lobes have Indian red lines. Capsule fusiform green, nearly 1 inch long, seeds orbicular flat.

Telôm; abundant, growing in masses in wet deep mud, sporadically along banks and on rotting trees in dark shady spots.

This beautiful balsam has flowers resembling in form and colour those of some *Oncidium*, hence its name. It shows some amount of variation in the form of the two large petals, the lobes being often narrower, and some forms are conspicuous from having Indian red streaks on the upper lobes.

26. I. sarcantha, *Hook. fil. MSS.*

A herb about 4-6 inches tall, occasionally 12 inches. Leaves numerous, opposite lanceolate, acuminate at both ends, 3-4 inches long, $\frac{1}{4}$-$\frac{3}{4}$ inch wide, upper surface dark green, sprinkled with very short unicellular hairs, more prominent on the

veins, beneath pale-coloured glaucous, dotted with hair similar to those above but longer, and denser on the nerves, margins wavy with short processes; petiole 1 inch long; nerves six pairs ascending. Flowers in upper axils on slender pedicels, 1½ inch long, pubescent. Sepals, laterals ovate, cuspidate, keeled, ⅓ inch long, posterior, ovate, cuspidate, pale pink, ½ inch; spur slender, curved acuminate, 1½ inch long. Petals, anterior, obovate, rose-pink, with a keel ending in a short point, laterals connate, bilobed, side lobes oblong obtuse, midlobe suborbicular emarginate with darker eye. Stamens deep crimson. Capsule fusiform, 1 inch long.

Telôm, on rocks in the river. Allied to *I. Griffithi*, Hook., with broader hairy leaves, and young parts of the stem pubescent and longer petioles.

RUTACEÆ.

27. Evodia pilulifera, *King*.

Telôm (13539).*

28. E. pachyphylla, *King*, var. grandis.

A much stouter plant than the type with larger leaves. Leaflets elliptic, rounded, narrowed to the base, 5-6 inches long, 3 inches wide, with a stout petiole, 3 inches long; petiolules ½ inch long; cymes 3 inches long (more lax than in type), including the peduncle 2 inches long. Cocci of fruit ½ inch long.

Gunong Berumban at the top. There seem to be three forms of this plant. The type locality unknown has short almost obovate leaves, 2 or 3 inches long, with cymes over 1 inch long. A form collected on Bujang Malacca by myself is much dwarfer with acute leaves, 1-1½ inch long, and very short cymes less than 1 inch long, and the variety described above. The flowers and fruits are much the same in all.

The species is confined to these mountain ranges so far as is known.

29. Zanthoxylum myriacanthum, *Wall.*

A fairly large tree with the trunk, thickly armed with thorns. The fruits are very aromatic. In a Sakai clearing at Telôm, one large tree in fruit and a number of seedlings; not rare in the Peninsula, even at low elevations.

30. Micromelum hirsutum, *Oliver.*

Telom, near the river. A shrub in flower and young fruit

* The numbers quoted thus are the distribution numbers of the Singapore Herbarium.

MELIACEÆ.

31. Chisocheton laxiflorus, *King*.

A tree with stout-ascending branches about 40 feet tall, with hard-wood, the fruit in long pendulous spikes, 2 feet long, bright pink, glabrous. The leaves are larger than those described by King, having six pairs of leaflets, and the fruits of the type are said to be tomentose; but the plant does not agree with the description of any other species.

32. Beddomea racemosa, *n. sp.*

A large tree, young parts covered with ferruginous tomentum. Leaves simple, thinly coriaceous, ovate to elliptic ovate, subacute with a short cusp, base narrowed a little, eventually 4-8 inches long, $2\frac{1}{2}$-4 inches wide; nerves 13 pairs, somewhat horizontal, meeting in loops intra-marginally; young leaves covered with ferruginous tomentum; adults glabrous; petiole $\frac{1}{4}$-1 inch long, tomentose grooved. Racemes slender, 2-6 inches long, two or three together in the lower axils, tomentose, occasionally branched. Flowers small, rather remote, $\frac{1}{10}$ inch long. Bracts small, linear, tomentose. Sepals five, oblong, subacute, tomentose. Petals, larger, rounded orbicular glabrous imbricate, five. Stamens five. Anthers lanceolate cells, diverging at base, connivent into a cone, subsessile on very short points in a ring, fleshy, composed of the filaments and disc, dehiscence introrse. Pistil superior and connate with the disc, ovary hairy above. Stigma conic, angled.

Perak, Ulu Batang Padang on the Pahang border. Flowers greenish white. The genus *Beddomea* has been hitherto confined to South India with two species, one *B. indica*, Hook., a shrub with pinnate leaves, and one *B. simplicifolia*, Bedd., with simple leaves. The addition of another species from the Malay Peninsula is of considerable interest. This species resembles *B. indica*, most in the form of its flowers and especially its stamens; but in its simple leaves and arboreous habit it resembles *B. simplicifolia*, Bedd.

OLACINEÆ.

33. Gomphandra gracilis, *King*.

A bush. Gunong Berumban at 6,000 feet altitude. Common in the mountain districts.

34. G. lanceolata, *King*.

Telôm and Gunong Berumban.

ILICINEÆ.

35. Ilex Griffithii, *Hook. fil.*

A bush, with small rose-pink flowers. A form on Telôm Ridge was peculiar in having long slender erect shoots about

10 feet tall, covered with close set small ovate leaves from ¼-½ inch long, and pubescent on both sides, the branches, too, were very pubescent. This plant has, at first sight, all the appearance of a *Vaccinium*, especially when in fruit.

Telôm Ridge and Gunong Berumban, 4,600 feet. Common at these altitudes all over the Peninsula.

Distrib.—Assam, Sumatra and Java.

CELASTRINEÆ.

36. Euonymus Wrayi, *King.*

A little tree on the lower slopes of Gunong Berumban at about 5,000 feet elevation; occurs also on Gunong Batu Putch and at Kota Glanggi in Pahang.

37. Celastrus Championii, *Benth.*

A climbing shrub, with white flowers, and a capsule containing a single seed with a bright red aril. The leaves are very much thinner than usual: but the plant appears to be very variable.

Telôm, on the river bank, scrambling over trees, in flower and fruit abundant.

Distrib.—Hills of the Peninsula and Hongkong.

RHAMNEÆ.

38. Gouania leptostachya, *Dc.*

Abundant on the road to Jor about the 15th mile, in flower.

Distrib.—India and Perak.

AMPELIDEÆ.

39. Vitis Lawsoni, *King.*

Gunong Berumban at 6,000 feet elevation.

Distrib.—Malay Peninsula.

40. V. furcata, *Laws.*

Telôm, about the camp.

41. V. glaberrima, *Wall.*

Telôm, at the camp. Common in the low country.

42. V. trifolia, *L.*

Telôm Camp. A common lowland plant.

SAPINDACEÆ.

43. Allophyllus Cobbe, *L.*, var. glabra.

A tree, with quite glabrous, trifoliate leaves: the leaflets lanceolate acuminate, shining on both surfaces pale, subcoriaceous nerved, 3½-5 inches long, 1½-2½ inches wide, entire. Racemes branched slender, three to five on a peduncle, each 4-8 inches long. Bracts small. Telôm, banks of the river.

In spite of the similarity of the flowers and fruit, it is very difficult to bring oneself to class all the plants included as varieties by Hiern as varieties only. In life no plants of a genus could look more dissimilar than the tidal swamp bush (var. *racemosa*) and the tree *glabra*.

CONNARACEÆ.

44. Rourea concolor, *Bl.*

Telôm Forest, on a fallen tree. Specimens nearly perished and in very bad condition but apparently this species, which occurs also in the low country and in Sumatra and Borneo.

LEGUMINOSÆ.

45. Desmodium laxum, *Dc.*

A slender wiry plant, hardly more than a herb, with pink flowers. Telôm, in a Sakai clearing, scanty, also obtained in Ulu Batang Padang by Wray, and occurring in India, China and the Malay islands.

46. D. Scalpe, *Dc.*

A slender plant like the last but with orange scarlet flowers. Telôm Camp, not previously recorded from the Peninsula. *Distrib.*—Africa and India.

47. D. megaphyllum, *Zoll.*

A beautiful bush about 8 feet tall, with violet flowers. Ulu Batang Padang, collected in the same district by Wray, but not known elsewhere in the Peninsula.

Distrib.—Tenasserim and Java.

48. Erythrina, *sp.*, probably lithosperma, *Miq.*

One or two big trees of an *Erythrina* in flower, but too lofty to obtain specimens from, were seen in the forests of the Ulu Batang Padang, undoubtedly wild. The occurrence of any species of the genus wild in the Peninsula has been extremely doubtful except in the case of the Lankawi plant, perhaps. *E. suberosa*, *E. indica*, *E. stricta* and *E. ovalifolia* are planted, and the specimens referred to in the "Materials," as well as at least most, if not all, of the *E. lithosperma* are also from remains of cultivation.

49. Bauhinia, *sp.*

A large climbing species, with red and orange flowers, was seen, draping a mass of trees from the lower slopes of Gunong Berumban, and seedlings were seen scattered through the Telôm woods, but the flowering plants were quite inaccessible, and the species could not be identified.

ROSACEÆ.

50. Rubus glomeratus, *Bl.*

Telôm, in Sakai clearings and by the river bank. This takes the place of *R. Moluccanus*, which is an exclusively lowland plant, in the hills.

51. R. rosæfolius, *Sm.*

Common in abandoned Sakai clearings round Telôm. It is quite common at elevations of 2,000 feet in many parts of the Peninsula. The elongated orange red fruit is sweet and juicy when ripe, but quite flavourless.

SAXIFRAGACEÆ.

52. Dichroa febrifuga, *Lour.*

This beautiful shrub is abundant round Telôm, in more open parts of the woods. The buds are white; and in the open flower the petals, stamens and stigmas are indigo-blue.

Distrib.—India, China, Malaya.

MYRTACEÆ.

53. Eugenia Robinsoniana, *n. sp.*

A fairly large tree, with pale bark. Leaves thinly coriaceous, elliptic, shortly acuminate, obtuse, base slightly narrowed, paler beneath; nerves slender about 25 pairs, intermediate ones conspicuous, rather straight intra-marginal, $\frac{1}{10}$ inch from the margin, 6-7 inches long, 3 inches wide; petiole less than $\frac{1}{4}$ inch long, rather thick. Panicle short, 2 inches long or less, with a few about four short branches, 2 inches long. Flowers small, $\frac{1}{4}$ inch long, sessile. Calyx funnel shaped, smooth, green, mouth entire; corolla, petals white, orbicular, small, four; stamens fairly numerous, short; filaments slender; anthers small, oblong. Fruit globose, $\frac{1}{2}$ inch through, crowned with the raised ring-shaped calyx mouth.

Telôm, by the cascade. I cannot match this with any described species.

54. Eugenia pendens, *Duthie.*

Banks of streams in forest, Telôm.

This small lax-spreading tree occurs in such situations all over the Peninsula from Singapore to Penang, and in Sumatra

55. Rhodamnia trinervia, *Bl.*

Small trees of this, nearly typical in character, were seen in the Telôm woods, though it is by no means common to find it in forest.

MELASTOMACEÆ.

56. Melastoma malabathricum, *Linn.*, var. polyanthum, sub-var. montanum.

Telôm, near the camp and high up on the lower slopes of Gunong Berumban.

This form is the one commonly met with at such altitudes. A tall plant about 10 feet high, with large, dark-coloured flowers.

57. M. perakense, *Ridl.*

M. malabathricum var. *perakense*, *King*, *Mat. Flor. Pen. Mal.*, ii., p. 415.

Telôm, by the river bank.

This is a very distinct plant from *M. malabathricum* in its greater size in all parts, and its very large flowers and peculiar hairs on the calyx tube; no one seeing it alive could take it for a form of *M. malabathricum*.

58. Allomorphia alata, *Scort.*

Telôm.

Common on the river bank at Tapah also. Endemic.

59. Allomorphia rosea, *n. sp.*

A shrub about 8 or 9 feet tall, much branched; the branches velvety, with soft hairs (brown when dry). Leaves opposite nearly equal, ovate with a rounded base, subcordate, 4-6 inches long, 3-4 inches wide, above glabrous, beneath hairy on the nerves and nervules; nerves three pairs, two rising from the base of the midrib, one pair from higher up; petiole 2 inches long, velvety hairy. Panicle terminal, 8 inches to 1 foot long, 4 or 5 inches across, hairy. Flowers numerous, small, rose-pink. Bracts minute hairy caducous.

Calyx obovoid strigose, with four small acute points, rose-pink, $\frac{1}{10}$ inch long. Petals four, very small lanceolate acuminate, pink. Stamens eight, unequal, four narrow linear oblong, apex truncate, base shortly cordate, four oblong obtuse half as long. Style cylindric long, rather stout, stigma capitate. Capsule urn shaped, strigose $\frac{1}{10}$ inch long, apex convex four celled. Seeds numerous, narrowed to the base, elongate straight.

Telôm, very common, the prevailing shrub on the ridges at 4,000 feet and lower. Almost out of flower. A very pretty plant in bloom, with its large panicles of rosy-pink flowers.

I refer this species to *Allomorphia*, as it seems to be nearest to *A. exigua*, Bl., although quite a different style of plant. The three genera, *Oxyspora*, *Allomorphia* and *Anerincleistus*, as laid down for our species in the "Materials," require

some revision. The latter genus is particularly mixed, *A. floribundus*, King, being, according to Cogniaux, *Oxyspora macrophylla*, Treub.; while the Penang plant described as *Allomorphia exigua* var. *minor*, a pink-flowered thing (*A. exigua* having greenish flowers) is, I think, correctly referred by Haviland and others to *Anerincleistus*.

60. A. ALBIFLORA, *n. sp.*

A glabrous shrub, with terete brown branches. Leaves subcoriaceous glabrous, opposite equal, lanceolate, ovate, acuminate, 4 inches long, 2 inches wide; nerves three, rising from the base, with a finer one running shortly within the margin, nerves and horizontal nervules elevated beneath, scurfy, above dark green, beneath paler; petiole ½-1 inch long. Panicle terminal, 4 inches long, lax with a short peduncle. Flowers white in threes on the end of short pedicels, $\frac{1}{10}$ inch long. Calyx funnel shaped, $\frac{1}{10}$ inch long, with four short ovate lobes. Petals four, oblong quite obtuse, $\frac{1}{10}$ inch long, broad white. Stamens eight, all equal, filament long pustular, anther as long acuminate with a shortly-bilobed base and a small process on the back, yellow. Style stout cylindric, stigma small capitate, proterogynous. Fruit urn shaped with strong ribs, dehiscing loculicidally, ½ inch long.

Gunong Berumban at 6,000 feet elevation.

61. BLASTUS COGNIAUXII, *Stapf.*

A big shrub, overhanging the river banks, Telôm River, common Flowers yellowish.

Distrib.—Johore and Gunong Pantai, Gunong Janing; Pahang, Kuala Lipis, Tahan River; Selangor: Ginting Bidei, Bukit Kutu; Perak: Taiping Hills, Bujang Malacca. Also in Borneo, Sarawak.

62. ANERINCLEISTUS MACRANTHUS, *King.*

A shrub or a small bushy tree about 20 feet tall. The great characteristic of this curious plant lies in the three bracts which enclose the umbel. These bracts are lanceolate, acuminate and rose-pink in colour, 1 inch long, and nearly ¼ inch wide. The inflorescence on its slender drooping peduncle with these connivent pink bracts has a strange resemblance to the flower of some anonaceous plant. Between the bracts can be seen the small inconspicuous white flowers slightly tinted with pink. The bracts seem to fall off early. The allied species *A. hirsutus*, Korth., of Sumatra, does not appear to have these characteristic bracts.

The plant is very abundant at 5,000-6,000 feet elevation on Gunong Berumban, where we found it in flower and fruit

63. Sarcopyramis nepalensis, *Wall.*

This little plant closely resembles some species of *Sonerila*, but its extremely shortly-stalked flowers, with their eight stamens and oblong anthers and the curiously-veined large valves to the capsule, distinguish it readily. It has never previously been met with in the Peninsula, and is an interesting addition to our Flora, being another of the Himalayan plants which have found their way down the mountain chains to the heart of the Peninsula. It is recorded from the Himalayas, Khasiya, Sumatra and Java. In the forests at Telôm at 3,000-4,000 feet altitude.

64. Sonerila tenuifolia, *Bl.*

Not rare in the Telôm woods, nearly out of flower at the time of our visit.

Distrib.—Mt. Ophir; Gunong Batu Puteh in Perak; and Java, Sumatra and Borneo.

65. S. hirsuta, *n. sp.*

S. tenuifolia var. *hirsuta, Stapf.*

A slender erect plant, 3-8 inches tall, little or not branched. Stems bright red and hairy. Leaves usually bright red purple, lanceolate, acuminate, dentate, base rounded, $\frac{1}{4}$-1 inch long, $\frac{1}{4}$ inch wide, closely hairy on both sides with multicellular of 10 crimson hairs; nerves inconspicuous. Flowers axillary and terminal on short pedicels, solitary. Calyx narrow obconic, nearly glabrous, $\frac{1}{8}$ inch long, teeth very short subacute. Petals white, $\frac{3}{8}$ inch long, oblong, mucronulate. Stamens shorter, $\frac{1}{4}$ inch long, anthers graceful-curved acuminate yellow. Capsule turbinate, $\frac{1}{4}$ inch long, smooth shining, valves low and straight edged, pedicel $\frac{1}{2}$ inch long.

Gunong Berumban on mossy banks at 6,000 feet elevation.

I take this to be the plant referred to by Stapf. as a variety of *S. tenuifolia*, Bl.; but as it differs so conspicuously in the form and hairiness of its leaves and larger flowers, as well as other minor points, I consider it advisable to keep it as a distinct species. The plants described by Stapf. were obtained on Gunong Bubu, and in other parts of Perak, of which the localities are not given.

66. S. picta, *Korth., Kruidkunde*, p. 249, t. 52.

This species was based on a plant obtained in Sumatra at "Batang Bessie" (Besi), and is well figured in the above-mentioned plate in 1897. I obtained on the Kelantan River in Siak, Sumatra, a plant exactly similar to the one figured by Korthals, and found that a plant by no means rare in the Malay Peninsula, but omitted from the "Materials of the

Malay Peninsula," was identical except for the absence of the silvery marks on the leaves of the type. There are also in the Malay Peninsula a number of quite dwarf plants, often with white-spotted leaves, which, different as the extremes are, I am unable to separate, except as varieties, as there are connecting links between them. I will therefore describe them here as several of the varieties occur abundantly at Telom

Sonerila picta, Korth., a dwarf herb, 3-12 inches in height, usually about 6 inches tall, quite glabrous. Leaves lanceolate to ovate lanceolate or ovate in dwarf plants, narrowed to the base, apex acute or acuminate, unequal, one not more than half as big as the other, $\frac{1}{2}$-3 inches long, $\frac{1}{2}$-1 inch wide, margin obscurely serrate with short processes, dark green above (often marbled or veined white), glaucescent beneath, nerves three pairs, all rising from above the base; petiole $\frac{1}{4}$-$\frac{1}{2}$ inch long. Flowers in axillary and terminal umbels about five in an umbel, small rose-pink. Calyx funnel shaped, $\frac{1}{4}$ inch long, with three triangular acuminate processes. Petals three, lanceolate acuminate, $\frac{1}{6}$ inch long. Stamens three, filaments slender, anthers lanceolate acuminate. Style fairly stout, stigma capitate. Capsule smooth pale shining turbinate with low rounded valves.

Malay Peninsula, Sumatra and Borneo.

Var. *a.* typica.

Leaves $1\frac{1}{2}$-3 inches long, $\frac{1}{2}$-$1\frac{1}{4}$ inch wide, lanceolate, margins little toothed. Calyx and peduncle covered with glandular hairs, lobes more closely hairy. Leaves often with a broad silvery band on the midrib and nerves.

Sumatra, Kelantan River, Siak (Ridley, 8968).

Var. *b.* concolor.

Plant about 6 inches to 1 foot tall, branched. Leaves lanceolate, plain green. Calyx and pedicel quite glabrous. Ulu Batang Padang, Gunong Angsi, Maxwell's Hill, Bukit Kutu (7316), Mt. Ophir, Bukit Hitam (7321), Siak, Sumatra (8994), with traces of the hairs on the calyx as has a form from Mt Ophir (No. 3291), with short oval leaves. Pahang, Kota Glanggi, Tahan Woods, Telôm.

Var. *c.* dwarf form pusilla.

Not more than 6 inches tall. Leaves crowded ovate

Sub-var. *a.* Leaves plain green. Telôm, Gunong Pantai Sarawak, Quop (*Haviland*), Tawarar River (1284).

Sub-var. *b.* Leaves with a white median bar. Lingga (Hullett).

Sub-var. *c.* Leaves spotted with white on upper surface. Tahan Valley Woods, Telôm, Gunong Berumbun.

67. S. VELUTINA, *n. sp.*

Stems 6-12 inches tall, densely rufous, hairy, with longer hairs at the nodes. Leaves ovate obtuse, base rounded, margins denticulate hairy on both surfaces, 2 inches long, $1\frac{1}{2}$ inch wide; nerves two pairs, radiating from the base, one pair from above the base; petiole $\frac{1}{2}$ inch long, hairy. Flowers three or four on a short $\frac{1}{2}$ inch, hairy peduncle, umbelled, rose-pink or white. Calyx, $\frac{1}{10}$ inch long, narrow funnel shaped, with short points, green hairy. Petals, oblong obtuse, $\frac{2}{5}$ inch long, and half as wide, hairy, five, with glandular hairs on the keels. Stamens, cylindric acuminate curved, three, yellow; base cordate, $\frac{1}{5}$ inch long; filaments pink. Capsule cup-shaped turbinate, $\frac{1}{4}$ inch long, with a few hairs on conical bases. Valves short rounded; pedicel nearly $\frac{1}{2}$ inch long, thickened, triquetrous with decurrent bosses from which rise hairs; peduncle 1 inch long, triquetrous above, with similar processes. Telôm and Gunong Berumban, 3,000-6,000 feet altitude, covering the banks. A pretty plant with its velvety bright green flowers and large pink or white flowers.

A more slender form rooting at the nodes. Leaves less hairy, lanceolate ovate; peduncles of flower more slender. Banks at Telôm and in the Ulu Batang Padang.

68. S. CAPITATA, *Stapf.*

This plant, described from specimens collected on Gunong Batu Puteh, is somewhat variable in foliage. In the type the leaves are obovate, elliptic or oblong, with a short stout petiole. The Telôm plants differ in the length of the petiole and the form of the leaf, and may be described as a variety.

S. capitata var. *longipetiolata.* Leaves quite glabrous above, lanceolate acuminate to ovate acuminate, 6 inches long, and $2\frac{1}{2}$-3 inches wide; petiole slender, 3-4 inches long. Petals red and white. Stamens yellow. Telôm, in forests by streams, Nov. 21-08.

Some plants gathered in different spots were very much weaker with narrow leaves; the petiole and peduncles crimson hairy, and the fruits densely hairy muricate, but otherwise they resembled the local plant.

69. S. REPENS, *Stapf.*

Telôm, on the ridge behind the camp at an altitude of about 4,000 feet. Flowers white. This seems to be confined to Perak, occurring also on the Taiping Hills, and Bujang Malacca (oddly localised by Stapf. in the "Materials for the Flora of the Malay Peninsula," all through the article as "Malacca; Bujang").

70. S. CÆSIA, *Stapf.*

Telôm, banks of the stream, not very abundant. Flowers white. Stapf. gives them as pink. Apparently peculiar to Perak and this locality. Wray obtained it at Gunong Batu Puteh.

71. PHYLLAGATHIS HISPIDA, *King.*

Abundant above Telôm and on Gunong Berumban. In fruit at this time. It is common in the hills of Perak and Pahang.

72. PH. ROTUNDIFOLIA, *Bl.*

Common in the Tapah forests and in the Batang Padang valley up to the border line of Pahang, but not seen anywhere in Telôm, or its neighbourhood.

It is common in the forests of the plains from Johore northward, also in Burmah, Sumatra and Java.

73. MARUMIA NEMOROSA, *Bl.*

Telôm, near the river, common and widely distributed in the Peninsula, Sumatra and Borneo.

74. ANPLECTRUM PALLENS, *Bl.*

Ulu Batang Padang.

75. DISSOCHÆTA PALLIDA, *Bl.*

At Telôm. The form here, as at high altitudes in the Taiping Hills, differs from the form in the plains in its leaves ending abruptly in a long point 1 inch in length. I should take it to be the Sumatran *D. montana*, Cogn., but the stamens are of full size and not short as in that species.

76. MEDINILLA PENDULIFLORA, *n. sp.*

A large epiphytic shrub, branches four angled. Leaves sessile in pairs, ovate acuminate, fleshy, with a single pair of nerves running to the apex from the base and an intra-marginal pair very close to the margin, 6 inches long, 2½ inches wide. Inflorescence umbellate on a long slender peduncle, 6·5 inches long, with five or six branches at the end; the branches slender, flexuous, and occasionally branched again, 1–1½ inch long, angled, and bearing one to three flowers. Flowers on pedicels ½ inch long, pure white and fragrant. Calyx cupular with a short raised edge undulate, with six black spots (when dry) marking the sepals. Corolla lobes five, obovate, with a broad base rounded at the tip, ¼ inch long. Stamens 10, all similar, little shorter than the petals. Filaments short and anthers long curved acuminate, base produced shortly into a blunt-bilobed process, a low triangular keel on the back, ending in a short straight point. Style shorter, slender, cylindric. Stigma capitate.

Gunong Berumban at 6,000 feet elevation

This is a most exquisite plant. Its long hanging peduncles, with pure white deliciously fragrant flowers, would make it attractive anywhere. Only one plant was seen on a tree overhanging the track up Gunong Berumban. Its nearest ally in the Peninsula is *M. perakensis*, King.

77. M. VENUSTA, *King.*

Common at Telôm, on trees by the river. A large-spreading shrub. Flowers white.

78. M. CRASSINERVIA, *Bl.*

On a tree by the Batang Padang River.

79. PACHYCENTRIA TUBERCULATA, *Korth.*

Telôm, on trees by the camp.

Distrib.—Tenasserim and Borneo, not rare in the Peninsula.

BEGONIACEÆ.

80. BEGONIA (§ Casparya) ROXBURGHII, *Dc.*

Stem about 3 feet tall, stout succulent glabrous, dull red. Leaves lanceolate acuminate, with a long point, base unequally cordate, margin sparingly toothed, 6-8 inches long, 2 inches wide, longest lobe of leaf rounded, $\frac{1}{2}$-$\frac{3}{4}$ inch long, glabrous, light green; nerves five short ones from the base, the upper ones from the midrib. Flowers in clusters on short axillary peduncles, $\frac{1}{4}$ inch long, few, white; male $\frac{1}{2}$ inch across. Sepals two, ovate obtuse. Petals two, equally large, obovate. Stamens numerous in a head; filaments distinct half the length of the linear oblong blunt, not apiculate anther. Females, sepals and petals as in male, ovary bluntly trigonous. Stigmas two, each bilobed with spirally-twisted linear lobes. Fruit green-pulpy, $\frac{1}{2}$ inch long, trilobed, lobes rounded at the back not winged, but with a ridge ending in a short blunt process. Seeds minute brown, with few large oblong reticulations.

Telôm Woods, also Ginting Bidei in Selangor.

Distrib.—Nepal, Burmah and Assam.

This is the first of the fleshy-fruited Begonias from the Peninsula. I cannot distinguish it from the Indian *B. Roxburghii* (of which, however, I have seen no specimens) except that the leaf is lanceolate rather than ovate.

81. B. CARNOSULA, *n. sp.*

A succulent acaulescent plant, with a creeping rhizome. Leaves ovate cordate, oblique, the lobes almost or quite equal short rounded with an entire margin, 4-5 inches long, 3-4 inches wide; nerves six from the base of the leaf, the two

central ones soon branching, red hairy, otherwise the plant is glabrous succulent light green (drying very thin and flaccid); petiole 3-5 inches long, glabrous. Peduncle axillary, 5-7 inches long, glabrous, with one or two branches, 1 inch long at the top. Flowers white. Males with two very thin oblong obovate sepals, $\frac{3}{16}$ inch long. Petals two, linear oblong, much narrower. Stamens in a globular ball on a peduncle of equal length; filaments distinct, as long as the anther. Anthers spathulate obtuse truncate. Females not seen. Fruit three winged, $\frac{1}{2}$ inch long, one wing larger, rounded, $\frac{1}{4}$ inch across, the others much narrower.

Ulu Batang Padang, growing on muddy slopes of the hill side in thick forest.

This pretty species is evidently near *B. debilis*, King, of which I have seen no specimens, differing in the form of the leaf, petals very different from the sepals, different form of the anthers, which are borne on a cylindric peduncle, and the posterior fruit wing rounded, semi-ovate not oblong.

82. B. PRÆCLARA, *King, Mat. Fl. Mal. Pen.*, 13.66 (594) 1902.

B. decora, Stapf., Kew Bull., 1893, 29.

A beautiful plant with deep green or purple red leaves, marked along the veins with lighter colour, usually red underneath and hairy all over, very variable in colour and also in size. The flowers vary in size. In some the petals are only $\frac{1}{4}$ inch long, in others 1 inch long pure white or in red forms pinkish. King describes his plant as having "a few scattered hairs on the nerves beneath" and the petioles as having "a few flexuose hairs near the apex." The Telôm plant is densely red hairy on the nerves beneath, and the petiole is also very hairy. The sepals are $\frac{3}{4}$-1 inch long and $\frac{1}{2}$ inch wide; petals ovate, smaller. The stamens are spathulate obtuse in life, showing no distinct filament. It is abundant in the Telôm woods.

I cannot separate this plant from *B. decora*, Stapf., a plant obtained by Mr. Curtis in the Lankawi Islands and sent to Messrs. Veitch's Establishment in 1891 or 1892. It was exhibited at one of the Horticultural Shows in London as *B. barbata*, but the identification was shown to be erroneous and it was called *B. decora*. No description was ever published of it so far as I can make out, but in the list of new plants of the year, published in the "Kew Bulletin" above quoted, the name, with a few lines about it, is given, and the locality is given as Perak. It was under cultivation under the name of *B. decora* in the Singapore Botanic Gardens in 1891, but died out.

In the *Index Kewensis* it is put down as a Garden Hybrid, and, perhaps on account of this error, was not mentioned by Dr. King in the "Materials" under the name *B. decora*.

A similar fate befell *Begonia Rajah*, a native of Trengganu. I have retained Dr. King's name *B. præclara*, as Stapf.'s *B. decora* is practically a *nomen nudum*. To add to the confusion there is another *Begonia decora* from Brazil, mentioned in the Supplement to "Nicholson's Gardener's Dictionary."

83. B. VENUSTA, *King*.

What I take to be this species with beautiful white flowers, 3 inches across, occurred on the flat plain, north of Gunong Berumban.

84. B. PAVONINA, *n. sp.*

Rhizome creeping red, short. Leaves ovate cordate acuminate, or acute, base unequally lobed, lobes rounded, margin entire, glabrous, except when very young, when they are sparingly ciliate on the edge; nerves nine, including the midrib from the base of the leaf, 5 inches long, 4 inches wide, largest lobe, 1 inch long, light satiny green above when young, eventually deep green shot with peacock blue, the whole leaf appearing often of a superb blue, beneath red; petiole, 7 inches long, red, glabrous, succulent. Flowers few on a peduncle, 5-6 inches long, and glabrous. Bracts linear oblong soon caducous. Male flowers, sepals two ovate obtuse unequal ($\frac{1}{2}$ inch or more long, $\frac{3}{4}$ inch wide), white-tinted pink. Petals narrower, linear, oblong obtuse, white, often tinted with pink, $\frac{1}{2}$ inch long, $\frac{1}{5}$ inch wide. Stamens in a small sessile or very shortly-stalked head, yellow; filaments slender distinct; anthers oblong obtuse, slightly narrowed towards the base (apiculate when dry). Female sepals two, ovate, white. Petals two (rarely three). Styles two, separate about half way down, divided above into two spiral arms, ovary three-winged wings subequal. Fruit with two small and one large elliptic wings.

Telôm Woods, abundant.

A most beautiful plant, the leaves of which in most specimens are of an exquisite peacock blue above and red beneath. This colouring is not similar to the blue iridescence which appears on *Selaginella Willdenovii*, *Phyllagathis rotundifolia* and other plants in wet corners of woods, but seems to be normal to this plant. The leaves, when young, are of a bright light green, passing later into the bright blue. The flowers are 1 inch or more across.

85. B. ROBINSONII, *n. sp.*

Rhizome stout fleshy, $\frac{1}{2}$ inch through, with ovate sheaths. Leaves ovate subacute, base unequally lobed, lobes rounded, 3 inches long, 2 inches wide, rather fleshy, bright green quite glabrous, polished above, dull green beneath, margins entire; nerves five to seven from the base, midrib not distinct, all

branching low down; petiole glabrous 2 inches. Peduncle $1\frac{1}{2}$ inch long from the axil of a leaf, usually glabrous. Bracts below the inflorescence two large ovate green, $\frac{1}{2}$ inch long, and nearly as wide, acute; male flowers, pedicel, $\frac{1}{4}$ inch long, white. Sepals two, ovate obtuse, $\frac{3}{8}$ inch long, $\frac{1}{4}$ inch wide, white. Petals two, oblong obtuse nearly as large. Stamens capitate on a short column, filaments short, as long as the short oblong anther, connective short rounded oblong.

Telôm Woods, occasionally climbing a short way up tree trunks. This species in a dried state much resembles *B. pavonina*, but is easily distinguished by its thick rhizome, more succulent green leaves, and the large bracts persisting till after the flower opens. The petals in *B. pavonina* are narrower in proportion to the sepals, and the sepals more distinctly acuminate.

LYTHRACEÆ.

86. Duabanga sonneratioides, *Ham.*

Fallen calyces of this tree were seen scattered all over the Telôm Woods up to about 4,000 feet altitude.

Distrib.—India.

SAMYDACEÆ.

87. Casearia Kunstleri, *King.*

Telôm Forest.

CUCURBITACEÆ.

88. Gynostemma pedata, *Bl.*

This elegant little climber was in flower, on the track to Jor, at about the 15th mile from Tapah.

UMBELLIFERÆ.

89. Sanicula europœa, *L.*

The Sanicle was abundant in abandoned Sakai clearings. This is the first record of the occurrence of this plant in the Malay Peninsula. It occurs in Europe and through temperate Asia to the Himalayas, Java.

90. Hydrocotyle javanica, *Thunb.*

In abandoned Sakai clearings at Telôm. It also occurs in the Taiping Hills, and in India and Ceylon, in all the Malay islands high enough for it to the Philippines and Australia.

ARALIACEÆ.

91. Aralidium pinnatifidum, *Miq.*

Plants seen in the woods round the Telôm Camp, not in flower, abundant in the low country of the Peninsula, less common in the hills.

Distrib.—Sumatra.

92. Heptapleurum luridum, *King.*

Gunong Berumban at 6,000 feet elevation. It also occurs in the Taiping Hills. The leaves are rather larger than described by King, being often over 4 inches long and 1 inch across. The fruit which is undescribed I obtained on the Taiping Hills. It is as large as a pea, five angled with five flattened, half elliptic seeds.

93. H. coriifolium, *n. sp.*

Shrub stems pale wrinkled, rather stout. Leaves five, petiolate stiffly coriaceous, petiole 3 inches long, leaflets unequal, elliptic abruptly acuminate, 2-4 inches long, 1-2 inches across, midrib on the back strongly elevated and wrinkled; nerves 12 pairs, distinct beneath and elevated in the upper surface; petiole 1 inch long. Stipules large, coriaceous lanceolate obtuse, nearly 1 inch long. Panicle shorter than the leaves, 2-3 inches long of two or three branches stout angled from a short ($\frac{1}{4}$ inch) thick peduncle. Branchlets short, 1 inch long, ending in umbels of five or six flowers; pedicels very short, 1 line long; calyx cupular with a thin-spreading margin. Buds bluntly conic. Petals five, subtriangular with a broad base, norrowed upwards to a rounded tip, 1 line long. Stamens five, as long with long slender filaments and oblong anthers. Styles in a short cone. Fruit $\frac{1}{5}$ inch long, strongly five ribbed, ovoid, crowned by the cone-shaped stigma. Gunong Berumban at 6,500 feet altitude. In flower and fruit.

Certainly allied to *H. triste*, King, of Ulu Batang Padang, but that is described as trifoliolate with reflexed petals, and narrow oblong fruit.

94. Trevesia palmata var. cheirantha, *Clarke.*

Common in the Tahan Woods.

Distrib.—Malay Islands.

95. Dendropanax Maingayi, *King.*

Gunong Berumban. Common on all the hill ranges at about 4,000 feet. Endemic.

96. Arthrophyllum montanum, *n. sp.*

A tall plant with the habit of *A. diversifolium*. Leaves 2 or more feet long, simply pinnate; leaflets about 12 pairs, lanceolate acuminate, or linear lanceolate acuminate acute, 4-6 inches long, $\frac{1}{2}$-1 inch across, thinly coriaceous drying pale; nerves three to four pairs, sunk above, elevated below; petiole $\frac{1}{4}$ inch long. Umbels terminal on simple peduncles, $\frac{1}{2}$ inch across, crowded on the ends of a branch or on compound umbels, primary peduncle 4 inch long, secondaries $1\frac{1}{2}$-$2\frac{1}{2}$ inches long, all glabrous. Flowers very small, 9-20 in an umbel; pedicels $\frac{1}{8}$ inch long. Calyx shallow undulate. Petals very small, five, ovate triangular obtuse calyptrate.

Stamens five; filaments slender, thickened at the base, longer than the anther; anther reniform. Style short conic. Fruit $\frac{1}{4}$ inch long, crowned with the sinuate calyx and short conic style, one celled, one seeded, ovoid globose.

Gunong Berumban at 6,000 feet altitude. Also Hulu Semangko, Selangor, and on Gunong Kledang, Perak (Ridley, 9683).

Easily distinguished from *A. diversifolium*, of which it has the habit by its narrower and much smaller flowers, more coriaceous leaflets. In the Gunong Kledang plant the leaflets are very narrow, 6 inches long and $\frac{1}{2}$ inch wide. The whole plant is quite glabrous. *A. diversifolium*, Bl., is a common plant in the low country, but *A. montanum* appears only at high elevations. King describes the leaves of *A. diversifolium*, Bl., as bipinnate. I have never seen any bipinnate leaves on any *Arthrophyllum*. *A. diversifolium* is very common in Singapore, an abundant plant in secondary growth and coming up everywhere, but all I have seen have simply pinnate leaves.

97. Brassaiopsis palmata, *Kurz*.

Telôm, near the camp, and scattered about through the forests. It is common near Tapah.

Distrib.—India.

CORNACEÆ.

98. Mastixia propinqua, *n. sp.*

Branches brown when dry and grooved, the internodes 1 inch or more long. Leaves ovate acute entire, base slightly narrowed, rounded, coriaceous glabrous above with impressed nerves, paler beneath, the midrib and nerves much elevated, the midrib puberulous, becoming at length glabrous, whole leaf drying dark black above, whitish beneath, 5 inches long, 2 inches wide; petiole pubescent $\frac{1}{2}$ inch long. Panicle shorter than the leaves, pubescent. Bracts lanceolate, single at the base of each branch, pubescent. Flowers shortly pedicelled with a pair of ovate lanceolate acute pubescent bracts, pedicel and ovary hairy. Calyx lobes very short pubescent. Petals ovate fleshy pubescent, outside glabrous keeled within, four. Stamens four, anthers ovate cordate on very short filaments. Disc fleshy, indistinctly lobed, rather tall. Style stout, stigma flat broader, obscurely lobed.

Telôm.

I think this must be the plant referred to as *M.* sp. (a) by King as distinct, but of which fruit only was obtained by Wray and Kunstler at an elevation of 3,000-3,400 feet in Perak. It is certainly close to *M. Maingayi*, but is more glabrous. King refers to the latter as to pentamerous in the Synopsis and in describing Wray's plant, but describes it as tetramerous.

RUBIACEÆ.

99. ARGOSTEMMA PICTUM, *Wall.*

Gunong Irau. Not rare in the Peninsula.

100. A. YAPPII, *King.*

Telôm, in damp spots in the forest. The corolla is white like that of other species, not green as in the "Materials."

Distrib.—Perak and Selangor (Semangko Pass).

101. A. ÆQUIFOLIA, *Ridl. A. Ridleyi, King.*

At Telôm and on Gunong Berumban. Except in the more erect habit and rounder leaves with longer petioles, this is quite like the Ophir plant, on which the species was based. King overlooked the paper on which this species was described—viz., Flora of Ophir, "Journ. Roy. Asiat. Soc. Straits Branch," No. 35, p. 15.

102. A. INVOLUCRATUM, *Hemsl.*

Telôm. A tall form.

103. A. HIRTUM, *Ridl.*

A. involucratum var. *mollis, King.*

Telôm. This species was also published in the paper mentioned above. I think it is specifically distinct from the species *A. involucratum*, Hemsl., which was described from plants from the Taiping Hills.

104. A. SUBCRASSUM, *King.*

Telôm.

105. A. LANCEOLATUM, *n. sp.*

A succulent erect herb, 8 inches tall, simple or with a single branch. Leaves very unequal, the larger lanceolate long acuminate, the base usually less acuminate than the tip, margins subserrate or undulate with short thorn-like processes, above glabrous, beneath thickly sprinkled with short hairs, and paler in colour; nerves six to nine pairs, meeting in intramarginal loops, 4 inches long and $\frac{1}{2}$ inch wide or more, ovate lanceolate, 3 inches long by $1\frac{1}{2}$ inch wide; petiole $\frac{1}{4}$ inch long, pubescent; small leaf lanceolate, $\frac{1}{4}$ inch long, resembling the stipule. Inflorescence terminal, of three umbellate cymes, on a peduncle, $\frac{1}{2}$-1 inch long. Flowers about 12, nearly $\frac{1}{2}$ inch across white, all glabrous. Sepals ovate acute, very short, $\frac{1}{10}$ inch long. Corolla lobes lanceate acuminate, narrow. Stamens in a long cone, longer than the petals, with linear lanceolate anthers, terminating in a long terminal process, filaments very short. Fruit small cupular, crowned with the very small calyx teeth, $\frac{1}{8}$ inch in length. Telôm.

Allied to *A. subcrassum*, King, but distinct in its pubescent leaves, glabrous inflorescence and much smaller calyx lobes.

106. A. VISCIDUM, *n. sp.*

A dwarf plant, 4-6 inches tall. Leaves equal ovate lanceolate entire obtuse, $1\frac{1}{4}$ inch long, $\frac{1}{2}$ inch wide, base rounded petiole slender, $\frac{1}{2}$ inch long, above glabrous, minutely pustular, beneath similar but paler and with the nerves covered with short viscid hairs. Stipules ovate herbaceous, obtuse with a few short hairs on the tip, $\frac{1}{10}$ inch long, green. Cyme solitary terminal, $\frac{3}{4}$ inch long, peduncle, nearly $\frac{1}{2}$ inch long. Bracts ovate hairy on the edge. Flowers about shortly pedicelled, pedicells thickly white hairy. Calyx short, cupular densely woolly hairy, lobes five, ovate obtuse, as long as the tube. Corolla lobes lanceate obtuse hairy, within nearly $\frac{1}{4}$ inch long. Stamens anthers lanceolate acuminate, connivent into a cone, half the length of the petals, glabrous, style stout and stigma globose, longer than the stamens. Capsule, $\frac{1}{4}$ inch long, viscid hairy.

Telôm Cascade, on rocks by the stream. This is allied to *A. æquifolium*, Ridl., but erect or nearly so, with smaller flowers, and peduncle shorter than the leaves. The whole plant appears to be very viscid as the sand in which it was growing sticks thickly to the specimens. I found very little of it.

107. HEDYOTIS CAPITATA, *Wall.*

Scrambling over bushes by the river bank and in abandoned clearings. Common all over the Peninsula.

108. H. STIPULATA, *R. Br.*

A small white-flowered plant, growing sometimes in masses on rocks in the Telôm River, occurs also elsewhere in Perak, and at Kota Glanggi in Pahang.

Distrib.—India and Java.

109. H. MACROPHYLLA, *Wall.*

Telôm. Occurs in Malacca and Penang (Ridley, 9393). I have not seen a type specimen, but I think the identification is correct. The petiole is, however, longer (1 inch long) than in the description.

110. H. AURICULARIA, *L.*

On a high ridge between Telôm and the Batang Padang valley.

KLOSSIA, *n. gen.*

A herb with the habit of Ophiorrhiza. Stem simple or branched, hairy. Leaves herbaceous elliptic or lanceolate acuminate, in pairs, equal. Stipules green foliaceous ovate acuminate, free. Inflorescence of several three-flowered cymes on an erect terminal peduncle, with ovate foliaceous bracts, congested into a small capitulum. Calyx short campanulate, with five blunt obovate lobes. Corolla white tubular, much

longer than the calyx, lobes five, shorter than the tube. Stamens four included; filaments long, but free only in the upper part of the tube; anther linear oblong. Style cylindric, stigma of two large elliptic lobes. Capsule urn shaped, two celled, many seeded, seeds subquadrate brown punctate. One species in Malay Peninsula.

111. K. MONTANA, *n. sp.*

Whole plant 6-18 inches tall, often branched, stem hairy. Leaves elliptic to lanceolate acuminate, base narrowed to the petiole, dark green above, whitish beneath, glabrous except for a few scattered hairs above, beneath red scurfy pubescent on the nerves; nerves 13 pairs, conspicuous beneath slender, meeting in intra-marginal loops, $3\frac{1}{2}$ inches long, $1\frac{1}{4}$ inch wide; petiole red hairy, $\frac{1}{4}$-1 inch long. Stipules, $\frac{1}{4}$ inch long, ovate cuspidate foliaceous, green. Peduncle red hairy, $1\frac{1}{2}$ inch long. Cymes three flowered, several in a head, with ovate green bracts glabrous. Calyx campanulate glabrous lobes five, obovate and unequals deeply separated green. Corolla, $\frac{1}{3}$ inch long, glabrous white, tube narrowed in the middle dilate upwards, hairy in the mouth, lobes short. Stamens four; filaments running along the tube wall and adnate to it for most of their length; anthers fairly large. Style and stigma nearly as long as the stamens. Capsule, $\frac{1}{8}$ inch long, glabrous. Disc elevated.

Telôm, abundant in the forests in wet spots by streams. Also met with in Selangor at Ginting Bidei, and on Bukit Hitam (Ridley, 7411), and on the Track to Semangko Pass from Kuala Kubu.

This cannot, I think, be referred to *Hedyotis*, though it somewhat resembles *H. stipulata* on account of the form of the corolla; the stipules and bracts are peculiar, being quite foliaceous. In habit it resembles Ophiorrhiza, but the capsule is different.

112. OPHIORRHIZA ERUBESCENS, *Wall.*

Telôm and Gunong Berumban.

I take this to be the plant intended by King in his description; but a plant distributed by him under this name (Perak *Kunstler*, 5853) and quoted in the "Materials" is a small plant with hairy leaf margins, and not a completely glabrous plant except for the inflorescence, as he describes *O. erubescens*. The Telôm plant is our largest species, tall with broad glabrous leaves. Flowers, $\frac{1}{2}$ inch long, white, and large capsules. It occurs also in Penang.

O erubescens is also a native of Burmah.

113. O. HISPIDULA, *Wall.*

Telôm.

114. O. MUNGOS, *L.*

Telôm. If all the plants from India, Ceylon and the Malay Peninsula that are classed as *O. mungos*, L., are specifically identical, the plant is indeed, as King says, very variable.

115. O. RUGOSA, *Wall.*

On Gunong Berumban and in the Batang Padang valley

Distrib.—Himalayas.

116. ADENOSACME LANCEOLATA, *n. sp.*

Shrublet, about 2 feet tall, stem glabrous pale, shining with distant nodes. Leaves few terminal lanceolate acuminate, narrowed gradually at the base, 8 inches long, 2½ inches wide or less, herbaceous entire glabrous except that the midrib on the back is scabrid; nerves 16 pairs, visible above, conspicuous beneath, ascending to the margin, forming intra-marginal loops; petiole 1 inch long. Flowers in lax cymes from the nodes of the bare part of the stem two or three together, peduncles slender, ½ inch long, bearing each three pedicels, each with one or two flowers: pedicels ¼ inch long; all pubescent. Bracts linear acuminate, $\frac{1}{10}$ inch long. Calyx cupular, $\frac{1}{16}$ inch long, with five to six linear acuminate lobes, scabrid. Corolla yellow, tube slender cylindric, ¼ inch long, lobes five, short oblong ovate, all glabrous, but tube slightly scabrid. Stamens five, in the mouth of the tube anthers oblong, almost sessile. Style stout as long as the stamens, stigma bilobed lobes broad elliptic. Fruit, ¼ inch long, subglobose, crowned with the sepals.

Telôm, damp spots by the streams. This belongs to the group of *A. Scortechinii*, King and Gamble, but is a more slender plant, with very different leaves.

117. A. FLAVA, *n. sp.*

Shrub, 2 or 3 feet tall, stem woody, hollow ⅛ inch through, leafy only at the tip. Leaves thin obovate, abruptly acuminate, narrowed gradually to the base, 12 inches long, 5 inches wide or less, glabrous above, midrib and nerves rufous, hairy beneath; nerves about 15 pairs, nearly straight, meeting within the margin, nervules nearly vertical. Cymes short, pubescent on the old wood crowded, about 1 inch long, pedicels short. Calyx urn shaped, with five lanceate cuspidate teeth nearly as long as the tube, pubescent, ⅛ inch long. Corolla yellow, cylindric dilated above pubescent, hairy outside and in, lobes four, oblong rounded, little shorter than the tube. Stamens five, anthers linear oblong in the mouth of the tube. Style short, straight, hairy at the base. Stigmas two, filiform. Telôm woods by stream banks. This plant is certainly allied to and resembles *A. Scortechinii*, King, but I think it must be distinguished. The flowers in

A. longifolia, Wall., are di- or trimorphic in the matter of stamens and style, and it may so be in *Scortechinii*. In that species the stamens are sessile in the base of the tube and the style five armed. In this the stamens are in the tube mouth and the style arms two. The *Scortechinii* group require careful study in the woods, but unfortunately they are by no means common.

118. Urophyllum trifurcum, *Pears.*

Telôm Camp. A large shrub, with large showy orange-coloured fruits.

119. U. macrophyllum, *Korth.*

Forests at Telôm.

120. Brachytome Scortechinii, *King and Gamble.*

Flowers small, white. Telôm on the banks of a stream above the camp.

Gardenia (§ Gardeniella), *new section.*

Dwarf shrublets, little or not branched, unarmed, often pubescent. Leaves opposite, stipules ovate, ending in slender points. Flowers one to three on short peduncles from the lower part of the stem below the leaves (*i.e.*, where the leaves have fallen). Calyx tube cylindric, slender, lobes very narrow setaceous. Corolla tube elongate, gradually dilating upwards, green or creamy yellow with red spots. Stamens included, forming a cone round the style. Capsule elongate cylindric, narrow, pendulous, crowned with the narrow linear sepals. Seeds numerous, minute, oblong, not flattened, pustulate. Species three. Malay Peninsula.

The plants of this section are so utterly unlike those of a typical *Gardenia* that were it not for a connecting link in the form of *Gardenia tentaculata*, Hook. fil., one would have no hesitation in proposing a new genus for them. The plants have the habit of a *Didymocarpus* or *Didissandra*. The flowers borne below the leaves, on the lower bare part of the stem, are of fairly large size, yellow to green with pink streaks, gradually dilated upwards after the manner of *G. Rothmannia*, but much smaller. The stamens and style are those of a typical *Gardenia*, but the fruit is long slender and cylindric with innumerable dry seeds of a minute size, rounded oblong, and pustulate. This form of seed is quite characteristic of the small half shrubby plants which grow on the hill slopes in the Malay forests, such seeds being dispersed by rain water. *Gardenia tentaculata*, Hook. fil., is a bush which grows in tidal mud, on most of our rivers, and is referred to the section *Rothmannia* by Hooker. It resembles these hill plants, in its green red-spotted flowers borne in the lower axils of the branches, the shape of the corolla

and narrow sepals. Its fruit, however, is swollen and oblong, resembling that of typical *Gardenias*; and its seeds are much larger and flattened, but like those of *G. pulchella* are brown and pustular, it being a plant whose seeds are dispersed by water.

121. Gardenia (§ Gardeniella) pulchella, *n. sp.*

A shrublet, with a woody erect stem, about 2 feet tall or less, $\frac{1}{8}$-$\frac{1}{4}$ inch through, brown, hairy. Leaves thin oblanceolate, subacute or acuminate, glabrous above, pubescent on the nerves beneath: nerves seven to nine pairs, inconspicuous above, elevated beneath, ascending gradually to the margin, 6-7 inches long, $2\frac{1}{2}$-3 inches wide; petiole $1\frac{1}{2}$ inch long. Internodes $1\frac{1}{2}$-2 inches long. Stipules large, ovate, ending in a number of setaceous points, $\frac{1}{2}$ inch long. Flowers solitary or three or more on a short $\frac{1}{4}$-inch peduncle from a leaf axil on the denuded base of the stem. Pedicels very slender, $1\frac{1}{2}$-$2\frac{1}{2}$ inches long, pubescent. Calyx tube slender, cylindric, about 1 inch long, lobes linear acute, $\frac{1}{2}$-$\frac{3}{4}$ inch, green, pubescent. Corolla $2\frac{1}{2}$ inches long, base cylindric slender, gradually dilated upwards to the limb, which is $\frac{3}{4}$ inch across, five lobes, short rounded, creamy white outside, densely spotted streaked with red inside, tips of lobes cream with a violet spot at the apex, all glabrous. Stamens included, fuscous, connivent: filaments long, slender, free nearly to base; anthers linear acuminate. Style short thick, stigma clubbed. Capsule pendulous, cylindric, obscurely angled, glabrous. $1\frac{1}{2}$ inch long, $\frac{1}{2}$ inch through, crowned with the sepals, two celled, seeds oblong-pustular brown minute, very numerous.

Common on banks at Telòm.

This curious and pretty plant is certainly extremely unlike a typical *Gardenia* and very different from *G. Rothmannia*, Thumb., the type of the section. In many points, however, it is closely allied to *G. tentaculata*, Hook. fil., a common tidal swamp plant, especially resembling it in its small size, axillary flowers from old leaf axils, its long narrow sepals, and the colour of its flowers. The long slender capsule with its oblong rounded seeds, and elongate corolla tube, however, separate it widely from that species. Were it not for this connecting link one would certainly propose a distinct genus for this plant and its allies. I have met with two other species of this section in the Peninsula, one of which Pearson named *Acranthera dalymacarpa*, but I cannot find that any description of it was published. The genus *Acranthera*, however, contains only plants with strongly-peduncled terminal cymes, and is allied to *Mussaenda*, to which genus one species has been referred.

122. G. DIDYMOCARPUS, *n. sp.*

Acranthera didymocarpus, Pearson MSS.

Shrublet, with a stem 2 or 3 inches tall, densely hairy. Leaves oblong, or oblong ovate acuminate, narrowed slightly at the base, hairy all over with long soft hairs, especially on the margins and keels; nerves inconspicuous above, 7 to 10 pairs, 6-7 inches long, 2 inches wide; petiole 1 inch long or less. Stipules lanceolate acute, densely hairy. Flowers from the bare part of the stem solitary or in threes, with four or five linear acuminate hairy bracts, $\frac{1}{4}$ inch long, on the very short peduncle. Calyx lobes five or six linear acuminate, 1 inch long, hairy. Corolla campanulate, base of tube shortly cylindric, then dilating hairy outside and especially on the edges of the lobes, 2 inches long and over 1 inch across, yellow with pink spots in the tube, lobes rounded five or six. Stamens connivent, included five or six, anthers linear, $\frac{1}{2}$ inch long, filaments as long. Style thick, stigma fusiform. Capsule nearly 1 inch long, cylindric hairy on $\frac{1}{2}$-inch pedicel and crowned with the long persistent sepals.

Selangor at Ginting Bidei, and Bukit Kutu at 2,000-3,000 feet altitude (Ridley, 7573), and on the Raub track at the 15th mile from Kuala Kubu.

123. G. VIRESCENS, *n. sp.*

Stem woody over 1 foot tall, scabrid hairy on the young parts. Leaves in remote pairs, thin, broadly lanceolate or elliptic lanceolate, 5-6 inches long, 2 inches wide, glabrous above except for some scattered fugacious very small hairs, beneath shortly scabrid hairy on the nerves and midrib; eight pairs of nerves; petiole 1 inch long, slender, glabrous. Stipules ovate fringed with long points, $\frac{1}{4}$ inch long. Flowers solitary or in pairs from the axils, usually below the leaves. Peduncles, $\frac{1}{2}$-$\frac{3}{4}$ inch long, slender, scurfy hairy. Calyx lobes linear, acuminate, scurfy hairy, $\frac{1}{3}$ inch long. Corolla tube, 2 inches long, glabrous, cylindric for nearly half its length, then dilated mouth $\frac{1}{2}$ inch across, lobes short, undulate, green with pink spots. Stamens $1\frac{1}{2}$ inch long.

Perak, Taiping Hills, near the "Cottage," only a single plant seen in 1891.

124. TIMONIUS DIFFUSUS, *n. sp.*

A big tree, much branched with slender twigs. Leaves thin glabrous, broadly lanceolate acuminate, almost equally acuminate at both ends, 4-6 inches long, 2 inches wide; nerves eight pairs, curved up to the margin, slender, most conspicuous on the lower surface; petiole $\frac{3}{4}$ inch long. Stipules linear acumi-

nate, cuspidate, very narrow, ½ inch long. Cymes very lax and slender: peduncle 2¼ inch long, filiform, glabrous, branches few, very slender, 1 or 2 inches long. Flowers sessile at the fork and ends of the cyme-branch. Male flower, calyx funnel shaped, with five short teeth, ⅛ inch long, glabrous. Corolla tube slender cylindric, a little over ¼ inch long, pubescent, yellow, lobes four, short obtuse lanceolate, pubescent, not a quarter of the length of the tube. Stamens four, long narrow, linear almost sessile. Female flower on solitary axillary pedicels, 1½ inch long, ⅛ inch wide, ovary obovate, glabrous. Calyx lobes four, very short, ovate. Corolla $\frac{1}{10}$ inch long, silky tomentose, lobes as long as the tube, ovate, short, four, fleshy, channelled inside. Staminodes thin flat four. Style short thick. Stigma bilobed, lobes fleshy. Fruit ¼ inch long, ovoid globose, top flat, four lobed.

Telôm, very common in forests. A big tree for a *Timonius*. The plant is evidently allied to *T. laxus*, King and Gamble, but differs in its being almost completely glabrous, with the corolla tube of the male flower only slightly pubescent outside and quite glabrous within, and with very short lobes in proportion to the tube. On one cyme I find the flower replaced by a rosette of lanceolate leaves, the longest, ⅛ inch long, strongly hairy on the edges and keel.

125. Webera pulchra, *n. sp.*

A large-spreading shrub. Leaves broadly lanceolate or oblanceolate to nearly obovate, rather abruptly acuminate, base cuneate, or gradually acuminate, thin (drying black), glabrous, 3-9 inches long, 1-3½ inches broad; nerves 12 to 14 pairs, slender gracefully curved, elevated on both sides when dry; petiole ¾ inch long. Stipules stiff, linear, ¼ inch long. Panicles lax spreading, of four or five branches, 1½-3 inches long, on a peduncle of 1 inch long or less, bearing lax terminal cymes about 1 inch long; flowers on short pedicels, ⅛ inch long. Buds cylindric, ½ inch long. Calyx campanulate, with four short points, $\frac{1}{10}$ inch long. Corolla white, ¼ inch long, the tube slightly dilated upwards, ⅛ inch long, lobes linear oblong, a little longer, all glabrous, except for a ring of white hairs in the mouth. Stamens exserted, anthers linear, narrow. Style as long. Stigma linear, slightly dilated upwards, ending in a point. Fruit ½ inch through, one seeded, pericarp rather fleshy, dull grey green. Seed subglobose, with an excavate base.

This beautiful shrub, with its conspicuous ivory white flowers, was abundant all about Telôm up all the water-courses, and by the cascade. Its affinity seems to be with *W. grandiflora*

126. W. SALICINA, *n. sp.*

A large shrub. Leaves elongate, lanceolate, narrow acuminate, almost equally to both ends, glabrous; nerves eight pairs, ascending and ending in loops at the margins, 6-8 inches long, 1-1½ inch wide; petiole winged for most of its length, ½ inch long. Stipules lanceolate obtuse, cymes axillary opposite; peduncle 3 inches long; branches few, slender, 1½ inch long; pedicels very slender, filiform, 1½ inch long, bearing a single white flower. Calyx tube obconic, minutely pubescent, limb shorter, nearly entire, cup shaped, ½ inch long, glabrous. Corolla white, ½ inch long, base dilate shortly, tube abruptly narrowed, lobes wider, linear oblong, four, glabrous subobtuse, longer than the tube. Stamens four, anthers long, linear nearly as long as the corolla lobes, apiculate. Style stout, pubescent, almost as long as the stamens. Stigma bilobed, lobes elliptic, flat. Fruit globose ovoid, ½ inch long, seeds two. Telôm Water-fall. An elegant shrub remarkable for its long narrow leaves and diffuse cymes.

127. W. NAPIERII, *n. sp.*

A shrub. Leaves elongate, lanceolate acuminate, narrowed to the base, thinly coriaceous, glabrous above, hairy beneath, especially on the nerves and nervules, 7-12 inches long, 2½-4 inches wide; nerves 8 to 12 pairs, elevated on the lower surface; petiole 1½-2 inches long, hairy. Stipules triangular acute, hairy, ¼ inch long. Peduncle 6-8 inches long, pendulous, bearing at the end about four cymes, compact in a head, 1 inch long (more lax in fruit), very hairy. Calyx five lobed, densely covered with hairs. Corolla white, ½ inch long, hairy, lobes four oblong obtuse, about half the length of the tube. Stamens four as long as the lobes, glabrous, anthers linear apiculate. Style much longer than the corolla. Stigma very slender narrowed at both ends. Fruit globose, greenish grey.

Negri Sembilan at Bukit Tanga, near Seremban (W. G. Napier), Telôm (in fruit).

This species is most nearly allied to *W. longifolia*, Hook. fil., differing in its much larger and more hairy leaves, and long hairy peduncle bearing densely clustered hairy cymes. The only flowering specimen I have seen was obtained by Sir W. G. Napier, who made a small collection of plants near Seremban, after whom I name the plant.

128. IXORA GRANDIFOLIA var. ARBORESCENS.

Slopes of Gunong Berumban. A tree with smaller leaves than usual in this species.

129. I. PENDULA, *Wall.*

Near Telôm Camp. A shrub with the corolla tube pink and the lobes white. The leaves are broader and thinner than in the common low-country form.

130. PÆDERIA VERTICILLATA, *Bl.*

On the road side at the 12th mile from Tapah. The flowers only in bud, the whole flower spray of a rich deep purple. Not rare all over the Peninsula and in Borneo.

131. SAPROSMA SCORTECHINII, *King and Gamble.*

Woods at Telôm, in flower and fruit.

132. HYDNOPHYTUM FORMICARIUM, *Jack.*

Telôm, a mile from the camp, towards Batang Padang. A narrow-leaved form.

133. GEOPHILA RENIFORMIS, *Don.*

Ulu Batang Padang.

Distrib.—Most of the tropics.

134. LASIANTHUS MYRTIFOLIUS, *n. sp.*

A tall shrub, lower part of the branches pale, younger parts pubescent, drying black, branches slender. Leaves coriaceous lanceolate acuminate, base cuneate, nerves and nervules elevated on both surfaces, glabrous, shining above; nerves beneath (much raised) pubescent, ½-1 inch long, ¼ to nearly ½ inch wide; petiole pubescent, $\frac{1}{16}$ inch long. Stipules shorter, acuminate, pubescent. Flowers very small, one or two sessile in the axil of a leaf. Bracts minute, ovate. Calyx very short, pubescent, campanulate, four lobed, lobes short, blunt, four. Corolla ⅛ inch long, white, cylindric, with four linear lobes, obtuse, pubescent without, and white hairy within, lobes shorter than the tube. Stamens four, anthers nearly sessile, oblong with two short points at the base. Style shorter than corolla tube, rather stout. Stigmas very minute.

Telôm Ridge at 5,000 feet. A very distinct plant in habit and foliage.

135. L. SALICIFOLIUS, *n. sp.*

Bush, branches slender, thickly covered with felted hair. Leaves narrowly lanceolate, ending in a long point, base shortly narrowed subcuneate or rounded, thin herbaceous, drying black, pale olivaceous beneath, glabrous above except the midrib and veins covered with yellow hairy closely appressed beneath, midrib, nerves and nervules elevated densely yellow hairy; nerves ascending 15 pairs, 4 inches long, ½ inch wide; petiole ¼ inch long, hairy. Stipules

hairy. Flowers one or two axillary, sessile. Calyx campanulate, $\frac{1}{12}$ inch long, with five acute points, hairy. Corolla $\frac{1}{10}$ inch long, hairy, dilated at the base, narrowed upwards, limb dilated with five ovate lobes, much shorter than the tube. Fruit globose, hairy, $\frac{1}{4}$ inch long, crowned with the sepals. Telôm Ridge.

136. L. RHINOCEROTIS, *Bl.*

A large shrub or almost a tree, the biggest species I know. The flowers are pale rose-pink. All the other species in the Peninsula have white flowers.

137. L. CONSPICUUS, *n. sp.*

Shrub, about 6 feet tall, glabrous. Leaves lanceolate or oblong lanceolate, abruptly acuminate, with a broad base, very shortly narrowed, 5-7 inches long, $1\frac{1}{2}$-2 inches wide, thin textured, drying dark brown or black; nerves inconspicuous above, elevated beneath, eight or nine pairs, gradually ascending to the margin, not meeting in loops; petiole $\frac{1}{10}$ inch long. Stipules small lanceate, base broad. Bracts linear glabrous. Cymes shorter than the petioles or little longer. Flowers several. Calyx campanulate, hardly toothed. Corolla white cylindric, $\frac{1}{2}$ inch long, lobes five nearly half as long as the tube, all glabrous, except the strong tuft of white hairs in the mouth. Fruit small ovoid, $\frac{1}{4}$ inch long, crowned by the five-toothed calyx, pyrenes five.

Telôm, common and conspicuous in the forests from its quite large showy white flowers.

This resembles *L. Lowianus*, but has a totally different venation of the leaves, the shape and petiole of which are quite different and the fruit is not angled and has five pyrenes.

138. L. HIRTUS, *n. sp.*

Shrub, branches densely hairy, with brown hairs. Leaves lanceolate acuminate, with a long point, nearly sessile, 4-$4\frac{1}{2}$ inches long, $\frac{3}{4}$-1 inch long, hairy on both surfaces; nerves 10 pairs, indistinct above and impressed, midrib fringed with long yellow hairs, and the rest of the leaf covered rather thickly with yellow hairs, beneath nerves elevated, nervules conspicuous, all hairy; petiole $\frac{1}{10}$-$\frac{1}{4}$ inch hairy. Cymes shorter than petiole, densely hairy. Stipules lanceolate acute hairy and stipped with longer hairs. Calyx lobes five, densely hairy. Corolla not seen. Fruit small, $\frac{1}{10}$ inch long, hairy at first eventually glabrous, crowned by the densely hairy sepals, pyrenes four.

Telôm Forests.

This species is near *L. densifolius*.

139. L. PERAKENSIS, *King and Gamble*
Telôm.

140. L. LOWIANUS, *King and Gamble*.
Telôm.

141. L. (§ LITOSANTHES) GRACILIS, *King and Gamble*
Litosanthes biflora, Bl. (Bijdr., 994). A specimen of a plant received from Buitenzorg under the name *Litosanthes biflora*, Bl., and agreeing with Blume's description, is absolutely identical with the plant distributed by King as *Lasianthus gracilis*.

142. LASIANTHUS (LITOSANTHES) PENDULA, *n. sp.*
A tall shrub, 6 or 8 feet high, with long pendulous branches densely hairy. Leaves lanceolate acuminate, sessile or nearly so, petiole very short, base rounded, apex cuspidate, coriaceous, above glabrous and shining beneath, densely hairy; nerves eight pairs, much elevated beneath, depressed above; nervules transverse, 3-4 inches long, 1-1½ inch wide. Stipules lanceolate linear, densely hairy. Peduncles one in each leaf axil, hairy, 1½ inch long, bearing three or four flowers surrounded by a number of filiform long hairy bracts ½ inch long. Calyx short with five long lanceolate subulate hairy sepals. Corolla short, glabrous outside and inside white, tube nearly as long as the lobes. Stamens five, anthers linear oblong. Style little longer, stout. Stigma broad, trinicate bilobed. Fruit ½ inch long, obovate, narrowed to the base, five lobed, and crowned with the five hairy calyx lobes.
Gunong Berumban at 6,000 feet.
A very curious plant with long-hanging branches very hairy and with the young parts tinted with violet, very distinct from any other species in the section.

143. L. (LITOSANTHES) ROBINSONII, *n. sp.*
A tall shrub, stems pubescent, internodes 4 inches long. Leaves elliptic, rather thin, acuminate, slightly narrowed to the obtuse base, glabrous above, beneath hairy on the nerves, nearly sessile; nerves depressed above, elevated and conspicuous beneath, eight pairs, ascending gradually to the margin; nervules subhorizontal elevated hairy. 8 inches long, 2 inches wide; petiole ¼ inch pubescent. Flowers one to three, sessile on the end of a long filiform peduncle. Peduncle 2 inches long, hairy. Bracts two, subulate hairy. Calyx ¼ inch long, tube short, teeth elongate subulate longer, densely hairy, four. Corolla ½ inch long, hairy outside and in, tube very short, lobes longer, oblong, rounded at the top. Stamens four,

glabrous linear, included. Style shorter than corolla, stout. Stigma obovate flattened retuse papillose. Fruit (unripe) obovoid very hairy and crowned with the long linear sepals.

Telôm, abundant.

This is allied to *L. scalariformis*, King and Gamble, but differs in its pale leaves, hairy nerves, peduncle and calyx.

144. Psychotria brachybotrys, *n. sp.*

Scandent with slender stems, $\frac{1}{10}$ inch through. Leaves lanceolate coriaceous, acuminate obtuse, base acuminate, glabrous, minutely black dotted and dark green or black when dry, $1\frac{1}{2}$-2 inches long, by $\frac{3}{4}$ inch wide; petiole $\frac{1}{4}$ inch long; nerves four pairs, inconspicuous. Stipules short and ring shaped with two short points. Cymes very short, $\frac{1}{4}$ inch long in flower, lengthening in fruit, terminal almost completely glabrous. Flowers very shortly pedicelled, $\frac{1}{10}$ inch long. Bracts linear obtuse. Calyx very short, cup shaped, five lobed, lobes very short pubescent. Corolla very short, lobes five, pubescent outside, hairy within the tube. Stamens five, anthers oblong obtuse, longer than the short filaments. Style short. Stigma bilobed. Fruit on lengthened pedicels ($\frac{1}{8}$ inch long) and cyme branches lengthened to half an inch, elliptic pyriform, $\frac{1}{8}$ inch long (unripe): pyrenes three, ribbed.

Gunong Berumban at 6,000 feet elevation, and also met with on the Semangko Pass, Selangor (Ridley, 12072).

This species is allied to *P. Scortechinii*, King, differing in the smaller leaves, short cyme and coriaceous leaves.

145. Ps. fulva, *Buch. Ham.*

Sporadic in woods, Telôm. It also occurs in the Taiping Hills. The very small flowers are pinkish white and the fruit orange.

146. Ps. viridiflora, *Bl.*

A variety with rather larger and thinner leaves. A bush, Telôm.

147. Ps. condensa, *King and Gamble.*

Gunong Berumban. I only got a few scraps of this plant in bud. It appears to be the plant intended under this name, but the flowers have not been described, and I have not seen fruit.

148. Ps. angulata, *Korth.*

A single specimen of what appears to be a form of this common wide spread plant was obtained on Gunong Berumban.

149. Chasalia curviflora, *Thw.*

Common in woods, Telôm. The form much resembled the ordinary low-country one.

150. Chasalia minor, *n. sp.*

Shrub or bush, stems woody. Leaves small, lanceolate acuminate thin, narrowed to the base, 3½ inches long, 1 inch wide, glabrous, margins faintly undulate nerves six pairs. Cymes terminal, short with three slender spreading branches about ½ inch long, bearing three flowers on the end of each. Flowers white, shortly $\frac{1}{10}$ inch pedicelled. Calyx funnel shaped with five short-rounded lobes. Corolla tube short, dilated slightly upwards, ¼ inch long, curved, lobes five, lanceolate acute half as long, three nerved. Stamens four, protruding from the mouth, anthers linear, rather large. Style cylindric, stigmatic, lobes oblong, two. Disc cushion shaped. Fruit black, ¼ inch long, two celled, two seeded, seeds plano-convex.

Gunong Berumban. A very different plant from any form of *Chasalia curviflora* from the plains, variable though that is. It is much more of a spreading bush with slender twigs. The flowers are smaller, the tube much shorter in proportion to the lobes, and the pedicels not swollen and fleshy either in flower or fruit.

151. Cephaelis cuneata var. elliptica.

A small plant than usual with elliptic leaves, acuminate at the apex and narrowed at the base, thin in texture, and 4 inches long, 1½ inch wide: nerves 10 pairs: petiole ½ inch long, stipules thinly coriaceous acuminate: peduncle 2 inches long. Telôm Woods, sporadic and nearly all in fruit at the time.

I think this is a distinct species, but the whole genus, as far as the Peninsular species go, requires revising. Three species are given in the "Materials," and of those there are some doubts about. There are, however, certainly more species, but these fleshy plants preserve ill, and are somewhat difficult to separate when dry.

COMPOSITÆ.

152. Vernonia cinerea, *Less.*

Telôm, in Sakai clearings, and by the river bank. Two forms: a tall much branched form.

153. Adenostemma viscosum, *Forst.*

Telôm, abundant in a wet spot along the track, and in open spaces round the camp. It was also found far up in the region of Cameron's plateau, apparently indigenous. It is also to be met with along the track to Jor in the Batang Padang valley. The variety round Telôm is very different from the ordinary Malay Peninsular form, and I cannot fit it into any of the varieties mentioned by Clarke in the Compositæ

indicæ. It is about 18 inches tall, with a large lax-spreading panicle, 8 inches across. The branches which, as well as the stem, are viscid-pubescent, are slender. The leaves are thin, glabrous, ovate acuminate, narrowed at the base and decurrent on the petiole, and the margin is almost completely entire, occasionally obscurely serrate, 6 inches long, and 3 inches wide. The heads are $\frac{1}{8}$ inch across, involucre glabrous. Flowers pure white. The fruits are perfectly smooth, and not at all muricate, covered with glands, exuding a viscid gum and very adhesive. It seems to be nearest to the var. *microcephala*.

The plant, which is very variable in form, is distributed all over the tropics, and usually occurs as a village weed. I never saw it looking so thoroughly wild as I did at Telôm.

154. Ageratum conyzoides, *L.*
Telôm, in a Sakai clearing.

155. Mikania scandens, *Willd.*
Telôm, Sakai clearing.
Distrib.—Common in the Peninsula, Tropical Africa and Indo-Malaya.

156. Microglossa volubilis, *Dc.*
Telôm, not common in the Peninsula. I have it from Hermitage Hill, Perak, and from Chabau in Malacca. It has also been collected in Penang, and is met with in India, Burmah and the Malay islands and China.

157. Blumea balsamifera, *Dc.*
Telôm, Sakai clearing.

158. Bl. spectabilis, *Dc.*
Ulu Batang Padang, on the track, common on banks in the hills. I have it from Selangor, Ginting Bidei and Kuala Lumpur; Sungei Ujong and also from Christmas Island.

159. Gynura sarmentosa, *Dc.*
Telôm, on trees near the camp. A common forest plant all over the Peninsula in wet jungle, also occurring in Siam and the Malay islands.

160. G. bicolor, *Dc.*
A weed, abundant in the Sakai clearing at Telôm.
Distrib.—Malay islands and China.

161. G. pseudochina, *Dc.*
With the last but less abundant.

162. Siegesbeckia orientalis, *L.*
In an abandoned clearing near Telôm. This is by no means common in the Peninsula, and I have only seen it of late years in Singapore, where it appeared as a garden weed.

163. Bidens pilosa, *L.*

Telôm Camp and in Sakai clearings, the variety *pilosa* proper, with white ray-florets.

CAMPANULACEÆ.

164. Lobelia affinis, *Wall.*

Ulu Batang Padang; Telôm. I found a very small flowered form of this with white flowers and a glabrous calyx, growing in very wet mud in the forest at Telôm. The species seems to vary a good deal. It is common in damp muddy spots, usually in open places all over the Peninsula.

165. Pentaphragma begoniæfolium, *Wall.*

Telôm, banks in the forests. This species occurs, too, in Penang and Perak and at Telôm. The locality Singapore, (*Lobb*) in the "Materials," is obviously an error; Lobb no doubt got it in Penang, and the locality quoted from Tahan collected by me is also an error, the Tahan plant being *P. Scortechinii.*

166. P. Scortechinii, *King and Gamble.*

Telôm. The flowers of this are quite white, and not yellowish with violet spots in the tube as in *P. Ridleyi*; King and Gamble give Singapore, Bukit Timah, as a locality for a variety of *P. Scortechinii.* The species does not occur there, the only plant there is *P. Ridleyi.*

VACCINIACEÆ.

167. Vaccinium Scortechinii, *King.*

A compact bush. Gunong Berumban at 6,500 feet.

168. V. viscifolium, *King.*

A bush, stems red, flowers pale rosy white. The spathulate coriaceous leaves easily distinguish it. The specimens described were flowerless, so that the flowers have never been described. They are borne in racemes, 1½ inch long from below the leaves, axillary, pedicels [illegible] inch long decurved, glabrous. Calyx campanulate with six short ovate acute lobes. Corolla $\frac{1}{4}$ inch long cylindric, slightly dilated at the base with very short-rounded lobes rosy white. Stamens 10, filaments broad, tapering upwards, woolly, anthers oblong with two long apical appendages clubbed and bifurcate at the tip, no basal appendages. Disc low subentire. Style stout glabrous.

Gunong Berumban, 6,000 feet.

169. Pentapterygium Scortechinii, *King and Gamble.*

On the summit of Gunong Berumban.

A beautiful shrub with its large cherry red calyx and corolla.

ERICACEÆ.

170. Rhododendron Teysmanni, *Miq.*

An epiphyte on the high ridge behind Telôm Camp.

I think *R. Teysmanni* should be kept as a distinct species from *R. javanicum* as Miquel put it. It differs apparently constantly from *R. javanicum* in its colour, pubescent ovary, and hairy bases of the stamens.

171. Rh. Wrayi, *King.*

Bush, on Telôm Ridge and Gunong Berumban, in fruit. There seem to be two forms, possibly species, of this. The typical plant is a shrub about 4 or 5 feet tall with very coriaceous lanceolate or oblong leaves, rather short, white beneath. Flowers white spotted with red on the surface inside the mouth with orange red stamens. This occurs in Perak and on the Hulu Semangko Ridge, where Mr. Burn-Murdoch and myself found it.

The other var. *elliptica*, *n. var.*, is a large shrub or small tree, 15 feet tall, with longer and narrower leaves elliptic coriaceous, and pale (but not white beneath). The flowers pure white unspotted. This occurs with the other variety on Hulu Semangko, where Mr. Burn-Murdoch collected it, and is the plant I obtained on Gunong Berumban and also on the Telôm Ridge, and Mr. Robinson got it on Gunong Tahan. Mr. Burn-Murdoch considered that the two plants on Hulu Semangko were quite distinct specifically and perhaps they should be separated.

172. R. jasminiflorum, *Hook. fil.*, var. punctata.

Straggling shrub, epiphytic with ovate nearly sessile leaves very coriaceous. Flowers rather smaller than in the type, white with bright pink spots in the mouth of the tube; pedicels pubescent slender, 1 inch long.

Telôm Ridge; Taiping Hills (Ridley) and probably all the Perak plants mentioned by King and Gamble in the "Materials." The type of *R. jasminiflorum* was the plant obtained on Mt. Ophir by Lobb, and figured in the "Botanical Magazine," t. 4, 524. It appears to be peculiar to Mt. Ophir, where it has often been collected—viz., by Lobb, Griffith., Maingay, Derry, No. 624, and by myself. It differs in the flower being pure white without spots, and the pedicels being thick and barely $\frac{1}{2}$ inch long, making the umbel very much more compact and giving the whole plant a very different appearance. The description in the "Materials" seems to be a mixture of these two plants, which seem distinct enough to merit varietal names at least.

173. R. LONGIFLORUM, *Lindl.*

Epiphytic at Telóm, in full flower. This is the plant found on lofty trees on Bukit Timah in Singapore and not *R. javanicum* as recorded in the "Materials." *R. longiflorum* has also been met with in Negri Sembilan, near Kuala Pilah, and is the only species which has been found in the Peninsula. It occurs in Perak, also Borneo and Sumatra.

174. RHODODENDRON KLOSSII, *n. sp.*

A tall tree, 50 feet tall. Leaves opposite in pairs, whorled the ends of the branches, thinly coriaceous, glabrous, dark green, very slightly paler beneath, lanceolate acute, base acuminate to the petiole, 4-4½ inches long, 1-1½ inch wide, nerves faint, reticulations visible, rather large, on stout petiole ½ inch long. Flowers in three to six umbels terminal, peduncles ½ inch long, thick. Bracts numerous, lower ones small, ovate obtuse, upper ones lanceolate, ½ inch long, papery pale, margined with short white hairs. Pedicels slender, ¾-1 inch long, glabrous. Calyx very small, nearly flat with five very short lobes. Corolla tube cylindric about as long as the lobes, lobes oblong obtuse, whole flower 1½ inch long, white. Stamens nearly as long as the corolla 10, filaments slender filiform, anthers small oblong white. Style rather longer, capitate, ovary acuminate, glabrous. Gimong Pernikan at 6,000 feet altitude.

A fine tree. The biggest tree Rhododendron I have seen in the Peninsula. There are usually only two flowers on each peduncle and six peduncles in the umbel, making a head of 12 flowers. The tree was in full flower, and very attractive in its mass of white blooms.

175. RHODODENDRON LEUCOBOTRYS, *n. sp.*

A shrub, 12-14 feet tall, with straight erect branches. Leaves lanceolate acute, narrowed a little to the base, last not acute, coriaceous 2½-3 inches long, 1 inch wide, quite glabrous and not scaly, smooth slightly paler beneath, nerves elevated beneath slender, 10 pairs, petiole ¼ inch long or less. Umbels two to four terminal, peduncles very short ⅓ inch. Buds 1 inch long. Bracts caducous broad about ¼ inch with ciliate margins. Flowers twelve to an umbel; pedicels 1 inch long, slender. Calyx very small, margins undulate, nearly flat. Corolla 1¼ inch long, tube under ½ inch much shorter than the limb, campanulate, lobes ¼ inch across, 1 inch long, oblong, white with a yellow spot in the throat. Stamens nearly as long as the lobes, filaments slender, pubescent at the base for about a third of their length, above glabrous, anthers short oblong,

style longer, stigma capitate, pistil quite glabrous. Capsule fusiform, narrowed upwards, 1 inch long, $\frac{1}{4}$ inch through.

Kedah Peak. (Gunong Jerai) at 3,000 to 4,000 feet altitude, June, 1893. (Ridley, 5531).

This beautiful plant is apparently peculiar to Kedah Peak. I did not describe it before, as the part of the "Materials" dealing with this genus was not published. As, however, no description of it has appeared, I now describe it: It is allied to *R. Klossii*.

176. R. Robinsonii, *n. sp.*

An epiphyte of no great size, growing usually on very lofty trees, branches pale below. Leaves in whorls of three, of which one is smaller than the others, blade coriaceous elliptic to lanceolate, obtuse to subacute, the smaller leaf lanceolate acuminate sometimes, glabrous, dark above, paler beneath; nerves about eight pairs, conspicuous above, hardly visible beneath, $3\frac{1}{2}$-5 inches long, 2 inches wide; petiole thick, $\frac{1}{2}$ inch long. Flowers in a terminal umbel of five on a very short peduncle; pedicels $1\frac{1}{2}$ inch long, glabrous. Calyx very small and flat with very obscure rounded lobes. Corolla campanulate, 1 inch long, $1\frac{1}{4}$ inch wide, bright yellow, occasionally flushed with red. Stamens included, shorter than the corolla, nine, filaments filiform quite glabrous, anthers oblong, keel thick. Ovary glabrous style short, rather stout. Stigma capitate.

Common in the Telôm District from 3,400 to 5,000 feet on Gunong Berumban, growing often very high.

The shorter, broader, thicker leaves, smaller flowers, entirely glabrous, easily distinguish this pretty plant, which I am pleased to associate with Mr. H. C. Robinson.

177. R. malayanum, *Jack.*

Epiphytic. Gunong Berumban and Telôm. Common at high altitudes all over the Peninsula.

178. Pernettyopsis malayana, *King and Gamble.*

Summit of Gunong Berumban, originally found by Wray on summit of Gunong Batu Puteh (7,000 feet) and by Scortechini.

179. Gaultheria leucocarpa, *Bl.*

Gunong Berumban.

I am rather doubtful as to this identification, as the plant does not entirely agree with King's description, and I have seen no specimens or figures of the plant. It is a plant with long pendulous branches and aromatic foliage.

MYRSINEÆ

180. Mæsa perakensis, *n. sp.*

Small tree, with slender bright red brown branches. Leaves rather distant, elliptic-lanceolate, acuminate, margins crenulate with short teeth in the crenulations, 6 inches long 2 inches wide; nerves rather inconspicuous above, seven pairs, elevated beneath and meeting in loops within the margin. Petiole $\frac{1}{4}$ inch long. Inflorescence usually racemose, occasionally shortly panicled, $\frac{1}{2}$ to nearly 1 inch long, few flowered peduncle, and branches rufous velvety. Flowers minute, very short pedicelled, brown, calyx tube very short, wide, lobes five, ovate, acute, all pubescent. Corolla lobes five, pubescent, narrower and hardly longer than the calyx, tube much shorter than the lobes, stamens shortly protruded, anthers minute, ovary superior. Fruit small, $\frac{1}{10}$ inch long, red.

Telôm Woods.

This is a common plant in all our hill woods of over 2,000 feet and has been sent from the Taiping Hills under the numbers (Ridley, 3103, 5512, 10680, 11451; Curtis, 2090), but none of them are quoted by King or Mez in the "Materials" or the Monograph in the "Pflanzenreich." It seems very distinct from *M. indica*, the leaves being not dentate and the inflorescence red hairy. From *M. impressinervis* it differs in its larger leaves, pubescent raceme, acute petals and shorter tube to the corolla.

181. M. ramentacea, *Wall.*

Batang Padang valley up to 2,000 feet altitude.

182. Embelia ribes var. rugosa.

A form with rather larger leaves than usual and less pubescent inflorescence.

Telôm, near camp.

183. E. coriacea, *Wall.*

On Telôm Ridge and Gunong Berumban.

This plant is not rare in the low country. It is less usual to find it at such an altitude.

184. E. myrtillus, *Kurz.*

Gunong Berumban, occurs on most of our higher hills.

185. Labisia pumila, *Benth.*, var lanceolata.

Woods, Telôm.

186. Labisia longistyla, *King and Gamble.*

Sporadic on Telôm Ridge and Gunong Berumban.

This is described as undershrub, 2 feet tall, in the "Materials." It is seldom so tall as this—in fact, I only know it as a dwarf plant, no bigger than *L. pumila*.

187. Ardisia chrysophyllifolia, *King and Gamble.*

Gunong Berumban. I have seen no authentic specimen of this species, which was collected at Gunong Batu Puteh by Wray. The Myrsineæ of the Wray and Scortechini collection have not yet been distributed, or at least there are none in the Singapore Herbarium.

188. A. colorata, *Roxb.*

A tree on the lower slopes of Gunong Berumban and round Telôm. In fruit. This tree has larger and thinner, more elliptic leaves than usual.

189. A. rosea, *King and Gamble.*

Gunong Berumban. A form with narrower petals, stamens only half as long and blunt, but it varies somewhat according to exposure and altitude. Flowers pink.

190. A. villosa, *Roxb.*

Telôm Woods. Common in the low country.

191. A. theæfolia, *King and Gamble.*

Bukit S'tempat on the lower slopes of Gunong Berumban.

192. A. Maingayi, *King and Gamble.*

A bush or small shrub, not a tree. Flowers pink.

Telôm Woods. I have also met with it in the Sempang Mines at the Semangko Pass in Selangor.

193. A. glanduligera, *n. sp.*

Shrub, stems moderately stout. Leaves alternate, lanceolate to elliptic-lanceolate, longacuminate to acute, base acuminate, coriaceous-chartaceous, glabrous, entire, glands obscure, 6-7 inches long, 2-3 inches wide; petiole stout, $\frac{1}{2}$ inch long; nerves inconspicuous about 10 pairs, meeting in an intra-marginal vein. Inflorescence axillary, not longer than the petioles, on very short peduncles, $\frac{1}{4}$ inch or less long, thick, umbels of three flowers, pedicels $\frac{1}{2}$ inch long in flower, longer in fruit. Flowers pink, $\frac{1}{10}$ inch long, buds globose, bracts narrow, linear. Calyx lobes ovate subacute or obtuse, glabrous, densely gland dotted, slightly overlapping. Petals not seen. Drupe globular, dotted with prominent glands, $\frac{1}{3}$ inch long, bearing at the top the short filiform style.

Telôm. Unfortunately out of flower, but not identifiable with any known species.

SYMPLOCACEÆ.

194. Symplocus pruniflora, *n. sp.*

Tree about 25 feet tall, branches black when dry. Leaves lanceolate, acuminate glabrous, thinly coriaceous, narrowed at the base, but slightly (light green when dry) paler beneath; nerves four to six pairs, slightly elevated beneath, ascending

and meeting in extra-marginal curves, 4 inches long, 1 1/2 inch wide; petiole 1/4 inch long. Inflorescence of two or three racemes in a cluster from the leaf axils, sometimes borne on a short peduncle, 1 inch long, scurfy brown. Flowers very shortly pedicelled. Bracts very small, lanceolate. Bracteoles two. Ovary and calyx 1/4 inch long, scurfy pubescent. Calyx lobes rounded, very small. Corolla white 1/4 inch across, tube very short, lobes rounded, cleft nearly to the base, glabrous. Stamens about 40, equal, obscurely connate at the base, filaments slender, glabrous as long as the corolla lobes. Anthers subglobular. Style very short, quite glabrous. Fruit ovoid, small, green (not ripe).

Telôm, a mile from camp towards Batang Padang. A pretty tree allied to *S. spicata*, Roxb., but with scurfy brown inflorescence and entire leaves.

195. S. Curtisii, *Oliv.*
Telôm.

OLEACEÆ.

196. Jasminum Maingayi, *Clarke.*
Telôm Camp.
Distrib.—Penang, Perak and Borneo.

CONVOLVULACEÆ.

197. Lettsomia peguensis, *Clarke.*
At the 15th mile on the road to Jor from Tapah.

SOLANACEÆ.

198. Solanum Blumei, *Nees.*
Telôm Forest, on banks of streams, abundant in some spots. In most of the hill woods of the Peninsula; also in Java, Sumatra and Borneo.

199. S. torvum, *Sw.*
In Sakai clearings near Telôm Camp.

SCROPHULARINEÆ.

200. Bonnaya veronicæfolia, *Spreng.*
On stones in the river at Telôm.

201. Curanga amara, *Juss.*
Damp spots near the river Telôm.

202. Torenia peduncularis, *Benth.*
On the track towards Jor.

203. T. atropurpurea, *Bell.*, var. bicolor.
A handsome variety, over 1 foot tall and slender. The corolla tube deep violet, the limb creamy white. Capsule 1 inch long. Leaves 2 inches long. Ulu Batang Padang on the track

OROBRANCHACEÆ.

204. Christisonia Scortechinii, *Prain.*

This beautiful white flower with a broad yellow bar on the lip was abundant in the bamboo woods of Ulu Batang Padang, the flowers just appearing above the ground. It appeared to be parasitic on the bamboos.

APOCYNACEÆ.

205. Alyxia Forbesii, *King and Gamble.*

On Telôm Ridge. The fruit is, however, larger than usual, quite $\frac{1}{2}$ inch long. A hill plant in Penang, Perak and Pahang; and found also in Java and Sumatra.

206. A. Scortechinii, *King and Gamble.*

In flower on Gunong Berumban and Telôm Ridge.

ASCLEPIADEÆ.

207. Dischidia coccinea, *Griff.*

Gunong Berumban. Common on all hills at high elevation.

208. D. tubuliflora, *King and Gamble.*

Telôm Ridge.

209. D. hirsuta, *Decne.*

Telôm. Common in the low country.

210. D. monticola, *King and Gamble.*

Gunong Berumban.

211. Pentasacme caudata, *Wall.*

Rocks in the Batang Padang River.

LOGANIACEÆ.

212. Gærtnera Koenigii var. oxyphylla.

On the higher ridges at Telôm and Gunong Berumban. This variety seems to me very distinct from the *G. Koenigii*, of Wight, as figured in the *Icones*, 1315, so much so that I should certainly be inclined to keep it specifically distinct. It is a small shrubby tree with white flowers. King in the "Materials" omits to notice that the corolla inside is thickly white silky.

213. Fagræa oblonga, *King and Gamble.*

A big terrestrial shrub in fruit. Banks of a stream, Telôm.

GESNERACEÆ.

214. Æschynanthus parviflora, *n. sp.*

A tufted epiphyte with slender branches, over 1 foot long. Leaves opposite, fleshy, entire, narrow lanceolate, acuminate, 3 inches long, $\frac{1}{2}$ inch wide; petiole $\frac{1}{8}$ inch long. Flowers

solitary, on slender pedicels, ½ inch long. Calyx tube free to the base, very narrow, linear acuminate, glabrous, ½ inch long. Corolla greenish yellow, barely ½ inch long, tube narrow, cylindric, lobes oblong, rounded, margins ciliate minutely, stamens included, anthers subglobose; capsule narrow, linear, cylindric, acuminate, 4-5 inches long, seed with a tuft of hair at one end and a single hair at the other.

Telôm, near the camp, on trees overhanging the river. This plant is undoubtedly near *Æ. purpurascens* of Java, but is distinct in its smaller narrower entire leaves, and smaller flowers with the corolla hardly as long as the sepals, which are free to the base.

215. Æsch. perakensis, *Ridl.*

Common as an epiphyte, often on very high trees, round Telôm and Gunong Berumban.

216. Æsch. longicalyx, *Ridl.*

A splendid plant. Calyx and corolla of a brilliant red. The capsules are 8 inches long. Epiphytic on Gunong Berumban and also on Gunong Irau, whence Messrs. Kloss and Robinson brought it.

217. Didissandra filicina, *Ridl.*

Extremely abundant at Telôm and up Gunong Berumban, on banks and rocks. The flowers are of a beautiful violet blue, paler inside the tube and nearly white outside and, with its fern-like leaves, a very attractive plant.

218. D. Wrayi, *Ridl.*

Flowers white with longitudinal violet stripes in the tube.

Telôm, on rocks by the stream and at Gunong Irau. Much less common than the preceding and but few in flower.

219. D. longisepala, *n. sp.*

Six inches or more tall, with a hairy stem. Leaves petioled, distinctly elliptic, acute, edges serrate, 5 inches long, 2 inches wide or smaller, above sprinkled with scattered hairs, beneath hairy on midrib and nerves; nerves 14 pairs, fairly conspicuous beneath and less so above; petiole hairy, ¾ inches long. Pedicel of flower slender, hairy, 1 inches long. Sepals linear acuminate, the edges serrate with a hair on each serrative, ½ inch long, ⅛ inch wide. Corolla wide, ½ inches long, gradually dilated upwards, lobes rounded, violet, paler in the tube, stamens four, filaments slender.

Cameron's plateau on the track to Gunong Irau (Kloss). This is allied to *D. Wrayi*, Ridl., but differs in the larger serrate hairy sepals and different colouring.

220. Didymocarpus sulphurea, *Ridl.*

On the top of Gunong Berumban, almost out of flower.

221. D. VENUSTA, *Ridl.*

This remarkable plant was abundant on the upper part of Gunong Berumban at 6,000 feet, but the flowers were nearly all destroyed by some insect. Its tall woody stem and serrate leaves with prominent veins make it a very striking plant and quite unlike any other species. It occurs also at the Semangko Pass.

222. D. HISPIDULA, *Ridl.*

What appears to be a form of this, but was only in bud, was met with in the Telôm Woods. It is abundant on the Taiping Hills.

223. D. (§ HETEROBOEA) LANCEOLATA, *n. sp.*

Stem woody, covered with densely appressed hairs. Leaves lanceolate acuminate, decurrent to the base of the petiole, closely and finely dentate, dark green sprinkled with pale hairs above, beneath thickly hairy on the nerves; young leaves thickly pubescent all over. Peduncles slender, solitary or in pairs, pubescent. Bracts linear, acuminate, $\frac{1}{8}$ inch long, narrow, hairy, pubescent. Sepals lanceolate acute, densely silky hairy, $\frac{1}{8}$ inch long. Corolla glabrous, 1 inch long, tube dilate gradually upwards, white with yellow spot in the mouth. Stamens filaments, filiform, straight. Anthers glabrous. Style and ovary thickly glandular, pubescent. Capsule narrow, cylindric, over 1 inch long, pubescent. Cameron's plateau on the way to Gunong Irau. Messrs. Robinson and Kloss brought a single specimen of this plant, which is certainly allied to *D. fasciata*, Ridl., but there is no white central bar on the leaf, the peduncles are larger, the sepals wider and the corolla shorter and differently coloured.

224. D. CRINITA, *Jack.*

Occurs plentifully from Tapah up to about the 12th mile, but there it seems to stop.

225. D. ALBINUS, *Ridl.*

The type of this species is a plant obtained on Gunong Batu Puteh by Wray, and differs from a plant most abundant on Telôm in its being much less hairy or, more correctly, in possessing much shorter hair. This may be a slightly different local form, or perhaps due to some accident in drying. The Telôm plant was 4 feet or more tall and often branched. The stem olive-fuscous and thickly viscid-hairy. Leaves dark green above, paler beneath, with a purple midrib. The panicles were usually four in the upper axils; peduncles 4 inches long and dichotomously branched. The flowers are 1 inch long and pendulous. Sepals lanceolate purplish. Corolla tube $\frac{3}{4}$ inch long, the upper lobes oblong truncate, lower one longer, the two outer ones oblong,

median ovate, all white with two yellow lines on the disc, edged with violet dots. It is one of the tallest species of the genus and a most attractive and elegant plant. It grew everywhere in the Telôm Valley.

226. D. ALBINELLUS, *n. sp.*

Stems over 1 foot tall, but shorter than those of *D. albinus* Ridl., pubescent hairy. Leaves equal or subequal, ovate or lanceolate, acuminate subobtuse, base connate, 3-4 inches long, 1-2 inches wide, above glabrous, except in young leaves where the midrib is hairy, below hairy on the nerves, midrib and on the edges. Petiole hairy, ½-¼ inch long. Raceme a little longer than the leaves, 3-4 inches long, simple or with one or two short branches, glandular, hairy. Bracts linear, ⅛ inch long. Calyx lobes linear, acuminate, glandular, hairy, ⅛ inch long. Corolla ¼ inch long, the tube broad, the lobes rounded, white with violet stripes. Stamens included. Pistil pubescent. Fruit (unripe) elongate cylindric, acuminate pubescent.

Gunong Berumban at 6,000 feet altitude. This differs from *D. albinus* in its smaller size in all parts and more simple inflorescence and in the colouring of the flowers.

227. D., *sp.*

On the Telôm Ridge behind the camp. A species apparently allied to *D. albomarginata*, but no flowers could be found.

228. PARABŒA PUBIFLORA, *n. sp.*

Stem brown, rough. Leaves lanceolate acuminate obtuse, base decurrent on the petiole in an undulate margin, margins serrate irregularly with blunt serrations, above glabrous, dark green, beneath reddish, paler, the nerves pubescent, nerves about 16 pairs, 4 inches long, 1¼ inch wide, petiole rugose, winged to the base; pedunceles 3-4 inches long, slender, erect, two-flowered pubescent. Bracts broadly lanceolate, persistent, ¼ inch long, puberulous on the edges. Pedicels short pubescent. Calyx lobes free to the base, linear acuminate, pubescent, ¼ inch long. Corolla pubescent outside and in white, tube short, ½ inch long, limb widely rounded as long as the tube; obovate, stamens two short as long as the tube, anthers oblong, yellow, filaments pubescent. Style a little longer pubescent, stigma capitate.

Gunong Irau (Robinson and Kloss). Messrs. Robinson and Kloss brought a single specimen of this curious plant from their expedition to Gunong Irau. The foliage is somewhat like that of *Didymocarpus reinwardtus*. The flowers are very broad at the mouth in proportion to the length of the tube and the shortened stamens with thick pubescent filaments are those of the genus *Parabœa*. It is unusual to find the corolla hairy on both sides as it is in this plant.

229. Rhynchoglossum obliquum, *Bl.*

Ulu Batang Padang at the Second Camp.

230. Monophyllæa Horsfieldi, *R. Br.*

Ulu Batang Padang, abundant at one point on the track. I have never before seen this plant elsewhere except on limestone rocks.

231. Stauranthera grandifolia, *Benth.*

Ulu Batang Padang towards the Pahang boundary.

232. Rhynchotecum parviflorum, *Bl.*

Ulu Batang Padang.

233. Cyrtandromœa megaphylla, *Hemsl.*

A large-spreading bush, almost a small tree. On a Sakai clearing on Gunong Berumban lower slopes. Flowers white.

234. Cyrtandra cupulata, *Ridl.*

In the Batang Padang valley, absent from Telôm.

Very widely spread over the Peninsula.

235. C. dispar, *Dec.*

Ulu Batang Padang between Jor and Telôm.

236. C. grandiflora, *n. sp.*

A large stout plant about 3 feet tall, stem fuscous, glabrous, four angled below. Leaves oblanceolate, acuminate, decurrent on the petiole, glabrous, except when quite young, margins serrate, except on the lower quarter, deep green, purple on the back; nerves about eight pairs, prominent on both surfaces, midrib thick, 8-12 inches long, 3-4 inches across. Bracts cup shaped, $\frac{3}{4}$ inch long, truncate ciliate, on the margins with ovate points. Corolla tube short and stout, no longer than the bract, limb 2 inches across, upper lobe bilobed, with oblong lobes, lower three also oblong, all white, the mouth of the tube yellow outside, all white, silky. Stamens recurved included, ochre yellow. Style short, dilated upwards. Fruit cylindric conic with a short sharp point, 1 inch long, $\frac{1}{4}$ inch through, corky, tesselate, rugose, light brown.

Growing abundantly in masses by the stream near the Telôm Camp and elsewhere in damp spots; nearly out of flower. Remarkable for the very broad corolla and the short utricular bract.

ACANTHACEÆ.

237. Staurogyne setigera, *Kunze.*

Telôm.

238. S. arcuata, *C. B. Clarke.*

Not rare at Telôm, but only one plant found in flower. The corolla dark brown, red on both lobes. It occurs also on the Taiping Hills.

239. S. SUBGLABRA, *Clarke*.

Telôm Woods, common. Clarke gives this as very similar to *S. arcuata* in all essential points, the differences lying in the glabrous sepals and lanceolate leaves, but in life no two species could be more dissimilar. This species is, for the genus, tall with a long-arching raceme of pure white flowers the raceme often 8 inches long, very different from the short more compact racemes, with one or two red flowers open at a time, of *S. arcuata*. The racemes were solitary in all the Telôm plants, but in those of the Taiping Hills the plants is often branched and bears several spikes. It occurs at the top of the Taiping Hills and on Kedah Peak.

240. STROBILANTHES HIRTISEPALUS, *Clarke*.

A much-branched herb, about 2 feet tall, with white flowers. In damp muddy ground in the forest near Telôm Camp, abundant but local. The hairs in my herbarium specimens are rather black than rufous as described in this species.

241. S. RUFO-PAUPER, *Clarke*.

On Telôm Ridge and Gunong Berumban at from 5,000 to 6,000 feet elevation.

242. S. RUFICAULIS, *n. sp.*

Stems ascending from a creeping base, slender, simple or with one or two branches, roughly red hairy, the internodes 2-3 inches long or less, 8 inches to over 12 inches tall. Leaves herbaceous, opposite, subequal, elliptic-lanceolate acuminate base cuneate, margins undulate crenate, 4 inches long, 1½ inch wide, hairy on both sides, especially on the nerves, with scattered but abundant long yellowish hairs. Heads 1 inch long, few flowered with six or eight lanceolate obtuse bracts projecting beyond the flowers densely red hairy at the base, apices less hairy, ½ inch long, ⅛ inch wide.

Corolla campanulate with a narrow tube at the base, limb dilated lobes broad rounded sparingly hairy, ½ inch long and nearly as wide across the mouth, pale blue. Stamens four, anthers subglobose.

Gunong Berumban near the top.

I cannot fit this in with any of Clarke's species belonging to this section, nor have I seen it elsewhere.

243. S. VULPINUS, *n. sp.*

Stems 1 foot or more, branched or simple slender, densely covered with short curled dark brown hairs. Leaves equal broadly lanceolate to rhomboid, acuminate or cuneate at the tip, narrowed at the base, above sprinkled with a few hairs or glabrescent beneath, nearly glabrous, except for a little rough pubescence on the nerves, nerves nine pairs margins undulate or crenulate, 5 inches long, by 2 inches

wide; petiole $\frac{1}{2}$ inch long, shortly roughly hairy like the stem. Heads elongate, one or two together terminal on short or long 1 inch peduncles, 2 to nearly 3 inches long, $\frac{1}{2}$ inch through. Bracts linear or oblong-linear blunt, bases densely rufous hairy, upper ones about $\frac{1}{2}$ inch long. Sepals linear obtuse, $\frac{1}{5}$ inch long, with long red hairs. Corolla $\frac{3}{4}$ inch long, curved, dilated rather suddenly at the lobes, pubescent light, blue. Capsule dilated upwards from a narrow base, $\frac{1}{2}$ inch long. Seeds four.

Telôm and Ulu Batang Padang.

244. S. ALBOSTRIATA, *n. sp.*

A weak herb about 1 foot tall, erect, little branched with short brownish hair, soon glabrescent below. Leaves subequal or often unequal ovate or acuminate, base cuneate, margins crenulate; nerves five to seven pairs, above glabrous, dark green, with white bars along the veins, beneath dark red, with scurfy pubescent veins; petiole 1 inch long, scurfy, hairy. Heads three or four terminal, with one in each axil of the uppermost pair of leaves or only terminal peduncled. Peduncles hairy, $\frac{1}{4}$ to nearly $\frac{1}{2}$ inch long. Calyx, sepals linear, acuminate, hairy. Corolla blue, 1 inch long, tube at base narrow, then suddenly broadened and curved, lobes $\frac{1}{4}$ inch long, rounded: tube hairy, limb glabrous, stamens four.

Abundant at Telôm and conspicuous from its beautifully-marked foliage.

245. S. SCABRIDUS, *n. sp.*

Somewhat robust, stems closely shortly brown hairy, internodes 3 inches long. Leaves very unequal, lanceolate, acuminate, narrowed to the winged petiole, margins crenulate; nerves six pairs, prominent above, texture coriaceo-chartaceous, above glabrous scabrid, beneath smooth paler, midrib closely pubescent, hairy; largest leaves 6 inches long by 2 inches wide, smaller one about half as large. Capitulum terminal, sessile, globose, about 1 inch long. Bracts ovate to orbicular, elliptic, apex rounded, thickly dotted with raphides. Flowers white. Corolla over $1\frac{1}{2}$ inch long, tube narrow at the base, dilated upwards, 1 inch across, lobes rounded, glabrous; stamens four.

Gunong Berumban. I also obtained this plant at the Semangko Pass.

246. S. (§ Nudatæ) PEDICELLATA, *n. sp.*

Leaves ovate acuminate, base cuneate, margins serrate, glabrous, very unequal; nerves inconspicuous on both surfaces, six to seven pairs, boldly curved and meeting in intra-marginal

curves, black above when dry, pale beneath, largest leaf 3 inches long, 2 inches wide; smaller 1½ inch long, petiole ½ inch long. Inflorescence of three heads on slender peduncles, 2½ inches long, with a pair of leaf-like bracts at the base. Flowers several in a head with oblong pubescent obtuse bracts ½ inch long, and several oblong linear bracts at the base of the pedicels. Pedicels short and stout. Sepals linear, obtuse, pubescent and covered with ruptules ½ inch long, connate at the base. Corolla 1½ inch long, white, tube shortly cylindric, then campanulate, lobes rounded, subequal, glabrous outside, with long white hairs on the nerves inside. Stamens four, didynamous and filaments with long white hairs. Anthers ovoid, rounded, two celled, muticous.

Cameron's plateau on the track to Gunong Irat (Messrs. Robinson and Kloss). A single specimen of this plant was brought by Messrs. Robinson and Kloss. To a certain extent it resembles *S. penstemonoides*, Miq., but its pedicelled flowers make it very distinct from any of that group. From Miquel's description it might be *S. pedunculosa* except that the corolla is glabrous outside. This latter species is Javanese.

247. Filetia bracteosa, *C. B. Clarke*.

A large shrub, conspicuous from its white flowers, about 4 feet tall or more, with terminal spikes, 2 inches or so long. Bracts ovate, white. Calyx a little longer, white. Bracteoles two lanceolate, white. Sepals five, lanceolate, free to the base. Corolla tube short and thick, no longer than the calyx; upper lobe of limb broadly ovate, obtuse, slightly retuse, white; lower lip oblong bifid side lobes, linear oblong, a little longer than the central elevated one, which is broad and light yellow, ending in a rounded white tip. The whole corolla is about 1 inch long, stamens four in two pairs, filaments white, anther cells one a little above the other white tinted with fawn colour on the back, which, like the base of the stamens, is ciliate with white hairs. The capsule club shaped, subacute, 1½ inch long, seeds flattened elliptic inæquilateral on very short retinacula.

Clarke's description, or rather diagnosis, is so short that this description taken from living plants may make the plant easier to recognise.

It is very common round Telom. The original plant was collected in Perak by Scortechini, but no locality is recorded.

248. F. Ridleyi, *Clarke*.

Gunong Berumban at 5,000 feet and upwards.

This resembles *F. bracteosa*, but is known with narrower leaves. It occurs on the drier parts of the upland ridges; also on the Semangko Pass.

249. Justicia vasculosa, *Wall.*

Telôm. About 3 feet tall. Flowers pale yellow entirely.

250. J. bracteata, *n. sp.*

A straggling herb, 2 or 3 feet tall, nearly glabrous with slender branches. Leaves opposite, equal, ovate to lanceolate, thin, acuminate or acute, base cuneate, somewhat unequal, midrib on the back pubescent with close hairs; nerves 6 pairs, $4\frac{1}{2}$ inches long, 1-2 inches wide; petiole pubescent, 1 inch long. Cyme nearly sessile, terminal, about 1 inch long. Bracts lanceolate, obtuse, green, $\frac{1}{4}$ inch long. Sepals lanceolate acuminate, obtuse, green, glabrous. Corolla less than $\frac{1}{2}$ inch long, glabrous, white: the upper lobe inside striped with purple; the lower lip with violet. Stamens two, filaments glabrous. Anther cells, one above the other, elliptic oblong brown, both with white appendages, those of the lower cell, twice as long as those of the other, as long or longer than the cell. Capsule glabrous, $\frac{1}{2}$ inch long, club shaped with a long point. Seeds four, flattened, round, pale brown, closely pustulate.

Telôm and Gunong Berumban.

The Berumban form is smaller in leaf and rather more rigid and the bracts appear to have been purple.

251. Leda subcordata, *C. B. Clarke.*

A small, low-growing weedy plant, with pure white flowers, growing in the Batang Padang valley, among bamboos.

252. L. obovata, *C. B. Clarke.*

About 2 feet tall, with a weak slender spike of small flowers. The calyx is brownish in colour with glandular hairs. The corolla glandular hairy on the back; the upper lip dull red with two yellow streaks, the tip inside bright yellow; the lower lip is yellow, streaked on the palate with six red stripes. Stamens two with very unequal red brown anther cells, the filaments yellow with a red streak on the inner face. This is common about Telôm and in the Batang Padang valley from Jor to Telôm in wet spots in the woods, especially by streams.

VERBENACEÆ.

253. Callicarpa longifolia, *Lam.*

In a Sakai clearing at Telôm. Common in the low country.

254. Clerodendron, *sp.*

A large shrub, almost a small tree with deltoid leaves entire and corymbs of flowers several inches across. The flowers were not seen, but the calyx is large with acute lobes, and red.

It is allied apparently to *C. fragrans* and *C. colebrookianum*, Walp.

On Cameron's plateau, in low swampy ground.

LABIATÆ.

255. Scutellaria discolor, *Colebr.*

Abundant at Telôm Camp, by the river bank and in Sakai clearings in sandy spots.

Flowers blue.

Distrib. – India and Java.

256. Gomphostemma oblongum, *Wall.*

Dr. Prain gives this plant from the Andamans and suggests that it may perhaps occur in the Malay Peninsula. What (after careful comparison of description and drawings) appears to me undoubtedly this species is quite common in the Peninsula, far more so than *G. Scortechinii*. It has white flowers and a glabrous style and short teeth to the calyx tube. It was growing in close masses round Sakai clearings and in other parts of the Telôm Woods, but only a few plants in flower. I have also collected it in Johore on Bukit Sega near Batu Pahat (Ridley, 1130), Pahang at Kota Glanggi, Pulau Tawar (No. 2148), Tahan River and on the route to Semangko Pass (No. 8564).

257. G. Curtisii, *Prain.*

Telôm, near a Sakai clearing, and plentiful in a very wet swamp among *Impatiens oxalidioides*.

258. Paraphlomis rugosa, *Prain.*

Damp low-lying ground, Telôm.

APETALÆ.

AMARANTACEÆ.

259. Deeringia celosioides, *Br.*

About the 15th mile from Tapah to Jor.

The form of this plant met with here is the inland one with small flowers and leaves. It is an extremely different-looking plant from the typical sea-shore species, but it seems to be generally considered by botanists as specifically identical.

260. Cyathula prostata, *Bl.*

In Sakai clearings at Telôm.

261. Achyranthes aspera, *L.*

In cleared ground, Telôm.

POLYGONACEÆ.

262. Polygonum chinense, *L.*

Scrambling over grass and bushes at Jor, Telôm and on the lower slopes of Gunong Berumban.

Flowers white or rose-pink.

Distrib. India, Malay islands, China and Japan.

PIPERACEÆ.

263. Zippelia lappacea, *Benn.*
Ulu Batang Padang in dense forests.
Distrib.—Java.

264. Piper muricatum, *B. C.*
Telôm.

265. P. porphyrophyllum, *N. E. Br.*
Batang Padang valley.

266. P. peltatum, *Willd.*
Batang Padang valley.

266*a*. P. magnibaccum, *C. De C.*
Telôm on rotten logs.

266*b*. P. triandrum, *C. De C.*
Telôm.

266*c*. P. Ridleyi, *C. De C.*
Telôm.

266*d*. P. penangense, *C. De C.*
Telôm.

Three more Peppers were found, which I have been unable to identify. The most striking plant was an erect herbaceous plant with a zigzag stem, usually unbranched and very oblique lanceolate leaves, the spikes short and in fruit large coiled in a circle with orange yellow fruits, nearly as big as those of black pepper. It might be the plant intended by Blume under the name of *Piper arcuatum*, but that appears to be a climbing plant.

CHLORANTHACEÆ.

267. Chloranthus brachystachyus, *Bl.*
Forests at Telôm. Common in hill forests.

LAURINEÆ.

This order has not yet been worked up for the "Materials for a Flora of the Malay Peninsula," and the whole collection of *Laurineæ*, belonging to the Herbarium in Singapore, has been sent to Mr. Gamble, who is at work on them, so that it is impossible to fully work up the species collected. There were, however, obtained, the following plants:

268. Actinodaphne sesquipedale, *Hook. fil.*
A small-sized tree in flower at Telôm.

269. Endiandra, *sp.*
In fruit. A big tree, with large coriaceous leaves and elliptic fruit, slightly narrowed towards the base, 3 inches long. Calyx not enlarged in fruit.
Telôm Camp.

270. Alseodaphne (?)

Shrub, with narrow grey leaves.

Gunong Berumban.

271. Litsea myristicæfolia, *Wall.*

A small-leaved form. Telôm Ridge.

And three other *Litseas.*

NEPENTHACEÆ.

Nepenthes were remarkably scarce all through the region, though four species occurred.

272. Nepenthes macfarlanei, *Hook. fil.*

On Gunong Berumban. This plant has apparently only been recorded from Gunong Bubu, where all collectors have obtained it. It occurs also on the hills above the Semangko Pass.

273. N. sanguinea, *Lindl.*

Telôm.

274. N. gracillima, *Ridl.*

Telôm, also occurs on Gunong Tahan.

275. N. ramispina, *n. sp.*

Stem climbing nearly terete, pubescent above, woody. Leaves elliptic lanceolate amplexicaul not decurrent, ending in a cirrhus, coriaceous, glabrous, except for the midrib on both sides, which is pubescent; nerves invisible, 3-4 inches long, $\frac{1}{2}$-$\frac{3}{4}$ inch wide; cirrhus 2-8 inches long, pubescent. Pitchers (ascidia) cylindric, narrowed at the base and beak 6-8 inches long, 1 inch through, pubescent outside, wings low keel like, usually bearing bristles, $\frac{1}{4}$ inch long or less, sometimes nude. Peristome very narrow with close set ridges, running up to the narrow neck. Lid (operculum) orbicular, cordate, $1\frac{1}{4}$ inch across, a little wider than long, glabrous, glands circular scattered, not very conspicuous. Spur of three or four bifurcate processes pubescent, $\frac{1}{4}$ inch long. Raceme slender, unbranched, 6 inches long, rachis pubescent. Bracts linear subulate, $\frac{1}{10}$ inch, ciliate hairy. Flowers solitary on slender pubescent pedicels $\frac{1}{2}$ inch long. Sepals four, obovate obtuse, $\frac{1}{4}$ inch long, back pubescent edged with rufous hairs, thickly covered with elliptic glands above. Staminal column about as long, red pubescent. Anthers 12, glabrous. Female raceme shorter. Capsule $\frac{1}{2}$ inch long, fusiform, truncate, pubescent. Telôm Ridge, also on the top of the Semangko Hill, Scortechini (No. 1264 of my collection). Remarkable for the branched spines on the back of the neck between the operculum and top like those of *N. tentaculata.*

BALANOPHORACEÆ.

These curious plants were more abundant here than I have ever previously seen in the Peninsula, not only in numbers of specimens but in species.

276. Balanophora gigantea, *Wall.*

Not common. A plant in the Telôm Valley and one in the Batang Padang valleys. The tuberous rhizome, about 6 inches through, was dark orange colour. Bracts ovate subcoriaceous, dark red. The spike of male flowers 3 inches long. Flowers scattered on short white stalks. The petals four, reflexed oblong obtuse, whitish with dark red tips. Anthers numerous on a white column.

277. B. Forbesii, *Faw.*

The commonest species, abundant all through the Telôm Forests and into Ulu Batang Padang. Bright red.

278. B. multibrachiata, *Faw.*

Less common. Telôm Forests and brought by Messrs. Robinson and Kloss from the further woods towards Gunong Irau.

The brilliant scarlet branches of the rhizome of this handsome species resemble a scarlet coral.

279. B. polyandra, *Griff.*

Tuber rather large, about as big as the fist, deeply buried, and branching stems, only males seen, 4-8 inches tall, cylindric, slender, dirty yellowish with white anthers.

This appears to be parasitic on a large woody liane.

It is not rare in the Telôm Woods.

PROTEACEÆ.

280. Helicia, *sp.*

At Telôm, in fruit. This is a common species in the Malay Peninsula, but is not to be found in the "Flora of British India." It resembles *H. petiolata*, but has entire and much thinner leaves with longer petioles.

THYMELEACEÆ.

281. Daphne involucrata, *Wall.*

A shrub, with long-stalked white flowers, very pretty.

Ulu Batang Padang.

Distrib.—Himalayas.

282. Wikstræmia Candolleana, *Meissn.*, "*Chandan.*"

On Gunong Berumban. A form with narrow lanceolate acute leaves on Bukit S'tempat, one of the lower ridges of the same mountain.

LORANTHACEÆ.

283. Loranthus formosus, *Bl.*

Telôm; only fallen flowers could be obtained, as it grew on very lofty trees.

284. L. ferrugineus, *Roxb.* (?)

In fruit. The foliage exactly resembling that of *L. ferrugineus*. The fruit elliptic in outline, ferruginous, tomentose, ½ inch long. On trees over the river, Telôm.

EUPHORBIACEÆ.

285. Phyllanthus muscosus, *n. sp.*

Large shrub, branches slender brown; young parts red scurfy. Leaves alternate, chartaceous elliptic, subacute to acuminate, base rounded, inæquilateral, glabrous, except the midrib on the back, which is scurfy, 2-3 inches long, 1 inch wide; nerves inconspicuous above, about six pairs, ascending directly; petiole scurfy, $\frac{1}{12}$ inch long. Male flowers borne on axillary panicles, $\frac{1}{4}$ inch long or less, of three to five short branches covered with persistent rusty-brown bracts ovate. Pedicel slender, $\frac{1}{10}$ inch long. Perianth lobes four, obtriangular, lacerate red disc of four hemispheric lobes. Stamens two, anthers reniform sessile. Female flowers in upper axils solitary or two together. Bracts linear. Fruit tricoccous, capsule on a long slender peduncle, 2 inches long, dark brown covered all over with short papillæ, $\frac{1}{2}$ inch long. Seeds reniform with a convex back and sharp inner angle dark red brown shining, $\frac{1}{4}$ inch long, finely transversely lined.

Gunong Berumban. This is allied to *Ph. gomphocarpus*, but differs in the bracteate panicle of the male flowers, which resembles tufts of brown dry moss.

286. Breynia angustifolia, *Hook. fil.*

A small tree. Fruit red with a very large showy calyx. On Batang Padang.

287. Baccaurea motleyana, *Hook. fil.*

A tree in the Telôm Forests, only seems to differ from the well-known cultivated "Rambai" in its leaves, being narrowed at the base, and the male flowers borne on shorter pedicels. I have never seen the "Rambai" tree wild anywhere else.

288. B., *sp.*

Telôm. In fruit. This much resembles *B. latifolia*, but the leaves, which dry black, are glabrous and shining on both sides and nearly sessile. The fruit spikes are nearly 1 foot long.

289. Claoxylon longifolium, *Muell.*

On Gunong Berumban.

290. Alchornea discolor, *Hook. fil.*
Telôm on the further side of the river. Small tree with red leaves.

291. Homalanthus populifolius, *Gray.*
Common round Telôm Camp.

292. Macaranga triloba, *Muell.*
Telôm. This common low country tree ascends to about 4,000 feet altitude. Its bark was much in request for tying loads

293. Mallotus macrostachyus. *Muell.*
Telôm near the river.

URTICACEÆ.

294. Ficus pomifera, *Wall.*
In damp low-lying ground by the Telôm River.
Figs very large dull green blotched.

295. F. rostrata, *Lam.*
In forests, Telôm. Figs orange.

296. F. lepicarpa, *Bl.*
In forest at Telôm.

297. F. chartacea var. torulosa.
On Gunong Berumban.

298. F. indica var. gelderi.
On Gunong Berumban.

299. F. hirta, *Vahl.*
Common round the camps, Telôm.

300. F. alba, *Reinwdt.*
Common by the camp at Telôm.
Leaves much larger than usual and upper part of stem hairy.

301. F. pyriformis, *Hook. fil.*
A little shrublet on rocks at a cascade at the 13th mile from Tapah on the Jor route, growing well in the splash of the water. Figs purple.

302. F. variolosa, *Lindl.*
A bush with purplish figs. Common on Gunong Berumban.

303. F. diversifolia, *Bl.*
On Gunong Berumban.

304. Hullettia dumosa, *King.*
A tree of some size with large, deep green, coriaceous, shining leaves. The inflorescence is a decurved fleshy circular disc on

an obconic base, yellowish green, from which project 10 or more four-celled anthers. The disc is about ½ inch across and very fragrant.

Telôm in dense forest.

305. Pellionia javanica, *Bl.*

Telôm in low damp places by the river.

306. Elatostemma macrophyllum, *Brngn.*

Telôm.

307. E. lineolatum, *Wt.*

Damp spots, Telôm.

308. E. sessile, *Forst.*

Rocks in the streams, Telôm.

309. E. acuminatum, *Brngn.*

Telôm.

310. Procris frutescens, *Bl.*

Not rare, Telôm.

311. Pouzolzia bennettiana, *Wt.*

In grassy places near the camp at Telôm. New to the Peninsula.

312. P. viminea, *Wedd.*

Forests, Telôm.

313. Boehmeria sidæfolia, *Wedd.*

Telôm.

Distrib.— India and Java.

CUPULIFERÆ.

314. Quercus pulchra, *King.*

A tree overhanging the Telôm River. Only recorded from Borneo, Sarawak, but the plant seems identical with the plant figured by King.

315. Q. omalkos, *Korth.*

Fruits gnawed by squirrels were picked up in Telôm.

316. Castanopsis argentea, *A. D. C.*

On the first ridge between Ulu Batang Padang and Telôm and at Telôm Camp. Quite a small tree for a *Castanopsis*. New record for the Peninsula. As it has been met with previously in Tenasserim and Burmah, and also in the Malay islands, Dr. King in the "Annals of the Calcutta Botanic Gardens" expressed an opinion that it would also be found on the central range of the Peninsula, which prophecy has thus been found correct.

GNETACEÆ.

317. Gnetum brunonianum, *Griff.*

A small shrub. Common on many hills of the Peninsula. On a dry ridge leading from Telôm to the Batang Padang valley.

318. G. latifolium, *Bl.*

A big climber in flower and fruit on a large tree at Telôm Camp, not previously recorded from the Peninsula.

CONIFERÆ.

319. Podocarpus cupressina, *Br.*

Forests in Telôm Valley. Some large-sized trees and many seedlings seen.

320. Dacrydium elatum, *Wall.*

Some very big trees on the Telôm Ridge.

MONOCOTYLEDONS.

ORCHIDEÆ.

Although there were very many orchids growing about Telôm, by far the greater number were out of flower, so that this list does not give any idea of what might be obtained earlier in the year.

321. Oberonia porphyrochila, *Ridl.*

Apparently this species, originally obtained from Bujang Malacca, but it was in fruit only here.

322. O. flava, *n. sp.*

Stem short, 1 inch long, flexuous. Leaves narrow, linear, falcate acuminate, 2 inches long, $\frac{1}{10}$ inch thick; scape slender, 6 inches long, quite glabrous, the lower third nude except for a few linear acuminate bracts, spike rather dense, flowers minute yellow. Bracts narrowly lanceolate, acuminate, entire, as long as the ovary sepals ovate entire, obtuse, reflexed, shorter than the ovary. Petals narrower lanceolate entire, lips three lobed, lateral lobes short broad ovate blunt, middle much longer oblong, ending in two short acute straight slightly divaricate lobes.

Telôm Forests.

Allied to *O. gracilis*, Hook. fil., and *O. caudata*, King, but with longer more distinct lobes to the lip than the first, but not caudate acuminate like the second.

323. Liparis elegans, *Lindl.*

Common on dry banks, Telôm.

324. L. comosa, *Ridl.*

Common on trees at Telôm. Previously only known from the Taiping Hills.

325. L. (§ Mollifoliæ), *sp.*

Common in damp spots at Telôm, but only in fruit

326. Microstylis acutangula, *Hook. fil.*

In fruit, Telôm.

327. Platyclinis linearifolia, *Ridl.*

Gunong Berumban on the top 6,500 feet. Occurs on Mt Ophir and several of the Perak Hills at high altitudes. Flowers pale green, the keels on the lip brown.

328. Dendrobium longipes, *Hook. fil.*

On the top of Gunong Berumban in flower. Sepals and petals white rose tinted. Lip white, lobes streaked brown, tips yellow, midlobe with an orange yellow blotch and white tip, column white.

329. D. (§ Pedilonum) clarissimum, *n. sp.*

Stems about 1 foot long or more, flexuous, ¼ inch through, slightly flattened. Leaves thin, lanceolate, acute, 2-4 inches long, ½ inch through, base rounded, oblique. Raceme subterminal, of about four or five flowers on a rachis, 2 inches long. Bracts very small, ovate, acute. Pedicels slender, 1½ inch long. Flowers 1 inch across, white. Sepals ovate, acute, broad. Petals obovate, obtuse, larger, with a rounded tip slightly tinted with pink. Mentum 1 inch long, cylindric, then dilated, ending in a short point. Lip base linear, blade quadrate, finely fimbriate on the margin entire. Stelidia of the column short rounded obscure orange, anther ovate, blunt.

Telôm. A single plant in flower near the cascade and one or two more seen nearer the camp.

A very pretty species near *D. hymenopterum*, Hook. fil., with broader leaves and a different mentum and lip.

330. Bulbophyllum (§ Sestochilus) polystictum, *n. sp.*

A long-creeping rhizome, rather stout pseudobulbs distant, cylindric, 3 inches long. Leaves coriaceous elliptic oblong, petiolate obtuse at the tip and gradually narrowed to the petiole, 8-12 inches long, 2½ inches wide. Scape one flowered, 4-6 inches long, with three or four oblong cuspidate sheaths at the base. Flower large. Upper sepal, 3 inches long, ¾ inch wide at the base, lanceolate acuminate, the back yellow, thickly spotted with red, passing into dull maroon red on the edges, in front pale ochreous yellow, lower sepals three fourths the length of the upper one, lanceolate acuminate, 1 inch wide at the base, connate with the column foot, outside greenish, spotted with blackish red at the tip, the base tinted with red, inner face reddish punctate black petals Lip

ovate, cordate with a deep notch at the base and rounded lobes open, acuminate, fleshy, curved, sides elevated, upper surface pinkish with an orange spot in the notch, under surface pinkish, thickly spotted with black purple at the tip. Column foot long, curved, yellow with red spots, stelidia obscure, hardly distinguishable, orange. Anther orange.

Telôm on the track to Gunong Berumban, climbing up a tree trunk. A handsome species, perhaps as near *B. Lobbii*, Lindl., as any, but with very different distant pseudobulbs.

331. B. (§ Monantha parva) tinea, *n. sp.*

Rhizome very slender, filiform, pseudobulbs oblong, prostrate, with the tip ascending, distant, $\frac{1}{8}$ inch long and as far apart. Leaves narrow, oblanceolate, spathulate, dilating from the base upwards, obtuse, 1 inch long, $\frac{1}{8}$ inch wide. Scape filiform, 3 inches long, with a small lanceolate, appressed bract. Flower solitary, $\frac{1}{2}$ inch across, upper sepal lanceolate, acute, $\frac{1}{4}$ inch long, lower ones semi-ovate, obtuse, broader, all yellow orange streaked with darker orange. Petals very small, linear, oblong, yellowish with a pale green midrib. Lip fleshy, blunt, longer than the petals straight, oblong, pustular, dull reddish purple. Stelidia long, subulate, longer than the column.

On trees on Gunong Berumban at 6,000 feet altitude.

This is allied to *B. catenarium*, Ridl., differing in its larger leaves and pseudobulbs and broad-rounded sepals, which suggest the appearance of a small orange-coloured moth, whence the specific name.

332. Bulbophyllum (§ Hirtula) trichoglottis, *n. sp.*

Rhizome short with crowded pseudobulbs, $\frac{1}{2}$ inch long, cylindric, covered with fibrils. Leaf elliptic, narrowed to the base, apex obtuse, coriaceous, 6 inches long, $2\frac{1}{2}$ inches wide, hardly petioled; scape very slender, $2\frac{1}{2}$ inches long, pale green, with one or two lanceolate, acute, sheathing leaves. Flowers six, crowded at the tip subcapitate, small. Bracts ovate, acute, very small, green. Pedicel and ovary, $\frac{1}{10}$ inch long, pink. Sepals equal and subsimilar lanceolate, acute, upper one gibbous on the back, $\frac{1}{6}$ inch long, margins of upper one ciliate, yellowish reticulated with dark maroon purple, lower ones more ovate connate at base. Petals rather more than half as long, linear oblong subacute yellowish edges and lined with maroon purple, margins long ciliate, lip shorter than the sepals fleshy flattened, tongue-shaped obtuse, thick, pustular base of limb retuse with two acute points deep crimson, paler in the centre edge, ciliate, claw thick channelled, pale greenish yellow. Column stout, stelidia green, of

two broad short acute lobes. Anther flat broad oblong, margin ciliate. Telôm, brought home alive and flowered in the Botanic Gardens, February, 1909.

This species belongs to the group of *Hirtula* and resembles *B. hirtulum*, Ridl., and *B. limbatum*, Lindl., in many points. The flowers indeed are very like those of *B. hirtulum*, but it differs from both of these in its much larger leaves, and the flowers crowded together into a head. The size of the inflorescence is absurdly small for the size of the foliage.

333. B. CONIFERUM, *n. sp.*

Rhizome short and thick, pseudobulbs $\frac{1}{2}$ inch long, crowded together cylindric, covered with fibrils. Leaves very coriaceous, thick, spathulate narrowed to a channelled petiole, rounded at the tip, 6 inches long, and 1 $\frac{1}{2}$-1 $\frac{1}{2}$ inch in the widest part, light-shining green. Scape purple, 6 inches long, $\frac{1}{12}$ inch thick, with one or two lanceolate acuminate sheathing bracts, $\frac{1}{4}$ inch long. Flowers very densely set in a cone-shaped spike, very small. Bracts ovate acute, much longer than the ovary, cuspidate purple. Ovary extremely small, sunk in the thickened rachis. Upper sepal lanceolate green striped and tipped with fuscous purple, $\frac{1}{20}$ inch long, lower pair connate into an oval organ obtuse, as long, green edged with purple, all minutely puberulous. Petals linear lanceolate, green, pubescent, half as long as the sepals. Lip shorter, ovate, flat fleshy base, truncate retuse, apex rounded, light green. Column very small, stelidia ovate, obtuse, entire; anther broad transversely oblong, rounded, grooved between the cells, margin truncate emarginate, nearly as large as the lip and quite as broad and bigger than the column.

Telôm, on trees. Flowered in the Botanic Gardens, February, 1909. This species approaches *B. triste*, Rchb. fil., and *B. gracilipes*, King and Pantling, but is quite different in foliage from either, and the flowers are smaller and form a dense head.

334. B. GIGAS, *Ridl.*

In fruit. Telôm. Occurs also on the Taiping Hills.

335. B. CAPITATUM, *Lindl.*

Gunong Berumban. Usually found at most high altitudes in the Peninsula.

336. B. (§ RACEMOSA) ARACHNITES, *n. sp.*

Rhizome woody. Pseudobulbs close, very small cylindric truncate, $\frac{1}{3}$ inch long. Leaf coriaceous lanceolate acuminate latterly gradually narrowed to the petiole, 6 inches long, 1 inch wide, petiole 2 inches long. Raceme, 8 inches long, erect. Flowers about 12. Bracts small, ovate, pure white like the ovary

Sepals ovate, lanceolate filiform caudate, base rounded gibbous, white nearly 2 inches long, the tail being $1\frac{3}{4}$ inch long. Petals oblong truncate orange, shorter than the broad part of the sepals. Lip oblong, obtuse, flat, rather thin yellow. Stelidia of column erect, short setiform.

Telôm on a fallen tree by the first stream to the East.

The finest species of this group I have seen, the white sepals with their long thread-like tails give it a very pretty appearance.

337. Eria bidens, *Ridley.*

On trees on Telôm Ridge. Fruit only.

338. E. longifolia, *Hook. fil.*

Gunong Berumban and other high ridges near Telôm.

339. E. major, *Ridl.*

On Gunong Berumban.

340. E. tenuiflora, *Ridl.*

On trees at Telôm.

341. E. ferox, *Bl.*

Gunong Irau.

342. E. teretifolia, *Griff.*

Common on Telôm Ridge, Gunong Berumban, etc. Occurs on all our higher hills.

343. E. (§ Bractescentes) carnea, *n. sp.*

Stems tufted cylindric, 8 inches tall, $\frac{1}{4}$ inch through, with long wiry roots. Leaves elliptic lanceolate acuminate acute, narrowed to the base, 10 nerved, subpetioled, 6 inches long, 1 inch wide. Racemes two in the uppermost axils lax, about 12 flowered, slender, 3 inches long, subtended at the base by a lanceolate acuminate papery bract, $1\frac{1}{2}$ inch long. Bracts persistent oblong lanceolate, thin, pale, $\frac{1}{3}$ inch long. Pedicel $\frac{1}{2}$ inch long, slender, pubescent. Upper sepal narrow lanceolate linear acute curved, $\frac{1}{5}$ inch long, laterals broad at the base, falcate acuminate, mentum scrotiform rounded. Petals narrower than the upper sepal, linear curved. Lip three lobed, lateral lobes broad, ovate, falcate, large, minutely papillose, midlobe ovate orbicular acute with a very short narrow base, prominently marked with radiating veins, two short-raised ridges run on the base of the side lobes, thickest at the termination, and three lower undulate ones run along the disc to the midlobe. Column short and broad as long as its foot. Anther oblong.

Telôm, on trees overhanging the river. The flowers are small, dull flesh colour with some yellow on the lip. It is allied to *E. recurvata*, Hook. fil.

344. Phreatia crassifolia, *n. sp.*

Stems very short, ½ inch long, six-leaved. Leaves fleshy linear curved, 1½ inch long, $\frac{1}{10}$ inch across. Spikes longer from the upper axils, 1½ inch long, base with one or two lanceolate acuminate sheaths, the biggest ½ inch long, flowers densely crowded, numerous, white. Bracts pale lanceolate acuminate, longer than the flowers. Ovary short, thick papillose shortly stalked. Sepals ovate obtuse, mentum short scrotiform. Petals lanceolate obtuse, nearly as broad as the sepals. Lip ovate subacute, cordate on the free narrow column foot. Column very short, margins of clinandrium elevated. Anther broad, distinctly two celled.

Near Telôm (Mr. H. C. Robinson) also on Taiping Hills.

This small species differs noticeably in the close-set fleshy subterete curved leaves, much shorter and compacter than those of *P. minutiflora*, Lindl., of which I previously considered it a form. There is, however, besides this a difference in the flowers: the lip, instead of being absolutely adnate by its base to the column base, is borne on a short foot and is more widely ovate at the base.

345. Agrostophyllum majus, *Hook. fil.*

On trees, Telôm Woods, a large form.

346. Ceratostylis gracilis, *Bl.*

Telôm Woods.

347. Collabium nebulosum, *Bl.*

Sporadic in damp woods at Telôm. In flower by the cascade.

348. Nephelaphyllum pulchrum, *Bl.*

Telôm.

349. N. tenuiflorum, *Bl.*

On Gunong Berumbun. Petals and sepals olive green, lip white with violet edge and streaks in centre.

350. Spathoglottis aurea, *Lindl.*

Telôm.

351. Calanthe veratrifolia, *R. Br.*

One of the various forms with a lax raceme.

Woods towards Cameron's plateau, below Gunong Berumbun, just coming into flower.

352. C. ovata, *n. sp.*

Leaves several, obovate to lanceolate cuspidate narrowed to the base, plicate, five ribbed, glabrous, 8 inches long, 3 inches wide; petiole 6 inches long. Scape 30 inches tall with numerous flowers, slender, raceme 4 inches long. Bracts ovate shortly cuspidate, pubescent, persistent, ¼ inch long; lobed

ones lanceolate, acuminate, cuspidate. Flowers about 25, smaller than those of *C. veratrifolia*, on slender pedicels, $\frac{1}{2}$ inch long. Sepals and petals white, ovate, cuspidate. Petals narrower, subspathulate, $\frac{1}{2}$ inch long. Lip short, a little longer than the sepals, four lobed; lateral lobes erect, oblong, rounded, midlobe obovate, bilobed; lobes short, broad, rounded edges, fimbriate. Callus horse-shoe shaped, yellow. Column violet. Fruit elliptic, 1 inch long; spur filiform, $\frac{1}{2}$ inch long.

Telôm, banks of the stream near the camp.

Allied to *C. veratrifolia*, but with more distinctly-petioled leaves, smaller flowers and shorter, broader lip.

353. C. ANGUSTIFOLIA, *Lindl.*

Plentiful on Gunong Berumban. Flowers pure white, except the two horn-like calli and base of the obovate midlobe yellow. The spur as long as the short ovary and pedicel.

354. C. ANGUSTIFOLIA var. FLAVA.

With the pure white form of *C. angustifolia*, Lindl., on Gunong Berumban was found a plant, which differed conspicuously in its flowers being of an ochre yellow. The leaves are somewhat broader, but not as broad as in *C. albolutea*, Ridl., and the petals and sepals are short and blunter as in *C. angustifolia*, the lip is rather more deeply cleft. Possibly it is a natural hybrid.

355. C. ALBOLUTEA, *Ridl.*

Gunong Berumban.

356. C. MONOPHYLLA, *n. sp.*

Leaf solitary, ovate, acute, slightly narrowed at the base, five nerved, 6-7 inches long, 3 inches wide, glabrous; petiole slender, 3-6 inches long. Scape lateral erect, 7-9 inches long, glabrous, bearing four or five nodding flowers at the top. Bracts lanceolate acuminate, $\frac{1}{8}$ inch long. Ovary and pedicel nearly 1 inch long, sepals and petals ovate, cuspidate, $\frac{1}{2}$ inch long, rose-pink. Lip trilobed, lateral lobes short, oblong, acute, midlobe narrow, spathulate bilobed with rounded lobes, spur very short and straight, not dilate at the tip. Fruit elliptic, narrowed at the base, 1 inch long, pendent.

Telôm by the track near the camp. Only two plants seen.

It has the general appearance of a *Geodorum* in its small pink, never expanded flowers, and is apparently self-fertilized.

357. DILOCHIA CANTLEYI, *Ridl.*

Summit of Gunong Berumban. In fruit. It also occurs on Gunong Bubu and Gunong Inas.

358. Arundina speciosa, *Bl.*

Said to be common in this district. I did not find it, but Messrs. Robinson and Kloss found it between Telom and Kuala Lipis.

359. Cœlogyne speciosa, *Lindl.*

On trees near Cameron's plateau and Gunong Irau. In flower.

360. C. perakensis, *Hook. fil.*, C. sulphurea, *Ridl. Materials*, I. p. 132, not *Rchb. fil.*

Gunong Irau (Messrs. Robinson and Kloss).

Doubtless Hooker is right in separating the Malay Peninsula plant from the Javanese *C. sulphurea*.

361. C. carnea, *Hook. fil.*

Gunong Irau.

Several other *Cœlogynes* were seen, but not in flower. One appeared to be *C. asperata*, Lindl.

362. Pholidota parviflora, *Hook. fil.*

On a fallen tree at Telôm.

363. Eulophia macrorrhiza, *Bl.*

On the track to Jor, Ulu Batang Padang. This curious leafless and apparently saprophytic species is almost entirely of a dull reddish colour. The flowers dull red, the tip pink with a whitish bar in the centre, and a purple base, the spur white. It appears to be exactly Blume's plant.

364. Dipodium pictum, *Rchb. fil.*

On trees between the Sakai clearings and the river and elsewhere at Telôm in full flower. A very light-coloured form with few and small white spots. This plant seems equally at home in the damp forests of the plains and on the dry mountain ridges. I have found it in the Semangko Pass at a height of 4,000 feet, as well as in the low forests of Singapore.

365. Grammatophyllum speciosum, *Bl.*

A small plant seen on a fallen log across the river at Telom.

366. Renanthera matutina, *Lindl.*

On trees overhanging the Telom River. Common, but only a few in flower.

367. Saccolabium minutiflorum, *n. sp.*

Stem, 3-4 inches long. Leaves linear, fleshy, curved, 2 inches long, $\frac{1}{10}$ inch wide; sheaths, $\frac{1}{2}$ inch long, ribbed. Inflorescence panicled, very slender, 6 inches long; peduncle 3 inches long; branches four, very slender, 3 inches long, flexuose nearly to

the base. Bracts persistent lanceolate, acuminate, $\frac{1}{30}$ inch long. Flowers numerous, minute, white. Upper sepal lanceolate, laterals broader, ovate, cuspidate, keeled. Petals as long, linear oblong, truncate narrower. Lip, lateral lobes indistinct, rounded, hemispheric, erect, midlobe fleshy, base narrow, apex dilated, elliptic, ovate, obtuse in the centre, a rounded callus, beneath a larger conic thickening, spur elliptic, thick, obtuse, shorter than the ovary, as long as the lip, pendent not partitioned. Column short; anther hemispheric, grooved above, beak triangular up-curved. Pollinia pedicel linear, disc triangular.

Telôm, on a fallen tree by the track.

Allied to *S. perpusillum*, Hook. fil., but differing in its branched inflorescence, glabrous flowers and the curious form of the lip.

368. Thrixspermum, *sp.*, near lilacinum, *Rchb. fil.*

This plant, which was abundant on dry banks at Telôm, bore no trace of flowers. I have also met with it on the Taiping Hills, near the top, but equally flowerless. It has the habit of *T. lilacinum*, Rchb. fil., but is much more slender and weaker with smaller leaves.

369. Sarcochilus acuminatus, *n. sp.*

Stem $\frac{1}{2}$-2 inches long. Leaves few, elliptic, narrow inæquilateral at base, apex obtuse, 3-4$\frac{1}{2}$ inches long, $\frac{3}{4}$-1 inch wide. Raceme rather stout, 3 inches long, hardly thickened above the pedicel. Bracts persistent, small, ovate, acute. Sepals and petals long lanceolate, acuminate, 1 inch long, yellow. Lip three lobed, side lobes skin, midlobe short, straight, white spotted with purple on the base. Spur long. Column yellow.

Telôm, on a tree by the river. Remarkable for its long narrow petals and sepals.

370. Podochilus sciuroides, *Rchb. fil.*

Completely covering dry banks like moss at Telôm. Very abundant at some spots.

371. P. unciferus, *Hook. fil.*

On trees, Telôm.

372. P. cornuta, *Schlechter.*

Gunong Berumban.

373. P. lancifolia, *Schlechter.*

On trees at Telôm and near Cameron's plateau.

374. P. hasselti, *Schlechter.*

On trees by the river, Telôm. Also occurs in the Tahan Valley in Pahang and Java.

375. Galeola javanica, *Benth.*

A fine clump of this plant, exactly resembling Blume's figure in Rumphia, t. 69, was found by the plant collector in the Batang Padang valley on the return journey. It bore both flowers and fruit. This is a fine addition to the flora. It is a native of Java, but a drawing of the plant from Assam by Masters and specimens from Ceylon collected by Thwaites show its wider distribution.

376. Tropidia squamata, *Bl.*

On drier ridges at Telôm and Gunong Berumbun.

377. Aphyllorchis pallida, *Bl.*

Lower slopes of Gunong Berumbun.

378. Lecanorchis malaccensis, *Ridl.*

Telôm Woods.

379. Anæctochilus Reinwardtii, *Bl.*

Telôm, not plentiful.

380. Zeuxine biloba, *n. sp.*

Stem below the leaves succulent, 6 inches tall, with seven or eight internodes. Leaves ovate, lanceolate, petioled, acute, base rounded, 2½-3 inches long, ¾-1 inch wide, with numerous nerves; petiole ½-¾ inch long, slender, sheaths amplexate, cylindric, with an acuminate, ovate point, ending in the petiole. Scape 8 inches long, pubescent, basal 6 inches naked except for some three sheaths with acuminate tips, ¼ inch more or less. Raceme lax, about 20 flowered, pubescent. Bracts lanceolate acuminate. Upper sepal lanceolate oblong, thin, white at tip, red spotted at the base, laterals oblong, obtuse, larger, red hairy, ¼ inch long. Petals thin, pale, linear, obtuse, forming a galea with the dorsal sepal and little smaller than it. Lip base saccate, narrowing forwards to the claw of the midlobe, which is short channelled, with a pair of triangular lobes, very small, on the margin. Midlobe of two large, white, obovate, rounded lobes at right angles to the line of the lip. Whole lip ¼ inch long and as long across the lobes, calli in the sac of two low short crenulate ridges. Column short, with two low ridges in front. Anther cap long and narrow, lanceolate acuminate, three-fourths the length of the upper sepal. Pollinia large, club shaped, with a large linear oblong disc. Rostellar arms linear oblong.

Telôm, on the ridge above the Batang Padang valley.

381. Hetæria pauciflora, *n. sp.*

Stem below the leaves, 5 inches long, internodes ½ inch long. Leaves narrow, lanceate acuminate, hardly narrowed at the

base, 2 inches long, $\frac{2}{5}$ inch wide; petiole $\frac{1}{10}$ inch long: sheaths $\frac{1}{4}$ inch or less, narrowed upwards to the petiole, five ribbed. Peduncle with raceme $3\frac{1}{2}$ inches long, slender below, $2\frac{1}{2}$ inches, nude except for two acuminate sheaths, raceme 1 inch long, six flowered. Rachis pubescent. Bracts lanceolate acuminate, enwrapping the ovary and as long, $\frac{1}{10}$ inch long, glabrous, ovary pubescent. Flowers $\frac{1}{10}$ inch long. Sepals ovate, obtuse, glabrous, red, dotted with white spots (raphides?). Petals white, linear, much narrower. Lip shorter than the sepals, saccate, ovate (when expanded), with the tip rolled up into a tube; calli, two semi-ovate ridges at the base and two fleshy, short, central keels. Column broad and short. Anther large, ovate, acuminate. Pollinia pyriform, elongate, with a large conspicuous, elliptic, thick, fuscous disc. Stigma deep and wide, with long-projecting rounded walls. Rostellum broad, with two distinct subulate points and retuse between. Telôm. Only a single specimen. In the form of the lip perhaps this resembles *H. cristata*, Bl., as much as any. The pollen masses with the large thick disc and the large stigma are unusual.

382. H. ELATA, *Hook. fil.*

I obtained this on banks by the track up Gunong Berumban, near the top, and, having compared it with the figure of the type in *Icones Plantarum*, 2191, have no doubt that it is the plant intended, which was described from plants collected by Scortechini and by Wray in the Batang Padang valley. The plant I described, however, from Mt. Ophir seems to be distinct. Sir Joseph Hooker had some difficulty in making out the structure of the lip and column. My specimens, however, were good enough to make it out clearly. His description in the "Flora of British India" is so short that it is, perhaps as well, to give a more full one.

Stem very short below the leaves, about 1 inch long. Leaves three or four from near the base, ovate, acuminate; base rounded, 4 inches long, $1\frac{1}{2}$ inch wide, rather prominently three nerved; petiole 2 inches long, rather thick and sheathing for half its length. Peduncle and raceme 18 inches tall, lower part nude, except for three or four distant, lanceolate, acuminate sheaths. Raceme very dense, many flowered, 4 inches long, pubescent. Bracts lanceolate, long, acuminate, cuspidate, $\frac{1}{5}$ inch long, longer than the ovary. The sepals ovate, obtuse, $\frac{1}{10}$ inch long. Petals oblong, obtuse, as long. Lip shorter, ovate, saccate, sides towards the tip thickened and involute, folded, tip ovate, subacute; calli two, thin, oblong, laminas from the inside at the base and one horizontal, obtuse, median. Column short. Anther short, pyriform, beak blunt. Rostellum broad, with two short points, stig-

matic wall broad with two short teeth. Capsule ellipsoid, ½ inch long, crowned with the persistent column.

Banks on the top of Gunong Berumbun. Also observed by Wray in Batang Padang.

383. Habenaria inconspicua, *n. sp.*

Whole plant nearly 2 feet tall, very slender. Base of stem 4-5 inches, nude except for a few sheaths. Leaves about six, thin, flaccid, lanceolate, acuminate, 3-4 inches long and ¾ inch wide, above a few linear acuminate bracts. Raceme 6-8 inches long, slender. Flowers numerous, subsecund, very small green, rather distant. Bracts lanceolate, acuminate, keeled, ⅓ inch long; sepals ⅛ inch long; upper one erect, lanceolate; lower ones deflexed beneath the lip, lanceolate, acuminate. Petals larger, entire, erect, triangular with a broad base. Lip three lobed, central lobe linear obtuse, about as long as the sepal, three nerved; side lobes filiform, three times nearly twice as long. Spur slender, cylindric, curved, slightly dilated towards the tip or not, ¼ inch long. Column very small; anther cells short, rounded with thick upcurved spurs nearly as long. Pollinia small with a short pedicel and disc nearly as long. Stigmatic lobes rounded, small, rostellum linear.

Damp flat ground at Telôm, in forest, but rather open ground. A very inconspicuous plant.

APOSTASIACEÆ

384. Apostasia Wallichii, *R. Br.*

Woods at Telôm. Common all over the Peninsula.

385. A. latifolia, *Rolfe.*

Telôm Ridge. This differs from Rolfe's description in its bracts, which, he says, are not so distinctly developed at the base of the panicle as in *A. Wallichii*, R. Br. They are however, very conspicuous and large, over 1 inch long, lanceolate, acuminate, in these specimens.

SCITAMINEÆ

386. Globba cernua, *Bak.*

The commonest species at Telôm.

387. Gl. perakensis, *Ridl.*

Not rare at Telôm.

388. Gl. regalis, *n. sp.*

Whole plant 4 feet tall, base nude except for sheaths edged with short stiff hairs, ligule oblong truncate hairy, lamina lanceolate or ovate, lanceolate with a very long narrow point, narrowed slightly to the base and subpetioled, 12 inches long, 3 inches wide, the petiole 1-1½ inch long, base and middle

on the back, hairy, tip and cusp scabrid. Panicle strict, 18 inches long, with numerous distant branches $\frac{1}{2}$ inch long, bearing two or three flowers, all ivory white. Bracts deciduous lanceolate, $\frac{1}{10}$ inch long; ovary small, globose, glabrous. Calyx campanulate, very short and broad, $1\frac{1}{8}$ inch long, with three short teeth, cuspidate. Corolla tube twice as long pubescent above. Petals $\frac{1}{5}$ inch long, boat shaped, violet. Staminodes broader, shorter, obovate. Lip narrow oblong shortly bilobed, lobes rounded. Stamen filament $\frac{1}{2}$ inch long, anther elliptic with two linear acuminate deflexed spurs, rising from the base, all bright orange.

Telôm, by stream banks, not rare but few plants in flower. Near *Gl. violacea*, Ridl.

389. Gl. VALIDA, *n. sp.*

Plant about 3 feet tall; sheaths spotted with purple glabrous except on the edge near the mouth which is hairy; ligule retuse with hairy edges, $\frac{1}{10}$ inch long. Leaves elliptic or ovate lanceolate, shortly cuspidate, 7 inches long, 2 inches wide, pale beneath, glabrous. Panicle 18 inches long, with distant rather stout branches 1 inch long, bearing two or three flowers. Bracts caducous. Calyx cupular, $\frac{1}{10}$ inch long, with three cusps. Corolla tube $\frac{1}{2}$ inch long, lobes cymbiform, half as long. Staminodes linear oblong obtuse, much longer, all orange yellow. Staminal tube $\frac{1}{10}$ inch long. Lip shorter linear oblong retuse. Stamen filament from above lip over $\frac{1}{2}$ inch (whole flower $1\frac{1}{2}$ inch) long. Anther oblong cells slightly divaricate at the base, spurs subulate slender from the base two, shorter than the anther.

Telôm Woods, distinct in the very long staminodes. A big stout plant.

390. Gl. (§ Marantella) MACRANTHERA, *n. sp.*

Plants 3 feet or more tall. Leaves ovate to lanceolate-ovate, cuspidate base, shortly cuneate, glabrous, paler beneath; petiole $\frac{1}{10}$-inch winged to the base: ligule short, rounded, hairy; sheath hairy on the edge. Panicle 8 inches long, slender with distant few-flowered branches, $\frac{1}{2}$ inch long. Bracts persistent linear oblong, nearly $\frac{1}{2}$ inch long and $\frac{1}{10}$ inch wide. Calyx cylindric teeth short, lanceolate, $\frac{1}{4}$ inch long, orange. Corolla tube $\frac{1}{2}$ inch long, lobes ovate lanceolate, upper one hooded yellow, $\frac{1}{4}$ inch long. Staminodes elongate linear oblong, $\frac{3}{4}$ inch long, yellow. Lip base narrow, lobes divaricate excurved, yellow with a small central orange blotch, fuscous in the centre. Stamen filament very long, $1\frac{1}{2}$ inch long, translucent, spurs four, long acuminate. Telôm, by the stream.

This is peculiar from the great length of the staminodes. Described from living plants: when dry, the proportions of the flowers are smaller.

It seems allied to *Gl. cerina*, Bak.

391. Camptandra latifolia, *Ridl.*

Upper part of Gunong Berumban.

Flowers pure white, except for a yellow spot in the mouth.

392. Conamomum utriculosum, *Ridl.*

Telôm Woods, out of flower.

393. Costus, *sp.*

A number of small plants of a species of *Costus* grew in a damp spot by the river, but there were no signs of inflorescence.

394. Zingiber, *spp.*

Two species seen out of flower, Telôm Woods.

395. Amomum lappaceum, *var.*

This plant found at the water-fall near Telôm Camp differs a little from the plant described from Ginting Peras, but not sufficiently to distinguish specifically. The leaves were more linear oblong, sheath margins ciliate. The upper petal oblong, rounded at the tip, pinkish red, central bar yellow, the red part veined with white; the lower ones not half as broad. Lip subquadrate retuse brilliant yellow in the centre, lighter towards the tip. There are two small staminodes at the base. The anther, narrow linear, has a crest entire rounded. The type plant had no staminodes or crest.

396. Hornstedtia grandis, *Ridl.*

Very abundant in damp spots by the river, Telôm.

397. H. macrochilus, *Ridl.*

In the same locality.

398. H. venusta, *Ridl.*

In fruit at the upper part of the Ulu Batang Padang valley. The fruit is of a brilliant red.

399. Elettariopsis exserta, *Bak.*

This is common about Tapah, but I only found a single flower. It occurs in the Batang Padang valley as far as the river from Jor.

400. Geostachys penangensis, *Ridl.*

Dry banks at Telôm, out of flower.

401. Carenophila, *n. gen.*

Stem tall with large linear oblong acuminate leaves, narrowed at the base, hairy beneath. Inflorescence spicate basal on the rhizome, peduncle short, covered with papery bracts. Calyx bifid, longer than the corolla tube. Corolla tube short, lobes oblong obtuse. Lip entire oblong obtuse narrow. Staminodes represented by two short thin oblong lobes at the base of the lip. Anther large oblong with a large-rounded entire crest. Ovary glabrous polished. Fruit globose smooth, deep claret colour.

This plant seems to be nearest allied to *Alpinia*, from which it differs in its entire lip and crested anther and radical spike.

402. C. montana, *n. sp.*

Stems about 3 feet tall. Leaves large, sheaths over 6 inches long and $\frac{1}{4}$ inch through, densely yellow hairy at the tip, ligule rounded, woolly hairy, $\frac{1}{4}$ inch long, blade linear oblong acuminate, narrowed to the base, 12-15 inches long, 2 inches wide, above glabrous, beneath densely woolly hairy, with a prominent midrib. Spike 5 inches long, the base thickly covered with ovate papery bracts subacute, rather hairy, dark pink; the lowest $\frac{1}{2}$ inch long, the uppermost large, 3 inches long, $\frac{3}{4}$ inch wide, head 2-3 inches long. Calyx 1 inch long, bifid with mucronate lobes, glabrous pink, longer than the corolla tube. Corolla tube pink, lobes oblong, 1 inch long, white obtuse. Lip a little longer entire with upcurved side, white speckled with red. Staminodes two oblong obtuse lobes at the base of the lip. Anther large, oblong white crest, large-rounded entire. Ovary glabrous polished, claret colour. Fruit globose, as large as a big cherry, claret coloured.

Summit of Gunong Berumban.

403. Alpinia aurantiaca, *n. sp.*

A tall plant, about 6 feet tall. Leaves lanceolate cuspidate narrowed gradually acuminate at the top, less so at the base, 12 inches long, 3 inches wide, above glabrous, beneath softly hairy; petiole slender, 1-2 inches long, pubescent, sheath keeled, pubescent above; ligule $\frac{1}{8}$ inch long, truncate entire edges pubescent. Spike dense 3 inches long, peduncle very short, not projecting from the sheath, rachis thickly pubescent. Lower bract papery ribbed, margin pubescent lanceolate, $1\frac{1}{2}$ inch long; upper bracts more ovate, shorter ovary hairy. Calyx $\frac{1}{2}$ inch long, brown, bilobed, lobes very short, glabrous, third lobe very obscure. Corolla tube as long as the calyx. Petals oblong hooded. Upper one submucronate with a raised rib in the centre grooved, laterals broader, all orange. Lip a little shorter than the petals, broadly obovate, tapering to a point ending in two short cirrhi orange with red streaks on the side lobe. Staminodes erect, fleshy, glabrous, rather

large, deep red. Stamen, filament and anther bright orange. Anther oblong retuse crestless.

On the hills leading to Gunong Berumbun at about 4,500 feet and at Telôm.

In the colouring this recalls *A. Rafflesiana*, Wall., but it differs in height of plant, short corolla tube, the shape of the lip and the staminodes.

404. A. (§ Cenolophon) pulcherrima, *n. sp.*

Stems few, about 2 feet tall or less. Leaves ovate cuspidate, deep green, base rounded, broad, slightly inequilateral, nerves very fine and inconspicuous, glabrous, 15 inches long, 3½ inches wide; the cusp 1 inch long; petiole 7 inches long, slender sheath, 12 inches long, pubescent, densely brown hairy at the top, ligule short retuse. Raceme pendulous, 10 inches long, pubescent. Flowers about 22, opening one or two at a time. Pedicels $\frac{3}{10}$ inch long, pubescent. Ovary silky. Bracts caducous. Calyx cylindric, dilated above, white, 1 inch long, lobes short ovate acute, tube split on one face. Corolla tube as long as the ovary, lobes broadly oblong blunt white. Lip 2 inches across, broadly orbicular, margins undulate, pale yellow, with red radiating veins. Anther oblong, crest five-lobed, central lobe rounded, semi-circular, lateral lobes two on each side; upper one short, triangular acute curved; lower one longer, narrower, lanceolate. Style filiform. Stigma red, small. Fruit fusiform, 3 inches long, ½ inch wide, hairy. Seeds numerous, oblong, black, ¼ inch long. Telôm Woods, common. Also at the Semangko Pass in Selangor (Ridley, 12031).

This beautiful plant resembles *A. petiolata*, Bak., but is distinguished by its hairy sheaths, larger orbicular lip and five-lobed anther crest.

405. Donax grandis, *Ridl.*

Batang Padang valley as far as Jor, then disappearing.

406. Phrynium malaccense, *Ridl.*

A *Phrynium*, very abundant at Telôm in wet spots near the camp, appears to belong to this species. I only found one or two plants in fruit, and saw no flowers.

407. Ph. basiflorum, *Ridl.*, var. nobile.

A very fine variety of this plant was found at Tapah. The leaves, with the petiole, were about 8 feet tall, the blade 15 inches or more long and 6·8 inches across, light green above with dark green base, radiating from the midrib, beneath in young leaves rose-colour. The plant formed large clumps in forest swamps, and is far the grandest of our Marantaceæ, recalling some of the Calatheæ of South America.

408. Stachyphrynium Griffithii, *Schum.*

Also grew in great masses near Tapah, densely covering some of the hill sides in the forests towards Temoh. I found a fresh pig's nest made entirely of this plant, dug up and piled into a long-domed mass.

MUSACEÆ.

409. Musa truncata, *n. sp.*

Stems, 20 feet tall, 1 foot through at the base, deep brown purple. Leaves, with a thick petiole, 45 inches long, blade with a rounded base, apex truncate, quite straight, the midrib projecting in the form of a filament, 20 feet long, $2\frac{1}{2}$ feet wide, light green. Spike pendulous, about 4 feet long, bud deep violet conic pointed. Bracts deep purple violet, young ones maroon pink, darkening later. Male flowers whitish, shortly stalked, $1\frac{1}{2}$ inch long. Calyx boat shaped, longer than the corolla, four lobed with narrow cuspidate lobes. Fruit narrow cylindric, hardly angled, 5 inches long, in two rows of 11 each.

The common Banana at Telôm; allied to *M. malaccense*, but very much larger. It has much the habit of the cultivated Banana "Pisang Rajah Hudang."

410. M. violascens, *Ridl.*

Common in the low country, disappears soon after entering the Batang Padang valley.

411. M. malaccensis, *Ridl.*

Ascends higher but disappears before Telôm is reached.

AMARYLLIDEÆ.

412. Curculigo recurvata, *Dryand*, var. longepedunculata.

A form with peduncles 1 foot long and the leaves narrower. Telôm Woods. The same form occurs on the Taiping Hills.

413. C. latifolia, *Dryand*, var. angustifolia.

Cameron's plateau (Messrs. Robinson and Kloss). This form has very narrow grassy leaves, quite glabrous.

BURMANNIACEÆ.

414. Burmannia longifolia, *Becc.*

Gunong Berumban. Nearly out of flower at this time. It occurs all over our hill ranges. The flowers here were pure white.

TACCACEÆ.

415. Tacca cristata, *Jack.*

Telôm, by the stream at the camp. A large form with dirty green involucre and flowers.

DIOSCOREACEÆ

416. Dioscorea laurifolia, *Wall.*

Telôm, edges of Sakai clearings and bank of river.

417. D. orbiculata, *Hook. fil.*

Telôm.

418. D. sativa, *L.*

Sakai clearings at Telôm, evidently introduced for food.

LILIACEÆ

419. Protolirion paradoxum, *Ridl. and Groom.*

Gunong Berumban and Telôm Ridges.

420. Peliosanthes, *spp.*

None of these were in flower, and it is difficult to make certain of these plants by fruiting specimens only.

421. P. stellaris, *Ridl.*

On the track from Telôm to Kuala Lipis (Messrs. Robinson and Kloss).

422. P. lurida, *Ridl.*

Telôm and Ulu Batang Padang.

423. P. violacea var. (?)

A plant with more ovate long-petioled leaves than typical *P. violacea*. It may be a distinct species. Gunong Berumban.

424. Ophiopogon intermedium var. macranthum.

Stem woody, covered at the base with the papery white sheaths of the leaf bases. Leaves numerous, grassy linear acuminate, 18 inches long, ¼ inch wide, a little paler beneath. Scape (incomplete) 8 inches or more long, basal 6 inches quite tolerably stout. Flowers few, solitary in the axils, rather distant, white. Bracts linear acuminate, ½ inch long. Pedicels ⅛ inch long. Flowers campanulate, ½ inch across. Sepals and petals similar, ⅜ inch long, oblong truncate with a rounded tip, one nerved. Stamens shorter, filaments very short, hardly visible. Anthers linear narrow. Style longer. Cameron's plateau by streams (Messrs. Robinson and Kloss).

The Indian species *O. Wallichianum*, Hook. fil., and *O. intermedium*, Don., are, in the Himalayas, very variable, and the forms of both pass into each other. In the Malay plant the flowers are of the size of *O. Wallichianum* and the leaves as broad as in that species. The anthers are, however, linear or linear oblong and blunt with hardly any filament. Perhaps it is best classed as intermediate between the two under *O. intermedium* var. *macranthum*. The plant is very different from the *O. malayanum*, Ridl., from Perak, and is much more distinctly a Himalayan type.

425. Disporum pullum var. multiflorum.

Stems several, about 2 feet tall, sometimes branched. Leaves lanceolate acuminate, slightly narrowed at the base, 4 inches long, 1-2 inches wide, with a short petiole $\frac{1}{8}$ inch long. Flowers five to six in axillary or subterminal umbels, pedunculate on peduncles, $\frac{1}{2}$-1 inch long, pedicels 1-1$\frac{1}{2}$ inch long. Sepals and petals $\frac{1}{2}$ inch long. Sepals lanceolate, oblong cuspidate, $\frac{1}{2}$ inch long, greenish tinged with red saccate at the base, not spurred. Stamens about half as long, filaments broad flat, tapering upwards about as long as the anthers. Anthers thick elliptic with a rounded base and a short prolongation above the cells. Style and stigmas three, linear curved stout, little longer than the stamens. Berry dark blue as big as a pea, one to three or more seeded.

Telôm, sandy woods, near the river, abundant.

This species, which is new to the Peninsula, has, in its large sense, a wide distribution from the Himalayas to Java and China. It varies a good deal in size of flowers, colour and proportion of anther to filament. The Telôm plants exactly resemble Javanese plants collected by Hullett, except that in these the anther is much shorter than the filament. The Javanese plant is given by Miquel as *D. parviflorum*, Don. Syn., *D. Horsfieldii*, Don., and its sepals are said to be puberulous, which Hullett's and my specimens are not.

426. Dracæna gracilis var.

River bank at the cascade, Telôm. A large form with big leaves.

427. D. graminifolia var. angustissima.

Jor.

428. D. aurantiaca, *Wall.*

Ascends to about 2,000 feet in the Batang Padang valley.

429. Dianella ensifolia, *Red.*

Telôm.

430. Smilax lævis, *Wall.*

Telôm.

431. Sm. extensa, *Wall.*

Near Jor. A form with the leaves thinner and more elliptic.

432. Sm. myosotiflora, *A. De C.*

Gunong Berumban.

433. Sm. leucophylla, *Bl.*

At Telôm. Out of flower, but unmistakeable.

434. Tricalistra, *new genus.*

Stem woody, creeping. Leaves large, oblanceolate petiolate subcoriaceous. Spike axillary erect. Bracts ovate obtuse. Flowers small, sessile campanulate with short lobes. Sepals and petals similar. Stamens superior six, short. Anthers oblong. Pistil short, subcylindric. Style absent, stigma three, hippocreniform sessile ovary, one-celled ovules two. Fruit drupaceous green, large, globose, one seeded.

435. Tr. ochracea, *n. sp.*

Stem thick, ½ inch through, woody. Leaves oblanceolate acuminate, narrowed at the base to the petiole, glabrous, dark green, thinly subcoriaceous; 12 nerved, 16 inches long, 4 inches wide; petiole 6 inches long. Spike 8 inches tall, base for more than half nude, four angled. Bracts ovate, rounded at the tip, caducous, ½ inch long. Flowers sessile, tube basin shape, lobes all similar short recurved ovate blunt, all dull ochreous yellow. Stamens six short in the mouth of the tube, filaments short, anthers oblong. Pistil cylindric, three lobed short. Stigma three lobed, lobes rounded. Fruit unripe globose, as large as a bullet, green.

Telòm Woods, to the slopes of Gunong Berumban. A plant with the habit of *Susum malayanum*, Hook. fil., but with a rather short stout rhizome, sometimes partly erect. The flower spike is fleshy and densely covered with small pale yellow flowers of the form of those of *Tupistra*, but differing from any described plant of this group in the absence of any style, the trilobed stigma being sessile on the truncate top of the short ovary. This and the general structure of the flower suggest an affinity with *Peliosanthes*, to which group I would refer it, were it not for the fruit which is drupaceous with a single seed. Unfortunately, I was not able to find a ripe fruit, which is, indeed, rare to find in any of the *Asphodeleæ*, but it is clear that the fruit is similar to that of *Tupistra*. The ovary in section shows traces of three carpels, but only one contains any ovules.

COMMELINACEÆ.

436. Pollia thyrsiflora, *Endl.*

Ulu Batang Padang.

437. P. sorzogonensis, *Endl.*

On the track to Jor, Ulu Batang Padang.

438. Commelina obliqua, *Hass.*

On the river bank at Telòm in sandy and muddy parts. Its large blue flowers make it quite attractive. I have met with it, too, at Ginting Bidei in Selangor, but it does not appear to be common in the Peninsula.

439. Aneilema protensum, *Wall.*

Herb with weak stems, about 2 feet tall, glabrous. Leaves lanceolate acuminate acute, narrowed gradually to the petiole, quite glabrous, 4-6 inches long, $\frac{1}{2}$-1 inch wide; petiole $\frac{1}{2}$ inch long; sheath tubular, $\frac{1}{2}$ inch long, the mouth ciliate, otherwise glabrous. Panicle very lax spreading, widely with branches, very slender, 4 inches long, quite glabrous. Lower bracts with a narrow oblong limb. Upper bracts cup shaped, acute ovate, $\frac{1}{10}$ inch long, persistent. Sepals ovate obtuse, not reflexed, small. Petals three, orbicular clawed, pure white. Stamens five, two with linear yellow anthers and white glabrous slender filaments one anther, reniform, and two with a slender brown filament, bifurcating and ending in two globose yellow balls. Pistil densely grey hairy. Style simple acuminate, minutely capitate. Fruit subglobose, narrowed below, densely covered with grey-hooked bristles and strongly adhesive, $\frac{1}{10}$ inch through. Seeds three, oblong convex on the back, angled within, white, transversely rugose. Telôm in damp spots by the river.

Distrib.—Of type India, Sumatra and Java.

I have considered it best to describe this plant under the name of *A. protensum*, Wall., as it certainly closely resembles Wight's figure, t.c. 2071; but his figure and description of the stamens do not coincide with those of the Telôm plant. The figure in Clarke's *Commelinaceæ*, t. 24, of *A. protensum*, does not bear the least resemblance to either the Telôm plant or to Wight's figure. It represents a whole plant and seed and a copy of Wight's drawing of the flower. The Telôm plant is quite glabrous, and the panicle is not viscid as described in *A. protensum*. None of the describers mention that the fruit is armed with hooked bristles, making it very adhesive, but Wight's figure shows something like this. *A. scaberrimum*, Kunth. (*Commelina scaberrima*, Bl.), does not fit it in the least.

440. Floscopa scandens, *Lour.*

Ulu Batang Padang. Common all over the Peninsula.

441. Forrestia glabrata, *Bl.*

A stout, tall, almost completely glabrous herb. Stems $\frac{1}{2}$ inch through. Leaves lanceolate acuminate with a long point and gradually narrowed to the sheath, 8 inches to nearly 12 inches long, 2 inches wide, completely glabrous, except for the scanty marginal hairs, sheaths 1-1$\frac{1}{2}$ inch long, finely ribbed glabrous, except some white cilia at the edge. Capitula compact, 1 inch through or less, quite glabrous. Sepals oblong obtuse, $\frac{2}{5}$ inch long, keeled, quite glabrous. Fruit elliptic oblong with a rounded top, subtrigonous pale, much shorter than

the sepals, ¼ inch long, glabrous, and terminated by the slender style. Seeds two in each cell convex red brown, cerebriform. Telôm. A new record for the Peninsula.

Distrib.—India, Java, Sumatra and Tonkin.

442. F. MARGINATA, *Hassk.*

Telôm. This plant appears very variable, or there is more than one species included under the name.

443. F. MONOSPERMA, *Clarke.*

Ulu Batang Padang near Jor in damp ravines. Usually found in the neighbourhood of limestone rocks.

JUNCACEÆ.

444. JOINVILLEA MALAYANA, *Ridl.*

On banks on a ridge, about a mile from the Telôm Camp. In flower and fruit, the drupes bright red.

445. SUSUM MALAYANUM, *Bl.*

Telôm Woods. The form with large fruits as big as a cherry.

PALMÆ.

446. ARECA PUMILA, *Bl.*

Woods near Telôm. The leaflets seem narrower than those of the Larut Hills, but I think it is specifically the same. The stems were solitary, about 6 feet tall.

447. PINANGA SCORTECHINII, *Becc.*

Telôm Woods.

448. P. (§ Spirantha) DENSIFOLIA, *n. sp.*

A tufted plant, forming thick bushes. Stem about 9 or 10 feet tall, ½ inch thick. Leaves long, finely cut into narrow leaflets, rachis trigonous yellowish, leaflets very numerous, narrow linear acuminate, long cuspidate, dark green, nerved, 15 inches long, ¼ inch wide, terminal pair broad 6 inches long, 1 inch wide. Spathe broadly lanceolate ovate, shortly beaked, smooth, 7 inches long, 2 inches wide, inner flange ½ inch wide. Spadix of five to eight rather stout branches on a short, 1 inch long, broad peduncle decurved, 6 inches long. Flowers in four rows. Males ¼ inch long. Sepals short ovate triangular, hardly acute. Stamens 10 filaments, very short, with a broad base, abruptly acuminate. Anthers linear oblong, shorter than the petals. Females ⅛ inch long, globose. Sepals rounded glabrous, petals about as long. Fruit elliptic narrowed to both ends, little more than ½ inch long, seed elliptic smooth with thick ruminations, few, running nearly to the centre. Very abundant on the ridges behind Telôm on both sides of the river. In some places so abundant as to exclude almost anything else. The plant forms great tufts, much resembling those of *Chrysalidocarpus lutescens*.

449. P. POLYMORPHA, *Becc.*

This species was based on a plant collected in Perak by Scortechini, and is well marked and not really very variable. In King's distribution of the Wray and Scortechini collections, however, he distributed a very distinct plant as *P. polymorpha* var, *robusta*, and another as var. *minor*. The latter is obviously what Beccari intended and should be kept for that. It is extremely abundant in the Telôm Woods, forming quite dense thickets, and at first sight much resembles *Pinanga disticha*, Bl., even to the dark and light green mottling of the leaves.

A more full description of it, taken from life, may serve to distinguish it readily.

A slender-creeping ascending palm, from 4 to 6 feet tall, branched from the base, the stems $\frac{1}{4}$ inch through. Leaves 12-14 inches long. Sheaths 3-4 inches long, the blade broken up into two to four pairs of leaflets, the lower ones narrow acuminate or broad, strongly nerved, 7 inches long, up to 6 inches across the blade or more, mottled light and dark green as in *Pinanga disticha*. Ligule usually breaking up into fibres and soon disappearing. The petiole 3 inches long. Spathe 2 inches long, papery lanceolate. Spadix $1\frac{3}{4}$ inch long, flexuous with two branches on a peduncle, $\frac{3}{4}$ inch long, rachis red eventually. Flowers distant, spirally arranged. Male flowers, petals ovate triangular, shortly acuminate, $\frac{1}{4}$ inch long. Females, sepals short rounded, ciliate, petals narrower, hardly longer. Fruit black, $\frac{1}{2}$ inch long, narrowed at both ends, when dry, deeply ruminate.

Telôm Woods. The plant collected by Wray on Gunong Berumban Putch (365) belongs here and not to *P. disticha* as I previously referred it. The Singapore Lobb plant is, however, doubtless *P. disticha*, which is a lowland plant and not a highland one.

450. P. SUBINTEGRA, *Ridl.*

Abundant at Telôm. This plant resembles *P. subruminata* at first sight very closely, and is usually about the same size, about 2 feet tall. Its large brilliant red fruit on much longer spikes and leaves almost rounded at the base distinguish it easily. I add the following notes to my original description: Leaves oblong obcuneate, base only shortly and slightly narrowed, lobes 3 inches long. Lower sheaths 3 inches long. Flowers sunk in long elliptic oblong depressions with a short acute point (Bract) above. Sepals glabrous, $\frac{1}{10}$ inch long. Fruit, in life, elliptic pulpy, red, when dry, cylindric.

451. ARENGA WESTERHOUTI, *Griff.*

Common in the Batang Padang valley to the Pahang border, but not seen beyond.

452. Caryota, *sp.*

A big *Caryota* was seen in the Batang Padang valley and small plants in the Telôm Woods. They were probably *C. Rumphiana* var. *aequatorialis*.

453. Livistona cochinchinensis, *Mart.*

In the Batang Padang valley. Some trees of immense size, disappearing as the Pahang boundary ridge was reached, but a small seedling was found near the Telôm Camp.

454. Eugeissona tristis, *Griff.*

The "Bertam" disappears on leaving the plains at about the 12th mile from Tapah.

455. Orania macrocladus, *Griff.*

Goes to about the 12th mile and then ceases.

456. Dæmonorops periacanthus, *Mart.*

A small form on the Telôm Ridges.

457. Calamus filipendulus, *Becc.*

Telôm Woods.

458. C. Curtisii, *Ridl.*

Telôm. The fruits of this were obtained for the first time. They resemble those of *C. erilis*, Griff., of Mt Ophir. They are cylindric fusiform, beaked at the tip and supported in the tubular cylindric perianth, ½ inch long. The scales small, in 10 rows, pale buff, edged and tipped with brown, longer than broad, and rounded at the tip.

459. C. perakensis, *Becc.*

Abundant at Telôm on the higher ridges and on Gunung Berumban.

460. C. javensis var. purpurascens.

Plants were seen, not in flower, of this species at Telôm.

461. C. elegans, *Ridl.*

I was fortunate enough to get complete specimens of this rattan, which was only known from a portion of a leaf and spadix, which I got on Bujang Malacca some years ago, and some doubtful specimens and drawing of Wray and Scortechini. I am, therefore, able to give now a full description of the plant.

The stem was ¾ inch or rather more through of a dark colour, thickly armed with flattened spines, singly or in threes together, and ¼ inch long or less. Leaf 4 feet long with a spiny base, spines short terete with a broad pale base; petiole 15 inches long, leaflets in distant fascicles of five or six, 4-6 inches apart, narrow lanceolate linear-acuminate, 8 inches long by ¾ inch wide, dark green, not areolose

with scattered thorns on the slender rachis; flagellum terminal, 18 inches long, slender with black-tipped thorns in threes. Male spadix very slender filiform, 3 feet long, branches about three, 8-9 inches long; the lowest sheath 2 inches long, with a few short sharp straight thorns on the edge; upper sheaths with one or two very small-hooked thorns, internodes with one or two minute thorns, sheaths of the branches short, gradually dilate, unarmed, with a short point. Spikes 20, $\frac{1}{2}$-1 inch long. Bracts ovate acute, strongly ribbed. Spathellules ribbed. Calyx campanulate, lobes ovate subacute, ribbed. Petals oblong obtuse, twice as long. The whole flower $\frac{1}{12}$ inch long. Female spadix 3 feet long, slender, armed as in male, branches few, two 5-6-inches long spikes, about 6 inches each, 1-1$\frac{1}{2}$ inch long. Flowers about 20 on each, rather distant. Calyx and corolla as in the male, style stout. Fruit cylindric oblong, beaked, $\frac{1}{4}$ inch long; beak $\frac{1}{10}$ inch long. Scales in six rows, yellow, edged with brown convex and grooved rather deeply.

Telôm, hill woods.

462. Plectocomia Griffithii var.

A species of *Plectocomia* was abundant on the Telôm Woods, but only portions of decayed spathels were seen. These and the plant itself resembled *P. Griffithii*, Becc.; but were very much smaller, probably a mountain form.

463. Korthalsia, *sp.*

No flowers or fruit, near *K. ferox*, Becc. Telôm Woods.

464. Plectocomiopsis geminiflorus, *Becc.*

Common in the Batang Padang forests near Jor. *Calamus turbinatus*, Ridley, must be reduced to this. It was based on a fruiting specimen, the fruit not having been previously described, and differing from that of other species of the genus in having the regular scales of a *Calamus*.

PANDANACEÆ.

465. Pandanus ornatus, *Kurz.*

Cameron's plateau. (Messrs. Robinson and Kloss).

466. P. collinus, *Ridl.*

A branched, rather bushy, Pandan from 8-12 feet tall, forming large tufts with narrow leaves, glaucous beneath. Fruit glaucous green.

Very common on the Telôm Ridge and on other high ridges between that and Berumban. Also collected on Gunong Batu Puteh by Wray and on Kedah Peak by myself.

Several species of *Freycinetia* were seen at Telôm, but none showed signs of flowers. One was apparently *F. lucens*, Ridl.

AROIDEÆ.

467. Arisæma Roxburghii, *Kunth.*
Ulu Batang Padang and Telôm.

468. A. anomalum, *Hemsl.*
Telôm in damp shady spots, not rare.

469. A. Wrayi, *Hemsl.*
Telôm Woods, less common.

470. A. filiforme, *Bl.*, var.
A very fine *Arisæma*, with a large rich brown spathe, was brought by Messrs. Robinson and Kloss from their trip to Gunong Irau, and I obtained one or two more specimens from the low-lying woods of Cameron's plateau near Gunong Berumban. This plant agrees very well with the figure of Blume's *A. filiforme* and the description in "Rumphia," except in a few points, and with some specimens from Mt. Gede in Java, collected by Mr. Hullett, which I take to be *A. filiforme*. The plant collected on the expedition had leaves about 1 foot tall, with three ovate cuspidate leaflets with rounded bases, the outer pair oblique, 4-5 inches long and 3 inches wide; the nerves, usually few, meet in intra-marginal arches; petiolules $\frac{1}{2}$ inch long. The peduncle is 4 inches or more tall. The tube of the spathe 1 inch long and broad, the limb oblong broad cuspidate, 4 inches long and 2 inches wide, with a 2-inch point, the edges are widely everted. It was of a dark maroon brown colour. The spadix white, the appendage conic at the base, gradually passing into the long filiform tail, the conic portion about 1 inch long, bears a number of short subulate processes, occasionally branched, the tail is $3\frac{1}{2}$ inches long. All the plants found were males. The flowers consisted of five or six anthers borne on a short stalk, and were dispersed over the male portion.

Mr. Hullett's plants closely resembled mine, except in the anthers being in twos or threes and sessile, as is described and figured by Blume. Blume states that the leaflets are usually more than three, and his figure shows a different spathe, colouring much paler, and these distinctions, however, in such variable plants as *Arisæmas*, are hardly sufficient to constitute a distinct species.

471. Amorphophallus bufo, *n. sp.*
Tuber hemispheric, about 3 inches across. Leaf plant 4 feet tall, petiole fairly stout, mottled grey and green, lamina about 18 inches across, much divided lobes, ovate to lanceolate, cuspidate decurrent, nerves numerous and fine. Peduncle 3 feet tall, $1\frac{1}{2}$ inch through at the base, mottled and blotched,

greenish grey with six fuscous-purple spots darker purple in the base of the tube. Spathe tube 3 inches long, and as wide at the mouth, limb very broad, 6 inches long, 4 inches across, oblong ovate in front, curiously blotched with circular greenish blotches with a brown purple back ground, back paler olivaceous with pale greenish spots. Spadix 6 inches long, appendage a blunt cone cylindric, 3 inches long and 1 inch through, dull purple. Male portion yellowish cylindric, 1 inch long, anther cells two, parallel; flowers oblong crowded. Female portion $\frac{1}{2}$ inch long, pistils very shortly stalked or rather narrowed at the base, style cylindric distinct, stigma discord, very crowded.

Abundant all over the low-lying parts of the Telôm Woods. The great abundance of this *Amorphophallus* showed the scarcity of wild pigs. In Borneo and Johore, where these animals abound, *Amorphophalli* are scarce or, if fairly abundant, the tubers are deeply buried beneath big roots or under rocks, where the pigs cannot get them. The Sakais had practically exterminated the pigs here, hence the abundance of *Amorphophalli*, whose tubers were only just below the surface. This species is, perhaps, as near *A. carnea*, Ridl., as any other species. Its curiously-mottled spathe with its circular blotches of dull green on a purplish ground, and its shape, reminds one of the head of some curiously-blotched reptile.

472. Alocasia denudata, *Engl.*

Telôm, large and typical.

473. A. Beccarii, *Engl.*

Telôm Ridges in dry spots.

474. Aglaonema angustifolium, *N. E. Br.*

A broad-leaved form passing towards *A. schottianum*, Miq. Telôm.

475. A. oblongifolium, *Schott.*

By the Batang Padang River, not seen further than Tapah side.

476. Homalomena pumila, *Hook. fil.*

A considerable variety of forms, as far as the shape of the leaf goes, were at Telôm, from the typical little green round-leafed form to forms with elongate rhizomes and long-petioled leaves passing towards *H. propinqua*, Ridl. The purple-leaved variety *purpurascens* grew also on damp banks of the streams.

477. Schismatoglottis calyptrata, *Zoll.*

Var. *concolor*, Hallier, was commonest, var. *picta* scarcer and var. *albidomaculata* was local. All about Telôm.

478. S. RUPESTRIS, *Zoll.*

Telôm. I take this species, especially marked by the long interspace between the male and female flowers, to be what is intended by the above name. It has only previously been recorded from Java.

479. PIPTOSPATHA ELONGATA, *Ridl.*

Abundant in all the rocky streams at Telôm and in the Batang Padang valley, often apparently thriving completely and permanently under water. There is a form in the Telôm River with the leaves spotted light green on a darker ground like the typical form of *P. Ridleyi*. It grows with the plain green form.

480. SCINDAPSUS PICTA, *Hassk.*

Common at Telôm, as all over the Peninsula.

481. Sc. SCORTECHINII, *Hook. fil.*

Telôm Ridge and Gunong Berumban up to 6,000 feet altitude. Common.

482. RAPHIDOPHORA HUMILIS, *Ridl.*

Abundant on dry banks, Telôm.

483. R. GIGANTEA, *Ridl.*

Telôm Camp.

484. R. WRAYI, *Hook. fil.*

Common on trees at Telôm.

485. R. LÆTEVIRENS, *Ridl.*

Seen near Jor.

486. R. BECCARII, *Engl.*

On rocks at the Telôm cascade, not in flower.

CYPERACEÆ.

487. MARISCUS SIEBERIANUS, *Nees.*

In a Sakai clearing at Telôm, doubtless introduced by the Sakais.

488. GAHNIA JAVANICA, *Moritzi.*

Top of Gunong Berumban.

489. SCLERIA MULTIFOLIATA, *Boeckl.*

Some very weak forms at Telôm.

490. SCL. CHINENSIS, *Kunth.*

Telôm.

491. SCL. ELATA, *Thw.*

A very tall plant, about 12 feet tall, very stout, abundant, but nearly out of flower.

492. Carex cryptostachys, *Brngn.*
Woods, Telôm.

493. C. perakensis, *Clarke.*
Abundant on Gunong Berumban, and conspicuous from its whitish spikelets. Sporadic plants at Telôm also.

494. C. baccans, *Nees.*
On Gunong Berumban and also on Telôm Ridges.
A new addition to the flora.
Distrib.—India and Java.

GRAMINEÆ.

495. Paspalum conjugatum, *Berg.*
This grass has established itself in great abundance on the old Sakai clearings and covers the open parts of the tracks to them.

496. Isachne albens, *Trim.*
Telôm Camp, also occurs on the Larut Hills.

497. Panicum myosuroides, *Br.*
A few plants at the camp at Telôm.

498. P. plicatum, *Lam.*
Abundant at the Sakai camps, Telôm.

499. P. montanum, *Roxb.*
Telôm, near the camp.

500. P. oryzoides, *Sw.*
Ridge between Telôm and the Batang Padang valley.

501. P. pilipes, *Nees.*
Abundant. Telôm Camp.

502. P. patens, *Linn.*
Telôm Camp and Sakai clearings.

503. Ichnanthus pallens, *Munro.*
Ridge between Telôm and Batang Padang valley.

504. Thysanolæna agrostis, *Nees.*
Telôm Camp and river bank.

505. Oplismenus compositus, *Beauv.*
Rocky places and stream banks in the Telôm Valley, very tall forms.

506. Miscanthus sinensis, *Anderss.*
On the ridges between Telôm and Batang Padang and large clumps at the camp. This grass has not been recorded before from the Peninsula. It is conspicuously abundant in Sarawak, Borneo. According to the description in Haeckel's

"Monograph" of *Andropogoneæ*, the leaf edges of this grass are scabrid as they are in a specimen I have from Japan, but they are not so in Borneo and Malayan plants. The distribution given for this plant is China, Japan and Borneo.

507. Pogonatherum saccharoideum, *Beauv.*

On rocks in a stream cascade on the Jor track about the 12th mile from Tapah.

508. Pollinia ciliata, *Trin.*

Sakai clearing at Telôm, plentiful. An Indian species, which I also found in Eastern Pahang.

509. Garnotia stricta, *Brngn.*

A slender-tufted grass, growing abundantly in the rocks in the river at Telôm and often submerged. A new record for the Peninsula. Its recorded distribution is India and the Sandwich islands. I have it too from S. Borneo.

510. Lophatherum gracile, *Brngn.*

Common and tall in more open spots all over the Telôm Woods.

511. Centotheca lappacea, *Desv.*

In the Batang Padang valley common, but curiously enough I could not find it at Telôm.

512. Dendrocalamus pendulus, *Ridl.*

On the Jor track.

513. D. giganteus, *Munro.*

Fine clumps of this Bamboo occurred in the Batang Padang valley.

514. Schizostachyum Zollingeri, *Steud.*

Flowering specimens in a bad state, of what appears to be this species, were obtained on the Jor track.

515. Bambusa elegans, *Ridl.*

Top of Gunong Berumban and covering it with a dense low thicket. Also occurs in the Semangko Pass.

FERNS.

516. Gleichenia flagellaris, *Spr.*

Abundant at Telôm.

517. Gl. glauca, *Hook.*

As common as the last.

518. Alsophila comosa, *Hook.*

Telôm.

519. A. glabra, *Hook.*

Telôm.

520. A. DUBIA, *Bedd.*
Gunong Berumban.

521. A. GLAUCA, *Sw.*
Common about Telôm and on the Batang Padang valley.

522. A. CRENULATA var.
I am doubtful as to this. The pinnules are not crenulate and the sori in a single row close to the bases of the pinnules.
Telôm.

523. CIBOTIUM BAROMETZ, *Link.*
In the Batang Padang valley, abundant

524. LECANOPTERIS CARNOSA, *Bl.*
Telôm Ridge and common around Telôm.

525. HYMENOPHYLLUM NEESII, *Hook.*
Telôm.

526. H. JAVANICUM, *Spreng.*
Gunong Berumban; Telôm.

527. H. POLYANTHOS, *Sw.*
Telôm.

528. H. AFFINE, *V. D. Bosch.*
Telôm and Gunong Berumban.

529. H. DENTICULATUM var. FLACCIDUM.
Telôm.

530. TRICHOMANES PALLIDUM, *Bl.*
Telôm, not very common.

531. T. DENTICULATUM, *Bl.*
Telôm.

532. T. PLUMA, *Hook.*
Gunong Berumban.

533. T. BIPUNCTATUM, *Poir* (=T. filicula, *Bory*).
A large form at Telôm.

534. T. MAXIMUM, *Bl.*
Telôm, near the small water-fall.

535. T. OBSCURUM, *Bl.*
Telôm.

536. HUMATA PINNATIFIDA, *Bak.*
On banks at Telôm and Gunong Berumban, plentiful.

537. PROSAPTIA EMERSONI, *Presl.*
Telôm Ridge.

538. P. CONTIGUA, *Sw.*
Telôm and Gunong Berumban.

539. DAVALLIA BULLATA, *Wall.*
Gunong Berumban.

540. D. LORRAINEI, *Hance.*
Telôm. New to the flora.

541. D. SOLIDA, *Swartz.*
Telôm Camp. Common.

542. D. MOLUCCANA, *Bl.*
An extremely handsome and large *Davallia* on the banks of the stream by Telôm Camp. New to the flora.

543. MICROLEPIA PINNATA, *Car.*
Common at Telôm and by the Batang Padang River.

544. STENOLOMA CHINENSIS, *Swartz.*
Batang Padang valley near Jor.

545. LINDSAYA REPENS, *Thw.*
Telôm.

546. SCHIZOLOMA LOBATA, *Bl.*
Telôm and Gunong Berumban.

547. LITOBROCHIA INCISA, *Thunb.*
Gunong Berumban.

548. PTERIS AQUILINA, *L.*
Telôm Camp.

549. PLAGIOGYRIA EUPHLEBIA, *Kze.*
On the top of Gunong Berumban.

550. BLECHNUM ORIENTALE, *L.*
Telôm, near the camp.

551. THAMNOPTERIS NIDUS, *L.*
Common round Telôm Camp.

552. ASPLENIUM SCORTECHINII, *Bedd.*
Gunong Berumban.

553. A. NORMALE, *Don.*
Telôm.

554. A. BELANGERI, *Kze.*
Common round Telôm Camp.

555. A. RESECTUM, *Hook.*
Telôm.

556. DIPLAZIUM SUBSERRATUM, *Bl.*
Trees, Telôm.

557. D. ASPERRIMA, *Bl.*
Telôm.

558. ANISOGONIUM LINEOLATUM, *Mett.*
Telôm and Gunong Berumban.

559. A. DECUSSATUM, *Sw.*
Common by the banks of the Telôm River in damp spots. A very large fern.

560. A. HETEROPHLEBIUM, *Presl.*
At Telôm. A new record for the Peninsula.

561. DIDYMOCHLÆNA LUNULATA, *Desv.*
Banks of the stream by Telôm Camp, near the water-fall.

562. ASPIDIUM VASTUM, *Bl.*
Common in the Batang Padang valley.

563. A. RIDLEYI, *Christ.*
But the leaves are dentate.
Abundant. Telôm.

564. LASTREA CALCARATA, *Bl.*, var. SERICEA.
Banks of the Batang Padang River and Telôm.

565. L. DAYI, *Bedd.*
Telôm and upper part of Gunong Berumban.

566. NEPHRODIUM UNITUM, *L.*
Telôm.

567. N. LINEATUM, *Bedd.*
Telôm.

568. N. PAHANGENSE, *Christ* (sub. DRYOPTERIS).
Telôm cascade.

569. N. HETEROCARPUM, *Christ.*
Telôm.

570. N. LARUTENSE, *Bedd.*
Telôm.

571. ATHYRIUM CARVIFOLIUM, *Christ, n. sp.*
Gunong Berumban.

572. NEPHROLEPIS DAVALLIOIDES, *Kze.*
Telôm.

573. OLEANDRA NERIIFORMIS, *Cav.*
Telôm Ridge and Gunong Berumban.

574. PHEGOPTERIS HASSELTI, *Bl.*
Telôm.

575. POLYPODIUM TRICHOMANOIDES, *Sw.*
Telôm Hills on the route to Gunong Berumban.

576. P. MALACCANUM, *Bak.*
Gunong Berumban.

577. P. OBLIQUATUM, *Bl.*
Common at Telôm, on trees.

578. DIPTERIS HORSFIELDII, *Br.*
Common on dry ridges, Telôm.

579. DRYNARIA HERACLEUM, *Kze.*
Abundant at Telôm and up towards Gunong Berumban.

580. PLEOPELTIS WRAYI, *Bak.*
Gunong Berumban.

581. PL. ACCEDENS, *Bl.*
Common on trees, Telôm.

582. PL. RUPESTRE var. UNISERIALE n. var., *Christ.*
Telôm.

583. PL. PLATYPHYLLA, *Sw.*
Dry spots, Telôm Ridge.

584. PL. PALMATA, *Bl.*
Gunong Berumban.

585. PL. INCURVATA, *Bl.*
Gunong Berumban.

586. PL. PUNCTATA, *L.*
Telôm. Common.

587. PL. LEIORRHIZON, *Hook.*
Telôm. New record for Peninsula.

588. PL. ANGUSTATUM, *Bl.*
Telôm.

589. MONOGRAMME PARADOXA, *Fee.*
Telôm.

590. M. TRICHOIDEA, *Sm.*
Telôm.

591. LOXOGRAMME INVOLUTA, *Don.*
Telôm with a curiously-branched form.

592. SYNGRAMME QUINATA, *Hook. fil.*
Telôm Ridge. A new record for the Peninsula.

593. ANTROPHYUM RETICULATUM, *Kaulf.*
On rocks and trees at Telôm cascade. A very large form.

594. VITTARIA FALCATA, *Kze.*
Gunong Berumban.

595. TÆNITIS BLECHNOIDES, *Sw.*
Dry spots, Telôm.

596. Elaphoglossum conforme, *Sw.*
Telôm.

597. Stenochlæna sorbifolia, *L.*
Telôm. Common.

598. Gymnopteris spicata, *Linn. fil.*
Telôm, in dry spots on trees.

599. G. flagellifera, *Wall.*
Muddy spots by Telôm River.

600. Chrysodium bicuspe, *Hook.*
Dry banks at Telôm.

601. Angiopteris evecta, *Hoffm.*
Very fine and of immense size on islets and banks of Telôm River. Abundant.

602. Kaulfussia æsculifolia, *Bl.*
Batang Padang valley.

603. Ophioglossum malaccanum, *Schlechter* (*O. petiolosum*, Desv.).
In crevices of rocks in the Telôm River.

LYCOPODIACEÆ.

604. Lycopodium phlegmaria, *Hook.*
Telôm and Gunong Berumban. Some specimens had the ends of the fruit spikes terminated by a tuft of leaves.

605. L. squarrosum, *Forst.*
Telôm. This, too, had the fruit spikes terminated by a tuft of leaves.

606. L. casuarinoides, *Spr.*
Telôm, ridges at 5,000 feet altitude.

607. L. lucidulum, *Wt.*
Sporadic and scarce, Telôm.

608. Selaginella plumosa, *Presl.*
Telôm.

609. S. plumea, *Spring.*
Telôm.

610. S. canaliculata, *Spring.*
Telôm.

611. S. tenera, *Spring.*
Gunong Berumban.

612. S. proniflora, *Bak.* (?)
But differs from the type in having the leaves not ciliate.
Telôm.

ON MAMMALS FROM THE RHIO ARCHIPELAGO AND MALAY PENINSULA COLLECTED BY Messrs. H. C. ROBINSON, C. BODEN KLOSS AND E. SEIMUND, AND PRESENTED TO THE NATIONAL MUSEUM BY THE GOVERNMENT OF THE FEDERATED MALAY STATES.

By OLDFIELD THOMAS, F.R.S., and R. C. WROUGHTON, F.Z.S.

WITH NOTES.

By the Collectors.

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DURING 1908 Mr. H. C. Robinson, Director of Museums, Federated Malay States, and his assistant Mr. E. Seimund made a collecting trip to the Rhio Archipelago, south of Singapore, and obtained a magnificent series of mammals, prepared in the best modern manner, and forming a very full representation of the Mammal Fauna of the islands. This collection was supplemented by a series of other specimens obtained in Singapore itself and on the coast of S.-E. and E. Johore and the adjacent islands, as well as by other specimens from the vicinity of Kuala Lumpur in Selangor, and from the hills near Taiping in Perak, which latter were secured in conjunction with Mr. C. B. Kloss.

By the enlightened generosity of the authorities of the Federated Malay States a full set of these specimens, numbering nearly 600 skins, has been presented to the National Museum, in order that the result of so important an expedition should be of benefit to science in general as well as to the local institutions.

The Rhio Archipelago has been hitherto entirely unrepresented either in our own Museum, or, so far as we know, in any other, except the United States National Museum, which possesses the series obtained by Dr. W. L. Abbott during his various visits to the islands and some smaller collections from Mr. Kloss. On these latter have been based the only papers published on the Rhio Mammals—viz.,

Miller, G. S.: "The Mammals collected by Dr. W. L. Abbott in the Rhio-Linga Archipelago." *P. U. S. Nat. Mus.*, xxxi., pp. 247-286, 1906. With map:

Lyon, M. W.: "Mammals of Batam Island, Rhio Archipelago" *Tom. cit.*, pp. 653-657.

The present collection, therefore, is of the most material importance, both in filling up such a considerable hiatus in our collections and in enabling us to appraise the value of the many species described by the American naturalists referred to. In addition, we have found occasion to describe from the collections 10 additional species and sub-species, some from the islands and some from the adjoining mainland. Of these new forms, we have given preliminary diagnoses in the "Annals and Magazine of Natural History" for May, 1909.

With regard to the "species" founded by Messrs. Miller and Lyon, we can only reiterate our opinion that the majority of them should have been called sub-species rather than species. Their differences are, for the most part, average differences, based on series, the series overlapping in the characters used, and therefore, even though insular in locality, trinomials, and not binomials, might well have been used for them as indicating the nearness and more or less inconstant nature of their relationship to older known forms.

In conclusion, we would express our appreciation of the public spirit and sympathy for science shown by the authorities of the Federated Malay States, who have permitted the party the use of a specially-chartered vessel for these explorations, and have therefore helped materially in carrying out this extensive collecting trip. Of these authorities the names of Sir John Anderson, G.C.M.G., Governor of the Straits Settlements, and High Commissioner for the Federated Malay States; Sir William T. Taylor, K.C.M.G., Resident-General, Federated Malay States; and H. C. Belfield, Esq., C.M.G., Resident of Selangor, who was officiating as Resident-General at the time the Rhio expedition was projected and carried out, should be specially mentioned. Thanks are also due to H.H. the Sultan of Johore for facilities afforded in his territories and to Mr. H. Spakler, Consul-General for the Netherlands, for providing introductions which were of much assistance in islands under the Dutch Flag.

[The whole of the collections reported on in the present article, with the exception of those from Selangor and Perak, were made during a cruise, which lasted from the commencement of June, 1908, to the 4th September, 1908. The vessel used was a large Chinese tongkang, or sailing lighter, of about 70 tons measurement, which had formerly been used for conveying granite from the quarries of Pulo Ubin in Johore Straits to Singapore. She measured about 70 feet in length by 16 feet beam and drew when running light, as we used her, about 5 feet. She was ketch rigged and carried a crew of four Hokkien Chinamen and on a good breeze we could get six or seven knots out of her, though, with the light airs prevalent at the season, our progress was usually very slow and we took six days returning from Pulo Tinggi to Singapore Straits, a distance we had covered on the northward journey in 18 hours.

Our party consisted, for the greater portion of the trip, of two Europeans, four Dyak collectors and a couple of Malay servants, but Karimon and Kundur were not visited by Robinson, who had to return to Kuala Lumpur. We lived on board the tongkang, in which a comfortable and commodious cabin had been built amidships, collected from dawn until about 9 a.m. and again from 4 p.m. until dusk, the intervening time being spent in skinning. We secured in all rather over a thousand mammal skins and about two hundred birds. The latter, however, are of no particular interest and only include one rarity, the pigeon *Columba grisea*, G. R. Gr., which was shot on

Karimon. It had previously been obtained by Messrs. Abbott and Kloss on Pulo Taya, south-east of Lingga Island, and in the chain of islands, off the west coast of Sumatra, and is common on some of the islets, near the Sarawak coast, but, until recently as one of the rarest species of its group, the British Museum only possessing one antiquated specimen.

The collections described by Messrs. Thomas and Wroughton in the following pages were obtained in numerous localities, which may be conveniently grouped in five main divisions, regarding which it may be of interest to give some account.

From the north, southwards, these divisions are:

(I.) The Larut Hills, immediately above Taiping, the capital of Perak:

Specimens are listed from two localities in this range—viz.,

(*a*) "Maxwell's Hill," a clearing of about a hundred acres in extent, at an average altitude of about 3,600 feet and surrounded by heavy jungle;

(*b*) Gunong Ijau, the culminating summit of the Larut Range, about 3 miles from Maxwell's Hill and about 4,700 feet high.

From these localities two species of rats, hitherto known only from the type localities, were secured—viz., *Mus ferreoanus*, known only from Dr. Abbott's three skins from Trang, and *Mus bukit*, which was described from Bukit Besar in the Patani States—and also the type of *Rhinosciurus peracer*, Thos. and Wrought.

(II.) Selangor:

Five localities in this State are mentioned—viz.,

(*a*) Dusun Tua, about 17 miles from Kuala Lumpur, the capital of the State, near some thermal springs in the vicinity of orchards and rice fields, though there is still much old jungle left;

(*b*) Cheras, half-way between Dusun Tua and Kuala Lumpur, close to a big block of old jungle;

(*c*) "Klang Gates," about 9 miles from Kuala Lumpur, beneath a range of precipitous limestone hills, of no great elevation, covered with primary jungle. The spiny rats were found to be very common here, especially the obscure form, *Mus pallax*, which had hitherto escaped our notice. *Mus Klossii*, or what we thought was a form of *Mus asper*, Miller, was also very numerous:

(*d*) Gunong Mengkuang Lebah—

A mountain on the main range of the Peninsula between Selangor and Pahang, attaining a height of about 5,800 feet. Only small series of mammals have been

collected on this hill, but it is known to possess, in common with other ranges of similar elevation, species that are not met with in the low country, such as *Mus ciliatus*, Bonh.; *Sciurus tenuis tahan*, Bonh.; *Sc. novemlineatus*, Miller; and *Demomys rufigenis belfieldi* (Bonh.);

(*e*) Semangko Pass, 2,700 feet—

A pass on the main range between Selangor and Pahang, to the north of the preceding locality with high hills, on either side of it reaching about 4,800 feet.

(III.) Singapore and S. Johore:

(*a*) Bukit Timah, 580 feet—

In the centre of Singapore Island and the highest hill on it. Being a forest reserve, there is still some old jungle left, though it is very much damaged, most of the really large trees having been cut out. The hill, or its immediate neighbourhood, is probably the actual type locality for such species as *Sciurus tenuis*, *Tupaia ferruginea* and *Tragulus kanchil fulviventer*;

(*b*) Changi, Singapore Island—

A locality at the north-east corner of the island at the eastern entrance to Johore Straits, where there is still 300 or 400 acres of old jungle, and where mammals, especially rats and shrews, were found to be numerous;

(*c*) Tanjong Surat, S.-E. Johore—

On the coast of Johore, a few miles N.N.-E. of Changi. A large village with considerable groves of coconuts. There is no old jungle in the neighbourhood, all having been felled for gambier and pine-apples. Most of the plantations are now abandoned and have grown up in coarse grass (lalang) and bracken (resam);

(*d*) Si Karang, S.-E. Johore—

On the coast, 4 or 5 miles east of Tanjong Surat at the foot of the hill marked on the charts as Little Johore Hill. There was a certain amount of jungle here and characteristic species, such as *Mus rociferans* and *Rhinosciurus leo* were obtained;

(*e*) Tanjong Boi, S.-E. Johore—

A promontory between the estuaries of the Johore and Lebam Rivers and opposite Tanjong Surat.

A grove of coconuts yielded specimens of *Sc. peninsularis*, and not the new form *luteolus*, which occurs at Tanjong Surat and Si Karang, and also a few common rats;

(*f*) Bentan and Tanjong Penang—

Places on the south bank of the Lebam estuary, at each of which we had one night's trapping, securing specimens of *Mus klossi* and *Mus villosus*. The whole of the district has been devastated by pine-apple growers and no old jungle could be reached;

(*g*) Tanjong Gomok, S. Johore—

West of Pulo Ubin, on the north bank of the Johore Straits. This locality is only of interest on account of the presence of *Sc. v. miniatus*.

(IV.) E. Johore:

(*a*) Leman Point—

A small rocky knoll, projecting from an extensive sandy beach, which is fringed with a narrow grove of casuarinas and backed with a swamp so thorny as to be almost impenetrable. The locality, of which we had great hopes, proved most disappointing and yielded nothing but squirrels and a few rats. Game, however, was abundant, and the fresh tracks of deer and tiger were much in evidence during the three or four days we remained at anchor off the point. The village hard by had been deserted owing to the ravages of bears;

(*b*) Sibu Island—

An island about 4 miles long and 500 feet high, about 4 miles off the shore opposite Leman Point: the intermediate depth being under 10 fathoms. We spent one night here and secured a series of *Mus rattus*, which, we were told, was the only mammal on the island;

(*c*) Tinggi Island—

A lofty island, 5 miles by 2½, and about 2,000 feet high, 7 or 8 miles north-east of Sibu Island, and just inside the 15-fathom line. It is inhabited by a few "orang laut" of mixed Jakun and Malay origin and has several large coconut groves on it. With the exception of a few hours spent on it by one of us in 1906, it had never been collected on and it was hoped might yield species as interesting as its neighbours Tioman and Aor. Such was not the case, however, and the collections were most uninteresting, consisting merely of *Macaca fascicularis*, a squirrel of *peninsularis* type: *Mus concolor*, and a *Cynopterus* which is probably *C. montanus*.

A mouse deer is said to exist, but it is very rare, and the existence of any other species is denied by the natives. Even the plantain squirrel was exceedingly scarce.

Duyong (*Halicore duyong*) were not uncommon in some of the bays; but though two specimens were shot, they sank at once and were not recovered.

(V.) The Rhio Archipelago:

(*a*) Bintang Island—

With the exception of the outlying island of Panjang, or Mapor, which we were unable to visit, owing to unfavourable winds and currents, Bintang is the most easterly, as it is also the largest, island in the group. It is nowhere high, the biggest hill, Bukit Bintang, which forms an important mark for vessels entering Singapore Straits from the east and north only reaching 1,200 feet. The greatest part of its area consists of undulating land, from which all the jungle has been cleared in years past—for pepper, gambier and pine-apples—and has now, for the most part, relapsed into secondary growth, which is very difficult to penetrate. In places the ground is swampy and portions of the coast are fringed by mangroves, which, however, nowhere form a very broad belt, except on parts of the south coast, which we did not visit. On the north and east the shore is, for the most part, rocky with occasional beaches of fine white sand, and is nearly everywhere fringed by coral reefs. We collected at three places—viz., Tanjong Tombak, Pasir Panjang and Sungei Biru—all on the north coast, and the latter close to Tanjong Berakit, the north-east extremity of the island, and also visited for an hour or two Telok Dalam, a small settlement on the east coast:

(*b*) Batam Island—

Batam is the second largest island of the Rhio Archipelago and lies west of Bintang, from which it is separated by the Rhio Straits which form the highway for vessels proceeding from Singapore to Java and the Sunda Straits. It is even more cleared than Bintang, and those districts visited by us possessed very little original jungle indeed. The collections made by Kloss and reported on by Dr. Lyon were secured on the north and west coasts, while the present ones were made on the east at two localities within a few miles of each other—viz., Tanjong Sauh and Tanjong Turut. A full account of the island is given by one of us in the "Journal of the Straits Branch of the Royal Asiatic Society;" *

* No. 49, pp. 61-71 (1908).

(*c*) Sauh Island—

A small island in Rhio Straits between Batam and Bintang, the site of a light-house, maintained by the Dutch Government. Pigs of two species are found on it, mouse deer and the three species of rats, but no squirrels or shrews;

(*d*) Karimon Island—

This island is the most outlying of the Archipelago, and the most conspicuous of the northern group, owing to its height and position in the mouth of the Straits of Malacca near Singapore. Its peak, which is said to be an extinct volcano, rises to nearly 2,000 feet. Most of the timber has been cut out for export to the Singapore market and very little remains except at the northern end.

Four localities were collected in—viz., Monos at the northern end at the entrance of the Straits between Karimon and Little Karimon, Sebatak on the east coast, Tanjong Balai and Pemeral on the south. The whole of the south end of the island is covered with lalang grass and scrub;

(*e*) Little Karimon—

A small island to the north of Karimon, about 500 feet high. The only jungle left is on the tops of the hills, but large groves of coconuts, areca palms and durians exist. The island is only inhabited during the fruit season;

(*f*) Merah Island—

About a square mile in extent, a mile from the south coast of Karimon. The only animal secured was "Mus rattus;"

(*g*) Tulang Island—

A large low island, only separated by a narrow creek from Kundur. The expedition only stopped one night here on the way from Kundur. A form of *Ratufa insignis* was shot and a few "Mus rattus" trapped;

(*h*) Kundur Island—

A large low island, separated by a 10-fathom channel from Karimon but by much shallower water from Sumatra. Only a small patch, a few acres in extent, is left of the original jungle at the north end of the island, which was the only portion visited. Giant squirrels were fairly common, and the large white pig, *Sus oi*, was said to be very common, as was also the smaller *Sus rhionis*.

1. PRESBYTIS ALBOCINEREA, Desm.

♂ 1468/08. Dusun Tua, Selangor.

♀ 1470/08. Gunong Mengkuang Lebah, Selangor, 5,200 feet.

[Apparently unknown south of Selangor, where it is the commonest monkey in the inland districts.—H. C. R. and C. B. K.]

2. PRESBYTIS ALBOCINEREA CANA, Mill.

♂ 1434, 1451; ♀ 1452, 1501. Bliah, Kundur Island, Rhio Archipelago.

Topotypes.

[This form and the next inhabit the high woods and are not seen at river mouths nor in the mangroves.—H. C. R. and C. B. K.]

3. PRESBYTIS ALBOCINEREA RHIONIS, Mill.

♂ 811; ♀ 786. Sungei Biru, Bintang Island, Rhio Archipelago.

Topotypes.

4. PRESBYTIS CRISTATA, Raffles.

♂ 1515/08; ♀ 1510/08. Kuala Selangor, Selangor.

[Common in the coastal mangrove zone from Province Wellesley to Kuala Klang in Selangor, but unknown in Singapore or in any part of Johore.—H. C. R. and C. B. K.]

5. PRESBYTIS CRISTATA PULLATA.

Thos. and Wrought., Ann. Mag. N. H. (8), iii., p. 439 (1909).

♂ 760; ♀ 762. Pasir Panjang, Bintang Island, Rhio Archipelago.

♂ 921; ♀ 868, 869, 903, 904, 905, 906, 926. Tanjong Sauh and Tanjong Turut, Batam Island, Rhio Archipelago.

A local race of *Presbytis cristata*, differing by its darker colouring, especially on forehead and forearms and smaller teeth.

General colour as in *P. cristata* but duller, bases of hairs true black and pale tips quite short; whereas in true *cristata* the bases are slate colour, merging into silvery white for the terminal fourth of the hair length. Black cap more marked than in *cristata* and extending further back on to the nape; forearms much less grizzled with white, very often entirely black.

Skull as in *cristata*, except that the upper tooth row is rather shorter.

Measurements of the Type:

Head and body, 430; tail, 603; hind foot, 154; ear, 30 mm.

Skull: greatest length, 90.5; basal length, 65; palatal length, 32; greatest breadth, 69; braincase breadth, 50.5; nasal opening, 14.3 × 6.6; upper cheek tooth series, 26.3; maxillary tooth row, exclusive of incisors, 30 mm.

Habitat.—Batam and Bintang Islands, Rhio Archipelago (type from Tanjong Turut, Batam Islands).

Type.—Adult female. B. M. No. 9, 4, 1, 9. Original number 906. Collected 12th July, 1908.

[This Leaf Monkey, which is called "lotong itam," "lotong klabu," or merely "klabu," by the local Malays, is excessively common on both Batam and Bintang; though, curiously enough, Seimund did not meet with it on either Karimon or Kundur. As it was also unrepresented in Dr. Abbott's collections, it presumably does not occur on these islands. It is found usually in the mangroves in the immediate neighbourhood of the sea or tidal creeks, and hardly ever in high jungle.

It keeps in small parties of six or seven individuals made up of one old male with females and young of different ages. The newly born are brilliant orange yellow, but the pelage appears to be changed rapidly as specimens less than half grown are almost identical in colouration with the adults.—H. C. R. and C. B. K.]

6. MACACA FASCICULARIS, RAFFLES.

♂ 1065. Singapore Island.

♂ 849; ♀ 844. Tinggi Island, East Coast of Johore.

♂ 812; ♀ 740, 746, 780, 784. Bintang Island, Rhio Archipelago.

♂ 892, 893; ♀ 870, 877. Batam Island, Rhio Archipelago.

♂ 1329, 1331, 1332, 1662; ♀ 1330, 1636. Karimon Island, Rhio Archipelago.

♂ 1454; ♀ 1495. Kundur Island, Rhio Archipelago.

[The "kra" was very common indeed on every island we visited, including Singapore; females and young specimens were very tame and inquisitive, and consequently easy to collect, but the old males were very wary and took a good deal of getting. On Karimon they caused a great deal of trouble by springing or running off with the traps, as a result, a good many more than were really required came to an untimely end. The Peninsular form of this macaque is very variable, but it is not improbable that the smaller, brighter race inhabiting the more inland districts may be subspecifically distinct.—H. C. R. and C. B. K.]

7. PTEROPUS VAMPYRUS MALACCENSIS, K. ANT.

♂ 773; ♀ 759. Pasir Panjang, Bintang Island, Rhio Archipelago.

♂ 878, 976; ♀ 977. Tanjong Turut, Batam Island, Rhio Archipelago.

♂ 866, 867. Tanjong Sauh, Batam Island, Rhio Archipelago.

[The Malay Flying Fox, or "keluang," is essentially a denizen of the mangroves which fringe both shores of the Straits of Malacca, and although it may penetrate for considerable distances inland when certain fruits are in season, it is never seen in the countless millions that are a common sight in the narrow channels that intersect the islands in the neighbourhood of the Klang Straits on the coast of Selangor. In the Rhio Archipelago it was common on every island visited, though nowhere seen in very large flocks.—H. C. R. and C. B. K.]

8. CYNOPTERUS MONTANOI, Rob.

♂ 1271. Si Karang, S.-E. Johore.

♀ 1178, 1175. Tanjong Surat, S.-E. Johore.

♂ 895, 896, 940, 941, 957; ♀ 942, 970, 971, 972, 973, 974. Tanjong Turut, Batam Island, Rhio Archipelago.

♂. Pemeral, Karimon Island, Rhio Archipelago.

[Very common nearly everywhere in the southern half of the Peninsula and the islands, hanging in bunches under the eaves of the houses and on the fronds of the coconut palms. Replaced by the somewhat dubious species, *C. angulatus*, Mill., in the more northern districts, though how far south this form extends is as yet uncertain.—H. C. R. and C. B. K.]

9. CYNOPTERUS (NIADIUS) HARPAX.

Thos. and Wrought., Ann. Mag. N. H. (8), iii., p. 439 (1909).

♂ 695/08. Semangko Pass, Selangor-Pahang boundary, 3,000 feet.
571.
30th January, 1908.

B. M. No. 87. 20. 7. Type.

Size as in the Sumatran *C.* (*N.*) *minor*,* but teeth less square.

Size about as in *C. minor*, or a little smaller, the present specimen being old and the type of *minor* slightly immature. Colour quite as in typical *Cynopterus*, the back olivaceous brown with light bases to the hairs; sides of neck, throat and sides of belly brilliant ochraceous, median area of belly grey. Ears of medium size, margined with white, an angular lobule at the base of the external border.

Skull of about the size of that of *C. minor*, except that the interorbital region, is narrower and the tooth row shorter. Owing, however, to the imperfection of the typical skull, I am not able to make a complete comparison with the measurements given by Dr. Lyon. In general form the skull is quite similar to that of the much larger *C.* (*N.*) *princeps*, with the same grooved interorbital region with swollen margins and the same well-marked ridges.

Teeth of the same essential structure as in the other two forms of *Niadius*, with the same definite central cusp on p_4 and m_1, but the teeth throughout are narrower, less squared, and the lower ones are narrower posteriorly than anteriorly, the converse being the case (at least for p_3 and p_4) in *C. princeps*, with whose teeth those of *C. minor* are said to agree in every detail. The second minute central cusp of m_1 of *C. princeps* is, however, not represented in the new form.

Dimensions of the Type (the starred measurements taken in the flesh):

Forearm, 72 mm.; head and body, 105;* tail, 7;* hind foot, 15;* ear, 21.* Third finger metacarpal, 48; first phalanx, 31; second phalanx, 40.

Skull: tip of nasals to supraorbital foramen, 13.7; zygomatic breadth, 22.5; least interorbital breadth, 5.6; front of canine to back

* Lyon, P. U. S. Nat. Mus., xxxiv., p. 665 (1908).

of m^1 (alveoli), 10.5; last lower premolar, length, 2.3; breadth anteriorly, 1.9, breadth posteriorly, 1.6.

Habitat and Type as above. Should any mistake have been made in the allocation of skull to skin, which the close resemblance of the skin to ordinary *Cynopterus* suggests but which we have no other reason to suspect, the skull is to be taken as the type.

This most interesting species represents an intermediate link between *Cynopterus* and Mr. Miller's genus *Niadius*, possessing the extra-central molar cusps of the latter and the narrower and posteriorly-tapered teeth of the former. On this account, and also as we find that true *Cynopterus* has occasionally a small extra cusp on $m_{1,}$* we are not prepared to recognise *Niadius* as more than a sub-genus of *Cynopterus* even if it should not be altogether combined with the latter.

With regard to the specific distinctness of *C. harpax* from *C. minor* with which it agrees so closely in size, Dr. Lyon's statement that *minor* has the square-shaped teeth of *C. princeps* is so definite that in the case of such an accurate observer no doubt can exist as to the difference between the two forms.

[No doubt need be felt as to the allocation of skin to skull in the case of this specimen; there are four more of the species in the Selangor Museum collection, all shot in the same place and on the same day as the type described above. Unfortunately, the skulls of two are destroyed, and the others much damaged; but sufficient material remains to corroborate the cranial and skin characters given by the authors. It is unusual to meet with specimens of *Cynopterus* in deep jungle or at such an altitude as the Semangko Pass.—H. C. R. and C. B. K.]

10. PTENOCHIRUS LUCASI. Dobs.

♂ 1733, 1734; ♀ 1735. Bukit Timah, Singapore Island (H. N. Ridley).

♂ 706; ♀ 709, 712, 718. Tanjong Tombak, Bintang Island, Rhio Archipelago.

Mr. Ridley was the first to discover this bat out of Borneo, having sent specimens from Singapore to the British Museum in 1894.

The teeth of *Pt. lucasi* are rather variable in size, some of the specimens having much broader teeth than others. The same range of variation in this respect occurs both in Bornean and Peninsular specimens. The teeth of the males are generally larger than those of the females, but there seem to be some exceptions to this rule.

[This Fruit Bat is an inhabitant of caves and crannies, but is very local in the Peninsula, being only known from the above locality in Singapore and from the Batu Caves near Kuala Lumpur, where it is one of the rarer species.—H. C. R. and C. B. K.]

11. HIPPOSIDEROS GALERITUS. Cant.

♂ 1639, 1642; ♀ 1638. Monos, Karimon Island, Rhio Archipelago.

* B. M. No. 97, 11, 1. 1, from Bombay.

12. MEGADERMA SPASMA TRIFOLIUM, Geoff

♂. Tanjong Tombak, Bintang Island, Rhio Archipelago.

[Outside caves this is the commonest of the Leaf-nosed Bats in the Peninsula.—H. C. R. and C. B. K.]

13. NYCTALUS STENOPTERUS, Dobs.

♀ 1283. Si Karang, S.-E. Johore.

[Occurs also in Singapore and not hitherto recorded from the Peninsular region.—H. C. R. and C. B. K.]

14. SCOTOPHILUS CASTANEUS, Gray.

♂ 1221, 1222; ♀ 1226, 1227, 1229, 1232. Tanjong Surat, S.-E. Johore.

[Generally found in large numbers in the crowns of pinang and coconut palms, or in houses.—H. C. R. and C. B. K.]

15. MYOTIS ADVERSUS (Horsf.) (?).

1579, 1581. Lekop, Karimon Island, Rhio Archipelago.

16. EMBALLONURA PENINSULARIS, Mill.

♂ 1432, 1461, 1484. Bliah, Kundur Island, Rhio Archipelago.

Pending a general revision of the group, we use Mr. Miller's name for this bat on account of its locality. But we have already shown * that his main reason for distinguishing it from the Javan *monticola*, its supposed greater size, was non-existent, and we now fail to find any striking difference between the skulls of these specimens and those collected by Mr. Shortridge in Java.

[Since this bat was first recorded from Trang it has turned up in considerable numbers in various local collections. It is a jungle species flying in dense shade throughout the day and appearing in open spaces at dusk.—H. C. R. and C. B. K.]

17. TAPHOZOUS LONGIMANUS ALBIPINNIS, Thos.

♀ 1218. Tanjong Surat, S.-E. Johore.

[Found associated with large numbers of *Scotophilus castaneus*. Lives in hollow trees and among rocks.—H. C. R. and C. B. K.]

18. CHIROMELES TORQUATUS, Horsf.

♂ 1444, 1455. Bliah, Kundur Island, Rhio Archipelago.

[Very common in Singapore, in the Rhio Archipelago and in Tioman Island, but decidedly rarer on the mainland. It is not an easy species to obtain, as it flies with extreme swiftness, justifying its generic name, and only appears when it is almost dark. Several were shot from the deck of the tongkang but sank at once.—H. C. R. and C. B. K.]

19. GALEOPTERUS PENINSULÆ, Thos.

♂ 1120; ♀ 1089. Changi, Singapore Island.

[Quite common in those portions of Singapore Island, still under forest, the Flying Lemur, or "kubong," occurs abundantly on all the

* P. Z. S., 1909, p. 38.

islands round the Peninsula, but apparently more sparingly on the mainland itself. It inhabits dense jungle, where it passes the day with its body closely flattened against the trunks of trees with its head upwards, not hanging from branches like bats. It is probably crepuscular, but we have never seen it flying on its own initiative like the large flying squirrels of the genus *Pteromys*.

The lemon yellow tinge often observed on the pelage appears to be due to some extraneous matter as it partially disappears during the preparation of the specimen. Though commonly classed as an insectivore, the species is largely a vegetable feeder as the stomachs of the numerous individuals examined by us rarely contained any appreciable amount of animal matter, but were almostly wholly filled with masticated leaves and buds.—H. C. R. and C. B. K.

20. GALEOPTERUS AORIS, Mill.

♂ 752, 772; ♀ 751. Pasir Panjang, Bintang Island, Rhio Archipelago.

♂ 789, 795; ♀ 813, 814. Sungei Biru, Bintang Island, Rhio Archipelago.

♂ 1560, 1561; ♀ 1559. Lekop, Karimon Island, Rhio Archipelago.

♀ 1635. Monos, Karimon Island, Rhio Archipelago.

We find that the Flying Lemurs, inhabiting the Rhio Archipelago, Aor Island, the Natunas and Borneo, agree in being of medium size, with very small teeth in marked contrast to the large teeth of *peninsulæ*. But among themselves we have failed to find any constant local differences warranting their division into races, and have therefore adopted *aoris* as the oldest name for them.

[Very common on all the islands.—H. C. R. and C. B. K.

21. TUPAIA CASTANEA, Mill.

♂ 782, 792, 806; ♀ 791. Sungei Biru, Bintang Island, Rhio Archipelago.

♂ 749, 750; ♀ 742, 768. Pasir Panjang, Bintang Island, Rhio Archipelago.

Topotypes.

[This shrew is remarkably distinct from any form inhabiting the Peninsula or adjacent islands, though a closely-allied race has recently been described from Sumatra. It was very abundant on Bintang in secondary jungle which had grown up on the sites of old gambier plantations. The pelage of very young specimens is different from that of the adult and approaches *T. ferruginea*.—H. C. R. and C. B. K.]

22. TUPAIA FERRUGINEA, Raffles.

♂ 1011, 1035, 1054, 1101, 1128; ♀ 1007, 1069, 1129. Changi, Singapore Island.

♂ 1263; ♀ 1251. Si Karang, S.E. Johore.

[The jungle near Changi was an exceedingly good trapping ground, and out of 70 or 80 traps set every night, hardly one was found unsprung, or without an occupant next morning. Six or seven of these shrews were usually thus captured and many more were shot every day. The popular name of "tree shrew" for these animals is hardly descriptive of their habits, as, in the case of the majority

of species, at any rate, it is quite exceptional to see one anywhere than on the ground, among the roots of trees or on low bushes. The diet is very mixed, consisting of ants and other insects, fruits, seeds and buds. The nest is found in holes, often in fallen timber, and two young are produced at a birth.—H. C. R. and C. B. K.]

23. TUPAIA FERRUGINEA BATAMANA, Lyon.

♂ 881, 956, 966, 967; ♀ 900, 918, 965. Tanjong Turut, Batam Island, Rhio Archipelago.

Topotypes.

[As common in Batam Island as the typical form is in Singapore.—H. C. R. and C. B. K.]

24. ARCTOGALIDIA FUSCA, Mill.

♀ 1525, 1526. Bliah, Kundur Island, Rhio Archipelago.

Topotypes.

25. ARCTOGALIDIA SIMPLEX, Mill.

♂ 939; ♀ 938. Tanjong Turut, Batam Island, Rhio Archipelago.

[Species of this genus, to which the name of palm-civet far more properly applies than to the commoner *Paradoxurus*, are apparently by no means rare in the Rhio Archipelago. It is evidently far more diurnal than the ordinary musang and less carnivorous in its diet. It was numerous among the coconuts, fringing the east coast of Batam, and several were shot at dusk, though an individual has also been shot at midday while feeding in shady forests.

On the Peninsula itself the genus is rare and none of the local Museums possess an adult specimen, and neither of us have during many years seen a specimen in the flesh.—H. C. R. and C. B. K.]

26. AONYX CINEREUS, Ill.

♂ 770. Pasir Panjang, Bintang Island, Rhio Archipelago.

[Common among the mangroves on the shore.

Quite the most abundant of the otters of the Malay Peninsula and found equally in salt, brackish and fresh water, and even in mountain streams.—H. C. R. and C. B. K.]

27. RATUFA AFFINIS, Raffles.

♂ 1041. Changi, Singapore Island.

Topotype.

[Now getting rather scarce in Singapore, though common in S. Johore. Its extension northwards is very limited, and we do not know of any specimen obtained in the interior of the State. In Malacca and Negri Sembilan its place seems to be taken by the form to which the name of *Ratufa affinis aureiventer*, Geoff., has been applied by Bonhote. Further north on the west side of the mountains the dark-footed species *R. pyrsonota*, Mill., begins to appear. The black and yellow species *R. melanopepla*, Mill., occurs throughout the Peninsula except in the districts inhabited by *R. affinis*. It is not known from Singapore.—H. C. R. and C. B. K.]

28. RATUFA INSIGNIS, Mill.

♂ 894; ♀ 879. Tanjong Turut, Batam Island, Rhio Archipelago.

♂ 1532; ♀ 1533. Talang Island, Rhio Archipelago.

A comparison of the fine series of Rhio Giant Squirrels obtained by this expedition brings us to the conclusion that they ought all to be considered as one species, and that even as sub-species, the characters used by Mr. Miller to separate the different island forms, are so intangible and so inconstant that their recognition is only doubtfully advisable. For the moment we place the specimens that are topotypes under their respective island names, leaving those from Batam and Talang simply as *R. insignis*.

That the different island forms overlap in their characters is a fact beyond dispute, as these specimens clearly show, and we are more than ever convinced, that the use of binomials for such forms is a very great mistake.

[Apparently scarce on Batam, as the two specimens listed above were the only ones seen by a party of six in over a fortnight, while Kloss never met with it on two visits. Seimund reports it as common on Talang.

All the Giant Squirrels are inhabitants of high jungles except in the fruit season when they occasionally visit orchards. They keep to the tops of lofty trees, are solitary in their habits, and, when alarmed, give utterance to a loud chattering, which is sometimes heard in the jungle at night. The very special liability of members of this genus to rapid and extensive bleaching causes great difficulty in the recognition of the very numerous geographical races into which the original *R. ephippium* has now been split up.—H. C. R. and C. B. K.]

29. RATUFA INSIGNIS CARIMONENSIS, Mill.

♂ 1544, 1551, 1553; ♀ 1547, 1550, 1552, 1555, 1556. Selerak, Karimon Island, Rhio Archipelago.

♂ 1634. Monos, Karimon Island, Rhio Archipelago.

♀ 1372. Pemeral, Karimon Island, Rhio Archipelago.

Topotypes.

[Very common.—E. S.]

30. RATUFA INSIGNIS CONDURENSIS, Mill.

♂ 1493; ♀ 1470, 1472. Bliah, Kundur Island, Rhio Archipelago.

Topotypes.

[Common.—E. S.]

31. RATUFA INSIGNIS CONSPICUA, Mill.

♂ 790, 809; ♀ 807, 810. Sungei Biru, Bintang Island, Rhio Archipelago.

Topotypes.

[This species was common only in a patch of high jungle at the extreme north-east end of Bintang Island and was rather difficult to get, as it kept to the extreme tops of very lofty trees.—H. C. R. and C. B. K.]

32. SCIURUS PREVOSTII CONDURENSIS, Mill.

♂ 1437, 1445, 1446, 1469, 1492; ♀ 1438, 1439, 1440, 1442, 1450, 1468. Bliah, Kundur Island, Rhio Archipelago.

Topotypes.

[Very common. It is a curious fact that in the Rhio Islands, where squirrels of this group are met with, no form of *viltatus* occurs and *vice versâ*. All the specimens from the Archipelago were obtained in the vicinity of villages, but in the Peninsula they are strictly jungle animals and are quite unknown in orchards.—H. C. R. and C. B. K.]

33. SCIURUS PREVOSTII CARIMONENSIS, Mill.

♂ 1341, 1355, 1367, 1387, 1388; ♀ 1328, 1368, 1371, 1389, 1403. Pemeral, Karimon Island, Rhio Archipelago.

Topotypes.

34. SCIURUS VITTATUS MINIATUS, Mill.

♀ 1307, 1309. Tanjong Gomok, S. Johore.

[The occurrence of five specimens of this race at the extreme south of the Peninsula is a most disconcerting fact, as we were formerly of the opinion that the true *miniatus* was found only in connection with the main range and did not extend further south at most than the latitude of Malacca, while the remaining non-mountainous southern portion of the Peninsula (*i.e.*, the region south of the Pahang, Triang and Muar rivers) seemed to be occupied by the paler animals of the following races, with no clear red pencil to the tail. It seems at present an undoubted fact that these specimens of *miniatus* from Tanjong Gomok are isolated from the rest of their race by the southern forms, and that we have here a minor instance of discontinuous distribution.—H. C. R. and C. B. K.]

35. SCIURUS VITTATUS PENINSULARIS, Mill.

♂ 833. Leman Point, E. Johore.

♂ 1215, 1216. Tanjong Boi, S.-E. Johore.

♀ 860. Bukit Timah, Singapore Island.

♂ 1039, 1113; ♀ 1013, 1032, 1133. Changi, Singapore Island.

♂ 1687, 1688; ♀ 1666, 1689, 1711. Little Karimon Island, Rhio Archipelago.

♂ 766; ♀ 732, 743, 769. Pasir Panjang, Bintang Island, Rhio Archipelago.

♂ 702, 704, 710. Tanjong Tombak, Bintang Island, Rhio Archipelago.

♀ 825. Telok Dalam, Bintang Island, Rhio Archipelago.

♀ 794. Sungei Biru, Bintang Island, Rhio Archipelago.

Some of the Bintang specimens have a broader black lateral stripe than usual, but the character is not constant enough to justify their separation as a local race.

In working out these Plantain Squirrels the question has again arisen as to what is the typical *Sc. vittatus*, Raffles., a question which has given a great deal of trouble to recent workers, owing to the fact that the four specimens in the British Museum received from Raffles and considered as typical of his species are obviously referable to more than one form.

We now owe to the kindness of the authorities of the United States National Museum six specimens of the group, representing different forms described and recognised by Messrs. Miller and Lyon in their various writings on the subject, and have carefully compared Raffles' specimens with these in order to settle, pending the arrival of Bencoolen topotypes, what form should be considered to be the true *Sciurus vittatus*.

Of the four "typical" specimens, No. 79, 11, 21, 580, has a red tail tip, and is clearly referable to *S. v. miniatus*, Miller, a native of the northern part of the Malay Peninsula. No such form has been found in Sumatra, and since Raffles undoubtedly received many specimens from places in the Peninsula, we may consider this specimen as one of them, and eliminate it as being not typical of the Bencoolen *vittatus*.

A second specimen, No. 79, 11, 21, 581, has lost the tip of its tail, but the stump shows a little red, and this also may, therefore, be eliminated as possibly Malayan in its origin and put aside from the question.

The above two specimens are referred to in Horsfield's "Catalogue of the Indian Museum"* as having been presented by Sir T. S. Raffles, but no locality is assigned to them.

The other two specimens, 69*a* and 69*b*, were presented by Lady Raffles in 1830, and of them 69*a* with a broken tail and characters that we cannot match exactly in any Sumatran specimen may be put aside, thus leaving 69*b* to stand as the type.

This specimen agrees precisely with the two from localities nearest to Bencoolen now available to us—namely, one from Pajo in the Padang Highlands, collected by Carl Boek; and the other from Tarussan Bay, collected by Dr. Abbott—and typical of Mr. Lyon's *Sc. v. tarussanus*,† a name that will, therefore, become a synonym of *Sc. v. vittatus*.

This result is not unexpected, and there is little prospect of its being upset on the arrival of undoubted Bencoolen specimens of *Sc. vittatus*.

We, therefore, take the name *vittatus* for the Plantain Squirrel of the southern half of Western Sumatra, leaving *peninsularis* for those of the Peninsula and Eastern Sumatra, with the majority of the islands between the two. That from Batam, however, may be distinguished as a special local form.

36. SCIURUS VITTATUS NESIOTES.

Thos. and Wrought., Ann. Mag. N. H. (8), iii, p. 439 (1909).

♂884, 898, 912, 914, 920, 923, 969; ♀908, 909, 911, 935. Tanjong Tarsa, Batam Island, Rhio Archipelago.

♂873; ♀871, 874, 875. Tanjong Sauh, Batam Island, Rhio Archipelago.

A local race of *Sc. vittatus*, most resembling subsp. *peninsularis*, but with the dark lateral band reduced.

* P. 152 (1851). † Smiths. Misc. Coll., xlviii, p. 279 (1907).

General colour above rather greyer than in *peninsularis*; arms, hands, legs and feet as in true *vittatus* and lacking the bright golden grizzling of *peninsularis*. Lower surface "tawny ochraceous," black side stripe narrow in marked contrast to its strong development in the specimens of the *vittatus* group in the other islands of the Archipelago.

Skull as in typical *vittatus*.

Dimensions of the Type:

Head and body, 202; tail, 173; hind foot, 45: ear, 16 mm.

Skull: greatest length, 51; basilar length, 40; greatest breadth, 31.3; nasals, 15; diastema, 12.4; upper molar series, exclusive of p_3, 8.8 mm.

Habitat.—Batam Island, Rhio Archipelago (type from Tanjong Turut).

Type.—Adult male. B. M. No. 9, 4, 1, 170. Original number 920. Collected 14th July, 1908.

It might be difficult to distinguish certain individuals with exceptionally well-marked lateral stripe from extreme specimens of *Sc. v. peninsularis*, but the brighter colouring of the hands and feet in *peninsularis* helps to make the two forms easily separable.

37. SCIURUS VITTATUS SUBLUTEUS.

Thos. and Wrought., Ann. Mag. N. H. (8), iii., p. 440 (1909).

♂ 1250, 1274, 1275, 1278; ♀ 1246, 1248, 1276. Si Karang, S.-E. Johore.

♂ 850. Tinggi Island, S. China Sea.

A local form of *Sc. vittatus*, the same size as *v. peninsularis*, characterised by the "soiled" pale yellow colour of the abdomen.

Closely resembling typical *vittatus*, but the general colour somewhat greyer, the abdomen "orange buff," it is "ochraceous buff" in typical *vittatus* and "tawny" in *v. peninsularis*; hands and feet greyer than in true *vittatus*, the golden grizzling so conspicuous in *v. peninsularis* entirely absent.

Skull as in typical *vittatus*, but teeth somewhat smaller.

Dimensions of the Type:

Head and body, 191; tail, 186; hind foot, 47; ear, 17 mm.

Skull: greatest length, 51.5; basilar length, 41.3; greatest breadth, 30.5; nasals, 15.5; diastema, 13; upper molar series, excluding p_3, 8 mm.

Habitat.—Si Karang, S.-E. Johore.

Type.—Adult male. B. M. No. 9. 4. 1, 180. Original number 1250. Collected 1st August, 1908.

There is practically no variation throughout the series, and the form is recognisable at a glance from any other by the peculiar colouring of the belly.

[About sixteen specimens of this form have been actually preserved, and one of us has examined another 20, which were shot within 10 miles of the type locality at Tanjong Surat, and all agree in the

characters as given above. We are doubtful, however, whether the Tinggi squirrel, when a larger series is available, will be retained in this race. Moreover, specimens from Leman Point on the east coast of Johore, not more than 15 miles from Tinggi, are indubitably *peninsularis*. The corner of Johore, whence all but the Tinggi specimens come, is nearly an island, as a deep estuary, the Sungei Lebam, runs up to within 4 or 5 miles of the east coast, while the Johore Straits and the estuary of the Johore River separates it from the mainland to the west. At Tanjong Boi, within 8 miles, as the crow flies of the type locality of this race, but on the other side of the estuary, *Sc. t. peninsularis* is common.—H. C. R. and C. B. K.

38. SCIURUS TENUIS, Horsf.

♂ 1001, 1062, 1118; ♀ 1062*a*. Changi, Singapore Island.

♂ 856, 862; ♀ 859, 861. Bukit Timah, Singapore Island.

Topotypes.

[This small squirrel is widely distributed throughout the Peninsula up to about 4,000 feet, above which level it is, in Pahang and Selangor, replaced by *Sc. tenuis tahan*, a considerably larger form, which, apart from dimensions, can be recognised by the yellow buff, not white annulations to the hairs of the tail.

Though we have not actually seen topotypes of *Sciurus tenuis surdus*, Miller, described from Trang, we have had through our hands some hundreds of specimens from all localities south of a point about 150 miles south of Trang, and have been unable to draw any constant distinction, however slight between this large number and some 30 or 40 topotypes of *Sc. tenuis* from Singapore. From the fact that the authorities of the United States National Museum have distributed specimens from Johore under the name *Sc. tenuis surdus*, Miller, it would appear that they restrict the typical *tenuis* to Singapore Island, a conclusion with which we cannot agree.—H. C. R. and C. B. K.

39. SCIURUS SEIMUNDI.

Thos. and Wrought., Ann. Mag. N. H. (8), iii. p. 149 (1909).

Allied to, and of the same size as, *Sc. robinsoni*, Bonh., but having the pale belly area much narrowed and the hands and feet more coarsely made.

Fur soft and close, but rather short (7 mm. on the back). General colour above as in *robinsoni* but rather warmer especially on the fore-parts; below much less tinged with buff than in that species, at most yellowish white. Dark colour of back produced downwards on the sides, so that the pale belly area, which is parallel sided and sharply defined, is much narrowed, and the pale areas on the inner sides of the upper arms and legs are isolated from it. Hands and feet coloured like the back, more heavily built than in *robinsoni*.

Skull of type much damaged, but not appearing to differ from that of *robinsoni*, except that the upper incisors seem slightly more inclined forwards.

Dimensions of the Type:

Head and body, 115; tail, 86; hind foot, 32; ear, 12 mm.

Skull too damaged to yield reliable measurements except upper tooth series, exclusive of p^3, 5.5 mm.

Habitat.—Bliah, Kundur Island, Rhio Archipelago.

Type.—Old male. B. M. No. 9, 4, 1, 188. Original number 1505. Collected 21st August, 1903.

The narrowing of the belly colour by the prolongation downwards of the dark colouration of the upper surface serves to distinguish this species at a glance from *Sc. robinsoni*, Bonh., its only close ally.

We have named this species after Mr. E. Seimund, Mr. Robinson's assistant and taxidermist, to whose energy and collecting powers the richness of the Rhio collection is largely due.

[Squirrels of this type are really quite common in certain localities on the Peninsula, and considerable numbers of the local form named recently by Mr. Thomas, *Sc. robinsoni alacris*, have been collected in Selangor within the last few months. It is a ground species, running about in very thick undergrowth among fallen timber and rarely found at any height on the trees. It can only be shot, therefore, at very short range, and hardly any undamaged specimens with perfect skulls have as yet been secured.

The specimen from the Kateman River,* Eastern Sumatra, identified by Mr. Lyon as *Sciurus lowii*, Thos., must be very close to, if not identical with, this species.—H. C. R. and C. B. K.]

40. LARISCUS "INSIGNIS,"† F. Cuv.

♂ 129. Gunong Ijau, Perak, 4,700 feet.

♂ 2035; ♀ 2036. Cheras, Selangor.

♂ 1055, 1057; ♀ 1102. Changi, Singapore Island.

[We have recently brought together a large series of *Lariscus* (until lately more generally known as *Funambulus*) with a view to elucidating the two species hitherto described from the Peninsula—viz., *L. peninsulæ* (Mill.) from Trang, of which only one authentic specimen is known; and *L. insignis jalorensis* (Bonh.) type from Bukit Besar in the Patani States, of which we possess a very large series from all localities south of Perak, including specimens compared and identified with the type by Mr. Bonhote himself. It may briefly be stated that, with the exception of one specimen from Bukit Kutu in Selangor, which we are inclined to think abnormal, the whole of the very large series that has passed through our hands, except those from Johore and Singapore, can without hesitation be referred to the form described by Bonhote, without considering the validity of that form as compared with the typical *insignis* from Sumatra.

The five specimens that we have seen from Singapore, however, and others collected by Kloss in Johore, which were referred to *peninsulæ*

* Lyon, Proc. U. S. Nat. Mus., xxxiv., p. 642 (1908).

† *Laria* being preoccupied, we have suggested the name Lariscus in a paper published by the Zoological Society. (*P. Z. S.*, 1909, p. 389).

by Bonhote (P. Z. S., 1906, p. 7), agree among themselves and differ very markedly from *jalorensis* in having the sides and flanks very much more rufous, almost orange.—H. C. R. and C. B. K.

11. RHINOSCIURUS TUPAIOIDES,* Blyth.

♂ 673, 674. Tanjong Malim, Perak-Selangor boundary.

♂ 2005, 2037; ♀ 2004, 2070. Cheras, Selangor.

The original *tupaioides* may be readily distinguished by its white-washed tail, the tips of the hairs being either white, or with but the faintest trace of buffy, in marked contrast to the strongly buffy-washed tails of all the other members of the genus.

Dr. Annandale, of the Calcutta Museum, has been good enough to inform us that, in the original specimen described by Blyth, the "tips of the hairs of the tail appear to have been pure white without any trace of ochraceous whatever."

The present collection includes a magnificent series of *Rhinosciurus*, a genus so rare that the British Museum only possessed four skins of it before we received the typical series of *R. robinsoni* from Tioman last year, and judging by the lists published, Dr. Abbott's collections included but very few examples of it.

Now, however, we have before us no less than 42 specimens, including series from each of the localities chiefly dealt with in the present paper.

It is a curious thing that in this genus the cheek-teeth wear down with unusual rapidity, so that many old specimens have the teeth worn quite down to the roots, or even altogether absent. In one case we have had to select as type a specimen without any teeth, but as these, when present, are of little diagnostic value, such a selection does not materially matter.

The forms contained in the genus may be arranged as follows:

A. Tail hairs washed with whitish, Selangor, Malacca, etc. **tupaioides**

B. Tail hairs tipped with buffy ochraceous.

a'. Muzzle of skull comparatively broad.

a''. Hind foot 39 mm. or upwards.

a'''. Skull shorter, bullæ smaller, Perak ... ... **peracer**

b'''. Skull longer, bullæ larger.

*a*⁴. Hind foot averaging about 40 mm., Singapore **leo**

*b*⁴. Hind foot averaging about 42 mm., Rhio Islands ... ... **leo rhionis**

b''. Hind foot 36-38 mm., Tioman Island ... ... **robinsoni**

b'. Muzzle of skull very narrow, parallel sided, bullæ small, Borneo ... ... **laticaudatus**

* On further consideration, Thomas decides not to press his former contention ("Journal, Federated Malay States Mus.," ii., p. 101, 1908) that the English names in Gray's List of Mammals, 1843, should be considered technically as descriptions. As a result, the type of the present species is the specimen mentioned in 1855 by Blyth and not that in Gray's List.

It is to be noticed that the colour of the belly is different in the two sexes, owing to the male generally having a brown patch in the inguinal region, just in front of the hips, and this, with the brown colour of the scrotum, gives a much darker aspect to the under side than is the case in the females. Some few males are, however, without the brown patches.

[The habits of all the species of *Rhinosciurus* known to us are identical and what applies to one applies to all equally. They are strictly terrestial and very shy, which accounts for their rarity in collections. Their diet, judging from numerous specimens that we have examined, is principally insectivorous, consisting of large ants and beetles. The tongue is very long and remarkably protrusible, and it is probable that gritty matter taken up with the insects by means of this organ accounts for the rapid wear of the teeth, which Messrs. Thomas and Wroughton have commented on above. The animals are generally found in the neighbourhood of large and rotten logs and, at the least alarm, take refuge beneath or in any available hole. The considerable number obtained was principally due to the efforts of one of our Dyak collectors, who developed a remarkable capacity for securing ground birds and mammals.—H. C. R. and C. B. K.]

12. RHINOSCIURUS PERACER.

Thos. and Wrought., Ann. Mag. N. H. (8), iii., p. 440 (1909).

♀89. Maxwell's Hill, Perak, 3,600 feet. 1st September, 1908.

B. M. No. 9, 4, 1, 252. Type.

General colour dark; light shoulder stripes scarcely perceptible; under surface of medium buffiness. Hands and feet dark, becoming black on the fingers and toes. Tail hairs tipped with buffy ochraceous, rather less broadly and conspicuously than in the more southern forms.

Skull curiously more like that of the Bornean *laticaudatus* than of the intermediate forms, the bullæ similarly small, the muzzle not quite so narrow and parallel sided.

Dimensions of the Type measured in the flesh:

Head and body, 213; tail, 122; hind foot, 41; ear, 14 mm.

Skull: greatest length, 56; condylo-basal length, 52; greatest breadth, 26; length of bullæ, 11.7; upper molar series, exclusive of p^3, 10 mm.

Habitat and Type as above.

The occurrence of this *Rhinosciurus* with a buffy-washed tail to the north of *tupaioides* is curious, for the latter appears to range quite across the Peninsula, and to shut off *peracer* from all the other similarly-coloured forms to the south. Its skull is more similar to that of the Bornean species than to *leo*, the species occurring next south of *tupaioides*.

8. RHINOSCIURUS LEO.

Thos. and Wrought., t.c., p. 440 (1909).

♂ 1293. Si Karang, S.-E. Johore.

♂ 1032, 1122, 1123; ♀ 1058, 1066 (yg.), 1103, 1111. Changi, Singapore Island.

Like *R. peracer* externally, the general colour a little richer, the tail more broadly washed with buffy-ochraceous, and the under surface averaging whiter, though some specimens are quite as buffy below. Brown of hands and feet running on to the fingers and toes, these being only black just at the bases of the claws.

Skull longer than in *peracer*, and the bullæ markedly larger, the largest in the genus.

Dimensions of the Type measured in skin:

Head and body, 204; tail, 122; hind foot, 41; ear, 18 mm.

Skull: greatest length, 58; condylo-basal length, 53; greatest breadth, 29; palatal length, 32.5; length of bullæ, 12.3 (no cheek-teeth remaining).

Habitat.—Singapore Island and adjacent mainland (type from Changi, Singapore).

Type.—Old male. B. M. No. 9, 4, 1, 233. Original number 1122. Collected 24th July, 1908, by H. C. Robinson and E. Seimund.

This species is distinguished from the Perak animal by its much larger bullæ, from the Selangor *tupaioides* by its ochraceous-washed tail and from its insular representative *rhionis* by its smaller average size and lighter belly.

The hind feet of the six adult Singapore specimens measure as follows: 39, 39, 41, 41, 41, 41 mm.

41. RHIONOSCIURUS LEO RHIONIS.

Thos. and Wrought., t.c., p. 441 (1909).

♂ 1366, 1546, 1577, 1614, 1615. Karimon Island, Rhio Archipelago.

♂ 1473, 1511; ♀ 1446, 1504, 1510. Bliah, Kundur Island, Rhio Archipelago.

♂ 901, 937, 954, 955; ♀ 946. Tanjong Turut, Batam Island, Rhio Archipelago.

♂ 763, 771. Pasir Panjang, Bintang Island, Rhio Archipelago.

Like true *leo* but the general colour slightly richer, the light shoulder stripes more evident, the belly more strongly suffused with buffy, varying from "cream buff" to "buff" or even occasionally "ochraceous buff." Size averaging greater, as shown by the length of the hind feet given below.

Skull bullæ large, but barely so large in proportion, on the average, as in true *leo*.

Dimensions of the Type:

Head and body, 212; tail, 135; hind foot, 42.5; ear, 18 mm.

Skull: greatest length, 59; condylo-basal length, 55; greatest breadth, 28.8; palatal length, 32; length of bullæ, 12 mm.; front of p^1 to back of m^3, 10.5.

Habitat.—Rhio Archipelago, from Kundur on the west to Bintang on the east (type from Karimon).

Type.—Adult female. B. M. No. 9, 4, 1, 238. Original number 1366. Collected 13th August, 1908.

This Rhio form of *leo* is rather larger and lighter coloured with more strongly buffy belly, but the variation of the belly colour quite overlaps the Singapore series, while the lengths of hind feet also intergrade.

The following are some hind foot measurements of specimens from different islands:

Karimon	...	42, 42.5, 43, 43, 45	Average of 17 specimens, 42.5
Kundur	...	42, 42, 42, 43, 43.5	
Batam	...	41, 42, 42, 42.5, 43	
Bintang	...	41.5, 42	

45. MUS "RATTUS," Linn.

♂ 1340, 1341 (imm.), 1345, 1350, 1359, 1360, 1361, 1376, 1378, 1382, 1393, 1394, 1398, 1401; ♀ 1335, 1346, 1358, 1362, 1373, 1374, 1377, 1379, 1380, 1384, 1386, 1392, 1400. Pemeral, Karimon Island, Rhio Archipelago.

♂ 1313, 1314, 1327; ♀ 1316, 1319, 1320, 1321, 1323, 1326. Merah Island, near Karimon Island.

♂ 1416; ♀ 1413, 1422, 1424. Tanjong Balei, Karimon Island.

♂ 1587, 1588, 1590, 1591, 1592; ♀ 1562, 1567. Lekop, Karimon Island.

♂ 1601, 1602, 1603, 1604, 1605, 1622, 1659; ♀ 1608, 1609, 1610, 1655, 1660, 1661. Monos, Karimon Island.

♂ 1676, 1703, 1704, 1727, 1731; ♀ 1696, 1698, 1700, 1705. Little Karimon Island.

♂ 1430, 1463, 1465, 1508, 1513; ♀ 1431, 1432, 1447, 1453, 1464, 1467, 1487; ♂ 1514, 1515, 1530. Bliah, Kundur Island, Rhio Archipelago.

♂ 1535, 1538; ♀ 1537, 1539, 1541. Talang Island, Rhio Archipelago.

♂ 1162, 1181, 1186, 1191, 1239, 1242; ♀ 1169, 1185, 1189, 1237, 1241. Tanjong Surat, S.-E. Johore.

♂ 826. Leman Point, E. Johore.

♂ 838, 839, 841. Sibu Island, E. Johore.

♀ 1269. Si Karang, S.-E. Johore.

[With the exception of the series from Tanjong Surat and Si Karang, S.-E. Johore, which can be picked out at a glance as belonging to the form described by Mr. Bonhote as *Mus griseiventer*, these rats, though broadly referable to the true "rattus" group, impressed us as showing very great variation *inter se*. Those from Little Karimon are certainly different on cursory inspection from any of the many hundreds of the group from the Malay Peninsula and the vicinity that have passed through our hands.—H. C. R. and C. B. K.]

16. MUS RATTUS RHIONIS.

Thos. and Wrought., t.c., p. 441 (1909).

♂ 727, 739, 755, 765, 774, 816, 817; ♀ 696, 713, 711, 734, 738, 746, 747, 818. Bintang Island, Rhio Archipelago.

♂ 907, 947, 987. Batam Island, Rhio Archipelago.

♂ 995. Sauh Island (between Bintang and Batam Islands).

A form of *rattus* of the *rufescens* type of colouring, but darker than any other form known from this Archipelago.

Fur fairly long (18-20 mm. long on back) with comparatively few scattered spines. Individual hairs of the back grey with a one-third tip of "buff;" below white to their bases. The general colour above and below separated by a not very distinct dividing line.

DIMENSIONS OF THE TYPE (taken in the flesh):

Head and body, 187; tail, 187; hind foot, 35; ear, 20 mm.

Skull: greatest length, 44; basilar length, 36; zygomatic breadth, 20; braincase breadth, 16; diastema, 13; upper molar series, 6.7 mm.

HABITAT.—Bintang and Batam Islands, Rhio Archipelago (type from Bintang Island).

TYPE.—Adult male. B. M. No. 9, 4, 1, 322. Original number 739.

The long series quoted above includes animals of both sexes and all ages which are remarkably uniform in their general appearance.

[One of the most distinct of the "rattus" group that we have met with in the region, on account of its dark colouration.—H. C. R. and C. B. K.]

17. MUS KLOSSI, Bonh.

♂ 2061; ♀ 2019, 2023. Cheras, Selangor.

♂ 1208, 1210. Tanjong Penang, Sungei Lebam, S.-E. Johore.

♂ 1265. Si Karang, S.-E. Johore.

♂ 735, 756. Pasir Panjang, Bintang Island, Rhio Archipelago.

These undoubtedly represent Bonhote's *Mus klossi*,* but they agree so closely with Miller's description of *Mus asper* from Trang in the Nothern Malay Peninsula that we think it probable that further material will show the two forms to be indistinguishable.

[We are both familiar with the true *Mus klossi*, one of the original specimens from Pelepah,† Johore, being now in the Selangor Museum collection. We had been inclined to refer the series, listed above and numerous other specimens in our collection, to *Mus asper*, Miller, though we have never seen a specimen from the typical locality: for though the lineal dimensions nearly agree, *Mus klossi* in the flesh is very less bulky than these, and might almost be described as a mouse and not a rat. The question is further complicated by the occurrence

* P. Z. S., 1906, p. 9.

† Spm. *b'*. of Mr. Bonhote's List, *loc. cit.*

in the Peninsula of a form with grey belly, apparently the species described by Dr. Lyon as *Mus mandus*. These rats, which are nowhere very abundant, are found among the foot-hills in dry rocky country.—H. C. R. and C. B. K.]

48. MUS VILLOSUS, Kloss.

Antea, vol. ii., p. 146.

♂ 1347/08. Botanical Gardens, Singapore Island (Co-type).

♂ 1135, 1138; ♀ 1137. Changi, Singapore Island.

♂ 1172; ♀ 1235. Tanjong Surat, S.-E. Johore.

♂ 1198. Bentan, Sungei Lebam, S.-E. Johore.

♂ 1204, 1207. Tanjong Penang, Sungei Lebam, S.-E. Johore.

♂ 1269. Si Karang, S.-E. Johore.

[This species is very distinct from any other known to us from the Peninsula or the islands round the coast. It is, however, certainly very close to *Mus bullatus*, Lyon,* from Pulo Rupat, Pulo Padang and the Kateman River in east and south-east Sumatra. Besides the localities quoted above, it also occurs in the vicinity of Kuala Lumpur, Selangor, but is nowhere very common.—H. C. R. and C. B. K.]

49. MUS VALIDUS, Mill.

♂ 78; ♀ 116, 165. Maxwell's Hill, Perak, 3,600 feet.

[Widely distributed from S. Johore to as far north as has been explored, and from the hills at 4,000 feet to swamps at sea-level. A rat of very unpleasant smell.—H. C. R. and C. B. K.]

50. MUS FIRMUS, Mill.

♂ 885; ♀ 989. Tanjong Turut, Batam Island, Rhio Archipelago.

♀ 993. Sauh Island, Rhio Archipelago.

♀ 1347, 1364. Pemeral, Karimon Island, Rhio Archipelago.

♀ 1571, 1572. Monos, Karimon Island, Rhio Archipelago.

♂ 1599, 1628; ♀ 1598, 1629, 1653. Monos, Kurimon Island, Rhio Archipelago.

♂ 1481, 1512; ♀ 1509, 1521. Bliah, Kundur Island, Rhio Archipelago.

[The island representative of *Mus validus* and somewhat commoner than that species.—H. C. R. and C. B. K.]

51. MUS FERREOCANUS, Mill.

♀ 67. Maxwell's Hill, Perak, 3,600 feet.

♀ 132, 141. Gunong Ijau, Perak, 4,700 feet.

[This fine and very distinct species is only known at present from nine skins—the three original types from Trang and six specimens from the above localities. Those we have trapped have been secured in dense jungle among rocks. Its parti-coloured tail, white digits and pale yellow fronts to the incisors, distinguish it at a glance from *Mus validus*, the only other Peninsular species with which it could possibly be confused. Its nearest ally would appear to be *Mus berdmorii*, Blyth, from the Mergui Archipelago.—H. C. R. and C. B. K.]

* Proc. U. S. Nat. Mus., xxxiv., p. 646 (1908).

52. MUS SURIFER, Mill.

♂94, 110; ♀75, 140. Maxwell's Hill, Perak, 3,600 feet.

♂134; ♀125, 138. Gunong Ijau, Perak, 4,700 feet.

♂649, 652, 715. Cheras, Selangor.

♂1253; ♀1206. Si Karang, S.-E. Johore.

♂1029, 1046, 1070, 1071, 1148; ♀1073, 1083, 1105, 1112, 1155. Changi, Singapore Island.

[This species is quite the commonest of the spiny rats in the Peninsula, and in the districts in which it occurs is a decided nuisance as it springs the traps before other and more desirable species have time to get caught. Even when caught, it is a most unsatisfactory animal as the skin is so papery and the pelage so harsh that it is almost impossible to make satisfactory Museum specimens out of it. It decomposes with unexampled rapidity and seems to be more attacked by ants, when in the trap, than any other rat.

The form from Changi, Singapore, of which we secured some 50 or 60, struck us, in the flesh, as being both smaller and brighter than those from other localities, though in individual specimens the differences are not very tangible.—H. C. R. and C. B. K.]

53. MUS LINGENSIS, Miller.

♂697, 700, 715, 725; 698, 724. Tanjong Tombak, Bintang Island, Rhio Archipelago.

♂778; ♀737. Pasir Panjang, Bintang Island, Rhio Archipelago.

♂888, 890, 961, 990, 991; ♀886, 889, 913, 916, 917, 984, 986, 992. Tanjong Turat, Batam Island, Rhio Archipelago.

♂1448, 1489, 1490, 1500, 1502; ♀1457, 1458, 1459, 1491, 1499, 1516. Bhal, Kundur Island, Rhio Archipelago.

♂1564, 1570; ♀1566, 1569, 1585. Lekop, Karimon Island, Rhio Archipelago.

♂1596, 1618, 1645, 1647, 1649, 1650; ♀1597, 1617, 1619, 1648. Monss, Karimon Island, Rhio Archipelago.

♂1668, 1670, 1671, 1672, 1675, 1690, 1693, 1720, 1721, 1722; ♀1674, 1678, 1685, 1691, 1690. Little Karimon Island, Rhio Archipelago.

[This is the Rhio representative of *Mus surifer*, and is equally common. The Kundur specimens seem rather larger than those from other islands, and some of those from Little Karimon, are decidedly greyer on the belly, but the differences are not very constant.—H. C. R. and C. B. K.]

54. MUS BUKIT, Bonh.

♂147; ♀136. Maxwell's Hill, Perak, 3,600 feet.

[This is the second known locality for this species in the Malay Peninsula, the types coming from Bukit Besar in the Patani States, but it is said to occur also in "Siam." It is quite distinct from any other Peninsular rat, but evidently closely approaches *Mus jerdoni*, which is found on Mt. Mooleyit in Central Tenasserim.—H. C. R. and C. B. K.]

55. MUS PELLAX, Mill.

♂ 2069. Cheras, Selangor.

♀ T S. 50. Klang Gates, Selangor.

[Once one is familiar with this rat it is very readily distinguished from *Mus surifer*, though at first sight it is very liable to be confounded with worn and shabby specimens of that species.

It is somewhat smaller, and the upper surface is duller brown, without any tawny element in the pelage. Usually, but not invariably, there is a small white spot between the ears. The best differential character, however, is in the skull in which the nasals are invariably prolonged beyond the premaxillaries, which is never the case in *Mus surifer*. The species is frequently associated with *Mus surifer*, but in some localities occurs alone.—H. C. R. and C. B. K.]

56. MUS CREMORIVENTER, Mill.

♀ 119, 170. Maxwell's Hill, Perak, 3,600 feet.

[This rat is widely distributed over the northern parts of the Peninsula, but has not yet been found south of Perak, and what appears to be the same form is found on the islands of Langkawi and Terutau on the west coast.—H. C. R. and C. B. K.]

57. MUS CONCOLOR, Blyth.

♂ 160, 162; ♀ 155, 163. Maxwell's Hill, Perak, 3,600 feet.

♂ 167. Taiping, Perak.

♂ 1179, 1183. Tanjong Surat, S.-E. Johore.

♂ 1209, 1211, 1212. Tanjong Penang, Sungei Lebam, S.-E. Johore.

♂ 1217. Tanjong Boi, S.-E. Johore.

♂ 1267, 1286. Si Karang, S.-E. Johore.

♀ 847. Tinggi Island, East Coast of Johore.

♂ 726. Tanjong Tombak, Bintang Island, Rhio Archipelago.

♂ 777. Pasir Panjang, Bintang Island, Rhio Archipelago.

♂ 1000; ♀ 997. Sauh Island, Rhio Archipelago.

♂ 1406, 1407, 1408, 1409, 1410, 1411. Balei, Karimon Island, Rhio Archipelago.

[So far as our experience goes, invariably associated with human beings. Miller has separated the form occurring on Tioman Island as *Mus pullus*, and several other allied forms have also been described from various islands, all of which approach very closely this species or its Sumatran representative *Mus ephippium*, Jent. Comparison with authentic specimens from Burmah is required before the group can be dealt with adequately.—H. C. R. and C. B. K.]

58. MUS VOCIFERANS, Mill.

♂ 68, 80, 113; ♀ 63, 92, 96, 172. Maxwell's Hill, Perak, 3,600 feet.

♂ 142; ♀ 124, 135, 146. Gunong Ijau, Perak, 4,700 feet.

♀ 42. Klang Gates, Selangor.

♂ 1289, 1291; ♀ 1257. Si Karang, S.-E. Johore.

[Very common throughout the Peninsula, wherever collections have been made, in hilly, jungly country from sea-level to over four thousand feet. On certain of the higher hills its place appears to be

taken by *Mus ciliatus*, Bonh., which is widely, though very sparingly, distributed.—H. C. R. and C. B. K.]

[When large series are examined, considerable variation is found to exist in the tail of this rat, which is by no means always bicolor, though the hairs on it are always white.—H. C. R. and C. B. K.]

59. SUS OI, Mill.

♂ 720. Tanjong Tombak, Bintang Island, Rhio Archipelago.

[Very common on Bintang, Batam, Sauh and Kundur Islands, but apparently not on Karimon. Very destructive to pine-apple plantations on Batam and Sauh, and according to the natives very bold, and not easily scared away from the gardens. Unfortunately, we never met with any of these courageous pigs, and as a result, the collection only contains one specimen, which was shot grubbing about on the reef at low tide.—H. C. R. and C. B. K.]

60. SUS RHIONIS, Mill.

♀ 1404. Pemeral, Karimon Island, Rhio Archipelago.

The teeth of this specimen agree closely allowing for sex with the figure given by Mr. Miller of his type. Its parietal constriction, however, is 29 mm. across, a breadth considerably in excess of those recorded by Miller; no doubt the discrepancy is partly individual and partly due to immaturity.

[The "babi bakau," or Mangrove Pig, which includes both this and the succeeding species, is probably commoner than *Sus oi* in the Rhio Archipelago. It is a reef feeder, found on the shore in droves of eight or nine, and is also common in coconut and pine-apple plantations.—H. C. R. and C. B. K.]

61. SUS ANDERSONI.

Thos. and Wrought., Ann. Mag. N. H. (8), iii., p. 441 (1909).

♀ 815. Sungei Biru, Bintang Island, Rhio Archipelago.

♀ 880, 927. Tanjong Turut, Batam Island, Rhio Archipelago.

♀ 1349. Pemeral, Karimon Island, Rhio Archipelago (see below).

A pig of the *cittatus* group characterised by the small size of its premolars.

Externally resembling *Sus rhionis*, Mill., but somewhat redder when young, and greyer when adult, than that species.

Skull rather longer than in *rhionis*; the molar tooth series markedly shorter, and all the premolars both shorter and narrower than in *rhionis*.

Dimensions of the Type:

Head and body, 1116; tail, 316; hind foot (c. u.), 236; ear, 86 mm.

Skull: upper length, 310; condylo-basal length, 270; palatal length, 185; width of palate inside p^1, 30; width of palate, including m^3, 59; least width of palate between alveoli of m^3, 27; zygomatic breadth, 118; least interorbital breadth, 59; parietal constriction on upper surface, 33; nasal breadth at posterior extremity of premaxillæ, 62; length of nasals, 145; occipital depth to basion, 90.

Teeth: incisors $\frac{2}{2}$ (*worn*);* p^2, 10×4.3; p^3, 11×8.3; p^4, 10.3×12; upper molars, 57×17.3; p_2, 11×5.2; p_3, 12×6.3; p_4, 12×9. Lower molars, 31×14.6 mm.

Habitat.—Islands of the Rhio Archipelago (type from Batam).

Type.—Adult female. B. M. No. 9, 4, 1, 511. Original number 927. Collected 15th July, 1908.

Four specimens examined.

The pigs from the islands of Batam and Bintang prove to belong to a species conspicuously different in the size of their teeth from *S. rhionis*, all the teeth being markedly smaller, the difference being especially noticeable in the second upper incisor and the premolars, as will be seen by measurements given above. With regard to No. 1349, labelled as from Karimon, whence Mr. Miller records *Sus rhionis*, we can only say that it agrees in every respect with *S. andersoni* but whether both species really occur on that island, or the specimen has been wrongly labelled, we are at present unable to say.

We have named this distinct Wild Boar in honour of Sir John Anderson, G.C.M.G., Governor of the Straits Settlements, and High Commissioner for the Federated Malay States, who has actively sympathised with the objects of the expedition.

[We are absolutely certain that three, and three only of the *rhionis* type of pig were collected on Batam and Bintang, and Mr. Seimund is equally positive that the two pigs labelled as collected in Karimon came from that island and no other.—H. C. R. and C. B. K.]

62. TRAGULUS KANCHIL RUBEUS, Mill.

♀ 730, 731, 744. Pasir Panjang, Bintang Island, Rhio Archipelago.

[Nowhere on the islands are mouse deer of the "kanchil" group so common as the larger species or "napu," though our collections from the mainland are richer in the former. This group is also much less liable to variation.—H. C. R. and C. B. K.]

63. TRAGULUS KANCHIL FULVIVENTER, Gray.

♂ 1031; ♀ 1121. Changi, Singapore Island.

Comparison with the type shows that these are undoubtedly Gray's species. Whether Miller's *ravus* is also identical, or whether it is a northern local race, we are not at present in a position to decide.

Topotypes of *T. ravus*, Miller, from Trang are now available, so that this question will be shortly decided.

64. TRAGULUS STANLEYANUS PERFLAVUS, Mill.

♂ 902, 944, 959, 978, 979, 980, 981; ♀ 932, 933, 945, 952, 953, 958, 960, 982. Batam Island, Rhio Archipelago.

Though unfortunately the exact type locality of *T. stanleyanus*, Gray, is unknown, the present series is so closely like that species in all

* 11.3 mm. in an unworn specimen; 15.5 in an equally unworn specimen of *rhionis*.

but size, that we consider ourselves justified in ranking *perflavus* as a local race of the older established species. The present series are topotypes of Miller's *T. perflavus*.

[Exceedingly common on the island, the offer of 50 cents apiece producing large numbers from the local Malays. H. C. R. and C. B. K.]

65. TRAGULUS STANLEYANUS FORMOSUS, Mill.

♂ 729, 823; ♀ 820, 822. Bintang Island, Rhio Archipelago.

Topotypes of *T. formosus*, Mill.

Though extreme specimens differ widely, those less well marked in this form and *T. stanleyanus perflavus* approach sufficiently close to justify this Bintang animal, being also placed as a local race of *stanleyanus*.

66. TRAGULUS NIGROCINCTUS, Mill.

♂ 1474, 1479, 1480, 1494; ♀ 1443, 1523. Bliah, Kundur Island, Rhio Archipelago.

♂ 1663; ♀ 1637. Monos, Karimon Island, Rhio Archipelago.

The specimens from Kundur are topotypes.

67. MUNTIACUS MOSCHATUS, Blainv.

♂ 753; ♀ 779. Bintang Island, Rhio Archipelago.

NOTES ON BIRDS NEW TO, OR RARE IN, THE MALAY PENINSULA.

By HERBERT C. ROBINSON, C.M.Z.S., M.B.O.U.

SINCE the publication of my "Hand-list of the Birds of the Malay Peninsula, South of the Isthmus of Kra,"* and a further paper on "The Birds at present known from the Mountains of the Malay Peninsula,"† a considerable number of rare and interesting specimens have come to hand, concerning which it may be of interest to give some details:

COLUMBA PUNICEA.

Columba punicea (Blyth); *Salvadori, Cat. Birds Brit. Mus.*, xxi., p. 307 (1893).

Alsocomus puniceus, *Hume, Stray Feathers*, viii., p. 157 (1879).

A single female specimen was shot on the ground by one of the Museum collectors in the island of Terutau on the west coast of the Peninsula, some 80 miles north of Penang, early in March, 1909.

Hitherto the species does not appear to have been recorded south of the island of Tonka (*Hume, loc. cit.*) or, as it is variously called, Sekanga or Junk Zeylon. The present occurrence is therefore an extension in range for the species of nearly a hundred miles.

* Journ. Fed. Mal. States Mus., ii., pp. 66-83 (1907).

† Tom. cit., pp. 164-222 (1909).

COLUMBA GRISEA.

Columba grisea, G. R. Gr.; *Salvadori, tom. cit.*, p. 248, pl. vii.

Columba phasma, *Richmond, Proc. U. S. Nat. Mus.*, xxvi., p. 490 (1903).

I had previously recorded this species as an inhabitant of the Malay Peninsula with some doubt.

In August, 1908, however, Mr. Seimund shot a pair on the island of Karimon, in the Rhio Archipelago, within sight of Singapore, so that the bird may fairly be retained in the Peninsular list.

The species seems to be widely spread on small islands from the coast of Sarawak to the chain of islands off the north-west coast of Sumatra, but is of doubtful occurrence on large land masses.

PORZANA AURICULARIS.

Porzana auricularis, Rchnw., *Journ. für Orn.*, 1898, p. 139; *Sharpe, Hand-list Birds*, i., p. 102 (1899).

Porzana pusilla, *Sharpe, Cat. Birds Brit. Mus.*, xxiii., p. 106 (1894).

Two specimens were secured on marshy ground, among long grass at Ampang, near Kuala Lumpur, Selangor, in March, 1908.

PSEUDOGLOTTIS GUTTIFER.

Pseudoglottis guttifer (Nordm.); *Sharpe, Cat. Birds Brit. Mus.*, xxiv., p. 479 (1896); *Robinson, Journ. Fed. Mal. States Mus.*, ii., p. 69, No. 86 (1907).

I have previously (*loc. cit.*) recorded two specimens of this rare Limicoline bird from the mouth of the Kedah River, and on the 26th February, 1909, we obtained three more specimens on mud flats at the mouth of Kurau River in the Krian District of North Perak, 60 or 70 miles south of Kuala Kedah. On the Peninsular coast, therefore, the species is evidently by no means rare during the winter months, and its scarcity in collections is very possibly due to the strong superficial resemblance it bears to the common Greenshank.

GALLINAGO MEGALA.

Gallinago megala, Swinh.; *Sharpe, op. cit.*, p. 624.

An undoubted specimen of this species was shot by Mr. R. Charter at Ampang, near Kuala Lumpur, on the 12th December, 1909, and kindly presented by him to the Selangor Museum.

It has not previously been met with in the Malay Peninsula, though its occurrence was to be expected, in view of the fact that it is numerous in Labuan and North Borneo, during the winter months.

DISSOURA EPISCOPUS.

Dissoura episcopus (Bodd.); *Sharpe, Cat. Birds Brit. Mus.*, xxvi., p. 295 (1898).

Common on the island of Langkawi in February, 1909, and also in the Siamese West Coast State of Trang, about 130 miles north of Penang, in December of the same year.

HERODIAS ALBA.

Herodias alba (Linn.); *Sharpe, op. cit.*, p. 90

The Large White Egret does not appear to have been previously recorded from the Malay Peninsula. A male was shot on the 11th March, 1909, at Sungei Pulai on the coast of Selangor. Wing, 15 inches; tarsus, 5.6 inches; culmen, 4.1 inches. The colour of the face and bill incline me to the belief that the specimen should be referred to *H. alba*, of which it is an unusually small example, rather than to *H. timoriensis*, with which the dimensions agree better. The latter form has been recorded from North Borneo, but not from Sumatra or the Malay Peninsula.

ARDEOLA BACCHUS.

Ardeola bacchus (Bp.); *Sharpe, op. cit.*, p. 211

A male in full breeding plumage was shot on Pulau Langkawi in March, 1909. The species has not hitherto been recorded further south in the Peninsula than Tongka.

ARDEOLA GRAYI.

Ardeola grayi (Sykes): *Sharpe, op. cit.*, p. 207.

Mr. R. Charter obtained a female in winter plumage at Klang on the 26th December, 1909, and presented it to the Selangor Museum.

Though pond herons of this genus are fairly abundant in the north of the Peninsula, in the winter months, they are hardly known south of Penang, and I very much doubt the correctness of the locality "Malacca" ascribed to Cantor's specimen now in the British Museum, except as meaning the Malay Peninsula in the widest sense. Most of Cantor's specimens came from the island of Penang, Province Wellesley, or the States to the northward.

ARDETTA PULCHRA.

Ardetta pulchra, *Hume, Stray Feathers*, 1, p. 308 (1873).

Ardetta sinensis (*partim*), *Sharpe, op. cit.*, pp. 227, 228.

After examining a considerable number of individuals from the Malay Peninsula hitherto referred to *A. sinensis*, I have come to the conclusion that there are two perfectly distinct forms present, one which is migratory and only met with in the winter months being *Ardetta sinensis* (Gm.), and a second form characterized by much richer colouring with a bright chestnut patch at the angle of the wing. This is not improbably resident throughout the year, the three specimens in the Selangor Museum having been obtained in the months of April, June and December, while those of *A. sinensis* are dated January, March, October and December. This is the *A. pulchra* of Hume, originally described from the Andaman Islands. Dr. Sharpe (*loc. cit.*) takes note of the paint list, considering the variation due to climatic influences, sinks the name as a pure synonym of the older name. It may, however, be retained still, advisedly as possibly indicating a resident tropical race.

BOTAURUS STELLARIS.

Botaurus stellaris (Linn.); *Sharpe, op. cit.*, p. 253.

A specimen of the Common Bittern obtained near Malacca on the 3rd March, 1909, by Mr. F. Day and presented to the Selangor State Museum, by the Raffles Museum, Singapore, is the second on record for the Malay Peninsula, the first having been shot on Perseverance Estate, Singapore, in the autumn of 1908.

ASARCORNIS LEUCOPTERA.

Sarcidiornis leucopterus, Blyth, *Journ. Asiat. Soc. Bengal*, xviii., p. 820 (1849).

Asarcornis scutulata, *Salvad.* (*nec Müll.*), *Cat. Birds Brit. Mus.*, xxvii., p. 60 (1895); *Bonhote, P. Z. S.*, 1901 (i), p. 80 (*Patelung*).

This fine duck, one of the rarest of the Anatidæ, has hitherto been known from very few specimens, including two only from the Malay Peninsula, an old and deteriorated mounted specimen from the vicinity of Ipoh in the Kinta District of Perak, in the Selangor Museum, and the second, recorded above, obtained by the "Skeat Expedition" in Patelung and now in the Cambridge University Museum.

Annandale, who passed through Trang in May, 1902, records it as common in that State, though he did not obtain specimens.

In December, 1909, Mr. Kloss and myself obtained two specimens, male and female, at Chong, in Trang, at the foot of the dividing range. They came to feed in the rice fields at dusk and roosted in patches of jungle at the edge of the cultivated land. When disturbed, their flight was sustained and powerful, though not particularly rapid. They fed on large fresh water snails of the genus *Ampullaria*, and their crops and gullets were crammed with these and with one or two fresh water mussels.

Davison is recorded by Hume [*Stray Feathers*, viii., p. 158 (1879)] as having met the species in the forests of Kussoom about a 150 miles north of Trang, but failed to secure specimens.

CIRCUS MELANOLEUCUS.

Circus melanoleucus, Blyth; *Sharpe, Cat. Birds Brit. Mus.*, i., p. 61 (1874).

Until recently this handsome species was represented in the Museums of the Federated Malay States by a single shabby mounted specimen without particulars, Mr. Seimund, however, obtained a very perfect adult male in open country near Kuala Lumpur on the 27th March, 1909, and states that the bird is not uncommon during the winter months, but is exceedingly wild and hard to approach. Two other species of Harrier, *C. æruginosus* and *C. spilonotus*, occur with it, the former being by far the most abundant of the three.

An adult female was obtained also near Kuala Lumpur on the 13th January, 1910.

SPIZÆTUS NEPALENSIS.

Spizætus nepalensis (Hodgs.); *Sharpe, tom. cit.*, p. 267.

A young male was obtained by the Museum collectors at Pulau Udang, Pulau Terutau, north of Penang, on the 10th March, 1909.

This fine Forest Eagle has not hitherto been recorded from the Malay Peninsula, nor, according to Blanford (Fauna Brit. Ind. Birds, iii., p. 352, 1895), does it occur in Burmah.

The under surface is an almost uniform salmon buff as is also the head. The tail is whitish at the base with a very narrow white tip and six broad dark bars. Crest 3½ inches long, dark brown with a buff base and a narrow white tip. The feathering of the legs extends well on to the terminal phalanx of the middle toe.

Dimensions.—Wing, 16.4 inches; tail, 12 inches; tarsus, 4.1 inches. Bill from gape, 1.9 inches; culmen (from cere), 1.25 inches.

BAZA JERDONI.

Baza jerdoni (Blyth); *Journ. Asiat. Soc. Beng.*, xi., p. 464 (1842); *Blanford, Faun. Brit. Ind. Birds*, iii., p. 411 (1895).

Baza sumatrensis, *Sharpe, op. cit.*, p. 357, pl. xi., fig. 1; *Hume, Stray Feathers*, iii., p. 313; *Hume and Davison, op. cit.*, vi., p. 25; *Hume, op. cit.*, vii., p. 198, *Note*; *Gurney, op. cit.*, viii., p. 444.

There are three specimens of this Cuckoo-Falcon in the Selangor Museum—an adult, sex not determined, from Larut, Perak, mounted and in poor condition; an adult male from Sungei Kilim, Pulau Langkawi, north of Penang, shot on the 22nd February, 1909, and an immature female, dated the 23rd February, 1909, from the same locality.

Adult Male.—Top of the head blackish brown, sides of the face and loral region grey, feathers of the nape broadly edged with rufous brown, mantle back and rump blackish brown. Tail lighter brown, whitish at the base, with four bars of blackish, the terminal one much the broadest, narrowly tipped with white; tail beneath barred black and white, the white bars much the broadest. Throat and upper breast dull rufous edged with white, the feathers in some cases with dark centres and shaft stripes. A blackish chin stripe. Breast, abdomen, flanks and under tail coverts barred with rufous brown and white, the white bars the narrower; the dark bars much more blackish on the flanks and more rufous on the thighs and under tail coverts. Axillaries similar, under wing coverts and angle of the wing rufous buff, barred, tipped and edged with white. Wing feathers (primaries, secondaries and tertials) inconspicuously barred with blackish and dull brown externally, markedly barred with black and greyish white, like the tail, on their internal aspect. Crest black, narrowly tipped with white.

Dimensions.—Wing, 12.5 inches; tail, 9.1 inches; tarsus, 1.55 inches; bill from gape, 1.27 inches; bill from cere to straight edge, .97 inches; crest, 2.3 inches.

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ON MAMMALS AND BIRDS FROM TRENGGANU.

By C. BODEN KLOSS, F.Z.S., M.B.O.U.

TRENGGANU is a district of the Malay Peninsula that has received very little attention from zoologists. In September and October, 1900, I visited it with Dr. W. L. Abbott in his yacht "Terrapin," and we spent a month working various places on the coast between the Trengganu and Kemaman Rivers. In September, 1910, I went there again, accompanied by the Museum Dyak collectors.

The results of both visits were a little disappointing. Owing to the nature of the soil and the great amount of clearing that has taken place in remote times along the coast, we could not reach any good collecting spots from our schooner on the first occasion; later, on my return from the exploration of the Redang and Perhentian Islands, I was pressed for time and, as the month was the month of fasting (bulan puasa), the natives not unreasonably refused to engage as carriers or boatmen to the inland districts. Thanks, however, to the assistance of the British Agent, Mr. W. D. Scott, who lent us his motor-boat, we were enabled to proceed seven or eight miles up the Sungei Nerus which enters the north bank of the Trengganu River, a mile above the town of that name, and a camp was made near Bukit Jong, a small hill 700 or 800 feet in height, on which still remains a small amount of virgin jungle. A week was passed in this locality, not a good one for our purpose, but the best available under the circumstances.

An excursion by canoe was also made to Pulau Kapas, an island which lies 11 miles south from Trengganu and a mile from shore, in the hope that species of small mammals might be found thereon. The trip was almost without result; two or three common birds and a form of *Mus rattus* alone being met with: and the latter was stated to be the only mammal inhabiting the island.

As no report on the visit of the "Terrapin" has been published, I now combine in one list the species then obtained and those of my more recent collections: of the first collection, the mammals are from my notes; for the birds I am indebted to Dr. C. W. Richmond, of the United States National Museum; and both are indicated by their localities, which at this date I can only give as "Coast of Trengganu" though our principal collecting grounds were Trengganu Town, Tanjong Dungun, Pakeh River, Tanjong Laloha and Kuala Kemaman.

The only other visit of which I am aware is that paid by Messrs. Evans and Laidlaw, of the "Skeat" Expedition in October, 1899, when mammals appear to have been collected by both these gentlemen and birds by the latter. Mr. J. L. Bonhote in his reports on their

specimens * records from "Trengganu," under the name of *Sciurus caniceps*, Gray, two examples of a common squirrel which should stand as *S. concolor*, Blyth. The following birds were obtained, presumably all from Trengganu Town; of them only Nos. 2, 3, 8, 10 and 11 were not met with by me:

1. Turtur tigrinus (Temm.).
2. Charadrius domenicus (P.L. S. Müll.).
3. Ægialitis alexindrina (Linn.).
4. Rhyacophilus glareola (Gm.).
5. Haliaetus leucogaster (Gm.).
6. Polioaetus ichthyaetus (Horsf.).
7. Halcyon smyrnensis (Linn.).
8. Cacomantis merulinus (Scop.).
9. Zantholaema haematocephala (P. L. S. Müll.).
10. Pitta cyanoptera, Temm.
11. Pitta cucullata, Hartl.
12. Rhipidura javanica, Sparrm.
13. Pycnonotus analis (Horsf.).
14. Calornis chalybea (Horsf.).
15. Æthiospar fuscus (Wagl.).
16. Anthus rufulus, Vieill.

MAMMALS.

1. HYLOBATES LAR (LINN.).

Coast of Trengganu.

2. PRESBYTIS OBSCURA, *subsp.*

Bukit Jong. 3 ♂.

These animals are members of a race of *P. obscura* which occurs also in the Perhentian Islands, and of which a description will shortly appear.

3. NYCTICEBUS MALAYANUS (ANDERSON).

Coast of Trengganu.

4. MUSTELA FLAVIGULA PENINSULARIS, BONH.

Bukit Jong. 1 ♀.

5. CYNOPTERUS BRACHYOTIS ANGULATUS, MILLER.

Coast of Trengganu.

6. RHINOLOPHUS, *sp.*

Coast of Trengganu.

7. TUPAIA FERRUGINEA, RAFFLES.

Bukit Jong. 1 ♂; 1 ♀.

Coast of Trengganu (Tanjong Dungun, 1 ♂, 1 ♀, in Selangor Museum).

These are typical *ferruginea*. I have compared them with topotypes from Singapore and can detect no difference whatever.

8. RATUFA MELANOPEPLA, MILLER.

Coast of Trengganu.

9. SCIURUS CONCOLOR, BLYTH.

Bukit Jong. 15 ♂; 9 ♀.

Coast of Trengganu.

I have compared this large series with another large series of topotypes from Nyalas, Malacca, obtained less than a month later. Series

* Proceedings of the Zoological Society, 1900, p. 877; 1901, vol. I, p. 57 *et seq.*

for series the Trengganu animals are a trifle duller—*i.e.*, the top and sides of head are greyer, the ring round the eye is paler, and the [illegible] tawny suffusion of back and tail is less intense.

10. SCIURUS (VITTATUS) MINIATUS, Miller.

Bukit Jong. 12 ♂ ; 12 ♀.

Coast of Trengganu.

A typical series, indistinguishable from Trang (type locality) and East Coast animals.

11. SCIURUS (NIGROVITTATUS) BILIMITATUS, Miller.

Coast of Trengganu. 2 specimens.

One of these, a female from Tanjong Laboha, is the type. The race extends across the Peninsula to Upper Perak and goes northward

12. SCIURUS TENUIS, Horsf.

Bukit Jong. 7 ♂ ; 3 ♀.

Coast of Trengganu.

I have carefully compared the Bukit Jong series with a series of topotypes from Singapore. None of that dulness of pelage, which *S. tenuis* exhibits towards the northern extreme of its range, is traceable. On the contrary, the Trengganu series is more ochraceous than the Singapore collection, especially as regards the under surface of the body; the under parts of three males in particular being unmatched for depth and spread of that colour, while the abdomens of the remainder are decidedly more buffy, but the skulls and teeth do not differ appreciably.

Sciurus tenuis surdus, Miller,* was described from Trang examples, but, owing to the fact that until lately we had seen no topotypes, while the authorities of the United States National Museum had sent us specimens from Johore under that name, thus, apparently restricting the typical *tenuis* to Singapore Island, we had been unable to regard the race as valid.† We have recently, however, obtained a series of topotypes, and I am now prepared to accept Miller's race as distinct. It is confined, however, to the more northern parts of the Peninsula, though of course connected with *Sciurus tenuis typicus* by many intermediate animals, but, however indefinite many of these latter may be, by no means all individuals from the mainland must be placed under Miller's sub-species as I have shown above.

13. MUS VOCIFERANS, Miller.

Coast of Trengganu.

14. MUS SURIFER, Miller.

Bukit Jong. 2 ♂ ; 1 ♀.

Coast of Trengganu.

* Proceedings of the Washington Academy of Sciences, vol. II, p. 8, July 25, 1900.

† *Vide* Journal of the F.M.S. Museums, vol. IV, No. I, p. 117, December 1909.

15. MUS CREMORIVENTER, Miller.

Coast of Trengganu (Tanjong Dungun).

16. MUS RATTUS JALORENSIS, Bonh.

Bukit Jong. 2 ♂ ; 2 ♀.

17. MUS CONCOLOR, Blyth.

Bukit Jong. 2 ♂ ; 4 ♀.

18. MUS DECUMANUS, Pallas.

Trengganu Town.

The mangled bodies of the Norway Rat were frequently to be seen in the streets in the early morning. A considerable trade between Trengganu and Singapore has long been carried on by native sailing vessels and has afforded a means for the introduction of this wide-spreading animal.

19. TRAGULUS CANESCENS, Miller.

Bukit Jong. 1 ♀.

Coast of Trengganu.

Hind foot of Bukit Jong example, 134 mm.

BIRDS.

1. EXCALFACTORIA CHINENSIS (Linn.).

Coast of Trengganu.

These little Quails are fairly common along the coast, where there is much open grass land.

2. PAVO MUTICUS, Linn.

Bukit Jong.

Coast of Trengganu.

Peafowl are numerous in Trengganu: they are to be met with along the rivers and in open spaces near forests.

3. OSMOTRERON VERNANS (Linn.).

Coast of Trengganu.

4. TURTUR TIGRINUS (Temm.).

Bukit Jong.

5. GEOPELIA STRIATA (Linn.).

Coast of Trengganu.

Both this and the last species are commonly seen feeding in the open grass lands, and in the rice-field after the crop is harvested.

6. RHYACOPHORUS GLAREOLA (Gm.).

Bukit Jong.

The Wood-Sandpiper inhabits inland districts and is rarely seen near the sea.

7. GARZETTA GARZETTA (Linn.).

Coast of Trengganu.

8. SPILORNIS PALLIDUS (Walden).

Bukit Jong.

9. HALIAETUS LEUCOGASTER (Gm.).

Coast of Trengganu.

10. HALIASTUR INTERMEDIUS, Gurney.

Coast of Trengganu.

11. MICROHIERAX FRINGILLARIUS (Drap.).

Bukit Jong.

12. EURYSTOMUS ORIENTALIS (Linn.).

Coast of Trengganu.

13. PELARGOPSIS MALACCENSIS, Sharpe.

Coast of Trengganu.

Though inhabiting estuaries it is also common in inland districts.

14. ALCEDO BENGALENSIS, Gm.

Coast of Trengganu.

15. DICHEROS BICORNIS (Linn.).

Bukit Jong.

The Double-casqued Hornbill is a bird that is not frequently seen in the Peninsula.

16. CAPRIMULGUS AMBIGUUS, Hartert.

Bukit Jong.

17. MACROPTERYX LONGIPENNIS (Raffl.).

Coast of Trengganu.

The Long-winged Swift frequents the Casuarinas along the beach.

18. PYROTROGON NEGLECTUS, Forbes & Robinson.

Coast of Trengganu.

19. RHOPODYTES SUMATRANUS (Raffles).

Coast of Trengganu.

20. RHINORTHA CHLOROPHEA (Raffles).

Bukit Jong.

Coast of Trengganu.

21. UROCOCCYX ERYTHROGNATHUS (Hartl.).

Bukit Jong.

Coast of Trengganu.

22. CHOTORHEA MYSTACOPHANES (Temm.).

Coast of Trengganu.

23. THERESICERYX LINEATA (Vieill.).

Coast of Trengganu.

The Brown-headed Barbet was obtained in some numbers during the first visit in 1900, but was not met with later. South of Trengganu and Kedah it is almost unknown: a single individual is on record from Central Pahang.

24. MESOBUCCO CYANOTIS (Blyth).

Bukit Jong.

These Barbets are decidedly of the blue-eared northern type: the two forms must widely overlap each other on the East Coast, for Grant (Fasciculi Malayenses Zoology, Report on the Birds, p. 102) records black-eared individuals from Nawngchik in Patani.

25. ZANTHOLAEMA HAEMATOCEPHALA (Müll.).

Bukit Jong.

The Coppersmith was common round Bukit Jong, and was the only species of Barbet met with except the preceding.

26. GECINUS OBSERVANDUS, Hartert.

Coast of Trengganu.

Individuals of several species of Woodpecker are very numerous along the coast, where they are freely observed flying from tree to tree in the open country.

27. IYNGIPICUS CANICAPILLUS, Blyth.

Coast of Trengganu.

28. MIGLYPTES GRAMMITHORAX (Mahl.).

Bukit Jong.

Coast of Trengganu.

29. MIGLYPTES TUKKI (Less.).

Coast of Trengganu.

30. TIGA JAVANENSIS (Ljung).

Bukit Jong.

Coast of Trengganu.

31. CORYDON SUMATRANUS (Raffles).

Bukit Jong.

Met with in the tops of high jungle trees.

32. CYMBORHYNCHUS MALACCENSIS, Salvad.

The beautiful Blue-billed Gaper occurs in numbers near Bukit Jong, where its habit of perching and flitting along the banks of the river renders it conspicuous.

33. XANTHOPYGIA XANTHOPYGIA (Hay).

Bukit Jong.

This example and another obtained in Central Pahang a fortnight later are young males in immature plumage, which have evidently just arrived from the north. It is not common in this latitude: the only other specimens known to me are a pair from near Kuala Lumpur and a female shot eleven years ago on the Anambas Islands.

34. HIRUNDO JAVANICA, Sparr.

Coast of Trengganu.

35. MUSCITREA CINEREA, Blyth.

Pulau Kapas.

The Ashy Flycatcher is rare in inland districts, but is often met with near the sea: in certain localities it appears to particularly delight in mangroves.

36. HYPOTHYMIS AZUREA (Bodd.).

Coast of Trengganu.

Only found in deep jungle, where it frequents the lower branches, and is very fearless.

37. RHIPIDURA JAVANICA (Sparrm.).

Coast of Trengganu.

This Fantail Flycatcher is a bird of low scrub and open country.

38. TERPSIPHONE AFFINIS (Blyth).

Coast of Trengganu.

39. (?) PERICROCOTUS FLAMMIFER, Hume.

Coast of Trengganu.

This should probably be *P. igneus*, Blyth, as *P. flammifer* is, in the southern parts of the Peninsula, of sub-montane habitat.

40. ÆGITHINA TIPHIA (Linn.).

Bukit Jong.

41. CHLOROPSIS CHLOROCEPHALA (Wald.).

Coast of Trengganu.

If Dr. Richmond's identification is correct, this forms a record for the southern extension of this species; I, myself, am only certain of having obtained *C. chlorocephala* in Trang, a hundred and fifty miles to the north.

42. IRENA PUELLA (Lath.).

Coast of Trengganu.

The northern species grades into the southern *C. cyanea* in this latitude, and I think birds from Trengganu may be referred with equal correctness to either.

43. EUPTILOSUS EUPTILOSUS, Jard. & Selby.

Coast of Trengganu.

A widely distributed but nowhere common Bulbul.

44. ALOPHOIXUS PHAEOCEPHALUS (Hartl.).

Coast of Trengganu.

45. TRACHYCOMUS OCHROCEPHALUS (Gm.).

Bukit Jong.

Coast of Trengganu.

46. PYCNONOTUS ANALIS (Horsf.).

Coast of Trengganu.

47. PYCNONOTUS PLUMOSUS, Blyth.

Bukit Jong.

Coast of Trengganu.

48. PELLORNEUM SUBOCHRACEUM, Swinh.

Bukit Jong.

49. TURDINUS OLIVACEUS (Strickl.).

Coast of Trengganu.

50. TURDINUS MAGNIROSTRIS, Moore.

Coast of Trengganu.

51. SETARIA MAGNA (Eyton).

Coast of Trengganu.

52. SETARIA CINEREA (Eyton).

Coast of Trengganu.

53. CYANODERMA ERYTHROPTERUM (Blyth).

Coast of Trengganu.

54. MACRONUS PTILOSUS, Jard. & Selby.

Coast of Trengganu.

55. MIXORNIS GULARIS (Raffles).

Coast of Trengganu.

56. COPSYCHUS MUSICHUS (Raffles).

Coast of Trengganu.

57. CITTOCINCLA MACRURA (Gm.).

Bukit Jong.

58. BURNESIA FLAVIVENTRIS (Deless.).

Coast of Trengganu.

59. HEMIPUS OBSCURUS (Horsf.).

Coast of Trengganu.

60. PLATYLOPHUS ARDESIACUS, Cab.

Coast of Trengganu.

61. LANIUS TIGRINUS, Drap.

Bukit Jong.

62. LANIUS SUPERCILIOSUS, Lath.

Coast of Trengganu.

63. MELANOCHLORA FLAVOCRISTATA (Lafr.).

Coast of Trengganu.

64. CORVUS MACRORHYNCHUS (Wagl.).

Bukit Jong.

65. PLATYSMURUS LEUCOPTERUS (Temm.).

Bukit Jong.

66. DISSEMUMURUS PARADISEUS (Linn.).

Bukit Jong.

67. CALORNIS CHALYBEA (Horsf.).

Bukit Jong.

68. AGROPSAR STURNINUS (Pall.).

Bukit Jong.

Coast of Trengganu.

Nowhere a common bird in the southern half of the Peninsula, though occasionally met with in large flocks.

69. ETHIOPSAR FUSCUS (Wagl.).

Bukit Jong.

Very common in open spaces.

70. MUNIA ATRICAPILLA (Vieill.).

Coast of Trengganu.

71. MUNIA MAJA, Linn.

Coast of Trengganu.

72. LIMONIDROMUS INDICUS (Gm.).

Bukit Jong.

73. ANTHUS MALAYENSIS, Eyton.

Coast of Trengganu.

74. CYRTOSTOMUS PECTORALIS (Temm.).

Coast of Trengganu.

75. CYRTOSTOMUS FLAMMAXILLARIS (Blyth).

Coast of Trengganu.

Dr. Richmond has placed a note of interrogation against this title, and I think the bird in question is probably an example of the last species. *C. flammaxillaris* is hardly likely to occur so far south.

76. ÆTHOPYGA SIPARAJA (Horsf.).

Coast of Trengganu.

77. ANTHOTHREPTES HYPOGRAMMICA (S. Müll.).

Coast of Trengganu.

78. ANTHOTHREPTES MALACCENSIS (Scop.).

Bukit Jong.

Coast of Trengganu.

79. DICÆUM CRUENTATUM, Linn.

Coast of Trengganu.

The following species were observed:

Treron nipalensis, Hodgs.
Carpophaga ænea (Linn.).
Tringoides hypoleucus (Linn.).
Gallinago stenura (Kuhl.).
Fregata aquila (Linn.).
Spizaetus limnaetus (Horsf.).
Halcyon pileatus (Bodd.).
Buceros rhinoceros (Linn.).
Anthracoceros [illegible].
Macropteryx mystacea (Temm.).
Copsychus musicus (Raffles).
Eulabes javanensis (Osbeck).
Passer montanus, Linn.
Arachnothera longirostris (Lath.).
Dicæum trigonostigma (Scop.).

ON MAMMALS AND BIRDS FROM THE LOWLANDS OF PAHANG.

By C. BODEN KLOSS, F.Z.S., M.B.O.U.

PAHANG has been but little explored zoologically, and the results of two small collecting visits to that State are now put on record.

The narrative of a trip up the Pahang, Tembeling and Tahan Rivers, undertaken in 1891 by Messrs. H. N. Ridley, W. Davison and Lieut. H. J. Kelsall, was accompanied by lists of mammals and birds observed and collected during the journey. These lists, drawn up by Mr. Ridley and Lieut. Kelsall, consist so largely of species observed, rather than obtained, that they are not altogether reliable, but they present the first information we have of the animal life of the region.

The mammals noted are the larger and commoner species only, but amongst the birds recorded are two or three of interest—viz., *Gerygone modiglianii*, Salvad (*G. pectoralis*, Davison), which was obtained for the first time in the Peninsula; a somewhat dubious species, *Setaria melanocephala* (Davison), which, if distinct, is very closely allied to *S. affinis*, Blyth, was described; and a new species of Myna, *Acridotheres torquatus*, Davison, was also obtained.

The next collection from Pahang was made by Mr. Waterstradt on Gunong Tahan and is dealt with by Dr. Hartert in a paper entitled "On Birds from Pahang, Eastern Malay Peninsula": besides an account of the mountain birds it includes a number of species obtained by collectors in the lowlands of Pahang and also from the Sungei Lebeh.

More recent information is contained in the reports on the collections of mammals and birds made by Messrs. Robinson and Wray in 1905 on Gunong Tahan and at Kuala Tembeling.

Finally, some years ago, Dr. W. L. Abbott collected along the course of the Rompin River in South-eastern Pahang: no account of his specimens has been published, but the following were obtained or observed:

1. Hylobates lar (Linn.).
2. Presbytis obscura (Reid).
3. Felis tigris, Linn.
4. Paradoxurus hermaphroditus, Pallas.
5. Elephas maximus, Linn.
6. Tapirus indicus, Cuv.
7. Bos gaurus hubbacki, Lydekker.
8. Cervus unicolor equinus, Cuv.
9. Tragulus canescens, Miller.
10. Tragulus ravus, Miller.
11. Ratufa melanopepla, Miller.
12. Ratufa aureiventer (Geoffr.).
13. Sciurus tenuis, Horsf.
14. Mus vociferans, Miller.
15. Mus surifer, Miller.
16. Mus asper, Miller.
17. Tupaia malaccana, Anderson.
18. Galeopterus peninsulæ, Thomas.

The collections dealt with below were obtained: the first during May, 1910, at Genting and Punjom, spots about seven miles west of Kuala Lipis, which localities are quoted as "Lipis"; the second during June of the same year, at places between six to nine miles west

of Bentong, which place, in default of any other name, is given as the locality of the specimens.

In view of our present knowledge of the lowland fauna of the Peninsula, there are very few points to enlarge on: a certain number of species are recorded from the district for the first time, of which perhaps *Sciurus robinsoni alacris*, Thomas, a form of *Sciurus prevostii*, Desm., and *Mus pellax*, Miller, are the more interesting among the mammals, though they are such as we should expect to find there, while the known distribution of others has been slightly extended.

Of the birds, the two specimens of *Alcedo euryzona*, Temm., the rare Banded Kingfisher, are the first which have been taken for many years in the Federated Malay States; while the unstable state of *Mesobucco duvaucelii* (Less.), the commonness of *Munia leucogastra* (Blyth), scarcely ever met with in Perak or Selangor, and the fact that *Setaria affinis* (Blyth) occurs in an area where another closely allied form was thought to have replaced it, are all that call for comment.

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MAMMALS

1. HYLOBATES LAR (Linn.).

Hylobates lar, Bonhote, p. 2; Kloss, Journal of the Straits Branch Royal Asiatic Society, No. 53, 1909, p. 6.

Hylobates albimanus, Ridley, p. 57.

1 ♂. Lipis.

A specimen in the dark brown stage of pelage.

2. PRESBYTES OBSCURUS (REID).

Presbytes obscurus, Bonhote, p. 2; Kloss, op. cit., p. 7.

Semnopithecus obscurus, Ridley, p. 57.

2 ♀. Bentong.

Monkeys of the same species were also observed at Lipis. These specimens are somewhat pale in colour, the hands and feet alone being black. They exactly correspond with topotypes from Malacca.

3. MACACA NEMESTRINA (LINN.).

Macaca nemestrina, Kloss, op. cit., p. 9.

Macacus nemestrinus, Ridley, p. 57.

1 ♂. Bentong.

A young male with the posterior molars still uncut, closely resembling the adult female in colour. The fur is only slightly annulated and the wash of black on back and rump is not strong.

4. NYCTICEBUS MALAYANUS (ANDERSON).

Nycticebus malayanus, Kloss, op. cit., p. 11.

Nycticebus tardigradus, Ridley, p. 57.

1 ♂. Bentong.

This specimen is rather duller and colder in colour than usual. In this respect, and also in the large size of the skull (greatest length, 62 mm.; zygomatic breadth, 44 mm.), it approximates to *N. concang* (Boddaert) of Burmah and E. Bengal.

5. PARADOXURUS HERMAPHRODITUS, PALLAS.

Paradoxurus hermaphroditus, Kloss, op. cit., p. 22.

(?) *Viverricula malaccensis*, Ridley, p. 58.

1 ♀. Lipis.

1 ♂. Bentong.

The Lipis example shows the white-tipped tail, which so frequently occurs in this species.

6. TRAGULUS RAVUS, MILLER.

Tragulus ravus, Miller, Proc. Biol. Soc. Washington, 1902, p. 174.

Tragulus kanchil ravus, Bonhote, p. 11; Kloss, op. cit., p. 44.

Tragulus javanicus, Ridley, p. 60.

1 ♀. Lipis.

7. RATUFA AUREIVENTER (GEOFFR.).

Sciurus aureiventer, Cantor, Jour. Asiatic Soc. Bengal, 1846.

Sciurus bicolor, Ridley, p. 59.

Ratufa affinis aureiventer, Bonhote, Ann. and Mag. Nat. Hist., (7), v, 1900, p. 495; Bonhote, p. 5.

1 ♀. Lipis.

1 ♂. Bentong.

Owing to the fact that the squirrels of the genus *Ratufa* are nearly always wearing out (a process to which the term bleaching has been

applied) or renewing their pelage, perfect specimens are rarely obtained, and this individual variation has been the cause of much uncertainty and some confusion.

At present, however, three races of brown *Ratufa* can be distinguished in the Peninsula:

(1) *Ratufa pyrsonota*, Miller.

General colour above uniform ochraceous and brown, markedly annulated but becoming on fore legs, sides and thighs scarcely speckled tawny-ochraceous, under parts and inner surfaces of legs clear ochraceous. Top of muzzle dark brown, sides of muzzle whitish, cheeks and chin grizzled brown or whitish. Tail a variable brown, the bases of the hairs whitish, the latter colour conspicuous on the under surface where the short hairs clothing the vertebrae are brown. Feet dark brown.

Occurs in the northern half of the Peninsula. Waterstradt (*vide* Robinson) has obtained specimens in North Pahang, and it is known in Perak as far south as Kuala Kangsar.

(2) *Ratufa affinis* (Raffles).

General colour above a variable café-au-lait brown, the hairs dark tipped and very faintly annulated but becoming on neck, fore legs, sides and thighs tawny-ochraceous; under parts and inner surfaces of legs clear white or whitish-buff. Muzzle, cheeks and chin as in *R. pyrsonota*. Feet whitish or light buff like the under parts.

Occurs in Southern Johore and Singapore Island.

(3) *Ratufa aureiventer* (Geoffr.).

Nearly agrees with *R. affinis* above but below resembles *R. pyrsonota*. The back and tail are very variable, ranging from isabella-brown to pale cream buff. As Cantor has correctly noted, the feet may be dark or light—in fact, they range from dark brown to ochraceous buff, those of much bleached and abraded individuals often showing patches of both colours.

Occurs in the area between the districts occupied by the two preceding animals.

All these races agree in the possession of a notable pale patch on the outer side of the thigh, and in an annulated upper surface, though when the pelage is worn this often disappears entirely.

Mr. R. C. Wroughton, in a recent paper dealing with the Giant Squirrels (*Jour. Bombay Nat. Hist. Soc., Feb., 1910*), follows Mr Bonhote in stating that *R. aureiventer* is a yellow-footed form and confines it to Malacca, while the range of *R. pyrsonota* is given as from Trang to Selangor. But, as I have pointed out above, the former is both dark and light footed, and the gradation is so complete that the colour of the feet cannot be used as a differentiating character between these races, and *R. pyrsonota* which, far from extending to Selangor, apparently barely enters the Federated Malay States, where *R. aureiventer*, as Mr. Bonhote correctly noted, is the prevailing form.

We must take it that *R. pyrsonota* differs from the latter not so much in the colour of the feet as in the markedly annulated and ochraceous upper surface.

According to Mr. Bonhote, who last reviewed the squirrels of the *Prevostii* group (A. and M. N. H., 7, vii, 1901, p. 169), we have only two forms inhabiting the Peninsula: *Sciurus prevostii typicus*, in which the lateral white stripe runs unbroken from top of nose to heel of hind foot (extending also down the outer side of the fore limb), and *S. p. humei*, which has the shoulders fulvous-red, the colour of the fore limb extending upwards until it meets the black of the back. *S. p. typicus* appears to be confined to the southern extremity of the Peninsula ranging to Malacca, with perhaps Negri Sembilan, and the southern half of Pahang: I have examined Pahang examples from Tras, Liang and from the lower course of the Pahang River (Lebeh Tua). Examples of *S. p. humei*, Bonh., are known to me from Southern Perak (Blanja and Sungkai) and from localities throughout Selangor.

Two individuals of this group from Lipis and others from elsewhere fit with neither of these descriptions. From the first, they differ in having a variable degree of fulvous wash on the shoulders, and from the second, in that the colouring of the shoulders is never so intense or so large in extent. Their area of distribution seems to surround the red-shouldered form on the north and east, and I propose that individuals of this appearance should be known as:

8. SCIURUS PREVOSTII WRAYI, *subsp. nov.*

Type.—Adult male (skin and skull), No. 1,330/10, Selangor Museum. Collected at Genting, Kuala Lipis, Pahang, 11th May, 1910, by C. Boden Kloss. Original No. 3,261.

Characters.—Resembles *Sciurus prevostii*, Desm., but has the shoulders washed with the fulvous colour of the fore legs: differs from *S. p. humei*, Bonhote, in that the colouring of the shoulders is much less intense and frequently falls short of the black of the back.

Colour.—Above deep shining black. Below, including the entire fore limbs to elbows and the hind feet, a rich fulvous, deepest on the abdomen. On either side from back of shoulders to heel of hind feet a creamy white stripe broadening on the outer sides of the thighs. The fulvous hairs of the abdomen between shoulder and thigh adjoining this stripe have black bases. Sides of muzzle, chin, cheeks and sides of neck running up behind the ears chalky-white somewhat grizzled, the region below the eyes being darkest. Shoulders pale fulvous white, gradually deepening into the colour of the fore legs. Tail blackish below and grizzled at base, bleaching on the upper surface to a deep brown with a pale tip.

Skull and Teeth.—Skull and teeth do not in any way differ from those of the related forms.

Measurements.—Collector's external measurements of type: head and body, 262; tail, 260; hind foot, 56; ear, 19.5. Cranial measurements of type: greatest length, 57; basal length, 48.3; nasal length, 17; palatal length, 26.2; diastema, 14; molar row, 10.6; interorbital breadth, 24; postorbital constriction, 20; zygomatic breadth, 35.8.

Remarks.—This squirrel, which appears to be distributed north and east of the related races, is intermediate between the two. The extent and depth of the colour on the shoulder are very variable, but the white lateral stripe is never entirely unbroken there as in *S. prevostii*, nor is ever attained the rich colour, widely in contact with the black back, of *S. p. humei*.

All other races of *Sciurus prevostii* with shoulder coloration of this type are instantly separable from *S. p. vrayi* by the grey or blackish sides of head and neck, which areas in the latter are whitish.

9. SCIURUS HIPPURUS, Gray.

Sciurus hippurus, Bonhote, p. 6.

2 ♂. Bentong.

Nowhere common in the Peninsula and always rarer than the last species.

10. SCIURUS CONCOLOR, Blyth.

Sciurus caniceps concolor, Bonhote, Ann. and Mag. Nat. Hist., (7), vii, 1901, p. 272; Bonhote, p. 7.

Sciurus griseimanus, Ridley, p. 59.

3 ♂; 5 ♀. Lipis.
2 ♂; 2 ♀. Bentong.

All the specimens have the entire dorsal area and tail suffused with ochraceous, deepest on the rump.

11. SCIURUS BILIMITATUS JOHORENSIS, Robinson & Wroughton.

Sciurus bilimitatus, johorensis, Robinson & Wroughton, Journ. F.M.S. Mus., vol. IV, No. 2 *postea*.

2 ♂. Lipis.
1 ♂; 1 ♀. Bentong.

This race is much less ochraceous than *S. bilimitatus*, Miller, and these examples mark, as far as is known, its northward extension.

12. SCIURUS MINIATUS, Miller.

Sciurus notatus miniatus, Miller, Proc. Washington Acad. Sci., vol. II, 1900, p. 79.

Sciurus vittatus, Bonhote, p. 5.

Sciurus notatus, Ridley, p. 59.

3 ♂; 1 ♀. Lipis.
3 ♂; 3 ♀. Bentong.

These examples agree completely with specimens of *S. miniatus* from the eastern side of the Peninsula. All have the distal portion of the tail very strongly rufous.

13. SCIURUS TENUIS, Horsf.

Sciurus tenuis, Bonhote, p. 6.

3 ♂; 1 ♀. Lipis.
1 ♀. Bentong.

These examples agree with topotypes from Singapore.

14. SCIURUS ROBINSONI ALACRIS, Thos.

Sciurus robinsoni alacris, Thomas, Ann. and Mag. Nat. Hist., (8), ii, 1908, p. 306.

1 ♀. Bentong.

This is the southern and paler form of *Sciurus robinsoni*, Bonhote, from Bukit Besar, Patani States, and has only hitherto been obtained on the boundary range in Pahang. It is now known from numerous localities in the Western States, where its southern limit at present is Negri Sembilan.

15. LARISCUS JALORENSIS, Bonhote.

Funambulus insignis jalorensis, Bonhote, Fasciculi Malayenses Zoology, Part I, 1903, p. 26.

Funambulus insignis peninsulæ, Bonhote, p. 8.

Sciurus insignis, Ridley, p. 59.

2 ♂; 2 ♀. Lipis.
1 ♀. Bentong.

I have recently seen specimens of the striped Ground-Squirrel from Trang, whence came the single individual on which Mr. Miller's (*Smithsonian Miscellaneous Collections*, vol. 45, 1903, p. 25) *Funambulus peninsulæ* was based, which does not appear to differ from examples described as *Funambulus insignis jalorensis* by Mr. Bonhote, a name that has priority of date.

Though individuals from Perak to Singapore have been "lumped" by Messrs. Thomas and Wroughton (*Journ. F.M.S. Museums*, vol. IV, 1909, p. 118) under the name of *Lariscus insignis*, there is a marked difference between those from the Federated Malay States and the Northern Malay Peninsula and those from Southern Johore and Singapore; animals from the former area being only fulvous on shoulders and thighs, whereas the others are strongly fulvous throughout above, and below are washed with orange-fulvous on thighs and on sides of throat. The southern specimens differ decidedly from a large northern series (if from it be excluded an isolated specimen from Bukit Kutu, Selangor, which outdoes them in richness of colour but appears abnormal). Mr. Bonhote has referred (*P.Z.S.*, 1906, vol. I, p. 6) Johore specimens to *F. peninsulæ*, Miller.

16. RHINOSCIURUS, *sp.*

Funambulus laticandatus, Bonhote, p. 9.

Sciurus laticandatus, Ridley, p. 59.

1 ♂. Lipis.

An immature specimen.

(The only other specimen of *Rhinosciurus* known to me from Pahang, other than those referred to above, is a female obtained by

Lieut. Kelsall at Kota Glanggi in 1891 and now in the Raffles Museum, Singapore. It was identified by Mr. Thomas as *R. laticaudatus*, M. & S., but now that *R. laticaudatus* is known to be confined to Borneo, it must be recorded as an example of *R. tupaioides*, Blyth, as the tail hairs are distinctly washed with whitish.)

17. MUS VOCIFERANS, MILLER.

Mus vociferans, Miller, Proc. Biol. Soc. Wash., vol. XIII, 1900, p. 138.

1 ♀. Lipis.

2 ♂; 1 ♀. Bentong.

18. MUS SURIFER, MILLER.

Mus surifer, Miller, Proc. Biol. Soc. Washington, vol. XIII, 1900, p. 148.

4 ♀. Bentong.

19. MUS PELLAX, MILLER.

Mus pellax, Miller, Proc. Biol. Soc. Washington, vol. XIII, 1900, p. 147.

1 ♂; 2 ♀. Bentong.

This species has not hitherto been obtained from the eastern side of the Peninsula.

20. MUS CREMORIVENTER, MILLER.

Mus cremoriventer, Miller, Proc. Biol. Soc. Wash., vol. XIII, 1900, p. 114; Bonhote, p. 10.

1 ♂. Lipis.

This, at present, is the most southerly record for the east side of the Peninsula.

21. MUS ASPER, MILLER.

Mus asper, Miller, Proc. Biol. Soc. Washington, xiii, 1900, p. 145.

1 ♂. Lipis.

4 ♂; 3 ♀. Bentong.

The series serves to show the variability of *Mus asper*. It ranges from typical bright-coloured animals with rusty bellies to duller-backed individuals with grey under parts. Rats from Eastern Sumatra, with the latter characters and size a trifle greater than the typical *M. asper*, have been separated by Dr. M. W. Lyon (Proc. U. S. Nat. Mus., vol. XXXIV, 1908, p. 644) under the name of *Mus mandus*. But duller colour and greater size are by no means always associated in the Peninsular animals, and it does not appear at present desirable to recognise more than the one species in our area.

22. MUS VALIDUS, MILLER.

Mus validus, Miller, Proc. Biol. Soc. Wash., xiii, 1900, p. 141; Bonhote, P.Z.S., 1906, vol. I, p. 10.

2 ♀. Lipis.

Immature individuals are much darker above than adults and have grey under parts only slightly washed with buff.

23. MUS JALORENSIS, Bonh.

Mus jalorensis, Bonhote, Fasciculi Malayenses Zoology, Part I. 1903, p. 28.

1 ♂. Lipis.

2 ♂. Bentong.

White-bellied members of the *Rattus* group which appear referable to *M. jalorensis*, Bonh.

24. MUS CONCOLOR, Blyth.

Mus concolor, Bonhote, p. 10.

1 ♂. Lipis.

25. RHIZOMYS SUMATRENSIS (Raffles).

1 ♂. Lipis.

An old male. Head and shoulders cream-buff, under surface whitish. Outer sides of fore limbs, a line from occiput to saddle and remainder of pelage grizzled greyish brown. Head and body, 380; tail, 140; hind foot, 56; ear, 20 mm.

26. TUPAIA FERRUGINEA, Raffles.

Tupaia ferruginea, Bonhote, p. 3.

1 ♀. Lipis.

A very rufous individual.

27. TUPAIA MALACCANA, Anderson.

Tupaia malaccana, Anderson. Anatomical and Zoological Researches, 1878, p. 134.

Tupaia javanica, Ridley, p. 58.

1 ♂. Lipis.

28. GALEOPTERUS PENINSULÆ, Thos.

Galeopterus peninsulæ, Thos., Ann. and Mag. Nat. Hist., (8), ii, 1908, p. 303.

Galeopithecus volans, Ridley, p. 58.

1 ♀. Bentong.

A very ashy-backed example.

29. MEGADERMA SPASMA TRIFOLIUM, Geoff.

2 ♂; 1 ♀. Bentong.

A common House-bat.

BIRDS.

PHASIANIDÆ.

1. ROLLULUS ROULROUL (Scop.).

Rollulus roulroul, Hartert, p. 539; Grant, p. 57.

1 ♂. Lipis.

2. ARGUSIANUS ARGUS (Linn.).

Argusianus argus, Hartert, p. 538; Grant, p. 56.

1 ♀. Bentong.

COLUMBIDÆ.

3. TRERON NIPALENSIS, Hodgs.

Treron nipalensis, Grant, p. 54.

1 ♂. Lipis.

4. MACROPYGIA RUFICEPS (Temm.).

Macropygia ruficeps (? an sp. nov.), Hartert, p. 541.

Macropygia ruficeps, Grant, p. 53.

1 ♂; 2 ♀. Bentong.

RALLIDÆ.

5. RALLINA FASCIATA (Raffles).

1 ♂. Lipis.

ANATIDÆ.

6. DENDROCYGNA JAVANICA (Horsf.).

Dendrocygna javanica, Kelsall, p. 65; Hartert, p. 541.

FALCONIDÆ.

7. SPILORNIS PALLIDUS (Walden).

Spilornis bacha (? subsp.), Hartert, p. 541.

Spilornis bacha, Grant, p. 52.

1 ♀. Lipis.

8. MICROHIERAX FRINGILLARIUS (Drap.).

Microhierax fringillarius, Kelsall, p. 60; Hartert, p. 541; Grant, p. 52.

2 ♂; 4 ♀. Bentong.

PSITTACIDÆ.

9. PSITTINUS INCERTUS (Shaw).

Psittinus incertus, Kelsall, p. 64.

Psittinus malaccensis, Hartert, p. 542; Grant, p. 51.

5 ♂. Lipis.

2 ♂. Bentong.

10. LORICULUS GALGULUS (Linn.).

Loriculus galgulus, Hartert, p. 542; Grant, p. 51.

3 ♂. Lipis.

ALCEDINIDÆ.

11. PELARGOPSIS MALACCENSIS, Sharpe.

Pelargopsis malaccensis, Kelsall, p. 63; Grant, p. 50.

Pelargopsis javana malaccensis, Hartert, p. 542.

12. ALCEDO ERYZONA, Temm.

Alcedo eryzona (sic!), Hartert, p. 542.

1 ♂. Lipis.

1 ♂. Bentong.

The only previous record for Pahang of this Kingfisher—rare in the Peninsula—seems to be the specimen cited by Hartert to which no exact locality is attached. We had believed the bird to be a frequenter of mountain streams, but the localities where the above examples were obtained are decidedly in the lowland

13. ALCEDO MENINTING, Horsf.

Alcedo meninting, Kelsall, p. 63; Hartert, p. 543.

2 ♂; 1 ♀. Lipis.

14. CEYX TRIDACTYLA (Pall).

2 ♂; 1 ♀. Bentong.

15. CEYX EUERYTHRA, Sharpe.

Ceyx dillwynni, Hartert, p. 543.

Ceyx euerythra, Grant, p. 50.

1 ♂; 1 ♀. Lipis.

16. HALCYON CONCRETUS (Temm.).

Halcyon concretus, Grant, p. 49.

1 ♀. Bentong.

BUCEROTIDÆ.

17. BUCEROS RHINOCEROS (Linn.).

Buceros rhinoceros, Kelsall, p. 64; Hartert, p. 543.

1 ♂. Bentong.

18. BERENICORNIS COMATUS (Raffles).

1 ♂; 2 ♀. Bentong.

MEROPIDÆ.

19. MEROPS SUMATRANUS (Raffles).

Merops sumatranus, Kelsall, p. 63.

3 ♂; 2 ♀. Lipis.

20. NYCTIORNIS AMICTA (Temm.).

Nyctiornis amicta, Kelsall, p. 63; Hartert, p. 544; Grant, p. 49.

1 ♀. Lipis.

1 ♂. Bentong.

CAPRIMULGIDÆ.

21. CAPRIMULGUS AMBIGUUS, Hartert.

(?) *Caprimulgus macrurus*, Kelsall, p. 63; Hartert, p. 544.

1 ♀. Lipis.

CYPSELIDÆ.

22. COLLOCALIA INEXPECTATA, Hume.

1 ♂. Bentong.

23. CHAETURA LEUCOPYGIALIS, Blyth.

Chaetura leucopygialis, Grant, p. 46.

2 ♂; 1 ♀. Bentong.

24. MACROPTERYX COMATA (Temm.).

Macropteryx comatus, Kelsall, p. 63; Hartert, p. 544; Grant, p. 47.

1 ♂. Bentong.

TROGONIDÆ.

25. PYROTROGON DUVAUCELI (Temm.).

Harpactes duvauceli, Kelsall, p. 64.

Pyrotrogon duvauceli, Hartert, p. 544.

1 ♂. Lipis.

1 ♂; 1 ♀. Bentong.

CUCULIDÆ.

26. SURNICULUS LUGUBRIS (Horsf.).

Surniculus lugubris, Hartert, p. 544; Grant, p. 45.

2 ♂; 1 ♀. Bentong.

27. CACOMANTIS MERULINUS (Scop.).

Cacomantis passerinus, Kelsall, p. 64.

Cacomantis merulinus, Hartert, p. 544.

1 ♂. Bentong.

28. RHOPODYTES DIARDI (Less.).

Rhopodytes diardi, Hartert, p. 545; Grant, p. 44.

1 ♂. Lipis.

29. RHINORTHA CHLOROPHÆA (Raffles).

Rhinortha chlorophæa, Kelsall, p. 64; Hartert, p. 545; Grant, p. 44.

1 ♂. Lipis.

1 ♀. Bentong.

30. UROCOCCYX ERYTHROGNATHUS (Hartl.).

Phoenicophaus erythrognathus, Hartert, p. 546.

Urococcyx erythrognathus, Grant, p. 44.

1 ♀. Bentong.

CAPITONIDÆ.

31. CALORHAMPUS HAYI (J. E. Gray).

Calorhampus hayi, Kelsall, p. 64; Hartert, p. 546; Grant, p. 43.

2 ♂. Lipis.

4 ♂; 1 ♀. Bentong.

An immature individual from Lipis is strongly suffused with green both above and below, and the wing-coverts are tipped with ferruginous.

32. CHOTORHEA CHRYSOPOGON (Temm.).

Chotorhea chrysopogon, Grant, p. 43.

2 ♂; 1 ♀. Bentong.

33. CHOTORHEA VERSICOLOR (Raffles).

1 ♂. Bentong.

34. CHOTORHEA MYSTACOPHANES (Temm.).

2 ♂. Bentong.

35. CYANOPS HENRICI (Temm.).

Cyanops henrici, Kelsall, p. 64.

1 ♂; 1 ♀. Lipis.

3 ♂. Bentong.

36. MESOBUCCO DUVAUCELI (Less.).

Mesobucco duvaucelii, Grant, p. 42.

2 ♂; 1 ♀. Lipis.

1 ♂. Bentong.

Of the specimens from Lipis, the first has clear black sinciput, ear-coverts, malar stripe and gular pouch, the second has the feathers of sinciput and gular pouch slightly tipped with blue and the ear-

coverts and malar stripe strongly washed with that colour; the third, a female, has sinciput and gular pouch completely obscured with blue, the ear-coverts are likewise blue and the malar stripe is greenish-blue. The Bentong specimen has black sinciput and malar stripe, the ear-coverts are greenish and the gular patch is much reduced. In certain areas at least the differences of colour which have given rise to two names appear largely due to differences of age and sex. Grant (Fasc. Mal. Zool., Report on the Birds, p. 102) records the black-eared form, *C. duvauceli*, from so far north as Nawngchik in Patani: on the other hand, Trang birds are decidedly *C. cyanotis* as are also examples from Trengganu.

PICIDÆ.

37. GECINUS OBSERVANDUS, HARTERT.

Gecinus puniceus observandus, Hartert, p. 547.

Gecinus puniceus, Kelsall, p. 64; Grant, p. 41.

1 ♀. Lipis.

38. GECINULUS VIRIDIS, BLYTH.

2 ♂. Bentong.

39. IYNGIPICUS CANICAPILLUS, BLYTH.

Yungipicus canicapillus, Hartert, p. 547.

(?) *Iyungipicus auritus*, Kelsall, p. 64.

2 ♀. Lipis.

40. PYRRHOPICUS PORPHYROMELAS (BOIE).

Leptocestes porphyromelas, Kelsall, p. 64.

Pyrrhopicus porphyromelas, Grant, p. 40.

1 ♂; 2 ♀. Bentong.

41. MIGLYPTES GRAMMITHORAX (MALH.).

Miglyptes grammithoraæ, Kelsall, p. 64; Hartert, p. 547; Grant, p. 41.

2 ♂; 1 ♀. Lipis.

1 ♂. Bentong.

42. MIGLYPTES TUKKI (LESS.).

Miglyptes tukki, Kelsall, p. 64; Hartert, p. 547; Grant, p. 40.

1 ♀. Lipis.

43. MICROPTERNUS BRACHYURUS (VIEILL.).

Micropternus brachyurus, Kelsall, p. 64; Hartert, p. 547; Grant, p. 41.

2 ♂. Lipis.

1 ♀. Bentong.

44. CHRYSOPHLEGMA MALACCENSE (LATH.).

Chrysophlegma malaccense, Kelsall, p. 64; Grant, p. 41.

Chrysophlegma miniatus malaccensis, Hartert, p. 546.

2 ♀. Bentong.

45. CHRYSOPHLEGMA HUMII, HARGITT.

Chrysophlegma humii, Kelsall, p. 64; Hartert, p. 546; Grant, p. 41.

3 ♀. Lipis.

2 ♂. Bentong.

46. CHRYSOCOLAPTES VALIDUS (Temm.).

Chrysocolaptes validus, Grant, p. 41.

Chrysocolaptes rallidus, Kelsall, p. 64.

1 ♂ : 2 ♀. Lipis.

47. HEMICERCUS SORDIDUS (Eyton).

Hemicercus concretus sordidus, Hartert, p. 547.

1 ♀. Lipis.

2 ♂. Bentong.

The two specimens from Bentong are immature. In one, forehead, crown and crest are equally mingled rufous-buff and slaty-grey, the terminations of the crest feathers being faintly tinged orange-red; in the second, forehead and crown are rufous-buff, the feathers having slaty terminations, and the crest is orange-red, rufous-buff towards the end, the extreme terminations of the feathers being slaty.

48. ALOPHONERPES PULVERULENTUS (Temm.).

Humilophus pulverulentus, Kelsall, p. 64.

1 ♀. Lipis.

49. THRIPONAX JAVENSIS (Horsf.).

Thriponax javensis, Kelsall, p. 64.

1 ♂ : 2 ♀. Lipis.

50. SASIA EVERETTI, Hargitt.

Sasia abnormis everetti, Hartert, p. 547.

Sasia abnormis, Grant, p. 40.

1 ♂. Lipis.

1 ♂. Bentong.

The example from Bentong is immature and agrees in every respect with the description of the type (Hargitt, C.B.M., xviii, p. 559).

EURYLAEMIDÆ.

51. CALYPTOMENA VIRIDIS, Raffles.

Calyptomena viridis, Kelsall, p. 63; Hartert, p. 548; Grant, p. 38.

2 ♂ ; 1 ♀. Lipis.

3 ♂ : 2 ♀. Bentong.

52. EURYLAEMUS JAVANICUS, Horsf.

Eurylaemus javanicus, Kelsall, p. 53; Hartert, p. 548; Grant, p. 39.

1 ♀. Bentong.

53. EURYLAEMUS OCHROMELAS, Raffles.

Eurylaemus ochromelas, Kelsall, p. 63; Grant, p. 39.

4 ♂. Lipis.

2 ♂ ; 1 ♀. Bentong.

The female from Bentong is immature. It differs above from adult specimens in having the white collar faintly washed with yellow on the nape. Below there is no black gorget and the chin and upper throat are dusky only, the feathers being particoloured black and white and faintly washed yellow. Breast and abdomen are yellow, the dusky bases of the feathers showing on the breast, sides and flanks and down the

centre of the breast is a stripe of pale vinous purple. The subterminal spots on the tail are yellowish white, and there is a yellow supercilium extending from the nostril half-way over the eye.

54. CYMBORHYNCHUS MALACCENSIS, Salvad.

Cymborhynchus macrorhynchus, Kelsall, p. 63; Grant, p. 39.

Cymbirhynchus macrorhynchus lemniscatus, Hartert, p. 548

4 ♂; 2 ♀. Lipis.

1 ♂; 3 ♀. Bentong.

PITTIDÆ.

55. EUCICHLA BOSCHII, M. & S.

Pitta boschi, Kelsall, p. 63.

Eucichla irena, Hartert, p. 549.

1 ♀. Bentong.

Though common in Trang and other Siamese States, this Pitta is rare in the southern portion of the Peninsula and has been obtained recently only at Lenggong and Temengoh, Upper Perak, and at the above place. The locality, "Malacca," given for so many of the older specimens has now little value as it merely indicates that the skins came from a region on the west coast stretching from, and often including, Singapore to Penang.

HIRUNDINIDÆ.

56. HIRUNDO BADIA, Cass.

Hirundo badia, Kelsall, p. 63.

1 ♂; 1 ♀. Lipis.

MUSCICAPIDÆ.

57. CYORNIS SUMATRENSIS, Sharpe.

Cyornis sumatrensis, Hartert, p. 549.

1 ♀. Bentong.

58. ERYTHROMYIAS MUELLERI (Blyth.).

Erythromyias muelleri, Hartert, p. 351.

1 ♂. Lipis.

1 ♂; 1 ♀. Bentong.

59. HYPOTHYMIS AZUREA (Bodd.).

Hypothymis azurea, Hartert, p. 552; Grant, p. 37.

2 ♂; 1 ♀. Lipis.

2 ♂. Bentong.

60. RHIPIDURA PERLATA (S. Müll.).

Rhipidura perlata, Kelsall, p. 61; Hartert, p. 552; Grant, p. 36.

1 ♂. Bentong.

61. RHIPIDURA JAVANICA (Sparrm.).

Rhipidura javanica, Kelsall, p. 61.

1 ♂. Lipis.

62. TERPSIPHONE AFFINIS (BLYTH).

Terpsiphone affinis, Kelsall, p. 61; Hartert, p. 553; Grant, p. 37.

3 ♂; 1 ♀. Bentong.

Two of the males show the beautiful black and white adult plumage.

63. PHILENTOMA VELATUM (TEMM.).

Philentoma velatum, Kelsall, p. 61; Hartert, p. 553; Grant, p. 36.

1 ♂. Lipis.

1 ♂. Bentong.

64. PHILENTOMA PYRRHOPTERUM (TEMM.).

Philentoma pyrrhopterum, Kelsall, p. 61; Hartert, p. 553; Grant, p. 36.

1 ♂; 1 ♀. Lipis.

2 ♂; 1 ♀. Bentong.

65. RHINOMYIAS PECTORALIS (SALVAD.).

Rhinomyias pectoralis, Hartert, p. 553.

1 specimen. Lipis.

66. CULICAPA CEYLONENSIS (SWAINS.).

Culicapa ceylonensis, Hartert, p. 553; Grant, p. 35.

2 ♂. Bentong.

67. ABRORNIS SCHWANERI (TEMM.).

2 ♀. Bentong.

CAMPOPHAGIDÆ.

68. PERICROCOTUS FLAMMIFER, Blyth.

2 ♂. Bentong.

PYCNONOTIDÆ.

69. ÆGITHINA VIRIDISSIMA (Bp.).

Ægithina viridissima, Grant, p. 33.

1 ♂; 1 ♀. Lipis.

1 ♀. Bentong.

70. ÆGITHINA TIPHIA (LINN.).

Ægithina tiphia, Kelsall, p. 61; Hartert, p. 537.

1 ♂; 1 ♀. Lipis.

71. CHLOROPSIS ZOSTEROPS (VIG.).

Chloropsis zosterops, Kelsall, p. 61; Grant, p. 33.

1 ♀. Lipis.

4 ♂; 2 ♀. Bentong.

72. CHLOROPSIS ICTEROCEPHALA (LINN.).

Chloropsis icterocephala, Hartert, p. 537; Grant, p. 33.

2 ♂; 2 ♀. Lipis.

1 ♂; 2 ♀. Bentong.

73. CHLOROPSIS CYANOPOGON (TEMM.).

Chloropsis cyanopogon, Hartert, p. 537; Grant, p. 33.

1 ♂. Bentong.

74. IRENA CYANEA, Hodgs.

Irena cyanea, Kelsall, p. 62; Hartert, p. 537; Grant, p. 33.

1 ♂. Lipis.

1 ♀. Bentong.

75. HEMIXUS MALACCENSIS (BLYTH).

Hemixus malaccensis, Hartert, p. 538; Grant, p. 33.

1 ♂. Lipis.

76. IOLE OLIVACEA, BLYTH.

Iole olivacea, Hartert, p. 538; Grant, p. 32.

1 ♂; 1 ♀. Lipis.

1 ♂; 1 ♀. Bentong.

77. MICROTARSUS MELANOCEPHALUS (GM.).

2 ♂. Lipis.

2 ♂; 2 ♀. Bentong.

78. MICROTARSUS MELANOLEUCUS (EYTON).

Micropus melanoleucus, Grant, p. 32.

1 ♀. Lipis.

79. CRINIGER TEPHROGENYS, J. & S.

Criniger tephrogenys, Hartert, p. 538; Grant, p. 31.

1 ♀. Lipis.

2 ♂. Bentong.

80. CRINIGER FINSCHI, SALVAD.

Criniger finschii, Hartert, p. 560.

1 ♀. Lipis.

1 ♂. Bentong.

81. ALOPHOIXUS PHAEOCEPHALUS (HARTL.).

Criniger phaeocephalus, Kelsall, p. 61; Grant, p. 32.

Alophoixus phaeocephalus, Hartert, p. 560.

3 ♂. Bentong.

82. TRICHOLESTES CRINIGER (BLYTH).

Tricholestes criniger, Hartert, p. 560; Grant, p. 31.

3 ♂; 2 ♀. Lipis.

1 ♂; 1 ♀. Bentong.

83. TRACHYCOMUS OCHROCEPHALUS (GM.).

Trachycomus ochrocephalus, Kelsall, p. 62.

1 ♂; 1 ♀. Bentong.

84. PYCNONOTUS ANALIS (HORSF.).

Pycnonotus analis, Kelsall, p. 62.

Pycnonotus goiavier analis, Hartert, p. 560.

1 ♂. Lipis.

1 ♀. Bentong.

85. PYCNONOTUS FINLAYSONI (STRICKL.).

Pycnonotus finlaysoni, Hartert, p. 560.

2 ♂. Lipis.

2 ♂. Bentong.

86. PYCNONOTUS PLUMOSUS, BLYTH.

Pycnonotus plumosus, Kelsall, p. 62.

2 ♂. Lipis.

1 ♂; 1 ♀. Bentong.

87. PYCNONOTUS SIMPLEX, Less.

Pycnonotus simplex, Hartert, p. 560; Grant, p. 31.

1 ♂. Bentong.

88. PYCNONOTUS SALVADORII, SHARPE.

Pycnonotus salvadorii, Hartert, p. 561.

1 ♀. Bentong.

89. RUBIGULA CYANIVENTRIS (BLYTH).

Rubigula cyaniventris, Hartert, p. 561; Grant, p. 31.

2 ♂. Bentong.

TIMELIIDÆ.

90. POMATORHINUS BORNEENSIS, CAB.

Pomatorhinus borneensis, Hartert, p. 562.

1 ♂. Bentong.

91. TURDINUS OLIVACEUS (STRICKL.).

Turdinus abbotti, Kelsall, p. 62; Grant, p. 29.

Turdinus abbotti olivaceum, Hartert, p. 562.

1 ♂; 2 ♀. Lipis.

1 ♂. Bentong.

92. TURDINUS SEPIARIUS (HORSF.).

Turdinus sepiaria (? subsp. nov.), Hartert, p. 563.

1 ♂. Bentong.

Differs from the last species, which it very closely resembles, in its slightly smaller size, lighter bill, dark legs and feet and richer and darker upper surface, besides lacking the pale shaft-stripes to the crown-feathers possessed by *T. olivaceus*.

93. TURDINUS MAGNIROSTRIS, MOORE.

Turdinus magnirostris, Kelsall, p. 62.

Malacopteron magnirostris, Hartert, p. 563.

Malacopterum magnirostre, Grant, p. 29.

1 ♂; 1 ♀. Bentong.

94. TURDINUS MACRODACTYLUS (STRICKL.).

Turdinus macrodactylus, Kelsall, p. 62.

1 ♀. Bentong.

95. ERYTHROCICHLA BICOLOR (HORSF.).

Erythrocichla bicolor, Hartert, p. 563.

2 ♂. Lipis.

2 ♂. Bentong.

96. DRYMOCATAPHUS NIGRICAPITATUS (BLYTH).

Drymocataphus nigricapitatus, Kelsall, p. 62; Grant, p. 29.

4 ♂. Lipis.

2 ♂; 1 ♀. Bentong.

97. ÆTHOSTOMA ROSTRATUM (Blyth).

Trichastoma rostratum, Hartert, p. 563.

2 ♂. Lipis.

2 ♀. Bentong.

98. SETARIA MAGNA (Eyton).

Malacopterum magnum, Kelsall, p. 62.

Malacopteron magnum, Hartert, p. 563.

1 ♂. Lipis.

2 ♂. Bentong.

99. SETARIA CINEREA (Eyton).

Malacopteron cinereus, Hartert, p. 564.

1 ♂ ; 1 ♀. Lipis.

1 ♂ ; 2 ♀. Bentong.

100. SETARIA AFFINIS (Blyth).

(?) *Malacopteron melanocephalum*, Hartert, p. 565.

4 ♂ ; 2 ♀. Lipis.

Though the type of *Setaria melanocephala* (Davison) came from Kuala Tembeling, a locality less than 20 miles from Lipis, and Hartert records one other example from the Pahang lowlands, I prefer to list these specimens as *S. affinis*. According to Hartert the latter differs from *S. affinis* in its "deeper blackish crown, less rufous, more deep brown tail, slightly darker back." I have compared the present examples with an equal number of *S. affinis* from the vicinity of Kuala Lumpur and can detect no constant differences. Davison's single individual was apparently compared with *S. albigularis*, a very different bird, and it is quite possible to pick out from a series obtained at the same locality and time, one specimen differing from another to the extent of which Hartert separates *S. melanocephala* from *S. affinis*. The type of the previous species which belongs to the Raffles Museum, Singapore, is before me at the present moment: it has suffered much from careless treatment and is now of little value in settling the question, but I cannot recognise it as being in any way different from the series of twelve examples mentioned above.

101. ANUROPSIS MALACCENSIS, Hartl.

Anuropsis malaccensis, Grant, p. 29.

1 ♂. Lipis.

3 ♂ : 1 ♀. Bentong.

102. ALCIPPE CINEREA (Blyth).

Alcippe cinerea, Hartert, p. 566 ; Grant, p. 28.

1 ♀. Lipis.

3 ♂ ; 1 ♀. Bentong.

103. STACHYRIS POLIOCEPHALA (Temm.).

Stachyris poliocephala, Hartert, p. 566 ; Grant, p. 28.

1 ♂. Lipis.

2 ♂ ; 1 ♀. Bentong.

101. STACHYRIS MACULATA (Temm.).

Stachyris maculata, Hartert, p. 566.

2 ♂; 1 ♀. Lipis.

1 ♀. Bentong.

105. CYANODERMA ERYTHROPTERUM (Blyth).

Mixornis erythropterum, Kelsall, p. 62.

Cyanoderma erythroptera, Grant, p. 27.

1 ♂; 1 ♀. Lipis.

1 ♂. Bentong.

106. MACRONUS PTILOSUS, J. & S.

Macronus ptilosus, Kelsall, p. 62; Grant, p. 27.

3 ♂; 2 ♀. Lipis.

107. MIXORNIS GULARIS (Raffles).

Mixornis gularis, Kelsall, p. 62; Hartert, p. 567.

1 ♂; 1 ♀. Lipis.

2 ♂. Bentong.

108. HERPORNIS XANTHOLEUCA, Hodgs.

Herpornis xantholeuca, Grant, p. 25.

Erpornis xantholeuca, Hartert, p. 568.

1 ♂. Bentong.

TURDIDÆ.

109. HYDROCICHLA RUFICAPILLA (Temm.).

Hydrocichla ruficapilla, Kelsall, p. 62; Hartert, p. 570.

6 ♂; 3 ♀. Bentong.

One of the males is immature. It differs from adults in being less intense in colour, head and back being rufous rather than orange-chestnut and the black areas varying from brown to sooty. The terminations of the feathers of the lower breast are rufous brown and the sides are washed with the same colour. The black frontal and rump bands are hardly traceable and the white termination of the tail feathers are only just beginning to appear, while the throat is mingled black and white. Hartert has pointed out that the white throat on which Sharpe founded *H. cafidorsalis* is part of the immature plumage of this species.

110. HYDROCICHLA FRONTALIS (Blyth).

1 ♀. Lipis.

A species rarely obtained in the south of the Peninsula.

111. CITTOCINCLA MACRURA (Gm.).

Cittocincla tricolor, Kelsall, p. 62; Grant, p. 23.

Kittacincla macrurus, Hartert, p. 571.

1 ♂; 1 ♀. Lipis.

1 ♂. Bentong.

SYLVIIDÆ.

112. ORTHOTOMUS RUFICEPS (Less.).

Orthotomus ruficeps, Kelsall, p. 62.

1 ♀. Bentong.

113. ORTHOTOMUS CINERACEUS (Blyth).

2 ♂. Lipis.

114. FRANKLINIA RUFESCENS (Blyth).

1 ♂. Lipis.

1 ♂ ; 1 ♀. Bentong.

LANIIDÆ.

115. HEMIPUS OBSCURUS (Horsf.).

2 ♂. Lipis.

2 ♂. Bentong.

116. PLATYLOPHUS ARDESIACUS, Cab.

1 ♀. Lipis.

1 ♀. Bentong.

The Lipis specimen is immature. The feathers of the occiput are tipped with ferruginous as are the tertiaries and wing-coverts. The under surface is slaty-grey ; the feathers of the throat have white terminations, and there is an irregular ferruginous band across the breast.

117. LANIUS CRISTATUS, Linn.

Lanius cristatus, Kelsall, p. 62.

1 ♂. Lipis.

PARIDÆ.

118. MELANOCHLORA FLAVOCRISTATA (Lafr.).

Melanochlora sultanea, Grant, p. 21.

1 ♀. Lipis.

CORVIDÆ.

119. CORVUS ENCA, Horsf.

Corone enca, Kelsall, p. 61.

1 ♀. Bentong.

120. PLATYSMURUS LEUCOPTERUS (Temm.).

Platysmurus leucopterus, Kelsall, p. 61 ; Grant, p. 16.

3 ♂ ; 1 ♀. Lipis.

3 ♂ ; 2 ♀. Bentong.

DICRURIDÆ.

121. CHAPTIA MALAYENSIS (Hay.).

Chaptia ænea, Grant, p. 17.

2 ♂. Bentong.

122. DISSEMURUS PARADISEUS (Linn.).

Dissemurus platurus, Kelsall, p. 61.

Dissemurus paradiseus, Hartert, p. 579 ; Grant, p. 17.

3 ♂. Lipis.

2 ♂. Bentong.

STURNIDÆ.

123. EULABES JAVANENSIS (OSBECK).

Mainatus javanensis, Kelsall, p. 63.

Eulabes javanensis, Grant, p. 17.

Gracula javanus, Hartert, p. 579.

2 ♂. Lipis.

PLOCEIDÆ.

124. PLOCEUS INFORTUNATUS, HARTERT.

Ploceus baya, Kelsall, p. 63.

Ploceus passerinus infortunatus, Hartert, p. 577

Ploceus atrigularis, Grant, p. 18.

2 ♂ ; 1 ♀. Lipis.

125. MUNIA ACUTICAUDA, HODGS.

Uroloncha acuticauda, Kelsall, p. 63.

Munia acuticauda, Hartert, p. 579 ; Grant, p. 18.

1 ♂. Lipis.

3 ♂. Bentong.

126. MUNIA LEUCOGASTRA (BLYTH).

Munia leucogastra, Hartert, p. 578 ; Grant, p. 17.

1 ♂. Lipis.

8 ♂ ; 4 ♀. Bentong.

This species was unrepresented, after years of collecting, in the Federated Malay States Museums until a single example was obtained at Temengoh, Upper Perak, in 1909. Now, we have this large series from Pahang, showing that it is common on the east side of the main range, and individuals have been obtained recently in the hills near Seremban, Negri Sembilan.

NECTARINIDÆ.

127. ANTHOTHREPTES HYPOGRAMMICA (S. MÜLL.).

Anthothreptes hypogrammica, Kelsall, p. 62 ; Grant, p. 19.

Anthreptes hypogrammica, Hartert, p. 574.

1 ♂ ; 1 ♀. Lipis.

1 ♂. Bentong.

128. ANTHOTHREPTES MALACCENSIS (SCOP.).

Anthothreptes malaccensis, Kelsall, p. 62 ; Grant, p. 19.

Anthreptes malaccensis, Hartert, p. 573.

3 ♂ ; 2 ♀. Lipis.

129. CHALCOPARIA PHŒNICOTIS (TEM.).

Chalcoparia singalensis, Hartert, p. 574.

1 ♂ ; 1 ♀. Bentong.

130. ARACHNOTHERA MODESTA, EYTON.

Arachnothera affinis modesta, Hartert, p. 574.

4 ♂ ; 1 ♀. Bentong.

131. ARACHNOTHERA LONGIROSTRIS (LATH.).

Arachnothera longirostra, Hartert, p. 574; Grant, p. 19.

1 ♂. Lipis.

1 ♂. Bentong.

132. ARACHNOTHERA CRASSIROSTRIS (REICHENB.).

1 ♀. Lipis.

DICÆIDÆ.

133. DICAEUM CRUENTATUM (LINN.).

Dicaeum cruentatum, Kelsall, p. 62; Grant p. 20.

2 ♂. Lipis.

134. PRIONICHILUS IGNICAPILLUS, EYTON.

1 ♂. Lipis.

135. PRIONICHILUS MACULATUS, TEMM.

Prionichilus maculatus, Hartert, p. 575; Grant, p. 20.

1 ♂. Bentong.

NOTES ON INDO-MALAYAN SQUIRRELS.

BY HERBERT C. ROBINSON, C.M.Z.S., AND R. C. WROUGHTON, F.Z.S.

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I.—THE *SCIURUS NIGROVITTATUS* GROUP.

S. nigrovittatus, the type of this section of the genus was described by Horsfield from Java (Zool. Res., 1824), since when the following races have been described:

S. orestes, *Thos.* [Ann. Mag. Nat. Hist. (6), xv., p. 529 (1895)].	Borneo.
S. melanogaster, *Thos.* [Ann. Mus. Civ. Gen., xiv., p. 668 (1895)].	Mentawei Islands, N.W. Sumatra.
S. klossii, *Miller* [Proc. Wash. Acad. Sci., p. 225 (1900)].	Saddle Island, Tambelan Group.
S. bilimitatus, *Miller* [Smiths. Misc. Coll., 45, p. 8 (1903)].	Central Malay Peninsula.
S. atratus, *Miller* [Op. cit., p. 13 (1903)].	Pagi Islands, W. Sumatra.
S. microrhynchus, *Kloss*, Journ. Fed. Mal. States Mus., ii., p. 144.	Tioman Island, E. Malay Peninsula.

We now propose to separate the forms from the Southern Malay Peninsula and from Sumatra:

SCIURUS NIGROVITTATUS JOHORENSIS, *subsp. nov.*

A Southern Malay form of the size and pattern of *S. nigrovittatus bilimitatus*, but much less brightly coloured. Ochraceous colouring of face, etc., less bright than in *bilimitatus* and extending less on to the throat. Pale flank stripe dull buff not extending on to the hind leg. No bright colouring below the tail.

SKULL.—As in *bilimitatus*.

DIMENSIONS OF THE TYPE.—Head and body, 200; tail, 170; hind foot 45; ear, 17 mm. (measured in the flesh).

Skull.—Greatest length, 48; basilar length, 38, zygomatic breadth, 31; nasals, 14.5; diastema, 11.5; upper molar series, 10 mm.

Habitat.—The southern portion of the Malay Peninsula from Johore through the Settlement of Malacca, Negri Sembilan and Southern Pahang to Selangor, where it intergrades with the southern race. Specimens from Ulu Selama in Northern Perak are very brightly coloured and are to be referred to *Sc. nigrovittatus bilimitatus*.

The race from Tioman Island, *Sc. nigrovittatus microrhynchus*, Kloss, is, in external characters, close to the Johore form, but even duller with a greyer tail, lacking any ochraceous tinge, and differs further in the less robust skull with somewhat smaller teeth and feebler rostral region.

Type.—Adult female: B. M. No. 5. 12. 7. 16. Original No. 163. Collected at Pelepak, Johore, 24th March, 1905, by C. B. Kloss.

SCIURUS NIGROVITTATUS BOCKI, *subsp. nov.*

The Sumatran form differing from typical *nigrovittatus* by its somewhat smaller size and the brighter colouring of the flank stripes. From the races of the Malay Peninsula it is separable at once by the pale patches behind the ears.

Skull.—As in these forms, but smaller in all details.

Dimensions of the Type (from a skin specimen).—Head and body (*c*), 170; tail, (*c*), 150; hind foot, 43; ear, 15 mm.

Skull.—Nasals, 14; diastema, 11.5; upper molar series, 9 mm.

(The skull of the type is much broken, but from another specimen it seems that the greatest length is 46 and the zygomatic breadth, 28 mm.)

Habitat.—Sumatra.

Type.—Adult female: B. M. No. 79. 6. 28. 10. Collected by Carl Bock at Pajo in the Padang Highlands.

Besides another specimen from Pajo, there are two specimens skinned from spirits, in the collection, obtained by E. Modigliani from Si Rambi in Central Sumatra, which, allowing for the effect of alcohol on the colours, are not distinguishable from the type.

The following key may serve to distinguish the various members of the group:

I. General colour above an olivaceous grizzle, below grey. Hands and feet finely speckled with yellow.

A. Size larger; hind foot, 43-45 mm.

a. Grizzle of dorsal area coarser, belly darker, flank stripes obsolescent (especially the paler).

JAVA. S. [illegible]

b. Grizzle of dorsal area finer, belly paler, flank stripes well marked.

a_1. Hind foot, 45 mm. Pale patch behind ears indistinct.

a_2. Side stripes very conspicuous, the paler extending in a darker shade as an indistinct stripe down the hind legs to the ankle. Face, chin, sides of neck, throat and chest bright ochraceous. Tail below bright hazel.

NORTHERN MALAY PENINSULA. *S. n. bilimitatus* MILLER.

b_2. Side stripes less conspicuous, no sign of extension of paler one down hind leg. Face, chin and sides of neck (rarely extending to throat) ochraceous buff. Tail below not brightly coloured.

a_3. Rostrum slenderer, teeth smaller.

TIOMAN ISLAND. *S. n. microrhynchus*, KLOSS.

b_3. Rostrum more robust, teeth larger.

SOUTHERN MALAY PENINSULA. *S. n. johorensis*, R. & W.

b_1. Hind foot, 43 mm. Pale patch behind ears conspicuous. Tail below brightly ochraceous.

SUMATRA. *S. n. bocki*, R. & W.

B. Size smaller; hind foot, 36.40 mm.

a'. Patch behind ears well marked. General reddish suffusion above.

BORNEO. *S. n. orestes*, THOS.

b'. Patch behind ears obsolete. No reddish suffiusion above. Tail pencil pure black.

TAMBELAN ISLANDS. *S. n. klossii*, MILLER.

II. General colour above near "seal brown," below blackish. Hands and feet dull black.

A. Above grizzled "brick-red," tail all black, below "slate-black."

PAGI ISLANDS. *S. n. atratus*, MILLER.

B. Above grizzled "ochraceous buff," below black, tail obscurely banded.

MENTAWEI ISLANDS. *S. n. melanogaster*, THOS.

ON SIX NEW MAMMALS FROM THE MALAY PENINSULA AND ADJACENT ISLANDS

By HERBERT C. ROBINSON, C.M.Z.S., and C. BODEN KLOSS, F.Z.S.

RECENT work on the collections of the Selangor Museum has shown that the following six races of Malayan mammals are sufficiently distinct to merit description:

1. MUS RATTUS RUMPIA, *subsp. nov.*

TYPE.—Adult male (skin and skull), No. 250 09, Selangor Museum Collected on Pulau Rumpia, Sembilan Islands, off the Perak coast, W. Malay Peninsula, by E. Seimund, on the 7th March, 1909.

CHARACTERS.—Like *Mus rattus jalorensis*, Bonh., from the mainland of the Malay Peninsula, but considerably larger and darker above owing to the reduction of the ochraceous element in the pelage. The skull is more robust and the bullæ relatively larger.

COLOUR.—Above mingled ochraceous and sooty-brown, paler and somewhat greyer on the sides and darker on the rump and the median line of the back owing to the presence of numerous long black bristles. Under surface creamy white to the bases of the hairs, fairly clearly defined from the sides.

Under surface of scrotum greyish brown. Hands and feet flesh coloured, very thinly clad with pale hairs, darker on the median line of the feet.

SKULL AND TEETH.—Apart from its much larger size and more massive build, the skull of the present form is distinguished from that of *M. r. jalorensis* by the larger and more dilated bullæ and by the relatively shorter palatal foramina. Viewed from above, the rostrum is much heavier and broader, the cranium is more elongated and flattened and the postorbital ridges are heavier and more sharply deflected.

Apart from their greater size, the teeth do not differ.

MEASUREMENTS.—Collector's external measurements taken in the flesh: head and body, 180 (165*); tail, 207 (179); hind foot, 39 (30); ear, 23 (18) mm.

Cranial measurements: greatest length, 44.8 (41.5); basilar length, 37.0 (33.9); palatilar length, 21.5 (19.1); breadth between anterior molars, 4.5 (3.9); length of palatal foramina, 7.6 (7.1); breadth of rostrum at anterior extremity of foramina, 7.3 (6.8); diastema, 12.0 (11.9); length of upper molar row, 7.8 (7.1); median length of nasals, 15.8 (15.6); greatest breadth of combined nasals, 4.8 (4.2); interorbital breadth, 7.0 (6.1); cranial breadth, 16.5 (15.2); zygomatic breadth, 21.0 (19.0) mm.

The external measurements of twelve specimens average as follows, the figures in parentheses indicating the extreme range: head and body, 184 (175-200); tail, 209.8 (195-233); hind foot, 38.1 (37-39); ear, 22.7 (21-24).

* Measurements in parentheses are those of an adult male of *Mus jalorensis* from Bukit Jong, Trengganu (Selangor Museum, No. 2.12.10).

Specimens Examined.—Six skins and nine skulls, all from the type locality.

Remarks.—This race is readily separated from the mainland form by its much larger size, which is especially marked in the hind feet.

The series before us is very uniform both in size and in colouration, and does not differ from a further series of eight now in the British Museum, which were collected at the same time.

2. MUS SURIFER LEONIS, *subsp. nov.*

Type.—Adult male (skin and skull), No. 1,882/08, Selangor Museum. Collected at Changi, at the north-east corner of Singapore Island, by H. C. Robinson and E. Seimund, on the 22nd July, 1908. Original No. 1,048.

Characters.—Like *Mus surifer* from Trang, but more brilliantly tawny and size considerably smaller. Skull smaller with cranium rounder and relatively broader.

Colour.—Above brilliant tawny, sprinkled on the dorsal area and rump with brownish black: head, cheeks, sides of neck, shoulders and thighs, and sides along the line of demarcation from the belly, clear orange tawny. Under parts white, this colour extending to hands and roots of the vibrissæ and scarcely cut off from the white feet by the tawny colour of the outer thighs. A narrow tawny gorget across the chest. Tail bicoloured with terminal half white.

Skull and Teeth.—The skull in the broader and more globose cranium resembles rather the race dwelling in Terutau and Langkawi Islands than the mainland animal: the posterior terminations of the nasals are narrower than in the related forms.

Measurements.—Collector's external measurements taken in the flesh: head and body, 172; tail, 179; hind foot, 41; ear, 23 mm.

The average measurements of thirty specimens are: head and body, 170.3; tail, 176.3; hind foot, 39.3; ear, 22.6 mm.

Cranial measurements of the type: greatest length, 43.1; basilar length, 32.5; palatilar length, 17.9; breadth between anterior molars, 4; length of palatal foramina, 6.1; breadth of combined foramina, 3.2; diastema, 12.2; length of upper molar row, 6.2; length of nasals, 15.8; interorbital breadth, 6.9; cranial breadth, 16.4; zygomatic breadth, 18.5 mm.

Specimens Examined.—Thirty from the type locality.

Remarks.—Of the series the dullest are slightly brighter than the typical Peninsular animals, while the size is also decidedly less; but if this were due to immaturity, we should find them darker in colour.

When we first collected these rats we were struck with the differences as noted,* and re-examination of very large series of the allied forms, including topotypes of the typical race, confirms us in the opinion already expressed.

* Journ. Fed. Malay States Museums, iv, p. 125 (1909).

Though the variability of the mainland [illegible] occasionally produces individuals that match the Singapore animal in colour, yet the smaller size of the latter combined with their uniform tawniness indicates that they are a well-defined insular race, which, curiously enough, is more distinct from its geographical neighbour *Mus surifer lingensis*, of the Rhio Archipelago than it is from the true *Mus surifer surifer* of Trang.

From *Mus surifer flavidulus* of Langkawi Island, which it approaches in size, this race is easily separated by the brilliant colour and long tail; from *Mus surifer microdon* of Tioman Island, which approaches it in colour, it is distinguished by its smaller size, increased brightness and less interrupted white area of the under parts. The tawny gorget seen in the type is not of frequent occurrence.

3. SCIUROPTERUS (PETAURILLUS) KINLOCHII *Adm. sp. nov.*

Type.—Adult female (skin and skull), No. 2,668.10, Selangor Museum. Collected at Jeram Estate, Kapar, Selangor, by V. Kinloch, Esq., on the 13th October, 1910.

Characters.—A Pygmy Flying Squirrel of the subgenus, *Petaurillus*, of very similar dimensions to *Sc. hosii*, Thos., from Sarawak,* but, with smaller skull, much shorter rostrum and longer teeth, now differs further in having the ears markedly shorter, colour more rufescent above, median facial area darker, sides of the neck with a pure buffy patch below the base of the ear, hairs of chest and abdomen with greyish bases and the upper median line of the tail black.

Ears elongated, with rounded tips, the anterior edges convex, the posterior almost straight. Vibrissæ attain a length of 40 mm.

Colour.—Above black washed with rufescent-buff, strongly on occiput and body, but the limbs and inner portions of the parachute only slightly grizzled with the same colour. The buff-washed areas have the bases of the hairs slaty, their median third black and their tips rufescent-buff. The outer portions of the parachute are pure black to the bases of the hairs, and the extreme edges above and below are fringed with blacked hairs about 3 mm. long with buff tips.

Top of muzzle a ring round the eyes and areas between the eye and ear and below the latter sooty-black. A patch of pure white about 6 mm. in diameter at the posterior bases of the ears extending on to their outer surfaces. Sides of muzzle, cheeks immediately below eyes and sides of neck pure pale rufescent buff that, slightly interrupted by a small indefinite area of dusky hairs, extends below and round the bases of the ears, of which the posterior basal margins are black.

Below, under side of muzzle, posterior area of throat and upper chest white, the hairs concolorous throughout; anterior throat, body and limbs rufescent-buff, similar to cheeks, the bases of the hairs grey; under surfaces of parachute scantily clad with long hairs having dusky bases and white tips.

* Annals and Magazine of Natural History, (7), v. p. 275 (1900).

Upper sides of fore feet with a few black hairs on digits, wrists whitish, calcaneum from whitish proximally to ochraceous distally. Hind feet with inner sides buffy, their outer sides and heels black; proximal portion of digits buffy, extremities clad with white hairs overhanging the claws.

Tail above rufescent-buff, the hairs with white tips, thinly obscured by black hairs, which increase on the distal half where the underlying buff hairs have black sub-annulations: below almost pure rufescent-buff proximally, the edges paler; distally overlaid by black hairs as on the upper surface. The terminal, 15 mm., of tail pure white and buff.

Skull and Teeth.—These exactly agree with the characters given for the sub-genus by Thomas,* the skull being broad, low and short owing to the small size of the nasals, of which the posterior extremities and those of the premaxillaries are almost in a line. Mastoids inflated. The upper molar teeth show low and rounded ridges: p^4 is far less triangular than in the sub-genus *Sciuropterus* and is distinctly smaller than m^1, p^3, is placed mesially to it, so that m^1, p^4 and p^3 diminish regularly in size and their centres are in line with one another.

Measurements.—External measurements of the type in the flesh: head and body, 87 (87†); tail, 83 (98); hind foot, 19.4 (20); right ear, 13; left ear, 14 (17.5) mm.

Cranial measurements: greatest length, 26.0 (28.0†); basilar length, 20.1 (21.4); palatilar length, 10.2 (11.5); diastema, 5.1 (6.3); upper molar row, 4.75 (3.8); median nasal length, 6.5 (8.2); greatest breadth of combined nasals, 4.4 (4.0); interorbital breadth, 7.0 (7.0); greatest cranial breadth, 14.3; zygomatic breadth, 17.2 (18.8) mm.

Specimens Examined.—One, the type.

Remarks.—This is the first example of the sub-genus obtained in the Malay Peninsula, the two other species known both coming from Borneo. We have named it in honour of Mr. V. Kinloch, who obtained and presented it to the Federated Malay States Museums.

4. LARISCUS INSIGNIS MERIDIONALIS, *subsp. nov.*

Type.—Aged female (skin and skull), No. 1.909/08, Selangor Museum. Collected at Changi, north-east corner of Singapore Island, by H. C. Robinson and E. Seimund, on the 22nd July, 1908.

Characters.—Intermediate between *Lariscus insignis diversus* (Thos.) from Borneo and *L. insignis jalorensis* from the northern and central portions of the Malay Peninsula (types examined), having the flanks and thighs strongly tinged with rufous and the general colour of the upper surface rufescent, not olivaceous grey.

Colour.—General colour above rufescent, speckled with black, becoming orange tawny on the shoulders and thighs and duller and more buffy on the flanks and between the dorsal stripes; head, fore limbs and feet darker and browner. Three black dorsal stripes running from the

* Annals and Magazine of Natural History, (8), i., p. 1 (1909).

† Measurements in parentheses are those of the type of *Sciuropterus hosii*.

nape to the rump broader and more defined than in *L. i. jalorensis*. Under surface white, strongly tinged with orange-buff anteriorly, and orange tawny on the thighs. Tail annulated black and orange tawny with paler tips to the hairs.

Skull and Teeth do not differ materially from those of *L. i. jalorensis*.

Measurements.—Collector's external measurements taken in the flesh: head and body, 191; tail, 112; hind foot, [illegible]; ear, 16 mm.

Cranial measurements: greatest length, [illegible]; basilar length, [illegible]; palatilar length, 20.2; diastema, 11.8; upper molar row, [illegible]; median length of nasals, 14.7; greatest breadth of nasals, [illegible]; interorbital breadth, 14.0; cranial breadth, 20.5; zygomatic breadth, [illegible] mm.

Specimens Examined.—Five from the type locality and two from Southern Johore.

Remarks.—Examination of a series of topotypes shows that *Lariscus peninsulae* (Miller)* from Trang is identical with *Lariscus jalorensis* (Bonh.),† described about a month previously. The form described above is apparently confined to Singapore Island and the extreme south of the Peninsula as specimens from [illegible] or the interior of the Settlement of Malacca, though slightly brighter than typical *L. i. jalorensis*, are far nearer to that than to the present one.

Lariscus insignis insignis (F. Cuv.) from Sumatra, of which we have been able to examine a single example only, is a very much duller and greyer animal than either of the mainland ones.

5. TUPAIA FERRUGINEA WILKINSONI subsp. nov.

Type.—Adult male (skin and skull). No. [illegible], Selangor Museum. Collected at Ko-khau, Trang, Siamese Malaya, on the 12th January, 1910.

Characters.—Like *T. ferruginea ferruginea* from the northern portions of the Malay Peninsula, but with paler shoulders, the ferruginous area being confined to the rump.

Colour.—Upper surface annulated black and ochraceous buff producing an olivaceous effect, the head somewhat darker and more finely speckled, the rump and thighs suffused with ferruginous. An obscure yellowish-buff stripe from the sides of the neck to the shoulder. Under surface buff, yellowish on the throat and median line of the abdomen, whitish on the inner sides of the thighs. Tail above annulated black and buffy yellow, the latter colour being more conspicuous and whiter on the under surface. Hands and feet finely grizzled, the latter brownish.

Skull and Teeth do not differ from those of *T. f. ferruginea*.

Measurements.—Collector's external measurements taken in the flesh: head and body, 180; tail, 175; hind foot, 42; ear, 15 mm.

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* Smiths. Misc. Coll. [illegible] (Nov. [illegible]).

† Fasc. Malay. Zool. 1, p. [illegible] ([illegible]).

Cranial measurements: greatest length, 51.8; basal length, 44.9; palatal length, 28.0; width of palate at first molar, 9.5; zygomatic breadth, 25.9; least interorbital breadth, 14.5; cranial breadth, 20.9; tip of premaxillaries to lachrymal notch, 22.9; breadth of rostrum at diastema, 7.2; maxillary tooth row, 15.9 mm.

Specimens Examined.—Sixteen specimens from the State of Trang and three from lower Tenasserim.

Remarks.—This race appears to be intermediate between *T. f. ferruginea* from the southern Malay Peninsula and *T. f. belangeri* from Aracan and Pegu. From the former it differs in its generally paler and less rusty colouration, and from the latter in its much longer rostrum.

The race is dedicated to Mr. R. J. Wilkinson, Secretary to Resident, Perak, in recognition of the lively interest taken by him in the recent expedition of the Federated Malay States Museums to Trang.

6. PRESBYTIS NEGLECTA KEATII, *subsp. nov.*

Type.—Adult male (skin and skull), No. 1,231/10, Selangor Museum. Collected at Ko-khau, Trang, Siamese Malaya, on the 10th January, 1910.

Characters.—A member of the *femoralis-chrysomelas* section, distinguished from *P. neglecta* (Schleg.) of the southern portion of the Malay Peninsula and Singapore Island by its generally browner colouration, absence of white on the chest and by having the white femoral line produced quite to the heel.

Colour.—General colour clear brown, the tips of the long hairs slightly darker, paler on the occiput, nape, median dorsal line, elbows and buttocks. Frontal fringe, temporal tufts, sides of head and neck, hands and feet, extending up the posterior aspect of the limbs, and distal portion of tail, black. Inner side of upper arm, lower abdomen, extending broadly on to the thighs and thence in a regularly narrowing line to the heel, white.

Skull and Teeth present no differences from those of *P. neglecta*.

Dimensions.—Collector's external dimensions taken in the flesh head and body, 538; tail, 820; hind foot, 176 mm.

Cranial measurements: greatest length, 94.5; basal length, 68.7; cranial breadth, 60.0; zygomatic breadth, 75.4; maxillary tooth row, 30.4 mm.

Specimens Examined.—Three from the type locality and three from the Larut Hills, Central Perak.

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ON A COLLECTION OF MAMMALS AND OTHER VERTEBRATES FROM THE TRENGGANU ARCHIPELAGO

By C. BODEN KLOSS, F.Z.S., M.B.O.U.

IN company with four collectors, a Malay orderly and a servant I left Trenggánu town at 3 a.m. on 29th August, 1910, to make a zoological investigation of the Trenggánu Archipelago. The vessel in which we sailed, and for which with its crew I am indebted to Mr. Walter D. Scott, British Agent, Trenggánu, for his assistance in engaging, was a lug-rigged ketch of about 44 feet in length and 11 feet beam. She was unballasted and drew about three feet when loaded with our impedimenta and supplies. Though decked, the hold ran the whole length of the hull, but in the stern there was a raised rahan hatch giving six feet of head-room between roof and floor and this portion of the vessel was fitted with two bunks; the midship portion between the masts was occupied by a large hatch and forward of that again we carried on deck a wooden galley with a clay hearth. Our water was stored in jars and Mr. Scott kindly lent us a small boat which we towed astern. The prau was not a good sea-boat, her anchor and cable were untrustworthy and her sails so rotten that on a stormy night towards the end of the cruise they were practically blown away. She was very slow and we could not afford to press her owing to her indifferent sea-worthiness and poor gear. It was, however, only necessary to spend short periods on board as at the larger islands we took everything out of her and camped on shore.

The cruise, which lasted for eighteen days, was concerned with the vertebrate zoology of the islands with special reference to mammals. Species in particular, and individuals, with one or two exceptions, were not numerous.

Little Redang or Pulau Bedung, where one night was spent, produced eight mammals; Great Redang, where we camped for six nights, resulted in a collection of 106 specimens; a few hours spent at anchor one afternoon off Pulau Lantinga gave us 10 mammals and a sojourn of seven days in the Perhentians 181 more—a total of 305, of which a full account is given below.

The collection of birds numbered 95 specimens, of which *Calœnas nicobarica*, hitherto only obtained (from the islands properly belonging to the Malay Peninsula) on Pulau Jarak, Straits of Malacca, and the Langkawi group was perhaps the most interesting. The remainder do not call for comment.

Reptiles were scarce, and insect life, as is usual on all such islands, was extremely scanty: the butterflies obtained numbered less than fifty specimens.

The only previous visit of a zoological nature to any of the islands appears to be that of some members of the "Skeat" Expedition to Little Redang in 1899, when the four species of birds mentioned below were obtained: but the example of *Calœnas nicobarica* recorded by

Mr. J. L. Bonhote as coming from Kota Bharu, Kelantan (P. Z. 1908, vol. i., p. 77), indubitably came from one of the group.

The chain of small islands, of which Great Redang and the Perhentians are the chief, lies from 7 to 12 miles distant from the east coast of the Peninsula, to which it is roughly parallel, and extends through a length, N.-W. $\frac{1}{2}$ W. by S.-E. $\frac{1}{2}$ E. of about 30 miles. The islands belong to the Sultanate of Trengganu.

Though there are a number of rocks and small islets scattered about the vicinity only the four mentioned are of any interest.

Pulau Bedung, at the southern end of the chain, and the Perhentians, at the northern extremity, are situated apparently on the edge, but within the 10 fathom line which bends out to seaward in both instances to include them.

Great Redang, however, which lies rather farther from shore than the rest and is separated from the mainland by depths of 13 fathoms, is situated just within the 15 fathom line of which it forms a projection. Pulau Lantinga, in 16 or 17 fathoms, is alone outside the 15 fathom contour.

Little Redang, or Pulau Bedung, which is rather more than a mile in length and something less than a mile in width, attains a height of 985 feet. It has two small islets near its shores and several more five miles to seaward. The eastern side is edged with low cliffs, but to landward are two sandy beaches separated from each other by a rocky prominence; the bay fronting them is full of coral, cocopalms fringe the sand and beneath the trees are a dozen houses and a well of bad water. Beyond the village are plantations of tapioca and bananas, patches of hill paddy and a good deal of lalang grass. Behind, the island rises considerably, and being sterile and very rocky is covered with poor stunted forest. A path runs to the north end of the island. The few inhabitants possess a number of brightly-painted canoes of the Trengganu type and several trained brohs (*Macaca nemestrina*), obtained from the mainland, for collecting their coconuts.

The only land mammal except a rat is a dwarf squirrel, *Sciurus (vittatus) scotti*, of which a series was obtained, but two or three bats were reported to occur.

The birds met with were:

1. Myristicivora bicolor (Scop.).
2. Tringoides hypoleucus (Linn.).
3. Demiegretta sacra (Gm.).
4. Eudynamis honorata (Linn.).
5. Calornis chalybea (Horsf.).

All were fairly common but no king-fishers or bulbuls were seen. Mr. Bonhote (P.Z.S. 1910, vol. i., p. 57 *et. seq.*) records the following collected by members of the "Skeat" Expedition:

1. Tringoides hypoleucus (Linn).
2. Corvus enca, Horsf. (? macrorhynchus).
3. Dicrurus annectens, Hodgs.
4. Anthothreptes malaccensis (Scop.).

Only the first was met with by us.

The only reptiles seen and obtained were *Calotes cristatellus* and *Mabuia multifasciata*: both these were common.

Great Redang lies eight miles N. *b.* W. from Little Redang. It is an island of fair size, having a greatest length of four miles and a breadth of three miles. Its height is 1,139 feet, and there are several small islets and rocks to the south and east; of these, the largest is Pulau Pinang which fronts the entrance of a triangular bay on the south side in which coasting steamers not infrequently find temporary refuge in the strength of the monsoon. Pulau Pinang is rocky to seaward and a ridge of rocks extends from it into the southern passage leading into the bay, but the shore facing Great Redang is sandy, and on that side is a fair-sized village whose occupants are mainly engaged in fishing. The northern extremity of Great Redang is rocky and is covered with poor jungle but the north-eastern side of the island is still more forbidding and sterile. In the centre of this face lies a bay about half a mile square with a broad sandy beach across its head and its sides bordered by low cliffs topped with stunted vegetation. The bay gives quiet anchorage for half the year and a little fishing by means of seine nets is done, but in the north-east monsoon the breakers on the beach are said to be very violent. The two bays mentioned are joined by a flat valley about half a mile wide and two long which divides the higher portions of the island into two parts: the southern portion of this flat area is entirely filled with mangroves with a small river running down its centre; this stream at low tide has only a foot of water at the mouth which is obstructed with coral, but greater depth within and many turtles (*Chelone mydas*) inhabit it. Beyond the head-waters the land rises slightly and is occupied by plantations, then follows a wet swampy area which, save for a few rice fields, is overgrown by rushes, and beyond lies ground occupied by a village of a score or more houses surrounded by fruit trees, bananas, tapioca and maize growing on clearings made on the hill slopes. A few cattle were seen. Between the village and the northern bay exists kampong land dotted with pools of water and marshy spots. The whole valley has been cleared at one time, but is now either under cultivation or covered with lalang, scrub or short turf: the soil is poor. The forest covering the hills is at best thin and inferior, at the worst, where the slopes consist of little but rocks and boulders, it is a low dense scrub.

The mammals of the Great Redang group are as follows:

1. *Macaca fascicularis argentimembra*. The "Kra" monkey is common on both Great Redang and Pulau Pinang.
2. *Tupaia (ferruginea) obscura*. This form of Tree-Shrew was fairly common.
3. *Crocidura major*. Three only of these small Musk Shrews were taken though others were both seen and heard on several occasions during the daytime.
4. *Pteropus hypomelanus lepidus*, Miller. The Lesser Flying-Fox was seen many times. It is not gregarious and was

met with by day feeding solitary in the forest but was more frequently obtained in the cocopalms where it became active at dusk.

5. *Cynopterus angulatus*, Miller. Common at dusk in the cocopalms.
6. *Rhinolophus affinis superans*, Anderson. This Bat was fairly common in deep jungle where it was observed flying about during the daytime.
7. *Emballonura anambensis*, Miller. Two or three were seen every night in the palm groves.
8. *Sciurus (vittatus) plasticus*. This dwarf form of the common Red-bellied Squirrel was freely distributed throughout the islands but was least frequently met with in deep forest.
9. *Sciurus tenuis sordidus*. The Slender Squirrel was less common than the last species and was taken both in jungle and palm groves.
10. *Mus surifer grandis*. Fairly common in dry jungle.
11. *Mus rattus jalorensis*, Bonhote. Common everywhere.
12. *Tragulus ravus*, Miller. Only one specimen was obtained. The numerous village dogs were said to have driven the Lesser Mouse-Deer to the remote portion of the island and no natives could be persuaded to make snares.

It was stated that no Musang (*Paradoxurus*) or other carnivore occurred. The Flying-Lemur (*Galeopterus*), contrary to expectation, was neither met with nor heard of and pigs were absent.

The following birds were collected or observed:

1. Myristicivora bicolor (Scop.).
*2. Chalcophaps indica (Linn.).
3. Calænas nicobarica (Linn.).
4. Ochthodromus pyrrhothorax (Gould).
5. Numenius phæopus (Linn.).
6. Polioactus ichthyaetus (Horsf.).
7. Alcedo bengalensis, Gm.
*8. Ceyx euerythra, Sharpe.
9. Halcyon humei, Sharpe.
10. Hierococcyx nisicolor (Hodgs.).
11. Eudynamis honorata (Linn.).
12. Muscitrea cinerea, Blyth.
13. Cittocincla macrura (Gm.).
14. Orthotomus atrigularis (Temm.).
15. Calornis chalybea (Horsf.).
16. Limonidromus indicus (Gm.).
17. Cyrtostoma pectoralis (Hodgs.).
18. Anthothreptes malaccensis (Scop.).

The reptiles and batrachians obtained or observed were:

1. Bufo parvus, Blgr.
*2. Chelone mydas, Linn.
3. Draco volans, Linn.
4. Acanthosaura armata, Grey.
5. Calotes cristatellus, Kuhl.
*6. Mabuia multifasciata, Kuhl.

* Observed.

The cry of a large Gecko was frequently heard in the forest.

Pulau Lantinga lies five miles west of Great Redang; it is a mile and a half long and about half a mile broad; its summit is 520 feet high and is topped by a clump of big trees. To seaward the coast is very rocky but on the west side there is a stretch of flat land planted with cocopalms and a sand beach divided by a rocky headland edges this little plain. The better anchorage is off the northern stretch of sand but the other has the better water—a little waterfall amongst rocks. There were no inhabitants, but two or three ruined houses and sheds stood amongst the palms. The only mammals seen were an interesting squirrel, *Sciurus* (*vittatus*) *watsoni*, of which a series was obtained, together with a single Lesser Flying-Fox (*Pteropus hypomelanus lepidus*).

The only birds observed were:

1. Tringoides hypoleucus (Linn.).
2. Ardea sumatrana, Raffles.
3. Orthotomus sericeus (Temm.).
4. Cyrtostoma pectoralis (Horsf.).

Of reptiles, *Mabuia multifasciata* was obtained and *Calotes cristatellus* was seen.

The last islands of any importance in the Trengganu Archipelago are the Perhentians which lie nine miles N.-W. *b.* W. from Pulau Lantinga and the same distance from the coast. Both islands, which are separated from each other by a strait of water with a least width of half a mile, are approximately two and a quarter miles long, and the eastern, which is twice the area of the other, has a breadth of one and three-quarter miles; it is, however, almost sixty feet less in altitude, being 1,135 feet high.

West Perhentian is very sterile; there is practically no forest and the island possesses a somewhat unusual appearance through being largely covered with dense stretches of wild banana. The shore bordering the strait has been planted with cocopalms wherever suitable and a fair-sized village is situated at the south-eastern point of the island.

East Perhentian is uninhabited, though of a more inviting appearance than the other; more forest and less banana growth is to be seen. From the centre of its western shore a ridge of rocks stretches some distance into the strait which, south of this point, is narrow. Beyond, the channel widens, and the sheet of water lying between the two islands affords excellent anchorage during the S.-W. monsoon. Round the south-western portion of the island and opposite the village on West Perhentian are sand-beaches and a certain amount of flat land which has been planted with cocopalms, and there are cocopalms in the bays on the southern shore, but to the north the island is rocky with steep slopes.

Little collecting was done on West Perhentian owing to the nature of its surface and vegetation but the following mammals were obtained:

1. *Tupaia ferruginea longicauda.* A Tree-Shrew of markedly arboreal habits.
2. *Galeopterus pumilus* Miller. A Flying-Lemur inseparable from that occurring on several other islands near the shores of the Peninsula.
3. *Pteropus hypomelanus lepidus.* The Lesser Flying-Fox.
4. *Sciurus vittatus perhentiani.* A member of the *vittatus* group of Squirrels.

The mammal fauna of East Perhentian Island was ascertained to be as follows:

1. *Presbytes obscura styx.* A very dark race of the Dusky Lotong.
2. *Tupaia ferruginea longicauda.*
3. *Galeopterus pumilus,* Miller.
4. *Pteropus hypomelanous lepidus,* Miller.
5. *Sciurus (vittatus) proteus.* An insular race of the Red-bellied Squirrel exhibiting much variation within itself.
6. *Mus surifer flavigrandis.*
7. *Mus rattus jalorensis,* Bonhote.

Three species of Bats (probably *Rhinolophus, Emballonura* and *Cynopterus* spp.) were seen but not obtained: it was reported that there were no pig or mouse-deer and no carnivore with the exception of a small wild cat (not *Paradoxurus* sp.) which was not met with, nor any form of macaque.

The following birds were collected or observed:

1. Chalcophaps indica (Linn.).
2. Demiegretta sacra (Gm.).
*3. Ceyx euerythra, Sharpe.
4. Acanthopneuste borealis (Blas.).
5. Corvus macrorhynchus, Wagl.
6. Calornis chalybea (Horsf.).

Of reptiles were obtained or seen:

1. Rhacophorus leucomystax, Gravenh.
*2. Chelone mydas, Linn.
3. Acanthosaura armata, Gray.
4. Calotes cristatellus, Kuhl.
5. Mabuia multifasciata, Kuhl.
6. Python reticulatus, Schn.
7. Dendrelaphis caudolineatus, Gray.
8. Simotes cyclurus, Cantor.

Below is a full account of all the mammals obtained: preliminary diagnoses of the new forms appeared in the "Annals and Magazine of Natural History" for January, 1911.

PRESBYTES OBSCURA STYX.

Kloss, *Ann. and Mag. Nat. Hist.* (8), vii., p. 116, 1911.

Type.—Adult male (skin and skull), No. 2,061/10, Selangor Museum, collected on East Perhentian Island, off Trengganu, east coast of the Malay Peninsula, 12th September, 1910, by C. Boden Kloss. Original No. 3,634.

* Observed.

Characters.—A race of *Presbytes obscura* (Reid), characterized by extremely dark colour and absence of any paler and redder area on shoulders and back.

Colour.—Front and sides of head, back, sides and outer surfaces of fore limbs, black. Under-parts, dark brown, very scantily clad. Nuchal patch, drab-grey. Tail and outer sides of thighs, dark ashy grey, the tail somewhat silvery. Hands and feet, intense shining black. Hair of lips and chin, yellowish-white.

Natural colour of skin of face blue-black; of eye-patches, lips and chin, pale pinkish white; of abdominal skin, bluish-white; of hands and feet, black.

Skull.—The skull does not appear to differ from mainland specimens, but the mandible is much heavier, being both squarer anteriorly and deeper generally: the height at the condyle especially is greater and the ascending ramus is rather less curved on the anterior edge.

If a series of mixed skulls of similar age are placed side by side resting on their mandibles it will be seen that the zygomata of the Perhentian animals will rest above those of the mainland individuals, also, owing to the elevation of the posterior portion of the skull, the former, when viewed from above, appear to be decidedly less prognathous.

Measurements.—Collector's external measurements of type: total length, 1,332: head to symphysis pubis, 583; tail vertebræ, 797; hind-foot, 164. Cranial measurements: greatest length, 102; posterior occipital extremity to nasal spine, 84.3; posterior occipital extremity to glabella, 79.5; gnathion to median upper edge of supraorbital ridge, 46; gnathion to orbit, 29.2; orbit to posterior occipital extremity, 79; zygomatic breadth, 77; greatest orbital breadth, 62; post-orbital constriction, 43.2; greatest cranial breadth, 54; basal length, 79; palatal length, 33; palatal breadth at m^1, 21; palatal breadth at m^3, 18.3; greatest breadth of rostrum below roots of zygomata, 35; maxillary tooth-row excluding incisors, 35.2; mandibular tooth-row excluding incisors, 41.5; greatest length of mandible 75.5; height of mandible at condyle, 45.5.

Specimens Examined.—Four males and three females, all from the type locality.

Remarks.—The absence of any bronze dorsal area immediately distinguishes this lotong from any other race of *P. obscura*. Its occurrence on Perhentian Island is interesting, as, so far, this is the only island on the east coast that is known to possess a member of the genus.

MACACA FASCICULARIS ARGENTIMEMBRA.

Kloss, *Ann. and Mag. Nat. Hist.* (8), vii., p. 116, 1911.

Type.—Adult male (skin and skull). No. 2,068.10. Selangor Museum, collected on Pulo Pinang, Great Redang Island, Trengganu, east coast of the Malay Peninsula, 4th September, 1910, by C. Boden Kloss. Original No. 3,815.

Characters.—A macaque of medium size differing from the mainland animal and from *Macaca lætus* (Elliot)* of Tinggi and Tioman Islands, in the less annulated ochraceous upper surface which is greatly reduced in area, darker under fur, and also in the more silvery limbs and under-parts, and paler tail.

Colour.—Upper-parts mingled ochraceous and brownish black, the annulations indistinct and the dark element appearing rather as a wash or clouding than a speckle: base of fur, dark greyish brown. Colour of upper-parts confined to head and back and not extending to the sides. Outer surfaces of fore-limbs and upper-parts of thighs, frosted grey suffused with pale buff.

Entire under-parts with sides of body, entire lower-parts of thighs, inner sides of fore-limbs and sides of head, below and behind ears, pale whitish silvery.

Muzzle and sides of face clad with short greyish hairs; lateral facial fringes faintly sullied with buff; a fringe of black hairs above the forehead.

Hind-feet concolorous with legs, fore-feet like fore-limbs but lacking the faint buffy wash.

Outer surface of proximal half of tail greyish black, whole remaining portion silvery white like the abdomen.

Skull and Teeth.—Comparison of the skulls of macaques are of little value as the minor characters are not fixed and alter entirely with age. However, the supra-orbital ridges in the type are very high and projecting so that viewed laterally the nasals present a notably concave outline, very different from *M. lætus*, where the outline is nearly straight; the muzzle is broad, the canines very heavy and the palate strongly arched, yet, owing to the horse-shoe shaped arrangement of the maxillary teeth, the breadth of the muzzle is least across the canines.

Measurements.—Collector's external measurements of type: total length, 1,063; head to symphysis pubis, 490; tail vertebræ, 620; hind-foot, 135. Cranial measurements: greatest length, 113.3; posterior occipital extremity to nasal spine, 94.4; posterior occipital extremity to glabella, 78; gnathion to median upper edge of supra-orbital ridge, 62.4; gnathion to orbit, 41; orbit to posterior occipital extremity, 79.7; zygomatic breadth, 83; external biorbital breadth, 66; post-orbital constriction, 79; basal length, 81.5; palatal length, 41; palatal breadth at canine, 16.5; palatal breadth at m^1, 22.5; palatal breadth at m^3, 20; greatest breadth of rostrum below roots of zygomata, 40; maxillary tooth-row, excluding incisors, 37; mandibular tooth-row, excluding incisors, 44; greatest length of mandible, 82; height of mandible at condyle, 34.

Specimens Examined.—Two from Pulo Pinang and two others from Great Redang Island, 200 yards distant.

Remarks.—This macaque is characterised by moderate size, by the reduced extent of the ochraceous area and by the silvery limbs and

* "Annals and Magazine of Natural History," Ser. 8, vol. iv., Sept., 1909, p. 255.

under-parts: an adult female illustrates these features far more emphatically than does the male chosen as type.

Measurements of adult Monkeys from the Trengganu Archipelago:

Name.	Locality.	S. M. No.	Sex.	Total length.	Head to symph. pubis.	Tail vertebræ.	Hind-foot.	Greatest cranial length.	Zygomatic breadth.	Height of mandible at condyle.	Maxillary tooth-row exclusive of incisors.
Presbytes obscurus styx. type	East Perhentian Island	2061 10	Male	1,332	583	795	164	102	77	45.5	35.2
,,	,,	2062 10	,,	1,330	580	790	171	104.2	80	42	34.3
,,	,,	2064 10	,,	1,310	580	800	160	102	80.2	45.5	35
,,	,,	2065 10	,,	1,236	572	734	164	97.5	75.5	39	35.5
,,	,,	2063 10	Female	1,297	568	778	166	97	75	44	32.6
,,	,,	2066 10	,,	1,255	560	720	159	94.5	73	39.5	32.3
Macaca fascicularis aygula. type	Great Redang Island	2068 10	Male	1,063	490	620	135	113.3	83	34	37
,,	,,	2070 10	,,	1,055	470	630	131	107	73	29	36.5
,,	,,	2069 10	Female	945	435	550	118	96	67	24	33

PTEROPUS HYPOMELANUS LEPIDUS, Miller.

Great Redang Island. 5 ♂ ; 4 ♀.

Lantinga Island. 1 ♀.

The series of ten specimens agree, on the whole, with a series of eight skins from Tioman Island identified by Thomas* as *Pteropus hypomelanus lepidus*, Miller† (type locality, Tambelan Islands, Southern China Sea), and they may be referred to that race which they also approach in size.

Their colour is variable and ranges from individuals with dark chestnut shoulders, dark smoky-grey backs and blackish chestnut under-parts to others with tawny shoulders, pale fulvous-fawn backs (pale burnt umber) and broccoli-brown under-parts. The Lantinga Island example best illustrates most strongly the latter type of colouration.

One specimen (2059/10 ♀), a tawny-shouldered, brown-backed animal, only differs in colour from *P. h. robinsoni*, Andersen‡ (type locality, Sembilan Islands, Straits of Malacca), in being slightly paler on the extreme sides of the abdomen and thus stands somewhat apart from the others.

The only specimen of a Fruit-Bat previously known from Great Redang Island was recorded by Bonhote‖ under the name of *P. nicobaricus*, Fitzinger. None of the present specimens can be identified in any way with that species.

Perhentian Islands. 4 ♂ ; 3 ♀.

On arranging the animals from both this island and Great Redang in a series with those having the darkest shoulders and backs at one extreme and the lightest animals at the other, it is seen that in the one position there will be the bats from the Perhentian Islands and in the other the individuals from Great Redang with the specimen from Lantinga, brighest of all, at the extremity: there is a little overlapping in the centre.

Of the Perhentian specimens three are so dark as to approach in colour *P. nicobaricus*, but are much smaller: three others closely resemble *P. h. robinsoni*, but the shoulders and under-parts are a trifle darker and the backs a trifle paler. The final specimen (2049/10 ♂) nearly resembles Redang individuals in colour above but has the furry portion of the back greatly reduced in width (average breadth 35mm.).

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* "Journal of the Federated Malay States Museums," vol. ii, September, 1908, p. 102.

† "Proceedings of the Washington Academy of Sciences," vol. ii, August, 1900, p. 237.

‡ "Annals and Magazine of Natural History," Ser. 8, vol. iv, December, 1909, p. 534.

‖ "Proceedings of the Zoological Society," 1900, p. 875.

(*See* also *post* p. 212)

CYNOPTERUS ANGULATUS, Miller.

Great Redang Island. 4 ♂ ; 3 ♀.

Measurements made on five adult individuals from the island show them to be slightly but distinctly smaller than the type series.

In the description of the type* the upper molar is stated to be about equal to the third premolar but with a slightly narrower crown: in the present series, however, and in all other *Cynopteri* referable to *C. angulatus* that I have seen, it is both considerably smaller and sub-triangular in shape, narrowing posteriorly.

Males from Great Redang Island have the head olivaceous brown, nape, ochraceous, sides of neck and shoulders, tawny, back, brown washed with raw umber: below, the throat, chest and sides of body are ochraceous and the middle of the abdomen greyish olivaceous-brown. Females are paler than males throughout, lacking the ochraceous tails which are replaced to a certain extent by buff.

C. angulatus connects *C. sphinx*, Vahl, of Burmah and India, with *C. montanoi*, Robin., of the Malay Archipelago. The ears of the latter, however, show no indication of the whitish border (*vide* Miller, "Proc. U. S. Nat. Mus.," xxvi., p. 474), so marked in *C. sphinx* and in the present species, and *C. angulatus* should be regarded therefore as a southern race of the Indian animal. The skull and teeth more nearly resemble those of the latter than they do those of the more robust and broader-headed *C. montanoi*. There is also no trace of a sagittal crest.

Measurements of adult *Cynopterus angulatus* from Great Redang Island:

S. M. number ...	2073.10	2074.10	2075.10	2076.10	2675.10	Average
Sex	♀	♂	♂	♂	♂	
Head and body ...	95	98	93	94	94	94.8
Tail	10	9	9	12	9	9.8
Ear	16	16	16.5	16.5	16	16.2
Forearm	68	63	65.5	63	65	64.9
Second finger ...	112	115	108	113	110	111.6
Skull: greatest length	29.1	30	29.8	29.5		29.6
Interorbital breadth	7.2	5.6	6.0	6.5		6.3
Zygomatic breadth	19.5	19.3	19.5	19.4		19.4
Basal length ...	25.7	26	26	25.2		25.7
Palatilar length ...	13.5	14.5	14	13.5		13.9
Palatal breadth at molar	7	6	6	5.9		6.2
Upper tooth-row excluding incisors	9	9.5	9.2	8.9		9.1
Lower tooth-row excluding incisors	10.5	11	10.5	10		10.5

* "Proceedings of the Academy of Natural Sciences of Philadelphia" 1895, p. 316.

RHINOLOPHUS AFFINIS SUPERANS, Andersen.

Great Redang Island. 3 ♂. (One skin and two spirit specimens).

Three very uniform Bats taken on Great Redang Island appear to be members of this race though the maximum dimensions of the series are generally a little smaller than the *minimum* measurements of a series of individuals given with the description of the type, * and though they are in all respects smaller animals than examples from the mainland.

MEASUREMENTS.

	Minimum.	S.M. 2676/10.	S.M. 2677/10.	S.M. 2072/10.
Sex	...	♂	♂	♂
Head and body	...	58	58	57
Ears, length	20.2	19.6	19	19.5
,, breadth	14.8	14.8	14.8	14.5
Nose-leaves, total length ...	14.8	14.8		
,, breadth of horse-shoe	9.8	9.8		
Forearm	51.2	49	49	47.5
3rd metacarpal	36	35.5	35.8	34
III¹	14.6	14.5	14	13.7
III²	23.8	23.3	23.8	22.5
4th metacarpal	36.8	36.5	36.5	35
IV¹	10	9.5	9.5	9
IV²	14	13	13.5	13
5th metacarpal	37.7	36.5	36.5	35.5
V¹	11.2	10.5	10.4	10
V²	12.2	12	11	11
Tail	21.5	22.6	24	22.5
Lower leg	25	23	23.2	22
Foot, with claws	11.1	12.3	12	12.3
Skull, total length †	22.8	...	...	21
,, mastoid width	10.9	...	10.3	10
,, width of brain-case ...	9.8	...	9.6	9.7
,, zygomatic width ...	11.3	...	11	10.8
,, supra-orbital length ‡ ...	5.7	...	6	6
,, width of nasal swellings	6.2	...	6	5.8
Mandible length	15.8	...	...	14.2
Upper teeth §	9	...	...	8
Lower teeth §	9.7	...	...	8.9

EMBALLONURA ANAMBENSIS, Miller.

Great Redang Island. 1 ♂; 1 ♀ in alcohol.

Above dark vandyke-brown, below much paler: the hair everywhere whitish at base, markedly so above in contrast with the dark fur, but less distinctly so below.

* "Proceedings of the Zoological Society," 1905, vol. ii, p. 105.

† To front of canines.

‡ Front of nasal swellings to junction of supra-orbital and sagittal crests.

§ Excluding incisors.

On account of the slenderness of their skulls, these examples and others from Tioman Island should, I think, be referred to the race of the Anambas Islands * rather than to the mainland form *G. peninsularis*, Miller, † which possesses, relatively to the other dimensions of the skull, a decidedly broader rostrum and brain-case.

Dimensions of an adult female: head and body, 50; tail, 14; fore-arm, 44; hind-foot, 7.2; lower leg, 16; thumb, 8; second finger, 36.5, third finger [39.5 + 12.5 + 19 (chord of III.)], 71; fourth finger [32.5 + 9.5 + 6] 48; fifth finger [30 + 11 + 5], 46; Cranial measurements: greatest length, 14.4; condylo-basal length, 13.1; basal length, 12; zygomatic breadth, 8.4; greatest anteorbital breadth 5.7; least interorbital breadth, 3; cranial length, 9.2; cranial breadth, 7; breadth of palate between posterior molars, 3; palatal length, 4.4; upper molar excluding incisors, 5.1; lower molar row excluding incisors, 5.5; greatest length of mandible, 9.8. (S.M. No. 2678 [10].)

GALEOPTERUS PUMILUS, Miller.

Perhentian Islands. 3 adult ♂.
2 „ ♀.
2 immature ♀.

General colour impression of males: above is a bellline, shoulders darker and browner; sides and back of neck and head, and to a less extent the rump, smoky grey; top of head is a bellline; chin and muzzle to the eyes, blackish; fore-feet, blackish, spotted with buff; a tawny patch on the upper part of thighs and fore-limbs; the parachute washed pale buffy; the whole upper surface marbled and streaked with brownish-black and spotted with creamy buff; an elongate white patch below the eye which is tinged with blackish; the base of each individual hair, grey, the central portion buffy or white. Below pale pinkish is a bellline, the chest and abdomen darker with grey bases to the hairs; parachute somewhat ochraceous; uropatagium dark tawny-brown females: above, smoky grey, throat and muzzle, blackish; fore-feet, blackish spotted with cream-buff, a large white patch on the shoulders and a smaller on the posterior aspect of the thighs; sides of body and parachute washed with buff white; a white patch below the eye; the whole upper surface mingled dull black and whitish; the base of each individual hair, grey, the central portion buff or buff-white, extreme edge of uropatagium tawny. Below as in males.

The males agree in colour with topotypes of *G. pumilus*‡; the females resemble females of *G. peninsula*, Thomas,§ but are greyer above and brighter below.

* "Proceedings of the Academy of Natural Sciences of Philadelphia," 1898, p. 323.

† "Proceedings of the Washington Academy of Sciences," vol. 6, Aug. 1904, p. 236.

‡ "Smithsonian Miscellaneous Collections," vol. xlv., Nov. 1903, p. 40.

§ "Annals and Magazine of Natural History," ser. 8, vol. iii., 1909, p. 401.

The following collector's external measurements of specimens from the neighbouring island Aor are available:

	♀ *	♀.	♀.	♀.	♂.
Head and body	385	383	330	384	327
Tail	240	213	223	211	180
Hind-foot	54†	54	53	49	46
Ear	16†	17	16	17	16

It will be seen from the table below that some discrepancy exists between the foot and ear dimensions of the two series, but these measurements taken on the dried skins of the last two individuals are larger than those given by the collector.

Cranial measurements of the two adult females, however, are practically those of the type of *G. aoris*, Miller, save that in both instances the figures for mandible and mandibular tooth-row are somewhat less.

Selangor Museum No. ...	2321/10	2322/10	2324/10	2320/10	*Type of G. aoris.*
Sex...	♂	♂	♀	♀	♀
Head and body	312	323	353	358	385
Tail	188	203	230	220	240
Hind-foot	54	54	59	59	54 †
Ear	20	19	21	20.5	16 †
Skull, greatest length ...	63	63	66.3	68	67
Condylo-basal „ ...	59.5	59.9	63	64	63
Basal length	56	56	59	59.6	58
Lateral palatal length ...	29.2	30	30.1	30.5	30.4
Palatal width at front of 1st incisor	11.2	11.2	12	12.5	12.4
Palatal width at space between canine and 1st premolar	17	19.8	20.7	...	20.4
Distance between inner edges of posterior molar	12.8	13.8	...	...	15
Least distance from orbit to anterior nares ...	22.3	22.4	23	24.6	23
Zygomatic breadth ...	36	38	40	...	40
Greatest orbital breadth...	40.9	42	43	40.9	40.3
Least interorbital breadth	16	15.8	17	15.3	17.4
Mastoid breadth	28	28.6	30.1	...	30
Mandible	47.6	46	45	49	50
Depth of mandible between canine and 1st premolar	5.4	6	5.5	5.2	6.6
Depth of mandible through coronoid process ...	21	17.5	18.5	20	20.4
Maxillary tooth-row ...	30.1	31.3	31	31.1	31.6
Mandibular tooth-row ...	31	31.8	30	32	33.4

* Type of *G. aoris*, Miller.

† From dried skin.

(Since specimens from the Perhentians, Pulau Aor and the Langkawi group appear to be inseparable I have used the name applied to animals from the latter group as it has priority over *G. aoris*).

TUPAIA (FERRUGINEA) OBSCURA.

Kloss, *Ann. and Mag. Nat. Hist.* (8) vii., p. 116, 1911.

Type.—Adult male (skin and skull), No. 2279.10, Selangor Museum, collected on Great Redang Island, off Trengganu, east coast of the Malay Peninsula, 2nd September, 1910, by C. Boden Kloss. Original No. 3708.

Characters.—Closely resembles *T. belangeri*, Wagl., of Burmah and Tenasserim, but is smaller, the upper surface is slightly more tawny, the buff shoulder-stripes much larger and more distinct and the under-surface of the tail yellower. From *T. f. wilkinsoni*, Rob. & Kl.,* of Trang, it is immediately separable by its less rufous rump, paler under-surface, and paler, less blackish, tail. The latter also is alone sufficient to distinguish it from the darker and shorter-tailed *T. lacernata*, T. & W.,† of the Langkawi and Terutau group.

Colour.—Entire upper-parts a speckle of buff and black slightly washed with tawny on rump and thighs. Below, cream-buff tinged lemon yellow on throat and along median line of abdomen: the margins of abdomen like sides but paler and not annulated. Sides of neck and behind ear, pale buff, this colour extending over the upper shoulder in the form of a stripe. Tail above a grizzle of buff-white and black not concolourous with the rump, but blacker and less tawny; below the yellow predominates, the short hairs clothing the vertebræ being pure pale buff-white.

Skull and Teeth.—Viewed from above the skull exactly resembles that of *T. belangeri* (as figured by Anderson, Zool. Researches, vol. ii. plate 7) save that the extremity of the rostrum is a little broader. Viewed laterally the interorbital region is depressed and the outline of the cranium more curved, the entire occipital region being bent downwards. Compared with skulls of the *ferruginea* group from the Peninsula and islands south of Lower Tenasserim it is smaller, having the rostrum considerably reduced in length, but there is no appreciable difference in that portion of the skull posterior to, and including the orbits. The teeth differ merely in size.

Measurements.—Collector's external measurements of type: head and body, 173; tail, 167; hind-foot, 40; ear, 15. Cranial measurements: greatest length, 48; tip of nasals to posterior extremity of skull, 45.4; basal length, 42; palatal length, 25.8; lachrymal notch to tip of premaxillary, 20.6; breadth of rostrum at middle of diastema, 7; least interorbital breadth, 14; greatest cranial breadth, 19.1; zygomatic breadth, 25.8.

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

* "Journal of the Federated Malay States Museums," vol. iv., p. 177, 1911.

† "Annals and Magazine of Natural History," ser. 8, vol. iv., Dec. 1909, p. 535.

Remarks.—This species is very different from *Tupaia ferruginea*, Raff., *T. palonis*, Miller,* and *T. sordida*, Miller,† all members of the *ferruginea* group.

In some examples the tail is much greyer than the back but never attains the dark colour of the other Peninsular tree-shrews. The type specimen has almost entirely renewed its coat but traces of the old pelage are to be seen on the back in the form of mingled ochraceous and black patches, contrasting with the buffy annulations of the fresh hairs: the lemon wash on the lower-surface occurs in a few individuals only, the predominating colour below being cream-buff to deep buff.

The short skull and dull pelage of this animal ally it with the distant *T. belangeri* of Burmah and markedly distinguish it from *T. ferruginea*, its nearest geographical neighbour.

TUPAIA (FERRUGINEA) LONGICAUDA.

Kloss, *Ann. and Mag. Nat. Hist.* (8) vii., p. 117, 1911.

Type.—Adult female (skin and skull), No. 2295/10, Selangor Museum, collected on East Perhentian Island, off Trengganu, east coast of the Malay Peninsula, 8th September, 1910, by C. Boden Kloss. Original No. 3517.

Characters.—Resembles *T. ferruginea* from Singapore and the Malay Peninsula, but has the tail almost always longer than head and body and therefore much longer than the tail of *T. ferruginea*: further, differs in being lighter and less rufous above and distinctly yellower below, lacking the greyish tone of *T. ferruginea*, in having the feet and tail paler, the latter being very yellow below and above buff and black, instead of buff-white and black and in the spread of the buffy colour of the throat up the sides of the neck and behind the ear to meet the shoulder-stripe.

In the colour of its dorsal pelage it closely resembles *T. f. wilkinsoni* from Trang, but in other respects differs from this as it does from Singapore individuals.

From *T. sordida*, Miller, of Tioman Island, it differs in being paler above through possessing less of the black element, in having the under-parts and under-surface of tail buffy instead of greyish and also in longer tail and larger shoulder-stripe.

Colour.—Top of muzzle and head, fore- and hind-feet, finely speckled black and buff, the fore-feet rather lighter; remaining upper-parts mingled black and ochraceous but paler on the sides, the rump tinged with tawny but becoming blackish above the base of the tail. Below, buff-white to buff, the margins of the abdomen similar in colour to the sides of the body but much paler and not annulated. From the throat the buff colour extends over the sides of the neck to behind the ears and forms a well-defined stripe on the upper parts of the shoulders. Tail a grizzle of black and pale buff, much paler below, where the short hairs clothing the vertebræ are pure pale buff.

* "Smithsonian Miscellaneous Collections," No. 45, Nov. 1903, p, 56.

† "Proceedings of the Washington Academy of Sciences," vol. ii, Aug. 1900, p. 231.

Skull and Teeth.—The skulls of *T. longicauda* are a trifle smaller in all dimensions than those of *T. ferruginea*, but the only constant difference in form that I can detect is that the palatal foramina are notably broader in the former: this difference is, however, so marked and uniform that the skulls of the two species are immediately separable by it alone. The teeth are a little smaller: the reduction is most perceptible in the posterior upper molar.

Measurements.—Collector's external measurements of type: head and body, 178; tail, 192; hind-foot, 44; ear, 16. Cranial measurements: greatest length, 51.7; basal length, 44.7; tip of nasals to posterior extremity of skull, 48.2; palatal length, 27; lachrymal notch to tip of premaxillary, 22.1; breadth of rostrum at middle of diastema, 6.5; least interorbital breadth, 14.4; greatest cranial breadth, 19.5; zygomatic breadth, 26.2; breadth of combined palatal foramina, 4.

Specimens Examined.—Twenty-four from East and one from West Perhentian Island.

Remarks.—The black colour on the rump possessed by the type is frequently absent, the under-parts vary from buffy-white to lemon yellow, and the short hair, clothing the lower side of the tail, from buffy-white to pale ochraceous.

The long tail, which generally exceeds the length of head and body, renders the species conspicuous. It needs no comparison with *T. lacernata*, which is a small member of the same sub-group, nor with the very different *T. belangeri* and *T. obscura*; with exception of the tail it is in all dimensions, both body and cranial, a trifle smaller than the typical form inhabiting Singapore.*

I have not been able to compare *T. longicauda* with specimens of *T. pulonis*, Miller, from Aor Island, founded on two examples only. The latter race is said to be larger than *T. ferruginea*, but the cranial measurements of the type are considerably less than those of many Singapore animals, though the collector's external measurements are, as Miller states, considerably larger. As the tail is shorter than the length of head and body, the colour of the back that of *T. ferruginea*, and the rostrum relatively broader and more robust than the latter, the Perhentian Island animal does not appear to need close comparison with it.

Of the numerous species of *Tupaia* which I have collected personally, *T. longicauda* with *T. nicobarica*, Zelebor, and its sub-species *T. (N.) surda*, Miller, † alone are truly arboreal in habit. As a rule the so-called "tree-shrews" are seen and trapped on the ground where they live and feed, or, at most, climb occasionally into low bushes: in them the tail is shorter than the head and body length. The above-named animals, which are met with in high trees and have the habits of squirrels, all possess a tail that is considerably longer than the length of head and body.

* Animals from the adjacent mainland of Trengganu are [illegible] but I have compared *T. longicauda* with the topotypes in a much larger series of the latter is available.

† "Proceedings of the United States National Museum," [illegible]

Measurements of adult *Tupaia* from the Peninsular Region:

Name.	Locality.	S. M. No.	Sex.	Head and body.	Tail.	Hind-foot.	Ear.	Greatest length of skull.	Tip of muzzle to lachrymal notch.	Interorbital breadth.	Zygomatic.
Tupaia obscura, *type* ...	Great Redang Island ...	2279/10	Male	173	167	40	15	48	20.6	14	25.8
„ ...	„	2282/10	„	167	163	38	14	47.6	20.8	14.1	25
„ ...	„	2283/10	„	176	174	40	14	49	20.6	14.2	24.7
„ ...	„	2284/10	Female	171	165	38	15	48	20.4	14	24.3
„ ...	„	2285/10	Male	173	172	39	14.5	47.7	20.8	14.1	25.6
„ ...	„	2286/10	„	170	175	39.5	14.3	48.8	21	14	25.5
„ ...	„	2287/10	Female	174	179	39.5	14	48.3	20.5	14	24.3
„ ...	„	2288/10	„	165	170	39	15	48.3	20.7	14.3	24.8
„ ...	„	2290/10	„	172	168	38.5	14.5	48.6	20.6	14	24
„ ...	„	2292/10	„	160	175	38	15.5	48.6	21	14.3	24.6
„ ...	„	2293/10	„	166	162	38.5	14	47.8	20	14.2	24
„ ...	„	2294/10	„	166	164	38	14	47.4	19.8	14.2	24.3

average	„	...	...	*169.4*	*169.5*	*38.8*	*14.5*	*48.2*	*20.6*	*14.1*	*24.6*
Tupaia longicauda, *type* ...	East Perhentian Island ...	2295/10	Female	178	192	44	16	51.7	22.1	14.4	26.2
„ ...	„	2302/10	„	179	181	43	16	51	22	14.2	25.4
„ ...	„	2303/10	Male	171	189	43	16	52	22.4	15.3	26
„ ...	„	2304/10	„	179	176	43	15	51.1	22	14.2	25.2
„ ...	„	2307/10	„	173	190	44	15.5	52	22.3	14	25.4
„ ...	„	2308/10	Female	182	185	44	16	51.5	22	13.7	25.5
„ „	„	2311/10	Male	185	195	44	16.5	52.1	22.2	15	26
„ ...	„	2314/10	Female	178	178	42	16	50.8	21.8	14	25
„ ...	„	2315/10	„	190	184	44	16	52.2	22.4	14.9	26.6
„ ...	„	2316/10	„	167	173	42	15.5	50.6	21.4	13.9	25
„ ...	„	2317/10	Male	182	186	43.5	15.5	51	22.1	14.8	26
„ ...	„	2318/10	Female	178	182	42.5	16	51	21.8	14	25.2
average *	„	...	...	*177.5*	*185.6*	*43.5*	*15.9*	*51.6*	*22.1*	*14.8*	*25.6*
Tupaia belangeri, topotypes	Singapore Island										
average †	...	...	...	*183.1*	*155.8*	*11.7*	*15.1*	*52.3*	*23*	*14.8*	*25.6*

* Of external dimensions of 24 adult specimens.

† Of external dimensions of 20 adult specimens.

CROCIDURA ~~MAJOR~~. Kloss, Robinson.

Kloss, *Ann. and Mag. Nat. Hist.* (8) vii., p. 117, 1911.

Type.—Adult male (skin and skull), No. 2573/10, Selangor Museum, collected on Great Redang Island, off Trengganu, east coast of the Malay Peninsula, 31st August, 1910, by C. Boden Kloss. Original No. 3369.

Characters.—A large member of the sub-genus *Crocidura*, larger than *C. fuliginosa* and darker above. Approaching in size *C. lepidura*, Lyon,* of Eastern Sumatra, though with a relatively smaller foot, but larger than any other Sumatran or Indian form of the section. About the same size as the Bornean *C. baluensis*, Thos.,† but with smaller tail and foot, and less dense fur.

Colour.—Above, dark ashy-brown, the bases of the hairs dark-grey, each hair about 6 mm. long; below, ashy-brown to ashy-grey, palest on the throat, the bases of the hairs grey, rather lighter than the bases of the dorsal hairs; sides of body and abdomen very slightly frosted by whitish tips to the hairs; the lateral glands of the males concealed by patches of adpressed hairs (9 × 4 mm.) ashy-brown throughout‡; ears clad with very fine hairs; feet dark above, the inner edges paler, scantily covered with short dark hairs; the terminal phalanges of the hind-feet with a few white hairs overhanging the nails; tail finely annulated, dark-brown above paler below, clad with minute adpressed bristles throughout, the basal half with a few long pale hairs; vibrissæ with white tips and black bases, the longest about 20 mm.

Skull and Teeth.—I can detect no difference other than that of size between those of the Redang Island shrew and the skull and teeth of others from the Peninsula mainland.

Measurements.—For measurements of type and other specimens obtained see table below:

Specimens Examined.—Three (one in alcohol), all from the type locality.

Remarks.—There are no traces of lateral scent-glands in the single female obtained. This island shrew is exceeded in size amongst known Indo-Malayan species of the sub-genus by *C. lepidura* and approached by *C. baluensis* only. It is considerably larger than the largest *Crocidura* inhabiting the Malay Peninsula, which is about the same size as *C. weberi*, Jentinck,‡ from Singkarah (near Padang), Sumatra.

* "Proceedings of the United States Nat. Mus.," vol. xxxiv., 1908, p. 662.

† "Annals and Magazine of Natural History," ser. 7, vol. ii., Sept. 1898, p. 247.

‡ Weber, "Zool. Ergebn. Reis Niederland Ost-Indie," 1890, i., p. 124.

Measurements of *Crocidura major*:

Selangor Museum No. ..	2572/10	2573/10	2679/10
Sex	♂	♂ type	♀
Head and body	95	97	98
Tail	69	68	72
Hind-foot	16	16	15.5
Ear	10.5	10	10.5
Cranium, greatest length (excluding incisors)	23.1	23	22.3
,, basal length ...	21	20.9	20.4
,, palatal ,, ...	10.7	10	10
,, lachrymal breadth of rostrum ...	4.7	4.6	4.7
,, greatest ante-orbital breadth ...	8.1	7.8	8
,, ,, cranial breadth...	10.7	10.6	10.5
Entire maxillary tooth-row (including incisors)	11.1	10.8	10.5
,, mandibular ,, ,,	10.2	9.9	9.2

SCIURUS (VITTATUS) SCOTTII.

Kloss, *Ann. and Mag. Nat. Hist.* (8), vii., p. 117, 1911

Type.—Adult female (skin and skull), No. 2078/10, Selangor Museum, collected on Bedung Island, off Trengganu, east coast of the Malay Peninsula, 29th August, 1910, by C. Boden Kloss. Original No. 3360.

Characters.—Like *Sciurus miniatus*, Miller,† but smaller, also paler and duller above, the yellow element being pale buff rather than ochraceous-buff; below the rufous colour extending farther up the throat and everywhere conspicuously sown with white hairs, dark lateral stripe reduced and less intense, the buff stripe narrower and paler.

Colour.—Upper-parts a speckle of medium buff and black, the speckling being absent or much finer on sides of head and neck, chin, fore-limbs and hind-feet, where the black element undergoes reduction and the buff is brighter; an ochraceous ring round the eyes and the ears tinged with that colour.

Under-parts bright rufous (burnt sienna), extending beyond the whorl of hair on the throat almost to the lips and everywhere sprinkled with white hairs.

Upper lateral stripe cream-buff and narrow (4.5 mm.), the lower stripe dull black, tipped and annulated with the rufous of the abdomen, with which colour it is gradually overlaid, the pure black portion extremely narrow and adjacent to the buff stripe only.

* Measurements in parentheses those of an adult [illegible] from Gunong Semanggol, Larut, Perak. (S.M. No. 2680/10)

† "Proceedings of the Washington Academy of Sciences," vol. [illegible], [illegible], 1900, p. 79.

Tail coarsely annulated with black and pale buff, paler than the back, the annulations forming obscure black bands on the upper-surface; under-surface much yellower and less black. A rufous pencil covers the distal half of the lower surface but is not so extensive above where its hairs are tipped and annulated with black.

Skull and Teeth.—As compared with *S. miniatus*, Miller, the skull of *S. scottii* is very much smaller and the rostrum is relatively shorter and blunter. The nasals do not, as is the case with the mainland race, frequently have their posterior terminations (which are serrated, and not V-shaped in combination) markedly in front of those of the premaxillaries but both are practically coterminous, thus their median length is relatively greater and they are often actually broader posteriorly. Viewed from above the occipital region is more swollen and three distinct protruberances are visible on the walls of the supraoccipital bone where a central one only can be detected from the same point of view in *miniatus*. The junctions of the lateral and posterior edges of the frontal bone are subangular. The teeth only differ in size.

Measurements.—Collector's external measurements of type: head and body, 187; tail, 180; hind-foot, 44; ear, 17. Cranial measurements: greatest length, 45.1; basal length, 38.3; palatal length, 20.6; diastema 10.3; maxillary tooth-row, 8.9; median length of nasals, 12.6; greatest breadth of combined nasals, 6; interorbital breadth, 16.8; cranial breadth above roots of zygomata, 21; zygomatic breadth, 27.7.

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

Remarks.—The small size of this squirrel, together with its lighter upper-parts reduced lateral stripe and white-sprinkled abdomen, strongly differentiates it from its relative occupying the adjacent district of Trengganu and the greater part of the Peninsula.

It is named in honour of Mr. W. D. Scott, British Agent, Trengganu, whose assistance greatly facilitated and largely made possible my visit to the islands of the Trengganu Archipelago.

SCIURUS (VITTATUS) PLASTICUS.

Kloss, *Ann. and Mag. Nat. Hist.* (8) vii., p. 117, 1911.

Type.—Adult female (skin and skull), No. 2159/10, Selangor Museum, collected on Great Redang Island, off Trengganu, east coast of the Malay Peninsula, 1st September, 1910, by C. Boden Kloss. Original No. 3399.

Characters.—Like *Sciurus miniatus* but smaller, with paler upper-parts and tail and narrower black lateral stripe. Like *S. scottii* but with the buff element greater in quantity above and the dark lateral stripe more clearly defined, the rufous of the under-parts not extending so near the lips, the white hairs practically absent on the abdomen and the caudal pencil reduced in extent.

Colour.—Upper-parts a speckle of medium buff and black, the former in excess, the speckling being absent or very fine on sides of head and neck, chin, fore-limbs and hind-feet, which appear greyish buff: an obsolete ochraceous ring round the eye.

Under-parts bright rufous (burnt sienna), this colour extending but little beyond the whorl of hair on the throat.

Upper lateral stripe cream-buff (7 mm. wide), the lower stripe black, slightly grizzled with ochraceous and narrower than the other.

Tail coarsely annulated black and pale buff, paler than the back, the annulations forming obscure cross-bars on the upper-surface: the under-surface much more buffy than black. A rufous pencil extends distally along one-third of the under-surface, but is reduced above where its hairs are tipped and annulated with black.

Skull and Teeth.—The skull of *S. plasticus* is in general a small form of *S. miniatus*, with relatively longer nasals between which and the premaxillaries intrude wedges of frontal bone. The posterior termination of the combined nasals is V-shaped, so that their medium length is the minimum nasal length. Proportionately a much greater extent of the premaxillaries is visible on the upper surface. Generally the lateral and posterior edges of the frontal form a curve at their points of junction. The skull is larger than that of *S. scottii*, with a markedly longer rostrum: the teeth scarcely differ.

Measurements.—Collector's external measurements of type: head and body, 183; tail, 185; hind-foot, 43; ear, 16.5. Cranial measurements: greatest length, 46.2; basal length, 40; palatal length, 22; diastema, 10.6; maxillary tooth-row, 8.5; median length of nasals, 13; greatest breadth of combined nasals, 7; inter-orbital breadth, 17.2; cranial breadth above roots of zygomata, 21; zygomatic breadth, 28.

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

MUTATION 1.

Example.—Adult female (skin and skull), No. 2149/10, Selangor Museum. Original No. 3389. Other details as above.

Characters and Colour.—Like the type but the upper-parts throughout brighter, the yellow element being buff and in excess of the black; below, the rufous colour slightly less intense; pale lateral stripe similar, but the dark stripe much reduced and strongly grizzled, almost obscured by the rufous ochraceous tips of its hairs.

Measurements.—For measurements *see* p. 204.

Specimens with this appearance.—Ten, all from the type locality.

MUTATION 2.

Example.—Adult female (skin and skull), No. 2146/10, Selangor Museum, collected 3rd September, 1910. Original No. 3691. Other details as above.

Character and Colour.—Above mingled black and intense buff, the latter so greatly in excess as to produce a general golden effect: the upper-surface of head ochraceous-buff, brightest on the occiput. Ears, ring round eyes, fore- and hind-feet ochraceous; cheeks, chin and sides of head and neck clear buff; under-parts rufous; lateral stripe pale buff (5 mm. wide), dark lateral stripe entirely absent; tail above

like back but more coarsely annulated, the distal third rufous-tipped and annulated with black; below, intense buff, the black annulations almost absent, the distal half clear rufous.

Measurements.—For measurements *see* p. 204.

Specimens with this appearance.—Three, all from the type locality.

Remarks.—The squirrel of Great Redang Island is so extremely variable that, but for a long range of intermediate examples, it would be impossible to believe individuals at either extreme of the series to be of the same race and locality. A specimen most resembling forms prevailing throughout the Peninsula area has been chosen for the type, but at the same time, having regard to the unusual conditions of the animal, it has been thought desirable to define the appearance of others.

These are at present only stages of evolution, but—on the principle that when an animal, as a whole, commences to show in one direction all degrees of variation from the normal it will, if undisturbed and uninterrupted, eventually assume altogether the appearance of the extreme variation—the most extreme form will at some future day be typical of the race. In *S. proteus* of the Perhentian Islands, which follows, the turning point has been already attained and the majority of the animals there are now of the abnormal pattern.

It is open, nevertheless, to choose one of the other forms described for the typical animal, since, however, the case be regarded, it is an incontrovertable fact that the Redang Island squirrel is now a very distinct race and is on the way to become still more so.

The different animals are, however, only varieties, and the case of the island species is not analogous with that of *S. vittatus* in the Peninsula, where there occur three forms, *S. miniatus*, Miller, *S. peninsularis*, Miller,* and *S. subluteus*, T. & W., which, although they overlap and mingle on the borders of their distribution, are yet good geographical races.

The appearance of the extreme variety of this squirrel may be explained by erythrism, but in no other member of the *vittatus* group has this process been carried so far as to have brought about the complete disappearance of the dark lateral stripe. Save in East Perhentian, where the results of variation are equally marked, I do not think any other island so small can be cited in which a single race of squirrel exhibits so large a range of pattern and colouration.

Sciurus (vittatus) perhentiani.

Kloss, *Ann. and Mag. Nat. Hist.* (8) vii., p. 118, 1911.

Type.—Adult male (skin and skull), No. 2,172/10, Selangor Museum, collected on West Perhentian Island, off Trengganu, east

* It is unfortunate that this name has been applied to the race it represents, for the dominent Peninsular representative of *S. vittatus* is *S. miniatus*.

coast of the Malay Peninsula, 11th September, 1910, by C. Boden Kloss. Original No. 3609.

Characters.—Like *S. miniatus* but smaller and paler throughout, owing to the yellow element being greater in quantity and of a lighter buff while the annulations are much coarser; rufous of abdomen and tail slightly less intense, the under-surface of tail yellower and the pencil reduced in extent; the pale lateral stripe broader and of a deeper buff, and the dark stripe, though equally broad, a less clear black.

Like *S. scottii* and *S. plasticus* but a little larger; the buff of the upper-surface deeper and the tail yellower; the pale lateral stripe broader and deeper in tint, the dark lateral stripe blacker and more defined than in *S. scottii* and broader and less obscured than in *S. plasticus*.

Colour.—Upper-parts a coarse speckle of buff and black: the speckling being much reduced or absent on top of muzzle, sides of head and neck, chin, fore-limbs and hind-feet which are a dull buff; an ochraceous buff ring round the eyes.

Under-parts tawny rufous, extending but little beyond the whorl of hair on the throat.

Upper lateral stripe medium-buff (10 mm. wide), the lower stripe black (9 mm. wide), slightly grizzled with ochraceous and tawny.

Tail coarsely annulated with black and medium buff, paler than the back, the annulations forming obscure broad bands on the upper-surface: the under-surface much yellower and less black. A rufous pencil extends along one-third the lower side, but is much reduced on the upper-surface where its hairs are tipped and annulated with black.

Skull and Teeth.—Like *S. plasticus* in breadth but longer, with the combined nasals broader anteriorly, while posteriorly the termination is sometimes V-shaped, sometimes irregular; in the latter character resembling *S. miniatus*, but the nasals are broader anteriorly and the skull is smaller; the lateral and posterior edges of the frontal bone form a marked angle at their points of junction and the bone extends further behind the supra-orbital processes than is the case with *S. plasticus*.

No detailed comparison is needed with the smaller short-nosed and relatively broader skull of *S. scottii*.

Measurements.—Collector's external measurements of type: head and body, 188; tail, 172; hind-foot, 43.5; ear, 16.5. Cranial measurements: greatest length, 47.3; basal length, 40.9; palatal length, 23; diastema, 11.2; maxillary tooth-row, 9; median length of nasals, 14.0; greatest breadth of combined nasals, 7.2; inter-orbital breadth, 17.2; cranial breadth above roots of zygomata, 20.8; zygomatic breadth, 28.2.

Specimens Examined.—Twenty-nine, all from the type locality.

Remarks.—Its slightly smaller size and paler colouring sufficiently separate this race from the mainland animal, while differences in size and colour of the upper-parts, and the more marked lateral stripes, distinguish it from the other allied forms of the Trengganu Archipelago.

SCIURUS (VITTATUS) PROTEUS.

Kloss, *Ann. and Mag. Nat. Hist.* (8) vii., p. 118, 1911.

Type.—Adult male (skin and skull), No. 2094/10, Selangor Museum, collected on East Perhentian Island, off Trengganu, east coast of the Malay Peninsula, 13th September, 1910, by C. Boden Kloss. Original No. 3645.

Characters.—Smaller than *S. miniatus*; differs from *S. perhentiani* in being much paler above, while below the rufous is replaced by buff; the dark lateral stripe much obscured by the buff tips of the hairs.

Differs from *S. lutescens*,* Miller, of Sirhassan Island, and other allied races of Natuna Islands squirrels in possessing a notable rufous pencil to the tail.

Colour.—Upper-parts a coarse speckle of pale buff and black, the buff being in excess: sides of head and neck, chin, fore- and hind-limbs almost pure pale buff but dulled by the visible grey bases of the hairs, fore- and hind-feet clearer and less grey: a buff ring round the eyes.

Under-parts buff, palest on throat, axillæ and limbs (cream-buff); darkest on chest and down the median line of the abdomen (intense buff).

Pale lateral stripe cream buff (7-8 mm. wide), hairs of dark lateral stripe with blackish bases and buff tips, the general colour impression thus produced being a dark yellowish grey.

Tail, above, coarsely annulated black and pale buff, the annulation forming obscure bars; below, pure buff like the abdomen near the base, elsewhere with the black grizzling much reduced. A rufous pencil extending one-third up the tail below but much less above, where it is tipped and annulated with black.

In females the inguinal mammæ are surrounded by patches of white hairs about 13 mm. in diameter.

Skull and Teeth.—The skull is like that of *S. perhentiani* but is a little smaller, the combined nasals are narrower and have a regular V-shaped termination, and the angle formed by the sides and posterior edge of the frontal bone is less obtuse owing to the greater breadth of the latter.

As compared with *S. plasticus*, than which it is both a little longer and narrower, the terminations of the nasals are rather more anterior

* "Proceedings of the Washington Academy of Sciences," vol. iii., p. 124, 1901.

to those of the premaxillaries and the junction of sides and posterior edge of the frontal is angular.

No detailed comparison is needed with the smaller, short-nosed and relatively broader skull of *S. scottii*.

Measurements.—Collector's external measurements of type: head and body, 191; tail, 165; hind-foot, 43; ear, 17.5. Cranial measurements: greatest length, 46; basal length, 39.1; palatal length, 21.5; diastema, 10.6; maxillary tooth-row, 9; median length of nasals, 13; greatest breadth of combined nasals, 6.2; inter-orbital breadth, 16.2; cranial breadth above roots of zygomata, 21.3; zygomatic breadth, 27.

Specimens Examined.—Thirty, all from the type locality. The series includes a number of specimens in which the buff of the chest and median abdomen is slightly tinged with tawny.

MUTATION—1.

Example.—Adult female (skin and skull), No. 2124/10, Selangor Museum, collected 10th September, 1910. Original No. 3595. Other details as above.

Characters and Colours.—Like the type but with the chest and whole of the abdomen tawny buff and under-sides of limbs intense buff.

Measurements.—For measurements *see* p. 205.

Specimens with this appearance.—Ten, all from the type locality.

MUTATION—2.

Example.—Adult male (skin and skull), No. 2134/10, Selangor Museum, collected 10th September, 1910. Original No. 3584. Other details as above.

Characters and Colours.—Like the type above but with the buff annulations coarser; below, tawny; the dark lateral stripe grizzled and much obliterated over its whole extent by the colour of the abdomen.

Measurements.—For measurements *see* p. 205.

Specimens with this appearance.—Six, all from the type locality.

MUTATION—3.

Example.—Adult male (skin and skull), No. 2140/10, Selangor Museum, collected 12th September, 1910. Original No. 3648. Other details as above.

Characters and Colours.—Slightly paler than *S. perhentianus*, above; similar below but with the dark lateral stripe grizzled with ochraceous-buff and reduced to a width of less than 5 mm. by the superficial extension of the rufous abdomen; slightly darker than the typical *S. proteus* above, and otherwise very different.

Measurements.—For measurements *see* p. 206.

Specimens with this appearance.—Six, all from the type locality.

Remarks.—The East Perhentian Island squirrel differs from the Great Redang animal in that—while in the latter case departures from the generally prevailing form are still in the minority—in Perhentian Island it is the very distinct and unusually coloured animals that already predominate, and it therefore becomes necessary to take one of the latter for the type and regard the others as individuals in a stage of evolution.

The variation which this squirrel and also *S. plasticus* exhibit is extraordinary, for the island of Great Redang is perhaps ten square miles in area, while East Perhentian is about half that size only. The species most resembling *S. prevostoides* appears to occur on one of the Natuna Islands, but each of what are in Perhentian Island mere stages or varieties is parallelled by a distinct geographical race on one or other island of the Bornean group, each race there occupying an island by itself. *

The principal difference between *S. prevostoides* and these latter seems to lie in the rufous-pencilled tail of the former which, in spite of its pallid under-parts, allies it with the *minutus* branch of the *vittatus* group.

While mutations 2 and 3 closely resemble mutation 2 of the Great Redang squirrel the two species are yet very distinct and different.

SCIURUS (VITTATUS) WATSONI.

Kloss, *Ann. and Mag. Nat. Hist.* (8), vii., p. 118, 1911.

Type.—Adult male (skin and skull). No. 2055.10. Selangor Museum, collected on Lantinga Island, off Trengganu, east coast of the Malay Peninsula, 6th September, 1910, by C. Boden Kloss. Original No. 3500.

Characters.—Most nearly resembles *S. sublineatus*, T. & W.,† but is smaller and paler above, the yellow element being lighter, coarser and present in greater quantity, especially on head, limbs and feet. Pencil of tail more defined and intense: lateral pale stripe much broader and darker, dark stripe much shorter and much obscured by grizzling.

Colour.—Upper-parts a coarse speckle of buff and black; the black being much reduced or absent on sides of head and neck, fore-limbs and hind-feet: an obsolete buff ring round the eyes: chin and anterior portion of throat greyish-buff.

Under-parts soiled ochraceous, slightly tinged with tawny on the chest and abdomen.

Upper lateral stripe medium buff (7. 8 mm. wide): lower stripe dull black, about 10 mm. wide, strongly grizzled and obscured by the buff-ochraceous tips of the hairs and gradually blending with the colour of the upper-parts round the posterior termination of the buff stripe.

* "Proceedings of the Washington Academy of Sciences," vol., iii. pp. 124-128 (1901).

† "Annals and Magazine of Natural History," ser. 8, vol. iii., May 1909, p. 440. "Journal of the Federated States Museums," vol. iv., No. 1, Dec. 1909, p. 116.

Tail above coarsely annulated black and pale buff, the latter colour in excess on the under-surface and brighter near the base; the extremity of the tail occupied by a distinct rufous pencil about [illegible] mm. long below but less above, the hairs tipped and annulated with black.

SKULL AND TEETH.—The skull of S. *[illegible]* is rather smaller than that of S. *[illegible]*, S. *[illegible]* and S. *[illegible]*, but the nasals are much longer; anteriorly their combined breadth is as great as in S. *[illegible]*, but the sides converge rapidly and beyond their centre of length are almost parallel; the posterior termination is nearly straight and in line with the end of the premaxillaries; the junction of the sides and posterior edges of the frontal is angular but far more obtusely so than in S. *[illegible]* as the posterior edge is much closer to the supra-orbital processes.

Though the skull is much smaller than that of S. *[illegible]* the rostrum is equally long and it is broader anteriorly though not so deep; the nasal bones are markedly longer.

No comparison is needed with the smaller short-nosed and relatively broader skull of S. *[illegible]*.

MEASUREMENTS.—Collector's external measurements of type: head and body, 182; tail, 188; hind-foot, [illegible]; ear, [illegible]. Cranial measurements: greatest length, [illegible]; basal length, [illegible]; palatal length, 21.6; diastema, 11.2; maxillary tooth-row, [illegible]; median length of nasals, 14.8; greatest breadth of combined nasals, [illegible]; inter-orbital breadth, 14.2; cranial breadth above roots of zygomata, [illegible]; zygomatic breadth, 27.8.

SPECIMENS EXAMINED.—Nine, all from the type locality.

REMARKS.—The discovery of this squirrel in the [illegible] Archipelago is somewhat surprising since it is most nearly allied to S. *[illegible]*, a strongly marked form which occupies a restricted area in the extreme south of Johore and perhaps also [illegible] Island. It needs no comparison with S. *[illegible]*, Miller,* and from the other ochraceous-bellied squirrels of the Peninsular region—S. *[illegible]*,† Miller, S. *[illegible]*, Miller,‡ and S. *[illegible]*,§ Miller, which inhabit islands of the Johore Archipelago—it is sufficient to note that it is separated by the [illegible] colour of the [illegible] and by the possession of a small but well defined rufous pencil to the tail.

I have named this very distinct species in honour of Mr. R. G. Watson, Acting Resident-General of the Federated Malay States at the time of my visit to the islands, in recognition of his generous views with regard to zoological research.

* "Smithsonian Misc. Collections," Vol. [illegible], November [illegible], p. [illegible].

† "Proceedings of the Washington Academy of Sciences," Vol. [illegible], [illegible], p. [illegible].

‡ "Smithsonian Miscellaneous Collections," Vol. [illegible], November [illegible], p. [illegible].

§ Op. cit., p. [illegible].

Measurements of adult squirrels of the *vittatus* group:

Name.	Locality.	F. M. No.	Sex.	Head and body.	Tail.	Hind-foot.	Ear.	Greatest length of skull.	Median nasal length.	Interorbital breadth.	Zygomatic breadth.
Sciurus scottii	Bedung Island ...	2077/10	Male	182	171	44	18	45	12.2	17.6	26.5
,, *type* ...	,, ...	2078/10	Female	187	180	44	17	45.1	12.6	16.8	27.7
,, ...	,, ...	2079/10	Male	174	176	42	16.5	44.6	12.6	16.5	27
,, ...	,, ...	2080/10	Female	187	172	40.5	16.5	45.3	13	17.3	27.3
,, ...	,, ...	2081/10	,,	173	176	42.5	16.5	...	...	16.8	26.5
,, ...	,, ...	2082/10	Male	176	174	42.5	16.5	44.6	12	16.7	26.3
,, ...	,, ...	2083/10	,,	175	175	43	16	...	11.6	16	25
,, ...	,, ...	2084/10	Female	183	178	43.5	16.5	46.7	12	17.6	27.8
,, *Average*	,, ...	...	...	*179.6*	*175.2*	*42.7*	*16.7*	*45.2*	*12.2*	*16.9*	*26.7*
Sciurus plasticus (type) ...	Great Redang Island	2159/10	Female	183	185	43	16.5	46.2	13	17.2	28
,, ...	,, ...	2160/10	,,	185	185	44	17	47	14	16.9	29
,, ...	,, ...	2162/10	,,	190	185	43	16	46.7	12.8	17.2	27.8
,, ...	,, ...	2164/10	Male	189	170	41	16	47.5	13.2	16.4	28.1
,, ...	,, ...	2165/10	,,	183	174	43	17	46.5	13.5	17.7	27.2
,, ...	,, ...	2168/10	,,	175	175	43	16	45.6	13.5	16	26.5
,, mutation 1	,, ...	2149/10	Female	188	180	44	16.5	47.4	14	17.3	29
,, ,,	,, ...	2151/10	,,	189	171	42.5	16.5	46.8	12.8	17.1	28
,, ,,	,, ...	2156/10	,,	189	186	43.5	17	46.4	13.4	16.4	27.3
,, ,,	,, ...	2157/10	Male	175	170	39.5	16	46.6	13.6	17.2	27.3
,, mutation 2	,, ...	2146/10	Female	179	182	42	16	46	13.9	16.6	27.5
,, ,,	,, ...	2147/10	,,	195	185	44	17	46.4	13.4	17.4	28.8
,, ,,	,, ...	2148/10	,,	195	190	42	16.5	46	14	16.8	27.5
,, *Average* [1]	,, ...	...	...	*183.5*	*179.7*	*42.4*	*16.5*	*46.5*	*13.4*	*17*	*27.8*

Sciurus perhentiani, *type* ...	West Perhentian Island	2172/10	Male	188	172	43.5	16.5	47.3	14	17.2	28.2
,, ...	... ...	2174/10	,,	195	153	45	18	50.5	13.8	17.4	28.1
,, ...	... ...	2176/10	Female	194	183	45	17	47.5	13.6	17.5	28.3
,, ...	... ...	2181/10	Male	190	165	41.5	16	47.7	13.7	17.5	27.7
,, ...	... ...	2182/10	,,	190	159	43.5	17	47.8	14.5	17.3	26.5
,, ...	... ...	2183/10	,,	190	170	41.5	16	45	14.3	16.6	26.5
,, ...	... ...	2185/10	Female	192	170	42	17	47.5	14.4	16.2	27.8
,, ...	... ...	2191/10	Male	192	179	44	17	49	15	17.9	28.6
,, ...	... ...	2192/10	Female	197	173	43	16	48.4	14.4	17.1	28.3
,, ...	... ...	2193/10	,,	205	176	44	17	47	14.6	16.7	27.2
,, ...	... ...	2196/10	,,	182	165	42	17	47	14.3	16.4	27
,, ...	... ...	2198/10	,,	186	165	43.5	18	47.5	14.8	17.3	28.6
,, *Average* [2]	... ...	...	...	*189.5*	*172.5*	*43.2*	*16.5*	*47.7*	*14.3*	*17.1*	*27.7*
Sciurus proteus, *type* ...	East Perhentian Island	2094/10	Male	191	165	43	17.5	46	13	16.2	27
,, ...	,, ...	2098/10	,,	184	176	42	16.5	45.7	12.4	16.5	27.2
,, ...	,, ...	2101/10	Female	188	174	43	17	48.8	12.3	17.4	29
,, ...	,, ...	2103/10	,,	188	170	41.5	17	46.3	12.6	16	27.4
,, ...	,, ...	2107/10	Male	183	164	41	17	46	13	16.8	27.5
,, ...	,, ...	2120/10	,,	192	178	42.5	17.5	47	13	15.7	27.4
,, ...	,, ...	2122/10	Female	190	165	42	16	45.8	12.3	16.3	27
,, mutation 1	,, ...	2124/10	,,	190	172	43	18	47.3	15	16.7	28.7
,, ,, ...	,, ...	2125/10	Male	185	190	41	17	47.5	13	15.9	26
,, ,, ...	,, ...	2127/10	Female	178	154	41	16.5	51	12	16	26.3
,, ,, ...	,, ...	2128/10	,,	182	166	41.5	16.5	48.8	14.2	17.9	27.8
,, ,, ...	,, ...	2129/10	Male	190	175	42	17	46	13.4	16	26.4
,, ,, ...	,, ...	2133/10	Female	178	...	41	17	46.3	13	16	27.3
,, mutation 2	,, ...	2134/10	,,	185	170	42	17.5	46.3	13.3	17.3	26.5
,, ,, ...	,, ...	2136/10	Male	195	175	43	17.5	47.5	12.5	16.2	27
,, ,, ...	,, ...	2138/10	,,	189	168	42	17	46.3	13.3	16.5	29

[1] Of external dimensions of 26 adult specimens. [2] Of external dimensions of 29 adult specimens.

Name.	Locality.	S. M. No.	Sex.	Head and body.	Tail.	Hind-foot.	Ear.	Greatest length of skull.	Median nasal length.	Interorbital breadth.	Zygomatic breadth.
Sciurus proteus	East Perhentian										
,, mutation 3	Island	2140/10	Male	180	180	44	17	48.3	13.5	17.1	28.3
,, ,, ...	,, ...	2142/10	Female	178	172	41.5	17.5	46.5	13.3	16.5	26
,, ,, ...	,, ...	2143/10	,,	167	171	41.5	15.5	45.5	13	15.5	25.5
,, ,, ...	,, ...	2144/10	Male	181	169	42.5	16.5	45.8	16	13.7	26.5
,, *Average*[1]	,, ...	...	...	*184.4*	*168.6*	*41.8*	*16.7*	*47*	*13.2*	*16.3*	*27.2*
Sciurus watsoni, *type* ...	Lantinga Island ...	2085/10	Male	182	183	45.5	16.5	46.3	14.8	16.2	27.3
,, ...	,, ...	2086/10	Female	170	185	44.5	16.5	44.6	14	15.3	25.4
,, ...	,, ...	2087/10	Male	183	180	45	16.5	46.3	15	16.2	27.2
,, ...	,, ...	2088/10	,,	185	170	43	16.5	46.8	15	16.4	27.4
,, ...	,, ...	2089/10	Female	188	182	45	17	46.2	14.9	16.4	27.5
,, ...	,, ...	2090/10	,,	182	170	45	17	47.3	15.2	16.7	27.8
,, ...	,, ...	2091/10	,,	176	185	44	16.5	46.7	15	16	27.2
,, ...	,, ...	2092/10	,,	173	187	44	17	46	14.6	16.3	27.3
,, ...	,, ...	2093/10	,,	180	180	45	17	44.7	14	15.9	27.3
,, *Average*	,, ...	...	...	*179.9*	*180.2*	*44.5*	*16.7*	*46.1*	*14.7*	*16.1*	*27*
Sciurus miniatus	Bukit Jong, Trengganu ...	2357/10	Male	208	180	45	17	49.7	14	19	30
,, ...	,, ...	2363/10	Female	203	194	45	17	49.6	16	18.7	29.8
,, ...	,, ...	2365/10	Male	202	195	46	19	50.5	13.4	17.5	28.7
,, ...	,, ...	2366/10	Female	200	195	45	19	50.5	14.6	19	30
,, ...	,, ...	2369/10	Male	206	204	45	17	50	14.6	17.6	29
,, ...	,, ...	2370/10	Female	200	187	45	17	48.2	14	17.3	28.8
,, *Average*[2]	... ...	...	...	*203.1*	*192.5*	*45.1*	*17.6*	*49.7*	*14.4*	*18.2*	*29.4*

[1] Of external dimensions of 48 adult specimens. [2] Trengganu animals do not differ in size from topotypes from Trang, West Coast Siamese Malaya.

SCIURUS (TENUIS) SORDIDUS.

Kloss, *Ann. and Mag. Nat. Hist.* (8), vii., p. 119, 1911.

TYPE.—Adult female (skin and skull), No. 2407.10, Selangor Museum, collected on Great Redang Island, off Trengganu, east coast of the Malay Peninsula, 2nd September, 1910, by C. Boden Kloss. Original No. 3720.

CHARACTERS.—A form of *S. tenuis*, characterised by the small skull, even and regular posterior terminations of the nasals and premaxillaries, and by duller colour, closely resembling in the latter character *S. tenuis surdus*, Miller, from Trang.*

COLOUR.—Upper-parts a speckle of black and medium-buff (not ochraceous-buff as in *S. tenuis typicus*), brightest on muzzle and head. A ring round the eye, buff (not buff-ochraceous); ears, fore- and hind-feet, a wash on sides of head, shoulders, fore-limbs and thighs, pale dull ochraceous (not bright ochraceous).

Below, whitish-grey, suffused with cream-buff (paler than in *S. tenuis*), strongest on lower throat, chest and median line of abdomen.

Tail annulated black and buff, the bases of the hairs ochraceous-buff, the tips buff-white; base of under-side buff to buff-ochraceous (not ochraceous); a scarcely perceptible black pencil.

SKULL AND TEETH.—The skull and teeth generally resemble those of *S. tenuis* and *S. t. surdus* but are smaller: the posterior terminations of the nasals and premaxillaries are practically in a line, so that the sutures run evenly and continuously with a slight curve from side to side, and their serrations are not long and ragged but short and regular. The median nasal length is generally the maximum; in *S. tenuis* it is, owing to the Λ-shaped terminations of the combined nasals, frequently the minimum.

MEASUREMENTS.—Collector's external measurements of type: head and body, 135; tail, 105; hind-foot, 31.5; ear, 13. Cranial measurements: greatest length, 36.3; basal length, 32.3; palatal length, 16.2; diastema, 7.8; maxillary tooth-row, 6.9; median length of nasals, 10.2; greatest breadth of combined nasals, 5.1; inter-orbital breadth, 12.2; cranial breadth above the roots of zygomata, 17.2; zygomatic breadth, 22.

SPECIMENS EXAMINED.—Ten, all from the type locality.

REMARKS.—The cranial characters of this island squirrel separate it clearly from other races of the same group. It is curious to find that it differs markedly in colour from the bright animal inhabiting the adjacent mainland and resembles the dull-coated *S. t. surdus*, occupying a district on the west coast considerably to the north of Trengganu.

* "Proceedings of the Washington Academy of Sciences," vol. ii. p. 80 (1900).

Measurements of adult squirrels of the *Sciurus tennis* group:

Name.	Locality.	S. M. No.	Sex.	Head and body.	Tail.	Hind-foot.	Ear.	Skull, greatest length.	Median nasal length.	Inter-orbital breadth.	Zygomatic breadth.
Sciurus tenuis sordidus ...	Great Redang Island	2404/10	Female	147	116	33	14.5	36	10.6	12.3	21.4
,, ...	,, ...	2405/10	Male	143	...	34	15	...	...	...	...
,, ... *type*...	,, ...	2406/10	Female	142	...	33	14	36.3	10.7	11.4	21.4
,, ...	,, ...	2407/10	,,	135	105	31.5	13	36.3	10.2	12.2	22
,, ...	,, ...	2408/10	,,	133	134	32	13	37.5	...	11.5	20.4
,, ...	,, ...	2409/10	,,	132	120	31	12.5	35	10.2	11	21.3
,, ...	,, ...	2410/10	,,	127	118	30.5	13	34	10.2	11.5	20
,, ...	,, ...	...	...	*137*	*118.6*	*32.1*	*13.5*	*35.5*	*10.4*	*11.7*	*21*
Average...	,, ...										
Sciurus tennis	Bukit Jong, Trengganu	...	...	...	...	...	...	37.5	11.3	13	22.7
Seven specimens, *average*	,, ...	...	...	...	...	...	...				
Sciurus tenuis, *topotypes*	Singapore Island										
Seven specimens, *average*	,, ...	...	...	...	...	...	...	37	10.7	12.8	22.3

MUS (SURIFER) GRANDIS.

Kloss, *Ann. and Mag. Nat. Hist.* (8), vii., p. 119, 1911.

TYPE.—Adult male (skin and skull), No. 2206/10, Selangor Museum, collected on Great Redang Island, off Trengganu, east coast of the Malay Peninsula, 2nd September, 1910, by C. Boden Kloss. Original No. 3698.

CHARACTERS.—A large member of the *surifer* group, not requiring, on account of its very robust skull, any close comparison with allied forms.

COLOUR.—Upper-parts ochraceous, clouded on shoulders, back and rump with the dark brown tips of the spines, but clearer on top of head and almost pure on cheeks and sides of neck, fore-limbs, sides and thighs: top of muzzle greyish-brown, sides white.

Under-parts white, this colour continued to fore-feet down the inner side of thighs, though not reaching the heel, and extending beyond the throat and chin to lower cheeks, upper lip and sides of muzzle, where it includes the roots of many of the vibrissæ: scrotum white. Viewed from below the yellow sides of head and neck are not visible.

Fore- and hind-feet white above, tail black above, paler at tip; white below.

SKULL AND TEETH.—As compared with skulls of other *surifer* rats that of *M. grandis* is more robust and is especially remarkable for its large and heavy rostrum which is much broader and deeper, also the nasal bones are broader and the incisors heavier; there is a greater flare to the zygomatic arches and the infra-orbital plates (instead of having their anterior edges perpendicular or receding backwards from above) slant forward considerably. The interpterygoid space is distinctly wider, but the molars do not differ notably, and as in all the *surifer* rats the palate is narrowest at the posterior molar.

MEASUREMENTS.—Collector's external measurements of type: head and body, 204; tail, 188; hind-foot, 42; ear, 23. Cranial measurements: greatest length, 49 (—)*; basal length, 41.7 (43.6); nasal length, 19.8 (—); shortest distance between tip of nasals and lachrymal notch 20.4 (—); palatal length, 22 (22.7); diastema, 13.4 (14.7); molar length, 7.5 (7.0); length of foramina, 6.9 (7.2); breadth of combined foramina, 3.9 (4.0); zygomatic breadth, 21 (22.4); cranial breadth, 17.2 (17.8); depth of rostrum at anterior extremity of foramina, 9.3 (9.6); breadth of rostrum midway between henselion and foramina, 8.0 (8.0).

SPECIMENS EXAMINED.—Fourteen, all from the type locality.

REMARKS.—The entire series is in very abraded pelage and the colour given for the upper-parts must only be regarded as approximately correct. The robust skull and large size of this rat—immature individuals with unworn teeth being equal to fully grown adults of other races—render it very distinct, and it forms a notable exception to the general rule that insular races are smaller than those of the same species inhabiting the mainland.

* Measurements in parentheses those of a male (S.M. 2208/10) with worn teeth from the type locality.

MUS (SURIFER) FLAVIGRANDIS.

Kloss, *Ann. and Mag. Nat. Hist.* (8), vii., p. 119, 1911.

Type.—Adult male (skin and skull), No. 2220/10, Selangor Museum, collected on East Perhentian Island, off Trengganu, east coast of the Malay Peninsula, 12th September, 1910, by C. Boden Kloss. Original No. 3628.

Characters.—In size sub-equal to *M. grandis* but with a slightly larger hind-foot; pelage somewhat brighter; sides of muzzle and lower cheeks yellow, not white; white area of throat much narrower; scrotal area largely tawny. Skull generally similar but the nasals extending posteriorly beyond the lachrymal notch.

Colour.—Upper-parts ochraceous, clouded and darkened on shoulders, back and rump with the dark brown tips of the spines, but clearer on the top of the head and almost pure on cheeks and sides of neck, fore-limbs, sides and thighs where it becomes buff-ochraceous; top and sides of muzzle greyish-brown.

Under-parts white, this colour continued to fore-feet and down the inner sides of thighs but not quite reaching the ankles; a slight ochraceous gorget; scrotum partly ochraceous. Viewed from below the yellow sides of head and neck are distinctly visible.

Fore- and hind-feet white above; tail black above, paler at tip; white below.

Skull and Teeth.—The skull of *Mus flavigrandis* resembles that of *Mus grandis* save that the nasal bones are prolonged posteriorly beyond the anterior edges of the lachrymal notches.

Measurements.—Collector's external measurements of type: head and body, 208; tail, 180; hind-foot, 43; ear, 23. Cranial measurements: greatest length, 48 (48.8);* basal length, 42 (43.5); palatal length, 22 (23); nasal length, 20.7 (20.8); shortest distance between tip of nasals and lachrymal notch, 19.2 (19.9); diastema, 14 (14.3); molar row, 7.4 (7.8); length of foramina, 7 (7.6); breadth of combined foramina, 3.9 (4); zygomatic breadth, 21.5 (22.8); cranial breadth, 17.2 (16.8); depth of rostrum at anterior extremity of foramina, 9.1 (9.9); breadth of rostrum midway between henselion and foramina, 7.4 (8.1).

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

Remarks.—These specimens are in the same abraded state as the series of *Mus grandis* but they convey an impression of rather greater brightness of the upper-parts. The relative positions of the posterior terminations of the nasals and the shape of anterior roots of zygomata, together with the narrower white throat and absence of any pale area at the roots of the vibrissæ render separation of this form from *Mus grandis* very easy. Though the pale vibrissæ patches are not uniformly present in individuals of all the other races of *Mus surifer*, they are to be seen in the great majority of cases, and the entire absence of these in *Mus flavigrandis* is, for differential purposes, a useful character, the best of which are, however, the great size and robust skull as in *Mus grandis*, together with the peculiar nasal feature above referred to.

* Measurements in parentheses those of a female with worn teeth from the type locality, S.M. 2222/10.

Measurements of adult rats from the Trengganu Archipelago:

Name.	Locality.	S. M. No.	Sex.	Head and body.	Tail.	Hind-foot.	Ear.	Greatest length of skull.	Greatest nasal length.	Tip of nasals to anterior edge of lachrymal.	Zygomatic breadth.
Mus grandis	Great Redang Island ...	2201/10	Male	213	184	41.5	23	49	20	20.5	21.7
,, ...	... ,,	2202/10	Female	206	...	37	23.5	49.2	20.3	20.3	22
,, ...	... ,,	2203/10	Male	206	181	41	23	48.4	18.8	19.6	22.5
,, ...	... ,,	2204/10	,,	213	187	41	...	49.6	21.6	20.8	22.5
,, ...	... ,,	2205/10	Female	213	185	39.5	23	48.2	19.2	19.5	21.2
,, ...	*type* ... ,,	2206/10	Male	204	188	42	23	49	19.8	20.4	21
,, ...	... ,,	2207/10	,,	207	187	41	25	...	21	21	...
,, ...	... ,,	2208/10	Female	202	188	40	...	...	...	...	22.4
,, ...	*Average* ...	...	...	208	*180.7*	*40.3*	*23.4*	*48.9*	*20.1*	*20.3*	*21.8*
Mus flavigrandis	East Perhentian Island	2215/10	Male	222	192	44	24	...	21.7	20.4	...
,, ...	... ,,	2216/10	Female	207	...	43	24	46.5	20.1	18.6	21.2
,, ...	... ,,	2217/10	Male	197	193	42.5	25	...	19.2	18.4	...
,, ...	... ,,	2218/10	Female	205	162	40.5	24.5	46.8	19.7	19.1	22
,, ...	... ,,	2219/10	*Male*	213	...	44.5	...	48.4	21	19.8	21.3
,, ...	*type* ... ,,	2220/10	,,	208	180	43	23	48	20.7	19.2	21.7
,, ...	... ,,	2221/10	Female	212	176	41.5	23.5	48.3	21	19.8	21.7
,, ...	... ,,	2222/10	,,	220	...	41	24	48.8	20.8	19.9	22.8
,, ...	*Average* ... ,,	...	...	*201.5*	*180.6*	*42.5*	*24*	*47.8*	*20.5*	*19.4*	*21.9*

MUS RATTUS JALORENSIS, Bonh

Great Redang Island. 11 ♂ 7 ♀.

East Perhentian Island. 23 ♂ 13 ♀.

Accepting for the present Bonhotes' name of *Mus jalorensis* as applicable to all the white-bellied animals of the *rattus* group occurring in the Malay Peninsula, I place these examples from the Trengganu Archipelago under the same title, and pending a thorough examination and revision of the group, it may also cover the animals inhabiting many of the adjacent Islands—*i.e.*, Sibu, Jemor, the Langkawis and Terutau—though certain small differences are perceptible amongst all these.

From dimensions it would appear that the Great Redang animal is the smaller of the two, but the series consists of nine adult individuals only against 30 from East Perhentian Island:

	Head and body.	Tail.	Hind-foot.	Ear.
Redang average ...	176.2	187.8	35.5	20.4
Perhentian „ ...	181.3	200	35.6	21.3
Redang maximum	183	202	36	21
Perhentian „	197	225	38	22.5
Redang minimum	165	177	33.5	19.5
Perhentian „	172	193	34	20.5

TRAGULUS RAVUS, Miller.

Great Redang Island. 1 ♂.

The single example obtained does not appear to differ in any respect from the mainland animal. Collector's external measurements: head and body, 405; tail, 65; hind-foot, 105; ear, 32. Cranial measurements: greatest length, 88; basal length, 76; zygomatic breadth, 39; least interocular breadth 26.

NOTES ON TWENTY-THREE SPECIMENS OF *PTEROPUS HYPOMELANUS LEPIDUS*.

By KNUD ANDERSEN.

The series of *Pt. hypomelanus lepidus* on which the following notes are based is, thus far, the largest ever brought together for examination on one spot. A brief account of the individual variations exhibited by this series, chiefly as regards the colours of the fur, may therefore be of some interest to specialists.

MATERIAL EXAMINED.

Big Tambelan Island.—Three skins with skulls (two ♂ ad., one ♀ ad.), Aug. 9, 1899, paratypes of "Pteropus lepidus," Miller; U. S. National Museum, 101,649, '50, '51.

Pulau Aor.—One alcoholic with skull (♀ ad.), June, U. S. National Museum, 112,404.

Pulau Tioman.—Three skins with skulls (all ♂ ad.), June, 1906, and Sept., 1907; Kuala Lumpur Museum, 282, and B. M. 8, 1, 25, 2 and 8, 2, 25, 2.

Lantinga Island.—One skin with skull (♂ subad.), Sept. 6, 1910: Kuala Lumpur Museum, 2,051.

Great Redang Island.—Nine skins with skulls (four ♂ ad., one ♂ subad., two ♀ ad., two ♀ subad.), Aug. 31-Sept. 4, 1910: Kuala Lumpur Museum, 2,056-2,060, and B.M. 11.1.30. 4-7.

Perhentian Island.—Seven skins with skulls (two ♂ ad., two ♂ subad., two ♀ ad., one ♀ subad.), Sept. 9-13, 1910: Kuala Lumpur Museum, 2,047-2,050, and B.M. 11.1.30. 1-3.

The nine specimens (P. Tioman, Great Redang, Perhentian) in the possession of the British Museum have been presented by the Government of the Federated Malay States, through Messrs H. C. Robinson and C. B. Kloss. The four from Big Tambelan and Aor Islands were borrowed from the U. S. National Museum, through Mr. Gerrit S. Miller, Jr., during the preparation of the B.M. Catalogue of Megachiroptera. The remaining ten specimens (P. Tioman, Lantinga, Great Redang, Perhentian) are the property of the Kuala Lumpur Museum and were sent to the British Museum for examination and identification.

The Tambelan Islands (type locality of *Pt. h. lepidus*) are situated in the S. China Sea, about midway between Borneo and the southern point of the Malay Peninsula. P. Aor and Tioman close together off the south-east coast of the Peninsula; P. Lantinga, Great Redang, and Perhentian close together off the east coast of the Peninsula (at Trengganu), some 200 miles north of P. Tioman.

COLOUR OF BACK.

The darkest * specimens in the series have the back seal-brown or blackish brown distinctly sprinkled with light greyish (silvery-grey, white-grey) hairs; though conspicuous, the greyish sprinkling is not nearly strong enough to obliterate the seal-brown element of the coloration, the general impression of the colour of the back being a blackish or blackish brown tinge, thinly grizzled with light grey

* In point of colour the extreme eastern races of *Pt. hypomelanus* (viz., *Pt. h. luteus*, from New Guinea, and *Pt. h. hypomelanus*, from the Gilolo group) are the most "ordinary-looking" forms of this widely distributed and highly variable species—*i.e.*, the colours of the back (approximately Prout's brown), mantle and under-parts (ochraceous-buff or some related tinge) are not essentially different from those of many other species of *Pteropus*. So far as the colour of the fur are concerned, those eastern races may therefore be considered the least modified forms of the species. *Pt. h. lepidus* exhibits two important modifications of the colours—*viz.*, (1) a conspicuous, often even excessive, admixture of light grey in the colour of the back, and (2) a considerable darkening of the bright colour of the mantle and under-parts. In describing the individual variations of the colour of the back in *Pt. h. lepidus* it therefore appears natural to pass from the *darkest*-backed specimens (those exhibiting the thinnest admixture of light grey) to the *palest*-backed (strongest admixture of grey); and in describing the variations of the mantle and under-parts from the lightest extreme (nearest *luteus*) to the *darkest* (specimens in which the original bright colour of the mantle and under-parts is partly or wholly replaced by darker tinges).

(examples: Big Tambelan, 101,651, paratype; Perhentian, 11.1.30.2 and 2,050; Great Redang, 2,059).

From this darkest extreme the colour variations go in three directions: (1) the light greyish element is increased and the blackish or seal-brown more and more suppressed in the same proportion; or (2) the blackish or seal-brown element is lightened into paler tinges of brown; or (3) both changes are combined.

By increase of the light grey (silvery grey, white-grey) and corresponding decrease of the blackish (seal-brown) element the general colour of the back is transformed into dark brown heavily mixed with light grey (Tioman, 8.1.25.2; Perhentian, 11.1.30.1 and 2,047; Great Redang, 2,057 and 2,060); into light mouse-grey (Tioman, 8.2.25.2; Great Redang, 11.1.30.5); and from this through various intermediate stages into the lightest extreme, in which the colour of the back may be roughly described as light grey (silvery grey, white-grey, sometimes with a wash of buffy) more or less thinly sprinkled with blackish (Big Tambelan, 101,649, paratype; Great Redang 11.1.30.7). The modifications take place by the seal-brown or blackish brown hairs being gradually to a greater and greater extent replaced by *light grey hairs. The darkest-backed and lightest-backed specimens are so strikingly different in appearance that, if these only were known and if they happened to have been obtained in different islands, few zoologists would hesitate to consider them distinct species.

Either independent of this gradual spreading of the light greyish element, or, on the contrary, combined with same takes place, in some specimens, a gradual lightening of the blackish or seal-brown element itself. By this change the general colour of the back becomes some tinge of dark brownish (between seal-brown and vandyck-brown) more or less heavily mixed with grey (Perhentian, 11.1.30.1 and 3, 2,048); or, by increase and further lightening of the greyish element, mouse-grey or pale grey more or less strongly washed with vandyck brown. Prout's brown, or mars-brown.

(Big Tambelan, 101,650, paratype; Aor, 112,404; Great Redang, 11.1.30.6 and 2,058). Finally, the mars-brown tinge may spread over nearly the whole of the back, rendering the general colour light mars-brown sprinkled with greyish (Lantinga, 2,051).

COLOUR OF UNDER-PARTS.

The palest extreme is represented by specimens with the whole of the breast and belly dark cinnamon-rufous (palest, more golden, in the

* It is perhaps not unnecessary to say that, whether the *same individual* exhibits, during its life-time, various stages of lightening of the colour of the back, or whether the colour once acquired is preserved essentially unmodified during the life-time of the individual, is entirely unknown. When it is said above that the blackish hairs are gradually "replaced by" light grey, it only means that, passing from the darkest through many intermediate stages to the lightest specimens, it is quite evident that the colour of the latter is produced by a gradual increase of the greyish and corresponding decrease of the blackish elements.

centre) or between this colour and chestnut, and the flanks dark chestnut or seal-brown (Great Redang, 2,058, '59; Lantinga, 2,051). In many specimens, however, the dark chestnut or chestnut seal-brown tinge, instead of being confined to the flanks, has spread over a smaller or greater portion of the sides of the breast and belly thus restricting the golden cinnamon-rufous or golden chestnut colour to the centre of the breast and belly (Big Tambelan, 101,649 and '50, paratypes; Tioman, 8.1.25.2. and 8.2.25.2; Great Redang, 11.1.30.4 and 6, 2,056 and '57; Perhentian, 11.1.30.3, 2,048 and '49). This leads, finally, to the darkest extreme, in which the dark colour has encroached also upon the *centre* of the breast and belly, so as to make the whole of the underside of the animal practically seal-brown (perhaps more correctly a tinge of chestnut so dark as to closely approach seal-brown); Big Tambelan, 101,651, paratype; Great Redang, 11.1.30.5 and 2,060; Perhentian, 11.1.30.1 and 2, 2,047 and '50); but even in these specimens a faintly brighter (golden) tinge is still detectable on the centre of the breast, at least in certain lights.

In a limited number of specimens another modification of the colour of the underparts takes place—*viz.*, a spreading of the pale greyish element (*see* colour of back) over the anal region and a part or the whole of the flanks (Big Tambelan, 101,649, '50, paratypes; Tioman, 8.1.25.2, 8.2.25.2; Great Redang, 11.1.30.7).

The darkening of the colour of the under-parts takes place quite independently of the modifications of the colour of the back; that is, bright-bellied or dark-bellied individuals may exhibit any amount of greyish admixture on the back.

COLOUR OF MANTLE AND HEAD.

Generally speaking, the mantle and head are similar, or nearly similar, in tinge to the breast and belly—*i.e.*, specimens in which the brighter (golden chestnut, golden cinnamon-rufous) tinges are relatively conspicuous on the breast and belly (or centre of these) have, as a rule, the same tinges predominant, or at least conspicuously developed, on the mantle and crown, whole specimens with practically uniform seal-brown under-parts usually exhibit the same dark tinge on the mantle and head (except at the concealed base of the fur, which even in the darkest-coloured individuals is nearly always brighter-coloured).

The palest extremes are seen in specimens with the mantle and centre of the crown golden cinnamon-rufous or golden hazel (the tinge might perhaps equally well be described as deep golden tawny); but even in these specimens the forehead, sides of the head and neck, often also the line of demarcation between mantle and back are chestnut or seal-brown; or the golden cinnamon-rufous (hazel) tinge may be more or less considerably clouded or blotched with chestnut (Great Redang, 2,056, '57, 58, 59; Perhentian, 11.1.30.3, 2,049). This clouding or blotching with a darker tinge increases gradually, in other individuals, to such degree as to render the general impression of the colour a

paler or darker chestnut, more or less conspicuously or inconspicuously lightened with golden cinnamon-rufous (hazel), the latter tinge being sometimes restricted to the centre or the posterior portion of the mantle, or to the centre of the crown, or represented only by a distinct brighter "wash" of the general chestnut colour of the mantle and crown (Big Tambelan, 101,649, '50, paratypes; Tioman, 8.1.25.2, 8.2.25.2; Great Redang, 11.1.30.4, 5, 6, 7, 2,060; Perhentian, 2,048, '50). When even this remnant of a brighter tinge has nearly or entirely disappeared, we arrive at specimens with nearly or quite uniform dark chestnut-seal-brown mantle and crown (Big Tambelan, 101,651, paratype; Perhentian, 11.1.30.1, 2, 2,047).

ARE ALL THE SPECIMENS REFERABLE TO ONE RACE?

The question must be answered decidedly in the affirmative. In the case of a form so variable in colour as that have under consideration it would, of course, require a very large series of specimens from each of the six islands represented to give the actual proof that the variations in colour are precisely the same in each place. But, although the series from this point of view is wholly inadequate, there is still ample evidence that the specimens are representatives of one indivisible race. In order to give the reader an idea of the variations of colour exhibited, in the present series, from each island, the following method has been adopted (the single alcoholic specimen from P. Aor is, in this connection, left out of consideration, because it is not before me at the moment of writing these lines):

(1) Colour of back.—The darkest-backed extreme (least admixture of grey) in the whole series of specimens, irrespective of locality, is called 1, the lightest-backed (largest admixture and lightest tinge of grey) 15, the intermediate stages 2-14. It will be found, then, that the following stages are represented:

From Big Tambelan Islands: 1, 6 and 13;
From P. Tioman: 6 and 8;
From Lantinga: 10 (unusually strongly suffused with pale mars-brown).
From Great Redang: 2, 3, 6, 8, 9, 10, 11, 11 and 15;
From Perhentian: 2, 2, 2, 4, 4, 5 and 7.

The Redang series, it will be noticed, gives an approximately complete view of all the stages of the colour of the back. In the smaller series from Perhentian (situated nearest Great Redang) only the darker half of the scale of modifications happens to be represented. The single specimen from Lantinga and the two from Tioman show three different medium stages, the three from Tambelan the extremes (approximately) and one of the medium stages. There cannot be much doubt, therefore, that a longer series from each island would show an identical series of modifications of the colour of the back.

(2) Colour of under-parts.—No. 1 indicates the lightest, No. 15 the darkest colour of the under-parts, Nos. 2-14 the intermediate stages.

The following variations are represented:

From Big Tambelan Island: 5, 6 and 15;

From P. Tioman: 5 and 6;

From Lantinga: 3:

From Great Redang: 1, 3, 5, 7, 8, 9, 10, 13 and 15;

From Perhentian: 2, 4, 6, 11, 12, 13 and 14.

The sexes do not differ appreciably in colour (but males *average* slightly larger, the canines of males average a little longer and stouter, and the zygomatic breadth is relatively greater). So far as the present series goes, subadult (*i.e.*, nearly full-grown) individuals do not differ conspicuously in colour from fully adults; quite young individuals have not been available for comparison.

For measurements see table at end of this paper.

AFFINITIES.

The closest known relative of this form is without doubt *Pt. h. canus*, from the North Natuna Islands. In both of these races the admixture of light grey (silvery grey) in the colour of the back has become a fixed and very conspicuous character; they are the only two races of *hypomelanus* in which the premolars and molars average larger than usual; and they are both inhabitants of islands in the South China Sea. *Pt. h. canus* differs, in fact, only in having, as a rule, the silvery grey element even more strongly developed and purer in tinge, and the colour of the crown normally paler.

It must be emphasized, however, that the development of grey in the coloration of the back is by no means a character absolutely confined to these two races, *canus* and *lepidus*. It is, on the contrary, a feature that can be traced in all the western races of the species (that is, in all races inhabiting the region from Borneo westward) only the admixture of grey is in no other race so strong and so constant, nor the tinge of the grey colour so light and silvery. A grey sprinkling of the dark colour of the back (sometimes even rather heavy) occurs *sporadically* in *Pt. h. tomesi* (Borneo); is common in *Pt. h. annectens* (*S. Natunas*); present, but the grey colour normally of a considerably darker tinge, in *Pt. h. enganus* (Engano), *geminorum* (Mergui Archipelago), and *condorensis* (Siam, Cambodia, Pulau Condor); thin or sometimes practically absent in *Pt. h. robinsoni* (Sembilan Islands, Straits of Malacca, off west coast of Malay Peninsula). It is evident, therefore, that the silvery colour (or admixture to the colour) of the back in *Pt. h. canus* and *lepidus* represents only the extreme phase of tendencies present in all western (Indo-Malayan) races of the species.

Instances of a slight sprinkling of the dark colour of the back with grey are very common in the species of *Pteropus*: it is, in fact, relatively seldom that the colour of the back of a *Pteropus*, if it is

seal-brown or some other dark tinge of brown, is absolutely devoid of scattered grey hairs. But parallels to what has been described above in *Pt. h. canus* and *lepidus*—*viz.*, an extensive or even almost complete replacing of the seal-brown by light grey hairs—are rare within the genus. Perhaps the two most noteworthy instances are these: in *Pt. melanotus* (*nicobaricus*, auct.) the back is usually blackish seal-brown, with a few greyish-white hairs, as a rule, detectable on close examination; but in the island of Nias, *Pt. melanotus* is replaced by a distinct, though closely allied, species, *Pt. niadicus*, in which the seal-brown is thickly mixed with light grey (but the amount of greyish admixture individually variable, as in the case of *Pt. h. canus* and *lepidus*). In *Pt. melanopogon* (Amboina group) the back is glossy blackish seal-brown, in the Aru Island representative of the *melanopogon* group—*viz.*, *Pt. aruensis*—silvery greyish, everywhere thinly sprinkled with blackish hairs—that is, the seal-brown of *Pt. melanopogon* is almost completely replaced by silvery grey. This latter is within the whole genus, the closest analogy to the modification of the colour of the back in *Pt. h. canus* and *lepidus*.

Measurements of fully adult individuals:

	Skull.						
	Fore-arm.	Third meta-carpal.	Total length.	Zygo-matic breadth.	Mandi-ble length.	Upper teeth, c.-m.[2]	Lower teeth c.-m.[3]
	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Tambelan (3)							
Minimum ...	131	91	62.5	34.2	50	25.3	27.8
Maximum ...	139	95	67.2	38	53	26.2	29.8
Aor (1)							
♀ ad.	137	97	65.8	...	52	25	27.8
Tioman (3)							
Minimum ...	132	92	66.8	37	52	25.8	28.8
Maximum ...	137	96	67.5	38.5	52.5	26	29.5
Redang (6)							
Minimum ...	136.5	89	63	32.6	48.5	23.2	26.8
Maximum ...	144	98.5	68.5	37.8	53	26.2	28.8
Perhentian (4)							
Minimum ...	133.5	89	63	33.8	49	23.8	26
Maximum ...	140.5	93.5	66.8	36	51.8	25.2	27.8
All adults (17)							
Minimum ...	131	89	62.5	32.6	48.5	23.2	26
Maximum ...	144	98.5	68.5	38.5	53	26.2	29.8

ON MAMMALS AND BIRDS FROM THE HILLS OF NEGRI SEMBILAN.

By C. BODEN KLOSS, F.Z.S., M.B.O.U.

IN July, 1910, I made a short collecting visit to the Telapa Buroh and Berumbun Hills group in Negri Sembilan, and by permission of the authorities of the Raffles Museum, Singapore, Mr. Valentine Knight of that institution joined me at Seremban.

Of these hills, which attain in Gunong Telapa Buroh a height of 3,915 feet and are bounded on the north by the pass from Seremban to Jelebu (1,300 feet) and on the south towards Gunong Angsi (2,659 feet) sink to a still lower level, we had hoped to work the upper slopes with a view to ascertain whether the fauna of the main mountain range of the Peninsula, well represented in Selangor, extended so far southwards. Owing, however, to the unsatisfactory carriers we had to make use of, we finally camped on Bukit Lantai, at a height of 2,400 feet, and from thence collected upwards to 3,300 feet, finding throughout species very few both in number and in individuals and of a purely sub-montane type, thus confirming the conclusions of Robinson, derived from the examination of a small collection from Gunong Angsi which was made in November, 1904, and contained several migratory birds not met with by us.

I was compelled to return to Seremban after a few days, and a week subsequent to my departure, Mr. Knight and the collectors descended to Bukit Tangga in the Seremban-Jelebu Pass and settling themselves in the Rest-house at an altitude of 1,300 feet worked that neighbourhood for a further ten days.

Since Robinson's list of Gunong Angsi Vertebrates ("Journ. F.M.S. Museums," i., p. 25, 1906) was the only one in existence dealing with the fauna of this district of Negri Sembilan, I now record the mammals and birds obtained on the adjacent group of hills, together with some additional species obtained by the Museum collectors on Gunong Angsi during a second visit in the month of April and not included in his account of the first collection.

MAMMALS.

1. HYLOBATES LAR (Linn.).

Bukit Lantai, 2,500 feet. 3 ♂.

These animals are all in the dark phase of pelage. The White-handed Gibbon was fairly common at Bukit Lantai, but was not obtained at the lower collecting station.

2. PRESBYTIS OBSCURA (Reid).

Bukit Tangga, 1,300 feet. 1 ♂.

The exceedingly dark pelage of this dusky Lotong renders it somewhat abnormal for the locality; it more nearly resembles the northern race than the typical form occupying the lower portion of the Peninsula.

3. PRESBYTIS SIAMENSIS (MÜLL. AND SCHLEG.).

Bukit Lantai. 1 ♂.

A Grey-thighed Lotong exactly resembling topotypes from Malacca.

4. RATUFA AUREIVENTER (GEOFFR.).

Ratufa bicolor, *Robinson*, p. 26.

Bukit Tangga. 2 ♂; 1 ♀.

The Yellow-bellied Giant Squirrel is by far the commonest form of the genus in this region: the colour of the feet of these examples ranges from brown to yellow.

5. RATUFA MELANOPEPLA, MILLER.

Bukit Tangga. 1 ♂.

Bukit Lantai. 1 ♂.

The Black-and-tan Giant Squirrel is a much rarer animal than the preceding: the abdomens of both the examples obtained are of an exceedingly pure yellow.

6. SCIURUS HIPPURUS, Is. GEOFF.

Bukit Lantai. 1 ♀.

The Variegated Squirrel is a very stable form and in the Peninsula is one of the least abundant of the genus though widely distributed.

7. SCIURUS VITTATUS MINIATUS, MILLER.

Bukit Lantai. 1 ♂.

The Rufous-bellied Buff-striped Squirrel, generally met with in numbers throughout the Peninsula, appears to be rare on the group of hills where collecting was undertaken.

8. SCIURUS TENUIS, HORSF.

Bukit Lantai. 3 ♂; 3 ♀.

The Slender Squirrel was common on the upper part of the mountain but was not observed at the lower collecting station.

9. SCIURUS ROBINSONI ALACRIS, THOMAS.

Bukit Tangga. 1 ♂.

The Southern White-bellied Squirrel has not previously been obtained southward of Selangor.

10. LARISCUS JALORENSIS, BONHOTE.

Funambulus insignis, *Robinson*, p. 26.

Bukit Lantai. 1 ♂.

This example of the Striped Ground-Squirrel more nearly resembles the dominant Peninsular form than it does that occurring in the extreme south and Singapore Island.

11. MUS VOCIFERANS, MILLER.

Bukit Tangga. 3 ♂; 1 ♀.

Bukit Lantai. 2 ♂.

The Long-tailed Spiny Hill-Rat is widely distributed throughout the Peninsula where it is perhaps the most abundant of the larger rats.

12. MUS PELLAX, MILLER.

Bukit Lantai. 4 ♂; 2 ♀.

The Brown-backed Spiny Rat is generally found in association with the Tawny-backed Spiny Rat (*Mus surifer*) but in far smaller numbers. On Bukit Lantai, however, it was fairly common and totally displaced the other species.

13. MUS VALIDUS, MILLER.

Bukit Tangga. 2 ♂.

The Shaggy Rat is by far the commonest member of the *muelleri* group in the Peninsula; it is a wide ranging animal, being found from swampy grounds at the sea level to heights of four and five thousand feet.

14. MUS JALORENSIS, BONHOTE.

Bukit Tangga. 1 ♀.

15. TUPAIA FERRUGINEA, RAFFLES.

Bukit Tangga. 1 ♂ imm.

16. CYNOPTERUS (NIADIUS) MINOR, Lyon.

Bukit Tangga. 1 ♀.

The occurrence of this Bat—obtained by Mr. Valentine Knight at the Rest-house in the pass between Seremban and Jelebu—which is apparently referable to C. (*N.*) *minor*,[1] from the lowlands of Eastern Sumatra, rather than to *C. (N.) harpax*,[2] from the Semangko Pass on the Selangor-Pahang boundary, has led me to bring together such material as is available of the sub-genus *Niadius*.[3] This was founded on a bat from the Island of Nias, West Sumatra, but on account of the large size of the animal (length of head and body, 143 mm; of skull, 38.2 mm.) the latter need not be considered here.

The second form of the sub-genus, *C. (N.) minor*, came from the banks of the Siak River, East Sumatra; and the third, *C. (N.) harpax*, was described from an animal, one of a bunch of five, shot near the Rest-house in the Semangko Pass at an altitude of 2,700 feet: finally there is the present adult female from Negri Sembilan obtained at an altitude intermediate between the former two.

All the Semangko Pass animals were badly damaged by shot: one skull is fairly complete, two (including the type) are fragmentary, and those of the remaining animals were completely destroyed. The latter, however, were immature males and the skins serve to show that the pelage of such does not differ from that of the adult female.

An adult male differs slightly from the type, being in colour olivaceous-brown above, darkest on the head, with the nape slightly tinged with ochraceous; all the hairs with pale bases: sides of neck and the throat brilliant ochraceous, remaining under-parts greyish-buff, the median area greyer with an oblong tawny patch at the centre of the abdomen.

The female and young males are much darker and greyer above with the nape slightly paler; the sides of neck and the throat are buffy, and the rest of the lower surface varies from brownish-grey to deep fawn.

C. (*N.*) *minor* from Negri Sembilan is olivaceous-brown above, much darker and greyer on head and nape with no trace of collar: sides of neck and the throat dull ochraceous-yellow, remaining under-parts dull greyish-buff, much greyer and darker on the median area of the abdomen.

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[1] Lyon, "Proc. U. S. Nat. Mus.," xxxiv., p. 665 (1908).

[2] Thomas and Wroughton, "Ann. Mag. Nat. Hist." (8), iii., p. 439 (1909). Journ. F.M.S. Museums, iv., p. 108 (1909).

[3] Miller, "Proc. Biol. Soc., Washington," xix., pp. 61 and 83 (1906).

The antebrachial and wing membranes are black except close to the body where they are pale, and over the bones of the fingers which are sharply indicated is white.

The ears are somewhat pointed, their posterior edges slightly concave below the tips and there is a slight rounded lobe at the base. The edges are white but that colour does not extend to the extremities.

Below is a table of dimensions as far as it is possible to obtain them:

	C. (N.) ~~typical~~ ♂ *type*.	C. (N.) ~~typical~~ ♀ N. S.	C (N.) harpax ♂.	C. (N.) harpax ♀.	C. (N.) harpax ♂ *type*.
Head and body	100	100	105	98	105
Tail	8	7.5	7	5	7
Tibia	26	27			
Foot	17	16	15	14	16.5
Forearm	72	72	...	...	72
Thumb	27	26.7	25.5	26	26.5
2nd finger	48	49.5			
3rd metacarpal	...	48	47.7	44	48 ? 46.5
III[1]	...	31	32	29.7	31
III[2]	...	44.5	43	36.5	40
Total 3rd finger ...	108	123.5	122.7	110.2	119
4th metacarpal	...	45	46.3	41.5	43.5
IV[1]	...	24	24	23	24
IV[2]	...	27.3	27	23.5	26
Total 4th finger ...	89	96.3	97.3	88	. .
5th metacarpal	...	46.2	47.8	43	. .
V[1]	...	22	22.5	20.5	22.5
V[2]	...	23.4	23.7	20.5	
Total 5th finger ...	77	91.6	94	84	
Ear	...	16.5	15	18	
Skull, greatest length ...	32.3	32			
Condylo-basal length ...	30	30.5			
Basal length	26.4	26.7			
Palatal length	16.6	16			
Zygomatic breadth ...	21	22	23	...	22.5
Cranial breadth	14.4	14.2	14.5		
Interorbital breadth ...	6.5	6.5	6.5	6.2	6.5 ? 5.8
Postorbital breadth ...	7.5	7.2	6.2		5.7
Length of mandible ...	25	25	27	24	
Maxillary tooth-row including canine	11.2	10.6	10.5	10	
Mandibular tooth-row excluding incisors ...	12.2	11.8	12.9	11.8	11.2
Tip of nasals to supra-orbital foramen ...	...	13.1	13.6	...	13.7
Basi-sinual length ...	...	25.7	27.7		
Tip of nasals to posterior orbital extremity ...	...	30.5	32.6		

It will be seen that the Negri Sembilan example closely resembles the type of *C. lyoni* save in two particulars: the length of the 3rd, 4th and 5th fingers which in the latter is notably greater, while the Sumatran animal also seems to possess longer tooth series, all other measurements are within the limits of specific variation. The type of *C. minor* is, however, immature, and though of greater bodily length is closely approached in wing dimensions by the young animals from the Semangko Pass.

On the other hand, while the body measurement of the Negri Sembilan animal and *C. harpax* are very similar, the only available skull of the latter is considerably the larger of the two, it is, however, more adult, possessing well-developed saggital and occipital crests, which are present, but to a less degree, in the former. Additional differences exhibited by *C. harpax* are a more deeply grooved interorbital region, a more pear-shaped brain case, a shallower rostrum and a relatively narrower mandible.

The principal differences between the two forms lies in the shape of the teeth, which in the Negri Sembilan animal are very broad and square, agreeing with those of the type of *C. lyoni* and differing notably from the oblong, posteriorly narrowing teeth of *C. harpax*.

With regard to the tubercles on the lower molars which, with the shape of the teeth, are the features on which the subgenus is erected, interesting variations occur in the series here dealt with.

In the Semangko Pass female pm_4 is a simple *Cynopterine* tooth without any central cusp whatever, while m_1 possesses a single well-developed tubercle.

In the type of *C. harpax* and in the Negri Sembilan female pm_4 and m_1 each clearly exhibit a single tubercle only.

In the male from the Semangko Pass pm_4 is furnished with two tubercles and such is also the case with m_1, though in this tooth the second and posterior tubercle is somewhat rudimentary.

Thus, in a very small series, are animals having premolars with none, one and two, and molars with one and two tubercles. Thomas and Wroughton state that true *Cynopterus* has occasionally a small extra cusp on m_1 and cite a specimen from Bombay with this feature; so there seems to be a complete connection between the typical narrow-toothed cuspless *Cynopterus* and the square-toothed doubled-tubercled *Niadius* in this respect.

The Negri Sembilan animal is of considerably greater bulk than the common Lesser Fruit-Bat or "Klawar," and Mr Knight states that the white markings of the membranes are characteristic of the living animal. *C.* (*N.*) *lyoni* is apparently of a sub-montane habit in the Peninsula: more examples are required.

* The teeth of *Nyctinomus pumilus*, as figured by Miller in "The Families and Genera of Bats" (U. S. N. M., Bulletin 57, pl. xiii., 1907) appear to be those of the tubercles with those of this individual.

BIRDS.

1. TRERON NIPALENSIS, Hodgs.

Bukit Tangga, 1,300 feet. 2 ♂ ; 2 ♀.

2. MACROPYGIA RUFICEPS (Temm.).

Bukit Lantai. 1 ♀.

3. MICROHIERAX FRINGILLARIUS (Drap.).

Gunong Angsi, 1,500-2,500 feet.

4. ALCEDO EURYZONA, Temm.

Bukit Lantai, 2,400 feet. 1 ♂.

This example of the rare Broad-zoned Kingfisher was shot on the bank of a swiftly-running mountain stream in a deep gulley at an altitude of 2,200 feet.

5. CARCINEUTES PULCHELLUS (Horsf.).

Gunong Angsi, 1,500-2,500 feet.

6. CRANORRHINUS CORRUGATUS (Temm.).

Bukit Tangga. 1 ♂.

7. ANORRHINUS GALERITUS (Temm.).

Bukit Lantai. 1 ♀.

The Glossy Hornbill is one of the commonest of the genus in sub-montane localities, but is not met with elsewhere.

8. NYCTIORNIS AMICTA (Temm.).

Bukit Tangga. 4 ♂ ; 1 ♀.

Gunong Angsi, 1,500-2,500 feet.

LYNCORNIS TEMMINCKI, Gould.

Gunong Angsi, 1,500-2,500 feet.

9. MACROPTERYX COMATA (Temm.).

Bukit Tangga. 1 ♂.

10. PYROTROGON KASUMBA (Raffles).

Bukit Lantai, 1 ♂ ; 1 ♀.

11. PYROTROGON DUVAUCELI (Temm.).

Bukit Tangga. 1 ♂.

12. PYROTROGON ORESKIUS (Temm.).

Bukit Tangga. 1 ♂.

Bukit Lantai. 1 ♂; 1 ♀.

13. ZANCLOSTOMUS JAVANICUS (Dumont).

Bukit Tangga. 1 ♂.

Gunong Angsi, 1,500-2,500 feet.

14. RHOPODYTES SUMATRANUS (Raffles).

Bukit Tangga. 1 ♂.

15. URococcyx erythrognathus (Hartl.).

Bukit Tangga. 4 ♂; 1 ♀.

16. Calorhampus hayi (J. L. Gray).

Bukit Tangga. 4 ♂; 2 ♀.

17. Chotorhea chrysopogon (Temm.).

Bukit Tangga. 3 ♂; 3 ♀.

18. Chotorhea mystacophanes (Temm.).

Bukit Tangga. 1 ♂.

19. Cyanops henrici (Temm.).

Bukit Tangga. 7 ♂; 1 ♀.

Bukit Lantai. 1 ♀.

20. Mesobucco duvaucelii (Less.).

Bukit Tangga. 8 ♂; 6 ♀.

Bukit Lantai. 1 ♂.

In this series such individuals as have not attained fully adult plumage have the ear coverts strongly suffused with green or blue.

21. Gecinus observandus, Hartert.

Bukit Tangga. 1 ♂.

Gunong Angsi, 1,500-2,500 feet.

22. Pyrrhopicus porphyromelas (Boie).

Lepocestes porphyromelas, *Robinson, op. cit.* p. 29.

Bukit Tangga. 1 ♀.

Bukit Lantai. 1 ♂.

23. Miglyptes grammithorax (Malh.).

Bukit Tangga. 3 ♂; 1 ♀.

24. Miglyptes tukki (Less.).

Bukit Tangga. 1 ♂.

Gunong Angsi, 1,500-2,500 feet.

25. Micropternus brachyurus (Vieill.).

Bukit Tangga. 1 ♀.

26. Chrysophlegma malaccense (Lath.).

Gunong Angsi, 1,500-2,500 feet.

27. Chrysophlegma humei Hargitt.

Bukit Tangga. 2 ♂.

Bukit Lantai. 1 ♂; 1 ♀.

28. Chrysocolaptes validus (Temm.).

Bukit Tangga. 2 ♀.

29. Calyptomena viridis, Raffles.

Bukit Tangga. 1 ♂; 3 ♀.

30. EURYLEMUS JAVANICUS, Horsf.

Bukit Tangga. 1 ♂.

31. EURYLEMUS OCHROMELAS, Raffles.

Bukit Tangga. 2 ♂; 2 ♀.

32. CORYDON SUMATRANUS (Raffles).

Bukit Tangga. 2 ♀.

33. HYPOTHYMIS AZUREA (Bodd.).

Bukit Lantai. 1 ♂.

34. RHIPIDURA PERLATA, S. Müll.

Bukit Lantai. 2 ♂.

TERPSIPHONE AFFINIS (Blyth).

Gunong Angsi, 1,500-2,500 feet.

35. PHILENTOMA VELATUM (Temm.).

Bukit Tangga. 2 ♂; 1 ♀.

Bukit Lantai. 3 ♂.

36. PHILENTOMA PYRRHOPTERUM (Temm.).

Bukit Tangga. 1 ♂.

Bukit Lantai. 3 ♂; 2 ♀.

37. CULICAPA CEYLONENSIS (Swains).

Gunong Angsi, 1,500-2,500 feet.

38. ABRORNIS SCHWANERI (Temm.).

Bukit Lantai. 3 ♂.

39. PERICROCOTUS FLAMMIFER, Hume.

Bukit Tangga. 1 ♂ ; 5 ♀.

Bukit Lantai. 1 ♀.

40. ÆTHORHYNCHUS LAFRESNAYEI (Hartl.).

Bukit Tangga. 1 ♂.

41. CHLOROPSIS ZOSTEROPS (Vig.).

Bukit Tangga. 2 ♀.

Bukit Lantai. 2 ♂.

42. CHLOROPSIS ICTEROCEPHALA (Less.).

Bukit Tangga. 6 ♂ ; 7 ♀.

Bukit Lantai. 2 ♂ ; 2 ♀.

Gunong Angsi, 1,500-2,500 feet.

43. IRENA CYANEA, Begbie.

Bukit Tangga. 4 ♂ ; 1 ♀.

Bukit Lantai. 3 ♂.

Gunong Angsi, 1,500-2,500 feet.

44. HEMIXUS CINEREUS (Blyth).

Bukit Lantai. 1 ♂ ; 3 ♀.

45. HEMIXUS MALACCENSIS (BLYTH).

Bukit Tangga. 1 ♂.

Bukit Lantai. 3 ♂ ; 3 ♀.

46. IOLE OLIVACEA, BLYTH.

Bukit Lantai. 1 ♀.

47. CRINIGER OCHRACEUS, MOORE.

Bukit Lantai. 1 ♂.

48. ALOPHOIXUS PHILOCEPHALUS (HARTL.).

Bukit Tangga. 1 ♂.

Gunong Angsi, 1,500-2,500 feet.

49. TRICHOLESTES CRINIGER (BLYTH).

Bukit Tangga. 2 ♂.

Bukit Lantai. 1 ♂ ; 2 ♀.

50. PYCNONOTUS FINLAYSONI (STRICKL.).

Bukit Tangga. 2 ♂.

51. PYCNONOTUS SALVADORII, SHARPE.

Bukit Lantai. 1 ♂.

52. RUBIGULA CYANIVENTRIS (BLYTH).

Bukit Tangga. 2 ♂.

Gunong Angsi, 1,500-2,500 feet.

53. EUPETES MACROCERCUS (TEMM.).

Bukit Tangga. 2 ♂.

The curious Bare-necked Ground-Babbler is not common in collections: it is probably more numerous than would appear, however, for owing to its dull colouring, shy nature and terrestial habits, it is likely to escape observation.

54. POMATORRHINUS BORNEENSIS, CAB.

Bukit Tangga. 1 ♀.

Bukit Lantai. 5 ♂ : 2 ♀.

55. TURDINUS SEPIARIUS (HORSF.).

Bukit Tangga. 1 ♂.

56. TURDINUS MAGNIROSTRIS, MOORE.

Malacopteron magnirostre, *Robinson, op. cit.*, p. 27.

Bukit Tangga. 2 ♀.

Bukit Lantai. 1 ♂ ; 1 ♀.

57. TURDINUS MACRODACTYLUS, STRICKL.

Bukit Tangga. 1 ♂.

58. DRYMOCATAPHUS NIGROCAPITATUS (EYTON).

Bukit Tangga. 2 ♂.

59. SETARIA MAGNA, EYTON.

Bukit Tangga. 2 ♂.

60. ANTROPSIS MALACCENSIS, HARTL.

Bukit Tangga. 1 ♀.

Bukit Lantai. 1 ♂.

61. ALCIPPE CINEREA, Blyth.

Bukit Tangga. 1 ♂.
Bukit Lantai. 4 ♂ ; 3 ♀.

62. STACHYRIS DAVISONI, Sharpe.

Bukit Tangga. 1 ♂.
Bukit Lantai. 1 ♀.
Gunong Angsi, 1,500-2,500 feet.

63. STACHYRIS POLIOCEPHALA (Temm.).

Bukit Tangga. 1 ♂ ; 2 ♀.

64. STACHYRIS LEUCOTIS (Strickl.).

Bukit Lantai. 2 ♂.
Gunong Angsi, 1,500-2,600 feet.

65. STACHYRIS MACULATA, (Temm.).

Bukit Tangga. 1 ♂.

66. MACRONUS PTILOSUS, Jard. & Selby.

Bukit Tangga. 1 ♂.

67. MIXORNIS GULARIS (Raffles).

Bukit Tangga. 1 ♂.

68. HERPORNIS XANTHOLEUCA, Hodgs.

Herpornis xantholeuca, *Robinson, loc. cit.*

Bukit Tangga. 1 ♂; 1 ♀.
Bukit Lantai. 3 ♂; 1 ♀.

69. HYDROCICHLA RUFICAPILLA (Temm.).

Bukit Tangga. 2 ♀.
Bukit Lantai. 1 ♂.
Gunong Angsi, 1,500-2,500 feet.

HYDROCICHLA FRONTALIS (Blyth).

Gunong Angsi, 1,500-2,500 feet.

70. CITTOCINCLA MACRURA (Gm.).

Bukit Tangga. 1 ♂.
Bukit Lantai. 1 ♀.
Gunong Angsi, 1,500-2,500 feet.

71. ORTHOTOMUS ATRIGULARIS (Temm.).

Bukit Lantai. 1 ♂.

72. ACANTHOPNEUSTE BOREALIS (Blas.).

Gunong Angsi, 1,500-2,500 feet.

73. HEMIPUS PICATUS (Sykes).

Bukit Tangga. 1 ♂.
Bukit Lantai. 2 ♂; 1 ♀.

74. TEPHRODORNIS GULARIS (Raffles).

Bukit Lantai. 1 ♂.
Gunong Angsi, 1,500-2,500 feet.

75. LANIUS TIGRINUS, Drap.

Gunong Angsi, 1,500-2,500 feet.

76. PLATYLOPHUS ARDESIACUS, Cab.

Bukit Tangga. 1 ♂.

Bukit Lantai. 1 ♂.

77. MELANOCHLORA FLAVOCRISTATA (Lafr.).

Bukit Lantai. 2 ♂; 2 ♀.

78. DENDROPHILA SATURATIOR, Hartert.

Bukit Tangga. 2 ♂.

Bukit Lantai. 2 ♂.

These examples all illustrate the greater richness of colour possessed by the Peninsular Nuthatch as compared with *D. frontalis* of Java.

79. DISSEMURUS PARADISEUS (Linn.).

Bukit Tangga. 1 ♂.

Bukit Lantai. 2 ♂; 1 ♀.

80. ORIOLUS ZANTHONOTUS, Horsf.

Bukit Tangga. 1 ♂.

Gunong Angsi, 1,500-2,500 feet.

81. MUNIA LEUCOGASTRA (Blyth).

Bukit Tangga. 2 ♂; 2 ♀.

The White-bellied Munia was not uncommon on the roadside in the Bukit Tangga Pass, but as noted elsewhere it has only once been obtained of recent years during much collecting in the Western States.

82. ANTHOTHREPTES SIMPLEX, S. Müll.

Bukit Lantai. 1 ♂.

83. ARACHNOTHERA MODESTA, Eyton.

Bukit Tangga. 2 ♂.

84. ARACHNOTHERA ROBUSTA, M. & S.

Bukit Lantai. 2 ♂.

85. ARACHNOTHERA CRASSIROSTRIS (Reichenb.).

Bukit Lantai. 1 ♀.

86. PRIONOCHILUS MACULATUS, Temm.

Bukit Lantai. 2 ♀.

NOTES ON BIRDS NEW TO, OR RARE IN, THE MALAY PENINSULA.

(Second Series.)

By C. BODEN KLOSS, F.Z.S., M.B.O.U.

SINCE the first series of these notes was issued in the last number of this Journal, the Federated Malay States Museums have undertaken an expedition to Trang, Siamese Malaya, which has resulted in the addition of a large number of rare and interesting species to their collections and the results have been dealt with at length in papers to be found in the "Ibis" for October, 1910, and January, 1911.

The species now commented on have been obtained in the ordinary way of collecting at various localities in the Federated Malay States.

GALLINAGO MEGALA, Swinh.

Gallinago megala, *Sharpe, Cat. Birds Brit. Mus.*, xxiv., p. 479 (1896); *Robinson, Journ. F.M.S. Mus.*, iv., p. 130 (1909).

Since the first specimen was recorded by Robinson from the neighbourhood of Kuala Lumpur in 1909, Seimund has obtained two more examples in the vicinity of Taiping, Perak. Now that the species is known to occur here it will probably be noticed in fair numbers in future.

MILVUS GOVINDA, Sykes.

Milvus govinda, *Sharpe, Cat. Birds Brit. Mus.*, i., p. 325 (1874); *Blanford, Faun. Brit. Ind. Birds*, iii., p. 374 (1895).

The common Pariah Kite has not often been recorded from the Malay Peninsula; an example was shot near Taiping, Perak, in November, 1910, and it has been obtained in Penang (Cantor), Singapore (Kelham), and near Klang by Davison.

SYRNIUM MAINGAYI, Hume.

Syrnium maingayi, *Hume, Stray Feathers*, vi., p. 27 (1878); *Blanford, Faun. Brit. Ind. Birds*, iii., p. 276 (1895).

An example of the rare Malayan Wood-Owl was shot in the Semangko Pass, 2,700 feet, in April, and in June, 1910, another was obtained near Taiping by Seimund. Specimens from Kuala Tembeling, Pahang; Ginting Bidei, 2,300 feet, Selangor; and from Trang, Siamese Malaya, had previously been in the collections of the Federated Malay States Museums.

PHALACROCORAX CARBO, Linn.

Phalacrocorax carbo, *Blanford, Faun. Brit. Ind. Birds*, iv., p. 340 (1898); *Grant, Cat. Birds Brit. Mus.*, xxvi., p. 340 (1898).

The Cormorant is exceedingly rare in the southern half of the Malay Peninsula. A specimen was collected by Wray on the Batang Padang River near Tapah, South Perak, about fifteen years ago; a second example was obtained by Kloss on a fresh-water pond at Johore Bahru in 1904, and in July, 1910, Seimund shot a third on the small lake at Taiping, Perak. North of the Kelantan River on the East Coast and in Patani Bay it is not uncommon.

PELECANUS PHILIPPENSIS, Gm.

Pelecanus philippensis, *Blanford, Faun. Brit. Ind. Birds*, iv., p. 335 (1898); *Grant, Cat. Birds Brit. Mus.*, xxvi., p. 471 (1898).

A single example of the Spotted-billed Pelecan was taken near Taiping, Perak, some years ago, and in July, 1910, a second individual was obtained in the same locality.

ALCEDO EURYZONA, Temm.

Alcedo euryzona, *Sharpe, Cat. Birds Brit. Mus.*, xvii., p. 154 (1892); *Blanford, Faun. Brit. Ind. Birds*, iii., p. 126 (1895); *Robinson, Journ. F.M.S. Mus.*, ii., p. 172 (1909).

The Broad-zoned Kingfisher is a rare bird in the Federated Malay States and has long been represented in its Museums by a single female captured by Wray on the Larut Hills near Taiping, Perak. In December, 1909, three examples were collected in the mountains forming the Trang-Patelung boundary; in 1910 a fifth was obtained near Kuala Lipis, and a sixth near Bentong, Pahang, while the last collected to date was shot in the mountains of Negri Sembilan about 15 miles N.-E. of Seremban by Mr. V. Knight.

GERYGONE MODIGLIANII, Salvad.

Gerygone modiglianii, *Salvad., Ann. Mus. Civ. Genov.* (2), xii., p. 71 (1891): *Robinson, Hand-list of Birds of the Malay Peninsula*, p. 13, note (1910).

Gerygone pectoralis, *Davison, Ibis.*, 1892.

A pair of these little Grey-and-yellow Flycatchers was obtained in the grounds of the Perak Museum at Taiping in September, 1909. The species is decidedly rare in the Peninsula, being known previously by single examples from Kuala Pahang, Gunong Tahan and from Trang, Siamese Malaya.

RHINOMYIAS PECTORALIS (Salvad).

Rhinomyias pectoralis, *Hartert, Nov. Zool.*, ix., p. 553 (1902): *Robinson, Hand-list of Birds of the Malay Peninsula*, Kuala Lumpur, 1910.

This Brown Flycatcher is not common in the Peninsula. A specimen was shot at Kuala Lipis in May of this year and it has previously been obtained in Pahang by Waterstradt on Gunong Tahan and Robinson at Kuala Teku. The Museums have also a few specimens from Perak and Selangor.

PYCNONOTUS ROBINSONI, Ogilvie-Grant.

Pycnonotus robinsoni, *Ogilvie-Grant, Fasciculi Malayenses, Zool.*, iii., *Report on the Birds*, p. 85 (1905).

An adult female of this species, previously only known by two examples from Patani, was obtained in December, 1909, at Chong, Trang, and was overlooked when the "Ibis" paper already referred to was drawn up.

This Bulbul approaches *P. blanfordi* and differs from *P. plumosus*, which occurs in the same localities, in the possession of pale and dull upper-parts, faint greenish edges to the wing feathers, yellowish-white throat and under-parts and in a somewhat rounded culmen to the bill. It was originally compared with *P. eutrichus* from Palawan Island but more nearly resembles *P. blanfordi*, of which it is probably the Malayan representative, apparently differing only in having the silvery-white area of cheeks and ear coverts slightly reduced in extent.

KENOPIA STRIATA (BLYTH).

Kenopia striata, *Sharpe, Cat. Birds Brit. Mus.*, vii., p. 573 (1883); *Hartert, Nov. Zool.*, ix., p. 567 (1902).

The White-flecked Babbler is not often met with in the Peninsula. Abbott obtained it in Trang, Siamese Malaya, in 1899 (where the F.M.S. Museums also got a specimen in 1910), Waterstradt on Gunong Tahan two years later, Kloss shot one individual near Gunong Pulai, S. Johor, in 1904, and in July, 1909, Robinson and Kloss trapped another example at Temengoh, Upper Perak. No others seem to have been recorded for many years.

PETROPHILA CYANEA (LINN.).

Petrophila cyanea, *Blanford, Faun. Brit. Ind. Birds*, vol. ii., p. 146 (1898); Petrophila cyaneus, *Robinson, Journ. F.M.S. Mus.*, vol. ii., No. 4, 1909, p. 207.

A male was obtained at the Batu Caves near Kuala Lumpur by Kloss in August, 1908, and on 24th May, 1910, a second specimen, a female, was shot at the same place by Mr. C. B. Holman-Hunt.

NOTODELA LEUCURA (HODGS.).

Notodela leucura, *Sharpe, Cat. Birds Brit. Mus.*, vii., p. 23 (1883); *Robinson, Hand-list of the Birds of the Malay Peninsula*, p. 17, note (1910); *Oates, Faun. Brit. Ind. Birds*, i., p. 113 (1889).

Until recently the White-tailed Blue Robin was known from the Peninsula by a single specimen collected by Butler on the Larut Hills, Perak. In August, 1909, specimens were for the second time obtained in the Peninsula from the same locality by Robinson and Kloss.

LANIUS BENTET (HORSF.).

Lanius bentet, *Gadow, Cat. Birds Brit. Mus.*, viii., p. 263 (1883); *Oates, Faun. Brit. Ind. Birds*, i., p. 465 (1889); *Robinson, Hand-list of Birds of the Malay Peninsula*, p. 17, note (1910).

This handsome Long-tailed Shrike is an exceedingly rare bird in the Malay Peninsula and until Seimund shot four specimens near Kuala Lumpur in December, 1909, was unrepresented in the F.M.S. Museums.

MUNIA LEUCOGASTRA (BLYTH).

Uroloncha leucogastra, *Sharpe, Cat. Birds Brit. Mus.*, xiii., p. 362 (1890); *Oates, Faun. Brit. Ind. Birds.*, ii., p. 186 (1890); *Hartert, Nov. Zool.*, ix., p. 578 (1902); *Grant Journ. F.M.S. Mus.*, iii., p. 17 (1908).

The White-bellied Munia was lacking from the F.M.S. Museums collections until a specimen was obtained at Temengoh, Upper Perak, in August, 1909. Since then it has been taken in Negri Sembilan but it appears to be uncommon in the Western States; though it has turned up in large numbers from the lowlands of Pahang.

ON FIVE NEW SUB SPECIES OF ORIENTAL SQUIRRELS

By HERBERT C. ROBINSON, C.M.Z.S., and R. C. WROUGHTON, F.Z.S.

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SCIURUS EPOMOPHORUS MILLERI, *subsp. nov.*

A LOCAL form of *S. epomophorus* differing from the more northern *Sc. e. davisoni* in its paler general colouring.

Size rather smaller that typical *Sc. epomophorus* and *Sc. e. davisoni*, but with a relatively longer tail.

General colour.—Above, yellowish olive, below "drab-grey." Individual hairs of back (15 mm. long) having basal ⅓ black, median ⅓ buffy white with a faint narrow median blackish ring, terminal ⅓ black with a median buffy ring (2 mm. wide). Neck and flank patches "buff." Individual hairs of tail, 35 mm. long whitish buffy with four rings and tip (4-5 mm. wide) black, extreme tip of tail black. Hands and feet coloured like back but the pale element pure white in place of buffy-white.

Skull.—As in typical *epomophorus*.

Dimensions of the Type.—Head and body, 237; tail, 212; hind-foot, 47 mm.

Skull.—Greatest length, 54; basilar length, 41; zygomatic breadth, 32; nasals, 16; interorbital breadth, 19; upper molar series, 11 mm.

Habitat.—Trang, Siamese Malay States (West Coast).

Very many specimens from localities ranging from Trang southwards to Kedah (*Flower coll.*) but exact northern, southern and eastern limits not yet determined.

Type.—Adult male: B.M. No. 0.10.4.5. Collected by Dr. W. L. Abbott, 20th February, 1896.

Remarks.—In this form the neck and flank patches are almost as distinctly marked as in the typical *Sc. epomophorus* from the island of Salanga and the adjacent coast, though in a much paler shade of colour. In *Sc. e. davisoni* these patches are much less distinct while in *Sc. e. fluminalis* the flank patches are scarcely appreciable though the neck ones are well marked.

SCIURUS EPOMOPHORUS FLUMINALIS, *subsp. nov.*

A local form of *Sc. epomophorus*, still paler than the last and with a proportionately longer tail.

Size rather larger than the Trang form.

General colour.—Above olive-grey, below whitish-grey, almost white on the chest. Individual hairs of back (50 mm. long), basal ⅓ black, median ⅓ buff, terminal ⅓ black with a white ring (2 mm. broad). Neck and flank patches "buff."

Tail like back, strongly tipped with black, hands and feet paler than in *Sc. e. milleri*, the fingers and toes silvery white.

Skull.—Larger than in any member of the group that we have seen.

Dimensions of the Type.—Head and body, 234; tail (*c*) 270; hind-foot, 50 mm.

Skull.—Greatest length, 59; basilar length, 46.5; zygomatic breadth, 33; nasals 17; interorbital breadth, 20; upper molar series, 11 mm.

Habitat.—N. Siam (Type from Meping rapids, alt. 600 feet).

Type.—Adult male; B.M. No. 7.11.13.17. Collected and presented to the British Museum by T. H. Lyle, Esq.

Specimens Examined.—Four.

SCIURUS CASTANEIVENTRIS BONHOTEI, *subsp. nov.*

Size rather large.

General colour.—Above a fine tawny grizzle; below chestnut. Face, hands and feet like back, but grizzle finer. Tail like back, but grizzle becoming rapidly coarser and developing distally into a transverse barred pattern, black and tawny.

Dimensions of the Type.—(Measured on the skin.) Head and body, 270; tail, 200; hind-foot, 54; ear, 24 mm.

Skull.—Greatest length, 52; greatest breadth, 34; nasals, 16; diastema, 12.5; upper molar series, 11 mm.

Habitat.—Szechuen, China (Type from Chin Chien San).

Type.—Adult female: B.M. No. 8.8.11.25. Collected and presented to the British Museum by Mr. F. W. Styan.

SCIURUS CASTANEIVENTRIS MICHIANUS, *subsp. nov.*

Size rather smaller.

General colour.—Above a grey grizzle, giving the general effect of "hair brown"; below "hazel." Face, hands and feet coloured like the back; ears like the belly. Tail like back but the grizzle growing coarser, until it constitutes in the distal half an indistinct transverse black and yellowish barred pattern, the tip black but disguised by the long white tips of the terminal hairs.

Skull.—Small and slenderly built, teeth small.

Dimensions of the Type.—(Measured on the skin). Head and body, 240; tail, 180; hind-foot, 50; ear, 25 mm.

Skull.—Greatest length (*c*) 50; greatest breadth (*c*) 30; nasals, 15.5; diastema, 11.5; upper molar series, 9.5 mm.

Habitat.—Yunnan, South China (Type from Mee Chee).

Type.—Adult female: B.M. No. 8.11.14.13. Collected on 5th January, 1903, and presented to the British Museum by Mr. F. W. Styan.

SCIURUS NOTATUS BALSTONI, *subsp. nov.*

A local race of the Javanese *Sc. notatus* from which it is distinguished by the darker colouring above and the brighter colouring of the lower surface and by a broad pale ring round the eye not present in the typical *Sc. notatus* from Western Java.

Size and general colour.—As in typical *Sc. notatus* but darker above; below "pinkish-buff," but as the hairs have long black bases the colouring much disguised except on inner sides of limbs where the hairs are entirely buff. A broad "pinkish-buff" ring round the eye, extending downwards over the cheek. Hands and feet sparsely clothed with white tipped hairs as in true *Sc. notatus*.

Dimensions of the Type. (Measured in the flesh.) Head and body, 215; tail, 173; hind-foot, 45; ear, 22 mm.

Skull.—Greatest length, 49; basilar length, 39; zygomatic breadth, 28; nasals, 14; interorbital breadth, 16; braincase breadth, 22; diastema, 12; upper molar series, 9. 6 mm.

Habitat.—Southern Central Java (type from Tjilatjap).

Type.—Adult male; B.M. No. 9.1.5.706, Original Number 603, collected by Mr. G. C. Shortridge on 16th October, 1907, and presented to the British Museum by Mr. W. E. Balston.

Remarks.—All the old names for *Sc. notatus*—viz., *bodjing*, *plantani* and *bilineatus*—were directly or indirectly based on Pennant's *Plantain Squirrel* from Batavia and Princes Island. Horsfield was no doubt dealing with the present race as he mentions the eyepatch, but he called it *plantani*. While therefore the form from Batavia must be called *notatus* that from South Central and probably Eastern Java has so far remained unnamed.

A LIST OF A SMALL COLLECTION OF MAMMALS AND BIRDS FROM THE MOUNTAINS OF ULU LANGAT, SELANGOR.

By H. C. Robinson, C.M.Z.S., F.R.G.S.

UNTIL the present collection was made the southern limit of what has been termed the Himalayo-Sondaic element in the fauna of the Malay Peninsula had been placed at the Ginting Bidei Pass leading across the Main Range of the Peninsula from Selangor to Pahang, at an elevation of about 2,300 feet. On the mountains north of this line, above 3,000 feet, the dominant species of birds are of Himalayan or Sumatran facies, while further to the south on the hills of Negri Sembilan and on Mount Ophir on the Johore-Malaccan border, which approach or slightly exceed 4,000 feet, such forms are entirely absent.

The Massif on which the present collection was made at elevations slightly under and over 4,000 feet lies to the south-west of Ginding Bidei and attains in Bukit Nuang a maximum height of about 4,500 feet.

The actual locality visited was on the head-waters of the Langat river near the summit of a mountain known to the local Sakais as Menang Gasing. Five of the Dyak collectors of the Museum spent ten days there at the end of May and the commencement of June, 1911.

MAMMALS.

1. RATUFA MELANOPEPLA, Miller.

Ratufa melanopepla, Miller, "Proc. Acad. Sci. Washington," ii, p. 71 (1900).

2 ♀.

These specimens agree well with a series of topotypes from Trang in the western Siamese Malay States. The species is not usually found at such an altitude as 4,000 feet.

2. SCIURUS NIGROVITTATUS JOHORENSIS, Rob. and Wrought.

Sciurus nigrovittatus johorensis, Rob. and Wrought. ante, p. 166.

1 ♀.

Practically identical with the types of the sub-species from Southern Johore.

3. SCIURUS MINIATUS, Miller.

Sciurus notatus miniatus, Miller, "Proc. Acad. Sci. Washington," ii, p. 79 (1900).

2 ♀.

Not differing from Trang topotypes.

4. SCIURUS TENUIS TAHAN, Bonhote.

Sciurus tahan, Bonhote, "Journ. Fed. Malay States Mus.," iii, p. 6 (1908).

2 ♀.

Inseparable from a large series from the type locality and from more northern sections of the Selangor Main Range.

5. SCIURUS MACCLELLANDI NOVEMLINEATUS, Miller.

Sciurus novemlineatus, Miller, "Proc. Biol. Soc. Washington," xvi, p. 147 (1903).

2 ♂, ♀.

This is the most southerly locality from which any form of this wide-spread species has been obtained. The locality, Malacca, which is assigned to it by Bonhote is almost certainly erroneous, except in the most generalised sense.

6. MUS CILIATUS, Bonhote.

Mus. ciliata, Bonhote, P. Z. S. 1900, p. 879, pl. xvi.

2 ♂.

This species is only met with at considerable elevations and is on record from Gunong Inas (Perak), Gunong Mengkuang Lebah and Bukit Kutu (Selangor) and Gunong Tahan (Pahang), in each case from considerably above 3,000 feet. It is closely allied to *Mus edwardsi*, Thos., from Fokien, China.

7. MUS VOCIFERANS, Miller.

Mus vociferans, Miller, "Proc. Biol. Soc. Washington," xiii, p. 1888 (1900).

A single female specimen.

This rat occurs everywhere in the Peninsula from as far north as has been zoologically explored to the extreme south and from sea level

to about 5,000 feet. The present case, however, is the only one in which it has been found associated with the preceding species from which it is nevertheless extremely distinct.

8. MUS PELLAX, Miller.

Mus pellax, Miller, loc. cit, supra, p. 147.

A single female.

Widely distributed throughout the Peninsula, but not nearly so common as *Mus surifer*, Miller.

9. TUPAIA FERRUGINEA FERRUGINEA, Raffles.

Tupaia ferruginea, Raffles, "Trans. Linn. Soc.," xiii, p. 256 (1822).

1 ♂.

10. HYLOMYS SUILLUS, Müller and Schlegel.

Hylomys suillus, Müll. and Schleg. "Verhandl. Mamm.," p. 153, pl. xxv, figs. 4-7, pl. xxvi, fig. 1 (1839-44).

A single female of this extremely rare insectivore was trapped but was almost destroyed by ants leaving little but a portion of the dorsal skin and the skull. It appears to lack the median dorsal stripe which is generally present in Bornean examples. The species is generally credited to the Malay Peninsula but we are unaware of the existence of any specimen from localities south of Southern Tenasserim, where it has been obtained by Dr. W. L. Abbott (*Lyon, Proc. U. S. Nat. Mus.*, xxxvi, p. 456, pl. 36 (1909).

BIRDS.

* 1. ARBORICOLA CAMPBELLI Robinson.

Arboricola campbelli, Robinson, "Journ., Fed. Mal States Mus.," ii., p. 167 (1909).

A pair.

2. MACROPYGIA RUFICEPS (Temm.)

Op. cit. p. 170.

1 ♂.

3. NYCTIORNIS AMICTA (Temm.)

Robinson, *op. cit.* p. 173.

* 4. PYROTROGON ERYTHROCEPHALUS (Gould).

Op. cit. p. 176.

1 ♀.

5. CYANOPS MYSTACOPHANES (Temm.)

Op. cit. p. 179.

1 ♂.

* 6. CYANOPS OORTI (Muller).

Op. cit. p. 179.

2 ♂; 1 ♀.

* 7. PSILOPOGON PYROLOPHUS (Müller).

Op. cit. p. 180.

1 ♂ imm.

* 8. GECINUS RODGERI, Hartert & Butler.

Op. cit. p. 180.

1 ♂ ; 1 ♂ imm.

9. PYRRHOPICUS PORPHYROMELAS (Boie).

Op. cit. p. 182.

1 ♂.

10. CHRYSOPHLEGMA HUMII, Hargitt.

Op. cit. p. 183.

1 ♀.

11. CALYPTOMENA VIRIDIS, Raffles.

Op. cit. p. 184.

1 ♀.

† 12. PSARISOMUS DALHOUSIAE (Jameson).

Op. cit. p. 184.

1 ♂ ; 1 ♀.

† 13. SERILOPHUS ROTHSCHILDI, Hartert & Butler.

Op. cit. p. 185.

1 ♀.

Since the date of my paper quoted above we have obtained additional specimens of this beautiful Broadbill at Temengoh, in Upper Perak, at comparatively low elevations not exceeding 500 feet.

* 14. ANTHIPES MALAYANA, Sharpe.

Op. cit., p. 188.

6 ♂.

* 15. NILTAVA GRANDIS DECIPIENS, Salvad.

Op. cit., p. 188.

1 ♂, 1 ♀.

* 16. CRYPTOLOPHA BUTLERI, Hartert.

Op. cit., p. 191.

1 ♀.

This species seems widely though sparsely distributed throughout the length of the Peninsular Main Range. In addition to the specimens recorded above we possess a skin collected at Telom, 3,500 feet, on the Perak-Pahang boundary in November, 1908.

17. ABRORNIS SCHWANERI (Temm.).

Op. cit., p. 191.

1 ♀.

Widely distributed throughout the length of the Main Range from its foot to over 4,000 feet.

* 18. ARTAMIDES LARUTENSIS, Sharpe.

Op. cit., p. 192.

1 ♂.

* 19. PERICROCOTUS MONTANUS, Salvad.

Op. cit., p. 192.

1 ♂, 1 ♀, 1 ♂ imm., 1 ♀ imm.

* 20. CHLOROPSIS HARDWICKII, JARD. & SELBY.

Op. cit., p. 193.

1 ♂.

21. HEMIXUS CINEREUS (BLYTH).

Op. cit., p. 193.

1 ♂.

* 22. IOLE TICKELLI PARACENSIS, HARTERT & BUTLER.

Iole peracensis, op. cit., p. 194.

1 ♂.

23. CRINIGER OCHRACEUS, MOORE.

Op. cit., p. 195.

1 ♀.

* 24. TROCHALOPTERON PENINSULAE, SHARPE.

Op. cit., p. 197.

2 ♂ ; 1 ♀.

* 25. MELANOCICHLA LUGUBRIS (MÜLLER).

Op. cit., p. 197.

1 ♂ ; 2 ♀.

* 26. POMATORHINUS WRAYI, SHARPE.

Op. cit., p. 197.

1 ♀.

* 27. RHINOCICHLA MITRATA (MÜLLER).

Op. cit., p. 197.

4 ♂.

* 28. TURDINUS LORICATUS (MÜLLER).

Op. cit., p. 199.

1 ♂.

In the Peninsula this species has hitherto only been found in Selangor between 2,000 and 4,000 feet.

* 29. TURDINULUS GRANTI, RICHMOND.

Op. cit., p. 201.

1 ♂.

* 30. CORYTHOCICHLA LEUCOSTICTA, SHARPE.

Op. cit., p. 201.

1 ♂ ; 1 ♀.

* 31. ALCIPPE PERACENSIS, SHARPE.

Op. cit., p. 201.

1 ♂ ; 2 ♀.

* 32. PSEUDOMINLA SOROR SHARPE.

Op. cit., p. 201.

1 ♀.

* 33. STACHYRIS DAVISONI, SHARPE.

Op. cit., p. 202.

1 ♂ ; 1 ♀.

* 34. STACHYRIS CHRYSOIS, RICHMOND.

Stachyris chrysaea bocagei, op. cit. p. 202.

1 ♂.

* 35. BRACHYPTERYX WRAYI, GRANT.

Op. cit p. 204.

2 ♂, 2 ♀.

* 36. SIBIA WRAYI, GRANT.

Sibia wrayi, Grant, Bull. B.O.C. xxv, p. 98 (1910).

Sibia simillima, Robinson, op. cit, p. 204.

1 ♂.

* 37. SIVA SORDIDIOR, SHARPE.

Op. cit. p. 204.

1 ♂.

* 38. PTERYTHIUS TAHANENSIS, HARTERT.

Op. cit. p. 205.

1 ♀.

* 39. MESIA ARGENTAURIS, HODGSON.

Op. cit. p. 205.

3 ♂.

* 40. PNOEPYGA LEPIDA, SALVAD.

Op. cit. p. 205.

1 ♂.

41. CITTOCINCLA MACRURA (GM.).

Op. cit. p. 208.

1 ♀ imm.

42. SUTORIA MACULICOLLIS (F. MOORE).

Op. cit. p. 208.

1 ♂.

* 43. DENDROPHILA AZUREA (LESS.).

Op. cit. p. 210.

1 ♂.

* 44. CISSA ROBINSONI, GRANT.

Op. cit. p. 210.

2 ♀.

The Blue Hunting-crow has now been found to be distributed over all the high mountains of the Federated Malay States at elevations exceeding 3,500 feet.

* 45. BHRINGA REMIFER (TEMM.).

Op. cit. p. 211.

1 ♂ ; 1 ♀.

* 46. ORIOLUS CONSANGUINEUS, WARDL-RAMS.

Op. cit. p. 211.

1 ♂ ; 1 ♀.

* 47. AETHOPYGA WRAYI, SHARPE.

Op. cit. p. 212.

1 ♂.

48. ARACHNOTHERA LONGIROSTRIS (LATH.).

Op. cit. p. 213.

1 ♂.

* 49. ARACHNOTHERA MAGNA (Hodgs.).

Op. cit. p. 214.

3 ♂.

Out of the 49 species of birds procured, 33 (marked with an asterisk) are strictly confined, so far as the Peninsula is concerned, to the zone above 3,000 feet, while three (marked with a dagger) are of only accidental occurrence below that limit. Of the remainder, six may be classed as submontane while only seven are generally met with at low elevations.

Compared with the list of 86 species from the hills of Negri Sembilan (*antea*, p. 219) it will be observed that only ten species—*viz.*:

Macropygia ruficeps	Calyptomena viridis
Nyctiornis amicta	Abrornis schwaneri
Chotorhea mystacophanes	Hemixus cinereus
Pyrrhopicus porphyromelas	Stachyris davisoni
Chrysophlegma humei	Cittocincla macrura

are common to both lists, while of these 10 species, seven are low-land species, three are submontane and none are high elevation forms.

It is, therefore, I think, fairly evident that at some comparatively recent time a barrier has existed between the mountains of Southern Selangor and their continuation in Negri Sembilan, sufficient to prevent the extension of the dominant continental and Sumatran form southwards. It is evident, also, that this barrier must have been a substantial one, as wide stretches of low country separating the Gunong Tahan Ranges from the backbone of the Peninsula have not sufficed to effect any specific differentiation in the fauna of the two ranges.

Such evidence as is afforded by the small number of mammals found at high elevations also bears out the same contention.

ON NEW MAMMALS FROM THE MALAY PENINSULA AND ADJACENT ISLANDS.

By HERBERT C. ROBINSON, C.M.Z.S., and C. BODEN KLOSS, F.Z.S.

1. HIPPOSIDEROS RIDLEYI, *sp. nov.*

TYPE.—Adult male in spirit with extracted skull. No. 2068.11. Selangor Museum. Collected in the Botanic Gardens, Singapore, by H. N. Ridley, Esq., in June, 1911.

CHARACTERS.—A saucer-shaped disc in front of the nostrils above the horizontal nose leaf. No supplementary nose leaves on the sides of muzzle.

COLOUR.—Dried from spirit. Hairs of pelage about 10 mm. in length, the tips dark-brown, the bases dull brownish-white for two-thirds the length. Fur extending on to the wing membranes, above and below, for about 7 mm. from the sides of the body. Membranes, sooty-brown to black, inferior edge of the antebrachium narrowly edged with dull yellow.

Nose-leaf.—Anterior horizontal nose-leaf covering the end of the muzzle, slightly emarginate at the front and at the sides, sinuous in section, broadest posteriorly. Nostrils surrounded by laminæ; in front of and between the nostrils a concave circular disc connected with the front of the leaf and the base of the sella by low ridges of membrane. Sella broadly cordiform, narrower than the nose leaves, with slight wart-like prominences along its upper edge, the centre slightly projecting, the base with a faintly bisected concavity. Hinder-nose-leaf with rounded margin, the front surface concave and divided vertically into four cells; posterior surface with a broad projecting fold of skin.

A broad frontal glandular sac, situated between two warty prominences.

Ears.—Ears broad, the tips rectangular, outer margin very slightly concave below the tips, then slightly convex, the outer edges strongly folded near the base; extending to the end of muzzle when laid forward and connected by a low ridge of skin.

Wings and Membranes.—Wings from the tarsus; interfemoral membrane concave between the extremities of the calcanea, extreme tip of tail free.

Skull and Teeth.—Skull most nearly resembles that of *H. bicolor* but is more elongate, the zygomata relatively narrower, the sagittal crest less developed and the nasal swellings more dilated. P^3 is more developed and is situated well within the tooth-row: it is relatively much larger than the same tooth in *H. galeritus*.

Measurements (from spirit specimen).—Head and body, 49; tail, 24; hind-foot, 7.8; tibia, 19.5; fore-arm, 47.2; third metacarpal, 34; fourth metacarpal, 35.4; fifth metacarpal, 35 mm.

Breadth of posterior nose leaf, 9.0; breadth of sella, 7.8; breadth of horizontal nose leaf, posteriorly, 8.2; anteriorly, 4.3; height of posterior nose leaf from crown, 2.75; height of sella from base, 3.7; greatest length of horizontal nose leaf, 6.75; diameter of nasal disc, 3.0. Length of ear, 22; breadth, 17 mm. Cranial measurements: total length, 19.7; mastoid width, 10.8; width of brain-case, 8.8; zygomatic width, 9.6; maxillar width, 6.8; anteorbital width, 6.1; width across cingula of canines, 4.3; length of upper tooth-row, including canine, 6.8 mm.

Specimens Examined.—One (the type).

Remarks.—The nasal disc separates this species from all others of the genus though the absence of supplementary leaves on the muzzle allies it to *H. bicolor* and *H. doriae*.

TUPAIA FERRUGINEA PENANGENSIS, *subsp. nov.*

Type.—Adult male (skin and skull). No. 1445/11, Selangor Museum.

Collected at Telok Bahang, Penang Island, on the 2nd April, 1911, by E. Seimund.

Characters.—Smaller than *T. f. ferruginea ferruginea* and duller and paler above: differs from *T. f. wilkinsoni* and other northern races in having the ferruginous tint of the back extending on to the shoulders.

Colour.—Upper-surface grizzled black and ferruginous, somewhat olivaceous on the head and nape. Shoulder stripes, well marked, yellowish buff. Under-surface yellowish buff, brightest on the throat; the hairs of the centre of the abdomen and the limbs with greyish bases.

Tail above, distinctly darker than the back, annulated towards the base with black and whitish buff, the tips of the hairs glistening yellow: below, the whitish annulations in excess, the vertebræ clad with short black and grey hairs.

Feet, blackish brown, speckled with yellow buff.

Measurements.—Collector's external measurements taken in the flesh: head and body, 173; tail, 165; hind-foot, 42; ear, 16 mm.

Cranial measurements: greatest length, 50.1; basilar length, 43.5; palatilar length, 26.9; palatal breadth, 8.2; zygomatic breadth, 23.8; interorbital breadth, 12.9; cranial breadth, 19.0; breadth of rostrum at diastema, 6.8; length of rostrum at lachrymal notch, 21.3; upper molar series, 15.9 mm.

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

Remarks.—This race is more closely associated with the Singapore and Southern Peninsular form than those occurring on the islands and mainland to the north, from which it differs principally in colouration.

CROCIDURA MALAYANA, *sp. nov.*

Type.—Adult female (skin and skull). No. 1801.11. Selangor Museum. Collected on Maxwell's Hill, near Taiping, Perak, 3,300 feet, on 25th April, 1910, by E. Seimund.

Characters.—Intermediate in size between *Crocidura peligrina* and *C. major* * and darker than either.

Colour.—Dark rusty iron-grey throughout, the base of the fur grey. Feet, hands and tail very thinly clad with sooty hairs, the basal half of the latter furnished with a few scattered long white hairs.

Skull and Teeth.—Do not differ in characters from those of the above-mentioned races.

Measurements.—Collector's external measurements, taken in the flesh: head and body, 80; tail, 57; hind-foot, 13; ear, 11 mm.

Cranial measurements of the type;† greatest length (excluding incisors), 21.8; basal length, 19.5; palatal length, 9.9; lachrymal breadth of rostrum, 4.4; greatest ante-orbital breadth, 7.3; greatest cranial breadth, 10.0; entire maxillary tooth-row (including incisors), 10.1; entire mandibular tooth-row (including incisors), 9.3 mm.

Specimens Examined.—Five, including two from the type locality.

* *Ante*, p. 177.

† For measurements of another adult female see *ante*, p. 176.

Remarks.—Both size and colour differentiate this animal from the other Peninsular races; in dimensions it closely approaches *U. weberi*, Jentink,* from Western Sumatra, of which it may eventually prove to be the Malayan representative.

RATUFA AFFINIS JOHORENSIS, *subsp. nov.*

Ratufa affinis typica, Bonhote (nec *Sclater*), "Ann. Mag. Nat. Hist." (7), v. p. 495 (1900).

Ratufa affinis johorensis, "Trouessart. Cat. Mamm.," p. 308, No. 3.018*a* (1904) (*nomen nudum*).

Ratufa affinis (*sub. lege*), "Miller, Proc. Acad. Sci. Washington," ii. p. 77 (1900).

Type.—Adult female (skin and skull), No. 1090/11, Selangor Museum. Collected at Padang Tuan, Segamat, N. W. Johore, 25th February, 1911, by Museum Collector.

Characters.—Intermediate between *Ratufa affinis affinis* (Raffles.), from Singapore Island, and *Ratufa affinis aureiventer* (Geoffr.), from the territory of Malacca. From the former it differs in having the hands the feet concolorous with the rest of the limbs and in the reduction of the dark area on the cheeks and ears and from the latter in having the belly pure white, sharply differentiated from the sides.

Colour.—Bleached pelage. Above pale cream, head darker and more buffy, the hairs without any visible annulations. Muzzle, a patch beneath and in front of the ears, whitish. A narrow ring round the eye seal-brown. Ears pale seal-brown on their outer aspect, more or less ochraceous on the inner side. Limbs from the shoulders and thighs ochraceous-buff, hardly paler on the hands and feet. A stripe of paler ochraceous-buff from the shoulder to the thigh, interrupted by a not very conspicuous white patch on the outer aspect of the thigh. Tail whitish-brown above, beneath with the proximal half of the hairs whitish, the tips mingled brownish and buffy. Midrib whitish-brown, beneath pure white quite sharply defined from the sides.

Measurements.—Collector's external measurements taken in the flesh: head and body, 300; tail, 405; hind-foot (without claws) 70; ear 25 mm. Skull: greatest length,—; basilar length,—; zygomatic breadth, 41.5; greatest length of nasals, 21.8; diastema, 14.9; cranial breadth, 31.1; interorbital breadth, 26.3; upper molar series, 13.3 mm.

Remarks.—Mr. Miller has already (*loc cit. supra*) remarked that the Johore pale *Ratufa* would probably prove distinct from that of Singapore, while Prof. Trouessart has applied a name, without description, which we have adopted. Besides the type we have seen other specimens from the Sembrong River further south in Johore, but these were in bad condition and without skulls or measurements.

* In Weber's "Zool. Ergebn. Reis. Niederland Ost-Indie," 1, p. 124 (1890).

RATUFA MELANOPEPLA PENANGENSIS *subsp. nov.*

TYPE.—Adult male (skin and skull), No. 1348/11, Selangor Museum. Collected at Telok Bahang, Penang Island, by E. Seimund, on 11th March, 1911.

CHARACTERS.—Similar to *R. m. fretensis*,* Thos. and Wrought, in colour but smaller in size, greatest length of skull never exceeding 70 mm. Size about equal to *R. m. tiomanensis*,† Miller, but abdomen much brighter.

COLOUR.—Upper-surface, and entire tail with the exception of a narrow ochraceous streak at the base of under-surface, black; below, rich tawny ochraceous, this colour extending on the outer side of the neck to the ears and over the front of the fore-limb. No trace of a pale nuchal spot. A small tawny ochraceous patch on the inner side of the hind-foot.

MEASUREMENTS.—Collector's external measurements taken in the flesh: head and body, 322; tail, 372; hind-foot, 76; ear, 30 mm.

Cranial measurements: greatest length, 68.3; condylo-basilar length, 57.1; palatilar length, 25.3; diastema, 14.0; upper molar series, 14.2; interorbital breadth, 27.2; zygomatic breadth, 42.2; greatest length of nasals, 22.2 mm.

SPECIMENS EXAMINED.—Twenty, all from the type locality.

REMARKS.—The patch on the hind-foot is very variable, sometimes taking the form of a slight grizzling only, but it is present in almost every specimen examined.

MUS MUELLERI FOEDERIS, *subsp. nov.*

TYPE.—Adult female (skin and skull), No. 1853/11, Selangor Museum. Collected at Ulu Temengoh, Upper Perak, Federated Malay States, by H. C. Robinson and C. B. Kloss on the 12th July, 1909. Original No. 2917.

CHARACTERS.—A member of the *Muelleri* group agreeing with *Mus validus*, Miller, in its large teeth, shape of the parietals and in the posterior terminations of the nasals but differing in smaller size; with relatively larger feet and slightly more inflated bullae. From *Mus bullatus*,‡ Lyons, it is at once separated by its very much smaller bullae, very large teeth, and pentagonal parietals.

COLOUR.—Above grizzled brown and buff, becoming greyer on the sides and darker on the rump owing to the presence of numerous long black bristles. Lower-surface buffy white, the hairs with faint grey bases. Hands and feet very thinly clad, the former brownish the latter white with dark centres. Tail blackish brown throughout

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* "Annals and Magazine of Natural History," ser. 8, vol. iv, p. 535 (1909).

† "Proceedings of the Washington Academy of Sciences," vol. ii, p. 216 (1900).

‡ Lyon, "Proc. U. S. Nat. Mus." xxxiv, p. 646 (1908), 11th September, 1908. *Mus villosus*, Kloss, "Journ., Federated Malay States Museums," II, p. 140 (1st October, 1909).

Skull and Teeth.—Skull fairly lightly built not heavily ridged. Nasals narrowing to a point posteriorly and extending beyond the premaxillary suture. Bullæ somewhat dilated, more so than in *M. validus*, but not approaching those of *M. annandalii* and M. *bullatus* or those of the *rattus* group. Teeth large, larger than those of the much larger animal, *Mus validus*.

Measurements.—Collector's external measurements taken in the flesh: head and body, 182 (236);* tail, 239 (280); hind-foot, 45 (45.5); ear, 21 (23) mm.

Cranial measurements: greatest length, 48 (53.7); basilar length, 37.9 (44.7); palatilar length, 22.5 (24.4); breadth between anterior molars, 4.0 (4.8); length of palatal foramina, 8.1 (8.3); diastema, 12.2 (14.2); length of upper molar row, 10.0 (9.6); median length of nasals, 18.6 (22.7); greatest breadth of combined nasals, 5.6 (5.9); interorbital breadth, 7.0 (8.2); cranial breadth, 18.5 (20.0); zygomatic breadth, 22.5 (26.9).

Specimens Examined.—Two, the type and a sub-adult female from Ginting Bidei, Selangor (Selangor Museum, No. 1798/09).

Remarks.—This rat is evidently the peninsular representative of the Sumatran *Mus muelleri*, Jentink, the type of which is stated by Miller† to be a immature animal lacking the posterior portion of the skull so that no actual comparison is possible. The dimensions given being those of a mounted specimen can also only be regarded as very approximate.

ON A HORNED OWL, NEW TO THE MALAY PENINSULA.

By HERBERT C. ROBINSON, C.M.Z.S., M.B.O.U.

BUBO COROMANDUS. KLOSSII. *subsp. nov.*

A LOCAL race of *Bubo coromandus* from Peninsular India but very much darker than the typical form.

Adult male.—Above dull brown, head, ear-coverts and mantle slightly darker; the nape and outer webs of the secondaries vermiculated with whitish brown, the former with dark shaft stripes. The under-surface throughout vermiculated with dark brown and whitish-brown and with broad blackish-brown shaft stripes. Feathers of the thighs, under wing-coverts and under tail-coverts similar but more buff. Iris yellow, bill greenish-horn with black base, feet leaden. Total length, 21.5; wing, 15.7; tail, 8.7; tarsus, 2.55; bill from gape, 1.55 inch.

Type.—Adult male, Gunong Semanggol, North Perak, Malay Peninsula, collected on 22nd May, 1910, by E. Seimund.

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* Measurements in parentheses those of an adult female, *Mus validus* (Selangor Museum, No. 1854/11) from Maxwell's Hill, Taiping, Perak.

† "Proc. U. S. Nat. Mus." xxxiv, p. 647 (1909).

Another specimen from Malacca secured by Dr. Maingay is in the Tweeddale collection in the British Museum, while two mounted specimens from unspecified localities in the Raffles Museum, Singapore, are probably referable to this form.

Remarks.—According to Blanford ("Fauna. Brit. Ind. Birds," iii, p. 287 (1895)), *Bubo coromandus* has not been recorded from further south than Aracan so that the present occurrence is a very considerable extension in range. I have been unable to examine adult Chinese specimens which may possibly prove identical with this and not the Indian race.