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NOTICE.

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This Journal takes the place of the "Perak Museum Notes";  
the first number of which was issued in 1893.

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# JOURNAL

OF THE

## FEDERATED MALAY STATES

## MUSEUMS.



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## NOTES ON THE NEW ANTI-OPIUM DRUG.

BY L. WRAY, I.S.O.

A PARTY of Chinese wood-cutters, working in the jungle near Seremban in Negri Sembilan, ran out of tea, and to supply its place took the leaves of a jungle climber, dried them and made an infusion in the ordinary way. This, however, was not successful, as the beverage made the men ill with *sakit përut*—i.e., bowel complaint. The leaves were then roasted and a fair substitute for tea was obtained, which had no ill effects. Then, for some obscure reason, *tengko*, opium dross, or the refuse opium after being smoked, was mixed with it, and the men continued drinking the mixture for a week or more in place of tea. After this time it was found that all desire for opium smoking had been lost. Friends of the men were told of the discovery, and so the news was spread and others were induced to try the remedy.

The above is the history of the way in which the properties of the plant, which is now quite extensively used as a cure for the opium-smoking habit, was discovered. It was told to the writer by two of the men now in charge of the factory of the Selangor Anti-opium Society in Weld Road, Kuala Lumpur, where the drug is being prepared and distributed.

The plant which was thus used by these wood-cutters is a large climber with a long woody stem, attaining in old specimens a diameter of 6 to 7 inches and a length of a hundred or more feet. It grows in the jungle and climbs up to the tops of the trees, so that in the forest itself it would be very difficult to collect, as the branches and leaves are far up out of reach. A very fine example of this great climber is to be seen in the town of Kuala Lumpur, near the railway station, growing on the river bank and climbing up a large tree which has escaped the destruction which has befallen its fellows when the jungle was felled. In secondary forest, or *bluka*, it only attains small altitudes and is easy of collection. The plant appears to be quite common in and around Kuala Lumpur. It was collected in 1894 on Waterfall Hill, Taiping, and the specimen is in the Herbarium of the Perak Museum. Botanical specimens of the plant in use at Kuala Lumpur were kindly obtained for identification by

Mr Choo Cheng Khay, of the Blondin Mine, Sungei Krayong. An examination of these proves that the plant belongs to the order Combretaceae and is *Combretum sundiacum*. It is thus described in the "Materials for a Flora of the Malayan Peninsula," by Lieut.-Colonel Sir George King, K.C.I.E., F.R.S., page 337:

"3. COMBRETUM SUNDIACUM (*Miq. Fl. Ind. Bat., Suppl. 327*).—A very powerful climber; young branches closely covered with deciduous scales. Leaves opposite, thinly coriaceous, broadly elliptic to elliptic-ovate, abruptly and very shortly acuminate; the base rounded, rarely slightly cuneate, sometimes unequal-sided; both surfaces glabrous, the upper punctate and with very sparse scales, the lower with the scales more numerous and white with dark centres; main nerves about six pairs, oblique, curving slightly, not prominent on the upper surface, but slightly so on the lower when dry; length 2.75 to 4 inches, breadth 1.8 to 2.75 inches, petiole .4 to .8 inches. Panicles axillary and terminal, umbellate, longer than the leaves, the branches ending in dense globose, minutely bracteolate spikes. Calyx-tube about .35 inches long, minutely pubescent, not scaly, four-ridged along the ovary, above it cylindric, expanding upwards into a funnel-shaped mouth with four narrowly triangular-acuminate reflexed lobes; calyx inside with a ring of hairs at its base, but not filled with long coarse hair, narrowly ovate and very acute in bud. Petals much shorter than the calyx-lobes, oval, not clawed, glabrous. Stamens exerted. Fruit about 1 inch long and nearly as broad, with four coriaceous horizontally-striate shining wings, and with a few minute scattered scales. Clarke in Hooker, *fl., Fl. Br. Ind. I, 458*.

"Malacca: Maingay, 648. Singapore; Hullett, 89; Ridley, 4668. Perak: Scortechini, 1016. King's Collector, 4360, 4452, 5864, 7827; Wray, 4272.

"Readily recognised by its paniced inflorescence, the branches being umbellate and each ending in a globose spike of flowers with very acute buds which are not scaly."

Its Malay name is given by Messrs. N. Ridley and C. Curtis in "Malay Plant Names" in the "Journal of the Straits Branch of the Royal Asiatic Society," No. 38, p. 58, as *akar gegambar*. Two species of the genus, *Combretum decandrum* and *C. nanum*, are mentioned by Sir George Watt in "A Dictionary of the Economic Products of India" as being used in native Indian medicine, but without any details as to their properties or the diseases for which they are prescribed.

The method of preparing the drug for use is as follows: The branches of the plant are collected in the jungles around Kuala Lumpur and brought in. It at first fetched \$4 per pikul (133½ lbs.)

in the green state, but the price subsequently fell to \$2. About 120 pikuls (7 tons 3 cwts.) have been used during the three weeks that the society has been in operation. On arrival it is coarsely chopped up—twigs, leaves and all—into pieces about an inch to an inch and a half in length. This is done either with an axe or a Chinese chopping knife on a block of wood or by means of a pair of large shears, such as are used by Chinese apothecaries, resembling the instrument employed to cut cardboard. That is, there is a steel straight-edge fixed horizontally to a block of wood and a movable knife-blade, pivoted at one end and furnished with a handle at its free extremity, by which it can be brought down scissor-wise against the fixed blade.

The chopped stuff is allowed to dry for three or more days and is then put on large circular bamboo trays of about  $2\frac{1}{2}$  feet in diameter, and by the same winnowing action as is applied to padi after husking the woody portions are separated from the leaves. The latter being light are thrown off the tray, and the stalks by reason of their greater weight remain on it. The two qualities into which it is thus divided are put into separate sacks or baskets.

The next process is roasting. This is done on a large plate of sheet iron, set in brickwork, over a charcoal fire. The iron measures about 9 feet by 3 feet and has a low brick wall of about 1 foot in height around three sides of it. The remaining side, a short one, being left open to enable the roasted leaf to be easily scraped off into baskets at the completion of the operation. The object of separating the material is that the leaves are not roasted quite so much as the sticks, though in both cases the process is carried so far that a very considerable proportion of the whole is reduced to charcoal. According to the latest practice the roasting is not pushed quite as far as formerly. While roasting, the charge is kept in motion by two men armed with wooden hoe-like implements. When sufficiently roasted the drug is removed from the roasting furnace and the two portions, the leaf and the stick, are mixed together again.

The infusion is prepared by taking from 6 to 8 tahlil of the roasted drug and putting it into a kerosene oil tin filled with water. That is, 8 to  $10\frac{2}{3}$  ozs. avoirdupois to nearly 4 gallons of water. The tins are set in a double row on four square-sectioned parallel, horizontal iron bars supported on brickwork at about 9 inches from the floor level and are heated by charcoal fires kindled beneath the supporting bars on a grate composed of closely placed round iron rods. The tins are kept boiling for about three hours, being covered during that time by loose-fitting squares of tin-plate. The liquid is then poured through a fine rattan sieve, having meshes of about one-eighth of an inch square, into large wooden barrels. The sieve retains all the grosser portions of the spent drug, which is then thrown away. The infusion is next ladled up, by means of bucket-shaped ladles made of tin-plate

and fixed on to the end of long wooden handles, and is then strained through a piece of white cloth into other barrels. This completes the process, and the infusion is bottled by dipping it out with the before mentioned ladles and pouring it through a tin funnel into square gin or other bottles which are brought by the patients. It is a brown, rather turbid, tea-like fluid as thus prepared.

A complete series of specimens, illustrating the preparation of the drug, have been collected and prepared for exhibition in the Perak Museum.

This decoction is prescribed as follows: Whatever the amount of opium a man habitually smokes, that amount is to be mixed with the infusion. It may be mentioned here that the average opium smoker takes from 2 to 3 chi (116 $\frac{2}{3}$  grains to 175 grains) of chandu per diem. This quantity is often exceeded and in one case 1 $\frac{1}{2}$  tahlil (875 grains.) is stated to be the daily allowance of a particular smoker. Chandu, which is the opium as prepared by the Chinese for the use of smokers, is less potent than the official B. P. Extract of Opium. In the act of smoking a considerable quantity of the alkaloids contained in the chandu is certainly destroyed and only a mere fraction is absorbed into the system of the smoker. To proceed, if, for instance, a man has been in the habit of smoking 2 chi of chandu per day, then two reputed quart bottles (*a*) and (*b*) of the infusion are taken, and into one (*a*) is put 2 chi of burnt chandu, roasted on an iron skewer-like instrument in the same way as it would be if being prepared for smoking. Then a Chinese tea-cup is half filled from bottle (*a*) and taken by the patient, and half a tea-cup from bottle (*b*), the one which does not contain any opium, is put into (*a*). This is repeated each time a dose is taken, so that the liquid in (*a*), while maintaining its bulk, continually decreases in its opium contents, until bottle (*b*) is exhausted. The dose is to be taken as many times a day as the patient has been in the habit of smoking, usually three or four times, until the two bottles are finished; when the man should, it is stated, be cured of all wish to smoke. If this is not the case, then the treatment is to be repeated, but with a smaller initial proportion of burnt opium in bottle (*a*), the amount being again decreased if a third course is necessary. It is stated that sometimes two courses are sufficient, but generally three are required.

It will probably be of interest to go more fully into the curious system of dilution and dosage adopted in this instance. A Chinese tea-cup holds about three fluid ounces and a reputed quart bottle approximately 25 ounces, so that each bottle would contain some 16 doses. The decrease in the amount of opium would be  $\frac{1}{16}$ th of the total amount after the first dose and  $\frac{1}{16}$ th of the remainder for the next, and so on for each succeeding one, up to the 17th dose, when the dilution would remain constant to the 32nd dose. At 2 chi of

opium, and three doses per day, the strength of the first 21 doses would be as under—

Days.	Doses.	Amount of opium per dose.	Amount per day.	Daily decrease.
	1	... 7.291 grains		
	2	... 6.830 "		
1	... 3	... 6.419 "	20.540 grains	} 3.690 grains
	4	... 6.008 "	...	
	5	... 5.633 "	...	
2	... 6	... 5.209 "	16.850 "	} 2.908 "
	7	... 4.950 "	...	
	8	... 4.641 "	...	
3	... 9	... 4.351 "	13.942 "	} 2.488 "
	10	... 4.079 "	...	
	11	... 3.824 "	...	
4	... 12	... 3.585 "	11.488 "	} 2.022 "
	13	... 3.361 "	...	
	14	... 3.151 "	...	
5	... 15	... 2.954 "	9.466 "	} 1.505 "
	16	... 2.769 "	...	
	17	... 2.596 "	...	
6	... 18	... 2.596 "	7.961 "	} 0.183 "
	19	... 2.596 "	...	
	20	... 2.596 "	...	
7	... 21	... 2.596 "	7.778 "	

This last strength would continue till the two bottles were exhausted on the 11th day, when the whole of the 2 chi, equal to 116.666 grains would have been taken. In the above computation, figures beyond the third place of decimals were discarded, so that it is only approximately correct. If anyone takes the trouble to check it, it will be found that only 116.604 grains of opium are accounted for.

As the infusion contains no preservative, it is very subject to fermentative and other changes, so that it often becomes putrescent and has to be thrown away before the end of a course. A fresh supply then has to be obtained. This is stated to be of frequent occurrence, consequently only a portion of each supply is taken by the patient in many cases.

About 130 gallons of infusion are being made and distributed to the Chinese per day and the number of patients being treated is now (24th Nov.) from 260 to 270. The society began work on the 3rd November and from that date to the 23rd November 6,130 people applied for and were given the infusion. This is equal to a daily average of 292 patients. Accurate records appear to have been kept by the society, and there would seem to be no reason to doubt the correctness of these figures. The whole work is most methodically carried out. Each applicant receives a printed slip of paper containing the directions in Chinese as to the use of the drug and a wooden check, at the office; the latter he presents at the factory and receives in exchange two

bottles of the infusion. The checks are subsequently returned to the office and are used in preparing the records.

From the 16th to the 23rd of November about 396 patients had reported that they were completely cured of the habit. Previous to the former date no records on the subject were kept. Many patients naturally do not trouble to return and make a report.

Besides the Weld Road Establishment of the Selangor Anti-opium Society in Kuala Lumpur, to which the above figures alone relate, branches of the society have been opened at Kepong, Rawang, Serendah, Sungei Besi and Kajang.

It is also being prepared and distributed at the Methodist Episcopal Mission Hall in Sultan Street, Kuala Lumpur, and at an independent place in Kuala Kubu. In Penang, Seremban, Malacca and Singapore it is in use. The drug is sent from Seremban to Malacca and from Kuala Lumpur to Penang and Singapore.

The Rev. W. E. Horley writes, under date the 6th December, that "about 8,000 people have applied for the medicine at our Mission Hall" in Sultan Street, Kuala Lumpur; and "over 7,000" in Ipoh, Perak, "within the last few weeks."

The official opium returns for the State of Selangor show a very considerable reduction during the months of November and December. The figures for the period from June to December are as follows:

Month.				Chests of opium.	Total duty and handling charges.
June	...	...	...	141.00	\$79,365.00
July	...	...	...	153.00	86,090.00
August	...	...	...	146.00	82,155.00
September		...	...	136.00	76,382.50
October	...	...	...	145.00	81,590.00
November	...	...	...	106.00	59,667.50
December	...	...	...	122.03	68,840.50
				<u>949.03</u>	<u>534,090.50</u>

Taking the average of the five first months, as a standard, the consumption during November shows a decrease of 38 chests and the revenue collected during the same period a decrease of \$21,449. The figures for December show a decrease of 22 chests, which is 16 chests more than the November total. This increase is probably due to a return of a certain number of the patients to their opium pipes.

It is assumed by those interested in the matter that this large falling off is directly due to the effects of the anti-opium drug which

has been distributed. It is undoubtedly difficult to put forward any other cause which would satisfactorily account for such an extensive decline; for there has been no change to speak of in the mining industry, the price of tin has been well maintained, there has not been any labour trouble and no exodus of Chinese from the State. It appears, therefore, that the cause is attributable to there being less opium smoked, not of necessity, but from choice.

The details above given appear to go far towards proving that there is some efficacy in the treatment, and further, that it is not merely the substitution of one drug habit for another. Whether the active ingredient is the anti-opium plant or the burnt opium administered internally in gradually decreasing doses, is a subject worthy of investigation. The latter is possibly the true cause and the anti-opium plant may only act as an astringent, preventing the distressing intestinal troubles which usually supervene on a stoppage of a customary supply of opium. The amount and nature of the alkaloids present in burnt opium is also a promising field of enquiry. The charred state of the anti-opium drug, which was in use up to quite recently, suggests that any alkaloidal principle which it might possess had been destroyed in the process of roasting, or rather charring, to which it had been subjected. Should the above surmise prove correct, it is possible that gambier or some other astringent might, with advantage, be substituted for the anti-opium plant.

The favourable results so far attained appear to warrant the experimental trial of the treatment on the opium smokers who, from time to time, find their way into the various lock-ups and prisons of the Federated Malay States. These wretched people, as all those who have either seen or heard them must be aware, suffer very severely during the first few days of their incarceration from the compulsory cessation of the supply of opium. It might be argued that pity was thrown away on them, but it should be remembered that the innocent suffer as well as the wrong-doers; for it is by no means everyone who is detained in custody who is either guilty or is subsequently convicted of the charge brought against him. Besides these humane considerations, it would be a most favourable opportunity of testing the efficacy of the treatment under circumstances where the results could be watched and recorded.

The writer wishes to gratefully acknowledge the kind assistance which was given to him by Mr. H. C. Ridges, Protector of Chinese, Selangor; the Rev. W. E. Horley, of the Methodist Episcopal Mission; Mr. Choo Cheng Khay; and the representatives of the Selangor Anti-opium Society at Weld Road, by furnishing information, supplying specimens and affording opportunities for personally investigating the process of the preparation and distribution of the drug.

## A VISIT TO THE AROA ISLANDS, WITH A LIST OF THE BIRDS FOUND THERE.

BY HERBERT C. ROBINSON, M.B.O.U., C.M.Z.S.

THE Aroa Islands, as they are called on the British Admiralty charts, though the name is not known to the local Malays, are a small group of islets in the Straits of Malacca some twenty-five miles to the east of the Sumatran Coast, south of Asahan and about the same distance due west of One Fathom Bank, the well-known lighthouse on the fairway for large shipping between Penang and Singapore.

The majority of the islands are of metamorphic formation, sandstones, shales and schists, though there is reason to believe that the southernmost islet, Pulau Tokong, which rises abruptly from the sea and on which I was unable to land owing to heavy surf, is of granite. The elevation of no one of the group exceeds eighty feet and most of them are much less than that, some of them being mere half-tide rocks.

Navigation in the Archipelago is difficult even for small launches, owing to the very strong tides and to the large quantity of mud from the Sungei Rokan estuary hiding the position of sunken rocks, which are numerous. There are only two anchorages which are at all safe: one to the north of Pulau Jemor in four to six fathoms of water, which can be used in the south-east monsoon; and another in deeper water to the west of the same island, which is safer during the north-east monsoon, though in both the holding ground is somewhat foul.

Pulau Jemor, or Long Aroa, is the only island we visited and is the only one which has permanent water, though this is uncertain in quantity and indifferent in quality. In shape, the island is long and narrow about half a mile in length by a quarter in maximum breadth, and contains perhaps a hundred acres. Near the centre it is cleft, almost to sea level, by a narrow gully, which connects two sandy beaches on which large numbers of turtles deposit their eggs. The privilege of collecting turtle eggs on this and other islands of the group is farmed to Malays by the Sultan of Siak for the annual sum of \$400 and 12,000 eggs, and two or three tumble-down huts in the gully are more or less regularly inhabited by men on the look-out for the eggs which are laid, fairly uniformly throughout the year. Otherwise the group is quite uninhabited, though formerly it was much resorted to by pirates from Linggi and Selangor, by whom the fine grove of coconuts existing on Pulau Jemor was probably planted.

Vegetation is very scanty, and in the more exposed situations consists merely of a coarse and wiry sedge-like grass growing in isolated tufts on the sandstone, interspersed with a few stunted Pandani and the almost universal Straits Rhododendron or Senduduk (*Melastoma malabathricum*).

In the gullies it is rather more luxuriant and one or two large trees and palms occur, while the undergrowth is chiefly a coarse bracken-like fern (*Gleichenialinearis*). The sea-shore trees are the usual *Calophyllum*, overgrown with orchids, ferns (*Davalia*, *sp.*) and two or three species of Myrmecophilous plants.

The largest tree on the island was a specimen of *Pterocarpus indicus*, and there were also several fine mango trees.

Turning to animal life, the only mammal is a large rat, which was very abundant and which, in the present days of minute differentiation, will probably be honoured with a new specific name. Neither squirrels nor tree-shrews occur.

Lizards of three species—viz., a gecko, a skink (*Mabuia multifasciata*) and a monitor (*Varanus salvator*)—were common; the latter feeding on the small crabs, which scurried in millions over the smooth sand near the water's edge. A toad was also noticed in a small swamp, though specimens were unfortunately not brought home.

During my first visit in August, with the exception of sea and shore birds, very few varieties were noted; but during our second stay in November, the island was frequented by many species on migration, and as little or nothing is known of migration routes in Southern Asia, I have thought it worth while to give a complete list of the species observed or obtained.

Insects were scarce; no butterflies were seen, and only a few moths, principally *Crambidae* and *Tineidae*. Two or three dragon flies, belonging to wide-spread mainland forms, were observed and several species of grasshoppers including a large species of *Acridium*.

#### LIST OF BIRDS.

##### \* 1. *PTILINOPUS JAMBU*—THE PINK-HEADED FRUIT-DOVE.

*Ptilinopus jambu* (Gm.); *Salvad., Cat. Birds Brit. Mus.*, xxi., p. 80 (1893).

*Leucotreron jambu* (Gm.); *Sharpe, Hand-list of Birds*, i., p. 56 (1899).

A single male was seen and shot during our first visit in August, but fell into the sea and could not be retrieved.

This fruit pigeon, though formerly common in the old Malacca collections, is now decidedly rare and local in most parts of the Peninsula with which I am acquainted. It is found at all elevations up to about 4,000 feet, but appears to frequent by preference the vicinity of the coastal belt of mangroves. In such situations, I have, on one or two occasions, seen it in considerable numbers, notably at the mouth of the Linggi River on the borders of Negri Sembilan and the territory of Malacca in December, 1904.

2. *AMAUROORNIS PHAENICURA*—THE WHITE-BREASTED WATER HEN.

*Amaurornis phaenicura* (Forst.); *Sharpe, Cat. Birds*, xxiii., p. 156 (1894); *id., Hand-list of Birds*, i., p. 106 (1899).

A single adult was shot in a small swamp. Very common in suitable localities at all seasons of the year throughout the Malay Peninsula.

3. *STERNA DOUGALLI*—THE ROSEATE TERN.

*Sterna dougalli* (Mont.); *Howard Saunders, Cat. Birds*, xxv., p. 70 (1896); *Sharpe, Hand-list*, i., p. 135 (1899).

Probably nesting on some of the smaller islands of the group. Three specimens in full breeding plumage were shot in August, when the species was very abundant, though not a single tern of any kind was seen in November.

4. *STERNA ANAETHETA*—THE PANAYAN TERN.

*Sterna anaetheta* (Scop.); *Howard Saunders, t.c.*, p. 101; *Sharpe, t.c.*, p. 136.

One specimen.

Fairly abundant in August, but not so common as the Roseate Tern

5. *NUMENIUS VARIEGATUS*—THE EASTERN WHIMBREL.

*Numenius variegatus* (Scop.); *Sharpe, Cat. Birds*, xxiv., p. 361 (1896); *id., Hand-list*, i., p. 158 (1899).

A single female was shot on 13th November.

Along the mud-flats and estuaries of the Selangor coast both whimbrels and curlews are enormously abundant during the winter months, the former occurring in flocks of several hundred individuals, while, on the other hand, it is rare to see more than forty or fifty curlews together.

6. *TRINGOIDES HYPOLEUCUS*—THE COMMON SANDPIPER.

*Tringoides hypoleucus* (Linn.); *Sharpe, Cat. Birds*, xxiv., p. 456 (1896); *id., Hand-list*, i., p. 161 (1899).

A single female.

Common on river banks and the sea-shore during the winter months.

\* 7. *ARDEA SUMATRANA*—THE DUSKY-GREY HERON.

*Ardea sumatrana* (Raffles); *Sharpe, Cat. Birds*, xxvi., p. 68 (1898); *id., Hand-list*, i., p. 194 (1899).

A single specimen was seen, but not secured. Elsewhere in the Peninsula it is very abundant among the mangroves edging the tidal rivers, and is occasionally met with along open stretches of sandy beach. In the former situations it is remarkably fearless and can be approached within very few yards.

8. *DEMIEGRETTA SACRA*—THE REEF HERON.

*Demiegretta sacra* (Gm.) ; *Sharpe, t.c.*, p. 136 ; *id.*, *Hand-list*, i., p. 198.

Very common. All the specimens shot or seen were in the grey phase and those obtained in August were in nuptial plumage.

9. *GORSACHIUS MELANOLOPHUS*—THE MALAY BITTERN.

*Gorsachius melanolophus* (Raffles) ; *Sharpe, t.c.*, p. 166 ; *id.*, *Hand-list*, i., p. 199.

A single immature specimen was shot among high bracken at dusk.

Owing to its skulking and nocturnal habits, this species is rarely obtained and is not represented in the Singapore or Perak Museums or until recently in the Selangor Museum, which, however, has just received a fine adult from Kuala Selangor. I doubt if it is really by any means rare and in past years numerous specimens seem to have been obtained in the vicinity of Malacca.

10. *NYCTICORAX NYCTICORAX*—THE NIGHT HERON.

*Nycticorax nycticorax* (Linn.) ; *Sharpe, t.c.*, p. 146 ; *id.*, *Hand-list*, i., p. 198.

One immature bird was obtained.

11. *BUTORIDES JAVANICA*—THE LITTLE GREEN HERON.

*Butorides javanica* (Horsf.) ; *Sharpe, t.c.*, p. 177 ; *id.*, *Hand-list*, i., p. 199.

Several specimens are in the collection.

Very common throughout the coastal districts, especially among the mangroves.

12. *DUPETOR FLAVICOLLIS*—THE BLACK BITTERN.

*Dupetor flavicollis* (Lath.) ; *Sharpe, t.c.*, p. 247 ; *id.*, *Hand-list*, i., p. 203.

An adult and an immature bird were secured, also from among high bracken.

Somewhat uncommon in the Peninsula.

13. *SULA SULA*—THE BROWN GANNET.

*Sula sula* (Linn.) ; *Ogilvie-Grant, Cat. Birds*, xxvi., p. 436 ; *Sharpe, Hand-list*, i., p. 236.

Very large numbers of this gannet roosted on a small rock known as Pulau Tokong, rising vertically from the sea to a height of forty or

fifty feet, some miles south-east of Pulau Jemor, where our main collections were formed. The entire colony, consisting of some hundreds, appeared to be adult birds.

In the immediate neighbourhood of the coasts of the Malay Peninsula gannets are very rarely seen. An adult bird in the Selangor Museum was caught by flying under the thwarts of a boat at Pulau Jarak, in the centre of the Straits of Malacca, about a hundred and thirty miles south of Penang.

\* 14. *FREGATA AQUILA*—THE LARGER FRIGATE BIRD.

*Fregata aquila* (Linn.); *Ogilvie-Grant, t.c.*, p. 443; *Sharpe, t.c.*, p. 237.

Immense flocks of frigate birds were met with round the islands, but none could be obtained. They are not often seen in the southern half of the Straits of Malacca, except during the prevalence of strong winds, and I have only noted them once on the east coast of the Peninsula, near Senggora in December, 1901, during a strong gale from the north-east.

15. *ACCIPITER VIRGATUS*—THE BESRA SPARROW HAWK.

*Accipiter virgatus* (Temm.); *Sharpe, Cat. Birds, i.*, p. 150 (1874); *id., Hand-list of Birds, i.*, p. 253 (1899).

A constant stream of these small sparrow hawks, nearly all immature birds and evidently on migration, was passing over the islands during our visit in November and over thirty were shot. They were obviously half starving and showed extraordinary boldness in chasing and striking down birds much larger than themselves, several being captured in the act. They were observed feeding on *Pitta cyanoptera*, *Coccytes coromandus*, *Surniculus lugubris*, *Dicrurus annectens* and *Hierococcyx fugax*; the mimetic resemblance, the latter bird is said to possess, is thus evidently no protection against the actual model.

With the possible exception of the Brahminy Kite and the White-bellied Sea Eagle, this is the commonest bird of prey in the Malay Peninsula and is found everywhere from the top of the highest mountains to sea level, and in the densest jungle as well as on open grass plains.

16. *FALCO PEREGRINUS*—THE PEREGRINE FALCON.

*Falco peregrinus* (Tunst.); *Sharpe, t.c.*, p. 374; *id., Hand-list, i.*, p. 273 (1899).

Two males and a female were shot, but the two former fell into a tide-rip and could not be recovered. The specimen secured is not very dark and cannot be referred to the Sondaic and Papuan race, *Falco crassirostris* (Sharpe, *Ibis*, 1894, p. 548).

17. *PERNIS PTILONORHYNCHUS*—THE CRESTED HONEY-BUZZARD.

*Pernis ptilonorhynchus* (Temm.); *Sharpe, t.c.*, p. 347; *id.*, *Hand-list*, i., p. 271 (1899).

A single immature female.

\* 18. *HALIAETUS LEUCOGASTER*—THE WHITE-BELLIED SEA EAGLE.

*Haliaetus leucogaster* (Gm.); *Sharpe, t.c.*, p. 307; *id.*, *Hand-list*, i., p., 267 (1899).

Seen, but not secured.

19. *NINOX SCUTULATA* THE HAWK OWL.

*Ninox scutulata* (Raffles); *Sharpe, Cat. Birds*, ii., p. 156 (1875); *id.*, *Hand-list*, i., p. 290 (1899).

One very dark-coloured adult male.

One or more pairs of this owl are generally to be found on the small islands in the Straits of Malacca during the winter months, picking up a precarious existence by feeding on the smaller birds that may halt on the islands during migration.

\* 20. SCOPS, *sp.*

A very small owl, probably a *Scops* but possibly a species of *Glaucidium*, was observed, but not obtained.

21. *CEYX TRIDACTYLA*—THE THREE-TOED KINGFISHER.

*Ceyx tridactyla* (Pall.); *Sharpe, Cat. Birds*, xvii., p. 174 (1892); *id.*, *Hand-list*, ii., p. 52 (1900).

One adult female.

A somewhat unexpected find on a tiny island like Pulau Jemor with no running water.

22. *HALCYON COROMANDUS*—THE RUDDY KINGFISHER.

*Halcyon coromandus* (Lath.); *Sharpe, t.c.*, p. 217; *id.*, *Hand-list*, ii., p. 56 (1900).

One adult.

23. *HALCYON PILEATUS*—THE BLACK-CAPPED KINGFISHER.

*Halcyon pileatus* (Bodd.); *Sharpe, t.c.*, p. 229; *id.*, *Hand-list*, ii., p. 57 (1900).

Two males and three females, all somewhat immature, as is shown by the black edgings to the feathers of the breast.

24. *EURYSTOMUS CALONYX*—THE MIGRATORY ROLLER.

*Eurystomus calonyx* (Hodgs., M.S.) ; *Sharpe, t.c.*, p. 38, pl. ii., fig. 2 ; *id.*, *Hand-list*, ii., p. 47 (1900).

The seven specimens obtained are all immature birds in moult, but seem to belong to this sub-species.

25. *CAPRIMULGUS JOTAKA*—THE JUNGLE NIGHTJAR.

*Caprimulgus jotaka* (Temm. & Schleg.) ; *Hart., Cat. Birds*, xvi., p. 552 (1892) ; *Sharpe, Hand-list*, ii., p. 88 (1900).

Common on the island, four specimens having been obtained ; on the mainland of the Peninsula it is decidedly rare, and in the low country is met with only during the winter months, though it is possible that it is resident throughout the year on the higher mountains.

26. *COCCYSTES COROMANDUS*—THE RED-WINGED CRESTED CUCKOO.

*Coccytes coromandus* (Linn.) ; *Shelley, Cat. Birds*, xix., p. 214 (1891) ; *Sharpe, Hand-list*, ii., p. 155 (1900).

Very common.

27. *SURNICULUS LUGUBRIS*—THE DRONGO CUCKOO.

*Surniculus lugubris* (Horsf.) ; *Shelley, t.c.*, p. 227 ; *Sharpe, t.c.*, p. 156.

One specimen brought to ground by a sparrow hawk.

28. *HIEROCOCCYX FUGAX*—THE MALAY HAWK CUCKOO.

*Hierococcyx fugax* (Horsf.) ; *Shelley, t.c.*, p. 236 ; *Sharpe, t.c.*, p. 157.

A series of nine birds, of which three are very adult, as shown by the uniform deep lead grey of the upper surface. All the specimens agree in having a narrow terminal band of bright rufous to the tail.

29. *CUCULUS MICROPTERUS*—THE INDIAN CUCKOO.

*Cuculus micropterus* (Gould.) ; *Shelley, t.c.*, p. 241 ; *Sharpe, t.c.*, p. 158.

Four immature and one adult specimen.

30. *CUCULUS INTERMEDIUS*—THE HIMALAYAN CUCKOO.

*Cuculus intermedius* (Vahl.) ; *Shelley, t.c.*, p. 252.

*Cuculus saturatus* (Hodgs.) ; *Sharpe, t.c.*, p. 158.

A single adult male.

31. *EUDYNANIS HONORATA*—THE KOEL.

*Eudynanis honorata* (Linn.) ; *Shelley, t.c.*, p. 316 ; *Sharpe, t.c.*, p. 164.

Extraordinarily abundant on most of the small islands of the Straits of Malacca from October to April.

32. *PITTA CYANOPTERA*—THE LESSER BLUE-WINGED PITTA.

*Pitta cyanoptera* (Temm.); *Sclater, Cat. Birds*, xiv., p. 420 (1888); *Sharpe, Hand-list*, iii., p. 180 (1901).

Very numerous; also common in the winter months on Pulau Jarak and the Sembilan Islands, together with the succeeding species.

33. *PITTA CUCULLATA*—THE HOODED PITTA.

*Pitta cucullata* (Hartl.); *Sclater, t.c.*, p. 442; *Sharpe, t.c.*, p. 184.

Not quite so common as the preceding, but very abundant.

34. *LARVIVORA CYANEA*—THE SIBERIAN BLUE CHAT.

*Larvivora cyanea* (Pall.); *Oates, Faun. Brit. Ind. Birds*, i., p. 181 (1889); *Robinson, Journ., F.M.S. Mus.*, i., p. 28 (1905).

A single immature male, in plumage precisely resembling the adult female, was obtained on 14th November, and an adult male was also shot on the same day, but at such close quarters that it was found impossible to make a skin of it.

Between November and April the species is not uncommon in the mountains of Selangor and Negri Sembilan, at altitudes varying from 2,000 feet to 4,000 feet, but, so far as my experience goes, it is never met with in the low country. It has not hitherto been recorded from Sumatra.

35. *LOCUSTELLA LANCEOLATA*—THE STREAKED GRASSHOPPER-WARBLER.

*Locustella lanceolata* (Temm.); *Oates, Faun. Brit. Ind. Birds*, i., p. 353 (1889); *Sharpe, Hand-list*, iv., p. 186 (1903).

Three specimens of this warbler, which is called by the natives *burong tikus* or rat bird, were collected among long grass and bracken, being very shy and secretive in their habits. Two of these have the tail coverts uniform, while the third has them thickly streaked with blackish-brown, the streaks on the flanks being also much more pronounced. Of a pair collected on the coast of Selangor, the male has the under coverts streaked, while those of the female are uniform, so that the difference is possibly sexual. The species has not apparently been recorded either from the Malay Peninsula or Sumatra, though it is probably common in both countries in suitable localities during the winter months.

36. *TURDUS OBSCURUS*—THE DARK OUZEL.

*Turdus obscurus* (Gm.); *Sharpe, Hand-list*, iv., p. 140 (1903).

*Merula obscura* (Gm.); *Oates, Faun. Brit. Ind. Birds*, ii., p. 134 (1890).

Numerous individuals were seen on the day of our departure, after a somewhat stormy night, and a single specimen secured. The species

was very common on Pulau Jarak in December, 1904, and occurs abundantly on the mountains of the Peninsula throughout the winter months, but appears to make only a very brief stay in the lowlands on arrival and departure.

37. *HEMICHELIDON FERRUGINEA*—THE FERUGINOUS FLYCATCHER.

*Hemichelidon ferruginea* (Hodgs.); *Sharpe, Cat. Birds*, iv., p. 122 (1879); *Oates, Faun. Brit. Ind. Birds*, ii., p. 6 (1890); *Sharpe, Hand-list*, iii., p. 204 (1903).

A single female.

Very common on the high mountains of the Peninsula, being probably resident throughout the year above 4,900 feet.

38. *ALSEONAX LATIROSTRIS*—THE BROWN FLYCATCHER.

*Alseonax latirostris* (Raffles.); *Sharpe, t.c.*, iv., p. 127 (1879); *Oates, Faun. Brit. Ind. Birds*, ii., p. 35 (1890); *Sharpe, Hand-list*, iii., p. 206 (1903).

One male.

Common in the low country in the Malay Peninsula throughout the year, but much more abundant in the winter months.

39. *TERPSIPHONE AFFINIS*—THE BURMESE PARADISE FLYCATCHER.

*Terpsiphone affinis* (Hay.); *Sharpe, t.c.*, p. 349; *Oates, t.c.*, p. 47; *Sharpe, Hand-list*, iii., p. 263 (1903).

An adult female, probably belongs to this species, though it is extremely difficult to distinguish between females and young males of *T. affinis* and the closely allied *T. incii* (Gould).

40. *DICRURUS ANNECTENS*—THE CROW-BILLED DRONGO.

*Dicrurus annectens* (Hodgs.); *Oates, Faun. Brit. Ind. Birds*, i., p. 312 (1889); *Sharpe, Cat. Birds*, iii., p. 271 (1878); *Robinson, Journ., F.M.S. Mus.*, i., p. 28 (1905).

Numerous specimens, both adult and young. Very common also on Pulau Jarak in December, 1904, and April, 1906. Widely distributed throughout the Malay Peninsula in the winter months up to an altitude of about 3,000 feet, but scarce at other seasons.

\* 41. *CORVUS*, *sp.*

A crow, probably *Corvus macrorhynchos*, but possibly *Corvus enca*, the Slender-billed Crow, which I have recently ascertained to be fairly common in the Malay Peninsula, was also observed.

“KAIN PELANGI.”

BY L. WRAY.

THIS appropriately named cloth is now much in fashion with the Malays of the Straits and the Federated Malay States. It would appear to be of quite modern introduction, though it has obviously been developed from the much older tie-and-dye work so extensively employed in India for the decoration of cloth. The earliest examples of it, in the Native States, came under my observation in about the concluding year of the last century.

The Malay name means “rainbow cloth.” It, however, differs very materially from the cloth which was brought out in Europe under this name some few years ago. This had no pattern, but was dyed to represent the colouring of the spectrum, the colours grading one into the other. In the “kain pelangi,” on the other hand, there is a regular pattern, but the colours employed are the brightest tints obtainable with aniline dyes of various hues: hence its name.

The cloth is almost invariably silk. In Singapore, the white silk is bought, and comes either from Japan or China. In Tringganu, it is locally woven, especially for this purpose. The work is done entirely by female labour. In Singapore, the women are Boyanese, from the island of Bawean, off the coast of Java; and in Tringganu, they are natives of that State. This manufacture is also carried on in Kelantan, and possibly in other localities, but the subject has only been studied by the writer in Singapore and Tringganu.

The silk is spread on a short-legged table, having a padded top. The pattern is then printed on it, in outline, by means of carved wooden stamps. These are cut out of comparatively soft wood and are not so well finished as those used in stamping the “kain telepoh.” The design is also only in outline, no broad-printing surfaces being left. The stamp is pressed on to a pad of wet rag impregnated with red ferruginous earth bought from the Kling shops. This substance is called “khavi,” and is the pigment used by the Hindus for making the caste-marks on their foreheads. The stamp having been charged with colour is next rubbed on a stiff brush, which is fastened with its bristles upwards on the tray containing the pigmented pad. It was a common European boot-brush. The stamp after brushing is applied to the cloth. The stamps are small, containing only a single flower or a portion of a border, and considerable judgment and skill is required to build up the pattern with them. It is all done by eye, no register marks being used as in England when printing patterns by means of wooden blocks. The outline is thus formed in rather pale-red lines which wash out in the subsequent process. The stamping of the outline is done by the same people who do the dyeing.

The cloth may be single, but usually several thicknesses are tacked together at their edges and are done at once, the upper one alone having the outline printed on it. This, of course, saves labour and time, but probably the result is not quite so good as when a single thickness is treated at a time. The outlined cloth is given to other women who prepare it for the dyers. A good deal of the pattern is produced by stitching the cloth firmly together in puckers, and larger spaces which are intended not to take the dye are tied up tightly in pieces of the skin of the leafstalk of the banana. The workers are, of course, guided by the outlined pattern which has been printed on the cloth. When finished, the cloth has a curious crumpled-up appearance; a piece, sufficiently large to make a sarong, will have contracted to about 8 inches in diameter in the tying process.

The tied cloth is then given back to the dyers, who immerse it for a short time in the dye for the ground colour of the piece. Favourite colours for this purpose are yellow, green and red. As previously stated, the pigments used are all aniline ones. After the first application of the dye the cloth is allowed to dry, the tying and stitching is then undone and all the threads are pulled out. It now presents the appearance of a coloured cloth with a white pattern on it.

It is now ready for the next process. For this, it is stretched on a wooden frame with short legs. It may be mentioned that the Malay women, when working, sit or squat on a raised platform, like tailors, so that this frame and the printing table, previously mentioned, are furnished with legs about 9 inches high, to be of a convenient height for working at in that position. The frame is provided with a number of sharp brass pins round its outer edges for the purpose of holding the cloth. Further development of the pattern is now carried out on the stretched cloth by means of different coloured dyes applied with the brushes used by the Chinese for writing with. Most of this embellishment is drawn in free-hand on the white spaces left by the last process, but some of it is put on to the ground colour itself.

The cloth after this is taken off the frame and is ready for sale. No attempt is made to fix the colours and, as a consequence, they are fugitive and run badly when the cloth is washed, or even accidentally damped or wetted. Although both the makers and buyers are well aware of this fact, it does not appear to interfere with either their manufacture or sale. The brilliancy of colouring is the great point in their favour in Asiatic eyes. To the question of why they did not use their own permanent dyes, the makers answered that it would be a great deal more trouble and that the results would not be nearly so beautiful.

The idea that the harmonious colouring of the old Eastern artwork was due to the possession of a fine colour sense, is undoubtedly not borne out by facts. It was simply a matter of necessity, as they

could not produce the purer and cruder colours. Now that aniline, in all its varied tints, is obtainable, colour effects, which to educated European eyes are excruciating, are produced and much admired by Malays, Chinese and Indians of all nationalities. The Japanese alone, amongst Easterns, appear to be able to deal with these brilliant colours with taste and discretion.

Besides the above described cloth, a curious mixture of two separate methods of tie-and-dye work is sometimes combined in one garment. That is, a piece of cloth is woven with a part of the warp thread treated by the tie and dye method, which is used to produce the so-called "kain limau \*," and the remainder of the length is left white. This portion is subsequently tied and dyed as above described. If the ground colours of the two portions harmonise, the effect is by no means displeasing. There is one sarong in the Perak Museum, which was collected in Tringganu, of this composite cloth; the ground colours being a rather dull red for the "kain limau" part and a quiet yellow for the "kain pelangi" division. Another example, said to have been made in Kelantan, had the grounds of two different shades of red.

There is another species of cloth, produced in Singapore by the same people, which is also called "kain pelangi," though the technique of its manufacture is quite different. The basis is also white silk, which is stretched on the frame already described. The pattern is then drawn on it, in various shades of aniline by means of Chinese writing brushes. No stamps or guides are used, the work being entirely done by free-hand drawing, without even a preliminary sketch. In one specimen, in the possession of the writer, the colours employed are violet, red, green and yellow. The patterns are mostly conventionalised floral derivatives.

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## REPORTS ON CORUNDUM FROM PERAK, FEDERATED MALAY STATES.

BY PROFESSOR WYNDHAM R. DUNSTAN, M.A., F.R.S.,  
DIRECTOR, IMPERIAL INSTITUTE, SOUTH KENSINGTON., LONDON, S.W.

130-15. IMPERIAL INSTITUTE ROAD, LONDON, S.W.,

*27th September, 1904.*

SIR,—I have the honour to send herewith a report on specimens of corundum from the Federated Malay States received from Mr. L. Wray. The report also refers to other specimens of the same material received from Mr. Cecil Wray and from Mr. Alma Baker.

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\* See "Notes on Dyeing and Weaving as practised at Sitiawan in Perak," by L. Wray, in the "Journal of the Anthropological Institute," vol. 32, January-June, 1902.

It will be seen that the result of the investigation of the substance, which has been conducted here, render it probable that there may be a remunerative commercial demand for this corundum, and I propose, with your approval, to proceed further with the matter on the lines suggested in the report.

I would suggest that this report should be shown to Mr. Scrivenor, with a view to his assistance in the further development of the subject being secured since it is possible that deposits of this mineral occur elsewhere in the Federated Malay States.

I would also ask that the information contained in the report be conveyed to Mr. Leonard Wray and the other gentleman who submitted specimens.

I have, etc.,

WYNDHAM R. DUNSTAN.

H.E. THE HIGH COMMISSIONER, F.M.S., SINGAPORE.

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A SPECIMEN of grey-blue corundum, weighing about 3 ounces, was forwarded to the Imperial Institute by Mr. Leonard Wray, the Curator of the Perak Government Museum, and in the accompanying letter, dated the 28th November, 1903, he stated that he had collected it near Ipoh in the Kinta District, where the mineral occurs in more or less waterworn lumps in the drift which is worked for tin. At present no use is made of the corundum, but it was thought that, if it proved to be of marketable value, considerable quantities could be procured. Mr. Cecil Wray, the Resident Magistrate of Kinta, had also collected a large quantity of the mineral at Koban Sungei Kaiadi.

On Mr. Leonard Wray's return to Perak he forwarded to the Imperial Institute a larger sample, weighing nearly 5 lbs., which he had collected at Pulai, Sungei Raia, also in the Kinta District. In the letter accompanying the consignment, No. 13/04, dated the 24th February, 1904, he stated that the mineral occurs in quantity at or near Pulai, and thought there would be no difficulty in getting from 10 to 20 tons per month, judging from the amount he saw in the mines.

These two samples, the colour of which varies from pale blue to bluish-grey, are exactly similar in characters. No well-developed crystals are visible to the naked eye, the mineral occurs in compact, finely granular masses made up of microscopic crystals. Most of the pieces are more or less rounded by water action, though the exact manner in which this was brought about is not apparent.

The mineral is rather harder than some well-crystallised corundum from Ceylon, which was available for comparison. Its specific gravity varies from 3.75 to 3.90 according to the degree of the compactness of its texture. The higher figure is exceeded by few specimens of corundum, except ruby and sapphire, which reach 4.06.

An analysis in the Scientific and Technical Department of the Imperial Institute gave the following results :

Silica ... ..	SiO <sub>2</sub> ...	.15 per cent.
Alumina ... ..	Al <sub>2</sub> O <sub>3</sub> ...	7.10 ..
Lime ... ..	CaO ...	.50 ..
Magnesia ... ..	MgO ...	trace
Combined water ... ..	H <sub>2</sub> O ...	2.41 ..

The percentage of alumina is greater than in any sample of corundum which has been analysed, except ruby and sapphire. The amount of water is, however, rather high.

Corundum is used mainly for abrasive purposes in the same manner as emery. The finer qualities are also employed in place of gemstones in the movements of clocks and watches. It has been proposed to utilise it as a source of metallic aluminium, but at present other less refractory and cheaper compounds of the metal are preferred.

In determining the value of corundum for abrasive purposes, whether it be employed as a loose powder or embedded in cement in the form of discs, a trial on a large scale is absolutely necessary. In no other way can it be ascertained if the mineral satisfies industrial requirements, as not only hardness but toughness is important. The liability of some varieties to split into thin plates along the pseudo-cleavage that follows certain planes of decomposition is very objectionable, as instead of irregular points and edges which are effective for grinding purposes, flat surfaces are produced.

This characteristic seriously diminishes the value of Indian corundum, which was formerly exported in considerable amount to Europe, but is now unable to compete with the extensive deposits of the mineral which have been developed in the United States and Canada, and the artificial products carborundum and alurundum. Corundum is now mined in India mainly for local use and for export to China, only a small quantity being sent to Europe or America. On the other hand, the granular structure of the corundum from Perak seems calculated to increase its value for abrasive purposes.

The material from Kinta was sent to a commercial expert dealing in corundum for his opinion as to its value. He stated that he believed the material might be of value for abrasive work and it might be worth from £15 to £25 a ton for such purposes. If it

would take a high polish, it could be used for the movements of clocks and watches and might be sold at a higher price. Actual trial on a commercial scale was, however, necessary.

In June, 1904, a further sample of corundum, weighing 32 lbs., was received from Mr. Alma Baker, of Batu Gajah, Perak. This is in large lumps, some weighing as much as 8 lbs., and is in all respects similar to the previous samples.

There seems every reason to believe that, if this corundum can be obtained in the amounts which Mr. Leonard Wray believes to be the case, it could be sold either for abrasive purposes or for use in the movements of time-pieces at remunerative prices: but, in order that its capabilities may be properly determined by trial on a large scale, a consignment of not less than three or four hundredweight would be necessary in order to determine its precise commercial value as an abrasive agent, together with a smaller amount—say, 7 lbs.—of the clearest and most compact material for trial in the manufacture of watches and clocks.

If, therefore, it is considered advisable to proceed further with this enquiry, I should be glad to be informed whether these larger consignments can be supplied, in which case I shall endeavour to make arrangements with experts to carry out practical trials on the lines indicated above.

27th September, 1904.

WYNDHAM R. DUNSTAN.

FEDERAL SECRETARIAT.

No. H.C. 8875 04.

KUALA LUMPUR, F.M.S.,

31st October, 1904.

SUBJECT:

REPORT ON SPECIMENS OF CORUNDUM FROM F.M.S.

SIR,—I am directed to forward for your information, in connection with the shipments of specimens of corundum which have been made, a report by the Director of the Imperial Institute of the United Kingdom, the Colonies and India, giving the results of his investigations.

2. I am to ask you to report whether you can supply the larger consignments asked for, with a view to the carrying out of further trials by experts.

I have, et

A. R. VENNING,

LEONARD WRAY, Esq., PERAK.

*Federal Secretary, F.M.S.*

BATU GAJAH,  
6th November, 1904.

SIR,—I have the honour to acknowledge the receipt of your letter of 31st October (H.C. 8875/04) and to inform you that I will collect and send to the Imperial Institute the large sample of corundum asked for by Professor W. Dunstan.

I have, etc.,

THE FEDERAL SECRETARY,  
KUALA LUMPUR.

L. WRAY.

TAIPING, PERAK,  
22nd February, 1905.

MY DEAR DUNSTAN,—I send you by this post, in two boxes, a sample, weighing 18 lbs., of what appears to me to be the best quality of corundum for the movements of clocks and watches. I shall be much obliged, if, after trial, a sample of the stone, which proves to be suited to the purpose, could be returned to me. Also a few cut "jewels."

I am also sending, in three boxes, the large sample you ask for. It weighs about 5 cwt.

I went to Pulai, in Kinta, on the 17th February, and collected the whole sample from refuse heaps on one mine, in quite a short time. I am sure it could be obtained in considerable quantities if there was a demand for it, at a price which would cover cost of collection, bagging and freight to England.

I found a few pieces, with small well-formed hexagonal crystals on them, of the same form as that of the sapphire. I also found one large lump, with a portion of the matrix adhering to it. This appears to be a mica-schist.

I am, etc.,

PROFESSOR W. DUNSTAN, F.R.S.,  
DIRECTOR, IMPERIAL INSTITUTE.

L. WRAY.

IMPERIAL INSTITUTE OF THE UNITED KINGDOM,  
THE COLONIES AND INDIA.

IMPERIAL INSTITUTE ROAD, LONDON, S.W.,

9th October, 1906.

SIR,—I have the honour to forward a report on a consignment of corundum from Perak, which was sent for examination to the Imperial

Institute by the Director of Museums at Taiping, with letter, dated the 22nd February, 1905, in accordance with the suggestions made in the previous report, dated the 27th September, 1904, on this subject.

The investigation has shown that this corundum, although of unusual character, is likely to be of value for abrasive purpose, but, before further action can be taken, it will be necessary to know what quantity is available and the approximate price at which it can be placed on the market.

I shall be glad to receive information upon those points and, if possible, to be placed in communication with a firm willing to work the deposits in Perak.

I have, etc.,

WYNDHAM R. DUNSTAN.

H.E. THE HIGH COMMISSIONER, F.M.S., SINGAPORE.

## SECOND REPORT ON CORUNDUM FROM PERAK, FEDERATED MALAY STATES.

BY PROFESSOR WYNDHAM R. DUNSTAN, M.A., F.R.S.,  
DIRECTOR IMPERIAL INSTITUTE, SOUTH KENSINGTON, LONDON, S.W.

IN accordance with the recommendations made in the previous report (dated the 27th September, 1904) on corundum from Perak, further samples of the mineral were forwarded to the Imperial Institute by the Director of Museums, Taiping, Perak, in order that the material might be submitted to manufacturers for technical trial.

### DESCRIPTION OF SAMPLES.

The samples consisted of (1) 18 lbs. of selected corundum pebbles which were thought to be specially suitable for the preparation of bearing for the "movements" of clocks or watches, and (2) about 5 cwt. of ordinary corundum.

The larger consignment consisted of pieces of corundum of rather irregular size, which had a quantity of dust and clayey material adhering to the surfaces. The quality of the samples appeared, however, to be equal to that of the previous specimen, about 95 per cent. being genuine corundum.

The smaller sample, supposed to consist of corundum of superior quality, was in smaller pieces, but was practically identical with the main bulk.

### COMMERCIAL VALUATION.

Samples of the two consignments were submitted to a firm of mineral brokers, who reported that the small pebbles of corundum would not fetch a higher price than the large consignment. This firm

submitted samples to three manufacturers using corundum, all of whom expressed the opinion that the mineral would be of no value for abrasive purposes. Two of the firms also stated that they did not consider the material to be corundum. On this point, however, they were reassured and informed that the examination of the material at the Imperial Institute showed that it was an unusually pure corundum, containing 97.1 per cent. of alumina, whilst in hardness it was equal to any other variety of the mineral, except ruby and sapphire. The unusual appearance of the corundum, which probably gave rise to the doubts expressed, is due in part to its granular character and in part to its freedom from decomposition by silicification along certain planes, which causes a tendency to split into small flat plates. Both these characteristics, they were informed, ought to increase the value of the corundum as an abrasive.

The communication of these facts to the firms in question resulted in an offer from one of them to make a thorough test of the mineral. Before going to the trouble and expense of such a trial, the firm desires to know the price at which corundum could be delivered in London.

Another firm asked for a quotation for the 5-cwt. sample which was available, and also for quantities up to 1,000 tons per annum: (1) c.i.f. Liverpool, and (2) f.o.b. at port of shipment.

The firms were invited to make offers, but this they declined to do.

It is now necessary, therefore, that an approximate quotation should be given of the price at which quantities of corundum equal in quality to the sample can be delivered at London, Liverpool and New York, or placed on board ship at Singapore or other convenient port.

Subsequently, a sample of this corundum has been submitted to a firm of merchants with whom the Imperial Institute was in correspondence in regard to other minerals. This firm sent a portion to a customer on the Continent, who reported that the mineral is of good quality and would have a value of about £20 per ton, c.i.f. Hamburg. The Imperial Institute is also in correspondence with a firm in the United States with regard to this corundum, and it appears probable that a fair market for the material can be found if it can be supplied in large quantities at reasonable rates.

It would be an advantage if the Imperial Institute could now be placed in communication with some firm in the Federated Malay States willing to take the matter up, so that their name could be given to firms in this country desirous of buying supplies of the mineral.

*9th October, 1906.*

WYNDHAM R. DUNSTAN.

## REPORT ON THE MUSEUM DEPARTMENT FOR THE YEAR 1905.

### PERAK STATE MUSEUM.

**B**YOND a few slight improvements, nothing was done to the building itself. These included brick drains round the ethnological wing and guttering round its lantern roof. Guttering was also put round the roof of the porch, while the exterior of the whole was painted and colour washed. A small detached skinning shed was built in the grounds to relieve the workshop of the dirtier portions of the work.

2. In all the departments the rearrangement, which was begun in 1904, was carried on, and, except in a few instances, the various collections were placed in the order which had previously been determined on. A great deal more work, however, remains to be done to complete the details of the installation.

3. Considerable additions were made to most of the sections—by collection, exchange, purchase and donation. The sections to which the greatest increases were made are the ethnological, mineralogical and economic.

4. The registration and cataloguing of the collections, which was begun in December of 1904, was carried on, and by the end of the year the number reached was 3,800, equal to about 8,000 cards, including the guide-cards.

5. The library was also re-catalogued, which involved the type-writing of about 4,000 cards. This new card catalogue is worked on the same system as that for the other departments, which was mentioned in my last Annual Report, and explained in detail in a paper, entitled "A System for the Registration of the Contents of Museums," contributed to the "Museum Association" and reprinted in the third number of the "Journal of the Federated Malay States Museums."

6. The number of visitors admitted during the year was 55,103, and, as the Museum was open to the public on 295 days, this gives a daily average attendance of 188.83.

7. Mr E. Keilich, the Taxidermist, returned from eighteen months' leave on the 21st of September, and from then to the end of the year the staff was at its full strength.

### SERLANGOR STATE MUSEUM.

8. The new Museum was not finished by the end of the year, but the case-building had progressed in a satisfactory manner and the woodwork for the wall cases of the two long exhibition rooms was

practically ready for erection by December. The amount expended for case-building and furniture was \$2,472.66. This included the cost of a safe, the construction of a trap-door and hoisting tackle to enable the furniture, etc., to be raised to the upper floor, a supply of glass-topped boxes for storing the skin collection and cabinets to hold them, as well as some almeirahs and office furniture.

9. Collecting was actively carried on throughout the year and many specimens new to the collection and several new to science were obtained. In January and again in February the high mountains in the neighbourhood of Gunong Batang Kali were visited by the Curator and his collectors, in May the Gunong Tahan expedition started, and at the end of the year a visit was paid to Linggi in Negri Sembilan.

10. Owing principally to its dilapidated state it was decided to close the old Museum to the public in September and use the whole of it as a store. Many of the specimens were packed up, as this appeared to be the best means of preserving them from deterioration.

11. The number of visitors admitted during the first eight months of the year amounted to 20,930, against 23,219, for the corresponding months of 1904.

#### GENERAL.

12. The most important event of the year was the Gunong Tahan collecting expedition. It started on the 11th of May and returned early in September. Although the Director of Museums was compelled to return, owing to an attack of dysentery, on the 19th of July, the Curator of the Selangor Museum remained on the mountain and brought the work to a satisfactory conclusion. It is impossible to give any results at the present time. The specimens collected were all sent to the British Museum of Natural History, as previously arranged, and it will naturally be some considerable time before the material can be worked out by the specialists of that Institution.

13. Three numbers of the "Journal of the Federated Malay States Museums" were issued during the year: containing 108 pages of letterpress, five plates and one plan.

L. WRAY,

*Director of Museums, F.M.S.*

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## REPORT ON THE PERAK MUSEUM FOR THE YEAR 1905.

### THE BUILDING.

**E**ARLY in the year the scaffolding and ataps were removed from the four towers, which had been under repair during the greater part of the previous year. The result from a practical aspect is so far satisfactory, there being no sign of leakage up to the present.

The brick drain around the new wing, provided for in the Estimates, was built and completed in February.

The Estimates also provided for galvanised iron guttering around the lantern roof of the new wing, along the front verandah, and around the porch, and this was completed in March.

In May the whole of the exterior of the building was white-washed and the wood-work painted.

A new skinning-shed was built, in close proximity to the existing work-rooms, for the skinning, etc., of the larger animals and general work of a dirty nature.

The floors of the laboratory and dark room were re-cemented in parts where they were badly damaged; and numerous shelves, fixed by means of angle-irons, were erected to increase the storage capacity.

#### CASES.

The cases throughout the Museum are now all numbered a separate set of numbers being employed for each room. This has been done principally to facilitate registration; and by its means it is easy to state correctly and locate at a moment's notice the exact position of any specimen in the various collections.

The scheme successfully adopted in the ethnological galleries and explained in my last report, of a glazed title for each case, has been carried out in all departments. It has proved highly effective from a practical point of view, and improves the general appearance of the rooms.

New double, brass winders for the window and blind-cords were fitted on to the new wall-cases wherever necessary. In the older part of the building the old winders and unsightly screw substitutes were discarded in favour of the new ones.

In the Geological Department the table-case interiors were given two coats of fresh white paint previous to the re-arrangement of the collection.

With a view to obtaining a reliable paint or distemper to replace the old white oil-colour, the large wall-cases of the Economic Department have been experimented on. In changing the contents of a case it has always been necessary to give the interior a fresh coat of paint, owing to the yellow marks made wherever an object has stood on the painted surface for any length of time; and in other ways it has not been satisfactory. In the cases under notice Morse's Calcarium of a French grey shade has been applied, and has in every way proved satisfactory up to the time of writing. It is inexpensive, and the

colour chosen gives a warm and pleasing aspect to the general appearance of the room. It also forms an admirable background for whatever objects have, as yet, been exhibited against it. Should the experiment stand the test of time, the distemper will be used universally throughout the exhibition galleries, with a probable slight variety of colours to suit the circumstances.

Another innovation in the wall-cases has been the substitution, in certain cases, of plate-glass for the old wooden side-shelves. These shelves are cut out of broken sheets of plate-glass which were originally intended for case-fronts. They give a decidedly light and airy appearance to the inside of the cases. As there is a good deal of this broken glass still in hand, it will be possible to extend the use of it in this way into all the collections where the opportunity presents itself.

#### THE COLLECTIONS.

##### 1. ZOOLOGY (Rooms D and E) AND OSTEOLOGY (Part of Room B).

The mammalia were registered and catalogued, re-classified in some orders, and cleaned throughout. A list of the collection was compiled and will appear, in due course, in the "Journal of the Federated Malay States Museums." This list gives the total number of mammalian specimens at the end of 1905 as 297, representing eight orders, 27 families and 93 species.

Part of the spirit collection (snakes and batrachia) were installed in the passage leading into the new wing, in two of the old-fashioned cases with small panes of glass; but the impossibility of arranging the specimens without the interference of the wood-work places the preparations at a great disadvantage. A few rectangular preservative jars have been introduced here in place of the round ones. A stock of these jars is in hand, and all the batrachian specimens will eventually be remounted in them, in addition to introducing them into other parts of the Zoological Department.

The first of an instructive series of preparations, illustrating the evolution of different animals' lives from the embryo to the adult stage, has been placed in this case, and shows the metamorphosis of the frog (*Rana esculenta*) from the egg, or spawn, to the fully developed animal. Similar series obtained from England during the year were: the honey-bee (*Apis mellifica*) and the crab (*Carcinus maenas*).

A table-case will also be at the disposal of the reptilia when the birds' nests and eggs have been embodied in the general ornithological collection. The larger specimens of the chelonia already occupy half the case.

A fortnight's collecting on the Larut Hills in March was productive of a small collection of mammals, birds, reptiles and invertebrates. In a morning's visit to Bukit Gantang a specimen of the blackwing kite (*Elanus caeruleus*), with nest and egg, was secured. A specimen of a new flying-squirrel was procured at the Tea Gardens by Mr. W. Boomgardt. On being sent to Mr. Oldfield Thomas of the British Museum for identification, this proved to be a specimen of *Pteromys punctata*, of which only one has before been obtained: the type in the British Museum, which, I think, was procured in Malacca. A specimen of the grey musk shrew (*Crocidura caerulea*), not before represented in the collection, and a hill rat (*Mus vociferans*), new to Perak, were other notable additions.

A number of young adjutant, or marabout-storks (*Leptoptilus javanicus*), were purchased from a Malay in April, some dozen or so nests having been destroyed by a strong wind in the neighbourhood of Bagan Serai. One of these birds was killed and mounted at the time of purchase, and another some two or three months later, whilst the remainder are still at large in the Museum grounds. They will eventually form an instructive life-history group of this remarkable genus of birds.

A native collector by the name of Alang Sagab was employed in the neighbourhood of Kota Lama during the months of May, June and July, and a large collection of land mollusca, arachnida, lepidoptera, coleoptera, ornithoptera, rynchota, chilopoda and diplopoda was the result. Most of the coleoptera have kindly been examined and identified by Mr. Robinson of the Selangor Museum, and a selection from the rest of the collection has been sent to the British Museum for this purpose.

Word was received in January of the discovery of elephant remains at Ulu Bria, but on visiting the spot they were found to be those of the living race (*Elephas indicus*), and in an advanced state of decay. A small selection of the better preserved bones was made, however.

## 2. BOTANY.

Early in the year the herbarium cabinets were thoroughly overhauled, and the damage done by white ants to the panelling and backs was repaired. In this connection I am glad to report the complete success of the experiment (described in my last report) to frustrate the attacks of the ubiquitous termites. Not a single instance of attack has to be recorded, although signs of unsuccessful attempts by the little pests were evident.

Ten sheets of botanical specimens were received late in the year from the Royal Botanic Garden, Calcutta. These, with those received during 1904, have been mounted, labelled and incorporated in the herbarium.

Many gifts of botanical and agricultural literature were received and will be found duly acknowledged under the library donations for the year.

### 3. GEOLOGY AND MINERALOGY (Rooms A and B).

Both of these collections have been entirely re-arranged, which has not only added greatly to the attractiveness of the collections, but has permitted of the inclusion of a number of specimens previously stored up for want of space. Noticeable amongst these is, the collection of fossils presented by the Trustees of the British Museum, of cornish minerals presented by Mr. S. Wickett of Redruth, and of a more general collection of minerals and fossils presented and loaned by Mr. Leonard Wray. Reference to the donation list will also show the indebtedness of the Government to Mr. Cecil Wray for his many gifts to this department.

The arrangement in this department consists of two main divisions—local and general. The geological collections are arranged stratigraphically and the minerals alphabetically. In all cases new titles have been printed in large type and placed in position inside the cases, so that any group of minerals, or a geological stratum, can be quickly discovered. As in other collections each group is separated from its neighbours by thin strips of black wood. To effectively carry out the scheme of arrangement in this department, the front verandah (room A) has been used, and the cases there run consecutively with those in the main (room B).

A large amount of registration and cataloguing was done during the year, that of both the general and local mineralogical collections being nearly completed.

### 4. ECONOMICS (Room C).

During the year under review the final arrangement of this section was made. Progress, however, is somewhat slow; but a good amount of work was accomplished, and the registration and cataloguing of the collection was brought up to an advanced stage.

Wherever possible specimens of leaves of the various economical plants have been introduced into the body of the collection. These are mounted on white card, and glazed in frames made in multiples of the boxes containing the products amongst which they are exhibited. Besides adding largely to the attractiveness of the collection, this series proves highly instructive to the observer.

Many new plaster models have been added, both to the fruits and to the vegetables. Amongst these may be mentioned: the papaya or "buah betik" (*Carica papaya*), bullock hearts (*Anona reticulata*), white egg-plants and purple brinjals or "trong" (*Solanum melongena*), sword beans or "kachang parang," and two varieties (Borneo and Ribbon) of the sugar cane (*Saccharum officinarum*).

Valuable additions were made to the rubber exhibits, thanks to the very welcome co-operation of the Plantations Department, through the courtesy of the Superintendent, Mr. J. W. Campbell. Details of these gifts will be found in the list of donations for 1905.

A series of marble slabs were purchased early in the year from the Ipoh Marble Quarry Company, and have been placed in the case for economic minerals. They show very effectively the different grades, or varieties, of marble which are procurable from the quarry. Photographic enlargements of the quarry and works were made and hung on the wall contiguous to the case.

#### 5. ETHNOLOGY (Rooms F and G).

Progress in this department is still proceeding steadily, with the result that the local section has already advanced to the critical stage when extra space has become a serious matter.

Most additions in these rooms have been made by purchase, and the actual amount thus expended will be seen under "Financial."

In the lower, or comparative, ethnological room amongst the more prominent accessions are: the new Chinese nail chair; the two carved Chinese figures of Buddha, one in the attitude of contemplation (gilded and painted), the other in that of praying (in the plain wood); the handsome series of Satsuma ware from Japan; the various Arabian objects brought back from Mecca by the Muhammadan pilgrims; the interesting series of Batak sarongs in different stages of manufacture, with the implements and materials for making and dyeing the cloth; the large series of wooden stamps used in printing designs on sarongs, etc.; the set of Sudanese bamboo xylophones called "anklung," and other musical instruments; and the pair of quaint Sundanese puppets, resembling in idea the old-fashioned marionettes, and called "agu menara" (male figure), and "raden ankowi jaya" (female figure).

The collection of photographic enlargements of oriental races was augmented by four portraits of Semangs and two of Javanese.

In the historical section a collection of Perak buttons has been formed, derived from various sources, and representing the Perak Armed Police, Perak Sikhs, Perak Police, Federated Malay States Police and Perak Civil Officers.

In the local ethnology section a valuable and handsome series of old Rembau (Negri Sembilan) carving was procured, and forms a conspicuous exhibit on the right-hand side of the room. Many weapons were added to the already comprehensive series; and on the occasion of the Sultan of Perak's visit to the Museum His Highness was careful to inspect these weapons very closely, and afterwards expressed his great admiration for the collection.

Some additions to the Semang and Sakai specimens were derived from an expedition, made in November, to the Ulu Plus, the objective of the trip being to enquire into the conditions of life, etc., amongst the aboriginal tribes of the district. Besides the objects secured for the Museum collections, some valuable informations and statistics were obtained concerning these people.

Registration and cataloguing was continued at intervals throughout the year in both branches of ethnology.

#### THE LIBRARY.

A large amount of time and labour was spent on the library during the latter half of the year in re-cataloguing and numbering the books throughout. For this purpose a small oak cabinet, similar in design to that used for the Museum catalogue, was procured through the Crown Agents at a cost of \$75.91, together with 6,000 cards and two sets of guides—one alphabetical and the other numerical. After roughly cataloguing and numbering each volume, the finished cards for the catalogue and register were carefully type-written. The alphabetical catalogue contains three or four cards for each volume, so that a book may be found either by referring to the author or by looking up the title under its various headings. The register, arranged numerically, is formed of cards, giving the author's name for the headline, with full particulars of the book.

An extra Clerk was sanctioned by the Government to assist in this work. In all 701 books were catalogued, necessitating the typing of over 4,000 cards.

A revised set of Library Regulations was drawn out, approved by the Resident and duly gazetted. A copy of these, printed at the Government Printing Office, will be pasted in each volume.

There were many additions made during the year, mostly by presentation, the smallness of the book vote prohibiting large accessions being made by purchase. Amongst the latter were five more volumes of the Indian Fauna series—a three-volume work on "Museums: their History and their Use;" "Play and Politics: Reminiscences of Malaya;" "The Real Malay;" Maxwell's "Manual of the Malay Language;" and four numbers of the "Journal of the Royal Asiatic Society, Straits Branch"—replacing lost volumes.

With the free distribution of the "Journal of the Federated Malay States Museums" into the various parts of the civilised world, it will be noticed that the list of library donations has increased and expanded.

There were 25 book loans to approved applications during the year.

LIST OF DONATIONS TO THE PERAK STATE MUSEUM  
LIBRARY FOR 1905.

ANNANDALE, MR. NELSON :

- "Contributions to Oriental Herpetology," parts 1 and 2.
- "Additions to the Collection of Oriental Snakes in the Indian Museum."
- "Notes on an Indian Worm (*Chaetogaster*)."
- "The Hydra of the Calcutta Tanks."
- "On Abnormal Ranid Larvæ from North-east India."

CEYLON ROYAL BOTANIC GARDEN :

- "Circulars and Agricultural Journal for 1905."

EGYPTIAN GOVERNMENT ZOOLOGICAL GARDENS, GIZA (per the Director, Capt. Stanley S. Flower) :

- "Report of the Giza Zoological Gardens for 1904."

INDIAN MUSEUM, CALCUTTA :

- "Catalogue of the Indian Decapod Crustacea," Part 11, *Anomura*.
- "An Account of the Deep-sea Holothurioidea, collected by the 'Investigator.'"
- "Annual Reports for 1903-1904."

INDIAN ROYAL BOTANIC GARDEN, CALCUTTA :

- "The Aconites of India."
- "A List of Laccadive Plants."

KEILICH, MR. E. :

- "The Adventures of Louis de Rougement."

KEW ROYAL BOTANIC GARDENS :

- "Bulletin of Miscellaneous Information for 1905."

LEICESTER CORPORATION MUSEUM AND ART GALLERY (per the Curator, Mr. Montagu Browne) :

- "14th Report of the Museum and Art Gallery, 1902-1904."

LLOYD, MR. C. G. :

- "Bulletin of the Lloyd Library of Botany, Pharmacy and Materia Medica." Nos. 4-6.
- "Mycological Notes," Nos. 10-19.
- "Puff Ball Letter," No. 5.
- "LOUISIANA PLANTER" (per the Editor) :
- Complete Issues for 1905.

MAC GREGOR, MR. R. C. (Bureau of Government Laboratory, Manila) :

- "Birds from the Islands of Romblon, Libuyan and Cresta de Gallo."
- "Further Notes on Birds from Ticao, etc."
- "Birds from Mindoro and small adjacent Islands."
- "Notes on three rare Luzon Birds."

MANCHESTER MUSEUM (per the Director, Dr. W. E. Hoyle) :

- "Manchester Museum Report for 1904-1905."

MISSOURI BOTANICAL GARDENS (per the Director, Mr. W. Trelease) :

- "Annual Report of the Missouri Botanical Gardens," 14th, 15th and 16th.

MUHAMMAD TAJUDIN BIN HAJI ABDULLAH :

- "Sa-air Mamhangukan Himat or Pikiran Bagi Laki Laki."

MONTEVIDEO, MUSEO NACIONAL (per the Director) :

- "Flora Uruguaya," Parts i and ii.
- "Geografica Fisica y Esferica del Paraguay."

OTAGO UNIVERSITY MUSEUM :

- "Curator's Annual Report for 1904" (2 copies).

LIST OF DONATIONS TO THE PERAK STATE MUSEUM  
LIBRARY FOR 1905—(cont.)

- “PERAK PIONEER” (per the Editor):  
Complete Issues for 1905.
- RAFFLES LIBRARY AND MUSEUM,  
SINGAPORE:  
“Annual Report for 1904.”
- SARAWAK MUSEUM (per the Curator, Mr. R. Shelford, M.A.):  
“Report on the Sarawak Museum for 1904.”
- SECRETARY TO RESIDENT, PERAK:  
“Agricultural Bulletin of the Straits and Federated Malay States,” vol. IV (1905).  
“Journal of Indian Art and Industry,” vol. IX, Nos. 72 and 73, 75 and 76.  
“Diagnosis of Phytophagous Coleoptera” (*Fasciculi malayensis*).  
“Abstract of Proceedings of the Linnean Society of New South Wales for 1905.”
- “SINGAPORE FREE PRESS” (per the Editor):  
Mail Editions, complete for 1905.
- SMITHSONIAN INSTITUTION,  
U.S.A.:
- “The Birds of North and Middle America,” Part iii.  
“An Account of the Buildings occupied by the National Collections.”  
“United States National Museum Annual Report for 1903” (2 copies).
- SMITHSONIAN INSTITUTION,  
U.S.A.—(cont.)  
“Contributions from the United States National Herbarium,” vol. IX.  
“Catalogue of Geological Types in the United States National Museum.”  
“Progress Report of the United States National Museum.”  
“Proceedings of the United States National Museum,” vols. XXVI and XXVII.  
“Annual Report of the United States National Museum, 1901 and 1902.”  
“American Hydroids, Part ii, the Sertulariidae.”
- SYED ABDULLAH:  
“Um-al-Mazhab.”
- “TIMES OF MALAYA” (per the Editor):  
Daily Edition, complete for 1905.  
Weekly do. do.
- TOKIO IMPERIAL MUSEUM (per the Director, Prof. C. Ishikawa):  
“Proceedings of the Department of Natural History.”
- WEST INDIES, IMPERIAL DEPARTMENT FOR AGRICULTURE:]  
“West Indian Bulletin for 1905.”

REGISTRATION.

1. UNDER THE “BOOK REGISTRATION ORDER IN COUNCIL, 1895.”

There were two publications issued in Perak during the year, both in the Malay vernacular:

- No. 9.—“Sa-air Mamhangunkan Himat or Pikiran Bagi Laki Laki,” by Muhammad Tajudin bin Haji Abdullah, published at Ipoh by the Author:

No. 10.—“Um-al-Mazhab,” by Syed Abdullah, Chief Kathi, published at Kuala Kaugsar by the Translator. As this book deals exclusively with the Muhammadan religion, a special exemption from Section 3 (ii) was granted, and the name and address of the Printer and Publisher was omitted from the work.

“The Perak Pioneer” (No. 1) was issued as a daily from the 1st March, and “The Times of Malaya,” daily edition (No. 7), was enlarged to eight pages.

In January copies of all the Perak publications issued during 1904 were packed and sent to the British Museum, and henceforth they were forwarded quarterly.

## 2. UNDER THE “INVENTIONS ORDER IN COUNCIL, 1896.”

Five petitions for grants of exclusive privileges were registered during the year :

No. 23.—Mr. Fred. Arthur Turner, for “Improvements in, or connected with, Vapour Generating Lamps for Hydrocarbon Oil or Spirit” (Amended) ;

No. 24.—Mr. A. Grant Mackie, for a “New Form of Puddler Harrow ;”

No. 25.—Messrs. David Christie and Lai Tet Loke, for “Improvements in Puddling Machinery ;”

No. 26.—Mr. Charles Ernest Cumming, for “Improvements in Puddling Machinery (Centrifugal Puddler) ;”

No. 27.—Mr. Charles Ernest Cumming, for “Improvements in Puddling Machinery (Percussive Puddler).”

The inventions register was brought up to date. All past specifications, not previously registered, were procured from the Secretariat, copied, and the copies filed.

## ACCESSIONS.

There was a considerable increase in the number of donors and donations during 1905, as a comparison of the list given below with that of 1904 will show. Through the courtesy of the Editor of “The Perak Pioneer,” all donations have been publicly acknowledged monthly in the columns of the local newspaper; and this has, perhaps, been largely instrumental in recruiting fresh donors. There is still lacking, however, the co-operation on the part of officials in other Government Departments.

Many valuable accessions have been made by purchase and collection. The small staff of Malay collectors at Bukit Gantang in particular have been untiring in their efforts to increase the Museum collections. Attention has, however, already been drawn to the more important accessions of the year, so there is no need for further comment.

## LIST OF DONATIONS TO THE PERAK STATE MUSEUM FOR 1905.

- AH KWI** (Sungei Siput) :  
Specimen of Galena.
- AHMAT** (Orderly, Sanitary Board Office) :  
Indian Mangoes (*Mangifera indica*).
- ARCHER, MISS** :  
Perak Dog Tickets for 1902 and 1903.
- BARNARD, MR. B. H. F.** :  
Gecko Lizard (*Gymnodactylus pulchellus*).  
Common Malayan Porcupine (*Hystrix longicauda*) "Babi landak."
- BIRCH, MR. E. W., C.M.G.** :  
Small collection of Insects from "The Box," Larut Hills.
- BIRD, MR. G. F.** :  
Red Hematite from Salak, Kuala Kangsar.
- BODGER, MR. WILLIAM** :  
Head and Horns of Bangalore Goat (*Ovis aries*).
- BOOMGARDT, MR. W.** :  
Large Malayan Flying-Squirrel (*Pteromys petaurista*) "Grabah."  
Malayan Spotted Flying-Squirrel (*Pteromys punctata*).  
Large Malayan Squirrel (*Ratufa bicolor*) "Tupai nanding."  
Indian White-backed Vulture (*Pseudogyps bengalensis*).
- BOURNE, REV. J. B.** :  
Dusky Leaf Monkey (*Semnopithecus obscurus*) "Lutong."  
Skull of Crested Monkey (*S. cristatus*).  
Chinese Commemorative Brass Disc.
- BRATT, MR. E. H.** :  
Sheet of Para Rubber (*Hevea braziliensis*).
- BROWN, MR. G. GORDON** :  
Three Sheets of Para Rubber (*Hevea braziliensis*).
- CAMPBELL, MR. J. W.** :  
Larvæ attacking Caladiums on Maxwell's Hill (*Piplo. polytes*).  
A small collection of Invertebrates from Maxwell's Hill.  
Two Sheets of Para Rubber (*Hevea braziliensis*).  
Two Sheets of Rambong Rubber (*Ficus elastica*).  
Two Sheets of Ceara Rubber (*Munihot glazioire*).  
Two Sheets of Castilloa Rubber (*Castilloa elastica*), coagulated from washed Latex.  
Two Sheets of Castilloa Rubber (*Castilloa elastica*), coagulated from unwashed Latex.  
One Ball of Scrap Rambong (*Ficus elastica*).  
Latex of Para Rubber Tree (*Hevea braziliensis*).
- CHOO CHAK SANG, TOWKAY** :  
Common Leopard (*Felis pardus*), black var., juv., "Remau kumbang."
- COATES, MR. W. J.** :  
Two Avocada Pears or "Alligators" (*Persea gratissima*).
- CUMMING, MR. C. E.** :  
Vein Tin from the Hydraulic Workings, Bruseh.  
Tin in Decomposed Rock from Bruseh.  
Coal from Selebin, near Ipoh.
- DEPUTY COMMISSIONER OF POLICE, PERAK** :  
Perak Government Buttons.  
Perak Sikh Tunic Buttons and Pouch Badges.  
Perak Armed Police Buttons.  
Perak Police Tunic Buttons and Badges.  
Bronze Cape-Buttons of the Perak Sikhs.  
Tunic Buttons and Cap and Helmet Badges of the Malay States Police, Perak.  
Three \$10-Hongkong and Shanghai Bank Notes, Forgeries.  
Three, \$5-Government Notes, Forgeries.

LIST OF DONATIONS TO THE PERAK STATE MUSEUM  
FOR 1905—(cont.)

- DISHMAN, MR. A. :  
Stone Implement from Bidor.  
Brown Garnet from Ipoh District.  
Small collections of Minerals from Kinta and Batang Padang.
- EPHRAUMS, MR. W. :  
Marabout, or Adjutant, Stork (*Leptoptilus javanicus*)  
"Burong babi."
- FURNIVAL, MR. H. :  
Stag Beetle, *sp. inc.*
- GAY, MR. E. M. :  
Reticulated Python (*Python reticulatus*), juv., "Ular sawah."  
Leaf Insect and Eggs, *sp. inc.*  
Long-tailed Lizard (*Tachydromus seolineatus*).
- GERRARD, DR. P. N. :  
Malayan Wood Owl (*Syrnium seloputo*)  
Burrowing Snake (*Cylindrophis rufus*), juv.  
Cicada (*Dundubia sp.*).  
Fresh Water Bug (*Belostoma sp.*).
- GOWLAND, MR. H. J. :  
Limb Bones of Common Leopard (*Felis pardus*).
- GRAHAM, CAPT. A. McD. :  
Bronze Helmet-Badge of the 1st Perak Sikhs.  
White-metal Tunic Buttons of the Malay States Police, Perak.  
White-metal Helmet and Cap-Badges of the Malay States Police, Perak.
- GRAY, MR. N. T. :  
Combs of Honey-bee.
- HALE, MR. A. :  
Shells of River Snails (*Paludina sp.*).  
Malayan Sword Bean (*Canavalia ensiformis*) "Kachang parang."
- HARPER, MRS. J. P. :  
Snake (*Macropisthodon flaviceps*).
- HARRISON, MR. C. W. :  
Malay Fishing Net, "Ambai."
- HOGG, MR. W. :  
Tree Snake (*Dipsas boops*).
- HUME, MR. W. :  
Bug (*Eurostus sp.*).
- KEESING, MR. J. C. :  
Eastern Purple Heron (*Ardea manillensis*).
- KEILICH, MR. D. :  
Burmese Wattled Lapwing (*Sarcogrammus atrinuchalis*).  
Common Snipe (*Gallinago coelisticis*).  
Moth (*Anisoneura sp.*).
- KHYE GUAN AND SONS, MESSRS. :  
Three Chinese Shell Figures from Amoy.  
Fungi (*Lentinus sp.*) "Susurimau," abnormal growth.
- KNOCKER, MR. FRED. W. :  
Collection of Marine Invertebrates from Port Dickson, Negri Sembilan.  
Collection of Reptiles from Negri Sembilan.  
Small collection of River Fishes from Negri Sembilan.  
Small collection of Chilopoda and Diplopoda from Negri Sembilan.  
Common Scorpion (*Buthus spiniger*).  
Sword Beans (*Canavalia ensiformis*), var.  
White Egg Plants (*Solanum melangena*) "Trong."  
Negri Sembilan Dog Tickets for 1902-1903 and 1904.  
Perak Dog Ticket for 1905.  
Five-cent Ceylon Coin, 1870.  
One do do.

LIST OF DONATIONS TO THE PERAK STATE MUSEUM  
FOR 1905—(cont.)

- KYDD, MR. JAS :**  
Larvæ of Butterflies (*Delias hyparete*).
- LAIDLAW, MR. G. W. :**  
\$5-Government Note, Forgery.
- MACKIE, MR. A. GRANT :**  
Tin Ore from Sungei Besi (Selangor).
- MADDON, MR. L. J. B. :**  
Cicada (*Dundubia sp.*).
- MASTER-TAILOR, MALAY STATES GUIDES :**  
Perak Government Buttons.
- MOIR, MR. GEORGE :**  
Specimens of Horse Fly (*Tabanus sp.*).
- MOSS, MR. P. :**  
Four-tailed Grey Moth (*Nyctalemon patroclus*).
- NELSON, MRS. P. J. :**  
Long-tailed Lizard (*Tachydromus sexlineatus*).
- NG BOO BEE, TOWKAY :**  
Two Framed Photographs of Ng Boo Bee's Tin Mine at Kamunting and Visit of H.E. the High Commissioner to the Mine.
- NICHOLAS, MR. F. W. :**  
Guinea Worm (*Filaria medinensis*).  
Nematodes or Thread Worms (*Anchylostoma duodenale*).  
Thread Worm, *sp. inc.*
- OSMAN :**  
Malay Humming Top made from the Fruit of the "Klium" Tree (*Sorodocarpus borneensis*).
- PEARSE, MR. CECIL :**  
Cubic Iron Pyrites.
- RETHINASAMY PILLAY, MR. M. :**  
Silver Dart worn pierced through the tongue during the Hindu penance known as "Alagu."  
Double-pointed Silver Dart worn pierced through the cheeks during the Hindu festival known as "Alagu."
- ROBINSON, MR. H. C. :**  
Nest of Bronze-backed Imperial Pigeon (*Carpophaga badius*).
- ROWLEY, MR. T. W. :**  
Long-tailed Lizard (*Tachydromus sexlineatus*).
- SAYERS, MR. WM. :**  
Stick Insects and Young, *sp. inc.*
- SECRETARY TO RESIDENT, PERAK :**  
Perak Revenue Officer's Badge.
- SELANGOR STATE MUSEUM :**  
Collection of Minerals.
- SHELFORD, MR. R., M.A. :**  
Fruit Bat (*Cynopterus marginatus*).  
Two Snakes and one Young (*Macrocaltamus lateralis*).  
Two Bull Frogs (*Rana macrodon*).  
Horned Toad (*Megulophrys longipes*).  
Scorpion (*Buthus spiniger*).  
Five Burrowing Spiders (*Ctenizidoe, sp. inc.*).
- SHEFFIELD, MR. J. NEWTON :**  
Sakai (? Semang) Bamboo Spear.  
Bird-eating Spider (*Thrigmopoeus sexlineatus*).  
Reptiles from Gunong Grah.
- STONEY, MR. B. O. :**  
Pupae of Butterfly (*Euploea midanus*).
- STRONACH, MR. A. :**  
Specimens of Tin Money.
- TAHIB :**  
Nests of Malay House Swifts (*Cypselus subfurcatus*).

LIST OF DONATIONS TO THE PERAK STATE MUSEUM  
FOR 1905—(cont.)

## TAYLOR, MR. F. E. :

Candle Nuts (*Aleurites molluc-  
cana*) known in the F.M.S.  
as "Buah kras."

## WATSON, MR. E. LAUDER :

Tree Snake (*Dipsas boops*).  
Smaller Atlas Moth (*Attacus  
cynthia*).  
Abnormal growth of branch of  
a Para Rubber Tree (*Hevea  
braziliensis*).

## WILKINSON, MR. W. A. :

Hamadryad (*Naia bungarus*).

## WILSON, MR. A. WALLIS :

Indian Mongoose (*Herpestes  
mungo*).

## WRAY, MR. CECIL :

Quartz containing Auriferous  
Copper, Lead, etc., from  
Kechau, Pahang.

Ditto ditto 1 oz. of gold per  
ton.

Quartz containing Auriferous  
Galena, Blende, etc., from  
Kechau, Pahang, 1 oz. of  
gold per ton.

Auriferous Quartz from Mount  
Morgan, Australia.

Auriferous Pyrites from Celebes,  
2 oz. of gold per ton.

Auriferous Copper from Kechau,  
Pahang, 1 oz. of gold per ton.

Blende Ore from Kechau,  
Pahang.

## WRAY, MR. CECIL—(cont.)

Antimony from Merbau Lode,  
Silinsing, Pahang.

Thorianite from Bamberabos-  
luwa District, Ceylon.

Two rough cut Rose Catseyes  
from Ceylon.

Three specimens of Corundum  
from Ceylon.

Garnet Rock from Kandy,  
Ceylon.

Gem Rock from the Gem Mines,  
Ratnapura, Ceylon.

Two specimens of Plumbago  
from Ratnapura, Ceylon.

Zircon from Kandy, Ceylon.

Blue Apatite in Limestone from  
Kandy, Ceylon.

Magnetite in Limestone from  
Kandy, Ceylon.

Rock containing Garnets from  
Niuwara Eliya, Ceylon.

## WRAY, MR. LEONARD, I.S.O. :

Bamboo Bottle for holding  
Mercury (Chinese).

Gambier (*Uncaria gambier*).

First Class Perak Officers'  
Buttons.

## WRIGHT, DR. M. J. :

Larvæ of Moth (*Gynantoceras  
sp.*).

## YONG FOOK, MR. :

Young King Coconut.

## THE FOLLOWING SPECIMENS WERE ON LOAN :

## BOURNE, REV. J. B. :

Brass Jar of the time of the  
Ta Ming Dynasty, A.D., 1426,  
from Wei-hai-wei.

## HODSON, MR. A. W. :

Skull and Jaws of Tiger (*Felis  
tigris*).

## KNOCKER, MR. FRED. W. :

Japanese Three-stringed Musi-  
cal Instrument.

Japanese Lady's Chop-sticks in  
Case.

Pack of Japanese Playing  
Cards. "Hana huda."

## SPECIMENS WERE ON LOAN — (cont.)

## MAXWELL, MR. W. G. :

Head of Malay Tapir (*Tapirus indicus*).

Head of Javan, or Smaller one-horned, Rhinoceros (*Rhinoceros sondaicus*).

Head of Sumatran, or two-horned, Rhinoceros (*Rhinoceros sumatrensis*).

## WRAY, MR. CECIL :

Gold with Iron Pyrites.

## WRAY, MR. LEONARD, I.S.O. :

Eight specimens of Agate.

Specimen of English Amber.

Malachite (green carbonate of copper).

## WRAY, MR. LEONARD, I.S.O.—

(cont.)

Serpentine from Cornwall.

Labradorite from Canada.

Seventy-four Stone Implements collected in Kent.

Stone Implement from Ireland.

Two Drinking Cups made of Buffalo Horn.

Elephants' Tooth found at Gapis, Perak.

Chinese Chop-sticks and Knife in Case.

Two Plates of old Chinese china.

Two Chinese Tin Cups.

Chinese Fan Knife.

## ATTENDANCE.

The attendance for the year was greater than it has ever been before, and, though at times it is very erratic, it would appear that a steady annual increase has set in from 1902, the figures being :

1902.	1903.	1904.	1905.
40,022	46,685	52,854	55,103

A rough analysis of the attendance would probably show that Tamils far outnumbered other native races ; and then, in order of numbers : Chinese, Malays, Indians (exclusive of Tamils), Europeans and Eurasians, and Siamese and Burmese in small numbers.

Experimental opening on public holidays was successful only in the case of native festivals (excepting the Taiping race week), and towards the end of the year opening on European holidays was discontinued.

An examination of the attendance book gives the following interesting statistics :

The largest monthly attendance was 6,017, registered during March. The largest weekly attendance was 2,622, registered during the Taiping race week. The largest daily attendance was on the Hindu festival of " Pangini Utram " (21st March), the number being 1,074.

Other large daily attendances were recorded as under :

Race Week, 1st day, 15th August	...	...	1,025
Tai Pusum (Hindu festival), 21st January	...	...	800
H.H. the Sultan of Perak's Birthday Celebrations, 20th June	...	...	569
Race Week, 2nd day, 17th August	...	...	554
Chinese New Year, 6th February	...	...	512

The Museum was open throughout the year on 295 days, and this makes a daily average attendance of 188.83.

Mean daily average of visitors to Museum during 1905 :

Month.	Days open.	Maximum.	Minimum.	Total, monthly.	Daily average.
January ...	25	800	117	4,784	191.36
February ...	22	512	127	5,706	259.36
March ...	27	1,074	135	6,017	222.85
April ...	22	289	114	4,063	184.68
May ...	26	268	104	4,233	162.80
June ...	24	569	100	4,101	170.81
July ...	26	210	85	3,595	138.26
August ...	25	1,025	41	5,414	216.56
September ...	26	227	97	3,777	145.26
October ...	25	185	100	3,601	116.16
November ...	24	300	90	4,514	188.08
December ...	23	427	168	5,298	230.34
Means ...	24.58	490.50	106.50	4,591.92	185.54

The total for the year is 55,103, the number of days the Museum was opened during the year is 295, giving a mean daily average of 185 visitors.

H.H. the Sultan of Perak, Sir Idris Mersid-el-Aázam Shah, G.C.M.G., and suite, visited the Institution on the 24th June; H.E. the High Commissioner of the Federated Malay States, Sir John Anderson, K.C.M.G., on the 4th August; the Resident-General, Sir W. T. Taylor, K.C.M.G., on the 5th and 6th December; and the British Resident, Mr. E. W. Birch, C.M.G., with Lieut.-Colonel R. S. F. Walker, C.M.G., Commandant of the Malay States Guides, on the 1st February. Mr. R. Shelford, late Curator of the Sarawak Museum, made a prolonged inspection of the collections in March, on passing through Taiping, and the thanks of the Government are due to him for afterwards obtaining the valuable Javanese ethnological objects already mentioned.

Classes from the Central School visited the Museum on the 3rd April and 2nd June. On the former occasion the Curator was able to give the pupils a short address. Pupils and Sisters from the Klian Pau Convent School paid a visit on the 2nd August; and on Sunday, the 5th February, the Museum was opened, by special request, to the Penang Convent School.

STAFF.

Mr. E. Keilich, Taxidermist, returned from leave and resumed duties on the 21st September, after 18 months' furlough.

An extra Clerk was employed during the last five months and eight days of the year, and paid for out of the extra clerical assistance vote.

One Malay Attendant was added to the staff from the 1st January, being provided for in the Estimates, to watch and patrol the new wing.

#### FINANCIAL.

Owing to the circular issued in January from the Resident-General's Office disallowing rice allowance to Orderlies, Peons, etc., joining Government Service after 1st January, there was a balance in hand of \$24 on the rice allowance vote of \$96. The total saving on the expenditure of the department for the year was \$1,014.55, \$662.42 of which was saved on exchange compensation allowance vote.

The revenue collected by Taxidermist's fees, etc., amounted to \$50.45: 45 cents in excess of that estimated.

#### NOTES AND OBSERVATIONS.

The gift of a pair of slow loris (*Nycticebus tardigradus*)—commonly known in the Peninsula by the misnomer of "Sloth"—was made to the Zoological Society of London in August, and they were safely deposited in the Society's Gardens in September.

A young leopard (*Felis pardus*) of the black variety, which was presented to the Perak Museum by Mr. Choo Chak Sang, of Seremban, was sent to the Egyptian Government Zoological Gardens at Giza, where it arrived in excellent condition in October and was warmly acknowledged by the Superintendent, Captain Stanley Flower.

A pair of argus pheasants (*Argusianus argus*), procured for a similar purpose for the London Zoological Gardens, failed to survive for more than a month or so, and their skins were therefore added to the Perak Museum collections.

A specimen of the Malayan flying-squirrel (*Pteromys petaurista*) was presented to the British Museum in May.

A portrait of the late Sir Hugh Low, G.C.M.G., founder of the Perak State Museum, was framed and hung up; and the portrait of Mr. James Wheeler Woodford Birch, first British Resident of Perak, was hung at the entrance of the comparative ethnology room.

Towards the end of the year a new style of typewriter of the Hammond make was noticed, and one was immediately ordered through the Crown Agents. This machine writes only nine letter to the inch, instead of 11 to the inch as in the ordinary Hammond typewriter; and as the one drawback to type-written labels is their indistinctness, due to the closeness of the type, it was assumed that this machine would be of great assistance in coping with the labelling question.

FRED. W. KNOCKER,

*Curator.*

REPORT ON THE SELANGOR STATE MUSEUM.  
1905.

## EXPENDITURE.

ON the vote of \$6,096 for personal emoluments there was a saving of \$2,316.06, owing to the non-appointment of a taxidermist as provided for in the estimates and to the rise in exchange.

2. Under other charges, annually recurrent expenditure, \$3,600 was voted, which was spent as follows :

(1) Collecting trips and transport	...	...	\$861.34
(2) Specimens	...	...	830.75
(3) Glassware	...	...	422.05
(4) Preservatives, collecting and cleansing materials	...	...	303.18
(5) Mounting birds and mammals	...	...	98.82
(6) Plates for "Museum Journal"	...	...	82.52
(7) Books and periodicals	...	...	136.15
(8) Postage and petty cash	...	...	108.03
(9) Freight and insurance charges	...	...	54.71
(10) Repairs and sundries	...	...	55.26

3. Under special expenditure, \$1,000 was voted for the purchase of instruments and specimens and utilised as below :

(1) Purchase of ethnographical specimens	...	\$735.00
(2) Microscope	...	193.88
(3) Rifle	...	60.00
(4) Freight charges	...	10.77
Total	...	<u>\$999.65</u>

4. \$10,200 was revoted for purchase of furniture and much progress was made with the construction of cases for the new building ; by the end of the year the whole of the hardwood framing for the wall cases of the main galleries was practically ready for erection and the construction of table cases well advanced. A further supply of glass-topped boxes for containing the study collections of birds and small mammals, similar to those used in the British Museum, was obtained from the Crown Agents, and three zinc-lined cabinets, designed to be practically air tight, were ordered from the Public Works Department Factory. It is hoped that this method of storing specimens will be successful in preserving the valuable collections of the Museum from the ravages of a climate which is peculiarly destructive to zoological specimens.

A further stock of chengai was purchased at the end of the year and stacked to season, as it has been found that it is hopeless to attempt to make satisfactory cases unless the wood of which they are built has been cut approximately to size for at least a year.

The following charges were incurred on account of this vote :

(1) Labour	...	...	...	...	...	\$1,043.24
(2) Factory Engineer, almeirahs, bird cabinets and office furniture	...	...	...	...	...	498.75
(3) Timber	...	...	...	...	...	359.10
(4) Supplying trap-door and hoisting tackle to upper floor of Museum	...	...	...	...	...	69.08
(5) Iron work for cases	...	...	...	...	...	60.00
(6) Safe	...	...	...	...	...	160.00
(7) Shipping and handling charges	...	...	...	...	...	9.83
(8) Glass-topped boxes	...	...	...	...	...	272.66
						Total ... \$2,472.66

#### REVENUE.

Including a balance of \$14.46 from 1904, the revenue realised from work done for private persons and sale of surplus specimens was \$370.88.

Under authority, previously obtained, \$384.67 was expended, principally on freights on specimens sent to England for examination, on ethnographical collections and on expenses connected with the Gunong Tahan expedition, leaving a debit balance carried to the 1906 account of \$13.79.

#### VISITORS.

A large portion of the Museum was closed throughout the year and the entire building was closed from the 8th September. Notwithstanding this, the total attendance for the first eight months of the year amounted to 20,930 compared with 23,219 for the corresponding period of 1904, but it should be pointed out that these figures are merely recorded by a native watchman and, as he was under no European supervision from May to September of 1905, the figures should probably read considerably higher.

Of the total number of visitors the percentage distribution according to race works out as follows :

	1903, per cent.	First eight months.		
		1904, per cent.	1905, per cent.	1905, per cent.
Europeans	1.3	1.8	...	1.5
Eurasians	2.5	3.5	...	3.9
Bengalis	3.9	5.3	...	6.1
Tamils	16.7	16.2	...	18.9
Malays	22.7	20.1	...	17.5
Chinese	52.9	53.1	...	52.1
Total	100.0	100.0	...	100.0

It will be noted that the attendance of Europeans and Eurasians, taken together, is practically a constant proportion while that of Malays is diminishing; the variation, however, is probably due to changes in the constitution of the population of the town and not to any other cause.

#### LIBRARY.

No important additions were made to the library during the current year. Contributions were received from the Trustees of the British Museum, the Smithsonian Institution and the Philippine Museum, as well as several small pamphlets and annual reports from other sources. A duplicate set of "Stray Feathers," a journal of Indian ornithology, which contains much matter dealing with the Malay Peninsula, was purchased from the Singapore Museum and a few other books were ordered through the Crown Agents.

#### APPARATUS.

A Zeiss microscope and a dissecting microscope were purchased from the Cambridge Scientific Instrument Company, Limited.

#### EXCHANGES.

During the present period of transition it has not been feasible to arrange any very important exchanges, but a small collection of reptiles, desiderata of the Museum, was received from the British Museum as well as a few tubes of named termites.

#### PUBLICATIONS.

Two numbers of the "Journal of the Federated Malay States Museums" were issued during the year, consisting of about 70 pages of letterpress illustrated by two plates and a plan. Material for two other numbers is under preparation.

#### ECONOMIC ZOOLOGY.

A few insect pests were submitted and identified during the year including the larva of a small beetle of the family *Bostrichidae*, which was causing much damage to serial furniture manufactured by the Public Works Department Factory.

#### ADDITIONS.

##### I. — ZOOLOGICAL.

In January and February two brief expeditions were undertaken to the high mountains in the neighbourhood of Gunong Batang Kali and small collections were obtained from a height of over 5,000 feet. Amongst other specimens, new to the Museum, may be mentioned, *Cryptolopha trivirgata*, a small green warbler; *Cyanops ramsayi*, a brilliantly plumaged barbet; *Chalcurus inopinatus*, a fine peacock pheasant only known from two specimens obtained by the Hon. Walter

Rothschild's collector in Ulu Pahang; and a blue whistling thrush, new to science, which has been described by Mr. W. R. Ogilvie-Grant, of the British Museum. A small squirrel proved to be *Sciurus rufigenis*, hitherto not known from the Malay Peninsula and supposed to be confined to the mountain districts of Burma and Tenasserim. Another extremely rare squirrel, *Rhinosciurus laticaudatus*, was also obtained within the town limits of Kuala Lumpur.

The collections made on Gunong Tahan and in its vicinity have been sent to the British Museum, in accordance with the terms of the agreement whereby the Trustees of that institution paid a considerable proportion of the expenses of the expedition; but it is anticipated that the balance remaining after the first set has been deposited in the national collection will provide a number of species not hitherto represented in either the Perak or Selangor Museum. The numerous other additions, vertebrate and invertebrate, call for no special remark.

#### II.—ETHNOLOGICAL.

As in 1904 very special attention was paid to this department, and the accessions, mostly from Negri Sembilan and Pahang, are very numerous. The collection of native wood carving has been much extended and further additions have been made to the series of handmade pottery, which now comprises examples of nearly every fabric known from the Federated Malay States, including two beautiful specimens of a type of incised work now no longer made. A large number of spears, showing the development of the blade from a wooden model, were purchased and numerous specimens of the less common types of weapons. Several examples of old brass and silver work were also secured, including two waist buckles of silver, "jadam," the manufacture of which is now a lost art on this side of the Peninsula.

Mr. Cecil Wray, Resident of Pahang, kindly purchased for the Museum a most interesting set of miscellaneous ethnological specimens, mostly from Pekan, including a curious *tumbok lada*, or dagger, with a bronze blade.

Whilst at Kuala Tembeling I also made a small but varied collection, amongst which there may be mentioned a set of the dies used in making the pottery for which the district is famous and several fine specimens of "batu lintar" or neolithic celts dug out of the sand banks which border the Tembeling in several places. At the end of the year a visit was paid to Linggi, where several unique and curious objects were purchased, including a set of the implements used in the "zunnat" operation.

#### III.—MINERALOGY, GEOLOGY AND ECONOMIC PRODUCTS.

Works on these groups was entirely suspended, pending the transference of the collection to the new Museum, but arrangements have been made whereby the technical collections made by the Mines,

Geological, Agricultural and Forests Departments will be placed on view in the central hall of the new Museum: in the meantime, however, no storage room has been available.

#### DONATIONS.

Considering the out-of-the-way situation of the existing building and the fact that it has been impossible to exhibit specimens to advantage, it is not surprising that donations to the Museum have been few and unimportant. It is hoped, however, that on the removal of the collections to the commodious premises now practically finished this will be altered and that the general public will assist in making the Museum really representative of the resources of these States by contributing any specimens of interest that they may be in a position to obtain.

#### CONSERVATION.

The collections have throughout the year been cleaned and where necessary repaired, and many of the more perishable articles have been packed up in tin-lined cases, as the increasing dilapidation of the building has rendered their further exposure inadvisable.

A large number of rare mammals and birds were sent home for mounting by an experienced taxidermist, and the former have been safely received back in a most satisfactory condition, the results in the case of a large male siamang and a wild cat being particularly fortunate. Mounting from the dried skin, however, can never show such good effects as when the specimens are taken in hand immediately after death, and in a humid climate like that of the Federated Malay States the drying and subsequent relaxation of the skins are attended with special risk to the specimens, due to incipient decomposition.

#### STAFF.

The Dyaks attached to the Museum worked hard and well during the year, their duties on Gunong Tahan being specially arduous; but the Bengali watchmen were not satisfactory.

The Museum clerk absconded in September after pawning the silver mounts of several spears and crises; he was, however, captured and sentenced to nine months' rigorous imprisonment, and fortunately the majority of the stolen articles were recovered from the pawnbroker with whom they had been pledged, whilst the value of the balance was made good by the Government Officers' Guarantee Fund.

H. C. ROBINSON,  
*Curator.*

## THE MALAY VARNISH CALLED "GETAH LULI"

BY L. WRAY.

MR. E. M. HOLMES, F.L.S., Curator of the Museum of the Pharmaceutical Society, writes in the Museum Report for 1903-6, p. 32, published in 1907: "Nearly eleven years ago I described in the Journal of this Society (3), 25, a specimen of a varnish used by the Malays of the Straits Settlements, which is there considered to be the best in use, forming a white brilliant hard varnish. It was received from Mr. L. Wray, the Curator of the Perak Museum, who sent with it a leafy branchlet of the tree, but with fruit only, not flowers. From the specimens then sent, so far as I could determine, the tree yielding the varnish was either *Garcinia merguensis*, Wight, or nearly allied to it. Now Mr. Wray has sent specimens of flowers, and, on submitting the flowers to Mr. J. T. Duthie, B.A., the Assistant for India, at the Royal Herbarium, Kew, he has confirmed my supposition as correct."

This species is thus described in the "Materials for a Flora of the Malayan Peninsula," by Sir George King, K.C.I.E.:

"2. *GARCINIA MERGUENSIS*, Wight, Ill. 122, Ic, 116.—A tree 30 to 40 feet high; young branches thin, terete, dark brown when dry. Leaves: ovate-elliptic to lanceolate, bluntly caudate-acuminate, the base cuneate; upper surface when dry shining, dark brown; the lower dull pale brown, the midrib distinct on both; nerves indistinct, thin, spreading, about .075 inches apart; length 3 to 3.5 inches, breadth 1.1 to 1.4 inches; petiole .25 inches. Male flowers: .15 inches in diameter, in rather dense axillary minutely bracteolate 3- to 6-flowered cymes longer than the petioles; pedicels .2 inches, buds globose; sepals four, fleshy, the outer pair small, ovate-orbicular, sub-acute; the inner pair orbicular, all concave; petals four, orbicular, fleshy, concave, covering the stigma in bud; anthers numerous on both sides of four fleshy processes; sessile, oblong, dehiscing suturally; rudy-style long, cylindric, thick; stigma discoid, smooth, flat. Hermaphrodite flowers: sepals four, the outer pair, as in the male, ovate-orbicular, thin; petals four, orbicular-reniform, fleshy, not covering the stigma; stamens numerous on both sides of four triangular fleshy processes; anthers sessile, sub-orbicular, dehiscing vertically by the sutures; stigma sessile, very large, hemispheric, convex, smooth, covering the anthers when young. Female flowers: sepals four, the outer pair much smaller than the inner, all thin and concave; petals four, orbicular, about the same size as the inner sepals, concave, thinly coriaceous, with a thick-ended coloured patch at the base; staminodes and disk 0; stigma semi-hemispheric, almost covering the whole ovary. Fruit: pedicelled, globular, .75 inches in

diameter, smooth, covered by the concave smooth stigma. Hook., fl. Fl. Br. Ind., I., 267; Kurz., Fl. Burm., 1, 89; Pierre Flora Forest, Coch.-Chin. Fasc., VI., p. VI., tab. 68, 69, 91, D.

“Malacca: Griffith, Maingay, No. 155; Kew Distrib. Perak: Scortechini, Nos. 224A and 812; King's Collector, No. 2660; Wray, 1075. Penang: Curtis, No. 900.”

Professor Wyndham R. Dunstan, F.R.S., Director of the Imperial Institute, furnished the following report on this substance in 1905. It is printed in the “Bulletin of the Imperial Institute,” Vol. III., No. 2, p. 149:

“GARCINIA RESIN FROM PERAK, FEDERATED MALAY STATES.

“This material was forwarded to the Imperial Institute on behalf of the Government of the Federated Malay States by Mr. Leonard Wray, Curator of the Perak Museum. The specimen was accompanied by a letter, giving the following information with regard to the extraction and preparation of the resin:

“The resinous substance is the dried sap of a *Garcinia*. The sap is obtained by making incisions in the bark of the trees. It is then boiled until it is as thick as cream, when a little turpentine is added, and it is ready for use as varnish, being applied to the wood by means of a pad of cloth.

“As prepared, it is an emulsion of a pale yellow colour; if boiled till all the water is evaporated it solidifies, and cannot be dissolved again with turpentine; but if water is added at once it may again be made into an emulsion. It will only keep in good condition for a few days, fermentation of the watery portion of the sap readily setting in.

“This Malay varnish is, when dry, nearly white, very hard and brilliant, being quite equal to the Japanese lacquer. The tree which yields it is a wild one, and as it fruits freely there should be no difficulty in planting it.

“CHEMICAL EXAMINATION.

“The sample of this product forwarded has been examined in the Scientific and Technical Department of the Imperial Institute. The specimen weighed about 4 ounces, and consisted of a semi-solid resin contained in a portion of a bamboo stem. Internally the material was soft and opaque, and had a pale yellowish colour, and an odour resembling that of “t'ung” oil; but externally it was dark-brown in colour, and was covered by a very thin layer of brittle material, probably produced by the action of the atmosphere on the resin. This hard outer layer, which is probably identical with the insoluble resin produced by evaporating the whole of the water from the sap, constituted only a minute proportion of the whole: it was insoluble in turpentine oil and the usual solvents, but the small amount obtainable precluded its further investigation.

“The resin, when freed from the thin outer layer of altered material, was soluble in turpentine oil, chloroform, benzene and ether, and almost completely so in alcohol. It melted at 65° C. (159° F.), and on ignition furnished 0.21 per cent. of ash. One grain of the resin required 89.2 milligrams of potassium hydroxide for neutralisation, and 93.5 milligrams of this re-agent for complete saponification. It contains, therefore, a large proportion of free resin acids, and a comparatively small amount of resin esters.

“When dissolved in turpentine oil and the solution applied as a varnish to wood, there was left on drying a hard almost white ‘coat,’ similar to that produced by damar varnishes.

“A small sample of the resin was submitted to a firm of varnish makers for technical trial: they reported that it could probably be used as a substitute for damar resin in the preparation of varnishes suitable for in-door work, but that it would be necessary to carry out experiments on a large scale before a definite commercial value could be assigned to the material.

“These results indicate that this *Garcinia* resin is a product of considerable interest and likely to prove commercially valuable, and it has been suggested that a larger sample of about 14 pounds of the material should be prepared and forwarded to the Imperial Institute for further examination, technical trial and commercial valuation.

“At the same time a similar sample of the hard insoluble resin prepared by evaporating the whole of the water from the sap, as described in the letter accompanying the present specimen, has been requested, since it is possible that a process might be devised for preparing a resistant varnish of the copal type from this material.

“It is desirable that steps should be taken to identify the particular species of *Garcinia* from which this resin is derived. In this connection, it is of particular interest to note that this resin appears to be quite different in constitution from the gum-resin, gamboge, obtained from the nearly allied plants *Garcinia hanburii* and *Garcinia morella*.”

I will now supplement the above particulars as to its collection and use with further details obtained from some Perak Malays.

The method of collection is as follows :

Small horizontal notches are cut in the bark of the trees down to the wood. Each notch is made by a double cut, one with the knife held with the edge turned upwards and the next with it pointing downwards. The result being that a wedge-shaped piece of bark is removed. The tapping is to be done about 5 p.m., and it is essential that the trees be visited early in the morning as soon after sunrise as possible, otherwise the small bees, called *kelulut*, will carry away all the gummy sap for use in their nest building. During the night the sap oozes out and there is found in the morning a small quantit

of *getah* in each cut. It is removed by the finger tip and then scraped off into a bamboo. The *getah* is of a creamy consistency and of a pale yellow colour, with a characteristic smell. Examined under the microscope it is seen to be an emulsion.

It is next run out of the bamboo into a piece of white cloth. This is folded up lengthwise, the ends grasped by the two hands and the cloth twisted tightly, till all the fluid has been rung out; leaving only the chips of bark and other refuse in the cloth. To one part of the *getah*, two parts of spirits of turpentine are added, and the whole put into either a brass cooking pot or an iron *kuali*. This is placed over a fire and the contents brought to the boil three times in succession, when it is ready for use as a varnish. As thus prepared, it retains a considerable amount of water and is still an emulsion of a pale yellowish-brown colour. Some Malays say they use *minyak kapur barus*, or camphor oil, but the oil I have been shown under this name appears to be only turpentine, with possibly a little camphor in it. In Larut, any way, common spirits of turpentine is used. It was called *minyak kayu putih* by my informant, which is the Malay name for Cajeput oil, but turned out to be turpentine on examination.

Formerly, it was considered that it should be cooked only at midnight and the operator had to work in a state of nature; otherwise the process could not be brought to a successful termination.

To apply the varnish, a rag is sometimes used, but the best results are obtained by laying it on with the ball of the thumb, which has been previously smoothed by rubbing on a sharpening stone. If this is not done, the grain of the skin leaves marks on the finished surface of the varnish. No oil is employed to prevent sticking, as in the somewhat similar process of French polishing. Having been coated, the article is hung up to dry, usually under the eaves. This takes from three to five days according to the state of the weather. As first put on, the varnish is translucent from the admixture of water; but, as it dries, the water evaporates and it becomes transparent.

The wood, previous to varnishing, is rendered as smooth as possible by means of a knife, and the final finish given to it by rubbing it down with the leaves of a white-flowered climber, called *mamplas kasap* (*Delima sarmentosa*, Linn.), or those of several species of rough-leaved figs may be employed instead. These leaves give a smoother surface than the finest glass-paper can impart. With hard, close-grained woods like *kamuning* (*Murraya exotica*, Linn.), one coat of the varnish is sufficient: but with softer and more absorbent woods two are required. Nothing in the way of size is employed by the Malays to fill the grain before varnishing, as is done in Europe. It has, therefore, to be filled with the varnish itself.

The articles which are most frequently coated with this varnish are the scabbards and handles of weapons. The surface is bright and

hard and will stand much wear. No European varnish, that I am acquainted with, can be compared to it in these respects.

The tree is not a large one; it is found growing in the big forest of the low hills and some way up the sides of the bigger ranges. It is nowhere plentiful, though it is scattered sparsely over a large area of country.

About eleven years ago I obtained some seeds and raised four plants from them. Of these, three are still growing in the Museum Grounds, Taiping. The soil is very bad, the land having been previously mined, so that they have probably not made the growth they would have done under more favourable circumstances. The largest tree is now 21 feet 7 inches in height, measures  $9\frac{1}{2}$  inches in circumference, at 6 inches from the ground and 7 inches at 3 feet from the ground. The branches are long, slender and drooping, quite unlike the sturdy growth of the familiar *Garcinias*, such as the mangosteen and the *gluga*. Up to the present time the trees have not flowered. According to the Malays they are quite big enough to tap.

I have been unable to comply with Professor Dunstan's request for a 14-pound sample of the *getah*; although \$5 per gallon has been offered to the Malays for it, no one has yet undertaken to collect it.

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### “BIAK”: AN OPIUM SUBSTITUTE.

BY L. WRAY.

THE leaves of an indigenous tree are sometimes used in Malaya as an opium substitute. In the State of Perak its use is said to have declined in recent years, owing to the introduction of cheap opium; but it is still reported to be much in vogue in Patani and other Northern States. This native report was corroborated by Phya Sri Sahabheb, Vice-Minister for the Interior, Siam, who lately visited Perak. He described a tree, the leaves of which were used in place of opium, in the Siamese-Malay States of the northern part of the Malay Peninsula. From his description, I have no doubt, that the tree is *poko biak*. He said it was a much worse form of drug-habit than opium smoking, the effects on its habitual devotees being far more deleterious.

*Poko biak* is a medium-sized tree, with large leaves and balls of greenish-white flowers. It is widely distributed in Perak, and there is a place near Salak, in the Kuala Kangsar district, named after it. It is known as *Keton* in Patani. It occurs in the jungle and is planted in the kampongs, and also has been preserved when the other trees were felled and cleared away. Consequently, it is frequently seen in and around villages. Specimens of the dried and powdered leaves, as prepared for consumption, have been shown in the economic collection

of the Perak State Museum for over twenty years, and botanical specimens of it were collected in the year 1888. Mr. E. M. Holmes, Curator of the Museum of the Pharmaceutical Society, kindly examined and identified them as *Mitragyne speciosa* of Korthals. This was subsequently confirmed by the Botanists of the Royal Botanical Gardens, Calcutta, to whom I also sent them. The following description of the tree appears in Sir George King's "Materials for a Flora of the Malayan Peninsula:"

"2. MITRAGYNE SPECIOSA, Korth., Obs. de Naucées Indices, p. 19 (name only).—Young branches usually dark-coloured, compressed. Leaves membranous, oblong-obovate to oblong, shortly and abruptly acuminate or sub-acute, the base broad and rounded or rarely slightly and suddenly contracted; both surfaces glabrous, the lower minutely reticulate and sometimes puberulous on the 12 to 15 pairs of slightly curved ascending nerves: length 4 to 5.5 inches; breadth 2 to 3.5 inches; petiole thin, .8 to 1.2 inches long; stipules lanceolate, sparsely pubescent. Corolla .3 inch long; tube of calyx wide, ridged, its mouth about .075 inch across. Anthers sagittate at the base. Stigma mitriform.

"Haviland, in Journ. Linn. Soc., XXXIII., 69; *Stephegyne speciosa*, Korth., Verh.-Nat. Gesch. Bot., p. 160; *S. parvifolia*, K. Schum, fl. Kaiser-Wilh. Land., p. 127; *Nauclea speciosa*, Mig., Fl. Ind. Bat., II., 140.

"Pahang: Ridley, 2190. Perak: Wray, 1896, 4280; Scortechini, 616; King's Collector, 1770, 10029, 10459. Distrib., Sumatra; Forbes, Borneo: Motley, 1169; Korthals, Philippines; Cuming, Motley; Vidal, New Guinea."

It will be noticed that the geographical range of the species is very wide: embracing the whole Malayan Archipelago and Peninsula.

A reference to the supposed properties of the plant appears in the "Kew Bulletin," No. 5 of 1907, p. 199, where it is stated: "A communication from Mr. D. Hooper drawing attention to an article by Mr. H. N. Ridley in 'Journal of the Asiatic Society' for July, 1897, wherein the writer refers to the leaves of *Mitragyne speciosa*, Korth., as being employed in Perak as a remedy for the opium habit." It appears, however, that in the July number for that year there is only one article by Mr. Ridley, and that is "Malay Plant Names," and at p. 58 occurs the only mention of the plant, which is as follows:

"'BIAK' (Perak): MITRAGYNE SPECIOSA, Korth. (Rubiaceae).—Leaves used as a substitute for opium in Perak, according to Mr. Wray."

This is quite another matter; "remedy" and "substitute" being words of such widely diverse meaning. It only shows, once again, how very necessary it is to look up references.

There are two distinct ways of preparing the drug for use. In the first, the leaves are picked and put out to dry in the sun, until they become crisp, when they are reduced to a powder by rubbing between the hands. The fibrous ribs and veins of the leaves being removed during the process. The resulting powder may then be stored for future use.

The dose was, characteristically described by an old Malay to be, about four-*duit ayam*'s weight of the powder. A *duit ayam* is a small copper coin having on the obverse the figure of a cock. It was issued by the East India Company at several dates at the beginning of the last century. They weigh on an average 34 grains each, so that the dose would be 136 grains, or, say,  $2\frac{1}{4}$  drams Apothecary's weight. The powder is mixed with cold water in a cup and the whole drunk; or an infusion is made with hot water and it is taken like tea. It is usual to take it twice a day, before meals.

The second method of preparation is to dry the leaves as before in the sun, then boil them in water so as to form an infusion. This is strained and the clear filtrate is evaporated to a sirupy consistency. This extract can be kept a long time, and is usually stored in the little horn boxes used by opium smokers for keeping prepared opium in. It is called *chandu* by the Malays, which is also the name of opium when prepared for smoking. This extract of *biak* is mixed with hot water before taking. The dose is said to be one *hun*, which is equal to 5.83 grains Troy. Some people just put it on to the tongue and wash it down with a drink of water.

The extract may also be smoked, somewhat in the same way as prepared opium. The pipe employed for this purpose is made of the bamboo known to the Malays as *buloh minyak* (*Oxytenanthera sinuata*), and is  $14\frac{1}{2}$  inches long and  $\frac{7}{8}$ ths inch in diameter. It is closed by a natural septum at one end, and is open at the other, this is the end which is applied to the mouth in use. Near the closed end a brass tube is inserted, which projects at right angles to the bamboo, and is  $1\frac{3}{8}$  inch long, with a bore of  $\frac{1}{4}$  inch in diameter. There is in the Museum collection an opium pipe of Patani pattern, almost exactly similar to the one described above, only the bowl, if it may be so called, is of tin in place of brass. The extract is prepared for smoking by mixing it intimately with the finely shredded leaves of the *Palas* palm (*Licuala paludosa*), cut in the same way, and with the same implements, as native-grown tobacco. This mixture, which is a sticky, fibrous, brown mass, is called *madat*.

A lamp on a tall foot completes the outfit. A specimen in the Perak Museum has a wooden base in the form of a conventionalized four-lobed flower, of  $5\frac{1}{2}$  inches square and  $1\frac{1}{2}$  inch thick. The upper part consists of a piece of bamboo  $2\frac{5}{8}$  inches in diameter, cut so that the upper portion forms a shallow cup, closed beneath by a septum.

Below this the greater part of the walls of the bamboo have been cut away, leaving only four equidistant cylindrical-shaped pieces, the lower ends of which are mortised into the wooden base, the whole being 9 inches in height, the cup serves to hold the oil container which is a valve of a fluvio-marine shell. The wick is of twisted cotton cloth, kept in place by a metal support. Coconut oil is burned in it.

The method of smoking is as follows: The smoker sits tailorwise on the floor, with the lamp in front of him. He then takes a small piece of the *madat*, rolls it with his fingers into a pellet, the size of the bore of the brass tube, into which he inserts it, then putting his mouth to the other end of the bamboo he brings the *madat* in contact with the flame of the lamp and inhales the smoke of the burning pellet through the pipe. From twenty to thirty pellets are smoked at a time.

The effects of the drug, whether taken internally or smoked, are said to resemble those of opium, and in large doses it is poisonous, producing stupor. It is also said that users of it suffer from permanent enlargement of the abdomen. This is attributed, by some, to the indolent life which is induced by indulgence in the *biak* habit.

Besides the purposes already mentioned, the leaves of this tree are used medicinally for worms in children. They are made into a poultice and applied externally over the upper portion of the abdomen. It is held that, if applied to the lower portion, the worms are driven upwards and escape by the mouth; but if confined to just beneath the termination of the ribs they are expelled downwards and are passed in the ordinary way. Of their efficacy as a vermifuge, applied in the manner indicated above, I have very grave doubts.

Some time back I sent about 16 pounds' weight of the dried leaves to Mr. E. M. Holmes for examination. He, however, reported that no poisonous alkaloid had been found in it. A further consignment has now been sent, and it is hoped that the active principle will be successfully separated from the drug.

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### “SUJI TIMBA.”

By L. WRAY.

**T**HIS is a form of gold-thread embroidery, much used by the Malays for the ornamentation of mats and other articles. It appears to be very closely related to the so-called “gold lace” on Civil Service and some other uniforms; though whether it is produced in the same way, I am not in a position to say.

The design is drawn on white paper, in free-hand, for the most part; but where there is a pattern which consists of two or four symmetrical divisions, the paper, or, in the case of a large design, a

separate smaller piece of paper is folded in half or quarters and the motive is drawn on one section of the folded paper. It is then put on to a board and cut through all the folds by means of a sharp-pointed knife. It is subsequently unfolded and laid on the large pattern, being kept in place by means of a few small fragments of bees'-wax placed between the two papers, and a pencil run round it, when it may be removed. The drawing of the pattern being completed, it is cut out with a knife, all those portions of the paper which are to appear in gold thread being left and those which are to show the foundation are to be removed, care being taken to leave narrow strips of paper to support the pattern where necessary, and a circle, square, or other border is to be left to enclose the whole. This latter is called the *tali-ayer*, or water-course. These paper templets are called *achu* in Kuala Kangsar.

Strong cardboard is then built up by pasting several thicknesses of brown paper together, with two sheets of white for outside covers. When dry the paper templet is laid on this card, being kept in place as before mentioned by a little wax here and there, and the design is carefully traced by means of a fine-pointed pencil. The templet being removed, the pencil lines are cut through with a knife.

To make cording, narrow strips of rattan of the kind called *rotan segur* are taken. These are then passed through holes punched in a piece of tinned iron. First through large holes and then successively through smaller ones, till the strip becomes round and of the required size.

This process much resembles wire drawing, but differs from it mainly on account of the physical characteristics of the two materials. In the case of wire, the diameter is reduced by passing it through a series of conical holes, whereby its length is augmented at the expense of its section; while in the rattan, the sharp edges of the tin-plate scrape off portions of its substance without adding anything to its length.

The cardboard pattern, which is called *tempulok*, is put on to the cloth, usually velvet, which is to form the foundation of the design, and tacked down with stitches from a quarter to half an inch apart. The stitches are taken transversely across the card and not through it. Where lines are required to complete the design, the prepared rattan is stitched on in the same way.

It should be mentioned that the foundation cloth, with its backing of coarser material, is stretched on a horizontal work-frame before the application of the card pattern.

The next step is to cover the pattern with gold thread. For this purpose a winder is used consisting of a piece of bamboo about 9 inches long, across one end, and about  $1\frac{1}{2}$  inches from it, a shorter

piece of bamboo about 3 inches long is securely tied. This implement is called in Perak *olak-alek*, but it is known as *choban* in Pahang: where it is, or rather was, made of many fanciful and graceful shapes: in silver, brass, horn and other materials. A fine series of these was collected by the writer and is now in the Perak Museum.

On to the cross is wound the gold thread, usually a double strand, the other end of the implement serving as a handle. A small needle with fine white or ground coloured cotton is also necessary, as the gold thread is not passed over the card pattern and through the foundation and up the other side after the manner of crewel work, but is only carried over the front of the card, being stitched down on either side of it with the needle and cotton. To do this neatly requires some skill, as the cotton must not show and the gold thread must be laid evenly so as to completely cover the whole surface of the card. The way it is done is, after having fixed one end of the gold thread, to lay, by means of the winder, which is held in the left hand, the thread across the pattern, then the needle is brought up through the material at the edge of the card on one side of the thread, then over it and back again down through the material. This fastens the thread down on that side, then the winder is moved to the other side, so that the thread lies evenly next to that first laid, the needle is brought up again, over and down through the material. This process is continued till the whole of the card pattern is covered evenly with gold thread. As the supporting pieces of card previously mentioned are come to, they are cut off, and the surrounding outer ring, if it does not form a part of the design, is also removed by undoing the tacking cotton, when it is no longer required for the support of the pattern.

The pieces of rattan are covered in the same way as the card. As many as five of these strips of rattan are laid together to form a border in some cases. At other times two, three or four are used. In covering these borders the thread is carried across from No. 1 to the next, perhaps six times, then the same is done from No. 2 to No. 3, then again from No. 1 to No. 2, and so on alternately so as to form a chequered pattern, as is done in English gold lace. The gold thread is stitched down as already described. Occasionally single pieces of the rattan are covered by coiling thread round them before applying it to the work.

Beads, usually white, and spangles are freely used in this work to fill up all empty spaces. In this, as in most classes of oriental design, there appears to be a feeling that the whole surface should be covered with work of some sort. The restful effect of an unbroken back-ground does not seem to appeal to an Asiatic.

Sometimes the representation of coloured flowers is attempted by filling in spaces, which have been purposely left in drawing the design.

with a closely packed mass of coloured beads. It is probable that this shows Chinese influence, and it is not by any means an improvement on the plain gold; particularly as in many cases the choice of colours is apt to be anything but happy. Filling is also done with silver thread, which is much more harmonious.

When completed the result is a raised design in gold, on a foundation of some dark-coloured velvet or cloth, usually red, green or purple. Of the square mats the whole central portion of the upper one is generally embroidered in this method, while the edges of the top fold and of the lower ones are covered with some figured cloth of a different colour for each fold. It may be mentioned that these mats are made somewhat like the conical bellows of a photographic camera, with sometimes as many as six folds, each one being smaller than the one below it. The better class sleeping and praying mats are also made after this fashion, but usually have only two folds. In these long mats the portions that are ornamented by *suji timba* are the head piece and a row on either side of more or less triangular-shaped pieces. These are worked separately and then cut out and sewn on in their proper places. The centre of the mat, to the edges of which these pieces of embroidery are applied, is most effective when of plain or watered silk, but the Malays often use figured silk with not such good results; at any rate, from a European's art point of view. The bag at one end of a praying mat, which contains the praying staff, is also extensively embroidered.

Pillow-ends of circular, octagonal or rectangular shapes, and also bags, shoes and purses are frequently enriched with *suji timba*.

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## TWO RUBBER PESTS.

BY L. WRAY.

SOME years ago a large number of caterpillars appeared on the Para rubber trees at the Government Plantations at Pondok Tanjong, and did very considerable damage by defoliating the trees. Some of the caterpillars were sent to me, and I endeavoured to rear them, but they all died in a few days' time: apparently because they had had rough treatment before reaching the Museum.

The second outbreak of this same pest was in the early part of this present year at Gapis Estate, Padang Rengas, belonging to the Kuala Kangsar Plantations Company. Here again very marked damage was done to some twenty acres of young trees. Four of the caterpillars were sent to me in a tobacco tin, which had had some holes punched through it with a nail, the rough jagged edges of the tin projecting inwards. It is, perhaps, hardly necessary to state that they all died a few hours after arrival. Although I was promised more of the insects, they have never been sent.

The following superficial description, which will be sufficient to identify the pest when it occurs elsewhere, was taken down when the insects were received :

“ General colour above black, minutely spotted and lined with white, sides with a bright yellow, waved line, starting from just behind the third pair of legs and continuing to the tail. There are some conspicuous white spots on the shoulders and on the last segment but one of the body. Head and legs bright reddish brown, prolegs black, largely spotted with pale reddish brown ; beneath black largely spotted with dull yellow. The largest specimen was some inch and a half in length.”

In both cases the fields attacked were next to some young secondary jungle, or *bluka*, and the caterpillars were also found numerously on much of the vegetation composing it.

The remedy I proposed in both instances was the well-known one of poisoning the leaves by spraying them with water containing Paris green held in suspension, and the Museum spraying apparatus was lent for the purpose. It was reported that the treatment was quite effective and rapidly killed the pest.

It may be mentioned here, as a good deal of misapprehension exists, that this poison acts by being eaten with the natural food of the insect—that is the leaf. Consequently it is necessary in applying it to mix with the water some substance which will make it adhere to the leaves. Otherwise, when they become dry, the powder will fall off, or at any rate the first shower of rain will wash the leaves quite clean. The material I have found effective is a paste made with flour, or some other form of starch, which has been well boiled. A small quantity of this mixed with the water serves to fix the poison to the leaves sufficiently firm to withstand the rain.

The mere contact of the poison with the body of the insect has no effect, it must reach the organs of digestion and be absorbed before it becomes operative. The object of spraying is, therefore, to deposit a film of poison on the leaves which will subsequently be consumed by the leaf-eating pest which it is wished to destroy.

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RECENTLY considerable damage has been done to some young rubber trees at Lauderdale Estate, Matang, by the attacks of a green leaf-eating weevil, which I identified as *Astycus chrysochlorus*, Wied.

In 1897 this same beetle did a very large amount of damage to many acres of Liberian coffee at Gapis Estate ; and at the request of Sir W. H. Treacher I worked out its life history. The report, which was dated 27th July, 1897, was published in “ Perak Museum Notes.”

Vol. II., Part I., p. 61-8. From this I will quote the summary, which will be sufficient here :

“The egg is laid in a small hole in the surface of the ground. On hatching, the grub burrows into the soil and lives on the well-rotted roots and other vegetable matter contained in it. Having attained a size of about  $\frac{3}{4}$  of an inch in length, it forms for itself a chamber in the earth, about 2 inches below the surface, in which it undergoes its metamorphosis. The perfect insect burrows its way out of the earth at night and flies, probably the next day, in search of food. Having found a tree on which it can live, it stays on it while there is any leaf to eat, the females leaving the food plant from time to time to deposit their eggs in the ground.

“The results of digging showed that the grubs were most frequent in the cleanest land. I dug in grass and weeds in many parts of the estate, but could not find one. The same results followed digging in scrub and *lalang* land, and also under the hedges . . . . In the clear land, in one place, as many as six grubs were found within an area of less than one square yard; but, on an average, there are not more than one or two per square yard. Of course, the younger ones being very small undoubtedly escape observation when turning over the soil. At one per square yard we get 4,840 per acre, which is a sufficiently large total to account for a very extensive destruction of foliage.”

Taking into account the life history of the insect, there appears to be only one period of its life when it is possible to attempt to destroy it—and that is when it has attained maturity. Then it might be collected by hand picking or killed by poisoning its food supply with one of the arsenical powders applied as previously mentioned. Mr. E. Lauder Watson informs me that he has nearly exterminated it by hand picking. The same method was also reported by the late Sir Greame Elphinstone to be effective in ridding the Liberian coffee on Gapis Estate of the same pest.

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## DIE INLANDSTÄMME DER MALAYISCHEN HALBINSEL.

BY DR. RUDOLF MARTIN.

[IN this work—which covers two volumes and is extremely well printed and illustrated—Dr. Martin discusses the data that he has obtained, either personally or through the reports of other observers, regarding the wild tribes of the Malay Peninsula. He does not do more than touch upon linguistic questions, but, except in this important branch of research, his work is very thorough, and is only inconclusive because the data that we possess are insufficient to lead to any very positive results.

It is customary to divide the wild tribes of the Malay Peninsula into three distinct classes: the "Sĕmang," or black woolly-haired aborigines of the North; the "Sakai," or fair wavy-haired aborigines of the Batang Padang mountains; and the "Jakuns," or Indonesian aborigines of Malacca and Johor. Of the Jakuns, Dr. Martin has little to tell us—he saw nothing of them; but confined his personal observations to a few men of the Blanda, Bĕsisi, Sĕnoi and Sĕmang types—the best-known or stock types of "aborigines." Quite apart, however, from the "Jakun" omissions, it is extremely doubtful whether Dr. Martin has really done more than deal with the outer fringe of the "Sakai" question. The "Sĕmang," in the North, are certainly a highly specialized race; but between them and the Sĕnoi of Batang Padang lie other important tribes—the "Tembe," of Clifford; the "Bastard Sĕmang," of Annandale and Robinson—who differ from both Sĕnoi and Sĕmang, and who are not at all adequately discussed in Dr. Martin's book. In the valley of the Nĕnggiri there is said to be a large community of Sakais; very little is known about them, and Dr. Martin adds nothing to our knowledge. In the little-known country between the Tĕmbĕling and the Kuantan, there are more Sakais, but nothing whatever is known about their language, and the little that is known about their blowpipes and their costume shows a great difference between them and the other wild tribes of the Peninsula. In Selangor, the dialect of the Sakais behind Rasa has some marked peculiarities, while that of the Orang Kĕnaboi between Sungei Lui and Jelebu is (if our vocabularies are to be trusted) totally unlike any other known language. The numerous Sakai settlements between Johol and the Upper Rompin have also to be investigated. In any case, it is quite clear that the three stock divisions—"Sĕmang," "Sakai" and "Jakun"—are not an adequate description of the aboriginal races of the Peninsula, and will have to be extensively modified in the future.

Dr. Martin's work is, therefore, not by any means "the last word" on the wild tribes of Malaya, but it is an excellent summing up of all that we know at present about them. Our information hitherto has been largely of the nature of travellers' tales; Dr. Martin has subjected those tales—especially the tales of "Professor" Vaughan-Stevens—to scientific analysis and distinguishes to some extent between the true and the false. He begins by giving us 73 pages on the Geography, Geology, Climate, Flora and Fauna of the Peninsula—a section of the work which is called for by continental ideas of thoroughness and not by any special light that it throws on the questions at issue. He then goes on to discuss the data about Pre-historic Malaya. Who made the stone implements that we find in the Peninsula? Dr. Martin gives good reasons for believing that the Sakais did not make them. He then discusses the historical data, from Herodotus to the last census returns; but they throw no light on the origin of the Sakais. We then get a very useful 20 pages on the History of Sakai Research, in which Dr. Martin discusses very thoroughly the work of Vaughan-

Stevens and finally dismisses the "Professor" by quoting, with some show of approval, a casual remark that he was "the biggest liar in Asia." It was certainly time that the "Professor's" statements should begin to be taken with the salt of incredulity. Dr. Martin's account of the distributions and divisions of the wild tribes (pp. 177-218) comes next. It is the least satisfactory part of the book; he mentions very few tribes, confuses the Blandas and Bësi, and devotes for too much attention to trivial points, such as the spelling of tribal names. How can it really help us to know that the word "Sëmang" has been spelt in no less than seven different ways?

The consideration of the "Physical Anthropology" of the Sakai and Sëmang takes up no less than 433 pages, and is by far the most valuable portion of Mr. Martin's work. Of course, we need more data. No single aboriginal tribe has yet been exhaustively studied; many tribes are still practically unknown; the material that we possess is of unequal value. The "Ergology" of the wild tribes is discussed in about 350 pages, and Dr. Martin completes his work with 41 pages of "Concluding Remarks" on the anthropological position of the wild tribes of the Malay Peninsula. His conclusions are mainly negative. A good bibliography and some excellent plates are included in the second volume of Dr. Martin's work.

There can be no question of the utility of Dr. Martin's book. Except in the matter of linguistics, it completely supersedes every existing work, and is an excellent statement of the results obtained up to the present by the study of these little-known wild tribes. But they still remain little known. The great desideratum—a full account of the distribution of the aborigines and of their differences—is still lacking. Three tribes—Sënoi, Sëmang and Bësi—loom far too large in all accounts of the wild tribes of the Peninsula. We are left to judge the others by these three. Yet there are immense differences that are not to be so easily dismissed. The Kënaboi language differs far more from the language of the neighbouring Bësi, than the Bësi differs from Sëmang. What again is the explanation of the common element in the language of the Bësi, Sëmang and Sënoi, when the racial differences are so great? What is the explanation of the ergological differences, the different types of blowpipe coming from different parts of the Peninsula, the differing poisons, the various ways of making fire? What is the true relation between the so-called "Bastard Sëmang" and the Sënoi and Sëmang? Mere admixture of race will not explain the differences. Sakai Research is too much confined to "stock" tribes; we want to know more about the men of the Nënggiri, of Kuantan, of Ulu Rompin and the Kënaboi. There are numerous questions still remaining to be answered; and until more data are available any ambitious work on the wild tribes must run the risk of being considered premature.

## THE FOOD OF THE HAMADRYAD.

THE Hamadryad, *Naja bungarus*, Schleg., is the largest of poisonous snakes. Lydekker in the "Royal Natural History" gives the size as 13 feet and states that it probably grows larger. The longest one in the collection of the Perak Museum, measured in the flesh 14 feet 9 inches. I have heard of larger specimens, but have had no means of verifying the measurements.

*Ophiophagus*, one of the synonyms of the Hamadryad, means "snake-eating," in allusion to its well-known habit of devouring members of its own order. It, however, does not appear to have been recorded that it eats, not only innocuous, but poisonous snakes as well. Two instances of this have come under my observation. In the first a Hamadryad of about 10 feet in length was caught by hitting it with a stick, when it disgorged a 6-foot long Sun-snake (*Adeniophis biringatus*, Boie.), which had only just been swallowed. The second case was of a Hamadryad which was caught and killed while in the act of englutting a *Bungarus fasciatus*, Cantor.

The Sun-snake is, although poisonous, not of a very virulent type, and has such a small gape that it would be no match for a powerful snake like the King Cobra. The *Bungarus fasciatus*, on the other hand, is one of the more poisonous species, and is, according to the Fauna of British India, a snake-eater itself. Cantor in his "Catalogue of Reptiles inhabiting the Malayan Peninsula and Islands" writes: "A fowl, four minutes after it had been bitten on the inner side of the thigh by a *Bungarus fasciatus*, fell on the wounded side and was shortly after seized with slight purging. The eyes were half closed, the pupils alternately dilated and contracted, immobile. In seventeen minutes slight spasms occurred, under which the bird expired forty-three minutes after it had been wounded.

"Another fowl, wounded in the same place as the former by the same serpent, but, after an interval of seven hours, expired under similar symptoms, only more violent spasms, in the course of twenty-eight minutes."

Bearing on this subject, Sir J. Fayerer, Bt., K.C.S.I., in the "Thanatophidia of India" writes: "I have not been able to satisfy myself positively, after many experiments made on purpose, that the poisonous snakes are absolutely insensible to their own, or to the venom of others, but to a great extent they certainly are so.

"I have repeatedly made Cobras and Daboias bite themselves, and each other, and they never seemed the worse for it. But I believe that the poison does take effect on snakes of a less deadly character, and although I have generally seen the *Bungarus* escape, I have seen an occasional death of this snake after a bite by a Cobra that, I think,

might, with some reason, be attributed to the poison. The non-venomous snakes die rapidly—the *Ptyas*, a large, vigorous and fierce snake, though non-venomous, succumbs within an hour or so to the bite of a Cobra.”

From the fact that, in natural circumstances, a Hamadryad has been found to have killed and almost swallowed a large *Bungarus*, it appears that it may be assumed that the poison of the latter is not effective against the former, while the venom of the former is fatal to the *Bungarus*. The Hamadryad being a much more agile reptile than the other, it may rely on its quicker powers of movement to enable it to inflict a fatal bite on its prey and escape a bite itself; in the same way as the Mongoose does. There is, therefore, still some doubt respecting the first assumption, though, I think, that the second is clearly proved.

Two cases of Hamadryads, caught in the act of eating non-poisonous snakes, have also come under my notice. In one the prey was a *Coluber radiatus* of 5 feet 5 inches in length, while the Hamadryad measured 9 feet 7 inches; and in the second it was a common Rat Snake.

L. W.

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## REPORT ON *ERYTHROXYLON COCA* LEAVES FROM PERAK.

BY PROFESSOR WYNDHAM R. DUNSTAN, M.A., F.R.S.,  
DIRECTOR.

THE sample of coca leaves which is the subject of this report was forwarded for examination to the Imperial Institute by the Director of Museums, Federated Malay States, with letter No. D. M. 56/1907, dated the 15th April, 1907. The leaves were procured from the Kamuning Estate, Perak, where about half an acre has been planted with *Erythroxylon coca*.

### DESCRIPTION OF SAMPLE.

The sample consisted of about 15 lbs. of brownish-green leaves, which varied in length from 1 to 2 inches; they were brittle and very much broken. The leaves resembled those of *Erythroxylon coca*, Lam., var. *spruceanum*, as cultivated in Java, but were rather browner than a good sample of the latter.

### RESULTS OF EXAMINATION.

Chemical examination of the leaves gave the following results:

Moisture at 100° C. ...	...	...	9.19 per cent.
Ash ...	...	...	6.95 „
Total alkaloids ...	...	...	0.64 „

The percentage of alkaloids present is quite equal to the average amount found in commercial supplies of coca leaves from other sources.

#### COMMERCIAL VALUATION.

A sample of the leaves was submitted for valuation to a firm of manufacturing chemists, who reported that the colour was not particularly good, and that at present similar leaves containing 0.6 per cent. of total alkaloids would fetch  $7\frac{1}{2}d.$  to  $8d.$  per lb. on the London market.

The firm stated that they had recently made a considerable purchase of Java leaves of the same alkaloidal strength, but of superior colour at the above-mentioned price.

#### CONCLUSIONS AND RECOMMENDATIONS.

These coca leaves from Perak were not very well prepared, being much broken and discoloured. To obtain the best price, the leaves should be bright green, unbroken, and of good aroma, and these characters can only be obtained by collecting the leaves carefully and drying them fairly rapidly.

It is stated that, in Java and Ceylon, the best qualities of coca leaves are dried quickly by means of a current of warm air produced by a fan.

The price obtainable at the present time for coca leaves is fairly remunerative, because the trade, outside South America, is in a few hands and there is no over-production of the leaves. The total demand for coca leaves is, however, small, and there would be great risk of overstocking the market and so reducing prices if further extensive planting is undertaken. In these circumstances, if it is proposed to plant *Erythroxylon coca* in the Federated Malay States, the enterprise should be started on a small scale and afterwards extended, should circumstances point to the desirability of this being done.

(Sd.) WYNDHAM R. DUNSTAN.

15th July, 1907.

## A HAND-LIST OF THE BIRDS OF THE MALAY PENINSULA, SOUTH OF THE ISTHMUS OF KRA.

BY HERBERT C. ROBINSON, C.M.Z.S., M.B.O.U.,  
CURATOR, SELANGOR STATE MUSEUM.

SINCE Hume published his three papers<sup>1</sup> on "The Birds of the Western Half of the Malay Peninsula" in 1879 and 1880, no general list of the birds of the region has been issued, though a very considerable amount of collecting has been accomplished, more especially on

<sup>1</sup> *Stray Feathers*, viii., pp. 37-72; *ibid.*, pp. 151-163; *op. cit.*, pp. 107-132.

the main mountain range, in central Pahang, and on the north-east coast. In view, therefore, of a work on the Vertebrate Fauna of the Malay Peninsula, which is shortly to be undertaken under the auspices of the Government of the Federated Malay States, I have thought it well to bring together a revised list of the species at present recorded from the area. Considerations of space have prevented me from giving the distribution of the species, either local or general, nor have I, except in very occasional instances, thought it necessary to give any references to descriptions or authority for occurrence.

My sources of informations have been the collections of the Perak, Selangor and Singapore Museums (the two former of which are very rich in birds), the "Catalogue of Birds in the British Museum" and various papers on recent collections which I have cited in a former article<sup>1</sup> and need not here repeat.

For the convenience of local students, species, which are represented in one only of the local museums, are marked with an asterisk for Perak and a dagger for Selangor, while those, which are desiderate to both collections, are printed in antique type—*e.g.*, **Rheinwardtius nigrescens**. In addition, those forms which, though included in the list, are of somewhat doubtful occurrence in the Peninsula, are printed within square brackets.

ORDER GALLIFORMES—GAME-BIRDS.

- |  |  |
|--|--|
| 1. <i>Rhizothera longirostris</i><br>( <i>Temm.</i> ).   | 9. <i>Lophura rufa</i> ( <i>Raffles</i> ).                 |
| 2. <i>Arboricola charltoni</i> ( <i>Eyton</i> ).         | 10. <i>Gallus gallus</i> ( <i>Linn.</i> ).                 |
| †3. <i>Arboricola campbelli</i> , <i>Robinson</i>        | 11. <i>Polyplectron malaccensis</i><br>( <i>Scop.</i> ).   |
| 4. <b>Caloperdix oculatea</b> ( <i>Temm.</i> ).          | 12. <i>Polyplectron inopinatus</i><br>( <i>Rothsch.</i> ). |
| 5. <i>Rollulus roulroul</i> ( <i>Scop.</i> ).            | 13. <i>Argusianus argus</i> ( <i>Linn.</i> ).              |
| 6. <i>Melanoperdix nigra</i> ( <i>Vig.</i> ).            | 14. <b>Rheinwardtius nigrescens</b> , <i>Rothsch.</i>      |
| 7. <i>Excalfactoria chinensis</i><br>( <i>Linn.</i> ).   | 15. <i>Pavo muticus</i> , <i>Linn.</i>                     |
| 8. <i>Acomus erythrophthalmus</i><br>( <i>Raffles</i> ). | 16. <i>Turnix taigoor</i> , <i>Sykes</i> .                 |

ORDER COLUMBIFORMES—PIGEONS.

- |  |   |
|--|---|
| 17. <i>Butorion capelli</i> ( <i>Temm.</i> ).          | †19. <i>Sphenocercus korthalsi</i><br>( <i>Temm.</i> ). |
| †18. <i>Sphenocercus robinsoni</i> ,<br><i>Grant</i> . |   |

3. High mountains of South Perak and Selangor.

12. Mountains of Selangor and Pahang above 3,000 feet.

14. Ulu Dong, Gunong Tahan, and possibly the vicinity of Kuala Lipis, Pahang.

18. Gunong Tahan, Pahang; Semangko Pass and Gunong Mengkuang Lebah, Selangor.

19. The only specimen certainly known from the Malay Peninsula is one shot on Pulau Rumpia, one of the Sembilan Islands, off the mouth of the Perak River, in April, 1906.

<sup>1</sup> *Journ. Fed. Mal. States Mus.*, i., p. 45 (1906.)

## PIGEONS—(cont.)

- |   |  |
|---|--|
| <p>20. <i>Osmotreron fulvicollis</i> (Wagl.).</p> <p>+21. <i>Osmotreron bicincta</i> (Jerd.).</p> <p>22. <i>Osmotreron vernans</i> (Linn.).</p> <p>23. <i>Osmotreron olax</i> (Temm.).</p> <p>24. <i>Treron nipalensis</i>, Hodgs.</p> <p>25. <i>Ptilinopus jambu</i> (Gm.).</p> <p>26. <i>Carpophaga ænea</i> (Linn.).</p> <p>27. <i>Carpophaga badia</i> (Raffles).</p> <p>[28. <i>Carpophaga griseicapilla</i> (Wald.).]</p> <p>[29. <i>Columba grisea</i>, G. R. Gr.]</p> | <p>30. <i>Columba punicea</i> (Blyth).</p> <p>31. <i>Myristicivora bicolor</i> (Scop.).</p> <p>32. <i>Macropygia leptogrammica</i> (Temm.).</p> <p>33. <i>Macropygia ruficeps</i> (Temm.).</p> <p>[34. <i>Turtur humilis</i> (Temm.).]</p> <p>35. <i>Turtur tigrinus</i> (Temm. and Knip.).</p> <p>36. <i>Geopelia striata</i> (Linn.).</p> <p>37. <i>Chalcophaps indica</i> (Linn.).</p> <p>+38. <i>Calœnas nicobarica</i> (Linn.).</p> |
|---|--|

## ORDER RALLIFORMES—RAILS.

- |   |  |
|---|--|
| <p>39. <i>Hypotænidia striata</i> (Linn.).</p> <p>40. <i>Rallina fasciata</i> (Raffles).</p> <p>+41. <i>Rallina superciliaris</i> (Eyton).</p> <p>42. <i>Porzana auricularis</i>, Rehnw.</p> <p>43. <i>Poliolimnas cinereus</i> (Vieill.).</p> <p>44. <i>Limnobænus fuscus</i> (Linn.).</p> | <p>45. <i>Amaurornis phænicura</i> (Forst.).</p> <p>46. <i>Gallinula chloropus</i> (Linn.).</p> <p>47. <i>Gallicrex cinerea</i> (Lath.).</p> <p>48. <i>Porphyrio edwardsi</i>, Elliot.</p> <p>+49. <i>Heliopais personata</i> (G. R. Gr.).</p> |
|---|--|

## ORDER PODICIPEDIDIFORMES—GREBES.

50. *Podiceps philippinensis* (Bonn.).

21. One specimen was shot at Kuala Selangor on the Selangor coast in December, 1904.

28. The inclusion of this species in the Peninsular list rests on a specimen so identified by Colonel Bingham, which was obtained at an altitude of 1,500 feet on Bukit Serudum, Kuantan, Eastern Pahang. The species will not improbably be found on the mountains of the northern half of the Peninsula, which have not yet been properly explored.

29. I believe I have seen this pigeon in the mountains of South Perak and on Pulau Jarak in the centre of the Straits of Malacca, off the mouth of the Perak River. Mr. Boden Kloss has also obtained a specimen on Pulau Taya, a small island of the Lingga group, south of Singapore (*Journ. Straits Branch Roy. Asiat. Soc.*, No. 41, p. 58 (1904)).

34. The only specimens recorded from the Malay Peninsula are three in the British Museum (*Salvad. Cat. Birds Brit. Mus.*, xxi., p. 436, spms. *r'*, *s'*, *t'*, (1893)), obtained at Malacca by Wallace and Maingay. The bird is imported from South China to Singapore as a cage-bird, and I am inclined to think that these specimens were escapes from captivity, as the species is not one that is at all likely to be overlooked and no recent collector has met with it.

38. The only authentic locality for these species within the limits of the present paper is Pulau Jarak, where I obtained two specimens in December, 1904. The specimen from Khota Bharu, Kelantan, listed by Bonhote (*P.Z.S.*, 1901 (i), p. 77), is almost certainly a cage-bird.

42. Recorded only from Singapore (*Raffles Museum, Singapore*) and from Patelung on the north-east coast.

50. One specimen from Patelung is on record.

## ORDER LARIFORMES—GULLS AND TERNS.

- |  |   |
|--|---|
| 51. <i>Hydrochelidon leucop-<br/>tera</i> , <i>Meisn.</i> and <i>Schinz.</i> | †58. <i>Sterna bergii</i> , <i>Licht.</i>             |
| 52. <i>Gelochelidon anglica</i><br>( <i>Mont.</i> ).                         | †59. <i>Sterna sinensis</i> , <i>Gm.</i>              |
| 53. <i>Seena seena</i> ( <i>Sykes</i> ).                                     | †60. <i>Sterna minuta</i> , <i>Linn.</i>              |
| 54. <i>Sterna tibetana</i> , <i>Saunders.</i>                                | †61. <i>Sterna saundersi</i> , <i>Hume.</i>           |
| 55. <i>Sterna longipennis</i> , <i>Nordm.</i>                                | 62. <i>Sterna anæstheta</i> , <i>Scop.</i>            |
| 56. <i>Sterna dougalli</i> , <i>Mont.</i>                                    | 63. <i>Sterna melanauchen</i> , <i>Temm.</i>          |
| 57. <i>Sterna media</i> , <i>Horsf.</i>                                      | 64. <i>Anous stolidus</i> ( <i>Linn.</i> ).           |
|  | 65. <i>Micranous leucocapillus</i> ,<br><i>Gould.</i> |

## ORDER CHARADRIIFORMES—PLOVERS AND WADERS.

- |   |  |
|---|--|
| †66. <i>Arenaria interpres</i> ( <i>Linn.</i> ).              | †83. <i>Totanus stagnatilis</i> , <i>Bechst.</i>                     |
| 67. <i>Sarcogrammus atrinuchalis</i> ,<br><i>Jerd.</i>        | 84. <i>Tringoides hypoleucus</i><br>( <i>Linn.</i> ).                |
| 68. <i>Squatarola helvetica</i><br>( <i>Linn.</i> ).          | †85. <i>Glottis nebularius</i> ( <i>Gunner</i> ).                    |
| 69. <i>Charadrius dominicus</i><br>( <i>P. L. S. Müll.</i> ). | †86. <i>Pseudoglottis guttifer</i><br>( <i>Nordm.</i> ).             |
| 70. <i>Ochthodromus geoffroyi</i><br>( <i>Wagl.</i> ).        | 87. <i>Rhyacophilus glareola</i> ( <i>Gm.</i> ).                     |
| 71. <i>Ochthodromus mongolus</i><br>( <i>Pall.</i> ).         | 88. <i>Pavoncella pugnax</i><br>( <i>Linn.</i> ).                    |
| 72. <i>Ochthodromus pyrrhothorax</i><br>( <i>Gould.</i> ).    | 89. <i>Limonites minuta</i><br>( <i>Leisler.</i> ).                  |
| 73. <i>Ochthodromus veredus</i><br>( <i>Gould.</i> ).         | 90. <i>Limonites ruficollis</i><br>( <i>Pall.</i> ).                 |
| 74. <i>Ægialitis dubia</i> ( <i>Scop.</i> ).                  | †91. <i>Limonites damacensis</i><br>( <i>Pall.</i> ).                |
| 75. <i>Ægialitis alexandrina</i><br>( <i>Linn.</i> ).         | 92. <i>Ancylochilus subarquatus</i><br>( <i>Güldenst.</i> ).         |
| 76. <i>Numenius arquata</i> ( <i>Linn.</i> ).                 | 93. <i>Tringa crassirostris</i> ,<br><i>Temm.</i> and <i>Schleg.</i> |
| †77. <i>Numenius phæopus</i><br>( <i>Linn.</i> ).             | †94. <i>Limicola platyrhyncha</i><br>( <i>Temm.</i> ).               |
| 78. <i>Limosa novæ-zealandiæ</i> ,<br><i>G. R. Gr.</i>        | 95. <i>Gallinago stenura</i> ( <i>Kuhl.</i> ).                       |
| †79. <i>Limosa limosa</i> ( <i>Linn.</i> ).                   | 96. <i>Gallinago gallinago</i> ( <i>Linn.</i> ).                     |
| 80. <i>Himantopus himantopus</i><br>( <i>Linn.</i> ).         | *97. <i>Scolopax rusticula</i> , <i>Linn.</i>                        |
| 81. <i>Macrorhamphus taczon-<br/>owskii</i> ( <i>Verr.</i> ). | 98. <i>Rostratula capensis</i><br>( <i>Linn.</i> ).                  |
| †82. <i>Totanus calidris</i> ( <i>Linn.</i> ).                | 99. <i>Hydrophasis chirurgus</i><br>( <i>Scop.</i> ).                |
|   | 100. <i>Glareola orientalis</i> , <i>Leach.</i>                      |

51. Noted in the Perak River estuary in November, 1906.

80. A specimen labelled as coming from Jelebu, a small State in the centre of the Peninsula, east of Selangor, is in the Singapore Museum.

81. Also in the Singapore Museum from the Dindings.

86. Two specimens shot at Kuala Kedah, December, 1907.

88. Also in the Singapore Museum from Malacca.

97. I have examined the remains of a Woodcock shot at Parit on the Perak River, and have also heard of occurrence at Province Wellesley and Malacca.

## FAMILY GRUIDÆ—CRANES.

101. *Antigone sharpii* (*Blanf.*).

## FAMILY IBIDIDÆ—IBISES.

102. <i>Ibis melanocephala</i> ( <i>Lath.</i> ).	104. <i>Thaumatibis gigantea</i>
103. <i>Grptocephalus davisoni</i>	( <i>Oust.</i> ).
( <i>Hume.</i> ).	

## FAMILY CICONIIDÆ—STORKS.

†105. <i>Pseudotantalus cinereus</i>	107. <i>Leptoptilus dubius</i>
( <i>Raffles.</i> ).	( <i>Gm.</i> ).
106. <i>Dissoura episcopus</i>	*108. <i>Leptoptilus javanicus</i>
( <i>Bodd.</i> ).	( <i>Horsf.</i> ).
109. <i>Xenorhynchus asiaticus</i> ( <i>Lath.</i> ).	

## FAMILY ARDEIDÆ—HERONS AND BITTERNS.

110. <i>Pyrherodias manillensis</i>	117. <i>Gorsachius melanolophus</i>
( <i>Meyen.</i> ).	( <i>Raffles.</i> ).
111. <i>Ardea sumatrana</i> , <i>Raffles.</i>	118. <i>Butorides javanica</i> ( <i>Horsf.</i> ).
112. <i>Ardea cinerea</i> , <i>Linn.</i>	119. <i>Ardeola grayi</i> ( <i>Sykes.</i> ).
†113. <i>Mesophoyx intermedia</i>	120. <i>Ardeola bacchus</i> ( <i>Bp.</i> ).
( <i>Wagl.</i> ).	121. <i>Bubuleus coromandus</i>
†114. <i>Garzetta garzetta</i> ( <i>Linn.</i> ).	( <i>Bodd.</i> ).
115. <i>Demiegretta sacra</i> ( <i>Gm.</i> ).	122. <i>Ardetta sinensis</i> ( <i>Gm.</i> ).
†116. <i>Nycticorax nycticorax</i>	123. <i>Ardetta cinnamomea</i>
( <i>Linn.</i> ).	( <i>Gm.</i> ).
124. <i>Dupetor flavicollis</i> ( <i>Lath.</i> ).	

## FAMILY ANATIDÆ—DUCKS AND GEESE.

*125. <i>Asarcornis leucoptera</i>	127. <i>Dendrocygna javanica</i>
( <i>Blyth.</i> ).	( <i>Horsf.</i> ).
126. <i>Nettopus coromandelianus</i>	†128. <i>Spatula clypeata</i> ( <i>Linn.</i> ).
( <i>Gm.</i> ).	*129. <i>Querquedula circea</i> ( <i>Linn.</i> ).
130. <i>Nyroca fuligula</i> ( <i>Linn.</i> ).	

## FAMILY PLOTIDÆ—DARTERS.

131. *Plotus melanogaster* (*Gm.*).

101, 109. Recorded from Penang (*ex coll.* Dr. Cantor), but in both cases probably imported.

105. By no means uncommon on the Selangor coast, but almost unprocurable owing to the depth of mud on the flats it frequents. Also seen at Kuala Kedah.

106. Very common on the eastern side of the Peninsula, but almost unknown on the west coast, south of Kedah.

119, 120. Both these Pond Herons are also very rare on the west coast.

125. Very rare in the southern portion of the Peninsula, but commoner towards the north.

128. A specimen shot near Kuala Lumpur in 1898 is the only record for the Shoveller.

129. Occasionally met with on the Perak River, but rare.

130. A specimen shot some years ago at Temerloh, Central Pahang, was (*vide* A. L. Butler) identified as this species by Mr. F. Finn.

## FAMILY PHALACROCORACIDÆ—CORMORANTS.

- |  |  |  |
|--|--|--|
| *132. <i>Phalacrocorax carbo</i> ,<br><i>Linn.</i> |  | 133. <i>Phalacrocorax javanicus</i><br><i>(Horsf.)</i> . |
|--|--|--|

## FAMILY FREGATIDÆ—FRIGATE BIRDS.

- |  |  |  |
|--|--|--|
| 134. <i>Fregata aquila</i> ( <i>Linn.</i> ). |  | 135. <i>Fregata ariel</i> ( <i>Gould.</i> ). |
|--|--|--|

## FAMILY PHÆTHONTIDÆ—TROPIC BIRDS.

- 136.
- Phæthon indicus*
- ,
- Hume.*

## FAMILY SULIDÆ—GANNETS.

- 137.
- Sula sula*
- (
- Linn.*
- ).

## FAMILY PELECANIDÆ—PELECANUS.

- |  |  |   |
|--|--|---|
| 138. <i>Pelecanus roseus</i> ,<br><i>Gm.</i> |  | *139. <i>Pelecanus philippinensis</i> ,<br><i>Gm.</i> |
|--|--|---|

## ORDER ACCIPITRIFORMES.

## FAMILY VULTURIDÆ—VULTURES.

- |   |  |   |
|---|--|---|
| *140. <i>Vultur tenuirostris</i><br><i>(Hodgs.)</i> . |  | *141. <i>Pseudogyps bengalensis</i><br><i>(Gm.)</i> . |
|   |  | *142. <i>Otogyps calvus</i> ( <i>Scop.</i> ).         |

## FAMILY FALCONIDÆ—EAGLES AND HAWKS.

- |  |  |  |
|--|--|--|
| 143. <i>Circus spilonotus</i> , <i>Kaup.</i>     |  | *150. <i>Accipiter nisus</i> ( <i>Linn.</i> ).                     |
| †144. <i>Circus melanoleucus</i> , <i>Forst.</i> |  | 151. <i>Accipiter gularis</i> , <i>Temm.</i><br>and <i>Schleg.</i> |
| 145. <i>Circus pygargus</i> , <i>Linn.</i>       |  | †152. <i>Eutolmaetus pennatus</i><br><i>(Gm.)</i> .                |
| †146. <i>Circus æruginosus</i> , <i>Linn.</i>    |  | 153. <i>Lophotriorchis kieneri</i><br><i>(Geoffr.)</i> .           |
| 147. <i>Astur trivirgatus</i> ( <i>Temm.</i> ).  |  |  |
| †148. <i>Astur soloensis</i> ( <i>Lath.</i> ).   |  |  |
| 149. <i>Astur badius</i> ( <i>Gm.</i> ).         |  |  |
|  |  | *154. <i>Ictinaetus malayensis</i> ( <i>Gm.</i> ).                 |

132, 133. The shores of the southern portion of the Malay Peninsula are not suitable for Cormorants, and the most southerly recorded locality is Pulau Lalang, one of the Sembilan Islands, off the mouth of the Perak River.

134. Noted off the coast of Senggora, November, 1901, and near Pulau Tioman, S. China Sea, September, 1907.

135. Seen off Batu, Selangor coast, November, 1906, and at the Aroa Islands, Straits of Malacca, November, 1906, and June, 1907.

138, 139. Very local and occasionally disappearing for years at a time. Fairly common at Patani, north-east coast in June, 1901.

140, 141, 142. The southerly limit of the Vulture in the Malay Peninsula appears to be Kuala Kangsar on the western side and the north bank of the Pahang River on the east.

140. Shot near Taiping about fifteen years ago, and not met with since.

149. Recorded from Singapore by Dr. Hanitsch, but probably belonging to the Burmese race, *A. poliopsis*, *Hume.*

150. Two specimens in the Perak Museum, shot near Taiping many years ago, undoubtedly belong to this species.

151. I have followed Ogilvie-Grant in regarding the Malayan Besra as referable to *A. gularis* and not to the typical *A. virgatus*. In the mountains, however, a small richly coloured bird is found resembling *A. rufotibialis* from Kina Balu, which may possibly be a distinct species. Further material is wanted before the point can be decided.

EAGLES AND HAWKS *(cont.)*

- |   |  |
|---|--|
| 155. <i>Spizaetus limnæus</i><br>( <i>Horsf.</i> ).       | 164. <i>Haliastur intermedius</i> ,<br><i>Gurney.</i>      |
| 156. <i>Spizaetus alboniger</i><br>( <i>Blyth.</i> ).     | 165. <i>Milvus govinda</i> ( <i>Sykes</i> ).               |
| 157. <i>Circaetus hypoleucus</i><br>( <i>Pall.</i> ).     | 166. <i>Elanus cæruleus</i> ( <i>Desf.</i> ).              |
| 158. <i>Spilornis pallidus</i> ( <i>Wald.</i> ).          | 167. <i>Machærhamphus alcinus</i> ,<br><i>Westerm.</i>     |
| 159. <i>Spilornis bacha</i> ( <i>Daud.</i> ).             | 168. <i>Pernis cristatus</i> , <i>Temm.</i>                |
| +160. <i>Butastur indicus</i> ( <i>Gm.</i> ).             | 169. <i>Pernis tweedalei</i> , <i>Hume.</i>                |
| 161. <i>Buteo desertorum</i> ( <i>Daud.</i> ).            | +170. <i>Baza lophotus</i> , <i>Temm.</i>                  |
| 162. <i>Haliaetus leucogaster</i><br>( <i>Gm.</i> ).      | *171. <i>Baza jerdoni</i> ( <i>Blyth.</i> ).               |
| +163. <i>Haliaetus leucocoryphus</i><br>( <i>Pall.</i> ). | +172. <i>Cerchneis saturata</i> ( <i>Blyth.</i> ).         |
|   | 173. <i>Microhierax fringillarius</i><br>( <i>Drap.</i> ). |
|   | 174. <i>Falco peregrinus</i> , <i>Tunst.</i>               |
|   | 175. <i>Falco severus</i> , <i>Horsf.</i>                  |

## FAMILY PANDIONIDÆ—OSPREYS.

- |   |  |
|---|--|
| 176. <i>Pandion haliaetus</i> ( <i>Linn.</i> ).         | *178. <i>Polioætus humilis</i> ( <i>Müll.</i><br>and <i>Schleg.</i> ). |
| 177. <i>Polioætus ichthyaetus</i><br>( <i>Horsf.</i> ). |  |

## ORDER STRIGIFORMES—OWLS.

- |  |  |
|--|--|
| 179. <i>Asio otus</i> ( <i>Linn.</i> ).            | 188. <i>Ninox scutulata</i> , <i>Raffles.</i>        |
| 180. <i>Huhua orientalis</i><br>( <i>Horsf.</i> ). | 189. <i>Syrnium seloputo</i><br>( <i>Horsf.</i> ).   |
| 181. <i>Ketupa ketupa</i> ( <i>Horsf.</i> ).       | *190. <i>Syrnium newarense</i><br>( <i>Hodgs.</i> ). |
| 182. <i>Scops malayana</i> , <i>Hay.</i>           | 191. <i>Syrnium maingayi</i> ,<br><i>Hume.</i>       |
| [183. <i>Scops sunia</i> , <i>Hodgs.</i> ]         | 192. <i>Glaucidium brodei</i><br>( <i>Hutton.</i> ). |
| 184. <i>Scops lempiji</i> ( <i>Horsf.</i> ).       | 193. <i>Photodilus badius</i> ( <i>Horsf.</i> ).     |
| 185. <i>Scops sagittata</i> , <i>Cassin.</i>       | 194. <i>Strix javanica</i> ( <i>Horsf.</i> ).        |
| 186. <i>Scops rufescens</i> ( <i>Horsf.</i> ).     |  |
| +187. <i>Heteroscops vulpes</i> ,<br><i>Grant.</i> |  |

157. The species is recorded from Ampang, near Kuala Lumpur, Selangor, by Mr. A. L. Butler, but the specimen is no longer extant.

161. Two specimens, adult and immature, obtained many years ago near Taiping, are in the Perak Museum. A third has recently been obtained near Kuala Lumpur.

163. Equally common with *H. leucogaster* at Langkawi, 70 miles north of Penang, in December, 1907.

171. A very immature bird from near Taiping.

172. Though very much faded, two mounted specimens in the Singapore Museum appear to belong to this race. I obtained a third specimen in Langkawi in November, 1907.

179. A specimen was shot some years ago by Mr. H. N. Ridley in the Botanic Gardens, Singapore, and is now in the Raffles Museum.

180. Specimens of *Bubo coromandus* of reputed local origin, and attributed to this species, are in the Singapore Museum. Some mistake has probably been made about locality.

187. So far as is at present known, confined to the high mountains of Selangor and Pahang.

## ORDER PSITTACIFORMES—PARROTS.

- |  |   |
|--|---|
| †195. <i>Palæornis fasciatus</i><br>( <i>P. L. S. Müll.</i> ).<br>196. <i>Palæornis longicauda</i><br>( <i>Bodd.</i> ).<br>. | 197. <i>Psittinus incertus</i> ( <i>Shaw</i> ).<br>*198. <i>Loriculus vernalis</i><br>( <i>Sparrm.</i> ).<br>199. <i>Loriculus galgulus</i> ( <i>Linn.</i> ). |
|--|---|

## ORDER CORACIIFORMES.

## FAMILY PODARGIDÆ—FROGMOUTHS.

- |  |   |
|--|---|
| †200. <i>Batrachostomus auritus</i><br>( <i>Gray</i> ).<br>†202. <i>Batrachostomus affinis</i> ( <i>Blyth</i> ). | 201. <i>Batrachostomus stellatus</i><br>( <i>Gould</i> ). |
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## FAMILY CORACIIDÆ—ROLLERS.

- |  |  |
|--|--|
| 203. <i>Coracias affinis</i> , <i>McClell.</i> | 204. <i>Eurystomus orientalis</i><br>( <i>Linn.</i> ).<br>205. <i>Eurystomus calonyx</i> , <i>Sharpe</i> . |
|--|--|

## FAMILY ALCEDINIDÆ—KINGFISHERS.

- |  |  |
|--|--|
| 206. <i>Pelargopsis amauroptera</i><br>( <i>Pears.</i> ).<br>*207. <i>Pelargopsis malaccensis</i> ,<br><i>Sharpe</i> .<br>208. <i>Pelargopsis burmanica</i> ,<br><i>Sharpe</i> .<br>209. <i>Pelargopsis fraseri</i> , <i>Sharpe</i> .<br>210. <i>Alcedo bengalensis</i> , <i>Gm.</i><br>*211. <i>Alcedo euryzona</i> , <i>Temm.</i><br>212. <i>Alcedo meninting</i> , <i>Horsf.</i><br>213. <i>Ceyx tridactyla</i> ( <i>Pall.</i> ).<br>214. <i>Ceyx euerythra</i> , <i>Sharpe</i> . | 215. <i>Carcineutes pulchellus</i><br>( <i>Horsf.</i> ).<br>216. <i>Halcyon coromandus</i><br>( <i>Lath.</i> ).<br>217. <i>Halcyon smyrnensis</i><br>( <i>Linn.</i> ).<br>218. <i>Halcyon pileatus</i> ( <i>Bodd.</i> ).<br>219. <i>Halcyon armstrongi</i> ,<br><i>Sharpe</i> .<br>220. <i>Halcyon humii</i> , <i>Sharpe</i> .<br>221. <i>Halcyon concretus</i><br>( <i>Temm.</i> ). |
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## FAMILY BUCEROTIDÆ—HORN BILLS.

- |  |   |
|--|---|
| 222. <i>Buceros rhinoceros</i> ( <i>Linn.</i> ).<br>*223. <i>Dichoceros bicornis</i> ( <i>Linn.</i> ).<br>224. <i>Anthracoceros convexus</i><br>( <i>Temm.</i> ).<br>†225. <i>Anthracoceros malabaricus</i><br>( <i>Gm.</i> ).<br>226. <i>Anthracoceros malayanus</i><br>( <i>Raffles</i> ).<br>227. <i>Cranorrhinus corrugatus</i><br>( <i>Temm.</i> ). | 228. <i>Rhytidoceros undulatus</i><br>( <i>Shaw</i> ).<br>229. <i>Rhytidoceros subruficollis</i><br>( <i>Blyth</i> ).<br>230. <i>Anorrhinus galeritus</i><br>( <i>Temm.</i> ).<br>231. <i>Bericornis comatus</i><br>( <i>Raffles</i> ).<br>232. <i>Rhinoplax vigil</i> ( <i>Forst.</i> ). |
|--|---|

195. Seen at Trengganu by Davison, but not apparently procured.

198. A northern form extending as far south as Larut, and doubtfully to Klang.

203. Only recorded at present from the vicinity of Patani.

211. Confined to mountainous districts and very rare.

225. Not met with south of Kedah. Numerous on Langkawi—an island on the coast of that State.

229. Met with in large flocks along the west coast during the north-east monsoon, hence Maingay's name "*Hydrocissa migratorius*."

## FAMILY UPUPIDÆ—HOOPoes.

233. *Upupa indica*, *Reichenb.*

## FAMILY MEROPIDÆ—BEE-EATERS.

- |  |  |
|--|--|
| 234. <i>Melittophagus swinhoii</i><br>( <i>Hume</i> ). | 236. <i>Merops philippinus</i> ,<br><i>Linn.</i>   |
| 235. <i>Merops sumatranus</i><br>( <i>Raffles</i> ).   | 237. <i>Nyctiornis amicta</i><br>( <i>Temm.</i> ). |

## FAMILY CAPRIMULGIDÆ—GOATSUCKERS.

- |  |  |
|--|--|
| *238. <i>Lyncornis cervineiceps</i> ,<br><i>Gould.</i> | 240. <i>Caprimulgus ambiguus</i> ,<br><i>Hartert.</i>                |
| 239. <i>Lyncornis temmincki</i> ,<br><i>Gould.</i>     | +241. <i>Caprimulgus jotaka</i> , <i>Temm.</i><br>and <i>Schleg.</i> |

## FAMILY CYPSELIDÆ—SWIFTS.

- |  |   |
|--|---|
| +242. <i>Collocalia innominata</i> ,<br><i>Hartert.</i>            | 249. <i>Chætura leucopygialis</i> ,<br><i>Blyth.</i>      |
| +243. <i>Collocalia inexpectata</i> ,<br><i>Hume.</i>              | +250. <i>Cypselus pacificus</i> ( <i>Lath.</i> ).         |
| 244. <i>Collocalia linchi</i> , <i>Horsf.</i> and<br><i>Moore.</i> | 251. <i>Cypselus subfurcatus</i><br>( <i>Blyth</i> ).     |
| 245. <i>Collocalia gigas</i> , <i>Hartert.</i>                     | 252. <i>Tachornis infumata</i> ,<br><i>Sclater.</i>       |
| 246. <i>Chætura gigantea</i> ( <i>Temm.</i> ).                     | 253. <i>Macropteryx longipennis</i><br>( <i>Rafin.</i> ). |
| 247. <i>Chætura indica</i> , <i>Hume.</i>                          | 254. <i>Macropteryx comata</i><br>( <i>Temm.</i> ).       |
| 248. <i>Chætura cochinchinensis</i> ,<br><i>Oust.</i>              |   |

## ORDER TROGONES—TROGONS.

- |  |   |
|--|---|
| 255. <i>Pyrotrogon neglectus</i> ,<br><i>Forbes</i> and <i>Robinson.</i> | 258. <i>Pyrotrogon duvauceli</i><br>( <i>Temm.</i> ).               |
| 256. <i>Pyrotrogon kasumba</i><br>( <i>Raffles</i> ).                    | 259. <i>Pyrotrogon orrophæus</i> ,<br><i>Cab.</i> and <i>Heine.</i> |
| 257. <i>Pyrotrogon erythrocephalus</i><br>( <i>Gould</i> ).              | 260. <i>Pyrotrogon orescius</i><br>( <i>Temm.</i> ).                |

## ORDER COCCYGES—CUCKOOS.

- |   |   |
|---|---|
| 261. <i>Coccytes coromandus</i><br>( <i>Linn.</i> ).  | 263. <i>Hierococyx sparveriioides</i><br>( <i>Vig.</i> ). |
| 262. <i>Surniculus lugubris</i><br>( <i>Horsf.</i> ). | +264. <i>Hierococyx nasicolor</i><br>( <i>Hodgs.</i> ).   |

233. A line drawn from the mouth of the Kedah River on the west coast to the mouth of the Patani on the east seems to be the southern limit of this species.

238. Penang is the most southerly locality for this species.

241. Possibly a resident in the mountain districts throughout the year; common on migration during the winter months.

246. 247. Both forms are found in the Malay Peninsula, *Chætura indica* being commoner during the winter months and in the more northerly districts.

248. Recorded from Semangko Pass, Selangor, and from Taiping, Perak.

250. Until quite recently a specimen in the British Museum from Penang was the only authority for the occurrence of this species in the Malay Peninsula. In October, 1907, however, it appeared in immense flocks in the vicinity of Kuala Lumpur.

259. Not known north of Klang.

## CUCKOOS—(cont.)

- |   |  |
|---|--|
| 265. <i>Hierococcyx nanus</i> ,<br><i>Hume.</i>                 | †276. <i>Chalcococcyx malayanus</i><br><i>(Raffles).</i> |
| *266. <i>Hierococcyx bocki</i> , <i>Wardl.-</i><br><i>Rams.</i> | 277. <i>Eudynamis honorata</i><br><i>(Linn.).</i>        |
| 267. <i>Cuculus micropterus</i> , <i>Gould.</i>                 | †278. <i>Centropus rectunguis</i> ,<br><i>Strickl.</i>   |
| 268. <i>Cuculus canorus</i> , <i>Linn.</i>                      | 279. <i>Centropus sinensis</i> ( <i>Steph.</i> ).        |
| †269. <i>Cuculus saturatus</i> , <i>Hodgs.</i>                  | 280. <i>Centropus javanicus</i><br><i>(Dumont).</i>      |
| †270. <i>Cuculus poliocephalus</i> ,<br><i>Lath.</i>            | 281. <i>Zanclostomus javanicus</i><br><i>(Horsf.).</i>   |
| 271. <i>Penthoceryx sonnerati</i><br><i>(Lath.).</i>            | 282. <i>Rhopodytes tristis</i> ( <i>Less.</i> ).         |
| 272. <i>Cacomantis merulinus</i><br><i>(Scop.).</i>             | 283. <i>Rhopodytes diardi</i> ( <i>Less.</i> ).          |
| 273. <i>Chalcococcyx zanthorhynchus</i> ( <i>Horsf.</i> ).      | 284. <i>Rhopodytes sumatranus</i><br><i>(Raffles).</i>   |
| 274. <i>Chalcococcyx maculatus</i><br><i>(Gm.).</i>             | 285. <i>Rhinortha chlorophæa</i><br><i>(Raffles).</i>    |
| 275. <i>Chalcococcyx basalis</i><br><i>(Horsf.).</i>            | 286. <i>Urococcyx erythrognathus</i><br><i>(Hartl.).</i> |

## FAMILY CAPITONIDÆ—BARBETS.

- |  |  |
|--|--|
| 287. <i>Calorhamphus hayi</i><br><i>(J. E. Grey).</i>  | 293. <i>Cyanops oorti</i> ( <i>Müll.</i> ).                                  |
| 288. <i>Chotorhea chrysopogon</i><br><i>(Temm.).</i>   | †294. <i>Thereiceryx lineatus</i><br><i>(Vieill.).</i>                       |
| 289. <i>Chotorhea versicolor</i><br><i>(Raffles).</i>  | 295. <i>Mesobucco duvauceli</i><br><i>(Less.).</i>                           |
| 290. <i>Chotorhea mystacophanes</i><br><i>(Temm.).</i> | 296. <i>Mesobucco cyanotis</i><br><i>(Blyth).</i>                            |
| 291. <i>Cyanops henrici</i> ( <i>Temm.</i> ).          | *297. <i>Zantholæma hæmato-</i><br><i>cephala</i> ( <i>P. L. S. Müll.</i> ). |
| 292. <i>Cyanops ramsayi</i><br><i>(Wald.).</i>         | 298. <i>Psilopogon pyrolophus</i><br><i>(S. Müll.).</i>                      |

## FAMILY INDICATORIDÆ—HONEY-GUIDES.

299. *Indicator archipelagicus* (*Temm.*).

## FAMILY PICIDÆ—WOODPECKERS.

- |   |  |
|---|--|
| 300. <i>Gecinus vittatus</i><br><i>(Vieill.).</i> | 301. <i>Gecinus viridanus</i><br><i>(Blyth).</i> |
|---|--|

266. A somewhat immature specimen from the Taiping Hills has, Mr. Wray assures me, been identified as this species by comparison at the British Museum.

270. High mountains of Selangor, January, 1905.

282. Not occurring south of Kedah, except on the high mountains of Batang Padang.

292, 293, 298. All confined to the zone above 3,000 feet.

294. On the western side not recorded south of Kedah; on the east, it has been met with in central Pahang.

299. One of the rarest of all Malayan birds, the only Peninsular specimen being the one obtained by Davison, near Klang, and now in the British Museum.

301. Like so many other birds, this species attains its southern limit in Patani and Kedah.

## WOODPECKERS—(cont.)

- |   |   |
|---|---|
| 302. <i>Gecinus robinsoni</i> , <i>Grant</i> .                      | 316. <i>Micropternus phæiceps</i> ,<br><i>Blyth</i> .                   |
| 303. <i>Gecinus rodgeri</i> , <i>Hartert</i><br>and <i>Butler</i> . | 317. <i>Tiga javanensis</i> ( <i>Ljung</i> ).                           |
| 304. <i>Gecinus observandus</i> , <i>Hartert</i> .                  | 318. <i>Chrysophlegma malaccense</i><br>( <i>Lath.</i> ).               |
| +305. <i>Gauropicoides rafflesi</i> ( <i>Vig.</i> ).                | 319. <i>Chrysophlegma humii</i> ,<br><i>Hargitt</i> .                   |
| 306. <i>Gecinulus viridis</i> , <i>Blyth</i> .                      | 320. <i>Chrysophlegma wrayi</i> ,<br><i>Sharpe</i> .                    |
| 307. <i>Iyngipicus pumilus</i> ,<br><i>Hargitt</i> .                | 321. <i>Chrysocolaptes guttierista-</i><br><i>tus</i> ( <i>Tick.</i> ). |
| 308. <i>Iyngipicus canicapillus</i> ,<br><i>Blyth</i> .             | 322. <i>Chrysocolaptes validus</i><br>( <i>Temm.</i> ).                 |
| +309. <i>Iyngipicus auritus</i> ( <i>Gm.</i> ).                     | 323. <i>Hemicercus sordidus</i> ( <i>Ey-</i><br><i>ton</i> ).           |
| [310. <i>Dendrocopus analis</i><br>( <i>Horsf.</i> .)]              | 324. <i>Hemicercus canente</i><br>( <i>Less.</i> ).                     |
| +311. <i>Pyrrhopicus pyrrhotis</i><br>( <i>Hodgs.</i> ).            | 325. <i>Alophonerpes pulverulen-</i><br><i>tus</i> ( <i>Temm.</i> ).    |
| 312. <i>Pyrrhopicus porphyromelas</i><br>( <i>Boie.</i> ).          | 326. <i>Thriponax javensis</i><br>( <i>Horsf.</i> ).                    |
| 313. <i>Miglyptes grammithorax</i><br>( <i>Malh.</i> ).             | 327. <i>Picumnus innominatus</i><br>( <i>Burton</i> ).                  |
| 314. <i>Miglyptes tukki</i> ( <i>Less.</i> ).                       |   |
| 315. <i>Micropternus brachyurus</i><br>( <i>Vieill.</i> ).          |   |
|   | 328. <i>Sasia abnormis</i> ( <i>Temm.</i> ).                            |

## ORDER EURYLÆMIFORMES—BROADBILLS.

- |   |   |
|---|---|
| 329. <i>Calyptomena viridis</i> , <i>Raffles</i> .                          | 333. <i>Eurylæmus ochromelass</i><br><i>Raffles</i> .               |
| 330. <i>Psarisomus dalhousiæ</i><br>( <i>Jameson</i> ).                     | 334. <i>Corydon sumatranu</i> ,<br>( <i>Raffles</i> ).              |
| +331. <i>Serilophus rothschildi</i> ,<br><i>Hartert</i> and <i>Butler</i> . | 335. <i>Cymborhynchus malaccen-</i><br><i>sis</i> , <i>Salvad</i> . |
| 332. <i>Eurylæmus javanicus</i> ,<br><i>Horsf.</i>                          |   |

## ORDER PASSERES—PERCHING BIRDS.

## FAMILY PITTIDÆ—GROUND-THRUSHES.

- |  |  |
|--|--|
| *336. <i>Pitta cærulea</i> ( <i>Raffles</i> ).   | 340. <i>Pitta cucullata</i> , <i>Hartl</i> .                       |
| 337. <i>Pitta cyanoptera</i> , <i>Temm</i> .     | 341. <i>Eucichla boschii</i> , <i>Müll.</i> and<br><i>Schleg</i> . |
| +338. <i>Pitta megarhyncha</i> , <i>Schleg</i> . | 342. <i>Eucichla gurneyi</i> , <i>Hume</i> .                       |
| 339. <i>Pitta coccinea</i> , <i>Eyton</i> .      |  |

302. At present known only from the types from Gunong Tahan.

306. From the vicinity of Tongkah only.

310. This Woodpecker is recorded from Malacca, but I very much doubt whether it really occurs there; no recent collectors have met with it.

327. The only recorded specimen from the Malay Peninsula is one from the Larut Hills, obtained by Mr. Wray, and now in the British Museum.

330. Larut Hills, Perak; Semangko Pass, Selangor; Gunong Tahan, Pahang.

331. Known only from the four original specimens obtained by Mr. Butler on Gunong Ijau, Perak, and from two males from Ginting Bidei, Selangor, 2,300 feet, shot in November, 1907.

## FAMILY HIRUNDINIDÆ—SWALLOWS.

- |   |   |
|---|---|
| †343. <i>Hirundo rustica</i> , <i>Linn.</i>   | 345. <i>Hirundo javanica</i> , <i>Sparrm.</i> |
| 344. <i>Hirundo gutturalis</i> , <i>Scop.</i> | 346. <i>Hirundo barlia</i> , <i>Cass.</i>     |

## FAMILY MUSCICAPIDÆ—FLYCATCHERS.

- |   |  |
|---|--|
| 347. <i>Hemichelidon fuliginosa</i> ,<br><i>Hodgs.</i>  | †367. <i>Xanthopygia xanthopygia</i><br>( <i>Hay</i> ).    |
| 348. <i>Hemichelidon ferruginea</i> ,<br><i>Hodgs.</i>  | †368. <i>Cyanoptila bella</i> ( <i>Hay</i> ).              |
| 349. <i>Alseonax latirostris</i><br>( <i>Raffles</i> ). | 369. <i>Hypothymis azurea</i><br>( <i>Bodd.</i> ).         |
| †350. <i>Cyornis concreta</i> ( <i>S. Müll.</i> )       | 370. <i>Rhipidura albicollis</i><br>( <i>Vieill.</i> ).    |
| 351. <i>Cyornis ruecki</i> , <i>Oust.</i>               | 371. <i>Rhipidura perlata</i> ,<br><i>S. Müll.</i>         |
| 352. <i>Cyornis unicolor</i> , <i>Blyth.</i>            | 372. <i>Rhipidura javanica</i><br>( <i>Sparrm.</i> ).      |
| 353. <i>Cyornis tickellæ</i> , <i>Blyth.</i>            | 373. <i>Terpsiphone affinis</i><br>( <i>Blyth</i> ).       |
| 354. <i>Cyornis frenata</i> , <i>Hume.</i>              | 374. <i>Terpsiphone princeps</i><br>( <i>Temm.</i> ).      |
| 355. <i>Cyornis erythrogaster</i> ,<br><i>Sharpe.</i>   | 375. <i>Terpsiphone incii</i> ( <i>Gould</i> ).            |
| 356. <i>Cyornis sumatrensis</i> ,<br><i>Sharpe.</i>     | 376. <i>Philentoma velatum</i><br>( <i>Temm.</i> ).        |
| 357. <i>Cyornis turcosa</i> ,<br><i>Brüggem.</i>        | 377. <i>Philentoma pyrropterum</i><br>( <i>Temm.</i> ).    |
| 358. <i>Nitidula hodgsoni</i><br>( <i>Moore</i> ).      | †378. <i>Rhinomyias pectoralis</i><br>( <i>Salvad.</i> ).  |
| 359. <i>Anthipes malayana</i> ,<br><i>Sharpe.</i>       | 379. <i>Culicicapa ceylonensis</i><br>( <i>Swains.</i> ).  |
| 360. <i>Niltava decipiens</i> , <i>Salvad.</i>          | 380. <i>Cryptolopha trivirgata</i><br>( <i>Strickl.</i> ). |
| 361. <i>Muscitrea cinerea</i> ,<br><i>Blyth.</i>        | 381. <i>Cryptolopha butleri</i> ,<br><i>Hartert.</i>       |
| †362. <i>Erythromyias muelleri</i><br>( <i>Blyth</i> ). | 382. <i>Cryptolopha davisoni</i> ,<br><i>Sharpe.</i>       |
| †363. <i>Poliomyias luteola</i> ( <i>Pall.</i> ).       | †383. <i>Abornis schwaneri</i><br>( <i>Temm.</i> ).        |
| 364. <i>Muscicapula malayana</i> ,<br><i>Grant.</i>     | 384. <i>Stoparola melanops</i> ( <i>Vig.</i> ).            |
| 365. <i>Muscicapula westermanni</i> ,<br><i>Sharpe.</i> |  |
| 366. <i>Gerygone modiglianii</i> ,<br><i>Salvad.</i>    |  |
|   | 385. <i>Stoparola thalassinoides</i> ( <i>Cab.</i> ).      |

## FAMILY CAMPOPHAGIDÆ—CUCKOO-SHRIKES.

- |   |  |
|---|--|
| 386. <i>Artamides larutensis</i> ,<br><i>Sharpe.</i>      | 388. <i>Volvocivora neglecta</i><br>( <i>Hume</i> ). |
| 387. <i>Artamides sumatrensis</i><br>( <i>S. Müll.</i> ). | 389. <i>Pericrocotus flammifer</i> ,<br><i>Hume.</i> |

366. Known only, so far as the Malay Peninsula is concerned, from two specimens, both from Pahang.

381. The types are from Gunong Ijau, Perak, and no other specimens are known.

382. Recently obtained in numbers at Ginting Bidei, Selangor, 2,300 feet.

## CUCKOO-SHRIKES—(cont.)

- |  |  |
|--|--|
| 390. <i>Pericrocotus fraterculus</i> ,<br><i>Swinh.</i>      | 393. <i>Pericrocotus igneus</i> ,<br><i>Blyth.</i> |
| 391. <i>Pericrocotus montanus</i> ,<br><i>Salvad.</i>        | 394. <i>Pericrocotus cinereus</i> , <i>Lafr.</i>   |
| 392. <i>Pericrocotus zanthogaster</i><br>( <i>Raffles</i> ). | 395. <i>Lalage terat</i> ( <i>Bodd.</i> ).         |
|  | 396. <i>Lalage culminata</i><br>( <i>Hay</i> ).    |

## FAMILY PYCNONOTIDÆ—BULBULS.

- |   |   |
|---|---|
| 397. <i>Ægithina viridissima</i><br>( <i>Bp.</i> ).                 | 416. <i>Criniger salangæ</i> .<br><i>Sharpe.</i>                |
| 398. <i>Ægithina tiphia</i> ( <i>Linn.</i> ).                       | 417. <i>Criniger tephrogenys</i><br>( <i>Jard. and Selby</i> ). |
| 399. <i>Æthorhynchus lafresnayeri</i><br>( <i>Hartl.</i> ).         | 418. <i>Criniger ochraceus</i> ,<br><i>Moore.</i>               |
| 400. <i>Chloropsis hardwickii</i> ,<br><i>Jard. and Selby.</i>      | +419. <i>Criniger finschi</i> , <i>Salvad.</i>                  |
| 401. <i>Chloropsis zosterops</i><br>( <i>Vig.</i> ).                | 420. <i>Alophoixus phæocephalus</i><br>( <i>Hartl.</i> ).       |
| 402. <b><i>Chloropsis cholerocephala</i></b> ,<br><i>Wald.</i>      | 421. <i>Tricholestes criniger</i><br>( <i>Blyth</i> ).          |
| 403. <i>Chloropsis icterocephala</i><br>( <i>Less.</i> ).           | 422. <i>Trachycomus ochrocephalus</i><br>( <i>Gm.</i> ).        |
| 404. <i>Chloropsis cyanopogon</i><br>( <i>Temm.</i> ).              | 423. <i>Pycnonotus analis</i><br>( <i>Horsf.</i> ).             |
| 405. <i>Irena cyanea</i> , <i>Begbie.</i>                           | 424. <i>Pycnonotus finlaysoni</i><br>( <i>Strickl.</i> ).       |
| 406. <b><i>Irena puella</i></b> ( <i>Lath.</i> ).                   | 425. <b><i>Pycnonotus blanfordi</i></b> ,<br><i>Jerd.</i>       |
| 407. <i>Hemixus cinereus</i> ( <i>Blyth</i> ).                      | 426. <b><i>Pycnonotus robinsoni</i></b> ,<br><i>Grant.</i>      |
| 408. <i>Hemixus malaccensis</i><br>( <i>Blyth</i> ).                | 427. <i>Pycnonotus plumosus</i> ,<br><i>Blyth.</i>              |
| 409. <i>Iole olivacea</i> , <i>Blyth.</i>                           | 428. <i>Pycnonotus simplex</i> , <i>Less.</i>                   |
| 410. <i>Iole peracensis</i> , <i>Hartert.</i><br>and <i>Butler.</i> | 429. <i>Pycnonotus salvadorii</i> ,<br><i>Sharpe.</i>           |
| 411. <b><i>Iole virescens</i></b> , <i>Blyth.</i>                   | 430. <i>Otocompsa emeria</i> ( <i>Linn.</i> ).                  |
| 412. <i>Euptilosus euptilosus</i><br>( <i>Jard. and Selby</i> ).    | 431. <i>Otocompsa flaviventris</i><br>( <i>Tickell</i> ).       |
| 413. <i>Microtarsus melanocephalus</i><br>( <i>Gm.</i> ).           | 432. <i>Rubigula cyaniventris</i><br>( <i>Blyth</i> ).          |
| 414. <b><i>Microtarsus cinereiventris</i></b><br>( <i>Blyth</i> ).  | 433. <i>Rubigula weberi</i> ( <i>Hume</i> ).                    |
| 415. <i>Microtarsus melanoleucus</i><br>( <i>Eyton</i> ).           |   |

391. *Pericrocotus wrayi*, Sharpe, and *P. croceus*, Sharpe, have been shown to be synonyms or aberrations of this species, originally described from the mountains of Sumatra.

402, 406. Only known from the extreme north of the Peninsula.

418. *Criniger sordidus*, Richmond, *Proc. U. S. Nat. Mus.*, xxii., p. 320 (1900), is probably a synonym of this species, the author having evidently compared it with the yellower lowland form, *C. tephrogenys*, J. and S.

425. Listed by Bonhote from Biserat Jalor in the interior of the Patani States on the east coast of the Peninsula. (*P. Z. S.*, 1901, (i), p. 62).

426. As yet only known from the types collected on the coast of Patani.

## FAMILY TIMELIIDÆ—BABBLERS.

- |   |  |
|---|--|
| 434. <i>Eupetes macrocerus</i><br>( <i>Temm.</i> ).           | 455. <i>Setaria melanocephala</i><br>( <i>Davison</i> ).           |
| 435. <i>Trochalopteron peninsulæ</i> ,<br><i>Sharpe</i> .     | 456. <i>Anuroopsis malaccensis</i> ,<br><i>Hartl.</i>              |
| 436. <i>Pomatorhinus borneensis</i> ,<br><i>Cab.</i>          | 457. <i>Turdinulus humei</i> ,<br><i>Hartert.</i>                  |
| 437. <i>Pomatorhinus olivaceus</i> ,<br><i>Blyth.</i>         | 458. <i>Turdinulus granti</i> ,<br><i>Richm.</i>                   |
| 438. <i>Pomatorhinus wrayi</i> ,<br>( <i>Sharpe</i> ).        | 459. <i>Corythocichla leucosticta</i> ,<br><i>Sharpe.</i>          |
| 439. <i>Melanocichla lugubris</i> ,<br>( <i>S. Müll.</i> ).   | 460. <i>Alcippe peracensis</i> , <i>Sharpe.</i>                    |
| 440. <i>Rhinocichla mitrata</i><br>( <i>S. Müll.</i> ).       | 461. <i>Alcippe cinerea</i> , <i>Blyth.</i>                        |
| 441. <i>Timelia jerdoni</i> , <i>Walden.</i>                  | 462. <i>Pseudominla soror</i><br>( <i>Sharpe</i> ).                |
| 442. <i>Pellorneum subochraceum</i> ,<br><i>Swinh.</i>        | 463. <i>Stachyris davisoni</i> , <i>Sharpe.</i>                    |
| 443. <i>Turdinus olivaceus</i><br>( <i>Strickl.</i> ).        | †464. <i>Stachyris polio-gaster</i> ,<br><i>Hume.</i>              |
| 444. <i>Turdinus magnirostris</i> ,<br><i>Moore.</i>          | 465. <i>Stachyris poliocephala</i><br>( <i>Temm.</i> ).            |
| 445. <i>Turdinus macrodactylus</i> ,<br><i>Strickl.</i>       | 466. <i>Stachyris nigricollis</i><br>( <i>Temm.</i> ).             |
| 446. <i>Turdinus loricatus</i><br>( <i>S. Müll.</i> ).        | †467. <i>Stachyris leucotis</i><br>( <i>Strickl.</i> ).            |
| 447. <i>Erythrochla bicolor</i><br>( <i>Less.</i> ).          | 468. <i>Stachyris maculata</i><br>( <i>Temm.</i> ).                |
| 448. <i>Drymocataphus nigricapitatus</i><br>( <i>Eyton</i> ). | 469. <i>Stachyris chrysæa</i> ( <i>Blyth</i> ).                    |
| 449. <i>Drymocataphus tickelli</i><br>( <i>Blyth</i> ).       | 470. <i>Stachyris chrysops</i> ,<br><i>Richm.</i>                  |
| †450. <i>Æthostoma rostratum</i><br>( <i>Blyth</i> ).         | †471. <i>Kenopia striata</i> ( <i>Blyth</i> ).                     |
| 451. <i>Setaria magna</i> ( <i>Eyton</i> ).                   | 472. <i>Cyanoderma erythropterum</i><br>( <i>Blyth</i> ).          |
| 452. <i>Setaria cinerea</i> ( <i>Eyton</i> ).                 | 473. <i>Mixornis gularis</i> ( <i>Raffles</i> ).                   |
| 453. <i>Setaria albigularis</i> ,<br>( <i>Blyth</i> ).        | 474. <i>Macronus ptilosus</i> , <i>Jard.</i><br>and <i>Selby</i> . |
| 454. <i>Setaria affinis</i> ( <i>Blyth</i> ).                 | 475. <i>Myiophoneus dichrorhynchus</i> ,<br><i>Salvad.</i>         |
|   | †476. <i>Myiophoneus robinsoni</i> ,<br><i>Grant.</i>              |

437. Not known south of Kedah.

439. *Melanocichla peninsularis*, Sharpe, from the mountains of Perak and Selangor is identical with this Sumatran species.

442. The most southerly recorded locality is Taiping.

446. Hitherto known only from Sumatra. A single female was obtained at Ginting Bidei, Selangor, 2,300 feet, in dense bamboo jungle.

449. The only Peninsular localities at present known are Bukit Kutu, Ulu Selangor, at a height of 3,000 feet, and Ginting Bidei, 2,300 feet.

455. Only known from the type and one other specimen, both from Pahang.

458, 470. From the mountains of Trang, northern part of the Peninsula. Unique in the United States National Museum.

476. High mountains of Selangor.

## BABBLERS—(cont.)

- |   |   |
|---|---|
| 477. <i>Brachypteryx wrayi</i> , <i>Grant</i> .       | 482. <i>Cutia cervinicrissa</i> , <i>Sharpe</i> .       |
| 478. <i>Sibia simillima</i> , <i>Salvad</i> .         | 483. <i>Pterythius æralatus</i><br>( <i>Tickell</i> ).  |
| 479. <i>Siva malayana</i> , <i>Hartert</i> .          | 484. <i>Pterythius tahanensis</i> ,<br><i>Hartert</i> . |
| 480. <i>Siva sordidior</i> , <i>Hartert</i> .         | 485. <i>Mesia argentauris</i> , <i>Hodgs</i> .          |
| 481. <i>Herpornis zantholeuca</i> ,<br><i>Hodgs</i> . |   |

## FAMILY TROGLODYTIDÆ—WRENS.

- †486. *Pnoepyga lepida*, *Salvad*.

## FAMILY TURDIDÆ—THRUSHES.

- |   |  |
|---|--|
| 487. <i>Geocichla interpres</i><br>( <i>Temm.</i> ).            | 496. <i>Henicurus schistaceus</i><br>( <i>Hodgs.</i> ).  |
| 488. <i>Geocichla citrina</i> ( <i>Lath.</i> ).                 | 497. <i>Hydrocichla ruficapilla</i><br>( <i>Temm.</i> ). |
| 489. <i>Geocichla innotata</i><br>( <i>Blyth.</i> ).            | 498. <i>Hydrocichla frontalis</i><br>( <i>Blyth.</i> ).  |
| 490. <i>Cichloselys davisoni</i><br>( <i>Hume</i> ).            | †499. <i>Larvivora cyanea</i> ( <i>Pall.</i> ).          |
| 491. <i>Oreocichla affinis</i> , <i>Richm.</i>                  | 500. <i>Copsychus musicus</i><br>( <i>Raffles.</i> ).    |
| 492. <i>Turdus obscurus</i> ( <i>Gm.</i> ).                     | 501. <i>Cittocincla macrura</i> ( <i>Gm.</i> ).          |
| †493. <i>Petrophila solitaria</i><br>( <i>P. L. S. Müll.</i> ). | 502. <i>Trichixus pyrrhopygus</i><br>( <i>Less.</i> ).   |
| *494. <i>Petrophila gularis</i> ( <i>Swinh.</i> ).              | †503. <i>Pratincola maura</i> ( <i>Pall.</i> ).          |
| 495. <i>Henicurus leschenaulti</i><br>( <i>Vieill.</i> ).       | †504. <i>Pratincola caprata</i> ( <i>Linn.</i> ).        |

## FAMILY SYLVIIDÆ—WARBLERS.

- |   |   |
|---|---|
| 505. <i>Acrocephalus orientalis</i> ,<br><i>Temm.</i> and <i>Schleg</i> . | 512. <i>Cisticola cisticola</i> ( <i>Temm.</i> ).                   |
| †506. <i>Locustella lanceolata</i><br>( <i>Temm.</i> ).                   | †513. <i>Cisticola exilis</i> ( <i>Vig.</i> and<br><i>Horsf.</i> ). |
| 507. <i>Sutoria sutoria</i> ( <i>Forst.</i> ).                            | †514. <i>Franklinia rufescens</i><br>( <i>Blyth.</i> ).             |
| 508. <i>Sutoria maculicollis</i><br>( <i>Moore</i> ).                     | 515. <i>Arundinax ædon</i><br>( <i>Pall.</i> ).                     |
| 509. <i>Orthotomus atrigularis</i><br>( <i>Temm.</i> ).                   | 516. <i>Acanthopneuste tenellibes</i><br>( <i>Swinh.</i> ).         |
| 510. <i>Orthotomus ruficeps</i><br>( <i>Less.</i> ).                      | 517. <i>Acanthopneuste trochiloides</i> ,<br><i>Sundev.</i>         |
| 511. <i>Orthotomus cineraceus</i><br>( <i>Blyth.</i> ).                   | 518. <i>Acanthopneuste borealis</i><br>( <i>Blas.</i> ).            |

486. Gunong Batu Puteh, South Perak; Gunong Tahan, Pahang.

489. As Hume himself considered, it is more than doubtful if this so-called species can be separated from *C. siberica* (*Pall.*).

491. From Trang. United States National Museum.

494. The Perak Museum possesses a single specimen of this rare Rock Thrush from the Taiping Hills.

496. Recorded from Gunong Ijau, Perak, and from the vicinity of the Semangko Pass, Selangor.

503. At present only met in Singapore.

504. Sporadic in winter in the northern parts of the Peninsula.

506. Batu, Selangor Coast; Aroa Islands, Straits of Malacca; Singapore.

## WARBLERS—(cont.)

- |  |  |
|--|--|
| +519. <i>Acanthopneuste coronatus</i><br>( <i>Temm.</i> ). | 521. <i>Phyllergates cinereicollis</i> ,<br><i>Sharpe.</i> |
| 520. <i>Acanthopneuste magnirostris</i> ( <i>Blyth</i> ).  | 522. <i>Suya waterstradti</i> ,<br><i>Hartert.</i>         |
| 523. <i>Burnesia flaviventris</i> ( <i>Deless.</i> ).      |  |

## FAMILY LANIIDÆ—SHRIKES.

- |   |  |
|---|--|
| 524. <i>Hemipus obscurus</i> ( <i>Horsf.</i> ).         | 528. <i>Lanius bentet</i> ( <i>Horsf.</i> ).       |
| 525. <i>Hemipus picatus</i> ( <i>Sykes</i> ).           | 529. <i>Lanius tigrinus</i> , <i>Drap.</i>         |
| 526. <i>Tephrodornis gularis</i><br>( <i>Raffles</i> ). | +530. <i>Lanius luconiensis</i> ( <i>Bp.</i> ).    |
| 527. <i>Platylophus ardesiacus</i> ,<br><i>Cal.</i>     | 531. <i>Lanius cristatus</i> , <i>Linn.</i>        |
|   | 532. <i>Lanius superciliosus</i> ,<br><i>Lath.</i> |

## FAMILY PARIDÆ—TITMICE.

- |   |   |
|---|---|
| 533. <i>Parus cinereus</i><br>( <i>Vieill.</i> ). | 534. <i>Melanochlora flavocristata</i><br>( <i>Lafr.</i> ). |
|---|---|

## FAMILY SITTIDÆ—NUT-HATCHES.

- |   |  |
|---|--|
| 535. <i>Dendrophila azurea</i><br>( <i>Less.</i> ). | +536. <i>Dendrophila frontalis</i><br>( <i>Swains</i> ). |
| 537. <i>Dendrophila saturator</i> , <i>Hartert.</i> |  |

## FAMILY CORVIDÆ—CROWS.

- |   |  |
|---|--|
| 538. <i>Corvus macrorhynchus</i> ,<br><i>Wagl.</i>    | 540. <i>Cissa robinsoni</i> , <i>Grant.</i>          |
| 539. <i>Corvus enca</i> , <i>Horsf.</i>               | 541. <i>Crypsirhina varians</i><br>( <i>Lath.</i> ). |
| 542. <i>Platysmurus leucopterus</i> ( <i>Temm.</i> ). |  |

## FAMILY DICRURIDÆ—KING-CROWS.

- |   |  |
|---|--|
| 543. <i>Dicrurus annectens</i> , <i>Hodgs.</i>      | 546. <i>Chaptia malayensis</i><br>( <i>Hay</i> ).      |
| 544. <i>Dicrurus nigrescens</i> ,<br><i>Oates.</i>  | 547. <i>Bhringa remifer</i> ( <i>Temm.</i> )           |
| 545. <i>Dicrurus leucogenys</i> ,<br><i>Walden.</i> | 548. <i>Dissemurus paradiseus</i><br>( <i>Linn.</i> ). |

## FAMILY ORIOLIDÆ—ORIOLES.

- |  |  |
|--|--|
| 549. <i>Oriolus indicus</i> , <i>Jerd.</i>           | 551. <i>Oriolus zanthonotus</i> , <i>Horsf.</i>            |
| 550. <i>Oriolus melanocephalus</i> ,<br><i>Linn.</i> | 552. <i>Oriolus consanguineus</i> ,<br><i>Wardl. Rams.</i> |

## FAMILY STURNIDÆ—STARLINGS.

- |   |  |
|---|--|
| 553. <i>Eulabes intermedia</i><br>( <i>Hay</i> ). | 554. <i>Eulabes javanensis</i><br>( <i>Osbeck</i> ). |
|---|--|

520. High mountains of Perak, Selangor and Pahang.

522. Gunong Tahan, Pahang.

525. Mountains of South Perak and Pahang.

533. Coast line of the northern parts of the Peninsula only.

540. Gunong Tahan and high mountains of Selangor.

541. Coast of Patani.

550. Not known south of the vicinity of Tongkah (Junk Ceylon).

## STARLINGS—(cont.)

- |  |
|--|
| 555. <i>Calornis chalybea</i>   [558. <i>Sturnia nemoricola</i><br>( <i>Horsf.</i> ).   ( <i>Jerd.</i> ).]       |
| 556. <i>Sturnia sinensis</i> ( <i>Gm.</i> ).   +559. <i>Agrospas sturninus</i> ( <i>Pall.</i> ).                 |
| [557. <i>Sturnia malabarica</i>   560. <i>Acridotheres torquatus</i> ,<br>( <i>Gm.</i> ).]   ( <i>Davison.</i> ) |
| 561. <i>Æthiospar fuscus</i> ( <i>Wagl.</i> ).   |

## FAMILY PLOCEIDÆ—WEAVER BIRDS.

- |   |
|---|
| 562. <i>Sporæginthus amandava</i>   567. <i>Munia maja</i> ( <i>Linn.</i> ).<br>( <i>Linn.</i> ).]                        |
| [563. <i>Sporæginthus flavidi-</i>   568. <i>Munia acuticauda</i> , <i>Hodgs.</i><br><i>ventris</i> ( <i>Wallace.</i> ).] |
| 564. <i>Ploceus inexpectatus</i> ,   569. <i>Munia leucogastra</i> ( <i>Blyth.</i> ).<br><i>Hartert.</i>                  |
| 565. <i>Munia oryzivora</i> ( <i>Linn.</i> ).   570. <i>Munia punctulata</i> ( <i>Linn.</i> ).                            |
| 566. <i>Munia atricapilla</i> ( <i>Vieill.</i> ).   571. <i>Erythura prasina</i><br>( <i>Sparrm.</i> ).                   |
| 572. <i>Chlorura borneensis</i> ,<br>  ( <i>Sharpe.</i> )   |

## FAMILY FRINGILLIDÆ—FINCHES.

- |   |
|---|
| 573. <i>Passer montanus</i> ,   574. <i>Pyrrhula waterstradti</i> ,<br><i>Linn.</i>   ( <i>Hartert.</i> ) |
| +575. <i>Emberiza aureola</i> , <i>Pall.</i>  |

## FAMILY MOTACILLIDÆ—WAGTAILS.

- |  |
|--|
| 576. <i>Motacilla feldeggii</i> ,   579. <i>Motacilla taivanus</i> ,<br><i>Mich.</i>   ( <i>Swinh.</i> ) |
| 577. <i>Motacilla melanope</i> , <i>Pall.</i>   580. <i>Limonidromus indicus</i><br>( <i>Gm.</i> ).      |
| 578. <i>Motacilla borealis</i> ,   +581. <i>Anthus richardi</i> , <i>Vieill.</i><br><i>Sunder.</i>       |
| 582. <i>Anthus malayensis</i> , <i>Eyton.</i>  |

## FAMILY NECTARINIIDÆ—SUNBIRDS.

- |   |
|---|
| 583. <i>Chalcostetha pectoralis</i>   586. <i>Æthopyga siparaja</i> ( <i>Horsf.</i> ).<br>( <i>Temm.</i> ).   +587. <i>Æthopyga cara</i> , <i>Hume.</i> |
| 584. <i>Æthopyga wrayi</i> , <i>Sharpe.</i>   +588. <i>Æthopyga anomala</i> , <i>Richm.</i>   |
| 585. <i>Æthopyga temmincki</i>   589. <i>Arachnethra hasselti</i><br>( <i>Horsf.</i> ).   ( <i>Temm.</i> ).   |

557, 558. Both these species occur (*vide* Hanitsch) in Singapore. They have not been met with elsewhere in the Peninsula.

560. As yet known only from the type from central Pahang.

562, 563. The records of these species from Singapore are probably due to escapes from captivity. Both are found in large numbers in the bird shops of the city.

571. Rare: the only authentic localities are Klang, Selangor, and Bentong, Pahang.

572. The only specimen as yet secured is a female from the Telôm valley borders of Perak and Pahang at nearly 4,000 feet.

587. Obtained on Bukit Kutu, Selangor, 3,000 feet, by Mr. A. L. Butler, in November, 1898, and the only record for this species in the Peninsula.

588. Described from Trang in the north of the Peninsula, but also found on Bukit Kutu with the preceding.

## SUNBIRDS—(cont.)

- |  |   |
|--|---|
| 590. <i>Arachneethra pectoralis</i><br>( <i>Horsf.</i> ).      | 597. <i>Arachnothera magna</i> ,<br><i>Hodgs.</i>                     |
| 591. <i>Arachneethra flammaxillaris</i><br>( <i>Blyth.</i> ).  | 598. <i>Arachnothera modesta</i> ,<br><i>Eyton.</i>                   |
| 592. <i>Anthothreptes hypogrammica</i><br>( <i>S. Müll.</i> ). | 599. <i>Arachnothera longirostris</i><br>( <i>Lath.</i> ).            |
| 593. <i>Anthothreptes malaccensis</i><br>( <i>Scop.</i> ).     | 600. <i>Arachnothera chrysogenys</i><br>( <i>Temm.</i> ).             |
| 594. <i>Anthothreptes rhodolæma</i> ,<br><i>Shelley.</i>       | 601. <i>Arachnothera flavigastra</i><br>( <i>Temm.</i> ).             |
| †595. <i>Anthothreptes simplex</i><br>( <i>S. Müll.</i> ).     | 602. <i>Arachnothera crassirostris</i><br>( <i>Reichenb.</i> ).       |
| 596. <i>Chalcoparia phænicotis</i><br>( <i>Gm.</i> ).          | 603. <i>Arachnothera robusta</i> , <i>Müll.</i><br>and <i>Schleg.</i> |

## FAMILY DICÆIDÆ—FLOWER PECKERS.

- |   |   |
|---|---|
| 604. <i>Dicæum cruentatum</i><br>( <i>Linn.</i> ).    | 608. <i>Dicæum olivaceum</i> ,<br><i>Walden.</i>          |
| 605. <i>Dicæum trigonostigma</i><br>( <i>Scop.</i> ). | 609. <i>Prionochilus ignicapillus</i> ,<br><i>Eyton.</i>  |
| 606. <i>Dicæum chrysorrhæum</i><br>( <i>Temm.</i> ).  | 610. <i>Prionochilus maculatus</i> ,<br><i>Temm.</i>      |
| 607. <i>Dicæum ignipectus</i> ,<br><i>Hodgs.</i>      | †611. <i>Prionochilus thoracicus</i><br>( <i>Temm.</i> ). |
| 612. <i>Piprisoma modestum</i> , <i>Hume.</i>         |   |

## FAMILY ZOSTEROPIDÆ—WHITE EYES.

- |  |   |
|--|---|
| †613. <i>Zosterops palpebrosa</i><br>( <i>Temm.</i> ). | 615. <i>Zosterops tahanensis</i> ,<br><i>Grant.</i> |
| †614. <i>Zosterops aureiventer</i> ,<br><i>Hume.</i>   | 616. <i>Zosterops simplex</i> ,<br><i>Swinh.</i>    |

613, 616. Found only in the north of the Peninsula and possibly seasonal visitors.

## SUMMARY.

Total number of species in Fauna	...	...	...	...	616
Represented both in Perak and Selangor Museums	...	...	...	...	376
"    in Selangor Museum only	...	...	...	...	88
Total in Selangor Museum	...	...	...	---	464
Represented in Perak Museum only	...	...	...	...	23
Total in Perak Museum	...	...	...	...	399

## REPORT ON A SAMPLE OF LEAD ORE FROM PAHANG.

By L. WRAY.

MR. CECIL WRAY, the British Resident, Pahang, sent me a sample of galena, obtained from the alluvial in the Kuantan District, for examination. The ore, which is in small waterworn fragments, without any admixture of gang, came from Sungei Jambu,

Kuantan. The valley is rather small with low hills on either side. The *karung* or wash-dirt, which was being worked for tin, as the miners approached the high ground on the north side of the valley, held more and more galena, mixed with the tin oxide, and when the foot of the hill was reached, the lead ore was found in masses. It is reported to be the outcrop of a lode.

Lead occurs, associated with tin oxide, iron pyrites and copper ores, in the Pahang Consolidated Company's lode deposits at Sungei Limbing, so that it is just possible that lode tin ore may be discovered at Sungei Jambu also.

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TAIPING, PERAK,

25th October, 1907.

SIR,—I have the honour to inform you that I have assayed the sample of alluvial galena, from Kuantan, that you sent me some time back, with the following results :

Lead	...	...	...	...	78 per cent.
Silver	...	...	...	...	1 oz. 12 dwt. 6 grs. per ton

2. The galena is of good quality, as far as its lead contents are concerned; for not only is the percentage high, but the metallic button obtained was soft under the hammer and evidently free from impurity.

3. The proportion of silver is so small that it would not pay to extract. It is, in fact, the poorest galena I have ever assayed from the Malay Peninsula.

I have, etc.,

L. WRAY,

*Director of Museums, F.M.S.*

THE BRITISH RESIDENT,  
PAHANG.

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## REPORT ON THE MUSEUMS DEPARTMENT FOR THE YEAR 1906.

PERAK STATE MUSEUM.

SATISFACTORY progress was made in all the departments during the year, the greatest additions being made to the ethnological and economic sections. Pahang, Tringganu, Negri Sembilan, Selangor and Malacca were visited, and large collections made in these States: while the Singapore Agri-Horticultural Show yielded, as did the previous one held in Kuala Lumpur, quite an extensive series of specimens.

2. The local ethnological room, certainly, now contains the most complete Malayan collection in existence. It is still, of course, far from perfect, but since the newer portion of the building was available for the housing of it, very satisfactory progress has been made in filling up the gaps which previously existed.

3. The economic section has now assumed, as it should in a State like Perak, quite an important position. The room is not yet finished, but a great deal has been done towards its completion, by the collection of the necessary specimens, and in the year 1907 the original intention will be nearly fulfilled. It is the only collection of the kind which has been, so far, attempted in Malaya.

4. A point has now been reached in the history of the Museum, when it again becomes necessary to consider the question of additional space. The last enlargement, which was begun in 1900 and finished by the end of 1903, is at present practically full, as is also the space which was rendered available in the older portions of the building by the rearrangement of the collections, when the new galleries were occupied. Adequate space is also urgently required for the proper accommodation of the library, herbarium and the study collections; and some provision should be made for a small reading room. An inexpensive block, very similar to that last added, only 20 feet longer, would meet the requirements of the case.

5. The Perak Museum was founded in January of 1883, so that the year under review is the 24th of its existence. The central portion of the present building was begun in 1886, and it has been added to from time to time as it became overcrowded. When considering the progress which has been made, and comparing it with that of other institutions of a similar character and age, it should be remembered that the funds available for general expenses have been very limited in extent, and that out of this small annual vote the whole cost of the case building and fittings has had to be defrayed.

6. The registration and cataloguing of the contents of the Museum was proceeded with, and 2,700 specimens were registered; 846 of these being new accessions. Up to the end of the year, 13,000 cards had been used, exclusive of guides and subsidiary entries. It was found necessary to obtain a second eight-drawer card-cabinet, as the first had become congested. This should give sufficient accommodation for the next three or four years, at the present rate of progress. Five hundred and eleven new labels were typed, poisoned and mounted on cards. This work was much delayed in consequence of changes in the clerical staff, neither of the new clerks knowing how to use a typewriter at the time of appointment, and one being, up to the end of the year, incapable of using the instrument. There are many thousands of old and dirty labels which require replacing with new ones, and thousands more of manuscript ones which should be typed.

7. The number of visitors continues to increase, year by year, in the most satisfactory manner. The total for the year was 61,449, being the greatest number ever recorded. It is also pleasant to be able to report that there has been no case of damage to the Museum or to the exhibits, or of misbehaviour on the part of any of the many persons who have visited the Institution.

8. The Curator, Mr. Knocker, was absent on leave from the 1st of March to the end of the year. Mr. E. Keilich, the Taxidermist, acted for the Curator, and Mr. Yong Fook, the Assistant Taxidermist, for the Taxidermist. There were three changes in the appointment of Caretaker and Clerk, and from having a man at the top of Grade III, the present occupant is at the very bottom of that Grade.

9. In consequence of the fixing of the dollar at 2s. 4d., a saving was effected on the estimates of \$715.15, from the salaries of Messrs. Knocker and Keilich.

#### SELANGOR STATE MUSEUM.

10. The new Museum building was handed over by the Public Works Department during the year, and by the end of it the greater part of the case building was finished. A portion of the painting, glazing and fitting remained to be done, and some of the cases in the central hall were not completed. The sum of \$7,378.56 was expended on cases, and the general effect of the galleries, considering the low cost of construction, is by no means bad.

11. The collections were removed from the old building to the new. The old cases and fittings were sold and realised \$340.93. The work of installing the specimens was begun and carried on, as far as the state of the cases would allow.

12. Collecting proceeded throughout the year and many additions were made to all the departments. An Assistant Curator was appointed and arrived in August. He has already made very considerable progress in collecting and mounting various zoological specimens, but it will necessarily be some years before this portion of the collection is brought up to a satisfactory standard. In the early part of the year, prior to his appointment, a good many birds and mammals were sent to be mounted in England. Nearly the whole of the old collection of mammals will have to be discarded as soon as better mounted examples of the various species can be procured.

13. The wing set apart for the ethnological collection, although this is strictly local in character, is already becoming congested.

#### GENERAL.

14. One number of the "Journal of the Federated Malay States Museums" was issued during the year, and the MS. for another was

sent to the Government Printer in December. Material for other numbers was in hand, and the preparation of a guide to the Perak Museum and the report on the Gunong Tahan Expedition, together with the illustrations for these two latter works, was far advanced.

15. The birds and reptiles obtained during this expedition have been worked out at the British Museum, and the Federated Malay States share has been returned. These specimens will add many novelties to both Museums.

16. A considerable number of botanical specimens of economic plants have been collected and sent to the herbarium of H.H. Prince Roland Bonaparte. Including one consignment sent in December, 1905, 114 plants have been forwarded up to the end of 1906.

L. WRAY,

*Director of Museums, F.M.S.*

## REPORT ON THE PERAK MUSEUM FOR THE YEAR 1906.

### THE BUILDING.

OWING to the ravages of the white ants, the roof of the Laboratory and Workshop had to be removed, and a new one built in its place, the galvanized iron roofing tiles were used again. Two Dormer-windows were at the same time built in the eastern side of the roof, this has greatly improved the light in the building. Before the old roof was removed, a temporary atap roof was placed over the building, thereby preventing the interior and the contents from being damaged by rain.

The Museum was closed to the public for two days—the 26th and 27th of July—for a general cleaning, and all the wooden floorings were washed, and afterwards dressed with earth oil and kerosene.

### CASES.

Nine shallow wall cases, size 3 ft. by 1 ft. 11 ins., were made and fixed on the walls of the Economic Botany room, four of which contain fibres, two native medicinal plants, one native drugs and two specimen blocks of native woods. Twenty frames, size 12½ ins. by 9½ ins., were also made for showing mounted botanical specimens, and there are 34 mounted specimens awaiting the completion of more frames. Eight two-drawer cabinets, size of drawer 3 ft. by 1 ft. 9 ins. by 4 ins. deep, have been made and fixed under one of the table cases in the upper Ethnological room.

## ZOOLOGY.

The following mammals and birds were added to this section :

## MAMMALS.

- A Malayan Bear, female (*Ursus malayanus*) ;
- A Burmese Civet, male (*Viverra megaspila*) ;
- A Flying Lemur, male (*Galeopithecus volans*) ;
- A Grey Agile Gibbon, female (*Hylobates agilis*) ;
- Two Bats, male and female (*Megaderma spasma*).

## BIRDS.

- A Black Bittern, male (*Dupetor flavicollis*) ;
- A Lesser Coucal, male (*Centropus bengalensis*) ;
- Three Young Coucals (*Centropus bengalensis*) ;
- A Crested Goshawk, female (*Lophospizias trivirgatus*) ;
- A Burmese Peafowl, male (*Pavo muticus*) ;
- Two Argus Pheasants, male and female (*Argusianus argus*) ;
- A White-breasted Kingfisher, female (*Halcyon smyrnensis*) ;
- A Malayan-pied Hornbill, male (*Anthracoceros malayana*) ;
- A Malaccan Yellow-naped Woodpecker, male (*Chrysophlegma malaccensis*).

The alcohol in all the jars of the reptile collection was changed, and the discoloured spirit was re-distilled in the Laboratory ; altogether over 40 gallons of clear alcohol passed through the still.

## BOTANY.

About 66 specimens were mounted and added to the Herbarium, some more additions were made to the rubber exhibits, by the Superintendent of the Government Plantations, Mr. T. W. Main.

A very fine collection of fibres, medicinal plants, essential oils, etc., were given by the Manager of the Kamuning Estate, Mr. A. D. Machado.

Seventeen plaster of Paris models of fruits—*i.e.*, machangs, mangoes and pisangs—were cast and coloured to nature for the fruit collection.

Nineteen framed botanical specimens, a good many produce samples in glass-topped tins and a series illustrating the newly discovered anti-opium plant and its use were added to this section.

## GEOLOGY.

Five very handsome specimens were presented to this department by Mr. E. Gervais, of the French Tin Mining Company, Lahat ; Mr. Cecil Wray contributed three specimens from Pahang, particulars of which are given in the donation list ; and a large number of

specimens have been transferred from the Selangor State Museum. Messrs. G. and C. E. Cumming gave specimens of tin ore, the former from Salak South, Selangor, and the latter from a tin vein in granite, showing polished surface of slickensides.

#### ETHNOLOGY.

Quite a large number of valuable specimens have been added to this section, the result of some collecting trips made by the Director of Museums in Pahang, Tringganu, Negri Sembilan and Malacca, and a visit to the Agri-Horticultural Show, Singapore. The Curator, Mr. F. W. Knocker, also obtained a few Sakai specimens in his trip to Negri Sembilan in February.

Twelve papier-mâché models were made from four iron implements found in Selangor and Batang Padang. One set was presented to the British Museum and another to the Selangor Museum. Plaster casts of eight cannon balls, found in various places, were made and coloured.

#### REGISTRATION AND CATALOGUING.

A new eight-drawer card-cabinet was obtained, and registration and cataloguing has been carried on throughout the year in all the sections of the Museum. The total number of things registered amounts to 2,700, the total number of cards written to date, exclusive of guides, etc., is 13,000. The number of new accessions registered during the year was 846. The number of cards added to the Library Catalogue was 75, and 511 tickets were typed.

#### THE LIBRARY.

There were many additions to the Library by presentation, and the additions by purchase are as follows :

“British Malaya,” by Sir Frank Swettenham ; “Museums Journal,” Vol. 3 of 1903-4, Vol. 4 of 1904-5 ; “Journal of the Royal Asiatic Society, Straits Branch” ; “Philippine Journal of Science” ; “Colonial Office List” ; “The Straits Directory” ; “Whitakers’ Almanac” for 1906 ; “Who’s Who” for 1906 ; “Who’s Who in the Far East” for 1906 ; “Vocabulary of Malay Medical Terms,” by Dr. P. N. Gerrard ; “Carchester: a Tale of West and East,” by a Pilgrim ; the second edition of the “Living Races of Mankind,” 2 Vols. ; “Journal of Indian Art and Industry,” Vol. X ; Bland’s “Historical Tombstones of Malacca” ; Giles’ “Religions of Ancient China” ; “The Life of Sir Andrew Clarke” ; “Chinese Porcelain,” by W. G. Gulland ; “Pottery and Porcelain Marks,” by Hooper and Phillips ; “Elephant and Seladang Hunting in Malaya,” by T. R. Hubback ; “Heroes of Exile,” by Hugh Clifford.

LIST OF DONATIONS TO THE PERAK STATE MUSEUM LIBRARY  
FOR 1906.

BIOLOGICAL SOCIETY OF WASHINGTON, U.S.A.:

"Proceedings of the Biological Society, Description of a New Species of *Acordium* from the Philippines," by Oakes Ames.

EGYPTIAN GOVERNMENT ZOOLOGICAL GARDENS, GIZA (per the Director, Captain Stanley S. Flower):

"Report of the Giza Zoological Gardens for 1905."

FEDERAL SECRETARY:

"Blood-sucking Flies, Ticks and how to Collect Them" (by E. E. Austen).

GOVERNMENT PRINTER:

"Enactments, Pahang, 1905."  
"Negri Sembilan, 1905."  
"Selangor, 1905."  
"Perak, 1905."

HOBSON, MR. S. G.:

"The Ball."

INDIAN MUSEUM, CALCUTTA (per the Trustees of the Indian Museum):

"Annual Report for 1904-1905."  
"Catalogue of the Indian Decapod Crustacea in the collection of the Indian Museum," Part III, Macrura.

KEW ROYAL BOTANIC GARDENS:

"Bulletin of Miscellaneous Information" for 1906.

KING, COLONEL SIR GEORGE, K.C.I.E.:

"Materials for a Flora of the Malayan Peninsula," Nos. 16, 17 and 18.

KYOTO IMPERIAL UNIVERSITY (per the Secretary, Hajime Ishikawa):

"The Kyoto Imperial University Calendar" for 1905-1906.

LLOYD, MR. C. G.:

"Bulletin of the Lloyds Library Mycological Series," No. 3.  
"Index of the Mycological Writings," by C. G. Lloyd, Vol. 1, 1898-1905.

"Mycological Notes," by C. G. Lloyd, Vol. 1, 1898-1905.

"Mycological Notes," by C. G. Lloyd, May, 1905.

"Mycological Notes," by C. G. Lloyd, June, 1905.

"The Tylostomeæ," by C. G. Lloyd.

"LOUISIANA PLANTER" (per the Editor):

Complete Issues for 1906.

MACGREGOR, MR. R. C.:

"Birds from Mindoro and small adjacent Islands."

"Notes on Three Rare Luzon Birds."

"A Hand List of the Birds of the Philippine Islands."

MANCHESTER MUSEUM (per the Director, Dr. W. E. Hoyle):

"Notes from the Manchester Museum."

"Calendar of Lectures and Addresses for 1906-1907."

"Manchester Museum Report for 1906-1907."

MONTEVIDEO MUSEO NACIONAL (per the Director-General):

"Anales del Museo Nacional de Montevideo."

OTAGO UNIVERSITY MUSEUM:

"Curator's Annual Report for 1905" (2 copies).

"PERAK PIONEER" (per the Editor):

Complete Issues for 1906.

PLYMOUTH MUSEUM AND ART GALLERY (per the Curator, Mr. E. E. Lowe, F.I.S.):

"Annual Report for 1905."

LIST OF DONATIONS TO THE PERAK STATE MUSEUM LIBRARY  
FOR 1906—(cont.)

RAFFLES LIBRARY AND MUSEUM,  
SINGAPORE :

“Annual Report for 1905.”

ROYAL COLONIAL INSTITUTE :

“Journal of the Royal Colonial  
Institute.”

“Sessions, 1905-1906,” Nos. 1,  
2, 3, 4, 5, 6, 7 and 8.

“Sessions, 1906-1907,” No. 1.

SARAWAK MUSEUM (per the Cura-  
tor, Mr. J. Hewitt, B.A.) :

“Report of the Sarawak  
Museum for 1905.”

SCRIVENOR, MR. J. B. :

“Fossils from Singapore,” by  
R. Bullen Newton, F.G.S.

SECRETARY TO RESIDENT, PERAK :

“Agricultural Bulletin of the  
Straits and Federated Malay  
States,” Vol. V, 1906.

“Programme of the Presenta-  
tion of Colours to the Malay  
States Guides.”

“Federated Malay States Civil  
Service List” for 1906.

“Bulletin of the Imperial Insti-  
tute,” Vol. IV, Nos. 1 and 2.

“Scenery Preservation,” the  
Government of New Zealand.

SELANGOR MUSEUM (per the Cura-  
tor, Mr. H. C. Robinson) :

“Catalogue of the Selangor  
Government Library.”

“The Annals and Magazine of  
Natural History,” Vol. XV,  
Nos. 86, 87, 89, 90, 91, 92,  
93 and 94.

“SINGAPORE FREE PRESS” (per  
the Editor) :

Complete Issue for the half of  
year for 1906.

SMITH, SENATOR THE HONOUR-  
ABLE STANFORTH :

“Report on the Federated  
Malay States and Java.”

SMITHSONIAN INSTITUTION,  
U.S.A. :

“Bulletin of the United States  
National Museum,” Nos. 54  
and 55.

“Annual Report of the Smith-  
sonian Institution,” 1904.

“Proceedings of the United  
States National Museum,”  
Vol. XXVIII and XXIX.

“Contributions from the United  
States National Herba-  
rium,” Vol. X, Parts 1 and 2.

“Contributions from the United  
States National Herba-  
rium,” Vol. XI.

“TIMES OF MALAYA” (per the  
Editor) :

Complete Daily and Weekly  
Issues for 1906.

WEST INDIES, IMPERIAL DEPART-  
MENT FOR AGRICULTURE  
(per the Commissioner, Sir  
Daniel Morris) :

“West Indian Bulletin for  
1906.”

LIST OF DONATIONS TO THE PERAK STATE MUSEUM FOR 1906.

AMAT TASEH, PENGHULU :

Wooden Shoes for a Child from  
Lower Perak.

ASSISTANT COMMISSIONER OF  
POLICE, PAHANG :

Buttons and Badges of Pahang  
Police.

BAILEY, INSPECTOR H. :

Three Samples of Scrap Para  
rubber.

BARNARD, MR. H. C. :

Malaccan Yellow-naped Wood-  
pecker (*Chrysophlegma ma-  
laccensis*), Taiping.

LIST OF DONATIONS TO THE PERAK STATE MUSEUM  
FOR 1906—(cont.)

- BIRCH, MR. E. W., C.M.G. :  
A Peacock.
- BIRD, MR. G. F. :  
One Beetle (Cockchafer) from  
K. Kangsar.
- BOURNE, THE REV. J. B. :  
Three Female Kerringas from  
Taiping.  
Water from a Mineral Spring,  
Ulu Bernam.
- CAMPBELL, MRS. J. W. :  
Snake (*Doliophus bivirgatus*).
- CAMPBELL, MR. J. W. :  
Two Caterpillars from Max-  
well's Hill.  
Fruit of the Calabash (*Cres-  
centia cujete*) from Kuala  
Kangsar.
- CHEAH KEE EE, MR. :  
Micaceous Iron Oxide from  
Tambun, Kinta.
- CHOO CHEENG KLAY, MR. :  
Botanical specimens of the  
Anti-opium Plant (*Combret-  
um sundiacum*) from Kuala  
Lumpur.
- CHULAN, RAJA :  
Silver Cup.
- COMMANDANT, MALAY STATES  
GUIDES, THE :  
Buttons and Badges of the  
Malay States Guides.
- CUMMING, MR. C. E. :  
Tin Vein in Granite, showing  
polished surface of slicken-  
sides.
- CUMMING, MR. G. :  
Tin Ore from Salak South,  
Selangor.
- DAVIDSON, MRS. :  
Covered Jar of Siamese Ware,
- DIRECTOR OF POSTS AND TELE-  
GRAPHS, FEDERATED MALAY  
STATES :  
Two 1-cent Stamps (all green).  
Two 3-cent Stamps (all brown).  
Two 25-dollar Stamps.  
Two F.-size Registration En-  
velopes.  
Two G.-size " "
- DISHMAN, MR. A. :  
Specimens of Vivianite from  
Tanjong Malim.
- FOSTER, MR. R. :  
Thirteen Copper Coins.
- GERRARD, DR. P. N. :  
Elephant Beetle (*Xylotrupes  
gideon*, Linn.)  
Grasshopper from Parit Buntar.  
Caterpillar " "
- GERVAIS, MR. E. :  
Fluor Spar, Arsenical Pyrites  
and Tin Ore from Ayer Daun  
Sang, Lahat.  
Tin Ore in Limestone from  
Lahat.  
Calcite with Iron Pyrites, Lahat.  
Tin Ore from Lahat.
- GOWLAND, INSPECTOR H. J. :  
Chinese Apparatus for Inject-  
ing Morphia.  
Nine Counterfeit Dollars taken  
in Taiping.  
One Counterfeit \$5-Note taken  
in Taiping.  
One Counterfeit \$10-Note taken  
in Taiping.
- GREIG, MR. G. E. :  
Moth (*Antheraea sp.*), Kendong  
Valley near Grit.
- HARPER, MASTER GREAME :  
Beetle.
- HOBSON, MR. S. G. :  
Skeleton of Glass Sponge  
"Venus Flower Basket"  
(*Euplectella aspergillum*).

LIST OF DONATIONS TO THE PERAK STATE MUSEUM  
FOR 1906—(cont.)

## HODSON, MR. A. W. :

Argus Pheasant from Bruas.  
Mantis from Penang Hill.  
Scorpion from Bruas.

## HUME, MR. W. J. P. :

Hawk Moth (*Elibia dolichus*).  
Pikat from Maxwell's Hill.

## ISMAIL, HAJI :

Boyanese Basket.  
Red Iron Oxide from Sungei Siput.  
Javanese Silver Brooch and Earrings.

## KEILICH, MR. D. :

Hawk Moth (*Calymnia panopus*).  
Smaller Atlas Moth (*Attacus cynthia*).  
Crested Goshawk (*Lophospizias trivirgatus*).  
Five White Ant's Nests.

## KNIGHT, MR. B. C. N. :

Snake (*Adeniophis intestinalis*).

## KNOCKER, MR. F. W. :

Coloured Sleeping Mat.

## LEE YEN FAT, MR. :

One Siamese Copper Coin.  
Five Anam Copper Coins.  
Four Cambodia Copper Coins.  
Two Silver Indo-Chine Française Coins.  
One \$1 Indo-Chine Française Bank Note.  
Ten Indo-Chine Française Copper Coins.

Six       "       "       "  
Two       "       "       "

## MACHADO, MR. A. D. :

One Sample of Betel Nuts.  
"       Copra (Sun-dried).  
"       Cotton.

## MACHADO, MR. A. D.—(cont.)

One Sample of Silk Cotton.  
Two Samples of Liberian Coffee.  
"       Pepper (Black and White).  
One Sample of Patchouli.  
"       Coconut Oil.  
Collection of Fibres.  
"       Medicinal Plants.  
"       Essential Oils.

## MADDEN, MR. L. J. B. :

Nightjar's Egg.

## MAIN, MR. T. W. :

Glass Jar of Latex of *Hevea braziliensis*.  
Glass Jar of Seeds Pods of *Hevea braziliensis*.  
Specimens of Para Sheet Rubber.  
Specimens of Rambong Rubber.

## MASTER-TAILOR, MALAY STATES GUIDES :

Obsolete Turban and Cap Badges of the Malay States Guides.

## MATSOHO, O TITSAN :

Calc-Sinter from Hot Spring at Nagasaki, Japan.  
Model Japanese Clogs.

## METHODIST EPISCOPAL MISSION, KUALA LUMPUR :

Anti-opium Plant (*Combretum sundiacum*) from Seremban.

## MOSS, MR. P. :

Smaller Atlas Moth (*Attacus cynthia*).  
Butterfly (*Amathusia phidippus*) and other specimens.

## NELSON, MRS. P. J. :

Snake (*Macrophisthodon flaviceps*).

LIST OF DONATIONS TO THE PERAK STATE MUSEUM  
FOR 1906—(cont.)

NELSON, MR. R. :

Columbite or Tantalite from  
Australia.

NG ANN THYE, MR. :

Malayan-pied Hornbill (*An-  
thracoceros malayana*).

NICHOLAS, MR. F. W. :

Large Spider.  
Snake (*Coluber radiatus*).

SALISBURY, MR. E. R. :

Flying Lemur (*Galeopithecus  
volans*).

SAYERS, MR. W. :

Siamese Mango.

SECRETARY TO RESIDENT, PERAK :

Twelve framed Photographic  
Views of Taiping.

SELANGOR ANTI-OPIUM SOCIETY,  
KUALA LUMPUR :

Specimens of the Anti-opium  
Drug.

SELANGOR STATE MUSEUM :

Piece of Sandstone used for  
filing teeth.

Damar Chingal.

Two Tambourines made in  
Singapore by Tamils.

Old Chinese Plate.

Chinese Fighting Irons.

Small Chinese Fighting Irons.

Native Sulphur from Crater of  
a Volcano.

Large Bamboo Flageolet from  
Negri Sembilan.

Four Tobacco Pouches, made  
by Sakais under European  
supervision, from Batang  
Padang.

SELANGOR STATE MUSEUM—  
(cont.)

Pair of Rice Bags made by  
Sakais, Batang Padang.

Bullets found in the Fort, Kuala  
Selangor.

Two White Metal Buttons of  
Selangor Police.

Two White Metal Buttons of  
F.M.S. Police, Selangor.

Sapphires from Ceylon.

Verde Antique Marble from  
San Bernardin Co., Cali-  
fornia.

Fibrous Gypsum from Paris,  
France.

Petrified Shells, Twigs, etc., by  
deposit of Carbonate of  
Lime.

Gypsum from France.

„ Paris, France.

Encrinal Marble, Les Ecaus-  
sines, Belgique.

Selenite (Sulphite of Lime) San  
Joaquim Co., California.

Two Stalactites from Cave,  
Calaveras Co., California.

Skull of Simia Satyrus, Linn.,  
the Orang Utan or Mias  
from Borneo.

Skull of Babirusa (*Babirusa  
alfurus*) from the Celibes.

Twenty-three Species Fossils  
from Paris, Basin.

One *Sterna dougalli*.

One *Cyanops ramsayi*.

One *Sterna melanauchen*.

One *Poliolimnus cinereus*.

One *Alophoircus phaeocephalus*.

One *Anthothreptes hypogram-  
mica*.

One *Anuropsis malaccensis*.

One *Turdinulus humei*.

One *Rhipidura perlata*.

Obsidian Bombs from Kuantan,  
Pahang.

Mineral and Rock Speci-  
mens.

LIST OF DONATIONS TO THE PERAK STATE MUSEUM  
FOR 1906—(cont.)

SUMNER, MR. H. :	WAGNER, MR. C. :
Two pairs of Brass Stirrups from Pekan.	One Cap Badge of the First Perak Sikhs.
STONEY, MR. B. O. :	One Worked Badge of the First Perak Sikhs.
Portrait of Sir Frank Swetten- ham.	WRAY, MR. CECIL :
TAYLOR, SIR W. T., K.C.M.G. :	Chert Rock from Benus, Ben- tong, Pahang.
Seventeen Dutch East Indian Coins of the Eighteenth Century.	Carbonate of Lead from the Duff Development Co., Kelantan.
TOH KHAY BENG, MR. :	Amang containing Monazite from Sungei Lima, Ulu Dong, Pahang.
Iron Pyrites from Pulau Lang- kawi.	Stanniferous Garnet Rock from Triang, Pahang.
TWISS, MR. F. R. :	WRAY, MR. LEONARD., I.S.O. :
Cicada.	Comb of Large Malay Bee.
UPTON, MR. H. S. :	YONG FOOK, MR. :
Paddle from Port Dickson.	Lizard.
VADAMALIA THAMBY, MR. :	Four small Chinese Coins.
Lizard.	YOUNG, MR. C. :
	Grasshopper.

GENERAL.

A gift of the following animals—a male grey white-handed Gibbon (*Hylobates lar*), collected by the Curator, Mr. Knocker, from Sakais in the Ulu Plus; a male Leopard Cat (*Felis bengalensis*); and also three Macaque Monkeys (*Macacus fascicularis*), an adult female with young and a young male—was made to the Zoological Society of London. These animals were taken to England by Mr. Knocker and arrived safely in the Society's Gardens by the end of March.

VISITORS.

The number of visitors during the year has exceeded those of all previous years. The figures for the last five years are as follows:

1902.	1903.	1904.	1905.	1906.
40,022	... 46,685	... 52,854	... 55,103	... 61,449

This shows yearly increases of 6,663, 6,169, 2,249 and 6,346 respectively.

The following table gives the details of admission :

Month.	Days open.	Maximum.	Minimum.	Total.	Daily average.
January ...	24	418	131	5,593	233.04
February ...	23	520	71	5,519	239.95
March ...	26½	246	110	4,405	166.22
April ...	21	1,445	107	5,300	252.38
May ...	26	343	100	5,276	202.92
June ...	23	343	150	4,697	204.21
July ...	24	390	119	4,221	175.87
August ...	25	500	90	4,451	178.04
September ...	25	250	62	4,250	170.00
October ...	27	2,118	69	7,725	286.11
November ...	24	342	79	4,889	203.70
December ...	23	359	164	5,123	222.73
Mean ...	24.29	606.16	104.33	5,120.75	211.26

As the total number recorded by the turnstile was 61,449, and the number of days the Museum was open to the public was 291½, there was a mean daily average of 210.80 visitors. The greatest number of visitors for one month was 7,725, registered during October. The largest daily number was 2,118, this occurred on the 29th October, the opening of the newly erected Tanda-i-Thapani Temple at the Waterfall.

Other large daily attendances were recorded as shown below :

Hindu Festival, called Panguni Ootharam (7th April) ...	1,445
Chinese Festival, the 15th of the 8th moon (2nd October) ...	1,232
Hindu Festival, called Tai Pusum (8th February) ...	520
First day of Race Meeting (23rd August) ...	500

The Consul-General for Germany in the Straits and Federated Malay States visited the Museum on the 19th of January; the Earl and Countess of Carnarvon, the Countess of Lanesborough, and Mr. Kelway Bamber, the Ceylon Government Chemist, on the 5th of February; H.H. Tungku Mohamed, c.m.g., Yang di per Tuan of Negri Sembilan, H.H. Suleiman bin Almerhum Raja Musa, Sultan of Selangor, the British Resident of Selangor, and the Resident-General on the 12th of February; Professor Engler, Director of Botanical Gardens, Berlin, on the 24th of February; Senator the Honourable Stanniforth Smith, Commonwealth of Australia, on the 14th of March; H.S.H. Prince Heinrich Von Reuss on the 24th of March; Mr. T. Tanaka, the Acting Japanese Consul, on the 26th of March; Mr. Suen Tye Ting, the Chinese Consul-General, on the 6th of October; Phya

Sri Sahabheb, Vice-Minister for the Interior, Siam, and Mr. J. T. Westengard, Assistant Adviser, Siam, on the 27th of October; and Their Royal Highnesses Prince George and Prince Conrad of Bavaria and Baron Von Hacke on the 9th of December.

Some forty pupils from the Klian Pau Convent School paid a visit on the 3rd February. The boys of Standards II and III of the King Edward VII School, with Mr. Stainer, the Head-master, visited the Museum on the 9th and 14th March, and again during the month of May; Standard VII boys visited the Museum on the 9th; Standard III boys on the 16th; and Standard IV boys on the 31st.

#### STAFF.

Mr. Knocker, the Curator, left on the 1st of March on 13 months' leave.

Mr. E. Keilich, the Taxidermist, was appointed Acting Curator, and Mr. Yong Fook, the Assistant Taxidermist, Acting Taxidermist.

Mr. N. Bappoo, the Clerk and Caretaker, was transferred from this office on the 6th March to Tapah as Chief Clerk to the District Officer, and was succeeded by Mr. E. B. Carlos, who resigned on the 31st August. The post is now occupied by Mr. Ooi Khai Chong.

#### FINANCIAL.

The revenue collected amounted to \$146. A saving of \$884.11 was effected on the estimates, exclusive of personal emoluments. In consequence of the fixing of the dollar at 2s. 4d., there was a saving of \$378.65 on the compensation allowance. While there was a saving of \$336.50 on the Curator's salary, this is also on account of the fixing of the dollar, and \$117.75 on the Clerks' salaries; altogether a saving was effected on the establishments amounting to \$832.90.

E. KEILICH,

*Acting Curator.*

### REPORT ON THE SELANGOR STATE MUSEUM, 1906.

#### EXPENDITURE.

ON the vote of \$6,439 for personal emoluments there was a saving of \$1,880.15, owing to the rise in exchange and to the non-appointment of an Assistant Curator, as provided in the Estimates, until August.

2. Under other charges, annually recurrent expenditure, including a supplementary sum of \$230, \$3,830 was voted, which was spent as follows :

(1) Collecting trips and transport ... ..	\$698.72
(2) Specimens ... ..	992.79
(3) Taxidermist's outfit and stores ... ..	451.29
(4) Preservatives, collecting and cleaning materials	325.89
(5) Mounting birds and mammals... ..	179.64
(6) Plates for "Museum Journal" ... ..	53.24
(7) Books and periodicals ... ..	200.00
(8) Postage and petty cash ... ..	78.86
(9) Freight and insurance charges... ..	101.21
(10) Repairs and sundries ... ..	159.12
(11) Bonus to collectors ... ..	108.00
(12) Folding ladder and case fittings ... ..	113.11
(13) Uniforms ... ..	41.50

3. Including a supplementary provision of \$500, \$8,223 was provided to complete the furnishing of the Museum, and by the end of the year this work had been almost completed, all the wall and table cases for the two main galleries having been finished and glazed, while those for the central hall were well advanced.

The following charges were incurred on the vote :

(1) Labour ... ..	\$2,375.76
(2) Plate glass ... ..	2,237.15
(3) Painting and polishing ... ..	1,432.40
(4) Metal work ... ..	491.16
(5) Freight and handling charges ... ..	467.19
(6) Timber ... ..	374.90
(7) Glass-topped boxes ... ..	272.66
(8) Catalogue cabinet ... ..	137.29
(9) Office furniture ... ..	90.50
(10) Tank in photographic room ... ..	25.00

4. Three insect cabinets by a leading London maker were purchased and installed at a total cost of \$892.49.

5. The expenses of removal amounted to a sum of \$165.02, on a total estimate of \$500.

#### REVENUE.

The revenue realised from work done for private persons and sale of surplus specimens amounted to \$142.18.

Under authority previously obtained \$134.94, including a debit balance from 1905, was expended on ethnographical specimens, leaving a balance of \$7.24 to the credit of the fund. The sale of unserviceable cases in the old Museum realised a net sum of \$340.93.

## VISITORS.

During the removal from the old Museum and the re-arrangement of the collections in the new buildings the Museum was closed to the public throughout the year.

## LIBRARY.

A considerable proportion of the available sum of \$200 was devoted to binding, but one or two important books were purchased, including Dr. Rudolf Martin's monographic work on the Sakai and Semang Tribes of the Malay Peninsula. As in previous years several contributions have been received from the Trustees of the British Museum, the United States National Museum and the Department of the Interior, Philippine Islands.

## EXCHANGES.

A few reptiles were received from the British Museum in exchange for others, and a complete set of "Novitates Zoologicæ," a valuable publication containing many important monographs, from the Hon. Walter Rothschild, in return for some rare birds from the mountains of Selangor.

## PUBLICATIONS.

One number of the "Journal of the Federated Malay States Museums" was published during the year while another was in the press. The preparation of the illustrated report on the Gunong Tahan Expedition was far advanced.

## ADDITIONS.

## I.—ZOOLOGICAL.

As in previous years the high mountains in the vicinity of the Pahang boundary were visited with very satisfactory results, several extremely rare species of birds having been obtained. In June ten days were spent on the island of Tioman and a large collection of small mammals formed, including most of the varieties collected by the American naturalist, Dr. Abbott, and several others in addition. This collection, as well as other specimens from the adjacent islands of Pemmangil, Aor and Tinggi, have been forwarded to the British Museum and will be reported on in due course.

The Dyak Collectors also visited Rantau Panjang in the Selangor low country jungle and Gunong Angsi in Negri Sembilan with satisfactory results.

The Curator's duties as Inspector of Fisheries enabled him to visit several of the small islands in the Straits of Malacca, and several interesting birds and animals were obtained on Pulau Jarak and the Pulau Sembilan, and a large collection of over 200 skins was formed

by the Assistant Curator in Pulau Jemor, one of the Aroa Islands, which includes several littoral birds hitherto unrepresented in the collection. A visit to Batu on the Selangor coast in November proved less successful.

The birds collected on Gunung Tahan in 1905 were returned by the authorities of the British Museum after a representative set had been selected by them, and, as was anticipated, add several species of extreme rarity to the local collection.

The following species are new to the collection, those marked with an asterisk being either new to science or hitherto unknown from the Malay Peninsula :

* <i>Sphenocercus korthalsi</i>	<i>Pnoepyga lepida</i>
* <i>Sphenocercus robinsoni</i>	<i>Erythrocyhla bicolor</i>
* <i>Brachypteryx wrayi</i>	<i>Cuculus poliocephalus</i>
* <i>Muscicapula malayana</i>	,, <i>saturatus</i>
<i>Siva malayana</i>	<i>Hierococcyx</i> sp.
<i>Suya waterstradti</i>	<i>Nycticorax nycticorax</i>
<i>Pyrrhula waterstradti</i>	<i>Gorsachius melanolophus</i>
<i>Centropus rectunguis</i>	<i>Sterna melanauchen</i>
<i>Rhinomyias pectoralis</i>	,, <i>dougalli</i>
<i>Pteruthius tahanensis</i>	,, <i>anæsthera</i>
* <i>Locustella lanceolata</i>	

## II.—ETHNOLOGICAL.

A large number of Chinese plates of varying degrees of merit and antiquity were purchased, chiefly from Rembau and Sri Menanti, as well as some good examples of Malay silver and several fine weapons. As regards the southern portion of the Peninsula the collections of the Museum are now so extensive that it is only occasionally that a really desirable specimen is offered for sale and then at a price that is usually prohibitive.

The collection of stone implements was further extended, and several very uncommon types obtained.

At the end of the year a short expedition was made to the mountains of South Perak, and a representative collection made of the possessions of the local Sakai tribes, including sumpitans and quivers, bamboo comb, bark cloth and other specimen of primitive culture.

## STAFF.

The work of the staff generally was satisfactory, though for jungle work it has been found impossible to employ Malays.

H. C. ROBINSON,  
*Curator.*

ON MAMMALS COLLECTED BY MR. H. C. ROBINSON  
ON TIOMAN AND AOR ISLANDS, S. CHINA SEA.

By OLDFIELD THOMAS, F.R.S.

I HAVE been entrusted by Mr. H. C. Robinson, of the Kuala Lumpur Museum, with a number of mammals collected by him during 1906 on certain of the smaller islands round the Malay Peninsula. The majority were obtained on the islands of Tioman and Aor, off the east coast of Johore; and in the present paper I confine myself to these, as those from other localities are of little special importance.

The mammals of Tioman and Aor have hitherto only been known from papers by Mr. G. S. Miller on the material collected by Dr. W. L. Abbott, and now in the U.S. National Museum. In his first paper on the subject \* Mr. Miller gave a list of the species obtained on Tioman in 1899, while the Aor ones and some additional Tioman species are included in a later paper.†

Mr. Miller's Tioman list is as follows:

Macaca "cynomolgus" (= fascicularis)	Sciurus tenuirostris
Tupaia sordida	„ tenuis
Paradoxurus hermaphroditus	Mus stridens
Ratufa tiomanensis ‡	„ tiomanicus
	„ obscurus
	Tragulus rufulus

§ Mr. Robinson obtained all of these, with the exception of *Sciurus tenuis*, *Mus stridens* and *M. obscurus*, and, in addition, the following:

Pteropus hypomelanus lepidus	Rhinosciurus robinsoni, <i>sp. n.</i>
Galeopterus taylori, <i>sp. n.</i>	Mus surifer
Petaurista melanotus	Atherurus tionis, <i>sp. n.</i>

\* "Mammals collected by Dr. W. L. Abbott on Islands in the South China Sea," P. Wash. Acad. Sci. ii. pp. 203-246 (1900).

† "Seventy new Malayan mammals," Smiths. Misc. Coll. xlv. pp. 1-73 (1903).

‡ In the faunal list on p. 246 accidentally called *tiomanicus*.

§ Tioman was again visited in Sept., 1907, when *Mus stridens*, *Sciurus tenuis*, and a form of *Sciurus bilimitatus* which may possibly prove distinct were obtained. Several bats were also collected, amongst them being *Cheiromeles torquatus* and an *Emballonura* very close to *E. peninsularis* which is widely distributed throughout the Peninsula and adjacent islands. The only species from the island which has not been secured is *Mus pullus*, Miller, a synonym of *Mus obscurus*, Miller, which is preoccupied in the genus. Dr. Abbott obtained a single specimen of it. The "species" is very doubtfully distinct from the form of *M. concolor*, Blyth, inhabiting the mainland.—H.C.R.

Of Dr. Abbott's Aor mammals no list was published, but all the species obtained by Mr. Robinson have been described in the second paper above quoted.

With regard to the vexed question as to whether binomial or trinomial names should be used for the various closely allied races of the same type, when isolated in islands, I am strongly of opinion that the balance of convenience is in favour of trinomials, at least in large genera such as *Sciurus* and *Mus*, where binomials give no idea of the relationship of the animals. In certain cases, however, where I am morally convinced that a subspecific rather than a specific name is advisable, and yet where I have not had the opportunity or material to work out the group for myself, I have adopted the compromise of inserting the parent name in brackets, and so indicating the alliance of the animal dealt with.

MACACA FASCICULARIS, RAFF.

♀ 298. Juara Bay, Tioman.

PTEROPUS HYPOMELANUS LEPIDUS, MILL.

♂ 280, 290 (yg.), 329. Juara Bay, Tioman.

I am informed by Dr. Andersen that this Fruit-bat, described as *P. lepidus* by Miller, should be considered as a local subspecies of the widely-spread *P. hypomelanus*.

"Not uncommon on this island and on Pulo Aor, but not flying in great flocks like *P. vampyrus*."—H. C. R.

GALEOPTERUS\* AORIS, MILL.

♂ 278; ♀ 276, 277, 280. Pulo Aor.

These specimens are quite uniform in the size of their skulls and teeth, and differ markedly from the Tioman species. Two are in the grey phase and two in an intermediate phase between grey and rufous.

GALEOPTERUS TAYLORI, *sp. n.*

♂ 281 (imm.). Pulo Tioman. 13th June, 1906. B.M. No. 8. 1. 25. 3.  
*Type.*

"Very rare in this island."

Size greater than in *G. aoris*, about equalling that of the mainland species. Teeth very large.

Type in red phase. In colour and other external characters quite like a specimen of *G. tellonis*, Lyon, in the red phase. Hands and feet finely spotted with white.

Skull of the single specimen, although immature, already decidedly larger than in *G. aoris*, and almost equalling small examples of the mainland species, to the size of which when full-grown it might have

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\* Formerly *Galeopithecus*. See *Thos. Ann. & Mag. Nat. Hist.*, March, 1908., p. 254.

attained. Teeth very large, much larger than in any of the northern members of the group, and only equalled by those of the very much larger Javan species.

DIMENSIONS OF THE TYPE (immature), measured in flesh :

Head and body, 338 mm. ; tail, 179 ; hind foot, 49 ; ear, 16.

Skull: condylo-basal length, 66 ; basal length, 61.5 ; zygomatic breadth, 42.3 ; interorbital breadth, 17 ; tip to tip of postorbital processes, 31.5 ; palatal length, 31 ; breadth of mesopterygoid fossa, 12.3 ; length of upper tooth series, 35, of anterior maxillary tooth ( $p^2$ ) 7.1, of second ditto ( $p^3$ ) 5.8, of  $p^4$  and the three upper molars together 15, of  $p_2$  7.2, of  $p_3$  7.5 ; three lower molars together 12.1.

HAB. and TYPE as above.

This species is characterised by the great proportionate size of its teeth, which considerably exceed those of any of the geographically neighbouring forms, and equal those of the much larger Javan animal.

At the suggestion of Mr. Robinson I have named this new Flying-lemur in honour of Sir W. T. Taylor, K.C.M.G., Resident-General, Federated Malay States, who rendered the exploration of these islands possible by permitting the use of the Government yacht "Meran" for the purpose.

TUPAIA SORDIDA, MILL.

T. c. p. 231.

♂ 321 ; ♀ 320. Juara Bay, Tioman.

Topotypes.

PARADOXURUS HERMAPHRODITUS, PALL.

♂ 297. Juara Bay, Tioman.

PETAURISTA MELANOTUS, GRAY.

♂ 294, 296 ; ♀ 295. Juara Bay, Tioman.

These specimens differ considerably in the size of their skulls, that of 294, being about as large as in examples from Malacca, while 295 is little longer than the small *P. nitidula* of the Natunas.

RATUFA (MELANOPEPLA) TIOMANENSIS, MILL.

P. Wash. Ac. ii. p. 130 (1900).

♂ 283, 286, 287, 288, 289 ; ♀ 284, 285. Juara Bay, Tioman.

Topotypes.

Several characters, external and cranial, are given by Mr. Miller for the distinction of the Tioman Ratufa, but the only one which this series confirms is the slightly shorter tail, and as his own measurements completely intergrade, I should certainly consider the animal as merely a subspecies of the mainland form.

## SCIURUS (VITTATUS) TENUIROSTRIS, MILL.

P. Wash. Ac. ii. p. 221, fig. 13c (skull) (1900).

♂ 307, 309, 310, 312, 313, 314, 315, 316, 318; ♀ 308, 311, 317, 319. Juara Bay, Pulo Tioman.

Evidently the commonest species in Tioman. It is a larger form than the representative of the same group in Aor and Pemangil.

## SCIURUS (VITTATUS) "AORIS," MILL.

Smiths. Misc. Coll. xlv. p. 10 (1903).

♂ 301, 303; ♀ 300, 302. Pulo Aor.

## Topotypes.

Mr. Robinson also collected three Squirrels of this group on Pemangil Island, close to Aor, and these would represent Miller's *S. pemangilensis*, described just before *S. aoris*. I confess I fail to see any difference between the specimens from the two islands, though I provisionally use the name given to the Aor form.

RHINOSCIURUS ROBINSONI, *sp. n.*

♂ 340, 341, 343; ♀ 337, 338, 339, 342. Juara Bay, Pulo Tioman.

More allied to the Bornean *R. laticaudatus*, M. & S., than to the Malayan *R. tupaoides*, Gray\*: the tail-hairs broadly washed with ochraceous.

General colour above about as in *R. tupaoides*, paler than in a specimen from N. Borneo, which I provisionally accept as *R. laticaudatus*.

Centre of back blackish, rump more ochraceous, especially on sides, the whole dorsal area less uniform than in *laticaudatus*. Flanks above line of demarcation little suffused with buffy, while the belly itself, as in *laticaudatus*, is buffy throughout, being more ochraceous buffy posteriorly. Crown dark grizzled olive. Ears with an inconspicuous light patch behind them. Limbs darkening terminally, becoming blackish on the hands and hind toes as in *R. laticaudatus*. Tail-hairs black basally and subterminally, the second and terminal rings buffy or ochraceous buffy, similar to each other, or the terminal ring even darker than the subbasal; in the other species the ends are lighter than the subbasal rings, buffy white in *laticaudatus* and nearly quite white in *tupaoides*.

Skull with rather smaller bullæ than in *R. laticaudatus*, much smaller than in *R. tupaoides*.

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\* I quote this name as of Gray and not Blyth, because I do not think that the names in the former's "List of Mammalia," 1843, can be considered technically as *nomina nuda* in the cases where a characteristic English name was appended to them. The plan of the book not including descriptions in the usual sense, Gray seems to have done his best to make up for them by applying names by which the animals could be identified, and no one could any more doubt as to the identity of the "Sharp-nosed Squirrel" (p. 195) than of those of the "Blackish-backed," "Ashy-headed," or "Grey-thighed" species referred to on p. 143.

## DIMENSIONS OF THE TYPE :

Head and body, 199 mm. ; tail, 90 ; hind foot (s. u.), 37.

Skull: greatest length\*, 53 ; basilar length, 43.5 ; zygomatic breadth, 25.5 ; nasals,  $18.5 \times 5.3$  ; interorbital breadth, 12 ; breadth of brain-case, 20.5 ; diastema, 15.5 ; length of bulla, 10 ; length of upper tooth-series, 11.8.

TYPE.—Adult female. B.M. No. 8. 1. 25. 15. Original number 337. Collected 7th June, 1906, by H. C. Robinson.

This Long-nosed Squirrel differs very markedly from the Malayan *Rhinosciurus*, both in colour and skull-characters, and is clearly more nearly allied to the Bornean representative of the genus. The Museum had already received from Mr. Robinson a good example of *R. tupaioides*, collected by him in Pahang, and this shows well the white belly, buffy flanks, and white-washed tail which distinguish that animal from the insular forms.

I have much pleasure in naming this distinct species in honour of Mr. Robinson, its discoverer, to whom we are indebted for so much of our knowledge of the mammalian fauna of the Malay Peninsula and its islands.

## MUS TIOMANICUS, MILL.

♂ 330, 333 ; ♀ 331, 332. Juara Bay, Tioman.

A member of the *neglectus* group.

## MUS SURIFER, MILL.

♂ 335, 336 ; ♀ 334. Juara Bay, Pulo Tioman.

These specimens appear to be quite similar to those in the British Museum, obtained by Mr. C. B. Kloss and mentioned in Mr. Bonhote's paper on his collection.

ATHERURUS TIONIS†, *sp. n.*

♂ 324 (skull only), 325 ; ♀ 323. Juara Bay, Tioman.

Similar to the mainland *A. macrourus* in colour and in the detailed skull-characters which separate *A. zygomaticus* from that species, but markedly smaller, with shorter tail, the skull less inflated, and smaller throughout.

Skull lower and less inflated than in *macrourus*, but its shape otherwise very similar. Nasals rather larger in proportion, their size nearly equalling that found in the larger form. Molars smaller in all dimensions.

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\* The type is rather a small specimen ; two other skulls measure 56 and 56.5 mm. in greatest length.

† The middle syllable of Tioman being long, as in all other Malay names thus making such a word as *tiomanicus* almost unpronounceable, I have permitted myself the liberty of abbreviating the name of the island.

## DIMENSIONS OF THE TYPE (measured in flesh):

Head and body, 516 mm.; tail, 176; hind foot (s. u.), 60; ear, 35.

Skull: upper length, 91; basilar length, 77.5; greatest breadth, 48; nasals, 27 × 15; intertemporal breadth, 26; height of muzzle on diastema, 18.5; height of crown above palate, 25; palatilar length, 39; diastema, 28.5; length of upper tooth-series (crowns), 16.8.

TYPE.—Old male. B.M. No. 8. 1. 25. 21. Original number 325. Collected 13th June, 1906.

The specimen which I take as a characteristic example of the peninsular *macrourus* agrees closely in its skull-measurements with the one from Trong referred to by Miller in his description of *A. zygomaticus*. Of its skull, the upper length is 100 mm., the height of the muzzle 21, of the crown 29, and the length of the upper tooth-series is 18 mm. It was obtained at Jalor by Messrs. Robinson and Annandale.

This animal is clearly a small insular representative of *A. macrourus*, and does not show the peculiarities that distinguish the Aor Island form.

## ATHERURUS ZYGOMATICUS, MILL.

♀ 326, 327. Pulo Aor.

Topotypes.

These specimens quite agree with Mr. Miller's description, both in the peculiar character of the zygomata and in the dark colour of their sides and bellies.

Among the Eastern *Atheruri* in the British Museum I find an example of this species which was purchased in 1881 from a dealer, and was labelled in Japanese writing "Fasciculated Porcupine—native name *Ten pku koku*—India."

## TRAGULUS RUFULUS, MILL.

♂ 291, 293, 328 (skull only); ♀ 292. Juara Bay, Tioman.

Topotypes.

"Very common. Caught in fall-traps baited with jackfruit."—H. C. R.

These specimens differ from Mr. Miller's description by having their bellies more or less washed with fulvous, but appear to agree in all other respects.

They also entirely agree in colour with the type of Gray's *Tragulus stanleyanus*, a species whose exact locality has, to my knowledge, never been definitely determined; but their skulls are so far smaller that they cannot be referred to it.

Probably *T. stanleyanus* will prove to occur on the mainland and to bear much the same relation to *T. rufulus* that *Atherurus macrourus* does to *A. tionis*.

[*Extracted from the "Linnean Society's Journal"—Botany, vol. xxxviii., pp. 301-336, June, 1908.*]

## ON A COLLECTION OF PLANTS MADE BY H. C. ROBINSON AND L. WRAY FROM GUNONG TAHAN, PAHANG.

BY H. N. RIDLEY, M.A., F.R.S., F.L.S., ASSISTED BY OTHER BOTANISTS.

[Read 5th December, 1907.]

[IN 1905 the Trustees of the British Museum made a grant towards the expenses of Mr. H. C. Robinson's expedition to Gunong Tahan in the Malay Peninsula, on condition that the whole collection made by the expedition should be sent to the Natural History Museum and that the first set should become the property of the Trustees. An account of the expedition will shortly be published in the "Journal of the Federated Malay States Museums."\*]

The plants, numbering about 250 specimens, were collected from May to July, 1905, by Mr. Robinson and Mr. L. Wray, Director of Museums, Federated Malay States. As Mr. H. N. Ridley, who is specially interested in the botany of the Peninsula, was home on leave during last year, I asked him to prepare an account of the collection. He agreed, but having to return to Singapore early in January, left his paper in an unfinished state; with Mr. E. G. Baker's assistance I have compared it with the specimens in the study set at the British Museum, annotated, and prepared it for the press. The account of the Ferns and Mosses is largely the work of Mr. A. Gepp, and that of the Fungi and Lichens has been prepared by Miss A. Lorrain Smith.

(A. B. RENDLE.)]

THE mountain Gunong Tahan lies in the north of Pahang, on the east coast of the Malay Peninsula, and was formerly believed to be by far the highest mountain in the Peninsula. It proves, however, to be by no means so lofty as was at first supposed, being only 7,100 feet in altitude.

Several attempts were made to explore this mountain on previous occasions. The first of these was undertaken by the author of this paper, accompanied by Mr. W. Davison, Curator of the Raffles Museum, Singapore, and Lieut. Kelsall, R.E., in 1891. The position of the mountain was then unknown, and owing to the limited time allowed, the failure of the commissariat, the extremely unhealthy character of the Tahan Valley, and the unsettled state of Pahang, then on the eve of the rebellion which broke out the following year, the expedition failed to reach its goal. A good collection of plants, however, was made, an account of which was published in the "Transactions of this Society," ser. 2, iii. p. 267, and an itinerary of the trip in the "Journal of the Royal Asiatic Society," Straits Branch, vol. xxv. p. 33. This expedition attempted to reach the mountain by travelling up the Pahang

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\* Vol. III. (Feb., 1908).

River, then up the Tembeling and Tahan Rivers, which latter stream is reported to spring from the base of the mountain.

In 1893 Mr. H. M. Becher again attempted to reach the mountain by the same route, but perished in a spate of the Tahan River about five miles above the point at which the first expedition stopped. A few plants were added to the collections at Singapore Botanic Gardens by the Gardens' plant-collector, who accompanied Mr. Becher's ill-fated expedition.

In 1899 Mr. W. W. Skeat, who went with the Cambridge expedition to explore the north of the Peninsula, made a hasty trip to the mountain from the north, and after much difficulty and risk reached it.

In 1901 Mr. John Waterstradt reached the mountain in a trip made chiefly for the purpose of collecting birds. An account of his expedition was published in the "Journal of the Royal Asiatic Society," Straits Branch, vol. xxxvii. (1902) pp. 1-27.

The collection of plants made by Messrs. Robinson and Wray is one of considerable interest, and contains a number of remarkable additions to the knowledge of the Flora of the Malay Peninsula. It has long been known that the floras of the east and west coasts are very different, the eastern side showing a number of Australian and eastern Asiatic types not met with on the western side, the flora of which is more accessible and has been more thoroughly studied.

The greatest interest centres round the plants, the geographical distribution of which is further extended. Two of these are specially noteworthy—viz., *Pentaphylax malayana*, n. sp., and *Gentiana malayana*: the former is the second representative of a Chinese monotypic genus of Ternstrœmiaceæ previously known only from Hongkong; the latter is closely allied to a Bornean species occurring on Mt. Kinabalu and to a Javan species.

A curious new genus of Melastomaceæ allied to *Dissochaeta*, which I have called *Oritrephes*, is also an important addition. The genus *Xyris* is represented in the Peninsula by several sea-shore species, but is seldom met with inland or at any altitude; it is absent, so far as is known, from the Perak Hills and Mount Ophir, but one species, *X. Ridleyi*, was found by me on Kedah Peak at about 3,000 feet elevation. Two species occur on Gunong Tahan, one identical with that from Kedah Peak, the other, *X. grandis*, n. sp., perhaps the largest species of the genus, conspicuous from its stiff sword-like leaves resembling those of *Cladium Maingayi*, C. B. Clarke, of Mount Ophir.

There are, as usual in such collections, several species of *Didymocarpus*, including two new to science, and a number of Orchids, a good proportion of which are also new.

Among the previously described plants it is interesting to find several of those known only from Father Scortechini's collections and distributed without any specific locality. It is probable that as they

have not been met with on the western slopes of the Perak Hills, Scortechini must have collected them on the eastern watershed of the main range. Such are *Gordonia imbricata*, King, *Polyosma coriacea*, King, and *Calophyllum venustum*, King.

## SPERMATOPHYTA.

### DICOTYLEDONES.

#### POLYPETALÆ.

##### DILLENIACEÆ.

*ACROTREMA COSTATUM*, Jack, in *Mal. Misc.* i. (1820) No. v. 36 (p. 303).\*

Kuala Teku, 500-1,000 ft. (5536.)

*Distrib.*—Common in most hill regions of the Straits Settlements at that altitude and occasionally at lower elevations.

#### POLYGALACEÆ.

*POLYGALA MONTICOLA*, n. sp. (p. 303).

Frutex circa bipedalis, basi nuda lignosa, superne haud ramosa. Folia 3-4 poll. longa,  $1\frac{1}{2}$  poll. lata, lanceolata utrinque acuminata, petiolata, glabra aut raro pilis translucentibus parce munita, nervis primariis ad 8 paria, petiolo  $\frac{1}{2}$  poll. longo. Racemus subterminalis strictus erectus densus. Flores albi, carinis roseis,  $\frac{1}{4}$  poll. longis; pedicellis brevissimis. Sepala externa ovata rotundata pubescentia. Petala oblonga, carina cristata. Capsula immatura reniformis biloba ferme  $\frac{1}{4}$  poll. in diametro.

Gunong Tahan, 5,000-6,000 ft. A small shrub; flowers white; column edged with yellow, pinkish above; sepals edged with purple. (5456.) At 4,000-5,000 ft.; about 2 feet high. Flower white when first opened, afterwards turning pink; leaf-stalks tinted pink. (5384).

Forma MAJOR, foliis 6 poll. longis, 2 poll. latis, glabris, petiolis pollicaribus; racemo 9 poll. longo.

Flowers tipped rose-red, calyx and flower-stalks white; mid-ribs of leaves tinted with red. At 5,000 ft. (5333.)

Though this has been several times collected in the mountains of the Malay Peninsula by different collectors, it seems to have been confused with *P. venenosa*, Juss. Its smaller flowers on very short pedicels, as well as its dwarf stem and dense erect raceme, make it very distinct from the great spreading half-shrub which is common in the lower damp forests; and it is difficult to see how it could be considered a variety of *P. venenosa*, which is really much less variable than would appear from the number of varieties of it recorded.

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\* To facilitate citation the original pagination is quoted in italics after each species. Ed.

## PITTOSPOREÆ.

**PITTOSPORUM, sp.** A small tree 10-15 feet high, with light-coloured boughs and opposite subcoriaceous lanceolate leaves glabrous with impressed nerves above, strongly reticulate above and beneath, petioles pubescent. Fruit solitary, oval,  $\frac{1}{4}$  inch long, on a slender peduncle  $1\frac{1}{2}$  inch long.

Gunong Tahan, 5,000-6,000 ft. (5444.)

Too incomplete to describe, but I cannot identify it with any Asiatic species. The only species hitherto recorded from the Peninsula is *Pittosporum ferrugineum*, Dryand.

## GUTTIFERÆ.

**CALOPHYLLUM SPECTABILE**, Willd., in *Ges. Naturf. Fr. Berl. Mag.* v. (1811) 80 (p. 304).

In fruit, Gunong Tahan, 3,300 ft. A medium-sized tree 50-60 feet high. (5344.)

*Distrib.*—A common and widely dispersed species, occurring from the Andamans eastward to the Society Islands.

**C. VENUSTUM**, King, in *Journ. As. Soc. Beng.* lix. (1890) 180 (p. 304).

Gunong Tahan, 4,000-5,000 ft. A small tree with white flowers (5340, 5395.)

*Distrib.*—Perak. Only once previously collected.

## TERNSTREMIACÆ.

**ANNESLEA CRASSIPES**, Hook. ex Choisy, in *Mém. Soc. Phys. Gen.* xiv. (1855) 129 (p. 304).

Gunong Tahan, 3,300 ft. A small tree; calyx bright red. (5322.)

*Distrib.*—Found also on Mt. Ophir, and Gunong Batu Puteh and other mountains of Perak; also Philippine Is.

**ADINANDRA VILLOSA**, Choisy, *l. c.* 12 (p. 304).

Gunong Tahan, 5,000-5,500 ft. Tree 30-40 feet high; flowers white. (5517.)

*Distrib.*—Tavoy and Perak at high elevations.

**A. ANGULATA**, *n. sp.*

Arbor 40-50-pedalis, ramis compressis, ramulis complanatis angulatis validis, alabastris parce sericeis. Folia elliptica obtuse acuminata coriacea, 4-7 poll. longa, 2-4 poll. lata, siccitate flavescencia, nervis ad 20 paria conspicue reticulatis, petiolo  $\frac{1}{2}$  poll. longo crasso. Flores non visi. Bracteæ 2 parvæ ovatæ. Sepala ovata rotundata crassa glabra,  $\frac{1}{4}$  poll. longa. Ovarium globosum  $\frac{3}{4}$  poll. longum, stylo æquilongo coronatum. Fructus in pedicello 3 poll. longo, superne incrassato.

Gunong Tahan, 5,000-5,500 ft. (5518.) A very remarkable species, with the foliage of one of the large *Garcinias*, and quadrate stems with a narrow wing running along each edge. The very large fruits are in pairs.

**TERNSTRÆMIA JAPONICA**, *Thunb., in Trans. Linn. Soc. ii. (1794) 335*  
(*p. 304*).

Gunong Tahan, 3,300 ft. Bush; flowers white; leaves pale green beneath. (5328.) 5,000-6,000 ft. Shrub 2-3 feet high; flowers greenish white; anthers brown. (5501.)

*Distrib.*—An addition to the Flora of the Malay Peninsula. *Ternstræmia japonica* taken in a large sense is a widely spread species in Eastern Asia, and as *T. aneura*, Miq. (the type of which these specimens closely resemble), occurs in Banka.

**GORDONIA IMBRICATA**, *King, in Journ. As. Soc. Beng. lix. (1890) 204*  
(*p. 305*).

Gunong Tahan, 6,000 ft. A small tree; the flower cream-colour,  $\frac{3}{4}$  inch across. (5436 and 5406.)

*Distrib.*—A rare plant, only collected once in Perak by Scortechini.

**SCHIMA NORONHÆ**, *Reinw. ex Blume, Bijdr. 130*.

Gunong Tahan, 5,000-5,500 ft. A small tree 20-25 feet high, or a shrub 4-6 feet high; flower white, stamens yellow. (5508, 5525.)

*Distrib.*—Common and variable at high altitudes, occurring also in Burma and the Malay Archipelago.

**PENTAPHYLAX MALAYANA**, *n. sp. (p. 305)*.

Frutex vel arbor parva, ramis nigris. Folia coriacea glabra ovata obtusa, basi rotundata, nervis inconspicuis, 2 poll. longa, 1 poll. lata, siccitate flavescencia. Spicæ 1 poll. longæ densæ. Bracteæ ovatæ 4, marginibus ciliatis. Sepala ovata rotundata ciliata. Petala linearia oblonga retusa alba. Stamina quam petala breviora, filamentis oblongis, apicibus acuminatis. Stylus cylindricus brevis; stigma planum brevissime 5-lobum. Capsula breviter pedicellata,  $\frac{1}{4}$  poll. longa. Semina linearia curva, 2 in quoque loculo.

Gunong Tahan, 3,300-5,000 ft. Bush with white flowers. (5325, 5339, 5405.)

A very fine addition to the Flora of the Malay Peninsula, the only other known species, *P. euryoides*, Gardn. & Champ., being a native of Hongkong. Specimens of obviously the same species were some years ago brought by Mr. Barnes from K'luang Terbang in Pahang (*Journ. Roy. As. Soc., Straits Branch, xxxix. (1903) 1-18*). These specimens were in fruit, and the description of the fruit is taken from them. *P. malayana* differs from *P. euryoides* in its smaller, more thickly coriaceous, blunt leaves, and its shorter and thicker flower-spikes.

#### TILIACEÆ.

**ELÆOCARPUS MONTICOLA**, *n. sp. (p. 305)*.

Frutex foliis ovato-lanceolatis integris glabris coriaceis, 3 poll. longis, 2 poll. latis, nervorum 6 paribus, petiolis pollicaribus

Racemi breviusculi, 2 poll. longi, foliis breviores. Flores parvi dissiti pedicellati,  $\frac{1}{4}$  poll. longi. Sepala 4 ovata pubescentia roseo-brunnea. Petala vix longiora quam sepala, oblonga, fimbriata, viridescenti-alba, pubescentia. Stamina 12, filamentis brevibus, antheris linearibus, sine barbibus seu aristis. Ovarium globosum, stylo brevius. Torus crassus undulatus. Drupa globosa, plus quam  $\frac{1}{2}$  poll. longa, rugosa.

Gunong Tahan, 5,000-5,500 ft. Shrub 10-12 feet high. Sepals pinkish brown; petals greenish white. (5523.)

Near *Elæocarpus punctatus*, King, in Journ. As. Soc. Beng. lx. ii. (1891) 139 (Malay Peninsula, Java, and Sumatra), but differs in the more fimbriate petals, longer style, and entire leaves. The fruit is very different from that of *E. punctatus* and resembles that of *E. parvifolius*, Wall.

## RUTACEÆ.

*EVODIA SIMPLICIFOLIA*, n. sp. (p. 306).

Frutex 7-pedalis ramosus. Folia opposita elliptica obtusa, basi subcuneata vel rotundata, coriacea integra, nervis primariis sæpe 16, nervulis reticulatis, 3-3 $\frac{3}{4}$  poll. longa, 1 $\frac{3}{4}$  poll. lata, siccitate pallida, petiolis  $\frac{1}{2}$  poll. longis. Paniculæ petiolo vix longiores in axillis foliorum summorum dispositæ. Flores non visi. Capsulæ 4-lobatæ  $\frac{1}{2}$  poll. latæ rugosæ glabræ.

Gunong Tahan, 5,000-6,000 ft. A shrub 7 feet high. In fruit (5492.)

Much resembles *E. pachyphylla*, King, a native of Perak, but is very distinct in its simple unifoliolate leaves and glabrous capsules.

## CELASTRACEÆ.

*SALACIA PERAKENSIS*, King, in Journ. As. Soc. Beng. lxxv. ii. (1896) 364, e descript (p. 306).

Gunong Tahan, 5,000 ft. A small tree; flowers dull red. (5332.) I have seen no authentic specimen.

*Distrib.*—Originally collected in Perak by Scortechini, who gave no exact locality.

## ROSACEÆ.

*PHOTINIA DUBIA*, Lindl., in Trans. Linn. Soc. xiii. (1821) 104, t. 10 (p. 306).

Gunong Tahan, 5,000-6,000 ft. Small shrub 8-15 feet high; fruit brownish red. (5486.)

Not recorded in the "Flora of the Malayan Peninsula"; it was collected by Griffith at Bukit China, a low hill close to Malacca, and by myself on rocks by the river in the Dindings, where it is a low straggling bush.

*Distrib.*—North India.

PYRUS GRANULOSA, Bertol., in *Mem. Accad. Sc. Bologn.*, ser. 2, iv. (1864) 312 (p. 306).

Gunong Tahan, 5,000-5,500 ft. Tree 15-25 feet. (5520.)

*Distrib.*—Khasia, Burma, and Sumatra.

## SAXIFRAGACEÆ.

WEINMANNIA BLUMEI, Planch., in *Hook. Lond. Journ. Bot.* vi. (1847) 470 (p. 306).

Gunong Tahan. Tree; flowers red; leaves green, stalks red. (5319.)

*Distrib.*—Higher mountains of the Peninsula.

POLYOSMA CORIACEA, King, in *Journ. As. Soc. Beng.* lxvi. II. (1897) 300 (p. 307).

Gunong Tahan, 4,000-5,000 ft. Bush; flowers white. (5388.) A small tree 20-30 feet high; flowers yellowish-white. (5493.)

*Distrib.*—Perak and Kedah Peak.

P. LÆTE-VIRENS, Griff. ex King, *l. c.* 303.

Small tree at 5,000-6,000 ft. (5462.)

*Distrib.*—Malay Peninsula.

## HAMAMELIDEÆ.

RHODOLEIA TEYSMANNI, Mig., in *Versl. en Med. K. Akad. Wetensch.* vi. (1857) 123 (p. 307).

Gunong Tahan, 5,000-6,000 ft. Large shrub 10 feet high, or tree 18 inches in diameter; flower rosy pink. (5482, 5506.)

*Distrib.*—Hill-ranges of Malay Peninsula and in Sumatra.

## RHIZOPHOREÆ.

CARALLIA EUGENOIDEA, King, in *Journ. As. Soc. Beng.* lxvi. II. (1897) 320 (p. 307).

Gunong Tahan, 3,300 ft. Small tree.

*Distrib.*—Perak. Hitherto only known from Scortechini's collection.

## MYRTACEÆ.

BÆCKEA FRUTESCENS, Linn., *Sp. Pl.* 358 (p. 307).

Gunong Tahan, 3,300 ft. (5311.)

*Distrib.*—Common on all hills at this elevation; also Malay Archipelago.

LEPTOSPERMUM FLAVESCENS, Sm., var. COMMUNE, Benth., *Fl. Austral.* iii. 104 (p. 307).

Gunong Tahan, 4,000-5,000 ft., on ridges. Trunk up to 2 feet in diameter, but short and twisted. (5409.)

*Distrib.*—Common on the hills at this elevation in the Malay Peninsula, and throughout the Archipelago to Australia.

*RHODAMNIA TRINERVIA*, Blume. *Mus. Bot. Lugd.-Bat.* i. 79 (p. 307).

Gunong Tahan, 5,000-6,000 ft. (5500.) A mountain form with coriaceous ovate acuminate leaves, densely white woolly beneath, less so above, but with silky white pubescence on the upper face and pubescent fruit.

*Distrib.*—Malayan Archipelago and Philippines to Australia; Burma.

*EUGENIA PAHANGENSIS*, n. sp. (p. 307).

Arbor 20-pedalis cortice albescente. Folia coriacea crassa elliptica petiolata obtusa, costa superne depressa subtus elevata, nervis plurimis gracilibus subparallelis, 3-4 poll. longa, 2 poll. lata. Panicula brevis terminalis densiflora, 2 poll. longa, ramis paucis crassis angulatis. Flores flavescentes parvi congesti sessiles vix  $\frac{1}{4}$  poll. longi. Sepala brevissima crassa, triangularia acuta. Petala parva caduca orbicularia. Stamina breviuscula. Ovarium obconicum angulatum.

Gunong Tahan, 5,000-6,000 ft. Small tree 20 feet high; flowers pale yellowish. (5454.)

Belongs to the same group as *Eugenia subdecussata*, Duth., but is very distinct in its foliage.

*EUGENIA VIRIDESCENS*, n. sp. (p. 308).

Frutex. Folia coriacea sessilia glabra obovata, apicibus late rotundatis vix apiculatis, versus basin angustata, basibus subretusis,  $2\frac{1}{2}$ -3 poll. longa,  $1\frac{1}{2}$  poll. lata, nervis copiosis tenuibus approximatis, costa crassiuscula. Paniculæ quam folia breviores, terminales, 2 poll. longæ, pedunculis brevibus ramulis validulis. Flores inter minores,  $\frac{1}{4}$  poll. longa. Calyx campanulatus, margine subintegro undulato. Petala 4 calyptram formantia rotundata. Stamina brevia, calycem paullo superantia.

Gunong Tahan, 5,000 ft. A bush; flowers pale green, leaves and young wood tinged with purple. (5338.)

Allied to *E. subdecussata*, Duth., but differs in the form of the leaves, which narrow towards the base and end in a truncate retuse manner. They are less stiff than those of *subdecussata*, drying of a yellowish colour, and the margins curling back. The nervation is very fine and close and hardly distinguishable.

#### MELASTOMACEÆ.

*MELASTOMA MALABATHRICUM*, Linn., *Sp. Pl.* 559 (p. 308).

Gunong Tahan, 5,000-5,500 ft. Flower pinkish. (5514.)

A very large-flowered form of this variable species, the petals being nearly as large as those of *M. decemfidum*, Roxb., but otherwise there is very little difference between this and typical *M. malabathricum* of the plains.

*Distrib.*—India to China and North Australia.

SONERILA HETEROSTEMONA, *Naud., in Ann. Sci. Nat. sér. 3, xv. (1851)*  
326 (p. 308).

Kuala Teku, 800-1,000 ft. (5538.)

*Distrib.*—Common in the woods of the plains. Malay Peninsula,  
Sumatra to Borneo.

S. SUFFRUTICOSA, *Stapf & King, in Journ. As. Soc. Beng. lxxix. II. (1900)*  
29.

Gunong Tahan, 3,300 ft. Flowers white or tinted with pink; leaves  
dull green with white hairs, beneath crimson with white hairs.  
(5315, 5347.)

*Distrib.*—Perak, Gunong Bubu (previously collected by Wray).

S. PARADOXA, *Naud., l. c. 321.*

Gunong Tahan, 3,300 ft. Leaves bright green with metallic blue  
lights, beneath crimson, hairs on both sides crimson; flowers  
pale pink. (5362.) The very hairy form common at higher  
elevations.

*Distrib.*—Penang.

ANERINCLEISTUS FRUTICOSUS, *n. sp. (p. 309).*

Suffrutex multi-ramosus, cortice fusco. Folia subcoriacea lanceo-  
lata acuminata glabra, 1-3 poll. longa  $\frac{1}{2}$  poll. lata, subtus glauca,  
apicibus obtusis, basibus acuminatis. Flores solitarii vel 3-4 um-  
bellati, pedunculo  $\frac{1}{2}$  poll. longo. Calycis tubus vix dilatatus glaber.  
Sepala subulata acuminata glabra,  $\frac{1}{4}$  poll. longa. Petala 4, rosea  
lanceolata acuminata ferme subulata. Stamina 8, antheris elonga-  
tis  $\frac{1}{4}$  poll. longis inæqualibus, basi obscure emarginatis, nec appen-  
diculatis, antheris sterilibus rubris. Capsula obconica  $\frac{2}{8}$  poll.  
longa  $\frac{1}{4}$  poll. lata.

Gunong Tahan, 5,000-6,000 ft. Small shrub; flower pale pink;  
anthers pale yellow. (5453.)

Allied to *A. macranthus*, King, but more glabrous with smaller  
leaves and more woody.

ORITREPHEs, *n. gen.*

Frutex; foliis oppositis ellipticis acuminatis, basi cuneatis, triner-  
viis. Panicula terminalis pauciflora, floribus majusculis. Calyx  
leprosus obconicus, apice constricto, lobis 4 brevibus connatis,  
dentiformibus. Petala 4 obovata unguiculata alba. Stamina 8,  
æqualia, similia, antheris elongatis versus apices attenuatis, poro  
terminali, basibus breviter hastatis, appendicibus et setis nullis,  
dorso processu parvo circulari onustis. Stylus longus, stigmatibus  
punctiformi. Ovarium 4-loculatum ellipticum, ferme ad basin  
tubi calycis liberum, vertice depresso-concavum. Fructus bac-  
catus. Semina plura, placentis axillaribus suffulta; adhuc im-  
matura.

**O. PULCHRA**, *n. sp.*

Frutex ramosus; foliis superne glabris inferne rufescenti-lepidotis, nervis tomento rufo tectis, primariis tribus subtus elevatis, secundariis horizontalibus circa 26 paribus, 2-5 poll. longis, 1-2 poll. latis, petiolo pollicari. Pedunculus 3 poll. erectus, glaber. Flores 4-6. Calyx in pedicello æquilongo,  $\frac{1}{4}$  poll. longus, lobis brevibus connatis. Petala obovata retusa unguiculata, alba roseo-tincta. Stamina petalis æquilonga, filamentis pubescentibus, antheris flavis. Fructus leprosus immaturus  $\frac{1}{2}$  poll. longus.

Gunong Tahan, 5,000-5,500 ft. Petals white tipped with pink. (5509.)

Closely allied to *Dissochæta* and *Anplectrum*. Remarkable for its 8 similar stamens without hairs or appendages.

**MEDINILLA CLARKEI**, *King, in Journ. As. Soc. Beng. lxxix. II. (1900) 63 (p. 309).*

Gunong Tahan, 3,300 ft. Small-sized tree. (5312.)

*Distrib.*—Malay Peninsula.

**MEDINILLA PAHANGENSIS**, *n. sp. (p. 310).*

Frutex epiphyticus, cortice albo verrucoso. Folia verticillata lanceolata subobtusata vel oblanceolata, basi angustata, coriacea enervia, 2 poll. longa  $\frac{3}{4}$  poll. lata, petiolo  $\frac{1}{4}$  poll. Flores in cymis 1 poll. longis, pentameri, albi,  $\frac{1}{2}$  poll. longi. Calyx cupuliformis, granulatus, obscure 5-dentatus. Petala obovata rotundata. Stamina 10, filamentis sinuatis glabris, antheris æquilongis curvis, processibus 2 anticis ad basin corniformibus, unoque dorsali.

Gunong Tahan, 4,000-5,000 ft. Growing on trees; flowers white. (5396.)

In general appearance resembles *M. Hasseltii*, Blume, but is pentamerous.

**PACHYCENTRIA TUBERCULATA**, *Korth., Ver. Nat. Gesch. Bot. 246, t. 63 (p. 310).*

Gunong Tahan, on trees at 3,300 ft. Flowers white, each petal tinted rosered at the base; flower-stalks, fruit, and mid-ribs of leaves beneath coral-red. (5237.)

*Distrib.*—Malay Peninsula, Burma, Borneo. Common at all altitudes.

**MEMEYLON GARCINIODES**, *Blume, Mus. Bot. Lugd.-Bat. i. 358 (p. 310).*

Gunong Tahan, 3,300 ft. Flowers white: anthers violet. (5352.)

*Distrib.*—Borneo and Sumatra.

**M. MAINGAYI**, *C. B. Clarke, in Hook. fil. Fl. Brit. Ind. ii. 557.*

Gunong Tahan, 5,000-6,000 ft. Creeper; fruit chrome-yellow. (5457.)

*Distrib.*—Malay Peninsula.

## BEGONIACEÆ.

**BEGONIA SINUATA**, *Wall., List, No. 3680 (p. 310)*.

Kuala Teku, 500-1,000 ft. Flowers pale pink; stamens chrome-yellow; stalks purplish pink, leaves beneath reddish purple. (5539.)

*Distrib.*—Burma, Malay Peninsula.

**B. HERVEYANA**, *King, in Journ. As. Soc. Beng. lxxi. II. (1902) 63*.

Kuala Teku, 500-1,000 ft. (5546.)

*Distrib.*—Malacca.

## GAMOPETALÆ.

## RUBIACEÆ.

**ARGOSTEMMA MUSCICOLA**, *n. sp. (p. 310)*.

Herba parva erecta vel suberecta, hispidula, 2 poll. alta. Folia æqualia anguste lanceolata acuta basi cuneata herbacea, glabra, nervis tribus et marginali pilis albescentibus munitis exceptis, 1-1½ poll. longa, ½ poll. lata; petiolo brevi. Flores 1-2 terminales pedunculati, albi, inter majores generis, ½ poll. lati. Bracteæ lanceolatæ, et cum pedicellis hirsutæ. Sepala lanceolata acuta. Petala lanceolata acuta.

Gunong Tahan, 5,000-6,000 ft. Small herb on mossy rocks by streams. (5461.)

The number of *Argostemmas* in the Peninsula is large and increases with every mountain explored, as in the case of *Sonerila*. This little erect species belongs to the set with equal leaves, but has somewhat the habit of *A. involucratum*, Hemsl.

**ARGOSTEMMA ALBOCILIATUM**, *n. sp. (p. 311)*.

Herba reptans, gracilis, hispida, 3-7 poll. longa. Folia æqualia ovata apicibus subacutis vel rotundatis, breviter petiolata, dense hispida, ½ ad poll. longa, ¼-½ poll. lata. Stipulæ breves ovatæ. Flores 1-4 in pedunculo gracili hispido, 2 poll. longo. Bracteæ minutæ lanceolatæ lineares. Calyx hispidus, lobis brevibus hispidis. Petala lanceolata acuminata, hispidula, ¼ poll. longa.

Gunong Tahan, 3,300 ft. Flowers white; leaves pale green, covered with white hairs. (5229.)

A curious creeping species with ovate hairy leaves.

**A. YAPPIL**, *King, in Journ. As. Soc. Beng. lxxii. II. (1903) 145*.

Gunong Tahan, 5,000-6,000 ft. Flowers white; anthers yellow. (5491.)

*Distrib.*—Perak.

**A. HOOKERI**, *King, l. c. 45*.

Gunong Tahan, 3,300 ft. Leaves dark green, with broad irregular stripe of light silvery green in centre. (5376.)

*Distrib.*—Malay Peninsula. Frequent on the hills.

A. PICTUM, Wall., in Roxb. Fl. Ind. ed. Carey & Wall. ii. 327.

Kuala Teku, 500-1,000 ft. Flowers white. (5543.)

Distrib.—Malay Peninsula. Common in hill-forests.

OPHIORRHIZA MUNGOS, Linn., Sp. Pl. 150 (p. 311).

Kuala Teku, 500-1,000 ft. (5534.)

Distrib.—India, Malaya. A variable species common all over the Peninsula.

HEDYOTIS PATENS, n. sp. (p. 311).

Frutex parvus subrepens ramosus. Folia lanceolata carnosula acuta æqualia, basibus cuneatis, glabra, 2-3 poll. longa,  $\frac{1}{2}$ - $\frac{3}{4}$  poll. lata. Stipulæ late triangulares carnosæ acutæ persistentes. Panicula laxa patens, 6-8 poll. longa, sæpe 6 poll. lata, ramis trichotomis patentibus trifurcatis, gracilibus. Flores parvi singuli pedicellati in apicibus ramulorum. Calyx obconicus, lobis triangularibus acutis. Petala linearia alba. Stamina gracilia longe porrecta corollam multo superantia. Stylus longus porrectus. Capsula obovoidea  $\frac{1}{2}$  poll. longa.

Gunong Tahan, 4,000-5,000 ft. Bush; flowers pale green. (5393.)

At 5,000-6,000 ft. Shrub somewhat creeping in habit; flowers greenish. (5475.)

Allied to *Hedyotis Maingayi*, Hook. fil., of Mount Ophir, and *H. peduncularis*, King, of Kedah Peak, but much more branched than either. This group of *Hedyotis* is very characteristic of our high elevations, and the species are usually confined to one mountain-top.

TIMONIUS MONTANUS, n. sp. (p. 312).

Frutex 8-pedalis. Folia elliptica vel elliptico-lanceolata acuminata basi cuneata, glabra,  $2\frac{1}{2}$ -3 poll. longa,  $1-1\frac{1}{2}$  poll. lata, nervis circa 6 paribus, in pagina inferiore conspicuis, breviter petiolata. Stipulæ lanceolatæ acuminatæ. Flores 2-3 in pedunculo brevi vix  $\frac{1}{2}$  poll. longo, sessiles, glabri, flavi. Calyx campanulatus pubescens, lobis acutis triangularibus. Corollæ tubus longus cylindricus glaber,  $\frac{1}{2}$  poll. longus, lobis oblongis obtusis. Stamina inclusa, antheris linearibus. Flores fœminei et fructus non visi.

Gunong Tahan, 5,000-6,000 ft. Shrub 8 feet high; petals pale yellow; anthers rich chrome-yellow; corolla-tube reddish externally. (5499).

Resembling in habit some forms of *T. jambosella*, Thw., but distinguished by its long glabrous corolla and short peduncle.

LASIANTHUS CHINENSIS, Benth., Fl. Hongk. 160 (p. 312).

Gunong Tahan, 5,000-5,500 ft. Shrub 10-11 feet; fruit brownish. (5524.)

Distrib.—Perak, Hongkong, Formosa.

**L. CORONATUS**, *King & Gamble, in Journ. As. Soc. Beng. lxxiii. II. (1904)*  
120.

Gunong Tahan, 5,000-6,000 ft. Shrub; flowers white. (5503,  
5438.)

*Distrib.*—Perak.

CAMPANULACEÆ.

**PENTAPHRAGMA GRANDIS**, *n. sp. (p. 312)*.

Herba 1-2-pedalis, caule fistuloso,  $\frac{1}{4}$  poll. crasso. Folia alterna remota elliptica obovata obtusa denticulata, basi inæquilatera, superne glabra, 5 poll. longa,  $2\frac{3}{4}$  poll. lata, subtus præcipue in venis pilosula deinde glabrescentia, petiolo 1 poll. longo. Flores 6-7 axillares, aggregati,  $\frac{5}{4}$  poll. longi, sordide albi. Bracteæ ovarium subæquantæ, scariosæ, caducæ. Calyx tubulosus, lobis lanceolatis oblongis obtusis, omnino lanuginoso-pubescentibus. Petala sepalis subæqualia, apicibus recurvis pubescentibus. Stamina linearia. Stylus validus, basi pubescens; stigma cylindricum crassum canaliculatum.

Gunong Tahan, 4,000-5,000 ft. 1-2 feet high; flowers dirty white; leaves bright green fleshy, pale beneath. (5408.)

A large plant for the genus, remarkable for its tall fistular stem and large flowers.

VACCINIACEÆ.

**VACCINIUM PUBICARPUM**, *n. sp. (p. 313)*.

Frutex 4-pedalis terrestris. Folia tenuiter coriacea lanceolata acuminata acuta glabra obscure serrulata, 2 poll. longa,  $\frac{3}{4}$  poll. lata, nervis primariis 6, petiolo  $\frac{1}{2}$  poll. longo. Racemi foliis breviores 2 poll. longi laxi. Bracteæ minutæ lineares. Flores pedicellati, pedicellis  $\frac{1}{4}$  poll. longis, cum calyce pubescentibus. Calyx cupulatus, lobis acutis triangularibus. Corolla omnino pubescens. Staminum filamentis brevibus, antheris linearibus oblongis, processibus 2 apicalibus rectis cylindricis, antheras æquantibus, omnino glabra. Stylus cylindricus crassiusculus, apice plano. Bacca parva globosa pubescens sepalis coronata,  $\frac{1}{4}$  poll. longa.

Gunong Tahan, 5,000-6,000 ft. Shrub 4 feet high, in shady ravines. (5443.)

Resembles *V. malaccensis*, Wight, which is common in the lowlands of the Peninsula, but differs in the long acuminate leaves and pubescent fruit.

**V. LONGIBRACTEATUM**, *n. sp.*

Frutex ramis fuscis hirtis, pilis albis. Folia alterna ovata subcordata obtusa coriacea inferne pubescentia superne glabra, 1-1 $\frac{1}{2}$  poll. longa,  $\frac{3}{4}$ -1 $\frac{1}{4}$  poll. lata, petiolis pubescentibus  $\frac{1}{2}$  poll. longis. Racemi terminales longiusculi, rhachidibus pubescentibus. Bracteæ foliaceæ coriaceæ lanceolatae acutæ pubescentes, flores multo

superantes,  $\frac{1}{2}$ -1 poll. longæ,  $\frac{1}{4}$  poll. latæ. Flores desunt. Baccæ  $\frac{1}{8}$  poll. longæ globosæ pubescentes, pedicellis  $\frac{1}{4}$  poll. longis pubescentibus; lobis calycis triangularibus acutis 5, inflexis.

Gunong Tahan, 3,300 ft. (5326.)

Remarkable for its pubescence and the large lanceolate bracts. The leaves are close-set and very coriaceous, hairy beneath with conspicuous ascending nerves.

V. TEYSMANNI, *Miq., Fl. Ind. Bat.* ii. 1062.

Gunong Tahan, 3,300 ft. Flowers crimson; leaves rusty beneath. (5053).

*Distrib.*—Perak; Java.

ERICACEÆ.

PIERIS OVALIFOLIA, *D. Don, in Edinb. Phil. Journ.* xvii. (1834) 159 (p. 313).

Gunong Tahan, 5,000-6,000 ft. Small tree 15-20 feet; flowers whitish. (5476.)

*Distrib.*—Himalayas to Japan.

RHODODENDRON MALAYANUM, *Jack, in Mal. Misc.* ii. (1822) No. VII. 17 (p. 313).

Gunong Tahan, 3,300 ft. Small tree. (5323.)

*Distrib.*—Common on hills in Malay Peninsula; Malaya.

RHODODENDRON WRAYI, *King & Gamble, in Journ. As. Soc. Beng.* lxxiv. II. (1906) 75 (p. 314).

Gunong Tahan, 4,000-5,000 ft. (5387.)

*Distrib.*—Occurs also in the Kedah, Selangor, and Perak Hills.

R. LONGIFLORUM, *Lindl., in Journ. Hort. Soc.* iii. (1848) 88.

Gunong Tahan, 4,000-5,000 ft. Growing on trees; flowers salmon-pink. (5382.)

*Distrib.*—Perak, Borneo, and Sumatra.

R. ELEGANS, *n. sp.*

Epiphytica, ramis tenuibus undulatis. Folia opposita vel 5-verticillata elliptico-lanceolata obtusa basi cuneata parva, coriacea, glabra,  $\frac{3}{4}$ -1 poll. longa,  $\frac{1}{2}$  poll. lata, nervis inconspicuis, subtus crebre punctata superne nitida, petiolis brevissimis  $\frac{1}{10}$  poll. longis. Flores rubri singuli terminales,  $\frac{1}{2}$  poll. longi,  $\frac{2}{3}$  poll. lati, pedicellis æquilongis pubescentibus gracilibus. Calyx cupularis parvus, lobis brevissimis ovatis. Corolla parva recta crassa cylindrica rubra pubescens, lobis rotundatis brevibus. Stamina 8, filamentis pubescentibus. Ovarium hirtum. Stylus cylindricus crassiusculus haud exsertus; stigma clavatum.

Gunong Tahan, 5,000 ft. Flowers bright red; leaves dark shining green; growing on trees. (5429.)

A very elegant little slender-branched plant with small flowers. I know nothing exactly like it.

## EPACRIDEE.

*LEUCOPOGON MALAYANUS*, Jack, in *Mal. Misc.* i. (1820) No. v. 20 (p. 314).

Gunong Tahan. Small tree. (5316.)

*Distrib.*—Common on all the hills and on sandy coasts of the Peninsula. Occurs also in Borneo and Banka, with a variety in Tenasserim.

## MYRSINEE.

*ARDISIA ROSEA*, King & Gamble, in *Journ. As. Soc. Beng.* lxxiv. II. Extr. (1906) 150 (p. 314).

Gunong Tahan, 5,000-6,000 ft. Small tree; flowers white, stalks purplish. (5467.) Shrub; flowers white, flower-stalks red; leaves and young wood tinged with red. (5334.)

*Distrib.*—Perak, on most hill-ranges at high elevations.

## A. BINIFLORA, n. sp.

Frutex validus, ramis pallidis densis. Folia coriacea lanceolata obtusa basibus cuneatis, glabra,  $2\frac{1}{2}$  poll. longa, 1 poll. lata, carina subtus crassiuscula, nervis copiosis, petiolo  $\frac{1}{4}$  poll. longo. Flores axillares bini vel terni in pedunculo 1 poll. gracili, foliis breviores. Bracteæ ad basin pedunculi et pedicellorum foliaceæ parvæ ovatæ. Sepala rotundata brevia haud imbricata marginibus glanduloso-dentatis. Petala lanceolata acuta, glandulosa, glandulis magnis,  $\frac{1}{4}$  poll. longa. Antheræ lanceolatæ apiculatæ.

Gunong Tahan, in ravines, 5,000-6,000 ft. Shrub 10-15 feet high; flower reddish pink; anthers brownish. (5460.)

A shrub with the habit of *Ardisia littoralis*, Andr., but with very stiff, closely-veined, entire, obscurely gland-dotted leaves, and flowers in pairs on axillary peduncles.

*ARDISIA RETINERVIA*, n. sp. (p. 315).

Frutex 10-12 ped. alt., ramis validis brunneis, omnino glaber. Folia coriacea elliptica, apice rotundata, basi cuneata, 4-4 $\frac{1}{2}$  poll. longa, 2 poll. lata, crebre glandulose-punctata in utraque pagina, costa superne depressa subtus elevate crassiuscula; nervis superne inconspicuis, subtus elevatis horizontalibus numerosis valde reticulatis usque ad margines; margines integri, glandulis marginalibus nullis; petiolo valido brevi,  $\frac{1}{2}$ -1 poll. longo. Cymæ paucifloræ axillares breves. Flores desunt; pedicelli fructiferi subangulati,  $\frac{1}{2}$  poll. longi. Sepala 5 ovata obtusa haud glandulifera glabra brevia. Drupa globosa multi-sulcata,  $\frac{1}{4}$  poll. longa; stylo brevi.

Gunong Tahan, 5,000-6,000 ft. Shrub 10-15 feet high. (5502.)

Remarkable chiefly for its stiffly coriaceous, strongly reticulated leaves. The drupe, which is large for the genus, is marked with narrow ridges and grooves.

## STYRACEÆ.

*SYMPLOCOS ADENOPHYLLA*, Wall. ex G. Don, *Gen. Syst.* iv. 3 (p. 315).  
Gunong Tahan, 3,300 ft. (5320.)

*Distrib.*—Malay Peninsula and Archipelago.

*S. SCORTECHINII*, King & Gamble, in *Journ. As. Soc. Beng.* lxxiv. ii.  
Extr. (1906) 250.

Gunong Tahan, 4,000-5,000 ft. Tree; flowers white, tinged near the ends of the petals with pink, veins of flowers red. (5392.)

*Distrib.*—Perak. I have seen no authentic specimen of this plant, which has only once been collected, by Scortechini.

## ASCLEPIADACEÆ.

*PENTASACME CAUDATUM*, Wall., in *Wight, Contrib.* 60 (p. 315).

Kuala Teku, 500-1,000 ft. (5533.)

*Distrib.*—Common in streams at high altitudes in the eastern side of the Peninsula; North India, Burma.

*DISCHIDIA COCCINEA*, Griff. *Notulæ*, iv. 45 (p. 315).

Gunong Tahan, 3,300 ft. On trees; flowers red; leaves dull crimson. (5410.)

*Distrib.*—Malay Peninsula; common at high altitudes.

*DISCHIDIA ALBIDA*, Griff. *Notulæ*, iv. 46 (p. 316).

Gunong Tahan. On trees; flowers pale yellow. (5399.)

*Distrib.*—Malay Peninsula.

## GENTIANACEÆ.

*GENTIANA MALAYANA*, n. sp. (p. 316).

Herba pusilla 1-3 poll. alt. Folia carnosa congesta acuta lanceolata sessilia integra glabra,  $\frac{1}{4}$ - $\frac{1}{2}$  poll. longa. Flos terminalis  $\frac{1}{3}$  poll. longus. Calyx tubulosus, lobis acuminatis tubum corollæ superantibus. Corolla azurea tubulosa, lobis brevibus subspathulatis apicibus rotundatis, plicis integris. Stamina antheris longius hastatis prædita. Ovarium stipitatum: stylo brevi, stigmatibus brevibus.

Gunong Tahan, 5,000-6,000 ft. Flowers deep sky-blue. Growing among moss in damp places (5473): on wet rocks (5479).

The addition of the genus *Gentiana* to the Flora of the Malay Peninsula is an interesting one. The species is closely allied to *G. borneensis*, Hook. fil., from Kinabalu, differing chiefly in the quite entire leaves, rounded tips of the petals and entire, not lobed, folds between them. The anthers are narrower and more acute.

The plants collected under the two numbers seem specifically identical, but the specimens of No. 5473 are very much smaller than those of 5479.

*CANSCORA TRINERVIA*, *n. sp.* (*p.* 316).

Herba 3-5 poll. alta, caulibus pluribus. Folia glabra ovata vel ovato-lanceolata herbacea utrinque acuminata trinervia,  $\frac{1}{2}$ -1 poll. longa,  $\frac{1}{2}$ - $\frac{3}{4}$  poll. lata. Flores in axillis superioribus, albis. Calyx tubulosus superne angustatus  $\frac{1}{2}$  poll. longus, costis 8 elevatis, alternis bifurcatis, lobis acuminatis. Corolla irregularis alba, tubo quam sepala paullo longiore, lobis 4 oblongis rotundatis marginibus crispis, uno multo latiore,  $\frac{1}{4}$  poll. longis. Stamina fertilia 3, antheris oblongis, uno sterili filiformi. Stylus sat longus; stigmatibus 2 linearibus elongatis.

Gunong Tahan, 5,000-5,500 ft. Herb by stream; flowers white. (5507.)

There are two species of this genus recorded by C. B. Clarke in his description of the family in the "Materials for a Flora of the Malayan Peninsula," one of which—*C. diffusa*, a common Indian species—is recorded as belonging to this region only on the authority of a specimen collected by Lobb in Singapore and undoubtedly wrongly localised, the other—*C. pentanthera*, C. B. Clarke, an endemic species—occurs usually at high elevations; it has five complete stamens and a regular corolla, while *C. trinervia* has three complete stamens only and a staminode and an irregular corolla.

## OLEACEÆ.

*OLEA CAPITELLATA*, *n. sp.* (*p.* 317).

Frutex 3-4-pedalis. Folia opposita coriacea glabra elliptica obtusa petiolata, basi angustata, 2 poll. longa, 1 poll. lata, nervis 8 primariis. Stipulæ nullæ. Flores in capitulis parvis axillaribus petiolis brevioribus. Bracteæ ovatæ rotundatæ, marginibus ciliatis. Pedicelli breves pubescentes. Sepala ad basin connata, lobis ovatis pubescentibus. Corollæ tubus brevissimus; lobis rotundatis pubescentibus. Stamina 2, in ore tubi adnata, corollam multo superantia; filamentis linearibus, antheris bilocularibus ellipticis, loculis ad basin paullo divergentibus. Stylus erectus simplex quam tubus corollæ brevior.

Gunong Tahan, 5,000-6,000 ft. Small shrub 3-4 feet high; flowers yellowish. (5489.)

A very curious plant with densely set coriaceous elliptic leaves, closely minutely dotted, and small axillary heads or more strictly umbels of very small flowers, subtended by 2 rounded ciliate bracts. I know no species of the genus which at all resembles this singular plant.

## LOGANIACEÆ.

*GAERTNERA RAMOSA*, *n. sp.* (*p.* 317).

Frutex 10-pedalis ramosus. Folia lanceolata acuminata acuta glabra basi in petiolum brevem attenuata, 6 poll. longa,  $1\frac{1}{2}$  poll. lata, petiolo  $\frac{1}{4}$  poll. longo. Stipulæ amplexicaules per paria connatæ superne bidentatæ. Cymæ terminales, laxæ, 2-3 poll. longæ,

ramis paucis brevibus, rami breves 1-3-flori. Calyx cupulatus  $\frac{r}{15}$  poll. longus, dentibus 4, brevissimis. Corolla  $\frac{1}{2}$  poll. longa pubescens, lobis 6 lanceolatis carnosus apicibus inflexis, pilis sericeis densis in ore tubi infra antheras prædita. Stamina 6, antheris linearibus oblongis, connectivo in cornua minuta producto, filamentis brevibus pilis sericeis celatis.

Gunong Tahan, 5,000-6,000 ft. Shrub 10 feet high; flowers white. (5458.)

G. OBLANCEOLATA, *King & Gamble, in Journ. As. Soc. Beng.* lxxiv. II. (1907) 624.

Gunong Tahan, 3,300 ft. Bush; flowers white. (5343.)

*Distrib.*—Perak.

LENTIBULARIACEÆ.

UTRICULARIA NIGRICAULIS, *n. sp.* (*p.* 317).

Folia et utriculæ non visæ. Caulis filiformis tripollicaris ater, raro ramosus, squamis paucis lanceolatis subacutis haud infra productis. Flores perparvi 2-3 breviter pedicellati, bracteis 2 oblongis pedicello multo brevioribus. Sepala late oblonga obtusa, corollæ tubum longe superantia, purpurascens. Corollæ labium superius brevius, inferum longius; calcar breve incurvum conicum. Capsula ovata orbicularis calyce tecta.

Gunong Tahan, 5,000-6,000 ft.; in damp moss on rocks. Colour purplish-blue, stem black. (5447.)

Apparently near *U. minutissima*, Vahl, but has larger flowers.

UTRICULARIA ORBICULATA, *Wall. ex A. D C. Prodr.* viii. 18. (*p.* 318).

Gunong Tahan, 5,000-6,000 ft. Flowers blue, mouth of tube yellow.

Growing among wet moss. (5477.)

*Distrib.*—India, Malaya, South China.

GESNERACEÆ.

DIDYMOCARPUS SALICINA, *Ridl., in Trans. Linn. Soc.* ser. 2, *Bot.* iii. (1893) 329 (*p.* 318).

Kuala Teku, 500-1,000 ft. Flowers pale pink; anthers and pistil deeper pink.

*Distrib.*—Originally found in the Tahan Valley.

D. FLAVOBRUNNEA, *Ridl., l. c.*

Gunong Tahan, 3,000-3,300 ft. Leaves dark green; hairs on stalk red; flowers yellow lined with dull red, becoming confluent in the tube. (5367.)

*Distrib.*—Occurs in the same locality as the last.

D. GRANDIFOLIA, *n. sp.*

Planta valida acaulis, radice crassa lignosa. Folia oblanceolata magna, apice acuto, basi in petiolum decurrente, margine crenulato, superne glabra punctata, inferne glabra, 9 poll. longa,  $3\frac{1}{2}$  poll. lata, nervis pubescentibus ad 17 paria subtus elevatis, ner-

vulis reticulatis, petiolo 2 poll. longo. Pedunculi validi 8-9 poll. longi pubescentes parce ramosi, ramis brevibus 1 poll. longis. Sepala  $\frac{1}{4}$  poll. longa lanceolata acuminata acuta hispidula. Corollæ delapsæ. Capsula teres acuminata glabra, 3 poll. longa.

Gunong Tahan, 3,300 ft. Leaves green with the bracts, fruit, and stalk dull purple. (5369.)

Unfortunately there are no corollas on the specimens. It is evidently a fine plant with unusually large leaves for an acaulescent species.

D. ROBINSONII, *n. sp.*

Suffrutex ramosus ultra-pedalis hispidus. Folia opposita subæqualia lanceolata utrinque acuminata acuta crenulata superne hispidula inferne subglabra, nervis pubescentibus exceptis, 2 poll. longa,  $\frac{3}{4}$  poll. lata, petiolo hirto,  $\frac{1}{4}$  poll. longo. Flores axillares in pedicellis pubescentibus, 2 poll. longis. Sepala lanceolata linearia  $\frac{1}{2}$  poll. longa, glanduloso-hirta. Corolla longa infundibuliformis pubescens purpurascens albobriata, macula flava in ore tubi notata,  $\frac{3}{4}$  poll. longa. Capsula gracilis cylindrica acuminata,  $2\frac{1}{2}$  poll. longa.

Gunong Tahan, 5,000-6,000 ft. Flowers purplish streaked with white, with yellow at top of tube. (5470.)

This species is allied to *D. hispida*, Ridl. It is unusually branched and woody for its group.

LOXOCARPUS INCANA, *R. Br., in Benn. Pl. Jav. Rar.* 120 (*p.* 319).

Gunong Tahan, 5,000 ft. Flowers pale violet, darker in the throat. (5430.)

*Distrib.*—Malay Peninsula.

L. ANGUSTIFOLIA, *n. sp.*

Herba acaulis, foliis lanceolatis acutis subfalcatis plurimis, basibus in petiolis attenuatis sericeis,  $\frac{3}{4}$ -2 poll. longis,  $\frac{1}{4}$ - $\frac{1}{2}$  poll. latis. Pedunculus tenuis erectus sericeus, 2 poll. longus. Flores 2-3. Sepala lanceolata hispido-sericea,  $\frac{1}{2}$  poll. longa. Corollæ  $\frac{5}{12}$  poll. longæ, tubus crassus brevis, lobi rotundati, labium inferius longius, pallide purpureum. Capsula cornuta curva acuminata, pilis viscidis tecta.

Gunong Tahan, 5,000-6,000 ft. (5504.)

A very distinct plant with narrow lanceolate oblique leaves.

PARABŒA PYROLIFLORA, *Ridl., in Journ. Roy. As. Soc. Straits Br.* No. xlv. (1905) 67 (*p.* 319).

Kuala Teku, 300-1,000 ft. (5545.)

*Distrib.*—Originally found in the Tahan Valley.

P. RUBIGINOSA, *n. sp.*

Radix crassa lignosa, 6 poll. longa; caudex brevis, 1 poll. longus, lignosus, temento multo rufo tectus vel nullus. Folia rosulata

vel opposita oblanceolata obtusa basin versus angustata rotundata, margine dentato, nervis 10 paribus, superne atroviridia hispida, præsertim in marginibus, subtus crebre punctata glabra, nervis et costa rubiginoso-tomentosis exceptis. Pedunculi 3 vel plures, graciles, 6-8 poll. longi, rubropubescentes. Bracteæ minutæ lineares pubescentes. Sepala linearia brevia, vix  $\frac{1}{12}$  poll. longa. Corolla alba colore roseo tincta campanulata,  $\frac{1}{4}$  poll. longa, lobis rotundatis. Stamina brevia 2, antheris subglobosis. Capsula lanceolata acuminata,  $\frac{3}{4}$  poll. longa.

Gunong Tahan, 4,000-5,000 ft.; on rocks. Leaves dark velvety green; flowers white tinged with pink. (5398.)

Flowers resembling those of *P. pyroliflora*, Ridl., but the style is much shorter. The foliage is very different and more resembles that of *Didymocarpus heterophylla*, Ridl.

CYRTANDRA CUPULATA, Ridl., in *Journ. Linn. Soc., Bot.* xxxii. (1896) 527 (p. 319).

Kuala Teku, 500-1,000 ft. (5540.)

*Distrib.*—Malay Peninsula.

ÆSCHYNANTHUS, *sp.* (p. 320).

Gunong Tahan, 5,000-6,000 ft. Creeper very fleshy, reddish. (5483.)

A rather woody plant with pale bark and oval fleshy leaves  $\frac{1}{2}$  an inch long. There are no flowers (only pods already dehisced) and no seed. Doubtless an undescribed species, but the material is insufficient.

#### APETALÆ.

#### NEPENTHACEÆ.

NEPENTHES BONGSO, Korth., *Verh. Nat. Gesch. Bot.* 19, t. 14 (p. 320).

Gunong Tahan, 5,000 ft. Flowers dull red-brown; cups white tinted pale green at base and spotted with pink. (5411.)

The original plant was obtained on Merapi mountain in Sumatra. The Tahan plant seems to resemble it very closely, but the fruit is much larger than it is in Korthal's figure. The male flowers are small, with 4 oblong obtuse pubescent petals  $\frac{1}{10}$  inch long, the pedicels of the flowers  $\frac{1}{4}$  inch. The raceme is lax and about 6 inches long. The lid of the pitcher is densely glandular. The capsules are three-quarters of an inch long.

N. GRACILLIMA, *n. sp.*

Caulis gracillimus  $\frac{1}{10}$  poll. in diametro. Folia remota sessilia anguste lanceolata acuminata, lamina 2-3 poll. longa  $\frac{1}{2}$  poll. lata glabra coriacea; petiolulo 5-pollicari; amphora subcylindrica angusta, 4 poll. longa,  $\frac{3}{4}$  poll. in diametro, superne glandulosa paullo constricta, annulo angusto, obscure costato. Operculum

orbiculare  $\frac{1}{2}$ - $\frac{3}{4}$  poll. longum, cervice et lamina pubescentibus, cornibus ad basin operculi duobus  $\frac{1}{10}$  poll. longis, glandulæ nullæ. Racemus masculus gracilis plus quam 6 poll. longus. Flores parvi dissiti, pedicellis  $\frac{1}{10}$  poll. longis. Bracteæ lineares graciles. Petala 4 oblonga obtusa glabra. Racemus fructiferus circa 6 poll. longus; capsulæ  $\frac{3}{4}$  poll. longæ glabræ, pedicellis  $\frac{1}{2}$  poll. longis, valvæ utrinque angustatæ.

Gunong Tahan, 3,300 ft. Pitchers pale green, tinted in places with dull crimson, and mottled with dull purple; lid of cup brighter green lined with dull crimson. (5309.)

Allied to *N. gracilis*, Korth., but is a much slenderer plant; the stem is rounded and not angular, the leaves are not decurrent, the peristome is faintly ribbed on the lower surface, the cup is differently coloured, and the lid is not glandular.

## LAURACEÆ.

DEHAASIA LANCIFOLIA, *n. sp.* (*p.* 320).

Arbor 25-pedalis. Folia coriacea lanceolata obtusa (siccitate rufa), breviter petiolata glabra, nervorum 9-11 paribus prædita; nervis ascendentibus in margine arcuatis, costa crassiuscula,  $4\frac{1}{2}$ - $7\frac{1}{2}$  poll. longa,  $1\frac{1}{2}$ -2 lata. Paniculæ elongatæ patentis 7-8 poll. longæ, ramulis paucis brevibus pubescentibus. Flores 6-7 perparvi in cymulas in apicibus ramulorum virescentes dispositi, pedicellis brevibus pubescentibus. Sepala 3 minuta ovata obtusa. Petala alterna ovata obtusa cucullata pubescentia, quam sepala multo majora. Stamina 9 filamentis brevissimis, antheris ovatis. Stylus quam stamina longior crassus; stigma magnum rotundatum crassum atrum. Drupa elliptica  $1\frac{1}{2}$  poll. longa, pedunculo haud multum incrassato.

Gunong Tahan, 5,000-6,000 ft. Tree 11 inches in diameter, 25 feet high, flowers greenish (5468). Shrub 8-10 feet, in fruit (5526).

This fine plant is represented by two specimens, one in flower and one in fruit, which evidently belong to the same species. The leaves are bright brown when dry. The main nerves ascend and curving upwards at the margin connect with each other by a loop, and the intermediate nervules are conspicuously reticulated. The long lax panicle of short branches is not like that of any other species known to me. The flowers are quite those of a *Dehaasia*, some unisexual and some bisexual. The stigma is remarkably thick and rounded for the genus.

LINDERA CÆSIA, *Reinw. ex Vill., in Blanco. Fl. Philipp.* ed. 3, *Nov. App.* 181, e descript (*p.* 321).

Gunong Tahan, 5,000-6,000 ft. Small shrub. (5455.)

*Distrib.*—Philippines to Borneo.

## LORANTHACEÆ.

LORANTHUS PULCHER, *DC. Prod.* iv. 295 (*p.* 321).

Gunong Tahan, 5,500 ft. Shrub; flowers carmine; calyx and flower-stalks dull red; leaves very thick and fleshy. (5337.) The leaves are more oval in outline and more fleshy than usual. Not rare in the hill-region.

*Distrib.*—Penang.

L. LOBBII, *Hook. fil., Fl. Brit. Ind.* v. 204.

Gunong Tahan. (5485.) Common in the hill-regions.

*Distrib.*—Penang.

L. GLOBOSUS, *Roxb., Fl. Ind.* i. 550.

Gunong Tahan, 4,000-5,000 ft.; on trees. Flowers bright orange-red; leaf red above and dull green beneath. (5404.)

*Distrib.*—North India, Malay Peninsula, Java.

## SANTALACEÆ.

HENSLOWIA VARIANS, *Blume, Mus. Bot. Lugd.-Bat.* i. 244 (*p.* 322).

Gunong Tahan, 3,300 ft. Climber; fruit green, tinted dull red. (5349.)

*Distrib.*—Tenasserim, Malacca, Borneo.

H. LOBBIANA, *A. DC. Prod.* xiv. 631.

Gunong Tahan, 5,000-6,000 ft. Creeper; berries reddish. (5484.)

*Distrib.*—Malay Peninsula.

## EUPHORBIACEÆ.

CHORIOPHYLLUM MONTANUM, *n. sp.* (*p.* 322).

Frutex ramosus, foliis oppositis coriaceis, ellipticis, basi angustatis, apicibus retusis, superne nitidis, subtus pallidioribus 2 poll. longis,  $\frac{3}{4}$  poll. latis, breviter petiolatis, petiolo  $\frac{1}{10}$  poll. longo. Flores non visi. Capsula tricoeca globosa, coccis bivalvibus  $\frac{1}{2}$  poll. longis. Semina  $\frac{1}{4}$  poll. longa rufo-castanea polita elliptica subobliqua, arillo bilobo, semen semitegente, lobis subacutis triangularibus.

Gunong Tahan, 3,300 ft. (5434.) Flowers yellow.

Very distinct from *Ch. malayanum*, Benth., in its much smaller, elliptic, very coriaceous leaves.

## MYRICACEÆ.

MYRICA FARQUHARIANA, *Wall. Tent.* 61 (*p.* 322).

Gunong Tahan, 5,000-5,500 ft. Shrub 10-12 feet high; flowers reddish-brown. (5519.)

*Distrib.*—India, Malaya.

Common in the low country near the sea. This is referred to *M. Nagi*, Thunb., in the "Flora of British India," v. 597, but I cannot think it is identical with that Japanese plant.

## CUPULIFERÆ.

QUERCUS RASSA, *Miq., Fl. Ind. Bat. Suppl.* 350 (p. 322).

Gunong Tahan, 6,000 ft. (5440.) One of the very few oaks which are to be met with at an elevation of over 3,000 ft.

*Distrib.*—Malay Peninsula and Archipelago.

## MONOCOTYLEDONES.

## ORCHIDEÆ.

OBERONIA (§ *Caulescentes*) CONDENSATA, *n. sp.* (p. 322).

Caules congesti, 1-2 poll. longi, radicibus densis tenuibus ad bases præditi. Folia carnosâ decidua linearia acuta,  $\frac{3}{4}$  poll. longa,  $\frac{1}{8}$  poll. lata. Racemus pollicaris ad basin florifer. Bracteæ lanceolatae longe acuminatae, ad racemi basin longiores, superne minores. Flores citrini, poll.  $\frac{1}{2}$  in diametro. Sepala ovata obtusa. Petala lanceolata multo angustiora; labellum æquilongum, integrum elongato-triangulari, basi lato. Columna steliidiis brevibus instructa, anthera ovata alba.

Gunong Tahan, 5,000-6,000 ft.; on rocks. (5487.)

A very curious little plant, remarkable for its stiff short stem, its short, erect raceme, and its quite simple lip.

PLATYCLINIS GRACILIS, *Hock. fil., Fl. Brit. Ind.* v. p. 708 (p. 323).

Gunong Tahan, 5,000-6,000 ft. Flowers pale greenish, with two broad stripes on the lip not reaching to the tip. (5498.) A form with a very long rhizome and stout distant bulbs.

*Distrib.*—Perak.

P. KINGII, *Hook. fil., l. c.*

Gunong Tahan; on rocks at 6,000 ft. Flowers yellow. (5434.)

*Distrib.*—Perak and Borneo.

DENDROBIUM LONGIPES, *Hook. fil., l. c.* 713 (p. 323).

Summit of Gunong Tahan, 7,100 ft. Flowers yellow faintly lined with brown, lip and lobes mottled with crimson. (5529.)

*Distrib.*—Hill-ranges of the centre of the Peninsula.

D. KELSALLI, *Ridl., in Journ. Linn. Soc., Bot.* xxxii. (1896) 237.

Gunong Tahan, 3,000-6,000 ft.; on trees. (5496.)

*Distrib.*—All the hills of the central range.

*D., sp.*, with rather long bulbs, slender stems and terete acuminate leaves. "Flower pale yellow, lip spotted and veined with reddish-brown and with reddish hairs."

Gunong Tahan, 5,000-6,000 ft. (5481.)

This appears to be allied to *D. gracile*, Lindl., but there are no flowers on the specimens.

**D. UNIFLORUM**, *Griff. Notulæ*, iii. 305.

Gunong Tahan, 5,000-6,000 ft. (5497.) At 3,300 ft. (5342, 5306.) On trees: creamy white, lip tinted with green and three brown lines down the centre.

In No. 5306 the leaves are over 2 inches long and half an inch wide, of thinner texture than those of the other two specimens. The leaves of No. 5497 are those of the Mount Ophir form, short, thick and oblong.

The Dendrobiums of the section *Distichophyllæ*, of the *D. uniflorum* and *D. revolutum* series, require critical study both in the Malay Peninsula and in Borneo, where they are also abundant on the upper parts of the hill-ranges. There is considerable variation in the form and texture of the leaf and also in the height and habit of the plant, though the flowers seem to be much less variable.

**DENDROBIUM BIFARIUM**, *Lindl., Gen. & Sp., Orch.* 81 (*p.* 324).

Gunong Tahan, 5,000-5,500 ft. Lip creamy white with orange blotches; petals and sepals pale coffee-brown, much darker at the base. (5505.)

I cannot distinguish this from the well-known lowland plant, on which Lindley based his species, though Mr. Robinson's note as to the colour of the flower (which is usually creamy with a green lip) shows some variation from the normal. The species occurs both in the lowlands and the hill-region of the Malay Peninsula and Borneo.

**D. (§ Pedilonum) CORNUTUM**, *Hook. fll., Fl. Brit. Ind.* v. 730.

Gunong Tahan, 5,000 ft.; on trees. Flowers bright magenta, stalks and bracts the same colour; a yellow spot on the lip. (5431.)

*Distrib.*—Perak.

This species is closely allied both to *D. Kuhlii*, Lindl., and *D. Hasseltii*, Lindl., of Java and Sumatra. It differs but little from the latter, chiefly in the narrower acute sepals.

**D. (§ Pedilonum) SUBFLAVIDUM**, *n. sp.*

Caules plures graciles teretes, 18 poll. longi,  $\frac{1}{8}$  poll. crassi, internodiis bipollicaribus. Folia anguste lanceolata acuminata acuta, 3 poll. longa  $\frac{1}{2}$  poll. lata, conspicue 5-nervia, apicibus inæqualibus. Pedunculi e caulibus defoliatis  $\frac{3}{4}$  poll. longi biflori. Bracteæ ovatæ. Pedicelli cum ovariis gracilibus  $\frac{3}{4}$  poll. longi. Flos  $1\frac{1}{2}$  poll. longus ab apice sepali usque ad apicem menti. Sepalum posticum lanceolatum  $\frac{1}{4}$  poll. longum; sepala lateralia subtriangularia multo latiora, mentum cornutum 1 poll. longum, apice curvo. Labellum lanceolatum, ungue longo et anguste, limbo integro obtuso, 1 poll. longum  $\frac{1}{3}$  poll. latum. Columnæ parte libera brevi lata, alis alte elevatis.

Gunong Tahan, 3,300 ft. Flowers yellow. (5317.) At roots of trees; flowers pale greenish-yellow, lip yellow, spotted with crimson

near the base on either side; leaves tinged with dull crimson on the under face. (5300.)

Evidently allied to *D. megaceras*, Hook. fil., a little known plant collected by Maingay in Malacca and not since found. It differs chiefly in the lip being quite entire and the limb lanceolate. *D. Anthrene*, Ridl., of Borneo is also allied.

**BULBOPHYLLUM GALBINUM**, Ridl., in *Journ. Linn. Soc., Bot.* xxxii. (1896) 267 (p. 324).

Gunong Tahan, 3,300 ft.; on trees. (5305.)

*Distrib.*—Perak.

**BULBOPHYLLUM (§ Sestochilus) MICROGLOSSUM**, *n. sp.* (p. 325).

Caulis longe repens  $\frac{1}{12}$  poll. crassus, internodiis  $\frac{1}{4}$  poll. longis; pseudobulbis conicis ascendentibus  $\frac{1}{2}$  poll. longis  $\frac{1}{4}$  poll. latis ad bases. Folia elliptica obtusa, breviter petiolata coriacea  $1\frac{3}{4}$  poll. longa  $\frac{1}{2}$  poll. lata. Pedunculus gracilis  $1\frac{3}{4}$  poll. longus. Sepalum posticum ellipticum cucullatum, sep. lateralia ovata-lanceolata falcata obtusa  $\frac{1}{2}$  poll. longa. Petala lata oblongo-lanceolata obtusa fere subæqualia. Labellum minimum, basi late emarginato, apice decurvo, carnosum lateraliter compressum vix  $\frac{1}{4}$  poll. longum. Columna cum pede longo sursum curvo libero, alis in margine pedis elongatis, stelidia obscura.

Gunong Tahan, 4,000-5,000 ft.; on trees. Flowers dull yellow, lined and spotted with red, movable lip pink. (5327.)

Rather small-flowered for the section and with a very small lip which is flattened sideways and narrow, the base dilated and deeply emarginate. In the column, the side wings are well developed along the edge of the foot, forming rather large flanges running from the top of the column nearly to the point at which the foot becomes free from the sepals.

**B. (§ Monanthaparva) TITANIA**, *n. sp.*

Rhizoma longe repens, pseudobulbis arcte appressis tectum. Pseudobulbi oblongi apicibus ascendentibus ut in *B. catenario*, ferme  $\frac{1}{2}$  poll. longis. Folia lanceolata  $\frac{1}{2}$  poll. longa  $\frac{1}{8}$  poll. lata, basi angustato. Pedunculus gracilis capillaris  $1\frac{1}{2}$  poll. longus. Bracteæ infundibuliformes,  $\frac{1}{8}$  poll. longæ. Sepala lanceolata  $\frac{3}{16}$  poll. longa, 6-nervia, lateralia latiora. Petala minuta  $\frac{1}{4}$  longitudinis sepali æquantia, lanceolata uninervia. Labellum linguiforme, in medio flexum  $\frac{3}{4}$  longitudinis sepali æquans, carnosum flavum. Columna validula, stelidiis setiformibus longis.

Gunong Tahan, 5,000-6,000 ft.; growing among moss in gullies. Flowers and stalks orange, deeper on lip and column. (5471.)

Very near *B. catenarium*, but with larger flowers and pseudobulbs. The lip is yellow and not purple, and the stelidia are as long as the body of the column.

B. (§ *Racemosæ*) *VIRIDESCENS*, *n. sp.*

Rhizoma longum tenue, pseudobulbis nullis. Folia breviter petiolata, petiolo crasso, lamina elliptica 1 poll. longa  $\frac{3}{8}$  poll. lata crassa carnosâ obtusa. Scapi filiformes 2 poll. longi, floribus paucis remotis. Bracteæ lanceolatæ acuminatæ ovaria æquantæ  $\frac{1}{6}$  poll. longæ. Flores pallide virides,  $\frac{1}{6}$  poll. longi, carnosi. Sepalum posticum lanceolatum obtusum, sep. lateralia ad bases gibbosa sublanceolata subobtusa. Petala linearia falcata obtusa. Labellum sepalo æquale carnosum crassum linguiforme obtusum profunde canaliculatum brunneum papillosum. Columna minima, steliis obscuris.

Gunong Tahan, 3,300 ft. ; on trees. Flowers pale green, lip brown. (5313.)

Remarkable for the absence of pseudobulbs and the thick fleshy leaves, unusual in this section.

*ERIA NUTANS*, *Lindl., Bot. Reg. (1840) Misc. 83 (p. 326)*.

Gunong Tahan, 6,000 ft. Flowers white, lip and two inner petals tipped with yellow ; sepals tinged with pink ; bracts pale dull red. (5439.)

*Distrib.*—A common plant all over the Peninsula.

E. (§ *Hymeneria*) *CARUNCULATA*, *n. sp.*

Pseudobulbi carnosi crassi subteretes, 2 poll. longi. Folia coriacea lanceolata ad basin angustata, apicibus acutis, 5 poll. longa, 1 poll. lata. Racemus ad basin florifer 5 poll. longus. Flores copiosi parvi congesti,  $\frac{1}{8}$  poll. longi. Bracteæ ovatæ reflexæ,  $\frac{1}{12}$  poll. longæ. Rhachis cum pedicellis rufo-tomentosa. Sepalum posticum ovatum, sep. lateralia triangularia ovata obtusa, omnia pubescentia, mentum breve rotundatum sepali limbo æquale. Petala ovata, apicibus rotundatis. Labellum sepalis longius trilobum, lobis lateralibus ovato-lanceolatis, marginibus appressis carnosis quasi callos formantibus, lobo medio cum ungue angusto et limbo trilobo obovato, lobulis rotundatis vix distinctis. Columna brevis lata subquadrata.

Gunong Tahan, 5,000-6,000 ft. ; on rocks. Flower pallid brownish-white, lip edged with flesh-colour. (5445.)

Allied to *E. Mainyayi*, Hook. fil. The lip is rather curious in form, the side-lobes meet by their inner faces over the claw of the mid-lobe, and being very fleshy almost form a callus-like mass.

E. *LONGIFOLIA*, *Hook. fil., Fl. Brit. Ind. v. 790*.

Gunong Tahan, 5,000-5,500 ft. ; on trees. Flowers white, lip purple, edge of petals spotted with purple. (5515.)

*Distrib.*—Not rare on the central hill-ranges.

E. *TERETIFOLIA*, *Griff. Notulæ, iii. 298*.

Gunong Tahan, 5,000-5,500 ft. ; on trees. Flowers creamy white, base of lip pink ; sweet-scented. (5527.)

*Distrib.*—Common on trees at from 2,000 feet upwards in the Peninsula and Borneo.

*E. FEROX*, *Bl., Mus. Bot. Lugd.-Bat.* i. 184.

Gunong Tahan, 5,000-5,500 ft.; on the ground. Flowers creamy white, lip mottled with purple. (5516.)

*Distrib.*—Malay Peninsula, Java, Borneo.

*ERIA* (§ *Dilochiopsis*) *SCORTECHINII*, *Hook. fl., Fl. Brit. Ind.* v. 809 (p. 327).

Gunong Tahan, 5,000 ft. Stalks up to 8 feet high; bracts white, flowers white, tinted with pink. (5433.)

*Distrib.*—Hill-ranges of the Peninsula.

*E.* (§ *Acridostachya*) *REPTANS*, *n. sp.*

Rhizoma longe repens validum lignum, radicibus tenuibus. Pseudobulbi ascendentes, pollicem distantes, cylindrici pollicares, cum vaginis argenteis involutis. Folium in quoque pseudobulbo singulum anguste lanceolato-lineare subacutum valde coriaceum 6 pollices longum  $\frac{1}{2}$  pollices latum. Scapus 12-pollicaris, basi (7 poll.) nudo rufo-tomentoso cum bracteis paucis ovatis dissitis vix  $\frac{1}{12}$  poll. longis. Racemus densus 4 poll. longus, omnino rufo-tomentosus. Bracteæ minimæ ovatæ. Ovarium cum pedicello  $\frac{1}{4}$  poll. longum. Sepalum posticum oblongum cucullatum, sep. lateralia ovata falcata triangularia subacuta tomentosa. Mentum  $\frac{1}{8}$  poll. longum rectum cylindricum subclavatum. Petala lata ovata lanceolata glabra. Labellum oblongum rotundatum integrum, marginibus undulatis vix ad basin angustatum, fascia media incrassata minute papillosa. Columna parte libera brevi; rostellum rotundatum submarginatum.

Gunong Tahan, 5,000-6,000 ft.; on rocks. Flowers pale yellow. (5446.) Rather a striking plant for its section with its long creeping rhizomes, distant bulbs, and long wiry roots.

*E.* (§ *Acridostachya*) *CRASSIPES*, *n. sp.*

Pseudobulbi in rhizomate crasso ligneo congesti conici rugosi vaginis atrobrunneis coriaceis pollicaribus tecti. Folia bina coriacea lineari-lanceolata acuta, 5 poll. longa,  $\frac{1}{2}$  poll. lata. Scapus 12 poll., dimidio inferiore nudo, argenteo-tomentosus. Racemus densus rufo-argenteo-tomentosus. Bracteæ sparsæ minimæ lanceolatae acutæ. Sepala ovata obtusa pubescentia, lateralia semi-orbicularia. Mentum breve rectum clavatum. Petala parva angusta lanceolata curva. Labellum brevius tenue integrum oblongum flabellulatum, apice rotundato undulato. Capsula oblanceolata in uno latere fissa.

Gunong Tahan, 5,000 ft. (5336.) Allied to *E. brunnea*, Ridl., but with a different lip. The specimens are nearly out of flower.

CERATOSTYLIS GRACILIS, *Blume, Bijdr.* 306 (p. 327)

Gunong Tahan, 5,000-5,500 ft. (5528.)

*Distrib.*—Common all over the Peninsula and Java.

PHREATIA LISTROPHORA, *Ridl., in Journ. Linn. Soc., Bot.* xxxii.

(1896) 307 (p. 327).

Gunong Tahan, 5,000-6,000 ft. Flowers white, strongly scented. (5469.)

*Distrib.*—Malay Peninsula.

NEPHELAPHYLLUM PULCHRUM, *Blume, Bijdr.* 373 (p. 328).

Gunong Tahan, 3,300 ft.; on ground among dead leaves. Lip white, lined in the centre with green and outside with dull crimson; petals dull crimson-red; leaves resembling a dead leaf. (5302.)

*Distrib.*—Java.

TAINIA SPECIOSA, *Blume, Bijdr.* 354 (p. 328).

Gunong Tahan, 3,300 ft.; on the ground. Flowers dull pale green lined with crimson, point of lip yellow; stalks and pseudobulbs dull purple. (5308.)

*Distrib.*—Not rare at high elevations all over the Peninsula, also Java.

T. VEGETISSIMA, *n. sp.*

Rhizoma breviter repens, pseudobulbis approximatis  $\frac{1}{2}$ - $\frac{1}{3}$  poll. longis, vaginis papyraceis reticulatis tectis. Folium ovatum acutum margine incrassato, breviter petiolatum,  $1\frac{1}{4}$ - $1\frac{1}{2}$  poll. longum pollicem latum, lucidum purpurascens, nervis parallelis 6, petiolo kermesino. Scapus lateralis pseudobulbo approximatus gracilis 9 poll. longus, bracteis vaginantibus reticulatis 2 ad basin proximis, superne uno lineari circa  $\frac{1}{3}$  poll. longo. Racemus laxus triflorus; bracteae floriferae lanceolatae acutae  $\frac{1}{4}$  poll. longae. Pedicellus gracilis cum ovario  $\frac{1}{4}$ - $\frac{2}{3}$  poll. longus. Sepala anguste lanceolata acuminata  $\frac{1}{2}$  poll. longa  $\frac{1}{10}$  poll. lata, inferiora basi gibba. Petala quam sepala latiora et breviora trinervia. Label- lum obovato-orbiculare  $\frac{1}{2}$  poll. longum,  $\frac{1}{4}$  poll. latum integrum, disco kermesino margine flavo, callis semi-orbicularibus duobus ad basin instructo. Columna elongata curva gracilis, rostello rotundato integro, alis distinctis rotundatis.

Gunong Tahan, 3,300 ft.; on the ground. Flowers pale yellow closely lined with crimson, lip edged with yellow, centre crimson; leaves shining purplish-brown, stalks crimson. (5314.)

A very distinct and pretty plant allied to no species very distinctly, but in some points approaching *T. grandiflora*, Ridl. Like that plant its stem and leaves suggest an affinity with *Nephelaphyllum* and there is also some similarity in the column, but the absence of the spur prevents its being referred to that genus.

SPATHOGLOTTIS AUREA, *Lindl., Paxt. Fl. Gard. i. (1850) 16 (p. 328.)*

Gunong Tahan, 5,000 ft. (5441.)

The usual big form described as *S. Wrayi*, *Hook. fil., Fl. Brit. Ind. v. 813.*

*Distrib.*—Malay Peninsula, Borneo.

ARUNDINA SPECIOSA, *Blume, Bijdr. 401 (p. 328.)*

Gunong Tahan, 5,000-6,000 ft.; among brushwood in ravines. Petals pale pink, lip magenta ribbed with yellow. (5448.) Common in all our hill-ranges.

*Distrib.*—From India to Java.

CALANTHE CECILIÆ, *Reichenb. f., in Gard. Chron. ser. II. xix. (1883) 432 (p. 329.)*

Kuala Jelai, 500-1,000 ft. Flowers pure white; bracts pale green; column and lip tinged with sulphur-yellow. (5542.)

*Distrib.*—Common in the Peninsula in some localities.

CÆLOGYNE CARNEA, *Hook. fil., Brit. Ind. v. 838 (p. 329.)*

Gunong Tahan, 5,000-6,000 ft.; on low stems in shady thickets.

Flowers white, lip and column streaked with yellow. (5451.)

*Distrib.*—Perak.

C. STENOCHILA, *Hook. fil., l. c. 837.*

Gunong Tahan, 5,000 ft.; on trees. Flowers pale red-brown veined with brown on the sides of the lip. (5432.)

*Distrib.*—Perak.

C. CYMBIDIODES, *n. sp.*

Rhizoma crassum ligneum, pseudobulbis cylindricis 3-pollicaribus.

Folia lanceolata acuminata longe petiolata basi cuneata, 14-poll. longa  $2\frac{1}{2}$  poll. lata; nervis conspicuis elevatis 3, cum 2 minus elevatis, petiolo 3 poll. longo. Racemus longus pendulus. Flores remoti magni. Bracteæ oblongæ truncatæ papyraceæ pallide brunneæ, 1 poll. longæ, persistentes. Pedicelli  $\frac{3}{4}$  poll. longi. Sepala anguste lanceolata acuta,  $1\frac{1}{4}$  poll. longa,  $\frac{1}{4}$  poll. lata. Petala quam sepala paullo breviora. Labellum late obovatum trilobum, lobis lateralibus magnis rotundatis, lobo medio parvo rotundato, nervis tres medianis alte cristatis præcertim ad basin, undulato-cristatis in disco et cristato-carnosis in lobo medio. Columna longa curvula, marginibus clinandrii ovatis lobatis, lobulis obtusis inæqualibus. Anthera galeata elongata cum lateribus excisis, quam clinandrium brevior, apice lato obtuso. Rostellum crassum rotundatum emarginatum.

Gunong Tahan, 5,000-6,000 ft. Flowers whitish, stalks pale brown, lip striped with brown, white, and yellow. (5465.)

A handsome species, allied to *C. Dayana*, *Reichenb. f.*, but differing in the narrower pseudobulb, laxer spike, and long narrow petals and sepals.

*PHOLIDOTA PARVIFLORA*, *Hook. fil., Ic. Pl.* 1891 (p. 329).

Summit of Gunong Tahan, 7,100 ft. Leaves glaucous green; flower-stalks greenish, flowers white. (5531.)

Var. *PUMILA*, *n. var.* Pseudobulbi congesti conico-oblongi,  $\frac{1}{2}$  poll. longi. Folium ovatum,  $\frac{3}{4}$  poll. longum,  $\frac{5}{12}$  poll. latum. Racemus 2 poll. longus. Flores ferme  $\frac{1}{4}$  poll. longi.

Gunong Tahan, 7,100 ft. (5530.)

So different in habit from the typical form as to appear at first sight a very distinct species. As, however, the flowers are similar, I conclude that it is merely a condensed form due to its habitat.

*BROMHEADIA ALTICOLA*, *Ridl., in Journ. Linn. Soc., Bot.* xxviii. (1891) 338 (p. 330).

Gunong Tahan, 3,300 ft. Flowers creamy white. (5428.) Common at high and low altitudes on trees.

*Distrib.*—Selangor, Singapore.

*THRIXSPERMUM SCORTECHINII*, *Ridl., Fl. Mal. Pen., Monocot.* i. 183 (p. 330).

Gunong Tahan, 5,000-5,500 ft.; on trees. (5512.)

*Distrib.*—Malay Peninsula.

*APPENDICULA RUPESTRIS*, *Ridl., in Journ. Linn. Soc., Bot.* xxxii. (1896) 391 (p. 330).

Kuala Tahan, 500-1,000 ft. Flowers yellowish-white; top of column pink. (5537.) From the type-locality.

*ACRIOPSIS JAVANICA*, *Blume, Bijdr.* 337 (p. 330).

Gunong Tahan, 4,000-5,000 ft. (5412.) Fruiting specimen only.

*Distrib.*—Malay Peninsula, Tenasserim, Sumatra, Java.

*HETERIA ELEGANS*, *n. sp.* (p. 330.)

Caulis 3 poll. longus. Folia ovata acuminata acuta trinervia, 3 poll. longa 1 poll. lata, glabra, petiolo vaginante  $1\frac{1}{2}$  poll. longo. Pedunculus cum racemo 18-pollicari, basi (12 poll.) nudo. Racemus multiflorus, laxiusculus; rachis albopubescens. Flores vix plus quam  $\frac{1}{2}$  poll. longi, pedicello cum ovario  $\frac{1}{4}$  poll. longo. Bractea lanceolata acuminata. Sepala ovata obtusa glabra. Petala anguste linearia apicibus dilatatis. Labellum quam sepala brevius oblongum ovatum saccatum, cum processibus carnosus clavatis pluribus in sacco; carunculo carnosus in apice labelli. Columna basi angusta, superne dilatata. Rostellum late excisum, lobis latis obtusis.

Gunong Tahan, 5,000-6,000 ft. Flowers greenish. (5466.)

Near *H. elata*, *Hook. fil.*, of Batang Padang, but differs in having a laxer spike, narrower petals, and a different lip.

*HABENARIA ZOSTEROSTYLOIDES*, *Hook. fil., Fl. Brit. Ind.* vi. 155 (p. 330).

Gunong Tahan, 5,000-6,000 ft. Flowers greenish. (5480.)

*Distrib.*—Also occurs on Mt. Ophir and other hills in the Peninsula.

CYPRIPEDIUM BARBATUM, *Lindl., Bot. Reg. (1841) Misc. 53 (p. 330).*

Gunong Tahan, 5,000-6,000 ft. Leaves chequered pale green and white; lateral petals spotted with black-purple terminally. (5442.)

Specimen in fruit only; determination doubtful.

*Distrib.*—Malay Peninsula, Siam.

APOSTASIACEÆ.

APOSTASIA NUDA, *R. Br., in Wall. Pl. As. Rar. i. 76 (p. 330.)*

Gunong Tahan, 3,300 ft. Flowers white. (5318.)

*Distrib.*—Common in the Peninsula; also North-East India; Sumatra, Java.

ZINGIBERACEÆ.

HEDYCHIUM COLLINUM, *Ridl., in Journ. Roy. As. Soc. Straits Br. xxxii. (1899) 103 (p. 331).*

Gunong Tahan, 5,000-5,600 ft. Flowers white, stamens brownish; strongly scented. (5513.) Apparently the same species as I obtained on Kedah Peak, but a bigger and taller plant about 5 feet high. I had only one rather stunted plant from a somewhat exposed precipice. The calyx and corolla-tube are pubescent in this plant.

ZINGIBER GRACILE, *Jack, in Mal. Misc. i. (1820) No. 1. 1 (p. 331).*

Gunong Tahan, 3,300 ft. (5365.) Exactly the ordinary form as far as the specimen goes, but the field-note says: "Flowers pale yellow, bracts yellow, lower ones streaked with green; flower-stalk dull red." The bracts of this species are normally dull red.

CAMPTANDRA PARVULA, *Ridl., l. c. 104 (p. 331).*

Kuala Teku, 500-1,000 ft. Flowers white, throat yellow. (5532.)

*Distrib.*—Malay Peninsula.

CONAMOMUM UTRICULOSUM, *Ridl., l. c. 122 (p. 331).*

Gunong Tahan, 3,300 ft. Flowers yellow. (5424.)

*Distrib.*—Perak Hills.

GEOSTACHYS ELEGANS, *Ridl., l. c. 160 (p. 331).*

Gunong Tahan, 5,000-5,500 ft. Flowers yellow, the sides of the lip mottled with red, the lower surface of the leaves purple. (5511.)

*Distrib.*—Mount Ophir.

This is quite like the Mount Ophir plant, but the stamen in the one perfect flower I was able to examine has a distinct little lacerate crest.

LILIACEÆ.

DRACÆNA PORTERI, *Baker, in Journ. Bot. xi. (1873) 262 (p. 331).*

Gunong Tahan, 3,300 ft. Flowers white, leaves green; about 3 feet high. (5371.)

*Distrib.*—Common all over the Peninsula; Singapore, Siam.

## BURMANNIACEÆ.

BURMANNIA DISTICHA, *Linn., Sp. Pl.* 287 (p. 331).

Gunong Tahan, 4,000-5,000 ft. Flowers light green; bracts pale violet. Growing among low scrub, on ridges (5383.) On damp places in open (5449.) Common at high elevations.

*Distrib.*—India, Sumatra, China, Australia.

B. LONGIFOLIA, *Becc. Malesia*, i. 244.

Gunong Tahan, 3,300 ft. Flowers and bracts white, petals tinted on edges pale blue. (5230.) Usually with the last.

*Distrib.*—Malay Peninsula, Borneo.

## XYRIDACEÆ.

XYRIS GRANDIS, *n. sp.* (p. 332).

Herba valida: foliis magnis late ensiformibus acuminatis equitantibus subcoriaceis, 24 poll. longis,  $\frac{3}{4}$  poll. latis. Scapus brevior, 19 poll. longus, teres. Capitulum obovatum magnum  $\frac{1}{2}$  poll. in diametro. Bracteæ exteriores lanceolatae acutæ  $\frac{1}{2}$  poll. longæ, atrobrunnæ lucidæ. Sepala 3 inæqualia, lanceolata acuta cartilaginea atrobrunnæ. Petala 3 cuneato-oblonga, marginibus lacertatis, flava. Stamina oblonga glabra. Stylus cum brachiis 3 elongatis extrusis.

Gunong Tahan, 3,300 ft. Flowers yellow, leaves green tinted with red, brown at the base. (5341.)

This is the finest *Xyris* I know; the great sword-like leaves recall those of *Cladium Maingayi*, C. B. Clarke, of Mt. Ophir, and are quite unlike those of any other species.

X. RIDLEYI, *Rendle, in Journ. Bot.* xxxvii. (1899) 505.

Gunong Tahan, 5,000-6,000 ft., in damp places on rocks. Flowers bright cadmium-yellow, turning white. (5450.)

*Distrib.*—Kedah Peak.

The original specimen from Kedah Peak is somewhat taller with slightly larger heads, but the plants from the two localities are evidently conspecific (A. B. R.).

## ARACEÆ.

SCINDAPSUS SCORTECHINII, *Hook. fil., Fl. Brit. Ind.* vi. 541 (p. 332):

Gunong Tahan, 3,300 ft., climbing on trees. Whole flower pale yellow. (5307.)

*Distrib.*—Common in all the hill districts in the Peninsula.

## ERIOCAULONACEÆ.

ERIOCAULON MACROPHYLLUM, *Ruhl., in Engl. Pflanzenr., Erioc.* 77 (p. 332).

Gunong Tahan, 5,000-5,000 ft. Flower-heads greyish-white. (5510.)

I take this to be a form of the Javan plant described by Ruhlant, but have seen no type. Plants collected by Horsfield at Rawa Diyang seem to be the same thing.

## GYMNOSPERMÆ.

## CONIFERÆ.

AGATHIS LORANTHIFOLIA, *Salisb., in Trans. Linn. Soc.* viii. (1807) 312  
(p. 332).

Gunong Tahan, 5,000-6,000 ft. Tree from 35-40 feet high, in sheltered gullies. (5488.)

*Distrib.*—Malay Peninsula and Archipelago.

DACRYDIUM ELATUM, *Wall. ex Hook., Lond. Journ. Bot.* ii. (1843) 144  
(p. 333).

Gunong Tahan, 3,300 ft. Tree 60-80 feet tall. (5380.)

*Distrib.*—Common at high altitudes in the Peninsula and Archipelago.

PODOCARPUS CUPRESSINA, *R. Br. ex Mirb., in Mém. Mus. Par.* xiii. (1825) 75 (p. 333).

Gunong Tahan, 3,300 ft. Tree 50-60 feet high. (5354.)

*Distrib.*—Common at such altitudes in the Peninsula and Islands.

P. BRACTEATA, *Blume, Enum.* i. 88.

Gunong Tahan, 5,000-6,000 ft. Tree 20 feet high, branches at right angles to the stem. (5452.)

*Distrib.*—Not previously recorded from the Malay Peninsula; Java.

## PTERIDOPHYTA.

(With A. GEPP, M.A., F.L.S.)

GLEICHENIA DICARPA, *R. Br., Prodr.* 161 (p. 333).

Gunong Tahan, 4,000-5,000 ft. (5407.)

G. NORRISII, *Mett. ex Kuhn, in Linnæa*, xxxvi. (1869-70) 165.

Gunong Tahan, 3,300 ft.; climbing fern. Leaves bluish-white beneath. (5358.)

CYATHEA BRUNONIS, *Wall. ex Hook., Sp. Fil.* i. 15 (p. 333).

Gunong Tahan. (5379.)

ALSOPHILA KINGI, *C. B. Clarke, ex Bedd. Handb. Ferns Brit. Ind.* 475  
(p. 333).

Gunong Tahan, 3,300 ft. Tree-fern, stem about 4 feet high. (5425.)

MATONIA PECTINATA, *R. Br., in Wall. Pl. Asiat. Rar.* i. t. 16 (p. 333).

Gunong Tahan, 3,300 ft. (5351.)

LECANOPTERIS CARNOSA, *Blume, Enum. Pl. Jav.* 120 (p. 333).

Gunong Tahan, 4,000-5,000 ft.; growing on trees on ridges. (5389.)

HYMENOPHYLLUM POLYANTHOS, *Sw., in Schrad. Journ.* 1800, 102  
(p. 333).

Gunong Tahan, 3,300 ft.; growing in damp places on trees. (5422.)

- TRICHOMANES PALLIDUM, *Blume, Enum. Pl. Jav.* 225 (p. 333).  
Gunong Tahan, 5,000-6,000 ft. ; on damp shady rocks. (5474.)
- T. DIGITATUM, *Sw., Syn. Fil.* 370, 422.  
Gunong Tahan, 4,000-5,000 ft. ; growing on rocks. Pale olive-green.  
(5401.)
- T. PLUMA, *Hook., Ic. Pl. t.* 997.  
Gunong Tahan, 3,300-5,000 ft. (5359, 5385.)
- TRICHOMANES APIIFOLIUM, *Presl, Hymenoph.* 16, 44 (p. 334).  
Gunong Tahan, 3,300 ft. ; growing in damp places. (5421.)
- T. RADICANS, *Sw., in Schrad. Journ.* 1800, 97.  
Gunong Tahan, 3,300 ft. ; growing in damp places. (5419.) Specimen  
in very shrivelled condition, but apparently this species.
- HUMATA PEDATA, *J. Smith, in Hook. Journ. Bot.* iii. (1841) 416  
(p. 334).  
Gunong Tahan, 5,000-6,000 ft. ; growing on trees. (5437, 5472.)
- DAVALLIA PINNATA var. GRACILIS, *Hook. and Bak., Syn. Fil.* 98  
(p. 334).  
Gunong Tahan, 3,300 ft. (5377.)
- LINDSAYA RIGIDA, *J. Smith, l. c.* 415 (p. 334).  
Gunong Tahan, 5,000 ft. (5547.)
- L. CULTRATA, *Sw., Syn. Fil.* 119.  
Gunong Tahan, 5,000-5,500 ft. ; on rocks. (5521.)
- L. SCANDENS, *Hook., Spec. Fil.* i. 205.  
Gunong Tahan, 3,300 ft. ; climbing fern on trees. (5368, 5418.)
- L. FLABELLULATA, *Dryand., in Trans. Linn. Soc.* iii. (1797) 41.  
Gunong Tahan, 3,300 ft. (5372.)
- L. DIVERGENS, *Wall. ex Hook. & Grev. Ic. Fil. t.* 226.  
Gunong Tahan, 3,300 ft. (5373.)
- OLEANDRA NERIIFORMIS, *Cav., in Anal. Hist. Nat.* i. (1799) 115  
(p. 334).  
Gunong Tahan, 3,300 ft. ; climbing fern. (5357.)
- DIPTERIS HORSFIELDII, *Bedd., Ferns Brit. Ind. t.* 321 (p. 334).  
Gunong Tahan, 3,300 ft. (5350.)
- POLYPODIUM HIRTUM, *Hook., Spec. Fil.* iv. 170 (p. 334).  
Gunong Tahan, 5,000-6,000 ft. ; growing on trees. (5478.)
- P. STREPTOPHYLLUM, *Baker, in Journ. Bot.* xvii. (1879) 42.  
Gunong Tahan, 4,000-5,000 ft. ; growing on rocks. (5394.)
- P. CUCULLATUM, *Nees & Blume, in Nova Acta,* xi. (1823) 121.  
Gunong Tahan, 5,000-5,500 ft. ; on rocks. (5522.)

- P. VENULOSUM*, *Blume, Enum. Pl. Jav.* 128.  
Gunong Tahan, 5,000-6,000 ft. ; growing on trees. (5463.)
- P. (Phymatodes) STENOPHYLLUM*, *Blume, Enum. Pl. Jav.* 124.  
Gunong Tahan, 4,000-5,000 ft. ; growing on trees. (5386.)
- POLYPODIUM WRAYI*, *Baker, in Journ. Bot.* xxv. (1887) 206 (*p.* 335).  
Gunong Tahan ; growing on rocks at 5,000-6,000 ft. (5494.)
- P. LACINIATUM*, *Blume, Enum. Pl. Jav.* 131.  
Gunong Tahan, 5,000-6,000 ft. ; growing on damp rocks. (5459.)
- VITTARIA FALCATA*, *Kunze, in Bot. Zeit.* vi. (1848) 198 (*p.* 335).  
Gunong Tahan, 3,300 ft. ; growing on trees. (5301.)
- TÆNITIS BLECHNOIDES*, *Sw., Syn. Fil.* pp. 24, 220 (*p.* 335).  
Gunong Tahan, 3,300 ft. ; growing on the ground. (5345.)
- ELAPHOGLOSSUM LATIFOLIUM*, *J. Smith, in Hook. Lond. Journ. Bot.* i. (1842) 197 (*p.* 335).  
Gunong Tahan, 5,000-6,000 ft. ; growing on trees. (5464.)
- SCHIZÆA MALACCANA*, *Baker, Syn. Fil.* 428 (*p.* 335).  
Gunong Tahan, 4,000-5,000 ft. ; growing on the ground and on trees. (5403.)
- LYCOPODIUM CASUARINOIDES*, *Spring, Monogr. Lycop.* i. 94 (*p.* 335).  
Gunong Tahan, 4,000-5,000 ft. ; climbing among high bushes, etc. (5398.)
- L. NUMMULARIFOLIUM*, *Blume, Enum. Pl. Jav.* ii. 263.  
Kuala Teku, 500-1,000 ft. (5541.)
- SELAGINELLA PLUMOSA*, *Baker, in Journ. Bot.* xxi. (1883) 144 (*p.* 335).  
Gunong Tahan, 3,300 ft. ; growing on the earth in jungle. (5361.)
- S. WALLICHII*, *Spring, Monogr. Lycop.* ii. 143.  
Gunong Tahan, 3,300 ft. Stalks dull red. (5414.)
- S. ATROVIRIDIS*, *Spring, l. c.* 124.  
Gunong Tahan, 3,300 ft. Green, stalks dull red. (5366.)

## BRYOPHYTA.

(By A. GEPP, M.A., F.L.S.)

- SPHAGNUM JUNGHUHNIANUM*, *Doz. & Molk., Bryol. Jav.* i. 27 (*p.* 335).  
Gunong Tahan, 6,000 ft. Pale green, the tops pale reddish-brown. (5435.)
- EUCAMPTODON MACROCALYX*, *C. Müll., Syn. Musc.* i. 346 (*p.* 335).  
Gunong Tahan, 5,000-5,500 ft. ; growing on 5527 (*Eria teretifolia*).
- LEUCOBRYUM CHLOROPHYLLOSUM*, *C. Müll., Syn. Musc.* ii. 535 (*p.* 335).  
Gunong Tahan, 3,300 ft. ; growing on trees. (5420.)

TRICHOSTELEUM SCABRELLUM, *Jaeg. & Sauerb., Sp. & Gen. Musc.* ii. 484 (p. 335).

Gunong Tahan, 3,300 ft. ; growing on small tree. (5417.)

MNIODENDRON DIVARICATUM, *Lindb., in Öfv. Vet.-Akad. Förh. Stockh.* xviii. 1861 (1862) 375 (p. 336).

Gunong Tahan, 5,000-6,000 ft. Fruit yellowish. (5490.)

MASTIGOBRYUM, *sp. (p. 336).*

Gunong Tahan, 3,300 ft. (5374.)

LEPIDOZIA WALLICHIANA, *Gottsche, Syn. Hepat.* 204 (p. 336).

Gunong Tahan, 3,300 ft. ; on dead tree. Delicate pale green. (5360.)

## LICHENES.

(By Miss A. LORRAIN SMITH, F.L.S.)

STEREOCAULON CORALLOIDES, *Fries, Sched. Crit.* iv. 24, var. (p. 336).

Gunong Tahan, 3,300 ft. ; growing amongst moss. Colour very pale sea-green. (5348.)

USNEA DASYPOGA, *Nyl. ex Stiz. in St. Gall. Nat. Ges.* (1876) 202 (p. 336).

Gunong Tahan, 3,300 ft. ; growing on branches of trees. Dull ; very pale green. (5353.)

CLADONIA MACILENTA, *Hoffm. Deutschl. Fl.* 126 (p. 336).

Gunong Tahan, 4,000-5,000 ft. ; on trees. Pale dull green ; fruiting tops bright red. (5402.)

C. RANGIFERINA, *Hoffm., l. c.* 114.

Gunong Tahan, 5,000 ft. ; growing on the ground. White, slightly tinged with green. (5331.)

## FUNGI.

(By Miss A. LORRAIN SMITH, F.L.S.)

HEXAGONIA TENUIS, *Fries, Epicr.* 498 (p. 336).

Gunong Tahan, 3,300 ft. ; on dead wood. Shaded with warm brown above, brown powdered with white beneath. (5423.)

LACHNOCLADIUM BRASILIENSE, *Sacc., Syll. Fung.* vi. 738 (p. 336).

Gunong Tahan, 3,300 ft. ; on dead wood. Very pale brown. (5416.)

PANUS, *sp. (p. 336).*

Gunong Tahan, 3,300 ft. ; on dead wood. White shaded with warm brown above, pure white beneath. (5310.)

CLAVARIA FUSIFORMIS, *Sowerby, Engl. Fungi,* t. 234 (p. 336).

Gunong Tahan, 3,300 ft. ; growing among moss, etc. Whole plant ochre-yellow. (5346.)

## NEW MAMMALS FROM THE MALAY PENINSULA REGION.

By C. BODEN KLOSS, F.Z.S.,

CURATOR, SELANGOR STATE MUSEUM.

IN the collections of the Selangor State Museum there are examples of several Mammals from the Peninsular Region<sup>1</sup> which have not hitherto received the recognition that the distinctness of their characters requires. Descriptions of four of them are now published.

### PARADOXURUS (HERMAPHRODITUS) MILLERI, *sp. nov.*

**TYPE.**—Adult female (skin and skull), No. 2821/07, Selangor Museum. Collected on Tioman Island, East Coast, Malay Peninsula, 9th October, 1907, by H. C. Robinson. Original number 18.

**CHARACTERS.**—Smaller than *Paradoxurus hermaphroditus* and paler throughout, with brown, not black, markings. Dorsal stripes practically obsolete and upper proximal half of tail like back except mesially.

**COLOUR.**—General colour above a pale silvery drab-grey, slightly suffused with pale-buff posteriorly: hairs with ashy-brown bases and brown tips. Dorsal region with irregular rows of undefined brown spots, forming on back of neck an indistinct dull mottling and disappearing on sides with which chest and abdomen are concolorous. Centre of abdomen suffused with buff. Limbs brown, slightly grizzled with silvery except on feet. Muzzle, below eyes, cheeks, chin and throat, crown, ears and behind ears, brown; crown and throat grizzled. A distinct pale brow-band which extends below ears to sides of neck. A few white hairs below eyes and on chin. Proximal half of tail like rump above, buffy below; distal portion blackish-brown, extending towards the base along the median line of the dorsal surface: extreme base of tail below grizzled brown.

**SKULL AND TEETH.**—When compared with skulls of *Paradoxurus hermaphroditus* from the Peninsula that of *P. milleri* shows several essential differences. The least breadth between the maxillaries on the rostrum is much greater, while the posterior extension of the maxillaries is less: the constriction behind the post-orbital processes commences more suddenly and is far shorter, giving increased length to the brain-case. There is a far greater posterior extension of the palate; the audital bullæ are less dilated and truncated, but are somewhat flattened on the outer sides, while the anterior extremities are elongated into distinct spinous processes. Viewed laterally the upward flare or curvature of the zygomatic arches is much less pronounced. The teeth are too worn for comment.

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<sup>1</sup> Post, p. 147.

**MEASUREMENTS.**—Collector's external measurements: head and body, 495 (533)<sup>1</sup>; tail, 432 (452); hind-foot, 72 (111); ear, 45 (44). Cranial measurements: greatest length, 100 (113); basal length, 95 (105.5); henselion to posterior edge of bony palate, 44 (48.5); distance from transverse line joining posterior edge of last molars to end of bony palate, 7 (4.5); posterior extension of maxillary to posterior surface of postorbital process on rostrum, 10.5 (8.5); constriction in front of postorbital processes, 18 (20.5); constriction behind postorbital processes, 11 (12.5); least breadth between external edges of frontal bone on rostrum, 8 (6.5); zygomatic breadth, 59 (67).

**SPECIMENS EXAMINED.**—One, the type.

**REMARKS.**—The principal characters of this musang, as exhibited in an adult female obtained on Tioman Island by Messrs. Abbott and Kloss in 1899, were first noted by Mr. Gerrit S. Miller (Proc. Washington Acad. Sci., 1900, p. 228), after whom, now that its distinctness has been proved by the two further examples taken by Mr. H. C. Robinson (one in the British and one in the Selangor Museum), I have much pleasure in naming the species.

**SCIURUS (BILIMITATUS) MICRORHYNCHUS, sp. nov.**

*Sciurus bilimitatus*, Miller; Smith. Misc. Coll., vol. LXV., p. 8 (part).

**TYPE.**—Adult male (skull and skin), No. 2575/07, Selangor Museum. Collected on Tioman Island, Southern China Sea, 14th October, 1907, by H. C. Robinson. Original number 69.

**CHARACTERS.**—Generally resembles *Sciurus bilimitatus*, Miller, (type from Trengganu), but smaller and duller; skull less robust with rostral region slenderer.

**COLOUR.**—Upper surface a fine speckle of black and pale buff, the latter slightly brighter and somewhat in excess on top of face, sides of neck, shoulders, thighs and feet. Ears, a ring round eyes, cheeks muzzle and chin ochraceous. Under-parts grizzled bluish-grey. Ventral area tinged ochraceous. Tail, above coarsely annulated black and buff-white, forming distinct bands on terminal portion; below yellower. Sides striped whitish buff and black.

**SKULL.**—As in *Sciurus bilimitatus*, but with proportionately slenderer rostrum; the greatest combined breadth of the nasal bones being decidedly less than half their median length, while in *Sciurus bilimitatus* they are never less than half. The audital bullæ are perhaps a little narrower and the basioccipal a trifle broader.

**MEASUREMENTS.**—Collector's external measurements: head and body, 183; tail, 155; hind-foot, 39; ear, 18. Cranial measurements: greatest length, 47; basal length, 38; zygomatic breadth, 28.5; cranial breadth, 22; palatal length, 20; diastema, 12; upper tooth-row, 9:

<sup>1</sup> Measurements in parentheses are those of an adult male, *Paradoxurus hermaphroditus*, from Kuala Kangsar, Perak (S. M. No. 1257/08).

median length of nasals, 14; greatest breadth of both nasals, 6.75; interorbital breadth, 17.

**SPECIMENS EXAMINED.**—Three from the type locality.

**REMARKS.**—An insular form somewhat smaller than that occurring on the adjacent mainland, and further characterised by slightly paler and bluer colouration, slenderer rostrum and generally less robust skull.

**MUS (SURIFER) MICRODON, *sp. nov.***

**TYPE.**—Adult female (skin and skull), No. 2549/07, Selangor Museum. Collected at Juara Bay, Tioman Island, 14th September, 1907, by E. Seimund. Original number 57.

**CHARACTERS.**—Like *Mus surifer* but more tawny: centre of abdomen washed with buff-ochraceous; a tawny band across chest and white of under-parts not continued to hind-foot. Skull like that of the mainland race but with longer nasals, lachrymal bones more developed and palatal foramina larger. Molars greatly reduced in size.

**COLOUR.**—Above ochraceous-tawny, plentifully sprinkled with a black element which is strongest down the centre of the back, where it forms almost a dark stripe expanding on the rump. Cheeks, sides of neck, back of neck behind ears, shoulders, thighs and sides along the line of demarcation almost clear tawny. Under-parts white except the chest, which is crossed by a band of pale tawny about 18 m.m. wide, and the fore and hind legs, which are completely encircled with the same colour, extending almost to their junction with the trunk. Centre of abdomen washed with clear buff (in some specimens deep ochraceous). Upper surfaces of feet whitish. Tail bicolored with terminal portion white.

**SKULL AND TEETH.**—The skull does not differ consistently from typical *surifer* except in the larger rostrum, broader palatal foramina and inter-pterygoid space. The mandible is, however, less robust, and the crowns of all the molars are much reduced, the last upper molar in the insular animal being scarcely half the area of the same tooth in skulls of equal size from the Peninsula.

**MEASUREMENTS.**—Collector's external measurements of type: head and body, 178; tail, 163; hind-foot, 38; ear, 25. Cranial measurements of type: greatest length, 45; basal length, 35.5; palatal length, 19.5; breadth between anterior molars, 4.75; length of palatal foramina, 7; breadth of combined foramina, 4; diastema, 12.75; length of molar-row, 6.5; length of nasals, 17.5; interorbital breadth, 7; cranial breadth, 16.

Measurements of an adult male from the type locality: (Sel. Mus. No. 2551/07). Head and body, 180 (200)<sup>1</sup>; tail, 190 (190); hind-foot, 40 (40); ear, 24. Cranial measurements: greatest length, 46.5 (46.5); palatal length, 21 (20.5); diastema, 13.5 (13.25); length of

<sup>1</sup> Measurements in parentheses those of an adult male, Sel. Mus. No. 2490 07, from the Sembrong River, East Johore.

upper molar-row, 6.7 (7); length of lower molar-row, 6.5 (7); length of palatal foramina, 6.75 (6.5); combined breadth of foramina, 4.75 (3.75); breadth of palate between anterior molars, 5 (5); medium length of nasals, 18.5 (17); interorbital breadth, 7.75 (7); cranial breadth, 17 (17.5); zygomatic breadth, 20 (20).

SPECIMENS EXAMINED.—Eight from the type locality.

REMARKS.—This insular form is strikingly characterised by the great reduction that has taken place in the crowns of the molars. The change, however, does not yet appear to have affected the roots of the teeth, although the smaller size of the molar-row, combined with the broader foramina and inter-pterygoid space, causes the palate to appear wider: the mandible also, though proportionately less robust and powerful, and with the various processes somewhat atrophied, is not reduced in length. Compensation for these diminutions has been given in the form of a larger and heavier rostrum.

MUS VILLOSUS, *sp. nov.*

TYPE.—Adult male (skin and skull), No. 1348/08, Selangor Museum. Collected in the Botanical Gardens, Singapore, 12th July, 1908, by C. Boden Kloss.

CHARACTERS.—A large member of the *Muelleri* group, externally somewhat like *Mus validus*, Miller, but smaller, duller and less shaggy, and with colour of under-parts distinctly margined on sides. Fur long and moderately soft, devoid of spines, but thickly sprinkled with long coarse bristles. The skull like that of *Mus validus* except that the audital bullæ are exceedingly large and dilated, most nearly resembling in this respect that of the smaller *Mus annandalei*, Bonh.

COLOUR.—General colour above a grizzle of black and deep buff (pale ochraceous buff), darker posteriorly owing to the prevalence of the long black-tipped bristles which are everywhere present and which attain on the rump to a length of 40 m.m. Sides and limbs paler and duller, due to the grey under-fur showing through and to the absence of dark annulations to the hairs. Top of head and face and also below eye blackish, distinctly darker than cheeks and neck. Below pure buffy-white, sharply separated from the upper-parts, extending to the wrists and to the upper lip behind and below whiskers, but not to the ankles which are like the outer side of thigh. Along the sides of the abdomen a narrow stripe about 4 m.m. broad of pure buff. Hands and feet clothed with short dark-brown hairs. In males a brown prescrotal patch. Tail stout and unicolour, black, longer than head and body. Ear rounded.

SKULL.—Skull like that of *Mus validus*, but less robust and slenderer. Audital bullæ deeper anteriorly than posteriorly: much larger, rounder and more dilated than those of any other local rat.

MEASUREMENTS.—Collector's external measurements: head and body, 222; tail, 251; hind-foot, 41; ear, 23. Cranial measurements:

greatest length, 52; basal length, 45; palatal length, 25; least palatal breadth, 4.75; diastema, 15; length of upper molar-row, 9; length of palatal foramina, 8.25; combined breadth of foramina, 3.25; median length of nasals, 20; interorbital breadth, 7; cranial breadth, 18; zygomatic breadth, 24; greatest length of bullæ, 8.5; greatest depth of bullæ from highest point in inferior edge of squamous bone, 9; anterior breadth of basi-occipital, 5 m.m.

SPECIMENS EXAMINED.—Four, all from Singapore Island.

REMARKS.—Though allied to *Mus validus* this rat may be immediately distinguished by the abruptness of the line of demarcation between the colours of the sides and abdomen. Its skull notably differs in the larger bullæ and less developed post-orbital ridges.

## A PROVISIONAL LIST OF THE MAMMALS OF THE PENINSULAR REGION.

BY C. BODEN KLOSS.

THE last and most complete account of the Mammals of the Malay Peninsula previously drawn up was that of Mr. Stanley S. Flower (P.Z.S., 1900, pp. 338-351), in which about one hundred and forty species are recorded from our area. The work of naturalists during the last ten years, during which period there has been a great revival of interest in the Zoology of the Peninsula, has added considerably to the amount, which has been further increased by the discovery of a number of geographical races in the adjacent small islands that had hitherto remained unvisited, so that at the moment of writing, and disregarding reports shortly forthcoming on recent collections, the mammal fauna is now swollen to a total of nearly two hundred and twenty.

The Peninsular Region as treated here may be defined as containing the Malay Peninsula south of the Isthmus of Kra and all the small islands closely adjacent, of which the principal are:—Junkceylon, the entire Langkawi group, Penang, Pulo Jarak, Singapore, the Tioman and Tinggi chains, the Redangs and the group of islands off the Bandon Bight: but not the Rhio Archipelago, the fauna of which is more nearly related elsewhere than to the Peninsula.

### ORDER PRIMATES.

#### APES, MONKEYS AND LEMURS.

- |  |  |
|--|--|
| 1. <i>Symphalangus</i> <i>sp.</i>                      | 8. <i>Macaca fascicularis</i> ( <i>Raffles</i> ).        |
| 2. <i>Hylobates lar</i> ( <i>Linn.</i> ).              | 9. <i>Macaca nemestrina</i> ( <i>Linn.</i> ).            |
| 3. <i>Hylobates agilis</i> , <i>F. Cuvier</i> .        | 9a. <i>Macaca nemestrina adusta</i> ,<br><i>Miller</i> . |
| 4. <i>Presbytes cristatus</i> ( <i>Raffles</i> ).      | 10. <i>Macaca rufescens</i> , <i>Anderson</i> .          |
| 5. <i>Presbytes obscurus</i> ( <i>Reid</i> ).          | 11. <i>Nycticebus malayanus</i><br>( <i>Anderson</i> ).  |
| 6. <i>Presbytes femoralis</i> ( <i>Horsf.</i> ).       |  |
| 7. <i>Presbytes albocinereus</i><br>( <i>Cantor</i> ). |  |

## ORDER CARNIVORA.

CATS, CIVETS, MONGOOSES, DOGS, MARTENS, WEASELS, OTTERS AND BEARS.

- |   |   |
|---|---|
| 12. <i>Felis tigris</i> , <i>Linn.</i>  | 28. <i>Paradoxurus minor</i> ,<br><i>Bonhote.</i>                       |
| 13. <i>Felis pardus</i> , <i>Linn.</i>  | 29. <i>Paradoxurus leucomystax</i><br>( <i>Gray</i> ).                  |
| 14. <i>Felis nebulosa</i> , <i>Griffith.</i>  | 30. <i>Paradoxurus leucomystax</i><br><i>robustus</i> , <i>Miller.</i>  |
| 15. <i>Felis marmorata</i> , <i>Martin.</i>   | 31. <i>Arctogalidia leucotis</i> , <i>Blyth.</i>                        |
| 16. <i>Felis bengalensis</i> , <i>Kerr.</i>   | 32. <i>Arctogalidia major</i> , <i>Miller.</i>                          |
| 17. <i>Felis temmincki</i> , <i>Vig. &amp; Horsf.</i>                                       | 33. <i>Arctictis binturong</i> ( <i>Raffles</i> ).                      |
| 18. <i>Felis planiceps</i> , <i>Vig. &amp; Horsf.</i>                                       | 34. <i>Cynogale bennetti</i> , <i>Gray.</i>                             |
| 19. <i>Viverra zibetha</i> , <i>Linn.</i>   | 35. <i>Herpestes mungo</i> ( <i>Gmel.</i> ).                            |
| 20. <i>Viverra megaspila</i> , <i>Blyth.</i>  | 36. <i>Herpestes brachyurus</i> , <i>Gray.</i>                          |
| 21. <i>Viverra tangalunga</i> , <i>Gray.</i>  | 37. <i>Herpestes javanicus</i> ( <i>Geoffr.</i> ).                      |
| 22. <i>Viverricula malaccensis</i> ,<br><i>Gmel.</i>  | 38. <i>Cyon rutilans</i> ( <i>S. Müll.</i> ).                           |
| 23. <i>Hemigale hardwickii</i> ( <i>Gray</i> ).   | 39. <i>Mustela flavigula penin-</i><br><i>sularis</i> , <i>Bonhote.</i> |
| 24. <i>Prionodon maculosus</i> ,<br><i>Blanford.</i>  | 40. <i>Putorius nudipes</i> ( <i>F.</i><br><i>Cuvier</i> ).             |
| 25. <i>Paradoxurus hermaphrodi-</i><br><i>tus</i> , <i>Pallas.</i>                          | 41. <i>Lutra cinerea</i> , <i>Illiger.</i>                              |
| 25a. <i>Paradoxurus hermaphrodi-</i><br><i>tus macrodus</i> , <i>Gray.</i>                  | 42. <i>Lutra sumatrana</i> , <i>Gray.</i>                               |
| 26. <i>Paradoxurus</i> ( <i>hermaphrodi-</i><br><i>tus</i> ) <i>milleri</i> , <i>Kloss.</i> | 43. <i>Lutra macrodus</i> , <i>Gray.</i>                                |
| 27. <i>Paradoxurus niger</i> , <i>Desm.</i>   | 44. <i>Ursus malayanus</i> , <i>Raffles.</i>                            |

## ORDER UNGULATA.

ELEPHANTS, RHINOCEROSSES, TAPIRS, CATTLE, GOATS, DEER,  
MOUSE-DEER AND PIGS.

- |   |  |
|---|--|
| 45. <i>Elephas maximus</i> , <i>Linn.</i>                               | 54. <i>Tragulus canescens</i> , <i>Miller.</i>   |
| 46. <i>Rhinoceros sondaicus</i> , <i>Cuv.</i>                           | 55. <i>Tragulus</i> ( <i>canescens</i> ) <i>um-</i><br><i>brinus</i> , <i>Miller.</i>  |
| 47. <i>Rhinoceros sumatrensis</i> , <i>Cuv.</i>                         | 56. <i>Tragulus</i> ( <i>canescens</i> ) <i>rufu-</i><br><i>lus</i> , <i>Miller</i>    |
| 48. <i>Tapirus indicus</i> , <i>Cuv.</i>                                | 57. <i>Tragulus ravidus</i> , <i>Miller.</i>   |
| 49. <i>Bos gaurus hubbaeki</i> ,<br><i>Lydekker.</i>                    | 58. <i>Tragulus</i> ( <i>ravidus</i> ) <i>lancaven-</i><br><i>sis</i> , <i>Miller.</i> |
| 50. <i>Bos sondaicus butleri</i> ,<br><i>Lydekker.</i>                  | 59. <i>Tragulus</i> ( <i>ravidus</i> ) <i>ravidus</i> ,<br><i>Miller.</i>              |
| 51. <i>Nemorhædus swettenhami</i> ,<br><i>Butler.</i>                   | 60. <i>Sus jubatus</i> , <i>Miller.</i>  |
| 52. <i>Cervulus muntjac grandi-</i><br><i>cornis</i> , <i>Lydekker.</i> | 60a. <i>Sus</i> ( <i>jubatus</i> ) <i>jubatulus</i> ,<br><i>Miller.</i>                |
| 53. <i>Cervus unicolor equinus</i> ,<br><i>Cuv.</i>                     | 61. <i>Sus peninsularis</i> , <i>Miller.</i>   |

## ORDER RODENTIA.

SQUIRRELS, RATS, BAMBOO-RATS AND PORCUPINES.

- |   |  |
|---|--|
| 62. <i>Petaurista melanotus</i> , <i>Gray.</i>  | 63. <i>Petaurista punctata</i> ( <i>Gray</i> ).                |
| 62a. <i>Petaurista</i> ( <i>melanotus</i> ) <i>teru-</i><br><i>taus</i> , <i>Miller.</i> <sup>1</sup> | 64. <i>Iomys horsfieldi</i> ( <i>Water-</i><br><i>house</i> ). |

<sup>1</sup> The validity of forms marked *a* appears to be questionable. Sub-species are indicated by trinomials but insular races have the typical specific name placed in parentheses.

SQUIRRELS, RATS, BAMBOO-RATS AND PORCUPINES (*cont.*)

65. *Iomys davisoni* (*Thomas*).  
 66. *Pteromyscus pulverulentus* (*Günth.*).  
 67. *Sciuropterus tephromelas* (*Günth.*).  
 68. *Sciuropterus spadiceus*, *Blyth.*  
 69. *Ratufa melanopepla*, *Miller.*  
 69a. *Ratufa* (*melanopepla*) *tiomanicus*, *Miller.*  
 70. *Ratufa affinis* (*Raffles*)  
 71. *Ratufa affinis aureiventer*, (*Geoff.*).  
 72. *Ratufa pyronota*, *Miller.*  
 73. *Sciurus prevosti*, *Desm.*  
 74. *Sciurus prevosti humei*, *Bonhote.*  
 75. *Sciurus hippurus*, *Is. Geoffr.*  
 76. *Sciurus castaneoventris griseopectus*, *Blyth.*  
 76a. *Sciurus castaneoventris rubeculus*, *Miller.*  
 77. *Sciurus erythraeus*, *Pallas.*  
 78. *Sciurus caniceps*, *Gray.*  
 79. *Sciurus* (*caniceps*) *lancavensis*, *Miller.*  
 80. *Sciurus* (*caniceps*) *adangensis*, *Miller.*  
 81. *Sciurus caniceps epomorphus*, *Bonhote.*  
 82. *Sciurus caniceps concolor*, *Blyth.*  
 83. *Sciurus bilimitatus*, *Miller.*  
 84. *Sciurus* (*bilimitatus*) *micro-rhynchus*, *Kloss.*  
 85. *Sciurus vittatus*, *Raffles.*  
 86. *Sciurus* (*vittatus*) *tenuirostris*, *Miller.*  
 87. *Sciurus* (*vittatus*) *permangilensis*, *Miller.*  
 88. *Sciurus* (*vittatus*) *aoris*, *Miller.*  
 89. *Sciurus tenuis*, *Horsf.*  
 89a. *Sciurus tenuis surdus*, *Miller.*  
 90. *Sciurus tenuis tahan*, *Bonhote.*  
 91. *Sciurus robinsoni*, *Bonhote.*  
 92. *Sciurus maclellandi novemlineatus*, *Miller.*  
 93. *Funambulus jalorensis*, *Bonhote.*  
 94. *Funambulus jalorensis peninsulæ*, *Miller.*  
 95. *Funambulus rufigenis belfieldi*, *Bonhote.*  
 96. *Rhinosciurus tupaoides*, *Gray.*  
 97. *Rhinosciurus*, *sp.*  
 98. *Rhinosciurus robinsoni*, *Thomas.*  
 99. *Hapalomys longicaudatus*, *Blyth.*  
 100. *Chiropodomys gliroides*, *Blyth.*  
 101. *Mus vociferans*, *Miller.*  
 102. *Mus* (*vociferans*) *lancavensis*, *Miller.*  
 103. *Mus* (*vociferans*) *stridens*, *Miller.*  
 104. *Mus ciliatus*, *Bonhote.*  
 105. *Mus surifer*, *Miller.*  
 106. *Mus* (*surifer*) *flavidulus*, *Miller.*  
 107. *Mus* (*surifer*) *butangensis*, *Miller.*  
 108. *Mus* (*surifer*) *microdon*, *Kloss.*  
 109. *Mus pallax*, *Miller.*  
 110. *Mus jerdoni bukit*, *Bonhote.*  
 111. *Mus cremoriventer*, *Miller.*  
 112. *Mus asper*, *Miller.*  
 113. *Mus klossi*, *Bonhote.*  
 114. *Mus inas*, *Bonhote.*  
 115. *Mus ferreocanus*, *Miller.*  
 116. *Mus validus*, *Miller.*  
 117. *Mus villosus*, *Kloss.*  
 118. *Mus annandalei*, *Bonhote.*  
 119. *Mus jalorensis*, *Bonhote.*  
 120. *Mus* (*jalorensis*) *jarak*, *Bonhote.*  
 121. *Mus* (*jalorensis*) *tiomanicus*, *Miller.*  
 122. *Mus* (*jalorensis*) *pannosus*, *Miller.*  
 123. *Mus concolor*, *Blyth.*  
 123a. *Mus pullus*, *Miller.*  
 124. *Mus rufescens*, *Gray.*  
 125. *Mus griseiventer*, *Bonhote.*

## SQUIRRELS, RATS, BAMBOO-RATS AND PORCUPINES—(cont.)

- |   |  |
|---|--|
| 126. <i>Mus decumanus</i> , <i>Pallas</i> .           | 132. <i>Atherurus macrourus</i> ( <i>Linn.</i> ).                                |
| 127. <i>Mus musculus</i> , <i>Linn.</i>               | 133. <i>Atherurus</i> ( <i>macrourus</i> ) <i>zygomaticeus</i> , <i>Miller</i> . |
| 128. <i>Gunomys varius</i> , <i>Thomas</i> .          | 134. <i>Atherurus</i> ( <i>macrourus</i> ) <i>tionis</i> , <i>Thomas</i> .       |
| 129. <i>Gunomys varius varillus</i> , <i>Thomas</i> . | 135. <i>Atherurus</i> ( <i>macrourus</i> ) <i>terutaus</i> , <i>Lyon</i> .       |
| 130. <i>Rhizomys sumatrensis</i> ( <i>Raffles</i> ).  | 136. <i>Trichys lipura</i> , <i>Günther</i> .                                    |
| 131. <i>Acanthion brachyurum</i> ( <i>Linn.</i> ).    |  |

## ORDER INSECTIVORA.

## TREE-SHREWS, GYMNURAS, SHREWS AND FLYING-LEMURS.

- |   |  |
|---|--|
| 137. <i>Tupaia ferruginea</i> , <i>Raffles</i> .                          | 145. <i>Crocidura murina</i> ( <i>Linn.</i> ).                                 |
| 138. <i>Tupaia ferruginea belangeri</i> , <i>Wagn.</i>                    | 146. <i>Crocidura murina cærulea</i> ( <i>Kerr</i> ).                          |
| 139. <i>Tupaia</i> ( <i>ferruginea</i> ) <i>sordida</i> , <i>Miller</i> . | 146a. <i>Crocidura fuscipes</i> , <i>Peters</i> .                              |
| 140. <i>Tupaia</i> ( <i>ferruginea</i> ) <i>pulonis</i> , <i>Miller</i> . | 147. <i>Crocidura fuliginosa</i> ( <i>Blyth</i> ).                             |
| 141. <i>Tupaia malaccana</i> , <i>Anderson</i> .                          | 148. <i>Galeopterus temmincki</i> , <i>Waterhouse</i> .                        |
| 142. <i>Ptilocercus lowi</i> , <i>Gray</i> .                              | 149. <i>Galeopterus</i> ( <i>temmincki</i> ) <i>pumilus</i> ( <i>Miller</i> ). |
| 143. <i>Gymnura rafflesi</i> , <i>Vig. and Horsf.</i>                     | 150. <i>Galeopterus</i> ( <i>temmincki</i> ) <i>aoris</i> ( <i>Miller</i> ).   |
| 144. <i>Hylomys suillus</i> , <i>Müll. and Schleg.</i>                    | 151. <i>Galeopterus</i> ( <i>temmincki</i> ) <i>taylori</i> , <i>Thomas</i> .  |

## ORDER CHIROPTERA.

## BATS (152-207.)

(Vide post pp. 151-161.)

## ORDER CETACEA.

## WHALES, DOLPHINS AND PORPOISES.

- |   |   |
|---|---|
| 208. <i>Balænoptera indica</i> , <i>Blyth</i> .   | 211. <i>Orcella brevirostris</i> ( <i>Owen</i> ). |
| 209. <i>Physeter macrocephalus</i> , <i>Linn.</i> | 212. <i>Steno plumbeus</i> , <i>Dussumier</i> .   |
| 210. <i>Phœcana phœcanoides</i> , <i>Cur.</i>     | 213. <i>Sotalia sinensis</i> ( <i>Gmel.</i> ).    |
| 214. <i>Delphinus delphis</i> ( <i>Eræl</i> ).    |   |

## ORDER SIRENIA.

## DUGONGS.

- 215.
- Halicore dugong*
- ,
- Illiger*
- .

## ORDER EDENTATA.

- 216.
- Manis javanica*
- ,
- Deem*
- .

A LIST OF THE BATS OCCURRING IN THE  
PENINSULAR REGION WITH A KEY TO THE GENERA.

By C. BODEN KLOSS.

SO far as I am aware I have enumerated in the following list all the bats known to us at present from the Malay Peninsula and its islands. Whilst, however, on the one hand, further investigation may prove that two or three of the species included will have to be finally omitted, continued collecting will undoubtedly result in further additions to the fauna as we are now acquainted with it, for the geographical distribution of several species occurring in surrounding regions indicates that they should eventually be recorded from the Peninsula also, where a large extent of country, almost untouched, may still preserve forms yet undiscovered.

The keys given have been compiled with reference to Peninsular genera only. There is at present nowhere in the East any collection of Malayan bats sufficiently complete to work out upon it a key to the species.

With regard to the abbreviations used:—

(MILLER) following generic titles, refers to the most recent work on the subject. "The Families and Genera of Bats," by Gerrit S. Miller, Jr., 1907.

BLANFORD.—"The Fauna of British India. Mammalia," by W. T. Blanford, 1891.

DOBSON.—"Monograph of the Asiatic Chiroptera," by G. E. Dobson, 1876.

FAS. MAL. ZOOL.—"Fasciculi Malayenses," of N. Annandale and H. C. Robinson, Zoology, Part 1. Mammals.

P. A. N. S. P.—Proceedings of the Academy of Natural Sciences, Philadelphia.

P. W. A. S.—Proceedings of the Washington Academy of Science.

P. Z. S.—Proceedings of the Zoological Society of London.

A. M. N. H.—Annals and Magazine of Natural History, London.

J. A. S. B.—Journal of the Asiatic Society of Bengal.

P. A. S. B.—Proceedings of the Asiatic Society of Bengal.

J. S. B. R. A. S.—Journal, Straits Branch, of the Royal Asiatic Society.

J. F. M. S. M.—Journal of the Federated Malay States Museums.

## CHIROPTERA.

### KEY TO THE SUB-ORDERS.

- A. Neither nose-leaf nor tragus; margin of ear forming an unbroken ring; mandible with angular process practically absent or broad and low ... .. *Megachiroptera*.
- B. Either nose-leaf or tragus, or both; margin of ear interrupted at base; mandible with angular process well developed, long and narrow *Microchiroptera*.

## SUB-ORDER MEGACHIROPTERA.

## FAMILY PTEROPIDÆ.

## KEY TO THE SUB-FAMILIES.

- A. Tongue moderate; inner margin of nostril projecting; upper surface of mandibular symphysis forming conspicuous angle with alveolar line ... .. *Pteropinæ*.
- B. Tongue very long; no projecting margin to nostril; upper surface of mandibular symphysis parallel with alveolar line ... .. *Kiodotinæ*.

## SUB-FAMILY PTEROPINÆ.

## KEY TO THE GENERA.

- A. Neck and shoulders much more warmly coloured than rest of back: size larger, head and body much more than 150 mm. ... *Pteropus*.
- B. Neck and shoulders not more brilliant than rest of back: size smaller, head and body always less than 150 mm.
- a.* Five upper and six lower cheek-teeth aside *Rousettus*.
- b.* Four upper and five lower cheek-teeth aside.
- a*<sup>1</sup>. Two pairs of lower incisors ... .. *Cynopterus*.
- b*<sup>1</sup>. One pair of lower incisors.
- a*<sup>2</sup>. Tail present; rostrum nearly straight above ... .. *Ptenochirus*.
- b*<sup>2</sup>. Tail absent; rostrum strongly concave above ... .. *Megærops*.

## GENUS PTEROPUS (MILLER, p. 56).

## 152. PTEROPUS EDULIS, Geoff.

*Pteropus vampyrus*, Linn.

Blanford, p. 259. Dobson, p. 20.

Throughout the Peninsular area except the islands of Tioman, Permangil and Aor.

## 152a. PTEROPUS NICOBARICUS, Fitzinger.

Blanford, p. 260. Dobson, p. 17.

A female Fruit-bat from Great Redang Island, off Tringanu, has been identified by Bonhote (P.Z.S., 1900, p. 875) as *P. nicobaricus*, and the species is therefore included. Further confirmation is desired. *P. condorensis*, Peters, another dark Fruit-bat, may eventually be discovered.

## 152b. PTEROPUS MEDIUS, Temm.

*Pteropus giganteus*, Brünnich.

Blanford, p. 257. Dobson, p. 18.

Miller (P.A.N.S.P., 1898, p. 316) doubtfully refers a young adult female from Trang to this species. Not otherwise recorded.

153. PTEROPUS (HYPOMELANUS) LEPIDUS, *Miller*.

Miller, P.W.A.S., 1900, p. 237.

Islands of Tioman, Permangil and Aor.

154. PTEROPUS (HYPOMELANUS) TOMESI, *Peters*.

Tomes, P.Z.S., 1858, p. 536.

A single male in the Selangor Museum from Pulo Rumpia, off the mouth of the Perak River, has been thus identified by Andersen.

GENUS ROUSETTAS (MILLER, p. 54).

155. ROUSETTAS AMPLEXICAUDATA (*Geoff.*).

*Xantharpyia amplexicaudata*, Blanford, p. 26.

*Cynonycteris amplexicaudata*, Dobson, p. 29.

The Peninsula.

GENUS CYNOPTERUS (MILLER, p. 47).

156. CYNOPTERUS MONTANOI, *Robin*.

*Cynopterus marginatus* (*Geoff.*); Thomas, P.Z.S., 1886, p. 73; Blanford, p. 263; Dobson, p. 24.

*Cynopterus sphinx* (*Vahl.*); Bonhote, P.Z.S., 1900, p. 875; Fas. Mal. Zool. vol. I., p. 14.

The Peninsula and Islands.

157. CYNOPTERUS ANGULATUS, *Miller*.

Miller, P.A.N.S.P., 1900, p. 316.

The Peninsula (type from Trang). Doubtfully distinct from the preceding species: smaller and projection at base of outer margin of ear pointed.

GENUS PTENOCHIRUS (MILLER, p. 51).

158. PTENOCHIRUS LUCASI (*Dobson*).

*Cynopterus lucasi*, Dobson, A.M.N.H., August, 1880, p. 163.

Thomas, A.M.N.H., 1898, p. 361; Bonhote, P.Z.S., 1900, p. 875.

The Peninsula and Singapore.

GENUS MEGÆROPS (MILLER, p. 51).

159. MEGÆROPS ECAUDATA (*Temm.*).

*Cynopterus ecaudatus*, Dobson, p. 29; Bonhote, Fas. Mal. Zool. vol. I., p. 15.

The Peninsula; Bidor, South Perak.

SUB-FAMILY KIODOTINÆ.

KEY TO THE GENERA.

A. A claw on index-finger; tail rudimentary ... *Kiodotus*.

B. No claw on index-finger; tail distinct ... *Eonycteris*.

## GENUS KIODOTUS (MILLER, p. 70).

160. KIODOTUS MINIMUS (*Geoff.*).*Carponycteris minima*, Blanford, p. 265.*Macroglossus minimus*, Dobson, p. 34.Bonhote, P.Z.S., 1900, p. 875; *Fas. Mal. Zool.* vol. I., p. 15.

The Peninsula, Patani and North Perak.

## GENUS EONYCTERIS (MILLER, p. 69).

161. EONYCTERIS SPELÆA, *Dobson*.

Blanford, p. 266. Dobson, p. 33.

The Peninsula.

## SUB-ORDER MICROCHIROPTERA.

## KEY TO THE FAMILIES.

## A. Nose-leaf absent, tragus present.

*a.* Second bone of middle finger folded back towards the upper surface of the wing in repose; tail perforating its membrane on the upper surface, or considerably produced beyond a much truncated membrane ... *Emballonuridæ*.

*b.* Second bone of middle finger extended in repose: tail contained within membrane or very little produced beyond it ... *Vespertilionidæ*.

## B. Nose-leaf present.

*a.* Tragus absent ... *Rhinolophidæ*.

*b.* Tragus present ... *Nycteridæ*.

## FAMILY EMBALLONURIDÆ.

## KEY TO THE SUB-FAMILIES.

A. Tail slender, much longer than the slender legs and emerging above near the margin of the narrow membrane; index finger with two distinct joints; upper incisors weak; postorbital processes absent ... *Rhinopominaæ*.

B. Tail slender, much shorter than the slender legs and emerging above near the centre of the broad membrane; index finger with no joint; upper incisors weak; postorbital processes present ... *Emballonurinaæ*.

C. Tail stout, not shorter than the stout legs and produced far beyond the membrane, which it leaves at the margin; index finger with one indistinct joint; upper incisors strong; postorbital processes absent ... *Molossinaæ*.

## SUB-FAMILY RHINOPOMINÆ.

## GENUS RHINOPOMA (MILLER, p. 81).

162. RHINOPOMA MICROPHYLLUM, *Geoff.*

Blanford, p. 351. Dobson, p. 174.

*Rhinopoma hardwickii*, Gray; Cantor, J.A.S.B., 1846.

The Peninsula, Ghirbi.

## SUB-FAMILY EMBALLONURINÆ.

## KEY TO THE GENERA.

- A. Two pairs of upper and three pairs of lower incisors; size smaller, head and body less than 50 mm. ... .. *Emballonura*.
- B. One pair of upper and two pairs of lower incisors; size larger, head and body more than 75 mm. ... .. *Taphozous*.

## GENUS EMBALLONURA (MILLER, p. 86).

163. EMBALLONURA PENINSULARIS, *Miller*.

Miller, P.A.N.S.P., 1898, p. 323.

Bonhote, Fas. Mal. Zool., vol. I., p. 18.

? *Emballonura semicaudata*, Blanford, p. 345.

The Peninsula and Singapore (type from Trang).

## GENUS TAPHOZOUS (MILLER, p. 93).

164. TAPHOZOUS MELANOPOGON, *Temm.*

Blanford, p. 347. Dobson, p. 167. Flower, P.Z.S., 1900, p. 349.

The Peninsula; Islands of Langkawi, Penang and Singapore.

165. TAPHOZOUS LONGIMANUS, *Hardwicke*.

Blanford, p. 348. Dobson, p. 170.

*Taphozous longimanus albipennis*, Thomas, A.M.N.H., ser. 7, vol. II., p. 246.

The Peninsula.

166. TAPHOZOUS SACCOLÆMUS, *Temm.*

Blanford, p. 350. Dobson, p. 172. Cantor, J.A.S.B., 1846.

The Peninsula, Penang, Singapore.

167. TAPHOZOUS AFFINIS, *Dobson*.

Dobson, A.M.N.H., 1875, p. 232.

Dobson, p. 173.

A single example from Singapore is recorded by Ridley (J.S.B.R.A.S., No. 31, p. 104).

## SUB-FAMILY MOLOSSINÆ.

## KEY TO THE GENERA.

- A. Ears more or less united on forehead before eyes; body clothed with hair; two pairs of lower incisors ... .. *Chærephon*.
- B. Ears widely separated; body essentially naked; one pair of lower incisors ... .. *Cheiromeles*.

GENUS CHÆREPHON (MILLER, p. 244).

168. CHÆREPHON PLICATUS (*Buchanan*).*Nyctinomus plicatus*, Blanford, p. 354; Dobson, p. 183.*Nyctinomus tenuis*, Horsf., Cantor, J.A.S.B., 1846.

The Peninsula and Singapore.

169. CHÆREPHON JOHORENSIS (*Dobson*).

Dobson, P.A.S.B., Jan., 1873. Dobson, p. 183.

A single specimen is known from South Johore.

GENUS CHEIROMELES (MILLER, p. 249).

170. CHEIROMELES TORQUATUS, *Horsf.*

Dobson, p. 177. Flower, P.Z.S., 1900, p. 350.

Peninsula; Singapore and Penang.

## FAMILY VESPERTILIONIDÆ.

## KEY TO THE SUB-FAMILIES.

- A. Tail shorter than head and body ... .. *Vespertilioninæ*.
- B. Tail not shorter than head and body ... .. *Kerivoulinæ*.

## SUB-FAMILY VESPERTILIONINÆ.

## KEY TO THE GENERA.

- A. Only one pair of upper incisors ... .. *Pachyotus*.
- B. Two pairs of upper incisors.
- a*. Upper and lower cheek-teeth six aside ... .. *Myotis*.
- b*. Upper and lower cheek-teeth five aside.
- a*<sup>1</sup>. Fifth finger only slightly longer than the largest bone of fourth and middle fingers ... .. *Pterygistes*.
- b*<sup>1</sup>. Fifth finger longer than the largest and next bone together of fourth and middle fingers.
- a*<sup>2</sup>. Outer upper incisor curved backwards *Pipistrellus*.
- b*<sup>2</sup>. Outer upper incisor curved outwards... *Glischropus*.

c. Upper and lower cheek-teeth four and five  
aside, respectively.

a<sup>1</sup>. Skull noticeably flattened, occipital depth  
less than one-third greatest length; outer  
upper incisor level with inner ... .. *Tylonycteris*.

b<sup>1</sup>. Skull not noticeably flattened, occipital  
depth more than one-third greatest length;  
outer upper incisor directly behind inner *Hesperoptenus*.

GENUS PACHYOTUS (MILLER, p. 219).

171. PACHYOTUS KUHLI (*Leach*).

*Nycticejus kuhli*, Blanford, p. 320.

*Scotophilus temminckii*, Dobson, p. 120.

Peninsula and Islands.

172. PACHYOTUS CASTANEUS (*Horsf.*).

*Nycticejus kuhli*, Flower, P.Z.S., 1900, p. 346.

*Scotophilus castaneus*, Bonhote, Fas. Mal. Zool., vol. I., p. 17.

Peninsula and Penang.

GENUS MYOTIS (MILLER, p. 200).

173. MYOTIS HASSELTII (*Temm.*).

*Vespertilio hasseltii*, Blanford, p. 330; Dobson, p. 126.

The Peninsula.

174. MYOTIS ADVERSUS (*Horsf.*).

*Vespertilio adversus*, Blanford, p. 330; Dobson, p. 128;  
Hanitsch, Rep. Raffles Mus. and Libr., 1897, p. 11.

Singapore.

175. MYOTIS OREIAS (*Temm.*).

*Vespertilio oreias*, Dobson, Cat. Chir. B.M., p. 305.

Singapore.

176. MYOTIS MURICOLA (*Temm.*).

*Vespertilio muricola*, Blanford, p. 337; Dobson, p. 134.

The Peninsula, Penang and Singapore.

177. MYOTIS EMARGINATUS (*Geoff.*).

*Vespertilio emarginatus*, Dobson, p. 142. Bonhote, P.Z.S., 1900,  
p. 876.

The Peninsula, Biserat (Bonhote).

GENUS PTERYGISTES (MILLER, p. 207).

178. PTERYGISTES NOCTULA (*Schreb.*).

*Vesperugo noctula*, Blanford, p. 308; Dobson, p. 88.

The Peninsula and Singapore.

## GENUS PIPISTRELLUS (MILLER, p. 204).

179. PIPISTRELLUS ABRAMUS (*Temm.*).  
*Vesperugo abramus*, Blanford, p. 313; Dobson, p. 97.  
 The Peninsula, Jalor; Singapore; Penang.
180. PIPISTRELLUS IMBRICATUS (*Horsf.*).  
*Vesperugo imbricatus*, Dobson, p. 93; Flower, P.Z.S., 1900, p. 34.  
 The Peninsula, Malacca.
181. PIPISTRELLUS TENUIS (*Temm.*).  
*Vesperugo tenuis*, Dobson, p. 98.  
*Kirivoula tenuis*, Cantor, J.A.S.B., 1846.  
 Penang.
182. PIPISTRELLUS RIDLEYI, *Thomas*.  
 Thomas, A.M.N.H., ser. 7, vol. I., p. 361.  
 Selangor (type from Kepong).

## GENUS GLISCHROPUS (MILLER, p. 205).

183. GLISCHROPUS TYLOPUS (*Dobson*).  
*Vesperugo tylopus*, Dobson, P.Z.S., 1875, p. 473. Dobson,  
 p. 114.  
 The Peninsula, Jalor (Bonhote, P.Z.S., 1900, p. 876).

## GENUS TYLONYCTERIS (MILLER, p. 212).

184. TYLONYCTERIS PACHYPUS (*Temm.*).  
 Miller, P.A.N.S.P., 1898, p. 321.  
*Vesperugo pachypus*, Blanford, p. 307; Dobson, p. 115.  
 The Peninsula, Trang (Miller).

## GENUS HESPEROPTENUS (MILLER, p. 211).

185. HESPEROPTENUS BLANFORDI, *Dobson*.  
*Vesperugo blanfordi*, Dobson, J.A.S.B., XLVI., p. 312; Blanford,  
 p. 317.  
 The Peninsula, Selangor, Johore (Anderson, Cat. Mam. Ind.  
 Mus., pt. 1, p. 133).
186. HESPEROPTENUS TOMESI, *Thomas*.  
 Thomas, A.M.N.H., ser. 7, vol. XVI., p. 575.  
 The Peninsula (type from Malacca).

## SUB-FAMILY KERIVOULINÆ.

## GENUS KERIVOULA (MILLER, p. 232).

187. KERIVOULA PICTA (*Pallas*).  
 Blanford, p. 339. Dobson, p. 146.  
*Kirivoula picta*, Cantor, J.A.S.B., 1846.  
 The Peninsula; Penang (Cantor).

188. *KERIVOULA MINUTA*, *Miller*.  
 Miller, P.A.N.S.P., 1898, p. 321.  
 The Peninsula (type from Trang).
189. *KERIVOULA BICOLOR*, *Thomas*.  
 Thomas, A.M.N.H., ser. 7, vol. xiv., p. 199.  
 The Peninsula (type from Jalor).

FAMILY RHINOLOPHIDÆ.

KEY TO THE SUB-FAMILIES.

- A. A distinct antitragus markedly separated by a notch from the outer margin of the ear; upper and hinder nose-leaf pointed; six lower cheek-teeth aside ... .. *Rhinolophinæ*.
- B. A slight antitragus not separated by a notch from the outer margin of the ear; upper and hinder nose-leaf not pointed; five lower cheek-teeth aside ... .. *Hipposiderinæ*.

SUB-FAMILY RHINOLOPHINÆ.

GENUS RHINOLOPHUS (MILLER, p. 108).

190. *RHINOLOPHUS MALAYANUS*, *Bonhote*.  
 Bonhote, Fas. Mal. Zool., vol. I., p. 15.  
 Andersen, P.Z.S., 1905, vol. II., p. 89.  
 The Peninsula (type from Jalor).
191. *RHINOLOPHUS STHENO*, *Andersen*.  
 Andersen, P.Z.S., 1905, vol. II., p. 91.  
 The Peninsula (type from Selangor); Penang Island.
192. *RHINOLOPHUS AFFINIS SUPERANS*, *Andersen*.  
 Andersen, P.Z.S., 1905, vol. II., p. 104.  
*Rhinolophus affinis*, Horsf. Miller, P.A.N.S.P., 1898, p. 319;  
 Blanford, p. 274; Dobson, p. 47.  
 The Peninsula, Trang and Pahang (type).
193. *RHINOLOPHUS REFULGENS*, *Andersen*.  
 Andersen, P.Z.S., 1905, vol. II., p. 124.  
 The Peninsula, Selangor and Perak (type from Gunong Ijau).
194. *RHINOLOPHUS MINOR*, *Horsf.*  
 Blanford, p. 276; Dobson, p. 50.  
 The Peninsula, Batu Caves, Selangor (Thomas, A.M.N.H., ser. 7, vol. I., p. 361), Biserat (Bonhote, Fas. Mal. Zool., vol. I., p. 16).

195. *RHINOLOPHUS SEDULUS*, *Andersen*.  
Andersen, A.M.N.H., ser. 7, vol. xvi., p. 247.  
The Peninsula, Pahang.
196. *RHINOLOPHUS TRIFOLIATUS*, *Temm*.  
Blanford, p. 272; Dobson, p. 41; Miller, P.A.N.S.P., 1898,  
p. 319.  
Andersen, A.M.N.H., ser. 7, vol. xvi., p. 249.  
The Peninsula and Singapore.
197. *RHINOLOPHUS LUCTUS*, *Temm*.  
Blanford, p. 270; Dobson, p. 39; Andersen, A.M.N.H., ser. 7,  
vol. xvi., p. 251.  
The Peninsula and Singapore.
198. *RHINOLOPHUS CÆLOPHYLLUS*, *Peters*.  
Blanford, p. 272; Dobson, p. 53.  
Andersen, A.M.N.H., ser. 7, vol. xvi., p. 651.  
The Peninsula, Kedah.

## SUB-FAMILY HIPPOSIDERINÆ.

## KEY TO THE GENERA.

- A. Foremost part of nose-leaf not divided ... *Hipposideros*.  
B. Foremost part of nose-leaf divided into two  
distinct lappets ... .. *Cælops*.

## GENUS HIPPOSIDEROS (MILLER, p. 109).

199. *HIPPOSIDEROS DIADEMA* (*Geoff.*).  
Blanford, p. 284; Dobson, p. 64. Andersen, A.M.N.H., ser. 7,  
vol. xvi., p. 499.  
The Peninsula, Jalor (Bonh., P.Z.S., 1900), Johore (Thomas,  
P.Z.S., 1886), Penang (Cantor).
200. *HIPPOSIDEROS ARMIGER DEBILIS*, *Andersen*.  
Andersen, A.M.N.H., ser. 7, vol. xvii., p. 37.  
*Hipposideros armiger*, Hodgson; Blanford, p. 283.  
*Phyllorhina armigera*, Dobson, p. 64.  
The Peninsula (type from Province Wellesley); Penang  
Island (Cantor, J.A.S.B., 1846).
201. *HIPPOSIDEROS GALERITUS*, *Cantor*.  
Cantor, J.A.S.B., 1846, p. 183; Blanford, p. 287.  
*Phyllorhina galerita*, Dobson, p. 69.  
The Peninsula; Singapore and Penang (type).

202. HIPPOSIDEROS LARVATUS (*Horsf.*).

Blanford, p. 288. Miller, P.A.N.S.P., 1898, p. 319.

*Phyllorhina larvata*, Dobson, p. 68.

The Peninsula ; Penang (Cantor, J.A.S.B., 1846).

203. HIPPOSIDEROS BICOLOR (*Temm.*).

Blanford, p. 289 ; Flower, P.Z.S., 1900, p. 343.

*Phyllorhina bicolor*, Dobson, p. 70.

The Peninsula ; Penang and Singapore.

204. HIPPOSIDEROS STOLICZKANUS (*Dobson*).

*Phyllorhina stoliczkana*, Dobson, p. 61 ; Dobson, P.A.S.B., 1871,  
p. 106.

Penang Island (type).

GENUS CÆLOPS (MILLER, p. 113).

205. CÆLOPS ROBINSONI, *Bonhote*.

Bonhote, J.F.M.S.M., 1908, p. 4.

The Peninsula (type from Gunong Tahan).

## FAMILY NYCTERIDÆ.

## KEY TO THE GENERA.

- A. Tail long ; nose-leaf slight, consisting of a deep facial groove bordered by expansions of skin ; premaxillaries present ... .. *Nycteris*.
- B. Tail absent ; nose-leaf distinct, long and erect ; premaxillaries absent ... .. *Megaderma*.

GENUS NYCTERIS (MILLER, p. 101).

206. NYCTERIS JAVANICA, *Geoff.*

Blanford, p. 295 ; Dobson, p. 79.

The Peninsula, Malacca (Andersen, Cat. Mamm. Ind. Mus. pt. 1, p. 122), Jalor (Bonh., Fas. Mal. Zool. vol. I., p. 17).

GENUS MEGADERMA (MILLER, p. 103).

207. MEGADERMA SPASMA, *Linn.*

Blanford, p. 294 ; Dobson, p. 79.

The Peninsula ; Penang and Singapore.



ON A NEW SPECIES OF *CYORNIS* FROM THE MOUNTAINS OF THE MALAY PENINSULA.

BY HERBERT C. ROBINSON, C.M.Z.S., M.B.O.U.,  
DIRECTOR OF MUSEUMS, FEDERATED MALAY STATES.

*CYORNIS PENINSULARIS*, *sp. nov.*

**S**IMILAR to *Cyornis oatesi* (Salvad.) from Manipur and Tenasserim and *Cyornis vivida* (Swinh.) from China and Formosa, but considerably smaller than either; female with the under tail coverts pale chestnut buff.

**ADULT MALE.**—Lores and a narrow frontal band glossy black; crown, rump and a patch behind the ear coverts shining cobalt blue; mantle, back and wing coverts very dark purplish blue; ocular region, ear coverts, chin and throat black with a purplish wash, more defined on the line separating the throat from the breast, which, with the rest of the under surface, the under wing coverts, under tail coverts and axillaries, is chestnut; primaries and secondaries black, externally edged with purplish blue on their outer webs, the inner webs of the lesser primaries and the secondaries edged with rufous buff, more clearly defined on the innermost; tail feathers black, the outer webs purplish blue; iris dark hazel; bill black; feet blackish brown.

Total length, 5.6 in. (146 mm.); wing, 3.1 in. (78 mm.); tail, 2.95 in. (75 mm.); tarsus, .69 in. (17.5 mm.); bill from gape, .62 in. (15 mm.).

**ADULT FEMALE.**—Lores, facial and periocular region and throat dull greyish brown, speckled with rufous and black; crown and nape greyish, the feathers of the former with darker edges, presenting a scaly appearance; back, mantle and rump brownish ochraceous, more yellowish on the rump; upper tail coverts and tail dull chestnut brown; wing coverts dull brown edged with ochraceous; primaries and secondaries blackish brown, all except the outer primaries broadly edged with yellowish brown; edge of wing and under wing coverts pale yellowish buff; axillaries greyish buff; thighs ochraceous; breast, belly and flanks greyish; the feathers of the breast in the centre edged with ochraceous buff and with a clear whitish yellow patch in the centre of the belly; under tail coverts pale chestnut buff; iris hazel; bill black; feet blackish brown.

Total length, 5.23 in. (132 mm.); wing, 2.96 in. (75 mm.); tail, 2.65 in. (68 mm.); tarsus, .65 in. (16 mm.); bill from gape, .62 in. (15 mm.).

**TYPES.**—Male and female, Telôm, Perak-Pahang boundary, South Perak, Federated Malay States, collected on 28th November, 1908, by H. C. Robinson and C. B. Kloss; only the above pair were seen though nearly a month was spent in the locality.

Except for the character of the frontal plumes this species, together with its near allies, *C. oatesi* and *C. vivida*, would seem to be best placed in the genus *Niltava*, with which it agrees in the presence of a bright patch behind the ear coverts in the male, though this is absent in the female.

## THE BIRDS AT PRESENT KNOWN FROM THE MOUNTAINS OF THE MALAY PENINSULA.

BY HERBERT C. ROBINSON, C.M.Z.S., M.B.O.U.,  
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NO connected list has up to the present been attempted of the birds inhabiting the central mountain zone of the Peninsula, though various papers dealing with detached portions of it have appeared in the last few years, which are duly noted in the Bibliography.

I have, therefore, brought together all that is known on this region basing my conclusions on the very large material now in the Selangor Museum, which, after the elimination of duplicates, amounts to over 3,000 specimens. Systematic collecting, more especially in Selangor, has been carried on during the last five years, and I think it is now fairly certain that but few if any more species remain to be discovered on the main range of the Peninsula, though, as I have stated elsewhere, it is possible that the mountains of Lakon on the N.-E. Coast may yield further novelties.

Commencing from the north of the Peninsula, it may be well to detail the various mountains that have been collected on up to date with the collectors:

1. Mountains of Trang, latitude  $7^{\circ} 40'$  N., maximum height 3,000 ft.

Large collections were made on these hills by Dr. W. L. Abbott, the well-known American Naturalist, in 1899, but no detailed account has ever appeared; the following new species have, however, been described from the collection by Dr. C. W. Richmond:

*Oreocichla affinis*

*Athopyga anomala*

*Turdinulus granti*

*Stachyris chrysops* (synonym of *S. bocagei*, *postea*)

*Criniger sordidus* (synonym of *C. ochraceus*, *postea*).

2. Bukit Besar, E. Coast, Malay Peninsula, latitude  $6^{\circ} 30'$  N., maximum height 3,500 ft.

Considerable collections were made here by Dr. N. Annandale and myself in 1901 and reported on by Mr. O. Grant. The mountain is isolated and no high level fauna occurs thereon.

3. Gunong Inas, latitude  $5^{\circ} 10'$  N., height 5,800 ft.

A peak of the Larut range, which runs parallel to, but is not connected with, the main range.

A few mountain birds were collected here by Messrs. Yapp and Laidlaw of the Skeat Expedition and reported on by Bonhote, *loc. cit.*, but the collections were quite small.

4. Gunong Ijau; Maxwell's Hill; Larut Hills.

These peaks are the southern termination in about  $4^{\circ} 50'$  N. of the range, of which Gunong Inas forms one of the northern summits; they have been much collected on by Wray, Hartert and Butler, and large collections therefrom are to be found in the Taiping Museum, though unfortunately they have never been properly labelled and have all been mounted and exposed to light. Collections from this region, which varies in height from 2,000-4,750 ft., have been described by Sharpe, *loc. cit.*, (1) and (2); Butler, *loc. cit.*, and Hartert, *J. für. O.*, 1891, pp. 379-407.

5. Gunong Batu Puteh, Telôm, Batang Padang mountains.

These terms cover a district in the main central range of the Malay Peninsula centering round a point in about  $4^{\circ} 15'$  N. and ranging in altitude from about 3,500-7,000 ft.

Large collections have been made here by Wray, myself and the collectors of the Selangor Museum, and are partially described by Sharpe (3) and Grant (1).

6. Semangko Pass and neighbouring hills, 2,700-5,000 ft.

A point in the dividing range of the Peninsula between Selangor and Pahang in latitude  $3^{\circ} 40'$  N. at a height of 2,700 ft., from which hills rise steeply on both sides to over 5,000 ft.

The bulk of the mountain collections in the Selangor Museum have been obtained in this district, which is exceptionally well situated for collecting.

7. Gunong Mengkuang Lebah and Gunong Ulu Kali.

Points in the main dividing range of the Peninsula from 4,200-5,800 ft. in latitude  $3^{\circ} 25'$  N. *app.*

Large collections have also been made here and a few specimens are mentioned by Grant (2) *loc. cit.*

8. Ginting Bidei, 2,300 ft.

A pass on the main range about 20 miles south of Gunong Mengkuang Lebah in latitude  $3^{\circ} 13'$  N. *app.*

A few birds were collected here by Butler and considerable series have been obtained by the Selangor Museum collectors, working from this as a centre from 1,500-4,000 ft.

9. Gunong Angsi, Negri Sembilan, 2,600-3,200 ft., latitude  $2^{\circ} 45'$  N.

A control station on a spur south of the termination of the main dividing range.

Large collections have been made here, but no mountain forms occur.

10. Mount Ophir, borders of Malacca and Johor, latitude  $2^{\circ} 20' N.$ , 4,100 ft. high.

Wallace and Whitehead made small collections here, and several species received by Blyth from his Malacca correspondents were probably also from the vicinity. The lower slopes were favourite hunting grounds of the old Malacca trade skin hunters.

No mountain forms are known from the hill, which is quite detached.

11. Gunong Pulai, Johor, latitude  $1^{\circ} 35' N.$ , about 3,000 ft.

Much collected on by Davison for Hume, whose collections passed to the British Museum.

12. Gunong Tahan, an isolated massif on the east side of the main range, latitude  $4^{\circ} 45' N.$ , 7,150 ft. high.

Collected on by Waterstradt and myself; the respective collections described by Hartert (1) and Grant (2) *loc. cit.*

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#### LIST OF BIRDS.

##### 1. RHIZOTHERA LONGIROSTRIS--THE LONG-BILLED PARTRIDGE.

*Rhizothera longirostris* (Temm.); *Grant, Cat. Birds Brit. Mus.*, xxii., p. 183 (1893).

Ginting Bidei, 2,300 ft. May, 1908.

Almost confined to bamboo jungle and not ascending the hills to more than about 3,500 ft. at the outside.

##### 2. ARBORICOLA CAMPBELLI--CAMPBELL'S TREE-PARTRIDGE.

*Arboricola campbelli*, *Robinson and Grant, Ibis*, 1905, p. 165, pl. iv.; *id.*, *Journ. Fed. Mal. States Mus.*, i., p. 126.

This very distinct Tree-partridge was originally described from a pair collected in the Telôm Valley on the borders of South Perak and Pahang at about 3,800 ft. It has since been found to be not uncommon on Gunong Mengkuang Lebah and Gunong Ulu Kali in Selangor at heights of 4,500-5,200 ft., numerous specimens having been trapped in these localities.

A half-grown bird differs from the adult in having the white malar stripe more developed and the grey feathers of the breast and sides of the abdomen broadly tipped with rufous ochraceous.

The nest and eggs were discovered on Gunong Mengkuang Lebah in March, 1907, on the ground beneath a small stemless palm. The former is a loose pad of sticks and dead leaves very flat and about six inches in diameter; the eggs, two in number, are pure white and somewhat glossy with numerous small scattered pores; they are very pointed at one end and measure A, 42 × 32 mm.; B, 42 × 31.5 mm.

##### 3. ROLLULUS ROULROUL--THE CRESTED GREEN WOOD-QUAIL.

*Rollulus roulroul* (Scop.); *Grant, Cat.*, p. 225; *Hartert*, p. 539; *Grant* (2), p. 57.

Bukit Kutu, 3,000 ft. August; Gunong Mengkuang Lebah, 5,200 ft. April.

I can detect no tangible differences between these specimens and a pair collected in April at Tanjong Malim at the foot of the main range.

The species is common throughout the Western Malay Peninsula with the exception of the swampy littoral belt.

4. *POLYPECTRON INOPINATUS* ROTHSCHILD'S PEACOCK PHEASANT.

*Chalcurus inopinatus*, *Rothsch.*, *Bull. B.O.C.*, xiii., No. xcx., p. 41 (1903); *id.*, *Nov. Zool.*, x., pl. ii. (1903).

*Polypectron inopinatus*, *Grant* (2), p. 55.

Very common both on the mountains above the Semangko Pass, 2,700-4,500 ft., and on Gunong Mengkuang Lebah and Gunong Ulu Kali, whence we have secured a considerable number of specimens. At the former locality the species breeds about January, as very young specimens and chicks just emerging from the downy stage were obtained towards the end of February.

5. *RHEINWARDTIUS NIGRESCENS*—THE OCELLATED MALAY ARGUS-PHEASANT.

*Rheinwardtius ocellatus nigrescens*, *Hartert*, *Nov. Zool.*, ix., p. 538; *Grant* (2), p. 56.

This species is only known from the three original specimens obtained by Waterstradt, which came from the Ulu Dong in the Lipis District of Pahang on the west side of the Pahang River, and the two secured by myself at moderate elevations on Gunong Taban.

I do not think that it will ultimately prove to be confined to the mountains and I believe that I have heard its call, which is quite different from that of the common Argus, quite close to Kuala Lipis at not more than 300 or 400 ft. elevation.

6. *BUTRERON CAPELLEI*—THE LARGER THICK-BILLED GREEN PIGEON.

*Buteron capellei* (Temm.): *Salvad.*, *Cat. Birds Brit. Mus.*, xxi., p. 32 (1893); *Bonhote*, p. 76; *Hartert*, p. 539; *Grant* (1), p. 122.

One specimen was seen but not secured, flying through the Semangko Pass in February, 1908.

7. *SPHENOCERCUS ROBINSONI*—THE MALAYAN WEDGE-TAILED PIGEON.

*Sphenocercus korthalsi*, *Robinson nec Temm.*, *Journ. Fed. Malay States Mus.*, i., p. 52 (1905).

*Sphenocercus robinsoni*, *Grant*, *Bull. B.O.C.*, xix., No. cxxvii., p. 12 (1906); *id.* (2), p. 53.

Two ♀ specimens have been obtained in the vicinity of Ulu Kali, 5,000 ft., one of which is the female type of the species. It is distinctly difficult to obtain, as it is by no means common and flies very high while the country it frequents is very broken. A specimen from Gunong Ijau, Larut, 4,750 ft., shot on 12th September, 1908, is marked ♂ by the native collector, but has no maroon whatever on the shoulder or cinnamon on the under tail coverts, and is, therefore, probably very immature or else a female. Wing 6.5 in., tail 5.1 in.

8. *SPHENOCERCUS*, *sp.*

The Selangor Museum possesses two skins of a *Sphenocercus*, which probably represent a species allied to but distinct from *S. sphenurus*. One, an adult female, was shot on the Semangko Pass on 16th

February, 1908; while another, an immature male in moult, was obtained in Pulau Rumpia—one of the Sembilan Islands, off the mouth of the Perak River—in March, 1906. Both have the centre of the abdomen *pure white*, the under tail coverts pale chrome, broadly centred with greenish olive, and the tail greyish black tipped with paler grey.

The male has the angle of the wing maroon and indications of a dove grey collar on the hind neck. The base of the feathers on the side of the neck is rufous. Wing of female about 5.9 in.

The species is almost certainly distinct, but until more specimens are obtained I prefer not to describe it.

9. *TRERON NIPALENSIS*—THE THICK-BILLED GREEN PIGEON.

*Treron nipalensis* (Hodgs.); *Salvad., Cat.*, p. 34; *Grant* (1), p. 122.

Semangko Pass, Selangor-Pahang border, 2,700 ft. February, March, 1904, 1908.

During February and March on dark and rainy nights, accompanied by wind, this species often flies in numbers into the window of the Rest House, which is situated in the middle of the pass with steep hills on either side. On one evening in February, 1904, thirteen were thus captured.

The species is abundant in the foot hills, especially when the *kayu ara*, a variety of fig of which it is very fond, is in fruit.

10. *OSMOTRERON OLAX*—THE LITTLE GREEN PIGEON.

*Osmotreron olax* (Temm.); *Grant* (1), p. 121.

♀. Semangko Pass, Selangor-Pahang border, 2,700 ft. 24th February, 1908.

Very common in the low country, but only accidental on the high hills. The specimen enumerated above flew to light together with *Ptilinopus jambu*.

11. *PTILINOPUS JAMBU*—THE PINK-HEADED FRUIT DOVE.

*Ptilinopus jambu* (Gm.); *Salvad., Cat.*, p. 80; *Hartert*, p. 539.

2 ♂ ♀. Semangko Pass, Selangor-Pahang border, 2,700 ft. 24th February, 1908.

Captured at light together with one female of *Osmotreron olax*.

Sporadic throughout the Peninsula, but nowhere very common.

This species seems to perform local migrations at night; besides the present specimens, I have heard of one caught at Government House, Singapore, which is situated on an eminence about 200 ft. above the sea.

12. *CARPOPHAGA BADIA*—THE COPPER-BACKED IMPERIAL PIGEON.

*Carpophaga badia* (Raffles); *Salvad., Cat.*, p. 218; *Hartert*, p. 539.

*Ducula badia*, *Butler*, p. 29.

This Pigeon is exceedingly common during the greater part of the year along the ridges of the higher mountain ranges, where its loud booming note is constantly heard in the early morning. During the

fruiting of certain trees it, however, descends to the low country and the coast, and specimens have been shot among the mangroves at Tanjong Karang, Coast of Selangor (January); Dindings, Perak Coast (May); and Rantau Panjang low country, Selangor (February).

13. *MACROPYGIA LEPTOGRAMMICA*—THE LARGER MALAY CUCKOO-DOVE.

*Macropygia tusalia*, Sharpe (nec Hodgs.), *P.Z.S.*, 1887, p. 443.

*Macropygia leptogrammica*, *Salvad., Cat.*, p. 341; *Grant* (2), p. 53.

Fairly common on Gunong Mengkuang Lebah and Ulu Kali, Selangor, above 5,000 ft., but known elsewhere only from one or two specimens collected by Wray on the Larut Hills.

14. *MACROPYGIA RUFICEPS*—THE LITTLE MALAY CUCKOO DOVE.

*Macropygia ruficeps* (Temm.): *Salvad., Cat.*, p. 360; *Butler*, p. 30; *Hartert*, p. 540; *Grant* (2), p. 53.

Very common throughout the central portion of the Peninsula from the foot of the hills to over 5,000 ft., especially in the neighbourhood of the hot springs which are not uncommon. I can detect no difference whatever between specimens from 5,000 ft. and those from 200 ft.

15. *CHALCOPHAPS INDICA*—THE BRONZE-WINGED GROUND DOVE.

*Chalcophaps indica* (Linn.): *Salvad., Cat.*, p. 514; *Butler*, p. 30; *Bonh.*, p. 77; *Hartert*, p. 540; *Grant* (1), p. 120; *id.* (2), p. 53.

Fairly common throughout the hills, but more so at 2,000 ft. than at higher elevations. Ranges up to 4,500 ft.

16. *RALLINA SUPERCILIARIS* THE BANDED CRAKE.

*Rallina superciliaris* (Eyton): *Sharpe, Cat. Birds Brit. Mus.*, xxiii., p. 76 (1894); *Grant* (1), p. 120.

Apparently visits the high mountains of Perak in winter; one was trapped near the Telôm River in November, 1908, two or three miles from the locality whence a specimen was secured in January, 1902.

17. *ACCIPITER GULARIS*—THE MALAYAN BESRA.

*Accipiter virgatus* (Temm.); *Butler*, p. 29; *Sharpe, Cat. Birds Brit. Mus.*, i., p. 150 (1874).

*Accipiter gularis* (Temm. and Schleg.): *Grant, Ibis*, 1896, pp. 104 *et seqq.*

♂. Gunong Mengkuang Lebah, Selangor, 5,200 ft. 3rd April, 1905.

A single very adult male in fresh plumage has the upper parts pure slate-grey; throat stripe reduced to a mere hair line under parts except throat, belly and under tail coverts which are pure white, rufous salmon; thighs rufous salmon. Wing 6.4 in., tail 4.8 in., tarsus 1.85 in.

This specimen may possibly represent a distinct mountain form bearing the same relation to *A. gularis* that *A. rufotibialis*, Sharpe, from Kina Balu does to the typical *A. virgatus*. It differs from *A. rufotibialis* in larger size and in the almost obsolete throat stripe.

18. *PERNIS TWEEDALII* HUME'S HONEY BUZZARD.

*Pernis tweedalii*, *Hume, Stray Feathers*, ix., pp. 446-448; *id., op. cit.*, x., p. 513 (1887).

♀ ad. Semangko Pass, 2,700 ft. 17th February, 1904.

♀ ad. Batu, nr. Kuala Lumpur. 6th January, 1900.

♂ imm. Maxwell's Hill, Taiping, Perak, 3,600 ft. 8th September, 1908.

This bird is very common in the more jungly parts of the country, but can only occasionally be got. It appears to be resident, whereas the other Malayan species of the genus *P. cristatus* auct is certainly migratory.

The two adult specimens agree well with Hume's plate (*loc. cit. sup.*), except that there is decidedly more black on the plumage of the lower surface. The immature male has the under surface barred with rufous buff and white; breast and upper part of the belly with dark brown shaft stripes, more marked on the breast; black throat and moustachial stripes pronounced; feathers of the sides of the neck broadly edged with rufous; crest black faintly tipped with white, lores grey.

19. *ICTINAETUS MALAYENSIS*—THE BLACK EAGLE.

*Ictinaetus malayensis* (Rheinw.); *Sharpe, Cat. Birds Brit. Mus.* i., p. 257 (1874); *Sharpe* (2), p. 433; *id.* (3), p. 268.

Very fairly common in the high hills, especially in Larut, but practically impossible to secure except where there are large clearings. I have seen it on almost every hill. I have spent more than a day or two upon. Not often met with in the low country.

20. *SPIZAETUS ALBONIGER* BLYTH'S HAWK EAGLE.

*Spizaetus alboniger* (Blyth); *Sharpe, Cat.*, p. 271; *Butler*, p. 29; *Grant* (1), p. 114.

Very common on the Government Plantation on the Larut Hills, Perak, where it is very destructive to chickens, and also met with though more sparsely in the low country; much rarer in Selangor and Pahang.

*Spizaetus limnaetus* (Horsf.), mentioned by Sharpe (2), p. 433, but of which he did not examine specimens, is far more probably this species.

21. *HETEROSCOPS VULPES*—THE MOUNTAIN SCOPS OWL.

*Pisorhina luciae*, *Hartert*, p. 541.

*Heteroscops vulpes*, *Grant, Bull. B.O.C.*, xix., No. cxxvii., p. 11 (1906); *id.* (2), p. 51.

♂. Gunong Mengkuang Lebah, 4,800 ft. 13th March, 1907.

♂ imm. Semangko Pass, 2,700-4,000 ft. 7th March, 1908.

The immature bird is in a dark brown, not rufous, phase of plumage and is devoid of the whitish outer webs to the inner scapulars.

Probably by no means rare on the higher mountains, where the hoot of a small owl is often heard, but not often obtained.

22. *GLAUCIDIUM BRODIEI*—THE COLLARED PIGMY OWLET.

*Glaucidium brodiei* (Burton); *Sharpe, Cat. Birds Brit. Mus.*, ii., p. 212 (1875); *id.* (2), p. 434; *Grant* (2), p. 52.

Fairly common on the Semangko Pass and also on the mountains of South Perak.

23. *SYRNIUM MAINGAYI*—THE MALAYAN WOOD OWL.

*Syrnium maingayi*, *Hume, Stray Feathers*, vi., p. 27 (1878); *Sharpe* (1), p. 470; *Grant* (2), p. 51.

♂. Ginting Bidei, Selangor, 2,300 ft. May, 1908.

A single specimen from the above locality agrees well with Sharpe's description of the type. Wing 13.5 in.

24. *SYRNIUM NEWARENSE*—THE HIMALAYAN WOOD OWL.

*Syrnium newarensense* (Hodgs.); *Sharpe, Cat.*, p. 281; *id.* (2), p. 434.

Besides the specimen cited by Sharpe (*supra*) from the Larut Hills, I have examined another specimen from the Waterloo Estate near Taiping, which agrees well with the specimen of *S. maingayi* noted above. In all probability all the wood owls of this type from the Malay Peninsula should be considered to belong to *S. maingayi*, which is at best but a sub-species of *S. indrani* or *S. newarensense*.

25. *ALCEDO EURYZONA*—THE BROAD-ZONED KINGFISHER.

*Alcedo euryzona* (Temm.); *Sharpe, Cat. Birds Brit. Mus.*, xvii., p. 154 (1892); *Hartert*, p. 543.

Though I have never obtained a specimen, and though there are none in the Selangor Museum, I insert this bird in the list, as we constantly met with a single individual on the Semangko Pass in February, 1908, though it was so exceedingly wary that no one of our party was able to obtain it. It was also not uncommon at Kuala Teku at the foot of Gunong Tahan. There is a specimen in the Perak Museum from the vicinity of Taiping.

26. *CEYX TRIDACTYLA*—PALLA'S THREE-TOED KINGFISHER.

*Ceyx tridactyla* (Pall.); *Sharpe, Cat.*, p. 174.

Though abundant on deep jungle streams in the low country, birds of this genus are rare on the hills. There are two specimens in the Museum, immature and male adult, from the Semangko Pass, shot in November and February, respectively.

27. *BUCEROS RHINOCEROS*—THE RHINOCEROS HORNBILL.

*Buceros rhinoceros* (Linn.); *Ogilvie-Grant, Cat. Birds Brit. Mus.*, xvii., p. 352 (1892); *Butler*, p. 26; *Hartert*, p. 543.

Common in hills and low country and old jungle, but very hard to secure.

28. *DICHO CEROS BICORNIS*—THE HOMRAI HORNBILL.

*Dichoceros bicornis* (Linn.); *Grant, Cat.*, p. 355; *Butler*, p. 26; *Bonhote*, p. 70; *Grant* (1), p. 108.

Often seen from hill tops flying over the tops of the trees below, but not often got. More abundant in the northern half of the Peninsula.

29. *RHYTIDOCEROS UNDULATUS*—THE MALAYAN WREATHED HORNBILL.

*Rhytidoceros undulatus* (Shaw); *Grant, Cat.*, p. 382.

♂ ♀. Gunong Ulu Kali, Selangor, 4,800 ft. January, 1906.

Occasionally met with in flocks of up to ten or twelve individuals, but rare.

30. *ANORRHINUS GALERITUS*—THE BUSHY-CRESTED HORNBILL.

*Anorrhinus galeritus* (Temm.); *Grant, Cat.*, p. 391; *Butler*, p. 26; *Grant (2)*, p. 48.

Semangko Pass, 2,700 ft. February, 1904, 1908.

Ginting Bidei, 2,300 ft. May, 1908.

A characteristic hill bird, which, though not ascending very high on the mountains, is not found in the plains; common in the above localities.

31. *BERENICORNIS COMATUS*—THE LONG-CRESTED HORNBILL.

*Berenicornis comatus* (Raffles); *Grant, Cat.*, p. 423.

We have no very recent or exactly localised specimens of this magnificent Hornbill in the Selangor Museum. It is quite common in the State, but keeps to very high jungle, feeds on high trees and flies very high, and is, therefore, not an easy bird to procure. Crossing the Semangko Pass in a motor car in December, 1908, we observed near a summit a flock of nine or ten adult and immature birds perched in a tree near the road. They appeared quite undisturbed at our approach.

32. *RHINOPLAX VIGIL*—THE HELMETED HORNBILL.

*Rhinoplax vigil* (Forst.); *Grant, Cat.*, p. 427; *Butler*, p. 26; *Grant (1)*, p. 108.

Also fairly common.

33. *NYCTIORNIS AMICTUS*—THE VERMILION-BEARDED BEE-EATER.

*Nyctiornis amictus* (Temm.); *Sharpe, Cat. Birds Brit. Mus.*, xvii., p. 90 (1893); *Butler*, p. 29; *Hartert*, p. 544; *Grant (2)*, p. 49.

Common nearly everywhere, in fairly open jungle, up to about 3,500 ft. on the main range of the Peninsula, most abundant at from 1,000-1,500 ft.

34. *LYNCORNIS TEMMINCKI*—GOULD'S EARED NIGHT-JAR.

*Lyncornis temmincki* (Gould.); *Hartert, Cat. Birds Brit. Mus.*, xvi., p. 606 (1892); *Hartert*, p. 544.

Not so common in the hills as in the low country, but generally to be met with on the Semangko Pass, where its peculiar note tect-ta-bu is constantly heard.

35. *CAPRIMULGUS JOTAKA*—THE JUNGLE NIGHT-JAR.

*Caprimulgus jotaka* (Temm. and Schleg.) : *Hartert, Cat.*, p. 552 ; *Grant* (1), p. 107.

*Caprimulgus indicus jotaka*, *Butler*, p. 28.

Semangko Pass, 2,700 ft. February, 1908.

Telôm, Perak-Pahang border, 3,500 ft. January and November.

Possibly resident throughout the year on the mountains. In the lowlands and on the islands of the Straits of Malacca it is met with only in the winter months, when it is abundant.

36. *COLLOCALIA INNOMINATA*—HUME'S SWIFTLET.

*Collocalia innominata* (Hume) ; *Hartert, Cat.*, p. 503.

Semangko Pass, Selangor-Pahang boundary, 2,700 ft. February, 1904, 1908.

Gunong Mengkuang Lebah, Selangor, 4,800-5,200 ft. March, 1907.

Very widely distributed throughout the State of Selangor from the mangrove swamps on the coast to the tops of the highest mountains ; but, together with other species of *Cypselidæ*, commonest at the Semangko Pass.

These specimens may not impossibly represent *C. gigas*, *Hartert*, collected by *Butler* on the Semangko Pass. At the moment I have not access either to authentic specimens or to the description so prefer to record them as *C. innominata* with the description of which they perfectly agree.

37. *COLLOCALIA LINCHI*—HORSFIELD'S SWIFTLET.

*Collocalia linchi* (Horsf. and Moore) ; *Hartert, Cat.*, p. 508 ; *Butler*, p. 27.

Semangko Pass, Selangor-Pahang boundary, 2,700 ft. February, 1908.

Equally common with *C. innominata* at the above locality, but not met with elsewhere in the State. Abundant on the Larut range near Taiping.

38. *CHELURA GIGANTEA*—THE MALAYAN SPINE TAIL SWIFT.

*Chætura gigantea* (Temm.) ; *Hartert, Cat.*, p. 475 ; *Butler*, p. 27 ; *Grant* (2), p. 46.

Very numerous, both at Ginting Bidei and at the Semangko Pass in the early mornings and on cloudy afternoons during and after rain.

39. *CHELURA INDICA*—THE INDIAN SPINE-TAIL SWIFT.

*Chætura indica* (Hume) ; *Hartert, Cat.*, p. 475.

A male shot by Mr. A. L. *Butler* at the Semangko Pass in November, 1900, has the loreal spot clear white, while two other from the same locality obtained in February and May have indications of the same, though in one case they are very faint. The Perak Museum also possesses a specimen of *Ch. indica* shot in the neighbourhood of Taiping.

I am inclined to think that, while *Ch. gigantea* is the resident form, *Ch. indica* migrates south in winter, while possibly interbreeding also takes place.

40. *CILETURA COCHINCHINENSIS*—THE INDO CHINESE SPINE-TAIL SWIFT.

*Chætura cochinchinensis* (Oust.); *Hartert, Cat.*, p. 491; *id.*, *Ibis*, 1896, p. 491.

*Chætura klaesii* (Buttik.); *Hartert, Cat.*, p. 491 (synonym).

Semangko Pass, 2,700 ft. November, 1900. A. L. Butler [c].

Ditto, February, 1908.

This very distinct species differs from the other large Spine-tail Swifts in its smaller size, wing 7.0-7.3 in., its smoke-grey throat, clearly differentiated from the rest of the under parts and in having the centre of the back pale whitish brown. It is by far the most abundant species of its genus on the Semangko Pass, and is also known from Larut, Perak.

41. *CILETURA LEUCOPYGIALIS* THE WHITE RUMPED SPINE-TAIL SWIFT.

*Chætura leucopygialis* (Blyth); *Hartert, Cat.*, p. 490; *Butler*, p. 27.

♀. Semangko Pass, 2,700 ft. May, 1902.

Rare in Selangor or perhaps easily overlooked. The above specimen is the only one in the Selangor Museum. As noted by Butler, its flight is not nearly so swift or direct as that of its larger congeners, more resembling that of *Collocalia*.

42. *CYPSELUS PACIFICUS*—THE LARGE WHITE RUMPED SWIFT.

*Cypselus pacificus* (Lath.); *Hartert, Cat.*, p. 448.

Very common at the Semangko Pass in February, 1908, and also at Kuala Lumpur during rainy, windy weather in October, 1907. Hitherto its occurrence in the Peninsula has rested on a specimen *c*<sup>1</sup> of the British Museum Catalogue obtained by Cantor in Penang.

43. *TACHORNIS INFUMATA*—THE EASTERN PALM-SWIFT.

*Tachornis infumata* (Sclat.); *Hartert, Cat.*, p. 467; *Grant* (1), p. 107.

Semangko Pass, Selangor-Pahang boundary, 2,700 ft. February, 1908.

Fairly common, but not so abundant as the two species of *Collocalia* that fly with it.

44. *MACROPTERYX LONGIPENNIS*—THE CRESTED TREE-SWIFT.

*Macropteryx longipennis* (Rafin.); *Hartert, Cat.*, p. 514; *Butler*, p. 28; *Sharpe* (3), p. 278; *Grant* (2), p. 47.

♀. Bukit Kutu, Ulu Selangor, 3,000 ft. August, 1902.

2 ♀. Semangko Pass, Selangor-Pahang boundary, 2,700 ft. February, 1908.

Ranging as high as 5,000 ft. *Macropteryx comata* (Temm.) has not yet been met with at any elevation on the Selangor main range, though common among the foot hills.

45. *MACROPTERYX COMATA*—THE TUFTED TREE-SWIFT.

*Macropteryx comata* (Temm.); *Hartert, Cat.*, p. 517; *Sharpe* (3), p. 278; *Butler*, p. 28; *Hartert*, p. 544; *Grant* (2), p. 47.

Only accidental on the hills, not ascending them nearly so high as *M. longipennis*, but very common along their bases.

## TROGONIDÆ.

46. *PYROTROGON ERYTHROCEPHALUS*—THE RED-HEADED TROGON.

*Pyrotrogon* (*Harpactes*) *erythrocephalus* (Gould.); *Grant, Cat. Birds Brit. Mus.*, xvii., p. 488 (1892); *Sharpe* (3), p. 280; *Butler*, p. 28; *Grant* (1), p. 106.

Common on the main range of mountains from 3,000 ft. upwards, but not met with as yet on Gunong Tahan.

47. *PYROTROGON NEGLECTUS*—THE MALAYAN TROGON.

*Harpactes diardi* (Temm.); *Grant, Cat.*, p. 432 (*partim ex Malacca and Sumatra*).

*Pyrotrogon neglectus*, *Forbes and Robinson, Bull. Liverpool Mus.*, ii., p. 34 (1900); *Hartert*, p. 544.

By no means common anywhere, except quite in the south of the Peninsula. The Selangor Museum possesses specimens from low elevations only.

48. *PYROTROGON DUVAUCELI*—THE RED-RUMPED TROGON.

*Harpactes duvauceli* (Temm.); *Grant, Cat.*, p. 491; *Sharpe* (1), p. 353; *Butler*, p. 28; *Bonhote*, p. 70.

*Pyrotrogon duvauceli*, *Hartert*, p. 544; *Grant* (1), p. 106.

Recorded by Butler (*loc. cit.*) from as high as 3,500 ft. on the Larut Hills. Quite the commonest of the family in the low country.

49. *PYROTROGON ORESCIUS*—THE YELLOW-BREASTED TROGON.

*Pyrotrogon* (*Harpactes*) *orescius* (Temm.); *Grant, Cat.*, p. 494; *Sharpe* (3), p. 280; *Grant* (1), p. 106; *id.* (2), p. 45.

♀. Ginting Bidei, Selangor, 2,300 ft. May, 1908.

By no means common and apparently inhabiting a somewhat restricted zone from about 2,000-4,000 ft.

## CUCULIDÆ.

50. *SURNICULUS LUGUBRIS*—THE DRONGO CUCKOO.

*Surniculus lugubris* (Horsf.); *Shelley, Cat. Birds Brit. Mus.*, xix., p. 227 (189); *Hartert*, p. 544; *Grant* (1), p. 106; *id.* (2), p. 45.

♂ ad. Semangko Pass, Selangor-Pahang boundary, 2,700 ft. February, 1904.

♂ ad. " " " " " 1908.

♀ pull. " " " " 24th February, 1908.

The last-mentioned chick was found in the nest of a Flycatcher—*Cryptolopha butleri*, *Hartert*—built under an overhanging bank, and the

male foster-parent was shot while in attendance. The youngster is clothed throughout with black feathers very broadly tipped with white, less so on the back.

51. *HIEROCOCCYX BOCKI*—WARDLAW RAMSAY'S HAWK CUCKOO.

*Hierococcyx bocki* (Wardl.-Rams.); *Shelley, Cat.*, p. 234.

I include this species in the Peninsular list on the strength of a mounted specimen from the Larut Hills in the Taiping Museum, which, I am assured by Mr. Wray, the late Curator, was so identified by Dr. Sharpe. *H. sparcerioides* also occurs in the winter months in the low country.

52. *HIEROCOCCYX FUGAX*—HORSFIELD'S HAWK CUCKOO.

*Hierococcyx fugax* (Horsf.); *Shelley, Cat.*, p. 236; *Sharpe* (2), p. 442.

I have not myself met with this species in the Malay Peninsula, but it was very abundant on Pulau Jemor—a small islet in the Straits of Malacca—in November, 1906, together with several other migratory Cuckoos.

53. *CUCULUS POLIOCEPHALUS*—THE SMALL CUCKOO.

*Cuculus poliocephalus* (Lath.); *Shelley, Cat.*, p. 255; *Blandford, Faun. Brit. Ind. Birds*, iii., p. 209 (1895).

♂ ad. Gunong Ulu Kali, Selangor, 4,800-5,800 ft. February, 1906.

♀ ad. Semangko Pass, Selangor-Pahang boundary, 2,500 ft. February, 1908.

Shelley and Blandford (*loc. cit. supra*) both state that this species is found in the Malay Peninsula, but I do not know on what specimens their statement is founded. No recent collector has met with the species, and there are no specimens from the Malay Peninsula in the Hume collection in the British Museum. The species is almost certainly a migrant remaining for a very short time on the mountains of the Peninsula, as is the case with several other birds.

54. *CACOMANTIS MERULINUS*—THE RUFIOUS-BELLIED CUCKOO.

*Cacomantis merulinus* (Scop.); *Shelley, Cat.*, p. 268; *Bonhote*, p. 74; *Hartert*, p. 545; *Grant* (1), p. 105.

♀. Ginting Bidei, Selangor, 2,300 ft. May, 1908.

Common in the low country from December to May, but not often found in the hills.

55. *CENTROPUS SINENSIS*—THE CROW PHEASANT.

*Centropus sinensis* (Steph.); *Shelley, Cat.*, p. 343; *Bonhote*, p. 74; *Grant* (1), p. 105.

♂. Ginting Bidei, Selangor, 2,300 ft. May, 1908.

The Crow Pheasants in the Malay Peninsula are usually found in waste ground or in stretches of country overgrown with coarse lalang grass (*Imperatora koenigi*). They are, therefore, not met with as a

rule on the hills, which are covered with primary jungle, but at Ginting Bidei there happens to be a small patch of lalang, the site of a former bungalow, in which this bird was shot.

56. *RHOPODYTES TRISTIS*—THE LARGE GREEN-BILLED MALKOHA.

*Rhopodytes tristis* (Less.); *Shelley, Cat.*, p. 386; *Bonhote*, p. 75; *Hartert*, p. 545; *Grant* (1), p. 103.

- ♂. Semangko Pass, Selangor-Pahang boundary, 2,700 ft. February, 1908.  
 ♀. Telöm, Batang Padang, South Perak, 3,500 ft. October, 1904.  
 ♂. " " " " November, 1908.

The form of *Rhopodytes tristis* inhabiting the mountains of the Malay Peninsula is probably subspecifically distinct from the typical race from India differing in its smaller size. Wing 5.9 in. against 6.5 in., tarsus 1.35 in. against 1.55 in. However, in the absence of specimens for comparison of *R. tristis* from India and the northern parts of the Peninsula, where it is common in the lowlands, and of *R. elongatus* (S. Müll.) from Sumatra, I prefer not to separate the present race, which will probably be found to be intermediate between the two above-mentioned species.

57. *RHOPODYTES SUMATRANUS*—THE SUMATRAN GREEN BILLED MALKOHA.

*Rhopodytes sumatranus* (Raffles); *Shelley, Cat.*, p. 391; *Hartert*, p. 545; *Grant* (2), p. 43.

Common on Gunong Tahan up to about 4,000 ft., but not met with on other mountains at any elevation.

58. *ZANCLOSTOMUS JAVANICUS*—THE LESSER RED-BILLED MALKOHA.

*Zanclostomus javanicus* (Horsf.); *Shelley, Cat.*, p. 380; *Bonhote*, p. 75; *Hartert*, p. 545; *Grant* (1), p. 104; *id.* (2), p. 44.

- ♂. Bukit Kutu, Ulu Selangor, 3,000 ft. August, 1902.  
 ♀. Ginting Bidei, Selangor, 2,300 ft. May, 1908.

Sparsely distributed from sea level to 5,000 ft., but commonest about 3,000 ft. Usually met with in bamboo jungle.

59. *UROCOCCYX ERYTHROGNATHUS*—THE GREATER RED BILLED MALKOHA.

*Urococcyx erythrognaethus* (Hartl.); *Shelley, Cat.*, p. 398; *Bonhote*, p. 76; *Grant* (1), p. 104; *id.* (2), p. 44.

- Bukit Kutu, Ulu Selangor, 3,000 ft. August, 1902.

Of only accidental occurrence in the mountains.

## CAPITONIDÆ.

60. *CALORHAMPHUS HAYI*—THE BROWN BARBET.

*Calorhamphus hayi* (J. E. Grey); *Shelley, Cat. Birds Brit. Mus.*, xix., p. 51 (1891); *Butler*, p. 25; *Hartert*, p. 546; *Grant* (2), p. 43.

- Ginting Bidei, 2,300 ft. May.

Very common in low country jungle, but becoming much scarcer in the mountains up to 3,000 ft., above which it does not occur.

61. *CHOTORHEA CHRYSOPOGON*—THE GOLD-WHISKERED BARBET.

*Chotorhea chrysopogon* (Temm.); *Shelley, Cat.*, p. 57; *Butler*, p. 25; *Bonhote*, p. 72; *Grant* (1), p. 103; *id.* (2), p. 43.

Bukit Kutu, Selangor, 3,000 ft. August, 1902.

Distribution similar to the preceding species, but much scarcer.

62. *CHOTORHEA VERSICOLOR*—THE MANY-COLOURED BARBET.

*Chotorhea versicolor* (Raffles); *Shelley, Cat.*, p. 59; *Grant* (1), p. 103.

*Megalæma versicolor*, *Sharpe, P.Z.S.*, 1888, p. 280.

Rare on the mountains and not abundant anywhere.

63. *CYANOPS OORTI*—MÜLLER'S BARBET.

*Cyanops oorti* (Müller); *Shelley, Cat.*, p. 71; *Butler*, p. 25; *Hartert*, p. 546; *Grant* (2), p. 43.

*Megalæma oorti*, *Sharpe* (2), p. 442.

Common on the mountains of the main range from Northern Perak to the Semangko Pass. Also on the Larut Hills and Gunong Tahan, but not descending below 3,000 ft.

64. *CYANOPS RAMSAYI*—RAMSAY'S GOLDEN-THROATED BARBET.

*Cyanops ramsayi* (Wald.); *Shelley, Cat.*, p. 70; *Sharpe* (2), p. 442; *Bonhote*, p. 73; *Hartert*, p. 546; *Grant* (2), p. 43.

Distribution identical with the preceding.

65. *CYANOPS MYSTACOPHANES*—THE GAUDY BARBET.

*Cyanops mystacophanes* (Temm.); *Shelley, Cat.*, p. 72; *Bonhote*, p. 73; *Grant* (1), p. 102.

♀. Ginting Bidei, 2,300 ft. May, 1908.

Also from Rantau Panjang in the Selangor low country, but much commoner in the northern parts of the Peninsula.

66. *MESOBUCCO DUVAUCELLI*—THE CRIMSON-EARED BARBET.

*Mesobucco duvauceli* (Less.); *Shelley, Cat.*, p. 85; *Butler*, p. 24; *Grant* (1), p. 101.

Bukit Kutu, Selangor, 3,000 ft. August, 1902.

Sporadic, but fairly common in the low country wherever met with. All six specimens before me have the ear coverts strongly washed with verditer blue. They need comparison with typical *M. duvauceli* and with *M. cyanotis*, which is only a sub-species, from Tenasserim.

67. *PSILOPOGON PYROLOPHUS*—THE FIRE TUFTED BARBET.

*Psilopogon pyrolophus* (S. Müll.): *Shelley, Cat.*, p. 98; *Butler*, p. 24; *Sharpe* (1), p. 352; *id.* (2), p. 442; *Grant* (1), p. 101; *id.* (2), p. 43.

Distribution similar to *C. oorti* and *ramsayi*, except that it does not occur on Gunong Tahan and ranges lower down the hills to about 2,200 ft. Exceedingly common wherever met with.

## INDICATORIDÆ.

68. *INDICATOR MALAYANUS*—THE MALAY HONEY GUIDE.

*Indicator archipelagicus* (Temm.): *Shelley, Cat. Birds Brit. Mus.*, xix., p. 4 (1891) (*partim.*)

*Indicator malayanus*, *Sharpe, P.Z.S.*, 1878, pp. 794, 795 (Malacca); *Hume, Stray Feathers*, viii., p. 155 (Klang).

A single female specimen of a Honey Guide was shot in the vicinity of a bee's nest at Ginting Bidei, 2,300 ft., on 13th May, 1908, by one of the Museum collectors.

Like the type of the species from Malacca and Hume's bird from Klang, the present specimen lacks the yellow shoulder spot present in both sexes of *I. archipelagicus*, so that the Peninsular form may well be regarded as distinct under Sharpe's name *I. malayanus*.

The bird before me, which is perfectly adult, agrees fairly well with the type description, but has the breast strongly washed with dull greyish and is decidedly small. Wing 3.4 in. against 3.9 in.

## PICIDÆ.

69. *GECINUS RODGERI*—RODGER'S GREEN WOODPECKER.

*Gecinus chlorolophus*, *Hargitt, Cat. Birds Brit. Mus.*, xviii., pp. 60, 62 (part. specimen v<sup>m</sup>) (1890); *Sharpe* (2), p. 443.

*Gecinus rodgeri*, *Hartert and Butler*, p. 508; *Butler*, p. 23; *Grant* (2), p. 42.

Common on the hills of the Peninsula from 3,000-5,000 ft. from Larut to Gunong Mengkuang Lebah, but not on Gunong Tahan. Numerous specimens are in the Selangor Museum from Semangko Pass, Gunong Ulu Kali and Gunong Mengkuang Lebah.

70. *GECINUS PUNICEUS OBSERVANDUS*—THE CRIMSON WINGED GREEN WOODPECKER.

*Gecinus puniceus* (Horsf.): *Hargitt, Cat.*, p. 64; *Sharpe* (3), p. 279.

*Gecinus puniceus observandus*, *Hartert, Nov. Zool.*, iii., p. 542; *id.*, *t.c.*, ix., p. 547; *Grant* (1), p. 101; *id.* (2), p. 41.

Common throughout the State, except in the mangrove swamps, extending up the hills to about 3,000 ft., where it meets and is replaced by the succeeding species.

There are specimens in the Selangor Museum from the Semangko Pass and Ginting Bidei, besides numerous lowland localities.

71. *GEVINUS ROBINSONI*—THE BLACK-CAPPED WOODPECKER.

*Gecinus robinsoni*, *Grant, Bull. B.O.C.*, xix., No. c., xxvii., p. 10 (1906); *id.* (2), p. 42.

The types of this Woodpecker, whose nearest ally is *Gecinus occipitalis* which occurs in Tenasserim, were obtained on Gunong Tahan between 5,300 and 6,000 ft., and up to the present remain unique. The species will, however, not improbably be found on the high mountains in the vicinity of Temongoh, where the Kelantan, Perak and Pahang frontiers converge.

72. *GAUROPICOIDES RAFFLESI*—RAFFLE'S THREE TOED WOODPECKER.

*Gauropicoides rafflesi* (Vig.); *Hargitt, Cat.*, p. 132; *Grant* (1), p. 100; *id.* (2), p. 41.

A local species, not as a rule ascending the hills to any great elevation, and commoner in the southern half of the Peninsula.

73. *GEVINULUS VIRIDIS*—THE GREEN BAMBOO PECKER.

*Gecinulus viridis*, Blyth; *Journ. Asiat. Soc. Bengal*, 1862, p. 341; *Hargitt, Cat.*, p. 136 (1890); *Robinson, Journ. Fed. Malay States Museums*, ii., p. 76, No. 306 (1908).

MALE.—General colour above golden olive green, yellower on the sides of the occiput and nape; crown of head and nape rich scarlet, the feather greenish at their bases; rump and upper tail coverts flecked with scarlet, beneath duller olive green; primaries and secondaries dull brown; the outer webs margined with olive green, more broadly on the secondaries, the inner webs with large white spots; axillaries and under wing coverts dusky, with buffy white spots; tail feathers blackish brown, the outer webs fringed with olive, and the inner webs with buffy white spots; shafts black; iris chestnut; tarsi and feet plumbeous green; bill livid bluish grey, whiter at the tip.

FEMALE.—Similar to the male, but with the crown and nape yellowish olive.

IMMATURE.—Three very immature males from Ginting Bidei, shot in April and May, have the whole under surface brownish black, greyer on the throat and faintly washed with olive green on the belly and flanks; upper surface olive green without the golden tinge of adult birds; head greyish brown, the feathers broadly tipped with golden olive, the occipital region more or less strongly washed with scarlet; the rump in all three specimens flecked with scarlet.

SPECIMENS EXAMINED.—Fifteen, Semangko Pass, 2,700-4,500 ft. (February); Tanjong Malim, 500 ft. (April); Ginting Bidei, 2,300 ft. (April and May); Telôm, Perak-Pahang boundary, 3,800 ft. (November).

This Woodpecker appears to be not uncommon on the lower slopes of the Selangor and South Perak Main Range throughout almost its entire length, but seems hitherto to have escaped notice, which is

probably due to the fact that it is exclusively confined to dense bamboo jungle which is almost impenetrable and exceedingly unpleasant to collect in, owing to the immense number of large and venomous mosquitoes which frequent it. The only other place within Peninsular limits, from which this species has been recorded, is Kossoum near Tongkah, so that the present localities are an extension in range southwards of over 500 miles.

74. *PYRRHOPICUS PORPHYROMELAS*—THE MALAY BAY WOODPECKER.

*Lepocestes porphyromelas* (Boie); *Hargitt, Cat.*, p. 382; *Sharpe* (2), p. 443; *Sharpe* (3), p. 279; *Grant* (2), p. 40.

Has a very wide range in altitude from the swamp jungle near the coast almost to the tops of the highest peaks of the main range, but nowhere very common.

In habits it is similar to its congener, keeping on or near the ground. Found in every locality visited on the main range.

75. *PYRRHOPICUS PYRRHOTIS*—THE RED-EARED BAY WOODPECKER.

*Lepocestes pyrrhotis* (Hodgs.); *Hargitt, Cat.*, p. 380; *Sharpe* (3) p. 279.

In the Malay Peninsula, this species, so far as is at present known, is confined to the mountains of the main range above 4,000 ft. from Telôm in Batang Padang on the north to Gunong Mengkuang Lebah to the south.

The Selangor Museum possesses specimens from the latter locality and from the hills above the Semangko Pass, where the bird was not uncommon, being found in fairly dense undergrowth, usually on fallen timber.

76. *MIGLYPTES TUKKI*—THE BUFF-NECKED BARRED WOODPECKER.

*Miglyptes tukki* (Less.); *Hargitt, Cat.*, p. 388; *Sharpe* (3), p. 279; *Butler*, p. 24; *Hartert*, p. 547.

Very common up to 3,000 ft., but not higher.

77. *MIGLYPTES GRAMMITHORAX*—THE FULVOUS RUMPED BARRED WOODPECKER.

*Miglyptes grammithorax* (Malh.); *Hargitt, Cat.*, p. 385; *Sharpe* (2), p. 443; *Butler*, p. 23; *Hartert*, p. 547.

Occurring with the preceding and about equally common.

78. *MICROPTERNUS BRACHYURUS*—THE MALAY RUFOUS WOODPECKER.

*Micropternus brachyurus* (Vieill.); *Hargitt, Cat.*, p. 396; *Sharpe* (3), p. 279; *Bonhote*, p. 72; *Hartert*, p. 547; *Grant* (1), p. 99; *id.* (2), p. 41.

Usually found near cultivation or in secondary jungle, feeding on ants or tree termites, and rarely in high forest. A pair from the Semangko Pass differ in no way from lowland birds.

79. *CHRYSOPHLEGMA MALACCENSE*—THE BANDED RED WOODPECKER.

*Chrysophlegma malaccense* (Lath.) ; *Hargitt, Cat.*, p. 122 ; *Sharpe* (2), p. 442 ; *Bonhote*, p. 71 ; *Grant* (1), p. 100 ; *id.* (2), p. 41.

*Chrysophlegma miniatus malaccensis*, *Hartert*, p. 546.

Specimens are in the Selangor Museum from Telôm, Perak-Pahang boundary, 4,000 ft. ; Semangko Pass, 2,700 ft. ; and Gunong Angsi, Negri Sembilan, 2,600 ft. They appear indistinguishable from others obtained in the low country at heights not exceeding 500 ft.

80. *CHRYSOPHLEGMA HUMII*—HUME'S GOLDEN-NAPED WOODPECKER.

*Chrysophlegma humii*, *Harg.*, *Cat.*, p. 126 ; *Butler*, p. 23 ; *Hartert*, p. 546 ; *Grant* (1), p. 100 ; *id.* (2), p. 41.

Another low country and submontane form reaching 3,000 ft. on the main range at the Semangko Pass, above which it is replaced by *C. wrayi*. Found on Gunong Tahan at 3,000 ft. by myself and at 4,000 ft. by Waterstradt in the same locality, where, however, *C. wrayi* does not occur.

81. *CHRYSOPHLEGMA WRAYI*—WRAY'S GOLDEN-NAPED WOODPECKER.

*Chrysophlegma wrayi*, *Sharpe* ; *Hargitt, Cat.*, p. 130, pl. ii. : *Sharpe* (3), p. 279 ; *Bonhote*, p. 71 ; *Grant* (1), p. 100.

This fine species of Woodpecker is confined to the mountains of the Peninsula and does not occur below 3,000 ft. It is not found on the isolated range of Gunong Tahan, nor does it occur at Ginting Bidei, Gunong Ulu Kali, being the most southerly\*recorded locality. Wherever met with it is a common species frequenting good-sized jungle trees in pairs. It is very restless, and at the least alarm takes to flight, emitting a harsh scream or yell similar to that of the English Green Woodpecker (*Gecinus viridis*).

A female by dissection in the Selangor Museum (189/08), shot on the Semangko Pass on 25th February, 1908, is assuming the plumage of the male, having the basal portions of the feathers of the chocolate malar stripe lemon-yellow.

82. *CHRYSOCOLAPTES VALIDUS*—THE ORANGE BACKED WOODPECKER.

*Chrysocolaptes validus* (Temm.) ; *Hargitt, Cat.*, p. 458 ; *Bonhote*, p. 72 ; *Grant* (1), p. 99 ; *id.* (2), p. 99.

Rare on the mountains.

83. *HEMICERCUS SORDIDUS*—THE GREY AND BUFF WOODPECKER.

*Hemicercus sordidus* (Eyton) ; *Hargitt, Cat.*, p. 482 ; *Hartert*, p. 547 ; *Grant* (1), p. 98.

An immature male obtained at Ginting Bidei, 2,300 ft., in October, 1907, appears to represent the maximum elevation at which the species occurs in the Peninsula. It is fairly common in the low country, especially in bamboo jungle.

84. *PICUMNUS INNOMINATUS*—THE SPECKLED PICULET.

*Picumnus innominatus* (Burton); *Hargitt, Cat.*, p. 550; *Sharpe* (2), p. 443.

*Vivia innominata* (Burton); *Butler*, p. 24.

Three specimens obtained at a height of 4,500 ft. on the hills above the Semangko Pass are the only ones obtained in the Malay Peninsula, with the exception of the two recorded by Sharpe and Butler from the Larut Hills. At elevations of from 3,000-5,000 ft. the species is probably not very uncommon, but, owing to the fact that it frequents the tops of high trees, is very difficult either to see or obtain.

85. *SASIA ABNORMIS EVERETTI*—THE MALAYAN RUFOUS PICULET.

*Sasia everetti*, *Hargitt, t.c.*, p. 559, pt. xv.; *Hartert*, p. 547.\*

*Sasia abnormis* (Temm.); *Sharpe* (3), p. 279.

A submontane bird, widely but sparingly distributed throughout the Peninsula up to about 3,000 ft. Found among low trees and brushwood frequently, perching transversely on the boughs, not longitudinally like other Woodpeckers.

I have followed Hartert in adopting the name of the Bornean form for the species, which differs from the continental race in having a somewhat larger and more robust bill.

An immature female from the low country near Tanjong Malim, obtained in April, 1908, precisely resembles the figure of the type, an unsexed specimen from Lumbidan, Borneo, obtained by Sir Hugh Low.

## EURLÆMIDÆ.

86. *CALYPTOMENA VIRIDIS*—THE GREEN GAPER.

*Calyptomena viridis* (Raffles); *Sclat., Cat. Birds Brit. Mus.*, xiv., p. 456 (1888); *Hartert*, p. 548.

Ginting Bidei, 2,300 ft. May, 1908.

Common everywhere in the low country, especially in old secondary jungle. It does not appear to range far into the mountains, and the above elevation seems to be the greatest definitely recorded, though Waterstradt's birds from Gunong Tahan (*Hartert, loc. cit.*) are labelled 2,000-5,000 ft.

87. *PSARISOMUS DALHOUSIE*—THE LONG-TAILED BROADBILL.

*Psarisomus dalhousiæ* (Jameson); *Sclater, Cat.*, p. 458 (1888); *Butler*, p. 23; *Grant* (2), p. 38.

Common on the Semangko Pass at about 3,000 ft., though on Gunong Tahan it was met with as low as 500 ft. The only other recorded localities in the Peninsula are the Larut Hills, 3,500 ft., and Telôm, South Perak, 3,500 ft.

\* Waterstradt is stated to have obtained the species on Gunong Tahan at from 5,000-7,000 ft., but I think that some mistake has probably taken place in the labelling. It was probably secured much lower down the range.

88. *SERILOPHUS ROTHSCILDI*—ROTHSCILDI'S BROADBILL.

*Serilophus rothschildi*, *Hartert and Butler, Bull. B.O.C.*, vii., No. liv., p. 50 (1898); *id.*, *Nov. Zool.*, v., p. 508; *Butler*, p. 22; *Robinson, antea*, p. 77, No. 331.

MALE.—Forehead and anterior part of the crown bluish grey, darkening to dull brownish grey on the occiput and mantle; back, rump and upper tail coverts chestnut, duller on the back; starting from in front of the eye and reaching as far as the hind neck a glossy black superciliary streak, broadening posteriorly, the feathers somewhat elongate; loreal region dark grey; ear coverts grey with a tinge of brown; a white ring round the eye; under surface silvery grey, bluish on the breast and white on the centre of the abdomen and under tail coverts; tibial feathers glossy black; tail feathers black, all but the two centre pairs broadly tipped with white and with a narrow edging of white, extending some distance up the outer webs; primaries glossy black, the innermost narrowly tipped with chestnut on their inner webs with a speculum of greyish blue on the outer webs, and another white one on the inner webs, extending just beyond the shafts; the primaries, secondaries and tertiaries broadly tipped with white which extends some distance up the shafts, the white tips succeeded by an ill-defined band of greyish blue; remaining primaries, with the terminal portion of the shaft, white and very narrowly tipped with blue; secondaries similar to the inner primaries, but a much broader band of chestnut on the inner web; tertiaries chestnut, blackish basally; wing coverts glossy black, the lesser ones along the angle of the wing dark bluish grey; under wing coverts black; axillaries white.

“Iris greenish brown, mottled with golden specks; eyelid and base of mandible for about  $\frac{1}{8}$  in. bright gamboge yellow; bill pale bluish white, tip and lateral edges whitish; feet pale greenish chrome; claws milky blue.”—(*A. L. Butler*).

Total length, 62 in. (158 mm.); wing, 3.5 in. (89 mm.); tail, 2.6 in. (65 mm.); tarsi, .75 in. (19 mm.); bill culmen, .62 in. (16 mm.); bill gape, .93 in. (24 mm.).

FEMALE.—Similar to the male, but with a gorget, interrupted mesially, on the lower neck, formed by glistening white tips to the feathers.

IMMATURE MALE (half grown).—Almost identical with the adult male, but with the occiput browner and the chestnut on the tertiaries less developed; legs in dried skin pale yellowish, not dark greenish.

One of the most noticeable features in birds of this genus is the curious form of the outer primaries, which are abruptly truncated at the tip with the shaft extended for about  $\frac{1}{2}$  in., forming a sharp point.

SPECIMENS EXAMINED.—Five, Ginting Bidei, Selangor, 2,300 ft. (May and November), from bamboo jungle.

Until these specimens were obtained in November, 1907, this very beautiful species was known only from the three original specimens obtained by Mr. Butler on the Larut Hills between 2,500 and 3,500 ft.

in February and March, 1898. That it has not been obtained more frequently is probably due to the fact that it is largely confined to bamboo jungle, which, as mentioned previously, is difficult and unpleasant to collect in.

89. *EURLÆMUS JAVANICUS*—HORSEFIELD'S BROADBILL.

*Eurylæmus javanicus* (Horsf.); *Sclater, Cat.*, p. 463; *Hartert*, p. 548.

Bukit Kutu, Ulu Selangor, 3,000 ft. August, 1902.

Usually found on the foot hills, and not extending to greater elevation than the above.

90. *CORYDON SUMATRANUS*—THE DUSKY BROADBILL.

*Corydon sumatranus* (Raffles); *Sclater, Cat.*, p. 466; *Sharpe* (3), p. 278; *Hartert*, p. 548; *Grant* (2), p. 39.

Bukit Kutu and Semangko Pass, 2,700-3,500 ft.

Not found higher than the above limit, and much commoner on the lower hills, 500-1,000 ft.

### HIRUNDINIDÆ.

91. *HIRUNDO GUTTURALIS*—THE EASTERN SWALLOW.

*Hirundo gutturalis*, Scop.; *Sharpe, Cat. Birds Brit. Mus.*, x., p. 134 (1885); *Sharpe* (2), p. 442; *Butler*, p. 20.

Fairly common everywhere to considerable altitudes, especially in the winter months when young birds are in the great majority.

### MUSCICAPIDÆ.

92. *HEMICHELIDON FULIGINOSA*—THE SOOTY FLYCATCHER.

*Hemichelidon siberica* (Gm.); *Sharpe, Cat. Birds Brit. Mus.*, iv., p. 120 (pt.) (1879); *Butler*, p. 18.

The Sooty Flycatcher occurs in migration in the mountains of the Peninsula on migration, but is not abundant, and does not remain long. Specimens are in the Selangor Museum from Semangko Pass, 3,000 ft. (January); Bukit Kutu, 3,000 ft. (December); Tanjong Malim, 1,300 ft. (April).

93. *HEMICHELIDON FERRUGINEA*—THE FERRUGINOUS FLYCATCHER.

*Hemichelidon ferruginea*, Hodg.; *Sharpe, Cat.*, p. 132; *Butler*, p. 18; *Hartert*, p. 548; *Grant* (1), p. 95.

A migratory species like the preceding, but much commoner and apparently making a longer stay if not actually resident. The Selangor Museum possesses specimens from most localities visited on the main range, dated from October to March, and Waterstradt collected it at from 2,000-5,000 ft. on Gunong Tahan, where I did not myself meet with it in July. It has not yet been met with in the lowlands of the Peninsula itself, but I secured one specimen on the Aroa Islands—a small group of low islands in the Straits of Malacca, about 25 miles off the Sumatran Coast—in November.

94. *ALSEONAX LATIROSTRIS*—THE BROWN FLYCATCHER.

*Alseonax latirostris* (Raffles); *Sharpe, Cat.*, p. 127; *Butler*, p. 19; *Grant* (1), p. 94.

A winter visitor to the Peninsula. Specimens in the Selangor Museum are dated from November to February.

95. *CYORNIS CONCRETA*—THE WHITE-TAILED BLUE FLYCATCHER.

*Pachycephala cyanea* (Hume); *Gadow, Cat. Birds Brit. Mus.*, viii., p. 224 (1883).

*Niltava leucoprocta* (Tweedd.); *Sharpe* (3), p. 272.

*Cyornis concretus* (Müll.); *Hartert*, p. 549; *Grant* (2), p. 37.

Another characteristic bird of the mountain bamboo jungle. I have before me seven skins from Ginting Bidei, collected in November and May, and a single male from the Semangko Pass, shot in April. Evidently a rare and local species, as besides these specimens only three others on record from the Malay Peninsula. I regard the occurrence of the species at as low an elevation as 500-1,000 ft. on Gunong Tahan (*Grant, loc. cit.*) as purely accidental.

96. *CYORNIS MALAYENSIS*—THE MALAY BLUE AND CHESTNUT FLYCATCHER.

*Cyornis malayensis*, *antea*, p. 163.

♂ ♀. Telôm, Perak-Pahang boundary, 3,500 ft. November, 1908.

Will probably be found along the whole length of the main range above 3,000 ft.

97. *CYORNIS UNICOLOR INFUSCATA*—THE PALE BLUE FLYCATCHER.

*Siphia unicolor infuscata* (Blyth); *Hartert*, p. 215.

*Siphia unicolor*, *Sharpe, Cat.*, p. 446.

Four specimens before me (♂ ♀, Ginting Bidei, October and May; ♂, Bukit Arang, Selangor, 500 ft.; ♀, Gunong Tahan, 3,300 ft., June) agree with Dr. Hartert's remarks on the subject, in that the males are of small size (wing, 76-87 mm.) and very brightly coloured.

98. *CYORNIS TICKELLÆ*—TICKELL'S BLUE FLYCATCHER.

*Siphia tickellæ* (Blyth); *Sharpe, Cat.*, p. 447.

*Cyornis tickellæ*, *Butler*, p. 18.

Fairly abundant at the Semangko Pass in February and at Ginting Bidei in May. From the latter locality young birds in mottled plumage were obtained, so that the breeding season is probably in April.

99. *NITIDULA HODGSONI*—THE PIGMY BLUE FLYCATCHER.

*Tarsiger hodgsoni* (Moore); *Sharpe, Cat.*, p. 258.

*Nitidula hodgsoni*, *Butler*, p. 18.

Two males shot on the hills above the Semangko Pass in February, 1908, and Butler's specimen from 4,500 ft. on the Larut Hills are the only records for the Malay Peninsula.

100. *ANTHITES MALAYANA*—THE MALAY WHITE GORGETED FLYCATCHER.

*Digenea malayana*, *Sharpe* (3), p. 247; *Butler*, p. 18; *Grant* (2), p. 37.

*Anthites malayana*, *Sharpe* (3), pp. 247, 272.

Distribution in the Peninsula as *Muscicapula westermanni*. Common above 4,000 ft. in low scrub.

101. *NILTAVA GRANDIS DECIPIENS*—THE MALAYAN NILTAVA.

*Niltava grandis*, *Hodgs.*; *Sharpe* (1), p. 351; *id.* (2), p. 436; *id.* (3), p. 272; *Hartert* and *Butler*, p. 507; *Butler*, p. 19.

*Niltava decipiens*, *Salvad.*, *Ann. Mus. Civ. Gen.* (2), xii., p. 49 (1892); *Grant* (1), p. 94; *id.* (2), p. 37.

*Niltava grandis decipiens*, *Hartert*, p. 551.

Exceedingly common amongst low scrub on all the hills above about 3,500 ft.

102. *ERYTHROMYIAS MUELLERI*—THE SHORT TAILED FLYCATCHER.

*Erythromyias muelleri* (Blyth); *Sharpe*, *Cat.*, p. 200; *Hartert*, p. 551.

Ginting Bidei, 2,300 ft. October.

Semangko Pass, 2,700-4,500 ft. February.

This species occurs at low altitudes within a few miles of Kuala Lumpur, and has also been found dead on the beach at Kuantan on the East Coast (Pahang) after a heavy storm, so that it is not impossibly migratory.

103. *POLIOMYIAS LUTEOLA*—THE ORANGE BREASTED FLYCATCHER.

*Poliomyias luteola* (Pall.); *Sharpe*, *t.c.*, p. 201; *Grant* (1), p. 94.

Bukit Kutu, 3,000 ft. November, 1898.

Semangko Pass, 2,700 ft. November, 1900.

The two specimens recorded above, both collected by Butler, and two adult males from Telôm are very much more intense in colouration than individuals of the same sex collected on Pulau Terutau—an island off the West Coast of the Peninsula, about 80 miles north of Penang—in December, 1907.

104. *MUSCICAPULA WESTERMANNI*—THE LITTLE MALAY PIED FLYCATCHER.

*Muscicapula westermanni*, *Sharpe*, *P.Z.S.*, 1888, p. 280; *Butler*, p. 52; *Hartert*, p. 551; *Grant* (2), p. 38.

Fairly common on all the hills of the main range, on the Larut Range and on Gunung Tahan, above 4,000 ft., but not descending lower.

105. *MUSCICAPULA MALAYANA*—THE MALAYAN RUFOUS-BREASTED BLUE FLYCATCHER.

*Muscicapula malayana*, *Grant, Bull. B.O.C.*, xix., No. cxxvii., p. 10 (1906); *id.* (2), p. 38.

*Muscicapula hyperythra*, *Sharpe* (3), p. 270; *Hartert*, p. 552.

The only locality in Selangor for this Flycatcher is Gunong Mengkuang Lebah, 4,800-5,200 ft., where it is common. The general distribution in the Peninsula is the same as that of the preceding species, except that the present form has not yet been met with on the Larut Hills.

106. *GERYGONE MODIGLIANII*—MODIGLIANI'S FLYCATCHER.

*Gerygone modiglianii*, *Salvad., Ann. Mus. Civ. Gen.* (2), xii., p. 71 (1891); *Hartert*, p. 552

*Gerygone pectoralis*, *Darison, Ibis*, 1892, p. 99; *Sharpe, Bull. B.O.C.*, ii., p. 7 (1892).

Two specimens only, are on record from the Malay Peninsula: the type of *G. pectoralis* from the Coast of Pahang near Pekan, and Waterstradt's skin from Gunong Taban, 2,000-5,000 ft.

107. *CYANOPTILA BELLI*—HAY'S FAIRY FLYCATCHER.

*Xanthopygia cyanomelæna* (Temm.); *Sharpe, Cat.*, p. 249.

Four birds—an adult and two immature males, collected by Mr. A. L. Butler on Bukit Kutu, Ulu Selangor, 3,000 ft., and an adult male from Pulau Terutau, north of Penang, shot in March—appear to be the only specimens of this migratory bird hitherto obtained in the Peninsula.

108. *HYPOTHYMIS AZUREA*—THE AZURE FLYCATCHER.

*Hypothymis azurea* (Bodd.); *Sharpe, Cat.*, p. 274; *Hartert*, p. 552; *Grant* (1), p. 94; *id.* (2), p. 37.

Three thousand feet is about the superior limit of this species, which is very common in the low country.

109. *RHIPIDURA ALBICOLLIS*—THE WHITE THROATED FAN-TAIL FLYCATCHER.

*Rhipidura albicollis* (Vieill.); *Sharpe, Cat.*, p. 317; *Sharpe* (2), p. 435; *Hartert and Butler*, p. 507; *Butler*, p. 19; *Grant* (1), p. 92; *id.* (2), p. 37.

*Rhipidura atrata*, *Salvad., Ann. Mus. Civ. Gen.*, xiv., p. 203 (1879); *Hartert*, p. 552.

Common everywhere above 3,000 ft., but difficult to obtain in good plumage.

I have followed Grant in not recognising *R. atrata*, *Salvad.*, described from the mountains of Sumatra and based mainly on the wider white tips to the tail feathers as distinct.

110. *TERPSIPHONE AFFINIS*—THE BURMESE PARADISE FLYCATCHER.

*Terpsiphone affinis* (Blyth); *Sharpe, Cat.*, p. 349; *Sharpe* (3), p. 270; *Butler*, p. 19; *Hartert*, p. 553; *Grant* (2), p. 37.

Adult specimens in white plumage are in the collection from Ginting Bidei, shot in May, and also numerous examples in the chestnut plumage, amongst which may be included *T. incii*, which, however, is a migrant and does not probably occur in the Peninsula so late in the spring.

About 3,500 ft. represents the superior limit of the species, specimens having been obtained at that height at Telôm in the Batang Padang highlands, South Perak.

111. *PHILENTOMA VELATUM*—THE MAROON-BREADED FLYCATCHER.

*Philentoma velatum* (Temm.); *Sharpe, Cat.*, p. 365; *Sharpe* (3), p. 271; *Hartert*, p. 553; *Grant* (2), p. 36.

Bukit Kutu, August, and Ginting Bidei, May.

Not met with above 3,500 ft.

112. *PHILENTOMA PYRRHOPTERUM*—THE CHESTNUT-WINGED FLYCATCHER.

*Philentoma pyrrhopterum* (Temm.); *Sharpe, Cat.*, p. 366; *Sharpe* (3), p. 271; *Hartert*, p. 553.

Ginting Bidei. October.

Altitudinal range as in the two preceding species.

113. *RHINOMYIAS PECTORALIS*—SALVADORI'S FLYCATCHER.

*Rhinomyias pectoralis* (Salvad.); *Sharpe, Cat.*, p. 368; *Hartert*, p. 553; *Grant* (2), p. 35.

Specimens from Tanjong Malim, South Perak, at the foot of the main range are in the Selangor Museum.

114. *CULICICAPA CEYLONENSIS*—THE GREY-HEADED FLYCATCHER.

*Culicicapa ceylonensis* (Swains.); *Sharpe, Cat.*, p. 369; *Sharpe* (3), p. 271; *Butler*, p. 19; *Hartert*, p. 553.

Bukit Kutu, Semangko Pass and Ginting Bidei.

A submontane bird, rare in the low country, but not ascending the hills to more than 3,000 ft.

115. *CRYPTOLOPHA TRIVIRGATA*—STRICKLAND'S FLYCATCHER WARBLER.

*Cryptolopha trivirgata* (Strickl.); *Sharpe, Cat.*, p. 396; *id.* (2), p. 435; *id.* (3), p. 271; *Hartert*, p. 553; *Grant* (2), p. 36.

Gunong Mengkuang Lebah, 4,800-5,200 ft.

Not as a rule below 4,000 ft., but fairly common on most mountains above that elevation.

116. *CRYPTOLOPHA BUTLERI*—BUTLER'S FLYCATCHER WARBLER.

*Cryptolopha butleri*, *Hartert, Bull. B.O.C.*, vii., No. liv., p. 50 (1898); *id., Ibis*, 1898, p. 435; *id., Nov. Zool.*, v., p. 508 (1898).

♂, 2 ♀. Semangko Pass, 3,000-4,000 ft. February, 1898.

The type specimen was collected on Gunong Ijau on the Larut Range at about 4,000 ft. and remained unique until the above three specimens were obtained. The nest was also secured among roots and rubbish beneath an overhanging bank at the side of a path; it was the usual deep cup-shaped structure characteristic of the smaller Flycatchers and contained a nestling of the Drongo Cuckoo (*Surniculus lugubris*). The male parent was shot in the immediate vicinity of the nest.

117. *CRYPTOLOPHA DAVISONI*—DAVISON'S FLYCATCHER WARBLER.

*Cryptolopha davisoni*, *Sharpe, P.Z.S.*, 1888, p. 271; *Grant (2)*, p. 35.

Gunong Mengkuang Lebah, 4,800 ft. March, 1907.

In company with *C. trivirgata*, but much rarer.

118. *ABRORNIS SCHWANERI*—THE BAMBOO FLYCATCHER WARBLER.

*Cryptolopha schwaneri* (Blyth); *Sharpe, Cat.*, p. 403; *id., in Whitehead's Kinabalu*, p. 214 (1892).

Semangko Pass, 3,000 ft. February; Ginting Bidci, 2,300 ft. October and May.

Common in bamboo jungle in the above localities, but hitherto overlooked.

The main distinction between this species and the closely allied *Abrornis superciliaris* from Tenasserim lies in the *greyish black*, not brown lores, and in the greater extent of the grey crown.

The specimen of *A. superciliaris* in the British Museum referred to by Oates (*Faun. Brit. Ind. Birds*, i., p. 430) requires re-examination. If the identification is correct, there is probably some mistake in locality as it is in the highest degree unlikely that any bird of the genus occurs in the island.

119. *STOPAROLA THALASSINOIDES*—THE MALAYAN VERDITER FLYCATCHER.

*Stoparola thalassinoides* (Cab.); *Sharpe, Cat.*, p. 439; *id. (3)*, p. 271; *Hartert*, p. 553.

1 ♂. Semangko Pass. February, 1908.

Apparently somewhat rare and local in the Malay Peninsula. The only other specimens in the Selangor Museum are: one shot by Mr. A. L. Butler at Kuala Lumpur in March, 1900, and one from Telôm, November, 1908.

## CAMPOPHAGIDÆ.

120. *ARTAMIDES LARUTENSIS*—THE MOUNTAIN CUCKOO SHRIKE.

*Artamides larutensis*, *Sharpe, P.Z.S.*, 1887, p. 435.

*Graucalus larutensis* (Sharpe); *Butler*, p. 18; *Hartert*, p. 554; *Grant* (2), p. 35.

Fairly common, replacing *G. sumatrensis* (S. Müll.) above 3,000 ft.

121. *LALAGE CULMINATA*.

*Lalage culminata* (A. Hay); *Sharpe, Cat. Birds Brit. Mus.*, iv., p. 104 (1879); *Bull. B.O.C.*, i., No. 2, p. vii. (1892).

*Campophaga minor*, *Davison, Ibis*, 1892, p. 99.

*Lalage fimbriata culminatus*, *Hartert, Nov. Zool.*, ix., pp. 556, 557 (1902).

Gunong Tahan.

122. *PERICROCOTUS FLAMMIFER*—DAVISON'S SCARLET MINIVET.

*Pericrocotus flammifer*, Hume; *Sharpe, Cat.*, p. 74; *Butler*, p. 17; *Grant* (1), p. 90.

Very common on the Semangko Pass up to 3,000 ft., but very rare in the low country, where, however, it is occasionally met with.

123. *PERICROCOTUS FRATERCULUS*—THE BURMESE SCARLET MINIVET.

*Pericrocotus fraterculus*, Swinh.; *Sharpe, Cat.*, p. 73 (1870).

*Pericrocotus speciosus fraterculus*, *Butler*, p. 17; *Hartert*, p. 555.

The specimens from Gunong Ijau, 1,500-3,500 ft., and Gunong Tahan, 3,000 ft., are the only ones from the Malay Peninsula, with which I am acquainted; I have not met with the species myself, nor is it represented in the Selangor, Perak or Singapore Museums.

124. *PERICROCOTUS MONTANUS*—WRAY'S MINIVET.

*Pericrocotus montanus*, *Salvad., Ann. Mus. Civ. Gen.*, xiv., p. 205 (1879); *Hartert*, p. 554; *Grant* (1), p. 91; *id.* (2), p. 34.

*Pericrocotus wrayi*, *Sharpe* (3), p. 269, pl. xv.; *Butler*, p. 17; *Bonhote*, p. 60.

Exceedingly common on all the Selangor mountains above 3,000 ft., becoming scarcer above 4,500 ft.

## PYCNONOTIDÆ.

125. *ÆTHORHYNCHUS LAFRESNAYEI*—THE GREAT IORA.

*Æthorhynchus lafresnayei* (Hartl.); *Sharpe, Cat. Birds Brit. Mus.*, vi., p. 14 (1881); *Grant* (1), p. 88.

Bukit Kutu, 3,000 ft., and Ginting Bidei, 2,300 ft.

Not very rare in certain localities, but seldom procured, as it keeps to the tops of fairly high trees. There is a series of six specimens in the Selangor Museum, including lowland localities close to Kuala Lumpur.

126. *CHLOROPSIS HARDWICKII*—THE ORANGE-BELLIED GREEN BULBUL.

*Chloropsis hardwickii*, Jard. and Selby.; *Sharpe, Cat.*, p. 18; *Grant (1)*, p. 89.

Semangko Pass, Gunong Ulu Kali and Gunong Mengkuang Lebah.

Fairly abundant in the above localities, usually not below 4,000 ft. In Perak it occurs on the Larut Hills and in the Batang Padang Highlands at similar elevations. It has not yet been collected on Gunong Tahan, but doubtless occurs there.

127. *CHLOROPSIS ZOSTEROPS*—THE MALACHITE-SHOULDERED GREEN BULBUL.

*Chloropsis zosterops*, Vig.; *Sharpe, Cat.*, p. 24; *Grant (2)*, p. 33.

*Chloropsis viridis viriditectus*, *Hartert, Nov. Zool.*, ix., pp. 212, 557 (1902).

Mr. Butler collected a pair on Bukit Kutu, 3,000 ft., in November, 1898, but it has not since been met with on the mountains in Perak and Selangor. It occurs up to 3,300 ft. on Gunong Tahan.

128. *CHLOROPSIS ICTEROCEPHALA* THE YELLOW-HEADED GREEN BULBUL.

*Chloropsis icterocephala* (Less.); *Sharpe, Cat.*, p. 30; *Butler*, p. 14; *Hartert*, p. 557.

Semangko Pass and Ginting Bidei.

Not reaching more than 3,000 ft. The commonest species of the Genus in the Malay Peninsula.

129. *CHLOROPSIS CYANOPOGON*—THE BLUE-WHISKERED GREEN BULBUL.

*Chloropsis cyanopogon* (Temm.); *Sharpe, Cat.*, p. 32; *Hartert*, p. 557.

Ginting Bidei, 2,300 ft. May, 1908.

The range of this species is similar to *C. icterocephala*, but it is decidedly scarcer.

130. *IRENA CYANEA*—THE MALAYAN FAIRY BLUE BIRD.

*Irena cyanea*, *Begbie*; *Sharpe, Cat.*, p. 179; *Butler*, p. 14; *Hartert*, p. 557; *Grant (1)*, p. 88; *id. (2)*, p. 33.

Very common at low elevations, becoming scarcer on the hills and disappearing at 3,000 ft.

131. *HEMIXUS CINEREUS*—THE ASHY BULBUL.

*Hemixus cinereus* (Blyth); *Sharpe, Cat.*, p. 52; *Bonhote*, p. 61; *Hartert*, p. 557; *Grant (1)*, p. 88; *id. (2)*, p. 32.

Common on almost every mountain visited in the Malay Peninsula from Bukit Besar (2,500 ft.) near Patani in the north to Mount Ophir in the south.

The types of the species and of *Iole terricolor*, Hume, founded on worn specimens are stated to have come from near Malacca, but are probably from the slopes of the Mount Ophir. The species is, however, said to occur near sea level in Johore. Its superior limit is about 4,200 ft.

132. *HEMIXUS MALACCENSIS*—THE STREAKED BULBUL.

*Hemixus malaccensis* (Blyth); *Sharpe, Cat.*, p. 52; *Hartert*, p. 559; *Grant* (1), p. 88; *id.* (2), p. 33.

Ginting Bidei, 2,300 ft. October.

Decidedly rare north of Malacca on the W. Coast, the above specimen being the only one I have seen from Selangor. Common on Gunong Tahan.

133. *IOLE OLIVACEA*—THE OLIVE BULBUL.

*Iole olivacea*, Blyth; *Sharpe, Cat.*, p. 55; *Butler*, p. 15; *Hartert*, p. 558; *Grant* (1), p. 87.

Ginting Bidei, 2,300 ft. May, 1908.

Not found on the mountain beyond 2,500 ft., but fairly numerous in thick jungle on the foot hills. The specimens before me (seven in number) are very typical and show no approach to *Iole virescens*, which has been recorded from Tonka in the north of the Peninsula.

134. *IOLE PERACENSIS*—THE MOUNTAIN STREAKED BULBUL.

*Iole tickelli peracensis*, *Hartert* and *Butler, Nov. Zool.*, v., p. 506 (1898); *Butler*, p. 15; *Hartert*, p. 558.

*Iole peracensis*, *Grant* (1), p. 87; *id.* (2), p. 32.

*Iole tickelli*, *Sharpe* (2), p. 437; *Bonhote*, p. 61.

Very common on most mountains above 2,500 ft. Does not occur south of Selangor.

135. *MICROPUS MELANOLEUCUS*—THE BLACK AND WHITE BULBUL.

*Microtarsus melanoleucus* (Eyton); *Sharpe, Cat.*, p. 69; *Grant* (2), p. 32.

A single specimen was collected on Bukit Kutu by Butler in November, 1898. It has been met with on Gunong Tahan as high as 6,000 ft., and is common on the Selangor Coast throughout the year.

136. *CRINIGER TEPHROGENYS*—THE LOWLAND CRESTED BULBUL.

*Criniger tephrogenys* (Jard. and Selby.); *Sharpe, Cat.*, p. 71, *foot-note*; *Hartert*, p. 558; *Grant* (1), p. 86; *id.* (2), p. 31.

Ginting Bidei, 2,300 ft. May, 1908.

Common from the sea coast to about 2,500 ft., above which its place is taken by *C. ochraceus* (Moore).

137. *CRINIGER OCHRACEUS*—THE UPLAND CRESTED BULBUL.

*Criniger ochraceus*, Moore; *in Horsf. and Moore, Cat. B. Mus., E. I. Co., i., p. 252*; *Hartert, p. 559*; *Grant (2), p. 35*.

*Criniger gutturalis*, *Sharpe, Cat., p. 80*; *Butler, p. 24*.

*Criniger sordidus*, *Richmond, Proc. U.S. Nat. Mus., xxii., p. 320 (1900)*.

Fairly common from 2,000-4,000 ft., replacing the lowland *C. tephrogenys*, but found at sea level on Pulau Langkawi, north of Penang.

138. *CRINIGER FINSCHII*—FINSCH'S BULBUL.

*Criniger finschii*, *Salvad.; Sharpe, Cat., p. 84, pl. vi., fig. 1*; *Hartert, p. 560*.

Normally a low country form. The Selangor Museum possesses specimens from the vicinity of Kuala Lumpur and from Tanjong Malim, Perak. Met with by Waterstradt on Gunung Tahan from 2,000-5,000 ft.

139. *TRACHYCOMUS OCHROCEPHALUS*—THE YELLOW CROWNED BULBUL.

*Trachycomus ochrocephalus* (Gm.); *Sharpe, Cat., p. 93; id. (3), p. 272*.

Though this bird is exceedingly common on the banks of the big rivers, it is never, so far as my experience goes, met with in deep jungle. There is, therefore, probably some mistake in the labelling of the specimen recorded by Sharpe as from the Batang Padang mountains.

140. *ALOPHOIXUS PHÆOCEPHALUS*—THE CRESTLESS WHITE-THROATED BULBUL.

*Criniger phæocephalus* (Hartl.); *Sharpe, Cat., p. 74*.

*Alophoixus phæocephalus* (Hartl.); *Faun. Brit. Ind., i., p. 259 (1889)*; *Hartert, p. 560*.

Ginting Bidei, 2,300 ft. October, 1907.

Somewhat local and not extending far up the hills.

141. *TRICHOLESTES CRINIGER*—THE HAIRY-BACKED BULBUL.

*Tricholestes criniger* (Blyth); *Sharpe, Cat., p. 89; Butler, p. 14; Hartert, p. 560; Grant (1), p. 86; id. (2), p. 31*.

Bukit Kutu and Ginting Bidei.

Common; found as high as 3,000 ft.

142. *PYCNONOTUS FINLAYSONI*—FINLAYSON'S STRIPE THROATED BULBUL.

*Pycnonotus finlaysoni*, Strickl.; *Sharpe, Cat., p. 144; Butler, p. 15; Bonhote, p. 62; Hartert, p. 560; Grant (1), p. 85*.

One specimen from Semangko Pass, 2,700 ft., another from Tanjong Malim at the foot of the main range, and a third from Kuala Lumpur are the only records of this species from the State of Selangor. North of the latitude of Taiping it is very abundant, probably extending somewhat further to the south on the East Coast. It is stated to be common in Malacca, whence Hume's collectors obtained numerous specimens.

143. *PYCNONOTUS SIMPLEX*—MOORE'S OLIVE BULBUL.

*Pycnonotus simplex* (Less.); *Sharpe, Cat.*, p. 153, pl. ix., *Butler*, p. 15; *Bonhote*, p. 62; *Hartert*, p. 560; *Grant* (1), p. 86; *id.* (2), p. 31.

Ginting Bidei. May, 1908.

Common everywhere in secondary and old jungle up to 3,000 ft.

144. *OTOCOMPSA FLAVIVENTRIS*—THE BLACK-CRESTED YELLOW BULBUL.

*Otocompsa flaviventris* (Tick.); *Sharpe, Cat.*, p. 161; *Butler*, p. 14.

Sparsely distributed above 2,000 ft. Specimens are in the Selangor Museum from Bukit Kutu, Semangko Pass and Ginting Bidei.

145. *RUBIGULA CYANIVENTRIS*—THE GREY-BELLIED BULBUL.

*Rubigula cyaniventris* (Blyth); *Hartert*, p. 561; *Grant* (2), p. 31.

*Pycnonotus cyaniventris* (Blyth); *Butler*, p. 15.

Bukit Kutu, 3,000 ft. August, 1902.

Common in the lowlands and up to 3,000 ft.

146. *RUBIGULA WEBBERI*—THE SCALY-BREASTED BULBUL.

*Rubigula webberi* (Hume); *Sharpe, Cat.*, p. 171; *Hartert*, p. 561; *Grant* (2), p. 31.

Bukit Kutu, 3,000 ft. August, 1902.

The above specimen is the only one I have seen from the western Federated Malay States.

## TIMELIIDÆ.

147. *GAMPSORHYNCHUS SATURATOR*—THE WHITE-HEADED SHRIKE  
BABBLER.

*Gampsorhynchus saturator*, *Sharpe, P.Z.S.*, 1888, p. 273; *Butler*, p. 11; *Grant* (1), p. 83.

Semangko Pass, 2,400-3,000 ft.

This species is only known from the type procured by Mr. Wray in the Batang Padang highlands in South Perak, and the very numerous specimens obtained by Mr. Butler, myself and the collectors of the Selangor Museum at the Semangko Pass, where the bird is very common. It is generally seen in early morning or evening high among the bamboos, and is very active and restless in its habits. The zone it inhabits is very limited, and I have never seen it above 3,000 ft., nor much below 2,400 ft.

148. *EUPETES MACROCERCUS*—THE MALAYAN EUPETES.

*Eupetes macrocerus* (Temm.); *Sharpe, Cat. Birds Brit. Mus.*, vii., p. 338 (1883); *Hartert*, p. 561; *Grant* (2), p. 30.

Semangko Pass and Ginting Bidei.

A bird that seems to be very rarely met with, now that the days of the old Malacca plumage hunters are a thing of the past. I have

never seen the bird myself, but my Dyak hunters tell me it runs about on the ground among fallen timber like a Pitta. It has not been met with above 3,000 ft.

149. *TROCHALOPTERON PENINSULÆ*—THE MALAY LAUGHING THRUSH.

*Trochalopteron peninsulæ*, Sharpe, *P.Z.S.*, 1887, p. 436, pt. xxxvii.; *Hartert and Butler*, p. 506; *Butler*, p. 11; *Bonhote*, p. 63; *Hartert*, p. 562; *Grant* (2), p. 30.

Common on all the peaks of the Peninsula Main Range, south to Gunong Mengkuang Lebah, and also on Gunong Tahan; not so common on the Larut Range from G. Inas to the hills above Taiping; not as a rule found below 3,500 ft. A bird with a pleasant clear whistle usually met with in parties of four or five on low trees and bushes, sometimes nearly on the ground. Peculiar to the Peninsula.

150. *POMATORHINUS BORNEENSIS*—CABANI'S SCIMITAR BABBLER.

*Pomatorhinus borneensis* (Cab.); *Sharpe, Cat.*, p. 411; *Hartert*, p. 561.

Ginting Bidei. November, 1907.

Not rare on the lower hills of the southern portion of the Malay Peninsula up to about 2,500 ft. Waterstradt obtained it on Gunong Tahan at 4,000 ft.

151. *POMATORHINUS WRAYI*—WRAY'S SCIMITAR BABBLER.

*Pomatorhinus wrayi*, *Sharpe, P.Z.S.*, 1887, p. 437; *Butler*, p. 11; *Grant* (2), p. 30.

Sparsely distributed on mountains above 4,000 ft. as far south as Gunong Mengkuang Lebah.

152. *MELANOCICHLA LUGUBRIS*—THE BLACK BABBLING THRUSH.

*Melanocichla lugubris* (S. Müll.); *Sharpe, Cat.*, p. 451; *Grant* (1), p. 84.

*Melanocichla peninsularis*, *Sharpe, P.Z.S.*, 1888, p. 274.

Hitherto only found on the mountains of the main range from Batang Padang in South Perak to Gunong Mengkuang Lebah in Selangor at altitudes of from 3,400-5,000 ft. Usually on low trees or among fallen timber near the ground in parties of from three to seven.

153. *RHINOCICHLA MITRATA*—THE CHESTNUT CAPPED BABBLING THRUSH.

*Rhinocichla mitrata* (S. Müll.); *Sharpe, Cat.*, p. 452 (1883); *id.*, *P.Z.S.*, 1886, p. 352; 1888, p. 274; *Butler*, p. 11; *Bonhote*, p. 63; *Hartert*, p. 562; *Grant* (1), p. 84; *id.* (2), p. 562.

Common on nearly all the high mountain in Selangor above 3,000 ft., though apparently rare on Gunong Tahan, where I did not procure or see it, and where Waterstradt only got two specimens.

154. *TURDINUS ABBOTTI*—ABBOTT'S BABBLER.

*Turdinus abbotti* (Blyth); *Sharpe, Cat.*, vii., p. 540 (1883); *Grant* (2), p. 29.

*Turdinus abbotti olivaceum* (Strickl.); *Butler*, p. 12; *Hartert*, p. 562.

A single specimen from Ginting Bidei marks the upper range of this species.

A very common bird in the low country, usually found in parties of three or four among low bushes in secondary jungle. It is at first sight easily confused with the succeeding species, which is found in company with it. Indeed until Mr. Boden Kloss pointed out the mistake, the whole of the series of both species in the Selangor Museum had been registered under the above name.

On careful examination certain marked differences present themselves by which the two species can be at once differentiated; as the table of dimensions shows *T. abbotti* is a larger bird than *T. sepiarius* with noticeably longer tail and coarser bill, though the tarsus is slightly longer in the latter. The colour of the upper surface is richer and darker in *T. sepiarius*, the head being slightly darker than the rest of the upper surface. In addition there is a distinct grey supercilium, which is quite absent in *T. abbotti*. In the latter, the feathers of the head, more noticeably of the mantle, have pale shaft stripes, which is not the case in *T. sepiarius*.

155. *TURDINUS SEPIARIUS*—HORSFIELD'S BABBLER.

*Turdinus sepiarius* (Horsf.); *Sharpe, Cat.*, p. 544; *id.*, *P.Z.S.*, 1888, p. 275; *Hartert*, p. 563.

Ginting Bidei. October and May.

Also near Kuala Lumpur.

TABLE OF DIMENSIONS.

*Turdinus abbotti*.

Locality.	Sex.	Wing.	Tail.	Culmen.	Bill	
					from gape.	Tarsus.
		mm.	mm.	mm.	mm.	mm.
Cheras, Selangor (8-5-'08)	♂ ad.	71	55	19	22	25
.. (22-3-'08)	♂ ..	74	53	19	23.5	25
.. ..	♂ ..	72	57.5	19	23	24.7
Kuala Lumpur (February, 1907) ...	♂ ..	75	56	20.2	24.5	26
Tanjong Karang, Selangor Coast (16-1-'08) ...	♂ ..	76.5	54.7	20	23	25
Cheras, Selangor (14-3-'08)	♂ ..	72	58	19.5	22.5	24
Ginting Bidei, Selangor, 2,300 ft. (1-11-'07) ...	♂ ..	76	53.5	20.5	23	25
Malacca (trade skin) ...	...	70	53	20	23	24
Kuala Tembeling, Pahang (September, 1907) ...	♂	72	54	19.5	22.5	24.7

*Turdinus sepiarius.*

Locality.	Sex.	Wing. mm.	Tail. mm.	Culmen. mm.	Bill from gape. mm.	Tarsus. mm.
Nr. Kuala Lumpur, Selan- gor (8-7-'07)	♂	67	44.5	18	21	25
" " "	♂	68	48	17.5	20	26.5
" (9-7-'07)	♀	71	44	18	20	26.5
" (7-7-'07)	♀	69	41 (worn)	18	21	25
Ginting Bidei, Selangor, 2,300 ft. (26-10-'07)	♂	71.5	48	18.5	20	26
" (31-10-'07)	♂	71.5	49	18.5	21	27
" (9-5-'08)	♂	68	49	17.5	21	25.5

156. *TURDINUS MACRODACTYLUS*—STRICKLAND'S BABBLER.

*Turdinus macrodactylus* (Strickl.); *Sharpe, Cat.*, p. 548 (1883).

North of the latitude of Malacca, this species does not appear to be a very common bird, and the Selangor Museum possesses but few recent specimens, three from Ginting Bidei, and another from the Batu Caves near Kuala Lumpur.

157. *TURDINUS LORICATUS*—MÜLLER'S BABBLER.

*Myiothera loricata*, Müll., *Tijdschr. Nat. Gesch. Amsterd.*, 1835, p. 348.

*Turdinus marmoratus*, *Wardl.-Rams.*, *P.Z.S.*, 1880, p. 15.

*Turdinus loricatus*, *Sharpe, Cat. Birds Brit. Mus.*, vii., p. 550 (1883); *Robinson, Journ. Fed. Mal. States Mus.*, iii., p. 79; No. 446 (1907).

ADULT FEMALE.—General colour above rufous brown, the feathers, except those of the rump, obscurely edged with black, less markedly so on the head and lores; throat white, the feathers narrowly tipped with black, the black tips much broader on the malar region; ear coverts and a large patch on each side of the neck bright russet chestnut; breast and centre of the abdomen greyish black, each feather broadly and irregularly barred and tipped with white; flanks, thighs and under tail coverts russet brown, the latter faintly tipped with whitish buff; primaries dull brown, more rufous on the outer webs; tail rufous brown; under wing coverts brown with paler margins; iris chestnut; bill and tarsi black.

Total length, 8.4 in.; wing, 3.9 in.; tail, 3.2 in.; culmen, .85 in.; tarsus, 1.4 in.

IMMATURE FEMALE.—Similar to the adult, but with the feathers of the head, hind neck and mantle with rufous shaft stripes, broadening towards the tips of the feathers.

SPECIMENS EXAMINED.—One adult female from Ginting Bidei, Selangor Main Range, 2,300 ft., dated 3rd November, 1907, and two adult females and an immature female from the Semangko Pass, Selangor, 28th February, 1908.

Like *Gecinulus viridis* this Timeliad is an inhabitant of thick bamboo jungle and has escaped notice hitherto for similar reasons. It is strictly a ground bird with very limited powers of flight, but displays great agility in running along the fallen bamboos and rubbish, amongst which it lives.

I have never shot the species myself, all those obtained having been secured by a Dyak collector, and have only once caught a glimpse of it.

Careful comparison with Dr. Sharpe's description (*loc. cit.*) reveals no tangible difference between the Malayan and Sumatran form, from the mountains of which island alone the species has hitherto been recorded.

158. *DRYMOCATAPHUS NIGRICAPITATUS*—THE BLACK-CAPPED BABBLER.

*Drymocataphus nigricapitatus* (Eyton); *Sharpe, P.Z.S.*, 1888, p. 275; *Grant* (2), p. 29.

Ginting Bidei, 2,300 ft., and numerous other places in the Selangor lowlands.

159. *DRYMOCATAPHUS TICKELLI*—TICKELL'S BABBLER.

*Drymocataphus tickelli* (Blyth); *Sharpe, Cat.*, p. 557 (1883).

This bird is common at the Semangko Pass between 2,200 and 3,000 ft., and at Ginting Bidei at similar elevations, and a single specimen was also obtained by Mr. Butler on Bukit Kutu, 3,000 ft. It is also abundant in the Batang Padang highlands. It is only found in dense jungle and is very shy, which, perhaps, accounts for the fact that it has not hitherto been recorded from the Malay Peninsula.

160. *SETARIA CINEREA*—THE SMALLER RED-HEADED TREE BABBLER.

*Malacopterum cinerum* (Eyton); *Sharpe, Cat.*, vii., p. 565; *Hartert*, p. 564; *Grant* (1), p. 83.

Attaining its maximum elevation at about 2,500 ft. Three specimens were collected at Ginting Bidei in May, 1908.

161. *SETARIA MAGNIROSTRIS*—THE BROWN-HEADED TREE BABBLER.

*Turdinus magnirostris* (Moore); *Sharpe, Cat.*, p. 547; *Robinson, Journ. Fed. Mal. States Mus.*, ii., p. 79 (1907).

*Malacopterum magnirostre*, *Hartert*, p. 563; *Grant* (1), p. 83; *id.* (2), p. 29.

Ginting Bidei, 2,300 ft. May, 1908.

Range as in the preceding species.

162. *ANUROPSIS MALACCENSIS*—THE MALAY WREN BABBLER.

*Anuropsis malaccensis* (Hartl.); *Sharpe, Cat.*, p. 588; *Grant* (2), p. 29.

Very common from the sea coast to about 2,500 ft., above which level it is not met with, its place being apparently taken by *Corytho- cichla leucosticta*.

163. *TURDINULUS GRANTI*—GRANTS' WREN BABBLER.

*Turdinulus granti*, Richmond, *Proc. U.S. Nat. Mus.*, xxii., p. 320 (1900).

*Turdinulus exsul*, Grant, *Ibis*, 1895, p. 60.

*Turdinulus humei*, Hartert, *Nov. Zool.*, ix., p. 564 (1902); Robinson, *Journ. Fed. Mal. States Mus.*, i., p. 26 (1905).

2 ♂, 3 ♀. Ginting Bidei, Selangor, 2,300 ft. Oct., Nov., 1907; May, 1908.

♂. Semangko Pass, Selangor, 2,700-4,500 ft. February, 1908.

♀. Gunong Angsi, Negri Sembilan, 2,600 ft. April, 1906.

A comparison of the above series, which is actually before me, with Mr. Richmond's description of the five specimens collected by Dr. Abbott in Trang reveals no material differences, and *T. humei*, Hartert, must, therefore, be regarded as a pure synonym.

DIMENSIONS.—Wing, 2.07 in. (2.10 in.\*); tail, 1.02 in. (.96 in.); tarsus, .87 in. (.88 in.); culmen, .56 in. (.57 in.). The specimen from Semangko Pass is somewhat darker and more fulvous than the others, but is closely approached in this respect by a female from Ginting Bidei.

The species has been obtained by Mr. Kloss in Southern Johore, so that its range extends practically throughout the whole length of the Peninsula.

164. *CORYTHOCICHLA LEUCOSTICTA*—THE MALAY STREAKED BABBLER.

*Corythocichla leucosticta*, Sharpe, *P.Z.S.*, 1887, p. 438; Butler, p. 11; Bonhote, p. 64; Grant (2), p. 28.

*Turdinulus striatus leucosticta* (Sharpe); Hartert, p. 565.

Common everywhere from the tops of the highest mountains down to about 2,500 ft. Not known south of Selangor.

165. *ALCIPPE PERACENSIS*—THE MOUNTAIN NUN THRUSH.

*Alcippe peracensis*, Sharpe, *P.Z.S.*, 1887, p. 439; Butler, p. 12; Hartert, p. 566; Grant (1), p. 82; *id.* (2), p. 28.

Quite the commonest bird in the mountains, found everywhere about 3,000 ft. in parties of five and six, searching the boughs of low shrubs for insects. Below 3,000 ft. its place is taken by *A. cinerea*, which is, however, a much rarer bird relatively.

166. *ALCIPPE CINEREA*—THE GREY NUN THRUSH.

*Alcippe cinerea*, Blyth; Sharpe, *Cat.*, p. 622; Butler, p. 12; Hartert, p. 566; Grant (1), p. 82; *id.* (2), p. 28.

Common at Ginting Bidei in October and May.

167. *PSEUDOMINLA SOROR*—THE MALAY TIT BABBLER.

*Minla soror*, Sharpe, *P.Z.S.*, 1887, p. 439, pt. xxxviii., fig. 1; Grant (2), p. 25.

*Pseudominla soror*, Sharpe, *Hand-l. Birds*, iv., p. 47 (1903).

*Sittiparus castaneiceps soror*, Hartert, p. 25.

Very abundant on Gunong Mengkuang Lebah, rarer near Semangko Pass.

\* Dimensions in parentheses are those of the type specimen.

168. *STACHYRIS DAVISONI*—DAVISON'S BABBLER.

*Stachyris nigriceps*, *Sharpe* (nec *Hodgs.*), *P.Z.S.*, 1887, p. 440.

*Stachyris davisoni*, *Sharpe*, *Bull. B.O.C.*, i., p. vii. (1892); *Butler*, p. 12; *Hartert*, *Nor. Zool.*, i., p. 471 (1894); *id.*, *op. cit.*, ix., p. 566 (1902); *Grant* (1), p. 82; *Grant* (2), p. 28.

Fairly common at intermediate elevations, southward from Central Perak to Southern Johore, the Rhio Archipelago and the Natunas.

169. *STACHYRIS POLIOGASTER*—HUME'S BABBLER.

*Stachyris polioaster*, *Hume*; *Sharpe*, *Cat.*, p. 539.

♂. Bukit Kutu, Ulu Selangor, 3,000 ft. October, 1898. A. L. Butler [c].

♂ ♀. Ginting Bidei, Selangor, 2,300 ft. October, 1907, and May, 1908.

Besides the type, which was collected by Davison on Gunong Pulai in Southern Johore, these seem to be the only specimens met with up to the present.

170. *STACHYRIS POLIOCEPHALA*—THE GREY-HEADED BABBLER.

*Stachyris poliocephala* (Temm.); *Sharpe*, *Cat.*, p. 534; *Butler*, p. 12; *Hartert*, p. 566; *Grant* (2), p. 258.

Fairly common up to 2,500 ft. in suitable localities.

171. *STACHYRIS LEUCOTIS*—THE WHITE-EARED BABBLER.

*Stachyris leucotis* (Strickl.); *Sharpe*, *Cat.*, p. 537.

♂. Sungei Tali, Ulu Bentong, Pahang, 1,500 ft. December, 1904.

Apparently somewhat local, as few recent collectors have met with it. The only other locality, whence the Selangor Museum possesses specimens, is Gunong Angsi, Negri Sembilan, where it was found to be very common in April, 1906. It is also abundant (*vide* Kloss) in South-western Johore.

172. *STACHYRIS NIGRICOLLIS*—THE BLACK-NECKED BABBLER.

*Stachyris nigricollis* (Temm.); *Sharpe*, *Cat.*, p. 535; *id.* (3), p. 275.

Collected by Wray on the Batang Padang mountain. We have only found it in low country, where it is very abundant in certain localities.

173. *STACHYRIS CHRYSÆA BOCAGEI*—THE GOLDEN BABBLER.

*Stachyris bocagii*, *Salvad.*, *Ann. Mus. Civ. Gen.*, xiv., p. 223 (1879).

*Cyanoderma chryseæ*, *Sharpe*, *P.Z.S.*, 1887, p. 440.

*Stachyridiopsis chryseæ assimilis* (Walden); *Hartert*, p. 566.

*Stachyridiopsis chryseæ* (Hodgs.): *Butler*, p. 12; *Grant* (1), p. 81; *id.* (2), p. 27.

*Stachyris chrysops*, *Richmond*, *Proc. Biol. Soc. Washington*, xv., p. 157 (1902).

Abundant in small flocks on most of the higher hills above 3,000 ft. On the Semangko Pass the species was breeding in February, 1908, and two half-fledged young, which are uniform olive brown without a trace of golden yellow, were obtained on the 27th of that month.

The twelve adult specimens in the Selangor Museum (7 ♂, 5 ♀) agree minutely with the description of *Stachyris chrysops*, Richmond, from Trang [*Proc. Biol. Soc. Washington*, xx., p. 157 (1902)], which was founded on a single specimens.

The birds in freshly-mounted plumage are too bright to be referable to *S. assimilis* from N. Tenasserim, and I have therefore followed Grant in regarding them as identical with *S. bocagei* from the mountain of Sumatra, of which, in the absence of further material confirming the species, *St. chrysops* must be regarded a synonym.

174. *KENOPIA STRIATA*—THE STRIPED BABBLER.

*Kenopia striata* (Blyth); *Sharpe, Cat.*, p. 573; *Hartert*, p. 567.

Apparently rare. I have not yet met with the bird.

175. *MIXORNIS GULARIS*—THE YELLOW BREASTED BABBLER.

*Mixornis gularis* (Raffles); *Sharpe, Cat.*, p. 168; *id.*, *P.Z.S.*, 1888, p. 275; *Bonhote*, p. 64; *Butler*, p. 12; *Hartert*, p. 567; *Grant* (1), p. 8.

Widely spread throughout the Peninsula up to about 2,500 ft., but commonest on the sea coast, especially among *Casuarinas*. The Selangor Museum possesses a large series ranging from the Langkawi group of islands, north of Penang, to Malacca. Specimens from the former locality are distinctly intermediate between the present species and the Indian *M. rubricapilla*.

176. *MACRONUS PTILOSUS*—THE FLUFFY-BACKED BABBLER.

*Macronus ptilosus*, Jard. and Selby; *Sharpe, Cat.*, p. 583; *id.* (3), p. 275.

Batang Padang mountains (*Wray*). Almost the commonest of the smaller *Timeliidæ* in the low country.

177. *MYIOPHONEUS DICRORHYNCHUS*—THE LARGER WHISTLING THRUSH.

*Myiophoneus dicrorhynchus*, Salvad.; *Sharpe, t.c.*, p. 10; *Grant* (2), p. 27.

*Myiophoneus*, sp. inc., *Sharpe, P.Z.S.*, 1887, p. 436.

*Myiophoneus eugenii*, *Hume*; *Butler*, p. 12; *Bonhote*, p. 163.

2 ♂. Semangko Pass, 2,500-4,500 ft. February, 1908.

A large *Myiophoneus* is common in certain parts of the Malay Peninsula, but in the lowlands appears to be only found in vicinity of the precipitous limestone cliffs.

\* All the large *Myiophoneus* from the Malay Peninsula seem to be the same species, though whether referable to the Tenasserim species, *M. eugenii*, Hume, or the Sumatran, *M. dicrorhynchus*, is hard to say. The former, if distinct, must be very close indeed to the Sumatran race, which was described first. I have followed Grant in his identification, but by Sharpe's Key (*Cat. Birds*, vii., p. 6) all would appear to belong to *M. eugenii*.

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\* Since the above was in type we have obtained very large series of *Myiophoneus temmincki* from the islands of Langkawi and Terutau, north of Penang.

178. *MYIOPHONEUS ROBINSONI* THE MOUNTAIN WHISTLING THRUSH.

*Myiophoneus robinsoni*, *Grant, Journ. Fed. Mal. States Mus.*, i., p. 104 (1905).

By no means uncommon on the high mountains of Selangor above 3,500 ft.

Specimens are in the Selangor Museum from Gunong Mengkuang Lebah, Gunong Ulu Kali and the mountains above the Semangko Pass.

179. *BRACHYPTERYX WRAYI*—WRAY'S SHORT WING.

*Brachypteryx nipalensis*, *Sharpe, P.Z.S.*, 1888, p. 273; *Butler*, p. 13.

*Brachypteryx wrayi*, *Grant, Bull. B.O.C.*, xix., No. cxxvii., p. 10 (1906); *id.*, *Journ. Fed. Mal. States Mus.*, iii., p. 26 (1908).

Gunong Mengkuang Lebah and Semangko Pass.

Four specimens from the above localities agree well with the type description, with a skin from Gunong Tahan, and with three males from the vicinity of the type locality.

180. *SIBIA SIMILLIMA*—THE MALAYAN SIBIA.

*Sibia simillima* (Salvad.); *Sharpe* (1), p. 352; *id.* (3), p. 274; *Butler*, p. 13; *Bonhote*, p. 63; *Grant* (1), p. 8; *id.* (2), p. 26.

*Sibia picoides simillima*, *Hartert*, p. 567.

Met with in flocks of six or seven, and very noisy. Exceedingly common on the Larut Hills and the Peninsular main range, south to Southern Selangor, but not found below 3,000 ft.

181. *SIVA MALAYANA*—THE MALAYAN CHESTNUT-TAILED SIVA.

*Siva castaneicauda*, *Sharpe* (nec *Hume*), *P.Z.S.*, 1888, p. 275; *Bonhote*, p. 64.

*Siva malayana*, *Grant* (2), p. 25.

*Siva strigula malayana*, *Hartert*, p. 567.

Rather rare in Selangor, whence the Selangor Museum possesses only two specimens from Gunong Mengkuang Lebah and Gunong Ulu Kali, dated February and March. Both are in unworn plumage and differ from the large series of Tahan specimens, which are very faded and abraded in having the under surface below the throat and the under tail coverts bright orange yellow clouded with olive on the breast and flanks; the head is rich golden olive, deepening to dark orange on the forehead, and clearly defined from the back, which is greyish, strongly washed with yellowish olive, not almost pure, pure grey as in the Tahan birds. The differences are most striking, but are almost certainly due to the age of the feathers only.

182. *SIVA SORDIDIOR*—THE MALAYAN DULL SIVA.

*Siva sordidior*, *Sharpe, P.Z.S.*, 1888, p. 276; *Butler*, p. 13; *Grant* (1), p. 80.

Generally distributed over the high mountains of Selangor and Perak above 4,000 ft., but nowhere very common.

183. *HERPORNIS ZANTHOLEUCA*—THE WHITE BELLED HERPORNIS.

*Herpornis zantholeuca*, Hodgs. ; *Sharpe* (3), p. 275 ; *Butler*, p. 13 ; *Hartert* p. 568 ; *Grant* (1), p. 80 ; *id.* (2), p. 25.

A submontane bird, commonest at about 1,500 ft., but found as high as 3,300 ft.

184. *CUTIA CERVINICRISSA*—THE MALAYAN CUTIA.

*Cutia cervinicrissa*, *Sharpe*, *P.Z.S.*, 1888, p. 276 ; *Grant* (1), p. 80.

Found on the mountains of the main range from Batang Padang, in South Perak, to Gunong Mengkuang Lebah, in Selangor, above 4,000 ft.

The eight specimens now in the Selangor Museum and many other duplicates which have passed through my hands all bear out the diagnosis of the species in having the abdomen and lower tail coverts rufous tawny, not white as in *C. nipalensis*.

185. *PTERYTHIUS ÆRALATUS*—TICKELL'S SHRIKE TIT.

*Pterythius æralatus* (Tick.) ; *Sharpe* (2), p. 440 ; *id.* (3), p. 276 ; *Butler*, p. 14 ; *Bonhote*, p. 64 ; *Hartert*, p. 576 ; *Grant* (2), p. 22.

Distributed above about 3,500 ft.

186. *PTERYTHIUS TAHANENSIS*—THE TAHAN SHRIKE TIT.

*Pterythius tahanensis*, *Hartert*, p. 576 ; *Grant* (2), p. 22.

Gunong Mengkuang Lebah and Semangko Pass, Selangor.

Rare in Selangor and only found well above 4,000 ft.

187. *MESIA ARGENTAURIS*—THE SILVER-EARED MESIA.

*Mesia argentauris* (Hodgs.) ; *Sharpe* (1), p. 352 ; *id.* (3), p. 276 ; *Butler*, p. 14 ; *Hartert*, p. 568 ; *Grant* (1), p. 80 ; *id.* (2), p. 25.

Common at high elevations throughout the mountains of the Peninsula to the south of Selangor.

## TROGLODYTIDÆ.

188. *PNOEPYGA LEPIDA*—THE HILL WREN.

*Pnoepyga lepida*, *Salvad.*, *Ann. Mus. Civ. Gen.*, xix., p. 227 ; *Grant* (2), p. 24.

*Pnoepyga pusilla*, *Sharpe*, *P.Z.S.*, 1888, p. 273.

♂ ad., ♀ imm. Hills above Semangko Pass, 4,000 ft. February, 1908.

Decidedly rare and only found amongst the very thickest scrub, whence it is very difficult to obtain specimens.

The immature bird is dull blackish brown, beneath the feathers with blackish edges, the throat feathers paler, also edged with black.

## TROGOLYTIIDÆ.

189. *GEOCICHLA INTERPRES*—TEMMINCK'S GROUND THRUSH.

*Geocichla interpres* (Temm.); *Seebohm, Cat. Birds Brit. Mus.*, v., p. 167 (1881); *Richmond, Proc. U.S. Nat. Mus.*, xxii., p. 319 (1899).

Known at present from the mountains of Trang, Northern Malay Peninsula, and Rembau (Hume, *S. F.*, viii., p. 39) in Negri Sembilan.

190. *GEOCICHLA INNOTATA*—THE MALAY GREY AND ORANGE GROUND THRUSH.

*Geocichla innotata* (Blyth); *Seebohm, Cat.*, p. 176; *Butler*, p. 20.\*

It is exceedingly curious fact that no recent collector has been able to obtain any of the Malay *Geocichla*. I am not aware of any specimens having been obtained in the last twenty years, nor are there any in any of the local Museum. Possibly they are confined to the north of the Peninsula. Butler's specimen noted above was only *seen*.

191. *CICHOSELYS SIBERICUS*—THE SIBERIAN GROUND THRUSH.

*Geocichla siberica* (Pall.); *Seebohm, Cat.*, p. 180 (1879).

*Geocichla davisoni*, Hume; *Grant* (1), p. 78.

Common on the higher Selangor mountains in winter. I have had through my hands over twenty specimens of this Ground Thrush, of which thirteen are now before me, and I do not believe that it is possible to distinguish two races, *G. davisoni*, Hume, being as the author himself considered merely the very old male (*Stray Feathers*, v., pp. 63, 136, 1877). One specimen (Sel. Mus. 679,07) exactly answers to the description of *G. davisoni*, but all the others have much more white about them. I have obtained this species on Pulau Jarak in the middle of the Straits of Malacca, off the mouth of the Perak River in December, 1904, but the skin was unfortunately destroyed by rats.

192. *OREOCICHLA AFFINIS*—RICHMOND'S MOUNTAIN THRUSH.

*Oreocichla horsfieldi*, *Richmond, Proc. Biol. Soc. Washington*, xx., p. 158 (1902).

Mountain of Trang, Northern Malay Peninsula.

193. *TURDUS OBSCURUS*—THE DARK OUZEL.

*Merula obscurus* (Gm.); *Seebohm, t.c.*, p. 273.

*Turdus obscurus* (Gm.); *Grant* (1), p. 78.

Two females, evidently on passage, were shot on Gunong Ulu Kali, Selangor, 4,700 ft., in February, 1906.

\* Recently I have secured three specimens from Terutau and Langkawi, which are somewhat intermediate between *G. citrina* (Lath.) and *G. innotata* in respect to the white tips to the primary coverts.

194. *PETROPHILA SOLITARIA*—THE EASTERN BLUE ROCK THRUSH.

*Monticola solitaria* (Müll.); *Seebohm., Cat.*, p. 319.

*Monticola cyanus solitaria*, *Butler*, p. 20.

*Cyanocincla solitaria*, Hume, *Stray Feathers*, ix., p. 116 (1880).

The most southerly specimen recorded from the Malay Peninsula. Shot in February on the Larut Hills. Also obtained at Ghirbee (*Hume, loc. cit.*).

A male of the western form, *P. cyaneus*, was shot by M. Boden Kloss at the Batu Caves, Kuala Lumpur, on 3rd August, 1908.

195. *PETROPHILA GULARIS*—THE CHINESE ROCK THRUSH.

*Monticola gularis* (Swinh.); *Seebohm., Cat.*, p. 326; *Butler*, p. 20.

Besides the specimen from the Larut Hills recorded by Butler (*loc. cit.*), there is another mounted and undated specimen from the same locality in the Taiping Museum. A third specimen is known from Malacca [*Hume, Stray Feathers*, ix., p. 116 (1880)].

196. *HYDROCICHLA RUFUCAPILLA*—THE CHESTNUT-BACKED FORK TAIL.

*Hydrocichla ruficapilla* (Temm.); *Sharpe, Cat.*, p. 319; *Butler*, p. 19; *Hartert*, p. 572.

3 ♂, 2 ♀. Ginting Bidei, 2,300 ft. May, 1908.

Common on clear rocky streams and torrents throughout the Peninsula up to about 3,000 ft.

197. *HENICURUS SCHISTACEUS*—THE SLATY-BACKED FORK TAIL.

*Henicurus schistaceus*, Hodgs.; *Sharpe, Cat. Birds Brit. Mus.*, vii., p. 365 (1883); *Butler*, p. 19; *Hartert*, p. 570; *Grant* (1), p. 79.

Found in similar situations to the preceding, but not as a rule below 4,000 ft., though Butler obtained it on the Larut Hills at 2,000 ft. Very abundant above the Semangko Pass.

198. *LARVIVORA CYANEA*—THE SIBERIAN BLUE CHAT.

*Larvivora cyanea* (Pall.); *Seebohm., Cat. Birds Brit. Mus.*, v., p. 303 (1881); *Butler*, p. 13.

This species is met with throughout the Malay Peninsula from October to April, but is common in the hills than in the low country. It has also been met with in some of the islands in the Straits of Malacca, also during the winter months.

199. *NOTODELA LEUCURA*—THE WHITE-TAILED BLUE ROBIN.

*Notodela leucura* (Hodgs.); *Sharpe, Cat. Birds Brit. Mus.*, vii., p. 23 (1883); *Butler, Journ. Strait. Branch Roy. Asiat. Soc.*, No. 34, p. 99 (1900).

A single female collected by A. L. Butler on Gunong Ijau, Larut Hills, at 4,000 ft. in March, 1898, is the only record for the species in

the Malay Peninsula; elsewhere it is known from Mt. Mooleyit in Tenasserim and from Nepal and Sikkim. It has been overlooked by me in my Hand-list of the Birds of the Malay Peninsula, *antea*, p. 66.

200. *COPSYCHUS MUSICUS*—THE STRAITS ROBIN.

*Copsychus musicus* (Raffles); *Sharpe*, P.Z.S., 1888, p. 79; *Hartert*, p. 575; *Grant* (1), p. 79.

*Copsychus saularis* (Linn.): *Sharpe*, *Cat.*, p. 1; *Butler*, p. 20.

Occasionally found in large hill clearings and along the roads crossing the main range, but not a normal inhabitant of mountain jungle.

201. *CITTOCINCLA MACRURA*—THE SHAMA.

*Cittocincla tricolor* (Vieill.); *Sharpe*, *Cat.*, p. 84; *Grant* (1), p. 79.

*Cittocincla macrurus* (Gm.); *Hartert*, p. 572.

The Shama ascends the hills to about 3,000 ft., but is very much commoner in the low country though not met with in swamp jungle.

202. *TRICHIXUS PYRROPYGUS*—THE ORANGE-TAILED THRUSH.

*Trichixus pyrropygus* (Less.); *Sharpe*, *Cat.*, p. 32; *Grant* (2), p. 24.

Met with on Gunong Tahan at 3,000 ft.: fairly common in the low country, but local.

SYLVIIDÆ.

203. *ORTHOTOMUS ATRIGULARIS*—THE BLACK-THOATED TAILOR BIRD.

*Orthotomus atrigularis* (Temm.); *Sharpe*, *Cat. Birds Brit. Mus.*, vii., p. 220 (1883); *Butler*, p. 16.

Semangko Pass, February, and Ginting Bidei, May.

Not met with much above 3,000 ft.

204. *SUTORIA MACULICOLLIS*—THE LONG-TAILED TAILOR BIRD.

*Sutoria maculicollis* (F. Moore); *Sharpe*, *Cat.*, p. 218; *id.* (2), p. 440.

*Sutoria maculicauda* (*bapsu*); *Butler*, p. 17.

Common in gardens, etc. I have not myself noted it on the hills where it has been obtained by Wray and Butler.

205. *FRANKLINIA RUFESCENS*—BEAVAN'S WREN WARBLER.

*Citiscola beavani* (Wald.); *Sharpe*, *Cat.*, p. 225; *Butler*, p. 16; *Grant* (2), p. 23.

*Franklinia rufescens* (Blyth); *Hart.*, p. 569.

Common in the lowlands at certain times of the year. One specimen was obtained at the Semangko Pass in February, 1908.

206. *ACANTHOPNEUSTE CORONATA*—TEMMINCK'S CROWNED WILLOW WARBLER.

*Phylloscopus coronatus* (Temm. and Schleg.); *Seebohm*, *Cat. Birds Brit. Mus.*, v., p. 49 (1881).

♂ ad. Telóm. Perak-Pahang border, 3,000 ft. 12th October, 1904.

Also obtained at Malacca [*Hume*, *Stray Feathers*, viii., p. 65 (1879)].

207. *PHYLLERGATES—CINEREICOLLIS*—THE ORANGE-HEADED WARBLER.

*Phyllergates cinereicollis*, Sharpe, *Ibis*, 1888, p. 479; *Grant* (2), p. 23.

*Phyllergates cucullatus* (Temm.); *Sharpe*, *Cat. Birds Brit. Mus.*, vii., p. 229 (1883); *Sharpe* (2), p. 440; *id.* (3), p. 273; *Butler*, p. 16; *Hartert*, p. 569.

Common on the Selangor Mountains above 3,500 ft.

208. *SUYA WATERSTRADTI*—THE TAHAN HILL WARBLER.

*Suya waterstradti*, *Hartert*, *Nov. Zool.*, ix., p. 568 (1902); *Grant* (2), p. 23.

So far as is at present known confined to the higher parts of Gunong Tahan, where it is very common.

## LANIIDÆ.

209. *HEMIPUS PICATUS*—THE BLACK PIED SHRIKE.

*Hemipus picatus* (Sykes); *Sharpe*, *Cat. Birds Brit. Mus.*, iii., p. 307 (1877); *Hartert*, p. 576.

Replacing the lowland *H. obscurus* (Horsf.) above 3,000 ft., but not very common.

210. *TEPHRODORNIS GULARIS*—THE MALAY WOOD SHRIKE.

*Tephrodornis gularis* (Raffles); *Sharpe*, *Cat. Birds Brit. Mus.*, p. 278 (1877); *Butler*, p. 17; *Hartert*, p. 576; *Grant* (2), p. 21.

Does not range high into the mountains. *Butler* got it on the Larut Hills at 3,000 ft., and it is abundant on Gunong Angsi in Negri Sembilan at 2,600 ft.

211. *PLATYLOPHUS ARDESIACUS* (CAB.)—THE JAY SHRIKE.

*Platylophus ardesiacus* (Cab.); *Sharpe*, *Cat.*, p. 317; *id.*, *P.Z.S.*, 1888, p. 269; *Grant* (1), p. 77.

Common at Ginting Bidei.

An immature bird is greyer below somewhat browner above and with the greater wing coverts tipped with buff.

212. *LANIUS TIGRINUS*—THE THICK-BILLED SHRIKE.

*Lanius tigrinus* (Drap.); *Gadow*, *Cat. Birds Brit. Mus.*, viii., p. 289 (1883); *Butler*, p. 17; *Grant*, *Nov. Zool.*, ix., p. 480 (1902); *Hartert*, p. 576; *Grant* (2), p. 77.

2 ♀ imm. Semangko Pass. February, 1908.

Adult birds seem very rare in the Malay Peninsula. There are only two in the Selangor Museum collection, one from Gunong Angsi, Negri Sembilan, 2,600 ft., and another from Tanjong Malim at the foot of the main range, both females, and both shot in April.

## PARIDÆ.

213. *MELANOCHLORA FLAVOCRISTATA*—THE SULTAN TIT.

*Melanochlora sultanea* (Hodgs.): *Gadow, Cat.*, p. 6; *Sharpe* (3), p. 277; *Butler*, p. 14; *Grant* (1), p. 76; *id.* (3), p. 21.

*Melanochlora flavocristata* (Lafr.): *Hellmays, Serreich Parida*, p. 31 (1903); *Sharpe, Hand-l. Birds*, iv., p. 326 (1903).

Abundant nearly everywhere from 2,000 ft. to about 4,000 ft., and occasionally in the low country at the foot of the main range. It is usually met with in flocks of six or seven among high trees at the edge of clearings or in the jungle.

## SITTIDÆ.

214. *DENDROPHILA AZUREA*—THE DEEP BLUE NUTHATCH.

*Sitta azurea*, Less.; *Gadow, Cat. Birds Brit. Mus.*, viii., p. 357 (1883); *Hartert*, p. 573.

*Dendrophila azurea* (Less.); *Butler*, p. 15; *Grant* (1), p. 76; *id.* (2), p. 21.

Fairly common on the Selangor main range, but not found below 3,500 ft.

215. *DENDROPHILA FRONTALIS SATURATIOR*—THE MALAY NUTHATCH.

*Sitta frontalis saturator*, *Hartert*, p. 573.

*Dendrophila saturator*, *Grant* (1), p. 76; *id.* (2), p. 21

Semangko Pass. February, 1908.

Locally distributed up to about 3,000 ft.

The above specimen agrees well with a pair from Gunong Angsi, 2,600 ft., Negri Sembilan, and differs from a skin from Trang collected by Dr. W. L. Abbott in being much more intense in colouration. Malay Peninsula specimens require comparison with freshly-collected Javan ones (the type locality) and with Indian skins before the validity of the sub-species can be considered as established.

## CORVIDÆ.

216. *CISSA ROBINSONI*—THE MALAY BLUE MAGPIE.

*Cissa robinsoni*, *Grant, Bull. B.O.C.*, xix., No. cxxviii., p. 9 (1906); *id.* (2), p. 16.

This fine species originally described from a single specimen from Gunong Tahan has since proved to be very numerous on the Selangor mountains, especially near the Semangko Pass, whence a large number of specimens have been recently obtained: it also occurs at Telôm in the Batang Padang mountains. In all localities it is very wild and hard to secure. As is the case with other members of the genus, the plumage of this bird is extraordinarily sensitive to light and very slight exposure changes the greenish yellow of the head and body to pale blue and the margin of the primaries to dull grey.

## DICRURIDÆ.

217. *DISSEMURUS PARADISEUS*—THE LARGE RACKET-TAILED DRONGO.

*Dissemurus paradiseus* (Linn.); *Sharpe, Cat. Brit. Mus.*, iii., p. 258 (1878); *Hartert*, p. 579.

Waterstradt (*Hartert, loc. cit.*) is said to have got this species up to 5,000 ft. on Gunung Tahan. I have never met with it anywhere above 2,000 ft.

218. *BHRINGA REMIFER*—THE LESSER RACKET-TAILED DRONGO.

*Bhringa remifer* (Temm.); *Sharpe, Cat.*, p. 257; *id.* (2), p. 434; *Bonhote*, p. 59; *Hartert*, p. 580; *Grant* (1), p. 68.

Very abundant on all the hills from 2,500-5,000 ft., especially where there is much bamboo.

219. *CHAPTIA MALAYENSIS*—THE MALAYAN BRONZED DRONGO.

*Chaptia malayensis* (A. Hay); *Sharpe, Cat.*, p. 44.

*Chaptia aenea* (Vieill.); *Grant* (1), p. 67; *id.* (2), p. 17.

Almost as common in the hills as *Bhringa remifer* in similar situations, but unlike that species, occasionally found in low country also.

220. *DICRURUS ANNECTENS*—THE CROW-BILLED DRONGO.

*Dicrurus annectens* (Hodgs.); *Sharpe, Cat.*, p. 231.

♀ imm. Ginting Bidci, 2,300 ft. 29th October, 1907.

A migratory species, common on the islands of the Straits of Malacca and in the coastal districts in the winter months. Immature birds, with a great deal white in the plumage, are always in the majority.

## ORIOOLIDÆ.

221. *ORIOULUS CONSANGUINEUS*—THE BLACK-AND-RED MOUNTAIN ORIOLE.

*Oriolus consanguineus* (*Wardl.-Ramsay*); *Sharpe* (2), p. 434; *Bonhote*, p. 59; *Grant* (1), p. 68.

Very abundant on all mountains above 3,500 ft., except Gunung Tahan, from which it appears to be absent.

The large series before me confirm Mr. Grant's remarks, *loc. cit.*, about size. The amount of red on the primary coverts varies very greatly, being almost absent in some individuals.

222. *UROLOMCHA ACUTICAUDA*—HODGSON'S MUNIA.

*Uroloncha acuticauda* (Hodgs.); *Sharpe, Cat. Birds Brit. Mus.*, xiii., p. 356 (1890); *Butler*, p. 20.

Noted by Butler on the Larut Hills at 3,000 ft.; flocks were occasionally seen at the Semangko Pass in February, 1908.

223. *CHLORURA* *sp.*—THE MALAYAN GREEN WEAVER FINCH.

*Chlorura sp.*, *Grant, Fasc. Mal. Zool.*, iii., p. 70 (1905).

A single female of this genus was obtained at Telôm, Batang Padang highlands, South Perak, 3,500 ft., in January, 1902, but though

it has been searched for in the same locality on several occasions since, no additional specimens have come to hand. It is probably distinct from the Kina Balu form, *C. borneensis*, Sharpe.

224. *PYRRHULA WATERSTRADTI*—THE MALAYAN BULLFINCH.

*Pyrrhula waterstradti*, Hartert; *Nov. Zool.*, ix., p. 577 (1902); *Grant* (2), p. 18.

Gunong Ulu Kali, Selangor, 4,800-5,200 ft. February, 1906.

Gunong Mengkuang Lebah, Selangor, 4,800-5,200 ft. March, April, 1907.

Semangko Pass, Selangor, 3,500-4,800 ft. February, 1908.

The Malay Bullfinch probably occurs on all the higher mountains of Selangor wherever *Vaccinium* and Conifers are found, though it is nowhere so common as it was found to be on Gunong Tahan. Though carefully searched for, it has not yet been met with on any of the Perak Hills.

225. *MOTACILLA MELANOPE*—THE GREY WAGTAIL.

*Motacilla melanope* (Pall.); *Sharpe, Cat. Birds Brit. Mus.*, x., p. 500 (1885); *id.* (2), p. 441; *Butler*, p. 21; *Hartert*, p. 575; *Grant* (1), p. 71; *id.* (2), p. 19.

Common on roads, jungle paths and streams throughout the Peninsula from August to April.

226. *LIMONIDROMUS INDICUS*—THE FOREST WAGTAIL.

*Limonidromus indicus* (Gm.); *Sharpe, Cat.*, p. 532; *id.* (3), p. 278.

Collected by Wray on the Larut Hills, probably on migration; it has been met with in large flocks among the mangroves on the coastal districts of Selangor during the winter months.

227. *ANTHUS MACULATUS*—THE INDIAN TREE PIPIT.

*Anthus maculatus* (Hodgs.); *Sharpe, Cat. Birds Brit. Mus.*, x., p. 547 (1885); *Butler*, p. 21.

Butler's specimen, shot on Larut Hills at a height of about 3,700 ft. in March, 1898, is the only record of this Indian species for the Malay Peninsula. It is only a winter visitor to Tenasserim, but is found during that season in Saigon and Southern China.

Omitted by me in my Hand-list of the Birds of the Malay Peninsula, *antea*, p. 82.

NECTARINIIDÆ.

228. *ETHOPYGA WRAYI*—WRAY'S SUNBIRD.

*Ethopyga wrayi*, Sharpe, *P.Z.S.*, 1887, p. 440, pl. xxxviii., fig. 2; *Butler*, p. 21; *Hartert*, p. 573; *Grant* (1), p. 74; *id.* (2), p. 19.

Common on all the Peninsula hills, exceeding 3,000 ft. in height, but not found south of Gunong Ulu Kali in Selangor.

The specimen from Bukit Kutu that I recorded as *Ethopyga anomala* (*antea*, p. 82, No. 588) should be referred to this species; it is a mounted specimen in bad condition, lacking most of the feathers of the rump.

229. *ÆTHOPYGA TEMMINCKI*—HORSFIELD'S SCARLET SUNBIRD.

*Æthopyga temmincki* (S. Müll.); *Gadow, Cat. Birds Brit. Mus.*, ix., p. 16 (1884); *Robinson, Journ. Fed. Malay States Mus.*, i., p. 28 (1905).

Bukit Kutu, Ulu Selangor, 3,000 ft. November, 1900. A. L. Butler [c].  
Ginting Bidei, Selangor, 2,300 ft. November, 1907.

Somewhat rare and local, and apparently restricted to a very narrow zone in altitude. Fairly common on Gunong Angsi, Negri Sembilan, at a height of about 2,700 ft. in November, 1904. Not met with on the higher hills.

230. *ÆTHOPYGA ANOMALA*—ABBOTT'S SUNBIRD.

*Æthopyga anomala*, Richmond, *Proc. U.S. Nat. Mus.*, xii., p. 319 (1900).

This species has been described as near *Æ. saturation*; it appears, however, to be closer to *Æ. wrayi*, from which it only differs in lacking the yellow rump band.

231. *ANTHOTHREPTES RHODOLEMA*—SHELLEY'S SUNBIRD.

*Anthothreptes rhodolæma*, Shelley, *Monogr. Nectarin*, p. 13; *Hartert, Nov. Zool.*, ix., pp. 203, 209, 574 (1908).

I cannot recognise this species amongst the very large series of *Anthothreptes malaccensis* in the Selangor Museum.

232. *ANTHOTHREPTES HYPOGRAMMICA*—THE BANDED SUNBIRD.

*Anthothreptes hypogrammica* (S. Müll.); *Gadow, t.c.*, p. 112; *Hartert*, p. 574; *Grant* (1), p. 73; *id.* (2), p. 19.

♂. Semangko Pass, 2,500 ft. February, 1908.

2♂, 2♀. Ginting Bidei, Selangor, 2,300 ft. October, 1907.

Abundant in deep jungle from 200-2,300 ft., taking the place of *Anthothreptes malaccensis*, which is never found far from cultivation.

233. *CHALCOPARIA SINGALENSIS*—THE RUBY THROAT.

*Anthothreptes phaenicotis* (Temm.); *Gadow, t.c.*, p. 121.

*Chalcoparia singalensis*, *Hartert*, p. 574.

Collected by Waterstradt on Gunong Tahan between 2,000 and 5,000 ft.; fairly common in the Selangor low country.

234. *ARACHNOTHERA LONGIROSTRIS*—THE LONG-BILLED SPIDER HUNTER.

*Arachnothera longirostris* (Lath.); *Gadow, t.c.*, p. 103; *Sharpe*, p. 441; *Hartert*, p. 574; *Grant* (1), p. 71.

♂. Semangko Pass, Selangor-Pahang boundary, 2,700 ft. February, 1908.

The only specimen I have met with on the hills.

235. *ARACHNOTHERA MODESTA*—THE DULL SPIDER HUNTER.

*Arachnothera modesta* (Eyton); *Gadow, t.c.*, p. 107; *Hartert*, p. 574; *Grant* (1), p. 72.

Semangko Pass, 2,700 ft. November, 1900. A. L. Butler [c].

Common in the low country, but evidently rare on the hills.

236. *ARACHNOTHERA MAGNA*—THE STREAKED SPIDER HUNTER.

*Arachnothera magna* (Hodgs.); *Gadow, t.c.*, p. 105; *Sharpe* (2), p. 441; *Butler*, p. 21; *Grant* (1), p. 73; *id.* (2), p. 19.

Common on all the high hills of the Peninsula above 3,000 ft. as far south as Gunong Ulu Kali.

237. *ARACHNOTHERA CRASSIROSTRIS*—THE THICK-BILLED SPIDER HUNTER.

*Arachnothera crassirostris* (Reichenb.); *Gadow, t.c.*, p. 102; *Bonhote*, p. 64; *Grant* (1), p. 72.

A male was collected at Telôm, 3,500 ft. 1st December, 1908.

Widely distributed throughout the Peninsula, but decidedly rare.

## DICÆIDÆ.

238. *DICÆUM TRIGONOSTIGMA*—THE ORANGE-BILLED FLOWER-PECKER.

*Dicæum trigonostigma* (Scop.); *Sharpe, Cat. Birds Brit. Mus.*, x., p. 38 (1885); *Bonhote*, p. 65; *Hartert*, p. 575; *Grant* (1), p. 75; *id.* (2), p. 20.

♂ ♀. Ginting Bidci, Selangor, 2,300 ft. May, 1908.

The upper limit, from which this species has been recorded, is about 3,300 ft. In orchard land and low country secondary growth, it is common.

239. *DICÆUM IGNIPECTUS*—THE FIRE-BREADED FLOWER-PECKER.

*Dicæum ignipectus* (Hodgs.); *Sharpe, t.c.*, p. 41; *Sharpe* (2), p. 441; *Bonhote*, p. 65; *Butler*, p. 22; *Hartert*, p. 575; *Grant* (1), p. 75; *id.* (2), p. 20.

Met with on nearly all the mountains of the Peninsula, but not particularly common on any of them and not found below about 3,500 ft.

240. *PRIONOCHILUS THORACICUS*—THE SCARLET THROATED FLOWER-PECKER.

*Prionochilus thoracicus* (Temm.); *Sharpe, Cat.*, p. 67; *Grant* (2), p. 19.

The three specimens collected on Gunong Tahan appear to be the only record of the species from the Peninsula in recent years. It is, however, said to occur in "Malacca."

241. *PRIONOCHILUS MACULATUS*—THE SPOTTED FLOWER PECKER.

*Prionochilus maculatus* (Temm.); *Sharpe, t.c.*, p. 69; *Butler*, p. 22; *Hartert*, p. 575; *Grant* (2), p. 20.

Ginting Bidei, Selangor, 2,300 ft. May, 1908.

Not normally found in the hill country at any great height, but fairly common at the above locality, where numerous specimens were collected.

## ZOSTEROPIDÆ.

242. *ZOSTEROPS TAILANENSIS*—THE UPLAND WHITE EYE.

*Zosterops aureiventer*, *Hartert* (nec *Hume*), p. 575; *Grant* (nec *Hume*), (1), p. 75.

*Zosterops tahanensis*, *Grant*, *Bull. B.O.C.*, xix., No. cxxvii., p. 9 (1906); *id.* (2), p. 21.

♂, 2 ♀. Ginting Bidei, Selangor, 2,300 ft. May, 1908.

These three skins, when compared with a series of twenty-one specimens of typical *Z. aureiventer*, *Hume*, from the coasts of the Malay Peninsula and the islands in the immediate vicinity, clearly show the differences pointed out by Mr. Grant—viz., a darker green upper surface and darker grey under parts. In addition, the throat is a dull greenish yellow, not bright clear yellow as in *Z. aureiventer*, and the white ring round the eye is not so broad.

## SUMMARY.

On summarising the foregoing list, we find that the mountains of the Malay Peninsula above the height of 2,300 ft.—the altitude of the Ginting Bidei Pass—are now known to be inhabited by 242 species, which, with very few exceptions, are represented by recently collected specimens of undoubted authenticity; of these 157 species are also met with at lower altitudes, and may be divided into the following classes:

A.—Migrants of wide distribution and of no importance for faunal discussion:

- |                                 |                                    |
|---------------------------------|------------------------------------|
| 1. <i>Rallina superciliaris</i> | 8. <i>Poliomyias luteola</i>       |
| 2. <i>Caprimulgus jotaka</i>    | 9. <i>Turdus obscurus</i>          |
| 3. <i>Cypselus pacificus</i>    | 10. <i>Petrophila gularis</i>      |
| 4. <i>Cacomantis merulinus</i>  | 11. <i>Larvivora cyanea</i>        |
| 5. <i>Hierococyx fugax</i>      | 12. <i>Acanthopneuste coronata</i> |
| 6. <i>Hirundo gutturalis</i>    | 13. <i>Motacilla melanope</i>      |
| 7. <i>Alseonax latirostris</i>  | 14. <i>Limnidromus indicus</i>     |
|                                 | 15. <i>Dicrurus annectens</i>      |

B.—Species ranging from Burma or Tenasserim to the Malay Peninsula, but no further—*i.e.*, species of Continental Type :

- |                                 |                                    |
|---------------------------------|------------------------------------|
| 1. <i>Ceyx tridaactyla</i>      | 7. <i>Pericrocotus flammifer</i>   |
| 2. <i>Collocalia innominata</i> | 8. <i>Æthorhynchus lafresnayei</i> |
| 3. <i>Chætura indica</i>        | 9. <i>Pycnonotus finlaysoni</i>    |
| 4. <i>Dichoceros bicornis</i>   | 10. <i>Herpornis zantholeuca</i>   |
| 5. <i>Rhopodytes tristis</i>    | 11. <i>Geocichla innotata</i>      |
| 6. <i>Gecinulus viridis</i>     | 12. <i>Cittocinclla macrura</i>    |

C.—Species distributed from Tenasserim or beyond, through the Malay Peninsula to Sumatra and Borneo—*i.e.*, species of Generalised Malayan Type :

- |                                      |  |
|--------------------------------------|--|
| 1. <i>Rollulus roulroul</i>          | 36. <i>Calyptomena viridis</i>                     |
| 2. <i>Butoreron capellei</i>         | 37. <i>Eurylæmus javanicus</i>                     |
| 3. <i>Treron nipalensis</i>          | 38. <i>Corydon sumatranus</i>                      |
| 4. <i>Macropygia ruficeps</i>        | 39. <i>Cyornis unicolor</i>                        |
| 5. <i>Chalcophaps indica</i>         | 40. <i>Cyornis tickelliæ</i>                       |
| 6. <i>Accipiter gularis</i>          | 41. <i>Terpsiphone affinis</i>                     |
| 7. <i>Ictinaetus malayensis</i>      | 42. <i>Philentoma velatum</i>                      |
| 8. <i>Spizaetus alboniger</i>        | 43. <i>Philentoma pyrrhopterum</i>                 |
| 9. <i>Alcedo euryzona</i>            | 44. <i>Culicicapa ceylonensis</i>                  |
| 10. <i>Rhytidoceros undulatus</i>    | 45. <i>Chloropsis zosterops</i>                    |
| 11. <i>Anorrhinus galeritus</i>      | 46. <i>Chloropsis cyanopogon</i>                   |
| 12. <i>Berenicornis comatus</i>      | 47. <i>Hemixus malaccensis</i>                     |
| 13. <i>Rhinoplax vigil</i>           | 48. <i>Microtarsus melanoleucus</i>                |
| 14. <i>Nyctiornis amieta</i>         | 49. <i>Criniger tephrogenys</i>                    |
| 15. <i>Chætura leucopygialis</i>     | 50. <i>Alophoixus phæocephalus</i>                 |
| 16. <i>Tachornis infumata</i>        | 51. <i>Trachycomus ochrocephalus</i>               |
| 17. <i>Macropteryx longipennis</i>   | 52. <i>Tricholestes criniger</i>                   |
| 18. <i>Macropteryx comata</i>        | 53. <i>Pycnonotus simplex</i>                      |
| 19. <i>Pyrotrogon duvauceli</i>      | 54. <i>Rubigula cyaniventris</i>                   |
| 20. <i>Pyrotrogon oreseius</i>       | 55. <i>Turdinus abbotti</i>                        |
| 21. <i>Surniculus lugubris</i>       | 56. <i>Setaria magnirostris</i>                    |
| 22. <i>Centropus sinensis</i>        | 57. <i>Dryocotaphus nigricapita-</i><br><i>tus</i> |
| 23. <i>Zanclostomus javanicus</i>    | 58. <i>Copsychus musicus</i>                       |
| 24. <i>Urocoocyx erythrognathus</i>  | 59. <i>Orthotomus atrigularis</i>                  |
| 25. <i>Calorhamphus hayi</i>         | 60. <i>Melanochlora flavocristata</i>              |
| 26. <i>Cyanops mystacophanes</i>     | 61. <i>Dissemurus paradiseus</i>                   |
| 27. <i>Gecinulus observandus</i>     | 62. <i>Chaptia malayensis</i>                      |
| 28. <i>Gauropicoides rafflesii</i>   | 63. <i>Chalcoparia singalensis</i>                 |
| 29. <i>Pyrrhopicus porphyromelas</i> | 64. <i>Munia acuticauda</i>                        |
| 30. <i>Miglyptes grammithorax</i>    | 65. <i>Anthothreptes hypogram-</i><br><i>mica</i>  |
| 31. <i>Miglyptes tukki</i>           | 66. <i>Arachnothera modesta</i>                    |
| 32. <i>Micropternus brachyurus</i>   | 67. <i>Arachnothera longirostris</i>               |
| 33. <i>Chrysophlegma malaccense</i>  | 68. <i>Arachnothera crassirostris</i>              |
| 34. <i>Chrysophlegma humii</i>       |  |
| 35. <i>Hemicercus sordidus</i>       |  |
| 69. <i>Dicæum trigonostigma</i>      |  |

D.—Species ranging from the islands of Sumatra, Borneo, or Java to the Malay Peninsula, but not to Tenasserim—*i.e.*, species of Insular Type:

- |                                     |                                      |
|-------------------------------------|--------------------------------------|
| 1. <i>Rhizothera longirostris</i>   | 26. <i>Rubigula webberi</i>          |
| 2. <i>Osmotreron olax</i>           | 27. <i>Eupetes macrocerus</i>        |
| 3. <i>Ptilinopus jambu</i>          | 28. <i>Pomatorhinus borneensis</i>   |
| 4. <i>Carpophaga badia</i>          | 29. <i>Turdinus sepiarius</i>        |
| 5. <i>Buceros rhinoceros</i>        | 30. <i>Setaria cinerea</i>           |
| 6. <i>Lyncornis temmincki</i>       | 31. <i>Anuropsis malaccensis</i>     |
| 7. <i>Collocalia linchi</i>         | 32. <i>Alcippe cinerea</i>           |
| 8. <i>Chætura gigantea</i>          | 33. <i>Stachyris davisoni</i>        |
| 9. <i>Pyrotrogon neglectus</i>      | 34. <i>Stachyris poliocephala</i>    |
| 10. <i>Rhopodytes sumatranus</i>    | 35. <i>Stachyris leucotis</i>        |
| 11. <i>Chotorhea chrysopogon</i>    | 36. <i>Stachyris nigricollis</i>     |
| 12. <i>Chotorhea versicolor</i>     | 37. <i>Kenopia striata</i>           |
| 13. <i>Mesobucco duvauceli</i>      | 38. <i>Mixornis gularis</i>          |
| 14. <i>Chrysocolaptes validus</i>   | 39. <i>Macronus ptilosus</i>         |
| 15. <i>Sasia everetti</i>           | 40. <i>Myiophoneus dicrorhynchus</i> |
| 16. <i>Erythromyias muelleri</i>    | 41. <i>Geocichla interpres</i>       |
| 17. <i>Gerygone modiglianii</i>     | 42. <i>Hydrocichla ruficapilla</i>   |
| 18. <i>Hypothymis azurea</i>        | 43. <i>Trichixus pyrrhopygus</i>     |
| 19. <i>Rhinomyias pectoralis</i>    | 44. <i>Sutoria maculicollis</i>      |
| 20. <i>Stoparola thalassinoides</i> | 45. <i>Lanius tigrinus</i>           |
| 21. <i>Lalage culminata</i>         | 46. <i>Tephrodornis gularis</i>      |
| 22. <i>Chloropsis icterocephala</i> | 47. <i>Æthopyga temmincki</i>        |
| 23. <i>Hemixus cinereus</i>         | 48. <i>Anthothreptes rhodolæma</i>   |
| 24. <i>Iole olivacea</i>            | 49. <i>Prionochilus thoracicus</i>   |
| 25. <i>Criniger finschii</i>        | 50. <i>Prionochilus maculatus</i>    |

E.—The following species are peculiar to the Malay Peninsula:

Species.	Nearest ally.	Locality.
1. <i>Sphenocercus</i> sp.	<i>Sp. apicicauda</i>	Tenasserim
2. <i>Syrnium maingayi</i>	<i>S. indranee</i>	S. India
3. <i>Pernis tweedalii</i>	<i>P. cristatus</i>	Tenasserim and Borneo
4. <i>Indicator malayanus</i>	<i>I. archipelagicus</i>	Borneo
5. <i>Irena cyanea</i>	<i>I. puella</i>	Tenasserim
6. <i>Turdinus macrodactylus</i>	<i>T. rufipectus</i>	Sumatra
7. <i>Turdinulus granti</i>	<i>T. roberti</i>	Tenasserim
8. <i>Stachyris poliogaster</i>	<i>S. rufifrons</i>	"
9. <i>Platylophus ardesiacus</i>	<i>P. coronatus</i>	Sumatra and Borneo
10. <i>Dendrophila saturatior</i>	<i>D. frontalis</i>	Tenasserim

Out of the 142 species that remain in this section, after excluding 15 migrant forms, no less than 122 are of distinctly Malayan type, while only 20 are confined to the mainland of Asia or, in the case of peculiar species, most closely related to species so confined.

We may, therefore, conclude that the bulk of the submontane avifauna (and by submontane is meant the region from about 3,000 ft. in altitude to the limits of the coastal zone) has been derived from the Sunda Islands to the East, West and South, and has not spread over the Peninsula by way of Tenasserim and Burma.

The remaining 85 species in the list are, so far as is at present known, strictly confined to the mountains above 3,000 ft., and include the greater portion of the species peculiar to the Peninsula.

On analysing the list in the same manner as the preceding section, we find that—

Seven species are migrants, met within the winter only :

- |                                   |                                |
|-----------------------------------|--------------------------------|
| 1. <i>Cuculus poliocephalus</i>   | 4. <i>Cyanoptila bella</i>     |
| 2. <i>Hemichelidon ferruginea</i> | 5. <i>Cichloselys sibirica</i> |
| 3. <i>Hemichelidon fuliginosa</i> | 6. <i>Monticola solitaria</i>  |
| 7. <i>Anthus maculatus</i>        |                                |

Eighteen species occur elsewhere in the mountains of Tenasserim—viz.,

- |                                      |                                   |
|--------------------------------------|-----------------------------------|
| 1. <i>Syrnium newarense</i>          | 10. <i>Criniger ochraceus</i>     |
| 2. <i>Glaucidium brodiei</i>         | 11. <i>Otocompsa flaviventris</i> |
| 3. <i>Pyrotrogon erythrocephalus</i> | 12. <i>Drymocaptes tickelli</i>   |
| 4. <i>Cyanops ramsayi</i>            | 13. <i>Pteruthius æralatus</i>    |
| 5. <i>Pyrrhopicus pyrrhotis</i>      | 14. <i>Mesia argentauris</i>      |
| 6. <i>Psarisomus dalhousiæ</i>       | 15. <i>Notodela leucura</i>       |
| 7. <i>Nitidula hodgsoni</i>          | 16. <i>Henicurus schistaceus</i>  |
| 8. <i>Pericrocotus fraterculus</i>   | 17. <i>Arachnothera magna</i>     |
| 9. <i>Chloropsis hardwickii</i>      | 18. <i>Dicaeum ignipectus</i>     |

Eleven are high level Sumatran species—viz.,

- |                                    |                                 |
|------------------------------------|---------------------------------|
| 1. <i>Macropygia leptogrammica</i> | 6. <i>Melanocichla lugubris</i> |
| 2. <i>Cyanops oorti</i>            | 7. <i>Rhinocichla mitrata</i>   |
| 3. <i>Psilopogon pyrolophus</i>    | 8. <i>Stachyris bocagei</i>     |
| 4. <i>Niltava decipiens</i>        | 9. <i>Turdinus loricatus</i>    |
| 5. <i>Cryptolopha trivirgata</i>   | 10. <i>Sibia simillima</i>      |
| 11. <i>Pnoepyga lepida</i>         |                                 |

Three species are found elsewhere only in Borneo—viz.,

- |                                      |                              |
|--------------------------------------|------------------------------|
| 1. <i>Phyllergates cinereicollis</i> | 2. <i>Abrornis schwaneri</i> |
| 3. <i>Muscicapula westermanni</i>    |                              |

Four are common to the Malay Peninsula, Sumatra and Borneo—viz.,

- |                                 |                                |
|---------------------------------|--------------------------------|
| 1. <i>Pericrocotus montanus</i> | 3. <i>Hierococcyx bocki</i>    |
| 2. <i>Oriolus consanguineus</i> | 4. <i>Picumnus innominatus</i> |

Three are found in the Malay Peninsula, Sumatra and Cochin-China—viz.,

- |                                   |                            |
|-----------------------------------|----------------------------|
| 1. <i>Chætura cochinchinensis</i> | 2. <i>Cyornis concreta</i> |
| 3. <i>Bhringa remifer</i> *       |                            |

---

\* Also in Java.

Two range from Tenasserim to Borneo—viz.,

- |                             |   |
|-----------------------------|---|
| 1. <i>Hemipus picatus</i> * | 2. <i>Rhipidura albicollis</i> (= <i>atrata</i> ,<br>Salvad.) |
|-----------------------------|---|

One is met with only in Malay Peninsula, Java and Timor—viz.,

1. *Dendrophila azurea*

While the remaining 36 species are peculiar to the Malay Peninsula.

Mountain species peculiar to the Malay Peninsula, with their nearest allies :

Name.	Allied species.	Locality.
1. <i>Rheinwardtius nigrescens</i>	<i>R. ocellatus</i>	Indo-China
2. <i>Arboricola campbelli</i>	<i>A. rubrirostris</i>	Sumatra
3. <i>Polyplectron inopinatus</i>	<i>P. chalcurus</i>	"
4. <i>Sphenocercus robinsoni</i>	{ <i>Sp. korthalsi</i> { <i>Sp. permagnus</i>	" Loo Choo Is- lands
5. <i>Heteroscops vulpes</i>	<i>H. luciae</i>	Borneo
6. <i>Gecinus rodgeri</i>	<i>G. chlorogaster</i>	Tenasserim
7. <i>Gecinus robinsoni</i>	<i>G. occipitalis</i>	"
8. <i>Chrysophlegma wrayi</i>	<i>Ch. flavinucha</i>	"
9. <i>Serilophus rothschildi</i>	<i>S. lunatus</i>	"
10. <i>Anthipes malayana</i>	<i>A. submoniliger</i>	"
11. <i>Cyornis malayensis</i>	<i>C. oatesi</i>	"
12. <i>Muscicapula malayana</i>	<i>M. hyperythra</i>	"
13. <i>Cryptolopha butleri</i>	<i>C. castaneiceps</i>	Himalayas
14. <i>Cryptolopha davisoni</i>	<i>C. montis</i>	Borneo
15. <i>Artamides larutensis</i>	<i>A. larvatus</i>	Java
16. <i>Iole peracensis</i>	<i>I. tickelli</i>	Tenasserim
17. <i>Gampsorhynchus saturator</i>	<i>G. torquatus</i>	"
18. <i>Trochalopteron peninsulæ</i>	<i>T. melanostigma</i>	"
19. <i>Pomatorhinus wrayi</i>	<i>P. tickelli</i>	"
20. <i>Corythocichla leucosticta</i>	<i>C. striatus</i>	"
21. <i>Aleippe peracensis</i>	<i>A. nipalensis</i>	"
22. <i>Pseudominla soror</i>	<i>P. castaneiceps</i>	"
23. <i>Myiophoneus robinsoni</i>	<i>M. cyaneus</i>	Java
24. <i>Brachypteryx wrayi</i>	<i>B. nipalensis</i>	Tenasserim
25. <i>Siva malayana</i>	<i>S. castaneicauda</i>	"
26. <i>Siva sordidior</i>	<i>S. sordida</i>	"
27. <i>Cutia cervinicrissa</i>	<i>C. nipalensis</i>	Karen-nee
28. <i>Pteruthius tahanensis</i>	<i>P. melanotis</i>	Tenasserim
29. <i>Oreocichla affinis</i>	<i>O. horsfieldi</i>	Java
30. <i>Suya waterstradti</i>	<i>S. superciliaris</i>	Tenasserim
31. <i>Cissa robinsoni</i>	{ <i>Cissa minor</i> { <i>C. jeffreyi</i>	Sumatra Borneo
32. <i>Pyrrhula waterstradti</i>	<i>P. nipalensis</i>	Tenasserim

\* *Hemipus intermedius*, Salvad., in Sumatra.

Name.	Allied species.	Locality.
33. <i>Chlorura</i> sp.	<i>C. borneensis</i>	Borneo
34. <i>Æthopyga anomala</i>	<i>Æ. saturata</i>	Tenasserim
35. <i>Æthopyga wrayi</i>	<i>Æ. saturata</i>	"
36. <i>Zosterops tahanensis</i>	<i>Z. aureiventer</i>	Tenasserim, Java

With regard to the range of the endemic Peninsular forms, it may be noted that they are very evenly distributed throughout the main range, from as far north as has been explored to Gunong Ulu Kali in Selangor; south of Ginting Bidei in Selangor, practically all disappear; Gunong Angsi in Negri Sembilan, 3,000 ft., app., and Mt. Ophir on the borders of Malacca and Johore possessing none.

The hills behind Lakon in the N.-E. Coast of the Peninsula, which attain a height of over 5,000 ft. and have not yet been explored, may possibly yield further species, in view of the fact that the Trang hills on the same latitude on the West Coast, which are, however, of less elevation, undoubtedly possess certain mountain forms; the specific distinctness, however, of a proportion of the forms described therefrom is open to question.

Further analysis of this list of 77 resident mountain species discloses the fact that the larger proportion is derived from Tenasserim and the mainland of Asia, and not from the Sunda Islands, as is the case with the submontane forms, which is clearly shown by the following tables:

Submontane avifauna, 142 species—

	No.	Per cent.
Peculiar species ... ..	10	7.0
Species occurring on mainland only	13	9.3
"  "  islands only ...	50	35.2
"  of continental facies ...	20	14.1
"  of insular facies ... ..	122	85.9

Montane avifauna, 77 species—

	No.	Per cent.
Peculiar species ... ..	36	46.8
Species occurring on mainland only	18	23.4
"  "  islands only ...	18	23.4
"  of continental facies ...	44	57.1
"  of insular facies ... ..	28	36.4
Neutral ... ..	5	6.5

On going through the list in detail, one is struck, on the whole, by the lack of differentiation in the species: for, though 46 out of the 242 are not found elsewhere, hardly any of them are much more than subspecies and only nine or ten are really distinct forms. The mountains of the Malay Peninsula have been about equally well explored with Kina Balu, and what they lack in height, as compared with that mountain, they make up in area. The present list comprises 242

species included in 176 genera, while Whitehead records 159 species in 124 genera from the Bornean mountain.

But the Malay Peninsula contains no peculiar genus, while Kina Balu possesses no less than seven—viz.,

Chlamydochæra		Orthnocichla
Oreoctistes		Allocotops
Chlorocharis		Androphilus

Hæmatortyx

Several genera occur both in Tenasserim, Borneo and Sumatra, but find no representative species in the Malay Peninsula—viz.,

Merula		Staphidia
--------	--	-----------

Garrulax

nor are—

Cettia		Hyloterpe
--------	--	-----------

found on Kina Balu, met with here.

On the other hand, Himalayaic genera, not met with in the Sunda Islands, occur in the Peninsula—viz.,

Serilophus		Pseudominla
Nitidula		Siva
Gampsorhynchus		Cutia
Trochalopteron		Pyrrhula

As do also representatives of the Sumatran genera :

Chalcurus (Polyplectron)		Rhinocichla
Psilopogon		Melanocichla

which are not met with either in Tenasserim or Borneo.

Those few mammals that are known to be confined to the high mountains support the view that the fauna of the central chain has been very largely derived from the continental land masses to the North. These species are :

Name.	Nearest ally.	Locality.
Sciurus castaneiventris griseopectus	Sc. c. griseopectus	Assam
Sciurus tenuis tahan	Sc. tenuis	Low country, Malay Peninsula
Sciurus maclellandi novemlineatus	Sc. mc. typicus	Tenasserim
Funambulus rufigenis belfieldi	F. rufigenis typicus	„
Mus ciliatus	Mus edwardsi	Yunnan
Mus ferreocanus	Mus berdmorei	Mergui
Mus bukit	Mus jerdoni	Tenasserim

In conclusion, it may, I think, be taken as proved :

(1) That the origin of the submontane species of the Peninsula is Indo-Malayan and comparatively recent in time, the species have spread N.-W. from the Sunda Islands rather than S.-E. from Burma.

(2) That the actual mountain fauna is composed of two elements-- viz.,

(a) Continental,

(b) Sumatran,

(a) is largely in excess and consists of species, for the most part, identical or only slightly differentiated from the congeneric forms in Tenasserim and Burma at similar elevations ;

(b) is less dominant and comprises species identical with or very closely allied to West Sumatran mountain species.

(3) That the connection with the Bornean mountain fauna is very distant. We may also infer that, at some geological epoch by no means distant, the land area of the Peninsula was very much less than is at present the case, and that the connection with Tenasserim has been continuous or only interrupted for very brief spaces both in time and distance.

(4) That there has been a direct land connection with Sumatra, also in comparatively recent times.

(5) That the southern portion of the Peninsula--from some point N. of the mouth of the Muar River, including Mt. Ophir, and the area on the east side of the Peninsula, south of the Pahang River, at its confluence with the Triang--has been at some very recent time disconnected with the mainland. This is shown, by the entire absence of all Tenasserim and endemic species of birds, and by the fact that the line roughly indicated is the southern boundary of such continental mammals, as *Sc. concolor* and *Sc. maclellandi*; while it is the northern limit of such insular forms as *Sus vittatus* and *Sc. peninsularis*.





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