Vol. V. Part II

Journal

of the

Malayan Branch

of the

Royal Asiatic Society

November 1927

SINGAPORE
PRINTED AT THE METHODIST PUBLISHING HOUSE
1927

CONTENTS.

A List of Plants from Cameron's Highlands, Pahang.

By M. R. HENDERSON, F.L.S.

The area known as Cameron's Highlands lies at the headwaters of the Bertam River in Pahang, and is of interest at the present time owing to its possibilities of development as a hill station.

In 1890, Leonard Wray, Curator of the Perak State Museum, in the course of an exploration of the mountains east of Tapah, crossed Cameron's Highlands and presumably collected plants there (Jour. Str. Br. Roy. As. Soc., 21, p. 123).

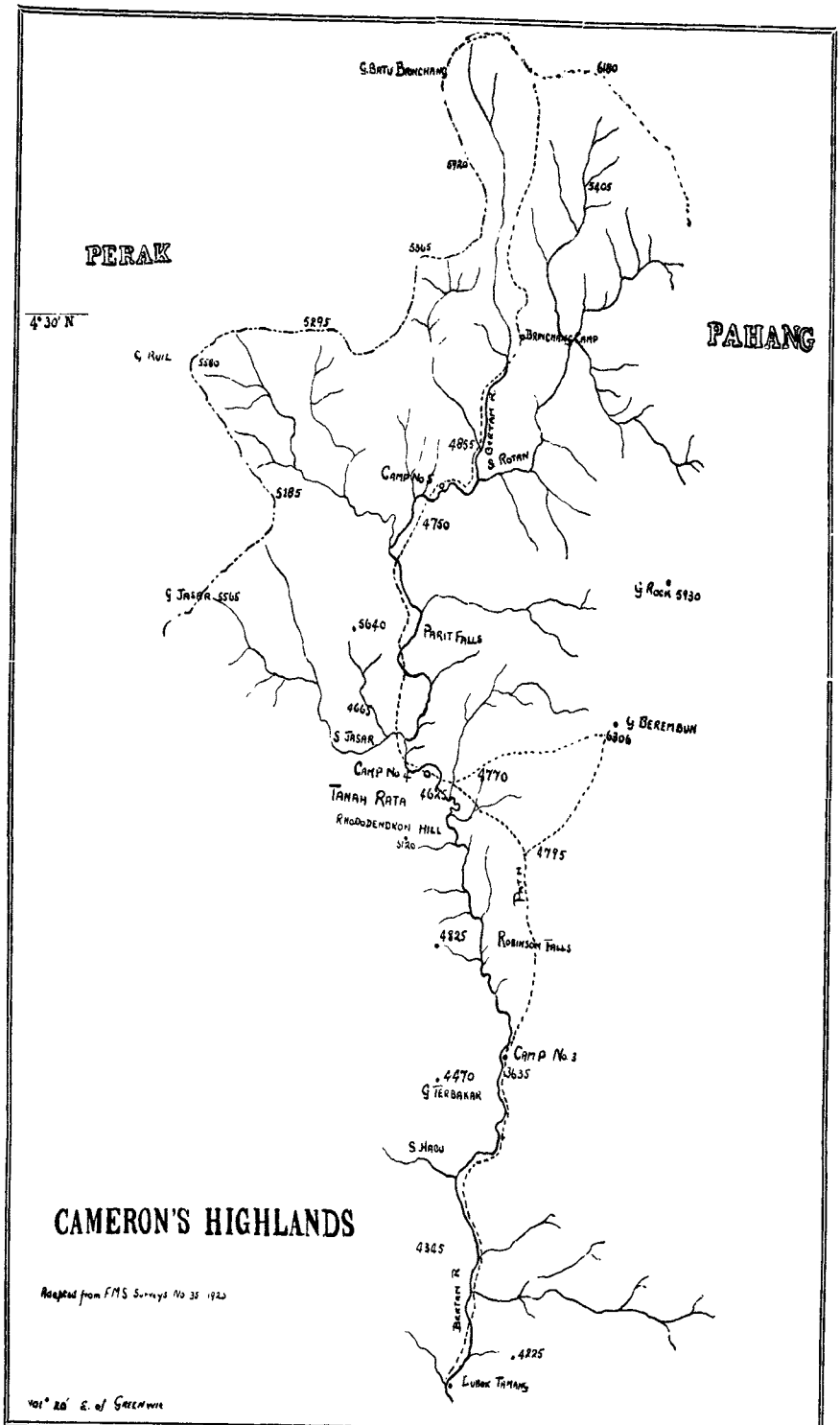
In 1908 Ridley accompanied Robinson and Kloss on an expedition to this area, and the results of his collections are published in the Journal of the F. M. S. Museums, Vol. IV (1909), No. 1, p. 1.

Ridley appears not to have reached what is now known as Cameron's Highlands, but to have camped at or near a spot on the Bertam river known as Lubok Tamang, which was until recently the site of one of the halting camps on the track to the Highlands. He calls the district Telom and the river the Telom river, but this is a mistake, for the Telom river lies farther to the north-east and joins the Bertam river a considerable distance eastwards to form the Jelai. Ridley collected largely round Lubok Tamang and as far as Gunong Berembun, and obtained many novelties, and in the introduction to his paper discusses shortly the occurrence of the Himalayan element in the flora. (See also Henderson, Singapore Naturalist, No. 5, p. 95, "A Note on the Flora of Cameron's Highlands").

In June, 1923, the writer collected at Lubok Tamang and on the Highlands, spending about a week in each locality. In January, 1924, he spent a month on the Highlands engaged chiefly in meteorological work, but time for a considerable amount of collecting was found.

In November, 1925, he accompanied Messrs. Whitty and Hodgson of the Forest Department, S. S. and F. M. S., who were sent thither on a survey of the forests of the area. Unfortunately, owing to very wet weather, work had to be abandoned after a fortnight, and the collections were disappointing, especially in the matter of orchids, which are extremely numerous in the area. A large collection of living orchids was taken back to Singapore, but few of them survived the change of climate long enough to come into flower.

The results of the three visits are summarised in the following pages.


S. Batu Brinchang
6180
6720
5405
5365
PERAK
4° 30' N
5295
PAHANG
G. Ruil
5580
Brinchang Camp
Bertam R.
4855
S. Rotan
Camp No 5
5185
4750
G. Jasar 5565
G. Rock 5930
5640
Parit Falls
4665
S. Jasar
G. Beremban
6806
Camp No 4
4770
Tanah Rata
4625
Rhododendron Hill
5120
4795
Parit
4825
Robinson Falls
Camp No 3
3635
4470
G. Terbakar
S. Hadu
4345
Bertam R.
4225
Lubok Tamang
CAMERON'S HIGHLANDS
Adapted from FMS Surveys No 35 1925
101° 28' E. of Greenwich

A List of Plants from Cameron's Highlands, Pahang.

By M. R. HENDERSON, F.L.S.

The area known as Cameron's Highlands lies at the headwaters of the Bertam River in Pahang, and is of interest at the present time owing to its possibilities of development as a hill station.

In 1890, Leonard Wray, Curator of the Perak State Museum, in the course of an exploration of the mountains east of Tapah, crossed Cameron's Highlands and presumably collected plants there (Jour. Str. Br. Roy. As. Soc., 21, p. 123).

In 1908 Ridley accompanied Robinson and Kloss on an expedition to this area, and the results of his collections are published in the Journal of the F. M. S. Museums, Vol. IV (1909), No. 1, p. 1.

Ridley appears not to have reached what is now known as Cameron's Highlands, but to have camped at or near a spot on the Bertam river known as Lubok Tamang, which was until recently the site of one of the halting camps on the track to the Highlands. He calls the district Telom and the river the Telom river, but this is a mistake, for the Telom river lies farther to the north-east and joins the Bertam river a considerable distance eastwards to form the Jelai. Ridley collected largely round Lubok Tamang and as far as Gunong Berembun, and obtained many novelties, and in the introduction to his paper discusses shortly the occurrence of the Himalayan element in the flora. (See also Henderson, Singapore Naturalist, No. 5, p. 95, "A Note on the Flora of Cameron's Highlands").

In June, 1923, the writer collected at Lubok Tamang and on the Highlands, spending about a week in each locality. In January, 1924, he spent a month on the Highlands engaged chiefly in meteorological work, but time for a considerable amount of collecting was found.

In November, 1925, he accompanied Messrs. Whitty and Hodgson of the Forest Department, S. S. and F. M. S., who were sent thither on a survey of the forests of the area. Unfortunately, owing to very wet weather, work had to be abandoned after a fortnight, and the collections were disappointing, especially in the matter of orchids, which are extremely numerous in the area. A large collection of living orchids was taken back to Singapore, but few of them survived the change of climate long enough to come into flower.

The results of the three visits are summarised in the following pages.

Mr. S. G. G. Kelliher, Meteorological Officer, F. M. S., has kindly supplied the following extracts from the meteorological observations taken at the Tanah Rata station during the years 1924-1926.

RAINFALL:-

	Total	Wettest month	Driest month
1924	114.49 ins. (2918 mms.)	October 20.07 ins. (509.8 mms.)	February 2.99 ins. (75.9 mms.)
1925	144.91 ins. (3680.3 mms.)	November 25.31 ins. (642.8 mms.)	July 3.47 ins. (88.1 mms.)
1926	109.46 ins. (2780.2 mms.)	December 26.46 ins. (672.0 mms.)	March 1.83 ins. (46.5 mms.)

TEMPERATURE (degrees Fahrenheit).

	Highest Max.	Lowest Min.	Mean Max.	Mean Min.
1924	78	45	72.2	55.8
1925	77	42	71.1	55.5
1926	78	43	72.5	56.0

MEAN HUMIDITY: 1924, 88.2%; 1925, 90.1%; 1926, 85%.

The whole area of Cameron's Highlands is heavily forested, the trees belonging chiefly to species of *Xanthophyllum, Gordonia, Saurauia, Calophyllum, Garcinia, Amoora, Dysoxylon, Stemonurus, Mangifera, Pyrus, Bucklandia, Tristania, Eugenia, Canthium, Cinnamomum, Endiandra, Daphniphyllum, Baccaurea, Pasania and Castanopsis.* No Dipterocarps are present, as is to

be expected at these altitudes. Several large trees of *Dacrydium elatum* were seen at the foot of Robinson Falls at an elevation of about 3500 feet, and a few stunted specimens of *D. Beccarii* occurred on ridge tops near Batu Brinchang camp at an elevation of 5000 feet. Several large trees of a species of *Canarium* were observed at an elevation of 4000-4500 feet.

"Mossy forest" occurs on the summits of the surrounding hills, but is most conspicuous and well developed on the summit of Gunong Batu Brinchang, 6665 feet. The ascent of Batu Brinchang is made by way of a very narrow ridge, and here the mossy forest is confined to the crest of the ridge. A few feet down on either side, the mosses and liverworts begin to disappear, first those on the ground, and then to a great extent, those on the tree-trunks. The ground underfoot is covered with a deep bed of very wet *Sphagnum*. The summit of Batu Brinchang is a short ridge with precipitous sides and is covered with "elfin forest," the trees, never more than 10-15 feet tall, gnarled and twisted, and covered with mosses and liverworts. Just below the summit is a small valley through which runs a streamlet. Although less than a hundred feet below the summit, there was here no sign of mossy forest. A small bamboo (*Bambusa elegans*, Ridl.) replaces the mossy forest on some parts of the ridge crests, and forms dense thickets.

In September, 1923, a clearing of about 16 acres in extent was made for meteorological purposes. It was interesting to observe, in November, 1925, the changes in the vegetation that had taken place as a consequence of the felling of the timber. The higher part of the clearing had been partially weeded and cleared of fallen timber for agricultural purposes, but along the jungle edge had sprung up a belt of *Litsea citrata*, 10-15 feet tall and conspicuous because of its pale green foliage. Where not interfered with, it intrudes itself into the clearing, and in the lower lying parts, which apparently have not been touched since the timber was felled, it forms a dense growth along with *Mallotus spp., Macaranga sp., Blumea balsamifera, Musa sp.*, intertwined with a *Vitis* and an *Uncaria*.

In the opener parts of the clearing, the following plants were collected:—

Portulaca oleracea, Vitis japonica, Microglossa volubilis, Erecthtbites valerianifolia (common and fruiting profusely), *Bidens pilosa, Ageratum conyzoides, Borreria setidens, Solanum torvum, Cyathula prostrata, Mariscus Dregeanus, Oplismenus compositus, Paspalum conjugatum.*

These plants, mostly weeds of cultivation, and two species of *Mallotus*, a species of *Macaranga* and *Blumea balsamifera*, have all intruded themselves into the clearing in the space of time of a little more than a year.

Polygonum chinense is very conspicuous in the clearing, and is present in two forms, one broad-leaved with deep pink flowers,

the other narrow-leaved with almost white flowers which may have a touch of pink in them. Dr. Danser, of the Botanic Gardens, Buitenzorg, states that the first is *P. auriculatum*. Meiss., later considered by the same mhonographer to be only a variety of *P. chinense* (var. ovalifolium)[1].

A short distance northwards along the river from Tanah Rata clearing is a curious patch of open swamp a few acres in extent. It lies between the base of the hill known as " Foster's Hill " and the river, but has no connection with the river and apparently no drainage outlet. It is destitute of trees but covered with a dense tangled undergrowth. *Baeckia frutescens* is present as a straggly shrub, sometimes as much as 15 feet tall, and it seems curious to find it here, as its natural habitat is on open dry hill-tops and similar places. The only other place in the vicinity where it has been found is on the summit of Gunong Terbakar, a curious conical hill which supports a xerophytic flora. In this swamp a *Hedychium* (*H. paludosum*, n. sp.) was very common and conspicuous. *Rhododendron jasminiflorum* was present in quantity as well as *Nepenthes spp.* and many orchids, and *Lycopodium casuarinoides*. The local Sakai declare that this patch is not old ladang, and it certainly has none of the characteristics of abandoned clearing. It may be considered a natural swamp formation.

The list contain the names of plants, of which four (*Sonerila Whittyi, Vitex Millsii, Hedychium paludosum*, and *Bulbophyllum Hodgsoni*) are described as new.

The following are known only from this area:—

SAURAUIA GRANDIS
STERCULIA ROSTRATA
IMPATIENS SARCANTHA
PHYTOCRENE TRICHURA
OXYSPORA MICROCARPA
ORITREPHES ALBIFLORA
SONERILA WHITTYI
SARCOPYRAMIS NEPALENSIS*
BEGONIA PAVONINA
SANICULA EUROPEA*
LONICERA MALAYANA
ARGOSTEMMA VISCIDUM
TARENNA PULCHRA
LASIANTHUS MYRTIFOLIUS
DIOSPYROS HENDERSONI
FAGRAEA FLAVIDULA
CYRTOPHYLLUM SPECIOSUM VAR MONTANUM*
DIDYMOCARPUS ALBINELLA
DIDYMOCARPUS LANCEOLATUS
STROBILANTHES RUFICAULIS
FILETIA BRACTEOSA
VITEX MILLSII
PIPER CYRTOSTACHYS
PHYLLANTHUS MUSCOSUS
DENDROBIUM CLARISSIMUM
BULBOPHYLLUM HODGSONI
GLOBBA MACRANTHERA
HEDYCHIUM PALUDOSUM
OPHIOPOGON INTERMEDIUS*
DISPORUM PULLUM*
POLLINIA HENDERSONI

Those marked with an asterisk have an extra- Peninsular distribution; all the rest are endemic.

1. Now described by Danser as a new species (P. malaicum, *Danser, Bulletin Jard. Bot. Buitenzorg, Série III, Vol. VIII, Livr. 2-3, (1927), p. 218.*)

To the above list must be added the following from Ridley's list of 1909, which have not since been collected:—

EUGENIA ROBINSONIANA
MEDINILLA PENDULIFLORA
BEGONIA ROBINSONII
ARGOSTEMMA LANCEOLATUM
ADENOSACME LANCEOLATA
TIMONIUS DIFFUSUS
WEBERA (TARENNA) SALICINA
LASIANTHUS CONSPICUUS
LASIANTHUS HIRTUS
LASIANTHUS SALICIFOLIUS
RHODODENDRON KLOSSII
RHODODENDRON ROBINSONII
ARDISIA GLANDULIGERA
SYMPLOCOS PRUNIFLORA
AESCHYNANTHUS LONGIFLORA
DIDISSANDRA LONGISEPALA
PARABOEA PUBIFLORA
CYRTANDRA GRANDIFLORA
STROBILANTHES PEDICELLATUS
OBERONIA FLAVA
BULBOPHYLLUM ARACHNITES
BULBOPHYLLUM CONIFERUM
BULBOPHYLLUM POLYSTICTUM
BULBOPHYLLUM TRICHOGLOTTIS
BULBOPHYLLUM TINEA
ERIA CARNEA
CALANTHE OVATA
CALANTHE MONOPHYLLA
SACCOLABIUM MINUTIFLORUM
SARCOCHILUS ACUMINATUS
ZEUXINE BILOBA
HETAERIA PAUCIFLORA
HABENARIA INCONSPICUUM
GLOBBA VALIDA
CARYOPHILA MONTANA
TRICALISTRA OCHRACEA
ANEILEMA PROTENSUM*
PINANGA DENSIFOLIA
CAREX BACCANS*

(Numbers and specimens quoted up to 11786 are those of the F. M. S. Museum Series, and above that, of the Singapore Field Number Series).

MAGNOLIACEAE

Magnolia Maingayi, King
Nr. Tanah Rata, 4800 ft., flr. Nov., 17814.
A shrub or small tree, montane in the Peninsula, not common. *Distrib*: Borneo.

Talauma mutabilis, Bl.
Nr. No. 5 Camp, 5000 ft., 11169; nr. Batu Brinchang Camp, 5000 ft., 18023; flr. June, Nov.
A shrub of montane jungle, known from Langkawi, Kedah Perak, Penang, and from the Main Range south to Semangkok Pass. *Distrib*: Siam, Sumatra, Java, Borneo.

WINTERACEAE

Illicum cambodianum, Hance
Below Rhododendron Hill, 4000ft., 11700; Myrtle Hill, 5200 ft., 11782; Batu Brinchang Camp, 5000 ft., 18009; flr. Jan., Nov.

var. crassifolium, Ridl. Nr. Gunong Terbakar, 4200 ft., flr. Jan., 11704.
A shrub or small straggly tree, common in the Peninsula in the hills. *Distrib*: Cambodia.

ANONACEAE

Artabotrys venustus, King
Tanah Rata, 4800 ft., 11671; flr. Jan.
A large liane, usually occurring in hill forest, not common. *Distrib*: Siam.

Polyalthia pulchra, King
Tanah Rata, 4800 ft., 11157, 17736; flr. June, fruit Nov.
A small tree of montane jungle, known from Gunong Tahan and the Main Range. Endemic.

VIOLACEAE

Viola serpens, Wall.
Lubok Tamang, 3500 ft., 10903; No. 5 Camp, 5000 ft., 11654; Tanah Rata clearing, on the river-bank, 4800 ft., 17912; flr. Jan., June, Nov.
A montane herb, rare in the Peninsula, known only from this locality, from Penang Hill, and doubtfully from Gunong Sitong, Kelantan. *Distrib*: India to China.

POLYGALACEAE

Polygala venenosa, Juss.
Lubok Tamang, 3500 ft., 10929; Robinson Falls, 4500 ft., 17974; flr. June, Nov.
A small shrub, common in the Peninsula in montane and submontane forest. *Distrib*: W. Malaysia to the Philippines.

Xanthophyllum sp.
Tanah Rata, 4800 ft., 18004, leaf and wood specimens only.
Sakai name: *Teramok*.

PORTULACACEAE

Portulaca oleracea, Linn.
Tanah Rata clearing, 4800 ft., 17937, beginning to appear in Nov. 1925.
A pantropic weed of cultivation, common in the Peninsula.

GUTTIFERAE

Garcinia Forbesii, King
Tanah Rata, 4800 ft., 11210; flr. June.
A small tree usually of lowland forest. *Distrib*: Sumatra.

Garcinia ?Hombroniana, Pierre
Nr. Batu Brinchang Camp, 5000 ft., 18033, leaf and wood specimens only.
Sakai name: *Minjok*.

Garcinia Maingayi, Hook. fil.
Below Robinson Falls, 3500 ft., 11214; flr. June.
A tree, usually of lowland forest, not common. Endemic.

Garcinia merguensis, Wight
Rhododendron Hill, 5000 ft., 11198; flr. June.
A small tree, common in the Peninsula from sea-level to 5000 ft. *Distrib*: Tenasserim, Cambodia.

Garcinia uniflora, King
Tanah Rata, 4800 ft., 11213, 17999.
A small tree, rather rare in the Peninsula, known from Perak, Pahang and Johore. It was abundant near the camp at Tanah Rata but very seldom in flower. Endemic.

Calophyllum ?pulcherrimum, Wall.
Tanah Rata, 4800 ft., 18002, leaf and wood specimens only. Sakai name: *Trehir.*

Calophyllum ?spectabile, Willd.
Tanah Rata, 4800 ft., 18003, leaf and wood specimens only. Sakai name: *Mintak.*

TERNSTROEMIACEAE

Eurya acuminata, DC.
Lubok Tamang, 3500 ft., 11011; flr. June.
A shrub or small tree, very common in the Peninsula, usually in open places. *Distrib*: India to China.

Schima Noronhae, Reinw.
Gunong Berembun, c. 5200 ft., 11091; flr. June.
A tree of hill forest, common in the Peninsula. *Distrib*: Indo-Malaya.

Gordonia taipengensis, Burkill
No. 5 Camp, 5000 ft., 11191; flr. June.
A rare tree, hitherto known only from the Taiping Hills.

Saurauia grandis, Ridl.
Lubok Tamang, 3500 ft., 10909; flr. June.
A tree, endemic and local.

Saurauia nudiflora, DC.
No. 5 Camp, 5000 ft., 11670; flr. June.
A small tree of montane forest, not uncommon in the Peninsula on the Taiping Hills and Main Range. *Distrib*: Java.

Saurauia tristyla, DC.
Below Robinson Falls, 3700 ft., 11132; flr. June.
A small tree, common in the Peninsula. *Distrib*: Indo-China and Siam.

MALVACEAE

Urena lobata, Linn.
Lubok Tamang, in old Sakai clearing, 3500 ft., 11037.
A common undershrub, occurring as a weed over the whole Peninsula. *Distrib*: Pantropic.

STERCULIACEAE

Sterculia rostrata, Ridl.
Below Robinson Falls, on riverbank, 3700 ft., 11136; flr. June.
A small tree, endemic and local.

Sterculia rubiginosa, Vent.
Nr. Tanah Rata, 4800 ft., 17806; flr. Nov.
A small tree, common in the Peninsula from Penang to Singapore. *Distrib*: Indo-Malaya.

BALSAMINACEAE

Impatiens oncidioides, Ridl.
Lubok Tamang, 3500 ft., 10940; Tanah Rata, 4800 ft., 11646, 17818; flr. Jan., June, Nov.
A herb, montane on the Main Range. Endemic.

Impatiens sarcantha, Hook. fil.
Lubok Tamang, 3500 ft., on rocks in stream, 10919, 10963; Tanah Rata, 4800 ft., 11678, 11785; flr. Jan., June. Seen in flower at the head of Robinson Falls, 4500 ft., Nov.
A herb, endemic and local.

RUTACEAE

Evodia pachyphylla, King
Gunong Berembun, c. 5500 ft., 11100; Rhododendron Hill, 5000 ft., 17892; flr. June, Nov.
A shrub or small tree, not common on the Main Range. Endemic.

Micromelum hirsutum, Oliv.
Lubok Tamang, 3500 ft., 11004; flr. June.
A shrub or small tree, not common in the Peninsula, usually in open places. *Distrib*: Indo-Malaya.

Citrus sp.
Below Robinson Falls, 3500 ft., 11786; fruit Jan., and also at Tanah Rata in fruit Nov.
A tree 30-40 ft. tall with globular, yellow, wrinkled fruits 1½ ins. in diameter.

SIMARUBACEAE

Eurycoma apiculata, Benn.
Below Robinson Falls, 3500 ft., 11127; fruit June.
A shrub, often montane, not uncommon in the north. Endemic.

MELIACEAE

Dysoxylon ?rugulosum, King.
nr. Tanah Rata, 4800 ft., 18007, leaf and wood specimens only.
Sakai name: *Siral, (Sirai)*.

Amoora aff. rubescens, Hiern
Tanah Rata, 4800 ft., 17997, leaf and wood specimens only. Sakai name: *Tentong.*

Gomphandra lanceolata, King
nr. Tanah Rata, 4800 ft., 11156, 11638, 11643, 11664; flr. June. Jan.
A shrub, common in the hills. Endemic.

OLACACEAE

Phytocrene trichura, Ridl.; Henderson, Gardens' Bulletin, S. S., Vol. IV., p. 51. Lubok Tamang, 3500 ft., 10928; flr. June.
A long climbing shrub, endemic and local, rare.

Stemonurus umbellatus, Becc.
No. 5 Camp, 5000 ft., 11658; flr. Jan; ?18041 Batu Brinchang Camp, 5000 ft., leaf and wood specimens only.
A tree, not common in the Peninsula in hill forest *Distrib*: W. Malaysia.
Sakai name: *Berlat.*

ILICACEAE

Ilex malaccensis, Loesn.
Robinson Falls, 4500 ft., 17960; fruit Nov.
A large shrub, rare in the Peninsula, usually lowland, Perak and Malacca. *Distrib*: Sumatra and Borneo.

Ilex triflora, Bl.
Lubok Tamang, 3500 ft., 10944; Bertam river, 4800 ft., 17851; in open swamp below Foster's Hill, 4800 ft., 17849 (var.); flr. June, Nov.
A bush, common in the Peninsula in montane forest. *Distrib*: Indo-Malaya and China.

CELASTRACEAE

Microtropis elliptica, King
Tanah Rata, 4800 ft., 11211; fruit June.
A shrub or small tree, not common. Penang, Perak, Johore. Endemic.

AMPELIDACEAE

Vitis japonica, Thunb.
?Lubok Tamang, in old Sakai clearing, 3500 ft., 11028; Tanah Rata clearing, 4800 ft., 17922; flr. June, Nov.
A slender climbing vine, not uncommon in the Peninsula in open places. *Distrib*: Java, China, Japan, Australia.

ANACARDIACEAE

?Mangifera sp.
nr. Batu Brinchang Camp, 5000 ft., 18049, leaf and wood specimens only.
Sakai name: *Pawok.*

LEGUMINOSAE

Millettia sericea, Benth., var.
No. 5 Camp, 5000 ft., 11192; flr. June.
A climbing shrub, common in the Peninsula in the lowlands. *Distrib*: W. Malaysia.

Bauhinia cornifolia, Baker
Below Rhododendron Hill, 4500 ft., 11708; flr. Jan.
A large climbing shrub, not uncommon in the hills from Penang to Negri Sembilan. Endemic.

Bauhinia ?integrifolia, Roxb.
Tanah Rata, 4800 ft., 11141; flr. June.

ROSACEAE

Pygeum rubiginosum, Ridl.
Rhododendron Hill, 5000 ft., 17894; flr. Nov.
A small tree, rare, hitherto known only from Gunong Tahan. Endemic.

Pygeum stipulaceum, King
nr. Batu Brinchang Camp, 5000 ft., 18045, leaf and wood specimens only.
A tree, not common, hitherto known only from Ulu Bubong, Perak. Endemic.
Sakai name: *Kĕrĕlek.*

Rubus glomeratus, Bl.
In Sakai clearing below Robinson Falls, 3700 ft., 11130; Tanah Rata clearing, 4800 ft., 17932; flr. Nov., fruit June.
A bramble, montane in the north of the Peninsula, descending to sea-level in the south. *Distrib*: Java and Borneo.

Rubus rosaefolius, Sm.
Forming dense thickets in old Sakai clearing, Lubok Tamang, 3500 ft., 11112; Tanah Rata clearing, 4800 ft., 17935; flr. and fruit June, Nov.
A bramble, common in the Peninsula on the Taiping Hills and the Main Range. *Distrib*: Africa, Indo-Australia, Japan.

Pyrus granulosa, Bertol.
No. 5 Camp, 5000 ft., 11778; Tanah Rata, 4800 ft., 17705; flr. and fruit June, Nov.
A tree, montane in the Peninsula on the Taiping Hills, Gunong Tahan and the Main Range. *Distrib*: India to Sumatra.

SAXIFRAGACEAE

Dichroa febrifuga, Lour.
Lubok Tamang, 3500 ft., 10933; flr. June.
A shrub, montane in the Peninsula on the Taiping Hills and the Main Range. *Distrib*: Indo-Malaya and S. China.

HAMAMELIDACEAE

Bucklandia populnea, Br.
nr. Tanah Rata, 4800 ft., 17987; flr. Nov.
A tree, not uncommon in the Peninsula on the Main Range. *Distrib*: India to Java.

MYRTACEAE

Baeckia frutescens, Linn.
Gunong Terbakar, 4500 ft., 10985; in the swamp below Foster's Hill, 4800 ft ; flr. June, Nov.
A shrub or small tree, common in the Peninsula on dry hill tops. *Distrib*: Malaya to China and Japan.

Tristania sp.
nr. Tanah Rata, 4800 ft, 17998, leaf and wood specimens only
Sakai name: *Keruntum* (*Kerentum*).

Eugenia sp.
nr. Batu Brinchang Camp, 5000 ft, 18050; flr Nov.
Sakai name (for all Eugenias): *Krop.*

Eugenia sp.
nr. Tanah Rata, 4800 ft., 18000, leaf and wood specimens only.

Eugenia ?Dyeriana, King
nr. Batu Brinchang Camp, 5000 ft, 18052, leaf and wood specimens only.

Eugenia nitidula, Ridl.
Foot of Gunong Terbakar, 4000 ft., 11696; flr. Jan.
A shrub, rare, hitherto known only from Fraser Hill. Endemic.

Eugenia ?zeylanica, Wight
nr. Batu Brinchang Camp, 5000 ft., 18039, leaf and wood specimens only.

MELASTOMACEAE

Melastoma ?normale, Don.
Gunong Terbakar, 4500 ft., 10998, leaf specimens only.

Melastoma perakense, Ridl.
In old Sakai clearing, Lubok Tamang, 3500 ft., 10912; flr. June.

A shrub, montane in the Peninsula from the Taiping Hills to Johore. *Distrib*: Lingga, Java.

Oxyspora microcarpa, Ridl. *Allomorphia rosea,* Ridl.
Lubok Tamang, 3500 ft., 10959; Gunong Terbakar, 4500 ft., 10994; Rhododendron Hill, 5000 ft., 11054, 17867; flr. June, Nov.
A shrub, known only from this area. Endemic.

Oritrephes albiflora, Ridl. *Allomorphia albiflora,* Ridl.
Rhododendron Hill, 5000 ft., 17880; flr. and fruit Nov.
A shrub, first obtained by Ridley on Gunong Berembun, and known only from these localities.

Blastus Cogniauxii, Stapf.
Lubok Tamang, 3500 ft., 10938; flr. June.
A shrub, usually montane in the Peninsula, Upper Perak to Johore. *Distrib*: Borneo.

Anerincleistus macranthus, King
Rhododendron Hill, 5000 ft., 11055; Gunong Berembun, 5000-6000 ft., 11087, 11693; flr. June, Jan.
A shrub or small tree, montane on the Main Range, not common. Endemic.

Sonerila caesia, Stapf.
Robinson Falls, 4500 ft., 17956; flr. Nov.
A herb, occurring in Upper Perak, and on the Main Range on Gunong Batu Puteh, Gunong Korbu, Fraser Hill, Jor (Batang Padang), and on Gunong Tahan and in Johore. Endemic.

Sonerila capitala, Stapf, var. *longipetiolata,* Ridl.
Lubok Tamang, 3500 ft., 11021; flr. June.
A montane herb, the var. known also from Gunong Bintang in Kedah. Endemic.

Sonerila hirsuta, Ridl.
Gunong Berembun, 6000 ft., in mossy forest, 11097, 11695; flr. Jan., June.
A montane herb, occurring usually in mossy forest, on the Main Range, Gunong Tahan and Mt. Ophir. Endemic.

Sonerila picta, Korth.
Lubok Tamang, 3500 ft., 11007; flr. June.
A small succulent herb, montane in the Peninsula, not uncommon. *Distrib*: Sumatra, Borneo.

Sonerila rudis, Stapf and King. *S. velutina,* Ridl.
Rhododendron Hill, 5000 ft., 11199; No. 5 Camp, 5000 ft., 11662; nr. Tanah Rata, 4800 ft., 17815; flr. Jan., June, Nov.
A montane herb, common on the Main Range from Perak to Selangor. Endemic.

Sonerila tenuifolia, Bl.
Lubok Tamang, 3500 ft., 10917; Robinson Falls, 4500 ft., 17973; fruit June, Nov.
A herb, montane in the Peninsula on the Main Range, Mt.

Ophir, Gunong Benom, and Gunong Tahan. *Distrib*: Sumatra, Java, Borneo.

Sonerila Whittyi, n. sp.

A branched herb, stems stout with swollen hollow nodes, reddish when dry and bristly. Leaves dissimilar, larger obliquely ovate, acute, base narrowed on one side, rounded on the other, glabrous above except for a few scattered bristles, bristly below on the nerves; up to 16 cms. long and 9 cms. broad; nerves three pairs, reticulations conspicuous. Petioles 2-3 cms. long. Small leaves orbicular, deeply cordate, 8 mms. broad. Cymes axillary capitate, up to about 1 cm. in diameter, on peduncles up to 2 cms. long. Bracts numerous, crowded, ovate lanceolate, 5 mms. long, with long bristles from their bases. Flowers numerous, on pedicels 2-3 mms. long. Calyx tube narrow, 3 mms. long, densely covered with long bristles, lobes as long, broadly triangular, fleshy, with a few long bristles. Petals oblong-ovate, acute, white, with 4 or 5 long bristles on the back; 4-5 mms. long. Stamens rather longer than petals, anthers oblong, produced into two short horns at the base. Fruit unknown.

Tanah Rata, 4800 ft., abundant, 11046, 17812 (type); flr. June, Nov.

Sarcopyramis nepalensis, Wall.

Below Robinson Falls, on riverbank, 3700 ft, 11134; Tanah Rata, 4800 ft., 11145; flr. June.

A herb, known in the Peninsula only from this locality. *Distrib*: India, Burma, China.

Phyllagathis hispida, King

Tanah Rata, 4800 ft., 11049; No. 5 Camp, 5000 ft., 11193; Top of Robinson Falls, 4800 ft., 17757; flr. June, Nov. A woody herb, common in montane forest from Kedah and Tomoh to Selangor and Pahang, and Johore. Endemic.

Marumia nemorosa, Bl.

Lubok Tamang, 3500 ft., in open places by edge of path, 11024; flr. June.

A climbing shrub, common in the Peninsula on forest edges. *Distrib*: Tenasserim, Sumatra, Borneo.

Dissochaeta pallida, Bl.

Bertam river, 3500 ft., 11129; flr. and fruit June.

A climbing shrub, not uncommon in the Peninsula from the lowlands up to 3000-4000 ft., Patani to Singapore. *Distrib*: Sumatra, Java, ?Borneo.

Medinilla Clarkei, King

Lubok Tamang, 4000 ft., 10974; Rhododendron Hill, 4800-5000 ft., 11204, 11705, 17875; flr. Jan., June.

An epiphytic shrub, montane in the Peninsula on the Main Range to Mt. Ophir and Johore, and on Gunong Benom and Gunong Tahan. *Distrib*: Sumatra.

Medinilla crassinervia, Bl.
Gunong Terbakar, 4500 ft., on open dry hill top, 10989; flr. June.
An epiphytic shrub, montane in the north of the Peninsula, descending to sea-level in Singapore. *Distrib*: Borneo to New Guinea.

Medinilla heterantha, King
nr. Tanah Rata, 4800 ft., 17811; Tanah Rata clearing, 4800 ft., 17919; flr. and fruit Nov.
An epiphytic shrub, montane in the Taiping Hills and Main Range, not common. Endemic.

Medinilla Scortechinii, King
Lubok Tamang, 3500 ft., 10950; flr. June.
An epiphytic shrub, montane on the Taiping Hills and Main Range. Endemic.

Medinilla venusta, King
Bertam river, 3500 ft.; Tanah Rata, 4800 ft., 17738; flr. June, Nov.
An epiphytic shrub, montane on the Taiping Hills and on the Main Range at Fraser Hill. Endemic.

Pachycentria tuberculata, Korth.
Lubok Tamang, hill behind camp, 4000 ft., 10972, 11003; flr. June.
An epiphytic shrub, not uncommon in the Peninsula on the seacoast and in the hills, Penang to Singapore. *Distrib*: Burma, Borneo.

BEGONIACEAE

Begonia decora, Stapf.
Tanah Rata, 4800 ft., 11080, 11672, 17821; flr. Jan. (abundant), June, Nov.
A montane herb, occurring in Langkawi and on the Main Range. Endemic.

Begonia Lowiana, King
Top of Gunong Berembun in mossy forest, 6000 ft., 11101; flr. June.
A montane herb, rare, hitherto known only from Wray's collections on Gunong Batu Puteh and Gunong Berumban (Wray's). Endemic.

Begonia pavonina, Ridl.
Below Robinson Falls, 3700 ft., 11137; Robinson Falls, in damp shady ravines, 4500 ft., 17969; flr. June, Nov.
A herb, endemic and local.

Begonia venusta, King
Tanah Rata, 4800 ft., 11647; No. 5 Camp, 5000 ft., 11649; flr. Jan.
A montane herb, occurring on the Main Range on Gunong Korbu, and in the Ulu Batang Padang. Endemic.

Begonia sp.
Tanah Rata, 4800 ft., 17804.

UMBELLIFERAE

Hydrocotyle javanica, Thunb.
Lubok Tamang, in old Sakai clearing, 3500 ft., 11029; Tanah Rata clearing, 4800 ft., 17931.
A creeping herb, not common in the Peninsula, usually montane, Upper Perak and on the Main Range. *Distrib*: Indo-Australia, China, Japan.

Sanicula europaea, Linn.
Lubok Tamang, 3500 ft., in secondary growth and in old Sakai clearing, 10953, 11033; flr. and fruit June; also seen in dense shade on Bertam river banks.
A herb, in the Peninsula known only from this locality. *Distrib*: Europe, montane in Trop. Asia and Africa.

ARALIACEAE

Schefflera tristis, Ridl. *Heptapleurum coriifolium,* Ridl.
Tanah Rata clearing, 4800 ft., 17917; flr. Nov.
A shrub, not common in the Peninsula, montane on the Main Range and Gunong Tahan. *Distrib*: Sumatra.

Trevesia cheirantha, Ridl.
No. 5 Camp, 5000 ft., 11185, 11668: flr. Jan., June.
A small prickly tree common in the Peninsula from sea-level to 5000 ft. *Distrib*: Burma and Sumatra.

Arthrophyllum alternifolium, Maing.
Below Rhododendron Hill, 4800 ft., 11699; flr. Jan.
A small shrub, rare, hitherto known only from the summit of Mt. Ophir. Endemic.

Arthrophyllum sp.
Top of Robinson Falls, 4500 ft., 17768; flr. Nov.

CAPRIFOLIACEAE

Viburnum sambucinum, Bl.
Robinson Falls, 4500 ft., 17984; flr. Nov.
A shrub or small tree, common in the Peninsula from sea-level to about 5000 ft. *Distrib*: Sumatra, Java, Borneo.

Lonicera malayana, Hend., *Jour. F. M. S. Mus. Vol. XI, p. 187.*
Lubok Tamang, 3500 ft., scrambling over bushes by riverside, 11008; flr. June.
A sprawling shrub, endemic and local.

RUBIACEAE

Argostemma grandiflorum, Ridl.
Rhododendron Hill, 5000 ft., 17868; flr. Nov.

A herb, rare, hitherto known only from Gunong Korbu. Endemic.

Argostemma involucratum, Hemsl.
Tanah Rata, 4800 ft., 11048, 17706; Rhododendron Hill, 5000 ft., 17869; flr. June, Nov.
A creeping herb, common in montane forest. Endemic.

Argostemma subcrassum, King
Lubok Tamang, 3500 ft., 10913; flr. June.
A herb, montane on the Main Range from Upper Perak to Selangor. Endemic.

Argostemma viscidum, Ridl.
nr. Tanah Rata, 4800 ft., 17800; flr. Nov.
A herb, rare, known only from this locality and from a few miles farther down the Bertam river, where Ridley collected it in 1909.

Argostemma Yappii, King
Rhododendron Hill, 5000 ft., 11056 (climbing on tree), 17888; Gunong Berembun, 5000 ft., 11086; flr. June, Nov.
A succulent herb, not uncommon on the Main Range, and on Gunong Tahan. Endemic.

Klossia montana, Ridl.
Lubok Tamang, 3500 ft., 10934; flr. June.
A montane herb, occurring also on the Main Range in Selangor. Endemic.

Mussaenda cordifolia, Wall.
?Lubok Tamang, 3500 ft., in old Sakai clearing, 11034; Tanah Rata, 4800 ft., 11142; flr. June.
A shrub, not common in the Peninsula, Penang and Fraser Hill. *Distrib*: India, Tenasserim.

Urophyllum glabrum, Wall.
Lubok Tamang, 3500 ft., 10923; Robinson Falls, 4500 ft., 17962; flr. June, Nov.
A shrub, common in the Peninsula from sea-level to about 5000 ft. *Distrib*: Sumatra, Bangka, Java, Borneo, Philippines.

Urophyllum hirsutum, Hook. fil.
Lubok Tamang, 3500 ft., 11022; flr. June.
A shrub or small tree, common, usually in lowland forest. Endemic.

Gardenia pulchella, Ridl.
Lubok Tamang, 3500 ft., banks of stream in shade, 10941; flr. June.
A creeping shrublet, rare in montane forest, Gunong Korbu, Fraser Hill. Endemic.

Ixora pendula, Jack
No. 5 Camp, 5000 ft., 11172; Top of Robinson Falls, 4500 ft., 17754; flr. June, Nov.

A shrub, common in the Peninsula from sea-level to about 5000 ft. Endemic.

Tarenna pulchra, Ridl. *Webera pulchra,* Ridl.
nr. Tanah Rata, 4800 ft., 11636; flr. Jan.
A large shrub, endemic and local.

Canthium sp.
nr. Batu Brinchang Camp, 5000 ft., 18043, leaf and wood specimens only.
Sakai name: *Ang.*

Psychotria brachybotrys, Ridl.
Rhododendron Hill, 5000 ft., 11052; flr. June.
A scandent shrub, not common, montane on the Main Range and Gunong Tahan. Endemic.

Psychotria fulva, Buch.
Tanah Rata, 4800 ft., 11146; flr. and fruit June.
A shrub, not common in the Peninsula, Langkawi, Ulu Batang Padang, Fraser Hill. *Distrib*: India.

Psychotria ovoidea, Wall.
Tanah Rata, 4800 ft., 11639; fruit Jan.
A slender climbing shrub, not uncommon in the lowlands in the south, occurring also on the Taiping Hills. Endemic.

Chasalia curviflora, Thw.
Lubok Tamang, 3500 ft., 10916; No. 5 Camp, 5000 ft., 11667; Tanah Rata clearing, 4800 ft., 17945; flr. Jan., June, Nov.
A shrub, common in the Peninsula. *Distrib*: Indo-Malaya to the Philippines.

Chasalia minor, Ridl.
?Rhododendron Hill, 5000 ft., 11059; Tanah Rata, 4800 ft., 11159; flr. June.
A shrub, not common in montane forest, Gunong Bintang (Kedah), Semangkok Pass. Endemic.

Cephaelis triceps, Ridl.
?Lubok Tamang, 3500 ft., 10922; Gunong Berembun, 5500 ft., 11691; flr. Jan.
A small shrub, rare, known from Fraser Hill and K. Lumpur. Endemic.

Geophila humifusa, King and Gamble
nr. Batu Brinchang Camp, 5000 ft., covering rocks in stream, 18029; fruit Nov.
A creeping herb, very rare in the Peninsula, hitherto known only from Scortechini's collections in Perak. *Distrib*: Borneo.

Lasianthus pendulus, Ridl.
Rhododendron Hill, 5000 ft., 11053; flr. June.
A shrub, rare in montane forest, known only from this area and doubtfully from Gunong Tahan. Endemic.

Lasianthus myrtifolius, Ridl.
Rhododendron Hill, 4800-5000 ft., 11203, 11701, 17873; flr. June, Jan., Nov.
A shrub, rare in montane forest, endemic and local.

Lasianthus rhinocerotis, Bl.
Tanah Rata, 4080 ft., 11047; No. 5 Camp, 5000 ft., 11657; Rhododendron Hill, 5000 ft., 17870; flr. Jan., June, Nov.
A shrub or small tree, montane in the Peninsula on the Taiping Hills, and the Main Range, and on Gunong Pulai, Johore (fide Ridley). *Distrib*: Sumatra, Java, Borneo.

Lasianthus Robinsonii, Ridl.
nr. Batu Brinchang Camp, 5000 ft., 18008; flr. and fruit Nov.
A shrub, rare in montane forest, known also from Gunong Tahan. Endemic.

Borreria setidens, Ridl.
Tanah Rata clearing, 4800 ft., 17938; flr. Nov.
A small herb, a common weed in the Peninsula in waste ground. *Distrib*: Java.

COMPOSITAE

Ageratum conyzoides, Linn.
Tanah Rata clearing, 4800 ft., 17936; flr. and fruit Nov.
A herb, common in waste ground all over the Peninsula. *Distrib*: Pantropic.

Adenostemma viscosum, Forst.
Lubok Tamang, 3500 ft., in old Sakai clearing, 11110; flr. June.
A herb, common in the Peninsula in waste ground. *Distrib*: Pantropic.

Bidens pilosa, Linn.
Lubok Tamang, 3500 ft., in old Sakai clearing, 11109; Tanah Rata clearing, 4800 ft., 17949; flr. June, Nov.
A herb, common in the Peninsula in open places. *Distrib*: Pantropic.

Erechthites valerianifolia, DC.
Tanah Rata clearing, 4800 ft., 17920; flr. Nov.
A common weed in the Peninsula. *Distrib*: Pantropic.

Blumea balsamifera, DC.
Tanah Rata clearing, 4800 ft., 17928; flr. Nov.
A shrub, common in the Peninsula in open places. *Distrib*: Indo-Malaya.

Dicrocephala latifolia, DC.
Tanah Rata clearing, 4800 ft., 17930; flr. Nov.
A herb, rare in the Peninsula, hitherto known only from Taiping. *Distrib*: Trop. Africa and Asia, Malaya.

Microglossa volubilis, DC.

Lubok Tamang, 3500 ft., in old Sakai clearing, 10910; Tanah Rata clearing, 4800 ft., 17926; flr. June, Nov.

A scandent shrub, not very common in the Peninsula in montane forest. *Distrib*: India, China.

LOBELIACEAE

Lobelia affinis, Wall.

Lubok Tamang, 3500 ft., 10964; Tanah Rata, 4800 ft., 11716; flr. and fruit Jan., June.

A creeping herb, common in the Peninsula in damp places. *Distrib*: Indo-Malaya, China.

Pratia begoniifolia, Lindl.

Tanah Rata clearing, 4800 ft., 17933; flr. Nov.

A creeping herb, montane in the Peninsula on the Main Range from Gunong Korbu to Gunong Menuang Gasing. *Distrib*: Indo-Malaya, China.

CAMPANULACEAE

Pentaphragma Scortechinii, King and Gamble

Lubok Tamang, 3500 ft., 11106; Tanah Rata 4800 ft., 17718; flr. June, Nov.

An erect herb, common from sea-level up to about 5000 ft., Upper Perak to Singapore. Endemic.

VACCINIACEAE

Agapetes perakensis, Ridl.

Below Robinson Falls, by riverside, 3700 ft., 11133; No. 5 Camp, 5000 ft., 11189; nr. Tanah Rata, 4800 ft., 11634; Top of Falls, 4800 ft., 17756; flr. June, Nov., fruit Jan.

An epiphytic shrub, montane from the Taiping Hills to Fraser Hill. Endemic.

Pentapterygium Scortechinii, King and Gamble

Gunong Terbakar, 4500 ft., 10988; summit of Gunong Berembun, 6050 ft., 11117; below Rhododendron Hill, 4000 ft., 11698; Tanah Rata, 4800 ft., 17750; flr. Jan., June, Nov.

An epiphytic shrub, montane, not common on the Main Range, Gunong Batu Puteh, Gunong Berembun (Wray's), Fraser Hill. Endemic.

Vaccinium bancanum, Miq.

nr. Batu Brinchang Camp, 5000 ft., 18036; fruit Nov.

A terrestrial or epiphytic shrub, montane in the Peninsula on the Taiping Hills, Gunong Tahan, Fraser Hill, Mt. Ophir, and on Klang Gates, Selangor. *Distrib*: Billiton, Bangka, Java (var.), Borneo.

ERICACEAE

Gaultheria fragrantissima, Wall.
Summit of Gunong Terbakar, 4500 ft., 10991; flr. June.
A shrub, rare in the Peninsula, montane on Gunong Korbu and Gunong Batu Puteh. *Distrib*: India, Sumatra, Java.

Gaultheria leucocarpa, Bl.
Summit of Gunong Terbakar, 4500 ft., 10983; Gunong Berembun, c. 5000 ft., 11681; below Foster's Hill, 4800 ft., 17846; flr. Jan., June, Nov. Seen on the summit of Gunong Berembun, 6050 ft., flr. Nov.
A scrambling shrub, not common in the Peninsula at high altitudes, Gunong Bintang, Kedah, and Perak. *Distrib*: Sumatra and Java.

Diplycosia latifolia, Bl.
Below Foster's Hill, 4800 ft., 17840; fruit Nov.
A shrub, montane in the Peninsula on the Main Range, Gunong Tahan and Gunong Benom. *Distrib*: Sumatra, Java, Borneo.

Pieris ovalifolia, Don.
Lubok Tamang, hill behind camp, c. 4000 ft., 10971; flr. June.
A shrub or small tree, montane in the Peninsula on Kedah Peak, Gunong Tahan and Gunong Korbu. *Distrib*: India, Japan.

Rhododendron jasminiflorum, Hook.
Lubok Tamang, hill behind camp, c. 4000 ft., 10975; below Foster's Hill in swamp, 4800 ft., 17838; flr. June, Nov. Seen in several other places.
A shrub, montane in the Peninsula from Kedah Peak and the Taiping Hills down the Main Range to Mt. Ophir, and on Gunong Tahan. *Distrib*: Sumatra, ?Java, Borneo.

Rhododendron malayanum, Jack.
Lubok Tamang, hill behind camp, c. 4000 ft., 10970; Gunong Terbakar, 4500 ft., 10987; Rhododendron Hill, 5100 ft., 11065, 11627, 11629; below Foster's Hill, 4800 ft., 17836; flr. Jan., June, Nov.
A common montane epiphytic shrub, from the Taiping Hills and Gunong Tahan to Mt. Ophir. *Distrib*: Sumatra, Java, Borneo.

Rhododendron Teysmanni, Miq.
nr. Tanah Rata, 4800 ft., 17825; nr. Batu Brinchang Camp, 5000 ft., 18028; flr. Nov.
An epiphytic shrub, usually montane in the Peninsula, Kedah Peak and Kelantan to Pahang. *Distrib*: Sumatra, Java.

Rhododendron Wrayi, King and Gamble
Gunong Terbakar, 4500 ft., 10995, 10997; Lubok Tamang, hill behind camp, c. 4000 ft., 10977; Rhododendron Hill, 5100

ft., 11071, 11715; Myrtle Hill, 5200 ft., 11784; flr. Jan., June. Seen in flr. on the summit of Gunong Batu Brinchang, 6665 ft., Dec.
A montane shrub, occurring on the Main Range and on Gunong Tahan. Endemic.

MYRSINACEAE

Embelia coriacea, Wall.
Tanah Rata, 4800 ft., 17715; flr. Nov.
A stout liane, common in the Peninsula from sea-level to 5000 ft. *Distrib*: Sumatra, Java, Borneo, Philippines.

Embelia myrtillus, Kurz.
Rhododendron Hill, 5000 ft., 17897; flr. Nov.
A montane shrub, occurring in the Peninsula from Gunong Bintang (Kedah) to Mt. Ophir. *Distrib*: Burma.

Labisia longistyla, King and Gamble
Lubok Tamang, hill behind camp, c. 4000 ft., 11002; Rhododendron Hill, 5000 ft., 17882; flr. June, Nov.
An undershrub, montane, rare, on the Main Range from Gunong Korbu to Fraser Hill. Endemic.

Labisia pothoina, Lindl.
Lubok Tamang, 3500 ft., 10915, 11012; Tanah Rata, 4800 ft., 11155; flr. June.
An undershrub, common in the Peninsula from sea-level to 5000 ft. *Distrib*: Sumatra, Java, Borneo, Philippines, Indo-China.

Ardisia Barnesii, Ridl.
Robinson Falls, 4500 ft., 17961; fruit Nov. (first collection of fruiting specimens of this species).
A montane shrub, rare, Gunong Benom, Gunong Belumut (Johore). Endemic.

Ardisia colorata, Roxb.
Gunong Berembun, c. 5000 ft., 11683; nr. Tanah Rata, 4800 ft, .17820 (var.); flr. Jan., Nov.
A shrub or small tree, common in the Peninsula from sea-level to about 5000 ft. *Distrib*: India to Borneo.

Ardisia crenata, Roxb.
Tanah Rata, 4800 ft., 11637; Gunong Berembun, c. 5500 ft., 11692; flr. and fruit Jan.
A bush, common in the Peninsula but usually at low altitudes and in open country and secondary growth. *Distrib*: Indo-Malaya, China, Japan.

Ardisia nr. Hullettii, Mez.
Robinson Falls, 4500 ft., 17963; fruit Nov.

Ardisia Maingayi, King and Gamble
Lubok Tamang, 3500 ft., 10921; Below Robinson Falls, 4000 ft., 11121; flr. June.

An undershrub of montane forest, occurring on the Main Range, Gunong Tahan, and Mt. Ophir. Endemic.

Ardisia ?montana, King and Gamble
Gunong Berembun, c. 5500 ft., 11115; flr. June.

Ardisia nr. oxyphylla, Wall.
nr. Batu Brinchang Camp, 5000 ft., 18022; fruit Nov.
Differs in leaf venation from typical A. oxyphylla.

Ardisia rosea, King and Gamble
No. 5 Camp, 5000 ft., 11173; Top of Robinson Falls, 4800 ft., 17759; flr. June, Nov.
A small shrub, montane from the Taiping Hills to Gunong Ulu Semangkok, and on Gunong Tahan. Endemic.

Ardisia theaefolia, King and Gamble
Lubok Tamang, hill behind camp, c. 4000 ft., 10973; Gunong Terbakar, 4500 ft., 10996; Rhododendron Hill, 5100 ft., 11630, 17896; flr. Jan., June, Nov.
A small shrub, montane, not common, Ulu Batang Padang. Endemic.

Diospyros Hendersoni, Ridl.
Below Robinson Falls, 3800 ft., 11138; fruit June.
A shrub, endemic and local.

OLEACEAE

Jasminum Maingayi, Clarke
Tanah Rata, 4800 ft., 11645; flr. Jan.
A climbing shrub, not uncommon, usually montane. Endemic.

Linociera lancifolia, Ridl.
Rhododendron Hill, 5100 ft., 11622; flr. Jan.
A small tree, rare, montane on Gunong Bubu and Gunong Benom. Endemic.

ASCLEPIADACEAE

Alyxia Forbesii, King and Gamble
Tanah Rata, 4800 ft., 11642, 11775; fruit Jan.
A slender climber, not uncommon in the Peninsula in the hills, Penang to Gunong Benom. *Distrib*: Sumatra, Java.

Tylophora longifolia, Wight
Tanah Rata clearing, 4800 ft., 17925; flr. Nov.
A slender twiner, hitherto known only in the Peninsula from the Taiping Hills, where it is common above 3000 ft., and from Fraser Hill. *Distrib*: India, Borneo.

Dischidia astephana, Scort.
Below Foster's Hill in swamp, 4800 ft., 17839; flr. Nov.
A slender epiphytic creeper, common in the hills. Endemic.

Dischidia coccinea, Griff.
Rhododendron Hill, 5100 ft., 11066, 11625; flr. Jan., June.
A slender epiphytic creeper, not common in the Peninsula, montane on the Taiping Hills, Gunong Tahan and the Main Range, descending to sea-level in Singapore. *Distrib*: Borneo.

Dischidia monticola, King and Gamble
Gunong Berembun, 6000 ft., 17994; flr. Nov.
A creeping undershrub, not common on the Main Range. Endemic.

Dischidia rhodantha, Ridl.
Tanah Rata clearing, 4800 ft., 17915; flr. Nov.
A slender creeper, rare, hitherto known only from the neighbourhood of Fraser Hill. Endemic.

Fagraea flavidula, Ridl.
Tanah Rata, 4800 ft., 11673; flr. Jan.
A stout epiphyte, climbing to the tops of tall trees, endemic and local, rare.

Fagraea lanceolata, King and Gamble, non Bl.
Tanah Rata, 4800 ft., 17729; fruit Nov.
An epiphytic climber, known from the Taiping Hills and Fraser Hill. Endemic. A doubtful species, of which flowers have not yet been collected.

Fagraea oblonga, King and Gamble
Below Robinson Falls, 3500 ft., 11128; flr. June.
An epiphytic climber, montane, not common, Taiping Hills and Fraser Hill. Endemic.

Cyrtophyllum speciosum, (Bl.) Ridl., var. *montanum,* Ridl.
Summit of Gunong Terbakar, 4500 ft., 10992; flr. June.
A small shrub, in the Peninsula known only from this locality. *Distrib*: (of species), Java to the Moluccas.

Gaertnera acuminata, Benth., var. *montana,* Ridl.
Rhododendron Hill, 5000 ft., 11196; Top of Robinson Falls, 4800 ft., 17769; flr. June, Nov.
A shrub, the var. montane from Kedah Peak to Mt. Ophir, the species very rare, collected once only in Singapore. *Distrib*: (species), ?Borneo.

GENTIANACEAE

Crawfurdia Blumei, G. Don.
Gunong Berembun, c. 5500 ft., 11685; fruit Jan.
A slender climber, montane in the Peninsula on Gunong Tahan, Gunong Korbu and Gunong Benom. *Distrib*: Sumatra, Java.

CONVOLVULACEAE

Lettsomia Scortechinii, Prain
Tanah Rata, 4800 ft., 11585 (Dyak coll: F. M. S. Mus.); flr. Oct.
A slender climbing shrub, rare, hitherto known only from the Taiping Hills. Endemic.

SOLANACEAE

Solanum torvum, Sw.
Lubok Tamang, in old Sakai clearing, 3500 ft., 11111; Tanah Rata clearing, 4800 ft., 17929; flr. June, Nov.
A prickly shrub, common in the Peninsula in waste ground. *Distrib*: Pantropic.

SCROPHULARIACEAE

Torenia atropurpurea, Ridl., var. *bicolor,* Ridl.
Lubok Tamang, 3500 ft., 11032; flr. June.
A herb, montane on the Taiping Hills and on the Main Range, the var. known only from this locality and from the Ulu Batang Padang. Endemic.

GESNERACEAE

Aeschynanthus Hildebrandtii, Hemsl.
Tanah Rata, 4800 ft., 11714; flr. Jan.
A creeping epiphyte, montane on the Taiping Hills and Gunong Benom. *Distrib*: Burma.

Aeschynanthus lanceolatus, Ridl.
Tanah Rata, 4800 ft., 11713; Tanah Rata clearing, 4800 ft., 17921; flr. Jan., Nov.
A creeping epiphyte, montane and rare, known only from this locality and from Fraser Hill.

Aeschynanthus longicalyx, Ridl.
No. 5 Camp, 5000 ft., 11050; Gunong Berembun, 6000 ft., 17988; flr. Jan., Nov.
A creeping epiphyte, montane, not uncommon on the Main Range, and on Gunong Benom. Endemic.

Aeschynanthus rhododendron, Ridl.
Gunong Berembun, c. 5000 ft., 11682; flr. Jan.
A small erect shrub, not common, Taiping Hills (common), Plus River. Endemic.

Didissandra filicina, Ridl.
Lubok Tamang, 3500 ft., 10939, 11006, Tanah Rata, 4800 ft., 11076; Rhododendron Hill, 5000 ft., 11628; Robinson Falls, 4500 ft., 17954; flr. Jan., June, Nov.
A woody herb, montane on Gunong Korbu, Gunong Chabang and Gunong Tahan. Endemic.

Didissandra Wrayi, Ridl.
Robinson Falls, 3500 ft., on wet rocks, 11139; flr. June.
A woody herb, montane, rare, known only from this locality and from Gunong Batu Puteh. Endemic.

Didymocarpus albina, Ridl.
Lubok Tamang, 3500 ft., 11020; below Robinson Falls, 3500 ft., 11126; nr. Tanah Rata, 4800 ft., 17805, common here; flr. June, Nov.
A tall herb, montane on the Main Range. Endemic.

Didymocarpus albinella, Ridl.
Gunong Berembun, c. 5000 ft., 11089; flr. June.
A herb, endemic and local.

Didymocarpus flava, Ridl.
Lubok Tamang, 3500 ft., 10920; below Robinson Falls, 3500 ft., 11125; flr. June.
A woody herb, often montane, but occurring at low altitudes, Upper Perak, Taiping Hills, Sungai Siput, Bukit Kapayang. *Distrib*: Lower Siam.

Didymocarpus lanceolata, Ridl.
No. 5 Camp, 5000 ft., 11175; flr. June.
A rare herb, endemic and local.

Didymocarpus reptans, Jack.
Tanah Rata, 4800 ft., 11044; flr. June.
A creeping herb, common in the Peninsula. *Distrib*: Sumatra, Java.

Didymocarpus sulphurea, Ridl.
Gunong Berembun, c. 6000 ft., 11032, flr. June.
A woody herb, not uncommon on the Taiping Hills and on the Main Range, and apparently wild in the Waterfall Gardens, Penang. Endemic.

Didymocarpus venusta, Ridl.
Gunong Berembun, 5500 ft., 11114; Tanah Rata, 4800 ft, 11212; flr. June.
A herb, montane on the Main Range and Gunong Benom, not common. Endemic.

Cyrtandra pilosa, Bl.
Robinson Falls, 4500 ft., 17980; flr. Nov.
A small herb, common in the Peninsula in the hills. *Distrib*: Tenasserim to New Guinea (?absent from Borneo).

ACANTHACEAE

Staurogyne subglabra, Clarke
Tanah Rata, 4800 ft., 11081, 17810; flr. June, Nov.
An erect herb, montane in the Peninsula on Kedah Peak, Taiping Hills and the Main Range. *Distrib*: Borneo (fide Ridley).

Strobilanthes albostriatus, Ridl.
Lubok Tamang, 3500 ft., 10905; flr. June.
A montane herb, rare, known only from this vicinity and from Upper Perak. Endemic.

Strobilanthes Maingayi, Clarke
Lubok Tamang, 3500 ft., 10961; flr. June.
An undershrub, montane on Gunong Raya (Langkawi), Penang Hill, Taiping Hills and the Main Range. Endemic.

Strobilanthes ruficaulis, Ridl.
Tanah Rata, 4800 ft., 11633; flr. Jan.
A herb, montane and rare, known only from this locality. Endemic.

Filetia bracteosa, Clarke
Lubok Tamang, 3500 ft., 10914; Rhododendron Hill, 5000 ft., 17889; flr. June, Nov.
A shrub, endemic and local.

Filetia Ridleyi, Clarke
Rhododendron Hill, 5000 ft., 11051, 11631; flr. Jan., June.
A herb, montone on the Main Range, occurring also in the Dindings and on the Tahan river. Endemic.

Justicia vasculosa, Wall.
Lubok Tamang, 3500 ft., 10902; flr. June.
A herb, widely spread in the Peninsula, usually at no great altitude. *Distrib*: Assam to Tenasserim, Sumatra.

VERBENACEAE

Vitex Millsii, n. sp.
A small tree, branchlets quadrangular, dark coloured when dry, with reddish hairs. Leaves trifoliolate. Leaflets elliptic, the middle leaflet slightly larger than the others, with equally cuneate base, the side leaflets rather broader at the base and unequally cuneate, apex acute; glabrous above, sparsely villous below on the mid-rib and main nerves; 16-21 cms. long, 7-10 cms. broad. Petioles 6-9 cms. long, petiolules of mid leaflets up to 4 cms. long, of side leaflets up to 2 cms., all pubescent.
Cymes axillary and opposite, red-pubescent, 2-2.5 cms. long. Bracts narrowly lanceolate, 2 mms. long. Calyx campanulate, 5-6 mms. long, villous with reddish hairs, lobes short, acute, persistent. Corolla lemon-yellow, 1 cm. long, pubescent without, glabrous within except for a ring of hairs at the insertion of the stamens; shortly two-lipped, upper lip two-lobed, lobes equal, oblong, blunt; lower lip three-lobed, the mid-lobe longer than the others, broad, retuse at apex. Stamens included, filaments glabrous, anther cells oblong with a short blunt appendage. Ovary glabrous, style glabrous, stout. Fruit unknown.

Robinson Falls, 4500 ft., 17958; flr. Nov.
This species is apparently intermediate between V. longisepala and V. vestita.

LABIATAE

Scutellaria discolor, Colebr.
Lubok Tamang, 3500 ft., 11000; Tanah Rata, 4800 ft., 11195, 11771; No. 5 Camp, 5000 ft., 11655; nr. Tanah Rata, 4800 ft., 17819; flr. Jan., June, Nov.
A slender herb, usually but not always montane, Kedah Peak to Perak and Pahang. *Distrib*: India, Java.

Gomphostemma oblongum, Wall., var. *setosa*, Ridl.
Robinson Falls, 4500 ft., 17872; fruit Nov.
A woody herb, montane, the species widely spread in the Peninsula but not common, Kedah Peak to Johore, the var. known only from this locality and from the Semangkok Pass. *Distrib*: India, Siam, Indo-China.

AMARANTACEAE

Amaranthus paniculatus, Linn.
Lubok Tamang, 3500 ft., in old Sakai clearing, 11030; flr. June.
Cultivated by Sakai. A N. American herb.

Cyathula prostrata, Bl.
Tanah Rata clearing, 4800 ft., 17939; flr. Nov.
A common weed in waste ground in the Peninsula. *Distrib*: Pantropic.

POLYGONACEAE

Polygonum chinense, Linn.
Tanah Rata, 4800 ft., 11773; Tanah Rata clearing, 4800 ft., 17923; flr. Jan., Nov.
A scrambling shrub, not uncommon in the Peninsula in the hills. *Distrib*: Indo-Malaya to China and Japan.

Polygonum malaicum, Danser. Bull. Jard. Bot. Buitenzorg, Série III, Vol. VIII, Livr. 2-3, (1927), p. 218.
Tanah Rata clearing, 4800 ft., 17924; flr. Nov.
A scrambling shrub, montane on the Main Range. *Distrib*: Sumatra.

NEPENTHACEAE

Nepenthes gracillima, Ridl.
Top of Robinson Falls, 4800 ft., 17752.
A climbing shrub, montane on Gunong Tahan and the Main Range. Endemic.

Nepenthes Macfarlanei, Hemsl.
Rhododendron Hill, 5000 ft., 17874, 17878.
A climber, montane, Gunong Bubu, Gunong Tahan and the Main Range. Endemic.

Nepenthes sanguinea, Lindl.
Rhododendron Hill, 5100 ft., 11067; below Foster's Hill in swamp, 4800 ft., 17841.
A climber, montane in the Peninsula on the Taiping Hills, Gunong Bubu, Gunong Tahan, the Main Range, Gunong Benom and Mt. Ophir. *Distrib*: Borneo.

PIPERACEAE

Peperomia ?Maxwellana, C. DC.
Robinson Falls, 4800 ft., 11720; flr. Jan.

Piper ?boehmeriaefolium, Wall.
Below Rhododendron Hill, 4800 ft., 11707; fruit Jan.

Piper cyrtostachys, Ridl.
Gunong Berembun, c. 5000 ft., 11090; Tanah Rata, 4800 ft., 11581 (Dyak coll: F. M. S. Mus.); below Rhododendron Hill, 4800 ft., 11707; flr. and fruit Jan., June.
An erect herb, rare, known only from this vicinity.

Piper magnibaccum, C. DC.
Tanah Rata, 4800 ft., 17719; fruit Nov.
A climbing herb, montane, Taiping Hills and the Main Range. Endemic.

Piper ?semangkoanum, C. DC.
Tanah Rata, 4800 ft., 17740; flr. Nov.

Piper stylosum, Miq.
Lubok Tamang, 3500 ft., 10927; Tanah Rata, 4800 ft., 11078; flr. June.
A small erect shrub, common in the Peninsula usually at low altitudes. *Distrib*: Sumatra, Borneo.

LAURACEAE

Endiandra Maingayi, Hook. fil.
Nr. Batu Brinchang Camp, 5000 ft., 18034; fruit Nov.
A tree, not common, usually in the lowlands, Perak and Malacca. Endemic.
Sakai name: *Selepak.*

Cinnamomum mollissimum, Hook. fil.
Tanah Rata, 4800 ft., 18005; sterile specimens only.
A shrub or small tree, not common, Penang and Perak. Endemic.

Cinnamomum Scortechinii, Gamble, var. *selangorense,* Ridl.
Rhododendron Hill, 5100 ft., 11207; flr. June.
A tree, rare, the species known from Ulu Batang Padang, the var. from Gunong Ulu Kali (Selangor). Endemic.

Cinnamomum ?velutinum, Ridl.
Nr. Batu Brinchang Camp, 5000 ft., 18038; leaf and wood specimens only.
Sakai name: *Baloi.*

Litsea citrata, Bl.

Tanah Rata clearing, 4800 ft., 17916; sterile.

A small tree occurring in the Peninsula in clearings in the hills. *Distrib*: India to China, Sumatra, Java, Borneo.

Lindera selangorense, Ridl.

Lubok Tamang, 3500 ft., 11018; flr. June.

A small tree, montane, not common on the Main Range. Endemic.

THYMELACEAE

Daphne composita, Gilg.

Tanah Rata, 4800 ft., 11632; flr. Jan.

A shrub or small tree, montane in the Peninsula, on the Taiping Hills and the Main Range. *Distrib*: Burma, Sumatra, Java.

LORANTHACEAE

Loranthus Lobbii, Hook. fil.

Below Rhododendron Hill, 4800 ft., 11702; fruit Jan.

A parasitic shrub, common and variable from sea-level up to about 5000 ft. Endemic.

Loranthus pulcher, DC.

Rhododendron Hill, 5000 ft., 11620; flr. Jan.

A parasitic shrub, not uncommon in the Peninsula from the Adang Islands to Selangor, usually at some altitude. *Distrib*: Tenasserim, Siam.

Elytranthe avenis, Don.

Below Foster's Hill, in swamp, 4800 ft., 17850; Rhododendron Hill, 5000 ft., 17876; flr. Nov.

A parasitic shrub, usually montane in the Peninsula, Setul, Kedah Peak, Taiping Hills, Gunong Bubu, the Dindings, Fraser Hill, Gunong Tahan, Ulu Batang Padang, Gunong Benom. *Distrib*: Sumatra, Java.

Lepeostegeres Kingii, Gamble

Gunong Berembun, c. 5500 ft., 11089; Tanah Rata, 4800 ft., 17826; flr. Jan., Nov.

A parasitic shrub, usually montane, Taiping Hills to Johore. Endemic.

SANTALACEAE

Henslowia Ridleyi, Gamble

Rhododendron Hill, 5100 ft., 11623; fruit Jan.

A parasitic climber, montane on Gunong Tahan, the Main Range and Gunong Benom. Endemic.

BALANOPHORACEAE

Balanophora globosa, Jungh.

Nr. Tanah Rata, 4800 ft., s. n.; flr. Nov.

A parasite, montane on the Main Range, Gunong Tahan and Mt. Ophir. *Distrib*: Burma to Java and Borneo.

Balanophora multibrachiata, Fawcett
Tubok Tamang, 3500 ft., 10968; Tanah Rata, 4800 ft., 17704; flr. June, Nov.
A parasite, montane in the Peninsula from the Taiping Hills to Johore. *Distrib*: Sumatra.

EUPHOBIACEAE

Phyllanthus muscosus, Ridl., *Jour. F. M. S. Mus., Vol. IV, p. 61.*
Tanah Rata, 4800 ft., 11150, 17817; No. 5 Camp, 5000 ft., 11660; flr. Jan., June, Nov.
A shrub, endemic and local.

Daphniphyllum lancifolium, Hook. fil.
Tanah Rata, 4800 ft., 18006; ?nr. Batu Brinchang Camp, 5000 ft., 18046; fruit Nov.
A tree, rare, hitherto known only from Gunong Hijau, Taiping Hills. Endemic.
Sakai names: *Rassa* (18006); *Gempok* (18046).

Baccaurea parviflora, Muell. Arg.
Lubok Tamang, 3500 ft., 10937; flr. June.
A small tree, common in the Peninsula in the lowlands. *Distrib*: Burma, Sumatra, Borneo.

Macaranga denticulata, Muell. Arg.
Nr. Batu Brinchang Camp, 5000 ft., 18040; flr. Nov.
A small tree, not uncommon in the Peninsula usually at low altitudes. *Distrib*: India, Sumatra, Java.
Sakai name: *Sepat.*

Macaranga triloba, Muell. Arg.
Lubok Tamang, 3500 ft., 10949; flr. June.
A small tree, common in the Peninsula in secondary growth. *Distrib*: Mergui, Sumatra, Java, Borneo.

URTICACEAE

Ficus chartacea, Wall., var. *torulosa,* King.
No. 5 Camp, 5000 ft., 11181.
A shrub, common in the Peninsula from sea-level up to about 5000 ft. *Distrib*: Burma.

Ficus cuspidata, Reinw.
Robinson Falls, 4500 ft., tree hanging over river, 17983. The typical form.
A shrub or tree, rare, hitherto known in the Peninsula only from the Taiping Hills. *Distrib*: Sumatra, Java, Borneo.

Ficus diversifolia, Bl.
Tanah Rata, 4800 ft., 11077.
A bush, epiphytic or not, common in the Peninsula and very variable. *Distrib*: Malay Archipelago.

Ficus hirta, Vahl.
Lubok Tamang, 3500 ft., 10948.
A shrub or small tree, not common in the Peninsula, doubtfully also from Ulu Gombak (Selangor). *Distrib*: Indo-Malaya, China.

Ficus pomifera, Wall.
Lubok Tamang, 3500 ft., by riverbank, 10932.
A tree, not very common in the Peninsula from Upper Perak to Johore. *Distrib*: Indo-Malaya.

Ficus pyriformis, Hook. and Arn., var.
Bertam river nr. Lubok Tamang, 3500 ft., 11043; below Rhododendron Hill, 4800 ft., 11703.
A shrub, not very common in the Peninsula, usually montane. *Distrib*: India to Tenasserim and S. China.

Ficus rostrata, Lam.
Lubok Tamang, by riverbank, 3500 ft., 10945; Tanah Rata, 4800 ft., 11776.
A climbing or erect shrub, common in the Peninsula. *Distrib*: India to Sumatra, Java and Borneo.

Ficus variolosa, Lindl.
Top of Robinson Falls, 4800 ft., 17761; ?below Foster's Hill in swamp, 4800 ft., 17837.
A shrub or small tree, not common in the Peninsula, Taiping Hills. *Distrib*: Hongkong.

Pellionia Duvauana, N. E. Br., var. *viridis*, Ridl.
Lubok Tamang, 3500 ft., 10999; flr. June.
A creeping herb, not uncommon in the Peninsula. *Distrib*: Tenasserim, Siam, Cambodia.

Pellionia javanica, Wedd.
Tanah Rata, 4800 ft., 17799; flr. Nov.
A creeping herb, not common in the north of the Peninsula. *Distrib*: Java.

Elatostemma acuminatum, Brngn.
Lubok Tamang, 3500 ft., 11013; Tanah Rata, 4800 ft., 17798; flr. June, Nov.
A herb, not uncommon in the Peninsula in the hills, usually near streams. *Distrib*: India to Java.

Elatostemma platyphyllum, Wedd.
Robinson Falls, 4500 ft., 17966; flr. Nov.
A large herb, not common in the Peninsula, Penang, Perak, Selangor. *Distrib*: India.

Pouzolzia vinimea, Wedd.
Lubok Tamang, 3500 ft, 10943; flr. June.
A small herb, usually montane in the Peninsula, Upper Perak, Kelantan and the Main Range. *Distrib*: India to Java and Borneo.

JUGLANDACEAE

Engelhardtia Wallichiana, Lindl.
Nr. Batu Brinchang Camp, 5000 ft., 18037, leaf and wood specimens only.
A tree, montane, not common, Penang, Taiping Hills, Fraser Hill. Endemic.
Sakai name: *Pa'ar.*

CUPULIFERAE

Pasania Bennettii, Gamble
Tanah Rata, 4800 ft., 18001; leaf and wood specimens only.
A tree, in the Peninsula near the sea and also montane. *Distrib*: Sumatra, Bangka, Borneo, Philippines.
Sakai name (for all Pasanias): *Kais.*

Pasania ?sundaica, Oerst.
Lubok Tamang, 3500 ft., 11010; flr. June.

Pasania sp.
Nr. Batu Brinchang Camp, 5000 ft., 18053; young fruit Nov.

Castanopsis ?Hullettii, King
Tanah Rata, 4800 ft., 11158; nr. Batu Brinchang Camp, 5000 ft., 18035; flr. June, Nov.
Sakai name: *Kais.*

ORCHIDACEAE

Microstylis micrantha, Hook. fil.
Tanah Rata clearing, 4800 ft., 17946; flr. Nov.
A creeping herb, not very common in the Peninsula, montane on the Taiping Hills, and occurring also in Malacca, Johore and Singapore. *Distrib*: Borneo.

Liparis compressa, Lindl.
Tanah Rata, 4800 ft., 11772; Top of Robinson Falls, 4800 ft., 17785; Robinson Falls, 4500 ft., 17986; flr. Jan., Nov., and in H. B. S., March 1926.
An epiphyte, not common in the Peninsula, montane on the Taiping Hills and the Main Range. *Distrib*: Sumatra, Java, Borneo, Celebes, Philippines.

Platyclinis odorata, Ridl.
Gunong Berembun, 6000 ft., 11116; Tanah Rata, 4800 ft., (Dyak coll: F. M. S. Mus.); flr. June, Oct.
An epiphyte, montane on Gunong Bubu and on the Main Range at Fraser Hill. Endemic.

Sarcopodium geminatum, Kranzl.
Tanah Rata, 4800 ft., (Dyak coll: F. M. S. Mus.); Rhododendron Hill, 5100 ft., 11621, 11777; flr. Jan., Oct.
An epiphyte, montane on Kedah Peak, Taiping Hills, Gunong Tahan and the Main Range. *Distrib*: Java.

Dendrobium clarissimum, Ridl.
Lubok Tamang, 3500 ft., 10962; flr. June.
An epiphyte, rare, known only from this locality.

Bulbophyllum brevipes, Ridl.

Gunong Berembun, c. 5000 ft., 11095; flr. June.

A small epiphyte, rare, hitherto known only from Bujong Malacca, Perak. Endemic.

Bulbophyllum (*Monanthella*) **Hodgsoni,** n. sp.

Rhizome creeping, pseudobulbs crowded, globose, 7-8 mms. through. Leaf one, lanceolate, 5-6 cms. long. Peduncle filiform, pale straw colour when dry, up to 10 cms. long with a minute amplexicaul bract.

Upper sepal narrow, linear oblong, 1.2 cms. long, laterals narrowly lanceolate, reddish-brown, 2 cms. long. Petals minute, oblong, blunt, about 3 mms. long. Lip triangular-ovate, cordate, grooved, ending in a long blunt subulate fleshy point; the total length of the lip, including the point, 6 mms., the point half as long. Arms of column very long, triangular at base, ending in long points.

Robinson Falls, 4500 ft., 11728; flr. Jan.

Bulbophyllum maximum, Ridl.

Below Robinson Falls, 3500 ft., 11215; flr. June; Lubok Tamang, 3500 ft., Sands s.n.

An epiphyte, rare, known also from Bujong Malacca (Perak). Endemic.

Bulbophyllum microglossum, Ridl.

Rhododendron Hill, 5100 ft., 11068; flr. June.

An epiphyte, montane, rare, hitherto known only from Gunong Tahan.

Bulbophyllum Skeatianum, Ridl.

Lubok Tamang, 3500 ft., 10965; Rhododendron Hill, 5100 ft., 11618; below Gunong Terbakar, 3500 ft., 11697; flr. Jan., June.

A small epiphyte, rare, hitherto known only from Gunong Tahan.

Dendrochilum angustifolium, Ridl.

Rhododendron Hill, 5100 ft., 11206; Tanah Rata, 4800 ft., (Dyak coll: F. M. S. Mus.); flr. June, Oct.

An epiphyte, montane on Gunong Tahan, the Main Range and Gunong Benom. Endemic.

Dendrochilum spathulatum, Ridl.

Top of Robinson Falls, 4800 ft., 17795; flr. in H. B. S., Jan., 1926.

An epiphyte, rare in the Peninsula, hitherto known only from the Tahan river. *Distrib*: Sumatra.

Eria brunea, Ridl.

Below Robinson Falls, 3500 ft., 11122; Tanah Rata, 4800 ft., 17749; top of Falls, 4800 ft., 17796; flr. June, Nov., and in H. B. S. Feb., 1926.

An epiphyte, not common in the Peninsula, Taiping Hills, the Main Range, Gunong Benom. Endemic.

Eria floribunda, Lindl.
No. 5 Camp, 5000 ft., 11178, 11190; flr. June.
An epiphyte, common in the Peninsula from sea-level up to 5000 ft. *Distrib*: Tenasserim to Java, Borneo, Philippines.

Eria longifolia, Hook. fil.
Tanah Rata, 4800 ft., 17741; flr. Nov.
An epiphyte, montane on the Taiping Hills, the Main Range, Gunong Benom and Gunong Tahan. *Distrib*: Sumatra, Borneo.

Eria Ridleyi, Rolfe
Tanah Rata, 4800 ft., 11144, 11710; below Foster's Hill, in swamp, 4800 ft., 17842; nr. Brinchang Camp, 5000 ft., 18027; flr. Jan., June, Nov.
An epiphyte, montane on Gunong Raya (Langkawi), Bukit Besar (Jalor), Taiping Hills, the Main Range and Gunong Benom. Endemic.

Eria Scortechinii, Ridl.
Gunong Berembun, 5500-6000 ft., 11098, 11686; Rhododendron Hill, 5100 ft., 11619; flr. Jan., June.
An epiphyte, or on rocks, montane on the Main Range, Gunong Tahan and Gunong Benom. Endemic.

Trichotosia aporina, Kranzl.
Rhododendron Hill, 5000 ft., 17872; flr. Nov.
An epiphyte, montane, not common, Kedah Peak, Taiping Hills, Main Range. Endemic.

Trichotosia pyrrotricha, Ridl.
Tanah Rata clearing, 4800 ft., 17914; flr. Nov.
An epiphyte, montane on the Taiping Hills, Gunong Tahan and the Main Range. Endemic.

Phreatia listrophora, Ridl.
Gunong Berembun, 5500 ft., 11687; flr. Jan.
A small epiphyte, not common in the hills, Gunong Raya (Langkawi), Taiping Hills, Gunong Tahan, Fraser Hill, Gunong Benom. Endemic.

Tainia Maingayi, Hook. fil.
Lubok Tamang, 3500 ft., Sands, s.n.; flr. July.
A creeping terrestrial herb, not common, Kedah Peak, Kelantan, Penang, the Main Range. Endemic.

Tainia speciosa, Bl.
Lubok Tamang, 3500 ft., 11113; flr. June.
A terrestrial herb, not uncommon in the Peninsula, montane, Kedah Peak, the Main Range, Gunong Tahan, Mt. Ophir, Gunong Bechua (Johore). *Distrib*: Java.

Spathoglottis aurea, Lindl.
Robinson Falls, 4500 ft., 11140; flr. June.
A terrestrial herb, montane in the Peninsula, common. *Distrib*: Sumatra, Borneo, Philippines.

Calanthe angustifolia, Lindl.
Tanah Rata, 4800 ft. (Dyak coll: F. M. S. Mus.); flr. Oct.
A terrestrial herb, montane in the Peninsula on Kedah Peak, Taiping Hills, the Main Range, and Gunong Benom. *Distrib*: Sumatra, Java.

Calanthe veratrifolia, R. Br.
Tanah Rata, 4800 ft., 11075, 11644; flr. Jan., June.
A terrestrial herb, not uncommon in the Peninsula from the Taiping Hills to S. Johore. *Distrib*: India to Australia.

Dilochia Cantleyi, Ridl.
Gunong Berembun, 5000 ft., 11680; below Foster's Hill, in swamp, 4800 ft., 17848; flr. Jan., Nov.
A terrestrial herb, montane in the Peninsula on Kedah Peak, in Kelantan, on Gunong Tahan, the Main Range, and Gunong Bubu. *Distrib*: Borneo.

Coelogyne carnea, Hook. fil.
Gunong Berembun, 5000 ft., 11094; top of Falls, 4800 ft., 17771; flr. June, and in H. B. S., Feb., 1926.
An epiphyte, or not, montane on Gunong Bintang (Kedah), Taiping Hills, Gunong Tahan, the Main Range and Gunong Benom. Endemic.

Coelogyne speciosa, Lindl.
Below Robinson Falls, 3700 ft., 11131; No. 5 Camp, 5000 ft., 11177, 11656; Tanah Rata, 4800 ft., 17710; top of Falls, 4500 ft., 17783; flr. June, Jan., Nov., and in H. B. S., Feb., 1926.
An epiphyte, common in the Peninsula from Penang to Singapore, montane in the north, descending to sea-level in the south. *Distrib*: Java, Borneo.

Coelogyne tomentosa, Lindl.
Gunong Terbakar, 4500 ft., on the ground in open dry places, 10978; Lubok Tamang, 3500 ft., 11039; below Robinson Falls, 3700 ft., 11135; flr. June.
An epiphyte, or not, montane in the Peninsula in Penang, on the Taiping Hills, Gunong Tahan, the Main Range, Gunong Benom and Mt. Ophir. *Distrib*: Sumatra, Borneo.

Crinonia Elizabethiana, Ridl.
Robinson Falls, 4800 ft., 17865; flr. in H. B. S., April, 1926.
An epiphyte, not common, montane on Gunong Tahan and Gunong Ulu Riang. Endemic.

Crinonia parviflora, Pfitzer
Rhododendron Hill, 5000 ft., 17881; flr. Nov.
An epiphyte, montane on Gunong Bintang (Kedah), the Main Range, Gunong Tahan and Gunong Benom. Endemic.

Chelistonele perakensis, Ridl.
Tanah Rata, 4800 ft., (Dyak coll: F. M. S. Mus.); flr. Oct.
An epiphyte, montane on the Taiping Hills, Fraser Hill and Gunong Benom. Endemic.

Appendicula lancifolia, Hook. fil.
Nr. Lubok Tamang, 3500 ft., 11040; flr. June.
An epiphyte, montane in the Peninsula on Bukit Besar (Jalor) the Taiping Hills and the Main Range. Endemic.

Corysanthes mucronata, Bl.
Summit of Rhododendron Hill, 5100 ft., in Sphagnum, 17883; flr. Nov.
A tiny tuberous herb, rare in the Peninsula, Kedah Peak, Gunong Belumut (Johore). *Distrib*: Java.

Tropidia curculigoides, Lindl.
Lubok Tamang, 3500 ft., 10951; Robinson Falls, 4500 ft., 17985; flr. June, Nov.
A terrestrial herb, common in the Peninsula from Kedah Peak to Singapore, montane in the north. *Distrib*: India, Borneo.

Anoectochilus Reinwardtii, Bl.
Lubok Tamang, 3500 ft., 11107; Robinson Falls, 4500 ft., 17975; flr. June, Nov.
A small terrestrial herb, montane in the Peninsula on Kedah Peak, Taiping Hills and the Main Range. *Distrib*: Sumatra, Java, Amboina.

Hetaeria elata, Hook. fil.
Rhododendron Hill, 5000 ft., 11058; No. 5 Camp, 5000 ft., 11194; flr. June.
A terrestrial herb, rare, Ulu Batang Padang. Endemic.

Cryptostylis arachnites, Bl.
Rhododendron Hill, 5100 ft., 11058; Tanah Rata, 4800 ft., 17733; flr. June, Nov.
A terrestrial herb, common in the Peninsula from sea-level to about 5500 ft. *Distrib*: India, Sumatra, Java, Philippines.

Ceratostylis cryptantha, Ridl.
Tanah Rata, 4800 ft., 11717; flr. Jan.
A small epiphyte, not common, montane on Penang Hill, the Taiping Hills, Fraser Hill. Endemic.

ZINGIBERACEAE

Globba aurantiaca, Miq.
Robinson Falls, 4500 ft., 17968; flr. Nov.
A herb, common in the Peninsula up to 5000 ft. *Distrib*: Sumatra, Borneo.

Globba cernua, Bak.
Lubok Tamang, 3500 ft., 10924; flr. June.
A herb, common in the hills from the Taiping Hills to Negri Sembilan. Endemic.

Globba macranthera, Ridl.
No. 5 Camp, 5000 ft., 11651; flr. Jan.
A herb, rare, known only from this neighbourhood.

Globba regalis, Ridl.

Lubok Tamang, 3500 ft., 10930; flr. June.

A tall herb, rare, known only from this locality and from Gunong Menuang Gasing (Selangor).

Hedychium paludosum, n. sp.

A tall terrestrial herb with thick aromatic rhizome. Leaves oblong lanceolate cuspidate, glabrous except for a slight pubescence along their edges, 25-30 cms. long, 4.5-6 cms. broad. Petiole 1 cm. long or less. Ligule glabrous, up to 5 cms. long.

Inflorescence lax, about 25 cms. long. Peduncle up to 12 cms. long, glabrous below, sparsely silky-hairy above, with midway a single broadly lanceolate bract, silky hairy on the outside.

Flowers two or three from each bract; the lower floral bracts oblong blunt, glabrous inside, sparsely golden-hairy outside, 2.5 cms. long; upper ones shorter and narrower.

Calyx tube narrow, tubular, densely silky-hairy, 4 cms. long. Corolla tube exceeding calyx tube by 2.5 cms., lobes linear, broadening towards the tips, acute, 3 cms. long; staminodes broader, as long; lip 3 cms. long, narrow, deeply bilobed. Stamen 6 cms. long, filament slender; anther broad, the cells prolonged below into short blunt horns. Stigma narrowly cup-shaped, with long hairs on the edge. Flowers pure white except for the brilliant red stamen. Fruit unknown.

Below Foster's Hill, in swamp, 4800 ft., 17844, abundant; flr. Nov.

Camptandra latifolia, Ridl.

Rhododendron Hill, 5000 ft., 11061; No. 5 Camp, 5000 ft., 11180; flr. June.

A herb, montane and rare, Penang, Gunong Batu Puteh, Bujong Malacca. Endemic.

Camptandra ovata, Ridl.

Tanah Rata, 4800 ft., 17727; flr. Nov.

A herb, montane and rare, ?Gunong Tahan, Gunong Korbu, Fraser Hill and Gunong Mengkuang Lebar. Endemic.

AMARYLLIDACEAE

Curculigo latifolia, Dryand

Tanah Rata, 4800 ft., 11085; flr. June.

A stemless herb, common in the Peninsula from sea-level to above 6000 ft. *Distrib*: Indo-Malaya.

Curculigo recurvata, Dryand

Robinson Falls, 4500 ft., 17971; flr. Nov.

A tuberous herb, not common in the Peninsula, but abundant where it occurs, Taiping Hills, Negri Sembilan, Singapore (Botanic Gardens). *Distrib*: India to China and Australia.

BURMANNIACEAE

Burmannia longifolia, Becc.

Rhododendron Hill, 5000 ft., 11060; Gunong Berembun, 5500 ft., 11690; flr. Jan., June.

A herb, common in the Peninsula in the hills. *Distrib*: Borneo to the Philippines and New Guinea.

TACCACEAE

Tacca cristata, Jack

Lubok Tamang, 3500 ft., 10969; flr. June.

A tuberous herb, common in the Peninsula from sea-level to about 4000 ft. *Distrib*: Burma.

LILIACEAE

Ophiopogon intermedius, Don, var. *macranthus,* Ridl.

No. 5 Camp, 5000 ft., 11780; flr. Jan.

A herb, rare, the var. known only from this locality. *Distrib*: (of species), Himalaya.

Disporum pullum, Salisb.

Lubok Tamang, 3500 ft., 11038; Tanah Rata, 4800 ft., 11143; flr. June.

A herb, rare in the Peninsula, known only from this vicinity. *Distrib*: India, Sumatra, Java, China.

Smilax laevis, Wall.

Rhododendron Hill, 5000 ft., 17891; flr. Nov.

A slender climber, montane in the Peninsula from Kedah Peak to Johore. *Distrib*: Borneo, S. China.

Smilax myosotiflora, DC.

No. 5 Camp, 5000 ft., 11171; flr. June.

A slender climber, common in the Peninsula from Kedah Peak to Singapore. *Distrib*: Lower Siam, Java.

COMMELINACEAE

Pollia thyrsiflora, Endl.

Lubok Tamang, 3500 ft., 11019; flr. June.

A herb, common in the Peninsula both at low and high altitudes. *Distrib*: Andamans to the Philippines and New Guinea.

Commelina obliqua, Ham.

Lubok Tamang, 3500 ft., 10907; No. 5 Camp, 5000 ft., 11653; Tanah Rata, clearing, 4800 ft., 17950; flr. Jan., June, Nov.

A herb, not very common in the Peninsula, Perlis, Kedah, Upper Perak, Ginting Bidai (Selangor). *Distrib*: India to Borneo.

PALMAE

Pinanga polymorpha, Becc.

Nr. Tanah Rata, 4800 ft., 17832; fruit Nov.

A small palm, montane on the Taiping Hills and the Main Range. Endemic.

Calamus elegans, Ridl.
Nr. Batu Brinchang Camp, 5000 ft., 18017; fruit Nov.
A slender climber, montane, not common, Gunong Tahan, Bujong Malacca, Fraser Hill. Endemic.

PANDANACEAE

Freycinetia montana, Ridl.
Lubok Tamang, by the river, 3500 ft., 11009; flr. June.
A climbing shrub, not common, Taiping Hills and the Main Range. Endemic.

ARACEAE

Arisaema anomalum, Hemsl.
Lubok Tamang, 3500 ft., 11005; flr. June.
A tuberous herb, montane on the Taiping Hills and the Main Range. Endemic.

Arisaema filiforme, Bl.
Tanah Rata, 4800 ft., 17703; flr. Nov.
A tuberous herb, rare in the Peninsula, known only from this locality. *Distrib*: Sumatra, Java, Borneo.

Arisaema Roxburghii, Kunth.
Lubok Tamang, 3500 ft., 10942; Tanah Rata, 4800 ft., 11084, ?17801; No. 5 Camp, 5000 ft., 11170, 11663; flr. Jan., June.
A tuberous herb, not uncommon in the hills from Pulau Adang to Selangor and Pahang. Endemic.

Alocasia Beccarii, Engl.
Tanah Rata, 4800 ft., 11167; No. 5 Camp, 5000 ft., 11182, 11666; flr. Jan., fruit June.
A creeping herb, montane in the Peninsula on the Taiping Hills and Main Range. *Distrib*: Borneo.

Homalomena purpurascens, Schott.
Top of Robinson Falls, 4800 ft., 17758; flr. Nov.
A small herb, not uncommon in the Peninsula, particularly in the south. *Distrib*: Sumatra, Java, Borneo, Philippines.

Schismatoglottis ?mutata, Hook. fil.
Robinson Falls, 4500 ft., 17979; fruit Nov.

Scindapsus Scortechinii, Hook. fil.
No. 5 Camp, 5000 ft., 11783; Tanah Rata, 4800 ft., 17748; flr. Jan., Nov.
A climbing shrub, montane, not uncommon in the Peninsula. *Distrib*: Lower Siam.

Amydrium humile, Schott.
Robinson Falls, 4000 ft., 11120; flr. June.
A long creeping plant, not common in the Peninsula, but abundant where it occurs, Penang Hill, Bujong Malacca. *Distrib*: ?Sumatra, Borneo.

CYPERACEAE

Mariscus Dregeanus, Kunth.
Tanah Rata clearing, 4800 ft., 17943.
A sedge, common in the Peninsula, but usually near the sea. *Distrib*: Trop. Africa and Asia.

Carex cruciata, Vahl., var.
Tanah Rata clearing, 4800 ft., 17941.
A sedge, montane in the Peninsula, not common. *Distrib*: Indo-Malaya to China.

Gahnia javanica, Mor.
Gunong Terbakar, 4500 ft., 10990.
A large sedge, montane in the Peninsula, common from Kedah Peak to Johore. *Distrib*: W. Malaysia to Polynesia.

GRAMINEAE

Paspalum conjugatum, Berg.
Tanah Rata clearing, 4800 ft., 17944.
A common grass in the Peninsula. *Distrib*: Pantropic, of S. America origin.

Oplismenus compositus, Beauv.
Tanah Rata, clearing, 4800 ft., 17934.
A grass, common in the Peninsula. *Distrib*: Pantropic.

Pollinia Hendersonii, C. E. Hubbard, *Kew Bull. 2, 1927, p. 79.*
Tanah Rata clearing, 4800 ft., 17940.
A tall grass, endemic and local.

Isachne albens, Trin.
Tanah Rata clearing, 4800 ft., 17927.
A grass, montane in the Peninsula on the Taiping Hills, Gunong Tahan and the Main Range, *Distrib*: Indo-Malaya and China.

Isachne javana, Nees.
Gunong Terbakar, 4500 ft., 10993; below Foster's Hill in swamp, 4800 ft., 17843.
A grass, not uncommon in the Peninsula in the hills. *Distrib*: Burma, Java, Borneo.

Setaria plicata, Cooke
Tanah Rata clearing, 4800 ft., 17947.
A tall grass, widely spread in the Peninsula and not uncommon. *Distrib*: Trop. Asia.

Bambusa elegans, Ridl.
Rhododendron Hill, 5000 ft., 17887; sterile; common on ridge tops, forming thickets; common on Gunong Batu Brinchang at about 6000 ft., forming a dense growth on the tops of narrow ridges amongst Sphagnum.
A small bamboo, rare, known also from Fraser Hill. Endemic.

CONIFERAE

Podocarpus imbricatus, Bl.
Robinson Falls, 4500 ft., Forest Dept. 10937.

A tree, montane in the Peninsula from Kedah Peak to Johore. *Distrib*: Burma to the Philippines and Hainan.

Podocarpus neriifolius, Don

Tanah Rata, 4800 ft., 17745.

A tall tree, montane in the Peninsula from Penang to Johore. *Distrib*: India to China and New Guinea.

Dacrydium Beccarii, Parl

Nr. Batu Brinchang Camp, 5000 ft., on ridge top, 18025.

A shrub or dwarf tree, montane in the Peninsula. *Distrib*: Borneo.

Dacrydium elatum, Wall.

Several large trees seen below Robinson Falls, 3500 ft.

A tall tree, not uncommon in the Peninsula in the hills. *Distrib*: Tonkin to Fiji through the Malay Archipelago.

The Geology of Malacca, with a Geological Map and Special Reference to Laterite.

By J. B. SCRIVENOR,

Geologist, Federated Malay States.

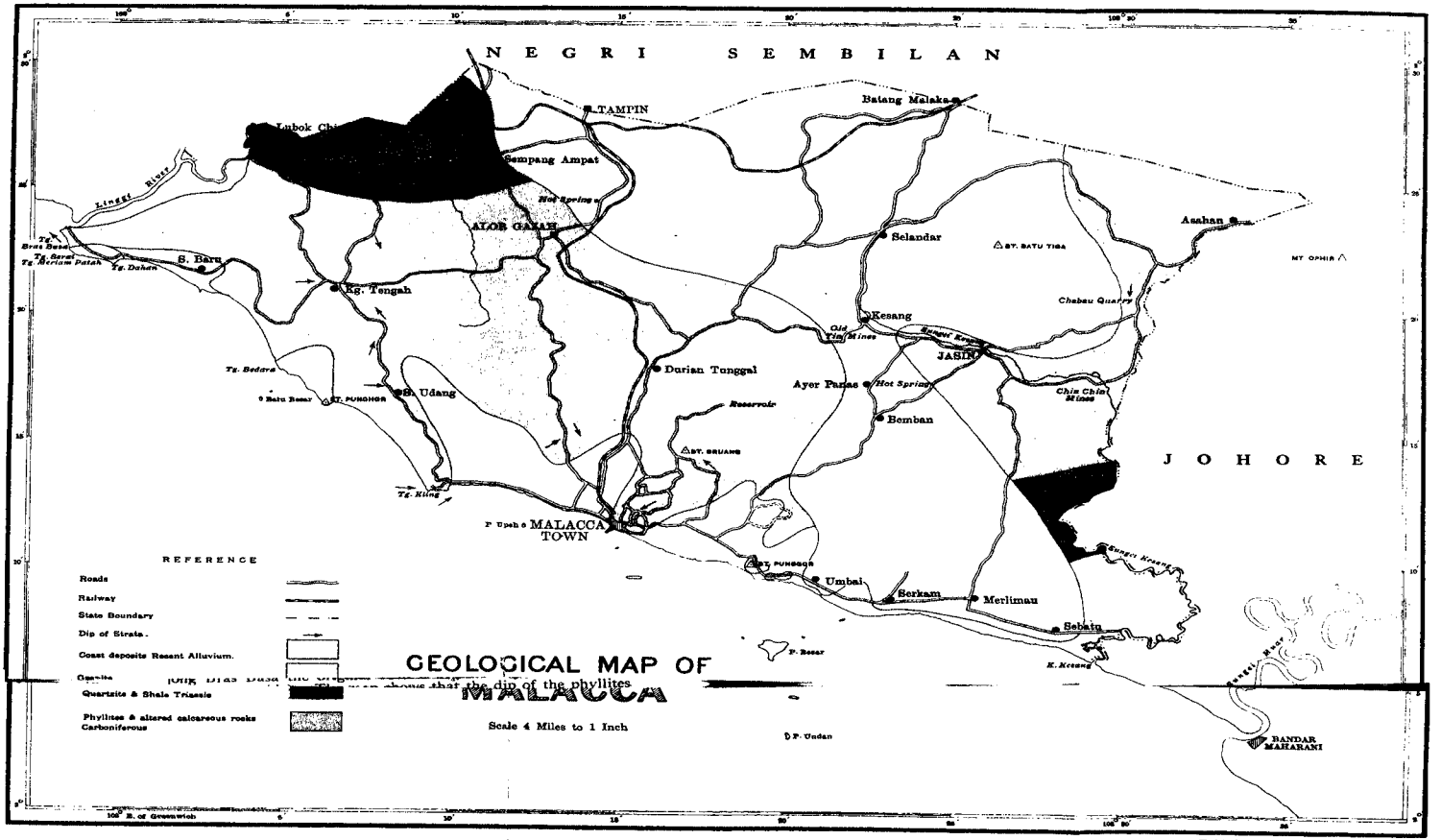
The Settlement of Malacca has an area of only 720 square miles, but is very well equipped with roads, which exceed 250 miles in length, and make an examination of the geology of the country less arduous than is usually the case in British Malaya. This paper is the result of work in the Settlement carried out in connection with the geological survey of British Malaya. The first work was done in 1906. After that hardly any information was obtained until 1926, when I was able to spend two months in preparing a geological map, which is published with this paper, and is reduced from the 1916 map of Malacca Territory, scale 1 inch = 1 mile, on which the field-observations were recorded.

Physical features.

Nearly half of the northern boundary of Malacca is granite, rising to hills of moderate height (*e.g.* Bukit Manis, 556 ft.; Bukit Ayer Tembusu, 520 ft.; Bukit Putus, 689 ft.; Bukit Punggor, 1304 ft.; Bukit Batang Malaka, 1419 ft.). To the north, in Negri Sembilan, are higher granite hills. To the south there are no very conspicuous features. The country is formed of low hills and beautiful valleys planted with rice. Excepting Forest Reserves and Rubber Protection Belts nearly the whole Settlement is cultivated, rice and rubber being the chief products. The rivers are small. The coast is in part sandy, in part mangrove-mud. There are rocky headlands of laterite at Tanjong Bras Basa and Tanjong Kling. Bukit Bruang, 564 ft., near Malacca Town, appears to owe its existence to quartz-veins in phyllites.

Phyllites and altered calcareous rocks.

The oldest rocks in Malacca are phyllites (micaceous slates) and altered calcareous rocks. They are believed, on evidence obtained elsewhere, to be of Carboniferous age, but in Malacca there is no direct evidence of age at all. Generally the phyllites are soft owing to weathering. The best specimens I obtained were from the underground tin-workings at Chin Chin, east of Jasin, where they contain tourmaline. At Tanjong Kling and at Tanjong Bras Basa the original rock is replaced by limonite (hydrated iron oxide). The map shows that the dip of the phyllites varies greatly, indicating great disturbance. Generally, the soil above the phyllites contains large blocks of limonite that frequently preserve the structure of the phyllites which they have



F. M. S. Survey No. 671 1926

replaced and are a valuable guide in field-work to the nature of the rock under the soil. These, and the limonite on the coast, are familiar as "laterite." Whether they should be called laterite or not is a question to be discussed later.

The phyllites occur on the west of the granite and on the east again in the neighbourhood of Jasin and Chin Chin. Between Chin Chin and Asahan, however, is a large outcrop of a different rock, which has been quarried. This is a hard, light-coloured rock whose mineral composition indicates that it is an altered calcareous rock. From surface indications I believe this rock continuous to, or near, Asahan, but the quarry at Chabau is the only place I know of where it is well exposed. At Chabau, these Carboniferous rocks form a narrow belt about three miles wide between the granite of Malacca, and the granite of Mt. Ophir, 4187 ft., and Gunong Meriong, 1650 ft., in Johore. North of Mt. Ophir, and beyond the Malacca boundary, limestone was found near Bukit Kadanak in a drill-hole about twenty-five years ago by Mr. R. W. Pawle while prospecting for the Borneo Co., Ltd. and I have no doubt this Chabau rock is the result of intense alteration of limestone by the granite. The outcrops resemble limestone outcrops. The chief constituent minerals are quartz, calcite, garnet, pyroxene, wollastonite, biotite, and pyrite. The garnet, coloured a dull red, is conspicuous and forms veins in the north face of the quarry.

On the road between Durian Tunggal and Selandar rocks of this group are altered to hornblende-schist at the granite-junction.

Near the fifth mile on the road to Alor Gajah from Malacca Town some fine sandy beds have been included in this group for want of evidence that would justify separating them from neighbouring phyllites.

Quartzite and shale.

This group is believed to form part of the widespread Triassic quartzite and shale formation of British Malaya, though, as in the case of the phyllites and altered calcareous rocks, no direct evidence of age is available in Malacca. The shales are largely altered to phyllites.

There are two outcrops of these rocks marked on the map, one between Lubok China and Sempang Ampat, the other on the eastern boundary. The latter it must be confessed is largely conjectural. These rocks have been mapped in Johore and must end against the granite somewhere in Malacca as shown on the map.

In the other outcrop, however, there is good evidence of quartzite, but the dividing line between this group and the older group is obscure.

The granite.

The granite in Malacca was intruded into the Carboniferous and Triassic rocks and is therefore younger than them. In the north of the Settlement there is abundant hard granite. Hard aplite, a fine-grained granitic rock, is found near Bukit Batu Tiga. In the south hard granite was seen at Umbai, on the islands off the coast near Umbai, and at and near Bukit Punchor. There are granite-quarries between Tampin and Sempang Ampat, between Selandar and Asahan, and on Pulau Besar. The granite in the vicinity of Tampin is porphyritic, that is, it contains large crystals of orthoclase. On Pulau Besar and at some other localities it is not porphyritic. The map shows a continuous outcrop from the north to Umbai, Serkam, and Merlimau. In the centre of the Settlement, however, about Kesang, Ayer Panas, and Bemban, the evidence is poor. It is usually easy to recognize a granitic soil, but in the locality mentioned I think there are numerous granitic intrusions into stratified rocks. Such intrusions can be seen in the old tin-mines near Kesang, but mapping granitic intrusions and stratified rocks separately is impossible on a small scale map, so I have coloured the whole area as granite.

The large outcrop of granite in Malacca is the southern end of the Main Range of the Peninsula; its northern termination is between the Patani and Telubin Rivers in Lower Siam.

Towards the west of the Settlement are two small granitic outcrops on the coast. That stretching from Tanjong Bedara to Bukit Punchor contains hard granite. The other, stretching from near Tanjong Bras Basa to near Tanjong Dahan, is of soft granite-aplite.

Near Malacca Town there is evidence of granitic intrusions. Close to the top of Bukit Tinggi is a granitic rock with muscovite, while in a ditch below Bukit China I found a white clay which on being washed yielded quartz, muscovite, and rutile. In 1906 I was shown an outcrop of hard granite near Malacca Town, but in those days there was no map and I did not record its position, nor could I find it again in 1926.

Soil derived from the granitic rocks usually has very little limonite, or "laterite" in it, compared with soil derived from the stratified rocks. Plates of white mica (muscovite) are common in this granitic soil, particularly in the neighbourhood of Serkam and Merlimau.

Recent deposits.

The recent deposits found in Malacca are:—1. alluvium; 2. beach-sand and the mud and sand on the sea-floor; 3. laterite. Regarding the alluvium there is nothing of special interest to note.

It provides the most fertile ground for cultivation and is mostly utilized for rice-fields. The beach sand and sea-floor, however, are interesting in that they contain tin-ore, and will be considered under mineral deposits. Laterite also is of interest and will be discussed in the final section of this paper.

Mineral deposits.

Malacca has been a settled country for so long that unknown mineral deposits of any value can hardly be expected to exist. In the early days of European settlement, after the arrival of the Portuguese in 1511, gold was brought from other parts of the Peninsula to Malacca. There were no geographical obstacles to the whole present rice-bearing area of Malacca being occupied by Malays. Intercourse between foreign Malays and Malacca Malays certainly took place. Gold must have been known to exist in the neighbourhood of Gemas, Gemencheh, and Mt. Ophir, just beyond Malacca's borders. Foreigners would be attracted by this, and it is difficult to believe that the available deposits of gold and tin-ore in Malacca did not become known at an early date.

The information that we have to-day is that there are 1. old gold-workings, 2. tin-workings inland, and 3. tin-ore on the coast and the sea-bed.

The old gold-workings are in the north-east of the Settlement, near Asahan, and are a continuation of the Negri Sembilan and Johore gold-workings. Whether Asiatics are still winning gold in either of these States I do not know, but in the Journal of the Straits Branch of the Royal Asiatic Society for December 1891 (No. 24) there is an interesting reference on pp. 81-82 by Dr. W. Bott to early work. Dr. Bott, who was then Government Analyst, Straits Settlements, reported on an "Alleged Discovery of Mercury in Malacca" and in a note to his paper quotes from Cameron's "Malayan India" to the effect that about 1864 Captain Playfair discovered at the base of St. Paul's Hill, in part of old Portuguese Government buildings, the remains of a store of mercury that had been brought there in connection with gold-mining on Mount Ophir. This would probably have been towards the close of tthe sixteenth century. Now, however, gold-mining is dead in Malacca, the only trace of it being small shallow, surface excavations near Asahan, in the triangle formed by the Johore boundary and the Asahan and Chabau roads.

Tin-mining not only still continues, but its possibilities for the future have interested miners considerably in recent years.

The tin-workings inland are in the neighbourhood of Kesang and Jasin. Those at Kesang are in rolling country, where granitic intrusions have invaded phyllites. In July of 1926 there were a few Chinese working near the Kesang-Durian Tunggal road, but

it is obvious that the best values have been extracted. Hydraulic-working with monitors would be worth considering for what remains if tailings could be kept from fouling the Sungei Kesang. I have no information about the actual tin-contents of the ground now.

The workings near Jasin are south of the village Chin Chin, in and near a Rubber Protection Belt of jungle. No granite is visible here. The country rock is phyllite with tourmaline, and traversing it are small veins containing tin-ore. On the surface the phyllites are covered by a thick cap of hard laterite, sometimes reaching ten feet or more, which is stanniferous where there was a vein in the phyllite replaced by the laterite. These veins have been worked for many years. They form a "stockwork" that would have been a valuable property if worked on a large scale before Chinese miners began "picking out the eyes." I first visited the Chin Chin mines in 1906. At that time there was a flourishing Chinese *Kongsi* at work on the last rich outcrops left: now a Singapore Company is about to attempt working what remains on a large scale.

Tin-ore occurs on the coast and on the sea-bed off the shore of Malacca, the chief source of which I believe to be the small patch of granite between Sungei Baru village and the mouth of the Linggi River. The rock here is soft and fine-grained granite-aplite, in which, close to the shore, is an old *lampan*, between Tanjong Serai and Tanjong Bras Basa, near the junction of phyllites and aplite. In December 1905 I went to this part of the coast from Port Dickson with the late Mr. Warnford Locke, then General Manager of the Raub Australian Gold Mines. A small suction-dredge was being operated by Mr. Gunn to prospect the sea-bed. It had been working for two years, and some time later a dredge was sent up from Singapore to work on a large scale but was unsatisfactory. In 1905 Malays were working on the beach. Tin-ore can be concentrated in pans there now. Near Tanjong Dahan the sea has concentrated the sea-sand and left a strip of black sand on the beach. Some of this was collected and analysed. The mineral-analysis (after removing quartz) was as follows:—

Magnetic. Ilmenite and tourmaline 82.4%
Non-magnetic. Rutile, anatase, zircon, and cassiterite 9.6%

The original sample with the quartz, was assayed for tin and was found to contain 0.29%. This is about equivalent to eight *katis* per cubic yard, but the amount of black sand available is very small and concentration of the cassiterite would be difficult.

The tin-ore on the sea-bed has certainly been distributed to some extent by tides, but how far it extends down the coast of Malacca I do not know. Prospectors are at work again and it is to be hoped that the values will prove high enough for dredging.

The extent of the aplite out to sea is unknown. In the old *lampan* small veins traverse the aplite. Such veins are the probable source of the ore on the sea-bed.

In turning over the pages of No. 24 of the Journal of the Straits Branch of the Royal Asiatic Society I came by chance on a note (pp. 166, 167) headed "Diamonds in the Malay Peninsula" and containing a quotation from Garcia da Orta to the effect that diamonds "of the class called old-rock diamonds" occurred at "the Strait of Tanjam in the Territory of Malacca" (the original text was in Latin). "They are few but valuable; however, they have one fault, that they are heavy, wherefore they are more valued by the sellers than by the buyers." There is nothing remarkable in the alleged diamonds being more valued by the sellers than by the buyers; it is a common divergence of opinion in commercial transactions; but where is the Strait of Tanjam? I suspect that quartz-crystals were the stones described; but perhaps anyone who can find the Strait of Tanjam will find a treasure.

In the Raffles Museum, Singapore, I found in 1922 a specimen of stolzite, lead tungstate, said to come from Malacca. Nothing was known of its history. The specimen is now in the Geological Department.

Hot-springs.

Before discussing the laterite of Malacca I will mention briefly the hot-springs. Dr. W. Bott wrote a paper in 1891 on "The Thermal Springs of Selangor and Malacca" in the Journal of the Straits Branch of the Royal Asiatic Society (No. 24 pp. 43-62) in which a French author, Stanislas Meunier, is quoted as having claimed to have proved that tin-ore had been deposited from the water of either the Ayer Panas hot-spring or that at Cheras in Selangor, it is not clear from which the specimen described came. This claim has since been totally disproved (Jones, W. R. Geological Magazine. 1914. pp. 537-541), and was severely criticized by Dr. Bott. For the details of Dr. Bott's analyses the reader is referred to his paper. He mentions three hot-springs; one at Cherana Puteh, in the jungle (not marked on the map), the well-known spring near Alor Gajah, near the 19th milestone, and the spring at Ayer Panas.

Laterite.

"What is laterite?" That is a question that I have often been asked, and that was the theme of a protracted discussion in the Geological Magazine, beginning in 1909. "Laterite" is a name first used by F. Buchanan in 1807 in a publication "Journey from Madras, through Mysore, Canara, and Malabar." Writing

of iron-ore he says:—"In all the hills of the country the ore is found forming beds, veins, or detached masses in the stratum of indurated clay, that is to be afterwards described, and of which the greater parts of the hills of Malabar consists. ..... What I have called indurated clay ..... is one of the most valuable materials for building. It is diffused in immense masses, without any appearance of stratification, and is placed over the granite which forms the basis of Malayala. It is full of cavities and pores and contains a very large quantity of iron in the form of red and yellow ochres. In the mass, while excluded from the air, it is so soft, that any iron instrument readily cuts it, and is dug up in square masses with a pickaxe, and immediately cut into the shape wanted with a trowel, or large knife. It very soon after becomes as hard as a brick, and resists the air and water much better than any bricks I have seen in India. ..... As it is usually cut into the form of bricks for building, in several of the native dialects it is called the brick stone (*Itica cullu*). ..... The most proper English name would be Laterite, from Lateritis, the appellation that may be given to it in science."

This name "laterite" came into general use. It was not restricted to geological literature. There can be no question, I think, that Buchanan intended it to be used for the indurated clay that could be quarried and used as bricks, but it came to be applied popularly to the iron-ore also, included in the indurated clay. The name travelled from India to other countries, including Malaya, and became general throughout the tropics. Many years later a number of analyses were made of Indian laterites and it was found that they contained hydrated iron-oxide and hydrated aluminium-oxide in varying proportions. Some specimens contained so much hydrated aluminium-oxide that the authors of the analyses said that they were bauxite, which is now used as an important source of aluminium. This discovery led to a proposal that the term laterite should be restricted to deposits formed by weathering and containing a high percentage of hydrated aluminium-oxide. I objected to this on the grounds that the original definition had nothing to do with hydrated aluminium-oxide, that the name was commonly associated with the presence of hydrated iron-oxide and utility as building-material or road-metal, and that its chief users now are engineers and others in the tropics who do not care whether it contains hydrated aluminium-oxide or not. I said that the term had become popular and should be dropped as a scientific term. This started the discussion, in 1909, which lasted until 1912 at least.

It is now I think agreed among scientists that laterite is a tropical weathering-product containing hydrated oxides of iron

and aluminium, and differing from weathering-products in temperate climes in that the latter contain hydrated silicate of aluminium instead of oxide. An hydrated silicate is the end-product of weathering in the temperate zone: in some tropical countries the silicate is further broken down, the silica removed, and hydrated oxide left. A condition apparently necessary for this further process on a large scale is alternating wet and dry seasons.

In 1923 the Geological Survey of India published a memoir by Mr. C. S. Fox (Memoirs Vol. XLIX. Part 1) on "The Bauxite and aluminous laterite occurrences of India."

In India two classes of laterite are recognized, primary, formed *in situ*, and detrital or secondary. Mr. Fox writes (op. cit. p. 5) "Practically all the bauxites or aluminous "laterites" occur associated with primary laterite—those which have been formed from various types of rock *in situ*. These bauxite segregations constitute an exceedingly small proportion of the primary laterites of the country. A very small percentage of the secondary laterites have enrichments of aluminous laterite suitable for use as bauxite." This I take to mean that laterites rich in hydrated iron-oxide form the bulk of Indian laterites and I think that "laterite" used alone should be taken to mean a weathering-product in which hydrated iron-oxide is abundant. The rarer deposits, rich in hydrated aluminium-oxide, are referred to as "aluminous laterites" by Mr. Fox, evidently as something which is not ordinary laterite.

In Malaya the rocks we call laterite are definitely ferruginous. In some cases the "laterite" used by the Public Works Department is pure, massive limonite (hydrated oxide of iron) formed in the soil. I believe a little hydrated oxide of aluminium is present in most of what we call laterite, but it is hard to prove. I find that chemists differ on the subject. Hydrated silicate of aluminium is certainly abundant. On the other hand, in some localities, light-coloured nodules are formed in the soil that are almost entirely hydrated oxide of aluminium.

Malacca, however, is, as far as I am aware, the only part of British Malaya where Buchanan's name "laterite" is absolutely correctly applied to an indurated clay that can be quarried and used as brick. Those big laterite blocks are familiar objects. They were used by the Portuguese to build St. Paul's Church. They were used for an old sea-wall which I am told has been discovered recently, and they are in common use to-day.

Laterite in Malacca is formed over the phyllites and over granitic rocks.

Plate 1 shows two typical occurrences. Fig. 1 is of laterite at Tanjong Bras Basa replacing weathered phyllites. The original bedding of the phyllites can be distinctly seen, preserved by the limonite of which the laterite is composed. Similar laterite forms the shore at Tanjong Kling. Inland limonite is abundant over phyllites in soil and frequently shows the structure of the original rock, a point of great value in mapping, where no unweathered rock is visible. Sometimes, however, the limonite forms spongy masses over phyllites. A good example of this can be seen in the quarries at Bukit Serendit, near Malacca Town.

Apart from the hard masses of limonite, "indurated clay" is formed over phyllites that can be quarried.

Fig. 2 of plate 1 shows laterite formed over aplite at Tanjong Dahan. In the foreground are spongy masses washed out of the soil. They show no structure. In the background is a low cliff of aplite, showing iron-staining in the soil.

Very little limonite is formed in granitic soils in Malacca, or elsewhere, compared with phyllite-soil.

I cannot prove now that any of the laterite blocks are quarried from granitic soil. In 1906 a Public Works Department officer showed me a quarry near Malacca Town where blocks were being excavated and hard granite exposed under the soil. In 1926, however, I could not find this quarry again, nor any evidence of granite other than that mentioned earlier in this paper. Between Sebatu and the sea are pits from which laterite blocks are taken that probably are over granite.

The laterite blocks are quarried in several places in Malacca, and are largely used by Malays. Fig. 1 of plate 2 shows a typical quarry near Bukit Piatu, by the side of the road. It will be seen that the material quarried is close to the surface. In the foreground are four dressed blocks, ready for use. When quarried they are soft enough to be easily cut, but harden gradually on exposure This hardening is due to the loss of moisture and perhaps also to partial dehydration of hydrated oxides. How hard the rock ultimately becomes can be judged from the laterite blocks in St. Paul's Church.

Figure 2 of plate 2 shows how Malays use the laterite blocks. In the centre are steps with a wall on either side. On the right the timbers supporting the house rest on dressed blocks of laterite. I noticed that some Malay householders have taken to coating the laterite blocks with cement,—a proceeding that is unnecessary and hides their natural warm colouring.

FIG 1. LATERITE AT TANJONG BRAS BASA REPLACING PHYLLITES

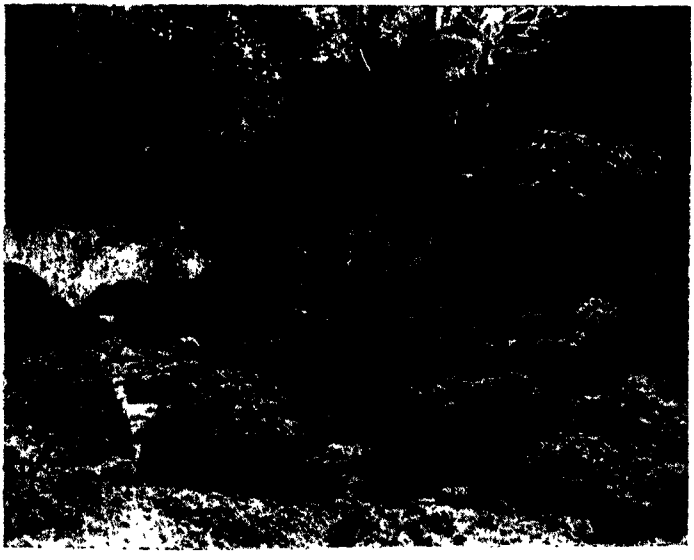


FIG. 2. LATERITE FORMED OVER APLITE AT TANJONG DAHAN

FIG 1 TYPICAL LATERITE QUARRY NEAR BUKIT PIATU

FIG. 2 A MALAY HOUSE SHOWING THE USE OF LATERITE BLOCKS

One of the blocks quarried near Bukit Piatu was taken to Batu Gajah for analysis. Mr. J. C. Shenton, Chemist in the Geological Department, obtained the following results:—

Silica	23.60%
Titanium dioxide	.86
Ferric oxide	37.94
Alumina	21.60
Manganese	trace
Zirconia	trace
Lime	1.20
Magnesia	.45
Sulphuric anhydride	3.36
Potash	.34
Soda	.37
Water and loss on ignition ..	11.20
	100.92

In this laterite the aluminium, calculated as alumina, the sesquioxide, is present mostly as hydrated silicate. There may be a little hydrated oxide.

Near Bukit Piatu again, however, I collected some light coloured nodules from a heap by the road side. They had evidently been taken from soil near by to be used as metal and resembled the aluminous nodules that occur in other parts of British Malaya. An analysis of these showed 1.04% of silica and as much as 41.14% of alumina soluble in hydrochloric acid without taking into account the insoluble alumina. In this case it is evident from the molecular proportions that most of the alumina present is not combined with silica.

The chances of finding aluminous laterite in sufficient quantity in Malacca, or elsewhere in British Malaya, to be saleable as aluminium-ore, are very remote. Dutch geologists have recently found weathered granite with hydrated oxide of aluminium in quantity on Batam, one of the islands south of Singapore, but nothing like it has been found so far on the Peninsula. Some of the Malacca laterite, for instance that at Chin Chin, would be useful as iron-ore if there were fuel available and a local demand. At the present time it could not be worked to produce iron more cheaply than it can be obtained from overseas.

Notes on the Geology of Sarawak

By J. B. SCRIVENOR.

In 1904 I was sent by the Federated Malay States Government to Sarawak to obtain information about the occurrence of gold and coal, and while there I gathered a considerable amount of geological information which was embodied in a report, "On the Geology of the Residency of Sarawak, and the Sadong District, Borneo, with special reference to the occurrence of Gold and Coal," published as a supplement to the Government Gazette of each Federated State, for March 24th, 1905. Since then I have received requests for copies of this report, but it has been out of print for a long time and this paper is written with a view to making the geological information it contained, and some further information, generally available. Shortly, however, after my report appeared, the late Mr. J. S. Geikie published a paper on "The occurrence of Gold in Upper Sarawak" in the Transactions of the Institution of Mining and Metallurgy, vol. xv. 1905-1906, in which there is a clear account of the geology of Upper Sarawak and an equally clear account of the occurrence of the gold. My remarks on the geology of the country must be considered as amplifying those of Mr. Geikie: about the ore-deposits I shall say nothing here, because Mr. Geikie had a much wider knowledge of them, and I have nothing to add that is likely to be of value. Concerning both the geology and the ore-deposits the views we expressed were substantially in agreement.

My itinerary in Sarawak was as follows. I arrived in Kuching on September 29th, 1904, and went to the Borneo Company's gold mine at Bau and Bidi. On the 12th of October I sailed from Kuching for Sadong, where I visited the Government coal-mines and also went up the rivers Sadong, Simunjan, and Krang. On November 5th I went to Santubong, and on November 14th I went again to Bau and Bidi, completing my work on November 27th.

The rocks entering into the structure of the gold-field of Upper Sarawak are limestone, sometimes with chert; marl; shale with thin sandstone bands; and thick sandstone with grit and conglomerate. In the coal-district of Sadong, shale, sandstone, grit, and conglomerate occur, while in Ulu Sadong shale, sandstone, and limestone are again met with. In the gold-field igneous rocks occur: they are also found on Gunong Matang, at Santubong, and on the Simunjan and Krang Rivers.

Limestone.

Limestone occurs in Upper Sarawak as the south-west extremity of a long line of limestone outcrops extending throughout the whole of Sarawak.

Two well-marked types of limestone can be recognized in this district. One of these is characterized by the abundance of calcite casts of a large fusiform gasteropod which has not, I believe, yet been identified. This type is pale blue-grey or pale brown in colour. It is very clearly exposed on the Sarawak River between Bidi and Bau, and also near the site of the old Club at the latter place. Thin sections under the microscope from specimens collected in the Sarawak River show foraminifera, some referable to *Miliolidae*, others resembling *Textularia*, and also coral and sponge remains.

The other type of limestone is characterized by the preponderance of corals and bryozoa over other forms, and I think that it was from this limestone that specimens were collected by Mr. A. H. Everett, described by the late Mr. R. B. Newton as *Heteropora Stylina*, and the sponge *Corynella*, and as evidence of Mesozoic age. Mr. Newton also described in the same paper (On a Jurassic Lamellibranch and some other fossils from the Sarawak River &c. Geol. Mag. p. 407. 1897) a lamellibranch. This is *Alectryonia amor*, a species restricted in Europe to the Middle Oolite. On the combined evidence of this shell and the other fossils Mr. Newton referred all the specimens of limestone he saw to the Middle Oolite; the second type can therefore be called conveniently the Middle Oolite limestone.

The distribution of fossils in the Middle Oolite limestone is by no means uniform. In some places they are so abundant as to constitute nearly the whole mass of the rock. In other places they occur sporadically, or in certain thin strata only.

This Middle Oolite limestone is abundant in the vicinity of Bau, Bidi, and Jambusan, and also in the Sarawak River above the landing-place for Bau. It varies in colour, but a deep blue is common. The microscope shows that it is crowded with micro-organisms, among which may be recognized calcareous algae and foraminifera. At Su San Shien I found a number of echinoid spines resembling closely those of *Cidaris glandifera*.

At Retto, in Ulu Sadong, I collected pale brown limestone specimens from an outcrop in the river. It is oolitic and contains obscure micro-organisms but I saw no fossils that could be used to correlate the limestone with that in Ulu Sarawak.

The limestone with chert may form a third division of limestone in Upper Sarawak, marking a definite horizon, but I was unable to prove this: indeed, at Bau, it seemed to be closely associated with the Middle Oolite limestone. The chert occurs in two forms. At Bidi, where it can be seen very well in the big cave in Bukit Kapur, it occurs as detached nodules: at Bau it occurs as continuous deposits reaching two inches or more in thickness. The Bidi chert contains some radiolaria and foramini-

fera; that at Bau is a mass of organisms, among which a foraminifer resembling *Textularia* is the best preserved. Radiolaria and sponge spicules are replaced by calcite.

Marl or argillaceous limestone.

The marl is closely associated with the limestone of Upper Sarawak, in fact I found that where marl is present the one passes into the other without any sharp break. The percentage of argillaceous matter varies considerably, and unless a shaley structure is strongly marked, it is only by the resistance of the insoluble residue to weathering that the one may be distinguished from the other in the field. The marl was best exposed at Su San Shien in 1904.

At Tai Parit, Bau, a quantity of marl had been taken from a tunnel. Searching over a heap of this marl I found some Ammonites which were sent to the British Museum of Natural History and described by the late Mr. G. C. Crick, a specialist on Cephalopoda. I publish Mr. Crick's description for the first time below:—

Note on three Jurassic Ammonites from Borneo.

Collected by J. B. SCRIVENOR, ESQ.

"Of the three Ammonites from Borneo submitted to me for "examination two are in a dark-grey limestone, labelled 'Argil- "laceous limestone, Level behind Tai Parit, Bau, Upper Sarawak,' "the other is in a much softer buff-coloured matrix labelled 'De- "composed argillaceous limestone, level behind Tai Parit, Bau, "Upper Sarawak.'

"All three specimens are referable to the genus *Perisphinctes*, "but they are all very imperfect, more or less distorted, and ex- "hibit no traces of the suture-line.

"The specimen (A) in the buff-coloured matrix is the remains "of a moderately widely umbilicated shell of about 80 mm. in "diameter with compressed whorls, ornamented with narrow, "fairly-sharp, almost radial, bifurcated ribs, which are relatively "finer and more numerous on the inner whorls.

"Of the two specimens in the dark-grey limestone, the "smaller (B) represents a not very widely umbilicated shell of "about 50 mm. in diameter, with rather high compressed whorls, "ornamented with fine forwardly-inclined bifurcated ribs, whilst "the larger example (C) indicates a rather widely umbilicated "shell of about 150 mm. in diameter, with compressed whorls, of "which the inner are ornamented with sharp slightly forwardly- "inclined bifurcated ribs, and the outer with rather widely placed "forwardly-inclined trifurcated ribs, the first subdivision of each "principal rib taking place near, or a little on the umbilical side "of, the middle of the lateral area, the posterior branch dividing "again nearer the periphery.

"These forms, all referable to the genus *Perisphinctes*, demon-
"strate clearly the presence of rocks of Jurassic age. Unfortu-
"nately they are not well enough preserved for identification, but
"the assemblage of forms seems to indicate that the rocks from
"which they were obtained are of Middle Oolite, probably Ox-
"fordian. age."

At the end of this description Mr. Crick wrote that if publication was intended, it should be considerably extended and accompanied by a figure of each specimen. Unfortunately it could not be published before Mr. Crick's death, and I think I am in order in publishing the shorter description now. The specimens are in the British Museum of Natural History.

In thin section the Tai Parit marl proved to be full of obscure organisms. The Su San Shien rock contains recognizable calcareous algae, foraminifera, coral and sponge structures. Another specimen showed *Miliolidae* and *Nodosaria*.

An unusual rock occurs in a section of an anticline on the right bank of the Sarawak River between Bau and Bidi. It is a very dark-coloured calcareous conglomerate. The most abundant pebbles are chert and sandstone: some dark pebbles effervesce with acid. The most remarkable component, however, is coal forming rounded pebbles coated and veined with calcite. The matrix appears to be entirely calcareous.

Shale, Sandstone, grit, and conglomerate.

While the limestone passes up into the marl without a sharp break, so again it was impossible, on the evidence available in 1904, to draw a line between the marl and overlying shale and sandstone; and it was also impossible to separate the Upper Sarawak shale and sandstone from that at Matang, Santubong and Sadong.

In Upper Sarawak the most striking feature in the shale is the presence of radiolaria, beautifully preserved in shale inclusions in the igneous rock at Su San Shien, and in the indurated shale at the junction with the same rock. At the landing-place for Bau on the Sarawak River I found a septarian nodule which proved to be full of radiolaria. At Santubong again I found remains of radiolaria in altered shale.

Shales are well exposed at Bidi, where I found a trace of fossil vegetation. At Jaibong I also found vegetable-remains. On the path between Bau and Busau plant-remains could be seen in somewhat sandy, well-defined beds. In a pepper-garden near Busau I found an outcrop of sandstone very rich in the same fossils, and between Puak and Jambusan I found a thin bed of sandstone also containing them. All these plant remains resemble those that occur in similar rocks at Sadong.

After my visit Mr. Reginald Pawle found a bed of impure coal at Bau, on "Grey's Ridge."

The mountain Matang, near Kuching, consists, in great part, of shale, sandstone, and a little conglomerate. At one spot I saw a thin seam of fossil wood. These rocks have been altered high up the mountain by igneous intrusions.

The isolated Santubong Mountain, like Matang, is made up of shale, sandstone, and conglomerate, with some igneous rocks. So also are some hills near by, where are good exposures of hard purple quartzite with secondary biotite, a sandstone altered by dynamic metamorphism and igneous intrusions. At Santubong I found fossil vegetation, including large pieces of wood in coarse conglomerate.

In the Sadong district there is a large development of shale and sandstone. The hill in which the Sadong coal was being worked is composed of yellow and white sandstone, a little conglomerate, and grey shale with abundant plant-remains, but not well enough preserved for identification.

The age of this group of rocks is uncertain. In mountain ranges near by the localities mentioned they reach thousands of feet in thickness. This is the series that contains coal-seams such as that at Sadong, but neither Mr. J. S. Geikie nor I could be sure that these coal-bearing strata are on the same horizon as the shales at Bau &c. (J. S. Geikie, op. cit. p. 2). The palaeontological evidence is insufficient for the purpose. The coal-bearing strata have been regarded as Eocene (Posewitz, Geology of Borneo). The coal-bearing series is, I think, after reading the literature of the subject, certainly Tertiary, but regarding the shales &c. at Bau, Bidi, Matang, and Santubong, we can only say at present that they are younger than Middle Oolite.

Igneous rocks.

The igneous rocks of Upper and Lower Sarawak may be broadly grouped under two heads:—

1. Dykes and perhaps sills, nearly always porphyritic.
2. Masses of even-grained holocrystalline rocks seen at Sijenjang (a hill near Santubong), Matang, and Ta Faw Shak, near Busau.

The dyke-rocks vary only slightly among themselves, and it may be that their most marked variation, that between a glassy and crystalline base, is due to weathering. On the other hand the glassy dyke-rock may owe its glassy base to more rapid cooling on the edge of the intruded material.

For the most part those dyke-rocks with a crystalline base are so much decomposed that it is only rarely that the nature of the ferromagnesian minerals can be recognized with certainty. Judging, however, from the composition of the associated glassy dyke-rock, they were in all probability hornblende and hypersthene. The glassy type is very fresh and admits of an accurate

determination of the constituent minerals. Good examples occur at Bunkok, Bidi, Taiton, between Bau and Jaibong, and nearer to Bau on the Busau path. In all these localities the rock is black and has the appearance of pitchstone. Porphyritic crystals of a clear felspar are abundant, and frequently a dark mineral can be detected in a hard specimen. Under the microscope the groundmass is seen to be an isotropic glass, full of minute doubly refracting microliths and equally minute crystals of magnetite. The felspar is a plagioclase with high extinction angles; while the ferromagnesians are hypersthene and hornblende in elongated prisms. In the Bunkok rock biotite occurs also. These rocks are hypersthene-andesites. They might equally well be called hypersthene-porphyrites. They were the "mineralizers" in the Upper Sarawak gold-field.

The igneous rocks at Matang, comprised in the second group, are, judging from their petrological characteristics, in all probability larger masses connected with rocks such as those just described. From the specimens collected it might be assumed that there are two distinct types at Matang, hypersthene-gabbro (norite) and quartz-diorite; but there is reason to believe that both have consolidated from the same magma, since some slides shew a rock with characteristics intermediate between the two. At Sijenjang quartz-diorite, precisely the same as that at Matang, is found; and there are also specimens containing hypersthene. A careful search might result in the hypersthene-gabbro being discovered. The specimens from Ta Faw Shak are quartz-diorite slightly weathered.

The quartz-diorite contains biotite, green and brown hornblende, a plagioclase felspar with high extinction angles, and a little quartz. The hypersthene-gabbro contains a similar plagioclase and irregular masses of the rhombic pyroxene.

On Matang I collected specimens of a very hard fine-grained rock closely associated with the quartz-diorite and hypersthene-gabbro, which proved to resemble the dykes of Upper Sarawak. One specimen, however, has the ground mass composed of felspar laths shewing flow-structure. At Santubong I found on the beach, on the south side of the river, boulders of coarse-grained ophitic diabase in which all the pyroxene has been altered to felted brown amphibole.

Igneous rocks were found in the Sadong district at Punda and Propok on the Simunjan River, and on Gunong Merbau. They are dolerites.

The structure of Upper Sarawak is very interesting in that it shows some points of resemblance to the geological structure of Kinta. It is interesting to compare the section on page 5 of Mr. J. S. Geikie's paper (cit. supra) with a section I published opposite

page 18 of the "Geology and Mining Industry of the Kinta District" Kuala Lumpur 1913. Disregarding the granite on the flanks of the Kinta section, in both areas we have a series of sedimentary rocks overlying limestone, but they differ in age in either area. In Kinta the limestone is Carboniferous or Permo-Carboniferous, the sedimentary rocks are Triassic. In Sarawak the limestone is Jurassic, the sedimentary rocks are younger than Middle Oolite. In both areas limestone hills occur, and both Mr. J. S. Geikie and myself ascribed them to the same cause, faulting and subsequent erosion. as may be seen from the sections. In both areas again these two series of rocks have been folded and in both areas the upper sedimentary series appears to be more disturbed than the lower limestone. This is due to two things—first that the limestone was more resistant, thrown into folds of large amplitude, perhaps overfolded (certainly overfolded in Kinta), while the sedimentary series was less resistant and puckered up into a multitude of small folds; and secondly, the disturbance of the sedimentary series rocks has been complicated by the fact that after being softened by ground-water they have gradually sunk on the limestone surface as the latter was dissolved away. In both areas, however, the evidence is overwhelming that the sedimentary series is above the limestone, but recently the apparently greater disturbance of the sedimentary series led an author to state with some emphasis that it must be below the limestone. Finally, in Kinta, immediately above the limestone are found beds of clay with boulders. The fact that similar beds of clay with boulders do not occur in the Sarawak area was one reason that led me to conclude that those in Kinta had been boulder-beds *ab initio* and were not the result of extreme disintegration of stratified shale, sandstone, and metamorphic rocks.

Before closing this paper I would like to say a word about oil-bearing strata in Sarawak. Much later than 1904 I went to Brunei to investigate the oil-prospects of that part of Borneo, and also paid a flying visit to Miri, the adjacent oil-field of Sarawak. I am not going to enter into any lengthy description of those oil-bearing rocks, but I take this opportunity to advise anyone who hears statements about potential oil-fields in the Malay Peninsula to go to Miri and Brunei, where he can study the conditions that really are favourable for the occurrence of oil. Oil certainly occurs in Brunei, as at Miri, and was, I believe, once running to waste up the Belait River, but I have not heard of any successful commercial venture yet. In the Malay Peninsula favourable indications are remarkable for their absence, excepting three small patches of shale with a little oil at the Selangor coal-field, Enggor, and in Perlis, and the chances of successful boring for oil are a great deal less.

The Great Flood, 1926.

By R. O. WINSTEDT, C.M.G., D. LITT.

By the courtesy of the Governments concerned this paper has been compiled from the accounts submitted by civil servants, police, engineers and other Government officers in the districts affected. The strenuous efforts of these officers, both European and Asiatic, to face the cataclysm have been deservedly praised in the local press and in official reports: it is with regret that I have had for reasons of space and because distinctions are invidious, to omit reference to the flood work of all public servants from this compilation. For accounts more full of personal incident and adventure than literal official reports can record reference must be made to the contemporary press. I notice one omission from the reports. A generation ago I fancy that even in the face of moving accidents by floods unparalleled the writers would have noted with interest the superstitions of the older village folk. I hear that along the Perak river they took to the hills dreading, needlessly as it proved, the *bah bĕtma*, which is so much deadlier than the male (*bah jantan*), and that they were laughed at by their grandchildren for their unscientific pains! Other bits of folk-lore were recorded in the press. One Perak tale was that a Police Inspector arrested a Malay medicine-man and that in the lock-up the prisoner asked for a piece of iron. Getting the iron, he struck the ground and in revenge for his arrest did magic that brought on the floods! Another Perak tale ascribed them to the king of all the crocodiles, who lives in the Perak river. Angry because so many of his subjects had been shot in Krian and elsewhere, he crawled ashore and stole a woodcutter's knife. Plunging back into his river, he dug a hole in its bed causing all the water at the centre of the earth to well up! He would have drowned every one in the State except that the Sultan of Perak arming himself with a bigger knife dived after the Crocodile King and killed him. Actually His Highness did so much for his people in their distress that he needs no such adventitious credit.

PERAK.

There were floods in Perak before Christmas but they were not abnormal for the time of the year. The floods were at their worst from December the 28th to January the 4th, their full effects not being experienced in Teluk Anson until after January the 1st. The floods were caused by the rising of the Perak River and its tributaries including the Kinta River and the Batang Padang River. The districts affected were (a) Upper Perak, (b) Kuala Kangsar including the sub-District of Bruas, (c) Kinta, (d) Batang Padang and (e) Lower Perak.

(a) The flooding of the road from Kuala Kangsar to Grik isolated Upper Perak, and communications were effected only *via* Kroh, and by messenger on foot from Kroh to Grik. Grik was isolated from Lenggong and the District Officer, Upper Perak, could furnish no news of that place. He was authorised to take such steps as he thought desirable for the control of foodstuffs. There was no loss of life in the district. Loss of property was enormous. "The village of Bersia" it was reported "has practically disappeared, while Kampong Padang near Grik is in a very bad way. The damage to irrigation works is probably nearly 100% and it is doubtful if in many villages any *padi* will be reaped this year."

(b) Kuala Kangsar had the worst experience. The normal height of the Perak River there is 105 feet above sea level. On December the 30th its height was 143.8 inches above mean sea level and 8 feet higher than the flood of 1897. Nearly the whole town was under water. It was necessary to remove the patients from the Hospital to Taiping by special train and also to evacuate the Malay College, the upper floor of which was made available for refugees. On the 28th December the pontoon bridge across the Perak River had to be broken in order to save it. Other bridges, between Kuala Kangsar and the pontoon bridge at Enggor, were destroyed and road communication south could not be re-established until January the 25th. It was feared that the Enggor railway bridge would give way but it stood the strain, and railway communication, though interrupted, was never completely cut either to the north or south of Kuala Kangsar. Tales were current that the bodies of victims were massed against the Enggor bridge but the casualties verified were one European, Mr. N. B. Booth who was drowned, while bathing in the flood at Sungai Krudda Estate, and three Chinese, one of whom refused to move from his *kongsi* when the others took refuge on higher ground, one of whom insisted on attempting to cross a submerged road, and a third of whom there are no particulars. The flood began to subside on December the 31st. After that date the cleaning up and disinfecting of the town progressed steadily. To prevent looting the Officer Commanding the Burma Rifles placed at the disposal of the civil authorities a platoon which relieved the Police of all guards in Kuala Kangsar. They stayed there from December 31st to Saturday the 8th January, 1927. The Officer in charge of the detachment remarked that the behaviour of the inhabitants was exemplary and that not a case of looting, housebreaking or rowdyism was brought to his notice. It is fair to add that probably the presence of the detachment helped towards this result. Of the 300 patients moved from the District and Malay Hospitals to Taiping only one died in transit—an old man suffering from dysentery who in the opinion of the Medical Officer would have died anyhow.

From information furnished by the Penghulus it is estimated that about 800 *kampong* houses were destroyed including 24 wooden houses at Manong. From the time that the flood commenced to subside to the end of January arrangements were made for the rationing of a large number of refugees, 10,000 in the first instance, rising to 12,000 by January the 12th and descreasing in number from January the 17th onwards. His Highness the Sultan returned to Kuala Kangsar from Penang as soon as he heard the news of the flood, and was active throughout in helping to rescue people. Among many others who furnished help the following were conspicuous: the Hon'ble the Raja di-Hilir, C.M.G., and Mr. Eliatamby of Taiping who from January the 2nd to 5th arranged for the feeding of about 1,000 persons, daily spending about $2,000 in food and in addition sending a cheque for $500 to the Relief Fund. The Agricultural Field Officer estimated that some 10,000 acres of *padi* were destroyed in the Kuala Kangsar District.

Bruas, a Sub-District of Kuala Kangsar, "appears to have escaped with little damage. Choping and Tepus sustained heavy loss, as there the river runs between high banks and the force of the water destroyed about 60% of the houses. Parit and its neighbourhood were practically normal. Telok Kepayang, Lambor Kiri and Telok Bakong being low-lying were more badly hit than other down-river districts." The Assistant District Officer adds that shopkeepers behaved well. The rise in prices was small and justified. Rationing of food was arranged for those in need. Mr. H. R. Watt, Assistant Manager of Parit Perak Estate deserved special mention, as on his own initiative and using his own credit when the flood was at its worst he ordered rice from Bruas for distribution through the local headmen. No lives appear to have been lost.

(c) In Kinta, though communications were cut for a time, there appears to have been discomfort but little distress. None of the mining companies were reported to have sustained serious damage and the chief problem was the cleaning up of Ipoh.

(d) At Tapah in the Batang Padang District, road and rail communications were cut on the 28th by water and many of the Government offices were flooded. There was some doubt whether the bridge over the Batang Padang river would stand the strain but the rain diminished to a drizzle and on the 29th December the water had receded considerably. Many *padi* fields by the river have been ruined but the District Officer reported that so far as he could ascertain there were no fatalities and the District appears to have sustained small loss and damage from the worst flood known within the memory of the oldest inhabitants.

(e) Lower Perak suffered considerable hardship as a greater portion of its area lies so low. Malays had to be rescued from their

Kampongs and Tamil labourers from estates that were flooded. As the result of the flood water banking up against the high tide, many shops in Teluk Anson were flooded to a depth of 1½ to 2 feet. Refugees had to be brought into the town but arrangements were made for feeding them and by the 5th and 6th January it was possible to commence repatriating them. The Raja Muda (Raja Aziz, C.M.G.) displayed great energy in organising and rendering assistance. A boat occupied by some Banjarese escaping from a flooded area was upset and it is believed that 16 or 17 lives were lost. Apart from this accident no report was received of casualties in Lower Perak. Of fruit trees, durians are said to have suffered and many are likely to die.

A Relief Fund was started at an early date by the *Times of Malaya*. The fund was put under the control of the Resident. It was thought that Government should bear all the expense of measures necessary for rationing and transporting refugees, though instructions were given that where refugees could pay for food they were to be requested to do so. The District Officers were authorised to issue loans to assist proprietors in restoring their property. Local Committees were appointed to assess other kinds of damage and make grants from the Relief Fund. The State Engineer's estimate of the damage done to roads and bridges in Perak by floods was $225,000 of which $100,000 damage was caused in the Perak River Valley.

The full effect of the floods will not be obvious for some months till the consequences of the loss of the rice crops are realised. Food and shelter were given in all urgent cases without regard to nationality, but nothing was done to discourage the self-reliance of the Malays and other Asiatics. Also an adequate reserve was kept for the time when the destruction of the rice crops may be felt later in the year. Unofficials started a separate Relief Fund in Lower Perak. A sum of $3,715 collected in Penang was received and credited to the Perak Relief Fund, but it was suggested that further contributions should be paid into the General Relief Fund for Malaya, and the Perak Relief Fund was closed about January the 20th when it reached $100,000.

PAHANG.

RAUB. In this district the riverine mukims of Batu Talam and Sega suffered badly and hardly a house on low ground remained within a mile of the river-banks. Three deaths were reported, one at Cheroh, two at Bentong. The District Officer was at Kuala Lipis for the Christmas holidays and tried to return to Raub at 8.30 a.m. on 2nd January. He left Lipis by boat. His party picked up the telegraph wires on the Trunk Road and pulling along them by hand travelled at the rate of 3 miles an hour. At the 6¼ mile the road surface was seen, and porterage

was necessary here and at the 8th mile. He reached Benta Estate at 3.20 p.m. During the night the river rose and next day he made so little headway, (one mile in 4 hours) that he returned to Benta Estate. On the 4th he reached Raub by swimming and walking to the 22nd mile and thence by car. Thereafter he devoted his energies to pushing forward supplies to Kuala Lipis and Jerantut. The first consignment from Kuala Lumpur reached Raub on January 6th and was transported to Benta by car and handling, and from Benta to Kuala Lipis by boats, which afterwards were fitted with outboard motors and later supplemented by a launch. By January 12th enough supplies had reached Raub to ensure the western part of Pahang against starvation till the end of February.

LIPIS. On 24th December the waters of the Lilpis, Jelai and Tembeling began to rise; on the 25th they receded a little; on the 27th they began to rise again, and road, train and telegraphic communication ceased; on the 30th the Jelai Street houses were completely submerged, the Railway Station and Rest House covered to the roofs, the patients were removed from the Hospital by boat, and the town of Kuala Lipis was an expanse of water with boats conveying refugees to the Government offices (800-900 persons), Residency (250) and other houses (80-150 each) on the hills. Many Europeans gave up half their quarters to refugees. The Malays behaved well and were cheerful. At least 20 shop-houses were washed away and 3 European bungalows floated down stream like Noah's Ark and hit the Railway bridge. Owners rushed their motor-cars into the Police compound. All rice was removed to high ground, commandeered and rationed. Some 9 deaths from drowning were reported. From the 31st December the rain abated and by January 4th the rain had gone down 2 feet.

A game ranger boating down the Tembeling was unable to recognize in the vast flood, where the Tembeling joins the Jelai.

From the Ulu Jelai to Kuala Lipis not a Malay house less than 30 feet above ordinary flood level was to be found after the cataclysm. All trees and crops and much live stock were destroyed. The peasants never had much and their little was taken away. In the Mukims of Ulu Jelai, Batu Yon and Telang, rice was distributed to over 1,100 Malays at the rate of 3 *gantang* a month for an adult and 1½ for a child. Salt also was distributed. There was a frantic demand for salt especially from the Chinese who when they got it put it in warm water and drank this saline mixture. Malays were allowed to clear unoccupied *bĕlukar* for catch-crops and were told that the Government would supply rice only up to February 10th. All who wanted work could get it on the Railway and in the Survey and Public Works Departments.

At Chegar Perah the usual Xmas Sports took place. On December 29th persons were being rescued from trees, telegraph posts etc. and the flood rose 18½ feet above rail level. There was only one small *pĕrahu*, and rafts were unwieldly in the current. On the 3rd January dysentery broke out. About 500 persons received a tin of milk a day. For 9 days three European ladies and two children lived in the Railway Engineer's office—without mosquito nets. A Siamese woman went mad, escaped and vanished. A Japanese gentleman. Mr. S. Tobishi of Kuantan rendered invaluable help in lifesaving. No bridges on the Railway line were washed out between Chegar Perah and Kuala Lipis but it was estimated it would take four months to repair the line.

As for the railway line below Kuala Lipis. Jeransang Railway Station was destroyed. Along the line to Temerloh many heavy landslides occurred. Between Krambit and Lipis the line hung in the form of a festoon several hundred feet long. At Bridge No. 567 over the Sungai Lipis the water rose between 60 and 70 feet and two sets of European quarters were carried away and shattered against the girders. At Krambit Station a passenger train was held up, and the coaches were totally immersed and battered by heavy logs.

TEMERLOH. Rains in the Ulu and intermittent rains locally from the middle of December caused the river to rise slowly from about the 20th of December. By the 25th of December the river had overflowed its banks, and the water had reached the ground floor of the shop houses in Temerloh village. On the 25th the Temerloh-Mentakab road was flooded in many places. From the 25th of December to the 3rd of January the water rose 3 feet every 24 hours on the average, flooding practically the whole of the district, except the higher hills. By the 3rd of January the flood had reached its highest level, when the road in front of the office, at the junction of the village of Temerloh, was one foot under water. At Mentakab the water got within 3 feet of the top floor of the shop houses on the Semantan side of the main road, while at Kuala Krau very little dry ground was left on the hill behind the Railway Station. The depth of the water at Mengkarak was about 9 feet on the railway line in front of the station, but Triang Village was not affected.

As the water rose, houses, not only on the river banks but also far inland, were lifted and floated away with the current, the occupants just managing to escape with their lives. The damage done to moveable property and crops everywhere is colossal. Where buildings have not been carried away they have been damaged beyond repair. Among such buffaloes as had not died of rinderpest the mortality due to the flood was high. It is doubtfull if there are many buffaloes left in the district.

All shophouses in Temerloh Village, except three were destroyed, while at Kuala Krau the Railway buildings and all wooden shophouses were destroyed. The people of Temerloh first moved to the mosque and the Rest House, but soon found those places flooded, and had to remove to the Office. The police barracks and station were vacated, the occupants being accommodated in the Office and the new Court House. From the 25th of December to the end of the month people kept moving from one place to another all the time.

The damage to Government buildings was great. Many of them drifted away and some have been shifted and badly damaged. Nearly all the Penghulus' Balais were destroyed; and the Rest House at Kuala Krau was carried away. At Temerloh, the Club and the Dispensary could no more be seen. A Forest Checking Station was shifted to the opposite side of the road, while a set of Survey lines was a total wreck. The Penghulu's Rest House was carried away about 10 chains.

Road and Railway communications were cut off on Monday morning, and telegraphic communication later in the day. Mails to Mentakab on the 27th had to be conveyed by motor boat, as also the mails from Mentakab to Temerloh on the same day.

As the water rose, food supplies diminished. Rice and flour were obtained from the shop-keepers at Mentakab and transported to Temerloh by motor boat. At Temerloh rice was retailed in small quantities in order to make the supplies last. Dealers in Mentakab were also advised not to sell in large quantities. On the 31st of December it was estimated that, with care and provided the water did not rise much higher, the supplies in the shops at Mentakab would last till communications were restored. Many people had managed to save some of their *padi*. As time went on, however, it became clear that the shortage would soon become acute. Rice was obtained from Mentakab and brought to Temerloh to be retailed under control. Care was taken to leave sufficient rice at Mentakab to last the population there for 10 days or so. In all 47 bags of rice and 10 bags of flour were brought to Temerloh.

The question of food supply became very serious between the 3rd and 6th January. Unless something could be done within the next week, even if the water went down rapidly, starvation would be general throughout the district. A note was sent to the District Officer, Bentong, by special messengers asking him to send rice down the Semantan river by rafts or boats. The 3rd, 4th, 5th and 6th January were anxious days; and matters were made worse, if possible, by an account given by one of the Assistants on Karmen Estate of the condition of things at Mengkarak and Triang and of the state of the railway line between Mengkarak and Mentakab. On the evening of the 6th, three days after the water had started

to go down, the District Officer's motor boat, which had gone to Mengkarak to take parboiled rice for Karmen and Mengkarak Estates, returned and brought back news that Railway telephone communication between Gemas and Triang had been restored, that trains could come as far as Kemayan and that it was possible to get rice from Singapore or Kuala Lumpur by rail to Kemayan, and possibly to Triang. Towkay Lim Chiak Khoon of Mentakab offered to go to Singapore and arrange for the supply of rice as usual. On the 7th of January the District Officer went to Mengkarak and saw Mr. Walker, District Engineer, Railways. From Mengkarak they went to Triang, going in the motor boat over the railway line all the way to within 2 miles of Triang. At Triang information was received that 300 bags of rice were being sent up from the south immediately. This was cheerful news, and arrangements were made for its distribution. A note was received on the 10th to say that 1,500 bags of rice, 20 bags of salt and 40 bags of dried fish had arrived at Triang and that five small launches were being sent up.

It is impossible to estimate the damage done by the flood. In addition to buildings, all catch-crops, such as bananas, pine-apples etc. were destroyed and trees, big and small, uprooted and killed. The damage was most serious on and near the river banks. For two days (28th and 29th December) there was a continuous stream of fallen timber floating down the Pahang river. Practically all the timber was fresh, but there was not an inch of bark on any log. The current was very swift, and it was most dangerous for any one to attempt to cross the river. Where the river, owing to the height and volume of the water, made short cuts through occupied land, the floating timber struck against coconut and other trees and knocked them down. There was hardly a bamboo clump standing upright on either bank. When the water went down most of the *kampong* people returned to the banks, some living on rafts and some in small sheds. They were in a really sorry condition.

No Malays seem to have perished. A Police Constable was stationed for 3 days on the hill facing the river to keep a sharp lookout for people in distress, but he did not see any one.

Early on the morning of the 28th it was reported that some people had been seen floating down the river on a *jamban* and a log, and that they had shouted out for help. The motor boat was at once sent after them. The boat went down about one mile but saw no sign of human beings. It would have gone down farther, but one of the propeller bushes came off and the chase had to be abandoned. The deaths among animals must have been heavy, not only on the river banks but also inland.

The amount of silt that came down the Pahang river was inconceivable. After the water had gone down all the places that

were under water were covered with mud. Owing to the silt the *payas* in the district will not be fit for planting this year and, perhaps, next year too.

On the 4th January, 1927, at daybreak the officer Commanding the Police Division left Bentong for Mempateh. Volunteers had been asked for without success. The journey to Lanchang was made by push-biking, walking and finally *perahu*. He arrived at Lanchang about 1 p.m. and heard that the Lubok Terua station and barracks had been swept away. They were jammed on coconut trees some distance from their sites. Books, rifles, guns etc. were saved and only a few handcuffs and small articles lost. The station had had to be deserted in haste as the men reported the water had risen rapidly. The village had been wiped out but apparently there was no loss of life. The villagers were living in rough shelters and their only danger was want of food. He returned to Bentong at about 11 a.m. on the 5th. Food was sent across to Mempateh.

On the 9th January at daybreak the same Police officer took a convoy of rice to Karak by bus and carrier and from there pushed on toward Temerloh. There was water over the road from Kuala Kuang to the 98th mile. He arrived at the 100th mile after dark and found another long stretch of water and no craft, so slept there. Next morning the three police with him made a raft and they crossed to the next patch of road. After that the road appeared in small patches and, as rafts had to be made, they did not arrive in Mentakab until after dark. Next morning the 11th January at 6 a.m., the Officer went by *perahu* to Temerloh arriving at 1 p.m. The town was under water except for the Government buildings which had been flooded but were not much damaged. The Police were billeted in the Government Offices The people of Temerloh had built a number of shacks on top of the hill and were carrying on "business as usual" with enhanced prices. He could not get back that night, so returned to Mentakab next morning. The District Forest Officer gave his *pĕrahu* which the Police Officer put on cart-wheels, and he returned to Bentong, arriving on the 13th January.

An Officer of the Cooperative Department reached Triang on the 13th January and was instructed to proceed down-river by the motor-launch *Laju* to Kuala Triang and thence as far as Lubok Luit, towing three house-boats of provisions for the peasants. The water was still 30 feet above the river banks. People were living on rafts and in huts on hillocks. At Tebing Tembah, Kertau, and Pulau Kening all houses had been washed away or smashed against the trees. At Kampong Bohor there were 150 people in the jungle about 20 chains from the river. At Kampong Sengkam 50 people were in huts on a hill and had lived on

bananas, palm cabbage and leaves for three days. All inhabitants of flat ground within 2 miles of the river had suffered. No deaths were reported. The floods were receding about 1½ feet in every twelve hours. Ascending the stream, the motor launch was forced back several times " and the faces of the *sĕrang* and steersman turned pale."

PEKAN. The flood began to rise on 26th December and by the 28th the police station and barracks had to be evacuated. The only Government buildings not under water on the 29th December were the District Officer's Quarters, the Residency (occupied as a hospital by the Lady Medical Officer) and the Astana Darat (occupied by the police). The only other refuge for people and store for food were boats and rafts. For miles around, Pekan was a sea dotted with trees; for, unlike other districts, it has no high land. At 9.30 on January 1st the water had subsided 1¾ feet but between the 2nd and the 5th it rose 3 feet above its previous highest level or 18 feet above normal wet monsoon height. Two Malays and one Chinese were drowned in the Pekan district. At Kuala Bebar 48 houses were washed away. Kuala Endau, Kuala Rompin and Kuala Anak Endau were the only places to escape damage.

The population affected was 15,000. To carry rice up-river there was only a motor-boat whose loading capacity was 15 bags and which was too weak to tow boats or even to reach the district boundary. Efforts to reach Kuantan failed as the estuaries had trebled their width and were roaring cataracts. Hundreds of head of cattle and all the *padi* were destroyed. At one time it was feared all the houses at Pekan might go, and rafts were built in case houses had to be abandoned.

The Straits Settlements Government assisted with supplies of rice etc. But boats took 10 hours to cross the mile from s.s. Mahidol to the shore and required 60 men to haul them in. Motor-boats were sent overland by the same Government and the upper reaches of this river district were reached eventually from Kuala Triang.

KUANTAN. Heavy rain commenced on the evening of 22nd December and continued incessantly till the 30th. The average rainfall for these nine days was something over 9 inches in each 24 hours, the heaviest fall in 24 hours occurring on 27.12.26, when Jeram Kuantan Estate recorded 24.85 inches and Semambu Estate 22.50 inches (rain-gauge overflowed). Kuantan Public Works Department gauge registered 19 inches. There were also high winds which blew down the P.W.D. Workshops and blew off part of the roof on the P.W.D. Offices.

During the night of the 23rd December the chain of the Tanah Puteh Ferry parted. This was repaired, but the water rose rapidly,

and the pontoon was submerged. It cannot now be located and even if found will take some months to get into running order.

The floods reached the highest point on the 28th and 29th December. The Kuantan river broke through from below Bukit Si-tungkul and swept across country in an easterly direction flooding Darat Mabar, the Bukit Ubi Road, Seong Kee Estate and carrying away about 40 yards of the Beserah Road at a point about 300 yards from the junction Beserah—Teluk Sisek Roads, and so on towards Teluk Sisek. People were rescued from the tops of houses and trees by boat.

The Kuantan river also cut over Peramu into the China Sea, but even so the water rose over the Government wharf. Kuantan town was an island. Along the main road from the ferry the water reached to within 3 chains of the District Officer's drive on one side, and to the 7th mile on the other. Had the river not cut through below Bukit Si-tungkul and across Peramu the whole town would have been inundated. Meanwhile *all* communications were cut and it was impossible to ascertain what was happening in the Ulu Kuantan or elsewhere. Food was sufficient and the real difficulty was transport.

By the morning of the 30th December the water at Kuantan had fallen several feet and that evening the s.s. Rahman was able to enter the river but could not get near the wharf. The s.s. Mahidol had meanwhile struck on the bar, being driven out of her course by the current, and eventually she had to return to Singapore without entering the river.

On the 31st about 9 a.m. news was received from a Malay that Kuala Reman Estate had been wiped out and that all inhabitants, including Europeans, were living in the jungle without food or clothing. They spent one night in the open, before they reached a house above flood level.

The following will give some indication of the damage. Beserah Road was breached in 3 places; 1 bridge was carried away and 2 were damaged. Kuantan Benta Road was breached in 3 places between the ferry and Gambang, two bridges carried away and one badly damaged. Pohoi bridge carried away and the road rendered impassable for ¼ mile. The pipes of both Bukit Ubi and Galing supplies burst and the reservoirs were damaged. The Bukit Ubi pipes have been replaced and work is going on at Galing. Beserah supply was cut off owing to burst pipes. Beserah village had some 50 houses destroyed, but no loss of life. Tanjong Lampur had 30 houses destroyed. The *padi* crop was totally destroyed and many Malays and other Asiatics lost their all. Luckily loss of human life has, so far as is known, been extraordinarily little. Only 3 deaths were reported.

Supplies were sent to Kuala Reman and for Sungai Lembing by motor launch, and to Ulu Soh, where a number of people were stranded; also to places up the Kuantan river between Kuantan and Pasir Kemudi. Supplies were also sent to Gambang and from there to Ulu Lepar and to Maran. Further supplies of rice were sent to Penor where 1,200 persons, mostly refugees from up the Pahang river, were reported by the Penghulu to be destitute and starving. Part of the rice was given by Chinese and part at Government expense.

At first the response to a request for labour on the roads was disheartening. Several philanthropic Chinese were giving free rice to able-bodied but homeless Malays who accordingly refused to do any work! This was stopped.

The Government of the Straits Settlements did everything in their power to send up supplies.

The heavy floods devastated most of the Sungai Lembing Valley below the railway line. Sungai Lembing village suffered heavily: the Police Station, the Hospital and many houses were carried away; shop-houses were inundated and full of silt. The water reached the top of the Court House. The flat land was covered with a thick layer of mud from 1 foot to 7 or 8 feet. There were many slips on the hillsides with an immense amount of mud at the foot. All gardens and all attap houses were destroyed. All hospitals were wiped out and the river was flowing in their place. The Railway line was destroyed over a considerable percentage of its length. Sungai Lembing coolies were living in European houses, the mill and other buildings. There was some lack of stores but the main trouble was transport.

KELANTAN.

By December 25th floods had reached ordinary monsoon level. Bad weather with gales and heavy rain continued. During the night December 28th—29th the river rose very suddenly and remained high till the 31st when it began to fall slowly in the Ulu. Rain still continued. The water did not begin to fall rapidly till January 2nd in the Ulu and later in the low country further north.

Reference to maps will show that the drainage of about two-thirds of this State is collected into the Kelantan River and has to pass Kuala Krai before it gets out into the plains. Floods above Kuala Krai rose to about 70 feet above normal dry weather flow. At Kuala Krai they rose at least 50 feet, i.e. about 20 feet above railway level. Between Kuala Gris and Kusial where most of the rubber estates are situated the rise varied from 70 to 50 feet.

Five villages of temporary houses, mainly railway construction camps, Manek Urai, Gris, Kemubu, Dabong and Bertam all up-

stream from Kuala Krai were entirely washed away. Villages further downstream were submerged. The towns of Kota Baharu and Pasir Mas were flooded. Kuala Krai town was temporarily abandoned and the population took refuge on adjoining hills.

A few miles north of Kuala Krai the floods were able to spread out to the east of the Kelantan River. The Sungai Golok, the eastern boundary of the State, was also in flood. All the intervening plain was deeply flooded. Nearer Kota Baharu the plain on the west of the main river was submerged. The main plain of Kelantan amounts to an area of approximately 1,000 square miles. At least 800 square miles of this were deeply flooded. Houses and telephone lines were hidden by water. Railway Stations and cooly lines were partially submerged.

South of the plain conditions were more serious The majority of the population lived within 30 and 50 feet of the normal dry weather level of the river. They were accustomed to deal with an ordinary monsoon flood but the additional 20 or 30 feet of water was unprecedented. The Malay population retreated to the nearest hills. If these proved too low they went further by raft or *pĕrahu* or had to swim. Cattle had to look after themselves. The Tamil and Chinese population on Estates and in Railway Construction Camps was shepherded by their employers to hills, rafts or boats. Launches and *pĕrahu* were sent out to assist in rescuing those who had been unable to escape to high ground or had reached houses only partially submerged. The number of drowned was 50. But for work done by employers and officials in the affected areas a very much larger number of casualties must have occurred.

2,900 cattle and buffaloes were drowned:—this number though large is less than 3% of the total number in the State. 1,700 houses and many estate buildings and cooly lines were washed away. The damage to the *padi* crop is difficult to estimate. The area reported under *padi* amounted to 168,000 acres. Probably one-third of this was ruined and much more was damaged owing to prolonged submersion. The riverside small holdings suffered very severely. The damage in Kuala Krai town is estimated at $300,000.

Relief supplies were sent out on December 30th and the 10 days following. Where necessary rice was given and in other cases it was sold. Telegrams asking for relief stores had to be sent from Che Hay in Siam by messengers who reached Che Hay by boat over the floods. Most of the railway in the State was under water. Several bridges were destroyed and embankments were breached.

When the water subsided, work on the railway, roads, and Estates was found for most of those who had need of assistance. In a few Mukims in Ulu Kelantan, free distribution of rice had to continue as no work was obtainable. The population driven to

the hills had to remain for several days and nights with only such shelter as they were able to improvise. The food available was chiefly wet rice.

The loss of houses, personal belongings, cattle and standing crops, whilst not often resulting in immediate starvation owing to the possibility of obtaining wages or free food and temporary shelter, is likely to result in serious poverty in the latter part of the year. When reconstruction of railways, roads and buildings is finished and work is scarce, there is strong possibility that a large programme of relief work will be required. The total loss to the country is probably many million dollars.

On 13th January further loss was caused by fire in Kota Baharu when 250 houses were destroyed and damage exceeding half a million dollars resulted.

Conditions in Kelantan where floods are an annual event are such that the Malay agricultural population is accustomed to retreat with its possessions to ground where flooding is not likely to be serious when the rains start. When the rains cease ordinary occupations are resumed. Stocks of *padi* are kept in reasonably safe places. Few people live in the lower portions of the rice fields. Owing to the exceptional nature of the floods many were caught this season but enquiries show that except in some of the mukims in Ulu Kelantan famine conditions are not likely to arise at present. Many persons lost most of their savings, plantations were ruined, and some rice fields silted up to a depth, which will prevent planting for one or two seasons. The loss on rubber estates both to individuals, particularly Europeans (who in many cases lost everything they possessed) and to the employing Companies, was very severe.

Subscriptions to a relief fund were not asked for in Kelantan. The donation of $25,000 from the Duff Development Company Limited and three other donations were used as subsidiary to the $50,000 voted by the Government. The $4,000 received from the Malayan Flood Relief Fund was allocated for the relief of immediate needs of the poorer classes.

TRENGGANU.

The weather commenced to be rough on the 21st December, and the wind increased in intensity until Christmas Day, when the Asdang managed to enter Kuala Trengganu. After that all communication with the outside world ceased, as the telegraphs both in Trengganu and Pahang were damaged. Communication with Kelantan was however soon restored.

Rain fell in torrents and it is no exaggeration to say that the sun was not seen for over 10 days. The rain-fall in December was 42.64 inches, which added to a rain-fall of 42.07 inches in November gave a total of nearly 85 inches for two consecutive months.

On the 28th the water in the river rose rapidly and on the 29th it was so high that the whole of the new road to Bukit Payang,

constructed at a height above any previously recorded flood level, was under water to such an extent that one was able to take the largest sea-going Motor-boats, drawing 4 ft., over and along the road for its whole length, and for miles on each side of it. Water in Chabang Tiga village was up to the second storey of newly constructed houses, and nothing of the Police Station could be seen except the very top of its roof. In many places the most dangerous currents were formed.

Relief was at once started and all the available Europeans worked night and day, taking craft of all kinds to rescue the marooned *rayat*. These conditions were general all over the Trengganu plain. Dumps of rice, oil, fish etc. were established in many places, and the greatest efforts made to reach the distressed. The want of a system of reliable salaried headmen made the position a most difficult one with which to deal.

The flood reached its highest point on the 30th December, and dropped by January 1st to a level still very high but probably eight feet lower than its greatest height. A high tide and strong wind, together with an extremely fast current, which the Captain of the Asdang estimated at 8 knots, still made navigation of the river very difficult. The Captain went ashore one night and was unable to get back to his ship, although he offered $40 for the fare which is normally 10 cents. He performed most excellent work in his motor boat, distributing rice in some of the tributaries and generally reporting on conditions.

Practically no loss of life so far as can be ascertained occurred. Only one or two cases of drowning were reported. The damage however to trees, crops, cattle and poultry was very great, while hundreds of houses were carried away or utterly damaged. The difficulty in a relief scheme was to distinguish quickly between the really necessitous people, coming to a dump and asking for food, and the others, not necessitous, who however did not wish to forego the chance of obtaining free rice.

* * * * *

So far as has been ascertained the Jelai River rose 60 feet above ordinary water level at Kuala Lipis, the Pahang 53 feet at Termeloh, while it is practically certain that the Tembeling rose at least 80 feet at Kuala Tahan. In Kelantan the rise at Kuala Krai was 72 feet.

The rainfall shows fairly even lines running North and South, the intensity decreasing towards the West. During the latter part of December the rainfall on the East Coast may be stated generally to have been 60 inches; on the line Lipis, Raub, Bentong it had decreased to 25 inches; on the main range it was also 25 inches, while on the Western side of the range and on the West Coast the figures were 15 and 8 inches. The focus of the heavy rain seems to have been the Kemaman-Kuantan area, where over 70 inches fell.

1927] *Royal Asiatic Society.*

The Origin of the Pawang and the Berpuar Ceremony.

By Dato' Sedia Raja, Abdullah.

Some of the natives of Negĕri Sĕmbilan, in spite of the opposition of the *'Ulama*, still observe with enthusiasm a curious ceremony called *Bĕrpuar* (mock fight) practised once every three years, with the object of driving evil spirits of the *Padi* away to the sea. The root of the word *Bĕrpuar* is *Puar*, which is a species of plant (*Armomum cardamomum*) commonly found growing on the hills, and the term when applied to the mock fight means to fight by throwing from a distance stems of the *Puar* plants at one another. Nowadays, people are not invulnerable as their ancestors used to be, when even the throwing of stones and other hard objects was more often than not practised in these friendly contests. To-day the *Puar* plants are merely thrown here and there at the imaginary evil spirits till some hundred yards from the place where the ceremony is started has been reached. The fight is also termed *Bĕrsĕketa* from *Bĕrsingketa* which means to engage in a conflict.

When the world, known in its original state as هو (*Hu*), had been created, it was desolate and unoccupied till the Archangel Gabriel sought the presence of the Almighty, who gave him something to hold tightly in his hand. Gabriel could not feel its presence, and this caused him to open his closed hand, whereupon that something vanished. Terror-stricken, he acquainted Allah with what had occurred and was mercifully forgiven for his negligence. That something thus accidentally released turned into evil spirits and demons. But Allah gave another thing of a like nature with that something which had disappeared and Gabriel brought it into the world where it gave birth to the human beings. When the human race multiplied, the evil spirits and demons, which had sprung into existence through Gabriel's negligence, wrought havoc among humanity. Having no means of self defence, many died and suffered as the result of these attacks till Gabriel informed Allah of their plight. Whereupon Allah gave him a Book in which could be found effective prescriptions for all ailments and through the medium of certain formulae, miracles could be performed, such for instance, as raising the dead to life, converting grey or white hair to black and making the old regain their youth. It was in that Book that the first mention of the words *Pawang* and *Bĕrpuar* were found.

Gabriel brought the Book to the Prophet Muhammad who intended to give it to a man named Muhammad Saleh, who was destined to become the world's first *Pawang*. While the Prophet was saying his prayers, Gabriel came down invisible to the eye,

tore, took away and destroyed those pages of the Book that contained the formulae for the performance of miracles and the exact, effective prescriptions for the different kinds of diseases. The Book, therefore, became useless so far as prescriptions were concerned and it was left to the first *Pawang* and his descendants to cure illness by the exercise of human wits.

Mankind's principal means of sustenance was even then the cultivation of *Padi*. The first harvest was good but the second was not forgotten by the evil spirits, and three months after planting, the *Padi* would have been ruined, had not To' Pawang Saleh come to the rescue. The third year's crop was almost totally destroyed but the Pawang said it might be saved if people would observe the ceremony of *Bĕrpuar* as prescribed in the medical Book in his possession. With this suggestion the people readily complied. The preparations for this ceremony principally consisted of the *Puar* plants, *Batang Kĕladi* (aroid plants), *Daun Sĕdingin* (*Bryophyllum calycinum*), *Daun Sambau* (a species of grass), *Puding Puteh*, *Puding Merah* (the white and the red crotons), *Daun Bĕribu Padi* (a kind of leaf), *Daun Tampang Bĕsi* (*Artocarpus Gomeziana*), *Daun Sibalek Angin* (a kind of leaf) *Tĕpong Tawar* (flour made by rolling rice which has been rendered soft by immersion in water), *Kĕmĕnyan* (benzoin), *Anchak-Anchak* (bamboo stand for burning incense), *Chanang* (small and shallow rimmed gong), *Tombak Bĕndĕrang* (naked spear with a tuft of hair), *Ular-Ular* (pennon), *Tunggul* (streamer) and *Mĕrual* (long oblong flag with balls at the end).

On the day when the ceremony was to start (*Mĕlĕpas Puar*), the people headed by To' Pawang Saleh wended their way right to the upper waters of the principal river watering the valleys, selected some venerable banyan tree, and spread under it all the above preparations. After that, prayers were said and then the Pawang recited in Arabic due praise for the Prophet (*Salawat Nabi*), which was answered by the crowd. The *Pawang* took four *Puar* plants, and threw one towards each of the four corners of the world. The gong was beaten and the procession started amidst much shoutings of *Hua, Hua, Hua!* as it was considered the louder the shouting and the more varied the noises made, the more frightened would the evil spirits be and the quicker they would retreat to the sea. Everybody had to walk in the wet rice-fields as to walk on the dry ridges was regarded as an insult to the *Pawang*.

The whole affair lasted for seven days, as there are seven days in the week. On the fourth day, To' Pawang Saleh requested the cultivators to erect temporary structures made of split bamboos called *Jamuan* (places of entertainment) in various halting-places from the *Hulu* right to the lower reaches where the principal river, watering the *Mukim*, joined the rivers of other valleys. These structures were adorned with curtains, canopies, carpets and small

square mattresses. It was here that vast assemblies of people awaited the arrival of the *Pawang* from the *Hulu* and when everything was ready, the heroes of the day came forward in pairs and threw the *Puar* and aroid plants and even stones at one another, with the object of displaying their courage to the evil spirits whom they would easily crush underfoot, if they tried to damage the year's crop or were reluctant to retreat to the sea. A mock fight of a similar nature was displayed at the next *Jamuan* and so on till the last one was reached.

The greatest personage of the day was the principal *Pawang* who must be received with a betel-box at some distance from each *Jamuan* and conducted to his special seat. He had the power of inflicting fines on those who committed any breach of etiquette during the observance of the ceremony and reconciling those who happened to quarrel. These fines were nominal and consisted in offering a *Tĕmpat Sireh* to the *Pawang* who as a rule accepted the apology thus tendered.

It may be of interest to describe the due order of the procession. At its head were the *Anak Dayong* or bearers of the different kinds of streamers and the small gong. Behind them came the principal *Pawang* himself, on the left and on the right of whom were his two assistants (*Pĕngapit*). These *Pawang* carried the water mixed with the *Tĕpong Tawar* which they sprinkled about by the help of the *Daun Si-puleh*. Behind these personages followed the village folk.

After the *Bĕrpuar* ceremony there followed a period of taboo (*Pantang*), lasting for three days at least and seven days at most. During this period, it was forbidden to shed the blood (*Mĕlayu*) of any living thing; that is to say, neither buffaloes nor fowl must be slaughtered nor even a living twig be broken. When the taboo was over, a pink buffalo (*Kĕrĕbau Balar*) was slaughtered in the *Hulu* where the *Bĕrpuar* ceremony was first started and the meat was not distributed for human consumption but was buried in the ground as food for the evil spirits and demons. An ordinary black buffalo was also slaughtered in the *Hilir* where the *Bĕrpuar* ceremony was brought to a conclusion (*Mati Puar*)but the meat was distributed according to the number of houses in the village, each house, of course, subscribing an equal amount towards the price of the two buffaloes. In addition, each house had to pay the *Pawang* as a customary fee a *gantang* of unhusked *Padi* and a small bag of *Emping* (rice pounded after frying it in a small pan) after the year's crop had been reaped.

When the season for sowing grain in the nurseries had arrived, the *Pawang* requested each cultivator to take to the *Hulu* a *chupak* of grain to be fumigated with incense after the offering of prayers to Allah, supplicating to co-operate in driving away the evil spirits of the *Padi*. After that, the villagers took the grain back, mixed it with other selected grain and then sowed the nurseries. If rats

or other pests damaged the stalks, the owners of the rice-fields were asked to take with them to the *Hulu* some quantities of *Lĕngkuas* (*Alpinia galanga*) and benzoin, over which the *Pawang* recited magical incantations. The *Lĕngkuas* had to be pounded and scattered broadcast in every outlet of the rice-field.

In conclusion, I cannot refrain from remarking that it is idle to hope for the economic progress of the Malays so long as this and similar beliefs prevail among them. Where those beliefs are deep rooted, science cannot make much headway, for superstitions and scientific truths cannot exist side by side. It is difficult, if not impossible, to deal scientifically with pests if damage to crops is believed to be due to the ravages of evil spirits.

On a migration of Catopsilia pomona (F.)

By THE REV. R. CARDON.

In his 'Rhopalocera Malayana," W. L. Distant says that according to Mackwood *C. catilla* (Btlr.) (= *pomona* (F.) ♂ f. *hilaria* (Cr.) and ♀ f. *catilla* (Cr.) is in Ceylon a remarkably migratory species.

"In the flights along the sea-coast, beginning generally in November, this species of *catilla* forms a third of the number, always travelling to the North, the flights lasting for days, thousands of them passing in an hour." Moore's Lep. Ceyl., vol. I, p. 122.

In last May, in Upper Perak, I had the occasion to witness a mass migration of this species. It was some ten miles before reaching Lenggong that I met with what I may call the vanguard of these insects. I did not notice at first that they were following any particular direction, as they seemed rather to fly to and fro all along the road. Their number, however, surprised me.

As soon as I had passed Sumpitan, the swarms were rapidly increasing in number and closely following each other. At the same time I also realized that all were keeping the same direction, from North to South.

Between Kenering and Lawin I fell in the midst of the migration's main body, and ran for about three miles through thousands and thousands of these Picridae which were, as it were, dancing all around like large yellow flakes. Here and there, on the roadside hundreds of them were resting on wet ground, so thickly packed together that those in the middle of the patch could not take their flight and were doomed to be run over by passing vehicles.

I availed myself of the occasion to cover with my net some of these gatherings, and thus was able to make certain that, with the exception of a few *C. pyranthe* (L.), *C. chryseis* (L.) and *C. scylla* (L.), the migration was exclusively formed of *C. pomona*. I need not add that, as is always the case, some *Papilios*, mostly of the *Eurypylus Group*, and a few other *Picridae*, such as *Hebomoia* and *Prioneris*, were to be found in these gatherings, though none of them joined the migratory stream.

I thus captured two ♀ forms: *bidotata* (form. nov.) with two patches on the underside of the posticae between the costal and second subcostal nervures. According to Fruhstorfer, this form occurs especially in Micro-malayana (Rhopalocera of the Indo-Australian Faunal Region. Dr. A. Seitz, p. 163). Since that time I have caught on the Maxwell's Hills a specimen with only one patch between the costal and first subcostal nervures.

The second form was the common *catilla* form (var. *b* of Dist., op. cit. p. 298), with a very large discal, dull and dark reddish patch extending from costal nervure to upper median nervure, some of the specimens having the narrow fascia directed towards the abdominal margin well marked, while in others it had become nearly obsolete, being reduced to three light dots between the median and submedian nervures.

When I left Lawin, the sky became cloudy, and the swarms decreased rapidly in frequence and in importance. At the 76th mile, only a few units could be seen on the wing, seeking a shelter from rain which was threatening, or, the time being then about 4 p.m., quarters where to put up during the night.

The following day (27th May), between 9 a.m. and noon, I had a stroll to Kuala Kendrong, and met again big swarms, flying towards Grit, and large gatherings of the same *C. pomona* on the road side.

On the morning of the 28th, I went to the 76th mile and noticed that the migration was still going on and streaming towards South. The swarms however, seemed to have lessened both in frequency and number. Finally, on the 29th when on my way back to Taiping, isolated insects only could be seen hovering as usual from shrub to shrub. The migration was over.

Capt. H. Berkeley, then D. O. of Upper Perak, told me that some two or three days before my coming, he had noticed this unusual invasion of 'yellow butterflies.'

In 1902, I had the occasion of seeing a migration of *Delias aglaia parthenope*, but it was of a quite different sort as the insects were flying (towards the South) not in swarms but isolatedly. Though I had not my net, I succeeded in capturing one of them.

According to Rev. L. C. Biggs (Monthly Packet, Vol. II, pp. 186-87, 1881), *D. aegialea* (*egialea* Cr.) in Java is "a common coasting butterfly" and can be "found sometimes in an apparently endless stream, all following one direction, and numbering twenty to thirty in sight per minute from any one point, but forming a belt several miles broad, extending far inland from the coast, and from morning till night, continuing to pass any fixed point for a fortnight or more. It seems seldom to feed or alight during these migrations, except at night or in early morning, when with dawn it resumes its flight, etc." (Dist. op. cit. footnote‡, p. 290).

It was on one afternoon only that I met this migration of *Delias*, so I cannot say for how many days it lasted. However it seems to me, as far as my recollection is correct, that the account of *D. egialea's* migrations in Java, as given by Rev. L. C. Biggs, is a faithful description of what I saw in Singapore.

1927] *Royal Asiatic Society.*

Achin Piracy.

(Published with the permission of the Colonial Secretary, Straits Settlements).

On the 23rd March, 1868, the British Schooner "Good Fortune" of 34 tons burthen, registered in Penang and belonging to Neou Tean How, sailed from Penang on a trading voyage with a cargo of piece goods for the North Coast of Sumatra as far as Acheen Head intending to call at Lho Seumawe to load cargo on the return voyage. During the night of the 26th April the schooner encountered bad weather, ran past Lho Seumawe and anchored at 2 a.m. on the morning of the 27th April off Kerti Creek about twelve miles to the eastward of Lho Seumawe. About three hours later three boats came alongside each manned with from fifteen to twenty Achinese who boarded the schooner and made the crew take to their boat, threatening to murder them if they did not do so. The Achinese then proceeded to plunder the vessel to the value of $5,000 in money and goods and on leaving unshipped the schooner's rudder and either sank it or took on shore. The master of the schooner (Tean Boon Chuan) and the crew made for the shore and complained to the "Raja of Kerti Creek", one "Tungku Chee Malim" who threatened to confiscate the schooner as well as the cargo whereupon the Master and the crew returned on board their vessel with all speed and set sail for Lho Seumawe where a new rudder was obtained. The "Good Fortune" subsequently returned to Penang arriving on the evening of 14th May. (Cp. C.S.O. "P. R. Receipt" No. 785/1868).

After some delay the Government Steamer "Peiho" with the Acting Colonial Secretary, Captain Playfair, on board and H.M.S. "Perseus" (Commander C. E. Stevens, R.N., Senior Naval Officer, Straits Division of the China Station), with H.M.S. "Grasshopper" in company, proceeded to Sumatra for the purpose of investigating the outrage. (Cp. C.S.O. "P. R. Receipt No. 1017/68).

The appended copy of the report of proceedings of the expedition to Kerti (Cp. C.S.O. "P. R. Receipt No. 1301/1868) was written by Mr. D. F. A. Hervey who was the first Cadet to be appointed to the Straits Settlements Civil Service. Mr. Hervey was born in 1849, educated at Marlborough College and appointed to his cadetship on 24th May, 1867. He was appointed Chief Clerk and Interpreter to the Lieutenant-Governor of Penang in 1870 in which year he accompanied H.M.S. "Algerine" to enquire into various cases of piracy on the coast of Acheen. He accompanied Governor Sir Harry St. George Ord on many political expeditions to the Native States and in 1882 was appointed Resident Councillor, Malacca. His services were recognised by the award of a C.M.G., in 1892. He retired in 1893 and died in 1911.

S. G. H. LEYH,

Colonial Secretariat, Singapore.

Report of Proceedings.

About the middle of June I received a letter from the Acting Colonial Secretary informing me that he was about to go to Achin in the S.S. "Peiho," and that it was the Governor's wish I should accompany him. The expedition was to investigate a matter of plundering a schooner which had taken place at Kerty Creek on the coast of Achin in Sumatra: the "Perseus" and "Weasel" were also going in the expedition under the command of Captain Stevens. We were to have started the next day, but our departure was postponed, in expectation of the "Weasel's arriving at Singapore to accompany the "Perseus" in the expedition. However after waiting a week or more, the Gunboat "Grasshopper" was taken in tow by the "Perseus" for Penang, June the 29th and the next day I joined Captain Playfair (Acting Colonial Secretary) in the "Peiho," and left Singapore for Penang about 1 p.m. Having had fair weather for two days, we reached Penang on Thursday July 2nd about 2½ p.m. I landed with Captain Playfair and he went to the Lieutenant-Governor's office, where we found Captain Stevens: they then entered into conversation with the Lieutenant-Governor, and requested him to get an interpreter, and to obtain witnesses to give evidence regarding the plunder of the schooner "Good Fortune" to obtain compensation for which was the object of the expedition. The Master Attendant having been applied to promised to bring forward the "serang" or navigator of the "Good Fortune" being the only witness he could procure, as the crew had all left Penang in the "Good Fortune" which had sailed some 10 days before upon another voyage to Telok Samawi, a port on the coast of Achin some 20 miles northwest of Diamond Point. Having agreed to meet and examine the witness in the office at 11 a.m. the next day, all left the office. All having repaired to the office at 11 a.m. the next day, and the witness being present, as well as the owner of the "Good Fortune". The Acting Colonial Secretary examined the witness, (the serang of the "Good Fortune") and the witness, stated nothing but what was confirmatory of the statement already made before the Master Attendant of Penang. The owner of the "Good Fortune" was next questioned as to the nature of his cargo, and as to whether there was any mark by which he could identify his property; he replied that the cargo was mostly piece goods of various kinds, and that he could identify his property by his chop, which he afterwards produced. After deliberating as to whether the evidence of this one witness could be held conclusive, Captain Stevens was inclined to think not, but on the Acting Colonial Secretary asking if they, being in possession of this evidence, and with the prospect, as soon as they reached Telok Samawi of obtaining ample evidence from the crew of the "Good Fortune", would be justified in declining to proceed with the matter any further, Captain Stevens decided in the negative, and then stated his intention of accompanying the Peiho as far as Diamond Point, and from thence

of turning off to Gighen, while the "Peiho" with the "Grasshopper" should make for "Telok Samawi", and obtain evidence from the crew of the "Good Fortune" concerning the outrage they complained of. We steamed from Penang early the next morning, (Saturday July 4th) and reached Diamond Point in company with the "Perseus," which soon discovered the "Grasshopper" lying at anchor, close in shore, awaiting our arrival,(she had been sent on ahead before reaching Penang, by Captain Stevens); the "Grasshopper" having begun to follow us, we steamed on for "Telok Samawi", but on our course we sighted a schooner, and Captain Stevens thinking she might be the "Good Fortune" made for her at once and we followed, but it was not the "Good Fortune", and Captain Stevens having first come on board the "Peiho" sent to the schooner for the Captain, and as soon as he was come, began to question him, (for he talked English very fairly) about" Kerty" and "Telok Samawi", and we learnt that the place his schooner was then lying off was "Kerty" Creek, which is a river with a bar in front, upon which, with the exception of a narrow channel, there is a considerable surf at all times, and it does not take much of a breeze to spread the surf right across this narrow channel; schooners of from 30 to 40 tons burthen can pass through this channel and up the river for a couple of miles. That night, Sunday July 5th, the "Perseus" steamed for Gighen, intending to return to us on Tuesday afternoon or Wednesday. The "Peiho" and the "Grasshopper" remained at anchor till Monday morning, when they steamed for "Telok Samawi", and after we had anchored some little while, a boat came off shore, containing the Raja's "Tambey" minister or adviser, who was a Kling man (as all men in that position seem to be in these countries) bringing the Raja's compliments who was then some distance off having a feast, and saying that he would on his own authority fire us a salute of 21 guns, for that the Raja had a great respect for the Queen of England, and after arranging about the time of our landing, he left the vessel, not however, before Captain Playfair had told him that the salute would be returned. Some time afterwards the "Telok Semawi" people began firing their salute, but at very long intervals, and when they had fired 16 guns, they ceased altogether. Some while afterwards the Kling Tambey returned on board to accompany us on shore, and explained with regard to their salute, that they had only fired 16 guns, wishing to reserve the last 5 for the occasion of our landing, when they did fire them from a gunboat belonging to the Raja, and in very quick succession. After rowing a mile or so, (the "Peiho" returned the salute just then) we had to land on the sailor's backs, our boats having stuck in the sand, Mr. Prickett landed with us, and we all followed the "Tambey" to the place where the Raja was awaiting our arrival; we had to scramble up two steps or benches leading under a low roof to the room in which were seated, the Raja, the younger brother of the Sultan of Achin, and two or three young

relations of the Raja; having shaken hands with them, we took the seats that were offered us, 2 of them chairs, while I sat on a sofa of planks. covered with chintz, on the left hand of the Raja. Captain Playfair after a few preliminary enquiries conversed with the Raja through the "Tambey" asking him if he had any witnesses of the plundering of the "Good Fortune" by the Kerty people (unfortunately the "Good Fortune" had sailed from "Telok Samawi" about 7 p.m. the evening before, so that we had to do whatever we best could without the evidence of her crew, as if we pursued her, the chances of our overtaking her would be very small indeed,she having sailed with a good breeze to help her on, and being only a sailing vessel, her course could not be reckoned very certainly) (for the Raja had written to a Chinese merchant in Penang saying that some of his fishermen had witnessed the plundering of the vessel) to Captain Playfair's question the Raja made reply that there was only a boy of 13 years old, for the fishermen referred to had merely seen the empty condition of the "Good Fortune" after being plundered, and not the plunderers engaged in relieving her of her cargo. The Acting Colonial Secretary further enquired of the Raja concerning a brig called "Victoria" which a Chinese merchant at Penang had temporarily lent to an Achinese "Panglima" or chief, and this chief having on his arrival at the coast of Achin exchanged the British Flag for an Achinese flag, the vessel "Victoria" then under his charge was captured by the Raja of Telok Samawi, with whom the Panglima was at enmity, and although there was no war actually waged between them, yet whenever they could get opportunity, they seized one another's vessels, and did one another all possible injury. This was the Raja's excuse for taking the above mentioned brig, and the Acting Colonial Secretary thought that it was well-founded. The brig was, at the time of our stay at "Telok Samawi" lying a wreck just off the low spit of land which runs along in front of "Telok Samawi". We left the Raja for a time to get a little fresh air, for the assembly was very hot and close, being crowded with natives, and the room very low, so we walked up and down the street of wretched shops, and then proceeded to have a look at the fort, which they said had been built by the present Raja's grandfather, but is now in a very dilapidated condition, there being one old rusty cannon which they are afraid to fire lest it should burst. After seeing this old fort, we returned to bid the Raja goodbye, and then walked off to our boats. The "Tambey" had told us before that the "Telok Samawi" people were in a few days going to war with the Kerty people, and that though the army of the latter numbered 20,000, and that of the former only 16,000, yet it did not matter, for the "Telok Samawians" always had their wits about them, while the Kertians were great simpletons. The reason assigned bythe Raja for this war being entered upon was that the Raja of Kerty was determined to be altogether independent of the Sultan of Achin, and that therefore he (the Raja of Telok Samawi)

had been instructed by the Sultan to bring back the Raja of Kerty to his proper allegiance. The first thing next morning we steamed across the bay (20 miles along the coast from Telok Samawi) to Diamond Point and dropped anchor first opposite Kerty, and having obtained a guide, (the serang of the schooner we had mistaken for "Good Fortune") we made for the mouth of the river, sounding all the way; when we got just inside the river, we landed to the left, and the Acting Colonial Secretary addressed a certain Panglima who could understand Malay, told him that a man-of-war was coming and desired him to inform the Raja that the Captain of the man-of-war wished to meet the Raja the next day: we then returned to our boats, and having taken some soundings in the river returned to our respective vessels. The next day we went in the boats right up the river (which for the last mile and more is very winding and troublesome) to the "Pakan" or Bazaar, close to which dwells the Raja; we landed, and were led to the same kind of audience room as we had met with at Telok Samawi, in front of it were two or three small cannon which we used as steps to mount the benches and here we met two Kling "Tambeys" with whom the Acting Colonial Secretary entered into conversation in Hindostani while awaiting the presence of the Raja who after some twenty minutes or so made his appearance, and with great humility seated himself on a ledge below that on which we were seated. Captain Playfair then entered into conversation with the Raja through one of the "Tambeys" and we learnt that the Raja never thought of being independent, but acknowledged the supremacy of the Sultan, and paid tribute to him; while he also stated the ambition of the Raja of Telok Samawi to be the cause of the war, for he wished Kerty to acknowledge him as a kind of second Sultan, which he (the Raja of Kerty) would certainly never do. Then on enquiring about the matter of the "Good Fortune" the Raja said he knew nothing about it, beyond the fact of the crew of the "Good Fortune" having applied for assistance in stress of weather to the Kerty people on the coast, and their application had been granted on condition of their paying their "assistants" $595 which they did; to this Captain Playfair replied, that we had no faith whatever in that account of the matter, but believed in the truth of what we had stated, besides all we wanted was that the Raja should himself investigate the matter, and punish such as were guilty. The Raja said Oh no! he couldn't find them, but we might search for them and in default of finding them might do what we liked to the country. (The Raja of this place, as well as that of Telok Samawi informed us that the punishment for all kinds of stealing, robbery, plundering, was death by decapitation). But Captain Playfair again said that the Government had no wish to do that, but only to see the Raja himself execute justice upon such as were guilty in any way; and after explaining to the Raja what was expected of one in his position, together with much insisting and perseverance Captain Playfair at last induced the Raja

to promise investigation of the matter on his own part, and also that the result of that investigation should be shown to us the next day. But the next day when we went to the Raja, we found that all the inquiry he had made (or pretended to make) was to write to the Panglima of the coast concerning the matter then under discussion, in answer to which he received (or at any rate said he received) a letter giving the same version of the story as the Raja had given us the day before, and which letter (was most probably composed by the Raja or his "Tambey") was read out loud to us before the Raja. Captain Playfair however explained to the Raja his view of the matter, and after considerable discussion, the latter offered to pay $595 and deliver up the Panglima of the coast who had superintended the plundering of the schooner: having definitely made the arrangement, that the Raja should appear on the morrow himself at the mouth of the river with the money and the man ready to be handed over to us, we made the best of our way on board through the surf. On the morrow, when we had reached the mouth of the river and landed, there were no signs whatever of the Raja, but only a few natives loitering about; shortly after somebody came and informed us that the Raja did not intend to appear (at which we were rather disgusted) but was sending two of his chief men to inform us of his intentions concerning the matter in hand; what did these men do when they came up to us, but propose a cargo of betel-nut ("which", said they, "we can load very quickly" viz. in 6 days) instead of the $595, because they had so few dollars in the place, they said, and when that was not to be thought of, they tried how piece goods would do: but Captain Playfair said "No, that wouldn't do, the Raja must fulfil his promise, and make his payment in just such kind as he had said he would, the day before": (if our evidence had been stronger, we would, push our demands further after such behaviour, but in such circumstances as we were then under, all that could be done was to hold our own, and not flinch a hair's breadth).* Part of their argument against payment was, their Panglima had sworn to his version of the matter," and" said they "yours has not" (i.e. Chinaman and serang). Captain Playfair said that ours had at Penang, moreover if the Raja had not faith in our statements, our men could have sworn in his presence the day before if he had only mentioned his wish, he concluded by saying that if they wished to avoid serious consequences they had better send the money and the man on board at 9 a.m. the next morning, and having pretty plainly shown our disgust at their treatment of us we returned on board. Before going on board the "Peiho" we went

*After finding talk with these men useless, Captain Playfair determined to go up the river and find the king himself to settle the matter with him. (Mr. Johnson was with us this time and the day before Captain Stevens' 1st lieutenant). But the Raja was not there, and we returned to the mouth of the river, notwithstanding many entreaties to wait 1 hour for the Raja on reaching the mouth of the river Capt. Playfair gave the warning mentioned below and we then returned on board.

on board the "Perseus" to inform Captain Stevens of the state of affairs; it was thought advisable to let these ignorant people see what kind of ammunition a man-of-war had and that we were not to be cheated and trifled with; so a shell or two was fired dropping into the sea, and one or two shot. The next morning we were just about to start in the boats when a boat came out from Kerty, bringing a man, the elder brother of the Panglima (for the Panglima had disappeared) and the $595. So we went on board the "Perseus" and informed the Captain, who received the money and the prisoner, and sent the "Tambeys" and chief men to their boat but not without fiirst telling them that they had got off very easily and that they must take care another time how they treated British subject or his property. Having thus brought the matter to a conclusion, we steamed away just at noon the same day, being Saturday July 11th, and reached Singapore Tuesday July 14th after an absence of a fortnight.†

All these Achinese people wear some kind of weapon, some two at a time:the weapons are 1st the *Klewang*, a large, broad-bladed heavy knife, some 2 feet long or nearly so; this weapon is broader in the blade at the extremity than at the part near the handle which is made of buffalo horn, wood, or ivory (which latter comes from the inland and mountainous country); with this weapon it is not difficult to deal a very heavy blow.

2nd. The *Renchong*, a smaller and decidely less formidable weapon than the foregoing one, but of somewhat similar make.

3rd. *The sekin panjang* or pisau panjang,which approaches the Klewang in size, but is merely as its name denotes, a long knife.

4th. The *sekin kechil* or *pisau kechil* which is the smallest of all, and the most pointed, the meaning of its name is "small knife". Notwithstanding all these weapons, these people don't seem to be particularly plucky, but rather to prefer getting a quiet cut from behind at a man. Neither is their country an interesting one, in a general way though I think the inland parts would prove

†The conduct of the Raja of Kerty in this matter proves that he felt the truth of the accusation made against him or some of his people; notwithstanding which he tried to shew that his acts were consistent with the story he advanced to account for the payment of a large sum of money. Curiously enough just before Captain Playfair had entered upon the matter at all, one of the "Tambeys" began referring to it, though none of us had in any way yet mentioned the matter; this rather tends to shew, that he was somewhat nervous as to the object of our arrival, and possibly had a tender conscience, though why such should be his frame of mind, if payment merely had been received for giving the crew of the "Good Fortune" timely assistance in stress of weather, I am sure I don't know.

very interesting for, and fully worthy of, an expedition. The Raja of Kerty is a very insignificant looking man; while his future enemy the Raja of "Telok Samawi" is a tolerably stout, well fed, comfortable looking sort of man. There are two Rajas in Kerty, the one we had to deal with was the younger of the two, the business man, while the elder one we never got a glimpse of; I suppose he lives in quiet, enjoying the fruits of his brother's labour, not that there is very much labour to be got through. Kerty is really more to the N.W .or W. than it is placed in the chart, and nearer to Telok Samawi. The population of Kerty was stated to be 100,000 but I daresay half that would not be underrating it very much, though to all appearance it was decidedly more populous than Telok Samawi.

Report of expedition to Achin, to obtain compensation for robbery of a schooner called the "Good Fortune" off Kerty Creek on the coast of Achin.

(Sgd.) D. F. A. HERVEY, *Cadet,*
July 14th, 1868.

The Honourable,
The Acting Colonial Secretary.

Pair-Words in Malay.

By ZAINU'L-ABIDIN BIN AHMAD.

The pair-words discussed here are set-phrases consisting of two words combined which retain fully their literal meaning.

Broadly, these pair-words may be classified as alliterative and non-alliterative.

To the first belong those pairs which repeat some of the sounds or syllables in one of the words, or reproduce them in some modified form. Such are pairs like *bukit-bukau, gĕrak-gĕri, haru-hara, kueh-mueh, lauk-pauk, bongkar-bangkir, kibang-kibut.* They are represented in English by forms like *dingle-dangle, flip-flap, helter-skelter, higgledy-piggledy, pell-mell, shilly-shally, topsy-turvy, willy-nilly* and the like.

In the non-alliterative class it is not the sounds or syllables that are repeated, but the idea in a different word of cognate significance. Many of them suggest haphazard alliteration. Such pairs are *budi-bahasa, ipar lamai, sangkut paut, ubat kĕlat, patah riok, rĕbah rempah, chomot kĕrtang, kusut masai, lintang pukang, luloh lĕntak, sakit pĕning, puchat lĕsi, simpang pĕrĕnang, kurus kĕring, gĕmok gĕdĕmpong.* These may be compared with such English phrases as *bag and baggage, goods and chattels, heart and soul, over head and ears, all and sundry, all in all,* and so forth.

To these two classes might be added pairs of opposed words: e.g. *atas bawah, alah mĕnang, tua muda, tĕgang kĕndur, kĕchil bĕsar, lĕbeh kurang, mujur malang, siang malam, hidup mati, hujan panas, huiong pangkal, hulu hilir.* But their meaning and uses are too evident to need inclusion here.

In the alliterative class, the pair consists of a principal and a secondary word, the latter qualifying or intensifying the meaning of the former. Usually the principal or primary word comes first; in a few instances of onomatopoeia the secondary. The secondary word is generally meaningless apart from the principal word and cannot stand alone.

The formation of these secondary words largely depends on euphony. Some are formed by substituting a different syllable for one in the primary word, e.g. *gĕrak-gĕri, chĕrai-bĕrai, kayu-kayan, tĕka-tĕki, lalu-lalang, bĕngkak-bĕngkil;* some by changes of vowel-sounds, e.g. *bongkar-bangkir, rumput-rampai, tabur-tebar, runtoh-rantah, bengang-bengot;* some by substituting *m* for the first letter in the primary word, such as *kueh-mueh, tĕlinga-minga, chembeng-membeng, chomot-momot, choreng-moreng.* This *m* formation one is tempted to connect with the verbal form *suroh-mĕnyuroh, utus-mĕngutus, tulis-mĕnulis, karang-mĕngarang* and the like, expressing combination or reciprocity.

In the non-alliterative pairs, the choice of the pairing is arbitrary, as in all idiomatic phrases: they are all fixed conventional forms.

Some pairs are employed only in conversation and some are provincialisms, while many have never found their way into the dictionaries. The purposes they serve is similar to those served by reduplication. It is either:

(*a*) to strengthen and intensify the ordinary meaning of the primary single word, by adding to it an idea of indefinite plural confusion;

(*b*) to imply indefinite repetition, association, continuity or multiplied quantity; or

(*c*) when the pairs are nouns, to express an indefinite universal inclusion of all kinds and species (and sometimes all materials). For this reason they are found with *banyak, habis, sĕgala,* or such-like words, which express indefinite plurality.

1. *anak-pinak*: the whole host of little children in one (human) family without distinction of sex or age. For a husband, the term generally includes his wife too; but not so for a wife, (*anak* = a child or the young of anything).
2. *bukit-bukau*: hills of every description. *Rata sĕgala bukit-bukau di-layau-nya.* Thoroughly he explores the whole range of hills
3. *chĕrai-bĕrai*: divorced. *Kalau tumboh chĕrai-bĕrai, charian bahagi,* in the event of divorce all that has been earned by the husband while with the wife shall be equally divided between them.
4. *gĕrak-gĕri*: all manner of indefinite movements, conscious or automatic, from the swinging of one's body in walking to the twitchings of muscles; bearing, behaviour, *apa-bila sa-sa-orang tĕlah mati, maka bĕr-hĕnti-lah sĕgala gĕrak-gĕri-nya,* when a person has died, all his movements stop. *Pĕrhatikan sĕgala gĕrak-gĕri orang itu,* keep an eye on that man's movements and behaviour.
5. *gunong-ganang*: mountains of all shapes and sizes. Also *gunong-gantang.*
6. *haru-hara*: widespread disturbance or calamitous unrest.
7. *jĕling-jĕluat*: repeated contemptuous side-glances of the eyes (*jĕling* = a side-glance, more usually expressing dislike or disapproval than fondness). *Lihat-lah jĕling-jĕluat-nya apabila kita datang,* observe his eyeings and grimaces of contempt (at us) whenever we come.

8. *kayu-kayan* (= *kayu-kayuan*): all species of trees and wood. It is often coupled with *rumput-rampai* (q.v.).
9. *kĕnduri-kĕndara*: all kinds of formal entertainments especially feasts given to celebrate certain events, such as marriage, circumcision, and the conclusion of study of the Koran.
10. *kĕnduri-mori*: all manner of social feastings in which guests are entertained, generally as a charity, either in aid of the suffering dead and in memory of them, or for the sake of acquiring "merit" in the sight of God. Sometimes = *kĕnduri-kĕndara*, above.
11. *kueh-mueh*: all kinds of cakes, sweetmeats and sugared preserves.
12. *lauk-pauk*: all kinds of curry-stuffs, condiments.
13. *mandi-manda*: bathings and washings, to bathe and wash. The term is specially used when the bathing takes an unusually long time; such as in ceremonial baths which are regulated by minute rules hallowed by custom, or in the practice of idle toilet-lovers. *Dua hari lĕpas bĕrsanding dan bĕrsatu baharu-lah mandi-manda kĕdua pĕngantin itu*, two days after (the ceremony of) sitting together and cohabitation comes the ceremony of bathings for the bride and bridegroom. *Orang pĕsolek, tĕntu-lah banyak macham mandi-manda dan bĕdak-langir-nya pada tiap-tiap pagi*, a foppish dandy (like him) will of course have endless manner of bathings and washings every morning.
14. *rumput-rampai*: all sorts of herbage. *Sĕgala rumput-rampai pun habis layu oleh tĕrsangat panas*, all grass and herbage become entirely withered through the excess of heat.
15. *saka-baka*: complete family descent on both sides, *saka* applying to the mother's side and *baka* to the father's side. (*Saka* as an adjective is applied to coconut trees getting too old to bear good nuts). *Bukan saka-baka-nya orang mĕmĕrentah nĕgĕri*, his stock is not that of administrators.
16. *saudara-mara*: kith and kin; blood-relations. *Tiada-lah lagi siapa-siapa saudara-mara adinda di-sana lain daripada kakanda tiga bĕranak*, there is no longer any one there, other than you and your two children, whom I can look upon as my kith and kin.
17. *suku-sakat*: all one's clan-folk.
18. *tĕka-tĕki*: riddles.

19. *bongkar-bangkir*: to rake up old scandals; to ransack or rummage. *Habis di-bongkar-bangkir-nya nenek moyang orang*, unsparingly does he upbraid and slander my dead ancestors. *Budak ini! jahanam surat-surat itu di-bongkar-bongkir-nya*, oh, what a boy! destroyed are those papers because of his rummaging.

20. *kibang-kibut*: to be in a confused jumble; to be thrown or flying about and disordered. *Kibutkan* = to cause such disorder. *Habis-lah surat-surat aku tĕrkibang-kibut oleh angin*, all my papers were blown pell-mell by the wind. *Habis di-kibang-kibutkan-nya sĕgala kain baju dalam almari itu*, he throws all the clothes in the wardrobe into disorder. *Barang ka-mana ĕngkau hĕndak bĕrkibong-bĕrkibut-lah, tiada siapa mĕnahan!* you may clear out wherever you like, no one will detain you.

21. *lalu-lalang*: to pass and repass; again and again.

22. *pindah-randah*: to remove bag and baggage ("not leaving even a broken pot") and carrying them topsy-turvy. *Orang-orang kampong itu habis pindah-randah ka-kuala*, all the people of the village are removing all their sticks to the mouth of the river.

23. *runtoh-rantah*: to crumble, e.g. of embankments or dilapidated buildings. *Habis runtoh-rantah tĕbing itu di-kĕrjakan oleh ayer*, the river-bank crumbles through the washing of the water. *Sudah runtoh-rantah rumah itu baharu hĕndak di-baiki*, (when) the house has fallen to pieces, then only is it to be put in good repair.

24. *tabur-tebar*: to scatter broadcast. *Bahasa Mĕlayu ini di-dapati bĕrtabur-tebar di-sĕrata-rata gugusan Pulau-Pulau Mĕlayu*, the Malay language is found widely scattered all over the length and breadth of the Malayan Archipelago. *Sudah rata di-tabur-tebarkan-nya khabar itu di-sĕluroh nĕgĕri ini*, widely has he spread the news all over the country.

25. *tĕbang-tĕbas*: to cut down all trees and shrubs.

26. *bechang-bechok*: confused and boisterous, e.g. from a squabbling crowd, (*bechok* = boisterously talkative). *Bechang-bechok bunyi orang bĕrkĕlahi*, frightfully confused are the voices of those people quarrelling.

27. *bengang-bengot*: twisted out of shape, of the thin edges of metal-plates or any flexible material. *Habis bengang-bengot bibir timba itu di-antok-antokkan-nya*, the edge of the bucket has become all twisted by his knocking it about carelessly.

28. *bengkang-bengkok*: turning and winding, zigzag, of a road or a beaten snake.

29. *bĕngkak-bĕngkil*: marked with many large bruises or bumps from being belaboured, stung by bees etc. *Sudah jatoh bĕngkak-bĕngkil sĕkarang, baharu tahu!* when you have fallen and caused your body to be covered with swellings and bruises, then only will you know.

30. *binchang-binchut* (or *benchang-benchol*): covered with little bumps, usually on the head, (*binchut* or *benchol* = a slight bump or swelling on the head). *Kĕpala-nya itu benchang-benchut kĕna tinju,* his head is sore all over and bumpy, because of the blows he received.

31. *bulang-baling* (or *bolang*): whirling (of a long object hurled) so that the onlooker cannot tell one end from the other. *Di-humbankan-nya tongkat itu bulang-baling pĕrgi-nya,* he hurls the walking-stick away so that it goes whirling and sprawling.

    Note. *Baling-baling,* as a substantive, is a toy wind-mill made of a light long board turning on a pivot and exactly balanced from both ends. An elaborate type has at these ends bamboo tubes fitted in such a way as to make a roaring sound, when the board, put at right angles to the wind, is forced to revolve by the wind blowing against it. Provided with "tails" to serve as vanes, and fitted with a bamboo axle at the end of a long pole, the wind-mill is hoisted up vertically against the wind on the top of a high tree. The hoisting up of this toy is sometimes made an occasion for feasting. Sometimes the word is shortened to *bĕbaling,* and sometimes pronounced as *bulang-baling.*

32. *chĕlum-chĕlam*: intermingling too freely with the people of a household. *Apabila masa kĕnduri-kĕndara samacham ini, jantan bĕtina pun bĕrchampur-lah chĕlum-chĕlam tiada bĕrkira lagi,* on any occasion of feastings like this, men and women freely intermingle without thought. *Kalau dudok dua kĕlamin sarumah, makan minum jangan chĕlum-chĕlam tiada bĕrtĕntu,* if two families live in the same house, let there be no indiscriminate mingling of food and drink.

33. *chembeng-membeng*: pouting the lips sulkily, ready to cry. *Lihat-lah bibir-nya sudah chembeng-membeng sapĕrti rupa tuai,* see how his lips have started pouting, just like the curve of a sickle.

34. *cheret-meret* (or *cheret-beret*): trudging in a disorderly Indian file. *Bila hari raya, cheret-meret-lah orang-orang kampong sa-panjang jalan itu,* when the day of Hari Raya comes, villagers will be seen trudging in long confused file along the road.

35. *chobak-chabek*: rent and torn, hanging in many tatters, not entirely cut off from the main piece (of cloth or torn ears), (*chabek* = torn in one place). *Chobak-chabek kulit badan-nya di-layat-layat oleh pĕnya-mun,* his skin hangs in unsightly shreds on account of the slicing inflicted upon him by the robbers.

36. *chomot-momot*: (of face, body or dishes), stained with dried cakes of black or yellow dirt; (of cloth) spotted with black mildew.

37. *chondong-mondong*: leaning (to fall) this way and that way, (of trees, stockades, or pillars which ought to stand in a perpendicular position), (*chondong* = leaning, of one object only). *Ini pun sudah chondong-mondong sahaja tiang-nya rumah itu,* even now the pillars of the house are all aslant.

38. *chopak-chapek*: walking in a halting manner, as a bow-legged person. *Bĕrjalan chopak-chapek.*

39. *choreng-moreng*: streaked with soot, ink or paint (usually black).

40. *chuak-chaik*: cross cut with lines of blade-wounds or claw-scratches, (*chaik* = full of cuts). *Habis kĕpala-nya chuak-chaik kĕna pauk,* his head is terribly full of wounds crossing each other, because of being chopped.

41. *chumpang-champing*: torn and tattered, especially of nether garments.

42. *dĕgah-dĕgoh* (also *lĕgah-lĕgoh, lĕgoh-lĕgah*): the sound of big objects knocking against hard wood, of the knockings of one's head against the floor of a house built on piles. *Apa nama-nya yang dĕgah-dĕgoh di-bawah rumah itu?* what is the meaning of those bumping noises under the house?

43. *dĕmpang-dĕmpong* (onom.): the sound of small stones and fruit falling continuously into water. *Dĕm-pang-dĕmpong bunyi buah-nya gugor ka-dalam ayer itu,* its fruits plump into the water.

44. *dĕngkang-dĕngkong*: sound of chopping hard wood, or of a staff striking against hard wood. *Di-lotarkan-nya bĕlantan-nya dĕngkang-dĕngkong singgah katonggak lĕsong itu*, he flings his staff so that it bangs against the block-shackling of the mortar.

45. *dĕntam-dĕntum* (also *lĕntam-lĕntum*): the continuous sound of crackers, or the booming of guns. *Dĕntam-dĕntum bunyi mĕrchun orang itu*, their big crackers go bang bang.

46. *dĕrak-dĕrok*: the sound of a large animal forcing its way through branches. *Gajah itu sudah tiba agak-nya: dĕrak-dĕrok sahaja bunyi-nya*, the elephants have come, I think. You hear them brushing their way.

47. *dĕrong-dĕrang*: the chink of coins or metal crockery. *Dĕrong-dĕrang bunyi ringgit dalam saku-nya*, the dollars in his pocket chink together.

48. *dĕrum-dĕram*: the continuous sound of distant guns, or of thunder.

49. *dolak-dalek*: inconstant in words and decisions. *Mĕngapa bĕrchakap dolak-dalek: sa-kĕjap "ya," sa-kĕjap "tidak"?* why are you inconstant in your words, now admitting, now denying?

50. *dongkok-dangkak* (or *dongkor-dangkar*): grovelling and crouching, of one attempting to get up beneath the blows of his enemy. *Sudah dongkok-dangkak kĕna tangan, baharu ia tahu*, only after cowering under blows does he learn his lesson.

51. *duduk-dadak*: hurled headlong: sent flying but not prone (by a kick or blow). *Sa-kali ku-tumbok duduk-dadak pĕrgi-nya*, one box from me sent him flying.

52. *gĕdak-gĕdok*: the bumping sounds of a loaded cart moving on the road.

53. *gĕdiang-gĕdiut*: wriggling the trunk from side to side, of a nautch-girl dancing, or of the movements of certain long-bodied fish, (*gĕdiut* = a wriggling motion of the body from waist upward). *Anak wayang Masri itu mĕnari gĕdiang-gĕdiut sapĕrti ikan sĕmbilang mĕnjalar*, the Egyptian actress dances with her body moving sinuously like the movements of the *sĕmbilang* fish.

54. *gĕlusor-gĕlasor*: restless and unbalanced in movements, like a giddy or agitated person. *Ĕngkau ini tĕr-gĕlusor-gĕlasar sahaja, sapĕrti orang mabok ganja*, you look continually restless and unbalanced like a man drugged.

55. *gĕndang-gĕndut*: loose and unstrung in some parts with hard tension in others. *Kulit pĕrut-nya gĕndang-gĕndut sapĕrti kulit gajah kurus*, the skin of his belly lies in thick folds like the hide of a thin elephant.

56. *gĕnting-gĕntat*: full of narrowings and bulgings at irregular intervals, of long objects. *Tiang itu sudah gĕnting-gĕntat kĕna pakok*, the post has become full of narrowings and bulgings through being too much notched.

57. *gopoh-gapah*: hurrying precipitately.

58. *gual-gail*: (of stakes or poles) unfirmly fixed in the ground, (*gail* = unfirmly fixed in a hole). *Kayu yang di-chachakkan-nya itu gual-gail sahaja, tiada tĕgap*, the stake which he drove into the ground is shaking and leaning to every side, not being firmly fixed.

59. *halai-balai*: pell-mell, as heaps of sewing, clothes or papers left thrown about at the signal of approaching danger.

60. *haru-biru*: all in confusion, higgledy-piggledy with panic or excitement.

61. *hempal-hempol*: moving with difficulty, as an extremely fat person, (*hempol* = heaving with weight of corpulency).

62. *henchang-henchut*: swerving again and again to the right and left, especially of the hind part:, rocking obliquely while in a swinging motion. *Ia bĕrjalan henchang-henchut sapĕrti orang mĕnghayun pong-gong*, he walks with oblique side-swerves like one deliberately swinging his posterior. *Bila buayan itu bĕrbuai, jangan pĕgangkan sa-bĕlah hujong-nya, henchang-henchut dia*, when the swing is in motion, do not catch hold of one end of it or the swing will swerve obliquely.

63. *herang-herot*: deflected much and repeatedly from the straight line, so as to appear zigzag; awry in an extreme degree. *Sudah-lah mĕnggunting herang-herut, mĕnjahit pun herang-herut juga*, not only is your cutting zigzag, (your) sewing also is awry.

64. *hina-dina*: humble and lowly.

65. *hingar-bangar*: in a state of hurly-burly or tumultous confusion. *Hingar-bangar ta' sa-angkoh bunyi, di-sana tĕrjĕrit, di-sini tĕrpĕkau*, noisy and tumultous beyond description, with shriekings there and screamings here.

66. *hulor-halar*: lying flat and writhing with pain or hunger: struggling in vain to raise after measuring one's length on the ground. *Sampai ka-rumah hulor-halar ia oleh pĕnat*, reaching home, he spuirmed with fatigue. *Abang kamu sakit pĕrut malam tadi hulor-halar*, your brother, (i.e. my husband) suffered from colic last night and writhed with pain. *Di-pijak-pijak-nya pĕnchuri itu hulor-halar sampai mĕminta nyawa*, he trampled the robber down squirming till the man begged for life.

67. *huntal-hantil*: dangling loosely, of long pendulous breasts, and of the testicles.

68. *huyong-hayang*: reeling and swaying in one's walk like a sick or drunken man.

69. *jĕlepah-jĕlepoh*: falling huddled from feebleness or langour. *Oleh tĕrsangat lapar ia pun mĕrĕbahkan diri di-atas lantai itu, jĕlepah-jĕlepoh tiada tĕrbuat bĕr-chakap lagi*, being intolerably hungry, he dropped in a huddle on the floor, his limbs thrown about while he was no longer able to utter a word.

70. *julur-jilat*: extruding and drawing in the tongue repeatedly; licking the lips as one who has tasted pepper or a tasty delicacy. *Aku lumuri lada mulut itu sĕkarang, tĕrjulur-jilat oleh pĕdas*, if I smear chillies on your mouth you'll loll and lick your tongue from its heat.

71. *kaya-raya*: rich and prospering. *Si-anu itu sa-lengkok pun tiada tahu mĕnulis dan mĕmbacha Inggĕris, mĕngapa-tah kaya-raya, tĕrsĕrgam rumah batu-nya?* Mr. so-and-so never knew how to write or read a word of English: why in the world did he become rich and prosperous with his brick house standing conspicuous?

72. *kĕmas-mĕmas*: packing up everything. *Kain baju, tikar bantal, pĕriok bĕlanga habis kĕmas-mĕmas di-punggah-nya*, clothing, bedding and cooking-utensils he takes all away.

73. *kĕmbang-kĕmbut*: flaring and flickering, of a dying or feeble flame. *Kalau api suloh kĕmbang-kĕmbut, itu-lah tanda ada harimau dĕkat*, if the light of the torch flares and flickers, it betokens that a tiger is near.

74. *kĕmpang-kĕmpis*: swelling and shrinking continually (of the stomach of one gasping for breath). *Ia tiba itu kĕmpang-kĕmpis pĕrut-nya mĕnarek nafas*, he came with his belly heaving and shrinking for breath.

75. *kĕmpang-kĕmpong*: dented in many places e.g. of the cheeks when the teeth are no more. *Habis kĕmpang-kĕmpong cherek itu di-banting-bantingkan-nya*, the kettle is all beaten-in and shrunken by his dashing it about.

76. *kemang-kemot*: twisted or crumpled, *not* of the edges but of the surface of thin metal plates, paper or any sheet of tough material. *Habis kemang-kemot kĕrtas itu di-ramas-nya*, the paper is all creased and crumpled by reason of his rough handling.

77. *kĕsak-kĕsok*: continuously rustling as pieces of tough cloth or leaves. *Apa yang bĕrbunyi kĕsak-kĕsok di-bawah katil itu?* what is that sound of rustling under the bed?

78. *kesang-kesot*: restlessly moving one's seat to and fro. *Ĕngkau ini dudok kesang-kesot sahaja, ta' pĕrnah diam*, you shift your seat restlessly and never keep still.

79. *kĕtunjang-kĕtunjit*: jumping and leaping continuously in vigorous dancing or childish romping (*kĕtunjit* = lifting one leg forward and jumping about on the other leg: *tunjang* = bony and muscular part of the haunches). *Kĕtunjang-kĕtunjit* (or *tunjang-tunjit*) *kaki orang itu mĕnari*, vigorous is the swinging of those people's legs in their dancing. *Jangan bĕrlari tunjang-tunjit sa-macham itu; tĕrlampau bising bunyi-nya; barang-barang di-atas papan itu pun habis bĕrjatohan*, don't be running and stamping about in that manner; it sounds too noisy, and all the things on the shelf are toppling down.

80. *kichap-kichau*: chattering like the *murai* bird.

81. *kopak-kapek* (onom.): the sound of an empty wooden case striking against something. *Ia pun lari-lah, kopak-kapek bunyi sarong parang di-pinggang-nya*, he then took to his heels, so that the knife sheath which hangs from his waist clattered.

82. *kumat-kamit*: closing and opening the lips continuously. *Ĕntah apa jampi yang di-bacha-nya: mulut-nya kumut-kamit, tĕtapi ta' kĕdĕngar sa-suatu apa*, what he was reciting we could not say: his lips were moving, but nothing was audible.

83. *kutong-katang* (*kĕrutong-kĕratang*): restless with irritation all over the skin, as from itching, mosquito-bites or nettle-stings. *Budak itu sudah kutong-katang oleh gatal, tidak juga di-pĕdulikan-nya*, the child has become restless with itchiness, and yet he shows no concern.

84. *kusut-kusau*: utterly dishevelled, of hair etc. *Apa-kah kĕna-nya rambut ĕngkau ini kusut-kusau sahaja?* What is the matter with your hair that it is all dishevelled.

85. *lĕbok-lĕbak*: falling together, e.g. of fruits. *Sa-kali di-goyang-nya batang pinang itu, lĕbok-lĕbak buah-nya gugur,* at one shake he gives to the betel-tree, its fruits fall thud together.

86. *lĕbur-lĕbar*: the sound of a number of people plunging into water, also of careless words bubbling out at random without consideration for the feelings of the hearer. *Lĕbur-lĕbar bunyi budak-budak itu tĕrjun ka-dalam sungai,* what splashing and plunging noise is made by those children jumping down into the river. *Chakap ĕngkau ini lĕbur-lĕbar sahaja kĕluar-nya, tiada bĕrkira lagi,* your words gush out without thought of consequences.

87. *lĕchup-lĕchap*: the sounds of a dart or pointed stick forcing its way into water. *Lĕchup-lĕchap bunyi tirok orang itu di-tikamkan-nya ka-dalam ayer itu,* their fish spears make swishing sounds as they are thrust into the water.

88. *lĕmah-lĕmbut*: gentle: winning and amiable in manner.

89. *lenggang-lenggok*: swinging the head and shoulders from side to side, while the waist is not moving. *Apabila ia mĕngaji, lenggang-lenggok-lah kĕpala-nya,* he swings his head from side to side, when he reads.

90. *lentang-lentok*: with the head hanging bashfully first to one side and then the other, the shoulders and chest remaining still. *Kalau ada apa-apa hajat-nya, baharu-lah ia datang lentang-lentok ka-pada kita,* if he has any favour to ask, then only will he come downcast and bashful to us.

91. *lepah-lepoh*: stumbling and throwing about the limbs languidly. *Budak itu lepah-lepoh 'dah dek takut, mau ta'mau bĕrjalan juga sa-lagi tĕrdaya,* the boy has become utterly exhausted with fatigue; but because of fear, he still plods on willy-nilly as long as he can.

92. *lĕpak-lĕpok*: sound of a smack or clapping. *Tiap-tiap hari lĕpak-lĕpok-lah bunyi budak itu kĕna tangan,* every day there are sounds of slaps inflicted upon the boy.

93. *lĕsap-lĕsup*: swishing or whizzing sounds. *Di-rembat-nya budak itu lĕsap-lĕsup dĕngan rotan*, he gave the boy a sound switching with a cane. *Anak panah pun bĕrtĕrbangan-lah, lĕsap-lĕsup di-kĕliling kita*, arrows flew whizzing around us.

94. *lĕtap-lĕtup*: the sounds of crackers, breaking twigs etc. *Bunyi-nya lĕtap-lĕtup sapĕrti api makan lalang*, its sound crackles like that of fire consuming grass.

95. *liang-liok*: writhing the body from the waist upwards in an undulating manner. *Dia itu bĕrjalan liang-liok sapĕrti pĕrĕmpuan*, he walks with an undulating gait like that of a woman.

96. *lichin-lichau*: smooth and glossy: clean of dishes with no remains of food. *Lichin-lichau hidangan kita di-makan oleh orang itu*, all our dishes are clean-swept by those feeders. *Rambut-nya lichin-lichau, lalat hinggap pun ta'lĕkat*, his hair is smooth and shining, even a fly could not stick on it.

97. *nonok-nanak*: unsteady (of walking): tripping and stumbling, with the head and body stooping. *Ĕngkau ini bĕrjalan nonok-nanak sahaja, sa-kĕjap tĕrsangkut kaki, sa-kĕjap tĕrpijak lobang: tĕrdorong ka-sana, tĕrdorong ka-sini*, your walk is very unsteady, now having your legs caught, now tripping in holes, stumbling here and stumbling there.

98. *ongkoh-angkah*: walking in a stooping manner, jogging and unfirm, especially when some projecting or bristling burdens are carried. *Tengok-lah orang tua itu: kuat juga lagi dia bĕrbĕban. Asal pagi ongkoh-angkah-lah dia mĕmikul tĕrangkek*, see that old man: he still has strength to carry burdens. As soon as it is morning he is seen jogging along stooping under the weight of his bamboo vessel.

99. *penchang-penchong*: zigzag. *Jangan bĕrjalan penchang-penchong sapĕrti kĕtam*, do not walk in a zigzag manner like a crab.

100. *porok-parak*: (in fighting) not to be able to hold one's footing, driven backward (through thickets so as to make *rak-rak* sounds). *Porok-parak orang itu kĕna tunda dĕngan kaki*, that man was spurned away so that the sound of his retreat was heard like the breaking of twigs.

101. *puntang-panting*: thrown about heedlessly, e.g. the limbs in haste, or a tin or bunch of keys tied to the end of a string. *Apabila di-lihat-nya pĕnyamun itu mĕngĕjar akan dia, maka puntang-panting-lah kaki-nya lari,* when he saw the robbers chasing him, his legs went helter-skelter. *Di-champakkan-nya pĕlita itu puntang-panting pĕrgi-nya,* he threw away the lamp so that it went clattering about.

102. *rempang-rempong*: torn in many places at the edge as the result, e.g. of being bitten. *Chuchoran atap itu habis rempang-rempong di-makan pĕluru mĕriam,* the eaves of the roof are all ruggedly torn off by cannon-balls.

103. *sakali-sakala*: once in a way: occasionally. *Kalau sakali-sakala pĕrgi mĕnengok (wayang) apa salah-nya? Tĕtapi sĕlalu jangan,* if you go to the theatre once in a way, there is nothing wrong; but do not make it a habit.

104. *sĕlang-sĕli*: lying cross-wise one upon another in a confused manner. *Macham mana na' mĕnyangkul? Urat kayu sĕlang-sĕli,* how can one use the hoe? The ground is a tangle of roots. *Bĕnang itu sudah bĕrsĕlang-sĕli: kalau ta' baik-baik mĕnguraikan-nya, kusut-lah,* the threads are all crossed; if they are not carefully untwined, they will be in a tangle.

105. *sĕnang-lenang*: surrounded with every comfort and ease. *Aku puas bĕrhujan bĕrpanas mĕnchari makan: kamu dudok sĕnang-lenang di-rumah,* I suffer heat and rain to earn our bread, while you remain at home with every comfort.

106. *sending-mending*: tilted, this way and that way, in succession. *Ĕngkau mĕngangkat dulang itu jangan-lah sending-mending sahaja,* when carrying the tray don't allow it to be tilting on one side or another. *Jambatan itu pun sudah sending-mending sahaja hĕndak tĕrhĕban,* the bridge is leaning in every direction, on its way towards complete collapse.

107. *senget-menget* (of a vessel or cap): inclined on this side and that side: no longer level. *Piring dalam dulang itu sudah senget-menget di-lĕjang ayam,* the dishes in the tray are no longer in position, because of being kicked by the fowl.

108. *sĕrĕbah-sĕrĕbeh*: slovenly, of clothes about the body. *Bĕtulkan-lah ikat kain ĕngkau ini, jangan sĕrĕbah-sĕrĕbeh macham itu,* do tie your *sarong* in a proper way, and not allow it to be slovenly like that.

109. *sĕrĕmbah-sĕrĕmbeh*: with uncontrollable tears rolling continuously down the cheeks. *Baharu sakĕjap si-Ujang datang ka-sini, sĕrĕmbah-sĕrĕmbeh dĕngan ayer mata-nya mĕngatakan adek-nya hilang*, only a moment ago our Ujang came here, with tears running down his cheeks saying that his little brother is missing.

110. *sepang-sepot*: childishly abashed: showing shyness by grinning, hanging the head and twisting the body (as young girls often do). *Pada masa ia tĕngah mĕnyanyi itu kalau di-lihat-nya orang mĕmandang dia, nĕschaya tĕrsepang-sepot-lah ia bĕrhĕnti*, when she is singing, if she sees somebody looking at her, she will at once stop and show extreme shyness.

111. *sibang-sibut*: bustling. *Masa orang tĕngah sibang-sibut tadi, agak-nya ia mĕngambil, siapa pula nampak?* he may have taken (it) during the tumultous rush a moment ago; who could have seen him then?

112. *silang-sĕli* (vide *sĕlang-sĕli*).

113. *sungkok-sangkak*: dashed and dragged hurriedly. *Sudah di-tarek-nya ĕngkau sungkok-sangkak ka-hujong ka-pangkal, bĕlum juga ĕngkau jĕran, ya?* after you have been lugged by him from one end (of the house) to another, you will have not learned a lesson, is that so?

114. *sungkor-sangkar*: grovelling face downwards on the ground owing to blows received. *Di-pĕlupoh-nya pĕnchuri itu sungkor-sangkar di-tĕngah halaman-nya itu sa-malam*, he belaboured the thief so heavily in the courtyard of his house yesterday that the man fell and grovelled on his face.

115. *susup-sasap*: pushing the head under leaves and branches, as one running for his life. *Bila di-lihat oleh pĕlandok itu orang, maka susup-sasap-lah ia lari ka-dalam sĕmak-sĕmak itu*, when the mouse-deer sees a man he will dash away (for his life), rushing and pushing into the thickets.

116. *tĕgap-tĕgun*: well-built, sturdy, and dignified, (of bearing).

Rupa-nya sikap macham pahlawan,
Tĕgap-tĕgun sukar di-lawan;
A warrior in look and mien,
With bearing that is seldom seen.

117. *tĕrang-bĕndĕrang*: shining brightly all around.

118. *tĕrang-tĕrus*: clear. *Chakap-nya tĕrang-tĕrus sahaja, tiada bĕrsĕlindong lagi,* his words were clear and distinct without concealment.

119. *tĕrsĕlit-tĕrsĕpit*: out-of-the-way, unnoticed. *Habis dibinchang-nya sĕgala yang tĕrsĕlit-tĕrsĕpit, tiada bĕrsĕtabek lagi,* he made insulting references to every secret, regardless of courtesy.

120. *tunggang-tunggit* (or *tonggang-tonggek*): repeatedly bowing, and prostrating as Muslims at prayer. *Sĕmbahyang tonggang-tonggit pun kalau hati bĕrtĕrbangan, ta'kan mĕmbĕri bĕkas baik,* in spite of outward prayers and prostrations, if the heart wanders good results will never be effected.

Tree Names—a few changes.

By F. W. FOXWORTHY.

A manual of the commercial timber trees of the Malay Peninsula is to be published soon and it seems desirable to indicate certain changes in terminology before the manual is issued.

Certain of our tree species have been mentioned, in various works, under wrong botanical names or under names which do not have the sanction of the best usage.

The following notes are arranged according to the most widely used common names of the trees considered. The common name is followed by the approved botanical name, other names being noted, with such explanation as seems necessary.

CHENGAL—Balanocarpus Heimii King, in materials for a Flora of the Malay Peninsula, Journ. As. Soc. Bengal 62,[2] (1893) 133.

Frequent mistakes have been made, during the past thirty years, in identifying this form as *Balanocarpus maximus* King, a rare species of very different character and furnishing a wood of inferior quality. This species was described at the same time and on the same page with *B. Heimii*, and was very well illustrated in the Ann. Roy. Bot. Gard. Calcutta, Vol. 5, Part 2 (1896) Pl. 192. A mistaken identification seems to have been made many years ago and the mistake taken up by various workers until, in 1922, Burkill correctly identified material of *Balanocarpus maximus* collected in Pahang. He later (this Journal, Vol. 1 (1923) p. 218) called attention to the differences between the seedlings of the two species. Since 1922, we have given a good deal of attention to these species and their distribution, and it seems plain that all of our Chengal is furnished by the one species, *Balanocarpus Heimii* King.

DAMAR MINYAK—Agathis alba (Lamk.) Foxw. in Phil. Journ. Sci. 5 (1910) Gen. Sci. 173; 6 (1911) Bot. 167. *Dammara alba* Lamk. Encycl. 2 (1786) 259. *Agathis loranthifolia* Salisb. in Trans. Linn. Soc. Bot. 8 (1807) 311; Ridley in Fl. Mal. Penin. 5 (1925) 278. The generic name *Agathis* is retained, according to the list of *nomina conservanda* of the Vienna Congress, and the oldest valid specific name is used with it. *Agathis flavescens* Ridl. in Journ. F. M. S. Mus. 6 (1915) 196; Kew Bull. Misc. Inf. 1914, p. 332; Fl. Mal. Penin. 5 (1925) 278, seems to be doubtfully distinct.

DEDARU—Urandra corniculata (Becc.) Foxw. in Phil. Journ. Sci. 6 (1911) Bot., 179. *Platea corniculata* Becc., Malesia 1 (1877) 117. *Cantleya johorica* Ridl. Fl. Mal. Penin. 1 (1922) 436. *Stemonurus corniculatus* Ridl., Fl. Mal. Penin. 5, Suppl. (1925) 297.

The plant was first described from rather incomplete material and it was not until more than thirty years later that the late J. C. Moulton obtained good material near Kuching, Sarawak. This material made it possible to determine the genus as above. Specimens were sent to Dr. Beccari, who said that the material represented the species described by him as *Platea corniculata*, and he agreed that the transfer to *Urandra* was necessary.

KELADAN—Dryobalanops oblongifolia Dyer in (London) Journ. Bot. 12 (1874) 100, t. 142, figg. 8-12; Burck in Ann. Jard. Buitenz. 6 (1887) 244; Brandis in Journ. Linn. Soc. Bot. 31 (1895) 51. *Baillonodendron malayanum* Heim in Bull. Soc. Linn. Paris, 2 (1890) 867, et Recherch. Dipterocarp., 83. *Dryobalanops Beccariana* Ridl. *pro parte*, in Fl. Mal. Penin. 1 (1922) 211, non *D. Beccarii* Dyer. Ridley's species is a mixture, the material used belonging to *D. oblongifolia* Dyer, while the description applies in part to *D. Beccarii* Dyer.

The original description of *D. oblongifolia* was made from flowering material, and it was not until some twenty years later that we find any mention of the fruit. Brandis says, "Cups of fruiting-calyx enclosing the base of the fruit only, funnel-shaped; segments short, thickly coriaceous, reflexed at apex."

None of the descriptions emphasize the characteristic feature of the ripe fruit, the very short calyx-wings, less than one-fourth the length of the fruit and reflexed. It seems that the ripening fruit pushes the calyx-wings outward and they then become reflexed. The tree is of common occurrence in lowland forest near streams in some parts of the Peninsula. It is also known from Sumatra and Borneo. The recorded distribution in the Malay Peninsula is as follows:—KELANTAN, DINDINGS, PERAK: Kinta, Batang Padang. SELANGOR: Ulu Selangor. PAHANG: Kuala Lipis, Temerloh, Pekan, Kuantan. JOHORE.

MALUT—Hopea anomala (King) n. comb. *Balanocarpus anomalus* King, in Journ. As. Soc. Bengal, 62,[2] (1893) 132.

The species was described from flowering material and King indicated that there was uncertainty about the genus, because of the lack of flowering material. The tree continued to be known only from the original collection until the past two years when, thanks to the efforts of forest officers in Kedah, a number of collections were received, apparently from the type locality. Flowering material matched the type very closely and fruiting material made it apparent that the plant belonged to the genus *Hopea*. The following is a brief description of the fruit, based on C. F. No. 10144, collected at Bukit Penarah, Lankawi in March 1926. Fruit cylindrical, conical in upper part, pointed, glazed, 8-12 mm. long and 3-5 mm. in diameter, greenish or brownish. The two long wings are yellow, spathulate, very much narrowed to the base, 3-4 cm. long and 10-14 mm. wide, with 5 to 7 nerves. The three short

wings 2-3 mm. long, thick, curved, bluntly pointed. The original description gives the common name as *Malaut*, but our collectors give it as above.

The Conservator of Forests, Kedah, writes that the tree is known from the island of Lankawi where it grows to large size and produces a durable timber which is used in house construction and for the ribs of boats, for which purpose it is exported to Penang. The bark is said to be used for the partitions in Malay houses.

MALABIRA—Fagraea crenulata Maing.

This was, for some years, mistakenly identified as *Fagraea fastigiata* Bl., a species which is a liane in the Netherlands Indies.

MERBATU—Parinarium spp. and **Angelisia splendens** Korth., in Nat. Tijdschr. Nederl. Ind. 7 (1854) 210. *Parinarium nitidum* Hook. f. in Fl. Brit. Ind. 2 (1878) 256. *Coccomelia nitida* Ridl. in Journ. Str. Br. R. As. Soc. 82 (1920) 183; Fl. Mal. Penin. 1 (1922) 671.

The generic name *Coccomelia* is invalid, because it was used by Reinwardt (Cat. Gew. Buitenz. 1823) for a genus of the Euphorbiaceae.

MERBAU—Intsia spp.

Our species have often been credited to the genus *Afzelia*. The approved names and their principal synonyms are.—

Intsia Bakeri Prain in Sci. Mem. Med. Off. Army Ind. 12 (1901) 13; Merr. in Phil. Journ. Sci. 11 (1916) Bot. 85. *Afzelia palembanica* Baker in Fl. Brit. Ind. 2 (1878) 275.

Intsia bijuga (Colebr.) O. Ktze. Rev. Gen. Pl. 1 (1891) 192. *Afzelia bijuga* A. Gray, Bot. Wilkes U. S. Explor. Exped. 1 (1854) 467, t. 51.

Intsia retusa (Kurz) O .Ktze. Rev. Gen. Pl. 1 (1891) 182. *Afzelia retusa* Kurz in Journ. As. Soc. Beng. 42 (1873) II., 73.

MERSAWA—Anisoptera sp.

Our commonest species is ***A. thurifera*** (Blco) Bl., Mus. Bot. 2 (1852) 42. *A. glabra* Kurz, For. Fl. Brit. Burma, 1 (1877) 112 is a synonym.

TEMBUSU—Fagraea spp. I see no reason for abandoning this name. Our two common species are:—

Fagraea fragrans Roxb. Fl. Ind. 2 (1824) 32. *Cyrtophyllum peregrinum* Bl., Bijdr. 1022; Ridl. in Fl. Mal. Penin. 2 (1923) 421.

Fagraea gigantea Ridl. in Journ. Str. Br. R. As. Soc. 79 (1918) 98. *F. speciosa* Ridl. non Bl. in Journ. Str. Br. R. As. Soc. 50 (1908) 122. *Cyrtophyllum giganteum* Ridl. Fl. Mal. Penin. 2 (1923) 421.

More Notes on Malay Magic

By R. O. WINSTEDT, *C.M.G., D. Litt. (Oxon.), M.C.S.*

The Shaman's Possession.

The use of the shaman as a medium has been found to be most common in areas where arctic hysteria is prevalent, especially in Siberia. And there is the closest resemblance between the hysteria of the Samoyed and the *latah* of the Malay and the Dayak. Both of these nervous maladies will cause sufferers to mimic the words and gestures of those who startle them, to strip themselves naked and to utter the obscenities of the subconscious mind. Catalepsy for the time is complete. This temporary paroxysm, like madness, the Peninsular Malay attributes to possession by a spirit. In Borneo a Milanau woman who has been possessed by a spirit only requires to undergo an elaborate ceremony of exorcism in order to become a medicine-woman. Contact with the spirit world made manifest by nervous seizures qualified man or woman in many primitive tribes to become healer, exorcist and diviner. "He stripped off his clothes and prophesied before Samuel and lay down naked all that day and all that night. Wherefore they say, 'Is Saul also among the prophets?'"

Modern science has found all the characteristics of the shaman in patients suffering from protracted hysterical delirium. In such sufferers excitement determines an outbreak. Visual hallucinations are especially visions of animals and fantastic processions, in which dead persons, devils and ghosts swarm. Attacks of amnesia may last for days or weeks. The patient will become cataleptic, and in somnambulic dialogue copy the peculiarities of dead relations and acquaintances, changing the voice whenever a new spirit manifests itself:—the names of the spirits may be inexhaustible but commonly all belong to two types, one gay one serious. Sometimes he or she uses a strange idiom that sounds like French or Italian. This "gift of tongues" is called "glossolalia": apparently the patient arranges together meaningless words, borrowing subconsciously sounds from various languages; it is only a pseudo-language "analogue au baragouinage par lequel les enfants se donnent parfois dans leur jeux l'illusion qu'ils parlent chinois, indien ou sauvage." One patient declared that she lost her body and went away to distant places whither the spirits led her. Once she was hysterically blind for half an hour, did not see the candle on the table and had to be led. She so influenced her relations that three of her brothers and sisters also began to have hallucinations. Another woman had to have a splinter cut out of her finger. "Without any kind of bodily change she suddenly saw herself sitting by the side of a brook in a beautiful meadow,

plucking flowers." Another gradually lost her abnormal sensitiveness and six months later was caught cheating at a *séance*, concealing small objects in her dress and throwing them up in the air, wanting to restore the lost belief in her supernatural powers. This diagnosis of hysterical delirium, summarized from Jung's paper "On the Psychology and Pathology of so-called Occult Phenomena," might have been made from the study of the Malay shaman alone.

Even in those magicians who have displayed no symptoms of epilepsy or neurosis, the novitiate for their calling is designed to induce an abnormal state of mind. The Hindu practises asceticism in order to become a medium. In a vigil in forest depths or beside a grave, the Malay shaman sees visions and acquires his familiar, the were-tiger, just as the Siberian shaman acquires a spirit helper that also appears in the shape of some animal. "Self-abnegation is required of all those Malays who practise the healing art," lately wrote a Straits-born Chinese observer from Penang. "Some live the life of a recluse; others leave their houses only at night. Though the uninitiated may rub shoulders with a medicine-man without knowing it, the trained eye can easily single him out."

To evoke the condition of automatism needed for a *séance* the Malay shaman employs well-recognized methods. Incense is burnt beside him. The thud of his attendant's drum waxes ever louder and more frantic. Holding a grass brush with stiff extended arm he stares fixedly at a candle, quivers, begins to grow rigid and swoons as each spirit enters his body. Often he whirls his head violently or executes weird dances. The Patani female magician, "she who has forgotten," to translate her native title, whirls her long black tresses as one whirls a mop. Since it is the spirit who speaks through the medium, the shaman talks not in his own voice and at times not even in his own language.

As a rule the object of a *séance* for the sick is to discover the name and desire of the spirit possessing the patient, so that it can be expelled by the help or advice of a stronger spirit or coaxed out of the sufferer's body either into the shaman's own or usually on to a receptacle containing food.

A Penang account describes how to rid a house of a ghost a Malay medicine-man will hold a *séance*. "Chanting before a candle he slowly loses consciousness and then while in a trance and roaring like a lion he goes chasing round the house until he falls in a faint at the door. This shows that the house has been cleared. From such *séances* cats and dogs are generally excluded, in case the medicine-man should eat them while he is in his trance. Were he to do so, he would become a tiger or some other wild beast."

The pious Muslim Malay dismisses the trance of the modern shaman as make-believe and declares that to-day it is no more genuine than the trance of the Malay nautch-girl who is supposed to be possessed by the spirit of dancing and to eat nothing but flowers for months.

Possession is enticed by chants and music not only at *séances* but for ends no longer serious. In one Malayo-Javanese dance the performer lies covered with a white sheet till the thud of tambourines has inspired her with the spirit of the dance, for whose advent a jar of flowers is placed ready. In another dance a young girl is possessed by the monkey-spirit and achieves marvellous feats of climbing. Among the Dayaks swinging is an aid to serious possession. But the sole survival of this practice among the Malays, if survival it be, is the swinging in a cot of the girl who is to perform the monkey dance. After the dance "when it is time for her to recover her senses, she is called upon by name, and if that fails to recall her she is bathed all over with coconut milk." Being accustomed to autosuggestion the Malay was prepared for the self-infliction of wounds practised by members of certain Muslim orders, who dance themselves into a transport to the clash of tambourines and stab their bodies with an iron awl or spit. But the average Malay is by nature sceptical and not of the stuff of martyrs, and generally leaves these devotional ecstasies to Indian Muslims.

Possession is not only of animate things. "At the installation of a Sultan of Perak the guardian genies of the State may inhabit the State sword and make it press upon the ruler's shoulder. In the regalia ritual they are invited to descend on posies, perhaps flowers stuck behind the ear of the magician, as the yellow *chĕmpaka* blossom is still stuck behind the ear of a ruler at his installation. The convulsive shaking of the shaman's grass switch may indicate that they enter there. Sweet jasmine attracts them. A Perak chief, who knew how to make from the shroud and coffin of a murdered man powder rendering spirits visible, enabled a friend at a *séance* to see two women with streaming hair descend through the roof and alight on a flower-vase, the artificial garden prepared for their advent."

According to one account the spirits invoked at a *séance* enter the flame of candles and cause them to flicker. If the flame flickers towards the shaman, he can undertake to cure his patient; if it flickers away from him, he cannot. A similar use of tapers is made to choose a spot suitable for building a house or an elephant corral. If the burning wick inclines towards the diviner, the omen is good; if away from him, bad. If it bends to the right or the left, a site in that direction should be chosen. If it becomes twisted or droops or burns with a double flame like the twin stones over a grave, the site is unlucky. If it burns upright, the omen is excellent. A Kelantan chief will fashion two

candles of identical size with wicks of seven or nine threads, name one for himself and one for his foe and, calling upon Allah to declare the future, infer victory for him whose candle burns longer. Even if the candle at a *séance* is regarded merely as a means of divination, yet the Malay mind supposes it to be animated by a spirit and its answer to be dictated by this lodger.

In one Malay dance an old woman, who must have an "impressionable soul", makes a sheaf of palm-blossom sway in time to the music, jump about and dash itself to the ground. In another a fish-trap dressed as a female scarecrow rocks and dances at the bidding of the magician. The puppets for Malay shadow-play are "all considered to be more or less animated." Again. A Malay magician uses a divining-rod of rattan canes tied at the butt: any number of canes from one to nine may be used. Grasping the rod, he invokes Father Long Beard (obviously a nickname suggested by the bunch of tapering canes) to descend and enter his embodiment. "Presently the tip of the rod or bundle begins to move in circles, small at first but with increasing force till the sorcerer loses consciousness. The rod in his hand then points in the direction where lost property will be found, and, if asked, it will even point in the direction of underground water. When the invoked spirit enters the magician's body it passes in through the fontanel at the top of the head and down the arm into the butt end of the rod, causing its frantic gyrations." Though the canes are inscribed with pentagrams and phrases from the Quran, these symbols have no bearing on their use and therefore are no proof that the use of the divining-rod was imported with Islam. But if, as seems likely, it was Islam that brought a form of the *planchette*, the Malay mind was not unprepared for its gyrations. Elsewhere I have alluded to a Malay type of the familiar pendulum experiment as probably Muslim. But the Karens of Burma also divine by means of a ring suspended from a thread above a metal basin, and the Malays may have borrowed Muslim prayers and Quranic texts to hallow a mystery far older than the coming of their latest faith.

ERE, vol. 10, *Possession*. Skeat, pp. 464-8, 516, 542, 578. *Man*, April, 1902, *Malay Divining Rods* by E. B. Tylor. *Shaman, Saiva and Sufi*, pp. 105, 161. Enthoven's *The Folklore of Bombay*, pp. 157, 273-4. Snouck Hurgronje's *The Achehnese* (1906), vol. II, pp. 251-257. N. and Q., No. 1, p. 23. Gimlette, p. 102. JRASSB, No. 45, p. 12; No. 85, pp. 140-150. JRASMB, No. 87, p. 254; No. 88, p. 381. Jung's *Analytical Psychology* (London, 1920) pp. 1-93.

Divining Blocks.

"In Negri Sembilan betel-nuts are cut into pieces and thrown like dice, inferences being drawn as to the sex of the unborn child according as more flat or rounded surfaces lie uppermost." This method of augury, though simpler, is identical with the Chinese

use of divining blocks. Malay elephant hunters employ a similar device. When timber is being felled for the gate of a corral, the first chip from the axe must fall bark uppermost or the wood is unsuitable. When the pannier is put for the first time on a newly caught elephant, the animal is sprinkled with coconut milk and the two halves of the nut thrown one at the head, the other at the tail: it is a good sign if they fall on the oval rind with the split half uppermost.

Shaman, Saiva and Sufi p. 120. JRASSB. No. 45, pp. 11, 12, 37. JRASMB. vol. II, Part I, p. 72.

Magicians in XVIII Century Perak.

The *Ninety Nine Laws of Perak* give a good idea of the power of magicians in the 18th century, especially if it is remembered that these laws were framed by a family of sayids which numbered among its members several Muslim saints. "Muslims," it is laid down, "must feed the district judge, the officers of the mosque, the magician and the midwife..... The muezzin is king in the mosque and the magician is king in the house of the sick, in the rice-field and on the mine..... A parish magician must be long-headed, suave, industrious and truthful, and he must not have intrigues with women-folk. If a person is sick, he must attend immediately. His reward is that he escapes taxation and forced labour." Again. "A magician's fee for taking care of (*bĕla*) a village is a gold *paha* and the remains of the feast: for taking care of a mine and its spirits, he gets the same plus a black jacket and head-kerchief. Magicians vivify whatever has been damaged and their fee for doing this on a hill-clearing or elsewhere is a length of white cloth and the remains of the feast: once every three months a magician vivifies the rice-plants, so as to earn his fee of two *dĕrham* from each cultivator." In old Muslim Perak these parish magicians were members of an illicit hierarchy, whose head was shaman for the state and bore the title of Sultan Muda. The wife of the Sultan Muda had the title of Raja Puan Muda. His deputy and heir-apparent was styled Raja Kechil Muda. An old list of Perak Chiefs, which gives Mudzaffar Shah as Sultan (and a Mansur Shah as Yang di-pertuan Muda with a note that he died before ascending the throne) gives as Sultan Muda a prince with the Muslim title of Sri Sultan Ala'u'd-din Shah, and adds that the Sultan Muda could not become Raja Muda or Bendahara (the two highest officers of the state below the ruler and commonly destined to succeed him), but he could ascend the throne. According to this account the State Shaman was too exalted to inherit any other office except the Sultanate but according to another account he was ineligible even for that. On spear and distaff side the Sultan Muda should be of the royal house. He was chosen for bravery and resource, knowledge of magic and ability to choose good and trusty medicine-men. His public duties were to 'keep alive' the state weapons, to conduct a feast for the royal drums, to sacrifice

to the genies of the state and to be chief of magicians and medicine-men. He was also court physician. A Sultan Muda was allotted a State allowance from port dues and the tax on opium.

Ant-Hills.

It is recorded under the date 22nd April 1880 in the diary of Sir Hugh Low, then Resident of Perak, how Raja (later Sultan) Idris of that State heard that an ant-hill (*busut*) had grown out of his father's grave at Kuala Teja and how he declared that unless a feast were held and a buffalo sacrificed, his family could not fully avail itself of the good future thus foretold.

Marriage of Elder Sisters.

Sir Hugh Low records (17th June, 1880) how a Perak Kathi, Shaikh Mat Taib, was furious when the Temenggong broke off his engagement with the Kathi's eldest daughter. He refused even to accept the customary compensation of $125 for this breach of promise, because it prevented the forthcoming marriages of his two younger daughters, as the eldest girl ought to be married first.

A Note on Bornean Badgers (*Mydaus*)

By C. Boden Kloss.

(Records of the Raffles Museum, No. 26).

In 1921 the late Dr. J. C. Moulton gave to two flat skins of Malaysian Badgers obtained from natives of Borneo the name *Mydaus javanensis montanus*[1]. This name was accompanied by a description of the skins and a locality. The type was presented to the Natural History Museum, South Kensington; the co-type is in the Raffles Museum, Singapore. Later Dr. Moulton gave some account of a third example in the Sarawak Museum from the same locality, viz., North Sarawak[2].

By all the rules of nomenclature the name is therefore sufficiently established and must be considered.

Nevertheless Drs. Lönnberg and Mjöberg consider it a *nomen nudum* and proceed to rename a Bornean badger, on specimens acquired by the latter in the same Kalabit country whence came Dr. Moulton's material, *Mydaus luciferoides*[3]. Like their examples the cotype of *montanus* has a pronounced whorl on the nape with a consequent reversal of hair, though reference to this character was rather unfortunately omitted by Moulton in his description.

Seeing how variable in colour pattern is *luciferoides*[4] I can see no differences in this respect between it and *montanus*.

In 1902 Oldfield Thomas described *Mydaus lucifer* on two examples from the mainland of Borneo near Labuan[5]. The fur is "uniformly directed backwards throughout; not reversed forwards on the nape as in *M. javanensis*." The size of the nape whorl and degree of reversal are very variable in the examples of Malaysian Badgers I have examined and perhaps we should not attach at present too much weight to the absence of these characters in the type female of *lucifer* and the paratype.

Thomas and Moulton state, and the others seem to indicate, that all Bornean animals are of large size.

I regard *luciferoides* as merely a gratuitous synonym of *montanus* and am doubtful whether the latter is really distinct from *lucifer*, while for me the "species" of *Mydaus* known are all forms of *javanensis* (Desm.).

---

1. Journ. Straits Branch, Royal Asiatic Society, No. 83, April, 1921, p. 142.
2. Op. cit. No. 85, March 1922, p. 212.
3. Ann. & Mag. (9) XVI, p. 509 (1925).
4. tom. cit. plate XXVII.
5. Ann & Mag. (7) IX, p 442 (1902).

Since the above note was written I have received from Mr. E. Banks of the Sarawak Museum photographs of four Bornean badgers. One came from S. E. Borneo and is in the Leyden Museum (vide Jentink, L. M. Notes, XVII, 1895, pp. 42, 44,) and three are from North Sarawak, being part of Mjöberg's series of ten, of which six were sent to Lönnberg and form the type series of *M. luciferoides* about which those authors write, "In all six specimens there is a strongly developed whorl on the nape and in consequence the hair in front of this is reversed forward" while in a footnote Mjöberg adds "As is the case also in the specimens not sent to Prof. Lönnberg for examination." This last statement is incorrect: one of the three shows no trace whatever of a whorl or reversed hair—and the Leyden example agrees with it.

I conclude that the presence or absence of a nuchal whorl is of no diagnostic value amongst Bornean badgers, that only one form has been demonstrated to occur on the island, and that it should be known as *Mydaus javanensis lucifer* Thos.

Our Malaysian badgers, therefore, are:—

I. *Mydaus javanensis javanensis* (Desm.) Java; and Sumatra.

II. *Mydaus javanensis lucifer* Thos., Borneo.

Then two forms have been proposed, from small islands, which I have not examined:—

III. *Mydaus* (*javanensis*) *schadenbergii* Jentink[6]. Calamianes Ids. north of Palawan.

IV. *Mydaus* (*javanensis*) *ollula* Thos[7]. Great Natuna Id., South China Sea, between Borneo and Malay Peninsula.

[Mr. Boden Kloss wrote the above note in 1926 he is now away from Singapore and has not yet seen Mr. Oldfield Thomas' contribution to the subject in Ann. Mag. Nat. Hist. (9) 20, 1927, p. 288. F.N.C.].

A rare Bornean Squirrel, *Glyphotes simus* Thomas.

By F. N. Chasen and C. Boden Kloss.

(Records of the Raffles Museum, No. 27).

This small squirrel was described by Thomas (Ann. Mag. Nat. Hist. (7), II, 1898, p. 250) from a skin collected by A. Everett on Mount Kina Balu, N. Borneo, but the altitude at which the specimen was taken is not stated. In the original description no mention is made of any example other than the type but in the Sarawak Museum there is a ♂ skin and skull collected by Waterstradt on Marabok Mt., Brunei, in December 1899 (0.10.82 B.M.) which is for some reason labelled by the Sarawak Museum as "co-type of the species" although it was taken in the year following the publication of the original description. This second

6. Notes Ley. Mus., XVII, 1895, p. 46.
7. Ann. Mag., (7), IX, p. 443 (1902).

specimen, which reached Sarawak as an exchange from the British Museum, is mentioned in the Report of the Sarawak Museum for 1901-1902 p. 11, and again listed in the 1903 Report p. 19, No. 95. In the Report for 1911, p. 30 *two* specimens are listed, but according to Mr. E. Banks, the present Curator, this number is due to a clerical error, the skull having been listed separately.

We now have to record the third known specimen of this squirrel which was taken at Tenompok near the south foot of Kina Balu on 10th June 1925, by one of the Raffles Museum Dyak collectors who was attached to Major Enriques' party during the ascent of the mountain in that year. This example is a young female (last molar not yet level) and the skull is much broken: it is everywhere much greyer and colder in tone than the Brunei specimen with which it has been compared, although it is difficult to say to what extent this latter has altered in colour in 28 years.

Measurements:—The adult ♂ from Brunei is given first and the immature ♀ from Tenompok second: the figures in brackets are the measurements of the type *fide* Thomas (*l.c.s.*) Head and body —, 103 (129); tail —, 112 (106); hind-foot 26 dry, 21 wet (28 wet); ear 12 dry, 14 wet (11 wet); basilar length 22, 20c., (21c.); greatest breadth of skull —, —, (18.2); nasals 6.5 x 5.8, —, (6.9 x 5.1); interorbital breadth 12.8, 10.5 (11.8); breadth of braincase 16.7, —, (16.5); palate length from henselion 11.2, 10.5 (11.2), diastema to p4, 6.7, 6, (6.4); upper tooth series from p. 4 only 4.4 (alveoli), —, (4.1); breadth of upper incisor 1.6, 1.1 (1.6); mandible, condyle to incisor tip 20, 18 (19.6).

The external measurements of the Tenompok specimen were taken in the flesh by a young native collector and are probably not reliable.

An Addition to the list of Bornean Birds: *Numenius minutus* Gould.

By F. N. Chasen and C. Boden Kloss

(Records of the Raffles Museum No. 28)

We have recently examined a skin of *Numenius* (*Mesoscolopax*)*minutus* collected at Kuching in Sarawak on 5th October 1900, by a native collector. Owing to misidentification this interesting bird has hitherto remained unrecorded.

According to the label the bird is a male and the collector noted that the iris was black, feet bluish and beak black; but this last is certainly not quite accurate for even in the dried skin the base of the lower mandible is very pale and it seems agreed that it is usually flesh colour.

Length in the flesh 315. Measurements from the skin, culmen 40, wing 191, tarsus 52 mm.

N. minutus is said to breed in Eastern Siberia and reaches Australia in the winter. It has been recorded from Celebes and the Philippines but its main migration route seems to lie more to the east and the bird now recorded from Kuching is the most westerly known example in the tropics.

The Pied Cuckoo-Shrikes

By C. Boden Kloss

(Records of the Raffles Museum No. 29)

When I wrote my note on these birds in the last volume of this Journal (IV, 1926, pp. 158-161) I had to leave the position of *Pycnonotus humeraloides* in doubt. I have since seen Lesson's description: his bird came from Java and since it has the breast and flanks pearl grey must be an example of *Lalage nigra nigra* Forst., not of *Lalage nigra sueuri* (Vieill.) which occurs in the eastern parts of that island.

The affinites of *Ceblepyris striga* Horsfield, were also uncertain. Mr. H. C. Robinson has recently examined the type series in the British Museum and has found that this name also must stand as a synonym of *L. n. nigra.*

The nomenclature used in my revision is not affected by these determinations.

A List of Reptiles from Pulau Galang and other islands of the Rhio Archipelago.

By F. N. Chasen & N. Smedley.

(Records of the Raffles Museum No. 30).

In view of the paucity of the literature dealing with the herpetology of the Rhio Archipelago the publication of a list of reptiles obtained from one of these islands, supplemented by such specimens from other islands as are in the collection of the Raffles Museum may serve some useful purpose.

The list should be read in conjunction with those published by Dammerman (1926) and de Rooij (1915-17).

To facilitate comparison the nomenclature of Dr. Nelly de Rooij in her work on "Reptiles of the Indo-Australian Archipelago" has been followed.

The bulk of the material is the result of systematic collecting by Mr. Carlton P. Brook, until recently resident on the island of Galang, and his colleague, Mr. W. R. McKee. Specimens from this and other islands have also been collected by Mrs. de Burgh

Thomas, and Messrs. C. Boden Kloss and F. N. Chasen of the Raffles Museum. More systematic collecting may be expected to bring to light a number of forms not here listed. In those cases where a record of numbers examined appears of interest they are appended.

LACERTILIA.

GECKONIDAE.

Gymnodactylus marmoratus (Kuhl.) P. Galang.

Hemidactylus frenatus D. and B. P. Galang.

Gehyra mutilata (Wiegm.) P. Galang.

Gecko verticillatus Laur. P. Galang.

Of this common gecko 11 specimens were examined. Without exception these were profusely spotted with red on the ventral surface, but otherwise agreed with the usual form in which the underparts are whitish often variegated with grey. Examination of the material in the Raffles Museum brought to light a similar specimen collected in Singapore (A. Listerman, 1923), and a rather doubtful case from Baram, Borneo (C. Hose). It appears, therefore, to be a well-constituted colour-variety, the more interesting from the fact that no typical specimens are known from P. Galang, where the variety is abundant. Several specimens had regenerated tails, the new portion being without rings and spotted with red.

AGAMIDAE.

Draco volans L. P. Galang 10, P. Bulan (F. N. C.) 6, P. Battam (C. B. K.) 3.

Calotes cristatellus (Kuhl.) P. Galang, P. Bulan.

A specimen from P. Galang had a short secondary tail growing out from the side of the true tail.

VARANIDAE.

Varanus dumerili (Schleg.) P. Galang.

Varanus rudicollis (Gray.) P. Galang.

Varanus nebulosus (Gray.) P. Galang, P. Bintang.

Varanus salvator (Laur.) P. Galang, P. Bulan.

Four of the five species known to the Malay Peninsula are thus seen to be present on P. Galang.

SCINCIDAE.

Mabuia multifasciata (Kuhl.) P. Galang, P. Bulan.

Lygosoma malayanum Doria P. Galang.

Lygosoma bowringi (Gthr.) P. Bulan.

The following colour notes were made in the field by F.N.C. Ventral surface of tail red, of body lemon yellow. A reddish longitudinal band ventral to the black body-stripe.

CHELONIA.

TESTUDINIDAE.

Cyclemys dhor (Gray). P. Galang.
Cyclemys amboinensis (Daud.) P. Battam (C.B.K.).

CHELONIDAE.

Chelonia imbricata (L.) P. Galang, P. Bulan.

EMYDOSAURIA.

CROCODILIDAE.

Crocodilus porosus Schn. P. Galang, P. Bulan.

Specimens were not brought in to the Museum, but are here recorded from notes made by F.N.C.

OPHIDIA.

BOIDAE.

Python reticulatus (Schn.) P. Galang, P. Bulan.

The collection does not include specimens of this common snake, but they are recorded by F.N.C. who has seen locally killed examples in both islands. Specimens of 24 ft. in length have been brought into Singapore from Pulau Galang.

COLUBRIDAE.

Polyodontophis geminatus (Boie.) P. Bulan.

Dendrophis pictus (Gmel.) P. Galang 18.

Dendrophis formosus Boie. P. Galang 14.

Dendrelaphis caudolineatus (Gray) P. Galang 13.

These last three closely related species are all extremely common on Pulau Galang.

Tropidonotus trianguligerus Boie P. Galang.

Tropidonotus maculatus Edeling P. Galang.

Xenelaphis hexagonatus (Cant.) P. Galang.

Coluber melanurus Schlegel. P. Galang.

Coluber oxycephalus Boie P. Galang.

Simotes purpurascens (Schlegel) P.Galang.

A single specimen lacking the sub-ocular.

Pseudorhabdium longiceps (Cant.) P. Galang.

Calamaria ? melanota Jan. a badly damaged immature specimen.

Dipsadomorphus dendrophilus (Boie) P. Bulan.

Dipsadomorphus cynodon (Boie) P .Galang, P. Bulan.

Of thirteen specimens from Pulau Galang, two were of the melanistic variety commonly found side by side with the more usual form. Two other specimens contained birds. One, measuring 1965 mm. in total length had swallowed an example of the small green pigeon, *Treron curvirostris* Raffles. The other bird was *Hemiprocne longipennis*, the snake measuring 1920 mm. Both birds had been taken in by the head.

Flower (1899) mentions a case of *D. cynodon* swallowing a bird. Annandale (1903) attributes a sluggish demeanour to this snake. Mr. Brook says that he has quite commonly found evidence that this snake feeds on birds and quotes a case in which he found three swallows in a *D. cynodon* which entered his room.

Psammodynastes pictus Gthr. P. Galang.

Dryophis prasinus Boie P. Galang, P. Bulan.

One immature grey specimen resembled *D. fasciolatus* in having the anal shield entire and only two small loreals. The head was spotted with darker but the markings were not arranged in a definite pattern as in a specimen of *D. fasciolatus* with which it was compared. Similar discrepancies were noted in a number of specimens of *D. prasinus* from various localities.

Chrysopelea ornata (Shaw.) P. Galang.

Chrysopelea chrysochlora (Schleg.) P. Galang.

No specimen in the collection, but F.N.C. saw one swimming across a wide creek in the mangrove.

Platurus colubrinus (Schn.) off P. Samboe.

Naja tripudians Merr. P. Galang, P. Bulan.

Of 11 specimens from P. Galang, one aberrant example had the internasals separated from the preocular. Others showed a tendency to an intermediate phase.

Naja bungarus Schlegel P. Galang.

One juvenile and the sloughed headskin of an adult.

Doliophis bivirgatus (Boie) P. Battam (C.B.K.).

Doliophis intestinalis (Laur.) P. Galang.

VIPERIDAE.

Lachesis purpureomaculatus (Gray) P. Galang, P.Battam (C.B.K.)

Lachesis wagleri (Boie) P. Galang.

Seven specimens, all of the immature green form.

References.

de Rooij. Reptiles of the Indo-Australian Archipelago, Vol. I, 1915; Vol. II, 1917.

Dammerman. The Fauna of the Rhio-Lingga Archipelago, Treubia VIII, 1926, p. 323.

Flower. P.Z.S., 1899. p. 681.

Annandale. Fasciculi Malayenses, Zoology 1, 1903, p. 164.

Sworder. Singapore Naturalist, Vol. I No. 3. 1924 p. 15.

On the Development of the Dogfish *Scyllium marmoratum* Benn., and allied Species.

By N. SMEDLEY, *M. A.*

(Records of the Raffles Museum No. 31.).

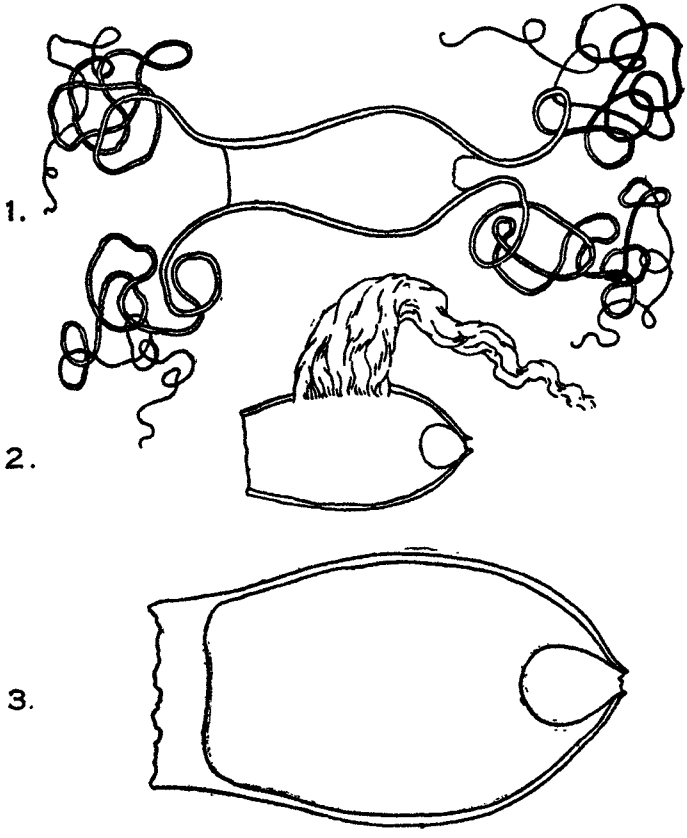
The Raffles Museum has received, from time to time, much interesting material, which has been collected by officers in charge of cable repair work, and which would otherwise have been inaccessible owing to the many difficulties in the way of deep-sea collecting. Several eggs of the Dogfish, *Scyllium marmoratum* Benn., were obtained by Mr. W. Maclear Ladds some years ago from the China Sea, lat. 18° 22′ N., long. 111° 11′ E., at a depth of 115 fathoms.

Three of the specimens contain embryos in various stages of development: one of these is sufficiently advanced for specific identification. They provide an interesting comparison with the embryos of the Striped Dogfish, *Chiloscyllium indicum* (Gmel.) and the Tiger-shark, *Stegostoma tigrinum* (Gmel.), with which I have dealt in previous papers.[1] The descriptions given are admittedly superficial, and no attempt is made to enter into embryological detail, which would require more and fresher material.

The egg-case is not unlike that of *Chiloscyllium*, but differs from it in being of a lighter colour, less opaque, and of slenderer form for the greater part of its length. It is about 3½ inches in length without the tendrils by a little over 1½ inches greatest depth. The same orientation[2] may be used as in my previous notes. The posterior corners almost meet, and there is a gradual tapering towards the anterior end, which, however, is broadly truncate. All four corners bear long, twining tendrils, which are

1. Journal Malayan Branch, Royal Asiatic Society IV, I, 1926, p. 164 et seq.

2. The very young embryo was taken as the basis. Its position gives the top of the egg-case; the head points to the truncate end (anterior), the tail to the posterior pointed end.



1. SCYLLIUM MARMORATUM
2. CHILOSCYLLIUM INDICUM
3. STEGOSTOMA TIGRINUM

extruded from the vent of the female, and, engaging with some fixed object, ensure that the egg shall be safely anchored before it actually leaves the oviduct of the mother.

The following observations were made on the three stages represented:—

1. Embryo about 40 mm. in length, lying along the upper margin of the case. Yolk-sac, about 35 mm. in diameter, lying below it. Practically all the yolk appeared to have been absorbed[3] from the egg-case into the yolk-sac. The embryo was at a much earlier stage of development than stage 2 of the series of *Chiloscyllium*,[1] but the yolk-absorption from the egg-case into the yolk-sac had reached practically the same stage as in that case.

2. Embryo about 50 mm. in length, with development comparable with that of *Chiloscyllium*, stage 2. Yolk-sac diminished to about 35 mm. in diameter.

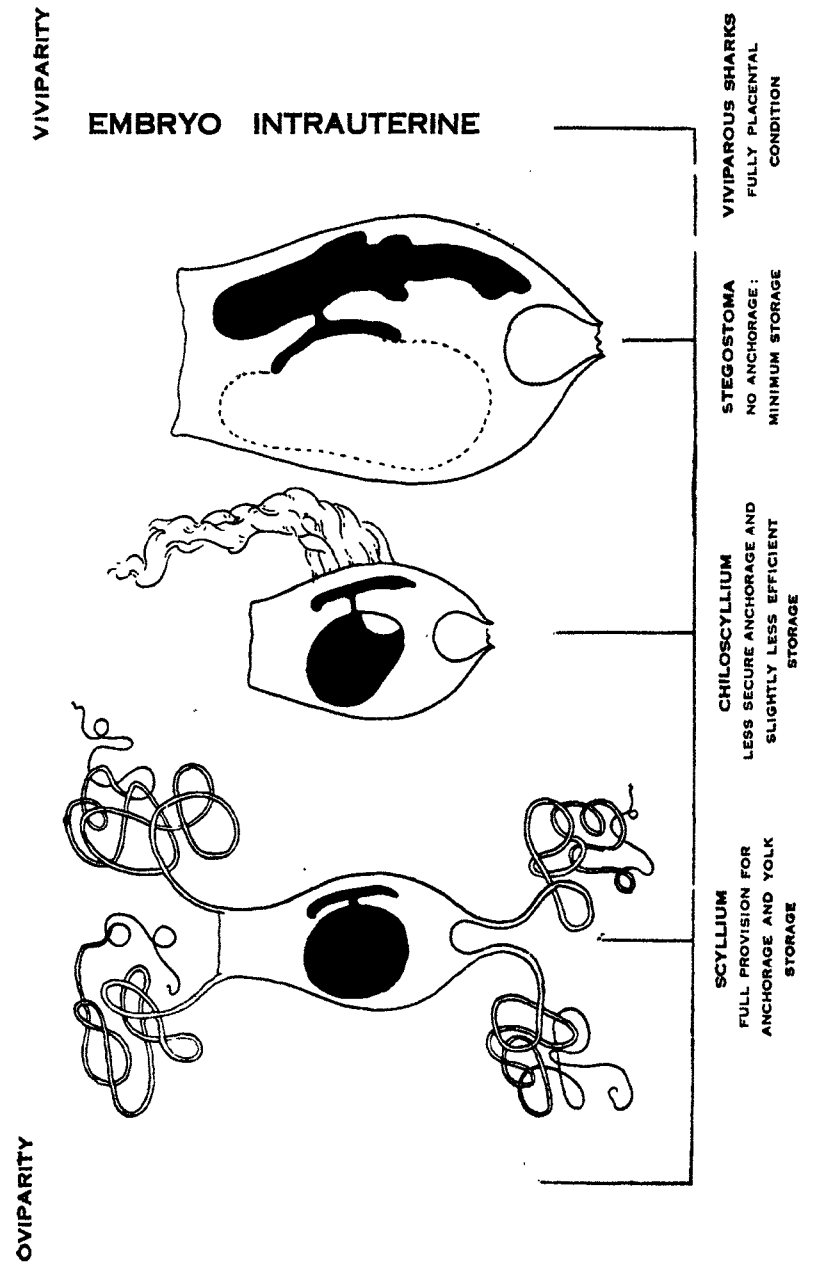
3. Embryo reaching an advanced stage of development (cf. *Chiloscyllium* 3 and 4). Marbled marking clearly defined. Yolk-sac about 10 mm. in diameter. Embryo coiled with head towards the anterior end of the egg-case, as in *Chiloscyllium*.

In a previous paper[1] I drew attention to the three types of egg-case illustrated by Malaysian species of Scyllium, Chiloscyllium, and Stegostoma. There would appear to be a close relation between the form of the egg-case and the manner in which the embryo develops, corresponding to stages on a scale which leads from oviparity to viviparity.

The egg-case of *Scyllium marmoratum* (Page 356, Fig. 1) has four strongly-developed tendrils, which ensure that the egg shall find a firm attachment before it can be released from the oviduct of the female. Related to this is the fact that the yolk-sac takes up[3] the bulk of the yolk before any considerable quantity of it is transferred to the developing embryo. This then illustrates a state of strong oviparity.

In *Chiloscyllium indicum* (Page 356, Fig. 2) the egg-case has lost all but the trace of tendrils. The band of interwoven threads which is produced from the upper edge of the egg-case is a very indifferent form of anchor and the egg may drift some distance before it is finally entangled in some firm object. The absorption of yolk by the embryo from the yolk-sac probably takes place to a greater extent before the whole of the yolk in the egg-case has been absorbed or enveloped by the yolk-sac than is the case with *Scyllium*. The absorption is of a more direct nature, and the function of the yolk-sac therefore rather more closely

3. I have referred to "absorption" of the yolk by the yolk-sac, as this term seems to cover all the processes which occur. In detail the blastoderm has been seen to grow over and envelope the yolk, in such forms as have been studied in detail.


VIVIPARITY
EMBRYO INTRAUTERINE
OVIPARITY
SCYLLIUM
FULL PROVISION FOR ANCHORAGE AND YOLK STORAGE
CHILOSCYLLIUM
LESS SECURE ANCHORAGE AND SLIGHTLY LESS EFFICIENT STORAGE
STEGOSTOMA
NO ANCHORAGE: MINIMUM STORAGE
VIVIPAROUS SHARKS
FULLY PLACENTAL CONDITION

related to that of a *placenta* than in the case of *Scyllium marmoratum*, although it still retains its original function as a food-store.

Stegostoma tigrinum (Page 356, Fig. 3) has an egg-case which has lost all means of attachment. A considerable quantity of yolk still remains loose in the egg-case when the embryo possesses the recognisable features of the adult. The yolk-sac is acting as an organ for the direct absorption of the food-yolk from the egg-case to the embryo, and has practically, if not entirely, lost its storage function. This absorption appears to take place before the closing of the yolk-blastopore.

It is only a step from this state to the retention of the egg within the body of the mother, as in the viviparous sharks.[4] The egg-case is present in the initial stages, but later disappears and the embryo is only for a very brief period dependent on the yolk in the sac. The yolk-sac produces folds which associate closely with those of the uterine wall, the connection between the duct of the yolk-sac and the embryonic gut is severed, and the cord acts as a passage for the blood. True placental absorption is thus effected.

The stages may be illustrated by the diagram (Page 358).

I am indebted to Mr. R. Walker of the Education Dept. who has brought my plates up to the standard necessary for reproduction.

4. For an account of some Indian viviparous sharks see Southwell and Prashad, Rec. Ind. Mus., XVI, 1919, pages 223-240.

Random Notes on Current Malay Beliefs.

By HAJI ABDUL MAJID.

How many of us are aware of the belief among Malays that the game of football was originated by unbelievers on the battle-fields of Karbala where Hassan and Hussein, grandsons of the Prophet, were killed? The story goes on to say that the unbelievers in their wild triumphant joy over victory took the holy heads of the grandsons of the Holy Prophet and kicked them about to shew there was no holiness in them at all. Believers (i.e.Muslims) by joining in the game of football which is looked upon by unbelievers as a commemmoration of their victory in Karabala are therefore guilty of profaning the religion of Islam inasmuch as they also kick about the symbolical heads of Hassan and Hussein, grandsons of the Founder of the religions. Of course, any one can refute this on historical grounds and pin down the motive for inventing the story to a desire on the part of some elderly person to keep off youngsters from the game which, as it is played by some Malays, is really dangerous to them. Yet the invention does not stop there since those who are in favour of the game argue it by saying that the Almighty Allah in His great wisdom never allowed the heads of Hassan and Hussein to be so profaned by being kicked about by unbelievers, but snatched them invisibly and put the heads of unbelievers in their stead!

Those who have read the *Hikayat Amir Hamzah* must be struck with the fantastic yarn woven round about the personality of this simple hero of Islam, who has been made to appear with all the glory of supernatural powers, winning victories both in the seen and unseen worlds, over men and jinns who came in his way. Since there is no fairy-like story in the whole history of Islam who, then, is responsible for giving a supernatural garb to the historical figure of Amir Hamzah? Akbar the Great, one of the Muslim Kings of India, was an illiterate man when he ascended the throne, having been imprisoned by his usurping uncle all the time that he should be studying at school. His Hindu Minister of State, with the intention of converting the King to Hinduism, started relating to the King the story of the Hindu hero, Sri Rama, who conquered every one in this world and up in *kayangan*, so that the King very nearly turned Hindu. His Muslim Minister of State, noticing this inclination of the King, informed the King that Islam also had heroes whose exploits and conquests surpassed in glory those of Sri Rama, and so the *Hikayat Amir Hamzah* came into existence. Needless to add, that saved Akbar from leaving the Muslim faith.

The Malays believe that the soul of the dead does not finally depart from the home where it made the exit from its corporeal existence until the hundredth day when the relatives will make a *khĕnduri*, known as *Mĕnurun batu*, that is a great feast for the purpose of putting up the two tombstones over the grave of the dead. Before the tombstones leave the house there is a little ceremony of washing them in *tĕpong tawar*, which might be looked upon as a means of conciliating the newly departed soul to its new place of abode for the future. The whole procedure is decidedly non-Islamic and may be a relic of the Hindu cult among the Malays of former days. Nor is the ceremony of "bathing" the grave on festival days Islamic, and in this connection I am inclined to believe it is copied from the Chinese who have great reverence for the souls of their departed relatives.

Whilst in Kota Bharu, Kelantan, the other day I was shewn the figure of a "bird" built of wooden and bamboo frames, immensely large in size and kept in a pavilion in what may be called the Royal Botanical Garden of Kelantan. On State occasions, such as royal marriages and the like, the bird with its gaudy wings and feathers of newly stitched-up silk and like material will be taken round the town in procession. I am told that the "bird" represents an actual pet bird of one of the princes of Kelantan who refused to be consoled on the loss of that pet by its death until the inhabitants made and presented him with this imitation bird. One wonders whether that pet bird of the Kelantan prince was one of those birds of paradise from New Guinea? It is possible that it found its way to Kelantan with the Lanun pirates who scoured the seas in those days. In any case, it must have been a "foreign" bird to Malaya for the prince to be so greatly grieved at its loss.

Malayan Natural History Notes. *

By A. W. HAMILTON.

Kĕpala Bĕsar (Kedah) or Kĕpala Rapang. The Large Sand Plover, *Charadrius leschenaulti*: a migratory bird, found in flocks on all tidal flats around the coast. The Malay name is from the appearance of the head.

Biji Nangka (Kedah). The Lesser Sand Plover, *Charadrius mongolus*: like the last a small wader, very like the European Ringed plover in appearance and found in large flocks on the tidal flats in the company of other migratory species (*e.g.* Large Sand Plover, Whimbrel, Red-shank, Stints, etc.)

Kangor (Kedah) or Lang Kangor. The White-bellied Sea-Eagle, *Haliaeetus leucogaster*. A common widely distributed bird in Malaysia. Adults are grey above and white below: young birds are all brown.

Kĕlĕngkeng. The Small Pied Hornbill. *Anthracoceros coronatus convexus*. A friendly, if noisy, bird which makes a good pet. The form of the casque varies with age: few birds are more noisy on the wing than Hornbills.

Sĕsorok. The Mole-Cricket, *Gryllatalpa* sp. At certain seasons numbers of these Mole-Crickets invade the houses in Kedah, and it is astonishing with what ease they can escape from under the palm of one's hand pressed flat down on them.

Kĕrawai. The Nocturnal Wasp. *Vespa dorylloides*. A small transparent-looking wasp, yellowish white in hue.

Chĕngkĕrek. The Large Field Cricket. *Brachytrypes portentosus*. This species of cricket is commonly used for fighting by the Malays.

Tĕbuan. A Wasp (or Hornet), *Polistes sagittarius*. This black hornet, with a vivid orange band on its pear-shaped extremity, builds the large nests often noticed in trees and is a dangerous customer when annoyed.

* Identifications made in the Raffles Museum.

Lĕbah. The Bee, *Apis dorsata*: the *Apis indica* is sometimes known as Kĕram. Both are common Malayan species and could perhaps be domesticated.

Kĕlolong. The pupa of a Skipper, a Hesperid butterfly. The pupa is commonly found wrapped in a tubular sheath of plantain leaf which still depends from the original frond and gives the tree a torn and untidy appearance. The Skippers are a very numerous group in Malaya but few of the specimens are striking in appearance: they are mostly small and brownish in colour.

Elephant Terms in Perak *

By J. I. MILLER, *M.C.S.*

In addition to the more common terms of the elephant equipment, such as kusa (the goad), rengka (the saddle), singkla (the shackle):—

the following are used by Gembalas in the District, of Kuala Kangsar and upper Perak—possibly of Patani origin:

	Elephant word	Malay equivalent	Meaning.
دي	di	datang	Come here.
تروم	trum	dudok	lie down.
ته	tah	bangkit	Get up.
ربغ	riang	berdiri betul	Right up.
كوة	kut	berjalan	walk.
هي	hi	berjalan-lah	walk out.
مو	mu	kanan	to the right.
كوغلا	kelong	kiri	to the left.
چين	chin	berjalan perlahan	Slowly.
كوية	koyit	buang kayu	Push aside the brushwood.
كن	kan	tundok-kan kayu	Trample down the brushwood.
تي	ti	jangan ambil apa-apa	Don't pick things up.
ڤها	paha	jangan terkena rengka kepada poko' kayu	Don't brush the saddle against trees.
لوة	lot	tundok-kan kepala	Down head.
تول اتو توهول	tul	undor	Back.

*See also "Notes and Queries," Journal Straits Br. R.A.S. 1885, p. 32. Ed.

لولو	lulu	tundok kepala dalam ayer	Dip your head.
دوگا	duga	(Kuat meye-rang sungai	A strong swim-mer.
ريف	riap	rapat-lah	Close up (to the stage).
هوه	haw	berhenti	Woh.
چروة	cherut	Masok dua kaki (dalam sing-hla)	Put both feet in (the shack-les).

Two Murut Pantuns from the Dalit District Keningau, British North Borneo.

By G. C. WOOLLEY.

I. Invitation to drink, and the reply, on arrival of a Chief or a party of well-known warriors.

Koi nobai saiilang
Boiuan kovei nagi,
Oko avoi anginoman
Ago luminsongan
Suang nu waloi.
Oko Kelaun itu

Kuritan kovei arakin
Lili itakau nantutoh.
Ilaio gua saiilang,
Kagino novei
Iginom davinsulun.

II.

Ano aningkaho da nginom,
Batang inan mairano
Pai nu Kelaun.
Inan mairano
Ondo dagino alaiun
Nuva vinsulun.
Kolotong patuon
Ka liga bebalaiing
Da anginuman.
Batang inan davinsulun itu
Kelaun voga-liga dagaling:
Duian ga-liga berbatangun:
Aki na makasuining

Oro ili nagaling?
Surai liga lelumbis:
Batang inan disulun
Imbalua liga lopot,
Sinsing liga ligogot:
Batang inan disulun
Sumbiling kalasangan itu.
Kolotong noiak pinato,
Gino liga binambal
Akai ahurambai.
Suyong amagun itu
Mamata kinindasu
Ayam lantongan itu.

Translation.

I.

Come, brothers,
Shame will fall on you:
Ye are slow to drink.
Follow in quick succession at the jar,
All ye that are in the house.
Else will ye, brave warriors,
Earn laughter and mockery
From us, your equals in age.
See now, brothers,
Thus do we drink,
We that are men.

II.

Nay, we wish not to drink deep.
Neither are these bodies of ours
Like those of great warriors.

These bodies of ours—
We are old now,
We men.
When we were young,
None could point the finger of scorn at us
In drinking.
As for these bodies of ours,
Truly we were great warriors in former days:
The red fruit lay scattered thick:
Have ye not heard how it was,
In the days of old?
We were as combs that smooth out the long hair:
And these bodies of ours,
Impenetrable as the tangled clump of the Imbalua rotan,
Stubborn rings that cannot be loosed:
These bodies of ours,
Like the hard sumbeling bamboo that wounds those that touch it:
When we were in our prime
Even so did we slay,
We, in the days that are past.
All the village then
Were as the pounded grains of roasted rice
Spread out on a broad mat.

Notes.

4 The jar of Tapai is fastened to one of the central posts and prepared for drinking, a long reed being pushed through to the bottom of the jar. Each in turn squats down and drinks through the reed until he has lowered the level down to a fixed mark. The jar is then re-filled to the brim with water, and the next man takes his turn at the reed.

6 Kelaun, a title given to successful warriors; "a Paladin".

23 Duian, the red jungle durian. Red fruit or red seeds symbolise heads taken, blood etc. "When we went out on a raid, the bodies of the slain lay thick."

26 We ruled the country and settled all disputes, even as a comb, surai, smooths out tangled locks.

28 As the centre of a tangled clump cannot be seen, or the outer skin of the rotan conceals the inner cane, so our deeds and thoughts were hidden if we liked. i.e. we avenged our private quarrels and slew in secret, and none knew that it was our hand that struck the blow. Our minds were inscrutable.

29 We were hot-headed and obstinate; we would not give up our desires at the bidding of others, as a ring may slip easily on to a finger but cannot be withdrawn. A string tied tightly round a parcel and knotted is "ligogot" "hard to be unloosed".

31 Sumbeling, a variety of bamboo with a very hard surface, which will turn the edge off, or blunt, a weapon; it has thorns, and the hair on its leaves cause itch. "An awkward thing to tackle"

II. Used on the occasion of a visit from an European

Koi moiun, maundong, tangkalon,
Pangkikiat, pangkukui,
Paat lundun dagito,
Tuangan dagito.
Pai nindaruloi inkagaya
Itakau sulokoiun, tambuluion.
Ando Kenawai kambula
Paat no nama-ramai nakasuku;
Pai Kenawai itu kambula
Takau pagun lamasun pulongan.
Oro poio dagaling dalaiir
Ka ramai kampong kapo limanggong:
Antotobo sario asisimbut;
Oro po-ban giato sulinggan:
Koson iak da pembaiit pongkoto
Suyong nu kampong sario amahun.
Gino insom nurakon; samu dio randaian.

Translation.

Come, women and girls,
Play and make merry,
Now on this evening,
On this night.
Not daily, not every day is it
That strangers visit, that men come to us.
A white Padi bird, a Kenawai,
Whilst many of us are here, has come to us.
Were it not for the white Kenawai
Our home would be an island, set in the midst of the flood,
Formerly, in the days of old,
There was no populous house, before the long Padi Mortar came;
All men stabbed and thrust with spears.
Now in these days the sun is risen;

15 Like brethren, brothers and sisters,
Are all the houses, all the people of the land.
Thus much do we say: do not add more.

Notes.

In a number of lines two words of identical or similar meaning are used; *eg.* maundong, tangkalun = women; pangkikiat, pangkukui = play; lundum, tuangan = night, etc.

7 The "White Kenawai" is the European visitor.

10 Lamasun, pulongan = an island, connotes danger, 'hemmed in by foes,' not safety.

12 Limanggong, the long log with holes, used for a padi mortar, is a common synonym for a man. Here it means The White Men.

Notices.

I.

We announce the publication of *Adatrechtbundel* (*Indonesian Adat Law Volumes*) *vols. XXV and XXVI* edited by the Board of the Adat Law Foundation at Leyden (Holland) at the request of the Royal Institute for the Philology, Geography and Ethnology of the Dutch Indies.

The complete table of contents of the 25 volumes, inserted in volume XXV, gives an idea of the enormous material concerning Indonesian Adat Law already collected by the Committee consisting of renowned Dutch orientalists of Leyden University and high-placed Indian officers. As we see, the topic for investigation is not confined to the Dutch Indies only, but the volumes contain also extensive collections of data relating to other Indonesian areas: the Philippines, the Malay Peninsula, Madagascar and the Indonesian parts of Formosa, Southern Siam and Indo China.

Volume XXV recently published is so-called *"Miscellaneous"* volume containing data from nearly all law circles in which the field of investigation has been divided in accordance with the classification in Professor van Vollenhoven's standard work on Indonesian law. Of special interest seems to us the native description of lawsuits of the Toradja's of Central Celebes edited by the late Dr. Adriani, the much regretted ethnologist and linguist of the Dutch Indies.

Of volume XXVI, *Malay Territory and Borneo,* the greater part treats of the Malay Peninsula and contains in the main excerpts on indigenous law from a great number of scarce books and articles.

Any one dealing with indigenous law will follow with interest the continuation of this important series.

1927] *Royal Asiatic Society.*

II.

XVIIth International Congress of Orientalists.

At the concluding meeting of the XVIth International Congress of Orientalists, held in Athens in 1912, it was agreed that the next Congress should be held in OXFORD. Having obtained the assent of the Vice-Chancellor of Oxford University, and the approval of the Royal Asiatic Society of Great Britain and Ireland, and of the leading Oriental Societies in France, Italy, Germany, Holland, and in America, the members of the Oriental Faculty of Oxford University are making arrangements for holding the XVIIth Congress here during the week beginning Monday, August 27th, 1928.

Coming after so long an interval, it is hoped that the XVIIth Congress may be notable not only for its truly international character, and the number of its participants, but also for the importance and originality of the communications made to it.

I am desired to say that the Oriental Faculty of Oxford University would be grateful for an assurance of public support, and for any publicity which your Society can give to the proposals now made. A Circular Bulletin with fuller information as to membership, arrangement of sections, and other matters, is being prepared, and will shortly be issued.

C. N. SEDDON,

Secretary.

The Bulletin referred to and forms of application for membership may be obtained from the Hon. Secretary, Mal. Br. R. A. S., c/o Raffles Museum, Singapore.

III.

Kern Institute, Leiden.

In April 1925 a Research Institute for the study of Indian archaeology was founded at the University of Leiden, Holland. The aim of the Institute (which has been named after the great Dutch orientalist, Dr. Kern) is to promote the study of Indian archaeology in its widest sense, that is, the investigation of the antiquities, not only of India proper, but of Further India, Indonesia and Ceylon and in fact, of all territories influenced by Indian civilisation, as well as the study of the ancient history of these countries, the history of their art, their epigraphy, iconography and numismatics.

The Kern Institute, which is now established in one of Leiden's historical buildings, is in possession of a library and of collections of photographs, slides, casts of sculptures, rubbings of inscriptions and other materials connected with these studies. Students from abroad, who wish to avail themselves of the facilities thus offered, will be cordially welcome.

The Institute has further taken in hand the publication of an "Annual Bibliography of Indian Archaeology", which will contain the titles, systematically arranged, of all books and articles pertaining to the field of studies outlined above. It is also proposed, in an introductory note, to survey the chief archaeological discoveries made in the course of the year, with the addition, if funds permit, of a few good illustrations. The endeavour will be to render this annual bibliography as complete as possible, especially with regard to archaeological publications appearing in India, which often, owing to their being published in local periodicals, remain unnoticed by scholars in Europe and America. Students of Indian archaeology and allied subjects are particularly requested to supply the Kern Institute with copies of their publications. It will be possible to send copies of the proposed "Bibliography" to members of the Institute regularly.

Those, who are in sympathy with the objects of the Kern Institute, are invited to give their support by becoming members. Applications and enquiries should be sent to the Honorary Secretary, The Kern Institute, Leiden, Holland. The annual subscription is 5 guilders for ordinary members and 25 guilders for patrons. The payment of 100 guilders (or 500 guilders for patrons) will entitle one to life-membership.

The Committee:

J. Ph. Vogel, Ph. D., *President.*
N. J. Krom, Ph. D., *Vice-President.*
J. H. Kramers, LL. D., *Hon. Secretary.*
R. A. Kern, N.I.C.S. (ret.), *Hon. Treasurer.*
A. W. Byvanck, Ph. D.
J. P. B. de Josselin de Jong, Ph. D.
M. W. de Visser, Ph. D.