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JUNE 15, 1926

No. 1

**A List of the
Mosses of the Malay Peninsula**

By

H. N. DIXON M.A., F.L.S.



To be purchased at the Botanic Gardens, Singapore.



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By H. N. DIXON M.A., F.L.S

INTRODUCTORY NOTE

Up to the present time no attempt has been made to publish a conspectus of the Moss-flora of the Malay Peninsula. Mitten's *Musci Ind. Or.* (*Journ. Linn. Soc., Bot.*, Vol. iii, Suppl.) contains some half-dozen records, the only data for which are "Malacca, Griffith." Fleischer has collected a considerable number of mosses, mostly in and around Singapore; these are recorded in the four volumes of his *Musci der Flora von Buitenzorg* (1900-1922). A short list is also given by Hj. Moeller of Straits Settlements mosses in *Hedwigia*, lx, 313, comprising some thirty species. Finally the present writer published descriptions of forty new species from the peninsula in *Bull. Torr. Bot. Club*, 51; pp. 225-259 (1924).

The great majority of entries, therefore, in the following list are unpublished records, and are based on collections made by various botanists, principally H. N. Ridley (R in the list), I. H. Burkill, R. E. Holttum, and C. H. Binstead, with other collectors from the Singapore Botanic Gardens.

The system I have followed is very largely that of Brotherus, in Engler and Prantl, *Pflanzenfamilien, Musci*, Ed. I.

The general character and relationships of the Moss-flora follow naturally very closely on the lines of the higher plants. The endemic species are comparatively few, and I think are not likely to be greatly increased; for while undescribed species are constantly collected, this is pretty well counterbalanced by the discovery of the extension of the range of supposed endemics (of Malaya) to neighbouring areas. On the other hand a very large percentage of the species have a remarkably narrow range of distribution beyond the peninsula itself, especially the Malay-Burma-Assam, Malay-Borneo, Malay-Philippines, and Malay-Java areas. It would be of some interest to give lists of these species, but it is preferable to wait till the distribution of the mosses in the peninsula itself is more completely known; the present list gives a basis for

such a conspectus, but it is only a beginning. Several of the States have been little more than sampled, for mosses, and nearly every collection that is made still contains some new record, either for the State, the Peninsula or for science. This may be illustrated by the fact that since the publication of my paper already referred to, in 1924, thirty undescribed species have come into my hands, and these appear, perforce, as "ined." in the present list.

Among special features of interest in the moss flora may be mentioned the prevalence of species of Calymperaceae (Syrrhopodon and Calymperes) a most interesting and striking Family, having a peculiar distribution mostly to tropical regions, and rarely found at any great distance from the sea, though in no sense maritime plants. This is curiously contrasted with the poor representation of some of the larger genera. Thus of Bryum (between 800 and 900 species) six are recorded from the peninsula; of Campylopus (about 500 species), three; of Macromitrium (415 species) ten; while of Syrrhopodon (235 species), there are thirty-one in the following list, and of Calymperes (200 species), twenty-four.

A further genus which is highly represented here is Acroporium (Sematophyllum Mitt. p.p.). Of about 90 known species (as the genus is understood in Brotherus, *Musci*, Ed. i), 33 are recorded for the peninsula. Here however we have to do with a genus which clearly has its principal centre of distribution in the Indo-Malay region; whereas this can scarcely be said of the Calymperaceae, which have an equally high distribution in tropical Africa, Madagascar and the Mascarene Is., tropical America, and Polynesia.

The total number of species in the following list is about 340, compared with 650 recorded from Java; and with more systematic collecting the number is certain to be very largely increased.

SPHAGNACEAE.

Sphagnum kelantanense Dixon sp. nov. ined.

Kelantan: Gunong Sitong, or ridge, circa 2600 ft. (Nur 12244).

Sphagnum cuspidatum C. M. var. **malaccense** Warnst.

Perak: Summit of G. Batu Puteh, 6900 ft. (Wray 902; type gathering).

Pahang: Cameron's Highlands (Henderson 22781); G. Tahan (R. 1026).

Kedah: Kedah Peak, common (Holtum 14881).

Sphagnum junghuhnianum Doz. and Molk.

Selangor: Ulu Semangkok (R. 277).

Pahang: G. Tahan (R. 1038).

Kelantan: Gunong Sitong (Nur 12243).

Kedah: Kedah Peak, 3000 ft. (Holtum 14882 a).

Malacca: Gunong Ledang (Mt. Ophir) (R. 221).

Sphagnum magellanicum Brid.

Kedah: Kedah Peak, 3000 ft. (Holttum 14882 b).

The Asiatic distribution hitherto of this almost cosmopolitan species is Bhotan and Japan.

DICRANACEAE.**Wilsoniella pellucida** (Wils.) C. M.

Selangor: Batu Caves (R. 644). I have not seen this, and do not know by whom it was determined. It would seem likely that it was the same plant as the following.

DISTR. Ceylon, Java.

Wilsoniella acutifolia Broth. ined.

Selangor: Batu Caves (R. 481).

Garckea phascoides (Hook.) C. M.

"Malay Halb-insel" (Fleischer).

Singapore: Penang: (Binstead 2, 6, 11).

Kedah: Kedah Peak, 2000 ft. (Holttum 15108).

Ditrichum flexifolium (Hook.) Hampe.

Perak: Gunong Keledang (R. 701).

[*Ceratodon purpureus* (L.) Brid. It is rather curious that this peculiarly cosmopolitan species does not appear to have been collected in the Malay Peninsula].

Microdus Miquelianus (Mont.) Besch.

Perak: Tapah (R. 160).

Negri Sembilan: Perhentian Tinggi (R. 739).

Singapore: Bukit Timah (R. 300, 304); Gardens (R. 599), a small form with very narrow leaves: Singapore (Binstead 76).

Penang: Crag Hill (Binstead 4, 7).

Selangor: 15th mile, Pahang Track (Semangkok Pass) (R. 484).

Microdus macromorphus Fleisch.

Perak: Tapah (R. 160).

DISTR. Java; Borneo.

Dicranella coarctata (C. M.) Bry. jav.

Selangor: Bukit Kutu (R. 396).

Penang: Penang Hill (Chipp 4692).

Kedah: Kedah Peak 1000 ft. (Holttum 15109).

Campylopodium euphorocladum (C. M.) Besch.

Kedah: Kedah Peak, 3000 ft. (Holttum 15027).

Braunfelsia dicranoides (Doz. and Molk.) Broth.

Pahang: Gunong Tahan, 5500-7000 ft. (Haniff and Nur 7915 b).

DISTR. Java.

Braunfelsia enervis (Doz. and Molk.) Par.

Pahang: Fraser Hill, 4000-4370 ft., on tree trunk (Burkill and Holttum 8838); Gunong Tahan (Robinson).

DISTR. Java.

A very densely foliate, julaceous form. Neither the figure given by Dozy and Molkenboer nor that of Fleischer gives a good idea of the habit of the plant, which, judging by the specimens in our national collections, is usually much more densely foliate, with more robust branches than as depicted by these authors. The present plant is so markedly different, indeed, from these figures, that I had no doubt at all of its being a new species, prior to examining specimens of the Java plant.

Braunfelsia longipes Dixon in *Bull. Torr. Bot. Club* 51: 225 (1924).

Pahang: Gunong Tahan, 7000 ft. (Haniff and Nur 7905).

Braunfelsia plicata (Lac.) Fleisch.

Kedah: Kedah Peak, 3800 ft., on ground, in thick jungle, just below summit (Holttum 14869) c.fr.

This has hitherto been found only in a single locality in Java.

Dicranoloma Blumii (Nees) Par.

Pahang: Gunong Tahan (R. 1021); Gunong Berumban (Wray's) (Wray 1562).

Perak: Gunong Batu Puteh, 4500 ft. (Wray 300).

A rather widely distributed species, but not hitherto recorded from continental Asia.

Selangor: Ulu Semangkok (R. 281 a). There is some doubt about this specimen, which is sterile, and may possibly belong to *D. brevisetum*.

Dicranoloma Braunii (C. M.) Par.

Singapore: Herb. Mitten. Two sterile and doubtful plants, which I incline to place under this species.

Perak: leg. Curtis; herb. Singapore Bot. Garden. This specimen is labelled "*Dicranum piliferum* Mitt. MS. in sched.", but I am inclined to think that Mitten wrote "filiferum," in reference to the long, stout, brown articulate brood-filaments in the leaf axils, characteristic of this species. It is new to continental Asia.

DISTR. Malay Archipelago to New Caledonia and New Hebrides.

Dicranoloma reflexifolium (C. M.) Par.

Pahang: Fraser Hill (R. 283).

Kedah: Kedah Peak, 3500 ft., on ground and tree bases in dwarf forest (Holttum 14867).

DISTR. Java; Sumatra.

Dicranoloma assimile (Hampe) Par.

Pahang: Gunong Tahan (R. 1036).

The fruiting plant, so that there is no doubt of its identity.

Perak: Gunong Hijau, 4700 ft. (Wray 648).

DISTR. Java; Borneo; Mindanao; Celebes (Everett 664, in herb. H. N. Dixon).

Dicranoloma leucophyllum (Hampe) Par.Malacca: Mt. Ophir (R. 712). This is sterile, and may possibly belong to *D. assimile*.

Perak: Gunong Hijau, Taiping Hills (Anderson 314A; Burkill 12636).

Dicranoloma sumatranum Broth. ined.

Selangor: Semangkok Pass (R. 284).

DISTR. Sumatra.

Dicranoloma perintegrum Dixon in *Bull. Torr. Club* 51: 226 (1924).

Malacca: Mt. Ophir (R. 780).

Dicranoloma brevicapsulare Dixon *op. et loc. cit.*

Pahang: Gunong Tahan, 5500-7000 ft. (Haniff and Nur 7915a).

Leucoloma molle (C. M.) Mitt. var. **longipilum** Fleisch.

Selangor: Bukit Hitam (R. 390).

Perak: Batang Padang (Stresemann 99).

Dindings: Lumut (R. 818a).

Penang: Penang Hill (R. 512, 574).

Leucoloma Walkeri Broth.

Kedah: Rawei I. (R. 293). A robust form, only differing in the size from the Indian and Burmese plant.

DISTR. India; Burma.

Leucoloma malayanum Dixon.

Penang: Crag Hill, on shaded granite rock (Binstead 13).

Leucoloma pallidum Dixon.

Kelantan: Gunong Sitong (Nur 12237b, 12272c).

Campylopus comosus (Hornsch. and Reinw.) Bry. jav.

Penang: Crag Hill (Binstead 8, 10, 12; Pinwell, in herb. Mitt.)

Kedah: Kedah Peak, 3000 ft., frequent on rocks and ground, usually sterile (Holtum 14896).

Campylopus serratus Lac. (*C. singaporensis* Fleisch.)

Singapore: Gardens (Larminat, in herb. Paris; Fleischer, M. Fr. Arch. Ind. et Polynes., 403; R. 611; Binstead 73, &c.). Bukit Timah (Holtum 13070).

Pahang: between Pekan and Ayer Tawar; abundant on the sandy promontory which the bridle path follows. Apparently the species used here for stuffing mattresses. (Burkill 17256); Kuantan, at base of tree (Burkill 17333b).

Kedah: Kedah Peak, on ground by path (Holttum 15028).
Form with unusually narrow upper cells.

This very marked plant must I think without doubt be Lacoste's species; it agrees exactly with the description and figures; I have also seen it from Borneo; I think that Fleischer must have overlooked this in giving it a new name. It seems to be a very characteristic plant in the Gardens at Singapore, as every collector of mosses who has visited the Gardens appears to have brought it away!

The very large genus *Campylopus* is poorly represented in the peninsula, only three species having been recorded.

Campylopus calodictyon Broth. ined.

Pahang: Gunong Berumban (R. 132).

I have not seen an authentic specimen of Brotherus' plant; but Ridley's moss agrees exactly with a Bornean gathering of Binstead's, which Fleischer determined (so far as possible from the gametophyte alone) as *C. calodictyon*.

Dicranodontium nitidum (Doz. and Molk.) Fleisch.

Kelantan: Gunong Sitong, on ridge, 2600 ft. (Nur 12247).

DISTR. Java; Celebes; Borneo; Philippines. Mitten records it from Ceylon. I have not examined Gardner's specimens; but a plant so named from Mitten's herbarium "Nuwara Eliya, T. W. N. Beckett" belongs to *Campylopus Nietneri* (C. M.), which throws doubt on the correctness of Mitten's determination of the earlier specimens.

Thysanomitrium exasperatum (Brid.) Nees.

Malacca: Mt. Ophir (R. 228).

Pahang: Gunong Tahan (R. 1011, 1019; Haniff and Nur 7908, a very slender form, perhaps worth varietal rank).

Kedah: Kedah Peak (R. 246).

Thysanomitrium umbellatum W-Arn. (*T. Blumei* Doz. and Molk.).

Selangor: Pahang track, 15th mile (R. 488).

Thysanomitrium Ridleyi Dixon in *Bull. Torr. Bot. Club*, 51: 227 (1924).

Pahang: Gunong Tahan (R. 1019b).

Thysanomitrium abbreviatum Dixon *op. et loc. cit.*

Pahang: Gunong Tahan, c. 7000 ft. (R. 1012).

LEUCOBRYACEAE.

Leucobryum chlorophyllosum C. M.

Pahang: Gunong Tahan (Robinson).

f. **minor** Fleisch.

Penang: Crag Hill (Binstead 14).

The species has not been recorded from continental Asia.

Leucobryum sanctum (Brid.) Hampe.

Common. I have records from at least seven States.

Leucobryum Bowringii Mitt.

Johore: Gunong Belumut, 3000 ft. (Holttum 10850).

Malacca: Mt. Ophir (R. 755).

Pahang: Gunong Tahan, 5500-7000 ft. (Haniff and Nur 7973a).

Leucobryum aduncum Doz. and Molk.

Singapore: on coconut palms (Fleischer, M. Frond. Arch. Ind. 5).

Malacca: Mt. Ophir (Griffith) herb. Mitten.

Leucobryum scalare C. M.

Singapore: Bukit Timah (Fleischer).

Penang: Crag Hill (Binstead 16, 18).

Leucobryum javense (Brid.) Mitt.

Singapore: Chan Chu Kang (R. 247).

Johore: one of the abundant ground mosses in the mossy forest of Gunong Belumut (Holttum 10696).

Pahang: Telom (R. 90); Pekan (Ridley).

Kedah: journey to Kedah Peak (Haniff 1).

Not recorded hitherto from continental Asia except from Annam, but one of the common species under certain conditions, and widely spread in Malaysia, and reaching to New Guinea.

Leucobryum sumatranum Broth. ined.

Pahang: Gunong Berumban, 5000 ft. (Henderson 11740).

A very fine species, resembling *L. javense* in habit, but of quite different structure. Only known otherwise from Sumatra.

Leucobryum stellatum Dixon.

Malacca: Mt. Ophir (R. 724).

[*Cladopodanthus speciosus* (Doz. and Molk.) Fleisch. (*Spirula speciosa* Doz. and Molk.). The only authority for this as a Malayan plant is a record by Mitten "Among moss sent with orchids to Dr. Wallace," and even the locality is not, I believe, specified. As the plant is a particularly striking one, at present only known from Java, I hesitate to include it on this vague record alone. It is quite possible that orchids, sent from the Singapore Gardens to Dr. Wallace, may have been packed in moss originally received with orchids from Java.]

[*Ochrobryum microphyllum* Card. Herzog in *Hedwig*. lxi, 295, records this as collected in Perak by Stresemann, No. 86. But as *O. microphyllum* is a South American species (*O. Gardnerianum* var. *microphyllum* Besch.), and as this group in the sterile state is a highly difficult and critical one, it appears to me that the identification must be very doubtful.]

Schistomitrium mucronifolium (A. Br.) Fleisch.

Pahang: Gunong Tahan (R. 1003). c. fr.

Kedah: Kedah Peak, 3000 ft., on a small trunk in dwarf forest, 3 ft. from the ground (Holttum 14890).

This and the preceding have leaves not falcate, thus differing from the type form; they are much too robust for *S. apiculatum*. The seta is more or less highly rugulose in both. It is quite probably a distinct species.

Schistomitrium apiculatum Doz. and Molk.

Perak: Gunong Batu Puteh, 3400 ft. (Wray 1085).

Leucophanes candidum (Hornsch.) Lindb.

Singapore: Kranji (R. 119, 256); Pasir Panjang (R. 249): no loc. (St. V. B. Down 60); etc.

Selangor: Gua Batu (R. 643); Rawang (R. 383).

Kelantan: Kuala Kalak, foot of G. Sitong (Nur 12263).

Leucophanes aciculare C. M. ined.

Singapore: Bajau, on tree at sea level, a very elongate form, in tufts 5-6 cm. high (Holttum 12277); Serangoon road (R. 206).

Leucophanes densifolium Mitt.

Singapore: Fleischer, *M. Frond. Arch. Ind. et Polynes.* 304; etc.

Johore: Tanjung Bunga (R. 338).

DISTR. Fiji and Admiralty Is.

Leucophanes albescens C. M.

Singapore: Pulau Ubin (det. Fleischer); Bot. Gardens (Holttum 16333); beim Friedhof an Baumrinde (H. Moeller).

Trengganu: Kuala Trengganu (Holttum 15188).

Kedah: Pulau Lankawi (Holttum 17478).

Leucophanes octoblepharoides Brid.

Singapore: on palms in Gardens (R. 46, 330, 593, 761); etc.

Selangor: Kuala Lumpur (R. 257).

Negri Sembilan: Ulu Bendul, on wet rocks by stream (Holttum 9830).

Penang: Richmond Pool, Government Hill (Haniiff and Kadir 15018).

Leucophanes pugioniforme Fleisch. ined.

Singapore: bei Tandjong Katong (Fleischer).

Octoblepharum albidum (L.) Hedw.

Widely distributed; common in the north of the Peninsula,
but not collected in the southern part.

Arthrocormus Schimperi Doz. and Molk.

Selangor: Telok Reserve, Klang (Burkill 5991, 6554).

Perak: Tapah (R. 156).

Kelantan: Sungei Ketei (Nur 11991 a).

Exodictyon Blumii (Nees) Fleisch.

Perak: Tapah (R. 819).

FISSIDENTACEAE.**Fissidens ceylonensis** Doz. and Molk.

Singapore: ad fossas (Kurz 1203; *F. abbreviatus* Mitt. MS in herb.).

Fleischer also records it from Singapore without further locality.

Malacca: Ayer Kurau (R. 702).

Penang: Crag Hill (Binstead 26, 40, 45). Government Hill (R. 749). Gardens (Holttum 17373, 17375).

Fissidens Hollianus Doz. and Molk.

Perak: Tapah (R. 819 b).

Trengganu: Kuala Telumong (Holttum 15310).

Penang: in botanischen Garten an Baumaesten, c.fr. (Moeller).

Kedah: Pulau Lankawi, on rock and small stems by stream (Holttum 17438).

DISTR. Java.

Fissidens Zollingeri Mont.

Trengganu: Kuala Telumong (Holttum 15310 p.p.)

A very little, mixed with *F. Hollianus*.

Fissidens javanicus Doz. and Molk. nov. var. **integrifolius**

Dixon ined.

Trengganu: Kuala Berang (Holttum 15334).

Kedah: Pulau Lankawi (Holttum 17447).

DISTR. (of type) Java, Andamans.

Fissidens siamensis Broth.

Kedah: Pulau Lankawi (Holttum 17479).

DISTR. Siam.

Fissidens crassinervis Lac.

Singapore: Bukit Timah (Fleischer, *M. Frond. Arch. Ind.* 17); Gaylang (R. 626); Gardens (R. 603); Reservoir jungle (Holttum 15366).

Perak: Tapah (R. 148).

Penang; rocks and stones in Botanic Gardens (Binstead 17, 74); Waterfall Gardens (Holttum 17377).

Kedah: Pulau Lankawi (Holttum 17446).

Fissidens Mittenii Par.

Singapore: (Fleischer); Gardens (Holttum 10492).

Fleischer also records the var. *javensis* from the Gardens.

I have only seen the type.

Fissidens subdiscolor Dixon in *Bull. Torr. Bot. Club* 51: 228 (1924).

Negri Sembilan: on root in a boggy hollow, Gemas (Burkill 6388).

Fissidens Zippelianus Doz. and Molk.

Singapore: Singapore (Fleischer); Gardens (Holttum 15368).

Penang: im botanischen Garten auf Erde (Moeller).

Kedah: Pulau Lankawi (Holttum 17444).

Fissidens asplenioides (Sw.) Hedw.

Penang: Penara Bukit (R. 572).

This widely distributed species in the tropics and subtropical regions has not been recorded from the Asiatic continent.

Fissidens amblyotis Dixon in *Bull. Torr. Bot. Club* 51: 329 (1924).

Johore: on wet rock by stream. 700 ft., Gunong Lambak (Holttum 9456).

Fissidens nobilis Griff.

Pahang: Tahan (Ridley).

Perak: Temengoh (R. 194, 214).

Fissidens areolatus Griff.

Pahang: Gunong Tahan, 5500-7000 ft. (Haniff and Nur 7980).

Ava, Burma, is the most southerly station hitherto.

CALYMPERACEAE.*SYRRHOPODON* Schwaegr.

Subgenus *Leucophanella*.

Syrrhodon revolutus Doz. and Molk.

Singapore: Tanjong Ru (R. 255); Gardens (Holttum 15351).

Perak: Krian road, Taiping (Haniff 13287).

Penang: (Fleischer).

Syrrhodon borneënsis (Hampe) Jaeg.

Johore: Gunong Belumut, 3000 ft. (Holttum 10753, 10765).

Pahang: Gunong Tahan (R. 1002); a robust form with lanuna cells smooth and back of nerve only slightly roughened.

Kedah: Kedah Peak, 3000 ft. (Holttum 14883).

Penang: Crag Hill (Binstead 24); Penang Hill (R. 748).

DISTR. Borneo, Java.

Syrrhopodon rufescens Hook. and Grev.

Singapore: Gardens (R. 780); Bukit Timah (Fleischer, *M. Frond. Arch. Ind.* 103); Singapore (Wallich; fide Mitten. *Musc. Ind. Or.*). Gardens, on *Platynerium* (Holttum 17385).

Syrrhopodon confertus Lac.

Singapore: Chan Chu Kang (R. 263). I have not seen this; it was determined by Brotherus, I believe.

Syrrhopodon Ridleyi Broth. e Dixon in *Bull. Torr. Bot. Club* 51: 229 (1924).

Singapore: Bukit Timah, on a *Platynerium* (R. 38, 731).

Penang: Government Hill, on lower side of large *Platynerium* (Burkill 763).

Subgenus *Eu-Syrrhopodon*.

Syrrhopodon albidus Thw. and Mitt.

Johore: Gunong Belumut, 3000 ft. (Holttum 10809).

DISTR. Ceylon.

Syrrhopodon tristichus Nees.

Pahang: Gunong Berumban, 5000 ft. (Henderson 11767);

Fraser Hill, 4000 ft., (Holttum 11372).

New to the mainland of Asia.

Syrrhopodon albo-vaginatus Schwaegr.

Singapore: Brotherus gives the distribution of this species as including Singapore; Reservoir jungle (Holttum 15363).

Pahang: Kuala Lipis (Burkill 15667c).

Perak: Sungei Siput (Haniff and Nur 6955).

Syrrhopodon involutus Schwaegr.

Singapore: Gardens (R. 29); Singapore (Fleischer).

Malacca: Mt. Ophir (Griffith; fide Mitten).

[*Syrrhopodon pseudo-involutus* Broth. ined.

Singapore: Tanjong Katong, on coconut trees (R. 210).

This is a MS. name of Brotherus'; the species has not been described, and I have not been able to see specimens.]

Syrrhopodon spiculosus Hook. and Grev.

Singapore: (Wallich; Fleischer); Kranji (Ridley); Bukit Timah (Burkill AB); Carimon Is. (Fox 581); &c.

Penang: Crag Hill (Binstead 22), two very different forms in habit and direction of leaves when dry.

Syrrhopodon elimbatus Dixon in *Bull. Torr. Bot. Club* 51: 230 (1924).

Malacca: Mt. Ophir (Ridley).

Syrrhopodon horridulus Fleisch. *Musc. der Fl. von Buit.* 1, 208, and corrigenda.
Singapore: Singapore, 1898 (Fleischer).

Syrrhopodon Griffithii Mitt.

Singapore: "Singapore (Griffith)." So Mitten in the *Musci Ind. Orientalis*; but Ridley points out that this should probably read Malacca, as Griffith did not visit Singapore.

Fleischer, it may be remarked (*op. cit.* 1,208) speaks of the leaf as having "an der Scheide einsele, lange, wimperartige Zaehne"; but this is in direct contradiction to the description, where the margins are distinctly stated to be "integerrimis" and without the basal spines of *S. trachyphyllus*.

Syrrhopodon ligulifolius Dixon in *Bull. Torr. Bot. Club* 51: 230 (1924).

Penang: Penara Bukit (R. 576).

Syrrhopodon trachyphyllus Mont.

Singapore: Singapore (Gaudichaud) fide Mitten, *Musc. Ind. Or.*; *ibidem* (Fleischer).

Syrrhopodon cavifolius Lac.

Trengganu: Kuala Trengganu (Holttum 15189).
DISTR. Banca, Borneo.

Syrrhopodon ciliatus (Hook.) Schwaegr.

Singapore: on sago palm, gardens (R. 459, 465); Fleischer, *M. frond. Arch. Ind.* 26. Seletar (R. 739).

Pahang: Kuantan (Burkill 16125).

The forma *pseudopodanus* Fleisch. occurs in both the above localities.

Syrrhopodon perakensis Dixon in *Bull. Torr. Bot. Club* 51; 231 (1924).

Dindings: Lumut (R. 449).

Subgenus *Thyridium*.

Syrrhopodon Wallisii C. M.

Singapore: (Fleischer).

Johore: Gunong Pulai, on fallen tree trunk (Holttum 16359).

Syrrhopodon repens Harv.

Singapore: Gardens (R. 45): Chan Chu Kang (R. 262); Pasir Panjang (R. 55); Bukit Timah (R. 309); Bukit Mandai (R. 706); Kranji (R. 11275).

Penang: Crag Hill (Binstead 29, 32).

It is rather curious that this species should appear to be common about Singapore, while apparently scarcely elsewhere in the Peninsula. It occurs in Ceylon and Banca.

Syrrhopodon Manii C. M.

Singapore: Tanjong Katong, f. *minor* (Fleischer, *M. Frond. Arch. Ind.* 71); Gardens (R. 315, 592); Seletar (R. 459); Pulau Ubin (R. 729); Galang (R. 357).

Penang: Crag Hill (Binstead 27 a).

Syrrhopodon fasciculatus Hook. and Grev.

Singapore: (St. V. B. Down 56); Kranji (Moeller); Gardens (Holttum 15352).

Trengganu: Kuala Trengganu, base of palm stem (Holttum 15309).

Syrrhopodon undulatus (Doz. and Molk.) Lindb.

Singapore: Reservoir jungle (Holttum 15364).

Perak: Temengoh (R. 217); Taiping (R. 204).

Kedah: Lankawi Is. (Haniff and Nur 7526); Kedah Peak, 3000 ft. (Holttum 14891).

Syrrhopodon undulatulus Broth. and Geh.

Singapore: (Fleischer); on trunk of tree, Reservoir jungle (Holttum 15358).

Penang: (Schiffner).

These records and that of *S. Wallisii* are found in Fleischer, *Musci der Fl. von. Buit.* I, 236.

Syrrhopodon flavus C. M.

Singapore: Gardens (Holttum 15356, 15357).

DISTR. Java.

Syrrhopodon pungens Dixon in *Bull. Torr. Bot. Club* 51: 231 (1924).

Selangor: Pataling (R. 772).

Subgenus *Calymperopsis*.

[*Syrrhopodon semilibera* (Mitt.) Besch. Brotherus (*Musci*) records this from "Malacca" only. Mitten's record in the *Musci Ind. Or.* p. 41 ("in peninsula Malayana, ad Tavoy") refers to Burma, and does not come within our area.]

Subgenus *Calymperidium*.

Syrrhopodon Muelleri (Doz. and Molk.) Bry. jav.

Singapore: Bajau (R. 242).

Johore: Gunong Pulai (Best 7708).

Perak: Temengoh (R. 186); Gunong Batu Puteh, 3400 ft. (Wray 1211 p. p.)

Penang: Penang Hill (R. 579).

Syrrhopodon fallax Lac.

Malacca: Mt. Ophir (R. 736).

Perak: Gunong Batu Puteh (Wray 1211 p.p.).

DISTR. Borneo; Banca.

No. 1211 Wray was received as *Syrrhopodon Wrayi* Broth. MS. It contained two species of *Syrrhopodon*, one of which is certainly a form of *S. Muelleri*, and the other *S. fallax*.

Syrrhopodon croceus Mitt.

Singapore: (Wallich); (St. V. B. Down 54); Reservoir jungle (Holttum 15361, 15362).

Johore: Gunong Belumut, 3000 ft. (Holttum 10819); Gunong Panti (Holttum 15043); Gunong Pulai (Holttum 16337).

Kelantan: Sungei Ketah (Nur 11991 b).

Kedah: Kedah Peak, 1000 ft. (Holttum 15110). A beautiful form, the whole plant purple-red.

Penang: Crag Hill (Binstead 19); Richmond Pool (Hauiff and Kadir 15022).

Syrrhopodon rectifolius Dixon ined.

Kedah: Kedah Peak, 3500 ft. (Holttum 14861).

Calymperes Dozyanum Mitt. (Syn. *C. Boulayi* Besch.).

Singapore: Gardens (Abdul Kadir 10494); ibidem, an Alleebaumen (Fleischer, *M. Frond. Arch. Ind.* 66); Kranji (R. 205).

Penang: on tree (Binstead 23).

C. eutrichostomum C. M. from Singapore is according to Fleischer only a narrow leaved form of *C. Dozyanum* Mitt.

Calymperes Delessertii Besch.

Singapore: (fide Brotherus).

Pahang: Pekan, Garden of H. H. the Sultan (Burkill 17130).

Burkill notes that this is used for stuffing mattresses.

It seems rather surprising that it should occur in sufficient quantity.

Calymperes subintegrum Broth.

Johore: Gunong Pulai, on tree trunk in jungle (Holttum 16335).

DISTR. Siam, Borneo.

A very distinct species in the structure of the leaf cells; cf. *Journ. Linn. Soc., Bot.*, xliii, 305.

Calymperes nitidiusculum Broth. e Roth in *Hedwigia* li, 128. (nomen nudum).

Johore: Gunong Pulai, on tree trunk in jungle (Holttum 16355).

DISTR. South Kanara, India.

This agrees well with an original specimen kindly sent me by Dr. Brotherus. It is extremely near to *C. subintegrum* Broth. and has the peculiar *Timmiella* like cells of that species, but differs in one or two characters.

Calymperes Vriesi Besch.

Penang: Ayer Itam; nov. var. **robustum** Dixon. (Binstead 20).

DISTR. (of type) Celebes.

Calymperes stenophyllum Dixon in *Bull. Torr. Bot. Club* 51: 233 (1924).

Dindings: Lumut (R. 777).

Calymperes nicobarense Hampe.

Singapore: Gardens (R. 355); Bajau (R. 218, 219); Pasir Panjang (R. 250); Woodlands (R. 12603); Kranji (R. 260); Keppel Harbour (Holttum 17480).

Kedah: Pulau Lankawi (Holttum 17417).

This is another case of a species being apparently frequent about Singapore while detected scarcely elsewhere in the peninsula. Otherwise it is known only from the Nicobar Is. It is a fairly marked species, the Singapore plants agreeing well with Hampe's type, differing from *C. Hampei* in the very rigid leaves and teniole scarcely reaching above the shoulder.

Calymperes punctulatum Hampe.

Singapore: Singapore (Fleischer).

Penang: Crag Hill (Binstead 21, 38); Ayer Itam (Binstead 36); Richmond Pool, Government Hill (Haniff and Kadir 15011, 15017), a tall form.

This also occurs elsewhere only in the Nicobar Is. A specimen exists in the Brit. Museum collection labelled "H. 1250, Singapore, leg. ? Wallich," determined by Bescherelle.

Calymperes Hampei Doz. and Molk.

Singapore: bei Serangoon auf Mangrove (Moeller). Gardens, on Albizzia (Holttum 15112).

Johore: Ulu Kahang, 250 ft. (Holttum 10894).

Penang: Ayer Itam (Binstead 25); rock, Botanical Gardens (Binstead 28); Ibidem (Holttum 17382).

Kedah: Pulau Lankawi (Holttum 17477).

Calymperes Fordii Besch.

Penang: Ayer Itam (Binstead 33, 35).

So far as it goes this seems to agree better with *C. Fordii* than with *C. Hampei*, but the differences are very slight, and I believe inconstant, some of the characters given by Fleischer for *C. Fordii* (e.g. basal hyaline cells quadrate) are not supported by Bescherelle's type, in which, too, the outline of the cancelline is very variable.

Calymperes tenerum C. M.

Singapore: Singapore (Schiffner, Fleischer).

Calymperes Bescherellei Fleisch. (Syn. *C. anisodictyon* Besch. in sched., fide Fleischer).

Singapore: Bukit Timah road (Schiffner).

Calymperes serratum A. Br.

Singapore: Bukit Timah (R. 317); Singapore (St. V. B. Down, herb. Binstead); Kranji (Moeller).

Calymperes recurvifolium Besch.

Singapore: Bukit Timah (R. 598; and Fleischer, *M. Froid. Arch. Ind.* 67).

Johore: Gunong Pulai (Holtum 16336).

Penang: im bot. Garten auf erde und Wurzeln (Moeller).

Calymperes heterophyllum (Mitt.) Besch.

Penang: shaded granite rock, Crag Hill (Binstead 13a).
A stem or two picked out of *Leucoloma*. It agrees exactly with Gardner's plant at Kew.

DISTR. Ceylon: Banca.

Calymperes orientale Mitt. var. **polytrichoides** Fleisch. (*C. subfasciculatum* Broth.)

Singapore: Chan Chu Kang (R. 277).

Fleischer reduces this to a var. of *C. orientale*.

Calymperes setifolium Hampe (*C. angustatum* Broth.).

Perak: Tapah (R. 149).

This, the type of *C. angustatum* Broth. MS. in sched., is certainly identical with *C. setifolium*.

DISTR. Philippines.

Calymperes fasciculatum Doz. and Molk.

Johore: foot of Gunong Pulai, on exposed rock (Holtum 16334).

DISTR. Java.

Calymperes longifolium Mitt. (*C. cristatum* Hampe).

Singapore: Chan Chu Kang (R. 440).

Pahang: Gunong Berumban, 5500 ft. (Henderson 11743).

Penang: Penang Hill (R. 533).

Kedah: Pulau Dayang Bunting, Lankawi Is. (Holtum 15132).

C. cristatum Hampe, as I have shewn elsewhere, is identical with *C. longifolium*. I am much inclined to believe that several of the species of *Macrhimanta* are but forms of a variable type, perhaps all to be included under *C. serratum*.

Calymperes constrictum Dixon in *Bull. Torr. Bot. Club* 51: 233 (1924).

Selangor: Klang watercatchment forest; on rotten bark on the ground (Burkill 6836).

Calymperes salakense Besch.

Singapore: Bukit Timah (Fleischer).

Penang: Waterfall Gardens (Holttum 17381, 17384).

[*Calymperes squarrosus* Broth. MS. was founded on a plant of Ridley's, St. Paul's Hill, Malacca (333); unfortunately no material is available; the specimen in the Singapore Bot. Gardens collection consists entirely of *Barbula indica* and *Bryum coronatum*, two terrestrial species which can hardly have formed part of the same gathering as a *Calymperes*].

[*Calymperes molluccense* Schwaegr. is recorded by Mitten as having been collected by Wallich in Singapore; but so many plants have been put under that name that it is scarcely possible to decide on its identity].

POTTIACEAE.

Hymenostomum edentulum (Mitt.) Besch.

Kedah: Pulau Lankawi (Holttum 15099).

Hymenostomum malayense Fleisch., *M. dcr Fl. von Buit.* 1,315.

Singapore: (Fleischer.).

Trichostomum sarawakense Dixon in *Journ. Linn. Soc., Bot.*, xliii, 308.

Perak: Gunong Lanoh, 350 ft., in crevices in limestone (Henderson 15063).

DISTR. Sarawak.

Hyophila commutata Broth.

Singapore: c. fr. (Moeller).

Hyophila javanica (Nees) Brid.

Singapore: auf dem Friedhof an Mauersteinen &c., c. fr. (Moeller).

Hyophila Micholitzii Broth.

Singapore: same localities as the preceding species (Moeller).

Chionoloma latifolium Dixon ined.

Kedah: Pulau Dayang Bunting, Lankawi Is., on limestone rocks (Holttum 15130).

Barbula comosa Doz. and Molk.Singapore: (Griffith) fide Mitten, *Musc. Ind. Or.* p. 35; but see note on *Syrhropodon Griffthii*.**Barbula indica** Brid.

Singapore: (Fleischer); in bot. Garten, &c. (Moeller).

Penang: im bot. Garten, (Moeller); Crag Hill, &c. (Binstead, 3, 34); Penang Hill (R. 747).

Barbula consanguinea Thw. and Mitt.

Singapore: (Fleischer).

Barbula louisiadum Broth.

Penang: Crag Hill (Binstead 30).

Gymnostomiella vernicosa (Hook.) Fleisch.

Singapore: an Mauern, c. fr. (Moeller).

Splachnobryum Oorschotii (Lac.) C. M.

Singapore: am Reservoir an feuchten Steinen (Fleisch.)

ORTHOTRICHACEAE.

Desmotheca apiculata (Doz. and Molk.) Lindb.

Singapore: Bukit Timah (R. 801).

DISTR. Amboina, Borneo, Java, Sumatra, Philippines, Burma (Mergui, leg. Meebold, 16618, herb. Hort. Bot. Calcutta).

Macromitrium minutum Mitt.

Perak: Gunong Batu Puteh, 3400 ft. (L. Wray Jr. 929), as *M. pilosum* Broth. MS. I cannot however separate it from *M. minutum*, from which it only differs in the reddish colour.

DISTR. Ceylon, Java.

[*Macromitrium nepalense* (Hook. and Grev.) Schwaegr.

Singapore: "Bukit Timah?" (R. 806). A plant with the leaves generally but not always incurved at apex, but agreeing with *M. nepalense* in other respects. The specimen is however poor, and the determination doubtful; the short, papillose basal cells distinguish it at once from *M. incurvifolium* (Hook. and Grev.). In all probability it is identical with the following species.]

Macromitrium brevirete Dixon.

Pahang: Jerantut, on upper branches of tree, about 60 ft. from the ground (Burkill 17467).

Macromitrium goniorrhynchum Doz. and Molk.

Singapore: im botanischen Garten (Moeller).

Macromitrium Zollingeri Mitt.

Kedah: Kedah Peak, 3000 ft., on dead tree trunk (Holtum 14862). This has the seta quite smooth, as in *M. Zollingeri*, but that species, *M. Blumei* and *M. concinnum* must be very close to one another.

Macromitrium ochraceum (Doz. and Molk.) C. M.

Kedah: Kedah Peak, 3800 ft., on ground, just below summit (Holtum 14871). New to the mainland of Asia.

DISTR. Java, Sumatra, Borneo.

Macromitrium Blumii Nees.

Malacca: Mt. Ophir (R. 231).

Pahang: Gunong Tahan (R. 1009).

DISTR. Java, Sumatra, Borneo.

Macromitrium magnirete Dixon in *Bull. Torr. Bot. Club* 51: 234 (1924).

Pahang: Gunong Tahan, 7000 ft. (Haniff and Nur 7907).

Macromitrium semipellucidum Doz. and Molk.

Singapore: Kranji (R. 308); Sungei Buloh (R. 244).

Negri Sembilan: Pantai (R. 749).

Selangor: Telok Reserve, Klang (Burkill 6613).

Perak: Temengok (R. 178); Kuala Kenering (R. 208).

Trengganu: Kuala Berang (Holttum 15333).

Macromitrium incurvifolium (Hook and Grev.) Schwaegr.

Singapore: Kranji (R. 261); Chua Chu Kang (R. 402).

Macromitrium sp.

Johore: Castlewood, on coffee trees, Apr. 1903 (R. 11622).

A sterile plant which appears to have some rather marked characters, but in absence of fruit and the somewhat doubtful normal habit (many branches are globose while others are several centimetres in length) it is best left undetermined.

[*Macromitrium orthostichum* Nees is recorded for Malacca by Brotherus (*Musci*, i, 479), but I do not know on what authority, and am inclined to question its authenticity. Fleischer does not cite it.]

FUNARIACEAE.

Funaria hygrometrica (L.) Sibth.

Frequent in clearings, on ashes etc. (fide H. N. Ridley). Pahang: G. Tahan (R. 1006).

DREPANOPHYLLACEAE.

Mniomalina semilimbata (Mitt.) C. M.

Penang: on granite rock, Ayer Itam (Binstead 37).

DISTR. Sumatra, Borneo, New Guinea, Samoa.

BRYACEAE.

Bryum argenteum L.

var. **australe** Rehm.

Penang: on granite rock, 2000 ft. (Binstead 39).

Bryum coronatum Schwaegr.

Common.

Bryum gedeanum Bry. jav.

Malacca: Mt. Ophir (R. 282).

Penang: Ayer Itam (Binstead 41). This is a somewhat larger plant, with more Bryoid, less Pohlioid areolation than in the Javan specimen issued by Fleischer (*M. Frond. Arch. Ind.* 365); but it agrees quite well with a small specimen in the British Museum collection "Java, Lacoste."

DISTR. Java.

Bryum ambiguum Duby.

Pahang: Gunong Tahan, 5500-7000 ft. (Haniff and Nur 8004).

Penang: Crag Hill (Binstead 42).

Binstead's plant is sterile: the Pahang specimen has abundant but immature fruit; the determination is therefore not quite certain, but I have little doubt that it is correct.

DISTR. Java, Sumatra, Philippines, Tonkin.

Bryum nitens Hook.

Johore: Ratoe (Moeller).

Bryum porphyroneuron C. M.

Penang: Penang Hill (R. 751).

Rhodobryum giganteum (Hook.) Schimp.

Pahang: Telom (R. 129); *ibidem*, 4000 ft. (Wray 1613).

MNIACEAE.

Mnium integrum Bry jav.

Pahang: Fraser Hill, in shade near stream, circa 3900 ft. (Holtum 11479).

Perak: (Ridley, in herb. D. Lillie, as *M. succulentum* Mitt.).

This is certainly the plant of the *Bry. jav.*, and the plant described by Fleischer (*M. der Fl. von Buitenzorg* II, 581), but it is not identical—as Fleischer makes it—with *M. succulentum* Mitt., which is a quite different plant with much larger cells.

It appears to me doubtful whether *M. integrum* be anything more than a diocious form of *M. rostratum*.

DISTR. Java, Sumatra.

RHIZOGONIACEAE.

Rhizogonium spiniforme (L.) Br.

Common.

Rhizogonium latifolium Bry. jav.

Singapore: Kranji (R. 106); Chan Chu Kang (R. 113).

Johore: Gunong Belumut, 3000 ft. (Holtum 10697).

Pahang: Gunong Tahan: (Ridley, without number).

Penang: Penang Hill (R. 526); Richmond Pool, Government Hill (Haniff and Kadir 15003).

Rhizogonium novae-hollandiae Brid.

Pahang: Gunong Tahan, 5500-7000 ft. (Haniff and Nur 7976). Sterile.

DISTR. South Australia, Patagonia.

A remarkable extension of the range of this species. The Pahang plant is a slightly more rigid form than the Australasian, with the leaves not at all altered when dry, but in all other respects agrees exactly. *R. salakanum* Broth. differs at once in the nerve not excurrent.

BARTRAMIACEAE.

Philonotis laxissima (C. M.) Bry. jav.

Penang: Crag Hill, 2000 ft. (Binstead 44); Penang (Haniff 300); im botanischen Garten (Moeller).

Philonotis secunda Doz. and Molk.

Perak: Maxwell's Hill (Burkill 12779, 12814); Taiping Hills (R. 11641).

WEBERACEAE.

Diphyscium rupestre Doz. and Molk.

Singapore; rare, on a rock, Bukit Timah (R. 618).

Perak: Gunong Keledang (R. 702).

DISTR. Java, Borneo.

POLYTRICHACEAE.

Rhacelopus pilifer Bry. jav.

Negri Sembilan: Gunong Tampin, on exposed rocks and earth, 900-1800 ft. (Burkill 2861, 2865).

Selangor: Ginting Peras (R. 420); Weld Hill Reserve, Kuala Lumpur (Nur 4766); Semangkok (Ridley).

Pahang: Fraser Hill, 4000-4370 ft. (Burkill and Holttum 8772).

Perak: Lenggong (R. 175); Taiping (R. 198); Maxwell's Hill (R. 281; Burkill 13216); Bujong Malacca (R. 743); Tapah (R. 169).

Kelantan: Kuala Kerai (Haniff and Nur 10145).

Pogonatum Neesii C. M.

Pahang: very abundant on freshly cleared ground on hill top, Fraser Hill (Burkill and Holttum 8458).

Fleischer, *M. der Fl. von Buit.* IV, 1583, 1590, describes the capsule as smooth; but C. Mueller in the original description describes it as "sexies callosa," and the ribbed capsule, plicate when empty, is distinct in the Neilgherries plant. It may, I think, be doubted whether *P. Junghuhnianum* really differs.

Pogonatum Junghuhnianum (Doz. and Molk.) var. **incurvum** Bry. jav.

Pahang: Telom (R. 103).

Pogonatum cirratum (Sw.) Brid.

Negri Sembilan: Gunong Angsi, abundant above 2000 ft. (Holttum 9933).

Pahang: Fraser Hill, 4000-4370 ft. (Burkill and Holttum 8469).

Perak: Batang Padang (Stresemann, 79); Maxwell's Hill, 3600 ft. (Burkill 12910).

Penang: Western Hill (Burkill 765); Moniot's Rd. (Burkill 2586).

Pogonatum Teysmannianum (Doz. and Molk.) Bry. jav.; forma
foliis longioribus, siccitate valde contortis.

Penang: Richmond Pool, Government Hill (Haniff and Kadir
15021).

Kedah: Kedah Peak, 3000 ft. (Holttum 15025).

DISTR. Java, Sumatra, Borneo, Amboina: (of type).

Pogonatum macrophyllum (Doz. and Molk.) Bry. jav.
(Syn. *P. flexicaule* Mitt.)

This magnificent species, which may attain a height of 35 cm., is not infrequent. I have records from Malacca, Selangor, Pahang, Perak, and Penang.

Elaborate attempts have been made to maintain the distinction between the Javan *P. macrophyllum* and the continental *P. flexicaule* Mitt., based entirely on the presence of lamellae of one row of cells in the latter, while in *P. macrophyllum* they are supposed to be absent, or the leaves are described as "fast lamellenlos." There is no reason I believe to suppose that the latter form is confined to Java, or that the continental plant is always the lamellate form; Fleischer indeed (who does not refer to *P. flexicaule*) records *P. macrophyllum* from Perak.

In my opinion they are but slight forms of the same plant, the Javan form exhibiting a slightly more hygrophytic condition. This view is I think not only supported but demonstrated by the fact that in cutting sections of *P. macrophyllum* (Fleisch., M. Fr. Arch. Ind. et Polyn. 499) I have found leaves which show the lamellae as fully developed as those of typical *P. flexicaule*.

Pogonatum sp.

Perak: Maxwell's Hill (Curtis 847).

A curious plant with habit of *P. contortum* (Menz.), but the capsule is quite different. The lamellae are very low, probably 1-seriate, but the leaves are strongly curled and very fragile, and do not moisten out, so that it is impossible to get a satisfactory section; and it is difficult to know whether it is a normal or a pathological condition. It is probable that it is a new species.

MYURIACEAE.

Myurium rufescens (Hornsch. and Reinw.) Fleisch.

Singapore: Gardens (R. 50).

Myurium subnitens Dixon in *Bull. Torr. Bot. Club* 51: 234
(1924).

Pahang: Fraser Hill (R. 282).

NECKERACEAE.

Endotrichella elegans (Doz. and Molk.) Fleisch.

Pahang: Fraser Hill, 4000-4370 ft. (Burkill and Holtum 8821); Robinson's Falls, Cameron's Highlands, 4800 ft. (Henderson 11727); Gunong Berumban, 6000 ft. (Henderson 11750); Telom (R. 113).

Perak: Gunong Kerbau (Haniff 243); Batang Padang (Stresemann 96).

Endotrichella plano-marginata Dixon in *Bull. Torr. Bot. Club* 51: 235 (1924).

Selangor: Gua Batu (R. 472).

Garovaglia aristata Bry. jav.

Selangor: Gua Batu (R. 640); Kuala Lumpur (R. 259).

DISTR. Burma.

Garovaglia polythrix Dixon ined.

Penang: Government Hill, 2500 ft. (Holtum 17374).

Symphysodon neckeroides Doz. and Molk.

Kedah: Gunong Raya, Lankawi Is. (Haniff and Nur 7109).

DISTR. Java, Sumatra, Borneo.

Papillaria fuscescens (Hook.) Jaeg. var. **rigidicaulis** Fleisch.

Pahang: Gunong Tahan (R. 1017).

Kedah: Kedah Peak, 3000 ft. (Holtum 14886). A form with shortly pointed, very plicate leaves.

Meteorium Miquelianum (C. M.) Fleisch.

Pahang: Gunong Berumban (R. 118).

Selangor; Batu Caves (R. 843).

Floribundaria floribunda (Doz. and Molk.) Fleisch.

Selangor: Gua Batu (R. 495).

Perak: Temengoh (R. 225, 230).

Penang: Crag Hill (Binstead 46).

Aerobryopsis longissima (Doz. and Molk.) Fleisch.

Frequent, and very variable.

var. **condensatum** Dixon.

Penang: Crag Hill, on gritty soil on ground (Binstead 64).

A very dense and very small form, with short branches and very small leaves.

Orthorrhynchium philippense C. M.

Perlis: Kanga (R. 305).

DISTR. Philippines.

Neckeropsis gracilentia (Bry. jav.) Fleisch.

Singapore: Chua Chu Kang (R. 357).

Selangor: Gua Batu (R. 479).

Dindings: Gunong Tungul (R. 502).; Bruas (R. 500).

Neckeropsis lepineana (Mont.) Fleisch.

Perak: Gunong Kerbau (Haniff 844).

Penang: (Curtis 4).

Neckeropsis penicillata Herzog in *Hedwigia* lvii, 242 (1916).

In der Bergen des Sakai-Gebietes (Inner-Malakka) von Dr. E. Werner gesammelt.

Neckeropsis andamana (C. M.) Fleisch.

Kedah: Pulau Dayang Bunting, Lankawi Is. (Holtum 15131). The determination is not quite certain. The leaves are a little more pointed than usual.

Himantocladium plumula (Nees) Fleisch.

Malacca: Bukit Tampin (Goodenough 1950).

Selangor: Ginting Bidai (R. 412).

Trengganu: (R. 280).

Penang: fide Fleischer (*Musci der Flora von Buit.* iii, 892) as *H. arbuscula* (Hampe). I have no hesitation however in following Mitten in reducing *H. arbuscula* to *H. plumula*.**Himantocladium rugulosum** (Mitt.) Fleisch.

Penang: (R. 559); im botanisch. Garten (Moeller).

Himantocladium loriforme (Bry. jav.) Fleisch.

Johore: Pulau Tinggi, on rocks by stream (Burkill 941).

Himantocladium exsertum (Hook.) Fleisch.

Malacca: fide Fleischer (op. cit. p. 887).

Homaliodendron flabellatum (Dicks.) Fleisch.

Malacca: fide Fleischer.

Kedah: Lankawi Is. (Haniff and Nur 7116).

Homaliodendron javanicum (C. M.) Fleisch.

Pahang: Gunong Berumban, Cameron's Highlands, 5000 ft. (Henderson 11769).

Homaliodendron microdendron (Mont.) Fleisch.Malacca: (R. 722). This is recorded in Ridley's list as *H. flabellatum*, but I have no doubt it is a lapsus calami of Brotherus for *H. microdendron*; my specimen is clearly that and there is no apparent mixture.**Homaliodendron scalpellifolium** (Bry. Jav.) Fleisch.

Perak: Gunong Hijau, on trees (Wray 107).

Homaliodendron pinnatelloides Herzog in *Hedwig.* lxi, 296 (1919).

Perak: Batang Padang: (Stresemann 91).

Homaliodendron intermedium Herzog *op. et loc. cit.*

Perak: Batang Padang: (Stresemann 84).

Homaliodendron exiguum (Bry. jav.) Fleisch.

Perak: Batang Padang (Stresemann 88).

Homaliodendron glossophyllum (Mitt.) Fleisch.

Perak: Taiping (R.); Temengoh (R.).

Pinnatella anacamptolepis (C. M.) Broth.

Selangor: Gua Batu (R. 638); Mitten determined this as *P. mucronata*, but it is certainly this species.

Perak: Tapah (R. 166).

Pinnatella mucronata (Bry. jav.) Fleisch.

Singapore: (Geach 39, herb. Mitt.); Stagmount (R. 140).

Johore: Kota Tinggi (Holtum 15046).

Pahang: Gunong Tahan: (R. 824).

Perak: Tapah: (R. 146) as *P. complanata* Broth. MS., but I can find no difference from *P. mucronata*.

Pinnatella Kuehliana (Bry. jav.). Fleisch.

Singapore: (Herb. Mitten).

Selangor: Gua Batu (R. 639).

Pahang: River Tahan (R. 211).

Pinnatella microptera (C. M.) Fleisch.

Singapore: Palms at Tanjong Katong (Fleischer).

Perak: Kati, Kuala Kangsar (Haniff 14937).

Pinnatella lingulata Dixon in *Bull. Torr. Bot. Club*, 51: 236 (1924).

Negri Sembilan: Gunong Tampin, 1800 ft., horizontal on upright trunks (Burkill 2864).

Perak: Gunong Batu Puteh 3400 ft. (L. Wray Jr. 1042). This was received as *Neckera plumuloides* Broth. M.S., but it had already been published under the present name.

ENTODONTACEAE.

Entodon Bandongiae (C. M.) Jaeg.

Selangor: Rawang (R. 403).

Pahang: Telom (R. 89).

Perak: Batang Padang Valley (L. Wray Jr. 1465). As *Entodon subpallidisetus* Broth. M.S. I cannot however separate it from this.

Campylodontium flavescens (Hook.) Bry. jav.

Pahang: Telom (R. 109).

Penang: (Curtis).

Cribrodontium Wernerii Herz. nov. gen. et sp. in *Hedwig*. lvii, 242 (1916).

Malacca: In dem Bergland der Sakai (Inner-Malakka) (Werner).

NEMATOCACEAE.

Ephemeropsis tjibodensis Goeb.

Penang: Penang Hill (R. 782).

Ridley lists this as determined, seemingly, by Brotherus. I have not seen Malayan specimens; it has hitherto been recorded only from Java, but I have recently detected it among other mosses on twigs of a Melastomaceous plant from Toko Rattan, Bencoolen, Sumatra, coll. C. J. Brooks, in herb Kew. It grows in very damp situations, and has quite probably been overlooked, owing to its minuteness and brown colour.

HOOKERIACEAE.

Distichophyllum nigricaulis Mitt.

Pahang: Fraser Hill, 4000 ft., on log in jungle (Holttum 11376a).

DISTR. Java.

Distichophyllum sinuosulum Dixon.

Perak: Birch's Hill, 3800 ft., on rock (Burkill 12606).

Distichophyllum cuspidatum Doz. and Molk.

Penang: Penara Bukit (R. 571); Penang Hill (R. 770); Moniot's Rd., 2300 ft., on branches near the ground (Burkill 2584).

Distichophyllum undulatum Doz. and Molk.

Perak: Gunong Batu Puteh (Wray 945). The locality is not actually stated, but the collecting number defines it without doubt.

Distichophyllum Mittenii Bry. jav.

Johore: Kukub (R. 4).

Pahang: Fraser Hill, on fallen tree trunk, 4000 ft. (Burkill and Holttum 8708, 8712); Gunong Berumban, Cameron's Highlands, 6000 ft. (Henderson 11729, 11752).

Perak: Temengoh (R. 187); Sungei Mengkoro, Taiping Hills (Anderson 313).

Kelantan: Gunong Sitong (Nur 12250); a form with obtuse leaves, without apiculus, and the border almost failing above, as in *D. Osterwaldii*, but it appears to belong here.

Distichophyllum spathulatum Doz. and Molk.

Pahang: Telom (R. 104, 135); Cameron's Highlands, 5000 ft. (Henderson 11752b); circa 6000 ft. (Henderson 11779).

Perak: Gunong Batu Puteh, 3400 ft. (Wray 1039).

Distichophyllum pterygophylloides Dixon ined.

Pahang: Gunong Tahan (R. 1024).

DISTR. Java, Sumatra.

Distichophyllum Schmidtii Broth.

Kedah: Pulau Lankawi, on earth bank by stream (Holttum 17445).

DISTR. Siam.

Eriopus remotifolius C. M.

Pahang: Cameron's Highlands circa 4500 ft., on roots of an epiphytic orchid, Sept. 1925 (Kinder). Two small scraps of what is clearly this species, and represents almost the same undeveloped state as the plant described as *Cyathophorum limbatulum* Ren. and Card. Fleischer (*Musci der Flora von Buit.* iii, 1011) expresses the opinion that this is probably a state of *E. remotifolius*, and the present plant confirms that view, as with exactly the same size and habit it has a broader border and longer points.

DISTR. Sumatra, Borneo, New Guinea.

Callicostella prabaktiana (C. M.)

Singapore: Bukit Panjang (R. 1); Bukit Timah (R. 360, 624); Gardens (R. 620).

Negri Sembilan: Gemas, on root in boggy hollow (Burkill 6388 p.p.); Perhentian Tinggi (R. 754).

Penang: Penang Hill (R. 513).

Callicostella papillata (Mont.) Jaeg.

Singapore: Bukit Timah (R. 36).

Pahang: Fraser Hill, 4000 ft. (Nur 11069, 11376).

Perak: Temengoh (R. 210); Birch's Hill, 3800 ft., on stones (Burkill 12601); Batang-Padang, forma (Stresemann 100).

Penang: Moniot's Rd., 2300 ft. (Burkill 2670), on upper surface of a plank bridge.

Callicostella Beccariana (Hampe) Jaeg.

Singapore: Bukit Timah (Ridley).

Selangor: Telok Reserve, Klang, on fallen log (Burkill 6566).

Chaetomitrium papillifolium Bry. jav.

Selangor: Ulu Gombak Reserve (Burkill 9964);

Perak: Tapah, on trunk of tree by river (Burkill 13513).

DISTR. Java, Ceylon, Andaman Is.

Chaetomitrium leptopoma (Schwaegr.) Doz. and Molk.

Selangor: Bukit Hitam (R. 417).

Perak: Birch's Hill, 4200 ft. (Burkill 13025).

Chaetomitrium muricatum Bry. jav.

Selangor: Ginting Bidai (R. 405, 411).

DISTR. Java.

C. leptopoma, *C. muricatum*, and *C. orthorrhynchum* are, as pointed out by Fleischer, three very closely related species, and perhaps more correctly considered as together forming a single species. Ridley's 405 and 411 are indeed intermediate between *C. leptopoma* and *C. muricatum*; and 405 is exactly the same thing as *C. cygneum* C. M. from New Guinea.

Chaetomitrium orthorrhynchum (Doz. and Molk.) Bry. jav.
Selangor: Gua Batu (R. 474).

DISTR. Java, Sumatra, Borneo, Celebes.

Chaetomitrium elongatum Doz. and Molk.

Pahang: Sungei Perting, Bentong (Burkill 16569).

Dindings: (R. 373).

This specimen, from the New York Bot. Garden, was named by Mitten *C. ciliatum* Doz. and Molk., but it is certainly not that species. It agrees well with Bornean specimens of *C. elongatum*, the calyptra and rather long seta being characteristic.

DISTR. Java, Borneo, Moluccas.

Chaetomitrium borneense Mitt.

Selangor.: Ginting Bidai (R. 422).

Perak: Upper Perak, 300 ft., on trees (L. Wray Jr., 3635);
as *Pilotrichella perakensis* Broth. MS.

DISTR. Borneo.

Chaetomitrium perakense Broth. e Dixon in *Bull. Torr. Bot. Club* 51: 237 (1924).

Perak: Bidor, Tapah (R. 159, 164).

Chaetomitrium setosum Broth. *op. et loc. cit.*

Perak: Tapah (R. 169).

Chaetomitrium nematosum Broth. (*Chaetomitrium serratum*
Broth. n. sp. in sched.)

Perak: Kuala Kenering (R. 205).

Distr. Queensland.

This was actually written *Chaetobryum serratum*, but clearly by a lapsus calami. It is quite distinct from any of the Malayan species of *Chaetomitrium*, but is indetical with the Queensland species, of which it has the peculiar brood-filaments, the rather curious dichroic colouring etc. The leaves are slightly less spreading than in the Queensland plant.

HYOPTERYGIACEAE.

Hypopterygium javanicum (Hampe) Jaeg.

Singapore: Bukit Timah (Ridley).

Negri Sembilan: Tampin (Goodenough 300).

Pahang: Telom (R. 127).

RHACOPILACEAE.

Rhacopilum spectabile Reinw. and Hornsch.

Pahang: Telom (R. 92, 93, 106, 122, 124, 133, 138, 828);
Fraser Hill, 4000 ft. (Nur 11206).

Perak: Batang Padang (Stresemann 91); Jor (Haniff
14220a).

Rhacopilum cuspidigerum Schwaegr.

Pahang: Jerantut, on branch of tree circa 60 ft. above ground
(Burkill 17466). A moss with a wide insular Malayan
and Pacific distribution, but not hitherto recorded from
continental Asia.

Pelekium velatum Mitt.

Singapore: Gardens, on coral in rockeries. (Holttum 15353).
Johore: Bukit saga (R. 240).

Selangor: Gua Batu (R. 60, 61, 62,); Telok Forest Reserve,
Klang (Burkill 7021, 7022, 6561).

Negri Sembilan: Gunong Tampin, 1800 ft. (Burkill 2853).

Pahang: Telom (R. 111); Pekan, on coral (Burkill 17132).

Perak: Temengoh (R. 188, 189, 215, 220).

Thuidium Meyenianum (Hampe) Bry. jav. (*T. trachypodium*
(Mitt.) Lac.).

Johore: Tempayan R., Kukub (Ridley).

Selangor: Ginting Bidai (R. 421).

Pahang: Telom (R. 100, 101).

Kedah: Pulau Lankawi (Holttum 17405).

Perlis: Kanga (R. 236).

Fleischer (*M. der Flora von Buit.* iv, 1521) reduces *T. trachypodium* (Mitt.) and *T. faulense* (Reichh.) to *T. Meyenianum* (Hampe). In *Journ. of Bot.* 1913, p. 326, I had already pointed out the indentity of *T. faulense* and *T. Meyenianum*. At the time I was inclined to consider the Pacific *T. erosulum* Mitt. distinct from *T. Meyenianum*, on account of the laxer, more complanate, more obtuse ramuline leaves of the former. I have later come to the conclusion, however, that *T. erosulum* is certainly inseparable from *T. trachypodium*, and the view is no doubt correct that all these plants belong to one species, showing a slight variation in the leaf arrangement and the form of the ramuline leaves. If this view is maintained, *T. erosulum* Mitt. must be added to the synonymy given by Fleischer.

T. Meyenianum is easily confused with *Pelekium velatum*, indeed, unless with fruit, or at least perichaetia, is difficult to separate from it.

Thuidium bifarium (Doz. and Molk.) Bry. jav.

Singapore: Chan Chu Kang (R. 278).

Selangor: Gua Batu (R. 65, 470, 635).

Perak: Temengoh (R. 183).

Perlis: Kanga (R. 304).

- Thuidium plumulosum** (Doz. and Molk.) Bry. jav.
 Selangor: Ulu Gombak (Ridley); Bukit Kutu (R. 413);
 Ginting Peras (R. 410);
 Pahang: Kota Glanggi (R. 212).
- Thuidium glaucinoides** Broth.
 Selangor: Ulu Gombak (Ridley).
 Penang: Crag Hill (Binstead 72).
- Thuidium orientale** Mitt.
 Penang: Penang Hill (Curtis, in herb. Mitten, type); Penara
 Bukit (R. 567).
- Thuidium cymbifolium** (Doz. and Molk.) Bry. jav.
 Pahang: Telom (R. 114).
 Perak: Temengoh (R. 179); Ulu Batang Padang (R. 95).

HYPNACEAE.

- Ctenidium falcifolium** Dixon in *Bull. Torr. Bot. Club* 51: 238
 (1924).

Perak: Taiping Hills (R. 817).

ECTROPOTHECIUM. This large and very difficult genus is rather well represented in the peninsula. I believe the following determinations to be correct, but I feel myself at a disadvantage from want of knowledge of the plants in the field. Fleischer's treatment in the *Flora von Buitenzorg* is in many ways helpful; but there are certain points which I find difficult to grasp, and certain relationships made which are not easy to follow.

- Ectropothecium buitenzorgii** (Bél.) Jaeg.
 Common and well distributed.

"*Cupressina malaccana* C. Muell. sp. n., type, Government Hill, Pulau Penang," Curtis in sched., appears to me to be only a robust, closely pinnate form of *E. buitenzorgii*. I am also unable to see anything else in *E. falciculatum* Broth. MS. (Perak, L. Wray Jr. 957).

- Ectropothecium singaporense** Dixon in *Bull. Torr. Bot. Club*
 51: 239 (1924).

Singapore: Gardens, in grass in open (Binstead 78).

- Ectropothecium sparsipilum** (Bry. jav.) Jaeg.
 Pahang: Gunong Berumban, Cameron's Highlands, 5500 ft.,
 on tree trunk (Henderson 11746).

DISTR. Java.

This appears to be a critical and much misunderstood plant and rare; the Pahang plant agrees well with the description given by Fleischer, having the habit, the seta about 2 cm. long, the calyptra slightly hairy, the perichaetial leaves strongly toothed and occasionally lacerate.

Ectropothecium ichnotocladum (C. M.) Jaeg.

Johore: Gunong Belumut, 3000 ft. (Holttum 10851).

Pahang: Telom (R. 112).

Fleischer, following the *Bry. jav.*, describes this as "fast glanzlos"; his no. 342, *M. Fr. Arch. Ind.*, is however markedly glossy, and fertile specimens from Sumatra agreeing in every way with the *Bry. jav.* figures and description are very highly so. It appears to be one of the rare cases in which the younger leaves show a gloss which is not retained in the older ones.

Ectropothecium eleganti-pinnatum (C. M.) Jaeg. (*E. callichroides* (C. M.) Jaeg. var. *elongatum* Dixon in *Bull. Torr. Bot. Club* 51: 239).

Selangor: Rawang (R. 382).

Perak: Temengoh (R. 184).

Kedah: Gunong Raya, Lankawi Is. (Haniff and Nur 7134);

Kedah Peak, 3000 ft., (Holttum 14898).

DISTR. Philippines.

Ectropothecium Moritzii (C. M.) Jaeg.

This species, which is stated by Fleischer to be rare in Java, is common and widely distributed in the Peninsula. I have received it from numerous localities ranging from Penang and Kelantan to Singapore.

var. **stereodontoides** Dixon in *Bull. Torr. Bot. Club* 51: 241 (1924).

Pahang: Fraser Hill, 4000 ft. (Burkill and Holttum 8715d);
ibidem (Holttum 11375).

For notes on this species see my article cited above.

Ectropothecium serratum Herzog in *Hedwig*. lxi, 297 (1919).

Perak: Batang-Padang (Stresemann 80).

Herzog compares this with *E. Moritzii*, stating that it differs in the sharply serrulate leaves and the habit; but in view of the great variability in that species, in which the leaves are commonly sharply toothed, the specific value of the present plant seems to me very doubtful.

Ectropothecium dealbatum (Hornsch. and Reinw.) Jaeg.

Negri Sembilan: Gunong Tampin, 1800 ft., on fallen log
(Burkill 1175).

Pahang: Raub; iron water-pipes in forest (Burkill 17155b).

Perak: Maxwell's Hill, 3800 ft. (Burkill 13198).

Penang: Waterfall Gardens (Holttum 17380).

Ectropothecium incubans (Hornsch. and Reinw.) Jaeg.

Singapore: Chan Chu Kang (R. 271, as *E. malaccense* Broth. sp. nov. in sched.). This appears to me undoubtedly *E. incubans*.

Negri Sembilan: Perhentian Tinggi (R. 737).

Perak: Telom (R. 112, as *E. malaccense* Broth. sp. nov. in sched.)

f. scaberula Fleisch. (*E. scaberulum* Broth.) Selangor: Gua Batu (R. 494).

Ectropothecium penangense Fleisch. *M. der Flora von Buit.* iv, 1410.

Penang: im botanischen Garten an Palmen (Fleischer).

Ectropothecium monumentorum (Duby) Jaeg.

Singapore: Gardens (R. 319, 329, 613); Bukit Timah (R. 307).

Ectropothecium Chamissonis (Hornsch.) Jaeg.

Pahang: Fraser Hill, circa 4000 ft., on tree in jungle (Holtum 11366a).

Ectropothecium Zollingeri (C. M.) Jaeg.

Singapore: Gardens; in the tank in Plant House; fruiting only when left dry (Burkill 3258). This is no doubt a form of *E. Zollingeri*, which is a distinctly hygrophytic species.

[*Ectropothecium singapurianum* Broth. MS. is a *Vesicularia*, which I do not think can be separated from *V. reticulata*.]

Trachythecium calcicolum Fleisch. *M. der Flora von Buit.* iv, 1417.

Selangor: "Malacca; bei Gualalumpur in Kalksteinhoehlen, 200m. (detex. Fleisch. 1909.)"

Allied to *Ectropothecium verrucosum* (Hampe) Jaeg., a species which should occur in Malaya.

Stereodon malayanus Dixon.

Perak: Birch's Hill, 3800 ft., on stump (Burkill 12602a).

The only species of this large and widely spread genus known from the peninsula.

Isopterygium Textori (Bry. jav.) Mitt.

Perak: Maxwell's Hill, 3800 ft., on stone in shade (Burkill 12647a).

DISTR. Japan, Annam, Borneo, South India.

Isopterygium arquifolium (Bry. jav.) Jaeg.

Kedah: Gunong Bintang, June 1917 (C. B. Kloss); in herb. Kew.

DISTR. Java, Amboina, Sumatra, Ceylon.

Isopterygium minutiramem (C. M.) Jaeg.

Singapore: Garden jungle (R. 328, 366).

Johore: Kukub (R. 301).

Pahang: Kuantan (Burkill 16126, 16703).

Perak: Birch's Hill, 3800 ft. (Burkill 12604).

Isopterygium albescens (Schwaegr.) Jaeg.

Singapore: Gardens, on Palm stem (Binstead 77).

Selangor: Gua Batu (R. 58, 406, 637). These appear as *Ectropothecium leiophyllum* Mitten MS. in Mitten's herbarium.

Pahang: Fraser Hill, 4000-4370 ft. (Burkill and Holttum 9181).

Perak: Maxwell's Hill, 3800 ft, on stone in shade (Burkill 12647b).

Isopterygium subalbescens Broth.

Singapore: (Fleischer).

Isopterygium laxissimum Card.

Selangor: Gua Batu (R. 641).

DISTR. Formosa.

This agrees perfectly with Cardot's description of the Formosan plant.

Isopterygium bancanum (Bry. Jav.) Jaeg.

Selangor: Gua Batu, on the ground (Burkill 6371); ibidem (R. 645).

Penang: Crag Hill (Binstead 55).

Isopterygium constrictum Broth. ined.

Perak: Lower Camp, Gunong Batu Puteh, 3400 ft. (L. Wray Jr. 1403).

Plagiothecium Miquelii (Bry. jav.) Broth.

Common and widely distributed; somewhat variable in habit, size, gloss, &c., but retaining its structural characters very constantly. Fleischer places it in *Vesicularia*, and it is certainly closely allied to *V. Kurzii*. It occurs under various names in herbaria; e.g. *Taxithelium albifolium* Mitt. MS., *Taxithelium Ridleyi* Broth. MS.

TAXITHELIUM. A very complex and difficult genus, grading in different directions into *Isopterygium*, *Trichosteleum*, *Acanthocladium*, and even to other genera. The genus, as understood by Brotherus, is distributed by Fleischer among a number of new genera, some of which, at least, I think will certainly stand. I have however, adopted Brotherus's arrangement here.

Taxithelium instratum (Brid.) Broth.

Singapore: Bot. Garden (Fleischer; Moeller); Jurong Road (Burkill 1410).

Negri Sembilan: Gunong Tampin (Holttum 9590).

Pahang: Jerantut (Burkill 17469).

Perak: Jor (Haniff 14249). Upper Perak, 300 ft. (L. Wray Jr. 3732), as *Trichosteleum pseudoinstratum* Broth.

Kelantan: Kuala Rek (Haniff and Nur 10178).

There is a peculiarity of the papillae in this species, which appears to have passed unnoticed. They are most frequently either bi-tri-fid at apex, or very often are geminate and side by side from the base, so that with a comparatively low magnifying power they appear often to be transversely elongate; and this is sometimes so regular that the whole line of papillae on a cell surface is "two deep," not as usual in "indian file." I have found this constant in plants from all parts including *Sigmatella trichochaete* C. M. from the Andamans, and its presence in Wray's *Trichosteleum pseudo-instratum* Broth. stamps it at once as belonging here.

Taxithelium nepalense (Harv.) Jaeg.

Singapore: Im botanisch. Garten (Moeller); Kranji (R. 695); Bukit Timah (R. 692, 693).

Pahang: 8 miles south of Kuala Lipis on sandstone rocks (Burkill 17200); Raub, on iron waterpipes (Burkill 17155a).

Penang: rocks, rotting wood, &c. (Binstead 49, 54, 61); ibidem (Fleischer).

Fleischer now unites *T. turgidellum* (C. M.) with *T. nepalense*, a reduction with which I am quite in agreement, as I have never been able to grasp the distinguishing characters. He also gives as a synonym *Trichosteleum trochalophyllum* (Hampe) Jaeg., (nomen solum) which I published (as *Tax. trachaelophyllum*) in *Bull. Torr. Bot. Club* 51: 243 (1924). Looking upon *T. nepalense* as a wide-spread species in the Indo-Malayan region, with a considerable range of variation in the form of leaf, the degree of obtuseness of the apex, and the distinctness of the papillae, this is I think quite a sound view, and at the same time my *T. subtrachaelophyllum* (op. cit.) and also *T. Gottscheanum* (Hampe) Broth. must fall into the same synonymy.

Taxithelium capillipes (Bry. jav.) Broth.

Singapore: Pulau Serapu (R. 733); Bukit Timah (R. 318).
Selangor: Port Swettenham (Burkill 845, 1276, 2698).

Pahang: Fraser Hill, 4000-4370 ft. (Burkill and Holtum 8454).

Penang: Moniot's Rd., 2000 ft. (Burkill 2679).

Taxithelium isocladum (Bry. jav.) Ren. and Card.

Frequent. I have it from practically all the States. *T. singaporense* Broth. MS. is certainly this.

Taxithelium isocladoides Dixon in *Bull. Torr. Bot. Club* 51: 243 (1924).

Perak: Bujong Malacca (R. 737).

Taxithelium Deningeri Herz. in *Hedwig*. lxi, 298 (1919).

Perak: Batang Padang (Stresemann 89).

Apparently much like my *T. isocladoides*, but differing at once from its allies in the large, hyaline or orange cells.

Taxithelium kerianum (Broth.) Broth.

Negri Sembilan: Perhentian Tinggi (R. 738, 740).

Selangor: Klang: (Fox 833).

Perak: Temok, Tapah (R. 164). This was determined by Brotherus as *T. perakense* n.sp., but it certainly belongs here.

DISTR. Queensland, New Guinea, Java.

Taxithelium Lindbergii (Bry. jav.) Ren. and Card.

Malacca: Mt. Ophir (R. 707 p.p.).

Selangor: Semangkok, 1500 ft. (R. 482).

Penang: Penang Hill (R. 517).

Kedah: Kedah Peak (R. 245).

Widely distributed in the Malayan Islands, and known also from Tahiti, but only recorded from Annam in continental Asia.

Taxithelium papillatum (Harv.) Broth.

Common and well distributed. Very variable in form and acumination of leaf, &c. I cannot think *T. acanthocladivides* Broth. MS. any more than a form of this. *T. stigosum* (Mitt.) is I think undoubtedly the same. Two of the extreme forms I incline to separate as varieties, var. *angustum* Dixon and var. *brevifolium* Dixon (both ined.).

Taxithelium decrescens (Doz. and Molk.) Broth.

Malacca: Kuala Lumpur, near Gua Batu (Fleischer). (This should be credited to Selangor; Fleischer uses "Malacca" evidently as a general term for the district).

Taxithelium Plumularia (C. M.) Broth.

Singapore: Bukit Timah (R. 317).

Negri Sembilan: Gemas, forming horizontal lines on a trunk (Burkill 4484).

DISTR. Only known hitherto from a single unlocalized spot in Java, coll. Blume.

Taxithelium magnum Fleisch. var. **majus** Fleisch.

Pahang: Gunong Benom, 5000 ft. (Collector 17481).

DISTR. Java, Sumatra.

A very fine and distinct species.

Taxithelium bilobatum Dixon in *Bull. Torr. Bot. Club* 51: 244 (1924).

Perak: Bujong Malacca (R. 739); Birch's Hill, 3800 ft., on stone in forest (Burkill 13007), nov. var. *scabrifolium* Dixon.

This remarkable plant, unique among mosses in having its leaves bifid or bi-lobed, was described from Ridley's No. 739, which has the leaves quite smooth. Most remarkably, within a few weeks of its publication I received the Birch's Hill specimen, which while

agreeing with the type in every other way has the apices of the cells highly prominent, so that the leaves are strongly scabrous at back. The upper marginal denticulations here, as in the type, are frequently bigeminate, a character which was overlooked in the diagnosis of the species.

Vesicularia reticulata (Doz. and Molk.) Broth.

Singapore: Bukit Panjang (R. 268); Singapore (Binstead 79); Bukit Timah (R. 630); Gardens (R. 586).

Selangor: Gua Batu (R. 493).

Perak: Maxwell's Hill (Burkill 13186).

Penang: (R. 562b).

Perlis: Kanga (R. 814).

Vesicularia Montagnei (Bel.) Broth.

Singapore: Gardens (Moeller).

Selangor: Gua Batu (R. 59).

Vesicularia Dubyana (C. M.) Broth.

Singapore: Gardens (R. 627); ibidem (Binstead 81; Moeller).

Selangor: Gua Batu (R. 63, 66).

Perak: Temengoh (R. 193, 211).

Penang: Government Hill, 2500 ft. (Burkill 2885, 2887).

Vesicularia Kurzii (Bry. jav.) Broth.

Singapore: Bukit Timah (R. 435).

Perak: Tanjong Malim (Burkill 13484).

LEUCOMIACEAE.

Leucomium aneurodictyon (C. M.) Jaeg.

Pahang: Telom (R. 98).

SEMATOPHYLLACEAE.

Mastopoma impolitum Dixon.

Johore: Gunong Belumut, 3000 ft. (Holtum 10694a).

Mastopoma papillatum Dixon.

Kelantan: Gunong Sitong, circa 2600 ft. (Nur 12234).

Acanthocladium scabrifolium Broth.

Pahang: Fraser Hill, 4800 ft., on tree trunk in low mossy forest (Burkill and Holtum 8730). Fruiting well. The fruit had up to now not been seen.

DISTR. Java.

Acanthocladium tenuisetum Dixon.

Pahang: Robinson Falls, Cameron's Highlands, 4800 ft. (Henderson 11719).

Trismegistia lancifolia (Harv.) Broth.

Singapore: Bukit Timah (R. 315, 331); Gardens (R. 606).

Johore: Gunung Pantii (R. 265); Gunong Pulau (Nur 7772).

Pahang: Telom (R. 123); Gunong Tahan (Haniff and Nur 8075).

Perak: Bujong Malacca (R. 738); Batang Padang (Stresemann 90).

Penang: (Curtis, in herb. Mitten); near Crag Hotel (Burkill 756.)

var. **Korthalsii** (Doz. and Molk.) Fleisch.

Selangor: Bukit Hitam (Kelsall 209).

Perak: Gunong Berumban (R. 115, 130).

Trismegistia rigida (Reinw. and Hornsch.) Broth.

Common and widely distributed.

Trismegistia Brauniana (Bry. jav.) Fleisch.

Kelantan: Gunong Sitong, circa 2600 ft. (Nur 12233a).

Trismegistia calderensis (Sull.) Broth.

Pahang: Gunong Tahan (R. 31).

DISTR. Philippines.

Meiothecium microcarpum (Harv.) Mitt.

Singapore: common.

Selangor: Gua Batu (R. 633); Ginting Bidai (R. 409).

Penang: common.

var. **lineolatum** (Duby) Bry. jav.

Singapore: (Fleischer).

Malacca: (Fleischer).

Meiothecium Jagori (C. M.) Broth.

Fleischer records this from "Malacca" (the original gathering), and Singapore. I must confess that I am quite unable to grasp the difference between this and *M. microcarpum*. The characters given by different authors are slight, elusive, and sometimes contradictory, and the distribution of the two—a wide one—is practically identical.

Meiothecium scaberulum Dixon.

Kelantan: Gunong Sitong, circa 2600 ft. (Nur 12237).

Rhaphidostegium complanatum Dixon.

Perak: Reservoir, Padang Rengas (Haniff 14981).

Rhaphidostegium coespitosum (Sw.) Jaeg. (*R. tristiculum* (Mitt.) Jaeg.).

Singapore: Gardens (Moeller).

Malacca: (Fleischer) (See note on *Taxithelium decrescens*).

Perak: Tapah (R. 163).

Penang: (Fleischer).

Setul: (Ridley 235).

Rhaphidostegium tristiculum is exactly identical with the S. American and African plant which has passed under so many names.

Rhaphidostegium microcladum (Doz. and Molk.) Jaeg.

Singapore: Woodlands (R. 259); Kranji (R. 270); Sungei Jurong (R. 363).

Rhaphidostegium saproxylophilum (C. M.) Jaeg.

Singapore: Selitar (R. 805); Bukit Timah (R. 457).

Johore: Gunong Belumut (Holttum 10816).

Trengganu: Kuala Trengganu (Holttum 15187).

Kelantan: Foot of Gunong Sitong (Nur 12259).

Rhaphidostegium sp.

Penang: Penang Hill (R. 551).

Unnamed in herb. Mitten. A scrap or two of a plant unknown to me, possibly a *Rhaphidostegium* very near to *R. capilliferum* Thw. and Mitt., but also possibly a *Stereodon* (Pseudo-*Rhaphidostegium*).

Rhaphidostegium densirameum Dixon.

Penang: Crag Hill (Binstead 62).

Trichosteleum hamatum (Doz. and Molk.) Jaeg.

Pahang: Fraser Hill, 4000-4370 ft. (Burkill and Holttum 8709).

Perak: Batang Padang (Stresemann 94). Gunong Batu Puteh, 3400 ft. (L. Wray Jr. 1212), as *Trichosteleum Wrayi* Broth. It appears to me to be one of the forms of this species.

Penang: Gardens (Binstead 53; Moeller; R. 647).

Herzog (*Hedwig*, lxi, 298) says of this "Eines der verbreitetsten Moose der Malaya." This is no doubt true of the general distribution, which is a very wide one in the coastal and insular regions at least of the tropical old world; but its occurrence in the peninsula appears to be rather local. I have not seen it from many localities.

Trichosteleum laciniatum Dixon ined.

Kedah: Pulau Lankawi (Holttum 17420).

The following group is a very perplexing one; *T. Boschii*, *T. singaporense*, *T. monostictum*, and *T. brachypelma* appear to me very closely allied and indeed intergrading species, differing from one another practically only in the length and degree of acumination of the leaf-point, and the length and degree of papillosity of the seta; all characters which vary greatly and are not always, to say the least, correlated with one another. The degree of papillosity of the cells, also varies very greatly, and this too seems scarcely to be correlated with any of the other characters.

Trichosteleum Boschii (Doz. and Molck.) Jaeg.

Common and widely distributed.

(*T. laxirete* Broth. MS. appears to me inseparable from *T. Boschii*).

Trichosteleum singaporense Fleisch.

Singapore: Gardens (Fleischer, Ridley, and others); the type is Fleisch, *M. Frond. Arch. Ind.* 383.

Malacca: Mt. Ophir (R. 730).

Negri Sembilan: Gunong Tampin (Burkill 3091); Perhentian Tinggi (R. 764).

Selangor: Rawang (R. 401).

Perak: Bujong Malacca (R. 737).

Dindings: Lumut (R. 776).

The main character of this species appears to be the seta smooth or practically so at apex, and the leaves less papillose. Fleischer describes it as having the leaves somewhat more broadly and shortly pointed than in *T. Boschii*; but my specimen of his No. 383 has them decidedly more gradually and longly acuminate than e.g. as figured for *T. Boschii* in the *Bry. javanica*.

Trichosteleum monostictum Thw. and Mitt. var. **laevius** Dixon.

Singapore: Bukit Timah (R. 588, 589).

Perak: Grik (Burkill 12389).

These plants agree with the South Indian plant which I described in the *Records of Bot. Survey of India* vi, 86; but I greatly doubt whether it be anything more than a form of *T. Boschii*. *T. monostictum* (type) differs from that species only, as Fleischer points out, in having the leaf acumen longly subulate and flexuose, and it is quite probable that many of the records of *T. Boschii* should really be placed here if the species is to be retained. My own view is that all the above plants as well as *T. brachypelma* are but forms or varieties—and by no means well defined ones—of *T. Boschii*.

Trichosteleum brachypelma (C. M.) Jaeg.

Singapore: Gardens (R. 47, 597); Bukit Timah (R. 588).

Negri Sembilan: Ulu Bendul (Holtum 9885).

The plants I have referred here agree very well with the original specimens I have seen of *T. brachypelma*. They differ from *T. Boschii* in the often very short, almost smooth seta, and the papillae of the leaves very low. They are at times, however very difficult to separate from *T. Boschii*. The perichaetial leaves are occasionally somewhat lacerated at the base of the acumen, in which case the plant may be taken for a small form of *T. luxurians*.

Trichosteleum mammosum (C. M.) Jaeg.

Penang: Moniot's Rd., 2300 ft., on tree trunks (Burkill 2587); Richmond Pool, Government Hill (Haniff and Kadir 15023).

Vegetatively this is very near *T. Boschii*, though usually, I believe, somewhat more robust, and of a yellower colour; but the fruiting characters are striking.

DISTR. Java, Sumatra.

Trichosteleum albifolium Dixon in *Bull. Torr. Bot. Club* 51: 246 (1924).

Johore: 7th mile from Kluang, on fallen tree in forest (Holtum 9296b).

Perak: Tanjong Malim (Burkill 13487).

Trichosteleum luxurians (Doz. and Molk.) Broth.

Singapore: Chan Chu Kang (R. 802).

Malacca: Mt. Ophir (R. 239).

Penang: Penang Hill (R. 578; Binstead 63, 66, 70); Moniot's Rd., 2300 ft. (Burkill 2589).

This at its best is a very fine and beautiful moss; but several of the above plants are smaller and less distinct, and when this is the case it may be difficult to separate from *T. Boschii* (see note on that species).

Fleischer remarks that he has not seen Javan specimens, and his figures are no doubt drawn from the Sumatran plant; it will be noticed that they differ very widely in leaf-form from those of the *Bry. javanica*. The Malayan specimens all agree with the latter. It is a species that evidently needs further study, and one or two of the records given above, viz. R. 578, and Binstead 66, 70, may have to be transferred.

Trichosteleum Bruchii (Doz. and Molk.) Broth.

Singapore: Chan Chu Kang (R. 439) (*Acanthocladium bifarium* Mitt. MS. in herb.); Sungei Jurong (R. 369).

Johore: Gunong Pantl, on small shrub (Holtum 15039).

Selangor: Petaling (R. 834); Petaling, 10th mile, a form with very long, flexuose, microphyllous flagella (R. 845).

Pahang: Tahan Woods (R. 825); Kuala Lipis (Burkill 17088).

Perak: Tapah (R. 145); Gunong Keledang (R. 715, 718, 745).

Penang: Richmond Pool, Government Hill (Haniff and Kadir 15009).

Several of the above plants are in fruit.

DISTR. Sumatra, Borneo.

Trichosteleum leptocarpon (Schwaegr.) Fleisch.

Singapore: Bukit Timah (R. 358).

DISTR. Java, Sumatra, Borneo, Ceylon.

ACROPORIUM Mitt. 1868 (*Sematophyllum* Mitt. 1864 p.p.).

See my note on this genus in *Bull. Torr. Bot. Club* 51; 247-8.

Acroporium asperifolium (*Sematophyllum asperifolium* Thw. and Mitt.) Dixon comb. nov.
Singapore: Selitar (Ridley, sine numero, det. Broth.).
DISTR. Ceylon.

Acroporium ruficaule (*Sematophyllum ruficaule* Thw. and Mitt.)
Dixon comb. nov. (Syn. *A. serrulatum* Dixon in *Bull. Torr. Bot. Club* 51. 249).
Malacca: Mt. Ophir (R. 745).
Penang: Penang Hill (R. 547, 750).
DISTR. Ceylon.

Since the publication of *A. serrulatum* I have ascertained that it is identical with the Ceylonese species of Thwaites and Mitten.

Acroporium leucophyllum Dixon *op. cit.* p. 250 (1924).
Pahang: Gunong Tahan, on wood (R. 1032).

Acroporium bogoricum (Bry. jav.) Dixon comb. nov. (*Hypnum bogoricum* Bry. jav.).
Perak: Batang Padang (Stresemann 95).
DISTR. Java, Borneo.

Acroporium clastobryelloides Dixon.
Penang: Crag Hill (Binstead 50).

Acroporium perangustifolium Dixon.
Kelantan: Gunong Sitong, 2600 ft. (Nur 12246a).

Acroporium punctuliferum (Thw. and Mitt.) Fleisch.
Pahang: Fraser Hill (R. 280).
Perak: Gunong Hijau 4700 ft. (Burkill 12637).
Penang: Penang Hill (R. 552).
DISTR. Ceylon.

A. punctuliferum is in habit and indeed in many other points much like the smallest forms of *A. rufum*; as I understand it, it may best be distinguished by the cuspidate, penicillate tips of the branches.

Acroporium lamprophyllum (Mitt.) Fleisch.
Malacca: Mt. Ophir (R. 765).
Pahang: Gunong Tahan (Robinson).
Kelantan: Gunong Sitong, circa 2600 ft. (Nur 12232a).

Acroporium subulatum (Hampe) Dixon comb. nov. (*Hypnum subulatum* Hampe).
Pahang: Telom (R. 139).

Fleischer states that the *H. subulatum* of the *Bry. jav.* is not Hampe's plant, but a fertile form of *A. diminutivum* (Brid) Fleisch. (*H. gracilicaule* Bry. jav.). I am unable to say to which of the two the Pahang plant—which was determined by Brotherus—belongs.

Acroporium decipiens (Dixon) Dixon comb. nov. (*Sematophyllum decipiens* Dixon in *Journ. of Bot.* lvii, 77).

Selangor: Bukit Hitam (R. 418).

DISTR. Borneo.

Acroporium convolutum (Bry. jav.) Fleisch.

Johore: Gunong Pantl (R. 260).

Perak: Taiping (R. 197); Temengoh (R. 212) *f. papillosa* (*Sematophyllum perpapilliferum* Broth. MS.); Tanjong Malim (Burkill 13480).

Kedah: Gunong Raya, Lankawi Is. (Haniff and Nur 7123).

Acroporium rufum (Hornsch. and Reinw.) Fleisch. (*Sematophyllum Braunii* (C. M.) Jaeg.

Malacca: Mt. Ophir (R. 226).

Johore: Gunong Belumut, 3000 ft. (Holttum 10694, 10699, 10701, 10702, 10760).

Pahang: Gunong Tahan, 5500-7000 ft. (Haniff and Nur 7904); *ibidem* (R. 1025b).

Perak: Gunong Hijau, 4700 ft. (Burkill 12262).

Penang: (Ridley, sine numero, herb. Mitten).

Kedah: Kedah Peak, 3000 ft. (Holttum 14899).

A common and highly variable moss, simulating at times several and very diverse species. It may generally be known when in fruit by the highly papillose seta, but I have forms with almost smooth setae which I can place nowhere else.

Acroporium rigens Broth.

Johore: Gunong Belumut, 3000 ft. (Holttum 10998).

Malacca: Mt. Ophir (R. 237, 722).

var. **dicranolomoides** (Broth.) Dixon.

Pahang: Gunong Berumbau (R. 131).

Perak: Gunong Batu Puteh (Wray 394), as *Eucamptodon Wrayi* Broth. in sched. in Herb. Kew.

Acroporium obscurum Broth. e Dixon in *Bull. Torr. Bot. Club* 51: 251 (1924).

Johore: Sedenak (R. 76).

Perak: Gunong Batu Puteh, 3400 ft. (L. Wray Jr., 977).

This was labelled *Sematophyllum Wrayi* Broth., but it has already been published under the above name.

Penang: Penang Hill (R. 538).

Acroporium secundum (Hornsch. and Reinw.) Fleisch.

Common and very variable.

The more important varieties are vars. *latifolium* (Bry. jav.) Fleisch. and *angustifolium* Fleisch., which intergrade with the type and are difficult to define, but which in their extreme forms are

very marked; and var. *minus* Ren. and Card., which is very marked and well defined, and may possibly be a distinct species. I have localities for these as follows:—

var. **latifolium** (Bry. jav.) Fleisch.

Selangor: Bukit Hitam (R. 381, 430).

Pahang: Kuala Tembeling (R. 823).

var. **angustifolium** Fleisch.

Selangor: Semangkok Pass (R. 279, 289).

Pahang: Fraser Hill (Burkill and Holttum 8398, 3741, 8910); Telom (R. 134, 141, as *Sem. spurio-obscurum* Broth. MS.).

Perak: Gunong Hijau, 4700 ft. (Burkill 12638).

Kelantan: Sungei Keteh (Nur 11989).

Penang: Penang Hill (R. 524).

Kedah: Gunong Raya, Lankawi Is. (Haniff and Nur 7124);
Kedah Peak (Holttum 14892).

var. **minus** Ren. and Card.

Pahang: Gunong Tahan (R. 1005, 1008a, 1022, 1027).

Kelantan: Gunong Sitong, 2600 ft. (Nur 12232c, 12246a).

var. nov. **longisetum** Dixon. Seta ad 4 cm. alta, supreme tuberculis humillimis numerosis praedita.

Kelantan: Gunong Sitong, circa 2600 ft. (Nur 12233 a).

A striking plant, robust, and similar to var. *latifolium* vegetatively; but with a very long seta, densely "platytuberculous" above.

A form with the leaves remarkably strongly and regularly falcate-secund was collected by Holttum on Kedah Peak (14842).

A plant from Kelantan, Ulu Sungei Keteh (Nur 12272), has the perichaetial leaves (the inner ones) with very short, erect points, not flexuose as usual, and the upper cells remarkably narrow, the walls being 2-3 times as wide as the extremely narrow, sinuose lumen. In other respects it seems to agree with *A. secundum*.

A further plant, which I have seen from two localities—Malacca, Mt. Ophir (R. 714), and Penang Hill (R. 543), presents considerable difficulty, the seta being about 1.5 cm. high, and rather strongly papillose above. The only perichaetium dissected was clearly female only; this and the length of the seta appears to exclude *A. sigmatodontium*, which it otherwise resembles. It is possible that it may belong to var. *latifolium*, and that the seta is characteristic of that var., which according to Fleischer has only been found sterile.

Acroporium longicuspis (Broth.) e Dixon in *Bull. Torr. Bot. Club* 51: 254 (1924).

Selangor: Bukit Hitam (R. 391).

Pahang: Fraser Hill, 4000-4370 ft. (Burkill 8711); Gunong Berumban, 5000 ft. (Henderson 11766).

Perak: Taiping (R. 200).

Acroporium albidissimum Dixon *op. cit.* p. 255.

Pahang: Gunong Tahan (R. 1023b).

Kelantan: Ulu Sungei Ketch (Nur 12272a).

Acroporium Ridleyi Dixon *op. cit.*, p. 256.

Pahang: Gunong Tahan (R. 1039).

Acroporium hamulatum (Fleisch) Fleisch., f. *procumbens* Fleisch.

Perak: Gunong Hijau, 4000 ft. (Burkill 12635); do. 4700 ft. (L. Wray Jr. 1883).

DISTR. Java.

Acroporium falcifolium Fleisch.

Pahang: Gunong Tahan (R. 1025a).

Kedah: Journey to Kedah Peak (Haniff).

DISTR. Java, Sumatra, Borneo, Celebes, Philippines.

Acroporium sigmatodontium (C. M.) Fleisch.

Penang: North of the Crag Hotel (Burkill 754).

Acroporium oxyporon (Bry. jav.) Fleisch.

Penang: Penang Hill (R. 521).

DISTR. Java, New Guinea, ? Ceylon.

Acroporium denticulatum Dixon in *Bull. Torr. Bot. Club* 51: 252 (1924).

Pahang: Fraser Hill, 4000-4370 ft. (Burkill and Holttum 8715a).

Acroporium hermaphroditum (C. M.) Fleisch.

Pahang: Gunong Tahan (R. 1008).

Acroporium monoicum (Bry. jav.) Fleisch.

Perak: Taiping Hills (Anderson 311).

Penang: Penang Hill, 2400 ft. (Burkill 2614; R. 746, 771, 786).

Acroporium aciphyllum Dixon *op. cit.*, p. 253 (1924).Pahang: Gunong Tahan (R. 1017, 1029); *ibidem*, a form with leaves spreading, not falcate (R. 1037).**Acroporium stramineum** (Hornsch. and Reinw.) Fleisch. (*Sematophyllum hyalinum* (Reinw.) Jaeg.).

Kedah: Kedah Peak 3000 ft., on rock (Holttum 14893); on shrub, Holttum (15111).

Acroporium procerum (C. M.) Fleisch.

Pahang: Gunong Tahan (R. 1013; Haniff and Nur 8000).

This magnificent species has hitherto been known from a few localities in Java and Sumatra, and there only known sterile. Both the above gatherings are in fruit, though in both cases only setae are present.

Acroporium pycnophyllum (C. M.) Dixon.

Dindings: Lumut (R. 774).

DISTR. Java; a single locality only.

Acroporium malayanum Dixon *op. cit.*, p. 257 (1924).

Penang: Bot. Gardens (Binstead 57).

Acroporium complanatum Dixon *op. cit.*, p. 256.

Malacca: base of Guong Ledang (R. 236).

Acroporium surculare Dixon *op. cit.*, p. 258.

Perak: on twigs, Bidor Rd., Tapah (R. 153).

Penang: Penang Hill (R. 551).

Piloecium pseudo-rufescens (Hampe) C. M.

Singapore: (St. V. B. Down, herb. Binstead; Fleischer).

Johore: Sungei Bau (R. 321).

Perak: Gunong Keledang (Ridley, sine numero, herb. Mitten).

Kelantan: Ulu Sungei Keteh (Nur 12272b).

RHEGMATODONTACEAE.

Macrohymenium Muelleri Doz. and Molk.

Pahang: Gunong Tahan (R. 1035).

DISTR. Java, Sumatra, Borneo.

BRACHYTHECIACEAE.

Rhynchostegium javanicum (Bél.) Besch.

Perak: Temengoh (Ridley, sine numero, det. Brotherus).

HYPNODENDRACEAE.

Hypnodendron arborescens (Mitt.) Lindb.

Singapore: Gardens jungle (Ridley 704); Chan Chu Kang (R. 438).

Pahang: Tahan R., (R. 234); Fraser Hill, 3900 ft. (Holtum 11373). Hill 3 miles from summit of Gunong Benom, 5000 ft. (Barnes).

Perak: (Wray, fide Fleischer).

Penang: (Curtis); Penara Bukit (R. 575); Penang Hill (R. 507, 511, 755); Balik Pulau (R. 754).

Hypnodendron Junghuhnii (C. M.) Lindb.

Selangor: Petaling (R. 483).

Pahang: Gunong Tahan (Robinson, R. 1014, 1034); Fraser Hill, circa 3800 ft. Holttum 11497); Telom (R. 128).

Perak: Gunong Berumban (R. 86, 106); Gunong Ulu Kali (Ridley).

DISTR. Java, Sumatra ?Celebes.

Hypnodendron Wrayi Broth. MS. Perak: On ground, Gunong Batu Puteh, 4500 ft. (L. Wray Jr. 301).**Mniodendron divaricatum** (Hornsch. and Reinw.) Lindb.

Malacca: Mt. Ophir (Ridley, sine numero, dt. Brotherus).

Pahang: Gunong Tahan (Robinson); ibidem (R. 1010); Kluang Terbang (Barnes).

Perak: Summit of Gunong Batu Puteh (Wray 892).

Penang: Penang Hill (Curtis 2733; R. 230, 516); Richmond Pool (Burkill 2601). (Curtis record may be based on the plant which is really *M. Mittenii*; v. infra).

Kedah: Kedah Peak (Ridley; Haniff 2; Holttum 14864).

Kelantan: Gunong Sitong, circa 2600 ft. (Nur 12238).

In continental Asia only known elsewhere from Annam.

Mniodendron Mittenii Salmon.

Selangor: Bukit Hitam (R. 429).

Pahang: Gunong Tahan, 7000 ft. (Haniff and Nur 7906; R. 15, 1004, 1031).

Perak: Bujong Malacca (R. 721).

Penang: Government Hill (Curtis), as *Mniodendron Curtisii* C. M. n. sp., Herb. Binstead, but it is quite inseparable from *M. Mittenii*.

Departmental Notices.

A list of plants which can be purchased at the Botanic Gardens, in Singapore and in Penang, can be had upon application. The same list appears at intervals in the Government Gazette.

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Some old photographs of the Singapore
Gardens

By the courtesy of the Director of the Royal Botanic Gardens, Kew, we have been provided with a set of old photographs of the Singapore Gardens, which we believe have never been published. They were taken about the year 1877, when H. J. Murton was Superintendent.

On the accompanying plates we publish a photograph from this collection taken on the top of the Bandstand Hill (Plate I), and a recent one taken as nearly as possible from the same position (Plate II).

The old photograph takes in a wider angle than the recent one, and it is not possible to make the two match exactly, but they have certain features in common which enable a comparison to be made. The Bandstand area itself is evidently the same now as in early days. In the recent picture the extreme right-hand portion of the raised area, and the palms which adjoin it, are not shown; the other palms of the ring (*Actinorhynchus calapparia*) are seen, though their heads could not be included in the picture.

The fine tree of *Koompassia malaccensis* is prominent in the background, near the middle of both pictures; evidently in 1877 it was nearly as tall as now, and its age must be considerable. On the right of the recent photograph appears the beautifully regular form of a jelutong tree (*Dyera costulata*): the dark tree on the right of the old picture may be the same individual, or possibly the *Artocarpus lanceifolia* which is very close to it. On the right of the *Koompassia* in 1877 is seen a clump of the traveller's palm (*Ravenala*). This still exists, but is hidden by the congea bush in the foreground of the recent photograph. The large tree in the background on the left of the old photograph is probably the fine *Shorea leprosula* (Seraya batu) killed by lightning in 1909 (see Agric. Bull. S.S. and F.M.S., Vol. VIII, plate opposite p. 364).

On the left of the picture of 1877, in the background, appear trees covered with creepers. These trees stand between the Upper

and Lower Ring roads round the Hill. In Murton's reports of 1877 and 1878 it is recorded that a fern rockery was started under some trees in this position, but their death and collapse in 1877, owing to the smothering of creepers which grew over them, caused the site to become too open for ferns. The present rockery on the north-west of the Bandstand Hill was established later by Cantley, beyond the Lower Ring Road. Two other photographs (not here published) show the creeper-covered trees in closer view, and enable their position to be located fairly accurately. The creeper which smothered them was probably *Thunbergia laurifolia*, which still continually causes much trouble. It occurs in many parts of the Gardens and has frequently to be cut back, to prevent further disasters like that which spoiled Murton's rockery.

Another photograph in the collection shows the road through the Gardens Jungle (now called Liane Road); the jungle adjacent to the road was not so well grown as now, and the road much more open. Another shows a view down Maranta Avenue, and indicates that the palm valley and its slopes, below the Director's house, had not then been planted with the palms which are now there.

Other pictures in the southern part of the Gardens show equally great changes. The island in the lake was covered by spreading trees (of which the largest was probably a Waringin) instead of the graceful clump of nibong palms and fine pandans which now adorn it. The avenue of sealing wax palms (*Cyrtostachys lakka*) on the south side of the Bandstand Hill had not been planted, and a view southwards from the site of that avenue shows the monkey house (then newly erected) in its original position near the present herbarium, and beyond it on the horizon the buildings of Tanglin Barracks, not then hidden by all the trees which have since grown up. It is hoped to publish others of these photographs in later issues of the Bulletin. Further details concerning the history of parts of the Gardens here mentioned are recorded in the papers published by Mr. Burkill in Volume II of the Bulletin, pp. 55-72 and 93-108.

R. E. HOLTUM.

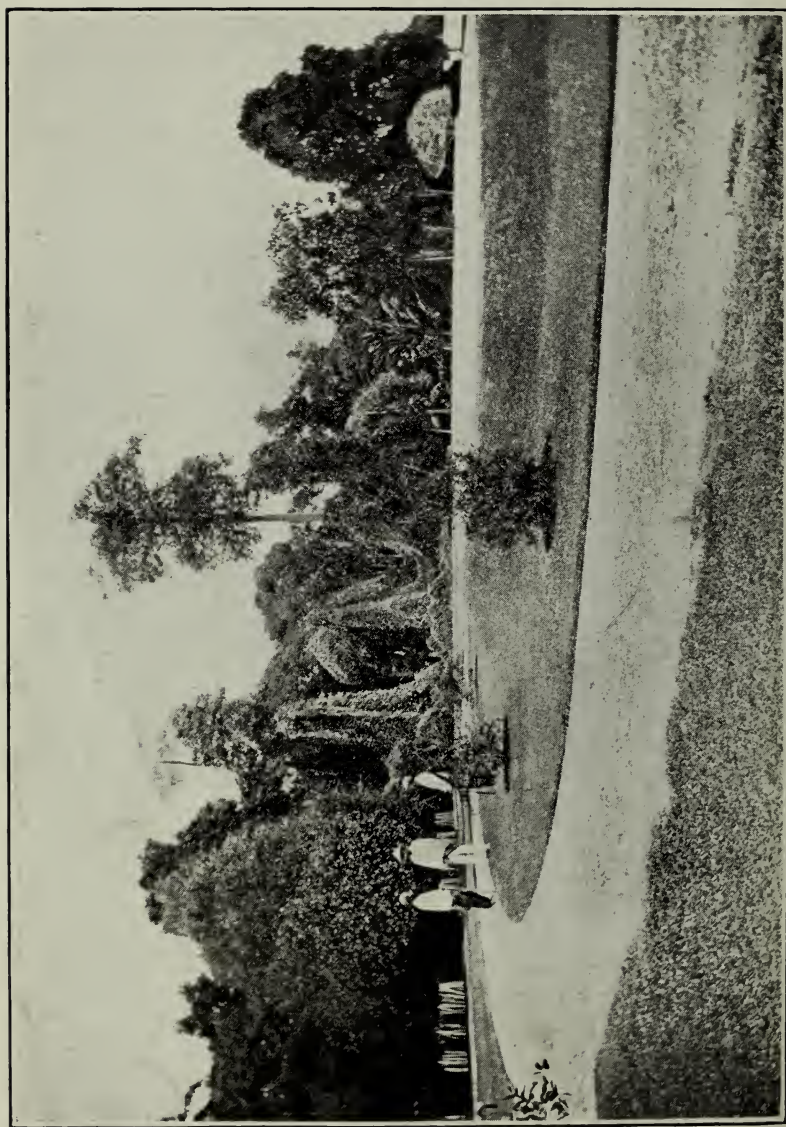
Additions to the Flora of the Malay Peninsula

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

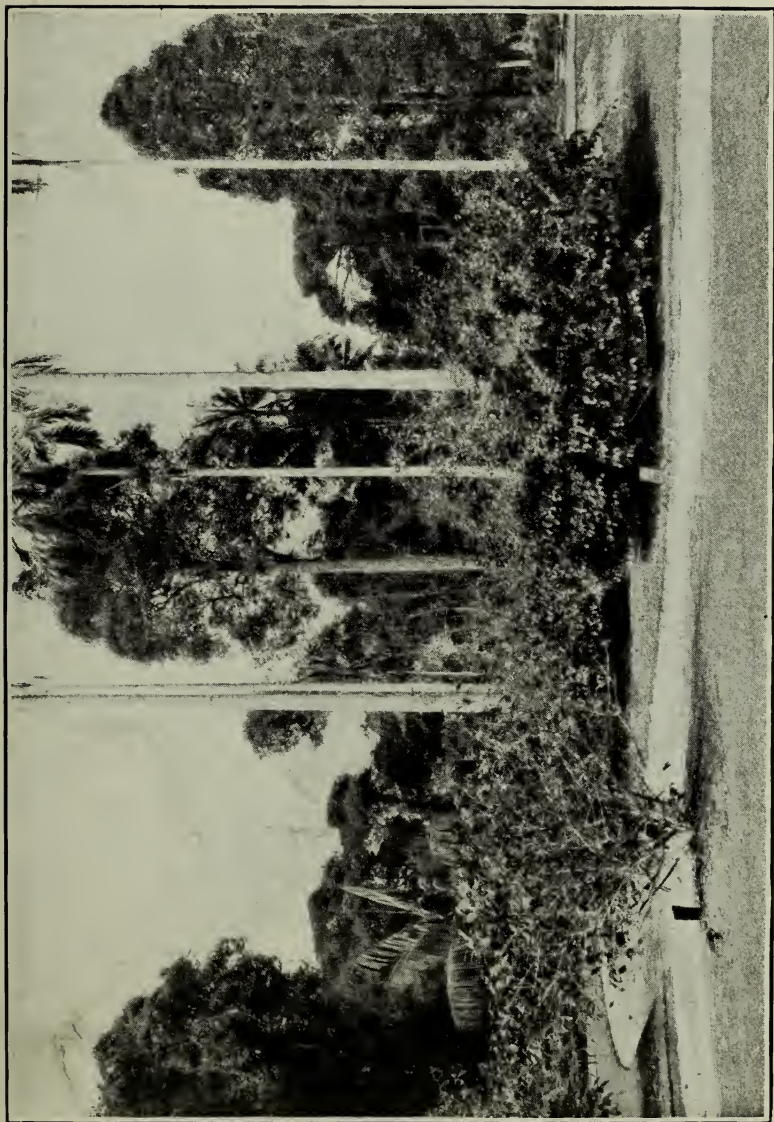
ANONACEAE.

Goniothalamus rotundisepalus, sp. nov.

Frutex 1-2 m. altus. Ramuli glabri, partes juniores ferrugineo-pubescentes. Folia glabra, 14-23 cm. longa, 4.5-8.5 cm. lata, oblonga vel elliptico-oblonga, acuminata, base acuta, nervis utrinque



The Bandstand Hill, Singapore Gardens, about 1877.



The Bandstand Hill in 1925.

7-9, supra obscuris, subter tenuibus sed distinctis. Flores axilarii, solitarii, 2.5 cm. longi; sepala rotunda, glabra vel extus sparse ferrugineo-pubescentia, intus glabra; petala exteriora late lanceolato-acuta, 2.5 cm. longa, circa 1 cm. lata, interiora ovata 1.2 cm. longa, 7 mm. lata. Carpella rubro-pubescentia, anguste oblonga, stigmatibus 2-lobato.

A shrub 1-2 metres high. Branchlets glabrous, dark-coloured, the youngest twigs and buds and very young leaves with a short red pubescence.

Leaves glabrous, 14-23 cms. long, 4.5-8.5 cms. broad, oblong or elliptic oblong, acuminate, narrowed to the base. Nerves 7-9 pairs, faint above, thin but distinct below, interarching far from the leaf margin. Reticulations indistinct.

Flowers solitary, axillary, pale-green, 2.5 cms. long. Bracts 4, ovate-acute, red-pubescent, 2-3 mms. long. Pedicels 4-5 mms. long, slender, with a few red hairs. Sepals orbicular or rotund, glabrous or with sparse red pubescence outside, glabrous inside. Petals leathery, drying black, the outer with a scattered red pubescence on both sides, broadly lanceolate-acute, narrowed to the truncate base, 2.5 cms. long, about 1 cm. broad; the inner ovate, red-pubescent on the outside like the outer petals, but with a denser brownish mealy pubescence inside, which is more pronounced at the cohering edges, and is almost absent at the base, 1.2 cms. long, 7 mms. broad. Stamens numerous, the appendages orbicular, pubescent. Ovaries linear-oblong, red-hairy, style rather stout, with two thick stigmas. Fruit unknown.

Sungai Renong, Kelantan, Md. Nur (with Dr. Foxworthy) 12157, February 1924.

Drepananthus pahangensis, sp. nov.

Arbor circa 3 m. alta. Folia elliptica vel elliptico-oblonga, base inaequilateralis, rotundata vel leviter cordata, acuminata, 17-29 cm. longa, 7-12 cm. lata, nervis utrinque 12-15. Sepala triangulo-acuta, 7 mm. longa et lata. Petala exteriora oblonga, 1.7 cm. longa, 7 mm. lata, interiora conniventia, 1.3 cm. longa. Carpella supra glabra, subter sericeo-pubescentia.

A tree about 3 metres tall. Young branches terete, red-pubescent, lenticellate. Leaves elliptic or elliptic-oblong, broadest near the apex, base inequilateral, rounded or slightly cordate, apex acute, dark brown (when dry) and glabrous above except for the nerves, brown below; 17-29 cms. long, 7-12 cms. broad. Nerves 12-15 pairs, fine on the upper surface and red tomentose like the sunk midrib, prominent below and interarching, sparsely pubescent. Reticulations faint above, prominent and regular below, pubescent like the nerves.

Flowers yellow, one or two on a short woody tubercle. Peduncle stout, up to 2 cms. long (but usually shorter), with ovate-acute bracts up to 5 mms. long, the peduncle and bracts red-hairy. Sepals and petals leathery, pustulose, with a sparse reddish pubescence. Sepals triangular acute, base broad, edges thickened, 7 mms. long and broad. Outer petals oblong, narrowed to the rounded tip, slightly constricted above the claw and arching over the base of the inner petals, but not connivent, the claw glabrous inside, the arch with a yellowish mealy pubescence, edges of limb incurved, 1.7 cms. long, 7 mms. broad. Inner petals connivent similar in shape to the outer, but smaller, strongly constricted above the claw, keeled on the back, 1.3 cms. long. Stamen appendages glabrous, hexagonal. Ovaries glabrous above, silky pubescent below with long yellowish hairs. Fruit unknown.

Pahang: Kuantan, Burn-Murdoch, May 1924; Baloh Forest Reserve, Forest Department 830, March 1919, and 3141, March 1920; Pulau Manis, Forest Department 824, September 1919.

Johore: Gunong Panti, altitude 1000 feet, R. E. Holttum, April 1925. Malay name "Antoi."

BALSAMINACEAE.

Impatiens Foxworthyi, sp. nov.

Herba reptans succulenta, 20-30 cm. alta, glabra. Folia petiolis ad 9.5 cm. longis, 6.5-8 cm. longa, 4.5-6 cm. lata, ovata, mucronata, margine denticulata. Inflorescentiae ad 20 cm. longae, pedicellis bracteatis. Sepala latiora ovato-rotundata, 5 mm. longa, 4-5 mm. lata, interiora parva, linearia, 4 mm. longa. Labelli limbus amplus, calcar robustum, incurvatum; vexillum ovatum, 8 mm. longum, apice mucronato; alae 1 cm. longae, sessiles, bilobae. Filamenta brevia; antherae oblongae.

A creeping and ascending succulent herb, 20-30 cms. high, glabrous. Leaves 6.5-8 cms. long, 4.5-6 cms. broad, crowded towards the top of the stem, ovate, thin, the margin with small spinulose teeth, the apex mucronate, the base narrowed and decurrent on the petiole. Petioles variable in length from 1.5 to 9.5 cms.

Inflorescences axillary or subterminal, peduncles glabrous, succulent, branched once, up to 20 cms. long. Flowers crowded towards the ends of the branches, the fallen ones leaving prominent scars. Bracts similar to the sepals, but slightly smaller, conspicuous and persistent. Pedicels slender, up to 1 cm. long.

Flowers yellow. Sepals 5, the laterals 5 mms. long, 4.5 mms. broad, ovate-rotund, oblique, slightly keeled, notched at the top with a thick blunt mucro in the notch; the inners narrow, linear, broadened at the base, 4 mms. long; the posterior sepal large, 1.5

cms. long and about 1 cm. across the mouth, the limb triangular with a short thick blunt point at the mouth, the spur stout, incurved, about as long as the limb. Petals: the vexillum ovate, 8 mms. long and 4 mms. broad, the keel prominent at the base and produced at the notched tip into a triangular point; the wings 1 cm. long and 8 mms. broad, sessile, two-lobed, the lobes rounded and nearly equal, the dorsal spur prominent, slightly down-curved. Stamens cohering, filaments short, anthers oblong. Fruit unknown.

On limestone rocks at Gua Kechapi on the Pahang-Kelantan boundary, Md. Nur (with Dr. Foxworthy) 11912, February, 1924.

OLACACEAE.

Phytocrene trichura, *Ridl., Flor. Malay Pen., Vol. II., p. 433.*

This plant was first collected by Mr. Ridley in the Ulu Batang Padang, Perak, in 1909, and was not again obtained until June 1923 at Lubok Tamang, Pahang, on the Bertam River. Mr. Ridley could not procure leaves, owing to the height to which the plant climbed, and described it from inflorescences only. The following is a short description of the leaves:—

Stem longitudinally wrinkled, red hairy. Leaves ovate cordate, deeply three-lobed, the lobes acuminate, the terminal lobe long and broad. Upper surface rough with greenish pubescence on the main nerves and sparse reddish hairs on the faint raised reticulations; nerves and reticulations below with bristly reddish hairs. Nerves three from the base, the main nerves and reticulations elevate and bold beneath; 12-15 cms. long, 10-11 cms. broad. Petiole roughly hairy, 4.5-5 cms. long.

Lubok Tamang, Pahang, altitude 3500 feet, June 1923. Coll: M. R. Henderson, F. M. S. Museums No. 10928.

SCROPHULARIACEAE.

Herpestis floribunda, *R. Br. Bacopa floribunda, Wettst.*

Not previously recorded from the Malay Peninsula. Collected in padi-fields at Padang Lerang, Kuala Trengganu, by R. E. Holtum, no. 17353, May 1925.

Distribution:—India to Australia.

ASCLEPIADACEAE.

Dischidia Fultonii, sp. nov.

Herba epiphytica. Folia carnulosa, exsiccata coriacea, ovata vel ovato-lanceolata, acuta, glabra, 1.5-1.9 cm. longa, 7 mm. 1.2

cm. lata, nervis obscuris. Pedicelli ad 1.5 mm. longi, crassi. Sepala membranacea, ovata, obtusa, 1 mm. longa, squamis minutissimis. Corolla alba, lobis rubicundis; tubus urceolus, 4 mm. longus. Coronae lobi erecti, membranacei, lobis recurvatis, acutis. Folliculi 5 cm. longi, glabri

A slender trailing or pendent epiphyte. Stems slender, pale below and minutely papillose, dark brown above, longitudinally wrinkled when dry. Leaves fleshy, coriaceous when dry, ovate or ovate-lanceolate, acute, glabrous, edges not recurved, both surfaces irregularly wrinkled when dry, 1.5-1.9 cms. long, 7 mms.—1.2 cms. broad. Nerves quite invisible. Petiole stout, 4 mms. long.

Umbels about 5-flowered on thick tubercled and bracteate rachises which are either supported on peduncles 2.5-3.5 cms. long, minutely papillose and longitudinally wrinkled like the stem, or are sessile in the leaf axils. Pedicels stout, up to 1.5 mms. long, Calyx lobes membranous, ovate obtuse, 1 mm. long. Scales very minute. Corolla white tipped with pink, tube urceolate, 4 mms. long, globose below, contracted at the mouth, glabrous except for the inside of the lobes, which are densely hairy. Corona erect, large, the lobes membranous, broadly anchor shaped, the recurved arms of the lobes long, acute.

Follicle 5 cms. long, glabrous, linear acuminate, slightly curved.

Johore: Gunong Belumut, altitude 3000 feet, R. E. Holttum 10727, May 1923.

GESNERACEAE.

Didymocarpus lancifolia, sp. nov.

Herba 10-13 cm. alta. Folia petiolis 5 mm. longis, lanceolata, 2.8-3 cm. longa, 8 mm.-1 cm. lata, supra sparse pilosa, subter nervis densissime pilosis. Pedunculi 1-floriferi, 2.6 cm. longi, rufi, pubescentes. Sepala linearia, lanceolata, pilosa, 2.5 mm. longa. Corolla alba; tubus cylindricus, superne dilatatus, 2 cm. longus; lobi rotundati. Stamina 2, filamenta 5 mm. longa. Ovarium cum stylo et stigmatibus pubescens.

A creeping and ascending herb, stem woody, hispid, 10-13 cms. tall. Lower part of the stem leafless, the leaves crowded towards the top. Leaves lanceolate, 2.8-3 cms. long, 8 mms.-1 cm. broad, narrowed to the apex and base, the upper surface sparsely covered with long soft hairs, becoming more dense on the edge, the lower surface densely hairy on the nerves. Nerves 4-6 pairs distinct below. Petioles hispid, 5 mms. long.

Peduncle one-flowered, 2.6 cms. long, red-coloured, pubescent; pedicel 6 mms. long. Calyx lobes 5, linear lanceolate, hairy, 2.5 mms. long. Corolla narrow, cylindric, dilated at the top, 2 cms.

long, slightly pubescent outside, lobes rounded; white, with two brown lines on the lower lip and a tinge of mauve round them. Stamens inserted one-third of the way down the corolla tube, filaments 5 mms. long, rather thick. No trace of staminodes. Disc conspicuous, one-sided, slightly lobed. Ovary, style and stigma all pubescent, the style reaching to the anthers, the stigma large, capitate. Fruit unknown.

Pahang: Gorge of the Sungai Tras near Raub, altitude 500 feet, I. H. Burkill and Md. Haniff 16946, November 1924.

***Loxocarpus papillosa*, sp. nov.**

Folia petiolis 1 cm. longis, obovata vel obcuneata, 6-11 cm. longa, 2.5-4 cm. lata, apice et base rotundata, nervis utrinque 10-12. Pedunculi 1-floriferi, 3.5-6.5 cm. longi. Sepala lineari-oblonga, pubescentia. Corolla coerulea, 5 mm. longa, leviter pubescens; tubus campanulatus, lobis oblongis, rotundatis. Stamina 2, filamenta brevia et crassa; antherae rotundatae, conniventes. Ovarium cum stylo pubescens. Capsula 7-9 mm. longa.

A stemless herb with the leaves in a rosette. Leaves obovate or obcuneate, apex rounded, base rounded and sometimes inequilateral, 6-11 cms. long, 2.5-4 cms. broad, the midrib, nerves and occasionally the intervening spaces on the upper surface with long hairs, which form a more or less uniform covering on the lower surface and on the margin. Nerves 10-12 pairs, thin but distinct on the lower surface, regular and parallel. Petiole densely hairy, 1 cm. long.

Scapes slender, reddish, pubescent, pale and glabrous when older, 3.5-6.5 cms. long, one-flowered. Sepals linear oblong, pubescent. Corolla pale blue, 5 mms. long, slightly pubescent, the tube wide, campanulate, lobes oblong, rounded, rather deep. Stamen filaments short, thick, the anthers round, peltate, connivent. No staminodes. Ovary and style pubescent, the style as long as the corolla tube, Stigma small, capitate. Capsule 7-9 mms. long, red pubescent, narrowly conic, straight, splitting along the upper edge, the style persistent. Seeds narrowly elliptic, reticulate.

Negri Sembilan: North side of Gunong Angsi, altitude 2600 feet, Md. Nur 11632, November 1923. Gunong Angsi, altitude about 2000 feet, R. E. Holttum 9923, December 1922.

***Paraboea Holttumi*, sp. nov.**

Herba erecta. Folia petiolis 1.5-3 cm. longis, 8-11 cm. longa, 1.5-2 cm. lata, lanceolata, nervis obscuris. Pedunculi circa 5.5 cm. longi; bractae angustae, 3 mm. longae. Calycis sepala lineari-lanceolata, hispida, 3.5 mm. longa. Corolla campanulata, circa 1.2

cm. longa, extus pubescens. Filamenta crassa; antherae magnae, triangulae, conniventes. Ovarium cum stylo ferrugineo-pilosum; stigma capitatum.

A herb with a stiff habit, about a foot tall. Stems woody, terete and glabrous below, above 4-angled and channelled. Leaves 8-11 cms. long, 1.5-2 cms. broad, in distant pairs, lanceolate, narrowed to both ends, texture thick, nerves invisible; the upper surface minutely papillose with scattered white multicellular hairs, more numerous on the young leaves and towards the margin, where they form a regular row; the lower surface rugulose, the hairs, which are similar to those on the upper surface, with a reddish tinge. In life the leaves are dark green above and dark purplish below, and this latter colour persists after drying as a reddish tinge. Petioles 1.5-3 cms. long, the younger ones with a few hairs.

Peduncle sparsely pubescent at base, more densely so towards the apex, about 5.5 cms. long. Branches short with 3 or 4 flowers on each. Bracts narrow, about 3 mms, long. Calyx tube very short, lobes linear lanceolate, hairy, 3.5 mms. long. Corolla campanulate, about 1.2 cms. long, pubescent outside, slightly two-lipped. Filaments rather long, thick, glabrous except at their point of insertion on the corolla, where they are covered with white hairs. Anthers large, connivent, triangular. Ovary and style red-hairy, stigma capitate. Flowers in bud pale yellow. Fruit unknown.

Johore: Gunong Belumut, altitude 3000 feet, R. E. Holttum 10685, May 1923.

This species is near *P. campanulata*, *Ridl.*, but differs in the thicker and narrower leaves, the narrower corolla, and the longer filaments of the stamens.

ACANTHACEAE.

Hemigraphis Ridleyi, *Clarke*, var. *nervosa*, n. var.

This variety differs from typical *H. Ridleyi* in the smaller leaves (3 cms. long and 2 cms. broad), which are broad at the base with a tendency to become cordate, and not cuneate; in the increased pubescence on both surfaces of the leaves, and the absence of raphides; and in the more conspicuous and elevated nerves and reticulations. The flowers are as in *Ridleyi*, except that the bracts are longer (1-1.5 cms. long) and also the calyx lobes (6 mms. long).

Pahang: Railway banks at Kuala Lipis, I. H. Burkill and Md. Haniff 15699, November 1924.

LORANTHACEAE.

Loranthus pekanensis, sp. nov.

Frutex parasiticus, ramulis glabris teretibus. Folia petiolis 1.5-2 cm. longis glabra, coriacea, ovata, apice rotundata, base cuneata, 9-10 cm. longa, 6-6.5 cm. lata; costa subter prominens; nervi laterales urtinque 3 vel 4. Flores 20-30 in fasciculis axillariis; pedicelli 4 mm. longi. Calycis tubus 4 mm. longus, urceolatus, limbo minuto denticulato. Corollae tubus 1.3-1.6 cm. longus, luteo-flavus; lobi 5, reflexi, viridi; Stamina 5. Fructus ignotus.

A shrub parasitic on *Vitex* sp. Branchlets glabrous, stout, terete, the youngest reddish brown, the lower greyish brown, lenticellate. Leaves glabrous, reddish brown when dry, in whorls of three or four, stiffly coriaceous, ovate, rounded at tip, narrowed to the base, 9-10 cms. long, 6-6.5 cms. broad. Nerves 3 or 4 pairs, just visible when dry, slightly more prominent on the upper surface than on the lower, the midrib prominent and elevate below.

Flowers glabrous except for a very fine white pubescence on the inside of the petals; in axillary fascicles of 20 to 30 on the thickened nodes. Pedicels 4 mms. long. Calyx urceolate, minutely toothed, 4 mms. long. Corolla orange-yellow, tipped with green, gamopetalous, of 5 segments, the tips of the petals reflexed, 1.3-1.6 cms. long. Stamens 5 included, style very shortly exsert. Fruit unknown.

Pahang: Pekan, I. H. Burkill and Md. Haniff 17104, November 1924.

ZINGIBERACEAE.

Alpinia Burkillii, sp. nov.

Caulis ad 2 m. altus. Folia 69 cm. longa, 10-13 cm. lata, oblonga-lanceolata, cuspidata, utrinque pubescentia; ligula 6-7 mm. longa, bifida, margine pilosa. Panicula 20-30 cm. longa; calyx circa 1.4 cm. longus, cylindricus, trilobatus; corollae tubus 1.4 cm. longus, pubescens; petala 2 cm. longa, ovato-lanceolata, extra pilosa; labellum amplum, glabrum, 2.7-3 cm. longum, 3 cm. latum. Staminodia magna, bilobata. Stamen glabrum, connectivi appendicula brevis. Capsula globosa, puberula, 2 cm. diametro.

A herbaceous plant about five feet tall. Leaves oblong lanceolate, long cuspidate, pubescent above with long regularly spaced hairs with swollen bases, softly pubescent below, 69 cms. long, 10-13 cms. broad. Petiole 2-2.5 cms. long pubescent. Ligule 6-7 mms. long, bifid, lobes rounded, long hairy on their edges. Panicle 20-30 cms. long, with a narrow pubescent sheath as long, branches 1.5-2 cms. long, all velvety pubescent. Bracts glabrous,

papery, ovate, enclosing 4 to 7 flowers on pubescent pedicels 1.5 cms. long.

Calyx cylindric, 3-lobed, rather longer than the corolla tube, glabrous except for the pubescent tips of the lobes. Corolla tube 1.4 cms. long, pubescent, with a ring of long hairs at the base. Petals 2 cms. long, ovate lanceolate, blunt, hairy on the back, the upper lobe hooded and with a conspicuous spur. Lip large, quite glabrous, 2.7-3 cms. long, 3 cms. broad; side-lobes rounded, mid-lobe bifid, the lobes truncate; margin of lip crippled; two patches of claret colour on the side lobes not reaching the margin, and a number of violet-black lines in the centre of the lip above the mid-lobe. Staminodes two, conspicuous, bilobed, adnate to the base of the stamen and lip. Stamen glabrous, the connective prolonged into a short crest.

Capsule globose, puberulous, about 2 cms. in diameter and crowned by the persistent calyx.

Negri Sembilan: Gemas, I. H. Burkill 4980, August 1919.

Pahang: 126th. mile, Kuantan Road, between Sungai Lepar and Sungai Ketam, and at Sungai Luit, I. H. Burkill and Md. Haniff 17210, 17461, November 1924.

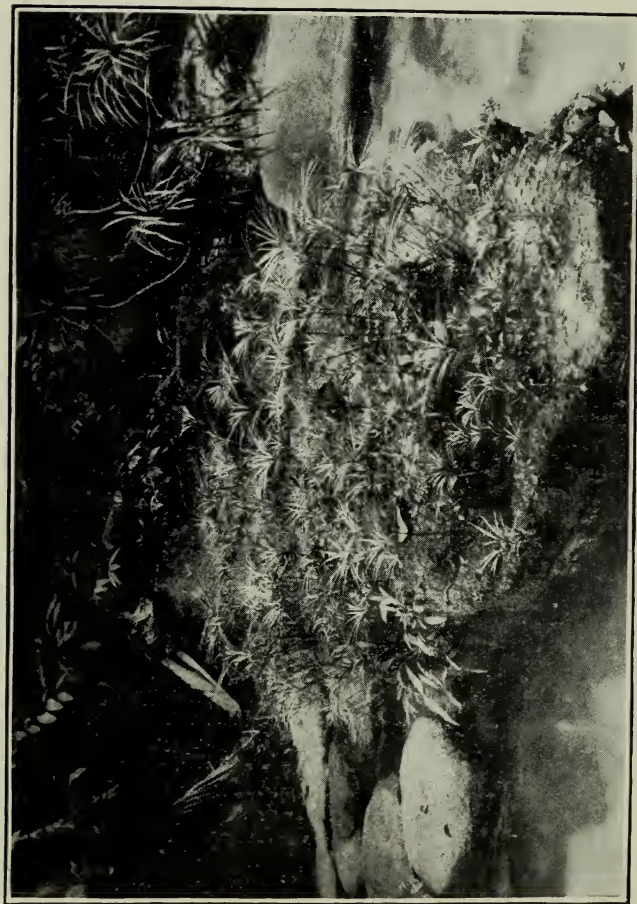
A New Fern from the Malay Peninsula.

Syngamma minima, *Holttum* sp. nov.

Rhizoma repens, tenue, pilis nigris nitidis vestitum. Stipites approximati, 5—15 mm. longi. Frondes rigidae, in sicco fragiles, glabrae, 1—4 cm. longae, 5—8 mm. latae, obovatae vel oblanceolatae, apice rotundatae, basin versus sensim angustatae, margine cartilagineae denticulatae. Costa utrinque vix prominens; venae simplices vel furcatae, liberae vel sub margine anastomosantes, fere obscurae. Sori 1-2 mm. longi, ad venas terminales.

Gunong Pantl, Johore, Holttum 17498.

This small fern grows side by side with *S. borneensis* on sandstone rocks at the top of the ridge of G. Pantl, at an altitude of about 1600 feet above sea. It somewhat resembles the young plants of *S. borneensis*, but is distinguished clearly from its earliest stages by the shape of its leaves and by its less densely tufted habit. The shorter leaves are often quite as broad as the longer ones, and leaves hardly more than 1 cm. in length may be fertile. The leaves on young plants are more deeply toothed than those produced later. The species is allied to *S. Dayi*, but has much shorter and broader



Dipteris Lobbiana, near Gunung Pulai, Johore.

leaves; *S. Dayi* also lacks the toothed cartilaginous edge. It is curious that both *S. minima* and young plants of *S. borneensis* on G. Pantl are parasitised by a scale insect, such being uncommon on wild ferns in this country.

Notes on Malayan Ferns

1. *Dipteris Lobbiana*.

This interesting fern has a wide distribution in Malaysia and is quite abundant, at least over part of its range, but probably because of its peculiar habitat it was not often found by the earlier collectors. In Christ's *Farnkräuter der Erde* (1897) it is said to be a rare plant. Its collection on Mount Ophir by Lobb, together with *Matonia pectinata*, with which it probably has a common ancestry, has associated the names of the two ferns together, though in nature they do not grow side by side. *Matonia pectinata* is found on the exposed summits of a number of the highest mountains in the Malay Peninsula and at lower altitudes on some of the small islands to the south of it; *Dipteris Lobbiana* is found only on rocks by the sides of forest streams, often quite in the low country. It has been found plentifully by several streams in Johore, as well as on Mount Ophir, and also further north in Pahang (Tahan River and Sungei Perting, Bentong), in Perak (abundantly in the Palas River on Gunong Bujong Malacca, and at other localities not specified) and as far north as Kedah Peak. In Borneo Bishop Hose has stated that it is found "on the banks of most rivers in Sarawak and North Borneo at some distance above the highest point to which the influence of the tide extends." van Alderwerelt van Rosenburgh gives the distribution "Malaya," a term to which he attaches a wide meaning. Copeland records it as occurring in Celebes, but the writer has seen no published record of its occurrence in Sumatra or Java, though the former is not unlikely. It is not found in the Philippines.

The present writer has seen this fern three times, on all occasions in Johore; by the Sungei Berhidong, north of Gunong Belumut, at about 450 feet above sea level, by one of the streams flowing southwards from Gunong Pulai (see accompanying plate), at a similar altitude, and in the Pelepah valley near Kota Tinggi. In descending the first-named stream from about 1600 ft., *Dipteris* was not observed in the steeper more shaded upper reaches, but appeared where the course became more level and open. The beds of all three streams are filled with granite boulders of greatly varying size; the fern grows over the boulders, its rhizomes clinging tightly to them. Sometimes by the side of the stream the boulders are covered with sand or silt, and in this case the rhizome is not

exposed; in such positions, on the edge of the jungle beside the stream, the fronds reach their largest size. The plant grows everywhere quite close to the water, sometimes on rocks in mid-stream, and it is evident that at times of flood the fronds are quite submerged. After heavy rain (which may occur at almost any time of year) such streams rise rapidly to a height considerably above their normal level. Burkill remarks of *Dipteris Lobbiana* at Bentong that "the tenacity with which it holds on to the rocks is remarkable. It grows in places where the floods must often submerge it" (note on field label). The division of the frond into narrow segments is undoubtedly of great service under such conditions; it could hardly survive if it had the broad lamina of *D. conjugata*. Further, the narrow coriaceous leaflets are a xerophytic character probably connected with the fact that the fern often grows exposed to the sun, and may be left with a restricted water supply when the stream is low.

Another fern growing under the same conditions is *Meniscium salicifolium* Wall. (*Dryopteris* C. Chr.). Its narrow entire coriaceous leaflets are quite comparable with those of *Dipteris Lobbiana*, though it has pinnate leaves and a short rhizome instead of a long creeping one. It has the same kind of relation to the broad leaved *M. cuspidatum* Bl. (which has a wider distribution) as *D. Lobbiana* has to *D. conjugata*. A third species, which is almost certainly of the same habitat, is *Aspidium semibipinnatum* Wall., from the south of the Malay Peninsula and Borneo. It has narrow ribbon-like leaflets in contrast to the broad pinnae of its allies which live in the shade of the jungle. These ferns are undoubtedly specialised to the stream bed habitat, and are not found elsewhere.

Borneo appears to be the centre of distribution of the genus *Dipteris* as it exists today, and has two peculiar species. One of these, *D. quinquefurcata* (Bak.), is very close to *D. Lobbiana*; in fact, the writer is disposed to doubt whether it is a distinct species. On the banks of the Pelepah stream above mentioned, somewhat in the shade of the edge of the jungle, were some very large fronds of *D. Lobbiana*, twice as big as many of those on the rocks in the stream bed. In these there is a very marked tendency for the sori to break up into as many as five or six smaller ones in a single areola, and the segments of the fronds reach 9 cm. in width. This condition is almost that described for *D. quinquefurcata*, and it is quite possible that the latter species, known from few specimens with little or nothing in the way of field notes, only represents an unusually large form of *D. Lobbiana*, grown under unusually favourable conditions.

Bower has suggested *Land Flora* (1908) pp. 618-622, *The Ferns* (1923) p. 226) that *D. Lobbiana* is the most primitive

member of the genus, most nearly allied to the ancestral *Matonia-Gleichenia* type. Its simple narrow divisions with a single row of rather large sori on either side of the midrib, and the fact that all sporangia in a sorus are produced simultaneously whereas the sorus of *D. conjugata* is "mixed," all point to a relatively primitive condition. At the same time it is rather remarkable that *D. Lobbiana* is so well adapted to the conditions of the peculiar habitat in which alone it appears capable of living in nature. One must suppose that it is derived from an ancient type, and has retained its primitive characters on account of their suitability to its environment. It is evidently unable to grow either in the shade of the jungle or on exposed ground away from streams; in the latter position it would be crowded out by more vigorous competitors. *D. conjugata*, on the other hand, may be regarded as a more recent and vigorous type, capable of holding its own under conditions in which it has far more competitors; it has a correspondingly wider range of distribution.

2. On the production of fertile fronds by *Stenochlaena palustris*.

Stenochlaena palustris (Burm.) Bedd is a fern of wide distribution in the eastern tropics, extending from northern India and southern China through the Malayan region to Australia and into the Pacific. In Singapore it is one of the commonest ferns, especially in somewhat moist places, being frequent by roadside ditches. It will flourish with its fronds fully exposed to the sun and its stems trail long distances over the ground or climb high up tree trunks. The young fronds are tender, and are edible, but the old ones are very stiff and leathery. Usually only the sterile leaves are produced, but from time to time the narrow fertile leaves may be observed, occasionally in large numbers.

The question arises as to what are the factors determining the development of the fertile fronds. Over part, probably most, of its range, this fern is subjected to a more or less prolonged dry season. I can find no records of its behaviour under such circumstances, but it seems probable that fertile fronds are produced during the dry season, and sterile fronds only or chiefly during the wet season. Where there is a dimorphism between the sterile and fertile leaves of terrestrial ferns it is usual for the fertile to have a more or less contracted lamina, and a longer stipe, thus exposing the sporangia to a drier air than is found close to the ground, and also guarding to some extent against the consequent greater transpiration (see Copeland E. B., on the comparative ecology of the San Ramon Polypodiaceae, *Philippine Journal of Science*, C., Vol. 2, pp. 59-61). *Stenochlaena* is not essentially terrestrial, and the dimorphism is here connected most probably with a drier season, not with a drier stratum of the

atmosphere. However, there appears to be a response to the greater dryness of the air away from the ground in the production of a greater number of fertile fronds on those stems which have climbed up tree trunks; but fertile fronds are not confined to such situations, being found on the ground also.

In Singapore we have such a uniform climate that this fern has not any definite seasonal stimulus to the production of fertile fronds. The most marked wet season is usually that of the north-east monsoon, about November to January; there is usually hardly so marked a dry season, and therefore what must be supposed to be the stimulus of change from wet to dry is not often a strong one. Probably any fairly pronounced dry period will initiate the production of fertile fronds, and a very wet period a crop of sterile ones.

From the few observations I have made in Singapore it seems probable that a period of about twelve days or more with little or no rain is sufficient to induce the production of fertile fronds on some at least of the plants of this species. The position of the plant has no doubt some influence on the matter. By the time the fronds have developed the weather may be wet again. The fertility of a frond must be determined at a very early stage, while it is still coiled up in its bud, covered by overlapping dark coloured orbicular scales. I have not been able to determine exactly at what stage the form of the fronds is determined; I have only observed the production of fertile fronds on certain plants constantly under notice, and have examined the rainfall records of the preceding few weeks.

My attention was first called very strikingly to this matter in March 1923. After the wet and cloudy weather of the N. E. monsoon there came an unusually prolonged drought. From Jan. 24 to Feb. 17 there was only .4 in. of rain, nearly all of which fell on one day; on Feb. 18 there fell 1.28 in.; from Feb. 19 to March 13 only 1.7 in. During March and April there was a great abundance of fertile fronds of *Stenochlaena palustris* in the Gardens, and also on some plants outside which I happened to notice. There was a less pronounced dry period from August to October, and again abundant fertile fronds, but I have no particular observations.

1924 was much wetter than 1923, and fertile fronds were fewer. The following are observations of their appearance: March 10; a few young fertile fronds observed. The second half of February had been dry, (.88 in.) after an excessively wet first half (14.7 in.). Early June; fertile fronds on several plants. There had been a dry period from April 26 to May 7 (.21 in.)

August 18; fertile fronds on several plants. The period July 14 to 26 had been dry (.10 in.).

Feb. 1, 1925; 16 fertile fronds on one plant, and many on other plants also. The period Dec. 23 to Jan. 4 had been dry, eight of these days being quite rainless, and a period of seven days having only .10 in. of rain. January was very wet, and on Feb. 10th a large number of new sterile fronds were seen unfolding. It is curious that the young sterile fronds are always pink (like the young leaves of many trees), whereas the young fertile fronds are green.

These observations are not very complete, but they appear to be of some interest. It is remarkable how little biological observation is recorded concerning the majority of our ferns; even information as to habitat is usually missing from systematic works. It is only the more remarkable species, such as the *Platycterium*s, *Lecanopteris* and *Drynaria* which have received attention, but there is much of interest to be recorded about species less remarkable from a morphological standpoint.

3. *Gleichenia opposita* v.A.v.R.

In various places on the lower slopes of the hills of Penang a peculiar *Gleichenia* is abundant. There are two old specimens in the Singapore Herbarium, collected by Curtis (no. 534, fertile) and Ridley (7037), and another has been added by the present writer (10286). It has recently been observed fairly abundant on the lower slopes of Kedah Peak, and was also collected at Semenyih in Selangor by H. L. Hume in 1922 (F. M. S. Museums no. 8327).

Mr. H. N. Ridley in his recent paper on the ferns of the Malay Peninsula (Journ. Malayan Branch, R. Asiatic Society, Vol. 4, p. 3) has described it as a new species, *G. parallela*. I find however that the type collection of *G. opposita* v.A.v.R. from Sumatra (which I have examined, by courtesy of the Curator of the Buitenzorg Herbarium) is identical, so that the latter name must be adopted (Bull. Jard. Bot. Buitenzorg, Series 2, XI, 13, 1913). The species is one of considerable interest, and as it appears to me that both the descriptions above mentioned are somewhat inadequate I have prepared the following notes on it. In dealing with the fronds of *G. linearis* and its allies with their manifold forking (with or without development of the included buds) the usual terminology of pinna and pinnula becomes a little difficult to apply. For convenience I have here regarded each leaf as a branch system and have adopted the term pinna only for the ultimate leafy branchlets.

The main lateral branches of the fronds of this fern appear at first sight to be regularly bipinnate, with opposite pairs of pinnae, something like a form of *G. glauca* with the pinnulae (in the strict sense) opposite and widely spaced. A closer examination shows that a bud is present in the axil of one pinna of each pair,

on alternate sides of the rachis, and that the pinnae subtending these buds are larger than those opposite. The pinnae have exactly the same form as the ultimate branches of some forms of *G. linearis*; the pinnulae are closely set and densely ferruginous-hairy beneath, especially on the costulae. Comparing the branching of this fern with that of typical *G. linearis*, the homologies of the various parts are obvious. The axils where buds are present really represent forkings of the rachis, the forking being here unequal; one branch continues the growth of the branch-system, while the other is leafy like the ultimate branches of *G. linearis*. The opposite smaller "pinna" is one of the accessory branches usually present at the forkings of *G. linearis*, the other one being suppressed.

This condition of the apparent existence of two opposite pinnae is frequently found in the commonest of the smaller forms of *G. linearis* occurring in the Malay Peninsula. Fig. 1 shows diagrammatically the typical symmetrical branching of the common large form, fig. 2 a frequent type of branching in the small form just mentioned (which is very irregular) and fig. 3 the branching of *G. opposita*. In fig. 2 it is seen that at the penultimate forking the pseudopinnate condition occurs; it may also occur lower down the branch-system, though less frequently. Sometimes there is some development of the suppressed accessory branch, which may be represented merely by a rather long and slightly lobed pinnule.

On examining a number of complete fronds of *G. opposita* it is found that various irregularities in its branching may occur, and that these are all tending to the condition of the variety shown in fig. 2. The principal irregularities are as follows. Two of them are indicated in fig. 4.

(1). The suppressed accessory branch at any forking may be developed, either in a rudimentary form, or more rarely of normal size. These rudimentary accessory branches are common in other forms of *G. linearis*, as mentioned above.

(2). At any forking the smaller branch may be again forked instead of simple, with or without development of the extra accessory branch.

(3) The bud in any fork may develop, forming a short branch, forking once or twice again. At these subsidiary forkings small accessory branches may be developed.

(4). It not infrequently happens that the lowest bud on the lateral branch-system of a large frond develops into a strong axis, only slightly less in size than the main axis, bearing at its forkings lateral branch-systems exactly like those of the main axis, though somewhat smaller. In the branch systems of these subsidiary axes I have observed the same irregularities as those of the branch-systems of the main axis just described.

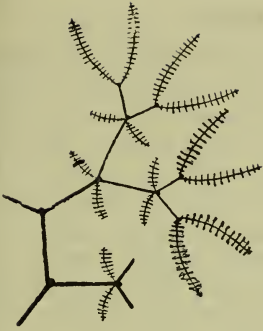


Fig. 1. Branching of normal *G. linearis*.

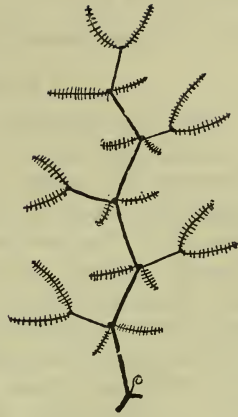


Fig. 2. Branching of a common form of *G. linearis*.



Fig. 3. Branching of *G. opposita*.



Fig. 4. Two abnormalities observed in *G. opposita*.

These irregularities all point to a close relationship with *G. linearis*; further, the fertile fronds show an arrangement of sporangia agreeing with *G. linearis*, 12 to 20 sporangia being present in each sorus.

4. *Syngamma borneensis* and *Lindsaya borneensis* in the Malay Peninsula.

On a recent visit to Gunong Panti, in the south-east of Johore, I found *Syngamma borneensis* (Hk.) J. Sm. and *Lindsaya borneensis* Hk. quite abundant in the low forest on the top of the sharp ridge which forms the hill. The altitude is about 1500 feet above sea. *Syngamma borneensis* grew on the ground, and also in rock crevices. Most of the plants bore fertile fronds, which were decidedly longer and narrower than the sterile ones. The species has not previously been recorded from the Malay Peninsula, but two specimens from Mt. Ophir collected by Mr. Ridley (3334 and 9079) have been found in the Singapore Herbarium. Mr. Ridley, in his paper on the ferns of the Malay Peninsula (*Journ. Malayan Branch, R. Asiatic Soc.*, Vol. 4, p. 111) appears to refer these specimens to *Elaphoglossum melanostictum*, but they are evidently to be referred here, though they are large (fertile fronds to 60 cm. long).

Lindsaya borneensis is otherwise represented in the Singapore Herbarium only by two specimens from Singapore Island, though Beddome records it as collected by Scortechini in Perak. Mr. Ridley's 3062 from Taiping Hills and 12132 from G. Pulai, which he records as this species, have much larger leaflets and are to be referred to *L. lancea*; his specimen from the Talan River has not been found here.

5. *Syngamma Dayi*.

Syngamma Dayi Bedd. is a very small species first collected by Day, on quartz rocks "on the pass between Kuala Kangsar and Kinta, 2000 ft. alt." The exact position of this locality is a little doubtful. The species has now been collected again on Klang Gates (by H. L. Hume, F. M. S. Museums no. 7149). Klang Gates is a ridge of quartzite in Selangor, the highest point of which is about 1400 feet above sea level. On its upper slopes grow many interesting xerophytic plants, a list of which is given by Mr. H. N. Ridley in the F. M. S. Museums Journal, Vol. 10, pp. 247-251 (1922). Mr. Ridley also records *S. Dayi* from Kanching, Selangor, in his recent paper of the ferns of the Malay Peninsula.

6. *Lindsaya lancea* and *L. scandens*.

Lindsaya lancea (L.) is a species of wide distribution in the tropics of both the old world and the new, while *L. scandens* Hk.

is recorded as confined to the Malayan region. The distinction between the two is sharp enough if extreme forms be considered; the one terrestrial with compound fronds, the other climbing with simple fronds. But if a large series be examined, it becomes impossible to recognise a distinction between them, and I think that *L. scandens* is a habit-form of *L. lancea*.

Climbing plants may be found bearing unbranched leaves typical of *L. scandens*, and (on the same stem) branched leaves which cannot be distinguished from leaves borne by terrestrial plants with short creeping stems. The terrestrial plants may have fronds with few branches and large pinnules, or many branches and smaller pinnules, and no line can be drawn separating them. The pinnules may have a slightly recurved lower edge, especially if large, or a straight one, in both scandent and creeping forms. The stems of both forms have exactly the same type of stiff dark brown lanceolate scales; but it is to be noted that the scales of *L. repens* are quite similar, so that scales are not to be relied on as specific characters in this genus. The roots on climbing stems are short and serve partly to attach the stem to its support; they are densely covered with root hairs. The roots of terrestrial stems are longer and stouter, and usually have lost their hairs in herbarium specimens, but types more or less intermediate may be found.

van Alderwerelt van Rosenberg says of *L. lancea* in the Supplement to his Handbook of Malayan Ferns (p. 506): "Variable, with the rhizome varying from short creeping to wide scandent, the stipes stramineous to black or purple brown, the fronds to 50 cm. long, the branches abruptly shortly acuminate to subcaudate, the leaflets $1\frac{1}{4}$ - $3\frac{1}{2}$ cm. long, pale to dark when dry." Admitting so much variation, I cannot see that it is possible to separate *L. scandens* as a distinct species.

We have here an instance of the variability of many fern species; it is shown by several of the Lindsayas. The only real test proving the specific identity of the various form would be to grow plants from spores borne on one frond, and try to produce all the growth forms from the same parent. I do not think that any one has attempted this task, at any rate with Malayan ferns. It has many difficulties, the chief of which is to exclude foreign spores from the experiment.

7. *Polypodium triangulare* Scort.

Polypodium triangulare Scort. was first found in Perak, and described and figured by Beddome in the Journal of Botany, 1887, p. 324, t. 278. There are several specimens collected by Scortechini in the Singapore Herbarium, all without locality, and also specimens collected by Wray (294) at 4500 ft. on Gunong Batu Puteh, and Kunstler (Larut 3647). Subsequently it has been found on

G. Kerbau at about 6000 ft. (Haniff 14739) and on G. Tahan at 5500 ft. (Haniff and Nur. 7980). It appeared that the description of Copeland's *Acrosorus exaltata* from the Philippines (Philippine Journal of Science Vol. 1 Suppl. 158) agreed closely with *Polypodium triangulare*, and through the kindness of Mr. E. D. Merrill, lately Director of the Bureau of Science, Manila, I have been enabled to examine a specimen of Copeland's fern. The two appear to be quite identical, and therefore the Philippine plant should be called *P. triangulare*, or *Acrosorus triangularis*, if Copeland's genus be adopted. (See also Phil. Journ. Sci. 3 C, 347).

There are in the Singapore Herbarium specimens of *P. triangulare* collected at Khao Luang in Lower Siam (Dr. E. Smith 725) and on Mt. Kinabalu in British North Borneo (by Major C. M. Enriquez, 18163 in Singapore Series). The species has thus a wide range of distribution in the Malayan region.

8. *Gleichenia Norrisii*.

This species was described by Kuhn in 1869; apparently from specimens collected by Griffith and Norris some years earlier in the Malay Peninsula. It was figured by Beddome in the Supplement to his *Ferns of British India*, tab. 346. It is closely allied to *G. glauca*, and incomplete herbarium specimens are not always easy to distinguish. When seen in the field, the distinction between the two species is at once apparent. *G. Norrisii* has a looser habit, with more distant pinnulae and broader more rounded segments; the distal pinnulae are also conspicuously bent backwards. It further lacks the long deeply divided stipule-like leaflets that surround the apical buds of the fronds of *G. glauca*, these being replaced by pairs of reduced pinnulae close to the bases of the pinnae which form the fork containing the bud.

In ascending Government Hill, Penang, one first meets *G. Norrisii* at about 1700 feet altitude, where it largely replaces *G. linearis* as the common fern in open places beside the road. It occurs from this altitude upwards to the top of the hill (2500 feet), but towards the top and on the slightly higher Western Hill *G. glauca* appears and is more abundant. *G. Norrisii* has also been found on the Taiping Hills at about 2000 feet (Scortechini 439), on Bukit Panchor in Province Wellesley (Ridley 12634), on G. Angsi at about 2000 feet (Holtum 9901), and at the same height on the top of G. Pulai in Johore (Ridley 12127). *G. glauca* appears to occur at somewhat higher altitudes (to at least 4000 feet) throughout the Peninsula, and has been more frequently collected.

9. *Lygodium polystachyum*.

Lygodium polystachyum Wall. is by far the most beautiful member of its genus occurring in the Malay Peninsula. It has

rather a restricted range, of which the southern limit appears to be in Upper Perak, though a specimen has been collected by Mr. Ridley at Kuala Tembeling in Pahang. It occurs in Penang and the Langkawi Islands, and Curtis records that it is abundant all over the Island of Puket in Lower Siam. Unlike the other species, it grows in the shade of the jungle, climbing up slender trees, and bears its fertile fronds in the shade. All the other local *Lygodiums* known to me are sun plants, or if they start life in the shade only flourish produce fertile pinnae in the open. The plants of *L. polystachyum* which have not yet produced climbing leaves have almost the appearance of a *Dryopteris*, and the basal pinnae of all fronds are very large. The texture also is much softer than in the other *Lygodiums*.

10. *Diplazium Ridleyi* (Copeland).

This species was described (as *Athyrium Ridleyi*) by Copeland in the Philippine Journal of Science, XI c, p. 39. The only distinction from *D. accedens* Bl. is in the presence of sterile areoles between adjacent rows of soriferous veins. Copeland also states that the rachis is smooth. The type collection, Ridley's 13970 from the Telom River, Pahang, is represented in the Singapore herbarium; with it is included a stipe which is covered with blunt spines. Probably no part of the stipe reached Copeland, as he does not mention it. Further, the upper pinnae and the distal portions of the lower ones lack the distinctive phenomenon of the sterile areoles separating the fertile veins. On comparison with other specimens from the Malay Peninsula it is seen that Ridley's Telom plant represents only an extreme form of a variable species. The following specimens all show the additional areoles at least at the bases of the pinnae, though none to such a marked extent as the type of *D. Ridleyi*: Burkill and Holttum 8730, Fraser Hill; Nur. 11083, Fraser Hill; Fox 10657, Maxwell's Hill; E. Smith 1924, Banang Sta, Patani. Considering the known variability of many species of *Diplazium*, it appears to me that these plants should all be reckoned as *D. accedens* Bl., or *D. proliferum* (Lam.) v. *accedens*.

I have lately seen at Buitenzorg, both in cultivation and in the herbarium, specimens of *D. permirabile* v.A.v.R. (*Bull. Jard. Bot. Buitenzorg*, Ser. 3, Vol. 5, p. 196), and it appears to me that these also should be included in the same species as the specimens above cited. The distinguishing feature of *D. permirabile* is the presence of scales at the apices of the spines on the stipes. The stipes of the herbarium specimens from the Peninsula above mentioned do not show these scales, but the blunt spines are exactly the same as in *D. permirabile*, and the absence of scales is to be ascribed to loss in the processes of drying and mounting. They are more easily lost than ordinary scales growing from the

surface of a stipe. There are plants from the Malay Peninsula in cultivation in the Singapore Gardens which bear scales exactly like those of *D. permirabile*.

11. *Schizoloma Walkerae*.

Schizoloma Walkerae (Hk.) Kuhn has hitherto been collected in the Malay Peninsula only on Mt. Ophir (no altitude recorded) and in Singapore. Mr. Ridley says that it grows in watery places. An additional locality can now be added, in the north of the Peninsula; I found this fern growing on Kedah Peak at an altitude of about 3000 feet above sea, amongst Sphagnum, by a small stream in the low forest.

12. *Dryopteris palcata* Copel.

This species was found on a specimen from Benkoelen in Sumatra. It occurs also in the Malay Peninsula, the other collections having been confused with *D. ferox*, which it resembles only in the extreme scabiness of stipe and rachis. The specimens known from the Malay Peninsula are as follows:

Gunong Angsi (N. Sembilan Holttum 9926, Nur s.n.; Bujong Malacca Ridley 9536; Penang, Ridley 7080, Curtis s.n.; Patani, E. Smith 1856.

The Peninsula specimens are somewhat more hairy than those I have seen from Sumatra. *D. persquamifera* v.A.v.R. from Celebes is closely allied.

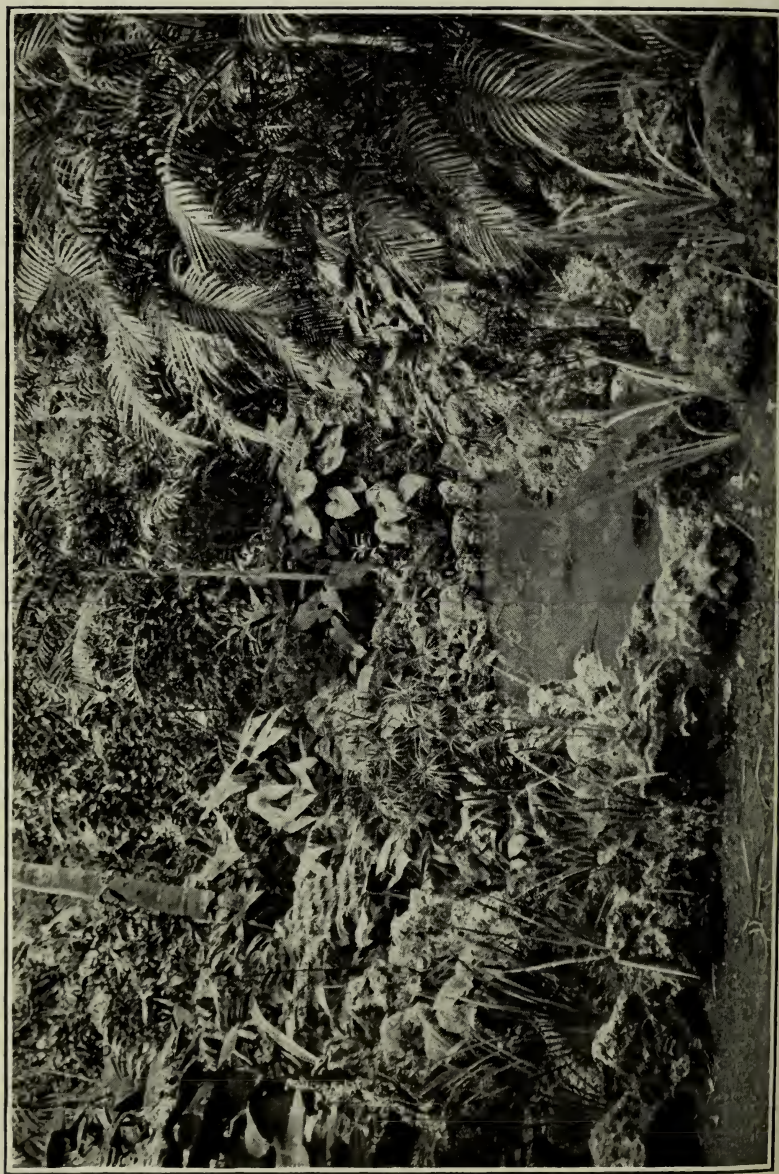
13. *Polypodium insigne* Bl.

Beddome records this species from the Malay Peninsula, but cites no specimens; nor do any exist among the older collections represented in the Singapore Herbarium. Two specimens of Mr. Ridley's from Telom are however clearly referable to it; one is numbered 13978, the other unnumbered. They agree well with specimens from Sumatra and from Gunong Gedeh in Java, though somewhat thicker in texture than the latter. This species appears normally to grow on rocks in streams; Mr. Ridley's 13978 is labelled "Telom River," and its appearance suggests a creeping habit.

Two specimens have been collected at Fraser Hill, by Miss G. Hose (no. 9, 1919) and by Burkill and Holttum (8789). The latter was climbing a small tree in the jungle, at about five feet from the ground, and its leaves are thicker in texture than the Telom plants, with narrower segments. These features are probably the consequence of restricted water supply in an unusual habitat.

14. *Hypolepis Brooksiae* v.A.v.R.

This species was described from Benkoelen in Sumatra (Bull. Jard. Bot. Buitenzorg, 2nd Series, XXVIII, 29, 1918), the writer remarking that it resembles *Dennstaedtia scandens* and *D. Moluccana*. It has been collected in the Malay Peninsula at Fraser Hill (Burkill and Holttum 8817, Holttum 11333) and Gunong Hijau (Haniff 9086) and is further represented in the Singapore Herbarium by a specimen from Brastagi in N. Sumatra (Holtum



The larger pond in the Dell, about 1917 (see plan No. 3.)

15435). Bonaparte has referred the specimen first quoted to *Dennstaedtia moluccana* Bl. (Notes Pteridologiques. Fasc. XIV, 55, 1923). I have recently compared the Peninsula specimens with the original in the Buitenzorg Herbarium and find that they agree exactly.

This species grows in tangled masses in open places, and is covered throughout with small thorns; it has apparently the same habit and almost exactly the same appearance as *Dennstaedtia moluccana*. It would be interesting to make a careful comparative study of these species. It seems likely that *Hypolepis Brooksiae* is derived from one of the scandent *Dennstaedtia*s by loss of the inner portion of the indusial cup, the outer part only remaining as a small growth at the base of the sinus below which the sorus is situated. In dried mature fronds it is impossible to detect any trace of the inner side of the cup, but in young fronds it might be found to exist.

It is interesting to observe that *Odontosoria aculata* (L.) from the West Indies appears to have a closely similar appearance and habit of growth.

15. **Polypodium Féei** (Bory) Mett. and **P. heterocarpum** (Bl.) Mett.

There is a common fern in the Malay Peninsula which has usually been called *P. Féei*. On comparing it with specimens of *P. Féei* from Java, and with descriptions, I have come to the conclusion that it should be called *P. heterocarpum*, and that the true *P. Féei* has not yet been found in the Malay Peninsula. The Peninsula fern is often small, the fronds frequently being only 7 to 10 cm. in length; the sori are much broken, rather distant, and distinctly embedded; the rhizome scales are very narrow, almost hair-like. *Polypodium Féei* from Java has usually larger fronds; the sori are much more regular, closer, and not immersed; the rhizome scales are broad. I have seen both plants in the field, and have examined a number of specimens of each in the herbaria at Buitenzorg and Singapore.

R. E. HOLTUM.

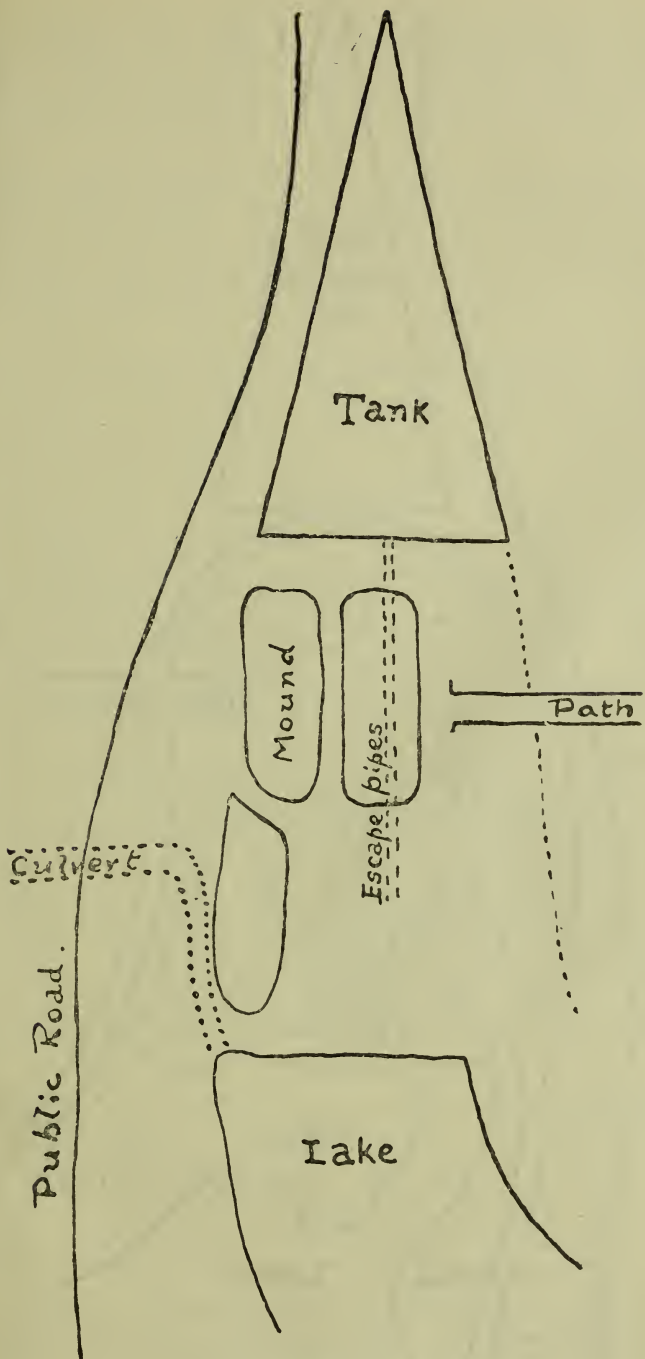
A Note Relating to the History of the Dell in the Gardens

The Botanic Gardens were founded in 1859. In that year the four and a half acres, now occupied by the Gardens Lake, made a swamp, down the middle of which ran the boundary between two properties—on the one side the Kerr property (newly sold to Hoo Ah Kay, better known by his trade name of Whanpoa, and then acquired by Government for the Gardens) and on the other, the western side, the Napier property. On the Napier property stood the first house called Tyersal—a house which William Napier had built in 1854 and sold in 1857. When the house was sold the Tyersal property was broken up and went into several different hands, the house which the Temenggong of Johore

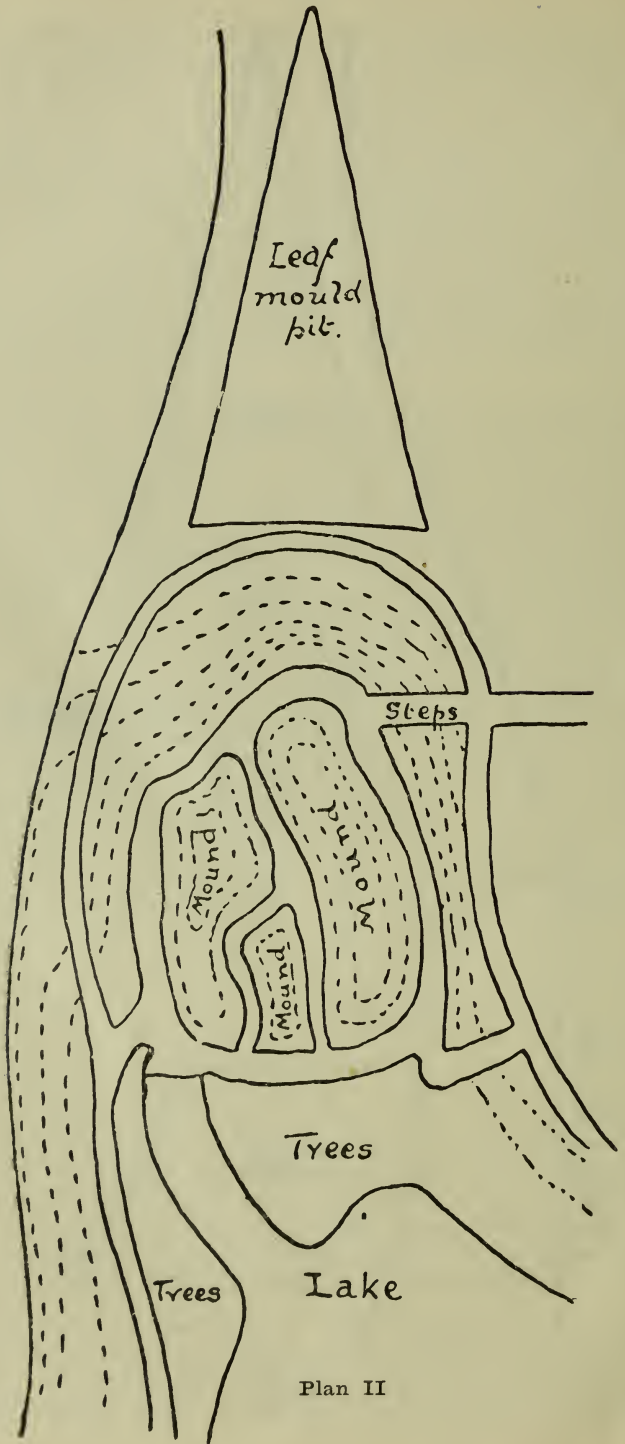
bought carrying with it a little more than sixty-six acres. The Temenggong sold his acquisition again in 1858, but repurchased it on May 23rd 1860. It was he who planted in 1862 the avenue of Tembusu trees (*Cyrtophyllum fragrans*) which leads to the house from Napier Road. In 1866 there were further deals in parts of the property, during which the Government acquired half of the Avenue together with the strip between the avenue and the swamp. The half of the avenue the Government converted into a public road, i.e. Garden road (now re-named Tyersal Avenue), and the narrow strip they made over to the Agri-horticultural Society for inclusion in the Gardens. The making of the Gardens Lake now became possible; and the Society by erecting a dam some eight feet high, created it.

Garden road is carried across the stream at the head of the Lake on an embankment over a culvert constructed of large rectangular pieces of granite. This culvert possesses a fall of slightly more than two feet in its length and is in section 3 feet 10 inches wide by 2 feet 7 inches high. At the time of its construction the Tyersal lakes did not exist; and, as shown by evidence obtained recently during the draining of them, their site was planted with coconut palms and mangosteens. What stood on the land thrown into the Gardens is quite unknown, as there is not a tree on the strip acquired by the Government, which can have been there in 1866; and there are no records. One may surmise that grass, and perhaps lallang, covered the ground. At the head of the lake, on account of the advantage of the inflow of water from the Tyersal grounds, the Gardens' cooly lines were placed; and a screen of kenari and pomelo trees was planted in front of them. Soon after this the Tyersal lakes were planned in imitation of the Gardens Lake, the imitation extending even to the islet. They were constructed just as the Gardens Lake had been, by deepening the hollow and steepening the banks, the earth from the bottom going in this case to construct a roadway all round the banks. In the extent of this roadway he departed from the model in the Gardens, for in the Gardens the raised road borders the lake only upon one side. The floor of the lower Tyersal lake was arranged to be on a level with the mouth of the Government's culvert, and a sluice was built to control the height of the water above it, whereby if necessary the lakes could be emptied approximately. Under the road along the lake side a culvert, small in section, made connection with the Government's culvert in a sump, and as the bottom of the lower lake was no higher than the entrance to the Government's culvert it was impossible to allow this small culvert to have any fall at all. Under what circumstances the complete emptying of the Lake was anticipated is not known: and there is no evidence that they were at any time emptied.

Emptying was apparently not contemplated in the case of the Gardens Lake, for no sluice existed, and no cutting on the embankment will even at this time completely empty it, as its bottom is still, after all these years of settling, below the level of the drain



Plan I



Plan II

along Napier Road: but there was made an unduly large brick escape channel, 4 feet high, $2\frac{1}{2}$ feet wide, domed and flat bottomed, which functioned for the escape of water till 1922. Only by breaking down its brickwork could this channel be made to carry off about five feet of water from the lake.

We can from these facts draw a picture of the appearance of the Dell, when Nathaniel Cantley in 1882 was appointed Superintendent of the Gardens. We see a gentle, and (except after rain) very small stream running from the Tyersal into the head of the Garden Lake over a sandy bed in a hollow that had been embanked on one side, and with cooly lines upon the other.

Cantley, an excellent organiser, removed the lines to a place outside the Gardens limits, and thereupon considered to what use he could put the vacated site. Murton, his predecessor, had failed in an attempt to make a fernery at a place close to the head of Maranta Avenue: and as Cantley, like Murton, was anxious to succeed in such an undertaking, he sought for a new site and selected the dell. To succeed he wanted a more sure supply of water than the stream gave, and this is how he tried to meet the need. Having removed the cooly lines and having carried the water underground to the lake (it is by no means clear why), he constructed a triangular concreted tank, about 140 feet long, and at the base 65 feet broad, where it was six feet deep. Probably by means of the earth from the tank mounds for the ferns were then thrown up between the tank and the head of the lake, mounds not higher than that the water supply could be led on to them. But unfortunately the tank was not a success, for it could not be kept watertight: and what with illnesses and with other work Cantley never created the fern garden that he aimed at. It is to be assumed that the water was to reach the ferns by runnels along the tops of the mounds. For overflow, (as recent observations on the spot have shewn) he laid in the first place a line of gas piping to conduct the water from the tank, and then he constructed a much larger circular brick channel above it. These escapes passed in a straight line direct to the lake, and obviously did not water the mounds; other contrivances must have been thought of for that. But Cantley died with them unfinished. An old guide book indicates the Dell to have been then as in plan No. 1.

Because it was clear that these mounds could not function as their originator had contemplated, they were somewhat altered in shape by Mr. Ridley, and the tank was put to a new service, i.e. for the accumulation of leaf mould. The mounds were clothed with a variety of plants: and at the end of Mr. Ridley's service they were in shape as in plan no. 2 carrying palms and ferns and shade plants of various orders, and a few very interesting trees.

It will be observed that there were two circular paths enclosing the mounds: one of these was at the lowest elevation, and the other above it by six feet. These paths were narrow, and it was impossible in the morning to pass along them with comfort by

reason of the dew-laden foliage arching into them. Moreover the lower paths could not be kept free of mud. It was obvious that changes had to be made as soon as possible: and alterations were commenced in 1914 when by means of dredgings from the lake the lower paths were raised.

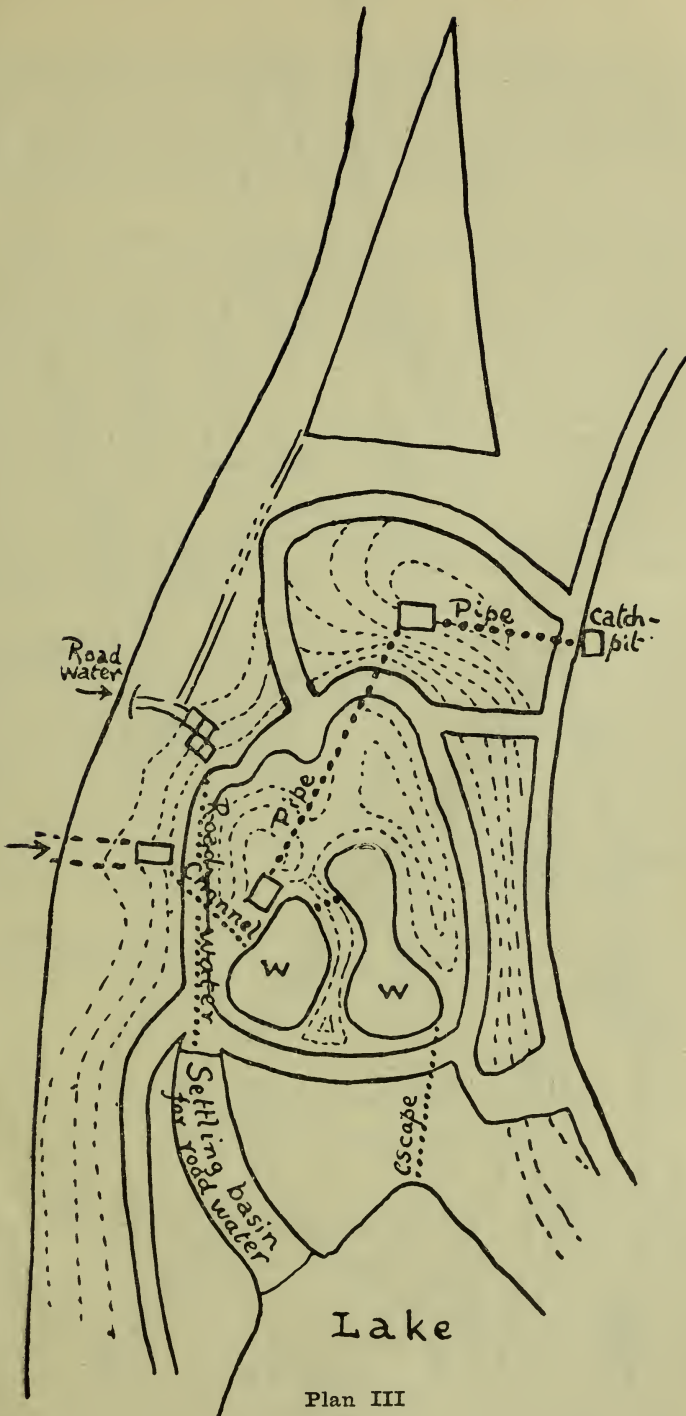
In 1915 the upper circular path was closed, and a new and much wider path with a greater diameter was made within the lower end of the cistern. This involved the erection of a mound along it to hide the leaf-mould pit. The drainage from the leaf mould was provided for at the same time by a channel behind a coral wall towards the public road. The silt off that road had been a source of annoyance in the garden for a long time, though the Municipality had done their best by steps and baffles in the roadside drain to abate it. The better to deal with it four catch pits were constructed in the Gardens where the road enters. The paths above the dell were changed likewise as the plan no. 3 indicates.

In 1916 the appearance of the dell were further improved by the creation of two pools in them, one oval and the other dumb-bell shaped: and those who saw them will remember that they were very pretty. Their surface was about 18 inches above the level of the water in the lake—a necessity to get the best appearance from the adjoining walks—which walks, as said, had been raised to keep them dry. One of these pools is shewn in the accompanying plate.

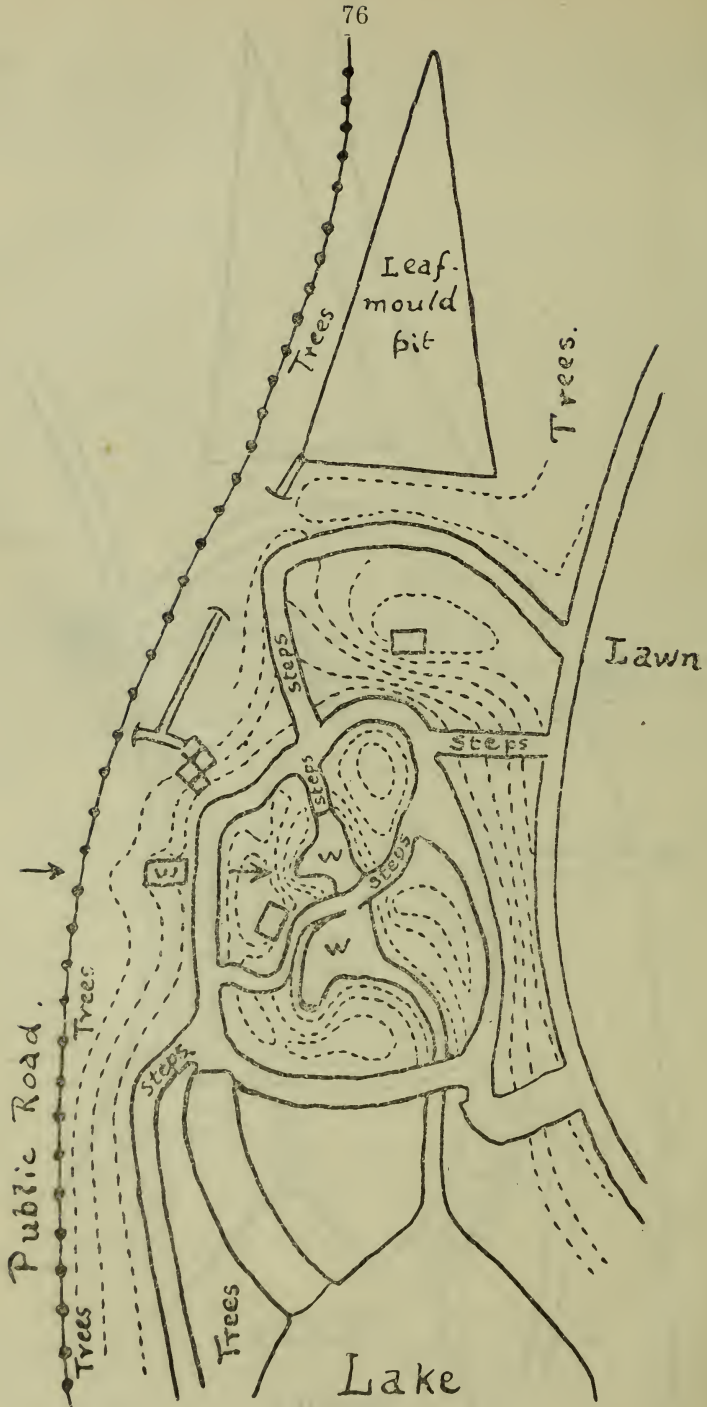
To maintain the water in the ponds two completely hidden bricks tanks were made, the lower supplied from the upper through an underground pipe and the upper receiving rain-water from a certain path-side drains towards the Bandstand Hill. Unfortunately the masonry of the upper tank gave way and undid the contrivance. But at that time it had been discovered in what way Cantley had dealt with the stream from Tyersal, and it was realised that by raising its level so that it filled the culvert and rose another few inches it could be fed into the ponds; accordingly it was so done by means of a simple concrete wall in Cantley's channel, and the bared end of the channel became the pretty rectangular pool at the side of the dell wherefrom the water passed underground into the oval pond, and through the dumb-bell shaped pond, while excess flood water still ran down Cantley's underground channel.

Permanence seemed to have been reached, and the dell had become very pretty.

Unfortunately the Tyersal ponds were found to be a source of mosquitos, and the emptying of them was determined upon. It was then quite unknown how deep the Tyersal lakes were: but a survey revealed that the lowest part of the bed of the lower pond was on a level with the bottom of the Tyersal sluice, and that



Plan III



Plan IV

drainage without filling would be impossible unless a free escape of the water into the Gardens was allowed. This free escape was asked for: and it was a great disappointment to feel obliged to concede it, for concession meant the undoing of the water channels in the dell which had been so newly completed.

The concession was made on the ground that the Gardens had no claim to a head of water found to be due to the sluice in the Tyersal grounds being out of order. Thereupon a rearrangement of the dell was commenced, with the intention of keeping its features. In the rearrangement the beds of the two pools were sunk about two feet, united into one, and the Tyersal drainage water was conducted by an "Armco" pipe into the top of the former dumb-bell shaped pond, and out again by another "Armco" pipe into the lake. The sides of both ponds were concreted. By the lowering of the level and because of the wideness of the "Armco" pipe these ponds were thereby made into a part of the lake; and the abundant fish of the lake, which allow no mosquitos to mature, have access to them.

Now a great part of the beauty of the oval and dumb-bell ponds was that they lay open at the visitor's foot, not being sunk at all. The new pond however, being of necessity sunk, threatened to lack beauty in this respect. There was made therefore a path right across the dell bridging the water close against its surface and skirting the edge of what is left of the oval pond, in reality occupying part of the old bed of that pond, having on its north side the wall of one of the irrigating tanks of 1916. This wall is becoming beautiful by reason of a coating of *Ficus repens*.

The mounds, which now lie as in plan no. 4, are given severally to different forms of vegetation.

I. H. BURKILL.

Tulang Daing or Sisik Puyuh

Carallia suffruticosa

Tulang daing means dried fish bones, and sisik puyuh means puyuh-fish skin: both these names belong to a small tree with serrations on the leaves that suggest the bones of a dried fish seen through the skin, which is exclusively used by the Malays of Perak and Pahang as a medicinal herb, but has hitherto remained rather strangely obscure. After much search it has been identified with *Carallia suffruticosa* Ridley (in Journ. Str. Br. Roy. As. Soc. 61, 1912, p. 6): and it is clear that *Carallia spinulosa* Ridley (in the same Journal, no. 82, 1920, p. 184) does not adequately differ.

The type of the first of these two names came from Dusun Tua, upon the east of Kuala Lumpur in Selangor: and that of the second from Tanjong Malim on the Selangor-Perak border. It extends southwards and has been found at Pulau Sebang in Malacca (Burkill 4960). As a medicinal herb, foliage has been got from Grik in northern Perak; and in Pahang from Budu in the Kuala Lipis district, from Beserah in the Kuantan district, and from Bentong. Mr. Ridley records *C. spinulosa* as occurring in Tonkin also.

The chief use that the Malays make of it is as a poultice for the ripening of boils; but it is also given internally under the idea that it is good for expelling worms, and as one of the innumerable herbs administered speculatively to women during the first three days after childbirth. It is again reported as one of several plants which at Grik are used in a decoction for a bath during fever.

The difference between *C. suffruticosa* and *C. spinulosa* is said to be in the inflorescence: but there is none: in both it is cymose. It was in flower and fruit at Tanjong Malim in February 1904, in bud at Dusun Tua in May 1896 and in flower at Pulau Sabang in August 1919.

I. H. BURKILL.

Teratological Notes

A.—Abnormalities in Coconut Palms.

I. Polyembryony. On p. 275 of this *Bulletin*, Vol. III, it was stated that the various references which had been consulted by me on the question of polyembryony in coconuts were not sufficiently clear as to make one to be quite positive about the occurrence of the phenomenon in coconuts. Cases, however, have come to my notice which prove beyond all doubt that polyembryony does occur in coconuts.

The ovary of coconuts, it will be remembered, is three-celled, two of which usually become abortive at an early stage of development, only one attaining maturity. The fruit consists of a thin outer skin or *epicarp*, below which is the thick fibrous *mesocarp* surrounding the hard shell or the stony layer of the nut. This shell is formed mainly of the *endocarp*, but the outer integument of the seed is also represented in it as a lignified inner lining of the shell (fide Juliano)¹. Inside this stony layer is the solid

1. Juliano, J. B.—Origin, Development, and Nature of the Stony Layer of the Coconut (*Cocos nucifera* L.). *Philippine Journ. Sci.*, XXX (1926), p. 187-200, pl. 3.

Winton, A.L.—Anatomy of the Fruit of *Cocos nucifera*. *Am. Journ. Sci.*, XII (1901), 265-280. Quoted by J. B. Juliano.

endosperm which is the kernel or "meat" in common parlance and which is lined outside by a thin blackish coating. This coating—we may as well call it "testa"—is derived from the inner integument of the ovule (Juliano¹). Then comes the cavity partially filled with water or "milk" (watery endosperm) in ripe coconuts. Corresponding to the three carpels of the ovary, there are three markings or "eyes" on the endocarp, two of which have become hard after the degeneration of the two cells of the ovary, while the third "eye" of the developed cell is soft. Just beneath this "eye" is the embryo. When the germination sets in, a suctorial organ—*haustorium* or "foot"—develops into the cavity, at the end of the cotyledon of the embryo, which supplies nutriment to the young growing plant by absorbing it from the endosperm.

Bearing these points in mind, it will be easy to study the nature of the phenomena concerned in the cases described below:—

(a).—On July 25th, 1925, there was exhibited at the Taiping Agri-Horticultural Show, a germinating coconut from Kampong Jelutong, Bukit Gantang, North Perak, which had put forth three shoots. The coconut was carefully husked by me to find the three shoots as distinct individuals as far as the soft "eye" through which they had extruded from the endocarp. The two other "eyes" were closed and hard as in an ordinary nut where two carpels are abortive. On breaking the nut open, it was observed that each shoot had its origin in a separate embryo, each having a cotyledon and a haustorium of its own. There was only one cavity in the endosperm into which these three haustoria had developed, and there were neither hard, nor leathery dissepiments in it which are said to be present in a polycellular nut.² The kernel inside also showed no signs of any special connection with the closed "eyes" as it showed with the soft "eye." This is then a genuine case of polyembryony in coconuts.

I have also examined many such specimens having two to three embryos from Singapore, Selangor, Penang and Malacca which go to prove that polyembryony does frequently occur in this country. These shoots may emerge out of the husk in all directions, and often in suchwise as to mislead one to think that these extra shoots are due to the functioning of more than one ovule. Hence I look with great suspicion on all the three cases mentioned from Philippines by Quisumbing³ as ones where more than one ovule were functional.

2. Furtado, C. X.—Branched Coconut Palms and their Fertility. Gardens' Bull., Singapore, Vol. III (1924), p. 274.

3. Quisumbing, E.—Branching in Coconut. *Philippines Agriculturist*, XV (1926), p. 3-4.

I have not yet come across in this country a genuine case where more than one ovule had developed giving rise to di—, tri—, or polylocular nut, though such cases have been reported from elsewhere.^{3 4 5}

(b).—Costerus and Smith (1923)⁵ describe a case of polyembryony in thus:—

“Legit H. A. B. Bunnemeyer, Isle of Nangka near Banka, 1917. One celled nut. From one of the black (germinating) spots there emerged four sprouts each showing its own cotyle. No question of branching. Consequently we have here to do with a true case of polyembryony.

“Mr. Smith is thoroughly convinced that the Coconut with three cohering stems, which we described in 1915, is after all a similar case of polyembryony with this difference only that the embryos of 1915 coalesced whereas in the present case they have maintained their full independence.”

The coconut referred to as having been described in 1915 is one which had given rise to three sprouts and which on being carefully opened had not shown any dissepiment whatsoever. “Only one germinating plant forcing its way through one of the black spots was to be seen, but the stem of this young plant showed a separation into three. The advanced state of (dry) specimen did not permit of a further examination into the cause of the phenomenon, but of polyembryony there can be no question.” No further details or reasons are given why Dr. Smith thinks this to be a genuine case of polyembryony and not of fasciation or branching.

(c).—In the Botanic Garden, Penang, there is a “coconut palm” which has three distinct individual stems from the base. Mr. Mohamed Hamiff who has been long connected with the garden, informs me that the three stems have originated from one coconut fruit and that it was planted there in 1901. Only two stems are bearing fruits, while the third one is yet barren and is also very much shorter than the other two. The small growth of this third stem is in all probability due to the fact that twice during its growth it was very badly attacked by borers (there are still marks on the palm of these attacks). The injury caused by the attacks must have retarded the growth very considerably, giving thereby the other two stems a chance to overshadow this one and to make its further development and production of flowers rather difficult. The overshadowing caused by another palm growing close to it may be an additional cause why this stem is weak and infertile. There is another similar palm with two fertile, and

4. Costerus, J. C. and J. J. Smith.—Studies in Tropical Teratology. *Annales Jard. Bot. Buitenzorg*, XXIX (1915), p. 84-85, and plates.

5. *Ibid* *ibid* —*ibid* XXXII (1923), p. 26 and plates.

one barren, stems in the Botanic Gardens Cooly Lines, Penang, which have originated (*vide* Mr. Haniff) also from one nut. The short and barren stem shows signs of injury in the past. In a private compound at Burma Road, Pulau Tikus, Penang, there is a tree about forty years old which has two stems, distinct from the base, both of which are producing fruits.

II. The Development of the Usually Abortive Ovary in Male Flowers. A coconut spadix was exhibited at the Taiping Show, 1925, which had numerous banana-like fruits and only two nuts of normal shape. The latter were borne in the regions of the spadix where normally female flowers are produced, while the former occupied the positions of male flowers. Apparently this is a case similar to the one quoted on page 263 of this *Bulletin*, III, the banana-like fruits being the result of the development of the usually abortive ovary in male flowers.

III. Albino Coconut Seedlings. In the Taiping Show, 1925, there were exhibited two coconut fruits which had put forth completely albino shoots. The albinism was apparently due to some internal factor, and may be a case of chlorosis due to lack of ferruginous products in the endosperm. It could not be attributed to the lack of light as the plants received ample sunlight at the show (and they must have been exposed during the transit), and because normally coconut seedlings germinated in darkness such as obtained in a closed house, have greenish leaves. Neither nut had put forth any roots out of the husk. From the shape, size and colour, the nuts appeared to have come from the same spadix. Further investigations on these nuts were not possible as they were not for sale.

IV. Suppression of Spikelets in Coconut Spadices. Ordinarily a coconut inflorescence consists of many flower-bearing spikelets produced on a fleshy stalk, which usually does not bear any flowers. At the Agri-Horticultural Shows of Taiping and of Kuala Lumpur, 1925, inflorescences were exhibited which were abnormal in that the axes were unbranched, the flowers being borne directly on them.

The flower-bearing region of one such specimen from Taiping measured three feet and four inches, while the non-flowering portion towards the tip was nearly six inches long, and towards the base over eight inches. The bearing portion of the stalk was occupied by female flowers which were more than a hundred in number. In the basal portion, the flowers were arranged in pairs, each pair being some distance apart from the other, and their arrangement resembled that of the male florets on the spikelets of normal inflorescences. The space between these pairs of flowers gradually decreased towards the end so that in the upper third of the bearing stalk the female flowers were so thickly crowded together that they did not admit any special relation between any two consecutive

flowers. On many of the cushions on which the pairs of female flowers were seated, there were two male florets, one on each side of the pair, while in the upper portion where the flowers were very close to each other one could notice occasionally one male floret between two consecutive female flowers. All the male flowers present at the time of examining the inflorescence had shed their pollen and were quite dry. Many of them dropped down with a slight shake, leaving behind no clear marks or scars to show that they were present there. Like normal flowers, they (male flowers) had six segments in perianth, six stamens and a vestigial ovary.

All the female flowers examined were morphologically normal, except that the papery yellow ring which is usually found around the base of the ovary was occasionally adorned with teeth varying from one to six in number. (For the morphological value of this ring see note on Horned Coconuts). The development of these flowers was acropetal so that the youngest flowers were found at the terminal end. Though many of the flowers towards the basal end had their stigmatic portion out of the perianth envelope, not a single one of them was ripe to receive pollen. This therefore means that any nut developed on such inflorescences would be a result of cross-pollination, unless of course they are fertilised by the pollen from another inflorescence on the same tree or by pollen from the same inflorescence which had retained its vitality till the female flowers had become ready to receive it. That similar inflorescences are not infertile was proved by two other such inflorescences, one at Taiping and the other in Kuala Lumpur. The Taiping specimen had three well-developed nuts and the Kuala Lumpur one had five, in their distal end.

Owing to the advance stages of all such inflorescences examined no further details could be gathered as to the exact relation of the male to female flowers, or as to the nature of the phenomenon concerned in the monstrosity.

I was told in Taiping that the palms which produce these monstrous inflorescences have the habit of producing such monstrosities many times during the course of a year. If so, it would be worth while to keep the palms under observation so as to study how these inflorescences originate, what exactly is the composition and nature of the spathes enveloping them, of young flowers, etc. Such a study may help to throw light as the cause and the nature of the phenomenon involved.

Costerus and Smith⁶ who have had a better opportunity of studying such specimens record that all the female flowers in such inflorescences they examined were paired, each female flower being

6. Costerus and Smith.—Ann. Jard. Bot., Buitenzorg, XXXII (1923), p. 24-25 and plates.

flanked by two male florets, but that these male florets soon perished. Similar inflorescences having a side branch have occasionally come to their notice.

V. Horned Coconuts. At the Malacca Agri-Horticultural Show, 1926, three "horned" coconuts (*kelapa tandok*) were shown, each having a horn in appearance similar to the husk. This horn measured five inches in length, and one and one-fourth inches thick in the central portion. It had two small lobes one on each side of the principal one which was large and thick. A copious exudation of gum was found on the inner side of the horn (the side towards the nut), and where there was gummy exudation, the epidermis of the horn seemed to be much affected though the epidermal tissue of the nut appeared to be quite intact. The perianth was then carefully removed from the nut and it was found that this horn was due to the abnormal development of the one side of the papery ring that is usually found between the perianth and the nut, the growth of the other half of the ring having become arrested at an earlier stage, so that it was not visible when the perianth was still attached to the nut. This portion of the ring also had one principal central lobe which measured about one centimeter from the tip of the base, and two small slightly developed ones, and it resembled the perianth in texture. At the tip of the central lobe abundant exudation of gum was noticed. The thalamus had also grown out a little more than usual, especially on the side of the horn, so that the horn could be mistaken for a basal outgrowth of the nut. The horn when cut open was found to be full of fibrous tissue only, like that of the husk, while the nut itself was normal and had all its three "eyes" as usual. The perianth consisted of six normal segments. Hence the view put forward by Masters⁷ that these horns are due to the hypertrophy of the perianth segments is untenable.

Petch (1924)⁸ describes similar cases of horned coconuts and mentions that the horns may vary in number from six downwards and that they sometimes coalesce in pairs, or two or three may unite by their tips. Some of these horns may be fringed by a thin wing, resembling in texture the segments of the perianth. In all such cases examined by him perianth segments were also present and were normal.

Costerus and Smith⁹ figure somewhat similar cases in the *Buitenzorg Annales* which they consider to be instances of

7. Masters, M. T.—*Vegetable Teratology* (1869), pp. 428-429).

8. Petch, T.—Horned Coconut. *Year-Book Dept. of Agric., Ceylon*, (1924), p. 20-21.

9. Costerus, J. C. and J. J. Smith.—*Studies in Tropical Teratology. Annales Jard. Buitenzorg*, XXXIII (1923), p. 95 and fig. 23.

apocarpic, but in the absence of a detailed description, those cases cannot be compared with the above described ones.

Petch seems to favour the view that the horns are due to a duplication of the segments of the gynaecium. But I am inclined to adopt his less favoured view that the horns represent the six stamens. The following will make clear the position of my view:

Examining flowers of coconut, one usually finds in the male, six perianth segments surrounding six stamens inside and a rudimentary pistil in the centre, and in the female, six perianth segments, a fertile pistil in the centre, and a papery ring between the base of the pistil and the inner perianth segments; that is, the papery ring occupies the place of the androecium in the male flower. May not then this papery ring in the female flowers represent the androecium which in the course of evolution has been reduced to this vestigial state? The fact that this papery ring is invariably present in the female flower, and a vestigial ovary is the male flower, and that the ring is a growth quite distinct from the perianth and the ovary, lends support to this view. And from the examination of the horned nuts exhibited at the Malacca Show, it was quite evident that the horns were due to the development of portions of the ring.

Gadd (1924)¹⁰ describes abnormal female flowers of coconut where three carpels were fused only at the base, being free to a greater or less extent at the apex. "Between the perianth and the gynaecium was a ring of six papillae, in a position which stamens would be expected to occupy, if present." These flowers seem to represent a somewhat earlier stage in the evolution of the female flower of coconut.

Recent histological studies made by Juliano¹¹ regarding the ontogenetical development of the female coconut flower from an additional evidence in favour of the view that the papery ring is a modified androecium. He shows by means of microtome sections that the development of the floral structures is acropetal, that is, the outer two prophylls are first differentiated from the primordium, then the sepals and the petals follow in succession. The ring which he calls "aril" arises just after the formation of the petals but much before the primordium has differentiated into an ovary and carpels. Hence therefore the ring or the horns cannot be an outcome of the multiplication of the carpels.

10. Gadd, C. H.—An Abnormal Inflorescence from a Nut. *Year-Book, Dept. of Agric., Ceylon*, (1924), p. 21-23.

11. Juliano, J. B.—Origin, Development, and Nature of the Stony Layer of the Coconut. *Philipp. Journ. Sci.*, XXX (1926), p. 187-200 and pl. 1-3.

B.—*Ananas sativa*.

It is not uncommon to see various forms of monstrosities in the fruits (soroses) of pine-apples (*Ananas sativa*). Hitherto I have been the following abnormal forms in this Peninsula:—

I. Fasciation. One of such monstrous pine-apple fruits had cylindrical base about two inches long and was much stouter than the average fruits of the same variety. The fruit then showed a tendency to taper in one axis and expand in the other. The expansion had occurred to such an enormous extent that it had given rise to several twistings and bendings. Measurements with a tape would indicate that the topmost part of the fruit had become more than two feet in breadth, while its thickness had been reduced to about an inch or a little more. The foliose shoot that usually crowns a pine-apple fruit had also fasciated apace with the fruit. Its vertical axis had become abbreviated to a very considerable extent and the leaves were reduced to mere scales, about an inch and half in length and half an inch in breadth, so that the expanded apex of the fruit appeared as if fringed with these scaly leaves. This form appears to be very rare in pine-apples.

Another form of fasciation that is more commonly met with in pine-apples is one which differs from the former in that the fruit in the latter flattens to a less extent and produces many cylindrical heads, each with a normal or reduced crown of its own. I have seen pine-apples with three, five and seven heads.

The third kind of fasciation affects the crown of the fruits only. In one such specimen the leafy crown had trifurcated, the fruit itself remaining normal. That these three shoots were due to fasciation of the main axis and not to the proliferation of the two axillary shoots was easy to be seen as the leaves were reduced to small scales and the lower portion of the stalk had become very much thicker.

Fasciation showing various grades of these three cases have been also observed.

II. Proliferation. On the stalk bearing the three-headed fasciated fruit described above, there were many, much proliferated, vegetative shoots arising from the axils of the bracts. They had grown as long as the fruit itself, and were present only in the upper portion of the stalk, close to the base of the fruit, lower portion of the stalk bearing no such shoots.

In another specimen there was a similar proliferation of shoots in the axils of bracts close to the fruit, but these shoots were reproductive so that they produced many banana-like, elongated fruits at the base of the main fruit.

Sometimes axillary shoots on the base of the leafy crown of the pine-apple fruit grow very vigorously, even much faster than the main shoot itself.

Proliferation of vegetative shoots on the stalk or on the crown of the fruit is very common, almost a "normal" phenomenon in pine-apples. Production of fruits at the base of the principal fruit has been noticed by me only twice in this country.

C. X. FURTADO.

***Dioscorea tamarisciflora*, Pr. and Burk.**

In September, 1890, Mr. Charles Curtis collected in the Langkawi islands a *Dioscorea* with male flowers, which was described in 1914 under the above name in the *Journal of the Asiatic Society of Bengal*, N. S., 10, p. 22, and until recently it has remained known only by his specimens. But in the early part of 1924, two collectors, Mohamed Nur and Kiah, were sent from the Botanic Gardens, Singapore, to the mountain of Gunung Pulai in the south-western part of the State of Johore, whence they brought back living tubers of the same plant; and these gave upon cultivation in the Gardens, both male and female plants. It is possible therefore to add to what is already known about it.

The tubers are black, densely covered with short roots, sparingly branched, the branches more or less cylindrical. They form at the surface of the soil and descend for 20 to 30 cm. It would seem by their appearance and surface growth as if they may be altogether unappetising to the hungriest of wild pigs, the chief destroyers of edible forest tubers. The plate given here well illustrates them.

The stems towards the base and also above carry sparingly small prickles. They attain the thickness of a crow-quill, and climb over any convenient support to 2 or 3 metres.

The upper leaves have been described. The lower are similarly ternate and scarcely differ. All leaflets are relatively small, the middle attaining little more than 5 cm. by 1.75 cm.

The male flowers have also been described. They were produced in Singapore in the greatest abundance.

The female flowers were more sparingly developed. They offered nothing that is not seen in the closely allied species of *Dioscorea*, section *Lasiophyton*.

The capsules resemble those of *D. pentaphylla*: but are slightly more acute, as the accompanying line block shews.

From the Langkawi islands to Gunung Pulai in a straight line it is about 450 miles, i.e. almost the whole length of British Malaya; and the species may occur sporadically throughout the Peninsula. It has been already found in one other place, namely



Dioscorea tamarisciflora, Pr. and Burk.



A fruiting spike of *Dioscorea tamarisciflora*, together with outlines of five capsules:—no. 1 an unusually rounded capsule of *D. tamarisciflora*, and no. 2, a normal capsule: nos. 3, 4 and 5, capsules of *D. pentaphylla* from various places in India, thus, no. 3 from the Khasya Hills (Hooker and Thomson), no. 4 from Hoshangabad in the Central Provinces (Duthie, 10578) and no. 5 from Behar (Hooker). All nat. size.

on rocks near a village named Pulai (from the *Alstonia* tree, like the mountain) in southern Kelantan close to the Pahang boundary (Mohamed Nur, 11944). It has not been met with outside the Peninsula.

D. PRAIN.

I. H. BURKILL.

A List of Mosses Collected in the Botanic Gardens, Singapore.

In the previous issue of the Gardens' Bulletin appears a list of all mosses hitherto collected in the Malay Peninsula, prepared by Mr. H. N. Dixon, who has himself determined the majority of the specimens concerned. Our best thanks are due to Mr. Dixon for the very great amount of work which he has put into the preparation of this paper. Before receiving Mr. Dixon's list, I had compiled a list of mosses found in the Singapore Gardens, with such first-hand observations as I had been able to make concerning their habits of growth, as it seemed that few observations of the kind had been recorded. This list is here printed as a supplement to Mr. Dixon's paper. It contains no references to collectors or numbers (these can be found in the complete list) but only names of species and such information as to habit and habitat as I have found on herbarium labels or collected myself. Not having made a critical study of mosses, in many cases I can only speak of the habitats of individual specimens collected by me and identified by Mr. Dixon, but there are a few common species which it is easy to recognise at sight, and of these it is possible to speak with greater certainty.

The Gardens present a fairly wide range of habitat for mosses, from the most exposed positions on the ground or on trees to the shade of the rockeries and the Gardens Jungle; but there is no place so moist and shady as much of the natural jungle of the Peninsula. The conditions are on the whole artificial, and this is reflected in the character of the moss flora; the more typical forest species are infrequent or absent.

A striking feature of the list, referred to by Mr. Dixon in the introduction to his paper, is the large proportion of species of *Syrrhopodon* and *Calymperes*; this is more marked in Singapore than in the north of the Peninsula. In Singapore Island 32 species of the two genera have been found, out of 51 for the whole Peninsula; from the north fewer are recorded, 16 only having been found in Penang (mostly in the Waterfall Gardens or on the hill) which after Singapore is probably the most-collected area. In recent collections I have paid particular attention to these genera, and in searching Penang Gardens it was with difficulty that they could

be found, whereas in Singapore they occur on tree trunks in any slightly shaded spot. It is possible that the more seasonal climate of Penang and the north of the Peninsula is not so favourable for these mosses; in Penang a pronounced dry season early in the year is the rule. They are not usually found in dense shade, but in light shade, on tree trunks, and sometimes on rocks or on the ground (according to the species and the conditions). They do not usually grow in full sunlight, except some of the more resistant species, (e.g. *S. borneense*; this grows in a close cushion which can retain moisture). During rather dry weather they are often much shrivelled up. It is perhaps their habit of growing in somewhat exposed places, together with inability to withstand severe drought, which causes their restriction, on the whole, to places with a fairly heavy and evenly distributed rainfall, or a continuously high atmospheric humidity.

Microdus miquelianus (Mont.) Besch.

On ground in the open.

Campylopus serratus Lac.

Very abundant. It grows on the ground, frequently on the lawns where the grass is poor, in the open, or more usually in moderate shade; sometimes in a close pure growth. It is usually sterile; I have found male plants with antheridia, but not ripe fruits.

Leucobryum sanctum (Brid.) Hpe.

Very abundant locally. It grows on the ground, requiring more shade than *Campylopus serratus*, and often forms large pure patches under trees, or mixed with *Campylopus* and such grasses as will tolerate a little shade. It may also grow on the bases of trees to some extent. No fructifications seen.

Leucophanes octoblepharoides Brid.

L. albescens C. M.

Leucophanes spp. usually grow on tree or palm trunks in masses, rather in the same positions as *Syrhophodon* spp. They may also grow on the ground in moderate shade.

Fissidens mittenii Par.

Found on bare ground under the shade of a *Phoenix sylvestris*.

F. crassinervis Lac.

Mr. Ridley has collected this species in the gardens. I have found it in the Reservoir jungle on the ground by pathsides in shady places rather abundantly, though not forming dense masses like the next species.

F. zippelianus D. & M.

Very abundant on brick drains and on rocks in shady places, also on hard ground (stiff clay) in the shade. It forms a dense continuous mat, and has not yet been observed bearing sporogonia. It avoids the mortar between the bricks of the drain (this is sometimes covered with a hypnoid moss) and, appears to avoid the coral in the rockeries.

Syrrhopodon ciliatus Schw.

Found on trunks of sago palms in shady places, forming a close mat, sometimes freely fruiting.

S. fasciculatus Hk. & Grev.

On the ground beneath an old *Artocarpus rigida*, and on the base of its trunk, shaded also by fronds of *Davallia* growing about the tree.

S. involutus Schw.**S. flavus** C. M.

On a dead tree trunk in the Gardens Jungle, abundant.

S. manni C. M., f. **minor** Fl.

On tree trunks in Gardens Jungle, creeping. Apparently a common species in Singapore, but always the f. *minor*.

S. repens Harv. Apparently a common species in Singapore.

S. revolutus D. & M.

On a Sabal trunk, underneath epiphytic ferns (*Asplenium nidus*) in thick rounded cushions. The fern roots with their accumulated debris are like huge sponges, and water flows down from them for some time after rain has ceased. The tufts of *Syrrhopodon* are also sponge-like and can hold much water. Apparently the same species occurs on the trunk of a big *Eyera costulata*, where also it is shaded and has ferns above it.

S. rufescens Hk.

Collected several times in Singapore by Mr. Ridley. Probably grows on tree trunks, but the only definite habitat note is its occurrence on the mass of roots of an old *Platyserium*. This is similar to the habitat described for the last species.

Calymperes dozyanum Mitt.

On a raised root of *Albizia* sp., in a rather shady spot.

C. hampei D. & M.

On roots and ground in shade.

C. nicobarense Hpe.

Collected by Mr. Ridley in the Economic Garden. Apparently a common species in Singapore; otherwise only known from Langkawi and the Nicobar Islands.

C. salakense Besch.

Collected in the Gardens once, by Mr. Ridley.

C. serratum A. Br.

Obtained by Mr. Ridley either in the Gardens or on Bukit Timah; exact locality uncertain.

Barbula indica Brid.

Grows in thick cushions, in rather exposed places. It is the commonest moss on open brick drains, and does not avoid the mortar. It will grow also in moderate shade, in which case it may be found side by side with *Fissidens zippelianus*.

Macromitrium goniorrhynchum D. & M.**Bryum coronatum** Schwaegr.

On rocks in rather exposed places (sun rockery) and on the ground; found also on rocks in moderate shade. It grows both on coral and other rocks. In dry weather it is quite shrivelled up, but during wet periods soon forms thick green cushions, which later bear abundant fruits.

Myurium rufescens (Hornsch. and Rw.) Fleisch.**Callicostella prabaktiana** (C. M.) Jaeg.**Pelekium velatum** Mitt.

On coral in shady rockeries, abundant. This is the only record from Singapore; in other parts of the Peninsula it is usually found on limestone.

Ectropothecium buitenzorgii (Bel.) Jaeg.**E. monumentorum** (Dub.) Jaeg.**E. moritzii** (C. M.) Jaeg.

Very abundant (though possibly mixed with other species). It often forms a close carpet on the ground in shady places, and on the bases of tree trunks; also to some extent among grass.

E. singaporense Dixon.

Collected once only, "on grass in open" (Binstead).

E. zollingeri (Bry. jav.) Jaeg.

In tank in plant house, fruiting only when left dry (Burkill).

Trismegistia lancifolia (Harv.) Broth.**Isopterygium albescens** (Schw.) Jaeg.

On the ground in a shady place. Found also by Binstead on a palm.

I. minutirameum (C. M.) Jaeg.

Plagiothecium miquelii (Bry. jav.) Broth.

This is a very common moss in the Peninsula, usually on old logs in shady places, but also occurring on the ground.

Taxithelium isocladum (Bry. jav.) Ren. & Card.

T. instratum (Brid.) Broth.

T. nepalense (Harv.) Jaeg.

Vesicularia dubyana (C. M.) Broth.

V. montagnei (Bel.) Broth.

V. reticulata (C. M.) Broth.

Meiothecium microcarpum (Harv.) Mitt.

Occurs on palm trunks and elsewhere in more exposed positions than most hypnoid mosses, often with algae of the genus *Trentepohlia*.

Rhaphidostegium caespitosum (Sw.) Jaeg.

Trichostelium Boschii (D. & M.) Jaeg.

T. brachypelma (C. M.) Broth.

T. singaporense Fleisch.

The hypnoid mosses are so alike in habit and are so abundant that I cannot distinguish any of them in the field with certainty, and cannot make any definite statement about the habitat of most of them. They are usually found on tree trunks, on logs or on the ground, in rather shady places.

Hypnodendron arborescens (Mitt.) Lindb.

Small specimens, collected in the Gardens Jungle by Mr. Ridley.

R. E. HOLTUM.

Additions to the List of Fraser Hill Plants.

This list is intended to supplement the enumeration of Fraser Hill plants published by Burkill and Holttum in this Bulletin, Vol. III, pp. 33—110.

The material from which it is compiled was obtained by a native collector working under the writer's supervision in August 1923, and by Mr. R. E. Holttum in the following month.

A few plants from the collections of Messrs. Burkill and Holttum have been added, where these have been determined since the publication of the original list.

All the plants, except where otherwise noted, were collected between the 3800 and 4200 feet contours.

SCHIZANDRACEAE.

Kadsura cauliflora, *Bl.* A big liane of Sumatra and Java; in the Peninsula Penang, Perak, Singapore, usually at low altitudes. (11197).

Kadsura lanceolata, *King.* A woody climber, endemic, Taiping Hills at low altitudes. (11266 at 4800 ft.).

ANONACEAE.

Artabotrys venustus, *King.* A big liane of Siam; in the Peninsula Taiping Hills and Gopeng, Perak. (11316).

Polyalthia sp. No flowers collected. (11341).

Goniothalamus Curtisii, *King.* A shrub or small tree, endemic, Perak and Selangor. (11191).

Goniothalamus subevenius, *King.* A small tree, endemic, Kedah Peak, Kelantan, Perak. (Burkill and Holtum 8896).

POLYGALACEAE.

Polygala monticola, *Ridl.* A small shrublet, endemic, montane, Gunong Bubu, G. Tahan, G. Mengkuang Lebah, G. Benom. (11272 at 4800 ft.).

HYPERICACEAE.

Cratoxylon arborescens, *Bl.* A tall tree of Indo-Malaya and Indo-China; in the Peninsula Perak, Penang, Selangor, Singapore, usually in the lowlands.

FLACOURTIACEAE.

Hydnocarpus castanea, *Hook. fil.* A tree of Burma and Tenasserim; in the Peninsula not uncommon from Langkawi to Malacca. (11277 at 4800 ft.).

GUTTIFERAE.

Garcinia eugeniaefolia, *Wall.* A tree of Tenasserim; in the Peninsula Kedah to Singapore, a lowland species. (11321).

Garcinia ?Hombroiana, *Pierre.* A small tree of Tenasserim; wild or planted over the whole Peninsula. (11224).

Calophyllum canum, *Hook. fil.* A tree, endemic, Penang to Singapore. (11282).

Calophyllum near **Griffithii**, *T. Anders.* A tall tree. (11463).

Calophyllum ?retusum, *Wall.* A tree, endemic and rare, known only from Johore and Singapore. (11468, sterile specimens only).

TERNSTROEMIACEAE.

Anneslea crassipes, *Hook. fil.* A shrub or small tree of Indo-China and the Philippines; in the Peninsula montane, Kedah, Gunong Tahan, the Main Range and Mt. Ophir. (11455).

Adinandra integerrima, *T. Anders.* A small tree of Siam and Indo-China; common in the north of the Peninsula. (11149 at 3700 ft.).

Adinandra macrantha, *Teyss. & Binn.* A tree of Sumatra and Java; in the Peninsula Perak, Pahang, Selangor and Johore. (11320, Burkill and Holttum 7760).

Gordonia singaporeana, *Wall.* A tall tree, endemic and common, more especially in the North. (11177, 11454).

Pentaphylax arborea, *Ridl.* A tree 30 or 40 ft. tall, endemic and local. (11332).

Pentaphylax malayana, *Ridl.* A bush, endemic, Gunong Tahan, G. Benom and the Main Range, not common, but abundant where it occurs. (11225).

Ternstroemia micrantha, *Choisy.* A bush of Sumatra, Java, and Borneo; in the Peninsula known only from this locality. (fide Ridley, *Flor. Mal. Pen., Supp.* p. 291).

STERCULIACEAE.

Sterculia hyposticta, *Miq.* A small shrub of Indo-China, Tenasserim and Sumatra; in the Peninsula not uncommon in the North. (11382 at 3900 ft.).

TILIACEAE.

Elaeocarpus Hullettii, *King.* A tree, endemic, Penang to Singapore, but not very common. (11306).

RUTACEAE.

Evodia macrocarpa, *King.* A tree endemic and rare, Penang and Taiping. (11018).

Evodia pilulifera, *King.* A shrub, endemic and montane, Taiping Hills, Pahang, Mt. Ophir. (11175).

Tetractomia Roxburghii, *Hook. fil.* A tree, endemic, Penang, Taiping, Singapore. (11328).

Zanthoxylum myriacanthum, *Wall.* A thorny shrub or tree, endemic, Penang to Malacca. (11310).

Glycosmis tomentella, *Ridl.* A shrub, endemic and rare, Menuang Gasing, Selangor. (11170).

SIMARUBACEAE.

Eurycoma apiculata, *Benn., var.* A shrub, endemic, Penang to N. Johore, commonest in the north. (11230, and collected here by Ridley).

MELIACEAE.

Chisocheton macrophyllus, *King.* A tree of Java; in the Peninsula Penang, Selangor, Singapore. (11390 at 3500 ft.)

Dysoxylon costulatum, *Miq.* A tree of Sumatra; in the Peninsula common. (11284).

Dysoxylon ?macrothyrsum, *Miq.* A tree of Java and Borneo; in the Peninsula Taiping to Singapore. (11451).

Aphanamixis Rohituka, *Pierre.* A tree of India to Sumatra and China; in the Peninsula common. (11322).

OLACACEAE.

Gomphandra lanceolata, *King.* A shrub, endemic and common. (11278).

Gomphandra penangiana, *Wall.* A shrub, endemic, not very common, Penang to Malacca. (11260).

ILACACEAE.

Ilex Kelsallii, *Ridl.* A small tree, endemic and rare, known only from Bukit Hitam, Selangor. (Burkill and Holttum 8693).

Ilex Maingayi, *Hook. fil.* A tree, endemic, not common, Penang, Perak, Selangor, Singapore. (11325).

Ilex triflora, *Bl.* A bush of Indo-Malaya and China; in the Peninsula common in the mountains. (11294).

CELASTRACEAE.

Perrottetia alpestris, *Loesn.* A bush of Sumatra, Java, Borneo and the Philippines; in the Peninsula not common, Perak. (11125 at 3700 ft., and as *Maesa perakensis*, *Ridl.* in the original enumeration, *Gardens' Bulletin* Vol. III p. 58).

SABIACEAE.

Meliosma nitida, *Bl.* A shrub of small tree of Sumatra and Java; in the Peninsula common, usually in the lowlands. (11185, 11209).

ANACARDIACEAE.

Melanorrhoea Curtisii, *Oliv.* A tree endemic, Kedah Peak, Penang Hill, Taiping Hills. (11229, 11336).

? **Melanorrhoea inappendiculata**, *King.* A tree. (11409, at 4200 ft., sterile specimens only).

LEGUMINOSAE.

Ormosia gracilis, *Prain*. A slender tree, endemic and rare, Taiping Hills. (11326).

Saraca taipingensis, *Cantley*. A small tree, endemic, common from Taiping to Malacca. (11387 at 3200 ft.).

Pithecolobium Kunstleri, *Prain*. A small tree, of Borneo; in the Peninsula Perak to Johore, usually in lowland forest. (11025).

ROSACEAE.

Parinarium rubiginosum, *Ridl*. A small tree, montane, endemic and rare, Gunong Tahan. (11147 at 3700 ft., 11301).

Pygeum Hookerianum, *King, var.* A shrub or small tree, endemic, the species not uncommon, the var. from Kiang Gates, Selangor (fide Ridley). (11164).

Pyrus granulosa, *Bertol*. A tall tree of India to Sumatra; in the Peninsula purely montane, Taiping Hills, Gunong Tahan, Cameron's Highlands. (11241).

LEGNOTIDACEAE.

Gynotroches axillaris, *Bl*. A small tree of W. Malaysia to the Philippines; in the Peninsula common. (11016).

MYRTACEAE.

Eugenia alycifolia, *Ridl*. A tree, endemic and local. (11213).

Eugenia goniocalyx, *Ridl*. A small tree, endemic and local. (fide Ridley, Flor. Mal. Pen. Supp. p. 309).

Eugenia Holttumi, *Ridl*. A tree, endemic and local. (Burkill and Holttum 7751).

Eugenia linoceroidea, *King*. A tree, endemic and rare, Perak. (11456).

Eugenia punctulata, *King*. A tree of Borneo; in the Peninsula not uncommon in the South and on the East coast. (11264, 11469).

Eugenia subdecussata, *Duthie*, var. *montana*, *King*. A small tree, endemic, the species common, the var. from Kedah Peak and Gunong Batu Puteh. (11211, and collected here by Ridley).

MELASTOMATACEAE.

Sonerila caesia, *Stapf*. A herb, endemic, not common, Upper Perak, Batang Padang, Gunong Batu Puteh. (11033).

Phyllagathis rotundifolia, *Bl.* A creeping herb of Sumatra; in the Peninsula common. (11182).

Medinilla Scortechinii, *King.* An epiphytic shrub, endemic and montane, Taiping Hills and the Main Range. (11135 at 3700 ft.).

Memecylon amplexicaule, *Roxb.* A small tree, endemic, Penang to Singapore. (11212).

SAMYDACEAE.

Casearia minutiflora, *Ridl.* A shrub, endemic and local. (Burkill and Holttum 8581).

BEGONIACEAE.

Begonia longicaulis, *Ridl.* A herb, endemic and rare, Gunong Tahan and G. Kerbau. (Burkill and Holttum 8428).

Begonia isoptera, *Dryand.* A creeping herb of Sumatra and Java; in the Peninsula common, usually in the lowlands. (11103 at 3700 ft.).

Begonia perakensis, *King.* A herb, endemic on the Main Range, but usually below 3000 ft. (11035).

UMBELLIFERAE.

Hydrocotyle javanica, *Thunb.* A creeping herb of Indo-Australia, China and Japan; in the Peninsula not common, usually montane, Taiping Hills, Cameron's Highlands, Upper Perak. (11413 at 3800 ft.).

ARALIACEAE.

Aralia Thomsoni, *Seem.* A prickly shrub or small tree of India; in the Peninsula Penang to Negri Sembilan, usually in hilly localities. (11121 at 3700 ft.).

Schefflera subulata, *Viguiet.* An epiphytic shrub of W. Malaysia; in the Peninsula common. (11166, 11244).

Trevesia cheirantha, *Ridl.* A small prickly tree of Burma and Sumatra; in the Peninsula common. (11124 at 3700 ft.).

Trevesia rufosetosa, *Ridl.* A small tree, endemic and local. (11070, and collected here by Ridley).

Brassaiopsis speciosa, *Decne. and Planch.* A small thorny tree of Assam, Siam, Sumatra and Java; in the Peninsula known only from this locality. (Burkill and Holttum 7882).

CORNACEAE.

Mastixia sp. A tree. "Not recognised, flowers wanted?" (Ridley). (11291).

Aralidium pinnatifidum, *Miq.* A small tree of Sumatra and Borneo; in the Peninsula common, usually lowland. (11217).

Nyssa sessiliflora, *Hook. fil.* A small tree of India, Burma, Sumatra and Java; in the Peninsula montane, very rare, only known from Gunong Batu Puteh. (11169).

CAPRIFOLIACEAE.

Viburnum lutescens, *Bl.* A shrub or small tree of Sumatra and Java; in the Peninsula a local species, Ulu Batang Padang and into Pahang. (11202).

RUBIACEAE.

Argostemma ?Hookeri, *King.* A slender creeper, endemic and usually montane, Penang, Gunong Tahan, Selangor, Johore. (11167).

Urophyllum macrophyllum, *Korth.* A shrub or tree of Tenasserim, Java and Borneo; in the Peninsula not uncommon in the north, occurring also in Singapore. (11222).

Brachytome Scortechinii, *King and Gamble.* A shrub, endemic, Kedah Peak, Taiping Hills, and the Main Range. (11178).

Tarena lancifolia, *Ridl.* A shrub, endemic and rare, Kedah Peak. (Burkill and Holttum 8686, sub *Stylocoryna fragrans*, *Bl.*, Gardens' Bulletin Vol. III, p. 51).

Gardeniopsis longifolia, *Miq.* A shrub of Sumatra; in the Peninsula common. (11172).

Timonius oreophilus, *Ridl.* A shrub, endemic and montane, Kedah Peak, Pahang, Selangor, Mt. Ophir. (11136 at 3700 ft., Burkill and Holttum 8922).

Canthium didymum, *Gaertn. fil.* A bush or tree of Borneo; in the Peninsula common. (11055, 11280).

Psychotria stipulacea, *Wall.* A shrub of Sumatra, common in the Peninsula. (11081 at 3700 ft.).

Cephaelis elongata, *Ridl.* A shrubby herb, endemic and local. (Burkill and Holttum 8627, Ridley 12073).

Cephaelis triceps, *Ridl.* A woody herb, endemic and rare, Kuala Lumpur. (Burkill and Holttum 8435, Ridley 15667).

VACCINIACEAE.

Agapetes pubescens, *Ridl.* An epiphytic shrub, endemic and local. (Burkill and Holttum 7828, sub *Agapetes Griffithii*, *C.B.C.*, l.c. p. 56).

MYRSINACEAE.

Embelia myrtillos, *King*. An erect or climbing shrub of Burma; in the Peninsula montane, Kedah, Upper Perak, Main Range, Mt. Ophir. (11271 at 4800 ft.).

SAPOTACEAE.

Sideroxylon firmum, *Pierre*. A small tree of Bangka and the Philippines; in the Peninsula rare, Penang Hill and Mt. Ophir. (11148 at 3700 ft.).

Sideroxylon sp. A tree. (11461).

Payena sp., near *lucida*, *DC.* A tree in fruit. (11327).

STYRACACEAE.

Symplocos adenophylla, *Wall.* A shrub or small tree of Sumatra, Bangka, Borneo and the Philippines; in the Peninsula common. (11159, 11458).

Symplocos ferruginea, *Roxb.* A tree of Indo-Malaya to the Philippines and S. China; in the Peninsula Penang, Perak, Pahang, Negri Sembilan, Malacca. (11215, 11462).

Cordyloblaste confusa, *Ridl.* var. with small leaves. A shrub of Borneo and S. China; in the Peninsula rare, Mt. Ophir. (11281).

APOCYNACEAE.

Rauwolfia perakensis, *King and Gamble.* A shrub of Lower Siam; common in the North of the Peninsula. (11107 at 3700 ft.).

Alstonia sp., near **macrophylla**, *Wall.* A tree of which no flowers or fruit have been collected. (11407).

Ecdysanthera rosea, *Bl.* A climber of Java, new to the Peninsula. (Burkill and Holttum 8467).

Trachelospermum obtusifolium, *Ridl.* A climber, endemic and local. (Burkill and Holttum 8898).

ASCLEPIADACEAE.

Tylophora grandiflora, *Ridl.* A twiner, endemic and local. (11482 at 3800 ft.).

LOGANIACEAE.

Fagraea lanceolata, *King and Gamble, not of Blume.* An epiphytic climber, endemic. A doubtful species, of which flowers have not yet been obtained. Collected in the Taiping Hills by Wray. (11288).

Strychnos ovalifolia, *Wall.* A big liane of Borneo; common in the Peninsula. (11188).

Gaertnera latifolia, *Ridl.* A shrub, endemic and local. (Burkill and Holttum 8606).

CONVOLVULACEAE.

Erycibe leucoxyloides, *Prain.* A bushy climber, endemic, Kuala Lumpur, Johore, Singapore. (11324).

Erycibe Stapfiana, *Prain.* A woody climber of Tenasserim; not common in the Peninsula, Larut and Batang Padang, Perak. (11293).

SOLANACEAE.

Solanum Blumei, *Nees.* A shrub of Sumatra, Java and Borneo; in the Peninsula montane in the Taiping Hills, the Main Range, and Johore. (11245).

GESNERACEAE.

Aeschynanthus lanceolatus, *Ridl.* A creeping epiphyte, endemic and rare, known only from this locality and from Cameron's Highlands. (11138 at 3700 ft.).

Ochradocarpa lilacina, *Ridl.* A herb, endemic, not common, montane in the Main Range on Gunong Batu Puteh and G. Mengkuang Lebah. (11046).

ACANTHACEAE.

Strobilanthes Maingayi, *Clarke.* A small undershrub, endemic and montane, Penang, Taiping Hills and the Main Range. (11412 at 3800 ft.).

Pseuderanthemum Teysmanni, *Ridl.* A sarmentose shrub, endemic and common. (11180).

Justicia Maingayi, *Clarke.* A shrubby herb, endemic and rare, Penang Hill. (Burkill and Holttum 8441, placed doubtfully under *J. subalternans* in the original enumeration).

Justicia uber, *Clarke.* A fleshy herb, endemic and common. (11087 at 3700 ft.).

Justicia vasculosa, *Wall.* A herb of Assam, Tenasserim, and Sumatra; widely distributed over the whole Peninsula. (11014).

VERBENACEAE.

Callicarpa sp. A small tree. (11102 at 3700 ft.).

Clerodendron disparifolium, *Bl.* A shrub of Sumatra, Java and Borneo; common in the Peninsula. (11303).

Gomphostemma Curtisii, *Prain*. A large woody herb, endemic, not common, Taiping Hills and the Main Range. (11100).

Gomphostemma lactea, *Ridl.* A woody herb, endemic and local. (11075 at 4200 ft.).

AMARANTACEAE.

Acryanthes aspera, *Linn.* A tall herb, pantropic; common in the Peninsula. (11200).

PIPERACEAE.

Piper Ridleyi, *C. DC.* An erect shrubby plant, endemic, Upper Perak, Main Range, Singapore. (11122 at 3700 ft.).

Piper uncinulatum, *Ridl.* An erect pepper, endemic and local. (11343).

MYRISTICACEAE.

Knema conferta, *Warb.*, var. *Scortechinii*, *Warb.* A small tree of Tenasserim and Borneo (the species); in the Peninsula the species common, the var. in Perak. (11313).

Knema oblongifolia, *Warb.*, var. *monticola*, *King.* A shrub or small tree, endemic, the species from Penang to Singapore, the var. montane in Perak. (11126 at 3700 ft., 11249).

LAURACEAE.

Cryptocarya ferrea, *Bl.* A tree of Java; in the Peninsula Penang and Kelantan to Singapore. (11452).

Cryptocarya Scortechinii, *Gamble.* A tree, endemic, not common, Perak and Malacca. (11330).

Nothaphoebe reticulata, *Gamble.* A tree, endemic and montane, Taiping Hills and the Main Range. (11253).

Phoebe declinata, *Nees.* var. *sericea*, *Gamble.* A tree of Java and Sumatra (the species); in the Peninsula not common. Penang to Singapore, the var. montane in Perak. (11331).

Actinodaphne Maingayi, *Hook. fil.* A tall tree, endemic, Perak, Malacca, Singapore. (11314).

Actinodaphne ?oleifolia, *Gamble.* A shrub of Borneo; in the Peninsula montane, Perak, Pahang. (11232).

Actinodaphne sp. near *Ridleyi*, *Gamble.* A small tree. (11023).

Actinodaphne sesquipedalis, *Hook. fil.* A tree of Borneo (a var. only); in the Peninsula Penang, Perak, Pahang. (11073 at 4800 ft.).

Litsea panamonja, *Hook. fil.* A tree of India, Burma and Lower Siam; in the Peninsula rare, Taiping Hills, Malacca. (11406 at 4200 ft.).

Lindera caudifolia, *Ridl.* A small tree, endemic and rare, Penang. (11235, and collected here by Ridley).

Lindera selangorensis, *Ridl.* A shrub or small tree, endemic, Semangkok Pass and Gunong Mengkuang Lebah. (11003).

HERNANDIACEAE.

Illigera lucida, *Teysm. and Binn.* A slender climbing of Java; in the Peninsula not common, Perak, Johore. (11484 at 3800 ft., 11194).

PROTEACEAE.

Helicia Kingiana, *Prain.* A tree, endemic, not common, Taiping Hills and Gunong Batu Puteh. (11173).

LORANTHACEAE.

Loranthus malaccensis, *Hook. fil.* A parasitic bush, endemic and not common in open places. (11144 at 3700 ft.).

Loranthus productus, *King.* A parasitic shrub, endemic and rare, Taiping Hills and Ulu Batang Padang. (11389 at 3500 ft.).

Elytranthe albida, *Bl.* A large parasitic shrub of Indo-Malaya; in the Peninsula Penang to Singapore, not very common. (11308).

Elytranthe avenis, *G. Don.* A parasitic shrub of Sumatra and Java; in the Peninsula montane, Kedah Peak, Perak, Pahang. (11323).

SANTALACEAE.

Henslowia Ridleyi, *Gamble.* A climbing parasitic shrub, endemic and montane, Gunong Tahan, G. Benom. (11286).

OPILIACEAE.

Lepionurus sylvestris, *Bl.* A small shrub of Siam, Java and Borneo; common in the Peninsula. (11384 at 3300 ft.).

BALANOPHORACEAE.

Balanophora truncata, *Ridl.* A parasite, endemic and montane in the Taiping Hills and the Main Range. (11132 at 3700 ft.).

EUPHORBIACEAE.

Aporosa Maingayi, *Hook. fil.* A small tree, endemic, Kedah to Singapore, usually lowland. (11317).

Aporosa lunata, *Benth.* A tree of Sumatra and ?Java; in the Peninsula Penang, Perak, Pahang, Singapore. (11388 at 3200 ft.).

Baccaurea Griffithii, *Hook. fil.* A tree, endemic and common. (11123 at 3700 ft.).

Baccaurea parviflora, *Müll. Arg.* A small tree of Burma, Sumatra and Borneo; in the Peninsula common. (11302).

Baccaurea velutina, *Ridl.* A tree, endemic and local. (11319, also collected by Ridley at the Semangkok Pass).

Galearia affinis, *Hook. fil.* A shrub of ?Siam; in the Peninsula common. (11379).

Macaranga sp. Apparently a species new to the Peninsula, but flowers have not been collected. (11161).

URTICACEAE.

Girroniera subaequalis, *Planch.* A tall tree of Ceylon to the Philippines and New Guinea, and S. China; in the Peninsula common. (11334).

Ficus villosa, *Bl.* A strong climbing shrub of Sumatra to the Philippines; in the Peninsula Penang to Singapore. (11486 at 3800 ft.).

Artocarpus polyphema, *Pers.* A tall tree of Java; in the Peninsula common. (11254).

Laportea stimulans, *Miq.* A small tree with stinging hairs, of Siam, Java and Borneo; in the Peninsula not uncommon in the north. (11193).

Villebrunea sylvatica, *Bl.* A tree of Java; in the Peninsula not common, Selangor and Negri Sembilan. (11093 at 3700 ft.).

JUGLANDACEAE.

Engelhardtia Wallichiana, *Lindl.* A tall tree, endemic, Penang, Taiping Hills. (11305).

CUPULIFERAE.

Pasania conocarpa, *Schky.* A tall tree of Sumatra, Java and Borneo; in the Peninsula not uncommon, usually in the lowlands. (11231).

Pasania ?Scortechinii, *Schky.* A tall tree, endemic and rare, Taiping Hills. (11315).

Pasania ?Wenzigiana, *Gamble.* A tall tree of Borneo; in the Peninsula not common, Penang and Perak. (11077 at 4300 ft.).

ORCHIDACEAE.

Bulbophyllum oeneum, *Burkill.* A small creeping herb, endemic and local. (11298, Burkill and Holttum 8676).

Eria Scortechinii, *Hook. fil.* An epiphytic herb, endemic and montane, Gunong Tahan, G. Benom, and the Main Range. (11061 at 4800 ft. and collected here by Ridley).

Trichotosia microphylla, *Bl.* A creeping epiphyte of W. Malaysia; in the Peninsula rare, known only from this locality (Burkill and Holttum 7799).

Phreatia listrophora, *Ridl.* A small epiphyte, endemic and montane, Langkawi, Gunong Tahan, Taiping Hills. (11396, and collected in this neighbourhood by Ridley).

Ceratostylis ?cryptantha, *Ridl.* A dwarf tufted epiphyte, endemic, Penang Hill, Taiping Hills. (11239).

Chelistonele perakensis, *Ridl.* An epiphyte, endemic and usually montane, Perak, Pahang and Singapore. (11300).

Appendicula robusta, *Ridl.* An erect terrestrial herb, endemic and local. (Burkill and Holttum 8856 at 3600 ft.).

LILIACEAE.

Tupistra grandis, *Ridl.* A herb, endemic and montane, Gunong Kerbau, Bujong Malacca, Batang Padang, Perak. (11381 at 3900 ft.).

Dracaena elliptica, *Thunb.* A shrub of Indo-Malaya; in the Peninsula Kedah to Singapore. (11189).

PALMAE.

Areca pumila, *Bl.* A small palm of Siam and Java; in the Peninsula Langkawi to Singapore. (11255).

Daemonorops callicarpus, *Mart.* A tufted palm, endemic, Penang to Johore. (11203).

Daemonorops geniculatus, *Mart.* A rattan, endemic, Kedah to Singapore. (11131 at 3700 ft.).

PANDANACEAE.

Pandanus globuliferus, *Ridl.* A small shrub, endemic and local. (11022. First collected here by Ridley in 1911).

Pandanus Houlettianus, *Carr.* A shrub, endemic, not common. Negri Sembilan, Johore, Singapore. (11256).

ARACEAE.

Amorphophallus sp. A large tuberous herb, of which a fruiting specimen only was collected. (11002).

Alocasia denudata, *Engl.* A herb of Lingga and Borneo; in the Peninsula Langkawi to Singapore. (11108 at 3700 ft.).

Homalomena caerulescens, *Jungh.* A herb of W. Malaysia; in the Peninsula common. (11380).

Homalomena mixta, *Ridl.* A herb, endemic and rare, Tahan river. (11091 at 3700 ft.).

Schismatoglottis mutata, *Hook. fil.* A herb, endemic, not common, Perak, Kelantan. (11287, and Burkill and Holttum 8696 may be this).

Pothos Barberianus, *Schott.* A climbing herb of Sumatra and Borneo; in the Peninsula Taiping Hills and the Dindings. (11145 at 3700 ft.).

CYPERACEAE.

Scleria radula, *Hance.* A sedge of Hongkong; in the Peninsula rare, Gunong Tahan, G. Kerbau. (11117 at 3700 ft.).

GRAMINEAE.

Thysanolaena agrostis, *Nees.* A tall grass of India to New Guinea; in the Peninsula not uncommon in hill forest, but not occurring south of Fraser Hill. (11157).

Bambusa pauciflora, *Ridl.* A small bamboo, endemic and local. (11234).

M. R. HENDERSON.

RAINFALL

at the Botanic Gardens, Singapore, during the first half of the
year 1925.

Readings taken at 9 a.m. and expressed in inches.

Date	Jan.	Feb.	March	April	May	June
1	..	.01	..	..	..	..
2	.01	2.39	..	..	.09	..
3	..	2.84	..	..	.11	..
4	.11	.35	..	.19	..	..
5	.37	1.76	.10	.34	.40	.09
6	.77	1.01	..	.34	.46	..
7	1.01	1.84	.01	.47	..	..
8	7.88	.15	1.04	..	..	..
9	2.06	.09	1.56	..	..	..
10	.22	.06	..	.06	.90	.05
11	.15	.31	.12	.09	..	trace
12	5.07	trace	.62	.01	..	.18
13	.24	.72	.40	..	..	.72
14	.18	.69	.26	..	..	.98
15	..	.21	..	2.21	..	..
16	.44	.19	.26	..	trace	..
17	.05	..	.06	.11	.11	.97
18	.44	..	.63	.22	..	..
19	.04	.10	trace	..	..	.25
20	..	.16	..	.28	.91	.03
21	..	.63	..	..	trace	.20
22	trace	.59	..	..	.28	.19
23	1.19	.02	2.59	..	.12	..
24	trace	..	.01	..	4.91	..
25	.04	..	1.64	..	.01	..
26	..	..	..	..	..	..
27	.23	..	.05	.11	.21	..
28	..	..	..	.38	.07	.83
29	.34	..	.27	.02	..	trace
30	..	..	.01	..	1.99	1.43
31	.63	..	.05	..	.01	..
Total	21.47	14.12	9.68	4.83	10.58	5.92

RAINFALL

at the Botanic Gardens, Singapore, during the second half of the
year 1925.

Readings taken at 9 a.m. and expressed in inches.

Date	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	.01	1.58	.08	..	..	.02
2	.34	trace	.41	.31	.16	.06
3	.44	..	.76	..	.25	.12
4	..	1.33	1.29	.50	..	1.53
5	..	..	.55	.32	..	.40
6	..	.30	..	.18	trace	.84
7	1.22	.01	..	1.32	.79	.10
8	..	.83	.39	2.92	..	.03
9	..	.81	..	.41	1.85	.16
10	..	..	.01	.02	.39	trace
11	..	..	.30	.01	.06	.20
12	..	..	.02	..	..	.40
13	.03	..	1.47	..	..	.01
14	..	trace	.01	..	.71	.14
15	..	..	..	1.78	.61	.12
16	.01	..	.04	..	.43	.76
17	..	..	.01	1.99	3.14	.18
18	.02	..	.03	trace	trace	.77
19	trace	1.94	..	2.51	..	trace
20	..	trace	.18	.38	..	..
21	.21	..	.05	.79	trace	1.91
22	.02	1.50	..	.25	.22	trace
23	..	.01	..	..	.02	..
24	..	..	.23	..	..	.01
25	.06	..	..	.25	.16	.03
26	..	trace	..	trace	.32	.01
27	trace	.15	..	..	.04	.96
28	..	..	..	.05	1.56	1.04
29	..	trace	..	..	.64	.49
30	..	.25	..	.78	.86	1.00
31	.20	..	..	.01	..	.40
Total	2.56	8.71	5.83	14.78	12.21	11.69

RAINFALL

at the head of the Waterfall Gardens, Penang, during the first half of the year 1925, in inches.

Readings taken at 8 a.m., and credited to the date in which the twenty-four hours began. Data kindly supplied by the Municipal Commissioners of George Town, Penang.

Date	Jan.	Feb.	March	April	May	June
1	.34	..	.21	.09	.42	..
2	..	.07	..	2.10	..	.64
3	.02	.02	..	.05	.23	..
4	..	..	.69	..	1.12	.15
5	.62	..	..	1.63	..	..
6	.02	.44	.16	1.82	2.05	..
7	.06	.03	.18	.37	.05	..
8	.07	..	.24	..	..	.22
9	..	..	.02	..	.62	..
10	.29	..	..	.06	.13	.14
11	..	..	.60	.18	..	..
12	.03	..	1.76	..	..	..
13	.58	.03	.57	.04	3.22	3.17
14	.05	..	.31	.86	..	.72
15	.91	..	..	1.65	.08	..
16	.08	.17	1.81	.28	.27	.52
17	.78	..	.03	.39	1.05	.90
18	.02	..	.25	.55	..	.46
19	..	..	.10	.12	.07	1.26
20	..	.09	..	.05	.95	1.53
21	.04	.10	..	..	.22	5.43
22	..	..	.45	..	.10	.58
23	..	..	5.57	.14	.02	.02
24	..	..	2.66	..	..	..
25	..	..	.03	.02	..	..
26	..	..	.24	1.22	..	..
27	..	..	.27	.32	.18	..
28	..	..	1.19	.20	.32	..
29	..	..	.78	.50	..	..
30	.18	..	..	.84	.18	..
31	1.87	..	.16	..	..	..
Total	5.96	.95	18.28	13.48	11.28	15.74.

RAINFALL

at the head of the Waterfall Gardens, Penang, during the second half of the year 1925, in inches.

Readings taken at 8 a.m., and credited to the date in which the twenty-four hours began. Data kindly supplied by the Municipal Commissioners of George Town, Penang.

Date	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	.06	.44	.07	.53	.90	..
2	..	..	.94	.37	.24	.15
3	..	.93	.03	.03	.10	.55
4	..	.28	.75	.30	..	.03
5	..	.03	1.73	10.43	..	.06
6	.52	.88	.56	5.59	.29	..
7	.40	..	.03	7.60	.11	.03
8	.89	..	1.76	2.49	.11	..
9	..	.14	.68	3.85	1.12	.10
10	..	..	..	2.18	.03	.03
11	..	..	2.96	1.20	..	.41
12	..	.55	.03	.12	.07	.20
13	..	..	.10	.09	..	.15
14	..	.49	.15	1.98	.90	.54
15	..	1.20	..	..	1.84	1.21
16	..	.57	..	.16	.04	.09
17	..	.16	.36	.22	.13	.12
18	.03	2.14	..	..	..	..
19	.45	1.79	.46	.66	.74	..
20	..	.17	.10	.68	1.87	..
21	.03	.03	.07	.90	.04	.03
22	..	.62	..	1.15	1.57	2.38
23	.10	.03	1.28	1.30	.03	..
24	..	.80	.04	..	..	.03
25	.12	.39	.60	.93	.32	..
26	.17	.04	..	.25	4.18	..
27	1.66	.40	..	.52	.42	..
28	1.62	..	1.20	.28	1.62	..
29	..	..	.03	..	.25	..
30	.07	..	..	..	3.55	..
31	1.23	..	..	1.92	..	..
Total	7.35	12.08	13.93	45.73	20.47	6.11

RELATIVE HUMIDITY for the year 1925 from wet and dry bulb readings made at 9 a.m. in the Botanic Gardens, Singapore.

Date.	Jan.	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	77	75	78	65	77	74	83	79	91	74	85	89
2	69	95	74	86	81	79	74	79	93	87	70	74
3	68	98	72	79	79	...	91	75	83	76	82	74
4	79	93	81	68	77	65	73	75	93	85	86	95
5	74	97	92	96	74	89	73	75	85	79	77	87
6	83	98	82	95	72	72	79	89	76	78	70	95
7	83	100	85	86	77	76	86	84	75	86	70	78
8	97	88	97	78	74	72	75	100	80	93	74	86
9	79	86	77	76	83	74	72	78	77	85	82	93
10	83	78	75	79	81	86	79	77	87	73	75	86
11	89	86	78	83	79	74	76	79	77	81	73	95
12	78	85	78	80	72	78	77	79	84	77	66	88
13	80	91	88	75	72	79	79	77	86	74	66	75
14	81	83	79	79	79	83	77	81	75	79	71	73
15	81	91	77	77	68	73	79	71	73	78	69	78
16	82	84	74	83	76	74	74	79	77	72	72	81
17	77	73	88	77	81	87	75	79	79	77	75	81
18	85	72	82	70	74	77	83	73	70	82	68	83
19	77	91	68	79	76	79	72	95	77	85	77	72
20	84	93	76	76	78	89	74	81	81	73	72	70
21	75	78	68	77	77	83	79	71	74	95	69	78
22	76	80	74	76	83	87	77	73	72	81	80	90
23	75	78	68	70	81	76	71	83	75	81	72	80
24	84	71	75	79	83	87	68	68	70	87	69	73
25	73	86	75	74	76	79	93	75	70	86	76	82
26	77	69	83	72	79	79	79	83	69	64	89	82
27	87	72	80	72	93	74	79	81	68	71	83	98
28	76	71	74	91	79	79	75	73	68	91	81	91
29	93	...	93	72	75	75	75	76	70	66	95	79
30	76	...	76	67	90	93	74	81	70	77	89	83
31	95	...	80	...	74	...	89	81	...	91	...	95
Mean	80.4	84.3	79.0	77.8	78.0	79.0	77.7	79.0	77.2	80.1	76.2	83.0

Mean for the year 79.3

Summary of Rainfall, 1925.

	SINGAPORE				PENANG			
	No. of rainy days	Amount of rain		Longest Spell without rain	No. of rainy days	Amount of rain		Longest Spell without rain
		inches	mm.			inches	mm.	
January	23	21.47	527	2 days	17	5.96	146	8 days
February	21	14.12	346	9 "	8	.95	23	9 "
March	19	9.68	237	6 "	23	18.28	448	2 "
April	16	4.83	118	5 "	23	13.48	330	2 "
May	17	10.58	259	5 "	19	11.28	276	3 "
June	14	5.92	145	5 "	14	15.74	386	8 "
July	13	2.56	68	5 "	14	7.35	180	9 "
August	16	8.71	216	4 "	21	12.08	296	4 "
September	17	5.83	142	7 "	22	13.93	341	2 "
October	21	14.78	362	3 "	26	45.73	1120	1 "
November	21	12.21	300	2 "	24	20.47	502	2 "
December	29	11.69	286	1 "	17	6.11	150	8 "
Total	227	122.38	3006		228	171.36	4198	

Greatest amount in 24 hrs.	7.88 ins. or 191mm.	10.43 ins. or 256 mm.
" "	48 hrs. 9.94 ins. or 243mm.	16.02 ins. or 392 mm.
" "	72 hrs. 10.95 ins. or 268mm.	23.62 ins. or 579 mm.

Excessively rainy periods, over 5 ins. having fallen in 72 hours 3 (Jan. (2) Feb.)

Excessively dry periods, less than .02 in. having fallen in 120 hours 8 (Feb. March, Apr., May, June, July (2) Aug., Sept.)

6 (March, June, Oct. (3), Nov.)

6 (Jan., Feb. (2), June, July, Dec.)



Departmental Notices.

A list of plants which can be purchased at the Botanic Gardens, in Singapore and in Penang, can be had upon application. The same list appears at intervals in the Government Gazette.

The Gardens' Bulletin is published as material becomes available. Its price is fifty cents for each number, post free, or in advance for every volume of twelve numbers, post free:—

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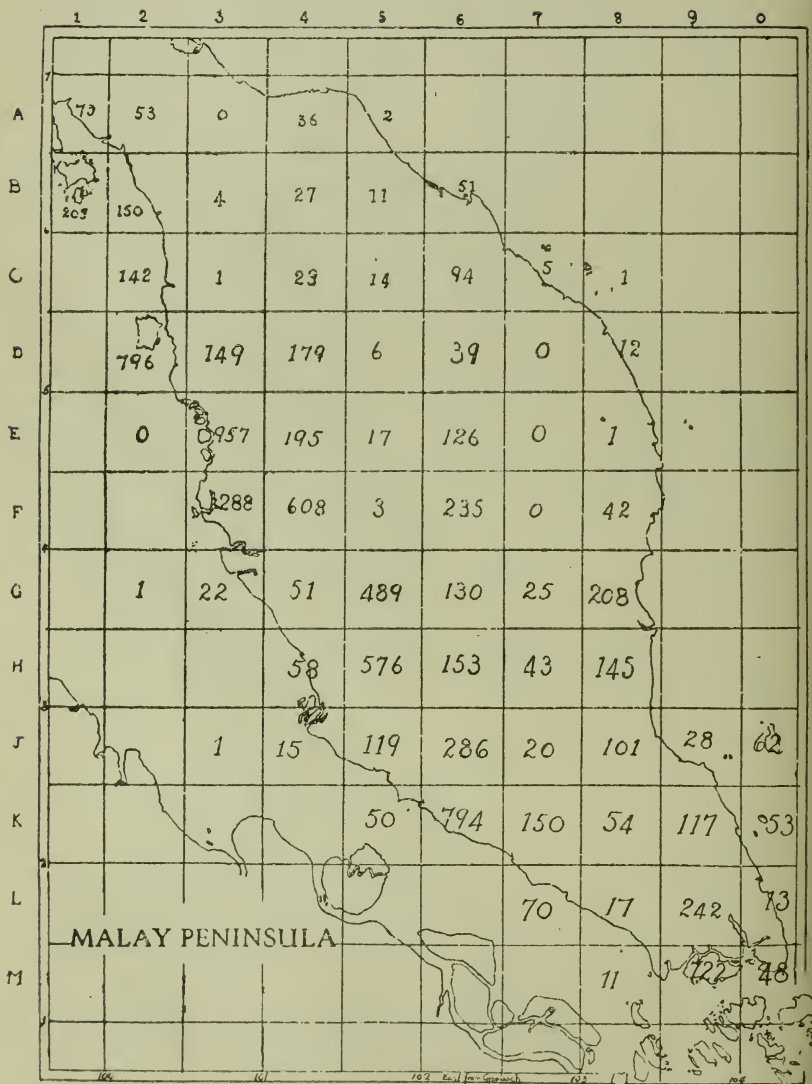
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To be purchased at the Botanic Gardens, Singapore.





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BOTANICAL COLLECTORS, COLLECTIONS AND
COLLECTING PLACES IN THE
MALAY PENINSULA.

A review of the work so far done towards a knowledge
of the plant-geography of Malaya.

BY I. H. BURKILL, M.A., F.L.S.

Mr. Ridley's *Flora of the Malay Peninsula*, south of 7° N. Lat. having been published and in regard to the higher plants the taxonomic foundation having been prepared thereby, it is appropriate that stock be taken at once of the knowledge that we possess upon the distribution of plants within the Peninsula. Towards that objective the following report is a first step. It brings out no scientific conclusions; but it indicates as concisely as possible in what measure the parts of the Peninsula have been botanised. A traveller touching at Penang will find in it the names of all who have collected plants in that island, and where their collections lie. The resident—let us say at Ipoh, but any name will serve—will obtain an estimate of how much remains to be done in the collecting of information within his circle. The administrator, who has power to direct collecting, will feel guided as to the way in which he can most profitably dispose his resources. The student, examining the herbaria which exist, will find in it a vade-mecum for the interpretation of too-often inadequate labels.

The report is in three parts:—(1) the collectors—an alphabetical list of all whose names are known to occur upon the labels of Malayan herbarium specimens, embodying sufficient biographical information for our purpose; (2) the collections, under which head the whole Peninsula is considered by squares of a half-degree of latitude and longitude—71 of them—and the work done in each set down; and (3) the collecting places, an index to the place-names which occur on the labels in herbaria, and at the same time an index to part 2.

There are two maps in the report. Upon the first the squares are all marked. These squares explain themselves, except that *1a* has been stretched a little to the west that all the Butang islands may be got into it; and square *0k* has been stretched a little to the east that Pulau Aor and

the islets near it may be included. A complete square of level land has a surface of about 1,225 square miles, a large area for our purpose, but to deal with subdivisions proves impossible. Of the 71, 28 alone have the full complement of land: the rest are all in part of sea.

The first map carries a figure in each square, the figure being the number of plants of the orders contained in the first volume of Mr. Ridley's Flora *, which can be proved to occur within each square. Add all the figures together and the total of 9,410 is obtained: but by reason of double and treble records for squares, the data compressed into the map by a very long way exceed this figure, and have been laborious to collect. That is why a halt has had to be called at the end of examination of the first volume, but the data on the data on the map do really suffice for the estimation of our knowledge in the form of a very approximate percentage.

The second map graphically indicates the percentages arrived at.

The lowness of these percentages as a whole is surprising. They read us a warning against hasty conclusions: they tell us how little we know; and that the square of Mount Ophir carries a figure so low as 12 and the square of Gunong Tahan one so low as 18, is material for consideration.

One more remark. The three Settlements,—Penang, Malacca and Singapore have received considerable attention, and a list of the places in them whereat plants have been collected would be long and extend Part 3 much; but to make one has not seemed necessary, for collectors' labels in regard to them have rarely proved misleading. Village names from these three Settlements, therefore, will only for special reasons † be found in the list. Good maps on a large scale are to be had and meet the rest of the need.

It is evident that orderly work can be based on the report.

In concluding these introductory remarks, Mr. Ridley, Colonel Kelsall, Dr. Gimlette and Dr. Foxworthy must be thanked for the kind way in which they supplied information.

* Begoniaceae had to be omitted from the count because the specimens of the Singapore herbarium are on loan and under elaboration in Germany.

† The majority of the special cases are where confusion may arise because the place-name is one of frequent occurrence; the following for instance are repeated from end to end of the Peninsula:—Ayer Hitam, or Black Water, Ayer Kuning, or Yellow Water, Bukit Putus, or the hill of the divide, Kota Baharu, or the new fort, Simpang Ampat, or cross roads, Tebing Tinggi or the upper bank (suitable for landing), Bukit Kayu Arang, or Diospyros hill, Pulau, or the *Alstonia* tree.

THE COLLECTORS.

A list as complete as possible of all whose names
appear upon the labels of Malayan
specimens in Herbaria.

ABRAMS, J.

A sergeant of Forest Guards, and later Forest Ranger, in Penang, 1888–1910, who obtained specimens for Curtis.

AHMED bin HASSAN.

Employed by the Botanic Gardens, Singapore, 1901– ; earlier collections numbered along with Ridley's; and later in Burkill's "Singapore Field Number" Series.

ALVINS, M. V.

Collector employed in the Forest Department of the Straits Settlements, 1884–1888 in Malacca, whence he journeyed into Negri Sembilan (Sungei Ujong State). His specimens are in the Singapore Herbarium and have been quoted as Cantley's Collector's or briefly as Cantley's. He numbered in the field.

ANDERSON, James Webster.

An Assistant Curator in the Gardens Department, Straits Settlements, 1910–1917, during which time he made small collections conserved at Kew and Singapore. He numbered in the field.

ANDERSON, Thomas. (1832–1870).

A surgeon under the Government of India, and from 1860–1868, Superintendent of Royal Botanic Gardens, Calcutta. On a journey to Java in connection with Cinchona culture, he found, in 1861, an opportunity of collecting plants in Singapore for the Calcutta Gardens. (Dict. Nat. Biogr. 1, 392).

ANNANDALE, Thomas Nelson. (1876–1924).

Superintendent of the Indian Museum, Calcutta and Director of the Zoological Survey of India. In 1899 he was attached to the Skeat Expedition, and in January and February, 1916, he revisited the same region. His collections of 1916 are in the Singapore Gardens, and were numbered in the field with Singapore Field Numbers. (Records Ind. Mus. Calcutta, 27, 1925, p. 1).

ARDEN, Stanley.

Employed in the Agricultural Department (1900–190). He sent plants to Singapore in 1902.

ASKEY, A. M.

A ranger in the Forest Department (1906–1922).

ASKEY, J. F.

A ranger in the Forest Department (1905–1910).

BAKER, Charles Fuller.

Professor and Dean of the College of Agriculture, Los Banos, Philippine Islands; in 1917 on the staff of the Botanic Gardens, Singapore; phanerogams in the Singapore Herbarium, and fungi widely distributed.

BARNARD, Basil H. F.

In the Forest Department, 1896– , chiefly in Perak, where he collected specimens of forest trees, etc.

BARNES, Warren Delabere. (1865–1911).

Of the Malayan Civil Service (1888–1910), and afterwards Colonial Secretary, Hongkong: conducted an expedition towards the mountain of Benom in 1900, and made a collection of plants upon a subsidiary summit. (*Jour. Straits Branch Roy. As. Soc.* No. 60, 1911, p. 4).

BAZELL, Clive.

Educational officer, stationed at Kuala Kangsar: sent to Singapore a small collection of plants from the summit of Gunong Bubu in 1923.

BECCARI, Odoardo. (1843–1920).

Naturalist and traveller in Malaysia (1865–1880). When in Singapore upon his way to Borneo, etc., he collected plants. His herbarium is in Florence. (*Ann. del Mus. Civ. de Storia Nat. di Genova*, Ser. 3, 9, 1921, p. 242).

BECHER, H. M.

A miner who lost his life in a flood in 1893 when exploring towards Gunong Tahan. He collected a little about Kuala Tembeling, Pahang.

BELL, L. M.

Municipal Engineer, George Town, Penang (1904–1920) and a member of the Committee for the management of the Waterfall Gardens, Penang; collected on Kedah Peak, in 1911, specimens which are at Singapore.

BELL, V. G.

Assistant Conservator of Forests, F.M.S. (1912–), since 1921 Conservator of Forests, Kedah. Sent plants from Kedah.

BEST, George Arnold.

Assistant Curator in the Gardens Department, Straits Settlements (1921–), collections in Singapore as part of the "Singapore Field Number" series.

BINSTEAD, Rev. Charles Herbert.

Paid a visit to Penang and Singapore in 1913 and collected mosses.

BLAND, Mrs. (Laura Shelford).

Wife of R. N. Bland, Resident Councillor, Penang, collected on the Taiping Hills in 1905 plants which are at Singapore.

BLOW, Thomas Bates.

Visited Singapore in 1904 and collected Characeae.

BORGES, V. P.

Extra Assistant Conservator in the Forest Department 1903-1924).

BOXALL, Richard.

Employed by the firm of Hugh Low and Co. to collect plants of horticultural value; he visited Kedah Peak and the Settlements about 1880.

BROOKS, Frederick Tom.

University lecturer in Botany, Cambridge. In 1914 temporarily in the Agricultural Department, and collected around Kuala Lumpur, Province Wellesley and elsewhere.

BRYANT, Alfred Thomas.

Of the Malayan Civil Service (1883-1918). Collected plants a little in the Dindings in 1890.

BURBIDGE, Frederick William. (1848-1905).

Traveller for ornamental plants in the employ of Messrs. Veitch; visited Singapore and southern Johore in 1877 and 1878; plants of his are at Kew. (*vide* Hortus Veitchii, p. 75, and his own "Gardens of the Sun").

BURKILL, Mrs. (Ethel Maud Morrison).

Wife of the following; collected and made drawings of Fungi for the Botanic Gardens, Singapore; numbered in the field.

BURKILL, Isaac Henry.

Director of Gardens, Straits Settlements (1912-1925); numbered in the field in a series labelled "Singapore Field Number," to which the whole Department and others contributed.

BURN-MURDOCH, Alfred M. (1868-1919).

Chief Forest Officer, afterwards Conservator of Forests, Federated Malay States and Straits Settlements, 1901-1914; collected forest trees in many places, and in 1913 contributed to the "Singapore Field Number" series. (Indian Forester, 40, p. 155).

C..... (H. C.).

A correspondent of the Botanic Gardens, Calcutta, who after having been in the Moluccas, sent plants from Penang to Roxburgh in 1798.

CANTLEY, Nathaniel. (-1888).

Superintendent of the Botanic Gardens Singapore (1880-1888), and of Forests (1885-1888); he collected plants in 1881 which are at Kew, and after 1881, which are in the Singapore Herbarium. *Jour. Kew Guild*, 1898, p. 37).

CHIPP, Thomas Ford.

Assistant Director, Royal Botanic Gardens, Kew; from 1914 to 1921, Assistant Director of Gardens, Singapore; collected in Singapore and elsewhere, chiefly Cryptogams.

CLERK, C. A.

Extra Assistant Conservator of Forests, Federated Malay States, 1910-1920. Collected in Negri Sembilan.

CRADDOCK, W. H.

Of the Burma Forest Service; worked on deputation in the Malay Peninsula, 1902-1903, and sent Pahang plants to Singapore.

CUBITT, George Eaton Stannard.

Conservator of Forests from 1915; specimens of forest trees collected in various places in his departmental herbarium and in the Botanic Gardens, Singapore.

CUMING, Hugh. (1791-1865).

Traveller and naturalist; visited Malacca and Singapore in 1839 and perhaps Singapore in 1835, when voyaging to and from the Philippine islands. His Malacca herbarium specimens have often been quoted in error as Philippine. Sets are in the herbaria at South Kensington and Kew; he sent living orchids both to the Calcutta Gardens and to the firm of Loddiges. (*Dict. Nat. Biogr.* 13, p. 295; Merrill in *Phil. Journ. Science*, 30, 1926, p. 159).

CURTIS, Charles.

Superintendent of Gardens and Forests, Penang (1884-1902); built up a herbarium in Penang which in 1910 was incorporated into that in the Botanic Gardens, Singapore. The numbers were put on to the specimens only after study.

DALHOUSIE, the Countess of (Christina Broun).

Wife of the 9th Earl and Commander in Chief in India, 1829-1832; collected in Penang, plants which were sent to Kew.

DE MORGAN, J.

A Civil Mining Engineer who made the first map of the Perak river. He collected a few ferns on Gunong Chabang which is over the Sungei Kerbau.

DE ZYLVA, E. R.

In the service of the Forest Department, Pahang, 1904-

DERRY, Robert.

Assistant Superintendent of Forests, Malacca (1885-1888); partly in Malacca, partly in Perak (1889-1903); Assistant Superintendent, Botanic Gardens, Singapore (1904-1908); Superintendent of Gardens and Forests, Penang (1908); Curator, Botanic Gardens, Singapore (1909-1913). In 1889 he sent plants to Kew; at various times he collected plants which are in the Singapore Herbarium.

DESCHAMPS, E.

Traveller; collected plants in easily accessible places near Penang and as far as Batu Gajah in 1900 and 1901, which were given to the Calcutta Gardens.

DESHMUKH, Gopal Bhikajee.

Field Assistant to the Botanic Gardens, Singapore (1918-1921); collected in and near Singapore.

DAUD.

In Herb. Wight are plants labelled "Singapore, Dawood." It is assumed that they came from a Malay collector named Daud, perhaps through Robert Wight's sea-faring brother.

DAUD, see TASSIM DAUD.

DOCTORS van LEEUWEN, W.

Director of the Botanic Gardens, Buitenzorg, Java; visited the Straits Settlements in 1920 and collected specimens chiefly cecidological, which are conserved at Buitenzorg.

DOWN, St. Vincent B.

Merchant of Singapore and afterwards of Sarawak; for many years on the Gardens Committee, Singapore; collected and gave plants to the Botanic Gardens, Singapore.

DRUCE, George Claridge.

Fielding Curator, Botanic Gardens, Oxford; visited Singapore in 1908.

DURNFORD.

A miner of Kuantan, who collected orchids and contributed them to the Singapore Gardens in 1889.

ELPHINSTONE, Sir Graeme H. D.

One of the earlier of the European planters in Perak; collected a little on the Taiping Hills, and his plants were given to Singapore.

ELLIS, William Gilmour.

Principal Colonial Medical Officer, Singapore; on the Gardens Committee in 1903, and collected plants in a few places.

ENGLER, Adolf.

Professor of Botany in the University and Director of the Botanic Gardens, Berlin; visited Singapore and Kuala Lumpur in 1905; collections presumably in the Berlin Gardens.

EVANS, I. H. N.

In the Museum Department, Federated Malay States; collected plants in many parts of Pahang in 1917, and also elsewhere. The collections were sent to Kew.

FARQUHAR, Colonel William.

As a Major, Resident of Malacca, later the first Resident of Singapore; employed a native to delineate the plants of the Peninsula, and submitted these drawings to Jack and Wallich. He climbed Mount Ophir and collected a little on it.

FEDDERSEN, Poul.

Planter and surveyor; collected orchids and other plants, sending specimens to the Botanic Gardens, Singapore (1916-).

FEILDING, J. B.

At the instance of the Government of Johore in 1892 visited the foot of Mount Ophir, and several places upon the coasts of the State, from the Kesang river round to the Endau and to the islands off the latter. Part of his journey was in the company of Lake and Kelsall, which accounts for plants having come from both Feilding and Kelsall from such places as Jambu Larang.

FERGUSON-DAVIE, Mrs. (Charlotte Elizabeth Hull).

Doctor of Medicine, wife of the Bishop of Singapore; collected plants in 1921 about Fraser Hill on the Main Range for the Singapore Gardens.

FERNANDEZ, Emanuel.

A collector employed by Griffith in Malacca while he was in Calcutta and presumably during his first residence in Malacca.

FINLAYSON, George.

Surgeon in the service of the East India Company; naturalist on the mission to Siam of 1821-23; collected plants which were distributed by Wallich in 1827-1832. (Dict. Nat. Biogr. 19, p. 32).

FLEISCHER, Prof. Dr. Max.

Visited Singapore, Kuala Lumpur and Penang in the year 1898, and collected mosses.

FLIPPANCE, Frederick.

An Assistant Curator in the Gardens Department, Straits Settlements, 1919- ; contributed to the "Singapore Field Number" series.

FOX, Walter.

In the service of the Gardens Department from 1878 to 1910, first in Singapore and then as Superintendent of Gardens and Forests, Penang; collected plants for Ridley.

FOXWORTHY, F. W.

Joined the Forest Department in 1918; collected in many parts of the Peninsula.

FURTADO, Cajetano Xavier.

Field Assistant in the Gardens Department, Straits Settlements, 1923- ; contributed to the "Singapore Field Number" series.

GAUDICHAUD-BEAUPRÉ, Charles. (1789-1844).

Traveller and collector; upon his second voyage round the world, 1835-1836, he touched at Singapore, Malacca and Penang, collecting a little, which is preserved at the Jardin des Plantes, Paris.

GIMLETTE, John D.

Surgeon in Government service, Malay States. Sent plants from Kuala Lebir, Kelantan, to the Singapore Gardens in 1904 and from Kota Bahru, Kelantan, from 1909.

GOLDHAM, C.

Educational Officer stationed at Ipoh and Kuala Kangsar, where he collected orchids, and from whence he sent specimens to Singapore.

GOODENOUGH, J. S.

Entered the Forest Service in 1888, and served in Malacca, Singapore, and as Forest Inspector in Selangor to 1901; collected forest trees in these places for Ridley.

GRIFFITH, William. (1810–1845).

Surgeon in the service of the East India Company; appointed civil surgeon of Malacca in 1841; recalled to take charge of the Botanic Gardens, Calcutta in 1842; returned in 1845. His herbarium is at Kew. (Dict. Nat. Biogr. 23, p. 240).

GWYNNE-VAUGHAN, David Thomas. (1871–1915).

Professor of Botany at Reading; in 1899 attached to the Skeat Expedition and from the southern Siamese Malay States travelled collecting towards Kelantan. His plants are at Kew and Cambridge. He numbered in the field. (Proc. Linn. Soc. London for 1915–1916, p. 61).

HAMID bin Mohd. Sah.

Forest Ranger. In Forest Department from 1907. Collected in many parts of the Peninsula.

HANIFF, Mohamed.

Entered the Gardens Department in 1890; and has collected in many parts of the Peninsula; later collections bear the "Singapore Field Number" series.

HASHIM bin Mohamed.

First in the Gardens Department and then Forest Ranger in the Forest Department, 1908–

HAVILAND, George Darby. (1857–1901).

Surgeon and naturalist; resided at Singapore as Director of the Raffles Museum and visited the mouth of the Pahang river in 1890 and there collected. His Pahang collections are at Singapore. (Kew Bull. 1907, p. 197).

HAY, M. C.

In the Malayan Civil Service; stationed at Batu Pahat in 1924, when he collected economic specimens for the Singapore Gardens.

HENBREY, G. J.

Deputy Conservator of Forests, Federated Malay States, 1905–

HENDERSON, Murray Ross.

In the Museums Department, Federated Malay States, 1921–1924; Curator of the Herbarium, Botanic Gardens, Singapore, 1924–. He numbered in the field.

HERVEY, Dudley Francis Amelius. (1849–1911).

In the Malayan Civil Service and Resident of Malacca (1882–1893), where he collected a herbarium which was given to Kew,

HILL, Henry Charles. (1852–1903).

Indian Forest Service, 1872–1903; Inspector General of Forests, India, 1900–1903; in 1899 deputed to report on the forests of the Malay Peninsula, for which purpose he travelled rapidly through the three Settlements in turn, then from the Dindings through Perak and Selangor, into Pahang via the Semangkok Pass to Kuala Lipis and down the Pahang river, thence to the Kuantan and Rompin rivers. Specimens gathered for identification were sent by him to Singapore.

HOBSON.

In the Survey Department; collected plants near Taiping and gave specimens to the Botanic Gardens, Singapore in 1909.

HOLMBERG, P. J.

In the Land Office, Malacca, and in 1891 in charge of the Malacca forests, when he collected forest trees for Ridley.

HOLTTUM, Richard Eric.

Assistant Director of Gardens, Straits Settlements, 1922– ; numbered in the "Singapore Field Number" series.

HOSE, E. S.

Son of the following; Malayan Civil Service, and from 1924–1925, Colonial Secretary, Straits Settlements; collected plants which are in the herbaria at Kew and Singapore.

HOSE, the Right Reverend George Frederick. (1838–1922).

Chaplain in Malacca, 1868–1873; in Singapore, 1874–1881; Bishop of Singapore and Sarawak, 1881–1908; collected plants, chiefly ferns; his collection of ferns is to be found at Kew. (*Journ. Straits Br. Roy. As. Soc.* 57, p. 1).

HCSE, Gertrude.

Daughter of the last named; collected grasses in various parts of the Peninsula.

HOSSEUS, C. Curt.

Traveller and collector; visited the Malay Peninsula in 1904 and collected plants, which presumably are conserved in the Botanic Gardens, Berlin.

HULLETT, Richard William. (1843–1914).

A schoolmaster in Singapore; a member of the Gardens Committee, and once in temporary control; collected a herbarium which he gave to the Gardens.

HUME, H. L.

Planter; attached to the Federated Malay States Museums during 1921, and collected plants in the neighbourhood of Kuala Lumpur.

HUNTER, Sir William. (1755-1812).

A ship's surgeon in the East. 1781, and in the employ of the East India Company, 1783-1812, and author of "Plants of Prince of Wales Island" printed in the Journ. Straits Branch, Roy. As. Soc. 53, p. 49. (Dict. Nat. Biogr. 28, p. 305).

ICHEBESTA, Rev. Father.

Missionary and linguist; collected some of the plants useful to the jungle folk of the Kedah-Perak boundary, for the Singapore Gardens, in 1924.

ISAAC, J. S.

A clerk in the Botanic Gardens, Singapore, who collected a little there under Ridley.

JACK, William. (1795-1822).

Surgeon in the employ of the East India Company and on the staff of Raffles; was in Penang and Singapore in 1819; his collections were lost in the "Fame," but he had sent duplicates of many to Wallich in Calcutta. (Journ. Straits Br. Roy. As. Soc. 73, 1916, p. 147).

JAGOR, F.

Traveller; author of "Singapore, Malacca, Java, Reiseskizze" 1866. He was for three months, April to July, 1858, in Malacca and for a much shorter time in Singapore. His collections are apparently conserved in Berlin.

JENSEN, Marius.

In 1901 collected plants in the neighbourhood of Singapore and Johore, which are preserved at Copenhagen.

JUPP.

Miner; climbed Gunong Stong in Kelantan and collected a few plants which he sent to Singapore.

KELSALL, Colonel J. H.

Royal Engineers; stationed as a Lieutenant in Singapore, whence he made several journeys of exploration, collecting plants for the Singapore Gardens.

KERR, Arthur Francis George.

Physician in the service of the Government of Siam, and in charge of the Botanical Section, Ministry of Commerce; collected in the Siamese Malay States, etc. He numbered partly in the field, partly after study.

KEUN, G. C.

Ranger in the Forest Department, 1906–1917.

KIAH bin Hadji Mohamed Salleh.

A plant collector employed in the Botanic Gardens, Singapore.

KING, Sir George. (1840–1909).

Superintendent of the Royal Botanic Gardens, Calcutta; sent in 1879 to Java in connection with cinchona culture; collected in Singapore, Johore, Malacca and Penang; plants at Calcutta. (Proc. Linn. Soc. London 1908–09, p. 42).

KINSEY, W. E.

Assistant and afterwards Deputy Conservator of Forests, Negri Sembilan (1907–) ; collected forest trees.

KLOSS, C. Boden.

In 1903 and 1907 on the staff of the Botanic Gardens, Singapore; then in the Museums Department, Federated Malay States; Director of Raffles Museum, 1923– ; collected plants in many places which are largely at Kew and also in the Singapore Herbarium.

KNIGHT, Valentine.

An assistant in the Raffles Museum, Singapore (1902–1922) who collected a little.

KUNSTLER, Hermann.

Collector employed by the Royal Botanic Gardens, Calcutta from 1880–1886 chiefly in Perak. Many of his plants are labelled “King’s Collector.” Some of his Kinta collections were mislabelled in Calcutta “Larut” and some of his 1886 collections were got in the State of Selangor, but mislabelled “Perak.” He numbered after partial study.

KURZ, Sulpiz. (1833 ?–1878).

Employed by the Dutch Government in Java, and then (1864–1878) by the Government of India in the Botanic Gardens, Calcutta; in 1863 collected a little in Singapore. His collections are conserved in the Calcutta Gardens.

LAKE, Harry.

Miner and surveyor; explored Johore and with Kelsall in 1892 made a crossing of it from east to west, collecting on the way for the Singapore Gardens.

LEDOUX, J. A.

Planter of Kota Tinggi, in Johore, from the neighbourhood of which he collected plants and sent them to the Singapore herbarium in 1910 and subsequently,

LEWIS, T.

Assistant Resident Councillor, Penang; a friend of Griffith to whom he sent plants from Penang.

LIM BOON KENG, the Hon'ble Dr.

A member of the Gardens Committee, Singapore, collected a little in Singapore.

LOBB, Thomas. (1820-1894).

Employed by the firm of Messrs. Veitch (1843-1860) to collect plants of horticultural value; collected also dried plants, but these, which were sold in sets after determination, often bear incorrect localities. It is thought that the majority of the Malayan plants were got in Penang. (*Hortus Veitchii*, p. 41).

LONG, F. R.

In charge of the Hill Garden, Taiping (1908-1910) and from the hills he sent a collection of plants to Singapore.

LOW, Sir Hugh.

Resident of Perak (1877-1889), during which period he collected a little, sending his plants to Kew, and he encouraged collecting by others. See *Agri. Bull.*, Straits and Federated Malay States, Vol. 4, p. 239.

LOW, Lieutenant-Colonel James. (-1852).

In the Madras Army, and later in civil charge of Province Wellesley; author of "A Dissertation on the Soil and Agriculture of Penang." He collected a few plants which are at Kew. (*Dict. Nat. Biogr.* 34, p. 183).

MACHADO, Alfred Dent. (-1910).

Miner, then for a short time (1902-1903) on the staff of the Botanic Gardens, Singapore, and later a planter in Perak and again in Singapore. He made several small collections which are conserved at Singapore.

McGILL, Captain Hilton.

At sea, and later a planter in Kelantan (1904-1913), where he collected plants for Ridley.

McNAIR, Major John Frederick Adolphus. (-1910).

Colonial Engineer, Straits Settlements; author of a report on Singapore timbers; collected specimens of timber trees in Penang for Cantley, when, in 1881-1882, he was officiating as Lieutenant-Governor of Penang.

MAIN, T. Wilson.

In charge of the Hill Garden, Taiping in 1907 and Assistant Curator, Singapore Gardens, 1908-1910.

MAINGAY, Alexander Carroll. (1826–1869).

Army Surgeon, and from 1862–1867 in charge of the jail in Malacca, where he collected vigorously. His herbarium and notes on plants are at Kew. (Trans. Bot. Gard. Edinb. 11, p. 36).

“MAT.”

A plant collector in Singapore (1888–1897), who visited Gunong Pulai and accompanied Beeker up the Tahan river.

MATTHEW, Charles Geekie.

Fleet-Surgeon; visited the Straits Settlements in 1904 and 1913, and collected ferns.

MILLS, G. R.

Planter; sent plants to Singapore from Batu Gajah in 1925 and subsequently.

MILSUM, John Noel.

In the Agricultural Department (1914–); collected plants which are at Kew.

MITCHELL, A. S.

Extra Assistant Conservator of Forests, Federated Malay States, 1907– .

MITCHELL, F. J.

Ranger in the Forest Department (1915–1922).

MOHAMED NUR bin MOHAMED GHOSE.

Employed in the Botanic Gardens, Singapore from 1913; collected in many parts of the Peninsula.

MOLLER, Hjalmar.

Visited Java in 1897 and when returning to Europe in the month of September collected mosses in Singapore and Penang.

MOORHOUSE, S. W.

In the Forest Department, Negri Sembilan, 1903–190 . He collected rotans for the Singapore Herbarium.

MOTLEY, James.

A miner engaged in Borneo (1852–1859); found an opportunity of collecting a little in Singapore. E. Barbour acquired the collections which he made to 1854, and sent them to Kew. (Journ. Straits Branch Roy. As. Soc. 79, 1918, p. 37).

MURTON, Henry James.

Superintendent, Botanic Gardens, Singapore (1872–1882); collected vigorously and sent specimens to Kew, but destroyed what he had retained in Singapore.

NANSON, William.

A lawyer of Singapore; interested in orchids, specimens of which he supplied to the Singapore Gardens.

NAPIER, Sir Walter J.

A lawyer of Singapore and Attorney General (1908-1909); on the Gardens Committee; collected plants for the Gardens from different places.

NEAL, G. E.

In the Forest Department (1911-1924); collected specimens of forest trees in Pahang.

NEWBOLD, T. J.. ().

Of the Madras Army, author of "A Political and Statistical Account of the British Settlements in the Straits of Malacca," 1839; transmitted plants from the summit of Mt. Ophir to Wallich in Calcutta.

NGADIMAN bin HADJI ISMAIL.

A plant collector employed in 1924- in the Botanic Gardens, Singapore.

NINGHUL.

A collector employed by Griffith; the editor of Griffith's "Posthumous Papers," spelling the name in various ways, took it to be a place name.

NONGCHI.

Employed as a gardener by His Highness the Sultan of Johore; in 1892 sent plants to the Singapore Gardens.

NORRIS, Sir William.

Recorder of Penang; a friend of Griffith, to whom he sent plants. Griffith's herbarium came to Kew, and Norris' own fern collection also reached Kew.

O'HARA, G. M.

In the Forest Department (1905-).

O'HARA, V.

In the Forest Department (1912-1926).

OXLEY, Thomas.

Surgeon and finally Senior Surgeon in the Straits Settlements (-1857); interested in economic plants, especially in Gutta-percha trees. About 1843 he sent plants from Malacca to Voigt in Bengal, at the moment when the East India Company had ordered the construction of a new herbarium in the Calcutta Botanic Gardens, evidently to replace what Wallich had just dispersed. He was said to possess a herbarium of 1,000-1,200 specimens in 1845. He climbed Mount Ophir in January, 1839 or 1840, and again in 1848, and sent plants to Kew from 1848 to 1852.

PEARS, Francis.

A planter of Johore who collected a little in the Muar valley in 1899.

PENNEY, F. Gordon.

In the Malayan Civil Service (1876–1906 or 1907); sent Pahang plants to Singapore in 1902.

PERRY, G. E.

Sent plants to the Singapore Gardens in 1920.

PHILLIPS, P.

Deputy Conservator of Forests, Federated Malay States, 1896–1925, collected in Pahang.

PHILLIPS, William Edward. (-1850).

For a long time in the service of the East India Company in Penang, and from 1819–1826 Governor; collected plants and gave them to Wallich, and also gave a collection to the Horticultural Society in London, which was passed on to Kew. (*vide* Jour. Malayan Branch Roy. As. Soc. N.S. 1, 1923, p. 8).

PINWILL, W. S. C.

A correspondent of the Royal Botanic Gardens, Kew, who sent thither a few plants from Malacca.

PORTER, George.

A member of the gardening staff of the East India Company's Garden at Calcutta, who accompanied Wallich to Singapore in 1822 and elected to remain in Penang, where he became a schoolmaster, and was put in charge of a Botanic Garden; he collected and sent plants to Wallich.

RACIBORSKI, Maryan.

Professor and Director of the Botanic Gardens, Lemberg, Galicia; collected in Singapore in 1899 upon his way from Java and sent plants to Kew.

RIDLEY, Henry Nicholas.

Director of Gardens and Forests, Straits Settlements (1888–1900); Director of Gardens (1901–1912); did not number in the field, but upon study.

ROBERTSON-GLASGOW, Charles Ponsonby. (-about 1900).

Visited Singapore and Perak in 1898 and collected fungi chiefly, which were sent to Kew; but the greater part of his collection seems to have been lost upon his death.

ROBINSON, Herbert C.

In charge of the Museum, Kuala Lumpur, then Director of Museums, Federated Malay States (1909–1925), collected and organised collecting, sending his collections chiefly to Kew.

ROSTADOS, E.

Miner and planter; collected plants about Bundi in South Trengganu in 1904 and sent them to Singapore.

ROXBURGH, William.

A son of William Roxburgh, the first Superintendent of the East India Company's Botanic Garden in Calcutta; collected living and dried plants for his father, in Penang, in 1802.

SANDERSON, A. R.

Sent plants to the Singapore Gardens in 1920.

SANDS, William Norman.

In the Agricultural Department (1920-); gave specimens in 1924 to the Singapore Gardens.

SCHIFFNER, Prof. Victor.

Of the University of Vienna; collected mosses in Penang and Singapore in November 1893. (Ges. zur Forderung Deutsch. Wissensch., Mitt. II).

SCHLECHTER, Dr. Rudolf. (1872-1925).

Of Berlin; travelled through Malaysia in 1901 collecting in February, between Penang and Singapore.

SCHOMBURGK, Sir Robert Hermann. (1804-1864).

Appointed British Consul in Bangkok in 1857, and on the way thither collected plants in Singapore which were sent to Kew. (Dict. Nat. Biogr. 50, p. 437).

SCORTECHINI, Rev. Father Benedetto. (-1886).

A missionary who came to Taiping from Australia in 1882; he collected diligently until his death, but considerably neglected to label his specimens. The collection went to Calcutta. In several places his name is wrongly given as Bertold, as for instance in *Oberonia Bertoldi*, King. (Rev. Mycol. 9; 1887, p. 123).

[SCOTT, John. (1838 ?-1880).

Curator of the Royal Botanic Gardens, Calcutta, is credited in books with collecting in Penang; but probably what he did was to cultivate plants brought to Calcutta from Penang by T. Anderson and others].

SEIMUND, E.

In the Museums Department, Federated Malay States; collected plants for H. C. Robinson.

SKEAT, Walter.

Of the Malayan Civil Service; organised in 1899 a scientific expedition, which collected in the north of the Peninsula. The plants collected on the expedition are at Kew and Cambridge.

SMITH, Christopher. (-1806).

Employed by the East India Company to introduce valuable plants into Penang (1796-1806), and from Penang he sent plants to the Gardens in Calcutta.

SMITH, Mrs. (Dr. Eryl).

Wife of Dr. Malcolm Smith in the service of the Government of Siam; collected plants at Fraser Hill, upon the Main Range in 1922.

SOUTH, F. W.

Sent plants to the Singapore Gardens in 1920.

STEPHENS, Arthur Bligh. (1855-1909).

Planter and then Forest Officer, Perak, later called Deputy Conservator of Forests (1897-1909); collected forest trees in Perak.

STEVENS, Hrolf Vaughan. (-1897).

Ethnologist; collected specimens of the useful plants of the wild tribes in Trengganu, which are conserved in Singapore. (*Zeitschr. fur Ethnologie*, 29, p. 235). See Wilkinson, *Papers on Malay Subjects, Supplement* (1910); *The Aboriginal Tribes*, pp. 3-5.

STOLICZKA, Ferdinand. (1838-1874).

Geologist in the employ of the Government of India; visited and collected in Penang and Singapore in August, 1869. (*Memoir in Scient. Res. Second Yarkand Mission*, 1886).

STRESEMANN, Dr. E.

A zoologist of the second Freiburger Molucca Expedition, 1910-1911, who took opportunity of visiting the main range of the Peninsula from Tapah and collected mosses.

T.....

The initials "G. T." (perhaps G. I.), together with the locality Singapore and the date December 1845, occur upon the label of a specimen in the herbarium of the Royal Botanic Gardens, Kew, to which has been added "G. Thomson." Who the collector was is unknown. Certainly it was not Dr. Gideow Thompson of Madras.

TASSIM DAUD.

Employed in the Singapore Gardens (1886-1895).

TENISON-WOODS, Rev. Julian Edmund.

A geologist, who visited Perak from Australia in 1884 and botanised with Scortechini.

VENNING, Alfred Reid. (-1908).

In the Malayan Civil Service (1893-1908); when Secretary to the Resident, Perak (1900-1903), residing in Taiping he collected plants which are conserved in Singapore.

VERAPHA.

A native collector employed by Griffith. The Editor of Griffith's "Posthumous Papers" mistook his name for a place name and spelled it in more than one way.

VESTERDAL, A. P. N.

Planter of southern Johore, where he collected plants and supplied specimens to the Singapore Herbarium in 1917. It is believed that he sent further collections to Copenhagen.

WALKER, Colonel George Warren. (-1844).

Collected in Penang and Singapore about 1837 plants which are at Kew and in the Natural History Museum, S. Kensington.

WALLACE, Alfred Russel. (1823-1913).

Naturalist; visited Singapore and Malacca in 1854, making zoological studies, and collected plants in connection therewith. He ascended Mount Ophir in July or August of that year. ("My Life," in two volumes, London, 1905).

WALLICH, Nathaniel. (1786-1854).

The second Superintendent of the East India Company's Botanic Garden in Calcutta (1815-1846); visited the Straits in 1822 and collected much in Singapore and a little in Penang. His collections were part of the Company's Herbarium distributed in 1828-1832. (Dict. Nat. Biogr. 59, p. 135).

WATSON, J. G.

At first in the Agricultural Department and then a Forest Officer in the Peninsula (1913-), in which capacity he collected in Johore and elsewhere.

WAWRA von FERNSEE, the Ritter Heinrich.

Surgeon in the Austrian Navy; travelled round the world in attendance upon two German princes and collected on brief visits to Singapore and Penang. His collections were listed in 1883-1888 in his "Itinera principum S. Coburgi, Die botanische Ausbeute von der Reisen ihrer Hoheiten der Prinzen von Sachsen-Coburg-Gotha."

WERNER, Dr. E.

Visited Penang in 1907 and a part of the mainland which he calls "the hills of the Sakai," collecting a few mosses.

WESTERHOUT (probably J. B., Assistant Resident of Malacca).

A friend of Griffith, who brought plants to him.

WHITE,.....

Chaplain of Singapore about 1841; collected plants and gave them to Cantor.

WIGHT.

A brother of the botanist, R. Wight. He visited Malacca and collected a few plants for him.

WILLIAMS, G.

Planter of Siliau in Negri Sembilan, where he studied orchids.

WINKLER, Hubert.

Professor of the University of Breslau; visited Singapore and Gunong Angsi in 1908, and collected plants which are preserved at Breslau.

WOLFERSTAN, Littleton Edward Pipe.

Of the Malayan Civil Service (1889-191); collected plants in the Dindings when stationed there in 1900.

WOOLDRIDGE, Theo. A.

Of Penang about 1893, collected living orchids through native agents.

WRAY, Leonard.

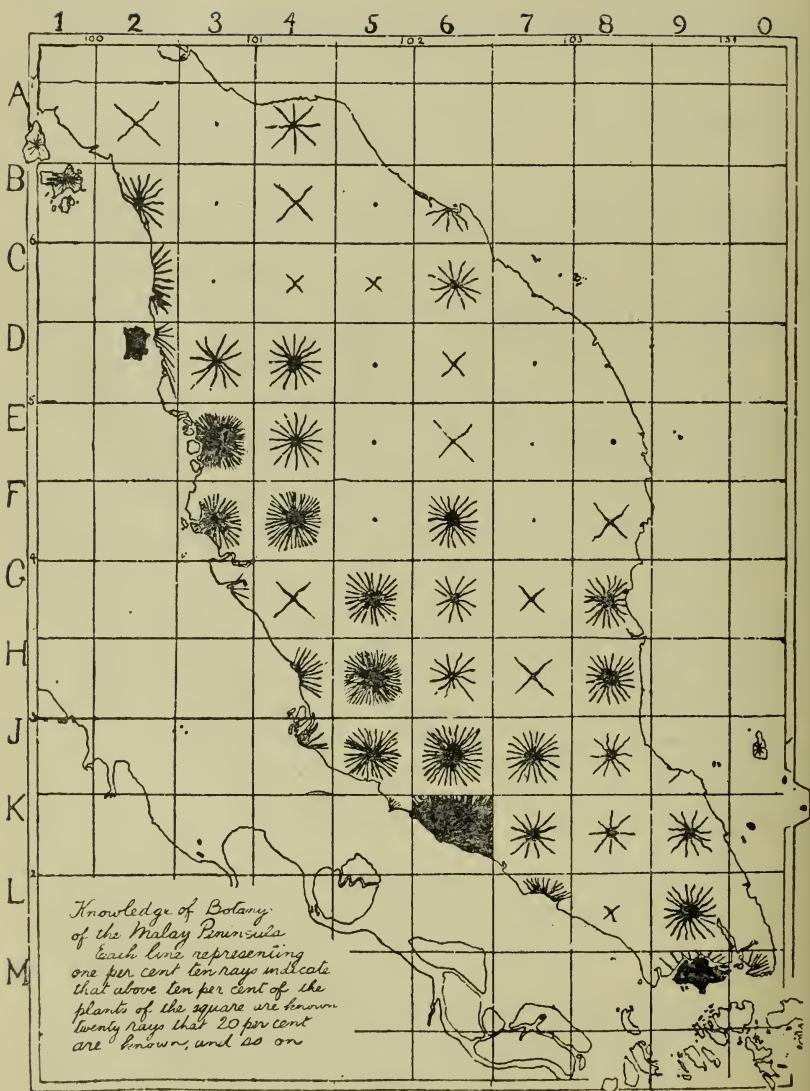
Superintendent of the Hill Garden, Taiping, 1881, and Curator of the Perak State Museum, 1883-1908, Director of Museums, Federated Malay States, 1905-1908; he made a considerable herbarium, which was worked up in Calcutta, where a complete set may be. The part he retained is now in Singapore. His father of the same baptismal name, resided in the Peninsula; therefore he commonly appended "junior" to his name.

YAPP, Richard Henry.

Professor of Botany, Birmingham University; in 1899 attached to the Skeat Expedition. His plants are at Kew and at Cambridge.

YEOB ABDUL RAHIM.

In Forest Department, Federated Malay States, and later in Johore. Collected extensively in various parts of the Peninsula, 1916-



THE COLLECTIONS.

A statement of the collecting done in all the parts
of the Malay Peninsula south of the seventh
degree north, considered by squares of
thirty minutes, as upon the
map preceding.

SQUARE 1a.

All the land in this square is Siamese, and is partly insular, partly peninsular. For convenience a liberty has been taken in extending the square westward a slight distance in order that all the islands of the Butang group should be brought within it. Thus extended it comprises from west to east Pulau Rawei, Pulau Adang, Pulau Tengah, the considerable Pulau Terutau, and many attendant islets; along with about 500 square miles of the Siamese administrative circle of Puket (State of Setul). It is recorded of this Siamese province that in 1780 it had ricefields back to twenty miles from the coast and plenty of cattle.

The western islands have been visited by one botanist only, and each for no more than a day or two. This was in the year 1911 when Ridley went successively to Pulau Rawei (April 20th–21st), Pulau Adang (April 21st), Pulau Nipis (April 22nd), and Pulau Tengah (April 23rd). An account of the visit is to be found in the Journal of the Straits Branch of the Royal Asiatic Society, No. 61, p. 45.

The island of Terutau has been visited several times. Curtis was there in the months of July and August, 1888, touching on this occasion only at Telok Wau (misprinted Noh) which is upon the south coast and for a few hours only (Rep. Forests, S.S. for 1888, appendix F). He visited Terutau again in July 1889 (Rep. Botanic Gardens for 1889, p. 18). In March, 1892 he reached Terutau for the third time, and in February, 1899, for the fourth. Then in November, 1901, he voyaged, as he records (Rep. Botanic Gardens for 1901, p. 21), fifteen miles further north than he had been upon any of the earlier expeditions, and visited the islet of Pulau Hujung Duri which is not remote from the Siamese coast of the Peninsula. In 1905 Fox visited Terutau, the month being October (Rep. Botanic Gardens for 1905 p. 9) and in 1906, in August, Mohamed Haniff was there. The last named was there again in 1915 on October 20th at Telok Udang. In November and again in December, 1916, Robinson touched the island at Telok Wau. In 1915 Haniff and Mohamed Nur on November 16th visited Telok Wau, and on November 19th, Telok Udang. All the visits have been short, often of only a few hours when the purpose was the obtaining of plants of horticultural value, such as *Impatiens mirabilis*: and the Botany is therefore very inadequately known.

The Botany of the mainland is altogether unknown.

The map prefixed to this report indicates that from among the Thalamiflorae-Calyciflorae we can attribute 73 species to the square against 205 from Langkawi and 796 for the square containing Penang. The number recorded for Penang suggests that only about one in ten or ten per cent.

of the plants native to the islands has as yet been collected in them. The outer islands have been visited in April only: Terutau has been visited in March, July, October and November: and except Pulau Hujung Duri, only on the southern coast where it can be reached easily by a short crossing from the bays of the north of Langkawi island. Timber working was commenced on Pulau Adang about 1900, but arrested by malaria.

SQUARE 2a.

This square contains almost its full complement of nearly 1,300 square miles, of land, most of it being Siamese, —part of the Siamese administrative circle of Puket: the rest is in the State of Perlis.

It contains the port of Setul to which Ridley went by sea in 1910, spending the days from March 10th to 16th there (*vide* Jour. Straits Branch Roy. Asiatic Soc., No. 59, p. 47). A year earlier Haniff had been there for living plants. Ridley's locality Bukit Raja Wang is near Setul, and he paid especial attention to such limestone hills in the neighbourhood as Batu Bunga, and Batu Berjongsong. Just previously, Ridley had entered the square from the south at Ginting Kabok on March 1st. In May 1919, Kerr on an enforced halt at Padang Besar collected a few plants.

The extent to which botanising has been done in the square is thus seen to be very small, and the months of the visits March and May, so that of plants vigorous during the rains there is no knowledge. The map shows a record of 53 species; and as the sum total existing must be in excess of what is found in Penang we appear to know only 5 per cent. of the plants of the square.

SQUARE 3a is in Siam and is quite unknown botanically. Parts of the Siamese Malay States of Sawngkla and Tepa enter into it.

SQUARE 4a.

This square is wholly Siamese. The land surface in it is of about 1,100 square miles, a little being in the Siamese Malay State of Tepa, within the Administrative Circle of Sritamarat, and the rest being in the States of Nawng-Chik, Tani, Jering, Jalor and Rahman, lying within the Administrative Circle of Pattani.

Gwynne-Vaughan and Annandale, with Skeat, collected at Tani town and Nawng-Chik on the lower Sungei Pattani in April and May, 1899, and then went south into the State of Jalor to Biserat and Jalor town, climbing Bukit Jalor and Bukit Besar (called by the Siamese Kala kiri) which reaches 3,000 feet, Bukit Tapang and the limestone hill of Bukit Gowa. Thence they went into square 4b.

In February 1916 Annandale revisited some of these places. Gwynne-Vaughan's collections were divided between Kew and Cambridge and his field notes are at Kew.

Kerr in July, 1923 travelled collecting through this square from north to south parallel to the Pattani river, and returned a month later down the river. In September, 1923, he collected on Bukit Besar.

Craib has published part of the results of Kerr's collecting in his *Florae Siamensis Enumeratio*; but the whole is not available yet. The names which it has been possible to collect for the purpose of the map which prefaces this report number 36 only. But with mountains rising to 3,000 feet, the number of species occurring in the square cannot be less than occur in Penang, and is probably more by several hundreds, so that making allowance for the unpublished Disciflorae and Calyciflorae of Kerr's collection, the percentage of Phanerogams collected in 4a may be estimated at eight. These have been collected in the months of February, April, July and August.

SQUARE 5a.

This is made up of parts of the Siamese Malay States of Jering, Sai and Rahman,—all within the Administrative Circle of Pattani.

Down collected a few plants in 1900 at the mouth of the Telubin river: and except for these, the botany of the square is wholly unknown.

SQUARE 1b.

This square is wholly insular, and consists as regards land of the Langkawi islands (Kedah State). There are but five miles of sea between the north coast of Langkawi proper, and the south coast of Terutau in square 1a. The mountain of Gunong Raya in Langkawi rises to 2,388 feet; and the islands are all very rugged, with limestone and granite formations intermixed. The islands had a considerable population prior to 1821, in which the Siamese laid them waste. Of recent years there has been considerable working of timber. Gunong Raya was visited by Curtis in February, 1890, and was climbed to the summit by Haniff and Mohamed Nur on November 13th, 1921. The list of botanical visits to Langkawi and the neighbouring islands is as follows:—

1888, Curtis in July spent four days at Kuala Malaka and Telaya Tujoh (Seven Wells).

1889, Curtis spent five days botanising on the islets.

1890, in February, Curtis, after collecting on the island of Dayang Bunting visited Langkawi proper and climbed

Gunong Raya and Gunong Chindrang. Dates upon herbarium labels indicate that he returned again in September for a few days.

1892, in April, Curtis spent a few days in the islands. One of the places visited upon this occasion was Pulau Nior Stali which is upon the south-west of Pulau Dayang Bunting.

1897, Ridley and Curtis visited Langkawi together in the month of February.

1899, in February, Curtis after a visit to Terutau in square *1a*, returned to Kuala Kuah for a few days and botanised upon the islets within easy reach.

1900, Haniff spent a fortnight in Langkawi in September much handicapped in collecting by the weather.

1901, Curtis in the month of November spent three days in Langkawi proper. Again he visited Pulau Nior Stali.

1904, Fox in December visited Langkawi.

1905, Fox revisited Langkawi in October, and went forward to Terutau.

1906, Haniff visited Langkawi in August.

1911, Ridley in April collected for two days about Burau, Telaya Tujoh and Pulau Segai.

1914, Haniff in September visited the Langkawi group and collected at Tasek Enak, Telok Siun, Kuala Burau and on Pulau Lidi.

1916, Robinson and Seimund used the opportunity of a zoological expedition for collecting plants in November and December and into January 1917, chiefly on the island of Dayang Bunting.

1921, Haniff and Mohamed Nur from November 14th to 27th collected on Pulau Segai, Pulau Chupak, Pulau Ampak, Pulau Lidi, at Tasek Enak, Telok Siun, Kuala Burau, Telok Datai, Temoyang, Penarak, Bukit Selat Panchur, Tanjong Neru, Telok Apau, Goa Chirita and Ayer Hangat.

1925, Holttum in August collected on Pulau Langkawi and Pulau Dayang Bunting.

The list appears long: yet the total number of Thalamiflorae-Calyciflorae collected, as given on the map, is only 205. Now the Langkawi group cannot carry fewer species than Penang; and probably carries more on account of its varied rock formations. It is therefore estimated that in spite of the long list of visits we know not more than 25 per cent. of the plants which occur. The more effective botanising has been done in the months of November and December: smaller collections have been made in February,

April, July, August and September. The limestone has perhaps received more attention than the other rock formations.

SQUARE 2b.

This square comprises the State of Perlis and a part of the State of Kedah, in all about 750 square miles. There is much rice-cultivation in it, a very large part of which is old. In 1821 the Siamese laid waste the land, and much went out of cultivation, to be resumed only after a considerable interval, but to be extended in no small measure during the last peaceful half-century. In 1821 Penang was dependent for its rice upon these Kedah fields, and suffered greatly in consequence of their devastation.

As the eastern margin of the square is east of the Alor Sta-Singgora road, all that has been collected along this road comes from within the square. Ridley having spent the period from February 23rd to 26th, 1910, about Alor Sta and on Bukit Pinang, traversed it on February 27th, proceeding to Perlis: Burkill and Haniff on March 19th, 1924 also collected along it, northward as far as Asun.

Ridley collected from February 27th to March 9th, 1910 round Kangsar, and particularly where limestone occurs in the neighbourhood, *e.g.* at Tebing Tinggi, Bukit Lagi and Bukit Besih Hangat; and he also collected at Bukit Telor Jambu and at Chupeng (*vide* Jour. Straits Branch, Roy. Asiatic Soc., No. 59, p. 27).

In the year 1881 in May Kunstler visited Kedah. It has never been quite clear to what places he went; but from the labels on his specimens it is clear that he reached the country from Penang and it would assuredly be by sea. Now among the specimens which he collected and labelled "Quedah" is a plant, which, strictly confined to limestone, can be got easily on Gunong Geriang near Alor Sta. These two observations leave the supposition that he went to Alor Sta quite probable.

The limestone hill just named was visited by Curtis for one day in 1889, and by Fox in 1904 (Report Botanic Gardens for 1904 where the name is misprinted Grenong), also by Ridley when at Alor Sta in 1910 and by Haniff in November 1914. Alor Sta was visited by Burkill and Haniff from March 16th to 20th, 1924, on which occasion collecting was done about Kuala Kedah, Anak Bukit, Kepala Batas, and Langgar. Haniff, who had collected at Alor Sta in November 1915, was there again in April, 1918 and April, 1924, each time for a few days. In November 1915 he proceeded from Alor Sta northwards to Bukit Wang and Jenum; and in March 1924, he visited Bukit Tunjang.

The result of this work, as far as the Thalamiflorae-Calyciflorae are concerned, is a list of 150 species, and as the square is likely to contain as many as square *2d* (within which is Penang), it may be that 18 per cent. of the plants of it are recorded.

The vegetation of the rains is almost unknown; and except for Haniff's work the hills have not been explored.

SQUARE *3b*.

This square is wholly of land, three quarters of it being in the State of Kedah, and the rest in the Siamese Malay States of Tepa and Jalor.

Except that Burkill and Haniff on March 17th, 1924, made an expedition from Alor Sta into the square nearly as far as Nerang, no collecting has been done in it.

SQUARE *4b*.

This square is wholly of land. A very small part of it is in the State of Kedah: the rest is in the Siamese administrative circle of Pattani being parts of the Siamese Malay States of Jalor, Rahman and Legeh.

In April or May, 1899, Gwynne-Vaughan visited Kota Bahru and Bukit Sembilan near to it, both being in the State of Rahman; and thence they passed into square *5b*. In July, 1923, Kerr traversed the square from north to south parallel to, and west of the Pattani river, and a month later descended the river. Kerr's collections are being worked out by Craib, and will increase the number of Species of Thalamiflorae-Calyciflorae recorded from the square to well above the figure of 27 as given on the map.

The square is full of high mountains and must possess a rich flora. If it is half as rich again as Penang and if the second part of Craib's *Florae Siamensis Enumeratio* doubles the figure on the map, then we know its Phanerogamic vegetation to the extent of upward of 5 per cent.

SQUARE *5b*.

There are about 1,000 square miles of Siamese land in this square, being part of the Siamese Administrative Circle of Pattani, and of the States of Legeh and Sai.

In April or May, 1899, Gwynne-Vaughan visited Tremangan and Belimbing in the State of Legeh and collected a few plants. In July, 1923, Kerr collected for four or five days between Tanjong Mas and the Telubin river; Bukit Railway Station at which he collected is in this square.

On the map 11 plants are assigned to the square, the flora of which is thereby demonstrated as all but unknown.

SQUARE 6b.

This square contains only about 380 square miles of land, a small part of it being in Siam (Pattani circle), and the rest being in the plains around Kota Bahru in the State of Kelantan.

On August 24th, 1889, Ridley spent a few hours collecting at a place called Kamposa, which has ceased to exist; it was near to the mouth of the Kelantan river (see Jour. Straits Branch Roy. Asiatic Soc., No. 20, p. 87). The neighbourhood was revisited by him in 1917, when he stayed for a week at Kota Bahru. In 1899, Yapp, who had joined the Skeat expedition, collected about Kota Bahru between September 29th and October 10th, and he collected also at Kuala Essam which is close to the southern margin of the Square. Gimlette, during several years of work at Kota Bahru, commencing in 1909, collected plants with an economic interest. Bagan estate, where McGill collected, is on the right bank of the Kelantan river about twelve miles above Kota Bahru.

The species recorded for the square, which on account of cultivation has a flora poor in numbers, are as regards the Thalamiflorae-Calyciflorae 51, or perhaps upwards of five per cent.

SQUARE 2c.

There are only about 350 square miles of land in this square, consisting of the coast of Kedah from near Kota Sarang Semut to the coast of Province Wellesley near Ayer Tawar, with rice fields behind a large part of it, but with Kedah Peak or Gunong Jerai rising about midway between the north and south limits to 3,978 feet.

As in square 2b, so in this square the Siamese invasion of Kedah in 1821 sent most of the rice land to waste. It was recovered slowly, and enterprise in irrigation of latter years has extended it.

Thomas Lobb, Veitch's collector (there were two brothers of this surname who collected for that firm of horticulturists) climbed Kedah Peak in 1845 (see Hortus Veitchii, 1906, p. 42), and the dried plants obtained by him were named, made up into sets and sold; but the localities sadly intermixed before they were issued. Lieutenant-Colonel James Low, when in charge of Province Wellesley at some date before 1867 climbed the Peak and sent plants collected there to Kew. Sir Hugh Low, when Resident at Taiping, also climbed the Peak, taking with him Boxall, a collector for his family's firm of Hugh Low and Co. Early in 1876 Murton made an expedition to it. A report which he addressed upon his return to the Gardens Committee, Singapore, is no longer to be found; but in his report on the Government Botanic Gardens for 1876, it is referred

to and called an expedition "to Quedah, Penang and the neighbouring States." He sent the plants which he obtained to Kew; and it is evident that he reached the foot of Kedah Peak.

In 1893 Ridley landed at Yan and ascended the Peak from that village, remaining six days upon the mountain. The month of this journey was June.

In March, 1911, Bell and Haniff climbed the mountain from Gurun upon the landward side; and this line of ascent has now become the usual one.

In 1915 Robinson and Kloss collected 200 specimens in the months of November and December upon the upper part of the mountain. In the same year in November Haniff spent two days on it, again three days in August 1919, and two days in February, 1920. Holttum and Haniff in April, 1925 spent four days on it, collecting chiefly near the summit.

So much for the mountain: next for the plains. At Gurun, whence the road ascends Kedah Peak, Burkill and Haniff collected in transit in March, 1924, and at Kota Sarang Semut. Ridley collected at Yan on the expedition mentioned above, the month being June. When upon their way to Yan, driven by weather to take shelter, he and Curtis spent a day on Pulau Songsong: from Yan Curtis returned to Penang.

Finlayson in 1821 visited the Kuala Muda in January, and in the same month of the year 1918, Burkill collected down the south bank of the Muda river from Pinang Tunggal to Dusun Gajah. Burkill and Haniff visited Sungei Patani town in March, 1924.

The map shows only 142 species of the Thalamiflorae-Calyciflorae, against 796 for the square containing Penang island. Yet Kedah Peak, with a greater height than the highest of the hills in Penang island, should contain a richer flora. It seems possible that we know but 14 per cent. of the Phanerogamic plants of the square: and it is clear that much more attention should be directed to Kedah Peak.

SQUARE 3c.

This square consists entirely of land: and most of it is in the state of Kedah. Except that the road between Sungei Patani and Alor Sta for a short distance near Bedong runs within the western margin of the square and that Burkill and Haniff collected a few plants there in March, 1924; and but for the collecting by Father Ichebesta near Baling of a few plants economic to the Negritos, nothing whatsoever is known of the Botany of the square.

SQUARE 4c.

There is a small part of the State of Kedah within this square, a considerable part of the Siamese Malay State of Rahman, and a large part of the northern marches of Perak.

In January, 1922, Flippance collected a few plants near Klian Intan which is close to the western margin. Betong is not remote, but within Siam: and there Kerr collected both in August, 1923, and March, 1925. Kerr's August expedition ended on Gunong Ina also called Gunong Titi Basah which is upon the Siam-Perak boundary.

The figure for this square upon the map is only 23: but this needs to be doubled in order to allow for the increment to our knowledge which will come when Craib publishes his further determinations of Kerr's plants. The square is one of mountains, and undoubtedly has a very rich flora. It contains a curiously abrupt and altogether unstudied peak in Gunong Kendrong. It also contains quite a considerable amount of deforested land. Probably our knowledge of its flora does not exceed four per cent.

SQUARE 5c.

One-third of this square is part of the Siamese Administrative Circle of Pattani being part of the State of Legeh the other two-thirds is part of the State of Perak.

In the years 1892 and 1893 Machado was employed at the Tomo Gold Mines, and around Tomo he collected plants which he sent to the Botanic Gardens, Singapore.

The square is one of mountains and dense forests with so rich a flora that Machado's contribution scarcely gives us knowledge of say two per cent. of the flora.

SQUARE 6c.

This square is almost entirely of land, and except for a small part of the State of Trengganu is in the State of Kelantan. The Kelantan river is formed just within its southern limit by the junction of the rivers Lebir and Galas. The name Lebir is here applied as upon the official maps.

Between 1903 and 1909 Gimlette was stationed at Kuala Lebir and there he collected economic plants which he sent to the Botanic Garden, Singapore (*e.g. vide* Report on the Gardens for 1904)..

In 1923 Haniff and Mohamed Nur ascended the Kelantan and Lebir rivers. Of their collecting places Riverside was reached on January 20th, and Kuala Krai on the next day. Kuala Krai is almost identical with Kuala Lebir. At Kuala Krai a halt was made of five days and Bukit Temangan was visited. Kuala Krai was revisited on the return journey upon February 14th.

The map shows 94 species for this square and judging thereby we can now record perhaps ten per cent. of the plants occurring in it.

SQUARE 7c.

This square consists of about 700 square miles of the State of Trengganu. Botanically it is entirely unknown.

SQUARE 8c.

In this square are about 30 square miles of the State of Trengganu and some islands including the island of Great Redang with Pulau Pinang sheltering under it.

These islands were visited by Yapp between October 14th and 19th, 1899, and the few plants collected in them are preserved at Kew.

SQUARE 2d.

This square contains the island of Penang, and, with it, the greater part of the Province Wellesley and a part of the Krian district of the State of Perak. Penang island has an area of 107 square miles and about 2,000 Phanerogams have been collected in it. The highest hill-top is 2,722 feet.

The island passed into the control of the Honourable East India Company in 1786, and was then wooded from shore to summits. Light and his company in three ships anchored at the point where Georgetown now is, and began clearing the woods of Calophyllum which was there: and this was followed by a kind of race for possession of the land behind: wherein "those who cleared the most. . . . were deemed the most meritorious." The progressive spread of this clearing is recorded in Logan's Journal No. 2, p. 174. Rapidly the land was denuded of its good timber back to the foot of the hills, all in the hope of great prosperity from its fertility; and in about 1800 a new town was planned called St. James' upon the Sungei Keluang which was to rival Georgetown or the original settlement. It failed, because the agricultural prosperity did not come at its making, and it had not the support of commerce.

War rendered a look-out on the hill-tops desirable; and therefore a road was made to what is now called Government hill, but then Flagstaff Hill. This road, finished in 1802 or 1803, made possible a considerable amount of destruction in the hill-forests. But it came slowly: indeed not in a great measure till the forests, when, what with charcoal burning and what with desultory pepper-growing, clearing extended to the very summits, provoking a protest which may be read in Logan's Journal, 2, p. 534. When the Straits Forest Department was created in 1883, the deterioration of the

timber-growth had become very marked. Even where extensive fellings did not occur, good timber was removed in such an excessive measure as to change the nature of the forest. Burn-Murdoch in his Annual Forest Administration Report for 1902 called attention to the still necessary need of letting the forests recuperate.

There is reason to believe that many plants common in Penang in 1786 are rare now in consequence of the change in the covering of the land, and that one or two, formerly present, no longer exist upon the island.

Christopher Smith was the first with any botanical knowledge to visit the island. He was employed by the East India Company to raise nutmegs, cloves and other spice trees in the Moluccas and to send them to Penang. When the young trees had arrived in considerable numbers, the Governor asked that Smith be sent to see to their planting and so he came to Penang in the year 1796: and from Penang sent plants of the island to Roxburgh in Calcutta. A collection of drawings which he made is in the British Museum of Natural History.

Roxburgh had another correspondent in Penang who had likewise been in the Moluccas. He is denoted in Roxburgh's *Hortus Bengalensis* by his initials,—H.C. And he had in 1802, a third,—his own son William, who in the months of May, June, July and August of that year collected dried plants, and sent or took them to Calcutta along with living plants for growth in the Company's garden.

In that year also, a surgeon upon the Madras staff, Sir William Hunter, found himself in Penang; and there he drew up an account of the plants of the island, which after remaining a century in manuscript in the British Museum, was printed in the *Journal of the Straits Branch of the Royal Asiatic Society*, No. 53, pp. 49–127. He too sent plants to Roxburgh. His often mentioned "Soongey Cloan" is the Sungei Keluang at Rihlau or St. James'.

In the year 1819 another surgeon in the Company's Service, William Jack in the train of Raffles reached Penang. He was there from December 31st, 1818 to May 22nd, 1819. His letters to Wallich in Calcutta, describing his botanising in Penang, were printed in the *Journal of the Straits Branch of the Royal Asiatic Society*, No. 73, pp. 151–238, and the plants which he is known to have collected are listed on pp. 241–268. Unfortunately he died young, and his valuable collections were burned in the destruction of the East-Indiaman "Fame."

In the end of 1821 a mission from India reached Penang upon its way to the further East; and as naturalist on this mission was the surgeon George Finlayson. From December 11th to January 5th of the next year Finlayson collected

in Penang: and the plants which he obtained went finally into the large East India herbarium distributed by Wallich between 1828 and 1832. Unfortunately it seems that some of Finlayson's specimens are mis-localised. Raffles edited his diary under the title "The mission to Siam and Hue in the years 1821-22" (London 1826).

Later in the latter year came to Penang Wallich, Roxburgh's successor as Superintendent of the Company's Garden in Calcutta, and with him was George Porter, head-overseer of the Garden, both seeking health. Wallich collected in Penang in the months of August and November,—in the first on the way to Singapore; in the second as he returned to Calcutta; but Porter elected to remain in the island, and was given a post of schoolmaster, together with, in 1823, the charge of a small experimental garden at Ayer Etam, not that once under Christopher Smith, but a plot nearby. Porter continued to collect for Wallich.

Wallich's and Porter's plants were distributed like Finlayson's between 1828 and 1832 by Wallich from London.

Over these years W. E. Phillips was Lieutenant-Governor of Penang. He put up and befriended Finlayson: he helped Wallich and doubtless brought about Porter's appointment. He collected plants himself, remitting them to Wallich and, it is said, later to Kew. In the year 1824 he presented a collection to the newly founded Horticultural Society of London, which perhaps represents his own herbarium: and these are now at Kew.

In 1830 Colonel George Warren Walker was stationed in Penang; and he collected plants. Between 1829 and 1832 Lady Dalhousie, wife of the 9th Earl, collected ferns in Penang for Sir William Hooker. In 1837 Gaudichaud upon his second voyage round the world touched at Penang. The voyage was conducted with great rapidity and Gaudichaud's opportunities for collecting were few: but one may be sure that he used them to the full. In 1845 on his way to Malacca Griffith spent in Penang the first few days of that year fatal to him and collected. He had two friends and correspondents in Penang who sent plants to him. One was Sir William Norris, the Recorder, the other the Assistant Resident Councillor, T. Lewis. The first named also sent plants to Kew.

In 1845 Thomas Lobb, who has been mentioned as having climbed Kedah Peak, collected in Penang. The remark already made in regard to the untrustworthiness of his localities unfortunately applies to his Penang plants, as to the others.

In 1857 the traveller Sir Robert Schomburgk was appointed British consul in Bangkok and on his voyage

thither he touched at and collected in Penang, sending his collections to Kew.

Between 1863 and 1868 Maingay, then Magistrate in charge of the Jail in Malacca found occasion to visit Penang and collected a little.

In 1873 Wawra spent a day or two in the month of February collecting in Penang. His collections are enumerated in his *Itinera principum S. Coburgi* (Vienna, 1883-1888).

In 1869 Stoliczka collected a few plants in the island.

In 1879 Sir George King upon his way between Calcutta and Java collected in Penang. This was in the months of August and November. After his return to Calcutta he engaged as a collector Kunstler; and we find that the latter was in Penang in April, 1881 and August and September, 1883. Hullett of the Education service in Singapore found an occasion of collecting in Penang.

In 1881 Major McNair, Colonial Engineer of the Straits Settlements, then acting Lieutenant-Governor of Penang, collected and sent to Cantley in Singapore specimens of the important timber trees of the island (Cantley's Report on the Forests of the Straits Settlements, appendix E, 1883).

The need of the forests brought about the continuous botanising of Penang under the administration of Cantley, Superintendent of the Botanic Gardens, Singapore. It was obviously impossible for Cantley from Singapore to supervise forest operations closely in Penang, and therefore as local forest officer Curtis was appointed with a considerable amount of independence from his superior. He reached Penang in July, 1884; and at once commenced to collect information upon the constitution of his forests, building up in Penang his own herbarium, while Cantley was building another in Singapore. He corresponded independently with Kew and with Calcutta, and produced in 1894 his "*Catalogue of the Flowering plants and Ferns growing wild in the island of Penang.*" But he also subsequently entered as regards the determination of herbarium material into close relations with Ridley.

Curtis used his subordinates for watching for the flowering of forest trees; and often his labels carry the information that a forest guard had brought the specimen in. J. Abrams was one of his subordinates.

The Penang herbarium for very sound administrative reasons was amalgamated with the Singapore herbarium in 1910.

Curtis left Penang in the year 1902; and was succeeded by Fox until 1910. Upon the Gardens staff under both and after both was Mohamed Haniff. Fox and Haniff have added

not a little to our knowledge of the island. Haniff's Mount Erskine is not the Mount Erskine of the maps, but Mount Olivia where Erskine once lived. In December, 1900, and forward to March, 1901, a traveller E. Deschamps visited Penang, and made a small collection of plants which was presented to the Royal Botanic Gardens, Calcutta. Visits of inspection took Ridley at intervals to Penang during the whole of his service; and more or less regular quarterly visits took Burkill from 1913 to 1924. They collected there and so also did Mohamed Nur of the staff of their department. Matthew in 1913 collected ferns in Penang. In addition several Forest Rangers have collected of recent years for the reference herbarium of the Conservator of Forests.

This completes the enumeration of botanists of Penang. The following paragraphs concern Province Wellesley.

It was in 1800 that Province Wellesley came under the administration of Penang, having at the time the scanty population of twenty souls per square mile, and therefore clad in forests. In the next year a Siamese invasion of Kedah gave it settlers, who, driven from their homes, cleared much of the northern part. This northern part differs from the southern in possessing many lines of sandy parallel sea-beaches which afforded excellent village sites; whereas the sea has had to be kept out by embankments from the lowlands of the southern parts. The north thus became settled by Malays, and rendered to Penang what Penang had hoped for before its acquisition, namely grazing lands and ricelands. Clearing therefore advanced in the northern half, back from the sea-front as far as the conditions extended of alternating old sea-beach and hollows, that is, of permatang and sawah. But the south of the Province passed into the hands of men with means enough to do the large drainage works demanded,—men who made sugar estates. Forest by these operations was pushed out of the square with which we are dealing; and when in 1883 Reserves were created in Province Wellesley, they were of necessity so far eastward as to be in square *3d*. At that time an experimental plantation was made at Kubang Ulu (since 1923 in the charge of the Agricultural Department). The care of this plantation and of the forest reserves in square *3d* frequently took Curtis and Ridley into the Province and inspection of coconut estates not infrequently took Burkill thither for a day at a time. In 1881 in April Kunstler paid a visit. Under these circumstances a fair amount of information has been gathered on the Higher plants. In the year 1894 Bishop Hose collected Pteridophyta which are now preserved at Kew.

The hill of Bukit Mertajam rises to 1,700 feet, and is within the square. It is interesting that it carries at least

one plant absent from Penang island. It was botanised on by Ridley in and by Burkill and Haniff on October 8th, 1922. But the area of forest left upon its top is small, and has been much cut over.

The small part of the district of Krian to the south of Province Wellesley, which lies within the limits of this square, has never been collected in.

The map which prefaces this report shows a record of 796 plants of the Thalamiflorae-Calyciflorae for the square; and experience teaches that very few are likely to be added. The square is therefore used as a standard to indicate how many species may be expected in an area of this latitude of about 600 square miles and rising to a little above 2,000 feet.

SQUARE 3d.

The half of this square is in the State of Perak, the rest in the State of Kedah and consisting of the eastern border of Province Wellesley towards Kedah. Within this eastern border is the Forest Reserve of Tasek Gelugor, now in the process of passing over to agricultural land, and there was the reserve at Ara Kudah, which was given over to agriculture in 1902. Visits to these two reserves took Cantley and Curtis into the square in November, 1885, and Curtis on many subsequent occasions, as well as Ridley and Burkill.

Expeditions just a little wider and so extending into the State of Kedah were made by Burkill to Lunas in December, 1913, Haniff to Kulim in June, 1917, Burkill and Haniff to near Padang Sarai in September, 1921; and further in 1910 Haniff visited Gunong Bongsu.

Northern Perak has received more attention. It happened that political events in 1879 caused the early opening up of the Selama district, and this opening up enabled the botanists encouraged by Sir Hugh Low to collect in it. One of these was Scortechini who has left a number of specimens labelled Ijok, and who, it seems also reached Gunong Inas, a mountain which rises to 5,898 feet. His locality quoted as Abu Selama appears to be rightly Ulu Selama.

Gunong Inas was reached by Wray in 1892 and by Yapp in 1899. Wray's visit was in the month of May, Yapp's in December. Both travelled by the Selama river. Yapp was at Selama village from November 27th to 29th, and on the upper part of the mountain from December 6th to 24th. In returning he collected at Sira Rimau on December 26th and to January 4th; and he also collected at a locality called "coffee plantation" which is between Sira Rimau and Selama. Northwards of Gunong Inas is Gunong Bintang

which exceeds 6,000 feet. It was visited by Kunstler in June, 1880, and by Kloss in June, 1917.

In the lowlands upon the southern limit of the square is the Pondok Tanjong Forest Reserve. Forest officers as Burn-Murdoch and Barnard have collected in it, and it was visited by Haniff and Burkill on March 25th, 1924. West of this is the developed agricultural area round Bagan Serai, botanically unknown except for a few plants collected by Burkill and Haniff in March, 1924.

The eastern slopes of the Bintang-Inas range come into the square, but are unknown except where in the extreme south-eastern corner of the square the Kuala Kangsar-Grik road passes through Durian Pipit and Kota Tampan and Lenggong. Ridley traversed this road in July 1909 and Burkill and Haniff in June 1924. At Lenggong are limestone cliffs whereupon Ahmed bin Hassan, Ridley's collector, obtained interesting plants (Journal of the Straits Branch of the Royal Asiatic Society, No. 57, p. 5).

The number of plants of the Thalamiflorae-Calyciflorae collected in the square, as the map shows, is 149, which seems to indicate that 12 per cent. of the flora is known. No part of the square is well known: and a full study of the mountains would have results of great interest.

SQUARE 4d.

Upper Perak makes the greater part of this square, in fact, except for an unknown bit of Pahang, the whole.

Wray was in Upper Perak in August 1885 when he visited the Kenering river, and in May of the year 1889. He was in Upper Perak again in 1905, collecting upon the Kenering River in the month of April. In he was on the Piah River.

In the year 1909 Robinson and Kloss made a zoological expedition to Temengor which is right in the centre of the square: and Ridley accompanied them. He reached Grik on July 4th and proceeded to Temengor by elephant, collected upon the Sungei Kertai and pushed up the Temengor river for a day's journey. After collecting diligently there but under considerable difficulties from the unhealthiness of the country he returned by river to Kuala Kendrong (not Kuala Kenering as is by inadvertence printed in the account of the expedition) and so to Grik again on July 29th. (Journ. Straits Branch, Roy. Asiatic Soc., No. 57, p. 5).

In 1924 Burkill and Haniff were at Grik from July 16th to 21st, collecting there, and also in coming and going at the following places along the road to Kuala Kangsar: Kenering, Lawin and Sungei Kulim.

It is important to observe that all the collecting in Upper Perak has been done over the months from April to July; and useful to recollect that over at least a part of this period there is a lull in the flowering of the vegetation which makes collecting relatively unremunerative. The count of the Thalamiflorae-Calyciflorae known from the square gives 179, which assuming that square *3d.* and *4d.* are equally rich gives 15 as the percentage that is known.

The climate and perhaps also past conditions encourage bamboos, which are rather conspicuously present in the wide forests.

SQUARE *5d.*

This square is astride the Main Range and is half in the State of Perak and half in the State of Kelantan. No part of it is botanically known except the interesting mountain of Gunong Stong in Kelantan upon its eastern limit. Gunong Stong is of granite with a very abrupt cap of metamorphosed limestone.

Jupp climbed it in the month of 191 , and sent a few plants from the summit to Singapore. Mohamed Nur when accompanying Foxworthy from Kuala Lipis in Pahang to Kelantan in 1924, climbed it on March 5th to 7th. The small figure for the square given on the map shows that for every part of the square, not excluding Gunong Stong, there is an unworked field.

SQUARE *6d.*

Except for the eastern edge which is in Trengganu, this square is in the State of Kelantan. It is made up of two valley-systems, that of the Galas river and that of the Lebir river, which will be considered in this order.

Galas valley.—Down collected a few plants upon a prospecting expedition up the Galas river. In 1924, between February 22nd and March 1st, Mohamed Nur, attached to that expedition of Foxworthy which is mentioned above, collected at a series of places down the course of the river, *e.g.*, Kuala Sameh, Sungei Renong and Kuala Limau Nipis.

Lebir valley.—In 1899 when Skeat was making his attempt to ascend Gunong Tahan from the north (Journ. Federated Malay States Museums, 3, p. 77) Yapp accompanied him as far as Kuala Aring (where the Aring river enters the Lebir river), and remained at this place from August 16th to September, 26th, collecting. In 1917 for half the month of February, Ridley resided upon the Channing Estate, which is upon the last reaches of the Lebir river before its junction with the Galas. His locality Jeram Panjang is on the Lebir just above the estate. In 1923, Haniff and Mohamed Nur entered this square from the north on January 26th and collected up the river

successively at the following places: Kuala Endong, Temiang, Kuala Rek, Telok Lalu, Bukit Papan, Kampong Kobang, Kuala Relai, and Kampong Parit. They passed out of the square southwards on January 31st; but descended the river again ten days later.

The number of species of the Thalamiflorae-Calyciflorae recorded on the map is only 39, and except for the small collection of Yapp, all were got in January and February. The vegetation must be quite as rich in species as that of the last two squares and assuming the similarity, 39 may be considered as indicating a knowledge of two per cent.

SQUARE 7d.

This square is in the State of Trengganu and botanically unknown.

SQUARE 8d.

This square consists of rather over 400 square miles of the State of Trengganu. In it is Trengganu town. Thither Ridley was taken on August 22nd, 1889, and contrived to get one day's collecting on the Island of Pulau Ketam and near the town. (Journ. Straits Branch, Roy. Asiatic Soc., No. 20, p. 86). Yapp from October 11th to 13th, 1899 and from October 20th to November 4th was in Trengganu and collected near the town and at Kuala Ibar to the south of it. Holttum visited Trengganu town in May 1925, visiting the island of Pulau Kapas and ascending the river to Kuala Berang. The neighbourhood contains vastly deteriorated forests and shows a great deal of the interference of man. Of its flora our stock of knowledge is but very little; perhaps two per cent.

SQUARE 2e.

There are but 60 square miles of land in this square, being a small area of the State of Perak between Kuala Kurau and Kuala Gula. It consists of mangrove forest with rice land behind it; and without any doubt the number of species which can be found is a very small one. But as yet no plant is recorded, except generically.

SQUARE 3e.

There are nearly 1,200 square miles of land in this square, entirely in the State of Perak. The town of Taiping is almost central, and has been the place from which botanical exploration has been done.

As early as 1875 the Botanic Gardens, Singapore were in touch with officers interested in promoting agriculture from Taiping; and when in 1877 Sir Hugh Low was transferred from Borneo to serve as Resident at Taiping his interest in plants caused him to take every opportunity for furthering botanic exploration. In 1877 Murton was sent

to him that he might report upon the extensive damage that had been done in the State by Malays and more particularly by Dyaks exploiting its resources in gutta-percha. Reaching Taiping in October, he climbed the hills on the east of the town, and collected plants, mostly living, which were dispatched for cultivation to Singapore; then he crossed the Gapis pass and went to Kuala Kangsar, whence he proceeded on to the slopes of Gunong Bubu, climbing to the summit. He returned to Singapore in December, reporting on his tour in an account which was printed in the Government Gazette for February 22nd, 1878.

In this same year, the coffee-leaf disease extended so greatly its hold upon the plantations in Ceylon as to cause something approaching a panic, during which certain planters of enterprise removed to Perak in the hope of carrying on where the disease, which in Ceylon they could not avoid, had not spread. These men opened new land near the Gapis pass, where already the Government had established experimental plantations, in the Trong district, and in parts of Perak in square 4*f*. One of the earliest of these men was Sir Graeme H. D. Elphinstone, who collected plants a little near the Gapis pass in 1884 or the following years. In 1881 Sir Hugh Low himself collected specimens of forest trees, and sent them to Cantley who happened at the time to be at Kew. In 1882 Sir George King's collector Kunstler, who had a free hand so long as he did good work, established his centre at Taiping; and up to February 1886 he spent the major part of each year collecting from Taiping material to which he attached notes of considerable value. When Kunstler sent plants from Gopeng in square 4*f*, Larut labels were used for them, and this seems to have led to a few erroneous records for Larut. In the same year (1882) Scortechini proceeded to Taiping on a visit, which culminated only with his death in 1886. Scortechini neglected the labelling of his specimens and it is difficult to ascertain whither he travelled from Taiping. In March, 1883, Kunstler ascended Gunong Bubu to the summit. In 1884, in May, Scortechini did the same, accompanying Tenison-Woods, whose mission was geologic. There is an account of this ascent in the Journal of the Straits Branch of the Royal Asiatic Society, No. 14, p. 1, from which it is evident that it was made from the north-east side via Gunong Arang Para where the house known as the Hermitage was situated. On his labels Scortechini calls this hill Gunong Haram or Gunong Haram Para. Other labels upon Scortechini's plants show that, confining ourselves to localities within square 3*e*, he botanised about Batu Kurau, on Caulfield's hill, Ulu Kangsar and Kuala Kangsar.

From 1881 to 1908 Wray was stationed in or near Taiping, first as Superintendent of the Hill-gardens and then

as Curator of the Perak State Museum and as Director of Museums, Federated Malay States. He accumulated a considerable herbarium during this period, referring for naming his specimens to Sir George King in Calcutta. Naturally the greater part of what he gathered came from this square, and we find on his labels the names of places such as Tupai, Batu Tugoh, Kota or Kampong Kota, Simpang, Blanda Mabok, Matang, Trong, Changkat Jering, Bukit Gantang, Matang Jambu which are all relatively near to Taiping. Wray ascended Gunong Bubu in March, 1890.

It was in 1885 that Curtis found the first occasion for a visit into this square; then in company with Cantley in the month of January, he ascended Gunong Bubu, Gunong Pondok and the Taiping hills. What happened to the collection made is not clear, except that the living plants went into cultivation at Penang. Curtis visited Taiping again in September, 1889, in May, 1890, in October, 1892, in July, 1893, in June, 1897, in October, 1900, and in December, 1901—short visits all; but all used for the collecting of specimens. The visit of October 1900 is described in an appendix to the Annual Report on the Botanic Gardens for that year. In 1887 he visited Hermitage Hill, and then the Waterloo Estate and Kuala Kangsar, and returning cut a way from the Waterloo Estate to the top of the Taiping hills in three days (appendix to Forest Report for 1887, p. 9).

Ridley paid his first visit to Taiping in March, 1891. He was there again in February and March, 1892, and visited Kuala Kangsar. He was there afterwards in June, 1893, in December, 1902, February 1904, and August 1909. Collecting was done on these occasions upon the hills over the town.

A forest department was formed in Perak in 1897, and A. B. Stevens appointed in charge of it. He was succeeded in 1908 by Barnard. These collected forest trees in various places: and in more recent years other forest officers as Burn-Murdoch, Foxworthy, V. O'Hara, and Borges have done the same. Naturally the attention of forest officers is directed towards particular forests and in square 3e has been largely towards the coastal mangroves, to which the following names are given: Singa islands, Sungei Limau, Trong and Telok Kertang.

In of before 1889 Hervey collected a little in the neighbourhood of Taiping. In 1898 Robertson-Glasgow visited and collected on the Gapis pass. In 1899 in October Fox collected at Taiping. In the years 1899, 1900 and 1902 Derry who was stationed at Kuala Kangsar collected a little. In 1901 or 1902 Venning collected a little at Taiping.

In 1904 Bishop Hose and Miss Hose collected plants, chiefly grasses, about Taiping town. In 1905 Mrs. Bland stayed for a short time at Taiping and collected. Sir Walter

Napier did the same in 190 . In 1909 Kloss collected upon the hills during a visit paid in May, and in the same year Long, who was stationed there collected and sent to Kew a bundle of specimens. In 1911 James W. Anderson paid a visit to the Taiping hills and collected. In 1913 Matthew collected ferns at and near Taiping. Burkill found an opportunity of a few days collecting in July, 1913 at Kuala Kangsar, when plants were got as well at Lubok Merbau and with Haniff for a fortnight in February on the Taiping hills, and a few days on two separate occasions in June at Kuala Kangsar, when plants were got as well at Lubok Merbau and on the limestone cliffs of Gunong Pondok.

Haniff had been on the Taiping hills on several previous occasions: first he was there with Mohamed Nur in the month of February, 1917 for eight days. In May, 1917 he was at Taiping and at that Ayer Kuning which is near Taiping. In October, 1923 he ascended the Taiping hills. In May, 1924 he was at Taiping and at Batu Kurau, and he was at Kuala Kangsar both in September, 1924 and January, 1925. Kota Lama and Lubok Kerbau are localities which were visited upon these two occasions.

Henderson was stationed in Taiping from December, 1921 to March, 1923 and collected chiefly at low levels.

Burkill collected at Batu Hampar on the edge of the Dindings on March 3rd, 1914.

The neighbourhood of Taiping has been deemed sufficiently worked for a list to be prepared of its plants (Gardens Bulletin 3, p. 303). If the reader will turn to the map he will observe that 957 species of the Thalamiflorae-Calyciflorae are recorded for the square; most of these are from the hills over Taiping. This number is greater by 161 than the number for the square *2d*, a circumstance which must be ascribed not to more thorough working, but to the greater elevation of the Taiping hills and to the greater variety of vegetation thus produced; for it is indubitable that Taiping is not so well worked as Penang: but thanks to Kunstler's long stay it has been worked in every season. An estimate of the percentage of the total number of Phanerogams now known to exist in the square must at present partake considerably of a guess, but is probably somewhere between 60 and 70. There are differences indicated between the east and west faces of the Taiping hills which require working out.

SQUARE *4e*.

This square is astride the Main Range of the Peninsula, extending into the three states of Perak and Kelantan and Pahang. It is hilly throughout; but the higher hills have been little studied. The following statement commences

with collections made in the lower ground, and from the north proceeds southwards.

The Plus river which is upon the northern limit of the square was visited by Wray in November, 1905, and he states that he collected to the headwaters. Burn-Murdoch * collected a few plants in the Plus and Chior reserves in 1912; his Sungei Njing is in the first and his Gunong Berekeh is in the second. Salak was visited by Haniff and Mohamed Nur in December, 1920, and so also Sungei Siput for three days; and Burkill visited Sungei Siput for one day in September, 1920. Near to this place is the Kamuning estate which was visited by Curtis in July or August, 1898, and by Ridley in February, 1894; and where Machado lived for a short while, collecting a small number of specimens.

Ipoh was visited by Curtis in the last days of the year 1895, and in July, 1898, when he collected about the town and southwards towards to Menglembu. Ridley, taking leave in October, 1898, collected about Ipoh and to the summit of Gunong Keledang and at Telok Pinang. He was again at Ipoh in January, 1921. Burkill spent eleven days at Ipoh in August, 1916, July and November, 1917, and September, 1920, collecting upon all sides of the town and largely upon the limestone cliffs of Tambun and of Gunong Rapat and upon those close to Ipoh town; he also collected towards Lahat. Burkill and Haniff spent another five days at Ipoh in June, 1924, when collecting was done largely upon the limestone cliffs of Ampang.

Goldham, an educational officer, collected a few living plants about Ipoh which were examined by Ridley.

Sungei Raya is upon the southern limit of the square. At it Kunstler collected in October, 1880; and from it Burkill and Haniff in June, 1924, procured by the agency of a bomoh a small collection of medicinal plants.

In the square is Gunong Korbu, the second highest peak in the Malay Peninsula. It reaches 7,160 feet. It was ascended by Barnard and Haniff by way of the Korbu river and Gunong Yong Blar and Gunong Bal in the month of May, 1909; but the facilities for collecting were poor, the forest at the time also particularly flowerless. In 1914 Robinson stationed a party of Dyak collectors upon the mountain at 5,000 feet, who from the end of February to the end of March collected between 3,000 feet and the summit. (Journal of the Federated Malay States Museums, 6, p. 43).

The map shows for this square 195 plants of the Thalamiflorae-Calyciflorae. But the square cannot be less rich in species than square *3e*; and if the estimate for *3e* is right, then our knowledge of *4e* is but 13 to 15 per cent.

* We have seen in herbaria these specimens mis-labelled "Selangor."

It is evident thus how little the expeditions to Gunong Korbu achieved in proportion to the work left for others—and Gunong Korbu is only one mountain of the many high ones in the square. Ridley collecting upon the lower hill of Gunong Keledang revealed several species of considerable interest.

SQUARE 5e.

This square is partly in the State of Kelantan and partly in the State of Pahang. Foxworthy's journey in February, 1924, from Kuala Lipis into Kelantan took him through the square; and Mohamed Nur who was attached to the expedition collected successively at Mesa, Bukit Jelatah, Goa Kechapi, Sungei Yu, Sungei Kaloh and Sungei Merapoh which are between the railway station of Chega Perah and the Kelantan boundary: then after that at Pulai, Kuala Kerteh, Batu Papan, Batu Bau, and Goa Panjang. No other collecting has been done in the square; and it must be stated of it that it is botanically almost unknown.

SQUARE 6e.

This square has in it, rather towards its southern limit, the mountain of Gunong Tahan, than which there is no higher in the Malay Peninsula. It reaches 7,186 feet. The boundary between the states of Kelantan and Pahang runs over it. Attempts have been made to climb it from the north, but no collecting was done on them. The credit of finding a way to the top, from the southern side, belongs to Robinson, who has had a part in all three collecting expeditions made to it.

In the year 1905 Wray and Robinson set out for Gunong Tahan in the month of May, and together reached the mid slopes, when Wray, by reason of illness was forced to return. Robinson continued and spent June and July collecting on the upper slopes (Journal of the Linnean Society of London, Botany, 38, p. 301). In 1911 Robinson and Kloss went together to the mountain and Ridley accompanied them. Reaching 3,000 feet on July 6th, collecting was commenced by Ridley and done in a remarkably complete way. The return was made in August (Journal of the Federated Malay States Museums, 6, p. 127). In 1922 Robinson, who had established a semi-permanent camp upon the mountain undertook to direct two of the staff of the Botanic Gardens Department upon it; and Haniff and Mohamed Nur proceeded thither. They collected for twelve days in June, demonstrating how very thoroughly Ridley had collected before them.

All these ascents of Gunong Tahan were made by the Teku river: and along it collecting has naturally been done.

Upon the north of Gunong Tahan in February, 1923, Haniff and Mohamed Nur collected along the course of the Lebir river at Kuala Pertang, Kelumpur, Kuala Bedong, Kuala Manis, Lala Terlong, and Bator Kelantan, on the 18th of February, 1924, Mohamed Nur collected at Goa Ninneh, which he reached from Pulai upon the upper course of the Galas river.

The map shows that only 126 species of the Thalamiflorae-Calyciflorae are known from the square. It is a small number, and possibly only five per cent. of the whole flora. It is disappointing that we know nothing of the plants of Gunong Tahan which do not flower in the months of June and July: in fact we know really very little of the flora of the mountain.

SQUARE 7e.

This square is distributed between the three States of Trengganu, Kelantan and Pahang. Botanically it is quite unknown.

SQUARE 8e.

There are about 1,200 square miles of land in this square, all in the State of Trengganu, and quite unknown botanically.

SQUARE 3f.

This square contains the west coast of the Peninsula from just north of the Bruas river to just beyond the Perak river. It is therefore partly in the Dindings, and mainly in the State of Perak. The land surface is about 900 square miles. The forests of the Dindings are but little disturbed and contain fine timber, while inland is the large Bruas or Blanja forest reserve.

The Dutch had a fort on Pangkor island for receiving tin, of which we are told that in 1688 it possessed not a yard of cultivation, but that the forest pressed upon it. (Dampier's Voyages, 2, 1699, p. 174). Then and afterwards ships would touch at the coast in its neighbourhood for refreshing—for water or for new masts and spars, etc.: and from his ship touching there on January 9th, 1822, for some simple need, Finlayson was able to collect a few plants. But after Finlayson no one botanised in the Dindings until the forest wealth was protected, except that Scortechini paid a short visit in July 1884.

On January 19th 1888 Curtis seems first to have commenced his charge: then he spent six days at Pangkor, about Lumut, Rajah Itam and elsewhere (S.S. Government Gazette in March, 1888). He was on Pangkor island, at Telok Sera, on the Bruas river, up to Pengkalan Bahru, at Tanjong Burong, on Gunong Tunggal, at Tanjong Hantu, Simpiti, Sungei Puyu, etc.,* between July 7th and 14th of

* Tanjong Gol is on certain records said to be in Perak: that is a mistake. It is the western end of Singapore Island.

the same year (Appendix to Forest Report for 1888). He was at Lumut again in November, 1889, and so on. Ridley and Curtis were together in the Dindings in February, 1892, and thence forward annually until 1900. In July of that year Hill and Curtis were together through the Dindings. After this date occurred Burn-Murdoch's visits to the Dindings and to the Bruas reserve. Burkill was at Lumut and at Pengkalan Bahru in the commencement of March, 1914.

Off the coast are the Sembilan Islands: they are all small. Ridley and Curtis visited them together in 1892; E. S. Hose visited them in 1918 and Kloss visited the largest of them, Pulau Rembia by name, in May, 1916. Seimund collected on Pulau Rembia in November, 1918, and on Pulau Lallang in November and December, 1925.

Telok Anson town is upon the very margin of the square. Kunstler collected a little at it when proceeding into the interior. Scortechini visited Telok Anson in August, 1886, and probably at other times. When stationed there, E. S. Hose collected in the countryside. In 1924 Haniff spent a week there in the end of September. The following localities near Telok Anson are upon their labels and within the square:—Kota Stia, Pulau Tiga and Pasir Panjang Ulu.

Largely as a result of collecting in the Dindings, the number of Thalamiflorae-Calyciflorae known from the square is, as recorded on the map, 288. The rest of the square has furnished little. It is not a mountainous square, and perhaps we can name 30 per cent. of the species occurring in it.

SQUARE 4f. *

This square contains the Kinta valley and the greater part of the Main Range to the east of it. The valley has suffered extensive degradation of its covering, both on account of clearing and on account of flooding by streams surcharged by silt. The change is not by any means all of the last half century, for Daly who surveyed it in 1874 has left it on record how relatively easy his work was on account of the removal of so much of the forest canopy. However, there are some extensive reserved forests within the square; and the mountains are densely forested.

Batu Gajah is close to the northern limit of the square, and from its neighbourhood Burkill and Haniff collected in the end of June, 1924. East of Batu Gajah and equally

* The locality "Limbo Hills" occurs in the Materials for a Flora of the Malay Peninsula. For it read limestone hills.

near to the northern margin of the square is the mining centre of Gopeng which place is connected by road southwards with Kuala Depang, Kampar and through Chanderiang with Tapah. These places received early attention when the country was opened up. In the year 1880, in the month of September, Kunstler went to Gopeng and remained there or near by at Kota Bahru and Kampar until the end of the year. The first European plantations were then being made on Gunong Bujong Malaka and about Kuala Depang.

In 1881, in November, Kunstler paid another visit to Gopeng, and he paid a third in 1883, spending then the months of June to August there. His locality Gunong Mesah is a hill a few miles to the south of Gopeng.

In April, 1885, Scortechini appears to have visited Gopeng. In July he returned to it again from Taiping and ascended the neighbouring parts of the Main Range. After that he was prostrated by fever, and took the voyage to Calcutta in a vain effort to shake it off. Discovering in Calcutta how extensive were Kunstler's collections, he agreed to pool his efforts at writing a flora with Sir George King's; but he died in the next year.

In August of the same year Kunstler worked in the Batang Padang district, and upon lower slopes of Gunong Batu Puteh.

Curtis made an extended journey in 1894, when having landed at Telok Anson on August 16th, he proceeded to Tapah, and thence (1) to Kalindi, four miles northward (2) to Kuala Depang, eighteen miles, and (3) collected on Gunong Bujong Malaka which is above it and (4) at Sungei Siput which is a mining village to the east, and (5) on Gunong Mesah. He returned to Telok Anson collecting upon the way in Kampar and Tapah (Gardens Report for 1894, Appendix). In the next year during the last ten days of the year he was back again at Kuala Depang, Gunong Bujong Malaka and Kampar (Gardens Report for 1895, Appendix B): and in 1898 he collected in August for a third time upon Gunong Bujong Malaka (Gardens Report for 1898, Appendix B). This hill was visited by Ridley in October, 1898. In April, 1925, Henderson visited the limestone hill Gunong Lanoh, near Gopeng.

In 1890 Wray organised a very extensive exploration upon the mountains east of Tapah. He set out from Telok Anson on June 6th for Tapah by road, and from Tapah went by river to Kuala Wok: from this spot he climbed Gunong Batu Puteh, and was back in Tapah on July 19th, whence he went to Chanderiang; but he returned to Tapah and spent August and half of September upon Gunong Batu Puteh. On October 5th he set out for Gunong Chunam Prah and Gunong Beremban from which he descended on the Pahang side of the Main Range into the watershed of a tributary

of the Jelei river; then he crossed Cameron's Plateau in a north-westerly direction reaching Gopeng on the 24th of the month, and from Gopeng his base at Tapah. This long expedition is described in the Journal of the Straits Branch of the Royal Asiatic Society, 21, p. 123. For the time being it seemed to exhaust interest in the region.

In 1908 Robinson and Kloss made a zoological expedition to the Plateau and Ridley accompanied them to botanise. November found Ridley at Tapah, where he collected for a fortnight, then he ascended to the Plateau and remained there for three weeks. He collected very largely upon a river called in the reports the Telom, but this instead of being the Telom of the official maps is the Sungei Bertam which only after a considerable course runs into the Telom. He collected also upon a Gunong Beremban which is not the "Gunong Brumber" (or G. Beremban) of Wray's expedition, though near it. The fact is that exact geography is an importation into these regions. The expedition is reported on in the Journal of the Federated Malay States Museums, 4, p. 1. Upon a second expedition into the Plateau, Robinson made notes upon the vegetation seen upon Gunong Terbakar (Journal of the Federated Malay States Museums, 10, p. 248). In June, 1923 Robinson paid a third visit and was accompanied by Henderson, and the latter returned thither in January, 1924, and again in November and December 1925.

Tapah was visited by Burkill and Haniff from June 27th to July 2nd, 1924, when collecting was done towards Jor, at Tapah Road and Temoh and Haniff returned to Jor between September 12th and 19th. After this he went to Telok Anson, where he was until September 30th, collecting within the square at such places as Bandar Telok Anson, Durian Sabatang, Sungei Tukang Sidin and Degong. Henderson spent a week at Jor, in May, 1923.

As a result of all this work, the number of Thalamiflorae-Calyciflorae recorded for the square upon the map is 608. The height of the mountains assures a far richer flora than Penang has, perhaps even a flora twice as numerous in species; and on this assumption it can be calculated that we know 35 to 40 per cent. of what occur. It is remarkable that all the collecting has been done in the second half of the year and in further work attention should be directed to the region in the first half.

SQUARE 5f.

This square is wholly in the State of Pahang. It consists of a mountainous and densely forested tract. The nomenclature of its rivers is peculiar; for the longest, the Telom, surrenders its name upon uniting with a much lesser stream, the Jelai, which in turn surrenders the name of Jelai in square 6f, to become the Pahang river.

Machado collected upon the Jelai in May, 1903. He had made an earlier expedition prospecting towards its head waters in 1900; but whether he collected then or was unable to do so is uncertain, and it is uncertain also if all the specimens labelled "Jelai" were gathered within this square or in *6f*. He described the upper part of the stream in the *Journal of the Straits Branch of the Royal Asiatic Society*, 33, p. 263. His Sungei Cha-ang seems to be the Sungei Chelang of the official maps and his Sungei Betak the Sungei Betan.

In the south-western corner of the square is Benta, where Burkill and Haniff collected a little in November, 1924.

Botanically the square is almost unknown as the small number—6—recorded from it upon the map indicates.

SQUARE *6f*.

This square is wholly in the State of Pahang. As the route by which Gunong Tahan has been reached is in it, and as Kuala Lipis is in it, rather more collecting has been done, than in the squares which border it.

In 1923 Machado collected a little about Kuala Lipis. In 1924 Burkill and Haniff spent a week in November there collecting about the station, at the much older centre of Penjom, at Chineras and Ulu Chineras and at Budu. The Benchah forest reserve is across the Lipis river from Penjom and has supplied specimens of forest trees to forest officers. And upon the same side of that river is the Sungei Cheka which has done the same.

A little further eastward the Tembeling river joins with the Jelai to make the Pahang river, and Kuala Tembeling has served as the base whence botanists have started for Gunong Tahan. The large and difficult expedition of Ridley, Davison and Kelsall towards Gunong Tahan, in 1891, collected about it. This expedition reached Kuala Tembeling on July, 12th, Pulau Manis upon the Tembeling river on the next day, Kuala Tahan on the day after; it was at Sungei Tenok from July 21st to August 8th (*vide* Appendix to Gardens Report for 1891, and the *Transactions of the Linnean Society of London* 3, p. 269). Collecting was done at a spot recorded as Khol. It did not pass northwards out of the square, but was driven back by difficulties along the Tahan river. Of the localities which appear upon the labels of specimens, it is believed that Pulau Kinchi is upon the Tembeling river, but none of the following can be placed:—Guai, Blay Manis, Pulau Tijau, Pulau Padang, Pulau Datoh, Lubok Pelang, and Sungei Paut.

In 1893, Becher, who soon after lost his life in a flood of the Tahan river, collected a little about Kuala Tembeling.

The expeditions of Wray and Robinson and of Robinson, Kloss and Ridley to Gunong Tahan refrained from collecting plants on the Tembeling that the portorage of specimens collected further up might not be interfered with. The expedition of Haniff and Mohamed Nur to Gunong Tahan in June, 1922, collected a little on the return journey at this place. Their locality Kuala Manis appears to be the same as Ridley's Pulau Manis.

In November, 1924, Burkill and Haniff procured a small collection from Kuala Tembeling.

The number of the Thalamiflorae-Calyciflorae recorded from the square is 235. Assuming the square richer in species than Penang island, and nearly as rich as square 4f, it can be estimated from the figure 235, that we are able to record about 15 to 18 per cent.

SQUARE 7f is partly in the State of Pahang and partly in the State of Trengganu; and it is botanically terra incognita.

SQUARE 8f.

There are rather more than 1,050 square miles of land in this square, most of it in the State of Trengganu; but a very little in the State of Pahang.

On August 25th, 1889, Ridley was taken by His Excellency the Governor of the Straits Settlements to the mouth of the Cherating river, and had a few hours for collecting. In 1890 Vaughan Stevens in an attempt to study the Sakai tribes upon the Kemaman river collected specimens of plants economic to them. In 1904 Rostados sent to Singapore a collection from the mining centre of Bundi, which is on the upper Kemaman.

By means of these small collections the number of Thalamiflorae-Calyciflorae known from the square is found to be 42, which cannot be more than four per cent. of the number existing.

SQUARE 2g contains the islet of Pulau Jarak, visited on December 20th, 1904 by Robinson, and in November, 1919, and described in the Journal of the Federated Malay States Museums, 10, p. 259.

SQUARE 3g.

In this square are the lowlands from near the mouth of the Perak river to a point about midway between the mouths of the Bernam and Selangor rivers. The area of land is under 500 square miles, and the flora doubtless restricted. Low caused the river Bernam to be explored in 1879 and in 1885 Sir Frank Swettenham commenced his journey from sea to sea along it. In 1886 Kunstler was on it; but it is uncertain if he collected upon the lower reaches,

i.e. in the square. In 1924 Haniff collected from Telok Anson, at Rungkup, Utan Melintang, Bagan Datoh and Telok Bahru.

The number of Thalamiflorae-Calyciflorae thus made known is 22; and the percentage of the flora of the square which has been collected may be set down at about two.

SQUARE 4g.

This square consists very largely of low-lying land, and a little sea. The area of the land is about 1,160 square miles, roughly half in the State of Perak and half in the State of Selangor. There are important reserved forests in it, as Changkat Jong, Bikum, Trolak and Bukit Belata; and from them a little collecting has been done. Joining the Sungei Bidor near Changkat Jong is the Sungei Sungkai. In May, 1882 Kunstler was upon the Sungkai river; and in November, 1885 Curtis also; but the chief object of the latter appears to have been living plants, and the herbarium specimens resulting are few.

Considerably further south and nearer the Bernam river is the small hill of Changkat Mentri, which was visited by Kloss in September, 1918.

The figure on the map for the square is 51, and we are unable apparently to record a greater percentage of the flora than three.

SQUARE 5g.

This square consists of a section of the Main Range, extending into the three States of Perak, Pahang and Selangor. It has been the subject of considerable attention very largely because the Semangko pass rendered the higher parts of the hills accessible. Within Perak is the Behrang forest where forest officers have collected; and south of it is Tanjong Malim where Burkill and Haniff collected a little in July, 1924. It is suspected that the plants which Kunstler labelled "near the Bernam river" came from somewhere in the direction of Tanjong Malim.

In the Selangor part of the square is Kerling, near to which Goodenough collected in 1899 and north to Kuala Kubu whence the road over the Semangko pass climbs to the head of the Selangor river. In the year 1886 Kunstler removed himself from Taiping and collected until September in this square. His chief collecting place was Ulu Bubong, and the specimens which he got there are dated with the months of January, July, August and September. In July, August and September he visited the heads of other streams, namely the Bera and Kal. The latter is written Kol upon the official maps; and in March and April he had visited further the head of one of the two Kerling streams, presumably the larger which has its source almost under Fraser

Hill; and he visited also the head of the Selangor river itself. These specimens when they reached Calcutta were labelled Perak; but the valleys themselves are in the State of Selangor. His base, if on the Bernam river, would be on the present State-boundary. During the period when he was working these Selangor valleys he also went north into Perak, and collected in the Slim valley, plants which may have been got in this square or in square 5f. He has a locality "P.P." which has not been identified, but may be assigned from his dates to this square.

The path over the Semangko pass which gave place to the modern road was long called the "Pahang track" and this name appears on upon the labels of plants; for instance, Ridley in July, 1897 collected upon the Pahang track, and Curtis in 1902 and Machado in May, 1903. In February, 1904 Burn-Murdoch collected a few forest trees at the pass, and in August of the same year Ridley made a stay more extended than upon his previous journey, being joined by Hosseus. At this date there were mines known as the Simpang mines at the place upon the ridge now known as Fraser Hill or Bukit Fraser; and Ridley collected much about them. He was there again in April, 1911. In 1912 Burn-Murdoch again collected a little at the pass. In 1921 Cubitt did the same, reaching northwards to "Pine-tree hill." In October, 1921 Mrs. Ferguson-Davie collected at Fraser hill. In 1922 Burkill and Holttum spent half the month of September collecting there (*Gardens' Bulletin*, 3, p. 19). In 1923 between August 25th and September 18th Holttum, Henderson, Foxworthy and Mohamed Nur collected there.

Somewhat nearer to Kuala Kubu than the Semangko pass is Bukit Kutu, where Ridley collected in May and June, 1896.

The Semangko pass gives access to the Raub district of the State of Pahang. Around Raub Burkill and Haniff collected in November, 1924 from the 8th to the 15th, and they procured by the agency of *bomohs* economic plants from Batu Talam to the northward. The following localities near Raub appear upon their labels:—gorge of the Sungei Tras, the Simpam river, the Liang river (both visited where the Batu Talam road crosses them), Gali and Dong. Many of the Dong plants came from the Jahit-Rambei forest reserve.

To the east of Raub is the large Bilut forest reserve, where forest officers have collected a little.

On the Main Range below the middle of the square is Gunong Ulu Kali whence Burn-Murdoch procured plants.

At the southern limit of the square is Bentong. Foxworthy and Burkill visited this town on December 6th,

1922. Best visited it from June 12th to 17th, 1924 and Burkill and Haniff from November 12th to 17th, 1924. The following localities near Bentong are within the square:—Sungei Perting, Gunong Raja, Bukit Raka, as also any place stated to be on the north or west of Bentong town. The flora of the conglomerate hills near Bentong is certainly interesting; but Best's visit at an unfavourable season to Bukit Raka is the only attempt so far made at a study of it.

The figure for the square appearing on the map is 489; and it is estimated that this represents 30 to 35 per cent. The hill collections have almost all been made in the first nine months of the year; the collections from the low country to the eastward have been made in June and November.

SQUARE 6g.

This square is the square of the mountain of Benom. It is entirely in the State of Pahang. In 1900 it was required that a trigonometrical survey beacon should be placed upon the summit of Benom and Barnes, taking a plant collector with him, made the attempt to get it there. He started from Ulu Gali; but did not reach the summit by some three miles. From a subsidiary summit where he placed the beacon, and which he supposed to be Gunong Kluang Terbang, he brought back a collection of 122 specimens. In March, 1923, Evans reached the summit and collected, and in July and August, 1925, a Chinese collector of the Federated Malay States Museums made a collection near the summit.

Within the northern margin of the square runs the Benta-Jerantut road, along which on November 23rd, 1924, Burkill and Haniff collected a little, at the localities Tanjong Musa and Batu Balai. Then they collected also at Jerantut upon the two subsequent days and on December 12th. In March, 1923, Foxworthy and Henderson collected in the Temerloh district north of the Semantan river.

From north to south the Pahang river runs through this square; and it has been collected on at various places. Ridley collected considerably between July 7th and 9th, 1891, in the Pulau Tawar neighbourhood, at Pulau Tawar, Pulau Changei, and Tanjong Antan, which indeed are not remote from the new Jerantut ferry. Ridley's locality Kadondong is on Pulau Tawar. To the east of the river at a few miles from it are the limestone rocks of Kota Glanggi where Ridley collected in 1891, and Kota Tongkat where Evans collected in June, 1917. Evans also collected at Kuala Tekam near by.

Further down the river is Kuala Krau, and opposite are more limestone rocks, those of Gunong Sennyum at which Evans collected in June and July, 1917.

The Thalamiflorae-Calyciflorae known from the square are 130, or 8 to 10 per cent. of the probable total.

SQUARE 7g.

This square which is wholly in the State of Pahang is covered by vast forests, traversed by the Jerantut-Kuantan road. Burkill and Haniff collected a very few plants along this road on December 7th, 1924 at Ulu Tekam and Sungei Lepar. Its southern margin is touched by the Pahang river whereon at Kuala Luit Ridley collected in 1891.

The figure on the map for the Thalamiflorae-Calyciflorae is 25, and our knowledge may be two per cent.

SQUARE 8g.

There are about 1,000 square miles of the State of Pahang within this square, the interior being botanically unknown, but some collecting having been done on the coast from Kuantan northwards, where it is bold and hilly.

There are extensive forest reserves in this area where forest officers have collected, *e.g.* Burn-Murdoch and more lately others. Between June 17th and 23rd, 1913, Burn-Murdoch collected at Bukit Gapis, Bukit Galing, Tanjong Api, Bukit Ubi and Tanjong Tembeling. Durnford sent orchids to Ridley from Kuantan in 1889. Burn-Murdoch has collected in the Baloh reserve. Burkill and Haniff were at Kuantan from December 3rd to 7th, 1924, collecting there, at Telok Sisik, Ayer Puteh, Beserah and Kuantan ferry.

At the very south of the square is the mouth of the Pahang river; and collecting done upon its north bank was done within the square. On August 19th to 21st, 1889 Ridley was at Kuala Pahang with His Excellency the then Governor of the Straits Settlements; Darat Selah is a locality of this visit. In 1890 he spent a fortnight in the month of May at Pekan, crossing over the river on occasions to the north bank where he visited Pramau, Jambu, Kuala Brawas and Tanjong Medang; and he visited Kuala Mahang, Tanjong Gajah Mati and Pulau Manis, which are a little inland. In 1891 he started for Gunong Tahan from Pekan, visiting Pulau Manis and Pulau Rumpit. In July, 1917, Evans collected a little at the mouth of the river.

The number of the Thalamiflorae-Calyciflorae recorded for the square on the map is 208; and it seems likely that this represents about twenty per cent.

SQUARE 4h.

There are within this square about 600 square miles of the State of Selangor, all low-lying and much of it cultivated. In the centre are vast swamps covered with timber, in which the Bukit Cheraka forest is reserved. To the north is the Rantau Panjang forest where Ridley and Burn-Murdoch collected in August, 1904. On its edge is Batang Berjuntai, another name which appears upon their

labels. Kloss collected a little at Rantau Panjang on July 28th, 1914. Ridley collected at Kuala Selangor and southwards to Klang in the month of June, 1896.

Port Swettenham is upon the southern margin: to it Burkill and Mohamed Nur have paid collecting visits in every month of the year except January. In some of these visits collecting was extended to Klang. There is a record of Bishop Hose collecting also at Port Swettenham in the month of

The flora is doubtless poor. The number of species of the Thalamiflorae-Calyciflorae collected in the square is only 58; and judged thereby we know not more than 12 per cent. of the plants occurring.

SQUARE 5h.

Kuala Lumpur is within this square, which extends from the State of Selangor across the Main Range into the State of Pahang. To Kuala Lumpur Ridley was sent in 1889 and there he collected plants. His Bukit Kuda of this trip is a spot where horses were changed on the way from Kuala Lumpur to Klang, and with horse transport the name has now gone. In 1890 he endeavoured to arrange that a native collector should be stationed there. To start the collector Curtis went thither, and collected a little; then he left the collector, who proved unsatisfactory and only worked through the month of May. Garawang is one of his collecting places.

In 1891 Kelsall went to Bukit Etam at the head of the Langat valley and brought back collections (Journal of the Straits Branch, Royal Asiatic Society, 33, p. 67).

In 1896 Ridley while inspecting forests between May 9th and June 11th, collected considerably about Rawang, Dusun Tua, Bukit Etam, Ginting Peras, Ginting Bidai, thus reaching the watershed (Selangor Journal of September 4th, 1896). Goodenough, a subordinate in the forest service, was transferred to Selangor in this year and continued during several years of work to collect, doing so at various places, such as Batu Caves, Rawang, Kuang and Kanching. In 1897, Ridley was again at Kuala Lumpur in the month of July and collected about Batu Caves; in 1899 he sent a plant collector thither and was himself there for a few days. He collected there again in August, 1898.

In the year 1905 Engler visited Kuala Lumpur. Such plants as he collected are without doubt conserved in the Botanic Gardens at Dahlem near Berlin.

In 1910 Burn-Murdoch procured specimens from Gunong Ulu Kali, and in 1912, using forest rangers, chiefly Hashim, he collected around Kuala Lumpur and sent the specimens to Kew.

In 1911, Robinson commenced to organise collecting on the Main Range above Kuala Lumpur with the object of working out the dispersal of Himalayo-Sondaic animals southwards along the hills; and with the same end in view he caused plants to be collected. He sent Dyak collectors first to the head of the Langat valley to Gunong Menuang Gasing or Bukit Nyor or Nerang in the end of May and they collected through June (Journ. of the F.M.S. Museums, 4, p. 235). In 1912 Kloss visited Ulu Langat, and went to Gunong Mengkuang Gasing (Journ. Linn. Soc. London, 41, p. 285). The plants collected were sent to Kew (Journ. of the F.M.S. Museums, 5, p. 28). Later the Dyaks were sent to Gunong Mengkuang Lebar which is not far from Gunong Ulu Kali where they collected through the months of January and February, 1913. Kloss in 1914 collected about Rawang. In March, 1915, Ridley, revisiting Kuala Lumpur was taken by Robinson in connection with these investigation to Ulu Gombak on the way to Ginting Sempah and to the quartzite ridge of Klang Gates. Upon a further visit in September, 1917, Ridley visited Ginting Sempah; and soon after Kloss collected upon the not remote pass of Ginting Bidai and again in Ulu Langat. In 1921 Ridley paid yet another visit to Kuala Lumpur, and collected again with Kloss and Milsum at Klang Gates in the month of January. The name Sungei Tua forest reserve indicates a corner of the extensive Gombak forest reserve. The Forest Department has collected in it. During 1921 Hume collected for the Federated Malay States Museums in the vicinity of Kuala Lumpur.

There is a small forest reserve in Kuala Lumpur itself, Weld's Hill, which has served many officers in the Forest Department as a place for studying plants. Its name occurs often upon labels. The Forest Department has also collected considerably around Kuala Lumpur, particularly since Foxworthy joined it in 1918. Sungei Buloh Forest Reserve and Kanching Forest Reserve in particular have supplied specimens.

The Sungei Buloh Forest Reserve is continuous with the Bukit Cheraka Forest Reserve towards Klang where Burkill has collected on odd days in March, June and October, 1922, in January and December, 1923, and in September, 1924. Burkill also collected near Kuala Lumpur upon different occasions, *e.g.* at Batu Caves in November, 1916, and in October, 1922, and elsewhere in February, 1919, and September, 1920. Foxworthy was at the Ginting Sempah in December, 1922, at Klang Gates and in the Sungei Buloh forest in December, 1923: and Mohamed Nur was in the Sungei Buloh forest in the same month, 1923. Burkill and Haniff collected a few plants about Serdang in November, 1924.

Matthew collected ferns near Kuala Lumpur in 1913. Sanderson collected Myxomycetes there, and Brooks fungi.

The road descending from the Ginting Sempah to Bentong is within the square all except its last few miles. Burkill and Haniff collected along it near the Benus river, in November, 1924; and also upon the first few miles of the Bentong-Kuala Pilah road.

A bit of the Negri Sembilan is in the square, but no one has ever botanised in it.

The map indicates that 576 plants of the Thalamiflorae-Calyciflorae have been collected in the square; and this figure suggests that we could authentically record rather over 50 per cent. of what occur.

SQUARE 6h.

This square is chiefly in Pahang; what is not is in the Negri Sembilan. The Bentong-Kuala Pilah road crosses the square and has been collected on by Best on July 14th, 1924. In November, 1924, Burkill and Haniff procured collections of economic plants from Karak and Pelangai (Manchis).

The Pahang river flows upon the east side of the square and near it are the townships of Semantan and Temerloh. Ridley, Davison and Kelsall passing along the river in 1891 collected near Temerloh or Kuala Semantan, Telok Malati, and at Jellam (?Jeram) Panjang to the south of it.

In 1913, Burn-Murdoch with the aid of a collector from the Botanic Gardens, Singapore, collected from Semantan and Temerloh down the river.

Under the direction of Kinsey forest trees have been collected in the reserves of the north-eastern part of the Negri Sembilan, such as Triang and Pasoh.

The figure that the square bears upon the map is 153. The collecting has been rather desultory and bearing in mind the certain richness of the flora, 153 indicates that not more than 15 per cent., and possibly only 12 per cent. of the plants occurring can be named.

SQUARE 7h.

This square is entirely in the State of Pahang; it has the Pahang river along its northern border, the marshes of the Bera river, and the forested hills from Gunong Chini southwards in the centre and south. Along the banks of the Pahang river where village succeeds village, taxonomic botanists have not been drawn to do any extensive collecting, and in reality they are little known. Ridley collected here and there along them in July, 1891, as at Kuala Bera (Kuala Brok on his labels), and Fox in 1893 travelled up

the river collecting at Gunong Chini in this square. In 1913 Burn-Murdoch travelled in the opposite direction collecting between June 9th and 14th, on Gunong Chini, at Kuala Bera, Lubok Paku and Bintang (Gardens Bulletin, 1, p. 310). In November, 1924, Burkill and Haniff reached the river at Lubok Paku, collected a little and left there for a few days a collector named Ngadiman.

Elsewhere the botany of the square is unknown.

The figure on the map is 43, and this suggests that our knowledge of the square amounts to less than three per cent.

SQUARE 8h.

There are rather less than 1,100 square miles in this square, all belonging to the State of Pahang. The Pahang river is upon the northern margin; swamp forest and forest on low hills covers the rest.

Kuala Lepar, where Burkill and Haniff collected a few plants in December, 1924, is on the river in the square. Pekan is in the square. As recorded under square 8g, Ridley visited Pekan for a few days in 1889, and for half a month in May, 1890, collecting considerably; but his localities are rarely to be found on the official maps and therefore an enumeration here will be useful. He visited Renchong, Kalambalai, Ayer Hitam, Pigang, Katapang, Bohie, Telok Malati, Pengkalan Kazai, Sungei Parit.

Haviland was at Pekan for a few days in 1890.

In 1891 Ridley, Davison and Kelsall started upon their journey to Gunong Tahan from Pekan, but did not collect much on the lower reaches then. In 1913 Burn-Murdoch collected a few plants there, and in 1917 Evans a few. In 1924 Burkill and Haniff spent the last week of November at Pekan in much rain, collecting as far as flooding permitted south and west of the town.

The number upon the map of Thalamiflorae-Calyciflorae is 145. The evenness of the surface of the land scarcely promises a large flora and it is possible that we know now eighteen or twenty per cent. of what occur.

SQUARE 3j contains the Aroa Islands which were visited by Robinson in August and September, 1906, (Journal of the Federated Malay States Museums, 2, p. 8, and 6, p. 253).

SQUARE 4j.

This square contains but 200 square miles of low-lying land in the State of Selangor, from Port Swettenham township southwards to Batu beyond Morib. The Telok Forest Reserve is within it, and was visited by Burkill on September 22nd, 1918, May 4th, 1919, March 6th and 13th, June 12th,

September 18th and 28th and December 7th, 1921. Collecting was done also between it and Port Swettenham on June 19th, 1913, March 25th, 1915, and August 13th, 1916.

The number of *Thalamiflorae-Calyciflorae* recorded for the square upon the map is 15 only; from which it is surmised that we can enumerate and authenticate the names of about six per cent. of the Phanerogams.

SQUARE 5*j*.

There are about 1,000 square miles of land in this square, partly in the State of Selangor, and partly in the Negri Sembilan. Very little collecting has been done in the Selangor part. Burkill and Haniff collected a few plants in November, 1924, at Kajang, and the Forest Department has collected a little in the Kalambau Forest Reserve. In the Bangi Forest Reserve, and about Bangi, which is in the Negri Sembilan, the Forest Department has collected also.

Of the little States of the Negri Sembilan, Sungei Ujong became accessible before any of the others, and in 1874 had a British officer at Seremban. In 1875 a rough survey of it was made; but it was not for another eleven years that any attempt was made to investigate its vegetation. The investigation was done under Cantley's orders, for he sent his collector Alvins to Seremban in 1885. Alvins passed through Rantau either in coming or in going, perhaps in both. Bukit Lasing at which he collected is a few miles to the south of Rantau. His localities Temiang and Kapayang are places close to Seremban. His Bukit Sutu has not been precisely identified, but there is only little doubt in regard to its identity with a hill over Setul. He passed northwards beyond Setul to Beranang which is upon the Selangor border. At this time a bridle path existed via Setul to Beranang, and a cart road was in course of construction from Seremban to the coffee plantations upon the Beremban hills. It may be assumed that Alvins collected upon both. He collected at Pantai which is a little to the north of Seremban and on Gunong Beremban which is in square 6*j*. On some occasion he visited Cape Rachado; but probably from Malacca by sea. Finlayson touched in 1821 at Cape Rachado.

Burkill and Haniff collected at Mantin on November 30th, 1924.

In square 5*j* are many forest reserves at which forest officers have collected, chiefly the Senawang reserve, near Seremban, and the Sendayan reserve, a little farther away.

In 1922 Holttum collected about Seremban and in the Senawang Reserve.

The Bukit Tunggal Forest Reserve is in Selangor, but upon the boundary of the Negri Sembilan. In it forest

officers have collected, and in 1896 Ridley visited the neighbouring country between Kajang and Sepang, chiefly the Reko woods. In 1898 he visited Seremban in December, and collected there and at Perhantian Tinggi. At the same places Burkill and Haniff collected at the beginning of November, 1924. In 1920 Ridley visited Bukit Tangga from Seremban in the month of December; and on account of the number of new species brought thence Mohamed Nur was sent to the same place at the commencement of December, 1923.

Williams collected orchids near Siliau about 1915 to 1918 and Ridley in 1891 collected along the railway from Port Dickson to Kuala Sawar on the Linggi river through Sirusa and Siliau. Milsum also has collected at Port Dickson.

In the Singapore Herbarium are a few specimens collected near Port Dickson by William P. Handover, a planter of that neighbourhood.

Sungei Ujong offers an instance of an interesting change in population centres. It is apparently the case that Beranang was once far more important than it is now, but no one has as yet tried to indicate to what extent the Malays repressed the forest before Europeans were able to enter the country.

The square as the map shows is known to possess 119 species of Thalamiflorae-Calyciflorae. The square containing Malacca is known to possess 794, yet it is much more level than square 5*j*, and certainly poorer in species. It cannot be therefore that 5*j* is better known than ten per cent.

SQUARE 6*j*.

This square is wholly in the Negri Sembilan, with the town of Kuala Pilah almost at its centre. Its lower ground is considerably given over to agriculture; but it has wide forests over mountains reaching over 3,000 ft. The Rembau ricefields are old, and while that country under the hills shows very markedly that the woodlands between the fields are in an artificial condition; so too do the lower slopes of the mountains themselves, the forests having been greatly changed by removing timber. The Main Range of the Peninsula ends at the south margin of the square in Gunong Tampin.

Gunong Tampin may have been climbed by Alvins, who certainly worked for quite a long time close to its foot. He also reached Aver Kuning in 1884 from the Malacca side and no doubt it was easily accessible as mines were being worked at the time at Geminchih. In 1893 and 1894, Goodenough collected for Ridley on Gunong Tampin. In 1913 in the month of September, Robinson sent his Dyak

collectors to collect upon it (Journal Federated Malay States Museums, 5, p. 51) and visited it himself. In August, 1915, July and August, 1916, July and November, 1917, January and October, 1918, Burkill collected upon the slopes of it and to Kendong; and on May 1st, 1918, Foxworthy and Burkill botanised to the summit. Holttum likewise botanised to the summit in November, 1922. Ridley got nearly to the summit in 1917.

During the last week of November, 1922, Holttum collected in the Tebong Forest Reserve, at Selaru, Senaling, Kuala Pilah, Bukit Linggung and Ulu Bendol, whence he climbed Gunong Angsi. At exactly the same period of the year following Mohamed Nur, attached to a zoological party under Chasen, collected on this mountain over a fortnight. His locality Ulu Rembau is the headwaters of the Rembau stream upon Gunong Angsi. Fourteen years earlier, that was in 1908, Winkler collected on Gunong Angsi, collections of which presumably the first set is preserved at Breslau.

Moorhouse, Kinsey and other forest officers have collected in the forest reserves of Senaling Inas, Kepis, Bahau, Serting, and at the Bemban which is northward of the river Triang at Juasseh, in the Ulu Petasih which is near the Triang reserve, and about Durian Tawar.

In 1917 Ridley visited Johol and collected for a few days upon the river there called Sungei Jelei.

The result of this collecting is that 286 Thalamiflorae-Calyciflorae are recorded; which figure, taking Malacca as a standard, indicates that less than thirty per cent. of the flora of the square can be named.

SQUARE 7j.

This square is made up of parts of the States of Pahang, Johore and the Negri Sembilan. Botanically it is very little known. Genuang in Johore was visited by Ridley in March, 1915. Gemas upon the borders of the Negri Sembilan and Johore was visited by Burkill on November 2nd, 1918, February 27th and August 9th, 1919, and September 16th, 1920. The figure for the square on the map is 20 only.

SQUARE 8j.

The watershed of the Rompin river in Pahang makes a large part of this square; south of it a part of the State of Johore is included. In 1891, in the month of August, Lake made a hasty visit to the Endau river and climbed Gunong Janeng which is just within the square. It was not the first visit paid by a scientist to the mountain, as Mikluho Maclay had been there in 1875; but it led immediately to another; for returning with Kelsall in October, 1892, Lake proceeded to survey towards the south while

Kelsall went up Gunong Janeng and made botanical collections (Journal of the Straits Branch of the Royal Asiatic Society, 26, p. 3).

Evans in July, 1917, collected on the lower Rompin river as at Leban Chondong.

In 1922 the Forest Department carried out an extensive reconnaissance of the Rompin forests and collections of some extent were made.

The figure upon the map for the square is 101, and an estimate of the extent of our knowledge of the Phanerogamic flora works out at about 10 per cent.

SQUARE 9j.

The area of land in the square is small, being but little more than 200 square miles. It is parts of the States of Pahang and Johore near the mouth of the Endau river, and islands off the mouth.

Feilding visited the Endau river in October, 1892, with Lake and Kelsall. Evans visited it in August, 1917, collecting at Kampong Piangu. Foxworthy in May, 1918, visited Penyabong.

The figure upon the map is only 28.

SQUARE 0j.

The beautiful island of Tiuman is in the square, its mountains covering its whole surface and rising to 3,383 ft. There is little room for cultivation and a small population; so that its forests have not suffered disturbance. The Dutch boats proceeding to China and Japan used to touch at it for water or spars which they could draw unmolested; and in that way Kaempfer came to land upon it in 1690. He estimated its population as 1,000 (History of Japan, 1728, p. 61). It has been said that later when pirates used Pulau Aor extensively, they depopulated Pulau Tiuman; but this is to be doubted seeing how Pulau Tiuman is devoid of level land for agriculture.

In 1889 Ridley touched at Nipa Bay upon the west coast on August 18th. Nanson went thither for orchids which he cultivated. In 1915 Robinson went thither upon a zoological expedition and Burkill accompanied him. The interval from June 21st to 29th was spent at Joara Bay upon the east coast and the mountains ascended to 1,100 ft. Sungei Tawar and Sungei Bagu empty themselves into this bay. A visit was paid also to Tanjong Duatah on the south coast. In June, 1916, Kloss made another small collection from Pulau Tiuman which he sent to Kew.

As the Thalamiflorae-Calyciflorae number 62 and as the island must be richer in species than Penang, we appear to know less than eight per cent. of its flora.

SQUARE 5*k*.

This square contains only 60 square miles of land, being the area round Kuala Linggi, and northwards to beyond Cape Rachado (Tanjong Tuan). The Menyala Forest Reserve and the Pasir Panjang Forest Reserve are in it; in them and at Tanjong Agas Forest Officers have collected a very little. Alvins visited Cape Rachado.

SQUARE 6*k*.

Almost the whole of the Territory of Malacca is in this square: with it is a narrow margin of that part of the Negeri Sembilan which lies just north of Malacca. Upon the east side a narrow strip of the Territory of Malacca is in square 7*k*.

The writer is inclined towards Dr. Winstedt's opinion in regard to the age of Malacca town. Dr. Winstedt has it that "Malacca existed as early as the 13th century A.D., and became a commercial centre about 1400 A.D. owing to immigration of Malays from Singapore or Tumasak—the sea country" (Journal of the Straits Branch of the Royal Asiatic Society, 1922, No. 86, p. 257). There is no reason for thinking that Malacca differed materially from the typical Malay state, which was founded by the ability of a party to extract revenue from the trade of a waterway: but in its case the waterway was an unusually large one, being the Straits of Malacca itself. For such a success men and resources were necessary; and it is clear that the immigrant element which brought the centre forward was, even if a fugitive element, one unbroken, and probably one quite friendly to the pre-existing element on which it grafted itself.

Taxation of the trade between India and Java furnished one part of the resources, but certainly not the whole, for commodities changed hands in Malacca, a merchant-population existing under the military population, and exploitation of the country behind was done. It would be gratifying to ascertain how great was the effect of this exploitation upon the vegetation: but the indications left to us are very meagre. The conclusions seem warranted that the ability of Malacca to levy duties indicates a largish population to be fed, which must have pressed upon the forest, and that the presence of the mart argues a certain amount of good government and security such as would aid it. But we have information in the Chinese work Ying-yai Sheng-lan of 1416 that rice being little grown was imported to feed the place: it was aided by some sago locally extracted: and in a list of vegetables, etc., which could be had in the town are named gourds, melons, mustard, and pepper, which may reasonably be considered imports like the rice: further, cattle, buffaloes, ducks,

fowls and goats were found only in small numbers. It may be taken as certain that Malacca did not feed itself from the land immediately behind it: instead from behind it, jungle produce as lignum aloes, dammar and ebony were drawn, and two tin mines were worked. The coconut-trunk, says this Chinese account, was split to make the floors of the houses: sugar-cane, plantains and the jak-fruit were to be had. These one regards as garden produce. Boat-building was an industry, the dammar used for caulking the seams; and much food was taken from the sea by fishermen who used dug-outs. Mats were made, doubtless by the women, and marketed: the Chinese account suggests that Nipa was used rather than Pandanus; and the Nipa would be got wild.

Thus we are brought to a conclusion that if the rice supply was certain, no more than gardens would be needed to add to it and the fish, upon which the town fed itself: but gardens on a fairly liberal scale.

Siam, after a long period of unchecked expansion southwards, at this time appears to have been able to extract tribute from Malacca, and Malacca to have thought it possible to assert itself against the demand. Then to avenge an affront, the Chinese Emperor Yong-lo sent a successful expedition against Siam and after it ordered Siam to keep its hands off Malacca, with which he entered into commercial relations a little closer; and Chinese merchants seem to have resided in Malacca, meeting there those who brought western calico, etc., from India.

A Chinese work, the Hsing-cha Sheng-lan of 1436, states that Pahang had much rice: and an account of Malacca in 1537 in another, the Hai-yu, states that Malacca got rice from three places, one being Siam, and another P'o-to-li, which is given elsewhere as in Pahang. As these Chinese works used older Chinese works for information without indicating what the older works were, the date at which the Chinese ascertained that Malacca was getting rice from Siam and Pahang is left uncertain: but it is a date apparently considerably prior to 1537, at which time the Portuguese were in Malacca, and to a date at which the Malays ruled in it. They, of course, were certainly in touch with Pahang, and that across country; so that the rice may have come overland: and if it did, the hold of Malacca upon its hinterland was stronger than outwardly appears. More cannot be said. The Malacca waters became unsafe for Chinese vessels next, and they ceased to venture up the Straits.

When the Portuguese, in 1511, had taken possession of Malacca they threw into the place three hundred of their countrymen, for whom they found native wives and

giving them lands and slaves, bade them raise a population favourable to Portugal. These lands, they tell us, extended from Cape Rachado to the Rio Formosa, that is Batu Pahat. It looks as if they were lands that had been settled by the Malays of the Malacca State—possibly lands considerably interrupted and spaced out by forest, but garden-lands contributing to the feeding of the town. The ousted Malays gave the Portuguese little peace; and as the colonists were liable to military service, they spent their lives under arms, living in the shadow of the fort in atap huts, instead of bringing into cultivation or maintaining under cultivation (whichever it might have been) the fiefs made over to them.

The Portuguese held Malacca for 130 years: and during that time they threw more and more men into the fort, so that Valentyn credited to it 11,000 to 12,000 souls. It is very significant that upon the Dutch victory of 1641, all that population, except 1,600, chose emigration to Negapatam, a hardship which they would not have consented to had they enjoyed prosperous possession of homesteads under cultivation. Thus was the Portuguese attempt at agriculture a failure; and it is quite likely that their occupation of Malacca undid a certain amount of clearing achieved by the Malays.

Afraid of the fort, but finding plenty of room at a fairly safe distance behind it, during the early days of the Dutch rule, colonies of Sumatran agriculturists moved up the Linggi river. These were the men who adhered to female succession of land, and the laws of Menengkabau; and who formed themselves into the States of Naning, Rembau, etc., expanding over a Sakai population. They spread ultimately towards Malacca as far as Rembia, where later they met the spread of agriculture with a male succession extending from Malacca. It is necessary to recognise in them a second centre of attack upon the virgin forests of the square: they passed eastwards over low undulations, using dry rice cultivation there, into the upper part of the Kesang valley, which was not country uninfluenced by Malacca, for mining, with the market for the metal in Malacca, kept a light touch on it.

About Malacca itself, the Dutch would have no rice grown: they had determined upon the artificial fostering of its production in Java, and forbade the raising of it at Malacca. This left no crops for the Malacca lands but garden crops: and the wastes could certainly not have been removed under the embargo. Dampier in 1688 wrote that rice was imported to feed the town, and the "country was all covered with wood like one forest." Valentyn wrote about 1720 that "except fish and some fruit. . . . everything has to be brought from other places" into Malacca fort.

However when subsequently the power of Achin and Johore waned, an experiment was tried with the lands which were given out (anew) at a very small rent on the understanding that they should be policed. But as they did not pay for policing, this measure did no good.

Konig, who paid three short visits to Malacca town then—one in September, 1778, the second in February, 1779, and the third, while waiting for a boat to India, from August 11th to December 15th, 1779 (*Journal of the Straits Branch of the Royal Asiatic Society*, 26, p. 100), records that forest commenced just beyond the village of Chang, i.e. at four miles from Malacca town. Another writer of the same period has left it on record that "the country was an impenetrable wilderness just beyond two miles from the Fort."

At the back of the wall of forest which had grown up round Malacca, an independent development went on slowly; and the district of Naning was cultivated in the Malay way, with fingers of rice along the valleys, villages on their edges and buffaloes, and with also a certain amount of dry rice growing for which forest was burned. When the power of Malacca was strong enough, Naning sent a tribute of rice thither: when it was possible it defied both Portuguese and Dutch. Behind the forest also in the same period, Malays worked gold mines at the foot of Mount Ophir, and on finding gold also at Geminchih worked mines there from about 1760. In 1793 tin-mines were opened at Kesang. As the demand for the tin and the gold came from oversea, and as Malacca controlled the sea, these mines kept open ways to the town, which were but the narrowest tracks supplementing the Malacca river.

From the strict Dutch rule, Malacca passed into British control in 1795: and as the paragraphs above show, it was at the time no more than a fort upon the narrows of the Straits of Malacca. Britain did two things, (1) removed the embargo on growing rice, and (2) removed the fortifications. It passed back to the Dutch in 1822, useless except as a pawn for bargaining in treaty making.

During the short Dutch rule which followed, Finlayson visited it. This was in 1822 and this is what he records:—"It is half-dead" with "every third house shut up," the country not raising rice-enough even with it so for its consumption. The Dutch surrendered it finally to Britain in 1825; and it was put under the administration of Penang.

Of Malacca it was written five years later that its rice-fields then reached to Rumbia at a distance ten miles on the way to Naning; and there the track plunged into forest. Again five years later as a consequence of defiance from Naning a punitive expedition advanced along the

track, its history throwing a most instructive light upon the density of the barrier of forest which Portuguese and Dutch rule had caused to grow up.

The expedition started from Malacca town for Alor Gajah, and as soon as the forest was entered found its way obstructed by felled trees and its flanks harried by its enemy in such a measure that it was deemed necessary for protection to cut a wide strip right through the forest. It was a tedious business, and the little affair advanced at the slow rate of only twelve miles in one hundred and fifteen days at the cost of one hundred thousand pounds sterling.

Griffith in 1841 or 1842 made a journey to Naning along the road that the expedition had left and found it bordered by a belt of secondary jungle one hundred yards deep on either hand.

In 1848 Balestier recorded that Malacca still produced nothing but a little rice. In 1862 Cavanagh ordered that roads should be opened to the boundaries of the Territory: and in the seventies it suddenly awoke to a great agricultural activity. Owing to the lateness of this activity, in 1883, when a Forest Department was created, the forests were found richer in timber than those of Penang and Singapore.

No Dutch botanists studied plants in Malacca unless Couperus' tract on Gambier be counted. The study of its vegetation commenced as soon as British rule came in.

There were two William Farquhars connected with Malacca during the first period of British rule. One was there as a Colonel and the other as a Major. The Major interested himself in Natural History and employed a Chinese artist to depict the plants which he found. These drawings he submitted to Jack in Penang and later to Wallich in Singapore. Jack criticised them as wanting in detail. Their fate is unrecorded. But Farquhar climbed Mount Ophir at some date before 1819, and brought back plants thence among which was the curious fern *Matonia pectinata*: to Jack he gave his specimen and Jack sent it to Wallich. It was in 1822, when he had become the first Resident of Singapore that Farquhar submitted his drawing of the plant to Wallich.

On January 14th, 1822, Finlayson reached Malacca and collected for a week. The plants then got passed into the East India house, and were distributed by Wallich between 1828 and 1832.

Gaudichaud in 1837 upon his second voyage round the world collected at Malacca: but the voyage, the purpose of which was to drop consular officers at a number of ports, was done with great haste, so that he could not collect much.

Cuming, who spent the years 1835 to 1839 upon a great collecting expedition to the Philippines islands, in the last year visited Malacca in order to go to Mount Ophir. In what month has not been ascertained.

In 1841 Griffith was appointed surgeon at Malacca and applied his tremendous energy to collecting: but he had not been long at the station when Wallich was taken ill, and in consequence he was called to Calcutta to take charge of the Company's Garden. During this period of his service he visited Mount Ophir, passing to reach it through Rim; there is an Ayer Panas near this route: but he visited also the Ayer Panas which is north of Alor Gajah. He engaged a Portuguese of Malacca named Fernandez as collector, and left him at work while he was acting for Wallich. He returned to Malacca in January, 1845, only to die a month after his arrival. His copious notes, often only in pencil, and his specimens, were bequeathed to the Company, and the notes were published as Posthumous Papers under the editing of McClelland, who clearly had in doing this a difficult task. From them it appears that Griffith himself, except in making the two expeditions as stated above, did not get far afield from Malacca town. Tanjong Kling, Kamuning, Cheng, Pringgit, Malim, Batu Berendam, Pulau Panjang, Pulau Java, and Pulau Besar, are localities recognisable in his notes and so recorded as if he himself visited them: they are all close to the town. After his return in 1845 in the short month left to him, he employed two native collectors whose names are variously spelled in the Posthumous Papers. One, apparently was a native of southern India with the name of Verapha; the name of the other was spelled by Griffith Nhingghull. The latter collected for Griffith about Alor Gajah and forwards to Tebong. In the Posthumous Papers the names of these men sometimes appear as if place names. "Tanjong" in these Papers appears to stand for Tanjong Kling; and the Ayer Panas mentioned is possibly in all cases that north of Alor Gajah.

Griffith's friend Westerhout brought plants to him from Keru between Ayer Panas and Tebong. Another friend, Sir William Norris, brought plants to him from Mount Ophir.

In 1845 Thomas Lobb who has been mentioned as having collected in Penang, collected also in Malacca.

In 1858 Jagor voyaged to Java, and upon the way stayed in Malacca from April to July. He made the journey through the forest belt to Ayer Panas north of Alor Gajah, via Ching and Rumbia, and he records that forest commenced near Rumbia about ten miles from Malacca. He also ascended the Linggi river for a short distance (Reis-skizze, 1886).

The next of the Malacca botanists was Maingay. Having accompanied the 1860 expedition to China, he on his return westwards became magistrate in charge of the Jail in Malacca; and over the years from 1862 to 1868 he collected and studied the flora very diligently, leaving a large herbarium and five note books on it, when in 1869 he was shot down in a mutiny in Rangoon. The herbarium and the notes are preserved at Kew; but by the phyto-geographer it is to be regretted that he rarely recorded the places whence his specimens came.

In 1877 there was a resident in Malacca, a W. S. C. Pinwill who sent Pteridophytes to Kew. In 1879 Sir George King paid a short visit in the month of November. In 1882 Cantley commenced his study of the forests of Malacca, with the object of organising a forest department; and in 1884, the better to ascertain the composition of them he stationed there a collector named Alvins, who sent numbered plants to him in Singapore in bundles as they were prepared and dried. He is recorded as having sent about one thousand before the year was out and is recorded as having sent 1,840 in the year 1885. By the use of the numbers it is possible in a great measure to trace Alvins' collecting places. The first seem to have been in the two forests nearest to the coast, namely the reserves of Sungei Udang and Merlimau: then he moved to the more inland forests around Selandar. He collected at a Bukit Danan, which has not been identified, between two periods at Selandar: some labels (not Alvins', but those additional labels which were attached in Singapore) state it to be in the State of Sungei Ujong, but not all; and because it is known that some of these additional labels are misleading (see Ridley in Gardens Report for 1889, p. 7) there is much probability that the Bukit Danan visited by Alvins is in eastern Malacca. When the numbering had reached the neighbourhood of 760, Alvins removed to the Naning corner of Malacca and his labels bear the names of Chinana Puteh, Bukit Naning, Bukit Klana, Bukit Kandong, Bukit Payong, Gaong Talan (possibly under Gunong Tampin), Bukit Dusun Paya, and Bukit Bertam, being places close to the limits of Malacca territory in the direction of the Negri Sembilan, or perhaps some just over the border in them. Unnumbered plants, probably gathered earlier than this, bear the names of Bukit Bruang, Pulau Nangka, Pulau Dodol, and other places near Malacca town, and Bukit Panchor. When he had collected considerably in Naning, he was sent into the State of Sungei Ujong as related under square 5*j*. But later still he worked in the square 7*k* upon the eastern border of Malacca territory, though not wholly, for the names of Merlimau and Bukit Kajang occur; and he seems to have reached Ayer Kuning in Negri Sembilan towards Geminchih.

Upon early labels the names of Bukit Kayu Arang and Bukit Terbakar are found: the first* was in the Sungei Udang forest reserve, the second in the Brisu forest. He also labelled plants with the name of Bukit Putus, apparently indicating the hill of that name north of Brisu.

It was decided in 1886 to appoint an officer from Europe to take charge of the Malacca forests under Cantley, and Derry was selected. He served in Malacca from August of that year to 1893 collecting plants, chiefly the larger forest trees, in various parts of his charge, and had headquarters at Ayer Kroh upon the edge of the Bukit Bruang Forest Reserve, except that through 1891 his presence was required in Penang, and Holmberg held charge. In 1893 and 1894 Goodenough took charge of the forest.

Feilding when he visited Malacca and Muar in 1892 appears to have gone to the foot of Mount Ophir and to have collected at the Lubok Kadondong there.

Harvey was Resident-Councillor of Malacca from 1882 to 1894 and made a herbarium of Malacca plants, which was given to Kew at his death: he also sent plants both to the Botanic Gardens, Calcutta, and to Singapore. His specimens are not precisely localised.

In 1889 Ridley paid his first visit to Malacca, and another in 1890 and others at intervals afterwards, the last being in 1917. Upon one occasion he visited Kuala Pedas in Negri Sembilan, and upon the last the neighbourhood of Tampin. In 1892 Curtis visited Malacca, and again in May, 1900, and in April, 1901, both brief visits. Hullett also visited Malacca in December, 1883, and in April, 1888, in order to climb Mount Ophir.

Between 1914 and 1924 administrative work took Burkill for short visits in every month of the year except September and to every part of the Territory. Collecting was done as occasion offered, and the localities were numerous, so numerous that as no names were used which are not on the maps, they will not be given. In November, 1922, Holtum collected in the Bukit Sedanan forest reserve and about Tampin.

Malacca has thus been very extensively examined and it is thought that a list of the plants occurring within this square might be made ninety-six per cent. complete. It has been botanised in every part of the year. Its surface offers interesting studies in what man in such a climate as it has can produce, and in plant-successions.

* The *Diospyros* trees which gave the hill its name were removed in 1883.

SQUARE 7*k*.

There is a narrow strip of Malacca territory on the western side of this square, which eastwardly extends into the States of Negri Sembilan and Johore. Mount Ophir is in the square and the greater part of the basin of the Muar river. The total land surface is about 1,200 square miles.

Naturally Mount Ophir has attracted botanists to it. Farquhar collected on it about 1818. Someone a little later supplied Mount Ophir plants to Robert Wight who himself never visited Malaya but was in service in Southern India upon the Madras Establishment. Newbold in April, 1833, ascended Mount Ophir from Asahan, and collected a few botanic specimens upon the summit which he sent to Wallich in Calcutta (Newbold's *British Settlements in Malacca*, 2, pp. 165-174, and *Journal of the Asiatic Society*, 1834, p. 48). In 1839 Cuming climbed it. In January, 1840, and again in April, 1848, Oxley climbed it. In Logan's *Journal*, 6, p. 636, is an account of the first of these ascents. We are told that then the virgin forest commenced at Rim; and that the gold mines, which had shortly before been destroyed, lay in a pocket amid the forest at the foot of the mountain. The ascent was by a Padang Batu—probably the well known one which many travellers have mentioned. In February, 1842, Griffith visited the mountain, not only ascending to the highest summit, but seeking plants upon the slopes of the subsidiary Gunong Mering. Oxley's second visit is the next historically, and as a result of it he sent plants to Kew. In 1853 an ascent was made by (Sir) T(homas) Braddell in the company of a botanist; but it is not known who this was. The ascent is described in Logan's *Journal*, 7, p. 73. In the year 1864 and again in August, 1867, Maingay climbed the mountain. There is an account of an ascent in the *Singapore Free Press* of March 10th, 1864. At that time the village of Asahan was unoccupied.

Cantley is said to have acquired plants from Mount Ophir, but it is not clear by what means, though his collector Alvins was at Chabau towards the end of his time. Hullett climbed the mountain in December, 1883, and in April, 1888; and subsequently gave his collections to the Botanic Gardens, Singapore. Derry climbed it in May, 1890, which month he remarks is not in a flowering season (Report on the Botanic Gardens and Forest Department for 1890, p. 22). Hervey and Ridley climbed Gunong Mering together in 1892 and in 1898 Ridley took leave in the month of December to climb Mount Ophir again. Bukit Kayara and Sungei Pauh are two contiguous localities on this trip. His Botany of Mount Ophir is in the *Journal of the Straits Branch of the Royal Asiatic Society*, No. 35, p. 1.

The Kesang river flows from the foot of Mount Ophir to the Straits of Malacca, and in its valley Burkill has collected upon several occasions about Chabau, Chinchin and in the State of Johore towards the Muar river. Lubok Kadondong and Rihlau are by its headwaters. Feilding was sent in 1892 to the foot of Mount Ophir to Lubok Kadondong.

In April, 1901, Curtis ascended the Muar river to Biawak.

In spite of these many visits to Mount Ophir, the botany of the square is very little known, so that there are only 150 species of the Thalamiflorae-Calyciflorae to be recorded as yet for it as against 794 for square *6k*. Now with so high a mountain in it as Mount Ophir the flora must be more than half as rich again as that of square *6k*; and on that assumption our knowledge of it appears to stand at only twelve per cent. It is certain that Mount Ophir deserves more attention.

SQUARE *8k*.

This square is entirely in the State of Johore and botanically it is very little known.

In 1892 Lake and Kelsall crossed a part of the square, having ascended the eastward flowing Sungei Sembrong, and the Sungei Kahang, they got into the westward flowing Sungei Sembrong and so to Batu Pahat. Their locality Simpai or Kampong Simpai is in the square close to the course of the railway, upon the eastern Sungei Sembrong. Sungei Malati is not remote.

In November, 1900, Ridley ascended the Simpang Kanan river from Batu Pahat as far as one of the very numerous Tcbing Tinggis that exist. It is assumed that he had entered this square then.

In 1922 between November 15th and 20th Holttum collected in the square about Kluang, climbing Gunong Lambak. In 1923 Watson made a track to the summit of Gunong Belumut from the direction of Kluang, and in May, 1923, Holttum was at Kluang again and proceeded to Gunong Belumut in square *9k* over Watson's track.

Down in 190 collected on the Bekok river, probably upon the part of the river near to the railway line.

The species of the Thalamiflorae-Calyciflorae known, as the map shows, amount to only 54, which may indicate a knowledge of about six per cent. of the total flora.

SQUARE *9k*.

This square is entirely in the State of Johore, and contains Gunong Belumut. The land surface is about 1,080 square miles.

Gunong Belumut was climbed by Hervey in 1879, but it is not known what plants he collected upon it, though he recorded that he brought some down. Lake and Kelsall in 1893 mapped the Sungei Kahang and the Sungei Madek, and collected in the Ulu Kahang.

Belumut was botanised on by Holttum between May 23rd and June 1st, 1923. Watson shortly before had cut a trail from the Kluang-Mersing road to the summit, and had collected a little. This trail Holttum followed; it took him via Ulu Madek and Gunong Chemondong; he returned by Gunong Berchuak, Ulu Kahang and Gunong Beridong.

The species of the Thalamiflorae-Calyciflorae collected within the square and identified are 117 and judging therefrom the botany of it is about twelve per cent. known.

SQUARE *ok.*

Some 35 square miles of the Peninsula, being part of the State of Johore are within the square, and various small islands, of which Pulau Tinggi is the largest. Pulau Aor has been squeezed into the square, so as to avoid having to make a new index number for it.

Pulau Aor used to be a pirate haunt, a mart for the slaves that they took; and it invited a considerable population which has tilled it to the summits. Koenig in 1778 visited it, and found it thus well inhabited. In 1849 J. T. Thomson, the Government Surveyor employed in Singapore described it in Logan's Journal. Nestling close under it is Pulau Dayang.

Feilding in October, 1892, visited successively Pulau Tinggi, Pulau Aor and Pulau Dayang. Burkill in 1915 accompanied Robinson to Pulau Tinggi and spent the period from June 16th to the 20th there; but failed to reach the top of the mountain which gives to it its name. Robinson and Knight during the same period visited the islet of Pulau Sanggul or Tokong Sanggul which is immediately to the south of Pulau Tinggi.

The map shows that 53 species of the Thalamiflorae-Calyciflorae are recorded, and as the flora of the area is probably less by one third than that of Penang, it seems as if we can name ten per cent.

SQUARE *7l.*

There are only about 220 square miles of land in this square, being the coast of the State of Johore near Batu Pahat and the lower parts of the two rivers which converge upon it. There are low hills and swamp lands in the square.

Feilding visited Parit Jawa and Bukit Muar which are in the square in 1892 and Lake and Kelsall in the month of August collected a little near Batu Pahat town: and in the same year Nongchi sent orchids from the neighbourhood

to Ridley. In 1900 Ridley was at Batu Pahat town from October 31st to November 18th; and Machado with him. The following are collecting places visited then:—Gunong Banang, Gunong Penggaram, Bukit Soga, Patani Ketchil, Hadji Senawi, and the headland of Batu Pahat. From Batu Pahat town or Bandar Penggaram Ridley ascended the Sungei Simpang Kanan (Report Bot. Gardens for 1900, p. 5). In November, 1924, at the end of the month, Burkill and Haniff visited Batu Pahat town.

The map indicates 70 as the number of the Thalami-florae-Calyciflorae known from the square; and as the flora cannot be a very rich one, we probably know 10 to 15 per cent. of it. It will be observed that collecting has only been done towards the end of the year.

SQUARE 8l.

There are some thousand square miles of the State of Johore in this square, which is botanically almost unknown.

Lake and Kelsall crossed a corner of it when they descended the Sungei Simpang Kanan, and similarly Ridley when he ascended it, as recorded under the heading of the last square. Burkill and Haniff collected in the end of November, 1924, a few plants in it at Ulu Benut and on the west of Sedenak.

SQUARE 9l.

The surface of this square is entirely of land, and in the State of Johore. Gunong Pulai is towards the south-west and Gunong Pantl towards the east.

Burbidge and Murton climbed Gunong Pulai in August, 1877 (Burbidge, Gardens of the Sun, 1880, p. 31). In the latter part of 1892, Lake took a plant collector thither from the Botanic Gardens, Singapore. Ridley, in December, 1904, took leave and spent a week upon it. In 1922, when extensive clearings were being made for waterworks, two other collectors, Mohamed Nur and Kiah, were sent thither from the Gardens. They collected along the Sungei Pulai Dua, on Gunong Pulai Duatas, on Bukit Abu Bakar and to the summit. Best visited the summit on December 18th, 1922, and Holttum on November 16th, 1924. Sedenak railway station visited by Ridley in August, 1908, is within the square to the north of Gunong Pulai.

Burkill and Haniff collected in the end of November, 1924, on the Scudai river to the south-east of Gunong Pulai.

Vesterdal collected at Mount Austin to the north of Johore Bahru.

In 1880 Kunstler visited Gunong Pantl in June. In December, 1892, Ridley climbed it from Kota Tinggi, and again in 1910 with le Doux. Holttum in March, 1925,

climbed it also with le Doux, and Haniff in December, 1925, and Holttum in February, 1926.

Gunong Muntahak which is near was visited by Kloss.

Southwards and right upon the edge of the square is Panchur where Ridley collected in 1900.

King in 1879 with Hullett visited Jaffaria which is somewhere within the southern edge of this square; and in May, 1903, Ridley visited Castlewood, which is not far away.

The total number of species of the Thalamiflorae-Calyciflorae collected is on the map 242 and our knowledge judged by this may be twenty per cent.

SQUARE 0l.

There are about 450 square miles of the State of Johore in this square, all but botanically unknown.

It has been said that Lake and Kelsall collected on the Sedili river; but that statement is erroneous. Feilding in 1892 and Down are the only persons who have collected upon it and they only a very little.

Ridley visited Johore Lama which is upon the western margin in October, 1900, from Pandim in square 9l.

SQUARE 8m.

There are only 60 square miles of the State of Johore in this square; it consists of very low-lying land. Kukob, which is the chief place in it, and the Tempayan river were visited by Ridley in April, 1908, and the Penerok river by Burkill on August 10th, 1913, and January 25th, 1914.

SQUARE 9m.

This is the square of Singapore Island; and contains with it a small part of the State of Johore wherein is the town of Johore Bahru.

The part of Johore which is in the square has been visited by Ridley at such localities as Tanjong Bunga, Tanah Runto, Tanjong Kupang and Tanjong Merawan. King, Hullett and Kunstler visited Johore Bahru.

Raffles at his taking over of Singapore collected plants, as Jack tells us in one of his letters to Wallich, being three species of Nepenthes: then Jack himself visited Singapore in June, 1819 (*vide* Journal of the Straits Branch of the Royal Asiatic Society, No. 73, p. 177). At this time Singapore Island was so completely "covered with jungle" that there was found to be barely large enough "a small spot on the eastern bank of the river barely large enough to pitch the tents on" which Raffles had brought with him.

Wallich in 1822 voyaged to Singapore expecting to meet his friend Jack, but Jack was dead then. Farquhar, who has been mentioned as having botanised in Malacca, was then Resident; and Wallich enjoyed his friendship as he had that of Raffles. He collected with his usual energy from August to the end of November. In the same year, but from January 20th to 25th, Finlayson had been in Singapore and collected. Wallich's specimens, Finlayson's and such as Jack had sent to Wallich, were among those distributed from London by Wallich between 1827 and 1832.

Gaudichaud was the next botanist to touch at Singapore, and that very lightly in the month of February, 1837. In 1835 and 1839 Cuming entered the port in his little exploring schooner, and collected, but chiefly living plants (*vide* Gardens Bulletin, 2, p. 441). In 1845 or 1846 Thomas Lobb likewise collected.

At this time the cultivators of gambier and pepper were completing the overrunning of the island with their temporary cultivation: the forest had suffered most extensive destruction both to get virgin soil for the pepper and fuel for the gambier boiling.

Oxley towards the end of a residence in the East of twenty-five years entered into correspondence with Kew, and sent plants: he sent plants also to Voigt in Bengal. A contemporary of his was Motley who during his residence of a year in Borneo, visited and collected a little in Singapore: this was apparently in the year 1852. Early in 1857 Sir Robert Schomburgk passing through the port collected for Kew. In 1861 Thomas Anderson doing the same collected and so also Kurz in December, 1863. In May or June, 1865, Beccari reached Singapore upon his way to Borneo and apparently he visited Singapore more than once afterwards, using these opportunities for collecting. In September, 1867, Maingay, passing through Singapore collected: and Wawra likewise passed through the port thrice, once at the end of 1872 and twice early in 1873; and also collected. In 1879, in August and September, Sir George King collected in Singapore.

In Wight's herbarium were some plants labelled "Singapore, Dawood." It is suspected that a native collector named Daud had got them at the instance of Wight's brother.

The continuous botanising of Singapore commenced in 1875 when Murton was appointed to the post of Superintendent of the Botanic Gardens. He was ambitious of producing a Flora of the island, and probably collected with diligence; but destroyed his collections when leaving Government service. In his time the neighbourhood of the Gardens seems to have been covered either with secondary

forest or with forest greatly deteriorated by the removal of timber. Cantley succeeded Murton in 1880; and set to work at the investigation of the flora: but his impaired health drove him to England in 1881, whither he took, to work at in the Royal Gardens, Kew, as many specimens as he could accumulate. Returning in 1882, he began to train a plant-collector, and tried to set in order what Murton had left; and in March of the year he was instructed to draw up recommendations for the care of the forests and forest lands of the Straits Settlements. His report on them was out in July, 1883; and it contains an interesting list of timber trees then verging on extinction in Singapore island. (Reports on the Forests of the Straits Settlements, appendix). At that date "such Crown forests as remained uncut were widely distributed in isolated patches over the island. . . . of various sizes from half an acre or so to twenty acres" and the Government had difficulty in selecting areas for economical conservation, so much so that not one half of these first suggested actually were included within the final selection as Reserves; and if reference be made to Ridley's Annual Report on the Botanic Garden and Forest Department for the year 1889, p. 10, it will be realised that failing to find adequate virgin forest that which was reserved contained very little good forest.

When Cantley died, Ridley in 1888 succeeded him as Director of Gardens and Forests. Unfortunately he found that much of what had been collected had perished: and this being so, the Singapore Herbarium is almost entirely of the latter's creating. Tassim Daud worked as a plant collector under him and as herbarium keeper until 1895; and Goodenough was temporarily under him in Singapore in 1895 and 1896. He frequently sent trained native plant-collectors out with exploring parties willing to look after them.

Hullett, who had been stationed in Singapore for a number of years, presented his herbarium to the Singapore Gardens when leaving the East in 1889.

Burkill succeeded Ridley in 1912. He was joined by Baker for a part of 1917, by Chipp in 1919 and 1920, by Holtum in 1922, and by Henderson in 1924. Working under these were the following who collected also, Ahmed bin Hassan, Kastawi bin Jalil, Mohamed Nur bin Mohamed Ghose, Ahmed bin Hadji Omar, Subramanian, Kiah bin Hadji Mohamed Salleh and others and their names will be found on plant-labels.

Visitors who have collected in Singapore since 1880 have been Scortechini who was on the island in 1886; Max Fleischer in 1898; Raciborski in 1899; Engler in 1905; Matthew in 1913,

The last named visited Johore also. In 1901 there was resident in Johore Jansen who conceived the idea of collecting sets of plants for sale; but seems not to have carried it out, though plants collected by him are conserved at Copenhagen.

In the year 1900 Ridley published a Flora of Singapore in the Journal of the Straits Branch of the Royal Asiatic Society, No. 33, p. 27, and in 1901 he published some addenda in No. 35, p. 84.

It is interesting that the lesser the land surface the further from typical high forest is the vegetation upon an islet: and this is illustrated by Holtum's account of the plants upon Pulau Jong (Singapore Naturalist, Vol. I, 5, p. 47.) Pulau Jong is a few miles removed from the south shore of Singapore island.

Very little has been added since Ridley's Flora; so little that the island itself may be held as about ninety-nine per cent. known: but within the square is a part of the State of Johore, which is scarcely known, and taking it into consideration it may be assumed that the square is about ninety-six per cent. known.

SQUARE *Om.*

The land surface within this square is only about 160 square miles of the State of Johore. Opposite to it are parts of the Dutch islands of Pulau Batam and Pulau Bintang which are outside our consideration.

The square was overrun by pepper and gambier plantations in the years 1840-1850 and other planting has followed. Ipecacuanha was grown there about 1880-1890 at Pinyerong; and it was probably on a visit to the plantation that Cantley got the Johore specimens which he took to Kew in 1882: they are dated February.

Feilding visited Tanjong Surat which is north-north-east of Changi in 1892. Ridley in 1890 collected over the island of Pulau Tekong.

It is chiefly from the collections of the last that we know so many of the Thalamiflorae-Calyciflorae of the square as 48. It indicates about ten per cent.

THE COLLECTING PLACES.

This list serves as an index to the foregoing pages and is meant to be used in the herbarium as a means of getting, with the aid of maps, as much information as possible out of the localities given upon labels.

- Alor=a ford
 Gajah—6k
 Sta—2b
 Ampang (Ipoh)—4e
 Anak Bukit—2b
 Ara Kudah—3d
 Aring—6d
 Aroa islands—3j
 Ayer=water or stream
 Hangat—1b
 Hitam—8h
 Kroh—6k
 Kuning (Taiping)—3e
 Kuning (N. Sembilan)—6j
 Panas (two)—6k
 Puteh—8g
 Raja forest—5h
 Assam Kumbang—3e
 Asun—2b
- Bagan Datoh—3g
 Bagan Serai—3d
 Bahau forest—6j
 Baling—3c
 Balok—8g
 Bandar Matahari—2c
 Bandar Penggaram—7l
 Bandar Telok Anson—4f
 Bangi—5j
 Batang Benar—5j
 Batang Berjuntai—4h
 Batang Padang—4f
 Bator Kelantan—6e
 Batu=rock
 Balai—6g
 Bau—5e
 Berjengkong—1b
 Bunga—1b
 Caves—5h
 Gajah—4f
 Hampar—3e
 Kurau—3e
 Pahat—7l
 Papan—5e
 Talam—5g
 Tiga—5h
 Tugoh—3e
 Bedong—3c
 Behrang forest—5g
 Bekok—8k
 Belimbing (Legeh)—5b
- Belimbing (Malacca)—6k
 Belingu—6h
 Bemban (nr. Triang)—6j
 Benchah forest—6f
 Benom mountain—6g
 Benta—5f
 Bentong—5g (5h)
 Benus valley—5h
 Benut—8l
 Beranang—5j
 Bernam river—3-5g
 Beserah—8g
 Besih Hangat—2b
 Betong—4c
 Biawak—7k
 Bidor—4f
 Bikum—4g
 Bilut reserve—5g
 Bintang—7h
 Biserat—4a
 Blanja—3f
 Blanda Mabok—3e
 Blay Manis—6f
 Bohei—8h
 "Box" hill—3e
 Briah—3d
 Bruas—3f
 Budu—6f
 Bukit=a hill or ascent
 Abu Bakar—9l
 Banang—7l
 Belata—4g
 Bertam—6k
 Besar—4a
 Besih Hangat—2b
 Birch—3e
 Bruang—6k
 Cheraka—4h
 Danan—6k
 Duri—7h
 Dusun Paya—6k
 Etam—5h
 Fraser—5g
 Galing—8g
 Goh—8g
 Gowa—4a
 Itam—5h
 Jalor—4a
 Jelatah—5e
 Jitan—8k
 Kajang—6k

- Bukit—(*contd.*)
 Kandong—6k
 Kapis—8g
 Kayara—7k
 Kapayang—4e
 Kapayang—5j
 Kayu Arang—6k
 Klana—6k
 Kuda—5h
 Kutu—5g
 Lagi—2b
 Lasing—5j
 Linggung—6j
 Mertajam—2d
 Muar—7l
 Mudom—7l
 Naning—6k
 Nuang—5h
 Nyor—5h
 Panchor—6k
 Papan—6d
 Patani—7l
 Payong—6k
 Penggaram—7l
 Pinang—2b
 Putus—6k
 Raja Wang—2b
 Raka—5g
 Ruang—2b
 Sedanan—6k
 Selat Panchor—1b
 Sembilan—4b
 Soga—7l
 Sutu (Setul)—5j
 Tangga—5j
 Tanjong—2b
 Tanah Abang—9k
 Tapang—4a
 Telor Jambu—2b
 Temangan—6c
 Terbakar—6k
 Ubi—8g
 Wang—2b
 Wok—
 Bundi—8f
 Burau—1b
 Butang islands—1a
 Butong island—2d
 Cameron's Plateau—4f
 Cape Rachado—5k
 Castlewood—9i
 Caulfeild's Hill—3e
 Chabau—7k
 Chanderiang—4f
 Changkat=a shallow; rising
 ground
 Jerin—3e
 Jong—4g
 Mentri—4g
 Serdang—3e
 Channing—6d
 Cheka river—6f
 Chemor—4e
 Cheng—6k
 Cherating river—8f
 Chinchin—7k
 Chineras—6f
 Chini—7h
 Chirana Puteh—6k
 Chupeng—2b
 Darat Selah—8h
 Degong—4f
 Dindings—3f
 Dong—5g
 Durian Pipit—3d
 Durian Sabatang—4f
 Durian Tawar—6j
 Dusun Gajah—2c
 Dusun Tua—5h
 Endau river—8j, 9j
 Enggor—3e
 Fraser Hill—5g
 Galas valley—6d
 Gali—5g
 Gaong=a hollow
 Talan—6j, 6k
 Gapis Pass—3e
 Garawang—5h
 Gemas—7j
 Gemenchih—6j
 Genuang—7j
 Ginting=a narrow or pass
 Bidai—5h
 Kabok—2a
 Peras—5h
 Sempak—5h
 Gopeng—4f

- Goa=a cave
 Batu—5h
 Chirita—1b
 Kechapi—5e
 Ninneh—6e
 Panjang—5e
- Great Redang island—6c
 Grik or Grit—4d
 Guai—6f
 Gunong=a mountain
 Arang Kayu—3e
 Arang Para—3e
 Angsi—6j
 Bal—4e
 Banang—7l
 Batu Brinchang—4f
 Batu Puteh—4f
 Bechua—9k
 Belumut—9k
 Benom—6g
 Berekeh—4e
 Beremban (Wray's)—4f
 Beremban (Ridley's)—4f
 Beremban (Alvins')—6j
 Beridong—9k
 Berumber=Beremban
 (Wray's)—4f
- Bintang—3d
 Bongsu—3d
 Bubu—3e
 Bujong Malacca—4f
 Chabong—4e
 Chemondong—9k
 Chindrang—1b
 Chini—7h
 Chunam Prah—4f
 Geriang—2b
 "Haram"—3e
 "Haram Para"—3e
 Ina—4c
 Inas—3d
 Janeng—8j
 Jerei (Kedah Peak)—2c
 Kayara—7k
 Keledang—4e
 Kendrong—4c
 Kerbau-Korbu
 Kluang Terbang—6g
 Korbu—4e
 Lambak—8k
- Ledang—7k
 Melintang—
 Mengkuang Lebar—5h
 Mentahak—9l
 Menuang Gasing—5h
 Merah—3d
 Mering—7k
 Meriong—7k
 Mesah—4f
 Pantii—9l
 Penggaram—7l
 Pondok—3e
 Pulau—9l
 Pulau Duatas—9l
 Rajah—5g
 Rapat—4e
 Raya—1b
 Sennyum—6g
 Stong—5d
 Tahan—6e
 Talan—6k
 Tampin—6j
 Terbakar—4f
 Titi Basah—4c
 Tunggal—3f
 Ulu—4f
 Ulu Kali—5h ? 5g
 Yong Blar—4e
- Gurun—2c
- Hadji Senawai—7l
 "Haram"=Arang
 Hermitage Hill—3e
 Hutan Melintang—3g
 Ijok—3d
- Ipoh—4e
- Jaffaria—9l
 Jalor—4a, 3b, 4b
 Jambu—8g
 Jambu lorong—
 Jelei river—6f
 Jellam Panjang—6h
 Jenum—2b
 Jeram Panjang (S. Lebir)—6d
 Jerantut—6g
 Jering State—4a, 5a
 Jitra—2b
 Johit-Rambeii forest—5g
 Jhol—6j

- Johore State—7-0k, 7-0l, 8-0m
 Johore Bahru—9m
 Johore Lama—0l
 Jor—4f
 Juasseh—6j
 Jugra—4j

 Kadondong—6g
 Kahang river—9k
 Kajang—5j
 Kal=Kol
 Kala Kiri—4a
 Kalambalai—8h
 Kalindi—4f
 Kampar—4f
 Kampong=village
 Bandar Bahru—3f
 Gajah—4f
 Kobang—6d
 Kota (on Plus river)—3e
 Kota (Kelantan)—6b
 Parit—6c
 Pianggu—9j
 Simpai—8k?
 Kamposa—6b
 Kamunting—3e
 Kamuning—4e
 Kanching—5h
 Kangar—2b
 Kapayang—5j
 Karak—6h
 Katapang—8h
 Katapang—7k
 Kechau river—6f
 Kedah State—2a, 1-4b, 2-4c, 3d
 Kedah Peak—2c
 Kelantan State—6b, 5-6c,
 4-6d, 4-7e
 Kelantan river—6b, 6c
 Kelumpur—6e
 Kemaman—8f
 Kendong—6j, 6k
 Kenering—4d
 Kepala Batas—2b
 Kepis forest—6j
 Kepong—5h
 Kerling—5g
 Khol—6f
 Kinta—4f
 Kertai—4d
 Keru—6k

 Klang—4h
 Klang Gates—5h
 Klang water catchment
 forest—5h
 Klian=a pit
 Intan—4c
 Trus—2c
 Kluang—8k
 Kluang Terbang—6g
 Kota=a fort, or locally a cave
 (Kota, Taiping)—3e
 Bahru (Kelantan)—6b
 Bahru (Kinta)—4f
 Bahru (Rahman)—4b
 Glanggi—6g
 Tampan—3d
 Tinggi—9l
 Tongkat—6g
 Sarong Semut—2c
 Stia—3f
 Kramat (Ridley's at Pekan)
 —8h
 Krian—2d, 2e
 Kroh—4c
 Kuala=rivermouth
 Aring—6d
 Bedong—6e
 Bera (Pahang)—7h
 Bera (Perak)—
 Brawas—8g
 Brok=Bera
 Burau—1b
 Depang—4f
 Dong—5g
 Endau—9j
 Endong—6d
 Essam—6b
 Kahang—8k
 Kangsar—3e
 Kedah—2b
 Kendrong—4d
 Kerteh—5e
 Krai—6c
 Krau—6g
 Kuah—1b
 Kubu—5g
 Kurau—2e
 Langat—4j
 Lebir—6c
 Lepar—8h
 Limau Nipis—6d

- Kuala—(*contd.*)
 Linggi—5k
 Lipis—6f
 Luit—7g
 Lumpur—5h
 Mahang—8g
 Malaka—1b
 Manis (upper Pahang R.)
 —6e
 Manis (lower Pahang R.)
 —6f
 Miang—8h
 Muda—2c
 Pahang—8g
 Pedas—6k
 Pertang—6e
 Pilah—6e
 Rek—6d
 Relai—6d
 Sameh—6d
 Sawar—5j
 Sekim—8h
 Selangor—4h
 Semantan—6h
 Sembrong—9k
 Tahan—6f
 Tekam—6g
 Teku—6e
 Tembeling—6f
 Tenok—6e
 Wok—4f
 Kuang—5h
 Kuantan—8g
 Kukob—8m
 Kulat (Ridley's)—9l
 Kulim—3d
 Labu—5j
 Lahat—4e
 Lala Terlong—6e
 Langat—4j
 Langat valley—5h
 Langgar—2b
 Langkawi—1b
 Larut—3e
 Lawin—4d
 Lebir valley—6d
 Legoh State—4-5b, 5c
 Lenggong—3d
 Liang river—5g
 Linggi rivermouth—5k
 Linsum—5j
 Lubok = a pool
 Chini—6k
 Kadondong (Mt. Ophir)—7k
 Kadondong (Pahang)—8g
 Lanjut—6h
 Merbau—3e
 Paku—7h
 Pelang—6f
 Tamang—4f
 Lumut—3f
 Lunas—3d
 Mahang—8h
 Malacca territory—6k, 7k
 Malacca town—6k
 Manchis—6h
 Mantin—5j
 Matang—3e
 Mengkibol—8l
 Menglembu—4e
 Menuang Gasing—5h
 Menyala forest—5k
 Merlimau—6k
 Mersing—9k
 Mesa—5e
 Minyak Buku—7l
 Morib—4j
 Mount Austin estate—9l
 Mount Ophir—7k
 Muar river—6j-7k
 Muar town—7k
 Muda river—2c
 Nakawn Sritamarat—4a, 3b
 Nawng Chik—4a
 Negri Sembilan—5-6h, 5-7j,
 5-7k
 Nerang—3b
 Nipa Bay—0j
 Nyalas—7k
 Padang = open space
 Batu—7k
 Besar—1b
 Rengas—3e
 Sarai—3d
 "Pahang track"—5g
 Pahang State—4-7e, 4-8f, 5-8g,
 5-0h, 7-0j, 9k
 Pajam—5j

- Panchur—9l
 Pandim—9l
 Pangkor—3f
 Pantai (Kelantan)—6b
 Pantai (N. Sembilan)—6j
 Parit forest—3f
 Parit Jawa—7l
 Pasir=sand, a sandy beach
 Panjang forest—5k
 Panjang Ulu—3f
 Puteh forest—5k
 Loyang—6g
 Salak—3f
 Pasoh—6h
 Patani or Pattani States—
 4-5a, 3-6b, 5c
 Patani Ketchil—7l
 Patani town—4a
 Pegang—8h
 Pekan—8h (8g)
 Pelangai—6h
 Penang—2d
 Penarak—1b
 Penerok estate—8m
 Pengkalan=a landing place
 Bahru (on Bruas river)—3f
 Kazai—8h
 Kempas—6k
 Penjom—6f
 Penyabong—9j
 Perak State—3-5c, 3-5d, 2-5e,
 3-5f, 4-5g
 Perhentian Tinggi—5j
 Perlis State—2a, 2b
 Permatang Bertam—2d
 Petasih, nr. Triang—6h
 Pianggu—9j
 Pinang Tunggul—2c
 "Pine-tree Hill"—5g
 Pinyerong—0m
 Plus river—4e
 Pondok Tanjong forest—3d
 Pontian—8l
 Port Dickson—5j
 Port Swettenham—4h, (4j)
 Prai—2d
 Pramau—8g
 Province Wellesley—2-3c, 2-3d
 Puket circle—1-2a
 Pulau—5e
 Pulau mountain—9l
 Pulau = an island
 Adang—1a
 Ampak—1b
 Aor—0k
 Besar—6k
 Chengei (Chenggal)—6g
 Chupak—1b
 Datoh—6f
 Dayang—0k
 Dayang Bunting—1b
 Dodol—6k
 Hujong Duri—1a
 Jarak—2g
 Jong, Langkawi—1b
 Jong, nr. Singapore—9m
 Jellam—6h
 Ketam—8d
 Kinchi—6f
 Lallang—3f
 Lidi—1b
 Manis (upper Pahang R.)
 —6f
 Manis (lower Pahang R.)
 —8g
 Nangka—6k
 Nior Stali—1b
 Nipis—1a
 Padang—6f
 Pinang (Redang Is.)—8c
 Rawei—1a
 Rumbia—3f
 Rumput—8g
 Sakijang—9m
 Sanggul—0k
 Segai—1b
 Songsong—2c
 Tawar—6g
 Tekong—0m
 Tengah—1a
 Terutau—1a
 Tiga (Perak river)—3f
 Tijau—6f
 Tinggi—0k
 Tirie—1b
 Tiuman—0j
 Ubin—9m
 Quedah=Kedah
 Rahman State—4-5a, 4b, 4c
 Rajah Itam—3f

- Rantau—5j
 Rantau Panjang—4h, 5h
 Raub—5g
 Rawang—5h
 Rawei island—1a
 Redang islands—8c
 Reko woods—5j
 Relau Tujor—3e
 Rembau—6j
 Renchong—8h
 Renggam—8l
 Rihlau—7k
 Rim—6k
 Riverside—6c
 Rompin river—8j
 Rumbia—6k
 Rumbia island—3f
 Rungkup—3g
- Sai State—5a, 5b
 Salak—4e
 Salak (Kuala Lumpur)—5h
 Sawngkla—3a
 Scudai river—9l
 Sedenak—8l, 9l
 Sedili river—0l
 Selama—3d
 Selandar—6k
 Selangor State—3-5g, 4-5h,
 4-5g
 Selangor river—4h, 5g
 Selaru—6j
 Selinsing river—3e
 Semangkok Pass—5g
 Semantan—6h
 Sembilan islands—3f
 Senaling—6j
 Senaling Inas forest—6j
 Senawang—5j
 Sendayan—5j
 Sennyum—6g
 Sepang—5j
 Serdang—5h
 Seremban—5j
 Serendah—5h
 Serom—8k
 Serting forest—6j
 Setul (Siam)—1-2a
 Setul (N. Sembilan)—6j
 Siliau—5j
 Siminyih—5h
- Simpai—8k
 Simpam river—5g
 Simpang = a possibility,
 parting ways
 (Simpang nr. Taiping) —3e
 Ampat in Krian—3e
 Kanan river—7l
 mines—5g
 Simpit—3f
 Singapore island—9m
 Sira Rimau—3d
 Sirusa—5j
 Sitiawan—3f
 Slim—4g
 Sungei = river
 Bagu in Tiunan—0j
 Batu Asah—
 Bau—9k
 Bera—7h
 Benchah—6f
 Bertam—4f
 Biku—8k?
 Buloh forest—5h
 Cheka—6f
 Galas—6d
 Jelei in Pahang—5-6f
 Jelei in N. Sembilan—6j
 Jerneh—6k
 Kahang—8k
 Kaloh—5e
 Keluang—2d
 Kenering—4d
 Kertai—4d
 Kesang—7k
 Keteh—6e
 Kulim—4d
 Lebir—6d, 6e
 Lengggin—8k?
 Lepar—7g
 Liang—5g
 Limau—3e
 Madek—9k
 Mahang—8h
 Malati—8k
 Meang—8h
 Merapoh—5e
 Menyala—5k
 Morai—0m
 Njing—4e
 Patani—2c

- Sungei—(*contd.*)
 Pattani—4a, 4b
 Pauh—7k
 Paut—6f
 Penerok—8m
 Perting—5g
 Piah—4d
 Pinang (two in Penang 1s.)
 —2d
 Pinang (in Pahang)—
 Pulai Dua—9l
 Puyu—3f
 Raya—4e
 Renong—6d
 Repas—5g
 Segari—3f
 Sekin—8j
 Sembrong (eastward)—8-9k
 (westward)—8k, 7-8l
 Simpang Kanan—8k, 7-8l
 Simpam—5g
 Singapore—9m
 Siput (Kuala Kangsar)—4e
 Siput (Kinta)—4f
 Tahan—6f
 Tawar in Tiunan—0j
 Teku—6e
 Tembeling—6f
 Tenok—6f
 Tras—5g
 Tukang Sidin—4f
 Udang (Malacca)—6k
 Udang (Terutau)—1a
 Ujong State—5-6j, 5-6k
 Yu—5e
 Sungkai river—4f
 Tahan river—6f (6e)
 Taiping—3e
 Tambun—4e
 Tampin—6k
 Tanah Runto—9m
 Tani State—4a
 Tanjong=a promontory
 (Tanjong of Griffith=T.
 Kling)
 Agas forest—5k
 Antan—6g
 Api—8g
 Bunga—9m
 Duatah in Tiunan—0j
 Gajah Mati—8g
 Gul—9m
 Hantu—3f
 Kling—6k
 Kupang—9m
 Malim—5g
 Medang—8g
 Merawang—9m
 Musa—6g
 Neru—1b
 Rambutan—4e
 Sireh—
 Surat—0m
 Tembeling—8g
 Telok Lalu—6d
 Tuan—5k
 Tapah—4f
 Tasek=a lake
 Chinik—7h
 Enak—1b
 Gelugor—3d
 Tebing=a high river-bank for
 landing
 Tinggi (on Kangar R.)—2b
 (on Simpang Kanan R.)—8k
 Tebong—6k
 Tebong forest—6j
 Tebrau river—9l
 Tekong—0m
 Teku—6e
 Telaya Tujoh—1b
 Telapak—
 Telok=a bay
 Telok forest—4j
 Anson—3f, 3g
 Apau—1b
 Bahru—3g
 Datai—1b
 Gadong—4j
 Kertang forest—3e
 Lalu—6d
 Noh=Wau
 Sera—3f
 Sisik—8g
 Siun—1b
 Udang—1a
 Wau—1a
 Telom river (Ridley's)—4f
 Telok Jambu—2b
 Telok Malati—8h

- Telok Pinang—4e
 Telubin river—5a
 Temengor—4d
 Temerloh—6h
 Temiang—6d
 Temiang (Nr. Seremban)—5j
 Tembeling river (lower)—6f
 Temoh—4f
 Temoyang—1b
 Tempayan—8m
 Tengarok—9k
 Tenok—
 Tapa State—3-4a, 3b
 Terutau—1a
 Tiunan—0j
 Tokong=a rock
 Sanggul—0k
 Tomo—5c
 Tras—5g
 Tremangan—5b
 • Trengganu State—6-8c, 6-8d,
 7-8f
 Trengganu town—8d
 Triang forest—6j (6h)
 Trolak—4g
 Trong—4e
 Tupai—3e

 Ulu=headwaters of a stream
 Batu Pahat—8l

 Bendol—6j
 Benut—8l
 Bera (in Perak)—5g
 Bera (in Pahang)—
 Bubong—5g
 Chineras—6f
 Gombak—5h
 Kahang—9k
 Kal—Kol
 Kenering—4d
 Kerling—5g
 Kol—5g
 Langat—5h
 Madek—9k
 Pedas—6j
 Petasih—6j
 Rembau—6j
 Sapetang—3e
 Sedili—9l
 Selama—3d
 Selangor—5g
 Slim—5g (5f)
 Tekam—7g
 Utan Melintang—3g

 Waterloo estate—3e
 Weld's Hill—5h

 Yan—2c

“THE PALMS OF BRITISH INDIA AND CEYLON.”

The volume published under the above title by the Oxford University Press comes from the able pen of Father E. Blatter. Having lived for many years in India he has had exceptional opportunities to study both indigenous and introduced species of the Palm family. This, coupled with a keen interest in the subject, has resulted in the production of a book, useful alike to the botanist and the layman. Much useful information is contained in the volume, well supported by numerous photographs and figures which are a very great help for identification purposes.

The introduction contains much useful information (i) in regard to the Geographic Distribution of *Palmae* generally, (ii) a short history of the exploration of the Palm flora in India together with a detailed account of its distribution and (iii) a general description of Palms couched in popular language.

The remainder of the book is devoted to (i) descriptions, (ii) considerable information concerning the economic value and uses of some species with histories and legends concerning them and (iii) photographs and figures. The descriptions generally, are very good and are set forth in scientific terms. Keys for identification purposes have been utilised in dealing with all genera and to a lesser extent, for the species. The generic keys are of necessity couched in botanical terms. Specific keys have been treated less scientifically, being in most cases based on general characteristics. Similarly, in a few instances the distinguishing features of two species have been contrasted or tabulated side by side. These, together with the many admirable photographs, should be of considerable assistance in the identification of species and will certainly be welcomed by the layman. This work might have been applied with good results to all genera in which two or more species are mentioned. The economic uses and importance of several of the better known species are dealt with in detail, especially in the cases of the Coconut, Betel Nut, and Date Palm. The histories and legends connected with these latter, are mentioned at length and give an interesting insight into the important part played by these plants in the lives of the natives, past and present. Cultivation is briefly touched upon, that dealing with tropical planting being of most value. Considerable work has been put into the compilation of lists of common and local names which should be of considerable use for determination purposes. No review would be complete without mention of the

admirable series of photographs included in the book; they should make identification a much easier matter. These are supplemented by numerous figures dealing with the morphology of flowers, etc., as aids to identification.

The author is to be congratulated on the production of a book useful alike to the botanist and the layman, a by no means easy task.

F. FLIPPANCE.

RELATIVE HUMIDITY

of the air at the Botanic Gardens, Singapore, from wet and dry bulb hygrometer readings made daily at 9 a.m. during the year 1926.

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	90	75	71	74	80	78	71	79	89	86	83	72
2	98	69	71	70	69	93	75	77	78	83	65	76
3	98	67	76	76	81	95	68	83	74	77	74	78
4	84	73	83	78	91	93	76	72	74	67	85	77
5	84	74	75	76	79	95	79	83	77	75	83	83
6	88	70	68	72	73	85	83	91	76	95	68	79
7	82	64	72	79	76	72	90	89	85	77	69	72
8	82	67	82	71	76	90	79	75	95	67	72	74
9	76	73	75	67	72	76	79	77	73	76	74	75
10	74	71	75	72	74	72	76	78	77	79	68	71
11	68	69	74	67	68	76	76	84	75	85	76	74
12	69	69	76	69	76	76	98	87	76	95	72	91
13	71	86	77	72	73	93	83	81	88	77	77	83
14	71	83	74	76	81	74	75	83	87	72	76	95
15	81	79	74	79	80	83	74	81	77	70	95	72
16	82	77	73	76	71	72	82	75	72	88	77	93
17	82	79	91	69	76	93	85	72	85	84	78	72
18	73	71	74	95	95	70	91	90	95	98	95	73
19	74	77	72	73	85	83	79	85	84	79	83	80
20	95	81	79	91	93	76	98	79	91	72	95	79
21	75	77	79	83	79	76	95	77	79	83	76	91
22	93	87	64	73	76	81	74	79	75	83	89	78
23	77	74	74	67	91	76	75	76	95	81	87	98
24	75	79	77	67	95	93	91	72	79	83	68	87
25	93	77	74	69	72	76	87	98	79	79	69	88
26	93	73	77	67	71	77	77	85	76	95	67	90
27	79	75	79	72	70	77	77	75	83	76	78	78
28	83	70	72	73	72	85	75	77	72	70	72	89
29	75	..	70	74	76	76	79	75	79	78	77	98
30	74	..	70	91	75	87	95	74	98	82	81	81
31	74	..	72	..	72	..	98	85	..	84	..	88

Mean for the year 79.

RAINFALL

at the Botanic Gardens, Singapore, during the first half
of the year 1926.

Readings taken at 9 a.m., and expressed in inches.

Date	January	February	March	April	May	June
1	1.00	...	.01	.01	.68	.01
2	.73	...	...	...	...	.67
3	1.36	...	...	.01	.45	.28
4	.02	...	.30	...	...	.28
5	.24	...	.03	.86	1.26	.27
6	...	...	.01	.25	.01	1.11
7	...	...	...	.01	trace	...
8	...	...	.05	...	...	.25
9	...	...	.65	trace	...	.01
10	...	...	...	...	.28	...
11	...	...	...	...	...	...
12	...	...	...	...	trace	...
13	...	.02	.09	...	.42	.14
14	...	.56	.05	...	.07	.30
15	.02	.99	.15	...	.26	...
16	...	...	...	.20	...	...
17	.24	...	.03	...	.02	1.30
18	.01	...	.02	.61	.05	1.17
19	...	...	.01	.01	.55	trace
20	.93	...	1.39	.17	.36	.14
21	.08	...	...	.14	...	...
22	.36	2.71	.01	.66	.44	...
23	trace	...	...	...	.05	...
24	.10	1.07	...	...	.30	.27
25	.02	.32	...	...	trace	trace
26	1.36	...	.06	2.02	...	...
27	.02	.03	.16	...	...	trace
28	...	...	.01	...	.09	.06
29	trace	...	...	.06	.02	1.01
30	...	...	.04	.10	...	.01
31	...	...	...	...	...	...
Total ...	6.49	5.70	3.07	5.11	5.31	8.39

RAINFALL

at the Botanic Gardens, Singapore, during the second half
of the year 1926.

Readings taken at 9 a.m., and expressed in inches.

Date	July	August	September	October	November	December
1	.03	.63	2.79	.03	..	.03
2	..	..	trace	.01	..	.01
3	..	.85	.22	..	..	.03
4	trace	..	trace	.15	.03	.47
5	.21	.65	.01	..	..	.01
6	2.15	1.28	..	.83	..	.42
7	.60	.04	.23	.04	.17	.11
8	.07	trace	1.57	..	.19	.05
9	..	..	.78	..	.02	.15
10	.21	..	..	..	..	.01
11	..	.26	..	trace	..	.29
12	3.11	trace	..	.50	.05	..
13	.05	..	.39	.62	.17	.02
14	..	..	.17	..	..	1.65
15	..	.01	.88	..	.28	..
16	..	..	..	1.16	.02	.05
17	..	..	.31	.19	1.35	..
18	..	.30	1.05	.78	3.19	1.33
19	.01	.01	.01	.92	.04	trace
20	1.82	.21	.07	trace	.49	..
21	.44	.01	1.65	..	trace	.07
22	.01	..	..	.04	1.51	1.05
23	..	trace	1.54	..	trace	1.61
24	.63	..	.05	1.80	.06	.01
25	.14	.77	..	trace	..	.15
26	..	.02	.06	.42	.01	.50
27	.24	trace	.14	.01	.47	trace
28	.39	..	..	..	..	.66
29	..	..	.04	trace	1.02	1.17
30	.86	.15	1.30	.20	.01	.09
31	.39	.17	..	..	..	.08
Total ..	11.36	4.76	13.26	7.70	9.08	10.02

RAINFALL

at the head of the Waterfall Gardens, Penang during the first half of the year 1926, in inches.

Readings taken at 8 a.m. and credited to the date in which the twenty-four hours begin. Data kindly supplied by the Municipal Commissioners, George Town, Penang.

Date	January	February	March	April	May	June
1	..	..	..	.06	..	..
2	..	..	..	..	.17	.05
3	..	..	..	..	.05	.09
4	..	..	.55	1.02	..	..
5	..	..	..	.65	..	..
6	..	..	..	.03	..	4.36
7	..	..	..	.05	..	1.00
8	..	..	.76	1.64	..	.22
9	..	..	..	.03	.03	1.22
10	.03	..	..	.05	..	..
11	..	..	..	..	..	.06
12	..	..	..	..	1.86	..
13	..	..	2.35	..	.03	.67
14	..	..	.05	.23	.10	.03
15	..	.30	.04	.03	..	..
16	..	..	..	..	.90	.04
17	.13	..	.06	.65	.11	.17
18	..	..	..	..	.12	..
19	..	.12	.97	1.78	..	.03
20	.07	..	.17	.23	..	1.50
21	..	.03	.03	..	..	..
22	.05	..	..	1.99	.18	..
23	.92	.07	..	.06	..	.15
24	..	.70	..	.04	.06	..
25	..	..	..	.03	.93	.08
26	.05	..	..	.73	..	.03
27	..	.22	..	.20	.22	.87
28	..	.07	.79	..	..	.05
29	..	..	..	.20	..	1.90
30	..	..	..	.82	.11	.06
31	..	..	..	..	.73	..
Total ..	1.25	1.24	5.77	10.52	5.60	12.58

RAINFALL

at the head of the Waterfall Gardens, Penang, during the second half of the year 1926, in inches.

Readings taken at 8 a.m. and credited to the date in which the twenty-four hours begin. Data kindly supplied by the Municipal Commissioners, George Town, Penang.

Date	July	August	September	October	November	December
1	.10	1.32	1.68	.37	.03	..
2	2.09	1.97	.12	.03	.56	.05
3	..	1.53	.08	.03	.98	.14
4	..	..	2.87	2.67	..	.04
5	..	2.95	.07	2.26	..	..
6	.16	.03	.03	.85	.03	..
7	..	..	.34	1.22	.19	..
8	..	..	1.03	.24	.20	..
9	..	..	1.98	1.65	.90	..
10	..	..	.03	8.25	..	..
11	.03	..	..	.70	..	..
12	.03	1.60	.03	2.26	..	.70
13	.62	.03	.67	2.40	.35	.57
14	..	.03	.39	.04	.53	.88
15	..	.44	..	.04	.30	.19
16	.72	.46	..	..	.09	.20
17	..	..	..	..	.03	..
18	.03	..	.22	3.28	.48	1.94
19	.34	..	..	.04	.42	.20
20	1.33	.04	..	.04	.28	.03
21	.99	..	.55	.05	.09	1.59
22	..	..	.03	..	..	.56
23	.05	.24	.44	.45	..	6.20
24	.10	.67	.99	.34	.04	1.90
25	..	1.67	.05	.19	..	.04
26	..	..	.12	1.49	..	.03
27	..	.05	.35	.09	.88	1.99
28	.10	.36	1.03	.05	1.05	2.16
29	1.05	.53	.04	.03	.58	2.19
30	..	.62	.04	.62	.86	.14
31	.53	2.00	..	.60	..	1.99
Total ..	8.27	16.54	13.18	30.28	8.87	23.73

SUMMARY OF RAINFALL, 1926.

—	SINGAPORE				PENANG			
	No. of rainy days	Amount of rain		Longest spell without rain	No. of rainy days	Amount of rain		Longest spell without rain
		inches	mm.			inches	mm.	
January ...	17	6.49	165	9 days	6	1.25	32	8 days
February ...	7	5.70	145	12 ..	7	1.24	31	13 ..
March ...	18	3.07	78	3 ..	10	5.77	147	6 ..
April ...	15	5.11	130	6 ..	21	10.52	267	3 ..
May ...	20	5.31	135	2 ..	15	5.60	142	5 ..
June ...	20	8.39	213	3 ..	20	12.58	320	2 ..
July ...	19	11.36	289	5 ..	16	8.27	210	4 ..
August ...	19	4.76	121	2 ..	19	16.54	420	5 ..
September ...	22	13.26	337	3 ..	24	13.18	335	3 ..
October ...	20	7.70	196	3 ..	28	30.28	769	2 ..
November ...	20	9.08	231	3 ..	21	8.87	225	3 ..
December ...	27	10.02	255	1 ..	22	23.73	603	7 ..
Total ...	224	90.25	2295		209	137.83	3501	
Greatest amount in 24 hrs. 3.19 ins. or 81 mm.					8.25 ins. or 210 mm.			
" " 48 hrs. 4.54 ins. or 115 mm.					9.90 ins. or 251 mm.			
" " 72 hrs. 4.58 ins. or 116 mm.					11.21 ins. or 285 mm.			
Excessively rainy periods, more than 5 ins. having fallen in 72 hours —					5 (June, Oct. (2), Dec. (2))			
Periods of comparative drought, less than .02 ins. having fallen in 120 hours 10 (Jan. (2), Feb. (3), March, Apr. (2), July, Aug.)					9 (Jan. (3), Feb. (2), March, May, Aug., Dec.).			

Departmental Notices.

A list of plants which can be purchased at the Botanic Gardens, in Singapore and in Penang, can be had upon application. The same list appears at intervals in the Government Gazette.

The Gardens' Bulletin is published as material becomes available. Its price is fifty cents for each number, post free or in advance for every volume of twelve numbers, post free :—

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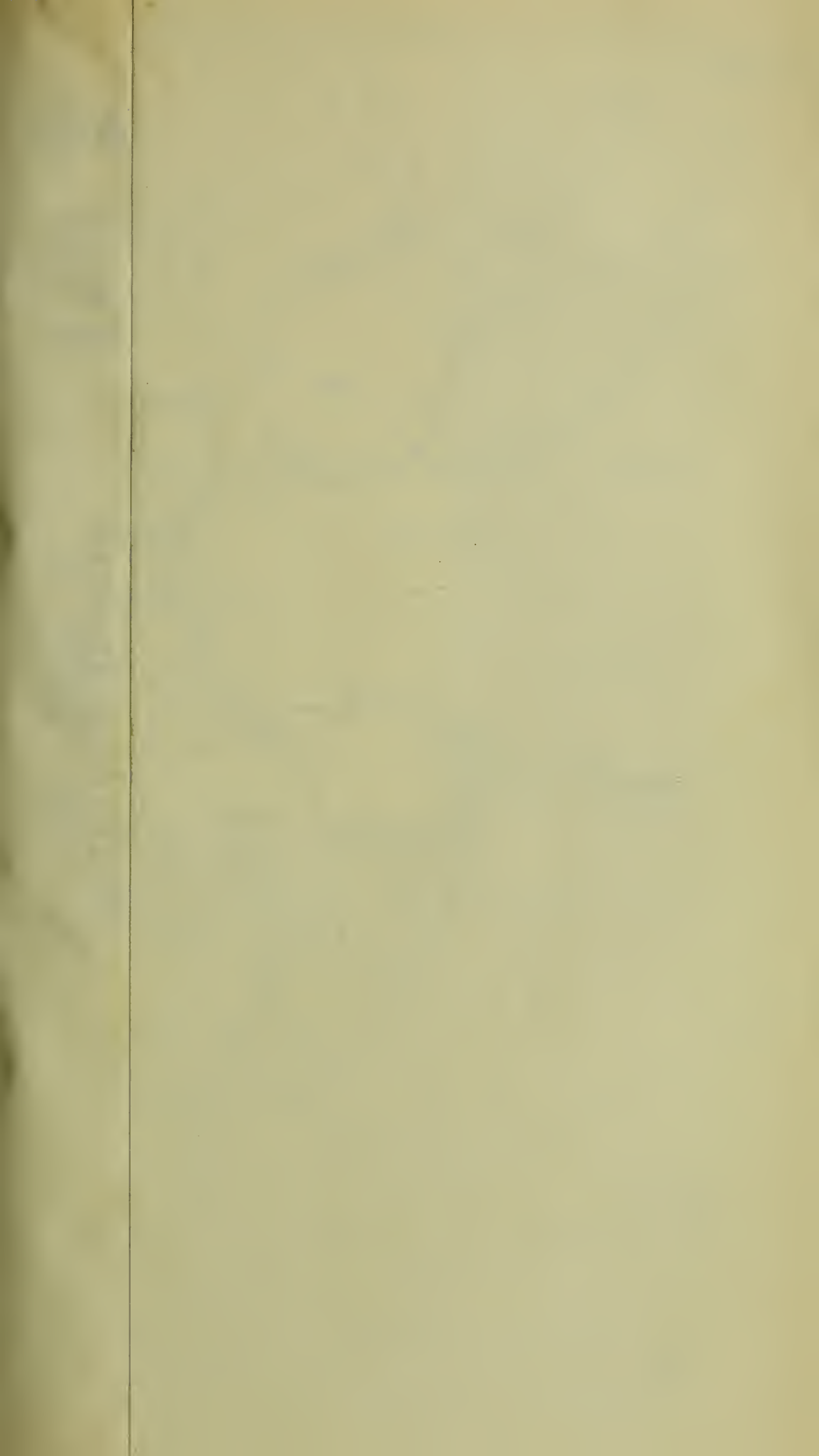
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Nos. 6—10

THE FLOWERING PLANTS OF KUALA LUMPUR,
IN THE MALAY PENINSULA.

By *M. R. Henderson, F.L.S.*

The following pages contain a list of the Higher Plants known from Kuala Lumpur and its vicinity.

The area which the list covers is roughly that included in a circle of which the centre is Kuala Lumpur and the radius is fifteen miles. The circle has been stretched to include nearby places from which important collections have come, but collections have not been made from every place within it.

The montane flora of the Main Range has been excluded in an endeavour to make the list contain only lowland species, but it has not been possible to do this accurately, as very few specimens were found to bear any indication of the altitude at which they were collected.

The following are the localities from which have come the collections utilised in the compilation of the list:—

Ampang Forest Reserve
Ayer Hitam Forest Reserve
Batang Berjuntai Forest Reserve
Batu Tiga
Batu Caves
Bukit Belachan Forest Reserve
Bukit Cheraka Forest Reserve
Bukit Lagong Forest Reserve
Bukit Raja Forest Reserve
Bukit Tarek Forest Reserve
Bukit Tunggal Forest Reserve
Damansara
Dusun Tua

Kajang
 Kanching
 Kepong
 Klang Gates
 Kuala Lumpur
 Kuang
 Petaling
 Public Gardens, Kuala Lumpur
 Pudu
 Rantau Panjang Forest Reserve
 Seminyih
 Sungai Buloh Forest Reserve
 Ulu Gombak
 Ulu Langat
 Weld's Hill Forest Reserve.

During recent years, the Forest Department has collected very largely in the vicinity of Kuala Lumpur, and full advantage has been taken of these collections in compiling the list. Towards the end of 1921 H. L. Hume made large collections for the F.M.S. Museums in the Batang Berjuntai and Rantau Panjang Forest Reserves, at Klang Gates, in the Ulu Gombak, and at various places close to Kuala Lumpur. These collections, along with the remainder of the F.M.S. Museums Herbarium, have now been loaned indefinitely to the Botanic Gardens, Singapore.

Ridley and his subordinate Goodenough collected at Kuala Lumpur while inspecting forests from 1889 onwards.

Smaller collections in this area have been made by Burkill, Kloss, Henderson, Milsum, Sands, and Mohamed Nur.

The writer is indebted to Dr. Foxworthy for much help, and for access to the herbarium of the Forest Department.

We are dealing here with an area large tracts of which have been completely denuded of their original covering of primary forest, and man's interference has resulted in the intrusion of numbers of widely distributed plants which can only obtain a hold when the forest is cleared. Hence the endemism characteristic of the Malayan forest flora is not strongly marked when the flora of the Kuala Lumpur area is considered as a whole. This is shown by a comparison with the flora of the Taiping region (Gardens' Bulletin, Vol. III, Nos. 7-12) where, in a heavily forested region, the specific endemism is 44%, whereas for the Kuala Lumpur area the figure is only 29%. Again, the figure for the local specific endemism for Taiping is 10% and for Kuala Lumpur 3%.

These local endemics, a list of which is given below, occur for the most part in forested areas, the exceptions being those which are peculiar to the limestone of the Batu Caves or Kanching or to the quartzite rocks of Klang Gates.

Local endemics in the Kuala Lumpur area.

Drepananthus carinatus, <i>Ridl.</i>	Sungai Buloh.
Polyalthia montana, <i>Ridl.</i>	Ulu Langat.
Hydnocarpus Humei, <i>Ridl.</i>	Klang Gates.
*Impatiens Ridleyi, <i>Hook fil.</i>	Batu Caves.
Gomphandra pubescens, <i>Ridl.</i>	Weld's Hill.
Napeodendron altissimum, <i>Ridl.</i>	Ulu Gombak.
*Carallia euryoides, <i>Ridl.</i>	Klang Gates.
Eugenia Klossii, <i>Ridl.</i>	Rantau Panjang.
Blastus pulverulentus, <i>Ridl.</i>	Ulu Langat.
Sonerila prostrata, <i>Ridl.</i>	Klang Gates.
Begonia rhoephila, <i>Ridl.</i>	Ulu Gombak.
Brassiopsis elegans, <i>Ridl.</i>	Ulu Langat.
*Aleisanthia rupestris, <i>Ridl.</i>	Klang Gates.
Argostemma trichanthum, <i>Ridl.</i>	Ulu Langat.
Ophiorrhiza fruticosa, <i>Ridl.</i>	Batu Caves.
Urophyllum Curtisii, <i>King MSS.</i>	Kuala Lumpur.
Pavetta pauciflora, <i>Ridl.</i>	Batu Caves.
Tarenna rudis, <i>Ridl.</i>	Weld's Hill.
Psychotria lanceolaria, <i>Ridl.</i>	Batu Caves.
*Borreria pilulifera, <i>Ridl.</i>	Klang Gates.
Ardisia vinimea, <i>Ridl.</i>	Ulu Gombak.
Linociera spicifera, <i>Ridl.</i>	Rawang.
Alstonia micrantha, <i>Ridl.</i>	Rantau Panjang.
*Hoya oclusa, <i>Ridl.</i>	Batu Caves.
Didissandra breviflora, <i>Ridl.</i>	Ulu Gombak.
Didymocarpus primulina, <i>Ridl.</i>	Klang Gates.
*Boea verticillata, <i>Ridl.</i>	Batu Caves.
Pseuderanthemum candidum, <i>Ridl.</i>	Ulu Gombak.
Pseuderanthemum sylvestre, <i>Ridl.</i>	Sungai Buloh.
Justicia microcarpa, <i>Ridl.</i>	Batu Caves.
Justicia trichodes, <i>Ridl.</i>	Seminyih.
Ptyssiglottis chrysea, <i>Ridl.</i>	Rantau Panjang and Ulu Gombak.
Cryptocarya tenuifolia, <i>Ridl.</i>	Ulu Gombak.
Dehaasia elliptica, <i>Ridl.</i>	Bukit Cheraka, Public Gardens and Ulu Gombak.
Phyllanthus erythrocarpus, <i>Ridl.</i>	Batu Caves.
Sauropus elegantissimus, <i>Ridl.</i>	Ulu Gombak.
Galearia lancifolia, <i>Ridl.</i>	Ulu Gombak.
*Trigonostemon salicifolius, <i>Ridl.</i>	Kanching.
Macaranga incisa, <i>Gage.</i>	Kuala Lumpur.
Oberonia aurantiaca, <i>Ridl.</i>	Kajang.
Oberonia grandis, <i>Ridl.</i>	Ulu Langat.
Adenoncos parviflora, <i>Ridl.</i>	Batu Caves.

<i>Saccolabium macrantherum</i> , <i>Ridl.</i>	Ulu Gombak.
<i>Thrixspermum montanum</i> , <i>Ridl.</i>	Ulu Langat.
<i>Gastrochilus longifolia</i> , <i>Ridl.</i>	Ulu Gombak.
<i>Ranalisma rostrata</i> , <i>Stapf.</i>	Batu Caves.
<i>Plectocomiopsis dubius</i> , <i>Becc.</i>	Rantau Panjang.
<i>Pandanus immersus</i> , <i>Ridl.</i>	Batu Tiga.
<i>Freycinetia acuminata</i> , <i>Ridl.</i>	Kuang and Sungai Buloh.
* <i>Raphidophora Burkilliana</i> , <i>Ridl.</i>	Batu Caves.
* <i>Pothos lorispatha</i> , <i>Ridl.</i>	Batu Caves.
* <i>Eulalia Milsumi</i> , <i>Ridl.</i>	Klang Gates.

Species marked with an asterisk are those peculiar to limestone or quartzite.

RANUNCULACEÆ.

Naravelia laurifolia, *Wall.* Ampang; Seminyih. A climber of India to the Philippines; in the Peninsula not uncommon north of Selangor, usually in secondary growth.

DILLENiaceÆ.

Delima sarmentosa, *Linn.* Batu Tiga; K. Lumpur; Petaling; Seminyih. A woody climber of Indo-Malaya and China; in the Peninsula common in open places from Langkawi to Singapore.

Tetracera sylvestris, *Ridl.* Batu Caves (Ridley). A woody climber of Borneo; in the Peninsula not very common, Penang, Perak, Negri Sembilan, Malacca, Singapore.

Acrotrema costatum, *Jack.* Seminyih (Hume). A herb of Borneo; in the Peninsula common from Langkawi to Johore, but absent from Malacca.

Wormia albiflos, *Ridl.* Weld's Hill (Forest Dept.). A large shrub, endemic and rare, hitherto known only from Johore.

Wormia oblonga, *Wall.* Batu Caves; Batu Tiga; Kuang; K. Lumpur; Seminyih. A small tree of Sumatra; in the Peninsula common in open places from Kedah to Malacca.

Wormia pulchella, *Jack.* K. Lumpur (Forest Dept.). A small tree of Sumatra and Borneo; in the Peninsula not uncommon in open places from Taiping to Singapore.

Wormia suffruticosa, *Griff.* Rawang (Goodenough). A shrub of Sumatra, Bangka and Borneo; in the Peninsula common in the south in open places.

Dillenia ? grandifolia, *Wall.* Kajang (Forest Dept.).

Dillenia meliosmaefolia, *Hook. fil.* Kajang; K. Lumpur; Ulu Gombak. A tall tree, endemic and common in forest from the Dindings to Malacca and Pahang.

Dillenia ovata, *Wall.* Weld's Hill (Forest Dept.). A small tree, endemic, not common, Penang, Perak and Pahang.

Dillenia reticulata, *King.* Public Gardens and Weld's Hill, K. Lumpur. A tree of Tongka; in the Peninsula not common, Province Wellesley and Perak.

Dillenia Scortechinii, *Ridl.* K. Lumpur; Sungai Buloh. A tall tree, endemic, not common in forest, Penang, Perak, Singapore.

Dillenia sp. Weld's Hill (Forest Dept. 5024).

MAGNOLIACEÆ.

Talauma lanigera, *Hook. fil.* Ulu Gombak (Forest Dept.). A small tree, endemic, not common, usually in montane forest, Penang, Taiping Hills, Mt. Ophir.

CULTIVATED MAGNOLIACEÆ.

Michelia Champaca, *Linn.* (Chempaka). A tree of India, cultivated throughout Indo-Malaya.

Michelia longifolia, *Bl.* (White Chempaka). A tree of Java, often cultivated in the Peninsula.

ANONACEÆ.

Cyathostemma Wrayi, *King.* Bukit Tarek Forest Reserve; Weld's Hill. A liane, endemic and rare in forest, Perak.

Uvaria excelsa, *Wall.* Petaling (Ridley). A liane of Indo-China and Borneo; in the Peninsula not very common in forest, Penang to Singapore.

Uvaria hirsuta, *Jack.* K. Lumpur (Ridley). A liane of Indo-Malaya; in the Peninsula common in forest from Penang to Singapore.

Uvaria Lobbiana, *Hook. fil. & Thoms.* Ampang; Batu Caves. A liane of Sumatra; in the Peninsula Penang, Perak, Malacca, Singapore.

Uvaria macrophylla, *Roxb.* K. Lumpur (Ridley). A liane of Ceylon, Burma and Java; in the Peninsula common from Penang to Singapore, often in open country.

Uvaria purpurea, *Bl.* K. Lumpur (fide Ridley). A liane of Indo-Malaya to the Philippines and S. China; in the Peninsula common both in open country and in forest from Perlis to Singapore.

Drepananthus carinatus, *Ridl.* Sungai Buloh (Forest Dept.). A tree, endemic and local.

Drepananthus pruniferus, *Maing.* Ulu Gombak; Weld's Hill. A tree, endemic and common in forest from Penang to Malacca.

Artabotrys gracilis, *King*. K. Lumpur (Ridley). A slender climber of Borneo; in the Peninsula not common in forest, Perak and Johore.

Artabotrys suaveolens *Bl.* Ulu Gombak (Hume). A climber of Indo-Malaya to the Philippines; in the Peninsula common in forest from Penang and Upper Perak to Singapore.

Desmos chinensis, *Lour.* Ampang; Sungai Buloh; Weld's Hill. A shrub or climber of Indo-Malaya and China; common over the whole Peninsula usually in open country.

Desmos cochinchinensis, *Lour.* Rawang (Goodenough). A slender climber of Indo-Malaya to the Philippines and China; in the Peninsula common north of Malacca in open places.

Desmos dasymaschala, *Safford.* K. Lumpur; Sungai Buloh. A shrub or small tree of Burma, Siam, Sumatra and Java; in the Peninsula common from Perlis to Singapore.

Polyalthia bullata, *Hook. fil. & Thoms.* Dusun Tua; Seminyih. A shrub, endemic, not common, Perak, Pahang, Negri Sembilan, and doubtfully from Malacca and Singapore.

Polyalthia cinnamomea, *Hook. fil. & Thoms.* Weld's Hill (Forest Dept.). A tree, endemic, not very common in forest, Langkawi to Malacca.

Polyalthia congregata, *King.* Batu Caves; Ulu Gombak. A tree of ? Sumatra; in the Peninsula rare in forest, Larut and Gopeng, Perak.

Polyalthia Hookeriana, *King.* Weld's Hill (Forest Dept.). A tree, endemic, in forest, Perak (common), Pahang, Malacca.

Polyalthia hypogaea, *King.* Kanching; Seminyih. A small tree, endemic, not common in forest, Perak, and doubtfully from Pahang and Johore.

Polyalthia Kunstleri, *King.* Sungai Buloh (Forest Dept.). A shrub or tree, endemic, not very common in forest from Penang to Malacca.

Polyalthia macrantha, *King.* Ulu Gombak (Hume 9289). A tall tree, endemic and rare in forest, hitherto known only from the base of the Taiping Hills.

Polyalthia macropoda, *King.* Bukit Cheraka; Kajang; Seminyih; Ulu Gombak; Weld's Hill. A tree, endemic, not uncommon in forest from Penang to Singapore.

Polyalthia montana, *Ridl.* Ulu Langat (Kloss, fide Ridley). A tree, endemic and local.

Polyalthia oblonga, *King.* Ulu Gombak, common (Hume). A small tree of Borneo; in the Peninsula not very common in forest, Penang, Perak and Johore.

Polyalthia Scortechinii, *King*. Public Gardens, Kuala Lumpur; Sungai Buloh. A small tree, endemic and not uncommon in forest from Langkawi to Singapore.

Polyalthia stenopetala, *Ridl*. Dusun Tua; Kanching; K. Lumpur; Petaling; Ulu Gombak. A small tree, endemic, Upper Perak and Kelantan to Malacca, in forest.

Polyalthia sumatrana, *King*. Kanching; Sungai Buloh; Ulu Gombak. A tree of Sumatra and Borneo; in the Peninsula Taiping to Singapore, in forest.

Polyalthia ? Wrayi, *Ridl*. Dusun Tua (Ridley 7281).

Anaxagorea Scortechinii, *King*. Dusun Tua; Klang Gates; Rawang; Seminyih. A bush or small tree of Lower Siam; in the Peninsula common in forest from Langkawi to Singapore.

Goniothalamus Curtisii, *King*. Batu Caves; K. Lumpur; Ulu Gombak. A shrub or small tree, endemic, not common in forest, Perak and Selangor.

Goniothalamus malayanus, *Hook. fil. & Thoms.* K. Lumpur; Kuang; Rantau Panjang (Kloss, fide Ridley). A small tree of Bangka and Borneo; in the Peninsula common in forest from Kelantan and Perak to Singapore.

Goniothalamus pendulifolius, *Ridl*. Kanching (Forest Dept. 11204). A shrub, endemic and rare, hitherto known only from near Bentong, Pahang.

Goniothalamus Ridleyi, *King*. K. Lumpur (Forest Dept.). A small tree of Borneo; in the Peninsula not uncommon in forest.

Goniothalamus Scortechinii, *King*. Ulu Gombak (Ridley). A shrub or small tree, endemic, not common, Penang, Perak, Pahang.

Goniothalamus tenuifolius, *King*. Sungai Buloh; Ulu Gombak. A shrub or small tree, endemic, not very common in forest from Kedah to Pahang and Selangor.

Goniothalamus Wrayi, *King*. Seminyih; Ulu Gombak. A shrub or small tree, endemic, not uncommon in Perak.

Orophea dodecandra, *Miq*. Petaling; Seminyih. A tree of Borneo; in the Peninsula common in forest from Langkawi to Singapore.

Orophea enterocarpa, *Maing*. Ulu Gombak (Hume 8475, 8844). A small tree, endemic not common in forest, Perak, Pahang and Malacca.

Orophea setosa, *Oliv*. Seminyih; Ulu Gombak. A shrub, endemic, not common in forest, Perak and Negri Sembilan.

Mitrephora macrophylla, *Oliv.* Dusun Tua; Seminyih; Ulu Gombak; Weld's Hill. A small tree, endemic and common in forest from Penang and Upper Perak to Johore.

Mitrephora reticulata, *Hook. fil.* Batu Caves; Ulu Gombak. A tree of Burma, Lower Siam, Java and Borneo; in the Peninsula common as far south as Selangor and Pulau Tioman.

Popowia fusca, *King.* Ulu Gombak (Hume). A tree, endemic, not common in forest, Perak and Singapore.

Popowia nervifolia, *Maing.* Batu Caves; Dusun Tua; Klang Gates; K. Lumpur; Rawang. A small tree of Lower Siam; in the Peninsula not uncommon in forest from Penang and Upper Perak to Johore.

Popowia nervosa, *Ridl.* Batu Caves; Weld's Hill. A small tree of Lower Siam; in the Peninsula common in forest from Penang and Upper Perak to Singapore.

Popowia pumila, *Ridl.* Batu Caves; near Klang Gates (fide Ridley). A shrub, endemic, not common in forest, Perak and Negri Sembilan.

Popowia ramossissima, *Hook. fil. & Thoms.* Batu Caves; Dusun Tua; Ulu Gombak; Weld's Hill. A small tree of W. Malaysia to the Philippines; in the Peninsula common in forest from Penang to Singapore.

Popowia tomentosa, *Maing.* Batu Caves (Ridley). A shrub, endemic and not uncommon in forest from Penang to Singapore.

Oxymitra biglandulosa, *Scheff.* K. Lumpur (Curtis). A woody climber of W. Malaysia; in the Peninsula not common in forest, Perak, Pahang, Malacca, Singapore.

Oxymitra latifolia, *Hook. fil. & Thoms.* Selangor, without definite locality (Ridl., August 1904). A climbing shrub, endemic, common from Langkawi to Singapore on the West.

Melodorum cylindricum, *Maing.* Ulu Gombak (Forest Dept.). A climbing shrub of Borneo, Billiton and Bangka; in the Peninsula common in the south on forest edges.

Melodorum elegans, *Hook. fil. & Thoms.* Sungai Buloh (Forest Dept.). A tall slender climber, endemic in forest, Penang, Perak, Malacca, Johore, Singapore.

Melodorum fulgens, *Hook. fil.* K. Lumpur; Ulu Gombak. A climbing shrub of Borneo; in the Peninsula not uncommon in open places from Taiping to Singapore.

Melodorum ? lanuginosum, *Hook. fil. & Thoms.* Ulu Gombak (Hume 9023, a galled specimen only).

Melodorum latifolium, *Hook. fil. & Thoms.* Ulu Gombak (Forest Dept.). A liane of W. Malaysia; in the Peninsula not common in forest.

Melodorum pisocarpum, *Hook. fil. & Thoms.* Bukit Lagong; Klang Gates; Seminyih; Ulu Gombak. A climbing shrub of Sumatra; in the Peninsula common from Penang to Singapore in forest.

Xylopia ferruginea, *Hook. fil.* K. Lumpur; Rawang. A tree of Borneo; in the Peninsula common in forest from Perak to Singapore.

Xylopia malayana, *Hook. fil. & Thoms.* Weld's Hill (Forest Dept.). A tall tree of Sumatra and Borneo; in the Peninsula common in the south, doubtfully from Penang.

Phaeanthus lucidus, *Oliv.* Batu Caves; K. Lumpur. A bush or small tree, endemic and common in forest from Penang to Singapore.

Phaeanthus nutans, *Hook. fil. & Thoms.* Batu Caves; Ulu Gombak; Weld's Hill. A bush or small tree of Sumatra; in the Peninsula common from Penang and Upper Perak to Singapore in forest.

Alphonsea Maingayi, *Hook. fil.* Ulu Gombak; Weld's Hill. A small tree, endemic and not uncommon in the south and in Pahang in forest.

Alphonsea subdehiscens, *King.* Weld's Hill (Forest Dept. 10464). A small tree, endemic and rare in forest, Perak and the Dindings.

Mezzettia Curtisii, *King.* Ulu Gombak (Hume 9689). A small tree, endemic and rare, hitherto known only from Penang.

CULTIVATED ANONACEÆ.

Anona muricata, *Linn.* (The Soursop).

Anona reticulata, *Linn.* (The Bullock's Heart).

Anona squamosa, *Linn.* (The Custard Apple). This, like the two preceding species, is a native of Trop. America, and often cultivated in the Peninsula.

Artabotrys odoratissimus, *R. Br.* K. Lumpur (Forest Dept.). Often cultivated in the Peninsula.

Canangium odoratum, *Baill.* A tree, doubtfully of Philippine origin, cultivated throughout Indo-Malaya.

Polyalthia longifolia, *Benth. & Hook. fil.* Near the Selangor Club, K. Lumpur (Forest Dept.). A tall tree of Ceylon, cultivated in India and occasionally in this country.

MENISPERMACEÆ.

Tinomiscium petiolare, *Miers.* K. Lumpur (Ridley). A liane of Indo-Malaya; in the Peninsula common from Perlis to Singapore, usually in secondary growth and open places.

Limacia oblonga, *Miers*. K. Lumpur (Ridl. 3970). A woody climber, endemic and common in secondary growth north of Malacca.

Limacia velutina, *Miers*. K. Lumpur (Ridl. 3968). A woody climber of Indo-China and W. Malaysia; in the Peninsula common from Penang to Singapore in secondary growth and open places.

Pericampylus incanus, *Miers*. Batu Tiga; Klang Gates; K. Lumpur; Seminyih. A slender climber of Indo-Malaya and China; in the Peninsula common in secondary growth, in hedges, and scrambling on bushes in open places.

Stephania capitata, *Spreng*. Rawang; Seminyih. A climber of W. Malaysia; in the Peninsula common from Penang to Singapore in forest.

Stephania hernandifolia, *Walp*. Seminyih (Hume 8015). A climber of Africa and Indo-Australia; in the Peninsula rare, Taiping, and doubtfully from Penang.

Cissampelos Pareira, *Linn*. K. Lumpur (Ridl. 3969). A slender climber, cosmopolitan; in the Peninsula not uncommon in hedges from Penang to Malacca.

CULTIVATED MENISPERMACEÆ.

Tinospora crispa, *Miers*. K. Lumpur, fide Foxworthy. A climber of Indo-Malaya; in the Peninsula introduced, cultivated and running wild in a few localities.

NYMPHAEACEÆ.

Barclaya Motleyi, *Hook. fil.* Batang Berjuntai (Ridl. 7348). An aquatic herb of Sumatra, Borneo and New Guinea; in the Peninsula Penang to Singapore, not uncommon.

CAPPARIDACEÆ.

Gynandropsis pentaphylla, *DC.* Petaling (Ridl.). A pantropic herb, common in the Peninsula in waste ground.

Capparis larutensis, *King*. Klang Gates (Ridl.). A thorny climber, endemic and rare, Larut and Kampar, Perak.

Capparis Scortechinii, *King*. Bukit Puteh Forest Reserve (Forest Dept. 10837). A climbing shrub, endemic, not common in forest, Penang, Perak.

Capparis sp. Batu Caves (Burkill 6369, fr. September).

Crataeva macrocarpa, *Kurz*. Batang Berjuntai; K. Lumpur. A tree of Indo-China; in the Peninsula common from Penang and Kelantan to Singapore, usually on riverbanks.

Crataeva religiosa, *Forst*. Pudu (Goodenough 10477). A shrub or small tree of South India; in the Peninsula possibly not native, but established at Pekan (Pahang) and Tanjong Kling (Malacca), and occasionally cultivated.

VIOLACEÆ.

Alsodeia capillata, *King*. Klang Gates; Ulu Gombak (fide Ridley). A shrub, endemic, not common, Perak and the Dindings.

Alsodeia comosa, *King*. Dusun Tua; Kuang; Rawang; Seminyih. A shrub or small tree of Indo-China and Borneo; in the Peninsula not common in forest, Perak and Kuantan.

Alsodeia echinocarpa, *Korth*. K. Lumpur; Sungai Buloh; Ulu Gombak. A bush or small tree of Siam, Sumatra, Borneo, Indo-China and the Philippines; in the Peninsula common from Penang and Trengganu to Singapore.

Alsodeia Kunstleriana, *King*. Batu Caves; Klang Gates. A shrub or small tree, endemic, not uncommon in forest from Upper Perak to Johore.

Alsodeia Scortechinii, *King*. Ayer Hitam; Batu Caves; Dusun Tua; K. Lumpur. A shrub or small tree of Lower Siam; in the Peninsula not very common in forest, Langkawi, Taiping and Singapore.

Alsodeia Wallichiana, *Hook. fil.* Batu Caves (Ridl. 8252, 8624). A shrub, endemic in forest from Penang and Upper Perak to Malacca and Johore.

PITTOSPOREACEÆ.

Pittosporum ferrugineum, *Ait.* K. Lumpur (Forest Dept.). A small tree of Indo-Australia; in the Peninsula common, usually near the sea.

POLYGALACEÆ.

Polygala cardiocarpa, *Kurz*. Batu Caves, on the limestone rocks (Ridl. 8243). A small herb of Tenasserim and Lower Siam; in the Peninsula on limestone at Langkawi and Goping (Perak).

Polygala pulchra, *Hassk.* Ulu Langat (Kloss, fide Ridley). A small shrub of Java and Sumatra; in the Peninsula usually in hill forest, Perak, Selangor and Negri Sembilan.

Polygala venenosa, *Juss.* Ulu Gombak (Burkill 9967). A small shrub of W. Malaysia to the Philippines; in the Peninsula common from Penang and Kelantan to Johore, commonest in hill forest.

Salomonina cantoniensis, *Lour.* Batang Berjuntai; K. Lumpur; Ulu Gombak; and doubtless in other localities. A small herb of S. E. Asia; in the Peninsula common in grass and sandy places.

Epirhizanthus elongata, *Bl.* Seminyih (Hume 7981). A small parasitic herb of Tenasserim to Borneo and China; in the Peninsula common in forest.

Trigoniastrum hypoleucum, *Miq.* K. Lumpur (Forest Dept.). A tree of Sumatra; in the Peninsula not uncommon from Penang to Singapore in forest.

Xanthophyllum affine, *Korth.* Batu Caves; K. Lumpur; Rawang; Sungai Buloh; Ulu Gombak. A large bush or small tree of Tenasserim to the Philippines; in the Peninsula common from Kedah to Singapore, usually in open spots.

Xanthophyllum bullatum, *King.* Dusun Tua (Ridley). A shrub or small tree, endemic and rare, known only from this locality and Taiping.

Xanthophyllum Griffithii, *Benn.* Klang Gates; K. Lumpur; Sungai Buloh. A tree of Tenasserim; in the Peninsula Penang to Malacca in forest.

Xanthophyllum obscurum, *Benn.* Public Gardens, K. Lumpur; Ulu Gombak. A tall tree, endemic, not common, Malacca and Singapore.

Xanthophyllum Palembangicum, *Miq.* Sungai Buloh; Ulu Gombak; Weld's Hill. A small tree of Sumatra; in the Peninsula common from Penang to Singapore in forest.

Xanthophyllum puberulum, *Ridl.* Klang Gates (Ridl. 13390). A shrub, endemic and rare, Dindings.

Xanthophyllum Scortechinii, *King.* Weld's Hill (Forest Dept. 606, ? tree 58). A small tree, endemic and rare in forest, Penang and Perak.

Xanthophyllum stipitatum, *Benn.* Ampang (Forest Dept.). A tree, endemic, not common, Perak and Malacca.

Xanthophyllum venosum, *King.* Dusun Tua; Rawang (Kloss, fide Ridley). A small tree, endemic and rare in forest, Perak.

Xanthophyllum verrucosum, *Chodat.* Weld's Hill (Forest Dept.). A tree of Sumatra; in the Peninsula not common, Penang to Selangor.

Xanthophyllum Wrayi, *King.* Klang Gates; K. Lumpur; Sungai Buloh. A shrub, endemic and common in forest from Penang and Upper Perak to Johore.

PORTULACACEÆ.

Portulaca oleracea, *Linn.* Ampang; K. Lumpur; Rantau Panjang; Seminyih; Ulu Gombak. A fleshy herb, pantropic; in the Peninsula a common weed in waste and cultivated ground.

HYPERICACEÆ.

Hypericum japonicum, *Thunb.* Ulu Gombak (Hume 9406, 9340). A small creeping herb of India to New Zealand; in the Peninsula not common in ricefields and open places, Kelantan, Penang and Singapore.

Cratoxylon arborescens, *Bl.* K. Lumpur; Sungai Buloh. A lofty tree of Burma, Sumatra and Borneo; in the Peninsula common from Penang to Singapore in forest.

Cratoxylon formosum, *Benth. & Hook. fil.* K. Lumpur; Seminyih. A tree of Siam and W. Malaysia to the Philippines; in the Peninsula common from Perlis to Singapore in open country.

Cratoxylon polyanthum, *Korth.* Weld's Hill (Forest Dept.). A tree of Indo-Malaya to the Philippines and China; in the Peninsula Penang to Malacca in thin forest.

FLACOURTIACEÆ.

Flacourtia Cataphracta, *Roxb.* K. Lumpur (Forest Dept.). A small spiny tree of Indo-Malaya; in the Peninsula common in villages.

Flacourtia Rukam, *Zoll. & Mor.* K. Lumpur (Forest Dept.). A small thorny tree of Indo-Malaysia; in the Peninsula common from Penang and Upper Perak to Singapore, a variety cultivated.

Hydnocarpus castanea, *Hook. fil.* Batu Caves; Weld's Hill. A tree of Burma and Tenasserim; in the Peninsula common in forest north of Malacca.

Hydnocarpus Humei, *Ridl., Kew Bull., 10, 1926, p. 470.* Klang Gates (Hume 7256). A small tree, endemic and local.

Hydnocarpus nana, *King.* Sungai Buloh (Nur 11884). A small tree, endemic and not rare in forest in Penang, Province Wellesley and Perak.

Taraktogenos Kunstleri, *King, var. tomentosa, Ridl.* K. Lumpur and Ulu Gombak (Forest Dept.). A tree of Sumatra (the species); in the Peninsula rare, both the species and var. in Perak.

Taraktogenos ? Scortechinii, *King.* Ulu Gombak (Forest Dept.).

Taraktogenos sp. Weld's Hill (Forest Dept. 828).

Pangium edule, *Reinw.* Batu Caves; Sungai Buloh. A tree of W. Malaysia; in the Peninsula Upper Perak and Kelantan to Pulau Tioman.

Scaphocalyx spathacea, *Ridl.* Ulu Gombak; Weld's Hill. A small tree, endemic and not common in forest, Negri Sembilan and Malacca.

Ryparosa fasciculata, *King.* Bangi; Klang Gates; Sungai Buloh. A tree, endemic, apparently not common in forest, Perak and the Dindings to Malacca.

Ryparosa Kunstleri, *King.* Kajang; K. Lumpur. A tall tree of Sumatra; in the Peninsula not common, Perak and the Dindings.

Ryparosa Scortechinii, *King*. Bangi; Sungai Buloh; Weld's Hill. A small tree, endemic in forest from Penang and Kelantan to Selangor and Pahang.

CULTIVATED FLACOURTIACEÆ.

Hydnocarpus anthelminticus, *Pierre*. (Chaulmoogra). Serdang Experimental Plantation. A tree of Cochin-China.

Taraktogenos Kurzii, *King*. (Burmese Chaulmoogra). Serdang Experimental Plantation. A tree of Burma.

GUTTIFERÆ.

Garcinia eugeniæfolia, *Wall*. Weld's Hill (Forest Dept.). A tree of Tenasserim; in the Peninsula common in forest from Kedah to Singapore.

Garcinia Forbesii, *King*. Sungai Buloh (Forest Dept.). A small tree of Sumatra; in the Peninsula not common, Perak, Pahang and Singapore.

Garcinia globulosa, *Ridl*. Weld's Hill (Forest Dept.). A tree, endemic, and common in forest from Perak to Singapore.

Garcinia nigrolineata, *Planch*. K. Lumpur; Rawang; Sungai Buloh. A tree of Burma, Siam and the Carimons; in the Peninsula common in forest from Langkawi to Singapore.

Calophyllum ferrugineum, *Ridl*. Sungai Buloh (Forest Dept. 2264). A tall tree, endemic and rare, known only from this locality and from Singapore.

Calophyllum floribundum, *Hook. fil*. Sungai Buloh (Forest Dept.). A tree, endemic, not very common, Perak, Pahang, Malacca and Singapore.

Calophyllum Griffithii, *T. Anders*. Sungai Buloh (Forest Dept.). A tall tree of Sumatra; in the Peninsula not common, usually on riverbanks, Penang, Malacca, Johore and Singapore.

Calophyllum inophyllum, *Linn*. K. Lumpur (Forest Dept.). A tree of Africa and Indo-Australia; in the Peninsula common, usually on sandy seashores.

Calophyllum Kunstleri, *King*. Weld's Hill (Forest Dept. 1831, tree 303). A tree of Borneo and the Philippines; in the Peninsula Langkawi to Negri Sembilan and Pahang.

Calophyllum macrocarpum, *Hook. fil*. Public Gardens, K. Lumpur (Forest Dept.). A tall tree of Borneo; in the Peninsula not common on riverbanks and near the sea, Perak, Malacca, Johore and Singapore.

Calophyllum Wallichianum, *Planch. & Triana*. Bangi; K. Lumpur; Sungai Buloh. A tall tree, endemic, common in forest from Penang to Singapore.

Kayea caudata, *King*. Klang Gates; ? Sungai Buloh. A small tree, endemic, not common in forest, Perak to Negri Sembilan.

Kayea elegans, *King*. Klang Gates (Ridley 13527). A tree, endemic and rare, Gunong Bubu (Perak).

Kayea grandis, *King*. Public Gardens, K. Lumpur; Ulu Gombak. A tree, endemic and common in forest from Penang to Malacca.

Kayea Kunstleri, *King*. K. Lumpur; Sungai Buloh; Ulu Gombak. A shrub or small tree, endemic in forest, Kedah, Penang, Perak, Dindings.

Kayea nervosa, *T. Anders*. Sungai Buloh; Weld's Hill. A tree of Burma; in the Peninsula rare in forest, Taiping.

Kayea rivulorum, *Ridl*. Kanching, fide Ridley. A small tree, endemic and rare, Malacca.

Mesua ferrea, *Linn*. Kajang; Sungai Buloh. A tall tree of India, Indo-China, Siam and Java; in the Peninsula common from Penang to Singapore.

CULTIVATED GUTTIFERÆ.

Clusia odorata, *Seem*. K. Lumpur (Forest Dept.). A bushy tree of Central America; in the Peninsula occasionally cultivated.

Garcinia atroviridis, *Griff*. K. Lumpur (Forest Dept.). A tree, endemic, Penang to Singapore, wild and cultivated.

Garcinia dulcis, *Kurz*. K. Lumpur (Agri. Dept.). A tree of W. Malaysia, common in cultivation in the Peninsula.

Garcinia Mangostana, *Linn*. (The Mangosteen). Cultivated everywhere in the Peninsula, but not known in a wild state.

Garcinia Prainiana, *King*. K. Lumpur (Agri. Dept.). A tall tree, endemic and not uncommon in orchards in Perak and Pahang.

Garcinia xanthochymus, *Hook. fil*. K. Lumpur (Agri. Dept.). A tree of India, Burma and Tenasserim; in the Peninsula occasionally cultivated.

TERNSTROEMIACEÆ.

Adinandra macrantha, *Teys. & Binn*. Weld's Hill (Forest Dept. 970). A tree of Sumatra and Java; in the Peninsula apparently not common, Perak, Pahang ad Johore.

Eurya acuminata, *DC*. Klang Gates; K. Lumpur; Petaling; Seminyih; Ulu Gombak. A shrub or small tree of Indo-Malaysia and China; common over the whole Peninsula in open country and occasionally in forest.

Pyrenaria acuminata, *Planch.* K. Lumpur (Curtis, Forest Dept.). A small tree, endemic, common in forest from Penang and Kelantan to Singapore.

Gordonia concentricatrix, *Burkill.* Rantau Panjang (Forest Dept. 878). A tall tree, endemic, not common in forest, Dindings, Pahang, Malacca.

Saurauia cauliflora, *Bl.* Batu Caves (Burkill 6257, Ridley 8269). A tree of Java; in the Peninsula rare near limestone, Batu Kurau (Perak).

Saurauia nudiflora, *DC.* Ulu Gombak (Forest Dept. 10452). A small tree of Java; in the Peninsula in forest from Upper Perak to Negri Sembilan.

Saurauia tristyla, *DC.* Batu Caves; Klang Gates; K. Lumpur; Rawang; Seminyih; Ulu Gombak. A small tree of Siam and Indo-China; in the Peninsula common usually in forest.

Archytea VahlII, *Choisy.* K. Lumpur (Forest Dept.). A small slender tree of W. Malaysia; in the Peninsula common from Penang to Singapore in open country.

DIPTEROCARPACEÆ.

Dryobalanops aromatica, *Gaertn. fil.* Kanching (Forest Dept.), planted in K. Lumpur and Rawang. A lofty tree of Sumatra, Lingga and Borneo; in the Peninsula not uncommon in the south, usually gregarious.

Dryobalanops oblongifolia, *Dyer.* Rantau Panjang (Forest Dept.). A lofty tree of Borneo; in the Peninsula Kelantan to Johore and from Kinta southwards on the west.

Dipterocarpus cornuta, *Dyer.* Bukit Puteh Forest Reserve (Forest Dept.). A tree of ? Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Dipterocarpus crinita, *Dyer.* Ampang; Batu Caves; Kajang; Weld's Hill. A lofty tree of Sumatra and Borneo; in the Peninsula common in forest.

Dipterocarpus Duperreana, *Dyer.* Ampang; Dusun Tua; Sungai Buloh; Weld's Hill. A lofty tree of Indo-China, Sumatra and Siam; in the Peninsula in forest, Langkawi, Kelantan, Pahang.

Dipterocarpus grandiflora, *Blanco.* Sungai Lallang Forest Reserve (Forest Dept.). A lofty tree of Tenasserim, Lingga, Bangka, Sumatra, Borneo and the Philippines; in the Peninsula common in forest.

Dipterocarpus verrucosa, *Foxworthy.* Kajang (Forest Dept.). A lofty tree of Sumatra and Borneo; in the Peninsula rare in forest, Negri Sembilan.

Anisoptera costata, *Korth.* Bangi Forest Reserve (Forest Dept.). A lofty tree of Tenasserim, Sumatra and Borneo; in the Peninsula not uncommon in forest in the south.

Anisoptera magistocarpa, *van Slooten.* Ulu Gombak (Forest Dept.). A tree of Sumatra; in the Peninsula in forest, Negri Sembilan, Malacca, Botanic Gardens, Singapore.

Anisoptera thurifera, *Bl.* 16½ mile, Ginting Simpak Road (Forest Dept.). A tree of ? Burma, ? Sumatra and the Philippines; in the Peninsula not common in forest, Perak.

Shorea acuminata, *Dyer.* Ampang; Kajang; Kanching; Sungai Buloh. A tall tree of Lingga and Borneo; in the Peninsula in forest from Penang to Malacca.

Shorea bracteolata, *Dyer.* Ampang; Ayer Hitam; Kajang; Kanching; Klang Gates; Sungai Buloh; Weld's Hill. A lofty tree of Sumatra; in the Peninsula not uncommon in forest from Penang to Singapore.

Shorea ciliata, *King.* Kajang (Forest Dept.). A tree, endemic and rare, Penang Hill.

Shorea costata, *King.* Kajang (Forest Dept.). A tree, endemic and rare, Penang.

Shorea Curtisii, *Dyer.* Kajang; Kanching; Ulu Gombak. A tall tree, endemic in forest from Penang to Singapore.

Shorea leprosula, *Miq.* Ampang; Kajang; Sungai Buloh; Weld's Hill. A lofty tree of Sumatra and Borneo; in the Peninsula common in forest from Taiping to Singapore.

Shorea macroptera, *Dyer.* Ampang; Bukit Puteh; Kajang; Kanching. A tree of Borneo; in the Peninsula common in forest from Penang to Singapore.

Shorea ? Maxwelliana, *King.* Kajang (Forest Dept.).

Shorea parvifolia, *Dyer.* Kajang; Kanching; Klang Gates; K. Lumpur; Sungai Buloh. A tall tree, endemic, common in forest from Penang to Singapore.

Shorea pauciflora, *King.* Ulu Gombak (Forest Dept.). A tall tree, endemic, not very common in forest, Penang to Singapore.

Shorea rigida, *Brandis.* Sungai Buloh (Forest Dept.). A tall tree, endemic, Negri Sembilan, Malacca, Singapore.

Shorea sericea, *Dyer.* Kajang (Forest Dept.). A tree of Borneo; in the Peninsula common in forest from Penang to Malacca.

Shorea sp. (Meranti Kait-Kait). Kajang (Forest Dept.). Also collected near Sungkai, Perak.

Shorea sp. 20¼ mile, Ginting Simpak Road (Forest Dept.).

Shorea sp., aff. *Pachyklamys Hemsleyanus*, *Ridl.* Bukit Cheraka Forest Reserve (Forest Dept.).

Pachyklamys Thiseltoni, *Ridl.* Sungai Buloh; Weld's Hill. A tree of Sumatra; in the Peninsula not uncommon in forest from Penang to North Johore.

Hopea globosa, *Brandis.* Rantau Panjang (Ridley). A lofty tree, endemic in forest from Taiping to Johore.

Hopea intermedia, *King.* Bukit Cheraka; Kajang; ? Rantau Panjang; Sungai Lallang. A tree, endemic, not common in forest, Penang and Perak. (Dr. Foxworthy prefers to keep this separate from *H. Pierrei*, *Hance*, with which Mr. Ridley unites it).

Vatica sp. Weld's Hill (Forest Dept. 2935).

Balanocarpus Heimii, *King.* Ampang; Bukit Cheraka; Sungai Lallang. A tree, endemic in forest, Penang to Malacca.

Balanocarpus latifolius, *Brandis.* Kanching (Forest Dept.). A tree of Borneo; in the Peninsula known only from this locality.

Balanocarpus penangianus, *King.* Ampang (Forest Dept.). A tree, endemic in forest, Penang to Malacca.

Pachynocarpus Stapfianus, *King.* Ampang; Bangi. A tall tree of Lower Siam; in the Peninsula not common in forest, Langkawi, Penang and Pahang.

BIXACEÆ, CULTIVATED.

Bixa Orellana, *Linn.* (Arnotto). Cultivated in various localities. A pantropic bush of South American origin.

MALVACEÆ.

Sida carpinifolia, *Linn. fil.* Seminyih; Ulu Gombak. An undershrub, pantropic; in the Peninsula a common weed in waste ground.

Sida rhombifolia, *Linn.* Batang Berjuntai; Klang Gates; K. Lumpur; Pudu; Seminyih; Ulu Gombak. A pantropic undershrub common in the Peninsula on seashores and waste ground.

Urena lobata, *Linn.* Batang Berjuntai; Klang Gates; Pudu; Seminyih; Ulu Gombak. A pantropic undershrub, common in the Peninsula in open places and waste ground.

Hibiscus macrophyllus, *Roxb.* Sungai Buloh; Weld's Hill. A tall tree of India, Indo-China, Siam and Java; in the Peninsula common in forest from Penang to Malacca.

Hibiscus tiliaceus, *Linn.* Pudu (Hume 7716). A small tree, pantropic; in the Peninsula common on seashores and often planted inland.

Bombax larutensis, *Ridl.* Ulu Gombak (Forest Dept., and other collectors). A tall thorny, tree, endemic, not common in forest, Penang, Perak, ? Kelantan, Negri Sembilan.

Durio Lowianus, *Scort.* Sungai Buloh (Forest Dept. 4596). A tree, endemic in forest, Kedah, Perak, Pahang, Negri Sembilan.

Durio malaccensis, *Planch.* K. Lumpur; Ulu Gombak. A tall tree, endemic in forest, Taiping to Malacca.

Durio Oxleyanus, *Griff.* Sungai Buloh (Forest Dept. 4903). A tree, endemic, not common in forest, Dindings, Pahang, Negri Sembilan and Malacca.

Boschia Griffithii, *Mast.* Klang Gates; Sungai Buloh; Ulu Gombak; Weld's Hill. A tree of Sumatra; in the Peninsula common in forest.

Neesia synandra, *Mast.* Weld's Hill (Forest Dept.). A tall tree of Lower Siam; in the Peninsula not uncommon in forest from Penang to Singapore.

Coelostegia Griffithii, *Benth. & Hook. fl.* Sungai Buloh (Forest Dept.). A tall tree, endemic and common in forest from Perak to Singapore.

CULTIVATED MALVACEÆ.

Durio zibethinus, *Linn.* (The Durian). A tree of Indo-China and W. Malaysia, known only in cultivation.

Eriodendron anfractuosum, *DC.* (Kapok). Common in villages, gardens, etc. A pantropic tree, origin probably South India.

Hibiscus esculentus, *Linn.* ("Lady's Fingers"). A tall herb, cultivated as a vegetable in all tropics.

Hibiscus mutabilis, *Linn.* A shrub of Chinese origin, cultivated in all tropics.

Hibiscus rosa-sinensis, *Linn.* Common in gardens. Pantropic in cultivation.

Hibiscus Sabdariffa, *Linn.* (Roselle). K. Lumpur; Serdang. A pantropic shrub, commonly cultivated in the Peninsula.

Hibiscus schizopetalus, *Hook. fl.* Common in gardens. A shrub of Africa, commonly cultivated in the Peninsula.

STERCULIACEÆ.

Sterculia hispidissima, *Ridl.* Ulu Gombak; Weld's Hill. A tree, endemic and rare in forest, doubtfully also from Singapore.

Sterculia laevis, *Wall.* Batu Caves; K. Lumpur; Ulu Gombak. A shrub of Tenasserim, Java and Borneo; in the Peninsula common in forest.

***Sterculia macrophylla*, Vent.** Batu Caves; K. Lumpur. A tall tree of Java and Borneo; in the Peninsula common in lowland forest.

***Sterculia parviflora*, Roxb.** Ampang; Weld's Hill. A tree of Sylhet, Burma and Cochin-China; in the Peninsula common in forest at low altitudes.

***Sterculia parvifolia*, Wall.** K. Lumpur (Forest Dept.). A small tree, endemic and rare in forest, Penang and Taiping.

***Sterculia rubiginosa*, Vent.** Sungai Buloh; Weld's Hill. A small tree of Indo-Malaya; in the Peninsula common in open country.

***Scaphium affine*, Ridl.** Weld's Hill (Forest Dept.). A tree of ? Indo-China; in the Peninsula common in forest in the south.

***Pterocymbium javanicum*, R. Br.** Weld's Hill (Forest Dept.). A tree of Indo-Malaya to the Philippines; in the Peninsula not common in open country, Perlis, Penang, Perak and Malacca.

***Erythropsis fulgens*, Ridl.** K. Lumpur (Curtis, Forest Dept.). A tree of Burma, Tenasserim, Sumatra and Java; in the Peninsula not common in forest, Penang, Upper Perak and Kelantan.

***Tarrietia perakensis*, King.** K. Lumpur (Forest Dept. 2367). A tree, endemic and rare in forest, Taiping Hills.

***Tarrietia simplicifolia*, Mast.** Dusun Tua (Ridley). A lofty tree, endemic and not uncommon in the south.

***Pterospermum Blumeianum*, Korth.** Klang Gates; Sungai Buloh. A tree of Indo-Malaya; in the Peninsula common in forest from Langkawi to Singapore.

***Pterospermum diversifolium*, Bl.** Batu Caves; K. Lumpur. A tall tree of Indo-China, Java and the Philippines; in the Peninsula not very common in forest, Kelantan, Perak, Negri Sembilan, Malacca, Singapore.

***Melochia corchorifolia*, Linn.** Ampang; Batang Berjuntai; Klang Gates; K. Lumpur; Pudu. A small pantropic shrub; a common weed in waste ground all over the Peninsula.

***Melochia velutina*, Bedd.** Sungai Buloh (Forest Dept. 2295). A shrub or small tree of Indo-Malaya and Mauritius; in the Peninsula not uncommon in the north in open places.

***Abroma augusta*, Linn.** Batu Caves (Ridley). A shrub of Indo-Australia and China; in the Peninsula Upper Perak to Singapore, usually near cultivation or limestone.

***Byttneria Jackiana*, Wall.** Batu Tiga (Ridley). A woody climbing shrub, endemic, Penang to Negri Sembilan in forest.

Commersonia platyphylla, *Andr.* K. Lumpur; Petaling. A small tree of Indo-Malaya to the Philippines; in the Peninsula common from Penang to Singapore in secondary growth.

Leptonychia glabra, *Turcz.* Batu Caves; K. Lumpur; Sungai Buloh. A shrub or small tree of Indo-Malaya; in the Peninsula common in forest, often montane or sub-montane.

CULTIVATED STERCULIACEÆ.

Cola acuminata, *S. & E.* (Kola nut). Serdang Experimental Plantation. A tree of Trop. America; in the Peninsula occasionally cultivated.

Muntingia calabura, *Linn.* Cultivated, fide Foxworthy. A tree of the West Indies; in the Peninsula occasionally cultivated.

Theobroma cacao, *Linn.* (Cocoa). A tree of Trop. America, occasionally cultivated in the Peninsula.

TILIACEÆ.

Pentace triptera, *Mast.* K. Lumpur (Forest Dept.). A tall tree, endemic, Taiping to Singapore in forest.

Grewia antidesmæfolia, *King.* Ulu Gombak (Forest Dept.). A small tree of Lower Siam; in the Peninsula not common in forest, Taiping to Johore.

Grewia fibrocarpa, *Mast.* Ulu Gombak; Weld's Hill. A tree, endemic and common in forest from Penang to Malacca and on the East coast islands.

Grewia latifolia, *Mast.* K. Lumpur; Ulu Gombak. A small tree, endemic, not uncommon from Perak to Singapore in forest.

Grewia Miqueliana, *Kurz.* Weld's Hill (Forest Dept.). A small tree, endemic, Taiping to Johore in forest.

Grewia paniculata, *Roxb.* Batang Berjuntai; Klang Gates; K. Lumpur. A small bushy tree of Indo-Malaya to the Philippines and Indo-China; in the Peninsula common as far south as Johore in open country.

Grewia umbellata, *Roxb.* Batu Caves; Bukit Raja; Klang Gates; K. Lumpur; Rawang; Seminyih; Sungai Buloh. A climbing shrub of Siam, Java and Borneo; in the Peninsula common in secondary growth.

Elaeocarpus Ganitrus, *Roxb.* Sungai Buloh (Forest Dept.). A tree of Nepal and Assam, doubtfully wild in the Peninsula.

Elaeocarpus glabrescens, *Mast.* K. Lumpur; Ulu Gombak. A tree of Lower Siam; in the Peninsula Kedah Peak, Penang, Selangor, Malacca, in forest usually in hilly localities.

Elaeocarpus Griffithii, *Mast.* Klang Gates; Public Gardens, K. Lumpur. A tree of Tenasserim; in the Peninsula not uncommon in forest in the lowlands.

Elaeocarpus Jackianus, *Wall.* K. Lumpur (Forest Dept.). A tall tree of Borneo; in the Peninsula common in forest on the west coast.

Elaeocarpus Mastersii, *King.* Klang Gates; K. Lumpur. A tree of Borneo; in the Peninsula common in open woody places.

Elaeocarpus obtusus, *Bl.* Weld's Hill (Forest Dept.). A tree of Indo-Malaya; in the Peninsula common from Penang to Singapore in open places and on the seacoast.

Elaeocarpus paniculatus, *Wall.* Ampang; K. Lumpur; Rantau Panjang. A tree of Lower Siam, Bangka and Borneo; in the Peninsula common in lowland forest.

Elaeocarpus parvifolius, *Wall.* Sungai Buloh; Weld's Hill. A tall tree of Lower Siam and Borneo; in the Peninsula common from Penang to Singapore, both in open country and in forest.

Elaeocarpus petiolatus, *Wall.* Batu Caves; K. Lumpur; Sungai Buloh. A small tree of Burma, Sumatra and Borneo; in the Peninsula common from Penang to Singapore in lowland forest.

Elaeocarpus stipularis, *Bl.* Ampang; Klang Gates; K. Lumpur; Rantau Panjang; Sungai Buloh. A tree of W. Malaysia; in the Peninsula common from Kedah to Singapore, usually in lowland forest.

CULTIVATED TILIACEÆ.

Berrya Ammonilla, *Roxb.* Public Gardens, K. Lumpur. A tall tree of India, Ceylon and Burma, occasionally cultivated in the Peninsula.

Corchorus olitorius, *Linn.* (Jute). Cultivated, fide Foxworthy. A native of India, pantropic in cultivation.

Honckenya ficifolia, *Willd.* K. Lumpur (Forest Dept.). A shrub of Trop. Africa, occasionally cultivated in the Peninsula.

GONOSTYLACEÆ.

Gonostylus Maingayi, *Hook. fil.* Ayer Hitam; Klang Gates; Sungai Buloh; Weld's Hill. A large tree, endemic in forest from Penang to Singapore.

LINACEÆ.

Roucheria Griffithiana, *Planch.* Klang Gates; K. Lumpur. A liane of Sumatra and Borneo; in the Peninsula common in lowland forest.

Ixonanthes icosandra, *Jack.* Batang Berjuntai; Klang Gates; Rantau Panjang; Sungai Buloh; Weld's Hill. A small tree of Sumatra; in the Peninsula common from Kedah to Singapore in woods and open country.

Ixonanthes reticulata, *Jack.* Public Gardens and Weld's Hill, K. Lumpur. A shrub of Borneo; in the Peninsula Kedah to Singapore in woods.

CULTIVATED LINACEÆ.

Erythroxylon coca, *Lam.* (Cocaine). Serdang Experimental Plantation. A shrub of S. America; in the Peninsula very occasionally cultivated.

MALPIGHIACEÆ.

Tristellateia australasica, *A. Rich.* K. Lumpur, cultivated (Forest Dept.). A woody climber of W. Malaysia to Polynesia; in the Peninsula wild in tidal swamps and often cultivated.

Hiptage madablota, *Gaertn.* K. Lumpur (Ridley). A liane of Indo-Malaya and China; in the Peninsula perhaps not wild south of Perlis.

Hiptage sericea, *Hook. fil.* Public Gardens, K. Lumpur (Forest Dept.). A liane of Lower Siam; in the Peninsula Penang to Singapore in open places and riverbanks.

Aspidopterys concava, *Juss.* K. Lumpur (Ridley). A liane of Burma and Tenasserim; in the Peninsula Penang to Singapore in forest.

Brachylophon Curtisii, *Oliv.* Seminyih (Hume 8168). A shrub or small tree of Sumatra; in the Peninsula rare, Penang, Perak, Mt. Ophir (a var.).

CULTIVATED MALPIGHIACEÆ.

Malpighia coccigera, *Linn.* Public Gardens, K. Lumpur (Forest Dept.). A shrub of the West Indies, cultivated in the Peninsula as an ornamental shrub.

OXALIDACEÆ.

Oxalis corniculata, *Linn.* K. Lumpur; Pudu. A creeping herb, cosmopolitan; in the Peninsula common near houses in waste ground.

Connaropsis monophylla, *Planch.* K. Lumpur; Sungai Buloh. A small tree, endemic, common in open places from Perak to Johore.

CULTIVATED OXALIDACEÆ.

Averrhoa Bilimbi, *Linn.* (The Belimbing). A small tree of Trop. America, cultivated in most tropical countries.

Averrhoa Carambola, *Linn.* (The Carambola). A small tree of Trop. America, pantropic in cultivation.

BALSAMINACEÆ.

Impatiens Ridleyi, *Hook. fil.* Batu Caves on the limestone (all collectors). A small shrubby herb, endemic and local.

RUTACEÆ.

Evodia glabra, *Bl.* Sungai Buloh; Weld's Hill. A tree of Tenasserim, Sumatra and Java; in the Peninsula common in lowland forest from Penang to Singapore.

Evodia latifolia, *DC.* K. Lumpur; Rantau Panjang; Sungai Buloh; Ulu Gombak. A small tree of Lower Siam, Java, Borneo and the Moluccas; in the Peninsula common in forest from Penang to Johore.

Acronychia laurifolia, *Bl.* K. Lumpur (Forest Dept.). A small tree of Indo-Malaya; in the Peninsula common in lowland forest.

Acronychia Porteri, *Hook. fil.* K. Lumpur (Weld's Hill and in the Public Gardens). A tree of Lower Siam; in the Peninsula in forest from Penang to Singapore and on the East coast.

Glycosmis malayana, *Ridl.* Klang Gates; Seminyih; Ulu Gombak; Weld's Hill. A shrub, endemic, common from Langkawi to Singapore in lowland forest.

Glycosmis monticola, *Ridl.* Seminyih (Hume). A shrub, endemic and rare, Gunong Angsi and Mt. Ophir.

Micromelum hirsutum, *Oliv.* Sungai Buloh; Ulu Gombak. A shrub or small tree of Indo-Malaya to the Philippines; in the Peninsula not uncommon in open country from Penang and Kelantan to Mt. Ophir.

Micromelum pubescens, *Bl.* Klang Gates (cultivated here by Tamils, *fide* Forest Dept.). A shrub or small tree of Indo-Australia and China; in the Peninsula common in open country.

Merrillia caloxylon, *Swingle.* Weld's Hill (Forest Dept. 5186). A bush or tree of Lower Siam; in the Peninsula not common, Patani, Upper Perak and Pahang, in forest and near rivers.

CULTIVATED RUTACEÆ.

Agele marmelos, *Correa.* (Bael fruit). A native of India, seldom cultivated in the Peninsula.

Citrus aurantium, *Linn.* (The Orange). Cultivated, as it is in most tropics and subtropics.

Citrus decumana, *Murr.* (The Pumelo). A tree, native of W. Malaysia to Polynesia, cultivated throughout Indo-Malaya.

Citrus medica, *Linn.*, var. *acida*, *Hook. fl.* (The Lime). A small tree of Trop. Asia, cultivated in all tropics.

Feronia elephantum, *Correa.* (Wood Apple). K. Lumpur (Agri. Dept.). A spiny tree of Indo-Malaya, not often cultivated in the Peninsula.

Murraya exotica, *Linn.* Circular Rd. Plantation and Weld's Hill, cultivated (Forest Dept.). A shrub or small tree of Indo-Australia and China; in the Peninsula wild on limestone, and often cultivated as an ornamental shrub.

Triphasia trifoliata, *DC.* K. Lumpur (Forest Dept.). A small shrub, probably of Chinese origin, cultivated throughout Indo-Malaya.

SIMARUBACEÆ.

Brucea sumatrana, *Roxb.* K. Lumpur (Ridley). A shrub of Indo-Australia; in the Peninsula common in open places.

Eurycoma apiculata, *Benn.* Petaling; Weld's Hill. A shrub, endemic, Penang to N. Johore, commonest in the north, in forest.

Eurycoma longifolia, *Jack.* Rantau Panjang (Hume). A shrub or small tree of Indo-Malaya; in the Peninsula common in forest.

Irvingia malayana, *Oliv.* K. Lumpur (Forest Dept.). A lofty tree of Burma and Siam; in the Peninsula Negri Sembilan, Malacca, Singapore, in forest.

OCHNACEÆ.

Gomphia oblongifolia, *Ridl.* Klang Gates; K. Lumpur. A tree of Tenasserim and Borneo; in the Peninsula common from Kedah to Singapore.

CULTIVATED OCHNACEÆ.

Ochna Wallichii, *Planch.* K. Lumpur, in the Public Gardens (Forest Dept.). A shrub of Burma, Tenasserim and Lower Siam; in the Peninsula cultivated only.

BURSERACEÆ.

Triomma malaccensis, *Hook. fl.* Public Gardens, K. Lumpur (Forest Dept.). A tree of Sumatra; in the Peninsula Selangor, Malacca, Singapore in forest.

Canarium caudatum, *King.* K. Lumpur; Rantau Panjang. A tree of Sumatra; in the Peninsula not common, Penang, Perak and Singapore in lowland forest.

Canarium grandiflorum *Benn.* Weld's Hill (Forest Dept.). A tree, endemic and not common in forest, Malacca and Singapore.

Canarium kadondon, *Benn.* Weld's Hill (Forest Dept.). A tree, endemic and common in forest from Penang to Singapore.

Canarium nitidum, *Benn.* Weld's Hill (Forest Dept.). A small tree, endemic, Perak to Singapore, usually in forest but often in open country.

Canarium pilosum, *Benn.* K. Lumpur (Weld's Hill and Damansara Hill). A tree, endemic, Penang to Singapore, in forest.

Canarium rufum, *Benn.* Weld's Hill (Forest Dept.). A tree, endemic, Upper Perak to Singapore, in forest.

Santiria apiculata, *Benn.* Batang Berjuntai; Bukit Raja; Kanching; K. Lumpur; Sungai Buloh; Ulu Gombak. A tree, endemic and common in lowland forest from Taiping to Singapore.

Santiria fasciculata, *Benn.* Weld's Hill (Forest Dept.). A tall tree, endemic, Penang to Malacca, in forest.

Santiria floribunda, *King.* K. Lumpur (Ridley). A small tree, endemic, not common in forest, Perak and Pahang.

Santiria laevigata, *Bl.* K. Lumpur; Ulu Gombak. A tall tree of Sumatra; in the Peninsula common in lowland forest from Taiping to Singapore.

Santiria laxa, *King.* Sungai Buloh; Weld's Hill. A tree, endemic and common in forest from Penang to Singapore.

Santiria multiflora, *Benn.* K. Lumpur; Sungai Buloh. A tree of Borneo; in the Peninsula in marshy forest from Taiping to Singapore.

Santiria Wrayi, *King.* Kajang; Kanching. A tree, endemic, Taiping to Johore on the west coast.

Icicaster Planchoni, *Ridl.* K. Lumpur (Weld's Hill and the Public Gardens). A tree, endemic, Taiping to Singapore in forest.

MELIACEÆ.

Turraea breviflora, *Ridl.* Kanching, on limestone (Ridley). A shrub, endemic and rare, Ulu Selangor and Singapore.

Chisocheton glomeratus, *Hiern.* Batu Caves; K. Lumpur; Ulu Gombak. A tall tree, endemic, not common, Perak to Negri Sembilan, in forest.

Chisocheton macrophyllus, *King.* Batu Caves (Curtis). A tree of Java; in the Peninsula not common in forest, Penang, Selangor, Singapore.

Chisocheton princeps, *Hemsl.* Sungai Buloh (Forest Dept.). A tree, endemic and rare, Penang.

Chisocheton spicatus, *Hiern*. Klang Gates (Forest Dept.). A tree of Sumatra and Borneo; in the Peninsula Penang to Singapore in forest.

Dysoxylum arborescens, *Miq.* Klang Gates (Forest Dept.). A small tree of Tenasserim to Celebes; in the Peninsula Perak, Pahang, Malacca, in lowland forest.

Dysoxylum cauliflorum, *Hiern*. Weld's Hill (Forest Dept.). A tree of Borneo (a var.) and the Philippines; in the Peninsula Penang to Singapore in forest.

Dysoxylum costulatum, *Miq.* Dusun Tua (Ridley). A tree of Sumatra; in the Peninsula common in forest.

Dysoxylum dumosum, *King*. Seminyih (Hume). A shrub, endemic, Perak to Johore in forest.

Dysoxylum flavescens, *Hiern*. K. Lumpur (Forest Dept.). A tree, endemic, not common in forest, Penang, Malacca and Singapore.

Dysoxylum macrothyrsum, *Miq.* Batang Berjuntai; K. Lumpur; Sungai Buloh (var. *microbotrys*, *Ridl.*). A tree of Java and Borneo; in the Peninsula Taiping to Singapore in forest.

Dysoxylum thrysoideum, *Griff.* Sungai Buloh (Forest Dept.). A tall tree of Borneo; in the Peninsula common in forest.

Dysoxylum turbinatum, *King*. Sungai Buloh; Ulu Gombak; Weld's Hill. A small tree of Sumatra; in the Peninsula common in forest in the south.

Amoora Maingayi, *Hiern*. Weld's Hill (Forest Dept.). A small tree, endemic, rare and little known, Taiping and Malacca.

Aphanamixis Rohituka, *Pierre*. K. Lumpur; Sungai Buloh; Ulu Gombak; Weld's Hill. A tree of India to Sumatra and China; in the Peninsula common in forest.

Aglaia cordata, *Hiern*. Bukit Tunggal Forest Reserve (Forest Dept.). A small tree of Borneo; in the Peninsula common in forest.

Aglaia glabriflora, *Hiern*. Ayer Hitam Forest Reserve; Weld's Hill. A small tree, endemic, not uncommon in the south in open places.

Aglaia Griffithii, *Kurz*. Sungai Buloh (Forest Dept.). A tree of Tenasserim; in the Peninsula common in forest from Penang to Singapore.

Aglaia Hiernii, *King*. Klang Gates; Ulu Gombak. A tall tree, endemic, Perak and Malacca, in forest.

Aglaia odoratissima, *Bl.* Seminyih; Ulu Gombak; Weld's Hill. A tree of Siam, Sumatra and Java; in the Peninsula common in lowland forest.

Aglaia oligophylla, *Miq.* Weld's Hill (Forest Dept.). A small tree of Burma and Sumatra; in the Peninsula not common in forest, Perak, Malacca, Johore and Singapore.

Aglaia palembanica, *Miq.* Ulu Gombak. A shrub or small tree of Sumatra, Bangka and Borneo; in the Peninsula common in forest.

Aglaia tenuicaulis, *Hiern.* Dusun Tua; Seminyih; Ulu Gombak; Weld's Hill. A shrub or small tree of Sumatra; in the Peninsula Penang to Negri Sembilan, in forest.

Aglaia trichostemon, *C. DC.* K. Lumpur (Forest Dept.). A small tree of Borneo; in the Peninsula common in lowland forest.

Lansium domesticum, *Jack.* Batu Caves; K. Lumpur; Weld's Hill (var. *pubescens*, *Koorders*). A small tree of W. Malaysia; in the Peninsula common, cultivated and wild.

Walsura multijuga, *King.* Sungai Buloh; Ulu Gombak; Weld's Hill. A small tree of Sumatra, Bangka, Borneo, and the Philippines; in the Peninsula Penang to Singapore in forest.

Walsura villosa, *Wall.* Ulu Gombak (Forest Dept.). A small tree of Tenasserim, Siam and Indo-China; in the Peninsula rare, Perak, Pahang, Malacca.

CLUTIVATED MELIACEÆ.

Aglaia odorata, *Lour.* K. Lumpur. A shrub of China; in the Peninsula cultivated only.

Melia Azedarach, *Linn.* K. Lumpur. A small tree of India; in the Peninsula occasionally cultivated.

CHAILLETIACEÆ.

Chailletia Griffithii, *Hook. fl.* Ampang; Batang Berjuntai; Batu Caves; Dusun Tua; Klang Gates; Seminyih; Ulu Gombak. A shrub, endemic, not uncommon in forest from Perak to Malacca.

OLACACEÆ.

Harmandia Kunstleri, *King.* Batu Caves (Ridley). A tree, endemic, not common in forest, Perak, Malacca.

Ochanostachys amentacea, *Mast.* Ampang; Kajang, K. Lumpur; Rantau Panjang; Sungai Buloh; Ulu Gombak. A tree of Tenasserim, Bangka, Lingga and Borneo; in the Peninsula common in forest from Penang to Singapore.

Ctenolophon parvifolius, *Oliv.* Seminyih (Hume). A tree of Sumatra and Borneo; in the Peninsula common in forest.

Strombosia javanica, *Bl.* Batu Caves; Batu Tiga; Weld's Hill. A small tree of Tenasserim and W. Malaysia; in the Peninsula Penang to Singapore in forest.

Strombosia rotundifolia, *King*. Kajang (Forest Dept.). A shrub, endemic, not common in forest, Taiping to Singapore.

Gomphandra affinis, *Mast*. Batu Caves; Dusun Tua; K. Lumpur; Rawang; Seminyih; Sungai Buloh. A shrub of Moulmein; in the Peninsula common in forest.

Gomphandra gracilis, *King*. Ulu Gombak (Hume 9693). A shrub or small tree, endemic, rare, Perak at Larut and Chanderiang.

Gomphandra lanceolata, *King*. Klang Gates; Petaling; Seminyih; Ulu Gombak. A shrub, endemic and common in forest, usually at some altitude.

Gomphandra Maingayi, *King*. Ulu Gombak (Hume). A shrub, endemic, not common in montane forest, Penang, Pahang.

Gomphandra pubescens, *Ridl*. Weld's Hill (Ridley). A shrub, endemic and local.

Stemonurus capitatus, *Becc*. Weld's Hill (Forest Dept.). A small tree, endemic, not very common in forest, Langkawi to Johore.

Stemonurus scorpioides, *Becc*. Sungai Buloh (Forest Dept.). A tree of Sumatra and Java; in the Peninsula Perak, Johore, Singapore.

Gonocaryum longe-racemosum, *King*. Batu Caves; Kajang; Kanching; Ulu Gombak. A shrub of Lower Siam; in the Peninsula Perak to Singapore in lowland forest.

Phytocrene palmata, *Wall*. K. Lumpur (Ridley). A long climbing shrub, endemic in forest, Penang, Taiping and Malacca.

Lophopyxis Maingayi, *Hook. fil*. Batu Tiga (Ridley). A climbing shrub, endemic, not common in forest, Taiping to Malacca.

ILICACEÆ.

Ilex macrophylla, *Wall*. Carcosa Domain; ? Weld's Hill. A tree of Mergui, Sumatra and Java; in the Peninsula not common in open places, Penang, Malacca and Singapore.

Ilex Maingayi, *Hook. fil*. K. Lumpur (Forest Dept.). A tree, endemic, not very common in forest, Penang to Singapore.

CELASTRACEÆ.

Microtropis filiformis, *King*. Sungai Buloh (Ridley). A shrub or small tree of Burma and Lower Siam; in the Peninsula not uncommon in forest in the north.

Euonymus javanicus, *Bl.* Batu Caves (Ridley). A shrub of Burma, Sumatra and Java; in the Peninsula common in forest from Langkawi to Negri Sembilan.

Glyptopetalum quadrangulare, *Prain.* Seminyih (Hume 8191). A shrub, endemic, not common, usually in montane forest, Perak, Pahang, Selangor.

Lophopetalum oblongifolium, *King.* K. Lumpur (Curtis 3771). A tall tree of Sumatra; in the Peninsula rare, Perak.

Kurrimia paniculata, *Wall.* Bukit Tunggul; K. Lumpur; Rawang; Sungai Buloh. A tree of Lower Siam, Sumatra and Borneo; in the Peninsula common in lowland forest.

Hippocratea nigricaulis, *Ridl.* Rawang (Ridley). A slender climber of Burma and Lower Siam; in the Peninsula Penang to Johore, usually in forest.

Salacia flavescens, *Kurz.* Batu Caves; Seminyih; Ulu Gombak. A scandent shrub or bush of Tenasserim and Siam; in the Peninsula common in open country and in forest.

Salacia grandiflora, *Kurz.* Ulu Gombak (Hume). A shrub of Tenasserim; in the Peninsula very common from Penang to Singapore, usually in open country.

RHAMNACEÆ.

Zizyphus calophylla, *Wall.* K. Lumpur (Ridley). A strong thorny climber of Bangka and Borneo; in the Peninsula common in forest.

Zizyphus oenoplia, *Mill.* Batu Caves; Rawang; A thorny bush of Tropical Africa and Australia; in the Peninsula common in open country.

Zizyphus sp. Top of the Batu Caves (Ridley, Kelsall).

Ventilago malaccensis, *Ridl.* Ulu Gombak (Forest Dept.). A climbing shrub of Lower Siam and Borneo; in the Peninsula common from Langkawi to Singapore in open places.

Ventilago oblongifolia, *Bl.* Batu Caves; Weld's Hill. A strong climber of Java and the Philippines; in the Peninsula in forest from Taiping to Singapore.

Gouania javanica, *Miq.* Batu Caves; K. Lumpur; Ulu Langat; Weld's Hill. A climbing shrub of Sumatra and Java; in the Peninsula Perlis and Kelantan to Malacca, in open places.

CULTIVATED RHAMNACEÆ.

Zizyphus jujuba, *Lam.* (The jujube). K. Lumpur (Agri. Dept.). A small tree of Indo-Malaya; sparingly cultivated in the Peninsula.

AMPELIDACEÆ.

Vitis cantoniensis, *Seem.* Batu Tiga; Petaling; Ulu Gombak. A slender vine of Indo-China and China; in the Peninsula not very common in open places, Taiping to Johore.

Vitis cinnamomea, *Wall.* Batang Berjuntai; Klang Gates; K. Lumpur; Seminyih; Sungai Buloh. A vine, endemic, common in lowland forest.

Vitis furcata, *Laws.* Batu Caves; Bukit Raja; Seminyih; Ulu Gombak. A vine of Sumatra; in the Peninsula Penang to Singapore in forest.

Vitis glaberrima, *Wall.* Batu Caves (Ridley). A vine of Tenasserim, Lower Siam, Sumatra and Bangka; in the Peninsula Penang to Singapore, in forest.

Vitis gracilis, *Wall.* Sungai Buloh (Ridley). A slender vine of Sumatra and Borneo; in the Peninsula common.

Vitis hastata, *Miq.* Batu Caves; Klang Gates; K. Lumpur. A vine of W. Malaysia; in the Peninsula common in open places from Langkawi to Singapore.

Vitis japonica, *Thunb.* Batang Berjuntai; Petaling; Rantau Panjang; Rawang. A slender vine of Java, China, Japan and Australia; in the Peninsula common in open places and secondary growth from Penang and Kelantan to Singapore.

Vitis lanceolaria, *Wall.* Batu Caves (Ridley). A vine of India, Lower Siam, Sumatra and Java; in the Peninsula common in forest and on riverbanks from Perlis to Negri Sembilan.

Vitis Lawsoni, *King.* K. Lumpur; Seminyih; Ulu Gombak. A liane of Burma; in the Peninsula Penang to Singapore in lowland forest.

Vitis macrostachya, *Miq.* Bukit Raja; Rawang; Seminyih; Ulu Gombak. A long climber of Sumatra; in the Peninsula common in open places.

Vitis mollissima, *Wall.* Bukit Raja; Klang Gates; K. Lumpur; Sungai Buloh; Ulu Gombak. A vine of Lower Siam; in the Peninsula common, usually in open places.

Vitis peduncularis, *Wall.* K. Lumpur; Ulu Gombak. A woody vine of Sumatra and Borneo; in the Peninsula Penang and Kelantan to Johore, usually in hill forest.

Vitis polystachya, *Wall.* K. Lumpur; Rantau Panjang. A vine of Siam and Sumatra; in the Peninsula not uncommon in forest, Penang to Johore.

Vitis pyrrhodasys, *Miq.* Seminyih (Hume). A slender vine of W. Malaysia; in the Peninsula common in open places.

Vitis repens, *Wight & Arnott.* Batu Caves; Ulu Gombak. A vine of S. E. Asia; in the Peninsula common in open places and hedges.

Vitis Scortechinii, *King*. Batu Caves (Curtis 3775). A slender vine, endemic, not common, Kelantan and Perak.

Vitis ? trifolia, *Linn.* Dusun Tua (Ridley).

Vitis Wrayi, *King*. Batu Caves; Dusun Tua; A slender vine of Lower Siam; in the Peninsula Penang to Johore, usually in hill forest.

Pterisanthes cissoides, *Bl.* Dusun Tua; Seminyih; Ulu Gombak. A climber of W. Malaysia; in the Peninsula Perak and the Dindings to N. Johore, in thin forest.

Pterisanthes coriacea, *Korth.* K. Lumpur; Petaling; Rawang; Sungai Buloh; Ulu Gombak. A slender climber of Lower Siam, Sumatra and Borneo; in the Peninsula common south of the Taiping Hills in forest.

Pterisanthes rufula, *Planch.* Batu Caves; Dusun Tua; Petaling; Seminyih; Sungai Buloh. A climber of Sumatra; in the Peninsula not common in open places, Perak, Malacca.

Leea angulata, *Korth.* Rawang (Goodenough). A thorny tree of Java; in the Peninsula common in open dry places from Upper Perak and Kelantan to Singapore.

Leea gigantea, *Griff.* Batu Caves; Dusun Tua; Klang Gates; K. Lumpur; Seminyih. A large bush, endemic and common in open country.

Leea sambucina, *Willd.* Damansara Hill; K. Lumpur. A big shrub of India to Sumatra; in the Peninsula common in open country.

Leea saxatilis, *Ridl.* Batu Caves (Curtis, Ridley). A herb, endemic, usually on limestone, Langkawi to Pulau Tioman.

Leea sundaica, *Miq.* Ulu Gombak (Hume). A small tree of Java, Borneo; Celebes and Papua; in the Peninsula rare in forest, Gunong Bubu (Perak).

CULTIVATED AMPELIDACEÆ.

Vitis discolor, *Dalz.* Cultivated, fide Foxworthy. A slender vine of Indo-Malaya and Indo-China; in the Peninsula cultivated and wild on limestone in the north.

SAPINDACEÆ.

Allophylus fulvinervis, *Bl.* Rantau Panjang (Kloss, fide Ridley). A small tree of Tenasserim to Java; in the Peninsula not common in forest, Perak, Pahang, Selangor, Malacca.

Allophylus glaber, *Wall.* Batu Caves; K. Lumpur. A small tree, endemic and common in forest from Langkawi to Johore.

Erioglossum edule, *Bl.* K. Lumpur (Forest Dept.). A tall tree of Indo-Australia; in the Peninsula Langkawi to Singapore, common in open country.

Aphania paucijuga, *Radlk.* Rawang. Weld's Hill. A tree, endemic, not uncommon in forest from Penang to Malacca.

Lepisanthes Scortechinii, *King.* Klang Gates (Hume). A tree of Lower Siam; in the Peninsula rare in forest, Langkawi, Kedah, Perak, Dindings (var.), Johore.

Otophora imbricata, *Bl.* Public Gardens, K. Lumpur (Forest Dept.). A small tree of Borneo; in the Peninsula rare, Pahang.

Otophora resecta, *Radlk.* Weld's Hill (Forest Dept.). A small tree of Lower Siam; in the Peninsula not common in forest, Penang and Pahang.

Xerospermum intermedium, *Radlk.* Bangi; Ulu Gombak; Weld's Hill. A tree of Burma; in the Peninsula common in forest from Penang to Singapore.

Nephelium eriopetalum, *Miq.* Batu Caves; K. Lumpur. A tall tree of Sumatra; in the Peninsula Penang to Singapore in lowland forest.

Nephelium glabrum, *Noronh.* K. Lumpur; Sungai Buloh. A tree of ? W. Malaysia; in the Peninsula Perak to Singapore in lowland forest.

Nephelium hamulatum, *Radlk.* K. Lumpur (Forest Dept.). A tree, ? endemic, not common in forest, Dindings and Malacca.

Nephelium pallens, *Radlk.* Batang Berjuntai (Hume 7526). A tree, endemic, not common, Perak and Malacca.

Nephelium ophioides, *Radlk.* Weld's Hill (Forest Dept.). A tall tree, endemic, Perak and Malacca.

Pometia alnifolia, *Radlk.* K. Lumpur; Sungai Buloh; Ulu Gombak. A tree, endemic, Penang to Singapore in forest.

Pometia pinnata, *Forst.* Dusun Tua; Klang Gates; Sungai Buloh; Weld's Hill. A tree of Malaya to Polynesia; in the Peninsula common on riverbanks from Penang and Upper Perak to Johore.

Napeodendron altissimum, *Ridl.* Ulu Gombak (Ridley). A tall tree, endemic and local.

Arytera littoralis, *Bl.* K. Lumpur. A tree of Indo-Malaya to the Philippines; in the Peninsula in tidal swamps and on riverbanks from Perak to Singapore.

Mischocarpus sumatranus, *Bl.* K. Lumpur; Sungai Buloh. A tree of Indo-Malaya and Indo-China; in the Peninsula not common in lowland forest, Penang, Kelantan, Perak and Singapore.

CULTIVATED SAPINDACEÆ.

Nephelium lappaceum, *Linn.* (The Rambutan). A tree of W. Malaysia, widely cultivated in the Peninsula and occurring as an escape.

Nephelium malaiense, *Griff.* Public Gardens, K. Lumpur (Forest Dept.). A tree, endemic and common in villages, etc.

Nephelium mutabile, *Bl.* (The Pulasan). Weld's Hill (Forest Dept.). A tree of W. Malaysia to the Philippines; in the Peninsula commonly cultivated.

STAPHYLEACEÆ.

Turpinia latifolia, *Wall.* K. Lumpur; Sungai Buloh. A tree, endemic, common in forest in the lowlands.

SABIACEÆ.

Meliosma elliptica, *Hook. fil.* K. Lumpur. A small tree of Sumatra and Java; in the Peninsula Taiping to Singapore in lowland forest.

Meliosma lancifolia, *Hook. fil.* Weld's Hill (Forest Dept.). A small tree, endemic, not common in forest, Penang and Perak.

Meliosma nitida, *Bl.* Klang Gates; Petaling; Ulu Gombak. A shrub or small tree of Sumatra and Java; in the Peninsula in forest from Penang to Johore.

ANACARDIACEÆ.

Buchanania sessilifolia, *Bl.* Bukit Cheraka; Klang Gates; K. Lumpur; Rawang; Sungai Buloh. A tree of Indo-Malaya; in the Peninsula common in forest.

Mangifera foetida, *Lour.* K. Lumpur (Forest Dept.). A tall tree of Siam and W. Malaysia; in the Peninsula common in cultivated ground in the south.

Gluta virosa, *Ridl.* Rantau Panjang (Ridley). A tall tree, endemic, Penang, Perak, Dindings, in forest.

Melanorrhoea aptera, *King.* Klang Gates (Forest Dept.). A tree, endemic, not very common in forest, Penang, Perak, Pahang.

Melanorrhoea Wallichii, *Hook. fil.* Public Gardens, K. Lumpur (Forest Dept.). A tree of Borneo; in the Peninsula not uncommon in forest in the south.

Swintonia Schwenkii, *Teys. & Binn.* Klang Gates; Ulu Gombak. A tree of Burma, Sumatra, Borneo (var.) and Indo-China; in the Peninsula not common in forest, Pahang, Negri Sembilan and Malacca.

Swintonia spicifera, *Hook. fil.* Ulu Gombak (Forest Dept.). A tree, endemic, not uncommon in forest as far south as Mt. Ophir.

Camposperma auriculata, *Hook. fil.* Ampang (the species and var. *Wallichii*, *Ridl.*); Bangi (var. *Wallichii*); K. Lumpur (the species and var. *Wallichii*); Kajang (var. *Wallichii*); Rantau Panjang. A tall tree of Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Microstemon velutina, *Engl.* Weld's Hill (Forest Dept.). A tall tree, endemic, Perak, Pahang, Negri Sembilan, Malacca, in forest.

Pentaspadon officinalis, *Holmes.* Kanching; Sungai Buloh; Weld's Hill. A tall tree, endemic, not common in forest, Perak, Negri Sembilan and Malacca.

Melanochyla angustifolia, *Hook. fil.* Weld's Hill (Forest Dept.). A tree, endemic, not common in forest, Penang, Taiping, Negri Sembilan, Malacca.

Melanochyla rugosa, *King.* Ayer Hitam Forest Reserve; Sungai Buloh; Ulu Gombak. A tall tree, endemic, rare in forest, Tapah (Perak), Temerloh (Pahang).

Melanochyla tomentosa, *Hook. fil.*, var. *glabrescens*, *Koorders.* Bukit Cheraka (Forest Dept.). A tree, the species of Java, the var. endemic and local.

? *Melanochyla torquata*, *King.* Sungai Buloh (Forest Dept.), leaf specimens only.

Semecarpus Curtisii, *King.* Sungai Buloh (Forest Dept.). A tree of Siam; in the Peninsula Setul to Negri Sembilan, usually in open places.

Semecarpus velutina, *King.* Klang Gates (Forest Dept.). A tree, endemic, rare in forest, Gunong Bubu (Perak) and Johore.

Dracontomelum mangiferum, *Bl.* Sungai Buloh; Weld's Hill. A tree of Indo-Malaya; in the Peninsula on riverbanks from Penang and Upper Perak to Singapore, probably planted in some localities.

CULTIVATED ANACARDIACEÆ.

Anacardium occidentale, *Linn.* (The Cashew-nut). A straggling tree of South America; in the Peninsula cultivated and run wild.

Bouea macrophylla, *Griff.* K. Lumpur; Serdang. A bushy tree of Java and Borneo; in the Peninsula common in villages.

Bouea microphylla, *Griff.* K. Lumpur (Agri. Dept.). A bushy tree of Malaysia; in the Peninsula cultivated and perhaps also wild.

Mangifera caesia, *Jack*. K. Lumpur (Agri. Dept.). A tall tree of W. Malaysia; common in the Peninsula in villages.

Mangifera indica, *Linn.* (The Mango). A tree of South India; in the Peninsula often cultivated.

Mangifera odorata, *Griff.* (Kwini). K. Lumpur (Agri. Dept.). A tall tree of W. Malaysia; in the Peninsula cultivated and wild.

CONNARACEÆ.

Connarus ellipticus, *King*. K. Lumpur (Curtis), and in the Public Gardens. A sarmentose shrub, endemic, Penang to Singapore, common in open places.

Connarus ferrugineus, *Jack*. Rantau Panjang (Ridl.). A shrub or climber of Lower Siam and Sumatra; in the Peninsula in open places from Penang to Singapore.

Connarus oligophyllus, *Wall.* Batu Caves (Ridley). A scandent shrub of Lower Siam; in the Peninsula Penang to Singapore in open places and edges of forest.

Connarus semidecandrus, *Jack*. K. Lumpur; Rawang. A sarmentose shrub of Siam; Tenasserim and Sumatra; in the Peninsula common in open country.

Ellipanthus Griffithii, *Hook. fil.* Kanching (Forest Dept.). A climber of Borneo; in the Peninsula Perak, Malacca, Singapore, in forest.

Rourea fulgens, *Planch.* K. Lumpur (Forest Dept.). A climbing shrub, endemic and rare, Singapore.

Rourea rugosa, *Planch.* Klang Gates (Ridley). A liane, endemic and common in forest.

Rourea similis, *Bl.* K. Lumpur; Seminyih. A liane of Sumatra and Borneo; in the Peninsula common in forest.

Roureopsis pubinervis, *Planch.* Dusun Tua; K. Lumpur; Sungai Buloh. A climbing shrub of Java; in the Peninsula Kedah to Malacca in forest.

Agelaea vestita, *Hook. fil.* K. Lumpur; Sungai Buloh. A big liane of W. Malaysia; in the Peninsula common in forest.

Cnestis ramiflora, *Griff.* K. Lumpur (Forest Dept.). A sarmentose shrub of Indo-Malaya; in the Peninsula common in open country.

LEGUMINOSÆ.

Abrus precatorius, *Linn.* K. Lumpur (Forest Dept.). A slender climber, cosmopolitan; in the Peninsula common in open dry places.

Abrus pulchellus, *Wall.* Batu Caves (Ridley). A slender climber of S. Africa and S. E. Asia; in the Peninsula Langkawi to Negri Sembilan and Pahang.

Crotolaria Saltiana, *Andr.* K. Lumpur; Ulu Gombak. A small shrub, pantropic; in the Peninsula common from Perlis to Singapore, usually in waste ground.

Flemingia strobilifera, *R. Br.* K. Lumpur (Ridley). A small shrub of S. E. Asia; in the Peninsula common in open dry places.

Vigna parviflora, *Ridl.*, non *Welw. Flor. Trop. Africa*, Vol. II, p. 291. Ulu Gombak (Hume). A slender twiner, endemic, Upper Perak to Negri Sembilan, in sandy places.

Clitoria cajanifolia, *Benth.* K. Lumpur; Seminyih. A shrub of South America, introduced into the Peninsula and now common by roadsides in the south.

Dioclea javanica, *Benth.* Batu Tiga; K. Lumpur. A liane of Burma, Ceylon and Java; in the Peninsula not common, Perak.

Pueraria phaseoloides, *Benth.* Batu Caves; Seminyih. A slender twiner of S. E. Asia; in the Peninsula common from Perlis to Negri Sembilan in secondary growth.

Mucuna acuminata, *Grah.* Batu Caves (Ridley). A slender climber of Java; in the Peninsula not very common in secondary growth, Penang, Perak and Singapore.

Tephrosia purpurea, *Pers.* Kajang (Ridley). A small shrub of S. E. Asia; in the Peninsula in waste ground, perhaps introduced.

Tephrosia subamoena, *Prain.* K. Lumpur (Hume). A herb of North India; in the Peninsula common in waste ground.

Millettia albiflora, *Prain.* Kanching; Klang Gates; K. Lumpur; Petaling. A tree, endemic, Penang to Malacca in forest.

Millettia Hemsleyana, *Prain.* Klang Gates (Ridley). A tree, endemic, Upper Perak to Negri Sembilan, in forest.

Millettia sericea, *Benth.* K. Lumpur; Serdang. A liane of W. Malaysia; in the Peninsula common from Penang to N. Johore in forest and secondary growth.

Adinobotrys atropurpureus, *Dunn.* Public Gardens, K. Lumpur (Forest Dept.). A tall tree of Burma, Tenasserim, Sumatra and Borneo; in the Peninsula common in forest and secondary growth.

Dalbergia stercoracea, *Maing.* K. Lumpur (Forest Dept.). A climbing shrub of Sumatra; in the Peninsula common in open places from Penang and Kelantan to Singapore.

Pongamia glabra, *Vent.* Kanching; Rawang. A tree of Trop. Asia and Australia; in the Peninsula common on seashores and sandy places.

Derris elegans, *Benth.* Ulu Gombak; Weld's Hill. A slender liane of Tenasserim to the Philippines; in the Peninsula Perak and Malacca, not very common in forest.

Derris thyrsoflora, *Benth.* K. Lumpur; Ulu Gombak. A bush of Tenasserim, Sumatra and Java; in the Peninsula common from Kedah to Singapore in open country.

Uraria crinita, *Desv.* Batu Caves; Rantau Panjang. A small shrub of the tropics of the Old World; in the Peninsula common in open places.

Uraria lagopoides, *DC.* Batu Caves (Ridley). A small shrub of Indo-Malaya, Indo-China and China; in the Peninsula common in open sandy places.

Alysicarpus vaginalis, *DC.* K. Lumpur (Hume). A herb of the tropics of the Old World; in the Peninsula in dry open places apparently not very common.

Desmodium capitatum, *DC.* Open country near Batu Caves (Ridley). A small creeping shrub of Tropical Asia; in the Peninsula in open country in the north.

Desmodium polycarpum, *DC.* Rantau Panjang (Hume). A small erect shrub of Africa, Asia and Polynesia; in the Peninsula common in open country and grassy places.

Desmodium triflorum, *DC.* Ulu Gombak (Hume). A small diffuse herb, cosmopolitan; common on roadsides and in grass over the whole Peninsula.

Desmodium trifolium, *Miq.* Ulu Gombak (Hume). A small creeping shrub of Java to New Guinea; in the Peninsula not common in forest, Upper Perak to Negri Sembilan.

Ormosia nitida, *Prain.* Weld's Hill (Forest Dept.). A tree, endemic and rare, Gopeng (Perak).

Ormosia sumatrana, *Prain.* Weld's Hill (Forest Dept.). A tall tree of Sumatra; in the Peninsula not common, Penang, Kuantan (Pahang), Malacca.

Cassia alata, *Linn.* Common round K. Lumpur. A large shrub, pantropic, of South American origin; in the Peninsula common in waste ground.

Cassia glauca, *Lam.* K. Lumpur; Serdang (cultivated). A shrub or small tree of S. E. Asia; in the Peninsula doubtfully wild.

Cassia hirsuta, *Linn.* Batu Caves; Ulu Gombak; Weld's Hill. An introduced South American weed, not very common in the Peninsula in waste ground.

Cassia nodosa, *Ham.* Klang Gates; K. Lumpur. A tree of Indo-Malaya and Indo-China; in the Peninsula common in forest from Penang and Upper Perak to Malacca.

Cassia obtusifolia, *Linn.* K. Lumpur; Pudu; Seminyih; Ulu Gombak. A herb of S. American origin, now naturalised in S. E. Asia; in the Peninsula common in waste ground.

Cassia occidentalis, *Linn.* Batang Berjuntai; Ulu Gombak. A small shrub, pantropic, of S. American origin; in the Peninsula common in waste ground.

Cassia timoriensis, *DC.*, var. *xanthocoma*, *Miq.* Batu Caves; Public Gardens, K. Lumpur. A small tree of Tenasserim to the Philippines; in the Peninsula common on or near limestone.

Cassia Tora, *Linn.* Rantau Panjang; Weld's Hill. A herb or small shrub, pantropic, native of S. America; in the Peninsula not common in waste ground.

Koompassia malaccensis, *Benth.* Kanching; Rantau Panjang; Sungai Buloh; Ulu Gombak. A lofty tree of Sumatra; in the Peninsula common in forest from Panang to Singapore.

Dialium indum, *Linn.* Sungai Buloh (Forest Dept.). A tree of Java; in the Peninsula on riverbanks from Penang to the Pahang River.

Dialium laurinum, *Baker.* Sungai Buloh (Forest Dept.). A tall tree, endemic, Pahang, Selangor, Malacca and Singapore, in forest.

Dialium Maingayi, *Baker.* Sungai Buloh (Forest Dept.). A tall tree, endemic, Penang to Singapore, in forest.

Dialium platysepalum, *Baker.* K. Lumpur (Forest Dept.). A tall tree, endemic and common in forest.

Dialium Wallichii, *Prain.* Rantau Panjang (Forest Dept.). A tree, endemic, Perak and Pahang to Singapore, in forest.

Bauhinia bidentata, *Jack.* Batu Caves; Rawang. A long climber of Sumatra; in the Peninsula Penang to Johore, common in forest.

Bauhinia calycina, *Ridl.* K. Lumpur; Petaling; Weld's Hill. A climbing shrub, ? endemic, not uncommon in the south in forest.

Bauhinia cornifolia, *Baker.* Petaling; Seminyih; Sungai Buloh. A liane, endemic, Penang and Kelantan to Negri Sembilan, in forest.

Bauhinia ferruginea, *Roxb.* Petaling (Ridley). A liane, endemic, Penang, Perak, Pahang, not common in forest.

Bauhinia flammifera, *Ridl.* Ampang; Bangi; K. Lumpur; Seminyih; Ulu Gombak; Weld's Hill. A big climber of Lower Siam; in the Peninsula common in forest from Penang and Upper Perak to Johore.

Bauhinia semibifida, *Roxb.* Sungai Buloh (Forest Dept.). A climbing shrub of Sumatra and Borneo; in the Peninsula not common in forest, Trengganu, Malacca, Singapore.

Bauhinia strychnoidea, *Prain.* Batu Caves (Kelsall). A climbing shrub, endemic, usually on limestone, Perak, Pahang and Negri Sembilan.

Cynometra inaequifolia, *A. Gray.* K. Lumpur (Forest Dept.). A tall tree of Lower Siam and the Philippines; in the Peninsula common in forest from Penang to Negri Sembilan.

Cynometra polyandra, *Roxb.* Weld's Hill (Forest Dept.). A tree of India; in the Peninsula not common in forest, Penang, Kelantan and Malacca.

Sindora coriacea, *Prain.* Bangi; Sungai Buloh. A tree, endemic, not very common in forest, Penang to Malacca.

Azelia palembanica, *Baker.* Dusun Tua; K. Lumpur; Sungai Buloh; Ulu Gombak. A tall tree of Sumatra; in the Peninsula common in forest.

Azelia ? retusa, *Kurz.* Ulu Gombak (Forest Dept.).

Saraca cauliflora, *Baker.* K. Lumpur; Sungai Buloh. A small tree, endemic, not common, Perak, Kelantan, Pahang, Dindings, Malacca.

Saraca declinata, *Miq.* Kajang; K. Lumpur; Rawang; Ulu Gombak. A small tree of Lower Siam and Java; in the Peninsula Upper Perak, Pahang, Taiping, Malacca, in forest.

Saraca ? Kunstleri, *Prain.* Public Gardens, K. Lumpur (Forest Dept.).

Saraca taipingensis, *Cantley.* Batu Caves; K. Lumpur; Ulu Gombak. A small tree, endemic, common in forest by streams from Taiping to Johore.

Saraca triandra, *Baker.* Bukit Lagong; Kanching; K. Lumpur; Seminyih; Sungai Buloh. A small tree or shrub of Lower Siam, Sumatra and Borneo; in the Peninsula common in forest from Kedah and Kelantan to Malacca.

Leucostegane latistipulata, *Prain.* K. Lumpur (Forest Dept.). A small tree, endemic and rare in forest, Dindings.

Crudia Curtisii, *Prain.* Kepong; K. Lumpur. A lofty tree, endemic, Penang to Malacca, in forest.

Mezoneuron sumatranum, *Wight & Arnott.* Weld's Hill (Forest Dept.). A prickly climbing shrub of Sumatra, Borneo and the Philippines; in the Peninsula Penang to Singapore, in open places.

Adenantha bicolor, *Moon.* K. Lumpur; Sungai Buloh; Ulu Gombak. A tree of Ceylon; in the Peninsula Penang, Taiping, Malacca, Singapore, in forest.

Adenanthera pavonina, *Linn.* Sungai Buloh (Forest Dept.). A small tree of S. E. Asia; in the Peninsula often planted and doubtfully wild.

Entada Schefferi, *Ridl.* K. Lumpur (Forest Dept.). A large climbing shrub of Lower Siam and Java; in the Peninsula not uncommon on riverbanks.

Leucaena glauca, *Benth.* K. Lumpur (Forest Dept.). A pantropic shrub of South American origin; in the Peninsula in waste ground, introduced.

Mimosa pudica, *Linn.* (The sensitive plant). A pantropic undershrub of South American origin; in the Peninsula very common in waste ground.

Acacia pennata, *Wild.* Batu Caves; Seminyih. A long climbing shrub of Tropical Africa and Tropical Asia; in the Peninsula common in open country, especially in the North.

Pithecolobium angulatum, *Benth.* Rawang; Weld's Hill. A small tree of Indo-Malaya and the Philippines; in the Peninsula common in secondary growth.

Pithecolobium bulbalinum, *Benth.* Ulu Gombak; Weld's Hill. A small tree of Sumatra; in the Peninsula not common in forest, Penang, Malacca and Singapore.

Pithecolobium Clypearia, *Benth.* Batang Berjuntai; K. Lumpur; Sungai Buloh. A small tree of W. Malaysia and South China; in the Peninsula common in secondary growth and open places.

Pithecolobium confertum, *Benth.* Ampang; Kajang; Weld's Hill. A small tree of Sumatra; in the Peninsula not common in open country, Penang, Pahang, Malacca, Singapore.

Pithecolobium contortum, *Mart.* Klang Gates; K. Lumpur; Rantau Panjang; Ulu Gombak. A small tree, endemic, common in forest from Kedah to Singapore.

Pithecolobium ellipticum, *Hassk.* Sungai Buloh; Weld's Hill. A small tree of W. Malaysia to the Philippines; in the Peninsula common in secondary growth and open places, from Kedah to Singapore.

Pithecolobium Kunstleri, *Prairie.* Weld's Hill (Forest Dept.). A small tree of Borneo; in the Peninsula not common in forest, Perak, Pahang, Johore.

Pithecolobium lobatum, *Benth.* Klang Gates; Weld's Hill. A tree of Tenasserim to Borneo; in the Peninsula common in waste ground and secondary growth from Penang to Singapore.

Pithecolobium microcarpum, *Benth.* K. Lumpur (Forest Dept.). A small tree of Sumatra and Borneo; in the Peninsula common from Penang to Singapore, especially in open country.

CULTIVATED LEGUMINOSÆ.

Acacia auriculiformis, *Cunn.* Public Gardens, K. Lumpur. A small tree of Australia; in the Peninsula occasionally cultivated.

Albizzia Lebbek, *Benth.* Public Gardens, K. Lumpur (Forest Dept.). A tree, widely distributed in tropical and sub-tropical countries, and cultivated; in the Peninsula probably cultivated only.

Albizzia moluccana, *Miq.* K. Lumpur (and in other localities). A tall tree of Borneo and the Molucca; in the Peninsula cultivated.

Arachis hypogaea, *Linn.* (The Groundnut). K. Lumpur (Ridley). A native of tropical America, cultivated in Indo-Malaya and other warm countries.

Bauhinia monandra, *Kurz.* K. Lumpur, in the Public Gardens. A small tree of Burma; in the Peninsula occasionally cultivated.

Bauhinia variegata, *Linn.* K. Lumpur (Forest Dept.). A tree of India, Burma and China; in the Peninsula cultivated only.

Caesalpinia pulcherrima, *Sw.* Common in gardens. A large shrub of Trop. America, often cultivated in the Peninsula as it is in most tropical countries.

Cassia javanica, *Linn.* Planted in K. Lumpur. A spreading tree of W. Malaysia; in the Peninsula cultivated only.

Centrosema Plumierii, *Benth.* Cultivated as a cover crop. A twiner of S. American origin; in the Peninsula cultivated only.

Desmodium gyroides, *DC.* Serdang Experimental Plantation. A shrub of Trop. Asia to New Guinea; in the Peninsula not common, Penang and Perak.

Enterolobium Saman, *Prain.* The rain tree, planted as a shade tree, native of Guiana.

Erythrina indica, *Linn.* K. Lumpur, probably planted (Forest Dept.). A tree of India to Polynesia; in the Peninsula a seashore tree, and often planted inland.

Indigofera hirsuta, *Linn.* Serdang Experimental Plantation. A herb, pantropic on seashores, not very common in the Peninsula.

Mimosa invisa, *Mart.* (Giant Mimosa). Serdang Experimental Plantation. A shrub of Brazil, occasionally cultivated in the Peninsula.

Parkia Roxburghii, *G. Don.* Planted in K. Lumpur. A tall tree of Assam, cultivated in Indo-China and Malaya, not wild in the Peninsula.

Peltophorum ferrugineum, *Benth.* K. Lumpur (Forest Dept.). A spreading tree of Tenasserim to Australia and Indo-China; in the Peninsula common near the sea, often planted inland.

Phaseolus lunatus, *Linn.* (Haricot Bean). A native of America, often cultivated in the Peninsula.

Pithecolobium dulce, *Benth.* Pudu (Forest Dept.). A tree of America, occasionally cultivated in the Peninsula.

Poinciana regia, *Boj.* (Flame of the Forest). A tree of Madagascar; in the Peninsula cultivated as an ornamental and roadside tree.

Pterocarpus indicus, *Willd.* (Angsena). Cultivated as a roadside tree. A tall tree of Tenasserim to the Philippines; in the Peninsula often planted, and perhaps wild in Penang, Ulu Selangor and Malacca.

Tamarindus indica, *Linn.* (The Tamarind). Ampang (Forest Dept.). A tree, pantropic in cultivation, probably African in origin; in the Peninsula cultivated and escaping.

ROSACEÆ.

Coccomelia nitida, *Ridl.* K. Lumpur (Ridley). A small tree of Sumatra, Borneo and the Philippines; in the Peninsula common in open places from Setul to Singapore.

Pygeum Hookerianum, *King.* Klang Gates (var.); Sungai Buloh. A shrub or small tree, endemic and not uncommon in open places from Perak to Johore, the var. recorded also from Fraser Hill.

Pygeum lanceolatum, *Hook. fil.* K. Lumpur (var. *Maingayi*, *Ridl.*); Seminyih. A small tree, endemic, the species in Penang, Trengganu, Malacca, Johore, the var. in Penang, Upper Perak, Fraser Hill, Negri Sembilan and Malacca.

Pygeum parviflorum, *Teys. & Binn.* Bangi (Forest Dept.). A tree of Java and Borneo; in the Peninsula common in forest from Upper Perak to Singapore.

Pygeum polystachyum, *Hook. fil.* K. Lumpur; Ulu Gombak. A tree, endemic and common in forest.

Rubus angulosus, *Focke.* Ampang; Batu Tiga; K. Lumpur. A big shrub of Mergui; in the Peninsula common in open places and secondary growth from Penang and Kelantan to Singapore.

Rubus elongatus, *Smith.* Ulu Gombak (Hume, Burkill). A slender bramble of W. Malaysia; in the Peninsula rare, Taiping Hills.

Rubus rosaefolius, *Smith.* Ulu Gombak (Hume). A bramble of Africa, Indo-Australia, China and Japan; in the Peninsula common in clearings and secondary growth in the Main Range, usually at considerable altitudes, and in Penang and the Taiping Hills.

SAXIFRAGACEÆ.

Polyosma flavo-virens, *Ridl.* Sungai Buloh. A small tree, endemic, not very common in forest, Penang, Perak, and the Dindings.

Polyosma laete-virens, *Griff.* K. Lumpur; Sungai Buloh. A tree, endemic, Penang to Mt. Ophir.

HAMAMELIDACEÆ.

Rhodoleia Teysmanni, *Miq.* Klang Gates (all collectors). A shrub or small tree of Sumatra; in the Peninsula usually montane in open dry places, Kedah Peak to Mt. Ophir.

LEGNOTIDACEÆ.

Carallia euryoides, *Ridl.* Klang Gates, on quartzite rocks, (Ridley). A small tree, endemic and local.

Carallia integerrima, *DC.* K. Lumpur (Weld's Hill and the Public Gardens). A tree of Indo-Australia and China; in the Peninsula common in forest from Perlis to Singapore.

Carallia Scortechinii, *King.* Batu Caves; Petaling. A shrub or small tree, endemic, rare, Perak and Singapore.

Carallia suffruticosa, *Ridl.* *Carallia spinulosa*, *Ridl.* Dusun Tua; Seminyih; Weld's Hill. A shrub or small tree of Tonkin; in the Peninsula not common, Perak and Pahang.

Gynotroches axillaris, *Bl.* K. Lumpur; Rantau Panjang; Ulu Gombak. A small slender tree of W. Malaysia to the Philippines; in the Peninsula common in forest.

Pellacalyx axillaris, *Korth.* Public Gardens and Weld's Hill (Forest Dept.). A small tree of Sumatra and the Philippines; in the Peninsula common in open damp places from Penang to Singapore.

Pellacalyx Saccardianus, *Scort.* Batang Berjuntai; Kajang; K. Lumpur; Rawang; Seminyih; Ulu Gombak. A small tree of Borneo; in the Peninsula common in open places and secondary growth; from Penang to Singapore.

ANISOPHYLLAEACEÆ.

Anisophyllaea apetala, *Scort.* Klang Gates; Petaling. A small tree, endemic, Taiping to Malacca, in forest.

Anisophyllaea Griffithii, *Oliv.* K. Lumpur; Rantau Panjang; Ulu Gombak. A tree, endemic, Penang, Malacca and Singapore, in forest.

COMBRETACEÆ.

Terminalia belerica, *Roxb.* K. Lumpur (Forest Dept.). A tall tree of Indo-Malaya; in the Peninsula not common in forest, Perak.

Terminalia bialata, *Steud.* Weld's Hill (Forest Dept.). A tall tree of Burma and Tenasserim; in the Peninsula rare in open country, Perlis and Langkawi.

Terminalia citrina, *Roxb.* Weld's Hill (Forest Dept.). A tree or climber of India; in the Peninsula Penang, Perak, Pahang, Negri Sembilan, in forest.

Combretum chinense, *Roxb.* Ampang (Forest Dept.). A climbing shrub of India to Tenasserim and China; in the Peninsula not common in open places, Penang and Perak.

Combretum nigrescens, *King.* Batu Caves; Sungai Buloh. A large climbing shrub, endemic, Perak, Pahang and Negri Sembilan, in forest.

Combretum sundaicum, *Miq.* Batu Caves; K. Lumpur; Petaling; Sungai Buloh. A large climbing shrub of W. Malaysia to the Philippines; in the Peninsula common in open places from Penang to Singapore.

CULTIVATED COMBRETACEÆ.

Quisqualis indica, *Linn.* Ampang; Seminyih. A climbing shrub of the Tropics of the old World; in the Peninsula cultivated, and wild in Perlis and Pahang.

Terminalia Catappa, *Linn.* K. Lumpur, planted (Forest Dept.). A tree of India to Polynesia; in the Peninsula common on sea coasts, and often planted inland.

MYRTACEÆ.

Baeckia frutescens, *Linn.* Klang Gates (all collectors). A shrub or small tree of W. Malaysia, China and Japan; in the Peninsula common on dry open mountain tops.

Melaleuca leucadendron, *Linn.* K. Lumpur (Forest Dept.). A tree of Indo-Australia and Indo-China; in the Peninsula common in wet places and often planted.

Rhodamnia cinerea, *Jack.* K. Lumpur; Ulu Gombak. A small tree of Siam to Australia; in the Peninsula common in secondary growth.

Rhodomyrtus tomentosa, *Wight.* K. Lumpur, and doubtless in other localities. A shrub of Indo-Malaya to the Philippines, China and Japan; in the Peninsula common in dry open places.

Decaspermum paniculatum, *Kurz.* K. Lumpur; Sungai Buloh. A small tree of Indo-Malaya; in the Peninsula common in secondary growth from Langkawi to Singapore.

Eugenia acuminatissima, *Kurz.* Sungai Buloh (Forest Dept.). A tall tree of Burma and Sumatra; in the Peninsula common in forest from Penang to Singapore.

Eugenia bracteolata, *Wight.* K. Lumpur (Forest Dept.). A small tree of Burma; in the Peninsula common in forest and secondary growth.

Eugenia caudata, *King*. Sungai Buloh (Forest Dept.). A small tree, endemic, usually montane or sub-montane in forest, Penang, Taiping, Selangor, Mt. Ophir, Johore.

Eugenia chlorantha, *Duthie*. Sungai Buloh; ? Ulu Gombak (Hume 8940); Weld's Hill. A tree of Sumatra and Borneo; in the Peninsula common, especially in the South.

Eugenia cymosa, *Lam*. K. Lumpur; Sungai Buloh. A small tree of Indo-Malaya; in the Peninsula common in open country from Langkawi to Singapore.

Eugenia Dyeriana, *King*. Sungai Buloh; Weld's Hill. A tree, endemic, not common in forest, Perak and the Dindings.

Eugenia filiformis, *Wall*. Kanching; K. Lumpur; Rantau Panjang; Sungai Buloh. A small tree, endemic and common in forest and secondary growth from Penang to Singapore.

Eugenia grandis, *Wight*. Public Gardens, K. Lumpur (Forest Dept.). A tall tree of Burma and Siam; in the Peninsula common on seashores, and often planted as a roadside tree.

Eugenia Griffithii, *Duthie*. K. Lumpur (Forest Dept.). A tree, endemic, Perak to Singapore, in forest.

Eugenia Hemsleyana, *King*. Kanching (Forest Dept.). A small tree, endemic, not common in forest, ? Penang, Perak and Selangor.

Eugenia Klossii, *Ridl*. Rantau Panjang (Kloss, fide Ridley). A tree, endemic and local.

Eugenia lepidocarpa, *Wall*. K. Lumpur (Forest Dept.). A tree of Burma; in the Peninsula common in secondary growth from Perak to Singapore.

Eugenia lineata, *Duthie*. Kajang; Rantau Panjang; Weld's Hill. A tree of W. Malaysia; in the Peninsula very common in open country.

Eugenia microcalyx, *Duthie*. K. Lumpur (Forest Dept.). A tree, endemic and common in forest from Penang to Singapore.

Eugenia oblata, *Roxb*. K. Lumpur (Forest Dept.). A tree of Assam to Borneo; in the Peninsula common in forest.

Eugenia papillosa, *Duthie*. K. Lumpur; Sungai Buloh. A tall tree, endemic, Perak, Malacca and Singapore, in swampy forest.

Eugenia penangiana, *Duthie*. Klang Gates (Brooks). A slender tree, endemic, Penang, Taiping, Malacca, in forest.

Eugenia pendens, *Duthie*. Sungai Buloh (Forest Dept.). A small tree, endemic and common in forest in the South,

***Eugenia pergamentacea*, King.** Weld's Hill (Forest Dept.). A small tree, endemic, not common, Penang, Gunong Tahan.

***Eugenia polyantha*, Wight.** Rantau Panjang; Weld's Hill. A tree of Indo-Malaya; in the Peninsula common in forest from Kedah to Singapore.

***Eugenia pseudo-formosa*, King.** Klang Gates; Ulu Gombak; Weld's Hill. A shrub or small tree of Sumatra; in the Peninsula Langkawi to Singapore in forest apparently more common in the North.

***Eugenia pseudo-subtilis*, King.** Weld's Hill (Forest Dept.). A small tree of Lower Siam; in the Peninsula Perlis to Singapore, perhaps planted in some of the localities.

***Eugenia pseudo-tetraptera*, King.** Sungai Buloh (Forest Dept.). A small shrub of the Carimon Islands; in the Peninsula not rare in forest but seldom flowering (Ridley).

***Eugenia punctulata*, King.** K. Lumpur (Forest Dept.). A tree of Borneo; in the Peninsula Taiping to Singapore, not uncommon.

***Eugenia pyrifolia*, Duthie.** Batu Tiga; Sungai Buloh; Weld's Hill. A tree of Lower Siam; in the Peninsula common in open places in the South.

***Eugenia Ridleyi*, King.** Sungai Buloh (Forest Dept.). A tall tree, endemic, not uncommon in forest, Penang, Pahang, Negri Sembilan and Singapore.

***Eugenia Scortechinii*, King.** Seminyih; Weld's Hill. A small tree of Lower Siam; in the Peninsula Kedah to Singapore, in swampy forest.

***Eugenia simulans*, King.** Rantau Panjang; Rawang; Sungai Buloh. A tree, endemic, Penang to Singapore.

***Eugenia subdecussata*, Duthie.** Ulu Gombak; Weld's Hill. A bush or tree, endemic, common from Kedah to Singapore in open places and secondary growth.

***Eugenia urceolata*, King.** Rawang; Ulu Gombak. A tree of Sumatra and Borneo; in the Peninsula common in open forest from Perak to Singapore.

***Eugenia valdevenosa*, Duthie.** Weld's Hill (Forest Dept.). A tree, endemic, Penang to Johore, usually in forest in the mountains.

***Eugenia variolosa*, King.** K. Lumpur; Sungai Buloh. A small tree, endemic, common from Taiping to Singapore in lowland forest.

***Eugenia venulosa*, Wall.** K. Lumpur (Forest Dept.). A small tree of the Karimon Islands; in the Peninsula common in the open country in the South.

Eugenia zeylanica, *Wight*. Sungai Buloh; Ulu Gombak. A bushy tree of India, Lower Siam, Java and Borneo; in the Peninsula common in open country from Penang to Singapore.

Pseudo-eugenia singaporensis, *King*. Rantau Panjang; Sungai Buloh. A small tree, endemic and common in the South.

Barringtonia fusiformis, *King*. Batu Caves (Ridley). A small tree, endemic, Langkawi and Kelantan to Malacca, in bamboo forest.

Barringtonia macrostachya, *King*. Ulu Gombak; Weld's Hill. A shrub or small tree of Burma and Borneo; in the Peninsula Langkawi, Kedah, Taiping, Malacca, Negri Sembilan, Johore (Pulau Tinggi), Singapore, in forest.

Barringtonia ? pauciflora, *King*. Weld's Hill (Forest Dept.). A small tree, endemic and rare, hitherto only known from the Taiping Hills. The Weld's Hill specimen is in fruit only, and as fruit of *B. pauciflora* has not been described, its identity is doubtful.

Barringtonia racemosa, *Roxb.* K. Lumpur (Forest Dept.). A shrub or small tree of Indo-Malaya to Polynesia; in the Peninsula common near the sea and in open places.

Barringtonia Scortechinii, *King*. Sungai Buloh; Weld's Hill. A tree, endemic, Penang to Malacca, in forest.

Barringtonia sumatrana, *Miq.* Klang Gates (Forest Dept.). A large shrub of Sumatra, Borneo and Celebes; in the Peninsula Penang to Singapore usually near the sea.

CULTIVATED MYRTACEÆ.

Bertholletia excelsa, *H. & B.* (Brazil nut). Serdang and the Public Gardens, K. Lumpur. A tree of Brazil; in the Peninsula very occasionally cultivated.

Eugenia aquea, *Burm.* (Jambu Ayer). K. Lumpur (Agric. Dept.). A small tree, probably native of India, cultivated only in the Peninsula.

Eugenia caryophyllata, *Thunb.* (Cloves). Serdang Experimental Plantation. A tree of the Moluccas; in the Peninsula occasionally cultivated.

Eugenia malaccensis, *Linn.* (Jambu). K. Lumpur (Agric. Dept.). A tree of unknown origin, not known in a wild state.

Eugenia quadrangularis, *Duch.* Circular Rd. Plantation. (Forest Dept.). A native of S. America, cultivated in the Peninsula.

Eugenia uniflora, *Berg.* K. Lumpur (Agric. Dept.). A small tree of Brazil, now widely cultivated in the East.

Eugenia xanthocarpa, *Thw.* K. Lumpur (Forest Dept.). A tree of Ceylon; in the Peninsula occasionally cultivated.

Psidium guava, *Linn.* (The Guava). A small tree, pantropic, native of Trop. America; in the Peninsula commonly cultivated.

MELASTOMATACEÆ.

Melastoma imbricatum, *Wall.* Ulu Gombak (Ridley, Hume). A large shrub of Assam, Indo-China and Sumatra; in the Peninsula Penang, Taiping, the Dindings, and on the Main Range, in forest.

Melastoma malabathricum, *Linn.* Rantau Panjang; Ulu Gombak. A shrub of Indo-Australia and the Mascarene Islands; in the Peninsula common in open places in the North, K. Lumpur being its most southerly range.

Melastoma polyanthum, *Bl.* Klang Gates; K. Lumpur; Pudu (flowers white); Seminyih. A shrub of W. Malaysia to the Philippines; in the Peninsula very common in open places in the south.

Allomorpha exigua, *Bl.* Klang Gates; Rantau Panjang; Seminyih. A small shrub of Sumatra; in the Peninsula not very common in forest, Penang Hill.

var. **capillaris**, *Ridl.* Klang Gates; Ulu Gombak. Endemic, Upper Perak, Taiping, the Dindings and North Johore.

Allomorpha malaccensis, *Ridl.* Batu Caves; K. Lumpur; Rantau Panjang; Rawang; Sungai Buloh; Ulu Gombak. A shrub of Sumatra; in the Peninsula common in forest.

Blastus pulverulentus, *Ridl.* Ulu Langat (Kloss, fide Ridley). A shrub, endemic and local.

Ochthocharis decumbens, *King.* Sungai Buloh (Ridley). A slender shrub, endemic, not common in damp forest, Perak, Johore.

Anerinoleistus pauciflora, *Ridl.* Klang Gates; Ulu Gombak. A shrub, endemic and rare in forest, Ginting Bidai (Selangor).

Phaulanthus Curtisii, *Ridl.* Seminyih (Hume). A small shrub, endemic, not common in forest, Penang, Upper Perak, Taiping, not hitherto recorded from further south than Sungei Siput.

Phaulanthus rudis, *Ridl.* Seminyih (Hume). A shrub, endemic, not common in forest, known also from Ginting Bidai and Ginting Peras on the Selangor-Pahang boundary.

Sonerila bicolor, *Stapf.* Sungai Buloh; Ulu Gombak. A herb, endemic, Perak and North Johore, in forest.

Sonerila heterostemon, *Naud.* Batang Berjuntai; Kanching; Klang Gates; K. Lumpur; Seminyih; Sungai Buloh; Ulu Gombak. A small herb of Sumatra and Borneo; in the Peninsula very common in open places in forest from Taiping to Singapore and in Trengganu and Pahang.

Sonerila integrifolia, *Stapf & King.* Batu Caves; Dusun Tua; Kanching; Klang Gates; Rawang; Seminyih; Sungai Buloh; Ulu Gombak. A herb, endemic, Taiping Hills and the Main Range in forest.

Sonerila nidularia, *Stapf.* Seminyih (Hume). A herb, endemic, usually in montane forest, Perak and Pahang.

Sonerila prostrata, *Ridl.* On the roadside at Klang Gates (Ridley, Burkill). A small slender creeping herb, endemic and known only from this locality.

Phyllagathis Griffithii, *King.* Batang Berjuntai; K. Lumpur; Kuang. A herb, endemic, common from Taiping to Johore in forest.

Phyllagathis hispida, *King.* Kanching on limestone (Ridley). A herb, endemic and common, but usually montane.

Phyllagathis rotundifolia, *Bl.* Batu Caves; Dusun Tua; Klang Gates; K. Lumpur; Petaling; Rantau Panjang; Sungai Buloh; Ulu Gombak. A herb of Sumatra; in the Peninsula common in forest from Kedah to Johore.

Marumia nemorosa, *Bl.* Batang Berjuntai; Dusun Tua (var. *verrucosa*); Klang Gates; Seminyih; Ulu Gombak. A slender climbing shrub of Tenasserim, Sumatra and Borneo; in the Peninsula common on the edges of woods from Kedah and Trengganu to Johore.

Dissochaeta anomala, *King.* Seminyih (Hume 8152). A slender climber, endemic, not common in forest, Kelantan, Perak.

Dissochaeta celebica, *Bl.* Batang Berjuntai; Klang Gates; K. Lumpur; Petaling. A slender climbing shrub of Borneo, Celebes and the Philippines; in the Peninsula common from Penang and Trengganu to Singapore, on forest edges.

Dissochaeta gracilis, *Bl.* Ampang; Batu Caves; Kanching; Klang Gates; K. Lumpur; Rawang; Seminyih; Ulu Gombak. A slender climbing shrub of W. Malaysia; in the Peninsula common from Upper Perak and Kelantan to Singapore, on forest edges.

Dissochaeta hirsuta, *Hook. fil.* Ulu Gombak (Hume 9131, 9287). A climbing shrub of Borneo; in the Peninsula rare in open places, Johore.

Dissochaeta intermedia, *Bl.* Rawang; Sepang. A slender climbing shrub of Java; in the Peninsula Penang to Singapore, on forest edges.

Dissochaeta pallida, *Bl.* Batang Berjuntai; Batu Caves; Bukit Raja; Klang Gates; K. Lumpur. A climbing shrub of W. Malaysia; in the Peninsula common in forest more especially in the North.

Dissochaeta ? punctulata, *Hook. fil.* Rantau Panjang (Hume).

Anplectrum divaricatum, *Triana.* Batang Berjuntai; Dusun Tua; Klang Gates; K. Lumpur; Petaling; Rantau Panjang; Ulu Gombak. A climber of W. Malaysia; in the Peninsula Penang to Malacca, on forest edges.

Anplectrum lepidosetosum, *King.* K. Lumpur; Seminyih; Ulu Gombak. A slender twining shrub of Borneo; in the Peninsula Penang to Singapore, not common in forest.

Anplectrum pallens, *Bl. var petiolare*, *Ridl.* Rantau Panjang; Ulu Gombak. A slender climber of Sumatra and Borneo; in the Peninsula the var. common in forest, the species recorded from Penang only.

Medinilla crassinervia, *Bl.* Ulu Gombak (Forest Dept.). An epiphytic shrub of Borneo to New Guinea; in the Peninsula in forest from Penang to Singapore.

Medinilla Hasseltii, *Bl.* Klang Gates; K. Lumpur; Petaling; Seminyih. An epiphytic shrub of W. Malaysia; in the Peninsula common in forest from Upper Perak to Singapore.

Pogonantha pulverulenta, *Bl.* Klang Gates; Ulu Gombak. A small shrub of W. Malaysia; in the Peninsula common on rocks and trees.

Pternandra coerulescens, *Jack.* Kajang; K. Lumpur; Rawang; Sungai Buloh; Ulu Gombak. A small tree of W. Malaysia except Java; in the Peninsula common in the lowlands on the West.

Pternandra echinata, *Jack.* Ampang; Klang Gates; K. Lumpur; Rantau Panjang; Sungai Buloh; Ulu Gombak. A bushy tree of W. Malaysia; in the Peninsula very common, especially in secondary growth.

Pternandra galeata, *Ridl.* Batu Tiga (Ridley). A small tree of Borneo; in the Peninsula not common in forest, Perak and Johore.

Pternandra Jackiana, *Ridl.* Ulu Gombak (Hume). A small tree, endemic, not common, Penang, Malacca, Singapore.

Memecylon acuminatum, *Sm.* Ulu Gombak (Hume). A tree, endemic, common in forest from Penang to Singapore.

Memecylon campanulatum, *Clarke.* Rawang (Kloss, fide Ridley). A tree, endemic and rare in forest, Ginting Bidai (Selangor), and Malacca.

Memecylon cinereum, *King*. ? Sungai Buloh; Weld's Hill. A shrub, endemic, not common in forest, Perak.

Memecylon dichotomum, *Clarke*. Dusun Tua; Klang Gates (var. *eugeniiflorum*, *Ridl.*); Seminyih; Sungai Buloh (var. *eugeniiflorum*); Ulu Gombak. A shrub, endemic, Kedah to Malacca in forest, the var. in Upper Perak and on Fraser Hill.

Memecylon edule, *Bl.* Weld's Hill (Forest Dept.). A shrub or small tree of Indo-Malaya; in the Peninsula common in open places, often near the sea.

Memecylon garcinioides, *Bl.* Rawang (Ridley). A small tree of W. Malaysia; in the Peninsula common in forest from Pulau Adang to Singapore.

Memecylon heteropleurum, *Bl.* K. Lumpur; Seminyih; Ulu Gombak. A shrub or small tree of Sumatra and Borneo; in the Peninsula common in forest from Perak and Pahang to Singapore.

Memecylon lævigatum, *Bl.* Weld's Hill (Forest Dept.). A shrub or small tree of Burma to Borneo; in the Peninsula Taiping to Singapore, in forest.

Memecylon myrsinioides, *Bl.* K. Lumpur (Ridley, Forest Dept.). A shrub or small tree of W. Malaysia; in the Peninsula common from Langkawi to Singapore, in secondary growth and near the sea.

Memecylon oleaefolium, *Bl.* Sungai Buloh (Forest Dept.). A small tree of Lower Siam, Sumatra and Bangka; in the Peninsula not common in forest, Penang, Perak, Singapore.

Memecylon oligoneuron, *Bl.* Sungai Buloh; Ulu Gombak. A small tree of Java, Borneo and the Philippines; in the Peninsula not very common in forest, Penang, Perak, Pahang (Pulau Tioman), Malacca.

Memecylon pubescens, *King*. Sungai Buloh (Forest Dept. 8295). A small tree, endemic, apparently not common in forest, Perak, Malacca, Singapore.

LYTHRACEÆ.

Crypteronia Griffithii, *Clarke*. Sungai Buloh; Weld's Hill. A tree, endemic, Penang, Perak, Pahang, Malacca, in forest.

CULTIVATED LYTHRACEÆ.

Lagerstroemia flos-reginæ, *Retz.* (Pride of India). Common in gardens. A small tree of India and Java; in the Peninsula often cultivated, and wild on riverbanks in Kedah, Kelantan, Pahang and Negri Sembilan.

Lawsonia alba, *Lamk.* (Henna). Circular Rd. Plantation and Pudu (Forest Dept.). A small tree of Persia, cultivated in many tropical countries.

ONAGRACEÆ.

Jussiaea erecta, *Linn.* Ampang (Hume). A herb of Indo-Australia and China; in the Peninsula common in wet places.

Jussiaea repens, *Linn.* Ampang (Hume). An aquatic herb, pantropic; in the Peninsula common in ditches.

Jussiaea suffruticosa, *Linn.* Ampang; K. Lumpur; Pudu; Rantau Panjang; Seminyih; Serdang; Ulu Gombak. A herb, pantropic; in the Peninsula common in wet places.

Ludwigia prostrata, *Roxb.* Batu Tiga (Goodenough). A herb of Indo-Malaya and Japan; in the Peninsula common in ditches.

SAMYDACEÆ.

Casearia Clarkei, *King.* Weld's Hill (Forest Dept.). A small tree, endemic, not common in forest, Penang to Singapore.

Casearia esculenta, *Roxb.* Ulu Gombak; Weld's Hill. A shrub or small tree of India; in the Peninsula apparently common.

Osmelia Maingayi, *King.* Batu Caves; Klang Gates. A tree, endemic and common in forest from Upper Perak to Singapore.

Homalium frutescens, *King.* Klang Gates; K. Lumpur; Rantau Panjang. A small tree of W. Malaysia; in the Peninsula Langkawi, Perak, Pahang, Johore, in wet forest.

Homalium grandiflorum, *Benth.* Ulu Gombak; Weld's Hill. A tree of Tenasserim and Sumatra; in the Peninsula Perak and the Dindings to Singapore, in forest.

Homalium logifolium, *Benth.* Batu Caves; K. Lumpur; Sungai Buloh; Ulu Gombak. A tree, endemic, Penang and Tomoh to N. Johore, in forest.

TURNERACEÆ, CULTIVATED.

Turnera ulmifolia, *Linn.* Cultivated, fide Foxworthy. A herb of South American origin, cultivated and run wild in the Peninsula.

PASSIFLORACEÆ.

Passiflora foetida, *Linn.* Common in and around K. Lumpur. A climbing herb, pantropic, of S. American origin; in the Peninsula common in open country and waste ground.

Adenia acuminata, *King*. Batang Berjuntai; Bukit Raja; Petaling; K. Lumpur. A slender climber of Sumatra and Java; in the Peninsula common on forest edges.

Adenia nicobarica, *King*. K. Lumpur (Ridley). A slender climber of the Andaman and Nicobar Islands, and Lower Siam; in the Peninsula Setul to Johore, in secondary growth.

Adenia populifolia, *Engl*. K. Lumpur; Petaling; Seminyih; Sungai Buloh; Ulu Gombak. A slender climber of Borneo and Timor; in the Peninsula common on forest edges from Taiping to Singapore.

Paropsia vareciformis, *Mast*. Ulu Gombak; Weld's Hill. A shrub or small tree, endemic, not common in forest, Perak and Malacca.

CULTIVATED PASSIFLORACEÆ.

Carica Papaya, *Linn*. (The Papaya). A native of S. America, cultivated in the Peninsula as it is in all tropical countries.

Passiflora quadrangularis, *Linn*. (The Granadilla). Cultivated, fide Foxworthy. A native of Trop. America, cultivated in all tropics.

CUCURBITACEÆ.

Trichosanthes celebica, *Cogn*. Circular Rd. Plantation (Forest Dept.). A climber of Celebes; in the Peninsula Taiping to Singapore.

Trichosanthes Wallichiana, *Wight*. Rantau Panjang (Kloss, fide Ridley). A climber of India; in the Peninsula common in forest from Penang to Singapore.

Hodgsonia capniocarpa, *Ridl*. Batu Caves; Batu Tiga. A climbing herb of India, Burma, Sumatra and Borneo; in the Peninsula Penang to Malacca, in open places.

Gymnopetalum quinquelobum, *Miq*. Ulu Gombak (Hume). A creeping herb of Indo-Malaya; in the Peninsula not common, Penang and Kelantan to Singapore.

Momordica charantia, *Linn*. Seminyih; Ulu Gombak (doubtless escapes from cultivation). A climber, pantropic; cultivated in the Peninsula.

Momordica cochinchinensis, *Spreng*. Batu Caves (Ridley). A climber of Indo-Malaya to New Guinea, and China; in the Peninsula on riverbanks in the North.

Melothria affinis, *King*. Batu Caves (Ridley). A climbing herb of Borneo; in the Peninsula Perak and Kelantan to Johore.

Melothria marginata, *Cogn*. Batu Caves (Ridley). A climbing herb of Sumatra and Java; in the Peninsula Langkawi to Malacca in waste ground.

Zanonia Clarkei, *King*. Batu Caves (Ridley). A climber, endemic and rare, Kinta (Perak).

CULTIVATED CUCURBITACEÆ.

Benincasa cerifera, *Savi*. (The Wax Gourd). Cultivated, fide Foxworthy. A large climbing herb of Africa, Indo-Australia, China and Japan, known only in cultivation.

Citrulus vulgaris, *Linn*. (The Water Melon). Cultivated, fide Foxworthy. A climbing herb, pantropic in cultivation.

Cucumis sativus, *Linn*. (The Cucumber). A climbing herb, cultivated in all tropics and in temperate regions.

Cucurbita maxima, *Duch*. (The Gourd). An annual climbing herb, cultivated in all tropics and in temperate regions.

Cucurbita Pepo, *DC*. (The Pumpkin). Cultivated, fide Foxworthy. A large climbing herb, cultivated in the tropics and in temperate countries.

Luffa ægyptica, *Mill*. (The Loofa). Cultivated, fide Foxworthy. Cultivated in all tropics, origin uncertain.

Lagenaria vulgaris, *Ser*. (The Bottle Gourd). Cultivated, fide Foxworthy. A large climbing herb, cultivated in all tropics.

BEGONIACEÆ.

Begonia clivalis, *Ridl*. Klang Gates (all collectors). A small herb, endemic and rare on sandy banks, Semangkok Pass.

Begonia Hasskarlii, *Zoll. & Mor*. Batu Caves (Ridley). A herb of Java; in the Peninsula not very common on limestone in Perak and Pahang.

Begonia isoptera, *Dry*. Klang Gates; Ulu Gombak. A herb of Sumatra and Java; in the Peninsula common in damp places in forest.

Begonia phoeniogramma, *Ridl*. Batu Caves (Ridley). A small herb, endemic and rare, on limestone, Langkawi.

Begonia rhoephila, *Ridl*. Ulu Gombak (Ridley). A creeping herb, endemic and local.

Begonia sinuata, *Wall*. Seminyih (Hume). A tuberous herb of Lower Siam; in the Peninsula not uncommon in forest in the North.

Begonia taipingensis, *King*. Kanching (Ridley). A creeping herb, endemic, Taiping Hills, Semangkok, in forest.

CACTACEÆ, CULTIVATED.

Opuntia monacantha, *Haw.* K. Lumpur, cultivated. A succulent shrub of S. E. Brazil, now established in the Peninsula in sandy places near the sea.

FICOIDEÆ.

Mollugo pentaphylla, *Linn.* K. Lumpur; Seminyih. A herb of Indo-Malaya, China and Polynesia; in the Peninsula common in waste ground.

UMBELLIFERÆ.

Hydrocotyle asiatica, *Linn.* K. Lumpur; Ulu Gombak. A creeping herb of the tropics and subtropics of the Old World; in the Peninsula common in grass.

Hydrocotyle javanica, *Thunb.* Ulu Gombak (Hume). A creeping herb of Indo-Australia, China and Japan; in the Peninsula usually montane in forest, Upper Perak to Selangor.

Eryngium foetidum, *Linn.* K. Lumpur; Ulu Gombak. A spiny herb of South American origin; in the Peninsula common in waste ground.

ARALIACEÆ.

Aralia ferox, *Miq.* Ulu Gombak (Hume). A scandent shrub of Java and Borneo; in the Peninsula usually in montane forest, Perak, Pahang, Semangkok Pass.

Aralia Thomsoni, *Seem.* Ulu Gombak (Hume). A prickly shrub of India; in the Peninsula not uncommon, usually in montane forest, Penang to Negri Sembilan.

Schefflera heterophylla, *Harms.* Weld's Hill (Forest Dept.). A shrub or small tree of Sumatra and Java; in the Peninsula Penang and Upper Perak to Malacca, in forest.

Schefflera subulata, *Viguiet.* Batu Caves; Kajang; Klang Gates; Ulu Gombak; Weld's Hill. An epiphytic shrub of W. Malaysia; in the Peninsula common from Penang to Singapore.

Schefflera tomentosa, *Viguiet.* Batu Tiga; K. Lumpur; Ulu Gombak. A shrub of Sumatra and Java; in the Peninsula Taiping to Johore, not common in forest.

Schefflera venulosa, *Harms.* K. Lumpur (Forest Dept.). An epiphytic shrub of Indo-Australia; in the Peninsula Langkawi to Singapore.

Trevesia cheirantha, *Ridl.* Ulu Gombak; Weld's Hill. A small prickly tree of Burma and Sumatra; in the Peninsula common in forest from Kedah and Kelantan to Singapore.

Arthrophyllum congestum, *Ridl.* Klang Gates (Ridley). A small tree, endemic and rare, Dindings,

Arthrophyllum ovalifolium, *Miq.* K. Lumpur (Forest Dept.). A small tree of the Andamans and Sumatra; in the Peninsula common in open places and secondary growth.

Brassiopsis elegans, *Ridl.* Ulu Langat (Kloss, fide Ridley). A shrub, endemic and local.

CORNACEÆ.

Alangium ebenaceum, *Griff.* Rantau Panjang; Sungai Buloh; Weld's Hill. A small tree, endemic, Penang to Johore, in forest.

Alangium nobile, *Harms.* Sungai Buloh (Forest Dept.). A tall tree, endemic, Penang to Singapore, in forest.

Alangium uniloculare, *King.* Sungai Buloh; Weld's Hill. A tree, endemic, common in forest from Perak to Singapore.

Aralidium pinnatifidum, *Miq.* Klang Gates; K. Lumpur; Rawang; Seminyih; Sungai Buloh; Ulu Gombak. A small tree of Sumatra and Borneo; in the Peninsula common in forest.

RUBIACEÆ.

Mitragyne speciosa, *Korth.* Klang Gates; Petaling. A tree of W. Malaysia to New Guinea; in the Peninsula not common in open places, Penang, Perak, Pahang.

Nauclea Junghuhnii, *Merr.* K. Lumpur; Seminyih. A bushy tree of Indo-China and W. Malaysia to the Philippines; in the Peninsula Penang to Singapore in lowland forest.

Nauclea Maingayi, *Hook. fil.* Bukit Raja; Kepong; K. Lumpur. A tall tree of Borneo; in the Peninsula Penang to Negri Sembilan, usually in open swampy places.

Nauclea subdita, *Merr.* Klang Gates; K. Lumpur; Seminyih; Ulu Gombak. A small tree of Sumatra to New Guinea; in the Peninsula common in forest and on riverbanks.

Neonauclea purpurascens, *Ridl.* Klang Gates; Rawang; Seminyih. A small tree of Sumatra to the Philippines; in the Peninsula not common in forest, Upper Perak to Singapore.

Adina polycephala, *Benth.* Weld's Hill (Forest Dept.). A tall tree of Burma; Indo-China, Sumatra and Java; in the Peninsula not common in forest, Penang and Malacca.

Adina rubescens, *Hemsl.* Rantau Panjang; Weld's Hill. A tree, endemic and common in forest.

Anthocephalus indicus, *Rich.* Ampang; K. Lumpur. A tall tree of Indo-Malaya; in the Peninsula rare, Perak.

Uncaria attenuata, *Korth.* Seminyih (Hume). A slender climber of Indo-Malaya; in the Peninsula common in forest.

Uncaria dasyoneura, *Korth.* Seminyih (Hume). A climber of Ceylon and Java; in the Peninsula not common, Penang to Malacca.

Uncaria Gambier, *Roxb.* Ulu Gombak (Hume). A slender climber, or (in cultivation) a bush, of W. Malaysia; in the Peninsula cultivated and escaping.

Uncaria glabrata, *DC.* Batu Tiga; Klang Gates; K. Lumpur; Rawang; Seminyih; Sungai Buloh; Ulu Gombak. A climbing shrub of W. Malaysia; in the Peninsula common in forest in the South.

Uncaria jasminiflora, *Hook. fil.* Petaling (Ridley). A climbing shrub of Borneo; in the Peninsula not common in forest, Perak and Singapore.

Uncaria ovalifolia, *Roxb.* K. Lumpur; Rantau Panjang; A slender climbing shrub of Burma and Borneo; in the Peninsula common in forest.

Uncaria pedicellata, *Roxb.* K. Lumpur; Rantau Panjang; Ulu Gombak. A climbing shrub of W. Malaysia; in the Peninsula common, usually in open places.

Uncaria pteropoda, *Miq.* K. Lumpur (Ridley). A liane of Sumatra to New Guinea; in the Peninsula common in secondary growth and forest edges.

Uncaria Roxburghiana, *Korth.* K. Lumpur (Ridley). A slender climber of Sumatra and Borneo; in the Peninsula Taiping to Singapore, on forest edges.

Uncaria sclerophylla, *Roxb.* K. Lumpur (Ridley). A big climbing shrub of W. Malaysia; in the Peninsula common in forest and secondary growth.

Uncaria trinervis, *Hav.* Ulu Gombak (Hume). A slender climber, endemic and rare in forest, Penang Hill, Taiping Hill.

Coptosopelta flavescens, *Korth.* Ulu Gombak (Forest Dept.). A climbing shrub of Indo-Malaya; in the Peninsula common in forest.

Greenia Jackii, *Wight & Arn.* Batang Berjuntai; Klang Gates; Rantau Panjang; Ulu Gombak; Weld's Hill. A shrub or small tree, endemic and common in forest from Langkawi to Malacca.

Aleisanthia rupestris, *Ridl.* Klang Gates (all collectors). A small shrub, endemic and local in cracks of quartzite rocks.

Becheria parviflora, *Ridl.* Batu Tiga (Ridley). A small shrub of St. Barbe Isle; in the Peninsula not common in forest, Perak, Pahang.

Argostemma bicolor, *King.* Weld's Hill (Md. Nur 4791). A small herb, endemic and rare, Perak.

Argostemma denticulatum, *Ridl.* Klang Gates (Hume). An erect herb, endemic and rare, known also from Ginting Sempak, Selangor, at 3,990 feet, fide Ridley.

Argostemma Hookeri, *King.* Petaling (Ridley). A slender creeping herb, endemic, usually in montane forest, Kedah to Johore.

Argostemma inæquilaterum, *Benn.* Batu Caves (Ridl.). A herb, endemic, not common, usually on limestone, Penang, Perak and Malacca.

Argostemma oblongum, *King.* Seminyih (Hume). A small herb, endemic, Perak to Johore in forest.

Argostemma pictum, *Wall.* Klang Gates (Ridley). A small succulent herb of Tenasserim and Lingga; in the Peninsula common in forest.

Argostemma subcrassum, *King.* K. Lumpur; Seminyih. A succulent herb, endemic, usually in montane forest, Perak and Pahang.

Argostemma tenue, *Ridl.* Ulu Gombak (Ridley). A herb, endemic and rare in forest, Tampin Hill (Negri Sembilan).

Argostemma trichanthum, *Ridl.* Ulu Langat (Kloss, fide Ridley). A small herb, endemic and local.

Argostemma unifolioide, *King.* Ulu Gombak (Hume). A herb, endemic, not common in forest, Perak.

Argostemma unifolium, *Benn.* Seminyih (Hume). A herb, endemic and usually in montane forest, Kedah, Penang, Mt. Ophir, Johore.

Ophiorrhiza communis, *Ridl.* Klang Gates; Petaling; Rawang. A herb of Borneo; in the Peninsula common in forest.

Ophiorrhiza discolor, *R. Br.* Batu Caves; Klang Gates; K. Lumpur; Sungai Buloh; Ulu Gombak. A herb, endemic, Penang to Johore in forest.

Ophiorrhiza fruticosa, *Ridl.* Batu Caves (Ridley). A small shrublet, endemic and local.

Ophiorrhiza major, *Ridl.* Batu Caves; K. Lumpur; Seminyih; Ulu Gombak. A herb, endemic, common in forest as far south as Mt. Ophir.

Ophiorrhiza pallidula, *Ridl.* Batu Caves; Seminyih; Ulu Gombak. A herb, endemic, not common in forest, Perak, Pahang, Selangor.

Ophiorrhiza tenella, *King.* Ulu Gombak (Hume). A small herb, endemic and usually in montane forest, Kedah, Perak, Pahang, Selangor.

Ophiorrhiza tenuis, *Ridl.* Dusun Tua; Ulu Gombak (var. *minor*, *Ridl.*). A herb, endemic and rare in forest, Perak and the Semangkok Pass (Selangor).

Ophiorrhiza tomentosa, *Jack.* Ulu Gombak (Hume). A herb of Siam and Sumatra; in the Peninsula Langkawi to Mt. Ophir in forest.

Hedyotis auricularia, *Linn.* Batang Berjuntai; Klang Gates; K. Lumpur; Seminyih; Ulu Gombak. A herb of Indo-Australia; in the Peninsula common in open places.

Hedyotis capitellata, *Wall.* Klang Gates; Rawang; Ulu Gombak. A scandent herb of Tenasserim to W. Malaysia; in the Peninsula common in open places and forest edges.

Hedyotis congesta, *Wall.* Batang Berjuntai; Rantau Panjang; Seminyih; Ulu Gombak. A shrubby herb of Tenasserim, Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Hedyotis macrophylla, *Wall.* Ulu Gombak (Hume). A woody herb of Tenasserim; in the Peninsula widely spread in forest, but not common.

Hedyotis mollis, *Wall.* Ulu Gombak (Hume). A scandent herb, endemic, Penang and Kelantan to Negri Sembilan in forest.

Hedyotis vestita, *R. Br.* Klang Gates; Ulu Gombak. A herb of Indo-Malaya to the Philippines; in the Peninsula common in open and waste ground.

Oldenlandia corymbosa, *Linn.* Klang Gates; K. Lumpur. A pantropic herb, common in the Peninsula in open sandy places.

Oldenlandia dichotoma, *Hook. fl.* K. Lumpur; Salak; Seminyih; Ulu Gombak. A herb of India; in the Peninsula common in dry shady places.

Oldenlandia diffusa, *Roxb.* Batang Berjuntai; Klang Gates; Rantau Panjang; Seminyih; Ulu Gombak. A diffuse herb of Trop. Asia and Japan; in the Peninsula common in dry open places.

Oldenlandia trinervia, *Retz.* Ulu Gombak (Hume). A prostrate herb of Trop. Africa and Indo-Malaya; in the Peninsula in open sandy places, Penang, Pahang River, Singapore.

Lucinaea membranacea, *King.* Seminyih; Sungai Buloh. An epiphytic climber of Borneo; in the Peninsula Taiping to Singapore in forest.

Lucinaea morinda, *DC.* K. Lumpur (Ridley). A climbing bush of W. Malaysia; in the Peninsula Taiping to Singapore usually near the sea.

Lecananthus erubescens, *Jack.* K. Lumpur; Petaling. An epiphytic shrub of Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Mussaenda glabra, *Vahl.* Batang Berjuntai; K. Lumpur. A bush or climber of Indo-Malaya and China; in the Peninsula common in secondary growth.

Mussaenda mutabilis, *Hook. fil.* K. Lumpur; Rawang; Seminyih; Ulu Gombak. A sarmentose bush, endemic, common in forest from Kelantan and Perak to Singapore.

Mussaenda polyneura, *King.* Ulu Gombak (Hume). A climbing shrub of Tenasserim; in the Peninsula not common in forest, Perak and Singapore.

Mussaenda villosa, *Wall.* Dusun Tua; Klang Gates; K. Lumpur; Seminyih; Ulu Gombak. A shrub of Siam and Borneo; in the Peninsula common in forest in the north.

Mussaenda Wrayi, *King.* Ulu Gombak (Ridley). A scandent shrub, endemic, Penang to Selangor, in forest.

Adenosacme malayana, *Wall.* Batu Caves; Ulu Gombak. A small shrub, endemic and common in forest over the whole Peninsula.

Mycetia Scortechinii, *Ridl.* Ulu Gombak (Hume). A shrub, endemic in forest, Perak, and Bukit Hitam and Ginting Sempak, Selangor.

Aulocodiscus premnoides, *Hook. fil.* Batu Caves; K. Lumpur; Rawang; Sungai Buloh. A small tree of Tenasserim; in the Peninsula common in forest.

Urophyllum Curtisii, *King, MS.* K. Lumpur (Curtis 2348). There is only one sheet of this in Herb. Singapore, and apparently it has never been described.

Urophyllum glabrum, *Wall.* Ampang; Dusun Tua; Kanching; Petaling; Rantau Panjang; Sungai Buloh; Ulu Gombak; Weld's Hill. A shrub of W. Malaysia to the Philippines; in the Peninsula common in lowland forest.

Urophyllum Griffithianum, *Hook. fil.* Bukit Cheraka; Rawang. A shrub or small tree of Sumatra and Java; in the Peninsula common in forest from Langkawi to Singapore.

Urophyllum hirsutum, *Hook. fil.* Klang Gates; Ulu Gombak; Weld's Hill. A shrub or small tree, endemic, common in forest from Penang to Singapore.

Urophyllum macrophyllum, *Korth.* Dusun Tua; K. Lumpur; Rantau Panjang; Seminyih; Ulu Gombak. A shrub or small tree of Tenasserim, Java and Borneo; in the Peninsula Penang to Singapore, in forest.

Urophyllum streptopodium, *Wall.* K. Lumpur; Seminyih; Ulu Gombak. A slender shrub of Borneo; in the Peninsula common in forest.

Urophyllum trifurcum, *Pears.* Ulu Gombak (Hume). A shrub or tree, endemic, Perak to Singapore, in forest.

Urophyllum umbellulatum, *Miq.* Dusun Tua (Ridley). A shrub of Sumatra; in the Peninsula not common, montane in Penang and Negri Sembilan.

Urophyllum villosum, *Wall.* Ulu Gombak (Hume). A small shrub, endemic, Penang to Singapore, in forest.

Randia anisophylla, *Jack.* K. Lumpur; Seminyih. A small tree of Sumatra and Borneo; in the Peninsula common in lowland forest.

Randia densiflora, *Benth.* Batu Caves; K. Lumpur; Sungai Buloh; Ulu Gombak. A shrub or tree of Indo-Australia, China, and Japan; in the Peninsula common in forest from Langkawi to Singapore.

Randia ? exaltata, *Griff.* Seminyih (Hume).

Randia impressinervia, *King and Gamble.* Rantau Panjang (Hume). A semi-parasitic shrub of Borneo; in the Peninsula not common in forest, Perak.

Randia macrophylla, *Hook. fil.* K. Lumpur; Seminyih; Sungai Buloh; Ulu Gombak. A small shrub of Sumatra; in the Peninsula common in forest.

Randia penangiana, *King and Gamble.* K. Lumpur (Ridley). A woody climber, endemic, Langkawi to Singapore, in forest.

Randia Scortechinii, *King and Gamble.* Batang Berjuntai; Batu Caves; Klang Gates; K. Lumpur; Rantau Panjang; Sungai Buloh; Ulu Gombak. A tree of Borneo; in the Peninsula common in forest from Penang to Negri Sembilan.

Gardenia elata, *Ridl.* Sungai Buloh (Forest Dept.). A lofty tree of Borneo; in the Peninsula rare in forest, Perak and Singapore.

Gardenia tentaculata, *Hook. fil.* Pudu (Ridley). A small bush of Borneo; in the Peninsula common, especially on riverbanks.

Gardenia tubifera, *Wall.* Sungai Buloh (Forest Dept.). A bush of Siam and W. Malaysia; in the Peninsula Selangor to Singapore, on muddy riverbanks.

Petunga floribunda, *Ridl.* K. Lumpur (Ridley). A bush or tree, endemic, Perak, Pahang, Johore, in marshy forest.

Petunga Roxburghii, *DC.* K. Lumpur (Ridley). A bush or small tree of India to Borneo and the Philippines; in the Peninsula common in wet places.

Diplospora malaccensis, *Hook. fil.* Seminyih; Sungai Buloh; Ulu Gombak. A small tree of Sumatra and Borneo; in the Peninsula common in forest from Langkawi to Singapore.

Diplospora ? Wrayi, *King and Gamble*. Ulu Gombak (Hume).

Jackia ornata, *Wall*. Sungai Buloh (Forest Dept.). A small tree of Sumatra and Borneo; in the Peninsula Taiping to Singapore in marshy places.

Ixora arguta, *Br*. Batu Caves (Ridley). A bush of Burma and Siam; in the Peninsula common in forest from Perlis to Johore.

Ixora concinna, *Br*. Seminyih; Ulu Gombak. A tall tree of St. Barbe Isle and Borneo; in the Peninsula Taiping to Singapore in forest.

Ixora congesta, *Roxb*. Klang Gates; K. Lumpur; Petaling; Rantau Panjang; Seminyih; Ulu Gombak. A shrub of Tenasserim; in the Peninsula common in forest.

Ixora diversifolia, *Wall*. Batu Caves (Ridley). A shrub or small tree of Burma; in the Peninsula not common in forest, Perak and Pahang.

Ixora humilis, *King and Gamble*. Batu Caves; Dusun Tua; Seminyih; Ulu Gombak. A small shrub, endemic, not uncommon in forest in the north.

Ixora Kingstoni, *Hook. fil*. Batu Caves; K. Lumpur; Ulu Gombak. A large bush, endemic, Taiping to Johore in forest.

Ixora Lobbii, *Loud*. Klang Gates; K. Lumpur; Rawang; Sungai Buloh; Ulu Gombak. A shrub of Siam; in the Peninsula common in forest, Penang to Singapore.

Ixora pendula, *Jack*. Batu Caves; Dusun Tua; Seminyih; Ulu Gombak; Weld's Hill. A shrub of Sumatra; in the Peninsula common in forest.

Ixora stricta, *Roxb*. Bukit Raja; Klang Gates; Rantau Panjang. A shrub of Indo-China, China, Tenasserim, Java and Borneo; in the Peninsula common on riverbanks and in open places from Setul to Singapore.

Pavetta graciliflora, *Wall*. Klang Gates; Rawang; Sungai Buloh. A shrub of Lower Siam; in the Peninsula common in forest as far south as Malacca.

Pavetta indica, *Linn.* var. *canescens*, *Ridl*. Dusun Tua; Ulu Gombak; Weld's Hill. A bush of Indo-Australia and S. China; in the Peninsula the var. common, the species in Perlis.

Pavetta pauciflora, *Ridl*. Batu Caves (Ridley). A small tree, endemic and local.

Tarenna Curtisii, *Ridl*. Batu Caves, a var. with very small leaves (Ridley). A small shrub of Lower Siam; in the Peninsula rare, Langkawi on limestone.

Tarenna longifolia, *Ridl.* Ulu Gombak (Forest Dept.). A small shrub, endemic, Setul to North Johore, in forest.

Tarenna Napierii, *Ridl.* Seminyih; Ulu Gombak. A shrub, endemic, Perak, Pahang, Negri Sembilan, Johore, in forest.

Tarenna rudis, *Ridl.* Weld's Hill (Forest Dept. 2592, 2593). A shrub, endemic and local.

Tarenna stellulata, *Ridl.* Batu Caves; K. Lumpur. A shrub, endemic, common from Langkawi to Singapore.

Stylocoryna costata, *Miq.* K. Lumpur (Curtis, Forest Dept.). A tall tree of Sumatra; in the Peninsula Perak, Negri Sembilan and Malacca, in secondary growth.

Stylocoryna fragrans, *Bl.* Klang Gates; Weld's Hill. A large bush of W. Malaysia; in the Peninsula common in secondary growth.

Stylocoryna Maingayi, *King.* Ulu Gombak (Hume). A shrub, endemic, Taiping to Johore, usually in montane forest.

Stylocoryna mollis, *Wall.* Kanching; Sungai Buloh; Ulu Gombak. A small tree of Sumatra; in the Peninsula Penang to Singapore in forest.

Coffea malayana, *Ridl.* K. Lumpur (Ridley). A shrub, endemic, Selangor, Negri Sembilan and Johore in forest.

Coffea viridiflora, *Ridl.* Batu Caves (Ridley). A shrub, endemic and rare, known also from Waterloo, Perak.

Gardeniopsis longifolia, *Miq.* Seminyih; Ulu Gombak. A shrub of Sumatra; in the Peninsula common in forest from Langkawi to Singapore.

Timonius peduncularis, *Ridl.* K. Lumpur (Forest Dept., Ridley). A small tree of Indo-Malaya; in the Peninsula common in open country.

Timonius Wallichianus, *Valeton.* Klang Gates; Rantau Panjang; Sungai Buloh; Ulu Gombak; Weld's Hill. A small tree, endemic, common in open country from Langkawi to Singapore.

Morinda citrifolia, *Linn.* K. Lumpur (Forest Dept.). Probably from a cultivated plant. A small tree of Indo-Malaya; in the Peninsula perhaps not wild.

Morinda elliptica, *Ridl.* K. Lumpur (Curtis, Forest Dept.). A small tree, endemic and very common over the whole Peninsula in open places and near the sea.

Morinda umbellata, *Linn.* Ulu Gombak (Forest Dept.). A sarmentose shrub of Indo-Australia, China and Japan; in the Peninsula common in open places.

Rennellia speciosa, *Hook. fil.* Seminyih; Sungai Buloh; Ulu Gombak; Weld's Hill. A small shrub of Burma, Sumatra and Borneo; in the Peninsula common in forest from Kedah and Kelantan to Johore.

Gynochodes sublanceolata, *Miq.* K. Lumpur (Curtis). One sheet without flowers, doubtful). A slender woody climber of Sumatra and Borneo; in the Peninsula common in open country.

Canthium confertum, *Korth.* Ulu Gombak; Weld's Hill. A small tree of Bangka and Borneo; in the Peninsula common, but usually near the sea and on tidal rivers.

Canthium didymum, *Gaertn. fil.* K. Lumpur; Sungai Buloh; Ulu Gombak. A bush or small tree of Indo-Malaya and S. China; in the Peninsula common in forest and secondary growth.

Canthium glabrum, *Bl.* Weld's Hill (Forest Dept.). A small tree of Tenasserim, Siam and Java; in the Peninsula common in forest.

Canthium horridum, *Bl.* Klang Gates; Weld's Hill. A spiny shrub of Burma, Java, Borneo and the Philippines; in the Peninsula common in open country from Setul to Singapore.

Psychotria angulata, *Korth.* Batu Caves (Ridley). A shrub of Burma, Bangka and Borneo; in the Peninsula common in forest from Langkawi to Singapore.

Psychotria calocarpa, *Kurz.* Batu Caves; Ulu Gombak. A small shrub of India and Burma; in the Peninsula not common in forest, Kelantan, Perak, the Dindings, Malacca and Johore.

Psychotria Cantleyi, *Ridl.* Batu Caves (Burkill). A scandent shrub, endemic, Perak and Pahang to Singapore, in forest.

Psychotria lanceolaria, *Ridl.* Batu Caves (Ridley). A shrub, endemic and local.

Psychotria montana, *Bl.* K. Lumpur; Ulu Gombak. A shrub of Burma, Sumatra and Java; in the Peninsula not very common in forest, Upper Perak and Kelantan to Mt. Ophir.

Psychotria Maingayi, *Hook. fil.* Klang Gates; Ulu Gombak. A slender climber, endemic, Selangor to Singapore, often near the sea.

Psychotria penangensis, *Hook. fil.* Batang Berjuntai (Ridley). A shrubby climber, endemic, common in forest from Penang to Singapore.

Psychotria Ridleyi, *King and Gamble.* Ulu Gombak (Hume). A climber, endemic, not uncommon in forest in the south.

Psychotria rostrata, *Bl.* Dusun Tua; K. Lumpur; Rantau Panjang; Seminyih; Sungai Buloh; Ulu Gombak. A shrub of W. Malaysia; in the Peninsula common in forest from Perak and Kelantan to Singapore.

Psychotria sarmentosa, *Bl.* Rantau Panjang; Ulu Gombak. A climber of Indo-Malaya; in the Peninsula common in forest from Langkawi to Singapore.

Psychotria stipulacea, *Wall.* Ulu Gombak; Weld's Hill. A shrub of Sumatra; in the Peninsula common in forest from Kedah to Singapore.

Psychotria viridiflora, *Reinw.* Batu Caves; K. Lumpur; Petaling; Weld's Hill. A bush or small tree of Indo-Malaya; in the Peninsula common as far south as Malacca, in open places and forest.

Chasalia curviflora, *Thw.* Ampang; Batang Berjuntai; Batu Caves; Klang Gates; Rantau Panjang; Rawang; Seminyih; Sungai Buloh; Ulu Gombak; Weld's Hill. A shrub of Indo-Malaya to the Philippines; in the Peninsula very common in forest.

Chasalia pubescens, *Ridl.* Sungai Buloh; Ulu Gombak. A bush, endemic, not common in forest, Pahang, Negri Sembilan, Johore, Singapore.

Cephaelis cuneata, *Hook. fil.* Ulu Gombak (Hume). A small shrub, endemic and common from Taiping to Singapore.

Cephaelis Griffithii, *Hook. fil.* Seminyih; Ulu Gombak. A small shrub of Sumatra; in the Peninsula not uncommon in forest in the south.

Cephaelis triceps, *Ridl.* K. Lumpur (Ridley). A shrub, endemic and rare, known also from Fraser Hill and Cameron's Highlands.

Geophila reniformis, *Don.* Batu Caves; Seminyih. A creeping herb of Trop. America, Trop. Africa, Indo-Malaya to Polynesia and China; in the Peninsula common in forest from Langkawi to Singapore.

Lasianthus appressus, *Hook. fil.* Batu Tiga; Batang Berjuntai. A shrub of Borneo; in the Peninsula Langkawi to Singapore, usually in montane forest.

Lasianthus bractescens, *Ridl.* Batu Caves; Ulu Gombak. A shrub, endemic and rare in forest, Upper Perak and Perak.

Lasianthus constrictus, *Wight.* Sungai Buloh (Ridley). A shrub of Burma, Java and Borneo; in the Peninsula common in forest from Upper Perak and Kelantan to Singapore.

Lasianthus densifolius, *Miq.* Klang Gates; Seminyih; Ulu Gombak. A shrub of Borneo; in the Peninsula common in forest in the south.

Lasianthus ellipticus, *Wight*. Sungai Buloh; Ulu Gombak. A shrub, endemic, Upper Perak to Singapore, in forest.

Lasianthus Griffithii, *Wight*. Batu Caves; Petaling. A shrub of Lingga and Borneo; in the Peninsula Taiping to Singapore in forest on both coasts.

Lasianthus longifolius, *Wight*. K. Lumpur; Ulu Gombak. A shrub of Sumatra; in the Peninsula Dindings to Johore, in forest.

Lasianthus Lowianus, *King and Gamble*. Dusun Tua; Petaling; Seminyih. A shrub, endemic, often in montane forest, Kedah to Selangor.

Lasianthus Maingayi, *Hook. fl.* Dusun Tua; Klang Gates; Seminyih; Ulu Gombak. A shrub of Sumatra and Borneo; in the Peninsula common in forest from Upper Perak and Kelantan to Singapore.

Lasianthus montanus, *King and Gamble*. Ulu Gombak (Hume). A bush, endemic, usually in montane forest, Taiping Hills, Gunong Bubu, Gunong Tahan.

Lasianthus oblongus, *King and Gamble*. Klang Gates; Rawang; Sungai Buloh; Ulu Gombak; Weld's Hill. A large shrub, endemic, common from Kedah to Johore in forest.

Lasianthus pilosus, *Wight*. Batu Caves (Ridley). A shrub, endemic, Upper Perak and Kelantan to Johore, in forest.

Lasianthus Ridleyi, *King and Gamble*. K. Lumpur (Ridley). A small shrub, endemic, K. Lumpur to Singapore, in forest.

Lasianthus stipularis, *Bl.* Batu Caves; Kanching, on limestone (var. *hirtus*, *Ridl.*); Seminyih; Ulu Gombak. A slender shrub of Tenasserim to the Philippines; in the Peninsula common in forest, Upper Perak and Kelantan to Singapore.

Saprosma glomerulatum, *King and Gamble*. Kanching (Forest Dept.). A foetid shrub, endemic, Penang to Singapore, in forest.

Saprosma ternatum, *Hook. fl.* Batu Caves (Ridley). A shrub of India, Burma, Tenasserim and Java; in the Peninsula Perak and Kelantan to Mt. Ophir, in forest.

Paederia verticillata, *Bl.* Rawang (Ridley). A climbing shrub of Java, Borneo and the Philippines; in the Peninsula common from Kedah to Singapore in open places and secondary growth.

Borreria hispida, *Schum.* Circular Rd. Plantation; K. Lumpur; Salak South Rd. A rough wiry herb of Indo-Malaya to the Philippines and China; in the Peninsula common in waste ground.

Borreria laevicaulis, *Ridl.* Ampang; Klang Gates; K. Lumpur; Pudu; Ulu Gombak. A slender herb of India and Java; in the Peninsula common in waste ground.

Borreria latifolia, *Schum.* K. Lumpur (Hume). A fleshy herb, recently introduced from W. Indies and S. America, and not yet common in the Peninsula.

Borreria pilulifera, *Ridl.* Roadsides at Klang Gates (Ridley). A slender herb, endemic and local.

Borreria setidens, *Ridl.* K. Lumpur; Ulu Gombak. A herb of Java; in the Peninsula common in waste ground.

Spermacoce ocymoides, *Burm.* Batang Berjuntai; Rantau Panjang; Ulu Gombak. A pantropic herb, common in the Peninsula on roadsides and waste ground.

CULTIVATED RUBIACEÆ.

Coffea arabica, *Linn.* (Coffee). A small tree, pantropic in cultivation, native of S. W. Asia.

Gardenia florida, *Linn.* Common in gardens. A shrub of China and Japan; in the Peninsula commonly cultivated.

Ixora coccinea, *Linn.* Cultivated in K. Lumpur, fide Foxworthy. A bush, widely cultivated in Indo-Malaya.

Ixora macrothyrsa, *Teys. & Binn.* Common in gardens. A bush of Sumatra; in the Peninsula commonly cultivated.

Mussaenda erythrophylla, *Sch.* Public Gardens, K. Lumpur. A shrub of Trop. Africa; in the Peninsula occasionally cultivated.

Psychotria Ipecacuanha, *Stokes.* Serdang Experimental Plantation. A shrub of Brazil.

COMPOSITÆ.

Sparganophorus Vaillantii, *DC.* Klang Gates; K. Lumpur; Ulu Gombak. A herb of Trop. Africa, Asia and S. America; in the Peninsula in wet places in Kelantan and Singapore.

Elephantopus scaber, *Linn.* K. Lumpur, and doubtless in other localities. A herb, pantropic, very common in grass over the whole Peninsula.

Ageratum conyzoides, *Linn.* Ampang; Batang Berjuntai; K. Lumpur; Pudu; Seminyih; Ulu Gombak. A herb, pantropic, of South American origin; in the Peninsula very common everywhere in waste ground.

Adenostemma viscosum, *Forst.* Batu Caves; Ulu Gombak. A cosmopolitan herb, common in the Peninsula, usually in waste ground.

Bidens pilosa, *Linn.* Batu Caves; Seminyih; Ulu Gombak. A herb, pantropic; in the Peninsula common in open places.

Synedrella nodiflora, *Gaertn.* Ampang; Batang Berjuntai; Klang Gates; K. Lumpur; Pudu; Seminyih; Ulu Gombak. A pantropic herb of S. American origin; in the Peninsula very common in waste ground.

Eclipta alba, *Hassk.* Ampang; Seminyih; Ulu Gombak. A pantropic herb; in the Peninsula a common weed in waste ground.

Vernonia chinensis, *Less.* Ulu Gombak (Hume). A herb of W. Malaysia to the Philippines; in the Peninsula common in open and waste ground.

Vernonia cinerea, *Less.* Batang Berjuntai; Batu Caves; Klang Gates; K. Lumpur; Pudu; Ulu Gombak. A herb, pantropic; common over the whole Peninsula in waste ground.

Vernonia javanica, *DC.* K. Lumpur. A small tree of Java and Borneo; in the Peninsula common in open country.

Vernonia Wallichii, *Ridl.* Klang Gates; K. Lumpur; Ulu Gombak. A tree of Sylhet, Lower Siam and Borneo; in the Peninsula common in forest from Penang to Singapore.

Gynura malasica, *Ridl.* K. Lumpur (Ridley). A herb of Borneo; in the Peninsula common in waste ground.

Gynura sarmentosa, *DC.* Seminyih (Hume). A scandent or erect herb of S. E. Asia; in the Peninsula common in forest and open places.

Emilia sonchifolia, *DC.* Klang Gates; Seminyih; Ulu Gombak. A pantropic herb, common over the whole Peninsula in waste ground.

Erechthites valerianifolia, *DC.* Klang Gates; K. Lumpur; Seminyih; Ulu Gombak. A pantropic herb of S. American origin; in the Peninsula common in waste places.

Blumea balsamifera, *DC.* (Ngai Camphor). Klang Gates; Pudu; K. Lumpur. An aromatic shrub of Indo-Malaya; in the Peninsula common in open places.

Blumea chinensis, *DC.* Klang Gates; K. Lumpur; Rawang. A scandent herb of Indo-Malaya to the Philippines and S. China; in the Peninsula common from Penang to Singapore.

Blumea lacera, *DC.* K. Lumpur; Seminyih; Ulu Gombak. A herb of Trop. Africa and Asia; in the Peninsula common on roadsides.

Blumea membranacea, *DC.* K. Lumpur (Ridley). A herb of Indo-Malaya; in the Peninsula common in open places, especially in the north.

Blumea myriocephala, *DC.* K. Lumpur (Curtis). A shrubby herb of Indo-Malaya; in the Peninsula not very common in forest, Perak to Negri Sembilan,

Erigeron sumatrense, *Retz.* Batu Caves; Seminyih. A herb of Siam, Sumatra, Java and the Philippines; in the Peninsula common in waste ground.

Crepis japonica, *Benth.* Seminyih (Hume). A herb of the Tropics of the Old World; in the Peninsula not uncommon in clearings in the hills.

CULTIVATED COMPOSITÆ.

Cosmos bipinnatus, *Cav.* Common in gardens. A native of America.

Lactuca brevirostris, *Champ.* Seminyih (Hume). No doubt an escape from a vegetable garden. It is cultivated occasionally in the Peninsula.

LOBELIACEÆ.

Lobelia affinis, *Wall.* Batu Caves; Dusun Tua; Klang Gates. A creeping herb of Indo-Malaya and China; in the Peninsula common in damp places from Penang to Singapore.

CAMPANULACEÆ.

Pentaphragma Scortechinii, *King & Gamble.* Klang Gates; K. Lumpur; Seminyih; Ulu Gombak. A succulent herb, endemic, common in damp places in forest from Upper Perak to Singapore.

VACCINIACEÆ.

Vaccinium bancanum, *Miq.* Kanching; Klang Gates. A terrestrial or epiphytic shrub of Java, Bangka and Borneo; in the Peninsula in montane forest on the Taiping Hills, Gunong Tahan, Fraser Hill, and Mt. Ophir.

Vaccinium eburneum, *Ridl.* Klang Gates (Ridley). A small tree, endemic, rare in dry open spots, Kedah Peak.

Vaccinium Hasseltii, *Miq.* Kanching; Ulu Gombak. A large epiphytic shrub of Sumatra, Java and Bangka; in the Peninsula Kedah Peak to Singapore, usually in forest.

ERICACEÆ.

Rhododendron longiflorum, *Lindl.* Kanching; Klang Gates. A shrub, epiphytic or on rocks, of Sumatra and Borneo; in the Peninsula Kedah Peak to Singapore, usually in forest.

Rhododendron orion, *Ridl.*, var. *auranticum*, *Ridl.* Klang Gates (Brooks). A small shrub, endemic and rare, the species from Menuang Gasing, Selangor, the var. known only from Klang Gates.

PLUMBAGINACEÆ, CULTIVATED.

Plumbago rosea, *Linn.* Cultivated and occasionally escaping. Origin unknown.

PLANTAGINACEÆ.

Plantago asiatica, *Linn.* Petaling (Ridley). A herb of Europe and Asia; in the Peninsula a sporadic weed in waste ground.

MYRSINACEÆ.

Maesa indica, *Wall.* Ulu Gombak (Hume). A shrub or small tree of Indo-Malaya; in the Peninsula not common, often montane, Taiping Hills, Kuala Kangsar, Fraser Hill.

Maesa ramentacea, *Miq.* Batang Berjuntai; Kanching; Klang Gates; K. Lumpur; Sungai Buloh; Ulu Gombak. A sarmentose shrub of Indo-Malaya; in the Peninsula common in secondary growth from Langkawi and Kelantan to Singapore.

Myrsine Porteriana, *Wall.* Batu Caves (Ridley). A shrub or small tree of Sumatra; in the Peninsula common in forest from Penang to Johore.

Embelia amentacea, *Clarke.* Bukit Raja; Klang Gates; K. Lumpur; Rantau Panjang; Sungai Buloh. A slender climbing shrub of Borneo; in the Peninsula common in secondary growth from Taiping to Singapore.

Embelia coriacea, *Wall.* Klang Gates (Ridley). A liane of W. Malaysia to the Philippines; in the Peninsula common in forest.

Embelia dasythrysa, *Miq.* Ulu Gombak (Hume). A woody climber of Bangka and Borneo; in the Peninsula not common, Perak and Malacca.

Embelia garciniaefolia, *Wall.* K. Lumpur (Ridley). A slender woody climber of Indo-Malaya and China; in the Peninsula common on forest edges.

Embelia Lampani, *Scheff.* Ampang; Batang Berjuntai; Klang Gates; K. Lumpur; Rantau Panjang. A climbing shrub of Sumatra; in the Peninsula Penang to Singapore, in forest.

Embelia myrtilus, *Kurz.* Seminyih (Hume). An erect or climbing shrub of Burma; in the Peninsula usually a mountain plant, Kedah to Mt. Ophir.

Labisia potheria, *Lindl.* Batang Berjuntai; K. Lumpur; Rantau Panjang; Seminyih; Ulu Gombak. A shrublet of W. Malaysia; in the Peninsula common in forest.

Ardisia andamanica, *Kurz.* Ulu Gombak (Forest Dept.). A shrub of Tenasserim; in the Peninsula not uncommon in forest, usually montane.

Ardisia colorata, *Roxb.* Klang Gates; Pudu; Seminyih; Sungai Buloh (var. *complanata*, *Clarke*); Weld's Hill (var. *polyneura*, *Clarke*). A shrub of Indo-Malaya; in the Peninsula common and variable in forest.

***Ardisia crenata*, Roxb.** K. Lumpur (Ridley). A bush of Indo-Malaya, China and Japan; in the Peninsula common in open country and secondary growth.

***Ardisia lanceolata*, Roxb.** Batu Caves; Klang Gates; K. Lumpur; Sungai Buloh. A small tree of W. Malaysia to the Philippines; in the Peninsula common in forest.

***Ardisia littoralis*, Andr.** K. Lumpur (Forest Dept.). A bush of Indo-Malaya to the Philippines and China; in the Peninsula common on seacoasts.

***Ardisia odontophylla*, Wall.** Petaling (Ridley). An undershrub of India and Borneo; in the Peninsula Perak, Pahang and Malacca, in forest.

***Ardisia oxyphylla*, Wall.** Ulu Gombak (Hume). A shrub or small tree of Tenasserim, Lower Siam and Borneo; in the Peninsula Setul to Mt. Ophir, in forest.

***Ardisia pachysandra*, Mez.** Weld's Hill (Forest Dept.). A shrub or small tree of ? Borneo; in the Peninsula not common in forest, Kedah Peak, Penang, Perak, Johore.

***Ardisia Ridleyi*, King and Gamble.** Ulu Gombak (Hume). A shrub of Sumatra; in the Peninsula not common, but widely spread, Langkawi to Singapore.

***Ardisia sinuata*, King and Gamble.** Batang Berjuntai; K. Lumpur. A shrub or small tree, endemic, rare, Kota and Gopeng, Perak.

***Ardisia solanacea*, Roxb.** Damansara (Forest Dept.). A shrub or tree of India, Burma and Tenasserim; in the Peninsula not common in forest, Perak.

***Ardisia tuberculata*, Wall.** Batu Caves (Ridley). A shrub of Bangka; in the Peninsula common in forest in the south.

***Ardisia villosa*, Roxb.** Dusun Tua, Klang Gates; K. Lumpur; Rantau Panjang; Seminyih; Sungai Buloh; Ulu Gombak. A small shrub of Indo-Malaya and Indo-China; in the Peninsula common in forest from Kedah to Singapore.

***Ardisia vinimea*, Ridl., Kew Bull., 10, 1926, p. 472.** Ulu Gombak (Hume 9676). A tall shrub, endemic and local.

***Ardisia virens*, Kurz.** K. Lumpur; Seminyih. A shrub of Assam, Burma, Borneo and China; in the Peninsula not common in forest, montane in the Taiping Hills and Ulu Batang Padang.

***Antistrophe caudata*, King and Gamble.** Ayer Hitam; Klang Gates; Seminyih; Ulu Gombak. A shrub or small tree, endemic, not common in forest, Taiping to Negri Sembilan.

SAPOTACEÆ.

(In dealing with the Sapotaceæ, Dr. H. J. Lam's recent monograph, Bulletin du Jardin Botanique de Buitenzorg, Serie 111, Vol. VII, Livr. 1-2, and Vol. VIII, Livr. 4, has been followed).

Chrysophyllum Roxburghii, *Don*. Weld's Hill (Forest Dept.). A tree of Indo-Malaya to the Philippines; in the Peninsula Malacca and Singapore in forest.

Lucuma malaccensis, *Dubord*. *Sideroxylon malaccense*, Clarke. Maxwell Rd. and Weld's Hill, K. Lumpur (Forest Dept.). A tree of Lingga and Sumatra; in the Peninsula Penang to Singapore in forest.

Payena Havilandi, *King and Gamble*. Rantau Panjang (Hume). A tree of Borneo; in the Peninsula not uncommon in forest, Langkawi to Singapore.

Payena lucida, *DC*. Kanching; Klang Gates; Sungai Buloh; Ulu Gombak; Weld's Hill. A small tree of Sumatra and Borneo; in the Peninsula common in forest.

Payena Maingayi, *Clarke*. Kajang; Sungai Buloh; Ulu Gombak. A tall tree of ? Borneo; in the Peninsula common in forest.

Bassia ? elongata, *Miq*. Sungai Buloh (Forest Dept.). A tree of Sumatra; in the Peninsula rare and little known, Malacca. "Might be a *Palauquium*, allied to *P. Gutta*, or to *P. elongatum* of the Philippines." "A relation with *Madhuca sericea* seems not impossible," H. J. Lam, l.c., p. 107.

Madhuca Dubardii, *H. J. Lam*. Ayer Hitam; Bukit Tunggal. A tree of Borneo; in the Peninsula rare in forest, known only from these localities.

Madhuca Korthalsii, *H. J. Lam*. *Bassia Braceana*, King and Gamble. Ulu Gombak; Weld's Hill. A tree of Sumatra, Borneo and New Britain; in the Peninsula Penang to Malacca in forest.

Madhuca laurifolia, *H. J. Lam*. *Bassia laurifolia*, King and Gamble. K. Lumpur; Ulu Gombak. A tree, endemic, Kedah, Penang, Perak, in forest.

Madhuca malaccensis, *H. J. Lam*. *Bassia malaccensis*, King and Gamble. Weld's Hill (Forest Dept.). A tree of Borneo; in the Peninsula Perak, Malacca, Singapore, in forest.

Madhuca sericea, *H. J. Lam*. *Bassia argentea*, Clarke. Sungai Buloh; Weld's Hill. A tall tree of Lingga, Bangka, Sumatra and Borneo; in the Peninsula Penang, Malacca, Singapore, in forest.

Madhuca utilis, *H. J. Lam.* *Payena utilis*, *Ridl.* Bukit Cheraka; Kajang; Rantau Panjang; Sungai Buloh. A lofty tree of Sumatra and ? Borneo; in the Peninsula not very common in forest, Perak, Pahang, Ulu Selangor and Johore.

Palaquium Clarkeanum, *King and Gamble.* K. Lumpur (Forest Dept.). A tall tree, endemic, not common in forest, Langkawi, Perak and Malacca.

Palaquium Gutta, *Burck.* (The Gutta Percha tree). Kanching; Kajang; K. Lumpur; Rantau Panjang; Sungai Buloh; Weld's Hill. A tall tree of W. Malaysia; in the Peninsula common in forest from Penang to Singapore.

Palaquium Maingayi, *King and Gamble.* Ampang; Kajang; Kanching; K. Lumpur; Rantau Panjang; Sungai Buloh. A tall tree, endemic, Perak, Negri Sembilan and Malacca, in forest.

Palaquium microphyllum, *King and Gamble.* 18th mile, Ginting Sempak Rd. (Strugnell, C. F. 11112). A tree of Lingga, Bangka, Sumatra and Borneo; in the Peninsula rare, hitherto known only from Singapore.

Palaquium obovatum, *Engl.* Weld's Hill (Forest Dept.). A tall tree of Indo-Malaya to the Philippines, and Indo-China; in the Peninsula common in forest in the south.

Palaquium Oxleyanum, *Pierre.* K. Lumpur; Rantau Panjang. A tall tree, endemic, Perak, Pahang, Singapore, in forest.

Palaquium stellatum, *King and Gamble.* Sungai Buloh (Forest Dept.). A tree of Sumatra; in the Peninsula not common in forest, Kedah, Perak, Pahang.

CULTIVATED SAPOTACEÆ.

Achras sapota, *Linn.* (The Chiku). A small tree of South American origin, pantropic in cultivation.

Mimusops Elengi, *Linn.* Cultivated as a roadside tree. H. J. Lam, l.c. p. 237, thinks it probably wild throughout Indo-Australia, especially near the seashore.

EBENACEÆ.

Diospyros argentea, *Griff.* Petaling; Weld's Hill. A shrub, endemic and common in forest from the Taiping Hills to Singapore.

Diospyros clavigera, *Clarke*, var. **pachyphylla**, *Ridl.* Weld's Hill (Forest Dept.). A tree, endemic, the species from Perlis to Singapore, the var. in Malacca and Singapore, in forest.

Diospyros graciliflora, *Hiern.* Klang Gates; Rantau Panjang; Ulu Gombak; Weld's Hill. A small tree of Java and Borneo; in the Peninsula Kedah, Penang and Perak, in forest.

Diospyros ? Kurzii, *Hiern*. Batu Caves (Ridley). A tree of the Andaman Islands; in the Peninsula known only from this locality.

Diospyros latisepala, *Ridl*. Kanching; K. Lumpur; Sungai Buloh. A tree, endemic, not common in forest, Perak, Negri Sembilan and Malacca.

Diospyros lucida, *Wall*. K. Lumpur (Forest Dept.). A shrub or small tree of Lower Siam and St. Barbe Isle; in the Peninsula common in forest and near the sea from Penang to Singapore.

Diospyros Scortechinii, *King and Gamble*. Rawang (Ridley). A tree, endemic, Penang to Selangor, usually in montane forest.

Diospyros subrhomboidea, *King and Gamble*. Batu Caves (Ridley). A shrub of Sumatra; in the Peninsula not common in forest, Taiping Hills, Semangkok Pass.

Diospyros toposioides, *King and Gamble*. Batu Caves (Curtis). A small tree, endemic, Perak and the Dindings, usually on limestone.

Diospyros Wallichii, *King and Gamble*. Batu Caves; K. Lumpur. A tree of Lower Siam; in the Peninsula common in forest from Langkawi to Malacca.

CULTIVATED EBENACEÆ.

Diospyros discolor, *Willd*. (Butter fruit). K. Lumpur (Agri. Dept.). A tree of the Philippines; not commonly cultivated in the Peninsula.

STYRACACEÆ.

Styrax Benzoin, *Dryand*. Klang Gates; K. Lumpur; Sungai Buloh; Ulu Gombak. A tall tree of Sumatra and Borneo; in the Peninsula common in forest from Taiping to Singapore.

Symplocos adenophylla, *Wall*. Ulu Gombak (Hume). A shrub or small tree of Sumatra, Bangka, Borneo and the Philippines; in the Peninsula common in montane forest and near the sea from Kedah to Singapore.

Symplocos Curtisii, *Oliv*. Seminyih (Hume). A shrub or small tree, endemic, not common, usually montane, Penang, Perak and Pahang.

Symplocos fasciculata, *Zoll*. Batu Caves; K. Lumpur; Seminyih. A tree of W. Malaysia; in the Peninsula common in open places and secondary growth from Taiping to Singapore.

Symplocos nivea, *Brand*. Weld's Hill (Forest Dept. 1593). A tree, endemic and rare, Penang.

Symplocos perakensis, *King and Gamble*. K. Lumpur (Ridley). A tree, endemic, not very common, Perak and Pahang, in forest.

Symplocos rigida, *Clarke*. Sungai Buloh (Forest Dept.). A tree, endemic, common in forest from Taiping to Singapore.

Symplocos rubiginosa, *Wall*. Weld's Hill (Forest Dept.). A shrub or small tree of Sumatra and Borneo; in the Peninsula Penang to Singapore, in forest.

OLEACEÆ.

Jasminum bifarium, *Wall*. Batu Caves; Klang Gates; K. Lumpur. A sprawling bush of W. Malaysia to the Philippines; in the Peninsula very common in open country from Kedah to Singapore.

Jasminum Griffithii, *Clarke*. Batu Caves (Ridley). A slender climbing shrub, endemic, Penang to Singapore, in forest.

Jasminum Maingayi, *Clarke*. Klang Gates (Ridley). A climbing shrub, endemic, Perlis to Johore in forest, often montane.

Jasminum Wrayi, *King and Gamble*. Batu Caves (Curtis). A slender climber, endemic, not common, Perak.

Linociera spicifera, *Ridl*. Rawang (Kloss, fide Ridley). A tree, endemic and local.

Olea maritima, *Wall*. Public Gardens, K. Lumpur (Forest Dept.). A shrub of W. Malaysia; in the Peninsula common in open country and near the sea.

CULTIVATED OLEACEÆ.

Jasminum Sambac, *Ait*. Common in gardens. A bush of India, Burma and Siam, cultivated in all tropics.

APOCYNACEÆ.

Willughbeia coriacea, *Wall*. Sungai Buloh (Forest Dept.). A liane, endemic and common in forest from Langkawi to Singapore.

Willughbeia firma, *Bl*. Klang Gates (Forest Dept.). A liane of W. Malaysia; in the Peninsula common in forest from Langkawi to Singapore.

Willughbeia tenuiflora, *Dyer*. Sungai Buloh (Forest Dept.). A liane of Sumatra and Borneo; in the Peninsula common in forest in the south.

Chilocarpus atroviridis, *Bl*. Batang Berjuntai; Batu Caves. A slender climbing shrub of Tavoy and Mergui; in the Peninsula Taiping Hills, Malacca, in forest.

Chilocarpus Cantleyi, *King and Gamble*. K. Lumpur. A climbing shrub, endemic and rare, Perak and Lower Perak,

Chilocarpus costatus, *Miq.* Ampang; Klang Gates; K. Lumpur; Sungai Buloh; Seminyih; Weld's Hill. A climbing shrub of Sumatra; in the Peninsula Penang to Malacca in forest.

Chilocarpus decipiens, *Hook. fil.* Batang Berjuntai; Batu Caves. A slender liane, endemic, not common in forest, Malacca.

Leuconotis Griffithii, *Hook. fil.* K. Lumpur; Sungai Buloh. A climbing shrub, endemic, Taiping, Negri Sembilan, Malacca and Singapore, in secondary growth.

Leuconotis Maingayi, *Dyer.* Bukit Cheraka; Sungai Buloh; Weld's Hill. A climbing shrub, endemic, not common, Singapore.

Alyxia selangorica, *King and Gamble.* Top of the Batu Caves (Ridley). A slender climbing shrub of Sumatra; in the Peninsula very rare, known only from this locality.

Hunteria corymbosa, *Roxb.* Batu Caves; Bukit Belachan; Kajang; Sungai Buloh; Ulu Gombak; Weld's Hill. A small tree of India, Ceylon and Sumatra; in the Peninsula not uncommon in forest from Langkawi to Negri Sembilan.

Rauwolfia perakensis, *King and Gamble.* Batu Caves (Ridley). A shrub of Lower Siam; in the Peninsula common in open places in the north.

Kopsia Ridleyana, *King and Gamble.* Rawang; Sungai Buloh. A small shrub, endemic, local, but common in Negri Sembilan.

Kopsia singaporensis, *Ridl.* Public Gardens, K. Lumpur (Forest Dept.). A shrub or small tree, endemic, not common in forest in the south.

Ervatamia Curtisii, *King and Gamble.* Seminyih (Hume). A shrub, endemic not common in forest, Penang, Perak and Pahang.

Ervatamia cylindrocarpa, *King and Gamble.* Batang Berjuntai; Klang Gates; Rantau Panjang; Sungai Buloh; Weld's Hill. A shrub, endemic, Penang and Upper Perak to Malacca, in forest.

Ervatamia malaccensis, *King and Gamble.* Batu Caves; K. Lumpur. A shrub, endemic, common in forest from Penang to Singapore.

Ervatamia peduncularis, *King and Gamble.* Batu Caves; Seminyih; Ulu Gombak. A shrub, endemic, common in forest from Langkawi to Mt. Ophir.

Ervatamia polyneura, *King and Gamble.* Public Gardens, K. Lumpur (Forest Dept.). A big shrub, endemic, usually in montane forest on the Main Range and Gunong Tahan.

Dyera costulata, *Hook. fil.* Kajang; K. Lumpur; Rantau Panjang; Sungai Buloh. A lofty tree of Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Dyera laxiflora, *Hook. fil.* K. Lumpur; Sungai Buloh. A lofty tree, endemic and common in forest.

Alstonia angustiloba, *Miq.* Batu Caves (Forest Dept.). A lofty tree of Java, Borneo and the Philippines; in the Peninsula Penang, Taiping, Singapore, in forest.

Alstonia micrantha, *Ridl.* Rantau Panjang (Kloss, fide Ridley). A tree, endemic and local.

Alstonia scholaris, *R. Br.* Ampang; Batu Caves; Kajang; Klang Gates; K. Lumpur; Sungai Buloh. A tall tree of Africa and Indo-Australia; in the Peninsula Penang to Malacca in forest.

Alstonia spathulata, *Bl.* Ampang; K. Lumpur; Pudu. A tall tree of Java and Borneo; in the Peninsula Perak to Singapore in wet swampy forest.

Vallisneria spiralis, *Hook. fil.* Klang Gates; K. Lumpur. A tree, endemic, Penang, Negri Sembilan, Johore and Singapore in forest.

Pottsia cantoniensis, *Hook. & Arn.* Klang Gates; Seminyih; Ulu Gombak. A climbing shrub of India, Burma, Java and S. China; in the Peninsula Penang to Malacca in forest.

Wrightia laevis, *Hook. fil.* Dusun Tua; Seminyih. A shrub or small tree of Lower Siam and Sumatra; in the Peninsula not common in forest, Upper Perak, Pahang, Negri Sembilan, Mt. Ophir.

Strophanthus dichotomus, *DC.* K. Lumpur (Weld's Hill and the Public Gardens). A sarmentose shrub of Tenasserim and Java; in the Peninsula Perak to Singapore in open places.

Urceola elastica, *Roxb.* Ampang; Bukit Tinggi. A liane of Sumatra; in the Peninsula Penang to Malacca in forest.

Urceola malaccensis, *Hook. fil.* K. Lumpur (Curtis). A climbing shrub, endemic, Perak to Singapore, in forest.

Parameria polyneura, *Hook. fil.* Ampang; K. Lumpur. A liane of Burma, Tenasserim, Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Ischnocarpus ovalifolius, *A. DC.* K. Lumpur (Ridley). A climbing shrub of Indo-Malaya to the Philippines; in the Peninsula common on riverbanks and in secondary growth from Penang to Johore.

Aganosma calycina, *DC.* 15th mile, Ulu Gombak (Forest Dept. 12891). A climbing shrub of Tavoy, rare in the Peninsula, hitherto known only from Gunong Chabang, Perak. (I have seen no other specimens of this, but the Ulu Gombak specimens agree well with the description).

Epigynum Maingayi, *Hook. fil.* K. Lumpur (Ridley). A climbing shrub, endemic, Perak, Pahang, Negri Sembilan and Malacca.

Epigynum Ridleyi, *King and Gamble.* Klang Gates; Rawang. A slender climbing shrub, endemic and rare, known also from Ginting Bidai, Selangor.

Micrechites tenuifolia, *Ridl.* K. Lumpur; Sungai Buloh. A slender climbing shrub, endemic, not common in forest, Ginting Bidai and Malacca.

CULTIVATED APOCYNACEÆ.

Allamanda Schotti, *Hook. fil.* Common in gardens. A shrub of South America; in the Peninsula cultivated and occasionally escaping.

Beaumontia grandiflora, *Wall.* (Nepal Trumpet Flower). Public Gardens, K. Lumpur. A shrub of India.

Cerbera odollam, *Gaertn.* Serdang Experimental Plantation (Milsum). A small tree of Indo-Malaya to Polynesia; in the Peninsula not common on seashores.

Dipladenia Harrisii, *Hook. fil.* Public Gardens, K. Lumpur. A climbing shrub of Trinidad; in the Peninsula often cultivated.

Ervatamia coronaria, *Stapf.* Cultivated, fide Foxworthy. A shrub, cultivated in the Peninsula and occurring as an escape. Origin probably North India.

Lochnera rosea, *Reichb.* Cultivated and occasionally escaping. Native of America.

Nerium oleander, *Linn.* Cultivated, fide Foxworthy. A shrub of W. Asia; in the Peninsula cultivated only.

Ochrosia borbonica, *Gmel.* K. Lumpur (Forest Dept.), doubtless cultivated. A small tree of Indo-Malaya; in the Peninsula rare, Pulau Adang and Singapore.

Plumiera acutifolia, *Poir.* (The Frangipanni). A commonly cultivated shrub, native of South America.

Roupellia grata, *Wall.* (Cream Fruit). Public Gardens, K. Lumpur. A shrub of Trop. Africa.

Strophanthus hispidus, *DC.* Public Gardens, K. Lumpur (Forest Dept.). A shrub of Trop. Africa.

ASCLEPIADACEÆ.

Toxocarpus Griffithii, *Dene.* Batu Caves (Ridley). A slender climber of Mergui; in the Peninsula not common in lowland forest, Perak, Malacca, Johore.

Asclepias curassavica, *Linn.* K. Lumpur (fide Foxworthy). A herb, pantropic, of American origin; in the Peninsula in waste ground, roadsides, etc.

Pentasacme caudatum, *Wall.* Ulu Gombak (Ridley). A slender herb of India and Burma; in the Peninsula common on rocks in mountain streams.

Marsdenia tinctoria, *Br.* Batu Caves; Ulu Gombak. A shrubby herb of Indo-Malaya to the Philippines and China; in the Peninsula Kedah and Perak, perhaps the remains of cultivation.

Pergularia accedens, *Bl.* Seminyih (Hume). A twining shrub of Sumatra and Java, not hitherto recorded from the Peninsula.

Tylophora exilis, *Colebr.* Rantau Panjang (Kloss, fide Ridley). A slender twiner of Assam; in the Peninsula Taiping to Malacca, in forest.

Tylophora longifolia, *Wight.* Rantau Panjang (Hume). A slender twiner of India and Borneo; in the Peninsula usually montane, Taiping Hills and Fraser Hill.

Tylophora tenuis, *Bl.* Batu Caves (Burkill). A slender climber of India to Burma, Java and Borneo; in the Peninsula common on tidal rivers, but also inland.

Heterostemma piperifolium, *King and Gamble.* Batu Caves (Burkill). A twiner, endemic, not common in forest, Perak.

Hoya citrina, *Ridl.* Batu Caves (Ridley). A long climber, endemic, not common, Perak on limestone.

Hoya coronaria, *Bl.* Sungai Buloh (Forest Dept.). A long twiner, widely Malaysian; in the Peninsula common on riverbanks and in mangrove.

Hoya lacunosa, *Bl.* Rawang; Sungai Buloh. A slender epiphyte of W. Malaysia; in the Peninsula Perak, Malacca, Singapore.

Hoya lasiantha, *Korth.* Seminyih; Ulu Gombak. An erect or climbing epiphytic shrub of Lower Siam, Java and Borneo; in the Peninsula not common in forest, Gunong Kerbau, Bujong Malacca.

Hoya multiflora, *Bl.* Seminyih; Ulu Gombak. An erect epiphytic shrub of Indo-Malaya; in the Peninsula common in forest from Penang to Johore.

Hoya oclusa, *Ridl.* Batu Caves (Ridley). A climber, endemic and local, rare.

Hoya parviflora, *Wight*. Ulu Gombak (Hume). A slender twiner of Tenasserim; in the Peninsula not rare, but not often flowering, Setul to Mt. Ophir.

Hoya revoluta, *Wight*. K. Lumpur; ? Ulu Gombak. A slender twiner, endemic, common in forest from Perlis and Kelantan to Singapore.

Dischidia complex, *Griff*. Batu Caves (Ridley). A slender epiphyte, endemic, rare and little known, recorded also from Malacca.

Dischidia hirsuta, *Dene*. Batu Caves; Ulu Gombak. A slender epiphytic creeper of Indo-Malaya; in the Peninsula common from Penang to Singapore.

LOGANIACEÆ.

Norrisia malaccensis, *Gardn*. Sungai Buloh; Weld's Hill. A tree of Borneo; in the Peninsula common in forest from Perak to Singapore.

Fagræa auriculata, *Jack*. Klang Gates (all collectors). An epiphytic shrub, eventually a small tree, of W. Malaysia to the Philippines and Indo-China; in the Peninsula common in open places from Taiping to Singapore.

Fagræa crenulata, *Maing*. Wild on the Klang Road, cultivated at Circular Rd. Plantation. A tall tree, endemic, not common, Kedah to Malacca by tidal rivers.

Fagræa Maingayi *Clarke*. Bangi; K. Lumpur. A tree, endemic, not common, Ulu Selangor, Negri Sembilan, Malacca.

Fagræa obovata, *Wall*. Kanching; K. Lumpur; ? Ulu Gombak. An epiphytic shrub of Indo-Malaya; in the Peninsula common in forest from Kedah to Singapore.

Fagræa racemosa, *Jack*. Dusun Tua; K. Lumpur; Weld's Hill. A bush of Borneo; in the Peninsula common in open places from Kedah and Trengganu to Singapore.

Fagræa vaginata, *King and Gamble*. Ampang; Rawang. A shrub or small tree of Java; in the Peninsula Taiping to Malacca, in forest.

Cyrtophyllum giganteum, *Ridl*. Rantau Panjang; Sungai Buloh. A tall tree of Sumatra; in the Peninsula Perak to Singapore, in forest.

Cyrtophyllum peregrinum, *Bl*. K. Lumpur; Sungai Buloh. A tree of Indo-China and W. Malaysia to the Philippines; in the Peninsula common in open country.

Strychnos ovalifolia, *Wall*. Sungai Buloh (Forest Dept.). A liane of Borneo; in the Peninsula common in forest.

Strychnos Scortechinii, *A. W. Hill*. K. Lumpur (Curtis). A liane, endemic, Taiping to Malacca, in forest.

Gaertnera ? grisea, *Hook. fl.* Ulu Gombak (Hume).

GENTIANACEÆ.

Canscora pentanthera, *Clarke*. Batu Caves (Ridley). A herb of Lower Siam; in the Peninsula usually on limestone, Langkawi, Kedah Peak, Perak.

Limnanthemum indicum, *Thw.* K. Lumpur, fide Foxworthy. An aquatic herb of Indo-Malaya and China; in the Peninsula in ponds and ditches, Perlis, Langkawi, Malacca, Johore, Singapore.

BORAGINACEÆ.

Tournefortia Wallichii, *DC.* K. Lumpur; Petaling; Seminyih. A climber of W. Malaysia; in the Peninsula common from Penang to Singapore.

Heliotropium indicum, *Linn.* Circular Rd. Plantation (Forest Dept.), and doubtless in other localities. A pantropic herb; in the Peninsula a common weed in waste ground.

CONVOLVULACEÆ.

Erycibe angulata, *Prain*. Batu Caves; Batu Tiga. A liane of Sumatra; in the Peninsula not common in forest, Perak and Malacca.

Erycibe leucoxyloides, *Prain*. K. Lumpur (Curtis). A bushy climber, endemic, Fraser Hill, Johore and Singapore, in open places.

Lettsomia Curtisii, *Prain*. K. Lumpur (Ridley). A climbing shrub, endemic and rare, Taiping.

Lettsomia Kunstleri, *Prain*. Batu Caves; Sungai Buloh; Ulu Gombak. A climbing shrub of Sumatra; in the Peninsula Perak to Malacca, in forest.

Lettsomia Maingayi, *Clarke*. K. Lumpur; Ulu Gombak. A twining shrub, endemic, not uncommon in forest from Perak to Johore.

Lettsomia peguensis, *Clarke*. Batu Caves; Klang Gates; Petaling. A twining shrub of Burma, Tenasserim, Sumatra and Java; in the Peninsula common in forest from Langkawi and Kelantan to Negri Sembilan.

Lettsomia penangiana, *Miq.* Ulu Gombak (Hume). A slender climber, endemic, usually montane in Perak and Selangor.

Lettsomia Ridleyi, *Prain*. Bukit Raja; K. Lumpur. A large twining shrub, endemic, common in forest in Johore and Singapore, and occurring in Negri Sembilan.

Neuropeltis racemosa, *Wall.* Klang Gates (Hume). A climbing shrub of India, Burma and Borneo; in the Peninsula Kedah to Singapore.

Merremia convolvulacea, *Dennst.* K. Lumpur (Ridley). A slender twiner of Trop. Africa, Asia and Australia; in the Peninsula a common weed.

Merremia umbellata, *Hallier.* K. Lumpur (Curtis). A long twiner, pantropic; in the Peninsula common in open places.

Ipomoea sagittaeifolia, *Burm.* Pudu; Rantau Panjang. A slender twiner of S. E. Asia; in the Peninsula common in waste ground.

Lepistemon flavescens, *Bl.* Batu Caves; Sungai Buloh. A climber of Assam to the Philippines; in the Peninsula Penang to Malacca.

CULTIVATED CONVULVACEÆ.

Ipomoea Batatas, *Lam.* (Sweet Potato). Native of America, commonly cultivated in all tropical countries.

Ipomoea pulchella, *Roth.* K. Lumpur, cultivated and running wild. A twiner of India and Indo-China; in the Peninsula cultivated only.

Porana volubilis, *Burm.* Public Gardens, K. Lumpur. A woody climber of Indo-Malaya, Indo-China and the Philippines; in the Peninsula cultivated only.

Quamoclit pinnata, *Boj.* Cultivated and sometimes escaping. A pantropic herb of S. American origin.—

SOLANACEÆ.

Solanum Blumei, *Nees.* Batu Caves; Ulu Gombak. A shrub of W. Malaysia; in the Peninsula usually in hill woods, Perak to Johore.

Solanum nigrum, *Linn.* Seminyih (Hume). A herb, pantropic and in temperate regions; in the Peninsula common in waste ground and cultivated.

Solanum torvum, *Sw.* Ampang; Klang Gates; K. Lumpur; Rantau Panjang; Seminyih; Ulu Gombak. A pantropic shrub; in the Peninsula common in waste ground.

Solanum verbascifolium *Linn.* K. Lumpur (Forest Dept., Goodenough). A pantropic shrub; in the Peninsula Kedah and Kelantan to Pulau Tioman, usually in open places.

Capsicum minimum, *Roxb.* Batu Caves, established here (Ridley). A shrubby herb of American origin, cultivated all over the Peninsula.

Physalis minima, *Linn.*, var. *indica*, *Clarke.* Batang Berjuntai; Batu Caves; Pudu; K. Lumpur; Rantau Panjang; Ulu Gombak. A pantropic herb; in the Peninsula common on seashores and in waste ground.

CULTIVATED SOLANACEÆ.

Brunfelsia undulata, Sw. Public Gardens, K. Lumpur (Forest Dept.). A shrub of Jamaica; in the Peninsula occasionally cultivated.

Datura fastuosa, Linn. K. Lumpur, fide Foxworthy. A tall herb of Trop. Africa and S. E. Asia; in the Peninsula cultivated and in waste ground, not native.

Nicotianum tabacum, Linn. (Tobacco). A native of Trop. America, cultivated in all tropical countries.

SCROPHULARIACEÆ.

Adenosma capitatum, Benth. K. Lumpur; Salak. An aromatic herb of S. E. Asia; in the Peninsula common on roadsides and sandy places.

Adenosma coeruleum, R. Br. Batu Caves; Rantau Panjang. An aromatic herb of Trop. Asia to Australia; in the Peninsula common in grassy places.

Herpestis monniera, H. B. & K. Salak South Rd. (Seimund). A succulent herb, pantropic; in the Peninsula in ditches and ricefields, Penang and Kelantan to Singapore.

Limnophila erecta, Benth. Rawang; Sungai Buloh. An erect herb of India, Indo-China, China and Lower Siam; in the Peninsula in wet places from Upper Perak and Kelantan to Negri Sembilan.

Vandellia crustacea, Benth. Ampang; Batang Berjuntai; Klang Gates; Rantau Panjang; Seminyih; Ulu Gombak. A small herb, pantropic; in the Peninsula a common weed.

Vandellia mollis, Benth. Rawang (Ridley). A creeping herb of India to China, Sumatra and Java; in the Peninsula rare, Upper Perak.

Vandellia pedunculata, Benth. Rantau Panjang; Rawang; Ulu Gombak. A herb of S. E. Asia; in the Peninsula common in damp places.

Torenia atropurpurea, Ridl. Ulu Gombak (Hume). A creeping herb, endemic, usually montane, Perak, Selangor.

Torenia mucronulata, Benth. Rantau Panjang (Hume). A creeping herb of Tenasserim; in the Peninsula Penang and Kelantan to Singapore.

Torenia polygonoides, Benth. Klang Gates; Rantau Panjang; Ulu Gombak. A creeping herb of Trop. Asia; in the Peninsula common in grassy places.

Curanga amara, Juss. Batu Caves (Ridley). A creeping herb of Indo-China and Indo-Malaya to the Philippines; in the Peninsula common in shady places, especially in the north.

Bonnaya brachiata, *Link & Otto*. Ulu Gombak (Hume). A small herb of China and Indo-Malaya to the Philippines; in the Peninsula common in wet places.

Bonnaya reptans, *Spreng*. Seminyih; Ulu Gombak. A tufted herb of Indo-Malaya to the Philippines; in the Peninsula common.

Striga hirsuta, *Benth*. Batang Berjuntai; Klang Gates; Seminyih. A herb, parasitic on grass roots, of India, Siam and Java; in the Peninsula common.

Scoparia dulcis, *Linn*. Batang Berjuntai; K. Lumpur; Ulu Gombak. A shrubby herb of American origin, now common in Africa and Indo-Malaya; in the Peninsula common in waste places.

CULTIVATED SCROPHULARIACEÆ.

Angelonia grandiflora, *C. Morr*. K. Lumpur, cultivated or an escape (Goodenough). A herb of America; in the Peninsula occasionally cultivated.

LENTIBULARIACEÆ.

Utricularia albina, *Ridl*. Salak (Seimund). A slender herb of Ceylon and Tenasserim; in the Peninsula not uncommon in ricefields and sandy grassy spots.

Utricularia bifida, *Linn*. Ampang (Hume). A small herb of Indo-Australia, China and Japan; in the Peninsula common in marshes and ricefields.

Utricularia flexuosa, *Vahl*. Ampang (Hume). An aquatic herb of Indo-Australia and Indo-China; in the Peninsula common in ponds and ditches.

GESNERACEÆ.

Aeschynanthus marmorata, *T. Moore*. Ulu Gombak (Hume). A tufted epiphyte of Burma and Siam; in the Peninsula Langkawi, Penang, Upper Perak, in forest.

Aeschynanthus obconica, *Clarke*. K. Lumpur; Sungai Buloh. A creeping epiphyte of Borneo; in the Peninsula Upper Perak to Selangor, in forest.

Aeschynanthus purpurascens, *Hassk*. Ulu Gombak (Hume). An erect epiphyte of W. Malaysia; in the Peninsula common in forest from Kelantan and Perak to Singapore.

Aeschynanthus radicans, *Jack*. Seminyih; Sungai Buloh; Ulu Gombak. A creeping epiphyte of W. Malaysia; in the Peninsula common in forest from Upper Perak and Trengganu to Singapore.

Didissandra breviflora, *Ridl., Kew Bull., 10, 1926, p. 474*. Ulu Gombak (Hume 8437). A herb, endemic and local.

Didymocarpus bombycina, *Ridl.* Ulu Gombak (Hume). A herb, endemic, not common in forest, Upper Perak and Kelantan to Negri Sembilan.

Didymocarpus crinita, *Jack.* Kanching; Seminyih. A woody herb of Sumatra and Borneo; in the Peninsula common in forest from Kedah to Johore.

Didymocarpus Komsobœa, *Clarke.* Ulu Gombak (Hume). A woody herb of Borneo; in the Peninsula Upper Perak and Pahang, in forest, usually above 2000 feet altitude.

Didymocarpus malayana, *Hook. fil.* Rawang; Ulu Gombak. A herb, endemic, common in forest on the Taiping Hills and the Main Range above 1500 feet altitude.

Didymocarpus pectinatus, *Clarke and Oliv.* Rawang (Ridley). A herb, endemic, rare, on limestone in Perak and on Bukit Hitam, Selangor.

Didymocarpus platypus, *Clarke.* Batang Berjuntai; Kajang; Kanching; Klang Gates; K. Lumpur; Kuang; Petaling; Rantau Panjang; Seminyih. A woody herb of Sumatra; in the Peninsula common in forest in the south.

Didymocarpus primulina, *Ridl.* Woods at Klang Gates (Ridley). A herb, endemic and local.

Didymocarpus quinquevulnera, *Ridl.* Batu Tiga; Bukit Raja. A woody herb, endemic, Perak, Pahang, Malacca, in forest.

Didymocarpus reptans, *Jack.* Batang Berjuntai; Dusun Tua (var. *violascens*, *Ridl.*); Kanching; Klang Gates; Rantau Panjang (var. *modesta*, *Ridl.*); Rawang (var. *violascens*); Seminyih; Ulu Gombak (var. *modesta*); Weld's Hill. A creeping herb of Sumatra and Java; in the Peninsula common in forest on the Taiping Hills and the Main Range, the varieties known only from the localities given.

Chirita caliginosa, *Clarke.* Batu Caves (all collectors). A herb, endemic, on limestone from Upper Perak to Selangor.

Boea paniculata, *Ridl.* Batu Caves (Ridley). A woody herb, endemic, limestone rocks in Perak.

Boea verticillata, *Ridl.* Batu Caves (Kelsall, Ridley). A woody herb, endemic and local.

Epithema saxatile, *Bl.* Batu Caves (Ridley). A succulent herb of W. Malaysia; in the Peninsula common on limestone.

Monophyllæa Horsfieldii, *Br.* Batu Caves; Ulu Gombak. A succulent herb of Sumatra and Java; in the Peninsula usually on limestone.

Monophyllæa patens, *Ridl.* Batu Caves (Ridley). A succulent herb, endemic, not common, on limestone, Perak.

Stauranthera umbrosa, *Clarke*. Batu Caves (Ridley). A succulent herb of Assam; in the Peninsula Upper Perak, Perak, Pahang, Johore, in forest.

Cyrtandromœa acuminata, *Benth. and Hook*. Seminyih; Ulu Gombak. A weak shrub of Sumatra; in the Peninsula common in forest in the north.

Cyrtandromœa grandis, *Ridl*. K. Lumpur; Petaling; Seminyih; Sungai Buloh; Ulu Gombak. A large shrub, endemic, Kelantan to Negri Sembilan, in forest.

Cyrtandromœa megaphylla, *Hemsl*. Weld's Hill (Ridley). A large bush, endemic, Kedah, Perak, Pahang, in forest.

Cyrtandra cupulata, *Ridl*. Kanching; Klang Gates; Seminyih; Sungai Buloh; Ulu Gombak. A shrub, endemic, common in forest from Upper Perak and Kelantan to Mt. Ophir.

Cyrtandra falcata, *Ridl*. Near Batu Caves (Ridley). A small epiphytic shrub, endemic, rare, Taiping.

Cyrtandra pendula, *Bl*. Batu Caves; K. Lumpur; Seminyih; Ulu Gombak. A small shrub of Sumatra and Java; in the Peninsula common in forest from Taiping to Singapore.

Cyrtandra pilosa, *Bl*. Seminyih (Hume). A shrub of Tenasserim to New Guinea; in the Peninsula Penang and Upper Perak to Johore, in forest.

BIGNONIACEÆ.

Oroxylum indicum, *Vent*. Weld's Hill (Forest Dept.), and doubtless in other localities. A small tree of Indo-Malaya and Indo-China; in the Peninsula common near rivers and in swamps.

Radermachera amœna, *Seem*. K. Lumpur (Ridley). A tree of Burma, Java and Borneo; in the Peninsula Perlis, Perak, Malacca, Singapore, in open places and secondary growth.

Radermachera stricta, *Zoll. and Mor*. Batu Caves; K. Lumpur; Ulu Gombak. A small tree of Indo-Malaya; in the Peninsula common in forest from Penang and Upper Perak to Singapore.

Diplanthera bancana, *Scheff*. Rantau Panjang (Hume). A tree of Bangka and Borneo; in the Peninsula not very common in forest, Penang to Malacca.

CULTIVATED BIGNONIACEÆ.

Bignonia magnifica, *Bull*. Public Gardens, K. Lumpur. A shrub of New Grenada, occasionally cultivated in the Peninsula.

Crescentia cujete, *Linn.* (The Calabash Tree). K. Lumpur (Forest Dept.). A tree of Trop. America; in the Peninsula occasionally cultivated.

Jacaranda mimosæfolia, *R. Br.* Common in gardens. A small tree of S. America; in the Peninsula often cultivated.

Spathodea campanulata, *Beauv.* Common in gardens and as a roadside tree. A native of Trop. Africa, often cultivated in the Peninsula.

Stereospermum fimbriatum, *DC.* K. Lumpur, cultivated, fide Foxworthy. A tall tree of Burma and Siam; in the Peninsula common north of Malacca.

PEDALINACEÆ, CULTIVATED.

Sesamum indicum, *DC.* (Gingelly Oil plant.) Cultivated and escaping. A herb, cultivated in all tropics.

ACANTHACEÆ.

Thunbergia fragrans, *Roxb.*, var. *javanica*, *King and Gamble.* Batang Berjuntai; Batu Caves; Klang Gates. A twining herb of Indo-Australia; in the Peninsula the species cultivated and perhaps wild in the north, the var. common on limestone and in villages.

Thunbergia laurifolia, *Lindl.* K. Lumpur, fide Foxworthy. A liane of Burma; in the Peninsula common in the north, in forest or open places.

Staurogyne angustifolia, *Wall.* Ulu Gombak (Ridley.) A herb of Tenasserim; in the Peninsula not common in forest, Perak and Malacca.

Staurogyne comosa, *Kuntze.* Rawang; Sungai Buloh. A woody herb, endemic, Penang and Upper Perak to Selangor, in forest.

Staurogyne Griffithiana, *Kuntze.* Seminyih; Ulu Gombak. A creeping herb, endemic, common in forest from Upper Perak and Kelantan to Singapore.

Staurogyne Kingiana, *Clarke.* Klang Gates; Ulu Gombak. A herb of Lingga; in the Peninsula Kedah to Johore, in forest.

Staurogyne longispica, *Ridl.* Ulu Gombak (Hume, Ridley). A herb, endemic and rare in forest, Bukit Tinggi (Negri Sembilan).

Staurogyne longifolia, *Kuntze.* Batang Berjuntai; Batu Caves; K. Lumpur; Kuang; Ulu Gombak. A herb, endemic, usually in hill forest, Upper Perak to Johore.

Staurogyne setigera, *Kuntze.* Batang Berjuntai; K. Lumpur; Rawang. A herb of W. Malaysia; in the Peninsula common.

Ruellia repens, *Linn.* K. Lumpur; Rantau Panjang; Seminyih; Ulu Gombak. A small herb of Indo-Malaya and China; in the Peninsula common in grass.

Aporuella sumatrensis, *Clarke*, var. *Ridleyi*, *Clarke*. Batu Caves (Ridley, Curtis). A herb, the species of Sumatra, the var, endemic and rare, known only from this locality.

Hygrophila angustifolia, *R. Br.* Batu Caves; K. Lumpur. A herb of Indo-Malaya, China and Japan; in the Peninsula common in wet places.

Hygrophila phlomoides, *Nees*. Batu Caves; Pudu; Ulu Gombak. A herb of Indo-China, Borneo and the Philippines; in the Peninsula common in wet places.

Hygrophila quadrivalvis, *Nees*. Salak South Rd. (Seimund). A stout herb of Indo-Malaya and Indo-China; in the Peninsula common in marshes.

Gymnostachyum Ridleyi, *Clarke*. Rawang (Ridley). A tall shrub, endemic and rare, Bujong Malacca (Perak).

Lepidagathis longifolia, *Wight*. Bukit Raja; K. Lumpur; Petaling; Sungai Buloh; Ulu Gombak. A shrubby herb of Lingga; in the Peninsula common in forest from Perak to Johore.

Pseuderanthemum candidum, *Ridl.* Ulu Gombak (Ridley). A small shrub, endemic and local.

Pseuderanthemum ?caudifolium, *Ridl.* Ulu Gombak (Hume).

Pseuderanthemum crenulatum, *Radlk.* Batu Caves; K. Lumpur; Seminyih; Ulu Gombak. A small shrub of Burma, Siam, Tenasserim and Indo-China; in the Peninsula common in forest.

Pseuderanthemum graciliflorum, *Ridl.* Klang Gates; Rantau Panjang; Sungai Buloh; Ulu Gombak. A bush of Lower Siam; in the Peninsula common in forest and often cultivated.

Pseuderanthemum lilacinum, *Stapf*. Batu Caves (Ridley). Ridley believes this to be *P. Teysmanni* altered by cultivation (*Ridl. Flor. Malay Pen. Vol. II, p. 591*).

Pseuderanthemum selangorense, *Ridl.* Batu Caves; Klang Gates; K. Lumpur; Sungai Buloh. A shrub, endemic, not common in forest, Upper Perak, Ulu Selangor, Bukit Hitam.

Pseuderanthemum sylvestre, *Ridl.* Sungai Buloh (Ridley). A shrub, endemic and local.

Pseuderanthemum Teysmanni, *Ridl.* Batu Caves; Seminyih; Sungai Buloh. A sarmentose shrub, endemic and common in forest from Upper Perak to Johore.

Calophanoides quadrifaria, *Ridl.* Batu Caves (Curtis). A small shrub of India, Tenasserim, Sumatra and China; in the Peninsula Upper Perak, Kelantan, Singapore, by riverbanks.

Justicia ?*Maingayi*, *Clarke.* Ulu Gombak (Hume).

Justicia microcarpa, *Ridl.* Batu Caves (Ridley). A weak herb, endemic and local.

Justicia ptychostoma, *Nees.* Batu Caves (Ridley.) A herb, endemic, common from Perlis to Malacca in open country.

Justicia subcymosa, *Clarke.* Batu Caves; Dusun Tua; Seminyih. A herb, endemic, common in the north, in forest and secondary growth.

Justicia trichodes, *Ridl., Kew Bull, 10, 1926, p. 475.* Seminyih (Hume 7816, 8165). A herb, endemic and local.

Justicia uber, *Clarke.* Batu Caves; Seminyih; Ulu Gombak. A fleshy herb, endemic and common in forest, Upper Perak and Kelantan to Malacca.

Ptyssiglottis chrysea, *Ridl.* Rantau Panjang (Hume); Ulu Gombak (Ridley). A woody herb, endemic and local in forest, rare.

Polytrema æquale, *Ridl.* Batu Caves (Ridley). A herb, endemic, not common in forest, Bukit Besar (Rahman), Gunong Senyum (Pahang), Bukit Tangga (Negri Sembilan).

Polytrema vulgare, *Clarke.* K. Lumpur (Curtis). A shrubby herb of Lower Siam; in the Peninsula Penang and Upper Perak to Johore in forest.

Peristrophe acuminata, *Nees.* Klang Gates; Rantau Panjang; Seminyih; Ulu Gombak. A herb of Indo-Malaya; in the Peninsula common by roadsides and in waste ground.

CULTIVATED ACANTHACEÆ.

Barleria prionitis, *Linn.* K. Lumpur, cultivated or escaping (Forest Dept.). A herb of Africa and India; in the Peninsula cultivated and perhaps wild in Perlis.

Gendarussa vulgaris, *Nees.* Cultivated, fide Foxworthy. A bush of S. E. Asia; in the Peninsula common in or near cultivation.

Graptophyllum hortense, *Nees.* Common in gardens. A shrub of unknown origin, cultivated throughout India and Malaya.

Jacobinia magnifica, *Benth. and Hook!* Weld's Hill (Forest Dept.), cultivated or an escape. A shrub of Brazil.

Sanchezia nobilis, *Hook. fil.* Public Gardens, K. Lumpur (Forest Dept.). A shrub of Ecuador, occasionally cultivated in the Peninsula.

Thunbergia grandiflora, *Roxb.* Public Gardens, K. Lumpur (Forest Dept.). A long climber of India; in the Peninsula cultivated and occasionally escaping.

VERBENACEÆ.

Lantana aculeata, *Linn.* Klang Gates; K. Lumpur; Pudu; Ulu Gombak; and doubtless in all the other localities. A prickly bush, pantropic, of S. American origin; in the Peninsula very common in open places and waste ground.

Lippia nodiflora, *Mich.* Salak South Rd. (Seimund). A creeping herb, pantropic; in the Peninsula occasional in waste ground.

Stachytarpheta indica, *Vahl.* K. Lumpur; Rantau Panjang. A small shrub of Indo-Malaya; in the Peninsula common, often on seashores and sandy places.

Stachytarpheta jamaicensis, *Vahl.* K. Lumpur; Pudu; Seminyih; Ulu Gombak, and doubtless in most of the other localities. A shrub, pantropic, of S. American origin; in the Peninsula a common weed.

Geunsia farinosa, *Bl.* Klang Gates; K. Lumpur; Petaling; Rantau Panjang; Rawang; Seminyih; Ulu Gombak. A tree of Indo-Malaya to the Philippines and Moluccas; in the Peninsula common in open country.

Callicarpa angustifolia, *King and Gamble.* Batu Caves (Ridley). A shrub, endemic on limestone in Langkawi and Perak.

Callicarpa longifolia, *Lam.* Ampang; Batang Berjuntai; Batu Caves; Klang Gates; K. Lumpur; Rantau Panjang; Seminyih; Ulu Gombak. A shrub of Sumatra to N. Australia; in the Peninsula common in open places and secondary growth from Langkawi to Singapore.

Callicarpa Maingayi, *King and Gamble.* Ulu Gombak (Hume). A tree, endemic, not common in forest in Selangor, Pahang and Malacca.

Premna pyramidata, *Wall.* Dusun Tua (Ridley). A tree of Burma, Java and Timor; in the Peninsula Langkawi to Negri Sembilan, in forest.

Clerodendron deflexum, *Wall.* Batu Caves; Klang Gates; Rantau Panjang; Seminyih; Ulu Gombak; Weld's Hill. A shrub, endemic and common in forest from Penang and Upper Perak to Singapore.

Clerodendron disparifolium, *Bl.* Kanching; Rawang; Ulu Gombak. A small tree of W. Malaysia; in the Peninsula common.

Clerodendron paniculatum, *Linn.* K. Lumpur; Ulu Gombak. A tall shrub of Java; in the Peninsula common in waste ground and often cultivated.

Clerodendron penduliflorum, *Wall.* Batu Caves (Ridley). A small shrub of Burma and the Nicobar Islands; in the Peninsula not rare in open country in the north.

Clerodendron Ridleyi, *King and Gamble.* Batu Tiga (Ridley). A shrub or small tree of Borneo; in the Peninsula rare, Larut.

Clerodendron serratum, *Spreng.* Pudu; Weld's Hill. A shrub of Indo-Malaya and Indo-China; in the Peninsula common in open country in the north.

Clerodendron umbratile, *King and Gamble.* Seminyih (Hume). A shrub of Sumatra; in the Peninsula usually in montane forest, Taiping Hills to Malacca.

Clerodendron villosum, *Bl.* Weld's Hill (Forest Dept.). A shrub of Indo-Malaya to the Philippines; in the Peninsula common in waste ground.

Vitex gamosepala, *Griff.* Ampang; K. Lumpur; Rantau Panjang; Ulu Gombak. A small tree of Sumatra and Borneo; in the Peninsula Perak and Trengganu to Singapore, in forest.

Vitex heterophylla, *Roxb.* Ulu Gombak (Forest Dept.). A tree of Indo-Malaya; in the Peninsula not common in forest, Perak.

Vitex longisepala, *King and Gamble.* Dusun Tua; Kanching; Klang Gates; Rantau Panjang; Rawang; Seminyih. A small tree, endemic, common in forest from Penang to Malacca.

Vitex Negundo, *Linn.* Kajang (Forest Dept.). A shrub of Indo-Malaya; in the Peninsula not common in waste ground, probably introduced (Ridley).

Vitex pubescens, *Vahl.* Bangi; Batang Berjuntai; Bukit Belachan; Bukit Cheraka; Bukit Puteh; K. Lumpur; Sungai Buloh. A tree of Indo-Malaya to the Philippines; in the Peninsula common in open country from Perlis to Singapore.

Vitex siamica, *Williams.* Batu Caves (Ridley). A small tree, endemic on limestone, Langkawi and Perak.

Vitex trifolia, *Linn.* K. Lumpur; Salak South Rd. A shrub or small tree of Indo-Australia and Japan; in the Peninsula Langkawi to Singapore in open places and seashores.

Vitex vestita, *Wall.* Batu Caves; Bukit Cheraka; Batu Tiga; Klang Gates; K. Lumpur; Rawang; Ulu Gombak. A small tree of Burma, Sumatra and Borneo; in the Peninsula common in forest.

Peronema canescens, *Jack*. K. Lumpur (Forest Dept.). A shrub or tree of W. Malaysia; in the Peninsula common from Penang and Kelantan to Singapore, usually on riverbanks.

Sphenodesme pentandra, *Jack*. Ulu Gombak (Forest Dept.). A climbing shrub of India, Siam and Borneo; in the Peninsula common in open places and forest edges.

Sphenodesme triflora, *Wight*. K. Lumpur; Sungai Buloh. A climber or erect shrub of Sumatra and Borneo; in the Peninsula common from Langkawi to Johore in forest and secondary growth.

CULTIVATED VERBENACEÆ.

Clerodendron fragrans, *R. Br.* A shrub of Chinese origin, cultivated and run wild in the Peninsula.

Clerodendron siphonanthus, *Br.* Batu Tiga; Public Gardens, K. Lumpur. A shrub of Indo-Malaya; wild in Kedah, Perak and Pahang, and often cultivated and escaping.

Clerodendron Thomsonæ, *Balf.* Common in gardens. A climber of Africa; in the Peninsula often cultivated.

Congea velutina, *Wight*. Common in gardens. A climbing shrub of Burma and Siam; in the Peninsula often cultivated.

Duranta Plumieri, *Jacq.* K. Lumpur, fide Foxworthy. A shrub of South America.

Faradaya papuana, *Scheff.* Public Gardens, K. Lumpur. A climber of New Guinea, occasionally cultivated in the Peninsula.

Holmskioldia sanguinea, *Retz.* Public Gardens, K. Lumpur (Forest Dept.). A climbing shrub of the Eastern subtropical Himalaya; in the Peninsula occasionally cultivated.

Stachytarpheta mutabilis, *Vahl.* K. Lumpur (Ridley). A shrub of Trop. America; in the Peninsula cultivated only.

Tectona grandis, *Linn.* (Teak). Occasionally cultivated. Native of India, Burma, Siam, Sumatra and Java (fide King and Gamble), not wild in the Peninsula.

LABIATÆ.

Hyptis brevipes, *Poit.* Batu Caves; K. Lumpur; Rawang; Seminyih; Ulu Gombak. A pantropic herb of S. American origin; in the Peninsula common in open places and waste ground.

Hyptis suaveolens, *Poit.* Klang Gates; K. Lumpur; Rantau Panjang; Ulu Gombak. A pantropic herb of S. American origin; in the Peninsula a very common weed.

Coleus atropurpureus, *Benth.* K. Lumpur (Ridley). A herb of W. Malaysia to Polynesia; in the Peninsula common in open places.

Pogostemon Heyneanus, *Benth.* Rawang (Ridley). An aromatic herb of Indo-Malaya to the Philippines; in the Peninsula by riverbanks in Upper Perak, Pahang, Negri Sembilan and Johore.

Dysophylla auricularia, *Bl.* Batang Berjuntai; Rantau Panjang; Seminyih; Ulu Gombak. A herb of S. E. Asia; in the Peninsula common in open places.

Anisomeles ovata, *R. Br.* K. Lumpur; Ulu Gombak road. A stout herb of Indo-Malaya and China; in the Peninsula not very common in waste ground.

Leucas zeylanica, *R. Br.* Ampang; Batang Berjuntai; Klang Gates; K. Lumpur; Seminyih; Ulu Gombak; and doubtless in all the other localities. A herb of S. E. Asia; in the Peninsula a very common weed.

Leonurus sibiricus, *Linn.* Pudu (Goodenough); cultivated, fide Foxworthy. A pantropic herb; in the Peninsula in waste ground and often cultivated.

Gomphostemma crinitum, *Wall.* Batu Caves (var. *Griffithii*, *Prain*); Ulu Gombak. A woody herb of Tenasserim; in the Peninsula common in forest above 1,000 feet altitude.

Gomphostemma oblongum, *Wall.* Seminyih (Hume). A large woody herb of India and Indo-China; in the Peninsula Kedah, Perak, Pahang, Johore, not very common in forest.

Gomphostemma Scortechinii, *Prain.* Seminyih (Hume). A woody herb of Tenasserim; in the Peninsula not common in forest, Taiping Hills and Kelantan.

Acrymia ajugiflora, *Prain.* Kanching, on limestone (Ridley). A creeping undershrub, rare, Perak.

CULTIVATED LABIATÆ.

Mentha javanica, *Bl.* Cultivated, fide Foxworthy. A herb of Ceylon and the Malay Islands, probably only a form of the cultivated mint (Ridley).

Ocimum basilicum, *Linn.* K. Lumpur (Ridley). A small bushy shrub, pantropic; in the Peninsula cultivated only.

Ocimum sanctum, *Linn.* Cultivated, fide Foxworthy. A small herb, pantropic; in the Peninsula cultivated, doubtfully wild.

Pogostemon Cablin, *Benth.* (Patchouli). A strongly scented herb, not known in a wild state, widely cultivated in Indo-Malaya.

Salvia coccinea, *Juss.* Common in gardens. A herb of America; cultivated in Africa and S. E. Asia.

NYCTAGINACEÆ, CULTIVATED.

Bougainvillæa glabra, *Choisy.* Common in gardens. A scrambling shrub of Brazil, often cultivated in the Peninsula.

AMARANTACEÆ.

Celosia argentea, *Linn.* Pudu (Hume). A pantropic herb; in the Peninsula in waste ground, Upper Perak, Kelantan, Pahang, Singapore.

Amaranthus caudatus, *Linn.* K. Lumpur (Ridley). A pantropic herb; in the Peninsula cultivated and wild in waste ground.

Amaranthus gangeticus, *Linn.* Seminyih (Hume). A cosmopolitan herb; in the Peninsula a weed of cultivation.

Amaranthus spinosus, *Linn.* K. Lumpur; Pudu; Ulu Gombak. A herb, pantropic; in the Peninsula a common weed from Penang to Singapore.

Amaranthus viridis, *Linn.* K. Lumpur; Rantau Panjang; Ulu Gombak. A cosmopolitan herb; in the Peninsula very common in waste ground.

Cyathula prostrata, *Bl.* Batu Caves; Klang Gates; K. Lumpur; Sungai Buloh (var. major, *Ridl.*); Seminyih; Ulu Gombak. A pantropic herb; in the Peninsula very common in open places and waste ground.

Acryanthus aspera, *Linn.* K. Lumpur, fide Foxworthy. A woody herb of the Tropics of the Old World; in the Peninsula common in open places and waste ground from Penang to Singapore.

Alternanthera sessilis, *Brown.* Ampang; K. Lumpur; Ulu Gombak. A prostrate herb, pantropic; in the Peninsula very common in waste ground.

CULTIVATED AMARANTACEÆ.

Amaranthus paniculatus, *Linn.* K. Lumpur (Ridley). A North American herb, cultivated in the Peninsula.

Celosia cristata, *Linn.* ("Cock's comb"). A pantropic herb of unknown origin, often cultivated in the Peninsula as an ornamental plant.

POLYGONACEÆ.

Polygonum barbatum, *Linn.* K. Lumpur; Ulu Gombak. A herb of the Tropics of the Old World; in the Peninsula common in wet places.

Polygonum flaccidum, *Meissn.* K. Lumpur (Good-enough). A tall herb of Indo-Malaya and China; in the Peninsula in damp places in Kelantan, Perak, Pahang and Negri Sembilan.

Polygonum minus, *Huds.* K. Lumpur; Petaling. A slender herb of Europe, Asia and Australia; in the Peninsula not uncommon in wet places.

Polygonum pedunculare, *Wall.* Batu Caves; Dusun Tua; Klang Gates; K. Lumpur. An aquatic herb of Indo-Australia and China; in the Peninsula common in ponds and ditches.

CULTIVATED POLYGONACEÆ.

Antigonon leptopus, *Hook. and Arn.* (Honolulu creeper). Common in gardens. A climber of Tropical Africa; in the Peninsula much cultivated.

ARISTOLOCHIACEÆ.

Apama corymbosa, *Soler.* Batang Berjuntai; Batu Caves; Bukit Raja; Kanching; Klang Gates; K. Lumpur; Seminyih; Ulu Gombak. A shrub of Sumatra; in the Peninsula common in forest from Penang to Malacca.

Thottea dependens, *Klotzsch.* Pudu (Hume). A shrub, endemic, not very common in forest, Penang to Singapore.

Thottea grandiflora, *Rottb.* Ulu Gombak; Weld's Hill. A shrub of Borneo; in the Peninsula common in forest in the south.

Aristolochia Tagala, *Cham.* Dusun Tua (Ridley). A slender climber of Indo-Malaya to the Philippines; in the Peninsula common from Penang and Kelantan to Malacca, in open places.

NEPENTHACEÆ.

Nepenthes ampullaria, *Jack.* Rantau Panjang (Kloss, fide Ridley). A climbing shrub of Sumatra, Borneo and the Philippines; in the Peninsula common in the lowlands from Penang to Singapore.

Nepenthes angustifolia, *Mast.* Rantau Panjang (Kloss, fide Ridley). A creeping plant of Borneo; in the Peninsula rare, known only from this locality. Ridley, *Flor. Mal. Pen.* V. p. 327, suspects this to be a young prostrate form of one of the lowland species.

PIPERACEÆ.

Peperomia dindigulensis, *Miq.* Batu Caves (Ridley). A small succulent herb of South India; in the Peninsula rare on limestone, Kota Glanggi (Pahang).

Peperomia pellucida, *Korth.* K. Lumpur; Seminyih; Ulu Gombak. A pantropic herb of S. American origin; in the Peninsula common in waste ground.

Peperomia portulacoides, *A. Dietr.* Batu Caves (Ridley). A succulent herb of India and the Mascarene Islands; in the Peninsula rare, known only from this locality.

Piper argyrites, *Ridl.* Batu Caves (Ridley). A stout climbing shrub, endemic and rare in forest, Ginting Bidai.

Piper boehmeriaefolium, *Wall.* Ulu Gombak (Hume). An erect shrub of E. Himalaya to Siam; in the Peninsula in forest in Perak, Pahang and Negri Sembilan.

Piper caninum, *Bl.* Batu Caves; Rantau Panjang; Seminyih; Ulu Gombak; Weld's Hill. A slender climbing shrub of Indo-Malaya to the Philippines; in the Peninsula common in forest.

Piper Curtisii, *C. DC.* K. Lumpur; Ulu Gombak. A climbing shrub, endemic, Upper Perak to Johore, in forest.

Piper Kurzii, *Ridl.* Batu Caves (Ridley). An erect shrub of Burma; in the Peninsula rare, Upper Perak and Kelantan.

Piper Maingayi, *Hook. fil.* Dusun Tua (Ridley). A climbing shrub, endemic, not common in forest, Klang, Malacca, Singapore.

Piper malaccense, *C. DC.* Sungai Buloh (Ridley). An erect small shrub, endemic, not common in forest, Malacca and Johore.

Piper miniatum, *Bl.* Seminyih (Hume). A climbing shrub of Java; in the Peninsula common in forest from Langkawi to Singapore.

Piper muricatum, *Bl.* K. Lumpur; Rantau Panjang; Seminyih; Ulu Gombak. A shrubby herb of W. Malaysia; in the Peninsula common in forest from Upper Perak to Johore.

Piper pachyphyllum, *Hook. fil.* Ulu Gombak (Ridley). A climbing shrub, endemic, common in forest but seldom flowering.

Piper pedicellosum, *Wall.* Public Gardens, K. Lumpur, (Forest Dept.). A climbing pepper of Assam and Tenasserim; in the Peninsula Upper Perak to Singapore in forest.

Piper porphyrophyllum, *N. E. Br.* Batu Caves; Klang Gates; Petaling; Seminyih; Ulu Gombak; Weld's Hill. A slender climber of Borneo; in the Peninsula common in forest, but seldom flowering.

Piper ramipilum, *C. DC.* Ulu Gombak (Hume). A creeping shrub, endemic, Penang and Upper Perak to Singapore, in forest.

Piper ribesioides, *Wall.* ?Klang Gates; Rawang; ?Seminyih. A creeping shrub of Tenasserim and Sumatra; in the Peninsula common in forest from Langkawi to Singapore.

Piper Ridleyi, *C. DC.* Ulu Gombak (Hume). A shrub, endemic, usually montane, Upper Perak to Singapore.

Piper stylosum, *Miq.* Batang Berjuntai; Batu Caves; Bukit Raja; Kajang; Klang Gates; K. Lumpur; Seminyih; Sungai Buloh; Ulu Gombak. An erect small shrub of Sumatra and Borneo; in the Peninsula common in forest from Upper Perak and Kelantan to North Johore.

Piper subpenninerve, *Ridl.* Batu Caves (Curtis). A climber of Tenasserim; in the Peninsula rare in forest, Perak and the Dindings.

Piper umbellatum, *Linn.* Batu Caves; Ulu Gombak. A pantropic shrub, common in the Peninsula in forest.

CULTIVATED PIPERACEÆ.

Piper Betle, *Linn.* Batu Caves; K. Lumpur; Ulu Gombak. A climbing shrub, extensively cultivated in S. E. Asia.

Piper nigrum, *Linn.* (Black Pepper). A native of South India, not wild in the Peninsula.

CHLORANTHACEÆ.

Chloranthus officinalis, *Bl.* Batu Caves; Ulu Gombak. A small shrub of Indo-Malaya to the Philippines and New Guinea, and China; in the Peninsula common in forest from Langkawi to Singapore.

MYRISTICACEÆ.

Horsfieldia amygdalina, *Warb.* Sungai Buloh (Forest Dept.). A small tree of India, Burma and Tenasserim; in the Peninsula rare in forest, Penang Hill and Singapore.

Horsfieldia Lehmanniana, *Warb.* Public Gardens, K. Lumpur (Forest Dept.). A tree, endemic, Perak to Singapore in forest.

Horsfieldia majuscula, *Warb.* Klang Gates; Rawang. A tree of Lower Siam; in the Peninsula Penang to Singapore in forest.

Horsfieldia subglobosa, *Warb.* Public Gardens, K. Lumpur (Forest Dept.). A tree of Sumatra; in the Peninsula not common in forest, Perak, Malacca, Johore.

Horsfieldia superba, *Warb.* Ulu Gombak; Weld's Hill. A tall tree, endemic, Penang to Singapore, in forest.

Horsfieldia tomentosa, *Warb.* Weld's Hill (Forest Dept.). A small tree of Borneo; in the Peninsula not uncommon in forest from Penang to Singapore.

Horsfieldia Wallichii, *Warb.* Public Gardens, K. Lumpur; Rantau Panjang. A tree, endemic, not common in forest, Province Wellesley, Negri Sembilan, Singapore.

Gymnacranthera Farquhariana, *Warb.* Batu Tiga (Curtis). A tree, endemic, common in forest from Penang to Singapore.

Gymnacranthera Forbesii, *Warb.* Klang Gates; K. Lumpur; Ulu Gombak. A tree of Sumatra; in the Peninsula common in the lowlands from Penang to Singapore.

Myristica crassa, *King.* Sungai Buloh; Weld's Hill. A tree, endemic, Taiping to Singapore in forest.

Myristica cinnamomea, *King.* Kanching; Sungai Buloh; Ulu Gombak. A tree, endemic and common in forest.

Myristica elliptica, *Wall.* Sungai Buloh; Ulu Gombak. A tree of Sumatra and Borneo; in the Peninsula common in forest.

Myristica ?maxima, *Warb.* Weld's Hill (Forest Dept. 1802).

Knema Cantleyi, *Warb.* Klang Gates; Sungai Buloh; Weld's Hill. A tree, endemic, not common in forest, Penang, Perak, Selangor, Singapore.

Knema conferta, *Warb.* Weld's Hill (Forest Dept.). A small tree of Tenasserim, Siam and Borneo; in the Peninsula common in forest from Penang to Singapore.

Knema ?Curtisii, *Warb.* Batu Caves (Forest Dept. 6445).

Knema furfuracea, *Warb.* Weld's Hill; Klang Gates. A small tree of Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Knema Hookeriana, *Warb.* Bukit Raja; Klang Gates. A small tree of Sumatra and Borneo; in the Peninsula common in the lowlands from Langkawi to Singapore.

Knema Kunstleri, *Warb.* K. Lumpur; Ulu Gombak. A small tree, endemic, Taiping to Malacca, in forest.

Knema laurina, *Warb.* K. Lumpur; Seminyih; Ulu Gombak. A tree of W. Malaysia; in the Peninsula common in forest from Penang and Kelantan to Singapore.

Knema malayana, *Warb.* Klang Gates; K. Lumpur. A tree of Burma and Tenasserim; in the Peninsula common in forest from Penang to Singapore.

Knema missionis, *Warb.* K. Lumpur; Ulu Gombak. A tree of Burma, Tenasserim and Borneo; in the Peninsula common in forest from Setul to Singapore.

Knema oblongifolia, *Warb.* Weld's Hill (Forest Dept.). A shrub or small tree, endemic, Penang to Singapore, in forest.

Knema Wrayi, *Warb.* K. Lumpur; Ulu Gombak. A small tree, endemic, Taiping to Singapore, in forest.

CULTIVATED MYRISTICACEÆ.

Myristica fragrans, *Linn.* (The Nutmeg). Public Gardens, K. Lumpur (Forest Dept.). A tree, native of the Moluccas, cultivated occasionally in the Peninsula.

MONIMIACEÆ.

Matthaea sancta, *Bl.* Klang Gates (Ridley). A shrub or small tree of Borneo; in the Peninsula Taiping Hills to Singapore, in forest.

Kibara chartacea, *Bl.* Seminyih; Ulu Gombak. A shrub of Sumatra; in the Peninsula Penang to Malacca, in forest.

Kibara coriacea, *Tul.* K. Lumpur (Forest Dept.). A small tree of Java; in the Peninsula rare in forest, Penang and Perak.

LAURACEÆ.

Cryptocarya areolata, *Gamble.* Weld's Hill (Forest Dept.). A tree, endemic, not common in forest, Perak and Ulu Selangor.

Cryptocarya crassinervia, *Miq.* Sungai Buloh (Forest Dept., fide Ridley). A tree of Sumatra and Borneo; in the Peninsula not common in forest, Perak and the Dindings.

Cryptocarya ?ferrea, *Bl.* Seminyih (Hume 7901).

Cryptocarya Griffithiana, *Wight.* K. Lumpur; Sungai Buloh. A tall tree of Tenasserim, Sumatra and Borneo; in the Peninsula common in forest from Perak to Singapore.

Cryptocarya tenuifolia, *Ridl.* Ulu Gombak (Ridley). A tree, endemic and local.

Beilschmiedia longipedicellata, *Ridl., Kew Bull., 10, 1926, p. 475.* Seminyih (Hume 8432). A small tree, endemic and local.

Beilschmiedia Maingayi, *Hook. fil.* Ulu Gombak (Hume 9267). A tree, endemic, not common in forest, Perak, the Dindings, Malacca.

Beilschmiedia perakensis, *Gamble.* Weld's Hill (Forest Dept.). A shrub or tree, endemic, not common in forest, Perak.

Dehaasia cuneata, *Bl.* K. Lumpur; Ulu Gombak. A tree of Burma, Sumatra and Java; in the Peninsula, Adang Islands, Perak and the Dindings, in forest.

Dehaasia Curtisii, *Gamble*. Batu Caves (Kelsall). A small tree, endemic and rare, Penang.

Dehaasia elliptica, *Ridl*. Bukit Cheraka Forest Reserve (Forest Dept. 3462); Public Gardens, K. Lumpur (Forest Dept. 2456, 4760, 4884, 4914); Ulu Gombak (Hume 9306). A tree, endemic and local

Dehaasia microcarpa, *Bl*. Ulu Gombak (Forest Dept.). A small tree of Sumatra, Java and Borneo; in the Peninsula common in forest.

Dehaasia nigrescens, *Gamble*. Klang Gates (Ridley). A small tree, endemic, not common in forest, Penang and Singapore.

Èndiandra Maingayi, *Hook. fil*. Public Gardens, K. Lumpur (Forest Dept.). A tree, endemic, Perak and Malacca, in forest.

Endiandra praeclara, *Gamble*. Sungai Buloh (Forest Dept.). A tree, endemic, not common in forest, Penang and Perak.

Cinnamomum iners, *Reinw*. K. Lumpur. A small tree of Indo-Malaya to the Philippines; in the Peninsula common in open places.

Cinnamomum mollissimum, *Ridl*. Weld's Hill (Forest Dept.). A shrub or small tree, endemic, Penang to Negri Sembilan, in forest.

Cinnamomum paraneuron, *Miq*. Weld's Hill (Forest Dept.). A tree of Sumatra; in the Peninsula apparently not uncommon.

Alseodaphne peduncularis, *Hook. fil*. K. Lumpur; Petaling; Rantau Panjang; Sungai Buloh. A shrub or small tree, endemic, common in forest.

Alseodaphne Ridleyi, *Gamble*. Weld's Hill (Forest Dept.). A tree, endemic and rare in forest, Semangkok Pass.

Nothaphoebe umbelliflora, *Bl*. Sungai Buloh; Weld's Hill. A tree of Siam to Borneo; in the Peninsula common in forest from Penang to Singapore.

Phœbe cuneata, *Bl*. Weld's Hill (Forest Dept.). A tree of Java; in the Peninsula Penang to Singapore, in forest.

Phœbe macrophylla, *Bl*. Ampang; Ulu Gombak. A small tree of Java; in the Peninsula not common in forest, Perak, the Dindings and Singapore.

Phœbe opaca, *Bl*. Kepong; Sungai Buloh; Weld's Hill. A tree of W. Malaysia; in the Peninsula not uncommon in forest from Penang to Singapore.

Actinodaphne Maingayi, *Hook. fil.*, var. *elliptica*, *Gamble* Damansara Road, K. Lumpur (Ridley). A tree of ?Borneo; in the Peninsula Perak to Singapore in forest.

Actinodaphne sesquipedalis, *Hook. fil.* Weld's Hill (Forest Dept.). A tree of Tenasserim, Lower Siam and Borneo; in the Peninsula Penang, Perak and Pahang, in forest.

Litsea amara, *Bl.* Kepong; Klang Gates (var. *fusco-tomentosa*, *Meissn.*); Petaling; Seminyih; Sungai Buloh (var. *angusta*, *Meissn.*); Ulu Gombak; Weld's Hill (var. *attenuata*, *Gamble*, and var. *angusta*, *Meissn.*). A shrub or small tree of Indo-Malaya; in the Peninsula common in forest and open country from Langkawi to Singapore.

Litsea angulata, *Bl.* Batu Caves (Ridley). A tree of Java; in the Peninsula rare in forest, Taiping Hills.

Litsea castanea, *Hook. fil.* K. Lumpur; Rantau Panjang. A tall tree, endemic, Taiping to Malacca, in forest.

Litsea citrata, *Bl.* Ulu Gombak (Hume). A small tree of Indo-Malaya and China; in the Peninsula in clearings in hill forest, Perak, Pahang and Selangor.

Litsea firma, *Hook. fil.* K. Lumpur; Sungai Buloh. A tree of Sumatra, Borneo and Celebes; in the Peninsula common in forest from Taiping to Singapore.

Litsea grandis, *Hook. fil.* K. Lumpur (Forest Dept.). A tree of Burma and Java; in the Peninsula common in open country.

Litsea Griffithii, *Gamble*. Batang Berjuntai; Weld's Hill. A tree of Sumatra; in the Peninsula common in forest from Taiping to Singapore.

Litsea johorensis, *Gamble*. Seminyih (Hume). A tree, endemic, not common in forest, Pahang, Negri Sembilan, Johore.

Litsea lancifolia, *Hook. fil.* K. Lumpur (Curtis). A bush or small tree of Indo-Malaya and China; in the Peninsula Perak to Singapore, in forest.

Litsea machilifolia, *Gamble*. Batang Berjuntai; Rantau Panjang. A tree, endemic in lowland forest from Penang to Singapore.

Litsea magnifica, *Gamble*. Weld's Hill (Forest Dept.). A small tree of Sumatra; in the Peninsula not very common in forest, Penang, Pahang, Malacca.

Litsea megacarpa, *Gamble*. Dusun Tua; Klang Gates; Rantau Panjang. A tree, endemic, Province Wellesley to Singapore, in forest.

Litsea monticola, *Gamble*. Sungai Buloh (Forest Dept. 1585). A tree, endemic and rare in forest, Taiping Hills.

Litsea nidularis, *Gamble*. Weld's Hill (Forest Dept.). A tall tree, endemic, not common in forest, Penang, Perak, Pahang.

Litsea Noronhae, *Bl.* Batu Caves (Ridley). A shrub or tree of Sumatra and Java; in the Peninsula not common in forest, Taiping to Selangor.

Litsea panamonja, *Hook. fil.* Public Gardens, K. Lumpur (Forest Dept.). A tree of Assam, Burma and Lower Siam; in the Peninsula rare, Perak, Selangor and Malacca.

Litsea penangiana, *Hook. fil.* Weld's Hill (Forest Dept.). A small tree, endemic, usually in hill forest, Penang Hill, Gunong Batu Puteh, Fraser Hill.

Litsea perakensis, *Gamble*. Sungai Buloh; Weld's Hill. A tree, endemic, Perak, Johore, Singapore, in forest.

Litsea petiolata, *Hook. fil.* Weld's Hill (Forest Dept.). A tall tree, endemic in the lowlands from Perak to Singapore.

Litsea robusta, *Bl.* Batu Caves; Sungai Buloh. A tall tree of Burma and Java; in the Peninsula not common in forest, Perak and Singapore.

Litsea spathacea, *Gamble*. K. Lumpur; Seminyih; Ulu Gombak. A shrub or small tree, endemic, Penang to Negri Sembilan, in forest.

Litsea tomentosa, *Bl.* Weld's Hill (Forest Dept.). A tree of Java; in the Peninsula not common in forest, Penang, Perak and N. Johore.

Litsea ujongensis, *Gamble*. Seminyih (Hume). A shrub or small tree, endemic, not common in forest, Perak, Negri Sembilan, Mt. Ophir.

Neolitsea zeylanica, *Merr.* Weld's Hill (Forest Dept.). A shrub or small tree of Indo-Australia; in the Peninsula common in open country.

Lindera malaccensis, *Hook. fil.* K. Lumpur (Ridley). A tree of Sumatra and Borneo; in the Peninsula common in the lowlands from Perak to Singapore.

Lindera pipericarpa, *Boerl.* Ulu Gombak (Hume 9192, 9718). A tree, endemic, not common in montane forest, Perak and Pahang.

CULTIVATED LAURACEÆ.

Cinnamomum zeylanicum, *Nees*. (Cinnamon). Public Gardens, K. Lumpur (Forest Dept.). A small tree of India and Ceylon; in the Peninsula cultivated only.

Persea gratissima, *Gaertn.* (Avocado Pear). K. Lumpur, (Agri. Dept.). A tree of Trop America; in the Peninsula occasionally cultivated.

HERNANDIACEÆ.

Illigera appendiculata, *Bl.* Batu Caves (Ridley). A climbing shrub of India, Burma and Java; in the Peninsula common in forest.

Hernandia peltata, *Meissn.* Public Gardens, K. Lumpur (Forest Dept.), probably planted here. A tall tree of E. Africa to Polynesia; in the Peninsula not very common, usually on seashores.

PROTEACEÆ.

Helicia attenuata, *Bl.* Dusun Tua; Klang Gates; K. Lumpur; Ulu Gombak. A shrub or tree of Java; in the Peninsula common in forest from Penang to Johore.

Helicia petiolaris, *Benn.* K. Lumpur (Goodenough). A tree, endemic, Penang (cult.) to Singapore, in forest.

Helicia robusta, *Wall.* K. Lumpur (Ridley). A tree of India, Burma, Sumatra and Java; in the Peninsula common in forest in the south.

THYMELACEÆ.

Wikstroemia viridiflora, *Meissn.* Batu Caves (Ridley). A small shrub of India, Burma China and the Philippines; in the Peninsula not common, Langkawi and Penang.

Aquilaria malaccensis, *Lamk.* Weld's Hill (Forest Dept.). A tall tree of W. Malaysia to the Philippines; in the Peninsula common in forest from Penang to Singapore.

LORANTHACEÆ.

Loranthus ferrugineus, *Roxb.* K. Lumpur; Ulu Gombak. A parasitic bush of W. Malaysia to the Philippines; in the Peninsula very common.

Loranthus grandifrons, *King.* K. Lumpur (Ridley). A parasitic shrub of Lower Siam and Sumatra; in the Peninsula common in open places from Taiping to Malacca and in Pahang.

Loranthus heteranthus, *Wall.* K. Lumpur. A big parasitic shrub of Indo-Malaya; in the Peninsula Kedah to N. Johore in forest.

Loranthus pentandrus, *Linn.* Ulu Gombak (Hume). A large parasitic shrub of India to S. China, and W. Malaysia to the Philippines; in the Peninsula common.

Loxanthera speciosa, *Bl. & Fisch.* Rantau Panjang (Hume). A parasitic shrub of W. Malaysia; in the Peninsula not common, Perak, Malacca, Johore.

Elytranthe Barnesii, *Gamble.* K. Lumpur, parasitic on *Durio zibethinus*, (Sands 32). A parasitic shrub, endemic and very rare, hitherto known only from Gunong Benom (Pahang).

Elytranthe globosa, *Don.* K. Lumpur (Forest Dept.). A parasitic shrub of Indo-Malaya to the Philippines; in the Peninsula common from Perlis to Singapore.

Elytranthe platyphylla, *Gamble.* Ulu Gombak (Hume). A large parasitic bush, endemic, not common, Upper Perak to N. Johore.

SANTALACEÆ.

Henslowia umbellata, *Bi.* Ulu Gombak (Hume). A climbing parasitic shrub of W. Malaysia; in the Peninsula common, often near the sea.

OPILIACEÆ.

Champereia Griffithii, *Hook. fil.* Klang Gates; Sungai Buloh; Weld's Hill. A shrub of Indo-Malaya to Formosa; in the Peninsula common in forest and open country from Langkawi to Singapore.

Lepionurus sylvestris, *Bl.* Klang Gates; Seminyih; Ulu Gombak; Weld's Hill. A small shrub of Siam, Java and Borneo; in the Peninsula common in forest from Langkawi to Singapore.

BALANOPHORACEÆ.

Balanophora multibrachiata, *Fawcett.* Ulu Gombak (Hume). A parasite of Sumatra; in the Peninsula Perak, Negri Sembilan, N. Johore, in forest.

EUPHORBIACEÆ.

Euphorbia hirta, *Linn.* K. Lumpur; Rantau Panjang; Salak; Seminyih; Ulu Gombak. A pantropic herb; in the Peninsula common in waste ground.

Euphorbia synadenium, *Ridl.* Seminyih (Hume). A shrub, endemic, not common, Penang, Upper Perak, Selangor, Malacca.

Bridelia pustulata, *Hook. fil.* K. Lumpur (Ridley). A tree, endemic, Penang to Singapore in forest.

Bridelia tomentosa, *Bl.* Batu Caves; Klang Gates; K. Lumpur. A small tree of Indo-Australia; in the Peninsula common in open places and secondary growth from Langkawi to Singapore.

Cleistanthus hirsutululus, *Hook. fil.* Batu Caves (Burkill). A small tree of Lower Siam; in the Peninsula Perak to Singapore in forest.

Cleistanthus membranaceus, *Hook. fil.* Batu Caves (Forest Dept.). A tree, endemic, not common in forest, Penang and Taiping.

Actephila excelsa, *Muell. Arg.* Batu Caves (Ridley, Curtis). A small shrub of India, Assam, Burma, Tenasserim, Java; in the Peninsula often near limestone, Penang, Perak, Singapore.

Actephila javanica, *Miq.* Batu Caves (Ridley). A small shrub of Tenasserim, Lower Siam, Java and Borneo; in the Peninsula widespread in forest, commonest in the north.

Andrachne calcarea, *Ridl.* Batu Caves (Ridley). A small shrublet of Siam; in the Peninsula rare on limestone, Langkawi.

Phyllanthus dalbergioides, *Wall.* Batu Caves; Ulu Gombak. A small shrub of Burma; in the Peninsula not common in forest, Langkawi, Perak.

Phyllanthus erythrocarpus, *Ridl.* Batu Caves (Ridley). A tree, endemic and local.

Phyllanthus frondosus, *Wall.* Batu Caves; K. Lumpur; Rantau Panjang; Ulu Gombak. A shrub of Siam, Lingga and the Carimon Is.; in the Peninsula common in forest from Kedah to Johore.

Phyllanthus gomphocarpus, *Hook. fil.* Petaling; Sungai Buloh. A shrub of Siam; in the Peninsula Langkawi to Mt. Ophir in forest.

Phyllanthus Niruri, *Linn.* Batang Berjuntai; Seminyih; Ulu Gombak. A pantropic herb; in the Peninsula common in waste ground.

Phyllanthus pulcher, *Wall.* Klang Gates; Ulu Gombak. A small shrub of Siam and Java; in the Peninsula on riverbanks and escaping from cultivation.

Phyllanthus urinaria, *Linn.* Dusun Tua; K. Lumpur; Seminyih; Ulu Gombak. A pantropic herb; in the Peninsula a common weed.

Glochidion desmocarpum, *Hook. fil.* K. Lumpur (Ridley). A small tree, endemic, Penang to Singapore.

Glochidion glomerulatum, *Boerl.* K. Lumpur; Rawang. A tree of Sumatra and Java; in the Peninsula rare in forest, Penang, Perak and Malacca.

Glochidion Kunstlerianum, *Gage.* K. Lumpur (Curtis). A shrub, endemic, not common in forest, Perak, Johore, Singapore.

Glochidion lævigatum, *Hook. fil.* K. Lumpur; Sungai Buloh (var. *cuspidatum*, *Ridl.*); A tree of Tenasserim; in the Peninsula the species common in open country, the var. at Taiping and Klang.

Glochidion leiostylum, *Kurz.* K. Lumpur; Ulu Gombak. A tree of Burma, Siam and Borneo; in the Peninsula Langkawi to Singapore, in open places.

Glochidion microbotrys, *Hook. fl.* Weld's Hill (Forest Dept.). A tree of Lower Siam; in the Peninsula not common, Taiping and Singapore.

Glochidion nanogynum, *Hook. fl.* Batu Caves; (Ridley). A shrub or tree, endemic, Penang, Perak, Malacca.

Glochidion obscurum, *Bl.* Ampang; K. Lumpur. A shrub or tree of Siam, Sumatra, Java and China; in the Peninsula common in the north.

Glochidion rubrum, *Bl.* K. Lumpur (Forest Dept.). A shrub of Lower Siam, Java and the Philippines; in the Peninsula Langkawi, Province Wellesley, Pahang, Johore.

Glochidion sericeum, *Hook. fl.* Ayer Hitam; Batu Caves; K. Lumpur; Petaling; Sungai Buloh; Ulu Gombak. A small tree of W. Malaysia; in the Peninsula common south of Taiping in open places and secondary growth.

Glochidion superbum, *Baill.* Klang Gates; K. Lumpur; Sungai Buloh. A small tree of W. Malaysia to the Philippines; in the Peninsula common in secondary growth.

Glochidion tetrapteron, *Gage.* Ulu Gombak (Hume). A shrub or tree, endemic and rare in forest, Semangkok Pass.

Glochidion trilobum, *Ridl.* Seminyih (Hume). A tree, endemic, not common in forest, Perak, Negri Sembilan, Singapore.

Glochidion Wallichianum, *Muell. Arg.* Ampang; K. Lumpur, Public Gardens and Weld's Hill (Forest Dept.). A tree, endemic, not common in forest, Penang, Pahang and Malacca.

Breynia angustifolia, *Hook. fl.* Ulu Gombak (Hume). A shrub of Siam; in the Peninsula Taiping to Selangor in forest.

Breynia coronata, *Hook. fl.* Rantau Panjang; Ulu Gombak. A small tree, endemic, common in forest from Langkawi to Johore.

Breynia discigera, *Muell. Arg.* Klang Gates; Ulu Gombak. A shrub or small tree of Siam; in the Peninsula not uncommon in forest and secondary growth from Penang to Taiping.

Breynia reclinata, *Hook. fl.* Ampang (Forest Dept.). A shrub of Sumatra and Java; in the Peninsula common in secondary growth and open places.

Breynia rhamnoides, *Muell. Arg.* Rantau Panjang; Ulu Gombak. A small tree of Indo-Malaya to the Philippines; and China; in the Peninsula Penang and Upper Perak to Singapore in open places and secondary growth.

Sauropus albicans, *Bl.* Petaling; Ulu Gombak. A shrub of Indo-Malaya to the Philippines; in the Peninsula in waste ground and gardens.

Sauropus elegantissimus, *Ridl.*, *Kew Bull*, 10, 1926, p. 476. Ulu Gombak (Hume 9366). A small tree, endemic and local.

Sauropus spectabilis, *Miq.* Batu Caves (Ridley, Burkill). A shrub of Assam and Sumatra; in the Peninsula rare, known only from this locality.

Sauropus sumatranus, *Miq.* Klang Gates (Ridley). A shrub of Sumatra; in the Peninsula rare, known only from this locality.

Drypetes longifolia, *Pax.* Weld's Hill (Forest Dept.). A tree of Indo-Malaya to the Philippines; in the Peninsula not common in forest, Malacca.

Drypetes pendula, *Ridl.* Public Gardens, K. Lumpur (Forest Dept.). A tree, endemic, Penang, Taiping, Singapore, in forest.

Longetia malayana, *Pax.* Klang Gates (all collectors). A tree of Borneo; in the Peninsula Kedah to Singapore in dry open places.

Antidesma alatum, *Hook. fil.* Ulu Gombak (Hume). A small tree of Lower Siam; in the Peninsula common in forest from Taiping to Singapore.

Antidesma coriaceum, *Tulasne.* Batu Caves; Ulu Gombak. A small tree of Lower Siam and Borneo; in the Peninsula common in forest from Penang to Singapore.

Antidesma cuspidatum, *Muell. Arg.* Batang Berjuntai; K. Lumpur; Sungai Buloh; Ulu Gombak. A tree of Borneo; in the Peninsula common in forest from Perlis to Singapore.

Antidesma fusiforme, *Gage.* Batu Caves; K. Lumpur. A ?shrub, endemic, Penang, ?Perak, Dindings, Johore.

Antidesma Ghæsembilla, *Gaertn.* Batang Berjuntai (Hume). A bush or small tree of Indo-Australia and China; in the Peninsula Setul to Malacca in open country.

Antidesma montanum, *Bl.* Batang Berjuntai; Sungai Buloh; Ulu Gombak. A small tree of Indo-Malaya; in the Peninsula common in lowland forest.

Antidesma salicinum, *Ridl.* Klang Gates (Forest Dept.). A shrub of Borneo; in the Peninsula on riverbanks from Upper Perak and Kelantan to Johore.

Antidesma stipulare, *Bl.* Ulu Gombak (Hume, Ridley). A shrub or small tree of Java, Borneo and Amboina; in the Peninsula not common in forest, Perak and Johore.

Antidesma tomentosum, *Bl.* Seminyih (Hume 8192). A shrub or small tree of W. Malaysia; in the Peninsula Upper Perak to Johore in forest.

Antidesma velutinosum, *Bl.* Batu Caves; K. Lumpur. A small tree of Burma Siam, Sumatra and Java; in the Peninsula very common in forest from Langkawi to Singapore.

Daphniphyllum bancanum, *Kurz.* K. Lumpur (Ridley). A tree of Bangka; in the Peninsula not common in open places, Setul, Perak, Pahang, Negri Sembilan.

Daphniphyllum laurinum, *Baill.* K. Lumpur; Sungai Buloh. A shrub of Siam and W. Malaysia; in the Peninsula common in open places and on the seashore from Setul to Singapore.

Aporosa aurea, *Hook. fil.* Weld's Hill (Forest Dept.). A bush or tree of Burma and Tenasserim; in the Peninsula common in forest from Langkawi to Johore.

Aporosa Benthamiana, *Hook. fil.* Klang Gates; Weld's Hill. A tree, endemic, Penang to Singapore, in forest.

Aporosa frutescens, *Bl.* Kuang (Ridley). A shrub or small tree of Sumatra and Java; in the Peninsula common in forest from Langkawi to Singapore.

Aporosa Maingayi, *Hook. fil.* K. Lumpur; Petaling; Sungai Buloh. A small tree, endemic, Kedah to Singapore, in forest.

Aporosa Miqueliana, *Muell. Arg.* Weld's Hill (Forest Dept.). A shrub or small tree of Lower Siam, Sumatra and Borneo; in the Peninsula Taiping to Johore in forest.

Aporosa ?nervosa, *Hook. fil.* Weld's Hill (Forest Dept. 828).

Aporosa Prainiana, *King.* Ayer Hitam; Bukit Tunggal; K. Lumpur. A small tree, endemic and common from Penang to Singapore.

Aporosa stellifera, *Hook. fil.* K. Lumpur; Sungai Buloh; Ulu Gombak. A small tree, endemic, Penang and Upper Perak to S. Pahang, in forest.

Aporosa symplocoides, *Gage.* Sungai Buloh; Weld's Hill. A tree, endemic, Penang to Singapore, in forest.

Baccaurea brevipes, *Hook. fil.* Dusun Tua; Klang Gates; Sungai Buloh; Ulu Gombak; Weld's Hill. A small tree of Borneo; in the Peninsula common from Kedah to Malacca in forest.

Baccaurea Griffithii, *Hook. fil.* Weld's Hill (Forest Dept.). A tree, endemic and common in forest from Penang to Singapore.

Baccaurea Kingii, *Gage.* Kanching; Sungai Buloh. A tree, endemic, Penang to Singapore, in forest.

Baccaurea Kunstleri, *Gage.* Weld's Hill (Forest Dept.). A tree, endemic, not common in forest, Perak and Singapore.

Baccaurea lanceolata, *Muell. Arg.* Batu Caves; Sungai Buloh. A tree of W. Malaysia to the Philippines; in the Peninsula Penang and Upper Perak to Singapore, in forest.

Baccaurea malayana, *King.* Sungai Buloh; Weld's Hill. A tree, endemic, Perak, Pahang, Malacca, in forest, and cultivated.

Baccaurea parviflora, *Muell. Arg.* K. Lumpur (Curtis). A small tree of Burma, Siam, Sumatra and Borneo; in the Peninsula common from Kedah to Singapore in forest.

Baccaurea ?polyneura, *Hook. fil.* Weld's Hill (Forest Dept., tree 362).

Baccaurea Wallichii, *Hook. fil.* Batu Tiga (Ridley). A tree of Borneo; in the Peninsula common from Penang to Singapore in forest.

Baccaurea Wrayi, *King.* Ulu Gombak (Hume). A tree, endemic, not common, Adang Islands, Penang, Perak, Pahang, in forest.

Elateriospermum Tapos, *Bl.* Batu Caves; Weld's Hill. A tall tree of W. Malaysia; in the Peninsula Penang to Malacca in forest.

Galearia affinis, *Br.* Batu Caves; Dusun Tua; Rantau Panjang; Sungai Buloh; Weld's Hill. A small tree of ?Siam; in the Peninsula common in forest.

Galearia fusca, *Ridl.* Seminyih (Hume). A shrub, endemic, not common, Negri Sembilan and Johore.

Galearia lancifolia, *Ridl., Kew Bull., 10, 1926, p. 476.* Klang Gates (Hume 7146); Ulu Gombak (Hume 9931). A small tree, endemic and local in forest.

Galearia minor, *Gage.* Seminyih (Hume). A small tree of Sumatra; in the Peninsula not common in forest, Perak, Pahang, Negri Sembilan.

Galearia Ridleyi, *Gage.* Dusun Tua (Ridley). A shrub, endemic, not common, Johore.

Microdesmis casearifolia, *Planch.* Kepong; Klang Gates; K. Lumpur. A small tree of Indo-Malaya to the Philippines; in the Peninsula common in forest from Perlis to Singapore.

Croton calcicolum, *Ridl.* Kanching, on limestone (Ridley). A shrub of Borneo; in the Peninsula known only from this locality.

Croton caudatum, *Geisel* var. *malaccanum*, *Hook. fil.* K. Lumpur (Ridley, Forest Dept.). A shrub, the species of Indo-Malaya to the Philippines, the var. from Tenasserim; in the Peninsula common, especially in open country.

Croton erythrostachys, *Hook. fil.* Kanching; Rawang. A shrub, endemic, usually montane, Perak, Klang, Negri Sembilan, Mt. Ophir, Johore.

Croton Griffithii, *Hook. fil.* Batu Caves; Klang Gates; K. Lumpur; Rawang; Seminyih; Sungai Buloh; Ulu Gombak. A shrub or tree, endemic and common in forest from Penang to Singapore.

Trigonostemon salicifolius, *Ridl.* Kanching, on limestone; Ulu Gombak. A small shrub, endemic and local.

Trigonostemon villosus, *Hook. fil.* K. Lumpur; Sungai Buloh; Ulu Gombak. A small shrub, endemic, not common in forest, Perak, Mt. Ophir, Johore.

Agrostistachys Gaudichaudii, *Muell. Arg.* Batu Caves (Ridley). A tree, endemic and common in forest from Langkawi to Singapore.

Claoxylon indicum, *Hassk.* Batu Caves; Ulu Gombak. A shrub of Indo-Malaya; in the Peninsula common in forest from Perlis to Singapore.

Claoxylon longifolium, *Muell. Arg.* Seminyih (Hume). A shrub or small tree of Sumatra and Java; in the Peninsula common in forest from Langkawi to Singapore.

Epiprinus malayanus, *Griff.* Dusun Tua; Klang Gates; Sungai Besi; Weld's Hill. A shrub of Sumatra; in the Peninsula Kedah to Malacca, in forest.

Cœlodiscus subcuneatus, *Gage.* Dusun Tua (Ridley). A small tree, endemic, not common in forest, Langkawi, Kedah, Perak.

Melanolepis multiglandulosa, *Rchb.* K. Lumpur (Ridley). A small tree of Malaysia and Indo-China; in the Peninsula not common in forest, Kelantan, Perak, Pahang.

Mallotus cochinchinensis, *Lour.* Batang Berjuntai; K. Lumpur; Petaling; Rantau Panjang; Rawang; Serdang; Ulu Gombak. A small tree of Indo-Malaya and China; in the Peninsula common in forest and secondary growth from Penang to Singapore.

Mallotus dispar, *Muell. Arg.* Batu Caves, common here (Ridley). A shrub or small tree of W. Malaysia; in the Peninsula usually on limestone, Kedah, Perak, Pahang, Pulau Tioman.

Mallotus Griffithianus, *Hook. fil.* K. Lumpur; Rantau Panjang; Sungai Buloh. A shrub, endemic, Langkawi, Perak, Pahang, Dindings, Malacca, in forest.

Mallotus Kingii, *Hook. fil.* Batu Caves; K. Lumpur. A tree, endemic and rare in forest, Perak.

Mallotus macrostachyus, *Muell. Arg.* Klang Gates; K. Lumpur; Seminyih; Sungai Buloh; Ulu Gombak. A shrub or small tree of Siam to Borneo; in the Peninsula common in open places and secondary growth from Langkawi and Kelantan to Singapore.

Mallotus Porterianus, *Muell. Arg.* Batu Caves; K. Lumpur. A small tree of ?Siam and Sumatra; in the Peninsula common in forest and secondary growth from Penang to Johore.

Mallotus repandus, *Muell. Arg.* Batu Caves (Ridley). A climbing shrub of Indo-Australia; in the Peninsula Perlis to Negri Sembilan in forest.

Mallotus subpeltatus, *Muell. Arg.* Batu Caves; K. Lumpur; Sungai Buloh. A small tree of Sumatra and Java; in the Peninsula Langkawi to Malacca and N. Johore, in forest.

Ptychopyxis costata, *Miq.* Weld's Hill (Forest Dept.). A small tree of Sumatra; in the Peninsula not very common in forest, Taiping Hills, Malacca, Singapore.

Macaranga denticulata, *Muell. Arg.* Rawang (Ridley). A tree of Indo-Malaya; in the Peninsula Perlis to the Pahang river in open forest.

Macaranga Griffithiana, *Muell. Arg.* Ampang (Forest Dept.). A small tree, endemic, not common, Penang to Singapore.

Macaranga Hosei, *King.* Ulu Gombak (Hume). A tree of Borneo; in the Peninsula not very common in forest, Trengganu, Perak, Malacca.

Macaranga Hullettii, *King.* Bukit Raja; Batu Tiga; Klang Gates; K. Lumpur; Rawang; Ulu Gombak. A small tree, endemic, Taiping to Malacca, in open places.

Macaranga hypoleuca, *Muell. Arg.* Klang Gates; K. Lumpur; Sungai Buloh; Ulu Gombak. A tree of Sumatra and Borneo; in the Peninsula common in secondary growth.

Macaranga incisa, *Gage.* K. Lumpur (Ridley). A tree, endemic and local.

Macaranga Kingii, *Hook. fil.* K. Lumpur (Forest Dept.). A small tree, endemic and rare, Johore.

Macaranga megalophylla, *Muell. Arg.* Klang Gates; Sungai Buloh; Weld's Hill. A tree of Sumatra and Borneo; in the Peninsula common from Penang to Johore in open swampy places.

Macaranga populifolia, *Muell. Arg.* K. Lumpur (Forest Dept.). A tree of Tenasserim; Sumatra and Borneo; in the Peninsula Penang to Singapore, in secondary growth.

Macaranga quadricornis, *Ridl.* Seminyih (Hume). A small tree, endemic and rare, Semangkok Pass and Klang.

Macaranga robiginosa, *Ridl.* K. Lumpur; Ulu Gombak, and doubtless in other localities. A small tree, endemic and common from Penang to Singapore, especially in secondary growth.

Macaranga tanaria, *Muell. Arg.* Batu Caves; Ulu Gombak. A small tree of Tenasserim to Australia, and China; in the Peninsula common north of Malacca, in open places.

Macaranga triloba, *Muell. Arg.* Bukit Raja; Ulu Gombak; Weld's Hill. A tree of Tenasserim to the Philippines; in the Peninsula common in secondary growth and open places.

Endospermum malaccense, *Muell. Arg.* Bukit Raja; K. Lumpur. A tall tree, endemic, Penang to Singapore common in forest.

Pimeleodendron Griffithianum, *Benth.* Klang Gates; K. Lumpur; Petaling. A tree, endemic, not common in forest, Penang to Singapore.

Homalanthus populifolius, *Grah.* Batu Caves (Ridley). A small tree of W. Malaysia and Australia; in the Peninsula common in the north and near limestone.

Sapium baccatum, *Roxb.* K. Lumpur; Petaling; Rantau Panjang. A tree of India and Sumatra; in the Peninsula Penang to Johore, in forest.

Sapium discolor, *Muell. Arg.* K. Lumpur (Ridley). A tree of Borneo and China; in the Peninsula not common in forest and secondary growth, Perak, Malacca and Singapore.

CULTIVATED EUPHORBIACEÆ.

Acalypha macrophylla, *H. B. K.* Common in gardens. A shrub of Polynesia, often cultivated in the Peninsula.

Aleurites moluccana, *Willd.* (Candle-nut). Ampang; Pudu, probably planted. A tree of Indo-Malaya and the Pacific Islands; in the Peninsula on seacoasts and often planted.

Baccaurea Motleyana, *Muell. Arg.* Public Gardens, K. Lumpur (Forest Dept.). A tree of Sumatra and Borneo; in the Peninsula cultivated and apparently wild on the Bertam river, Pahang.

Blumeodendron tokbrai, *J. J. Sm.* Public Gardens, K. Lumpur (Forest Dept.). A native of Sumatra, Java and Borneo.

Cicca disticha, *Linn.* K. Lumpur (Agri. Dept.). A small tree of Asia; in the Peninsula cultivated only.

Codiaeum variegatum, *Bl.* ("Croton"). Common in gardens in many varieties. A shrub, native of the Moluccas; in the Peninsula extensively cultivated as an ornamental shrub.

Croton tiglium, *Linn.* Rawang, cultivated, fide Foxworthy. A bush or small tree of Indo-Malaya and China; in the Peninsula in cultivated ground.

Euphorbia pulcherrima, *Willd.* *Poinsettia pulcherrima*, Grah. Common in gardens. A shrub of Trop. America; in the Peninsula often cultivated as an ornamental shrub.

Excoecaria bicolor, *Hassk.* Common in gardens. A shrub, origin doubtful; in the Peninsula often cultivated.

Hevea brasiliensis, *Muell. Arg.* (Rubber). A native of S. America.

Jatropha curcas, *Linn.* (The Purging nut). Serdang Experimental Plantation. A pantropic shrub, often cultivated in the Peninsula.

Manihot Glaziovii, *Muell. Arg.* (Ceara Rubber). A native of Brazil, occasionally cultivated in the Peninsula.

Manihot utilissima, *Pohl.* (Tapioca). A tall herb of South American origin, cultivated in all tropics.

Ricinus communis, *Linn.* (The Castor oil Plant). Cultivated, fide Foxworthy; Ulu Gombak, doubtless an escape, (Hume). Cultivated in all tropics, origin perhaps African.

URTICACEÆ.

Trema amboinensis, *Bl.* Batang Berjuntai; K. Lumpur; Seminyih; Ulu Gombak. A shrub or small tree of Indo-Australia in the Peninsula very common in waste ground and secondary growth.

Trema angustifolia, *Bl.* Klang Gates; K. Lumpur. A shrub of Borneo; in the Peninsula common in waste ground.

Trema virgata, *Bl.* Sungai Buloh (Ridley). A shrub of Tenasserim, Java, Borneo and China; in the Peninsula in waste ground but not common, Penang, Kelantan, Perak and Singapore.

Gironniera nervosa, *Planch.* K. Lumpur. A tree of Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Gironniera parvifolia, *Planch.* Weld's Hill (Forest Dept.). A tree of the Carimon Islands; in the Peninsula common in forest from Penang to Singapore.

Gironniera subæqualis, *Planch.* Weld's Hill (Forest Dept.). A tall tree of Indo-Malaya to the Philippines, and S. China; in the Peninsula common in forest from Penang to Singapore.

Slætia sideroxylon, *Teys. and Binn.* Rantau Panjang; Weld's Hill. A tall tree of W. Malaysia; in the Peninsula not uncommon in forest from Penang and Pahang to Singapore.

Ficus acamptophylla, *Miq.* Public Gardens, K. Lumpur (Forest Dept.). An epiphytic climber or a tree of Bangka and Borneo; in the Peninsula not common in forest, Perak, Dindings, Singapore.

Ficus alba, *Reinw.* K. Lumpur; Ulu Gombak. A shrub or small tree of W. Malaysia; in the Peninsula very common in secondary growth and waste ground.

Ficus annulata, *Bl.* K. Lumpur. An epiphytic shrub or tree of Indo-Malaya; in the Peninsula common.

Ficus apiocarpa, *Miq.* K. Lumpur (Forest Dept.). A large climbing shrub of W. Malaysia to the Philippines; in the Peninsula common in forest.

Ficus bracteata, *Wall.* K. Lumpur (Curtis). A large shrub or small tree of Java and Borneo; in the Peninsula not very common, Taiping, Malacca and Singapore.

Ficus chartacea, *Wall.* Bukit Raja; Klang Gates; K. Lumpur; Ulu Gombak. A shrub of Burma; in the Peninsula common in forest from Langkawi to Singapore.

Ficus chrysocarpa, *Reinw.* Rantau Panjang; Ulu Gombak; Weld's Hill. A shrub of Burma to Borneo; in the Peninsula common from Taiping to Singapore.

Ficus consociata, *Bl.* K. Lumpur (Ridley). An epiphytic shrub of W. Malaysia; in the Peninsula Penang to Singapore.

Ficus cunia, *Ham.* Ulu Gombak (Hume). A shrub or small tree of India to Tenasserim; in the Peninsula common in forest from Perak and Kelantan to Johore.

Ficus diversifolia, *Bl.* Klang Gates (var. *ovoidea* and var. *Kunstleri*); K. Lumpur (var. *ovoidea* and var. *Kunstleri*); Ulu Gombak. A terrestrial or epiphytic shrub of W. Malaysia; in the Peninsula on seashores, in secondary growth, forests and open places, common and very variable.

Ficus fistulosa, *Reinw.* Weld's Hill (Forest Dept.). A tree of Indo-Malaya and China; in the Peninsula Kedah to Selangor and Pahang in forest.

Ficus fulva, *Reinw.* Ampang; Klang Gates; Ulu Gombak. A small tree of Indo-Malaya; in the Peninsula not common in forest, Taiping and Fraser Hill.

Ficus gibbosa, *Bl.* K. Lumpur (Forest Dept.). An epiphytic shrub, then a tree, of Indo-Malaya and S. China; in the Peninsula not common, Penang, Perak, Pulau Tioman, Negri Sembilan and Malacca.

Ficus glabella, *Bl.* Public Gardens, K. Lumpur (Forest Dept.). A tree of Indo-Malaya; in the Peninsula common.

Ficus glandulifera, *Wall.* Weld's Hill (Forest Dept.). A shrub or small tree of W. Malaysia; in the Peninsula not uncommon in forest from Penang to Singapore.

Ficus globosa, *Bl.* K. Lumpur; Ulu Gombak. A climbing shrub of Indo-Malaya; in the Peninsula common in secondary growth,

Ficus heterophylla, *Linn.* K. Lumpur (Ridley). A creeping shrub, eventually a small tree, of Indo-Malaya; in the Peninsula on riverbanks in Perak and Pahang.

Ficus hispida, *Linn. fil.* Batu Caves; Weld's Hill. A shrub or small tree of Indo-Australia; in the Peninsula common in forest from Kedah to Johore.

Ficus indica, *Linn.* Batu Caves; Klang Gates; Weld's Hill. A tree of Indo-Malaya to the Philippines; in the Peninsula common in forest from Penang and Kelantan to Singapore.

Ficus lævis, *Bl.* Batu Caves (Ridley). An epiphytic shrub or small tree of Indo-Malaya; in the Peninsula Penang to Singapore in forest.

Ficus lepicarpa, *Bl.* Ulu Gombak (Hume, Ridley). A small tree of W. Malaysia; in the Peninsula Penang to N. Johore in forest and on riverbanks.

Ficus microstoma, *Wall.* K. Lumpur (Ridley). A tree of Java; in the Peninsula Taiping, Malacca, Johore, Singapore, in forest.

Ficus Miquelii, *Hook. fil.* Batu Caves; Weld's Hill. A tree of Tenasserim and W. Malaysia; in the Peninsula common in the lowlands in forest.

Ficus obpyramidata, *Hook. fil.* Dusun Tua (Ridley). A small tree, endemic and rare, Taiping.

Ficus obscura, *Bl.* Ulu Gombak (Forest Dept.). A shrub or small tree of Indo-Malaya; in the Peninsula common in forest from Upper Perak to Singapore.

Ficus obtusa, *Hassk.* Klang Gates (Ridley). A climbing shrub of W. Malaysia to the Philippines; in the Peninsula Penang to Malacca in forest.

Ficus patens, *Ridl.* Kanching; Ulu Gombak. A large shrub, endemic, common in the Selangor hills, occurring also in Negri Sembilan.

Ficus pisifera, *Wall.* Klang Gates; K. Lumpur; Ulu Gombak. An epiphytic shrub, eventually a tree, of W. Malaysia to the Philippines; in the Peninsula common in forest.

Ficus polysyce, *Ridl.* K. Lumpur; Ulu Gombak. A tree of Lower Siam; in the Peninsula common from Langkawi to Singapore in forest and secondary growth.

Ficus pomifera, *Wall.* Dusun Tua (Ridley). A tree of Indo-Malaya (?except Borneo); in the Peninsula Upper Perak to Johore, not very common in forest.

Ficus punctata, *Thunb.* Batu Caves; Klang Gates; Seminyih; Ulu Gombak. A creeping shrub of W. Malaysia; in the Peninsula common from Penang to Singapore in open places.

Ficus ramentacea, *Roxb.* Batu Caves; Klang Gates; Ulu Gombak. A climbing shrub of Burma and W. Malaysia; in the Peninsula common.

Ficus recurva, *Bl.* Seminyih (Hume). An epiphytic climber of W. Malaysia to the Philippines; in the Peninsula common from Penang to Singapore in forest.

Ficus rostrata, *Lam.* Ampang; K. Lumpur; Ulu Gombak. An epiphytic shrub of Indo-Malaya; in the Peninsula common in forest and secondary growth.

Ficus subulata, *Bl.* Batu Caves; K. Lumpur. A climbing shrub of Indo-Malaya to the Philippines, and S. China; in the Peninsula common from Penang and Kelantan to Johore, in forest

Ficus trachycarpa, *Miq.* Batu Caves (Ridley). An epiphytic shrub of W. Malaysia; in the Peninsula rare, Malacca.

Ficus truncata, *King.* K. Lumpur (Ridley). A tree of Java and Borneo in the Peninsula not common, Kelantan, Perak, Dindings, Pahang, Johore, Singapore.

Ficus urophylla, *Wall.* Ampang; K. Lumpur; Ulu Gombak. An epiphytic shrub of Indo-Malaya; in the Peninsula common in forest.

Ficus vasculosa, *Wall.* Weld's Hill (Forest Dept.). A small tree of Bangka, Java, Tavoy and China; in the Peninsula common from Penang to Singapore.

Ficus villosa, *Bl.* Batu Caves; Klang Gates; K. Lumpur; Ulu Gombak. A climbing shrub of W. Malaysia to the Philippines; in the Peninsula common from Penang to Singapore.

Ficus xylophylla, *Wall.* K. Lumpur (Ridley). An epiphytic shrub or small tree of Sumatra and Borneo; in the Peninsula Penang to Singapore.

Antiaris toxicaria, *Lesch.* Batu Caves; Kajang; Sungai Buloh. A tall tree of Indo-Malaya; in the Peninsula Penang and Upper Perak to Malacca, in forest.

Artocarpus Denisoniana, *Hook. fil.* Klang Gates; Ulu Gombak. A tree, endemic and rare in forest, Ulu Bubong (Perak).

Artocarpus Gomeziana, *Wall.* Kepong; Klang Gates; K. Lumpur. A tree of Tenasserim and Borneo; in the Peninsula common in forest from Penang to Singapore.

Artocarpus Kunstleri, *Hook. fil.* Public Gardens, K. Lumpur (Forest Dept.). A tall tree, endemic and common in forest, Penang to Singapore.

Artocarpus Lakoocha, *Roxb.* K. Lumpur (Forest Dept.). A tree of S. India to Lower Siam; in the Peninsula common in secondary growth and open places.

Artocarpus lanceæfolia, *Roxb.* Ampang; Ulu Gombak; Weld's Hill. A tall tree, endemic and common in forest from Penang to Singapore.

Artocarpus Lowii, *Hook. fil.* Weld's Hill and the Public Gardens, K. Lumpur (Forest Dept.). A tree, endemic, not common, Taiping, and Raub (Pahang).

Artocarpus Maingayi, *Hook. fil.* K. Lumpur (Forest Dept.). A small tree, endemic, Taiping to Singapore, in forest.

Artocarpus peduncularis, *Kurz.* K. Lumpur. A tree of Tenasserim and Lower Siam; in the Peninsula common in forest.

Artocarpus polyphema, *Pers.* K. Lumpur (Forest Dept.). A small tree of W. Malaysia and Indo-China; in the Peninsula commonly cultivated, and wild in Perak, Pahang and Negri Sembilan, in forest.

Artocarpus rigida, *Bl.* K. Lumpur; Sungai Buloh. A tall tree of Burma, Sumatra and Java; in the Peninsula common in forest from Taiping to Singapore.

Conocephalus amœnus, *Hook. fil.* Batu Caves; K. Lumpur. A stout epiphytic climber of Borneo; in the Peninsula common in forest from Langkawi to Singapore.

Conocephalus Scortechinii, *Hook. fil.* K. Lumpur; Sungai Buloh. An epiphytic climber of Borneo; in the Peninsula Perlis to Singapore, in forest.

Conocephalus suaveolens, *Bl.* Batu Caves; Klang Gates; K. Lumpur; Petaling; Seminyih. An epiphytic climber of Indo-Malaya and the Philippines; in the Peninsula common in forest.

Conocephalus subtrinervius, *Miq.* Petaling; Seminyih; Ulu Gombak. An erect epiphytic shrub of ?Sumatra and Borneo; in the Peninsula common in forest from Penang to Johore.

Hullettia dumosa, *King.* Klang Gates; K. Lumpur; Seminyih. A shrub, endemic, not uncommon in forest from Taiping to Negri Sembilan.

Fleurya interrupta, *Gaud.* Ulu Gombak (Hume). A herb of the Tropics of the Old World; in the Peninsula a common weed.

Laportea stimulans, *Miq.* Batu Caves (Ridley). A small tree with stinging hairs, of Siam, Java and Borneo; in the Peninsula Kedah and Kemaman to Malacca in forest.

Pilea muscosa, *Lindl.* Common in K. Lumpur. A small herb, endemic, on limestone in Kelantan and Perak.

Pilea muscosa, *Lindl.* Common in K. Lumpur. A small fleshy herb of S. America; in the Peninsula a common weed.

Pellionia Duvauana, *N. E. Br.*, var. *viridis*, *Ridl.* Batu Caves (Ridley). A creeping herb of Tenasserim; in the Peninsula common in forest from Setul and Kelantan to Negri Sembilan.

Pellionia Helferiana, *Wedd.* Batu Caves; Ulu Gombak. A herb of Tenasserim and Lower Siam; in the Peninsula not very common in forest, Pahang, Selangor and Johore.

Elatostemma acuminatum, *Brngn.* Ulu Gombak (Hume). A herb of Himalaya, Ceylon, Tenasserim and Java; in the Peninsula usually montane in the Taiping Hills and on the Main Range.

Elatostemma platyphyllum, *Wedd.* Batu Caves; K. Lumpur. A tall herb of India; in the Peninsula not common, Penang, Kelantan, ?Taiping.

Elatostemma sessile, *Forst.* K. Lumpur; Ulu Gombak. A herb of Africa, Asia and Polynesia; in the Peninsula common on rocks in streams, Penang and Upper Perak to Selangor.

Procris latifolia, *Bl.* Batu Caves; Dusun Tua; Ulu Gombak. A small succulent herb of Tenasserim to Samoa; in the Peninsula Upper Perak to Selangor, in forest.

Pouzolzia indica, *Gaud.* Klang Gates; Seminyih; Ulu Gombak. A herb of Indo-Malaya and China; in the Peninsula a common weed in waste ground.

Pipturus mollissimus, *Wedd.* Batu Caves; Klang Gates. A climbing shrub of Java; in the Peninsula not common in forest, Penang, Perak, Klang, Johore, Singapore.

Villebrunea sylvatica, *Bl.* Batu Caves; Ulu Gombak. A tree of Java; in the Peninsula not common in forest, Negri Sembilan.

Debregeasia squamata, *Hook. fil.* Batu Caves; Ulu Gombak. A shrub, endemic, not common in forest, Perak.

CULTIVATED URTICACEÆ.

Artocarpus incisa, *Linn. fil.* (Bread fruit tree). A native of the Pacific Islands, often cultivated in the Peninsula.

Artocarpus integrifolia, *Linn. fil.* (Jack fruit). A tree of Indo-Malaya; in the Peninsula commonly cultivated.

Bœhmeria nivea, *Hook. and Arn.* (Ramie). Ulu Gombak (Hume), an escape from cultivation. A shrub of Trop. Asia; in the Peninsula cultivated only.

Ficus Benjamina, *Linn.* A tree of Indo-Malaya; in the Peninsula often planted, but not wild.

Ficus elastica, *Roxb.* Cultivated, fide Foxworthy. A shrub or tree of Indo-Malaya; in the Peninsula formerly cultivated as a rubber producing plant, and very doubtfully wild.

Morus alba, *Linn.* (Mulberry). K. Lumpur Forest Dept.). A small tree of Asia; in the Peninsula occasionally cultivated.

CASUARINACEÆ, CULTIVATED.

Casuarina equisetifolia, *Forst.* Often planted in gardens and by roadsides. A tall tree of Indo-Australia; in the Peninsula wild on sandy seacoasts.

CUPULIFERÆ.

Pasania Curtisii, *Gamble.* Rawang; Weld's Hill. A tree, endemic, not common in forest, Penang, Perak.

Pasania cyclophora, *Gamble.* Ulu Gombak (Hume). A tall tree of Borneo; in the Peninsula usually in montane forest, Penang to Singapore.

Pasania discocarpa, *Gamble.* Weld's Hill (Forest Dept.). A tall tree of Sumatra, Bangka and Borneo; in the Peninsula apparently rare, Taiping Hills and Gunong Bubu.

Pasania Eichleri, *Gamble.* Rawang (Ridley). A tall tree of Sumatra; in the Peninsula not common in forest, Perak and Pahang.

Pasania encleisacarpa, *Gamble.* Kanching; Rawang; Sungai Buloh. A tree of Sumatra; in the Peninsula common in forest from Penang to Singapore.

Pasania erythrocarpa, *Ridl.* Ulu Gombak (Forest Dept. 11198). A tree, endemic and rare in forest, hitherto known only from Gunong Angsi, Negri Sembilan.

Pasania Ewyckii, *Gamble.* Ampang (Forest Dept.). A tree of Sumatra and Borneo; in the Peninsula Penang to Singapore in forest.

Pasania hystrix, *Gamble.* Bukit Cheraka; Kajang; K. Lumpur; Sungai Buloh. A tall tree of Sumatra and Borneo; in the Peninsula common in the lowlands from Penang to Singapore.

Pasania Kunstleri, *Gamble.* Kanching; K. Lumpur. A tree of Borneo; in the Peninsula not very common in forest, Langkawi and Perak.

Pasania lamponga, *Gamble.* Klang Gates; K. Lumpur (var. *ewyckioides*, *Gamble*); Ulu Gombak; Weld's Hill. A tall tree of Sumatra, Bangka and Borneo to Papua; in the Peninsula common in forest from Penang to Singapore.

Pasania lucida, *Gamble.* Ulu Gombak (Forest Dept.). A tree, endemic and common in forest.

Pasania Maingayi, *Schky.* Ulu Gombak (Hume). A lofty tree, endemic, not common in forest, Penang Hill and the Semangkok Pass.

Pasania rassa, *Gamble.* Sungai Buloh; Ulu Gombak. A tree of W. Malaysia; in the Peninsula Penang to Singapore in forest, usually at some altitude.

Pasania spicata, *Oerst.* Weld's Hill and the Public Gardens, K. Lumpur (Forest Dept.). A tall tree of Indo-Malaya; in the Peninsula common in forest.

Pasania sundaica, *Oerst.* Seminyih; Ulu Gombak. A tree of W. Malaysia to the Philippines; in the Peninsula common in forest from Penang to Singapore.

Pasania Wallichiana, *Gamble.* Weld's Hill (Forest Dept.). A tree, endemic and common in forest from Penang to Singapore.

Castanopsis fulva, *Gamble.* Sungai Buloh (Forest Dept.). A tall tree, endemic, not common, Perak, ?Negri Sembilan, ?Singapore.

Castanopsis megacarpa, *Gamble.* Klang Gates; Ulu Gombak; Weld's Hill. A tall tree, endemic, common in forest from Penang to Singapore.

Castanopsis nepheliodes, *King.* Bukit Puteh; K. Lumpur. A tree, endemic and common in forest from Taiping to Singapore.

Castanopsis sumatrana, *A. DC.* Bukit Cheraka; Weld's Hill. A tree of Indo-Malaya to the Philippines; in the Peninsula Penang to Malacca, common in forest.

Castanopsis Wallichii, *King.* K. Lumpur (Forest Dept.). A tall tree, endemic and common in forest.

SALICINACEÆ.

Salix tetrasperma, *Roxb.* Rawang; Weld's Hill. A small tree of E. Asia; in the Peninsula common from Penang and Kelantan to Malacca, in roadside ditches and edges of ricefields.

HYDROCHARIDACEÆ.

Ottelia alismoides, *Pers.* Pudu (Goodenough). An aquatic herb of Trop. Africa, Trop. Asia and Australia; in the Peninsula common in ponds and ditches.

ORCHIDACEÆ.

Oberonia aurantiaca, *Ridl.* Kajang (Goodenough). A small epiphyte, endemic and local.

Oberonia grandis, *Ridl.* Ulu Langat, (Kloss, fide Ridley). An epiphytic herb, endemic and local.

Liparis parvifolia, *Lindl.* Batu Caves (Ridley). An epiphytic herb of Siam to the Philippines; in the Peninsula common from Upper Perak to Singapore in forest.

Platyclinis gracilis, *Hook. fil.* Ulu Gombak (Hume). An epiphyte of Java; in the Peninsula montane in Perak and Pahang.

Dendrobium atropurpureum, *Miq.* Batu Caves; K. Lumpur. A small epiphyte of Tenasserim to Borneo; in the Peninsula common from Langkawi to Singapore.

Dendrobium calcaratum, *Lindl.* Seminyih (Hume). A terrestrial herb of Borneo; in the Peninsula in wet places, Malacca and Singapore.

Dendrobium crocatum, *Hook. fil.* Ulu Gombak (Ridley). An epiphyte, endemic, Perak and Pahang to Singapore, in forest.

Dendrobium crumenatum, *Swartz.* (The Pigeon Orchid). Common on roadside and other trees. An epiphyte of Indo-Malaya to the Philippines and China; in the Peninsula common.

Dendrobium ?eulophotum, *Lindl.* Seminyih (Hume).

Dendrobium gemelium, *Lindl.* Rantau Panjang (Hume). An epiphyte of Siam to Borneo; in the Peninsula Langkawi to Singapore.

Dendrobium grande, *Hook. fil.* K. Lumpur; Rawang. An epiphyte of ?Tenasserim and Lower Siam; in the Peninsula common from Penang and Kelantan to Singapore in forest.

Dendrobium lamellatum, *Lindl.* K. Lumpur (Curtis). An epiphyte of Tenasserim, Java and Borneo; in the Peninsula not common, Kedah to Singapore.

Dendrobium leonis, *Rchb.* Rawang; Seminyih. An epiphyte of Borneo and Indo-China; in the Peninsula common in forest from Penang to Singapore.

Dendrobium pallens, *Ridl. ?MS.* High up on the Batu Caves (Ridley). A rare orchid, known also from Siam.

Dendrobium pumilum, *Roxb.* Kajang; Seminyih. An epiphyte of Burma and Borneo; in the Peninsula common.

Dendrobium subulatum, *Hook. fil.* Batu Caves; K. Lumpur. An epiphyte of Java and Borneo; in the Peninsula Penang to Singapore.

Dendrobium truncatum, *Lindl.* Batu Caves (Ridley). An epiphyte of W. Malaysia; in the Peninsula not common, Kedah, Perak and Pahang.

Bulbophyllum flammuliferum, *Ridl.* Batu Caves (Ridley). An epiphyte, endemic and rare on limestone and mangrove, Port Dickson.

Bulbophyllum membranifolium, *Hook. fil.* K. Lumpur (Curtis). An epiphyte, endemic, not common, Perak and Pahang.

Bulbophyllum pileatum, *Lindl.* Rawang (Ridley). An epiphyte of Sumatra; in the Peninsula not common, Penang, Perak, Johore and Singapore.

Bulbophyllum vaginatum, *Rchb.* Petaling (Ridley). An epiphyte of Java and Borneo; in the Peninsula common.

Eria pendula, *Ridl.* Batu Caves (Ridley). An epiphyte of Sumatra and Borneo; in the Peninsula rare, Perak.

Trichotosia hispidissima, *Kranzl.* Ulu Langat (Goodenough). An epiphyte of Borneo; in the Peninsula rare, known only from this locality.

Phreatia linearis, *Ridl.* Ulu Langat (Kloss, fide Ridley). A small epiphyte of ?Sumatra; in the Peninsula rare, known only from this locality.

Phreatia minutiflora, *Lindl.* Batu Caves (Ridley). A small epiphyte of Sumatra, Borneo, Celebes, the Philippines and Samoa; in the Peninsula on mangrove trees and limestone, Setul, Perak, Johore, Singapore.

Agrostophyllum bicuspidatum, *J. J. Sm.* Seminyih (Hume). An epiphyte of Tenasserim to Celebes; in the Peninsula very common in forest from Kedah to Singapore.

Agrostophyllum callosum, *Rchb.* Rawang (Ridley). An epiphyte of Himalaya and Burma; in the Peninsula rare, Fraser Hill and Bukit Hitam (Selangor).

Agrostophyllum glumaceum, *Hook. fil.* Rawang; Seminyih; Ulu Gombak. A small epiphyte, endemic, Perak to Negri Sembilan in forest.

Agrostophyllum majus, *Hook. fil.* Ulu Gombak (Hume). An epiphyte of Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Ceratostylis cryptantha, *Ridl.* Ulu Gombak (Hume). A small epiphyte, endemic, not common, Penang, Perak, Semangkok.

Ceratostylis pendula, *Hook. fil.* Kajang (Goodenough). An epiphyte of Borneo to the Philippines; in the Peninsula, Penang, Taiping, Selangor, Pahang, Johore, in forest.

Spathoglottis plicata, *Bl.* K. Lumpur; Seminyih; Sungai Buloh; Ulu Gombak. A terrestrial herb of W. Malaysia to New Guinea; in the Peninsula common in open places.

Calanthe veratrifolia, *R. Br.* Ulu Gombak (Hume). A terrestrial herb of Java; in the Peninsula Perak and Pahang to Malacca, in forest.

Calanthe veratrifolia, *R. Br.* Ulu Gombak (Hume). A terrestrial herb of Indo-Australia; in the Peninsula not uncommon in forest from the Taiping Hills to Singapore.

Preptanthe vestita, *Rchb. fil.* Top of the Batu Caves (Ridley). An epiphyte of Tenasserim, Borneo and Celebes; in the Peninsula very rare, doubtfully also from Pulau Adang.

Phaius Wallichii, *Lindl.* K. Lumpur (Ridley). A herb of Indo-Malaya and Polynesia; in the Peninsula not very common, Kedah, Penang, Pahang, Malacca, Johore, but often cultivated.

Cœlogyne pandurata, *Lindl.* Rawang; Ulu Gombak. An epiphyte of Sumatra and Borneo; in the Peninsula common in forest in Perak and Selangor.

Cœlogyne Rochusseni, *De Vriese.* Rawang (Ridley). An epiphyte of W. Malaysia; in the Peninsula common in forest.

Pholidota imbricata, *Lindl.* Batu Caves (Ridley). An epiphyte of Indo-Malaya to the Philippines; in the Peninsula not common, Langkawi and Perak.

Claderia viridiflora, *Hook. fil.* Seminyih; Ulu Gombak. A terrestrial herb of Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Eulophia graminea, *Lindl.* Damansara Rd.; Rawang; Seminyih; Ulu Gombak. A herb of India, Siam and Rhio; in the Peninsula common in open places from Setul to Singapore.

Eulophia squalida, *Lindl.* K. Lumpur; Petaling. A terrestrial herb of W. Malaysia to the Philippines; in the Peninsula common in open grassy places.

Plocoglottis fœtida, *Ridl.* K. Lumpur; Rawang; Sungai Buloh. A tall herb, endemic, Perak to Singapore, in forest.

Plocoglottis javanica, *Bl.* Seminyih; Ulu Gombak. A terrestrial herb of Java and Borneo; in the Peninsula common in forest from Kedah to Singapore.

Plocoglottis porphyrophylla, *Ridl.* Seminyih; Ulu Gombak. A terrestrial herb of Sumatra and Borneo; in the Peninsula common, usually near the sea.

Grammatophyllum speciosum, *Bl.* K. Lumpur (Ridley). A very big epiphyte of Tenasserim to the Solomon Islands; in the Peninsula common in forest from Kedah to Singapore.

Bromheadia palustris, *Lindl.* Ulu Gombak (Hume). A terrestrial herb of W. Malaysia and Indo-China; in the Peninsula common in open places.

Adenoccos parviflora, *Lindl.* Batu Caves (Kelsall). A small epiphyte, endemic and local, rare.

Adenoncos virens, *Bl.* Batu Caves (Ridley). A small epiphyte of W. Malaysia; in the Peninsula common in forest and mangrove from Perak to Singapore.

Trichoglottis retusa, *Bl.* Batu Caves (Kelsall). A tall herb of Siam, Indo-China, Java, Borneo and the Philippines; in the Peninsula rare on limestone.

Saccolabium angræcum, *Ridl.* Batu Caves (Ridley). An epiphyte of Java; in the Peninsula rare, known only from this locality.

Saccolabium densiflorum, *Lindl.* Rawang (Ridley). An epiphyte of Indo-Malaya; in the Peninsula not common, Penang, Perak and Singapore.

Saccolabium latifolium, *Ridl.* Batu Caves (Kelsall), and var. *striatum*, *Ridl.* (Ridley). An epiphyte of Sumatra; in the Peninsula Setul to Johore in forest.

Saccolabium macrantherum, *Ridl.*, *Kew Bull.*, 10, 1926, p. 478. Ulu Gombak (Hume). A small epiphyte, endemic and local.

Saccolabium minimiflorum, *Hook. fil.* Batu Caves (Ridley). A small epiphyte of Siam; in the Peninsula rare, Perak.

Saccolabium tenuicaule, *Hook. fil.* Batu Caves (Ridley). An epiphyte, endemic and rare, Penang and Perak.

Microsaccus javensis, *Bl.* Batu Caves (Kelsall). A small epiphyte of Burma, Tenasserim, Siam, Java and Indo-China; in the Peninsula not common, Perak and Singapore.

Tæniophyllum macrorrhizum, *Ridl.* Batu Caves; Petaling. A small epiphyte, endemic, Langkawi, Perak, Pahang, Johore.

Tæniophyllum serrula, *Hook. fil.* Batu Caves; K. Lumpur. An epiphyte of Lower Siam; in the Peninsula common from Setul to Singapore.

Sarcochilus caligaris, *Ridl.* Batu Caves (Ridley). An epiphyte, endemic, not common in forest, Perak, Pahang, Negri Sembilan, Singapore.

Ascochilus hirtus, *Ridl.* Batu Caves (Ridley). A small epiphyte, endemic, Langkawi and Kelantan to Malacca, in forest.

Thrixspermum arachnites, *Rchb. fil.* Ulu Langat (Kloss, fide Ridley). An epiphyte of W. Malaysia; in the Peninsula common from Penang and Kelantan to Singapore.

Thrixspermum crassifolium, *Ridl.* Rantau Panjang (Hume). An epiphyte, endemic and rare, Pahang, Johore.

Thrixspermum lilacinum, *Rchb. fil.* Pudu (Good-enough). A terrestrial herb of Java and Borneo; in the Peninsula common in open grassy places.

Thrixspermum montanum, *Ridl.* Ulu Langat (Kloss, fide Ridley). A herb, endemic and local.

Thrixspermum notabile, *Ridl.* Seminyih (Hume). An epiphyte, endemic, not common, Perak, Johore and Singapore.

Dendrocolla filiformis, *Ridl.* Seminyih (Hume). An epiphyte of Lower Siam; in the Peninsula not common, Upper Perak to Singapore.

Acriopsis javanica, *Reinw.* Batu Tiga; Ulu Gombak. An epiphyte of Tenasserim to New Guinea; in the Peninsula common from Penang to Singapore.

Appendicula anceps, *Bl.* Batu Caves; Rawang. An epiphyte of Java, Borneo and the Philippines; in the Peninsula common in forest from Penang and Upper Perak to Singapore.

Appendicula cornuta, *Bl.* Ulu Gombak (Hume). A tufted epiphyte of Indo-Malaya to the Philippines, and S. China; in the Peninsula common in forest from Kedah to Singapore.

Appendicula purpurascens, *De Vriese.* Ulu Gombak (Ridley). An epiphyte of W. Malaysia to the Philippines; in the Peninsula Perak and Pahang to Selangor, usually montane.

Appendicula torta, *Bl.* Batu Caves; Rawang; Ulu Gombak. A tufted epiphyte of Java and Borneo; in the Peninsula not common in forest, Perak, Pahang and Johore.

Appendicula uncata, *Ridl.* Petaling (Ridley). A tufted epiphyte, endemic and rare, Fraser Hill and Singapore.

Thelasis capitata, *Bl.* Batu Caves (Ridley). An epiphyte of W. Malaysia to the Philippines; in the Peninsula not common in forest, Perak and Pahang.

Thelasis carinata, *Bl.* Batu Caves (Ridley). An epiphyte of W. Malaysia to the Philippines; in the Peninsula common in forest and mangrove from Kedah to Singapore.

Galeola Hydra, *Rchb.* Batu Caves; Kajang; K. Lumpur; Ulu Gombak. A saprophytic herb of Indo-Malaya to Java; in the Peninsula common in open places.

Aphyllorchis pallida, *Bl.* Seminyih (Hume). A saprophyte of Java, Borneo and the Philippines; in the Peninsula Penang and Upper Perak to Singapore in forest, commonest in the north.

Lecanorchis malaccensis, *Ridl.* Seminyih (Hume). A saprophytic herb of Siam and Borneo; in the Peninsula common in forest from Kedah to Singapore.

Corymbis longiflora, *Hook. fil.* Batu Caves; Ulu Gombak. A tall terrestrial orchid of Africa and Indo-Australia; in the Peninsula common in forest from Langkawi to Singapore.

Tropidia curculigoides, *Lindl.* Seminyih (Hume). A terrestrial herb of India and Borneo; in the Peninsula common in forest, usually montane.

Vrydagzynea lancifolia, *Ridl.* Ulu Gombak (Hume). A small herb, endemic, not very common in forest, Langkawi to Singapore.

Anectochilus Reinwardtii, *Bl.* Ulu Gombak (Hume). A small terrestrial herb of Sumatra and Java; in the Peninsula Kedah, ?Penang, Perak, in forest.

Zeuxine clandestina, *Bl.* Ulu Gombak (Hume). A small terrestrial herb of Java; in the Peninsula not common, Penang, Negri Sembilan and Singapore.

CULTIVATED ORCHIDACEÆ.

Arundina speciosa, *Bl.* K. Lumpur on railway banks, planted or run wild (Ridley). A tall terrestrial herb of Burma, Java and Borneo; in the Peninsula commonly cultivated and wild in Setul and on Kedah Peak.

Paphiopedilum barbatum, *Pftz.* *Cypripedium barbatum Lindl.* A terrestrial herb of Siam; in the Peninsula montane, Kedah Peak, Penang Hill, Mt. Ophir, Gunong Belulut (Johore), and often cultivated.

Vanda Hookeriana, *Rchb. fil.* A sprawling orchid of Borneo; in the Peninsula common in the Kinta Valley, Perak, and occurring also in Johore, and often cultivated.

Vanilla planifolia, *Andr.* (Vanilla). Serdang Experimental Plantation. A climber of the West Indies, occasionally cultivated in the Peninsula.

ZINGIBERACEÆ.

Globba aurantiaca, *Miq.* Batu Caves; Kajang; Klang Gates; Seminyih; Sungai Buloh; Ulu Gombak; Weld's Hill. A herb of Sumatra and Borneo; in the Peninsula common in forest from Penang to Johore.

Globba cernua, *Bak.* Ulu Gombak (Hume). A herb, endemic, not uncommon north of Negri Sembilan, usually in montane forest.

Globba panicoides, *Miq.* Batang Berjuntai; Batu Caves; Klang Gates; K. Lumpur; Rantau Panjang; Seminyih. A tufted herb of Sumatra and Borneo; in the Peninsula common in forest from Langkawi to Singapore.

Globba perakensis, *Ridl.* Klang Gates; Ulu Gombak. A herb, endemic, Upper Perak and Kelantan to Pulau Tioman, in forest.

Globba uliginosa, *Miq.* Batang Berjuntai (Hume). A herb of Sumatra and Bangka; in the Peninsula not very common in forest, Penang to Singapore.

Globba variabilis, *Ridl.* Seminyih (Hume). A herb of Lingga and Borneo; in the Peninsula not uncommon in forest from Perak and Kelantan to Johore.

Camptandra parvula, *Ridl.* Ulu Gombak (Hume). A small herb, endemic, common in forest in the north.

Gastrochilus longifolia, *Ridl.* Ulu Gombak (Ridley). A herb, endemic and local.

Gastrochilus plicata, *Ridl.* Klang Gates (Ridley). A tufted herb, endemic and not common in forest, Upper Perak, Kelantan, Pahang and Johore.

Costus globosus, *Bl.* Batu Caves; Dusun Tua; Klang Gates; Petaling; Seminyih. A herb of W. Malaysia; in the Peninsula common in forest from Upper Perak to Singapore.

Costus speciosus, *Sm.* Klang Gates; Petaling; Seminyih; Ulu Gombak. A herb, widely Indo-Malayan; in the Peninsula common in open places from Perlis to Singapore.

Zingiber citrinum, *Ridl.* Dusun Tua; Kanching. A herb, endemic, not common in forest, Perak, Pahang, Selangor, Negri Sembilan, Johore.

Zingiber gracile, *Jack.* Kanching; K. Lumpur; Petaling; Ulu Gombak. A herb, endemic and common in forest from Penang to Singapore.

Zingiber spectabile, *Griff.* Petaling (Ridley). A herb of Sumatra; in the Peninsula common in forest north of Malacca.

Amomum hastilabium, *Ridl.* Dusun Tua (Ridley). A tall herb, endemic, not common in forest, Perak, Johore, Singapore.

Amomum lappaceum, *Ridl.* Ulu Gombak (Hume). A tall herb, endemic, Perak, Selangor, Pahang, Johore, in forest.

Amomum micranthum, *Ridl.* Batu Tiga (Ridley). A herb, endemic, not common in forest, Penang to Negri Sembilan.

Amomum testaceum, *Ridl.* Batu Caves (Ridley). A tall herb, endemic, not common, often near limestone, Setul, Perlis, Perak, Pulau Tioman.

Amomum uliginosum, *Kœn.* Dusun Tua (Ridley). A tall herb of Siam and Borneo; in the Peninsula common in forest from Kedah to Johore.

Hornstedtia albomarginata, *Ridl.* Bukit Raja; Petaling; Sungai Buloh. A large herb, endemic, Penang and Kelantan to Negri Sembilan, not uncommon, especially in the hills.

Hornstedtia pauciflora, *Ridl.* Batu Caves (Ridley). A tall herb, endemic and rare, near limestone, Gunong Inas (Perak).

Hornstedtia macrochilus, *Ridl.* Bukit Raja (Burkill). A tall herb, endemic, not very common in forest, Upper Perak and Kelantan to Singapore.

Hornstedtia megalochilus, *Ridl.* Klang Gates; K. Lumpur; Ulu Gombak. A tall herb of Lower Siam and Sumatra; in the Peninsula common in forest from Setul and Kelantan to Singapore.

Hornstedtia metriochilus, *Ridl.* Batu Caves; Petaling; Ulu Gombak. A tall herb, endemic, common in forest from Penang and Kelantan to Johore.

Hornstedtia scyphus, *Retz.* Bukit Raja; K. Lumpur; Ulu Gombak. A tall herb of Sumatra and Borneo; in the Peninsula common in forest from Taiping to Singapore.

Phaomeria imperialis, *Lindl.*, var. *speciosa*, *Ridl.* Rawang (Ridley). A tall herb of Sumatra and Java (the species); in the Peninsula the species often cultivated and persisting in abandoned ground, the var. wild in the Taiping Hills and at Ipoh.

Phaomeria Maingayi, *Schum.* Dusun Tua; Klang Gates. A tall herb, endemic, Upper Perak and Kelantan to Singapore in forest.

Plagiostachys lateralis, *Ridl.* Bukit Raja (Burkill). A tall herb, endemic, Upper Perak to Singapore, in forest.

Elettariopsis Curtisii, *Bak.* Bukit Raja (Burkill). A herb, endemic and rare, Penang Hill.

Elettariopsis latiflora, *Ridl.* Sungai Buloh (Good-enough). A creeping herb, endemic, not common in forest, Kedah Peak to Singapore.

Alpinia cannæfolia, *Ridl.* Dusun Tua (Ridley). A herb, endemic, rare, Negri Sembilan.

Alpinia javanica, *Bl.* Batu Caves; Klang Gates; K. Lumpur; Seminyih. A herb of Sumatra and Java; in the Peninsula common in forest from Perak and Kelantan to Johore.

Alpinia Rafflesiana, *Wall.* Ulu Gombak (Hume). A herb, endemic and common in forest from Penang to Singapore.

Alpinia vitellina, *Ridl.* Dusun Tua (Ridley). A herb, endemic, not common in forest, Penang and Johore.

CULTIVATED ZINGIBERACEÆ.

Alpinia Galanga, *Sw.* Circular Road Plantation, K. Lumpur (Forest Dept.). A tall herb of Indo-Malaya to the Philippines and Moluccas; in the Peninsula commonly cultivated and persisting in abandoned ground.

Curcuma domestica, *Valet.* (Turmeric). A herb of Java, commonly cultivated in the Peninsula.

Hedychium coronarium, *Linn.* Common in gardens. A herb of India, cultivated in most tropical countries.

Kæmpferia Galanga, *Linn.* A herb of Indo-Malaya; in the Peninsula often cultivated and escaping.

Zingiber officinale, *Rosc.* (Ginger). A herb, native of Trop. Asia and cultivated in all tropics.

MARANTACEÆ.

Donax arundastrum, *Lour.* Batu Caves (Ridley). A tall herb of Burma, Indo-China, Sumatra and Borneo; in the Peninsula not very common, Upper Perak and Kelantan to Johore, often in tidal rivers.

Donax grandis, *Ridl.* Batu Caves; Klang Gates; Rawang; Seminyih; Ulu Gombak. A tall herbaceous plant of Tenasserim, Siam, Sumatra and Borneo; in the Peninsula common in forest.

Stachyphrynium Jagoranum, *Schum.* Batu Caves; Dusun Tua; K. Lumpur. A herb, endemic, Setul to Negri Sembilan, commonest in the north in open places.

Phrynium hirtum, *Ridl.* Dusun Tua; Ulu Gombak. A stemless herb, endemic and common in forest from Kedah to Johore.

Phrynium malaccense, *Ridl.* Kuang; Petaling; Ulu Gombak. A stemless herb of Lower Siam; in the Peninsula common in forest from Langkawi to Johore.

Phrynium tristachyum, *Ridl.* Bukit Lagong (Burkill and Foxworthy). A stemless herb, endemic and local.

CULTIVATED MARANTACEÆ.

Maranta arundinacea, *Linn.* (Arrow-root). Serdang Experimental Plantation. A herb of S. America, cultivated in the Peninsula usually as an ornamental plant.

CANNACEÆ, CULTIVATED.

Canna orientalis, *Rosc.* In gardens, and occurring in waste ground. A tall herb, probably native of India.

LOWIACEÆ.

Orchidantha longiflora, *Ridl.* Batu Caves; Klang Gates; Ulu Langat. A large tufted plant, endemic and not uncommon in forest, but not often flowering.

MUSACEÆ.

Musa malaccensis, *Ridl.* K. Lumpur; Ulu Gombak. An arborescent herb, endemic, common from Perlis to north Johore, in forest.

Musa violascens, *Ridl.* K. Lumpur; Petaling; Ulu Gombak. An arborescent herb of Borneo; in the Peninsula common in forest from Upper Perak and Pahang to Negri Sembilan.

CULTIVATED MUSACEÆ.

Musa sapientium, *Linn.* (Banana or Plantain). An arborescent herb of uncertain origin, cultivated in most tropical countries.

Musa textilis, *Nees.* (Manila Hemp). Serdang Experimental Plantation. An arborescent herb of the Philippines; in the Peninsula occasionally cultivated.

Ravenala madagascariensis, *Sonn.* (The Travellers' Palm). Common in gardens. An arborescent herb of Madagascar; in the Peninsula often cultivated.

APOSTASIACEÆ.

Apostasia latifolia, *Rolfe.* Ulu Gombak (Hume). A climber, endemic, not common in forest, Perak and Mt. Ophir.

Apostasia nuda, *R. Br.* Seminyih (Hume). A woody herb of Indo-Malaya; in the Peninsula Kedah to Singapore, in forest.

Apostasia Wallichii, *Br.* Seminyih (Hume). A woody climbing herb of Indo-Malaya to New Guinea; in the Peninsula not very common in forest, Penang to Johore.

BROMELIACEÆ, CULTIVATED.

Ananas sativus, *Schultes fil.* (Pineapple). A herb, pantropic in cultivation, native of Trop. America.

HAEMODORACEÆ, CULTIVATED.

Sansevieria zeylanica, *Willd.* (Bow String Hemp). Cultivated in various localities. A succulent plant of Trop. Asia and Africa, often cultivated in the Peninsula.

IRIDACEÆ, CULTIVATED.

Trimezia lurida, *Salisb.* Public Gardens, K. Lumpur, in grass, escaping from cultivation. Native of Mexico.

AMARYLLIDACEÆ.

Curculigo latifolia, *Dryand.* K. Lumpur; Seminyih; Ulu Gombak. A herb of Indo-Malaya; in the Peninsula common in forest.

Curculigo villosa, *Wall.* Batu Tiga (Ridley). A herb of W. Malaysia; in the Peninsula common in open places in the south.

CULTIVATED AMARYLLIDACEÆ.

Agave rigida, *Mill.*, var *sisalana*. (Sisal Hemp). Serdang Experimental Plantation. A succulent plant of Mexico; in the Peninsula cultivated for fibre and as an ornament.

Furcraea gigantea, *Vent.* (Mauritius Hemp). Serdang Experimental Plantation. A succulent plant of Trop. America; in the Peninsula cultivated for fibre.

BURMANNIACEÆ.

Burmannia cœlestis, *Don.* Ampang (Brooks). A herb of Indo-Australia and China; in the Peninsula common in open sandy places.

Burmannia tuberosa, *Becc.* Petaling (Ridley). A small saprophyte of Borneo and New Guinea; in the Peninsula Kedah to Singapore, in damp places in forest.

Gymnosiphon aphyllum, *Bl.* Petaling (Ridley). A small saprophyte of Sumatra and Borneo to Papua; in the Peninsula common in forest but sporadic.

Thismia aserœ, *Becc.* Petaling (Ridley). A small saprophyte, endemic, not common in forest, Pahang and Singapore.

Thismia fumida, *Ridl.* Petaling (Ridley). A small saprophyte, endemic, very rare, known also from Chan Chu Kang (Singapore).

TACCACEÆ.

Tacca cristata, *Jack.* Batang Berjuntai; Kanching; Rantau Panjang; K. Lumpur; Sungai Buloh; Ulu Langat. A herb of Burma; in the Peninsula common in forest.

DIOSCOREACEÆ.

Stenomeris borneensis, *Oliv.* Batu Caves (Ridley). A slender climber of Borneo; in the Peninsula very rare, known only from this locality.

Dioscorea bulbifera, *Linn.* Batu Caves; Bukit Raja; K. Lumpur. A climber of Africa and Indo-Australia; in the Peninsula common in waste ground from Langkawi to Singapore.

Dioscorea laurifolia, *Wall.* K. Lumpur; Ulu Gombak. A climber, endemic and common on forest edges.

Dioscorea polyclades, *Hook. fil.* Rawang; Ulu Gombak; Weld's Hill. A climber of W. Malaysia; in the Peninsula not very common on forest edges, Kelantan, Perak, Pahang, Negri Sembilan, Johore and Singapore.

Dioscorea Porteri, *Prain and Burkill.* Bukit Raja; Sungai Buloh; Weld's Hill. A climber, endemic, Kedah, Penang, Province Wellesley, Negri Sembilan, Johore and Singapore.

Dioscorea pyrifolia, *Kunth*. Batu Caves; Bukit Raja; Kanching; Klang Gates; Sungai Buloh; Weld's Hill. A climber of W. Malaysia; in the Peninsula common in hedges.

Dioscorea stenomeriflora, *Prairie and Burkill*. Batu Tiga (Ridley). A slender climber, endemic and rare, Taiping Hills, Singapore.

Dioscorea triphylla, *Linn*. K. Lumpur; Weld's Hill. A climber of Indo-Malaya; in the Peninsula common from Penang and Upper Perak to Singapore.

Dioscorea Zollingeriana, *Kunth*. Batu Caves (Burkill). A climber of Tenasserim, Sumatra and Java; in the Peninsula Perak to Singapore, in forest.

CULTIVATED DIOSCOREACEÆ.

Dioscorea alata, *Linn*. A Yam extensively cultivated in the East, not known in a wild state.

LILIACEÆ.

Peliosanthes albida, *Baker*. Klang Gates (Ridley). A herb of Sumatra and Borneo; in the Peninsula not common in forest, Penang, Perak, Selangor and Malacca.

Peliosanthes violacea, *Wall*. K. Lumpur; Ulu Gombak. A herb of India and Lower Siam; in the Peninsula common in forest.

Dianella ensifolia, *Redoubte*. Rantau Panjang; Seminyih; Ulu Gombak; Weld's Hill. A herb of Indo-Australia and the Mascarene Islands; in the Peninsula common in forest from Setul to Singapore.

Tupistra grandis, *Ridl*. Ulu Gombak (Burkill, Hume). A herb, endemic, not common in forest, Perak and Fraser Hill.

Dracæna aurantiaca, *Wall*. Ulu Gombak (Hume). A shrub of Borneo; in the Peninsula common from the Adang Islands to Singapore.

Dracæna congesta, *Ridl*. Batu Caves (Ridley). A small shrub of Borneo; in the Peninsula Kedah to Mt. Ophir, often on limestone.

Dracæna elliptica, *Thunb*. Batu Caves (Kelsall). A shrub of Indo-Malaya; in the Peninsula common in forest from Kedah to Singapore.

Dracæna Porteri *Baker*. Petaling; Ulu Gombak. A shrub of Siam; in the Peninsula common in forest from Penang and Kelantan to Singapore.

Dracæna singaporensis, *Ridl*. Dusun Tua; Seminyih; Ulu Gombak. A small shrub, endemic, not common in forest, Pahang to Singapore.

Smilax barbata, *Wall.* K. Lumpur (Ridley). A climber of Bangka; in the Peninsula common in open places in the south.

Smilax calophylla, *Wall.* Batang Berjuntai; Bukit Raja; Ulu Gombak. An erect shrub of Sumatra; in the Peninsula common in forest from Kedah to Singapore.

Smilax Helferi, *DC.* K. Lumpur (Ridley). A climber of Tenasserim and Lower Siam in the Peninsula common north of Malacca.

Smilax leucophylla, *Bl.* Sungai Buloh (Ridley). A climber of Indo-China to the Philippines and Moluccas; in the Peninsula Penang to Singapore in forest.

Smilax myosotiflora, *A. DC.* Ulu Gombak (Hume). A slender climber of Lower Siam and Java; in the Peninsula common in forest from Kedah to Singapore.

CULTIVATED LILIACEÆ.

Cordyline terminalis, *Kunth.* ("Dracæna"). Common in gardens. A shrub of India to Polynesia, but often only cultivated, as in the Peninsula.

Gloriosa superba, *Linn.* A herb of Africa, Indo-Malaya and Indo-China; in the Peninsula probably not wild anywhere, but often cultivated.

PONTEDERIACEÆ.

Eichornia crassipes, *Solms.* (The "Water Hyacinth"). Ampang; Pudu. An aquatic herb, introduced from Trop. America, and now common in the Peninsula.

COMMELINACEÆ.

Pollia sorzogonensis, *Endl.* Batu Caves; Klang Gates; Ulu Gombak. A herb of Indo-Malaysia and China; in the Peninsula common in forest from Langkawi and Patani to Singapore.

Pollia sumatrana, *Hassk.* Ulu Gombak (Hume). A herb of Sumatra and the ?Philippines; in the Peninsula rare in forest, Perak.

Pollia thyrsoflora, *Endl.* K. Lumpur; Seminyih; Ulu Gombak. A herb of Tenasserim to New Guinea; in the Peninsula common in forest and near streams from Langkawi to Pulau Tioman.

Commelina clavata, *Clarke.* Batu Caves (Ridley). A creeping herb of India Sumatra and Java; in the Peninsula rare, Ulu Selama (Perak).

Commelina nudiflora, *Linn.* K. Lumpur; Klang Gates; Seminyih; Ulu Gombak. A pantropic herb; in the Peninsula common in waste ground from Penang to Singapore.

Aneilema conspicuum, *Kunth*. Ulu Gombak (Hume). A herb of Burma to Java; in the Peninsula Penang and Kelantan to Malacca, in forest.

Aneilema lineolatum, *Kunth*. Rawang (Ridley). A herb of Indo-Malaya; in the Peninsula common in forest north of Selangor.

Aneilema nudiflorum, *Br.* Rantau Panjang; Seminyih; Ulu Gombak. A herb of S. E. Asia; in the Peninsula common in waste and sandy ground.

Cyanotis capitata, *Clarke*. Batu Caves (Ridley). A creeping herb of India to Japan and New Guinea; in the Peninsula not common in open grassy spots, Upper Perak, Kelantan, Pahang.

Floescopa scandens, *Lour.* Klang Gates; Ulu Gombak. A herb of Indo-Australia and China; in the Peninsula common in ditches from Penang and Kelantan to Singapore.

Forrestia gracilis, *Ridl.* Batu Tiga; Rantau Panjang; Seminyih; Sungai Buloh; Ulu Gombak. A herb, endemic, common in forest from Kedah and Kelantan to Singapore.

Forrestia Griffithii, *Clarke*. Klang Gates (Ridley). A herb, endemic, Perak, Malacca, Mt. Ophir, Negri Sembilan, Johore, in forest.

Forrestia irritans, *Ridl.* Seminyih; Ulu Gombak. A herb, endemic, not common in forest, usually montane, Perak to Negri Sembilan.

Forrestia monosperma, *Clarke*. Batu Caves (Ridley). A herb, endemic, not very common in forest, Upper Perak to Selangor.

ALISMACEÆ.

Ranalisma rostrata, *Stapf*. Batu Caves (Ridley). A herb, endemic and local, very rare.

Sagittaria sagittæfolia, *Linn.* Seminyih (Hume 8328, in fl. July). An aquatic herb of China; in the Peninsula cultivated by Chinese as food for pigs, and apparently very rarely flowering.

NAIADACEÆ.

Naias ?minor, *All.* Dusun Tua (Ridley).

FLAGELLARIACEÆ.

Flagellaria indica, *Linn.* K. Lumpur (Ridley, Forest Dept.). A climbing shrub of the tropics of the Old World; in the Peninsula common from Penang to Singapore, chiefly on seashores and in sandy places.

Susum malayanum, *Hook.* Batu Tiga; K. Lumpur; Ulu Gombak. A large herb of Java and Borneo; in the Peninsula common in forest from Penang to Singapore.

PALMÆ.

Pinanga calamifrons, *Becc.* Ulu Gombak (Hume). A small palm of Borneo; in the Peninsula not common, Kedah Peak and Negri Sembilan.

Pinanga disticha, *Bl.* Batu Caves; Petaling; Rawang; Seminyih. A small palm of Lower Siam and Sumatra; in the Peninsula common in forest from Kedah and Kelantan to Singapore.

Pinanga pectinata, *Becc.* Batu Tiga (Ridley). A small palm, endemic, Perak and Johore, in forest.

Pinanga Scortechinii, *Becc.* Ulu Gombak (Hume). A small palm of Lower Siam; in the Peninsula common in forest from Penang and Kelantan to Johore.

Pinanga subintegra, *Ridl.* Ulu Gombak (Hume). A small palm, endemic, not common, Kelantan, Perak, Pahang, Johore, in forest.

Nenga macrocarpa, *Scort.* Ulu Gombak (Hume). A palm, endemic and common in forest from Kedah to Johore.

Iguanura geonomæformis, *Mart.* K. Lumpur (var. *malaccensis*, *Ridl.*); Petaling (var. *malaccensis*); Rawang; Seminyih; Ulu Gombak. A small palm, endemic and common in forest.

Didymosperma hastata, *Becc.* Petaling; Rawang; Sungai Buloh. A small palm, endemic, not common in forest, Perak.

Caryota mitis, *Lour.* Batu Caves; Ulu Gombak. A palm of Indo-Malaya; in the Peninsula Perlis to Singapore, common.

Livistona rupicola, *Ridl.* Batu Caves (Ridley). A palm, endemic and rare on limestone, Langkawi.

Pholidocarpus macrocarpa, *Becc.* Batu Tiga; Petaling. A tall palm, endemic and rare in forest, Perak and the Dindings.

Licuala ferruginea, *Becc.* Batu Caves; K. Lumpur. A small palm of Sumatra; in the Peninsula Kedah, Pahang, Negri Sembilan, Johore, Singapore, common in the south.

Licuala Kingiana, *Becc.* Rantau Panjang (Ridley, Hume). A small palm, endemic and not common in forest, Perak.

Licuala Kunstleri, *Becc.* Ulu Gombak (Hume). A small palm, endemic, not common in forest, Penang, Upper Perak, Kelantan, Perak, Pahang.

Licuala modesta, *Becc.* Seminyih (Hume). A small palm, endemic and rare in forest, Taiping Hills and Kuala Kangsar.

Zalacca conferta, *Griff.* K. Lumpur (Ridley). A shortstemmed palm of Borneo; in the Peninsula common in swamps, Perak and the Dindings to Singapore.

Zalacca glabrescens, *Griff.* K. Lumpur (Ridley). A stemless palm, endemic, Penang, Kelantan, Pahang, Selangor, in forest.

Eugeissonia tristis, *Griff.* K. Lumpur; Ulu Gombak. A large tufted palm of Borneo; in the Peninsula common in forest on the west from Penang to Johore.

Dæmonorops calicarpus, *Mart.* Dusun Tua; ?K. Lumpur. A tufted palm, endemic and common in forest from Penang to Johore.

Dæmonorops carcharodon, *Ridl.* Batu Tiga (Ridley). A climbing palm, endemic and rare, Singapore.

Dæmonorops didymophyllus, *Becc.* Rawang (Ridley). A climbing palm of Borneo; in the Peninsula not uncommon in forest from Penang to Singapore.

Dæmonorops grandis, *Mart.* Batu Tiga (Ridley). A climbing palm, endemic, Kedah Peak to Singapore, common in the south in forest.

Dæmonorops hygrophyllus, *Mart.* Batang Berjuntai; Petaling. A stout climbing palm, endemic, not common, Taiping Hills and Malacca.

Dæmonorops Hystrix, *Mart.* Batu Tiga (Ridley). A climbing palm of W. Malaysia; in the Peninsula common in forest from Penang to Singapore.

Dæmonorops periacanthus, *Miq.* Ulu Gombak (Hume). A stout climbing palm of Sumatra, Bangka and Borneo; in the Peninsula Perak to Singapore, in forest.

Dæmonorops propinquus, *Becc.* K. Lumpur; Seminyih. A climbing palm of Sumatra; in the Peninsula Penang and Upper Perak to Singapore, in forest.

Dæmonorops setigerus, *Ridl.* Ulu Gombak (Ridley). A climbing palm, endemic, Taiping Hills to Singapore, common in forest.

Ceratolobus lævigatus, *Becc.* K. Lumpur; Sungai Buloh. A climbing palm, endemic, Perak, Dindings, Semangkok Pass, Pulau Tioman, in forest.

Calamus castaneus, *Griff.* K. Lumpur; Kuang; Seminyih. A tufted palm, endemic and common in forest from Penang and Upper Perak to Johore.

Calamus ciliaris, *Bl.* Ulu Gombak (Hume). A climbing palm of W. Malaysia; in the Peninsula not very common, Perak and Pahang to Johore.

Calamus conirostris, *Becc.* Weld's Hill (Ridley). A climbing palm, endemic and rare in forest, Gopeng (Perak).

Calamus Curtisii, *Ridl.* K. Lumpur (Curtis). A climbing palm, endemic, not common in forest, Perak and Pahang.

Calamus densiflorus, *Becc.* Batang Berjuntai; K. Lumpur. A climbing palm, endemic, Taiping to Singapore, in forest.

Calamus Diepenhorstii, *Miq.* Selangor, without precise locality (Cantley's collector). A climbing palm of Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Calamus filipendulus, *Becc.* Rawang (Ridley). A climbing palm, endemic and rare, Perak and Pahang.

Calamus javensis, *Bl.* Batu Caves; Klang Gates; K. Lumpur (the species and var. *purpurascens*, *Ridl.*). A climbing palm of Java and Borneo; in the Peninsula common in forest from Penang and Kelantan to Singapore.

Calamus Lobbianus, *Becc.* Petaling; Ulu Gombak. A short-stemmed palm of Borneo; in the Peninsula Pahang, Negri Sembilan, Johore and Singapore, in forest.

Calamus luridus, *Becc.* Rawang (Ridley). A climbing palm of Borneo; in the Peninsula Taiping to Singapore, in forest.

Calamus neglectus, *Becc.* K. Lumpur (Ridley). A climbing palm, endemic and apparently rare, Malacca.

Calamus perakensis, *Becc.* Ulu Gombak (Hume). A climbing palm, endemic, not common in montane forest, Pahang, Selangor.

Calamus ramosissimus, *Griff.* Seminyih; Ulu Gombak. A climbing palm, endemic, Kedah Peak to Negri Sembilan, in forest.

Calamus scipionum, *Lour.* Batu Tiga; K. Lumpur. A large climbing palm of Sumatra, Borneo and Indo-China; in the Peninsula Perak and Malacca, in forest.

Calamus singaporensis, *Becc.* Seminyih (Hume). A climbing palm, endemic, Penang to Singapore.

Plectocomiopsis dubius, *Becc.* Rantau Panjang (Ridley). A climbing palm, endemic and local.

Plectocomiopsis geminiflorus, *Becc.* Rantau Panjang; Sungai Buloh. A huge climbing palm of Tenasserim, Sumatra and ?Borneo; in the Peninsula not common in forest, Perak.

Korthalsia polystachya, *Mart.* Bukit Tunggul Forest Reserve (Forest Dept.). A climbing palm, endemic, not common in forest, Malacca, Johore and Singapore.

Plectocomia Griffithii, *Becc.* Sungai Buloh (Ridley). A large climbing palm, endemic and common in forest from Penang to Singapore.

CULTIVATED PALMÆ.

Areca catechu, *Linn.* (The Betel-nut Palm). Common in gardens and villages. A tall palm of doubtful origin, cultivated from India to Polynesia.

Arenga saccharifera, *Labill.* (The Sugar Palm). A palm of Indo-Malaya; in the Peninsula widely cultivated, doubtfully wild.

Cocos nucifera, *Linn.* (The Coconut Palm). Commonly cultivated, as it is in all tropical countries.

Cyrtostachys Lakka, *Becc.* (Sealing-wax Palm). Common in gardens. A tufted palm of Borneo; in the Peninsula common on tidal river banks and in swamps.

Elæis guineensis, *Jacq.* (The Oil Palm). A native of Trop. Africa.

Metroxylon sagus, *Rothb.* (The Sago Palm). A tall palm, cultivated throughout Malaya.

Oreodoxa regia, *H. B. K.* (The Royal Palm). Public Gardens, K. Lumpur. A palm of Cuba and Panama; in the Peninsula often cultivated.

PANDANACEÆ.

Pandanus helicopus, *Kurz.* K. Lumpur; Rawang. A tall pandan of Sumatra and Bangka; in the Peninsula not common in rivers, Johore and Singapore.

Pandanus immersus, *Ridl.* Batu Tiga (Ridley). An aquatic pandan, endemic and local, known also from the Labu river, Selangor.

Pandanus ornatus, *Kurz.* Ulu Gombak (Hume). A tall bushy pandan, endemic and common in forest from Kedah to Singapore.

Freycinetia acuminata, *Ridl.* Kuang; Sungai Buloh. A climbing shrub, endemic and rare, known only from these localities.

Freycinetia angustifolia, *Bl.* Ulu Gombak (Hume). A slender climbing shrub of W. Malaysia; in the Peninsula not common in forest, Bukit Hitam (Selangor), Malacca, Johore.

ARACEÆ.

Arisæma Roxburghii, *Kunth.* Batu Caves; Ulu Gombak. A tuberous herb of Java; in the Peninsula Langkawi to Selangor in forest.

Typhonium fultum, *Ridl.* Batu Caves (Ridley). A small herb, endemic and rare on limestone, Langkawi.

Amorphophallus Prainii, *Hook. fil.* Batu Caves (Ridley). A large tuberous herb of Sumatra; in the Peninsula Penang to Pahang and Negri Sembilan, in forest.

Colocasia gigantea, *Hook. fil.* Batu Caves; Ulu Gombak. A large herb of Siam, Indo-China, Java and Borneo; in the Peninsula not common, chiefly on limestone in Perak.

Alocasia denudata, *Engl.* Seminyih; Ulu Gombak. A herb of Lower Siam, Lingga and Borneo; in the Peninsula common from Langkawi to Singapore.

Alocasia Lowii, *Hook. fil.* Batu Caves (Ridley). A herb of Java and Borneo; in the Peninsula Perlis to Johore, often on limestone.

Alocasia ovalifolia, *Ridl.* Batu Caves (Ridley). A herb, endemic, Penang to Johore, in forest.

Aglaonema oblongifolium, *Schott.* Batu Caves; Ulu Gombak. A herb of Lower Siam, Lingga, and Borneo; in the Peninsula common in forest from Langkawi to Singapore.

Aglaonema pictum, *Kunth.* Batu Caves; Dusun Tua (var. *Scortechinii*, *Ridl.*); Klang Gates; K. Lumpur; Ulu Gombak. A herb of Burma and Sumatra; in the Peninsula common in forest from Perak to Singapore.

Homalomena coerulescens, *Jungh.* Bukit Raja; Dusun Tua; Seminyih; Sungai Buloh; Weld's Hill. A herb of W. Malaysia except Borneo; in the Peninsula common in forest from Penang to Singapore.

Homalomena crassa, *Ridl.* Kajang (Ridley). A herb, endemic and rare in forest, known also from Ginting Bidai (Selangor).

Homalomena Griffithii, *Hook. fil.* Ulu Gombak (Hume). A herb of Borneo; in the Peninsula common in forest from Penang to Singapore.

Homalomena humilis, *Hook. fil.* Batu Caves; Klang Gates; K. Lumpur; Petaling; Rantau Panjang; Ulu Gombak. A herb of Sumatra and Borneo; in the Peninsula common in forest from Penang to Selangor.

Homalomena lancifolia, *Hook. fil.* Ulu Gombak (Hume). A herb, endemic, not common in forest, Perak, Pahang and Selangor.

Homalomena purpurascens, *Schott.* Klang Gates (Ridley). A herb of W. Malaysia to the Philippines; in the Peninsula common in forest from Penang to Singapore.

Homalomena rostrata, *Griff.* Batang Berjuntai; K. Lumpur. A herb, endemic, not common in forest, Pahang and Selangor to Johore.

Homalomena Scortechinii, *Hook. fil.* Ulu Gombak (Hume). A herb, endemic, Upper Perak, Perak, Negri Sembilan, in forest.

Schismatoglottis brevicuspis, *Hook. fil.* Petaling (Ridley). A herb, endemic, Penang and Upper Perak to Malacca, in forest.

Schismatoglottis calyptrata, *Zoll. and Mor.* Batu Caves; Petaling; Ulu Gombak. A herb of Indo-Malaya; in the Peninsula common in forest from Penang to Singapore.

Schismatoglottis mutata, *Hook. fil.* Batu Caves (Engler). A herb endemic, not very common Perak and Selangor, often on limestone.

Schismatoglottis Scortechinii, *Hook. fil.* Klang Gates; K. Lumpur; Rawang; Ulu Gombak. A herb, endemic, not common in forest, Perak, Pahang, Johore.

Schismatoglottis Wallichii, *Hook. fil.* Batang Berjuntai; Batu Tiga; Rantau Panjang; Seminyih. A herb, endemic, Province Wellesley and Kelantan to Singapore, in forest.

Piptospatha perakensis, *Ridl.* Klang Gates; Ulu Gombak. A herb, endemic, Perak and Pahang to Malacca, on rocks in streams.

Anadendrum marginatum, *Schott.* Batu Caves; Ulu Gombak. A climbing epiphyte of Sumatra; in the Peninsula not very common in forest, Langkawi to Selangor and Pahang.

Anadendrum montanum, *Schott.* Batu Caves; Batu Tiga; Klang Gates; Sungai Buloh. A climbing epiphyte of Tenasserim to Celebes; in the Peninsula common in forest from Langkawi to Singapore.

Scindapsus hederacea, *Schott.* Batu Caves (Ridley). A shrubby climber of W. Malaysia to the Philippines; in the Peninsula Langkawi to Singapore in forest.

Scindapsus perakensis, *Hook. fil.* Batu Caves (Ridley). A climber of Java and Borneo; in the Peninsula not common in forest, Upper Perak to Malacca.

Epipremnopsis media, *Engl.* Klang Gates (Hume). A climbing shrub of Java, Borneo and the Philippines; in the Peninsula common in forest from Penang to Singapore.

Raphidophora Beccarii, *Engl.* Kuang; Rawang; Ulu Gombak. A climbing shrub of Siam and Borneo; in the Peninsula Penang and Upper Perak to Selangor.

Raphidophora Burkilliana, *Ridl.* Batu Caves (Md. Nur). A climber, endemic and local.

Raphidophora crassifolia, *Hook. fil.* Rawang (Ridley). A climbing shrub, endemic and rare in forest, Taiping and Batang Padang.

Raphidophora Korthalsii, *Schott*, var. *angustiloba*, *Engl.* Batu Caves (Ridley). A climber of Java and Borneo; in the Peninsula common in forest from Penang to Singapore (the species).

Raphidophora Maingayi, *Hook. fil.* Batang Berjuntai; Batu Caves; Seminyih. A climbing shrub, endemic, Malacca, and Singapore (common).

Raphidophora minor, *Hook. fil.* Klang Gates (Hume). A slender climbing shrub of Borneo; in the Peninsula Setul to Singapore, commonest in the south.

Raphidophora pteropoda, *Engl.* Batu Caves (Ridley). A climber of Sumatra and New Guinea; in the Peninsula not common in forest, Penang and Perak.

Raphidophora Wrayi, *Hook. fil.* Batu Caves (Engler). A climber, endemic, Penang, Perak, Pahang, in forest.

Lasia aculeata, *Lour.* Batu Caves; Batu Tiga; Seminyih. A tall herb of Indo-Malaya and Indo-China; in the Peninsula Penang to Singapore in wet places and tidal swamps.

Pothos latifolius, *Hook. fil.* K. Lumpur (Ridley). A climber of W. Malaysia except Borneo; in the Peninsula common in forest from Penang to Singapore.

Pothos lorispatha, *Ridl.* Batu Caves (Ridley). A slender climber, endemic and local.

Pothos scandens, *Linn.* Batu Caves; K. Lumpur. A climbing herb of Indo-Malaya; in the Peninsula Kedah, Penang, Perak and Pahang, in forest.

LEMNACEÆ.

Lemna paucicostata, *Hegelmaier.* K. Lumpur (Burkill). A minute aquatic plant, pantropic; in the Peninsula common in ditches.

Lemna polyrrhiza, *Linn.* Circular Road Plantation, K. Lumpur (Burkill). A cosmopolitan aquatic plant; in the Peninsula not common, Singapore.

Wolfia arrhiza, *Winm.* Circular Road Plantation, K. Lumpur (Burkill). A cosmopolitan aquatic plant; in the Peninsula not common, but abundant where it occurs, Malacca and Singapore.

ERIOCAULACEÆ.

Eriocaulon sexangulare, *Linn.* K. Lumpur; Ulu Gombak. A grasslike herb of Trop. Asia and Madagascar; in the Peninsula common in damp places.

CYPERACEÆ.

Kyllinga brevifolia, *Rottb.* Ampang; Batang Berjuntai; K. Lumpur; Ulu Gombak. A pantropic sedge; in the Peninsula common in waste ground.

Kyllinga melanosperma, *Nees.* Rantau Panjang; Seminyih; Ulu Gombak. A sedge of Africa, India, Java and the Philippines; in the Peninsula not common in grass.

Kyllinga monocephala, *Rottb.* Ampang; K. Lumpur; Seminyih; Ulu Gombak. A pantropic sedge; in the Peninsula common in grass.

Pycreus polystachyus, *Beauv.* Batang Berjuntai; Seminyih; Ulu Gombak. A sedge, pantropic; in the Peninsula common in waste ground.

Cyperus compressus, *Linn.* Klang Gates; Pudu; Ulu Gombak. A tufted sedge, pantropic; in the Peninsula common in waste ground from Penang to Singapore.

Cyperus diffusus, *Vahl.* Batu Caves; Klang Gates; K. Lumpur (the species and var. *pubisquama*, *Ridl.*); Seminyih; Ulu Gombak. A sedge, pantropic; in the Peninsula common from Kedah to Singapore in sandy places.

Cyperus digitatus, *Roxb.* K. Lumpur (Ridley). A tall sedge, pantropic; in the Peninsula common in ditches.

Cyperus distans, *Linn.* Ampang; Batang Berjuntai; K. Lumpur; Ulu Gombak. A sedge, pantropic; in the Peninsula common in wet places.

Cyperus Haspan, *Linn.* Ampang; K. Lumpur; Rantau Panjang; Seminyih; Ulu Gombak. A sedge, pantropic; in the Peninsula common in wet open places.

Cyperus Iria, *Linn.* Ampang; K. Lumpur; Seminyih; Ulu Gombak. A sedge of the tropics of the Old World; in the Peninsula common in ricefields, etc.

Cyperus pilosus, *Vahl.* Ampang; K. Lumpur; Pudu; Rantau Panjang; Seminyih; Ulu Gombak. A sedge of Africa and Trop. Asia to the Philippines; in the Peninsula common in wet places.

Cyperus pulcherrimus, *Willd.* Batu Caves; K. Lumpur. A tufted sedge of India to Java and Borneo; in the Peninsula common in wet places from Perlis to Selangor and Pahang.

Cyperus rotundus, *Linn.* K. Lumpur (Hume). A sedge, pantropic; in the Peninsula common in waste ground.

Cyperus Zollingeri, *Steud.* K. Lumpur (Hume). A sedge of Trop. Africa and Asia to Australia; in the Peninsula common in dry places.

Mariscus cyperinus, *Vahl.* Seminyih; Ulu Gombak. A sedge of Trop. Asia to Polynesia; in the Peninsula common in waste ground.

Mariscus microcephalus, *Presl.* K. Lumpur; Pudu. A tufted sedge of Mauritius and Indo-Malaya; in the Peninsula common near the sea or in damp places.

Mariscus sieberianus, *Nees.* Batu Caves; Kepong; K. Lumpur; Ulu Gombak. A pantropic sedge; in the Peninsula common in waste ground.

Eleocharis chaëteria, *Rœm. & Schultes*. Batang Berjuntai; Klang Gates; K. Lumpur. A small tufted sedge, pantropic; in the Peninsula common in damp places.

Eleocharis ochrostachys, *Steud.* Rantau Panjang (Hume). A tufted sedge of Java and Borneo; in the Peninsula common in wet places.

Fimbristylis asperrima *Bœck.* Ampang; Weld's Hill. A sedge of Indo-Malaya; in the Peninsula common in shade.

Fimbristylis diphylla, *Vahl.* Batang Berjuntai; Dusun Tua; Klang Gates; K. Lumpur; Pudu; Seminyih; Ulu Gombak. A pantropic sedge; in the Peninsula common in waste ground.

Fimbristylis ferruginea, *Vahl.*, var. *arvensis*, *Ridl.* Ampang (Hume). A sedge, the species pantropic and common in the Peninsula in tidal mud.

Fimbristylis globulosa, *Kunth.* Rantau Panjang; Seminyih. A sedge of India to Polynesia; in the Peninsula common.

Fimbristylis miliacea, *Vahl.* Ampang; Batang Berjuntai; Seminyih; Ulu Gombak. A tufted sedge, pantropic; in the Peninsula common in damp places.

Fimbristylis schœnoides, *Vahl.* K. Lumpur (Seimund). A sedge of S. E. Asia and Australia; in the Peninsula Penang and Kelantan to Singapore in open places.

Bulbostylis puberula, *Kunth.* Ampang; Ulu Gombak. A small tufted sedge of Indo-Malaya; in the Peninsula not very common in dry sandy places, Penang to Singapore.

Scirpus mucronatus, *Linn.* Ampang; K. Lumpur; Salak South Rd. A tall sedge of S. Europe to Australia; in the Peninsula common in wet places.

Furiëna umbellata *Rottb.* K. Lumpur; Pudu; Seminyih; A sedge, pantropic and common in the Peninsula in wet places.

Liphocarpa argentea, *A. Br.* Seminyih (Hume). A sedge of the tropics of the Old World; in the Peninsula common in damp places.

Rhyncospora aurea, *Vahl.* Batang Berjuntai; Batu Tiga; K. Lumpur; Pudu; Seminyih. A tall sedge, pantropic; in the Peninsula common in wet places.

Rhyncospora glauca, *Vahl.* K. Lumpur (Seimund). A sedge, pantropic; in the Peninsula not common in sandy places.

Gahnia tristis, *Nees.* K. Lumpur (Ridley). A large tufted sedge of Borneo and South China; in the Peninsula common in dry places.

Hypolytrum latifolium, *Rich.* Batang Berjuntai; K. Lumpur; Petaling; Seminyih; Ulu Gombak. A tufted sedge of Indo-Australia and China; in the Peninsula common in the lowlands in forest.

Mapania humilis, *Naves & Villar.* Petaling; Ulu Gombak. A sedge of W. Malaysia to the Philippines; in the Peninsula common in forest, Penang to Singapore.

Mapania Kurzii, *Clarke.* Klang Gates; Rantau Panjang. A tufted sedge, endemic, Penang, Perak, Malacca, in forest.

Mapania palustris, *Benth.* Seminyih; Ulu Gombak. A large tufted sedge of ?Java; in the Peninsula common in forest from Upper Perak to Singapore.

Mapania Wallichii, *Clarke.* Batu Tiga (Ridley). A large tufted sedge of Borneo; in the Peninsula not common in forest, Singapore.

Scleria bancana, *Miq.* Batang Berjuntai; K. Lumpur. A sedge of Tenasserim to the Pacific; in the Peninsula common in open places.

Scleria elata, *Thw.* Ulu Gombak (Hume). A sedge of India, Java, Borneo, China and New Guinea; in the Peninsula Penang and Upper Perak to Selangor in forest.

Scleria hebecarpa, *Nees.* Batu Caves; K. Lumpur. A sedge of Indo-Australia, China and Japan; in the Peninsula common in open places from Setul to Singapore.

Scleria lævis, *Retz.* K. Lumpur (Hume). A sedge of Indo-Malaya and China; in the Peninsula common in grass.

Scleria lithosperma, *Sw.* K. Lumpur (Hume). A sedge, pantropic (except Africa); in the Peninsula common in dry places.

Scleria multifoliata, *Bœck.* Seminyih; Ulu Gombak. A sedge of Indo-Malaya; in the Peninsula common in open places.

Scleria radula, *Hance.* Ulu Gombak (Hume). A tall sedge of Hongkong; in the Peninsula not common, usually montane, Penang, Perak, Pahang, Selangor.

Scleria sumatrensis, *Retz.* Batu Tiga; K. Lumpur. A sedge of Indo-Malaya to the Philippines; in the Peninsula common in open places from Penang to Singapore.

GRAMINEÆ.

Imperata arundinacea, *Cyrillo.* (Lallang). Klang Gates; K. Lumpur; Seminyih; and without doubt in all the other localities. A pantropic grass; in the Peninsula common everywhere in open country.

Saccharum arundinaceum, *Reiz.* Batu Caves (Ridley). A tall grass of Indo-Malaya to the Philippines and China; in the Peninsula common from Penang to Singapore, usually on river banks.

Eulalia Milsumi, *Ridl.* Klang Gates (Kloss, Milsum and Ridley). A tufted grass, endemic and local on quartzite rocks.

Ischæmum aristatum, *Linn.* Ampang; Seminyih; Ulu Gombak. A creeping grass of Indo-Australia and China; in the Peninsula very common in waste ground.

Ischæmum Beccarii, *Hack.* Top of the Batu Caves (Ridley). A grass of Borneo; in the Peninsula rare, known only from this locality and from the Botanic Gardens, Singapore.

Ischæmum muticum, *Linn.* Batang Berjuntai; K. Lumpur; and doubtless in most of the other localities. A creeping grass of Indo-Australia; in the Peninsula very common.

Ischæmum rugosum, *Salisb.* Weld's Hill (Burkill). A grass of Indo-Malaya and China; in the Peninsula not common in waste ground.

Ischæmum timorense, *Kunth.* Ulu Gombak (Hume). A grass of India to Polynesia; in the Peninsula common from Penang to Singapore.

Cœlorrhachis glandulosa, *Brongn.* Batu Caves (Ridley). A tall tufted grass of Indo-Australia; in the Peninsula common, often on riverbanks.

Chrysopogon aciculatus, *Trin.* K. Lumpur; Pudu; Ulu Gombak. A grass of Trop. Asia and Australia; in the Peninsula common in dry places.

Themeda villosa, *Durand and Jackson.* Batu Caves; K. Lumpur. A tall grass of Indo-Australia and China; in the Peninsula common in open places.

Digitaria cæspitosa, *Ridl.* Salak South Road (Seimund). A small tufted grass, endemic, Johore and Singapore in open places.

Digitaria chinensis, *Hornem.* Batu Caves (Ridley). A tufted grass of Indo-Malaya and China; in the Peninsula Penang, Perak and Singapore in waste ground.

Digitaria longiflora, *Pers.* Ampang; K. Lumpur; Pudu; Seminyih; Ulu Gombak. A creeping grass of the Tropics of the Old World; in the Peninsula common.

Digitaria marginata, *Link.* Ampang; Batu Caves; K. Lumpur Seminyih; Ulu Gombak. A pantropic grass; in the Peninsula common and variable.

Axonopus compressus, *Beauv.* Bukit Raja; K. Lumpur; Ulu Gombak. A South American grass, introduced into the Peninsula and now established in several localities.

Paspalum Commersonii, *Lam.* Weld's Hill (Md./Nur.). A tufted grass, pantropic, in the Peninsula not common in damp places, Pahang, Negri Sembilan, Singapore.

Paspalum conjugatum, *Berg.* Ampang; Klang Gates; Seminyih; Ulu Gombak; Weld's Hill. A pantropic grass, common in the Peninsula but probably introduced.

Paspalum longifolium, *Roxb.* Salak South Rd.; Weld's Hill. A grass of Indo-Malaya; in the Peninsula not very common in open places, Penang to Singapore.

Brachiaria mutica, *Stapf.* Petaling; Ulu Gombak. A pantropic grass, often cultivated in the Peninsula and occurring as an escape.

Oplismenus compositus, *Beauv.* Batu Caves; Klang Gates; Seminyih. A pantropic grass; in the Peninsula common in dry places from Langkawi to Johore.

Echinochloa colona, *Link.* K. Lumpur; Rawang; Seminyih; Ulu Gombak. A tufted grass, pantropic; in the Peninsula common in waste ground.

Eriochloa annulata, *Kunth.* Petaling (Ridley). A grass, pantropic; in the Peninsula occasional in waste ground.

Panicum auritum, *Presl.* Batu Caves; Batu Tiga; Klang Gates; Seminyih; Ulu Gombak. A tall grass of Indo-Malaya and China; in the Peninsula common in wet places.

Panicum cæsium, *Hook.* K. Lumpur (Hume). A grass of Indo-Malaya to the Philippines; in the Peninsula common in open places.

Panicum ovalifolium, *Poir.* Rantau Panjang (Hume). A grass of Africa, Indo-Malaya and China; in the Peninsula common in damp shady places.

Panicum sarmentosum, *Roxb.* Klang Gates; Rawang. A scandent grass of Indo-Malaya and China; in the Peninsula common on forest edges from Setul to Singapore.

Hemigymnia fusca, *Ridl.* Ampang; Batu Caves; Rantau Panjang. A grass of ?Indo-Malaya; in the Peninsula common.

Acroceras sparsum, *Stapf.* Batu Caves; Klang Gates; Rawang; Seminyih; Ulu Gombak. A creeping grass of Indo-Malaya; in the Peninsula common in open places and secondary growth.

Ichnanthus pallens, *Munro.* Batu Caves (Ridley). A pantropic grass; in the Peninsula not very common in forest, Penang to Johore.

Sacciolepis myosuroides, *Ridl.* Ulu Gombak (Hume). A grass of Trop. Africa and Asia to Trop. Australia; in the Peninsula common from Penang and Kelantan to Singapore in damp places.

Sacciolepis turgida, *Ridl.* K. Lumpur (Burkill). A tufted grass of India and Java; in the Peninsula common in grassy places.

Cyrtococcum accrescens, *Stapf.* Klang Gates; Rantau Panjang; Seminyih; Ulu Gombak; Weld's Hill. A creeping grass of Indo-Malaya to Polynesia and China; in the Peninsula common in shade.

Cyrtococcum carinatum, *Stapf.* Weld's Hill (Burkill). A small creeping grass of Indo-Malaya and Indo-China; in the Peninsula not common in shade, Malacca.

Cyrtococcum oxyphyllum, *Stapf.* Klang Gates; K. Lumpur; Ulu Gombak. A creeping grass of Indo-Australia and the Mascarene Islands; in the Peninsula common in waste ground and by roadsides.

Setaria plicata, *Cooke.* Batu Caves; Dusun Tua; Seminyih; Ulu Gombak. A tall grass of Indo-Malaya and China; in the Peninsula Perak and Kelantan to Johore, not very common.

Setaria rubiginosa, *Beauv.* Batang Berjuntai; Rantau Panjang; Ulu Gombak. A tufted grass of Trop. Asia; in the Peninsula common in waste ground.

Tricholæna rosea, *Nees.* Batu Caves; Klang Gates. A tufted grass of Africa; introduced into the Peninsula about 1901, and now established in Selangor and Negri Sembilan, and in parts of Perak.

Isachne australis, *R. Br.* Ampang; K. Lumpur; Pudu; Seminyih. A grass of Indo-Australia; in the Peninsula common in damp grassy places from Taiping and Trengganu to Singapore.

Isachne semitalis, *Ridl.* Batang Berjuntai; Petaling; Rantau Panjang; Rawang. A creeping grass of Borneo; in the Peninsula not uncommon in wet places.

Eriachne pallescens, *Br.* Klang Gates (Ridley, Foxworthy and Burkill). A grass of Indo-Australia and China; in the Peninsula common in open dry places.

Phragmites communis, *Trin.* K. Lumpur (Ridley). A tall grass of Africa and Trop. Asia to Australia; in the Peninsula common on riverbanks.

Thysanolæna agrostis, *Nees.* Ulu Gombak (Hume). A large tufted grass of India to New Guinea; in the Peninsula Penang to Negri Sembilan, common in dry places.

Sphærocaryum elegans, *Nees*. Batang Berjuntai; K. Lumpur; Ulu Gombak. A small grass of Indo-China; in the Peninsula common in wet places from Taiping to Singapore.

Zoysia pungens, *Willd.* K. Lumpur (Md. Nur). A small grass of the tropics of the Old World; in the Peninsula common in damp places.

Sporolobus diander, *Beauv.* K. Lumpur; Pudu; Seminyih; Ulu Gombak. A grass of Trop. Asia and Australia; in the Peninsula common in dry places.

Sporolobus indicus, *Br.* K. Lumpur; Pudu; Seminyih; Ulu Gombak. A grass, pantropic; in the Peninsula Penang to Singapore in dry places.

Eragrostis amabilis, *Wight & Arn.* Ampang; Batang Berjuntai; K. Lumpur; Pudu; Rantau Panjang; Seminyih; Ulu Gombak. A grass of Trop. Africa and Trop. Asia; in the Peninsula very common in waste ground.

Eragrostis elegantula, *Steud.* Ampang; K. Lumpur; Pudu. A grass of India to S. China, Borna and the Philippines; in the Peninsula common in damp places.

Eragrostis elongata *Jacq.* K. Lumpur (Hume, Ridley). A grass of Trop. Asia to Australia; in the Peninsula common in waste ground.

Eragrostis malayana, *Stapf.* Ulu Gombak; Weld's Hill. A grass of Bangka and Borneo; in the Peninsula not common in waste ground, Taiping to Singapore.

Eragrostis pilosa, *Beauv.* Batu Caves (Ridley). A pantropic grass, not uncommon in the Peninsula by roadsides.

Eragrostis tenella, *Rœm. & Schultes.* Pudu (Hume). A grass of Trop. Africa and Asia; in the Peninsula common in waste ground.

Cynodon dactylon, *Pers.* K. Lumpur, common. A creeping grass, pantropic; in the Peninsula common in open places.

Eleusine indica, *Gaertn.* Ampang; Klang Gates; Pudu; Seminyih; Ulu Gombak. A grass, pantropic; in the Peninsula very common in waste ground.

Dactyloctenium ægypticum, *Willd.* Ampang; Batu Tiga; K. Lumpur. A grass, pantropic, not very common in the Peninsula in sandy places.

Oryza latifolia, *Desv.* Ampang (Hume). A grass of Trop. America, Africa and Asia; in the Peninsula Kedah, Perak, Johore, in wet places.

Oryza Ridleyi, *Hook. fil.* Kajang Road (Ridley). A grass of Borneo; in the Peninsula in wet places from Perak to Johore.

Leersia hexandra, Sw. Ampang; K. Lumpur. A pan-tropic grass, common in the Peninsula in swamps.

Centotheca lappacea, Desv. Batang Berjuntai; Rantau Panjang; Seminyih; Ulu Gombak. A tall grass of the tropics of the Old World; in Peninsula common in forest.

Lophatherum gracile, Brngn. Batang Berjuntai; Rantau Panjang; Seminyih. A grass of Trop. Asia; in the Peninsula common in forest.

Leptaspis urceolata, Br. Batu Caves; Klang Gates; K. Lumpur; Seminyih. A grass of Indo-Malaya to New Guinea; in the Peninsula common in forest.

Gigantochloa Scortechinii, Gamble. Near Batu Caves (Ridley). A bamboo, endemic, Upper Perak to Selangor and Pahang.

Oxytenanthera sinuata, Gamble. Ulu Gombak (Hume). A slender bamboo of Lower Siam; in the Peninsula not common, Pahang, Negri Sembilan, Johore.

Dendrocalamus pendulus, Ridl. Ulu Gombak (Burkill, Hume). A tall bamboo, endemic, Upper Perak to Negri Sembilan.

Schizostachyum aciculare, Gamble. Batu Tiga; Ulu Gombak. A small bamboo of Sumatra and Borneo; in the Peninsula Dindings, Perak, Pahang, Selangor, Negri Sembilan.

Schizostachyum ?subcordatum, Ridl. Ulu Gonibak (Hume 8908).

CULTIVATED GRAMINEÆ.

Bambusa nana, Roxb. Cultivated for hedges. A small bamboo of China and Japan; in the Peninsula extensively cultivated.

Bambusa vulgaris, Schrad. K. Lumpur. A bamboo of India, often cultivated in the Peninsula.

Coix lachrymæ-Jobi, Linn. (Job's tears). K. Lumpur; Serdang Experimental Plantation. A tall grass of Trop. Asia; in the Peninsula commonly cultivated and occurring as an escape.

Cymbopogon citratus, Stapf. (Lemon grass). K. Lumpur; Serdang Experimental Plantation. A tufted grass of uncertain origin, widely cultivated in Indo-Malaya.

Cymbopogon Nardus, Rendle. (Citronella grass). K. Lumpur; Serdang Experimental Plantation. A tufted grass of ? Ceylon, cultivated in Africa, Asia and Australia.

Oryza sativa, Linn. (Rice). A tall grass, native of India, cultivated in the Peninsula as it is in most tropics and subtropics.

Panicum maximum, *Jacq.* (Guinea grass). Cultivated; near Klang Gates (Ridley). A tall grass of Africa; in the Peninsula cultivated for horse fodder.

Saccharum officinarum, *Linn.* (Sugar cane). A tall grass of unknown origin, cultivated in all tropical countries.

Zea Mays, *Linn.* (Maize). A grass of Mexico, cultivated in most temperate and tropical countries.

GNETACEÆ.

Gnetum brunonianum, *Griff.* Klang Gates; Seminyih; Sungai Buloh; Ulu Gombak. A shrub of Tenasserim and Borneo; in the Peninsula common in forest.

Gnetum Kingianum, *Gamble.* Ulu Gombak (Forest Dept.). A liane, endemic, common in forest from Penang to Singapore.

Gnetum longispicum, *Ridl.* Rawang (Ridley). A climber, endemic, not common in forest, Perak, Selangor, Pahang, Johore.

Gnetum tenuifolium, *Ridl.* K. Lumpur (Ridley). A climber of Lower Siam; in the Peninsula common in forest north of Malacca.

CONIFERÆ.

Agathis alba, *Foxworthy.* Ulu Gombak (Hume). A lofty tree of W. Malaysia to the Philippines and Indo-China; in the Peninsula Kedah, Penang, Perak, Pahang.

Podocarpus Blumei, *Endl.* Ampang (Forest Dept.). A tree of Java to New Guinea; in the Peninsula Perak to Singapore, sporadic in forest.

Note: Delete **Digitaria chinensis**, *Hornem.* from the list
Ridley's specimen from Batu Caves is **Cynedon dactylon**, *Pers.*

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Family names in capitals; generic names in ordinary type;
common names in italics.

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Departmental Notices.

A list of plants which can be purchased at the Botanic Gardens, in Singapore and in Penang, can be had upon application. The same list appears at intervals in the Government Gazette.

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THE
GARDENS' BULLETIN
STRAITS SETTLEMENTS

Vol. IV.

Nos. 11 & 12.

ON SOME FERNS FROM THE MALAY PENINSULA

By Carl Christensen, Copenhagen, Denmark.

From Mr. R. E. Holttum, Director of the Botanic Gardens, Singapore, I have received in 1926 and 1927 two lots of duplicate specimens of ferns from the Peninsula. The specimens were of extraordinary interest to me, because I am now engaged in the determination of three very large collections of ferns from Borneo, in connection with a critical revision of the whole fern-flora of that large island, based on examination of type specimens received on loan from the leading herbaria in Europe and America. It soon became clear to me that the fern floras of Borneo and the Malay Peninsula are very intimately related, having a very large number of species in common. I found that some of the specimens from the Peninsula so kindly sent by Mr. Holttum were perfectly identical with others from Borneo, but in not a few cases different names were given to them.

In July 1926 Mr. H. N. Ridley published his large paper, "The Ferns of the Malay Peninsula" (*Journ. Malayan Branch, R. Asiatic Soc.*, 4, part 1), which work I have studied with considerable interest. It appears that Mr. Ridley has identified the great majority of his specimens at Kew, and has in several cases without criticism adopted Beddome's species. All modern pteridologists agree in taking the species in a narrower sense than Baker and Beddome, and to me several of Ridley's species are an assemblage of a number of most distinct forms. On the other hand he has adopted some of the species recently described by van Alderwerelt van Rosenburgh, who has described an immense number of new species which are scarcely all well founded, and not rarely identical with species previously described. Unfortunately a large number of his new species are not represented by authentic specimens in European herbaria, even not in Leiden, and without examination of such specimens it is in most cases rather impossible to know whether his species are valid ones or not.

As a certain number of the species adopted by Mr. Ridley were unknown to me, and others seemed to be wrongly

named, I asked Mr. Holttum to send me on loan specimens of those species from the Singapore Botanic Gardens Herbarium, and very kindly he did so.

Having thus had specimens of most species enumerated in Mr. Ridley's list, and having compared them with an immense quantity of material from Borneo and with numerous type specimens, I have been able to verify the determinations, or in several cases give the species their right names. In the present paper a part of my critical remarks are published. It contains descriptions of a couple of new species, the first record of several species for the Peninsula, and a revision of some groups of closely related species.

Copenhagen, March 4th, 1928.

Hymenophyllum productum Kunze, Bot. Zeit., 1848, 305; v. d. Bosch, Hym. Jav., 56, pl. 45.

H. demissum Ridley p. 12 (pro parte?).

PERAK: Taiping Hill (Burkill 12836). PAHANG: G. Kajang, P. Tioman (Henderson 18604).

The distinct species has by most authors been considered a "form" of the Australian *H. demissum*; it differs from that species by its smaller size, more open habit and especially by the slightly but distinctly crenately toothed tips of the indusium valves. It is apparently a common species through the Malayan region.

Hymenophyllum semifissum Copeland, Philipp. Journ. Sci., 10 C, 145. 1915.

JOHORE: Gunong Panti (Holttum 18066).

Determined rightly by Mr. Holttum. The species, previously known from Borneo only, seems to be very distinct by its subdimidiate pinnae with long linear entire secondary segments, by the few but long brown hairs on the rachis and the subtrichomanoid sori, the indusia cut half-way down only with two acute valves and a long exserted receptacle. It seems to be rather common in Sarawak, and may be confounded with two other species also common there, viz. *H. Bakeri* Copel. (*Trichomanes denticulatum* Bak.) and ***H. microchilum*** (Bak.) C. Chr. comb. nov. (*Trichomanes* Bak.). The former differs by the serrated segments, the latter especially by the indusia very slightly cleft with two small valves and lack of hairs. Both were referred by Baker to *Trichomanes*, but the whole habit agrees much better with *Hymenophyllum*; within this genus the three species form a special little group. The two Bornean species probably occur also in the Peninsula.

Hymenophyllum tunbridgense (L.) Sm.

To this species Ridley (p. 13) refers two specimens, not seen by me; a third from Pahang (Henderson 18275) and so named by Holttum is certainly not *H. tunbridgense*, but a form of the very variable *H. holochilum*, near var. *affine*

(v. d. B.). I do not believe that the true *H. tunbridgense* occurs in the Malayan region.

Trichomanes sublimbatum K. Muell.

Specimens from Singapore (Bukit Timah), leg. Holttum (10481) and by him named *T. sublimbatum*, agree with the specimen from the same locality (Ridley 6684) which Ridley, p. 15, referred to *T. Henzaianum* Parish. It is a proportionally large form (leaves 2-3 cm. long), deeply pinnatifid with about 4 linear oblong lobes on each side, in habit recalling the American *T. montanum* Hook. Spurious veins many, as in *T. sublimbatum* (cf. v. d. Bosch: Hym. Jav. pl.2) but connected by an intramarginal continuous spurious vein, which is not found in the genuine *T. sublimbatum*. The determination is therefore not certain, but it is not, I think, *T. Henzaianum* Parish, known by me from Hooker's illustration (Cent. pl. 1) and certainly it is not a variety of *T. Motleyi*, as suggested by Ridley. Holttum's collection (no. 10481) contains several smaller fronds which no doubt are typical *T. sublimbatum* with entire or slightly lobed blades, without intramarginal vein, and mixed with them several others of the larger, pinnatifid form. It is probable that these two forms are states of one species, and may possibly be formed on the same rhizome, which I have not, however, observed, so I am not sure. If this hypothesis is wrong, I should be inclined to consider the larger, pinnatifid form an undescribed species. I have it also from Sumatra and Borneo.

Trichomanes humile Forst., Prod., 84.

Crepidomanes humile v. d. Bosch, Hym. Jav., 16, pl. 11.

Trichomanes pyxidiferum pro parte, Ridley, p. 18.

SINGAPORE: Bukit Timah (Holttum 10482).

Easily distinguished from *T. bipunctatum* and the two following species by the presence of a *marginal* spurious vein, and by its thin texture.

Trichomanes brevipes (Pr.) Baker, Syn. Fil., 84. 1867.

Didymoglossum brevipes Presl, Hymenoph., 23, 47. 1843.

Trichomanes melanorhizon Hook., Spec., 1, 140. 1846. Ic. Plant., pl. 705.

Trichomanes recedens Rosenstock, Meded. Rijks Herb. Leiden, no. 11, 2. 1912.

Trichomanes microlirion Copeland, Philipp. Journ. Sci., 10 C, 146. 1915.

Trichomanes pyxidiferum pro parte, Ridley, p. 18.

SINGAPORE: (Ridley.) JOHORE: (Ridley 13473).

A beautiful series of specimens from Borneo, with which these from the Malay Peninsula fully agree, have convinced me that *T. brevipes* is a distinct species, different

from *T. bilabiatum*, to which it has been referred (see Ind. Fil.) and therefore forgotten and in recent time redescribed as a new species by Rosenstock and Copeland. It differs from *T. bilabiatum* by its light green colour, by the presence of several short reddish hairs on rachis and ribs beneath, by the short spurious veins in the parenchyma within the submarginal one being very few or none, by the sori being confined to the axils of the uppermost pinnae, which often are very much reduced so that the sori sometimes form a spike at the top of the frond, and by the valves of the indusia being short, rounded, and at maturity reflexed. *T. pyxidiferum* Ridley is partly this species, partly probably *T. bilabiatum* and *T. humile*. The genuine *T. pyxidiferum* L. is a West Indian species not found in the Old World.

Trichomanes bilabiatum Nees et Bl., Nova Acta, 11, 123, Pl. 13, fig. 2. 1823.

Didymoglossum laxum v. d. Bosch, Hym. Jav., 37, pl. 27.

I have seen no specimen of this species from the Malay Peninsula, but as it occurs in most of the Malayan Islands it certainly also may be found in the Peninsula. In habit it resembles the former species; it is dark green, not so conspicuously hairy, spurious short veins in the parenchyma numerous, and the sori not confined to the axils of the upper pinnae, several of the outer segments being often soriferous, the valves of the indusium longer.

Trichomanes setaceum v. d. Bosch, Nederl. Kruidk. Arch., 5 (2), 176. 1861.

Tr. setigerum Backh., Cat. 14. 1861 (not seen). Moore, Gard. Chron., 1862, 45, sp. auth., Kew!

Tr. parviflorum auctt.; Ridley 20, not Poir.

Most specimens from Tropical Asia hitherto named *T. parviflorum* (or *T. foeniculaceum* Bory) belong, I think, to *T. setaceum* v. d. B. described from a specimen from Singapore. It seems to be common in Borneo and may easily be known from the other species of the section *Leptomanes* by the ultimate filiform segments being connate below, forming an undivided basal portion of the ultimate pinnules. The true *T. parviflorum* from the Mascarene Islands has, as *T. pluma* and *T. meifolium*, the ultimate pinnules cut to the midrib into filiform, terete segments, the midribs of which are bordered by 1-3 rows of clear parenchymatous cells, much as in *T. gemmatum*. The only specimen by Ridley referred *T. parviflorum* (leg. Murton) is to me *T. setaceum*. He cites this name as a synonym of *T. cupressoides* Desv., which differs by its somewhat crisped fronds and the secondary pinnules not being dissolved into filiform segments, the ultimate veins being connate nearly to the apex.

Alsophila Burbidgei Baker, Journ. Bot., 1879, 38.

? *A. trichodesma* Scort., Bedd., Journ. Bot., 1887, 321.

Cyathea mollis Copel., Philipp. Journ. Sci., 12 C, 52. 1917.

PERAK: Bujang Malacca (Herb. Bot. Gard. Singapore, probably coll. Wray, s. n.; *A. trichodesma*). NEGRI SEMBILAN: Bukit Tangga (Md. Nur, 11830).

The name *A. Burbidgei* was applied by Bishop Hose and Dr. Christ to a Bornean species, which differs from the true *A. Burbidgei*, from Sarawak (Burbidge, Kew!) by the densely squamose stipe and rachis; it is, I believe, very nearly the same as *A. Margarethae* Schwet. These large tree ferns are usually very difficult to identify because most material in the herbaria is fragmentary; this is the case with the type specimens of *A. Burbidgei* and *A. Margarethae* (Herb. Bonaparte, Paris).

The genuine *A. Burbidgei*, of which the stipe is unknown to me, is a rather thin-leaved species with dark brown or atropurpureous main rachis which shows no traces of scales but is minutely scabrous from fallen hairs, above densely and adpressedly pubescent. All its ribs beneath densely hirsute by patent, rather soft, pluricellular hairs, the costules with some few lanceolate brown scales and the midribs of segments with a few whitish bullate scales beneath. The pinnules are very shortly petiolulate, the segments subentire or crenate; sporangia mixed with some long hairs.

The specimen from Negri Sembilan resembles very closely Baker's type, and the specimen from Perak, supposed to be *A. trichodesma* Scort. is very nearly the same; its rachis is lighter and still pubescent beneath, the pinnules sessile, the segments distinctly crenately toothed, the hairs stiffer, cylindrical, subulate, distinctly septate, very much like those of *A. margarethae*, but all these differences seem scarcely sufficient for the segregation of this form as a distinct species. According to Beddome its stipe is scaly at base only. *Cyathea mollis* Copel. from British North Borneo (Sandakan, Mrs. Clemens 9440, Herb. Copeland!) is, I firmly believe, a less pubescent form of the same species.

***Dryopteris pectiniformis* n. sp.**

Lastrea. Rhizome probably erect. Stipe stramineous, shortly puberulous. Lamina ovate-elongate, acuminate, herbaceous, 45 cm. long, 22 cm. wide, bipinnatifid. Rachis densely but very shortly pubescent. Pinnae about 20 pairs, sessile, the lower opposite, the upper alternate, acuminate, the lower not reduced, the largest 11 cm. long, 1.8 cm. wide, at distances of about 3.5 cm., patent, very regularly pectinato-pinnatifid to a wing 1 mm. broad. Segments a little oblique, separated by narrow sinuses, the basal ones of lower

pinnae reduced, the upper basal one of upper pinnae somewhat enlarged, medial ones oblong, acute, entire, 2mm. broad Costae densely grayhairy on both sides, midribs and veins sparsely pubescent, the underside densely glandular with red, shining glands. Veins 7-8 jugate, simple. Sori medial or a little inframedial, indusia large, rufous, persistent, glabrous.

PERAK: without definite locality, leg. Bishop Hose. (Type in Herb. Roland Bonaparte, Mus. d'Hist. Nat. Paris).

The specimen was distributed as *Nephrodium gracilescens*, and it was probably collected in the Taiping Hills; other specimens from the same collection (Hose 293 ?) were referred to that species by Ridley, p. 64. It differs from *D. gracilescens* by larger size, finely glandular underside, more densely and more shortly pubescent rachis and costae, the large rufous-brown indusia, etc. The true *D. gracilescens* (Bl.) from Java is eglandulose, has obtuse segments, supramedial sori, and is as a whole much smaller. A specimen from Perak, leg. Scortechini, referred by Ridley to *D. gracilescens*, belongs rather to *D. pectiniformis*, agreeing with the type in the acute segments and large indusia, but it is without glands.

Dryopteris viscosa (J. Sm.) O. Kze.; C. Chr., Index.

Lastrea viscosa J. Sm., Ridley 65.

Nephrodium gymnopodium Baker, Trans. Linn. Soc., II S, Bot., 4, 252.

Dryopteris gymnopoda C. Chr., Index.

Lastrea Ridleyi Bedd., Kew Bull., 1909, 423.

Ridley 65.

Dryopteris Ridleyi C. Chr., Ind. Suppl., 38, 1913.

Dryopteris athyriocarpa Copeland, Philipp. Journ. Sci., 3 C, 344, 1909.

Dryopteris kinabaluensis Copel., l. c., 12 C, 55, 1917.

Having seen the type specimens of all these "species" described as new in recent time, I am fully convinced that they all must be referred to the old *D. viscosa*. They are all fully identical as to all important characters; the dark stipe, dark colour, more or less glandular surfaces, the reflexed basal pinnae, venation, etc., varying somewhat in indusium-characters and density of the glands. These are as a rule dark-brown, like drops of gum, and may be found on both surfaces, but evidently they soon dry out and are then scarcely perceptible. The indusia are generally persistent, reniform or sub-hippocrepiform with a deep sinus, rarely small as in a cotype specimen of *L. Ridleyi* Bedd. (Ridley 7849), which was described as exindusiate; it is identical with *N. gymnopodium* Bak. from Mt. Kinabalu, British N. Borneo (Haviland 1486, Kew!). *D. kinabaluensis* Copel. from the same mountain (Topping 1719, Herb.

Copeland!) is quite the same. *D. athyriocarpa* Copel. from Sarawak, Bongo Range (Brooks and Hewitt, Herb. Copeland!) is a somewhat different form, evidently common in Borneo, with subathyrioid indusia and the upper basal segment lobed. Other forms occur in Sumatra; the whole complex of forms is closely allied to *D. gracilescens*. Intimately allied to *D. viscosa* is

Dryopteris Robinsonii (Ridley) C. Chr. comb. nov.

Lastrea Robinsoni Ridley, 65.

In general habit and colour it does not differ from *L. viscosa*, but its pubescence is peculiar and it seems to be distinct. The whole leaf is densely glanduloso-pubescent with short hairs, those of the rachis and costae longer and reddish. The surfaces are densely dotted with small whitish spots, probably glands, that are dried out.

Dryopteris crassifolia (Bl.) O. Kze, and related species.

D. crassifolia is, as interpreted in Syn. Fil., by Beddome and Ridley a composite species, including several distinct forms, which I consider good species. In the large collections of Bornean ferns examined by me I find six or seven species pertaining to this group, which presumably also occur in the Malay Peninsula. This narrow group represents the American subgenus *Steiropteris* in Malaya, but is probably not genetically related to it. All species are very uniform in several characters, by which they differ essentially from all other species of the genus. The fronds are more or less coriaceous, when dried of a characteristic brown colour, the lower pinnae distinctly stalked, the veins simple and the basal ones connivent to the sinus, not truly united; in most species an intermittent vein runs from the costa between two segments to the sinus. It is a true vein, not a carinate fold as found in *Steiropteris*. Indusia generally large, but easily rubbed off. Rhizome (of all species?) creeping, the lamina not narrowed below, often terminating in a subdistinct pinnatifid end-pinna, yet not imparipinnate. To this group must naturally be joined some few species that differ from *D. crassifolia* and its immediate allies by the densely scaly stipe and lower part of rachis. All these species at present known to me may be distinguished by the following key:

1. Stipe naked or scaly near base only; rachis without scales or practically so - - - - 2
- Stipe and lower part of rachis densely scaly with linear castaneous scales, or woolly - - - - 6
2. Leaf papyraceous or chartaceous. Pinnae about 2 cm. or less wide, deeply incised to a wing to the costa 1—2 mm. wide, the segments under 3 mm. in width; the

- posterior basal vein springs out from the midrib or from the costa close to the axil of the midrib, reaching the edge just above the bottom of the sinus, to which the opposite anterior vein runs - 3
- Leaf rigidly coriaceous. Pinnæ 2—4 cm. wide, incised $\frac{1}{2}$ to $\frac{2}{3}$ of the way to the midrib, the segments 5—10 mm. broad; the posterior basal vein springs out from the costa 1—5 mm. from the base of the midrib, often midway between two midribs, and running straight to the sinus, below which it is connivent with the opposite anterior vein - - - 5
3. Leaves small, rarely 25 cm. long including the stipe, 4 cm. wide. often much smaller - - - *D. Teuscheri*
Leaves much larger, 50—100 cm. long, 25 cm. wide - - - v. A. v. R. 4
4. Leaf brown when dried; lower pinnæ short-stalked (stalks 1—2 mm.); rachis and costae beneath shortly pubescent and furnished with scattered linear brown scales; edges of segments distinctly thickened - - - *D. chlamydophora*
Leaf grey-green when dried; lower pinnæ on stalks 1—1.5 cm. long; leaf practically glabrous throughout, at best thickly puberulous on rachis above and on costae; scales few or none - Ros.
5. Sori subcostular or at least distinctly inframedial; costae without scales beneath (?); pinnæ incised $\frac{3}{4}$ of the way down, the costal wing at best 5 mm. broad; segments 5—7 mm. broad, falcate *D. Beccariana*
Sori medial, sometimes supra-medial; costae slightly scaly beneath; pinnæ incised about $\frac{1}{2}$ way, the costal wing 8—10 mm. broad; segments 8—10 mm. broad (Ces.) C. Chr.
6. Pinnæ scarcely 2 cm. broad; basal veins both running from the base of the midribs to the sinus; costae *D. crassifolia*
(Bl.) O. Kze.
D. Motleyana
(Hook.) C. Chr.

- and veins beneath short-hairy;
indusia persistent - - - - *D. echinata*
Pinnae 2—4 cm. broad; posterior
basal vein springing out from the
costa and meeting the opposite
anterior one below the sinus - 7
7. Costae above broadly sulcate with
the edges of the furrow densely
bearded with brownish patent
hairs; leaf coriaceous, brownish
when dried - - - - 8
Costae above narrowly sulcate
antrorsely strigose with shorter
or longer hairs; leaf subcoriaceous
or rather thin, grey-green - *D. trichopoda*
C. Chr.
8. Costae and veins beneath sparsely
pubescent; indusia small or none
(?); rachis scaly in the lower
part only - - - - *D. Hallieri*
(Christ) C. Chr.
Costae and veins densely villous;
indusia persistent, hirsute; rachis
scaly throughout - - - - *D. paleata* Copel.

Dryopteris Teuscheri v. A. v. R., Bull. Dept. Agric. Ind.
Néerl., 18, 6. 1908. Mal. Ferns, 183.

To this species, known to me from description only, I refer some specimens from Borneo and Sumatra which differ from the other species of the group by their small size. The largest leaf seen is 25 cm. long by 7 cm. wide, the stipe excluded, others much smaller, 10 cm. long by 2 cm. wide, chartaceous, brownish when dried, glossy above, finely downy and glandular beneath; rachis brownish, quadrangular, rather densely and long-hairy above, glabrous beneath; pinnae alternate, distinctly petiolate, (petioles 0.5—1 mm. long) the basal ones somewhat reduced and often reflexed, the medial ones the largest, 4 cm. long, 1 cm. wide, of small leaves 1—2 cm. long, 3—6 mm. wide, below the short entire obtuse or acute apex, cut down to a wing 1 mm. broad; upper pinnae sessile subentire. Segments oblique, oblong, obtuse, parallel, entire, 1—1.5 mm. broad, the basal ones of lower pinnae much reduced, the upper one free, 1 mm. long and broad, the lower one often quite obsolete. Veins free, simple, about 6-jugate, the anterior basal one running to the sinus, the posterior reaching the edge just above the bottom of the sinus. Sori medial, slightly impressed; indusia persistent, reniform, brown, glabrous (hairy, t. v. A. v. R.). Sarawak: Mt Matang (J. Hewitt 1908, Herb. Copeland); Bongo Range (C. J. Brooks 13, Herb. Copeland, Herb. C. Chr.). Sumatra: (J. Winkler 51).

In size and general habit this new species resembles small forms of *D. gracilescens*, but several important characters, as colour, texture, venation, indusia, show that its

nearest relative is *D. Beccariana*, and I referred my first specimens to that species, but the better specimens in herb. Copeland have, I believe, justified its segregation as a distinct species, especially differing from *D. Beccariana* by its much smaller size, short-tipped pinnae, and the rachis being rather longhairy above. I have seen no specimens of this species from the Malay Peninsula, where it very likely occurs. The specimens referred here are not quite identical; that from Sumatra is glandular and hairy beneath, as described by v. A. v. R.; those from Borneo without glands and glabrous beneath. The type was collected in Borneo.

Dryopteris Beccariana (Cesati) C. Chr., Index 254.

Nephrodium Beccarianum Cesati, Atti Acad. Napoli, 7, part 8, 23, 1876.

Beautiful specimens of this hitherto badly known species were collected by Dr. E. Mjöberg on Mt. Matang, Sarawak, which are fully identical with a fragment of the type, leg. Beccari (Kew!). In most characters it agrees with *D. Teuscheri*, but it is much larger. Stipe up to 50 cm. long, at base with many lanceolate castaneous scales, lamina 40-50 cm. long, 15-25 cm. broad, grey-green, papyraceous, practically glabrous and naked throughout (some minute hairs may be found on the upper part of the stramineous rachis and on the costae beneath). Most pinnae long-stalked (stalks 1-1.5 cm. long) terminating in long subentire caudate apex, incised to a wing 1.5-2 mm. broad, segments parallel, entire, oblique or subfalcate, subacute, about 3 mm. broad (those of the sterile leaf a little wider), the basal ones of lower pinnae much reduced or both fully obsolete, then the pinnae shortly cuneate at base. Veins about 12-jugate, simple, the basal ones running like those of *D. brunnescens*. Sori inframedial, indusia large, coriaceous, rufous or deep brown, glabrous, easily rubbed off.

SARAWAK: Mt. Matang (Beccari, Kew! E. Mjöberg, Herb. C. Chr.)

NEGRI SEMBILAN: Gunong Angsi, 1200 ft. (E. S. & G. Hose 4813, received from Kew). The latter specimen differs a little from the type by the sori being close to the midrib.

Dryopteris chlamydophora Rosenstock, Meded. Rijks Herb. Leiden, no. 31,5. 1917.

Lastrea nephrodioides Bedd., F. B. I., pl. 199 (not Moore).

Closely resembling *D. Beccariana* in size, texture, cutting and venation, but brown when dried. It differs by the rachis and costae and veins beneath being shortly pubescent and furnished with several linear brown scales, the underside being somewhat glandular, and by the much shorter 2-4 mm. long petioles of the lower pinnae; largest pinnae 20 cm. long, 2 cm. wide, the margins distinctly thickened,

the upper ones truncate-subcordate at base; veins 10-12 jugate; sori inframedial with large red indusia; sporangia mixed with shining red glands.

BORNEO: (Korthals, type in Leiden!); Sarawak, top of Mt. Poi (E. Mjoberg. Herb. C. Chr.).

MALAY PENINSULA: JOHORE, G. Panti (Holttum 18089); without definite locality, Kew distr. 738 (Herb. Copenhagen).

Most specimens quoted have been named *D. crassifolia*; they differ essentially from that species by much thinner texture, venation and glands. *Lastrea nephrodioides* Bedd., from Burma, referred by the author himself to *L. crassifolia* (Handb. 238) is according to description and illustration a more hairy form of *D. chlamydophora*; the name *nephrodioides* is not available in the genus.

Dryopteris crassifolia (Bl.) O. Kze.; C. Chr., Ind. 258.

Lastrea lata J. Sm., Hook. Journ. Bot., 3, 412.

The true *D. crassifolia* is, according to a cotype specimen from Java, leg. Blume, a much more rigid plant than the three former species, and with different venation owing to the pinnae being less deeply lobed as noted in the key above; the edge of the falcate segments is distinctly thickened; veins about 10-jugate; costae shortly strigose above, rather densely whitish-pubescent beneath with short crisped hairs and furnished with some brown scales towards the base, surfaces otherwise glabrous. Sori near the midrib, indusia apparently smaller and less coriaceous than in the former species.

This species is probably distributed through the whole Malayan region, but its area cannot now be determined with certainty, because most specimens so named appear to belong to other species. *Lastrea lata* J. Sm. from Luzon (Cuming 266) agrees closely with Blume's type, and a specimen from Perak (G. Hijau, Burkill 12588) is as to most characters typical, differing somewhat by the 1-2 cm. long stalks of the pinnae; according to Mr. Holttum it falls under *Nephrodium brachyodon* Bedd., Handb. 281, which to me is nearly identical with *D. Motleyana*.

Dryopteris Motleyana (Hook.) C. Chr., Ind. 278.

Nephrodium Motleyanum Hook., Syn. Fil., 266 (sub *N. crassifolia*).

Nephrodium brachyodon Bedd., Ferns Brit. Ind., Suppl., pl. 379; Handb. 281; Ridley 74; not Hooker.

In colour, texture and pubescence very similar to *D. crassifolia*, from which it differs mainly by its less deeply cut pinnae and medial sori. Stipe about 50 cm. long, scaly at base, like the rachis greyish-brown and finely puberulous. Lamina ovate-lanceolate or ovate-deltoid, 40-50 cm. long, 15-20 cm. wide, the sterile ones somewhat larger, pinnate,

rather abruptly narrowed into a pinnatifid apex. Lateral pinnae in 10-15 pairs, short-stalked (petioles of the lower ones rarely 1 cm. long), 10-12 cm. long, 2-2.5 cm. broad, truncate at base, terminating in a 2-3 cm. long entire acuminate apex, incised $\frac{1}{3}$ - $\frac{1}{2}$ of the way to the midrib into falcate segments 5 mm. long and broad. Veins of fertile segments 8-9-jugate, the posterior basal one generally springing out from the costa just below the sinus, below which it meets the opposite anterior one; the following two veins run out to the edge close to the bottom of the sinus. Sori medial or a little supramedial, indusia small fugacious; receptacle with several globose glands. Costa whitish-puberulous beneath, and towards the base furnished with several linear, brown scales.

BORNEO: LABUAN (Motley, type, Kew!); SARAWAK, Mt. Merinjak (Native collector, Sarawak Museum 161); DUTCH BORNEO, G. Damoet (Hallier 557).

PERAK: Gunong Keledang (Ridley 9537).

D. Motleyana, as here understood, includes the Asiatic form, which English botanists wrongly have referred to the American *D. brachyodus* (Kze) O. Kze. This is quite another species with 3-4 pairs of veins joining a membrane below the sinus and with a distinct aerophore at the base of the pinnae; in my monograph of the genus *Dryopteris*, 1, p. 172, I have referred it to *D. glandulosa* (Desv.) C. Chr. (not the Asiatic *D. glandulosa*) as a variety. Beddome's figure of his *N. brachyodon* is as a whole good, but the venation is not shown quite correctly.

To *D. Motleyana* I provisionally refer the following form as a variety:

var. *dulitenses* n. var.

Pinnae in four subopposite pairs below a terminal one nearly conform with the lateral ones, the largest 15 cm. long, 4 cm. wide, the basal ones on stalks 1.5 cm. long, incised about $\frac{1}{2}$, the segments nearly 1 cm. broad, otherwise scarcely different from the type.

SARAWAK: Mt. Dulit (E. Mjoberg, Herb. C. Chr.).

The following species form a special group, well characterised by the strong stipe being densely covered with castaneous scales throughout, a character very rarely found within the genus *Dryopteris*. As to other characters, the species show a close affinity to the narrow group of *D. crassifolia*. Most species are known from a single collection, and it is probable that their number should be considerably reduced. They differ chiefly by the density of the pubescence, a character not always a good one, and it is not improbable that they will appear to be forms of a single species.

Dryopteris echinata (Mett.) O. Kze. C. Chr., Ind. 262.

Lamina firmly herbaceous, 70-80 cm. long, rather gradually attenuated into a pinnatifid apex. Pinnae 15 cm. long, 1.5-2 cm. broad, the basal ones somewhat reduced and reflexed, incised to a wing about 2 mm. broad, the segments subfalcate, obtuse, parallel, 3 mm. broad; veins 9-10 jugate, the basal ones both running from the base of the midribs to the bottom of the sinus. Costae above deeply sulcate with the raised edges of the furrow rather densely antrorsely strigose, the upper side otherwise glabrous, the margins ciliate; costae and midribs beneath densely and shortly pubescent with whitish, patent hairs, the veins and leaf-tissue thinly downy or almost glabrous. Sori inframedial, indusia persistent, brown, white-setose.

BORNEO: (Korthals!), and several other specimens.

Dryopteris Hallieri (Christ) C. Chr., Ind. 269.

Intermediate between *D. echinata* and *D. trichopoda*, resembling the former in pubescence, the latter in texture. The sessile pinnae are 15-20 cm. long, 3 cm. broad, incised to a wing 4 mm. broad, coriaceous, brown, their costae broadly sulcate above, densely bearded by patent brownish hairs; costae and veins beneath pubescent with whitish needle-like shorter and longer hairs. Veins raised below, 10-11 jugate, the posterior basal one springing out from the costa about 1 mm. from the midrib and meeting the opposite anterior one a little below the sinus. Sori inframedial; indusia all rubber off.

DUTCH BORNEO: Amai Ambit (Hallier 3204!).

Dryopteris paleata Copeland, Philip. Journ. Sci., 9 C, 228. 1914. This comes very near to *D. Hallieri*, but is much more hairy and the indusia are rather persistent and hirsute. Costae above bearded as in *D. Hallieri*, beneath like the veins densely but shortly and softly villous, the margins long-ciliate. Further it differs in the rachis being densely scaly throughout, the scales about 1-2 cm. long, castaneous, lanceolate-acuminate, slightly fimbriated; and in all pinnae being short-stalked, at least distinctly so in the specimen from the Peninsula, which otherwise agrees closely with a cotype specimen in Herb. Bonaparte. Pinnae 15-20 cm. long, 2-2.5 cm. wide. Sporangia with numerous globe glands intermixed.

SUMATRA: Lebang Tandai, Benkoelen (C. J. Brooks 68. Herb. Bonaparte).

NEGRI SEMBILAN: G. Angsi (Holttum 9926).

Dryopteris trichopoda C. Chr., Ind. 298.

Nephrodium polytrichum Baker, Jour. Bot., 1891, 107.

Leaf 1 meter or more long, subcoriaceous. Pinnae up to 30 cm. long, 4.5 cm. broad, long-acuminate, sessile, incised to a wing 5 mm. broad, the segments falcate, 5 mm. broad the upper basal one somewhat reduced; costae and veins

densely hirsute beneath with long patent hairs. costae above shortly strigose, not bearded as in *D. Hallieri*. Veins 14-15 jugate, not raised below, the basal ones connivent below the sinus. Sori inframedial; indusia small, hirsute.

SARAWAK: Lingga Mts., (Bishop Hose, Kew!; Hewitt).

The rachis is not destitute of paleae as described by Baker; the scales become fewer upwards and extend to the lower part of the costae beneath as in the other species of the group.

To *D. trichopoda* I refer with some doubt a couple of specimens, that differ from the type in thinner texture, more soft pubescence and narrower pinnae; the under side is slightly glandular with red glands, the receptacle with many globose glands.

PENANG: C. G. Matthew 934 (Herb. C. Chr.).

SUMATRA: J. Winkler.

This form is evidently *N. crinipes* of Ridley (p. 71), not of Hooker.

The North-Indian *D. crinipes* is quite another species, with the basal veins truly united and with several pairs of reduced pinnae below.

Dryopteris persquamifera v. A. v. R.. (Bull. Jard. Bot. Buitenzorg, Ser. II, no. XVI, 10. 1914) from Celebes, known to me from description only, is evidently a species of this group.

The following species resembles in several characters those just mentioned, but its pubescence is peculiar and the venation is different, so that I dare not now associate it with them.

Dryopteris monodonta C. Chr., Ind. 278.

Lastrea unidentata Bedd., Handb. Suppl., 53; Ridley 64. (not *Dryopteris unidentata* (Hook. et Arn.) C. Chr.).

A specimen from the type locality, Gunong Bubu, Perak (Wray 3873) belongs no doubt to this species, although it does not agree in all details with Beddome's description. It is easily distinguished from the former species by stipe and rachis being densely and softly velutinous with thin jointed hairs, which are mixed with several lanceolate castaneous or blackish scales like those of *D. paleata*; in young leaves these scales are probably much more numerous. Pinnae strictly sessile, the basal segments somewhat produced and sublobate at base (rarely unidentate as described by Beddome, the name thus an unsuitable one) costae densely tomentose (not bearded) above, more thinly hirsute beneath with hairs like those of the rachis, and beneath dotted with conspicuous yellowish, dull glands. The basal veins spring both out from the midrib above its base and reach the margin above the bottom of the sinus as in the subgenus *Lastrea*. Sori

inframedial or subcostular, the indusia brown, thin, erose, glabrous, subpersistent.

Dryopteris heterocarpa (Bl.) O. Kze.

To this extremely variable species I refer as a glabrous form *Nephrodium glaucostipes* Bedd. (Ridley 75) judging from a cotype specimen in the Singapore Herbarium (Kunstler 2046). The under side is densely dotted with yellow glands as in the type, a character not mentioned in Beddome's description. Only one pair of veins truly join, and the following two run to the sinus. Similar forms occur in Borneo.

Dryopteris angustipes Copeland, Philipp. Journ. Sci., 7 C, 60. 1912.

NEGRI SEMBILAN: Setul Pass (E. S. & G. Hose 5050, received from Kew as *Nephrodium molle*).

A weakly characterised species, nearer *D. heterocarpa* than the *parasitica* complex, marked by a long row of reduced auriculiform pinnae along the stipe nearly to its base, the densely glandular under side, which is glabrous beyond the antrorsely strigose costae and contulae, the upper side strigose with appressed hairs and with scattered patent hairs on the veins; only one pair of veins anastomose. The specimen quoted agrees well with the type from Sarawak (Brooks 110, Herb. Copeland!). I am inclined to consider it a form of *D. heterocarpa*.

Dryopteris parasitica (L.) O. Kze. C. Chr., Ind., pro parte.

Nephrodium didymosorum Bedd., Ferns Brit. Ind., pl. 200.

Nephrodium tectum Bedd., Handb. Suppl., 79.

N. molle var. *didymosorum* Ridley 73.

Lastrea cana Bedd., Kew Bull., 1909, 424; Ridley 64. (not J. Sm.)

Among the numerous forms spread through all the tropics referred by authors to *D. parasitica* (*Nephrodium molle* auctt.) that described as *N. didymosorum* Bedd. best agrees with the genuine *Polypodium parasiticum* L., which is rather common in South-eastern China. It is densely hairy throughout, the lower pinnae not abbreviated and only one pair of anastomosing veins; sori often in a single pair at the base of each segment, but this character is not constant, 3-6 pairs of sori often being present. The specimen from Selangor (Ridley 7859) referred by Beddome and Ridley to *L. cana* belongs here; the genuine *D. cana* is a *Lastrea* with free veins.

Quite different from the true *D. parasitica* is a group of forms, which occur everywhere in tropical Asia and are commonly referred to *Nephrodium molle*, the type of which

is American, and to *N. amboinense*; I now refer them all to a single species, which I call

Dryopteris subpubescens (Bl.) C. Chr. comb. nov.

Aspidium subpubescens Bl., Enum., 149. 1828.

Nephrodium amboinense auctt.; Bedd., Handb. Suppl., 75.

N. molle var. *amboinense* Ridley 73.

This species differs materially from *D. parasitica* by the lower 2-3 pairs of pinnae being considerably abbreviated, by the less pubescent, often subglabrous surfaces, and by 3 or 4 lower veins (2 pairs) being united. The typical form is smaller than *D. parasitica*, the pinnae rarely 10 cm. long, 1.5 cm. broad. Hitherto this species has been named by most authors *N. amboinense* or *N. molle* var. *amboinense*, but it agrees badly with the type specimen of *Aspidium amboinense* Willd. (Bot. Mus. Berlin!) which is much smaller and less incised. Till now I have seen no specimen that exactly matches Willdenow's type from Amboyna, while on the other hand numerous specimens examined closely agree with the type of *A. subpubescens* Bl. from Java, leg. Blume! Typical *subpubescens* is a common fern in Malaya and several specimens from the Peninsula have been seen.

To this species I provisionally refer as a variety: var. **major** (Bedd.).

Nephrodium molle var. *major* Bedd., Handb. Suppl., 76.

Dryopteris sumatrana v. A. v. R., Mal. Ferns, 227.

Larger than the type; pinnae up to 15 cm. long, 2 cm. broad, bright green and of firmer texture, both surfaces finely downy with longer hairs on the costae and veins.

Common in Borneo, Sumatra and in the Peninsula (Singapore, Ridley 9481 and other specimens seen). It is perhaps a distinct species, but specimens from Borneo are intermediate between it and typical *D. subpubescens*.

To this variety I refer a specimen from Singapore (Rifle Range) quoted by Ridley under his *N. multilineatum* (p. 72). It differs from the common form by the lack of abbreviated pinnae, but as to all other characters it is typical. *N. multilineatum* Bedd. and Ridley should be called *Dryopteris megaphylla* (Mett.) C. Chr. It is widely different from all forms of the *parasitica* complex by its much larger fronds with pinnae up to 30 cm. long, nearly glabrous, shallowly cut only and with several pairs of alternately anastomosing veins. Several specimens distributed from Kew under the name *N. brachyodon* belong here.

A third, but somewhat doubtful species, is **Dryopteris procurrens** (Mett.) O. Kze.; C. Chr., Ind.

Nephrodium molle var. *procurrens* Ridley 73.

It differs mainly from *D. subpubescens* by its long creeping rhizome, but is otherwise so like it that specimens

without rhizome can scarcely be determined with certainty. Studies in the field may decide, perhaps, whether it is a good species, or, as Beddome believed, a form of *D. subpubescens*. The north Indian form referred by some authors to *D. procurrens* seems to be another thing. It is the var. *aureum* Clarke (Bedd. Handb. 278) and has been later redescribed as *Dryopteris cylindrothrix* Rosenstock, Fedde Repert., 12, 246. 1913.

Dryopteris Toppingii Copeland, Philipp. Journ. Sci., 12 C, 56. 1917. A co-type specimen of *Nephrodium pennigerum* var. *malayense* Bedd. (Handb. Suppl. 74: *Dryopteris indica* var. *malayense* v. A. v. R., Mal. Ferns 224: *Nephrodium indicum* Ridley 73) agrees very closely with the type of *D. Toppingii* from Mt. Kinabalu, B.N.Borneo (Topping 1766, Herb. Copeland!), differing by both surfaces being slightly downy and the indusia being pubescent; notwithstanding this difference I prefer to call the specimen *D. Toppingii*. The sori are not medial on the veins as described by Ridley but submarginal just as in the type.

Dryopteris mirabilis Copeland, Philipp. Journ. Sci., 6 C, 137, pl. 19. 1911.

Phegopteris cordifolia v. A. v. R. Bull. Jard. Buitenzorg, II S, XI, 19, pl. 5. 1913.

Dryopteris cordifolia v. A. v. R., l. c., C. Chr., Ind. Suppl. prél., 14.

Polypodium holophyllum Baker, Journ. Bot., 1888, 325 (not 1879, 43).

Dryopteris holophylla C. Chr., Ind., 271. 1905.

KEDAH: Pulau Langkawi (Holttum 17436).

As here interpreted this species includes a number of forms, which most authors have referred to *D. glandulosa* (Bl.) O. Kze. They differ from that species by the lateral pinnae being very few (1-2 pairs) or none, and much smaller than the large terminal one, and by the lack of glands; both surfaces densely verrucose. The frond is sometimes simple, cordate at base, and the edges subentire; this is *D. holophylla* from Sarawak (Hose, Kew!). *D. cordifolia* v. A. v. R. from Dutch Borneo (cotype in Rijks Herb. Leiden!) is the same with 2-3 lateral pinnae, and *D. mirabilis* Copeland from Sarawak (Brooks, Herb. Copeland!) is very nearly the same with a single pair of pinnae and with the indusiate sori arranged in distinct rows parallel to the midrib; the end pinna is more or less deeply crenate-dentate. The specimen from Kedah agrees best with *D. mirabilis* Copel., type, but 3-5 lateral pinnae are present. Like most forms of the species its leaves are subdimorphous, the fertile ones being narrower on longer stalks.

Dryopteris vilis (Kze) O. Kze.; C. Chr., Index, 300.

Aspidium intermedium Bl., Enum., 161; not others.

Dryopteris intermedia O. Kze.; v. A. v. R., Bull.

Jard. Buitenzorg, III S, 2, 144. 1920.

?*Lastrea intermedia* Ridley 68.

Dryopteris rhodolepis C. Chr., Ind. 288, pro parte.

Nephrodium sarawakense Bak., Journ. Linn. Soc. Bot., 22, 225. 1886.

Dryopteris sarawakensis v. A. v. R., Mal. Ferns, 200.

Lastrea padangensis Bedd., Handb. Suppl., 60. 1892. Ridley 68.

Dryopteris padangensis C. Chr., Ind. 282.

According to Prof. Rosenstock, who has examined the type specimens of both species in Leiden, *Aspidium vile* Kze is identical with *A. intermedium* Bl., and *N. sarawakense* Bak. (type, Kew!) is exactly the same. Unaware of this, in my Index I preferred for the whole complex of forms referred in Hook. Bak. Syn. Fil. to *N. intermedium* Clarke's name *rhodolepis*, used originally for a north Indian form, which I now consider distinct from *A. intermedium* Bl. Both this name and *Lastrea Blumei* Moore are invalidated within the genus, and the species must, therefore, now be called *D. vilis*. It seems to be very variable, and found in most regions of tropical Asia and Polynesia, in some places running gradually into related species, e.g. *D. aciculata* (Bak.) C. Chr. I hope to be enabled to unravel these forms later on; here it must suffice to state that all specimens seen from the Malay Peninsula belong with approximate certainty to *D. vilis*; very likely the large *D. aciculata* also occurs there, as it is common in Borneo. I have received from Mr. Holtum a specimen from Pahang, gorge of the Tras (Burkill 16939) named *D. padangensis* (Bedd.) C. Chr. It agrees excellently with Beddome's description, and I think it was rightly named; it appears to be fully identical with *D. vilis* (*N. sarawakensis* Bak.), and I dare, therefore, reduce Beddome's species to a synonym. Another specimen from Pahang, (Buloh Telang, P. Tioman, Henderson 18593) is unfortunately sterile; it is intermediate between *D. vilis* and *D. aciculata* and belongs perhaps to the latter species.

Dryopteris Boryana (Willd.) O. Kze.; C. Chr., Ind.

Phegopteris Kingi Bedd., Handb. Suppl., 84; Ridley 54.

Dryopteris Kingi C. Chr., Ind. 273.

Although Beddome (Handb. 266) quoted "Malay Peninsula" as a locality for his *Lastrea Boryana*, the species is not mentioned by Ridley. Having seen a couple of pinnae of the type collection of *Phegopteris Kingi* Bedd. from Perak (Kunstler 2250) I have little doubt that the "species" is a form of *D. Boryana*. It differs a little from the form occurring in Java by the pale green colour and apparently

exindusiate sori; in size, texture cutting and pubescence it is identical. *Polypodium subtripinnatum* Clarke, referred here by Beddome, is another exindusiate form. Whether the Indian-Malayan *D. Boryana* is the same as the genuine *D. Boryana* (Willd.) from Réunion is another question; if not, the old name *Aspidium divisum* Wall. (*Nephrodium* Hook.) must be taken up for the Asiatic forms.

Polystichum lindsaeifolium Scort., Ridley 61 (wrongly spelled *lindseaefolium*).

The specimen from Kelantan (Nur 12118) referred here by Ridley is so different from the North-Indian *P. obliquum* (Don) Moore that I consider Ridley's new species a good one. The leaves are much longer, up to 30 cm. long by 3.5 cm. wide, with 30-35 pairs of pinnae; these are subdimidiate, auricled at the upper base and shallowly crenately toothed at the upper and outer edge, the short teeth obtuse, never aristate, the stipe 4-5 cm. long with only some light brown scales, the rachis very scantily fibrillose or almost naked as are the surfaces; at best some few minute scales may be found beneath. Sori submarginal at the base of the teeth; indusia pale, orbicular, easily rubbed off.

Aspidium subdecurrens (Lueress.) C. Chr., Ind. 94.

Phegopteris subdecurrens Lueress., Bot. Centralbl., 11, 30. 1882.

SINGAPORE: Pulau Ubin (F. Kehding 2960!, Ridley 6027).

This characteristic species was omitted by Ridley although collected by himself at the type-locality. It is allied to *A. polymorphum* Wall., distinguished from that species by the terminal pinna being decurrent. The quite glabrous fronds are somewhat dimorphous, the sterile ones being larger than the fertile; terminal pinna of sterile frond up to 35 cm. long and 15 cm. wide, ovate, acuminate, entire or repand, at base confluent with one or two pairs of ascending large lobes, the lowest of which are decurrent along the rachis, the wing thus formed not reaching the upper pair of free pinnae, which are adnate to the rachis;¹ below them another pair of free, short-stalked entire pinnae, these broadest at the middle (6 cm.) and narrowed to both ends; fertile fronds similar but smaller; main veins distinct to the edge, connected by numerous arching cross-veins, smaller veins forming numerous angular areoles, mostly without free included veinlets. Sori exindusiate, small, irregularly scattered, dorsal on the netted veins, often elongated and confluent.

Aspidium terminale Rosenstock, Meded. 's Rijks Herb. Leiden, 31, 4. 1917.

¹ The extent of the wing on the rachis is very variable in this species. It is sometimes continuous throughout the rachis, extending even below the lowest pinnae. (R.E.H.)

LOWER SIAM: Khaw Pok Hill (Haniff & Nur 3828).

This most distinct species was founded by Prof. Rosenstock on a specimen from Dutch Borneo (Gunong Kempai, Hallier 1821, Rijks Herb. Leiden!) and very briefly described. In all essential characters the specimen from Siam kindly sent me by Mr. Holttum fully agrees, but receding from it in some minor points. The type may shortly be described thus:

In habit not essentially different from *A. polymorphum* Wall. The leaf is pinnate with three pairs of opposite short-stalked pinnae, which are all entire, cordate at base, oblong, acute or short-acuminate, the lowest 25 cm. long by 7 cm. wide and with a triangular hastate terminal pinna, cordate at base and with a pair of spreading basal lobes, the central lobe triangular, slightly lobed. Texture thin, the larger ribs very shortly rusty-tomentose above, the surfaces otherwise glabrous. A scaly bud is borne on the upper side of the rachis at the base of the terminal pinna, and smaller buds are found on the costa, mostly at the axil of a main vein, sometimes also on the basal cross-veins. All veins distinct, the finer ones forming a dense net of small areoles between the cross-veins, the areoles with free included veinlets. Sori irregularly scattered over the whole underside, very small, nearly always apical on the free veinlets. Indusia subsistent, reniform, glabrous. The specimen from Siam agrees with the type in colour, texture, venation and sori; there is no bud on the rachis, but small buds are found here and there in the axils of the main veins. It differs chiefly in the shape of the pinnae, which are ovate or elliptical, rounded-cuneate at base, the basal ones unequally short-lobed, 18 cm. long by 10 cm. wide at the middle.

A. terminale differs chiefly from *A. polymorphum* by the gemmiferous rachis and costa and by the apical sori.

***Leptochilus malaccensis* sp. nov.**

Rhizome creeping, clothed with dark brown lanceolate entire scales. Leaves subapproximate, dimorphic. Stipe of sterile ones about 20 cm. long, slightly scaly. Lamina about 25 cm. long and wide, with 5-7 pairs of distant lateral pinnae and a conform terminal one, dark green, subcoriaceous, glabrous but obscurely paleaceous on the costa beneath and on rachis, the scales small, blackish-brown. Pinnae lanceolate, up to 15 cm. long, 1-1.2 cm. wide at the middle, the lower ones short-stalked, the upper adnate to rachis and a little decurrent, all long-cuneate at base and long-acuminate at apex, entire. Main veins tolerably visible to near the edges, other veins quite hidden. The veins anastomose about as in *L. heteroclitus* (Bl.), i.e. forming a costal areole and above this two large costular ones on each side of the main vein; between these are found three central ones, a middle larger

one and an upper and lower smaller one, all areoles without free included veinlets. Fertile frond similar with contracted pinnae, which are about 10 cm. long, 7-8 mm. wide.

PAHANG: Buloh Telang, Pulau Tioman, (M. R. Henderson, Herb. Singapore, 18589, type in Herb. C. Chr.). KEDAH: P. Langkawi. G. Raya, (Curtis 3371, L. Preslianus Ridley 115).

This apparently most distinct species was wrongly referred to *L. Preslianus* C. Chr. by Ridley, l. c. Certainly it resembles that species superficially, but the venation is totally different, resembling that of *L. heteroclitus* (Bl.) C. Chr. (cf. Blume, Fl. Javae, pl. 13) but owing to the narrowness of the pinnae, the number of intercostular areoles is, of course, much smaller.

Stenochlaena leptocarpa (Fée) Underwood, Bull. Torrey Bot. Club, 33, 47. 1906.

Lomariopsis leptocarpa Fée, Acrost., 69, pl. 29. 1845.

Stenochlaena sorbifolia, pro parte, Ridley 111.

PERAK: Birch's Hill, (I. H. Burkill, Herb. Singapore 12725).

The specimen agrees closely with Fée's figure of the type from Luzon (Cuming 132). Among the Malayan species of the genus this resembles most the West Indian *S. sorbifolia*, but is yet quite different. The numerous sterile pinnae are about 12 cm. long and scarcely 1.5 cm. wide, gradually long-acuminate, their base subequally rounded-cuneate. The species is probably widely dispersed through the Malayan region.

Stenochlaena cochinchinensis (Fée) Underwood, Bull. Torrey Bot. Club, 33, 46. 1906.

Lomariopsis cochinchinensis Fée, Acrost., 66, pl. 26. 1845.

Stenochlaena abrupta v. A. v. R., Bull. Jard. Buitenzorg, II S, XX, 24. 1915. Handb. Suppl., 429.

Stenochlaena sorbifolia, pro parte, Ridley 111.

SINGAPORE: Botanic Garden, in the Dell (Herb. Singapore, 17484).

PAHANG: Sedagong, Pulau Tioman (Henderson 18618).

One of the best characterized species of the *S. sorbifolia* complex. Sterile leaves sometimes simple, but developed ones pinnate with up to 12 pairs of pinnae, these 12-15 cm. long by 4-5 cm wide, the base cuneate below, rounded above, the apex suddenly narrowed into a short "traufelspitze." *S. abrupta* v. A. v. R. is the same (an authentic specimen in herb. Leiden). The species is known from Cochinchina, Borneo, the Malay Peninsula, and Sumatra.

LINDSAYA

The smaller, simply pinnate forms of this genus were referred by older authors to several distinct species, the number of which later was greatly reduced, and Baker and Beddome referred most of them to a single species, *L. cultrata*. It seems to me however that some of the older species may be maintained as valid ones, and I shall here try to characterize briefly those species recorded from the Malay Peninsula.

A. Rhizome short-creeping, often very short, the leaves tufted, or nearly so.

1. *L. cultrata* (Willd.) Sw. . .

Stipe and rachis round beneath, sulcate above; pinnae about 1. cm. long, subacute, the lower edge convex, the upper nearly straight, with 2-3 low incisures; sori rather long.

This species was first described and figured by Willdenow as *Adiantum cultratum* (Phytogr., 14, pl. 10, fig. 2) after specimens from the Malabar coast, probably from the vicinity of Tranquebar. All south Indian specimens seem to agree very well with his type, and specimens from Himalaya, southern China and Siam are not essentially different. The species is said to be distributed through the whole of tropical Asia, but I have seen no specimens from the Malayan region that agree with the type, although it is possible that the species is to be found there. Most specimens from the Peninsula received as *L. cultrata* belong to the following species. Ridley (p. 22) quotes a large number of localities for *L. cultrata*; I suppose that the majority of them, perhaps all, really belong to

2. *L. Lobbiana* Hook., Spec., 1, 205, pl. 62 C.

L. crenulata Fée, Gen., 105, pl. 28, fig. 2.

Stipe and rachis quadrangular, sulcate above, the furrow with sharp raised edges. Leaf often much longer than that of *L. cultrata*, pinnae about 1 cm. long, the lower side straight or concave, the apex truncate, the upper side with 2-4 rather deep incisures; sori mostly shorter than in *L. cultrata* and extending to the outer edge. This species is apparently common through the Malayan region. Its synonymy is confused, and it is possible that the name chosen cannot stand; the older name *L. lucida* Bl., Enum. 216 (1828) applies perhaps to the same species. Judging from the figures quoted it seems probable that *L. crenulata* Fée, described from a specimen leg. Griffith presumably in Malacca, is identical with *L. Lobbiana*. Both were referred by Kuhn (Ann. Mus. Lugd. Bat. 4, 276) to *L. gracilis* Bl. as a var. *major*, but wrongly, I think, at least if *L. gracilis* Bl. is rightly understood by modern writers as being a species with a wide-creeping rhizome.

L. Lobbiana is apparently common in the Malay Peninsula; the following specimens were all named *L. cultrata*.

PAHANG: Buloh Telang, P. Tioman (Henderson 18587).
 TRENGGANU: Kuala Berang (Holttum 15332). JOHORE:
 (A. Vesterdal 26 and 168).

3. *L. concinna* J. Sm.; Hook., Spec., 1, 205, pl. 61 B.

Stipe and rachis quadrangular; pinnae 5-8 mm. long, the lower side mostly straight or convex, the apex bluntly rounded or subacute, the upper edge entire, the sori, therefore, continuous from base to tip, rarely interrupted by a single incisure. Sterile pinnae obtusely toothed or crenate.

This species has been confounded with *L. gracilis*, from which it differs by its short rhizome and tufted leaves. It is known from the Philippine Islands, New Guinea, Borneo and occurs no doubt in the Malay Peninsula. Ridley refers two specimens to it (p. 21); his description is adequate.

4. *L. orbiculata* (Lam.) Mett. (*L. flabellulata* Ridley 23).

I mention this polymorphic species here, because the simply-pinnate forms of it often are confounded with the species mentioned above. These smaller forms differ manifestly from the other species by the shape of the pinnae, which are either semicircular or triangular with the sori along the outer edge, the sterile ones acutely dentate, the indusia distinctly toothed. A small specimen from PAHANG: Sungei Perting (Burkill 16574), received under the name *L. cultrata*, belongs here.

B. Rhizome wide-creeping with distant leaves.

5. *L. gracilis* Bl.; v. A. v. R., Handb. 261.

With this species as interpreted by van Rosenburgh I am not acquainted; the specimens so named seen by me I refer to *L. adiantoides* (Bl.) Kuhn. Mettenius and Kuhn united it with *L. concinna* and I am not sure that these authors were wrong, because Mettenius had examined Blume's type. Ridley (p. 22), who takes the species in the sense of v. A. v. R., refers to it a specimen from Negri Sembilan. The long creeping rhizome seems to be the only reliable character.

6. *L. plumula* Ridley, p. 22.

This species is distinct enough from the four species mentioned under group A by its long creeping branched rhizome, and certainly it is not *L. gracilis* v. A. v. R. It agrees with *L. cultrata* by its semiterete stipes and rachis and in shape of pinnae. These are 5-7 mm. long, ascending, the lower edge convex, the upper slightly incised, coriaceous in texture, pale green, the lower and inner edge narrowly involute resembling a strong rib and believed by Ridley to be a rib; the real vein along the lower edge is however not

thicker than in other species. The indusia are broader than in the other species, their uneven edge reaching quite to the margin. The species is no doubt closely related to *L. cultrata*.

***Nephrolepis acutifolia* (Desv.) Christ.**

Negri Sembilan: Seremban (E. S. & G. Hose 5016, received from Kew). This interesting species is in habit and pubescence a *Nephrolepis*, in sori a *Lindsaya*. To me it is the type-species of a most distinct genus *Isoloma* J. Sm., which name very unnaturally has been applied to a group of species which may scarcely be separated generically from *Lindsaya*.

***Humata angustata* (Wall.) J. Sm. var. *hastata*, n. var.**

Fertile leaves 3-8 cm. long, 1 cm. wide, lamina suddenly narrowed and decurrent nearly to the base of the stipe, this 1-1.5 cm. long and with the decurrent wings 1-1.5 mm. broad above; margins broadly lobed about half-way, the lobes irregularly crenate, the basal ones often the largest, 5-8 mm. long, horizontal, the lamina becoming hastate.

PAHANG: G. Kajang, Pulau Tioman (Henderson 18256).

Not knowing similar forms occurring in Borneo, one would be inclined to consider this remarkable plant specifically distinct from *H. angustata*, with which it agrees in scales, texture, colour and sori. It differs chiefly from specimens from Borneo by its small size, short stipe and hastate shape of most leaves. *H. attenuata* and *H. mutata* v. A. v. R., Bull. Jard. Bot. Buitenzorg, III S, 5, 205-206 (1922), are evidently closely related forms and also local derivatives of *H. angustata*.

***Humata kinabaluensis* Copeland, Philipp. Journ. Sci., 12 C, 48. 1917.**

To this species I refer with a little doubt a specimen from Pahang (G. Berumban, Cameron's Highlands, Henderson 17989) named by Mr. Holttum *H. alpina* (Bl.) Moore. It is certainly not that species but agrees very well with Copeland's species from Mt. Kinabalu (Topping 1745, Herb. Copeland!). I have seen two fertile leaves only; they are thickly coriaceous, tripinnatifid at base, the pinnae almost reduced to the thick ribs, each secondary segment bearing 3-4 sori with large indusia. This form resembles much more the genuine *H. botrychioides* Brack. from Polynesia than other Malayan forms wrongly referred to that species.

***Microlepia Ridleyi* Copeland, Philipp. Journ. Sci., 11 C, 39. 1916.**

This species is not mentioned by Ridley, although founded upon a specimen from Pahang collected by himself (no. 14200). I have received from Mr. Holttum a specimen

from the same state (Bentong, Burkill 16699) which corresponds closely to Copeland's description. The surfaces are not glabrous as described by him, but, especially the under side, microscopically puberulous, the hairs not dense. In this it approaches a specimen from Perak (Kunstler 8331) referred by Ridley (p. 32) to *M. Kurzii* (Clarke) Bedd. It does not belong to that species, of which I have what I consider a typical specimen from Burma, and which is, in a few words, a densely hairy *M. platyphylla*. Kunstler's specimen has the pinnules pinnatifid almost to the costules and the whole underside is very densely puberulous with short erect hairs mixed with some longer ones on the ribs. Mr. Holtum is of opinion that it is a form of *M. Ridleyi*, and perhaps he is right, but certainly it is the same as *M. Brooksii* Copeland from Sumatra, and probably also identical with *M. puberula* v. A. v. R. All seem to be forms of a single species.

Microlepia speluncae (L.) Moore.; var. *villossissima* n. var.

The whole frond, especially beneath, very densely villous with grey shorter and longer hairs mixed together, the longer hairs prevailing on the upper side. Probably a distinct species.

PAHANG: Pulau Tioman (Henderson 18873, Herb. C. Chr.).

Saccoloma minus (Hook) C. Chr. comb. nov.

Microlepia alata J. Sm., Hook. Journ. Bot., 3,416. 1841. (nomen).

Davallia inaequalis var. *minor* Hook., Spec. Fil., 1,180, pl. 58 A. 1846.

Saccoloma moluccanum Mett.; C. Chr., Ind.

Dennstaedtia Kingii Bedd., Handb. Suppl., 6. Ridley 10.

PERAK: Larut (Kunstler 2118, cotype of *D. Kingii* Bedd.); Maxwell's Hill (Haniff 9083).

By his researches in Blume's herbarium in Leiden, Prof. Rosenstock has proved that Mettenius was mistaken in identifying *Microlepia alata* J. Sm., based on Cuming no. 119, and first described and figured by Hooker, with *Davallia moluccana* Bl.; the great bulk of specimens by Blume so named are identical with *Davallia amboynensis* Hook.=*Tapeinidium amboynensis* (Hook.) C. Chr. Ind. 631, which species subsequently must be named **Tapeinidium moluccanum** (Bl.) C. Chr. comb. nov. A single specimen in Blume's herbarium, and the only one seen by Mettenius, was with doubt referred by Blume himself to *D. moluccana*; it is thus the type of *Saccoloma moluccanum* Mett. I have a fragment of it, kindly sent by Prof. Rosenstock, and it agrees so closely with the two specimens from Perak that it may scarcely be

doubted that *Dennstaedtia Kingii* Bedd. is the same thing. Apparently it differs in indusial characters from *Saccoloma*, the indusium being cup-shaped, scarcely at all two-lipped, often protruding beyond the margin, and reflexed as in several species of *Dennstaedtia*, but the inner valve is distinctly attenuate towards the base, as in *Saccoloma*, and the whole habit with the characteristic unequal sided pinnæ and pinnulae, is entirely that of that genus.

In Blume's specimen the indusia are slightly two-lipped, but materially not different. From this Malayan type several of the Polynesian forms commonly referred to the same species are considerably different.

***Asplenium scolopendroides* J. Sm.**

PAHANG: Pulau Tioman, (Henderson 18763).

Easily distinguished from other simple-fronded species by the characteristic vein-like rim running parallel to the sori between two real veins. The specimen from P. Tioman agrees closely with the type at Kew (Cuming 318), well illustrated by Hooker (Ic. Plant., pl. 930), though the venation is not accurately shown.

***Asplenium dimidiatum* Sw.**

To this species Ridley (p. 46) refers a couple of specimens, of which I have seen that from Singapore. It is not at all *A. dimidiatum*, which is certainly not found in Asia, but it is difficult to say what the scanty specimen may be. It may be, as suggested by Beddome, a form of *A. adiantoides* (L.) C. Chr. (= *A. falcatum* Lam.), or perhaps of *A. nigrescens* Bl.

***Asplenium normale* Don.**

Some of the specimens referred by Ridley to *A. lunulatum*, at least Kunstler 8043, belong here. The genuine *A. lunulatum* Sw. certainly does not occur in the Malayan region; whether any of the many species related to it occurs in the Peninsula I do not know.

***Asplenium perakense* Matthew et Christ; Ridley 47.**

The specimen from Pahang quoted by Ridley (Holtum 11385) agrees excellently with Christ's description and is no doubt rightly named. It falls under *A. praemorsum* Sw. taken in a wide sense, but seems to be a distinct form worthy of specific rank. In gross characters it scarcely differs from other forms of *A. praemorsum*, but its scales seem to mark it sufficiently. They are of a pure brown, peltate, triangular-long-acuminate but not hair-pointed, slightly toothed at base, entire upwards, very finely reticulated but not clathrate; they differ widely from those of the Indian form of *A. praemorsum*, which are blackish, clathrate, shortly ciliate and hair-pointed.

***Asplenium spathulinum* J. Sm., Hook. Journ. Bot., 3, 408. 1841.**

A. cuneatum Ridley 48.

A. affine auctt., quoad plant. asiat.

PERAK: Bujong Malacca (Ridley 9546). PAHANG: Sedagong, P. Tioman (Henderson 18898).

The two specimens quoted match perfectly the type (Cuming 210, Kew!) and their resemblance to the true *A. cuneatum* Sw. of the West Indies is superficial only. The species is much closer allied to *A. affine* Sw. from the Mascarene Islands, but I think it is specifically different, being marked by the obtuse, erosodentate outer edge of the cuneate pinnules and by not being proliferous.

A. cuneatum var. *affine* Ridley (p. 48) from Perak (Kunstler 2228) is to me a tripinnate form of *A. spathulinum*. All these *Asplenium* differ very much in the degree of cutting.

Diplazium xiphophyllum (Bak.) C. Chr.

This species, founded upon a poor specimen from Borneo (Burbidge, Kew!) is apparently not rare in the Peninsula, but probably often confounded with *D. bantamense*, from which it differs chiefly by its narrower and much longer pinnae, often 40-45 cm. long, 3-3.5 cm. wide, terminating in a very long subulate apex.

Perak: G. Hijau (Burkill 12663). Pahang: Ulu Chineras (Burkill 15692). The former specimen differs from the type by the pinnae being irregularly double-crenate throughout; the latter by the lower pinnae being subcuneate at base; it matches nearly exactly *D. palauanense* Copeland, which I refer to *D. xiphophyllum*.

Diplazium sorzogonense Pr. and related forms.

This group of bipinnatifid species is extremely difficult, and the various forms are hopelessly mixed together in all herbaria. The material at hand from the Malay Peninsula may naturally be sorted into two species, *D. sorzogonense* and *D. speciosum* of Ridley (p. 51-52). They may briefly be characterized as follows:

Diplazium malaccense Presl, Epim. 86. 1849. Fée, Gen. 213, pl. 17 D, fig. 1.

D. Schkurii J. Sm., Hook. Journ. Bot., 3, 407 (nomen).

Asplenium Schkurii Mett., Aspl. no. 208.

Diplazium acuminatum Bl., Enum., 193. 1828?. v. A. v. R., Mal. Ferns, 409 (p. p.?). (not Raddi).

D. Christii C. Chr., Ind. 229. 1905 (p. p.?)

D. speciosum Ridley, 52 (entirely or partly).

Rachis and costae beneath naked or very slightly scaly; pinnae 2 cm. wide, cut 1/2—2/3 of the way to the costa, oblique, oblong, 5 mm. broad, truncate, entire or slightly dentate at the apex; veins simple, 6-7-jugate; the anterior basal sorus diplazioid.

PAHANG: Fraser Hill (Nur 10508). NEGRI SEMBILAN: Bukit Putus (E. S. & G. Hose 174, received from Kew).

Diplazium sorzogonense Presl.

Stipe, rachis and costae beneath more or less densely fibrillose with narrow brown or castaneous scales; pinnae 2-5 cm. broad, cut down to a wing 3-4 mm. broad into sub-horizontal oblong obtuse segments 4-5 mm. broad and finely serrate throughout or at the outer part only; veins simple, 10-11-jugate; diplazioid sori rarely found.

MALAY PENINSULA: (W. Norris 637, Herb. Copenhagen). PAHANG: G. Tahan (Nur. 7953); G. Rokam, P. Tioman (Henderson 18612).

D. speciosum Bl. is referred by most authors to *D. sorzogonense*, but considered distinct by v. A. v. R.; if rightly I dare not now express an opinion.

Diplazium crenato-serratum Bl.

D. larutense Bedd. (Ridley 50) is probably a form of this species. I have not seen the type, but a specimen from Negri Sembilan (Holtum 9775) is said by Mr. Holtum to resemble the type of *D. larutense*, and it is to me very typical *D. crenato-serratum*. In a collection from Sumatra are found among typical leaves some that correspond closely to Beddome's description, especially by the broadly rounded tips of the pinnae.

Polypodium subevenosum Baker.

P. Maxwellii Baker, Kew Bull., 1893, 211.

? *P. kinabaluense* Copeland, Philipp. Journ. Sci., 12 c, 60. 1917.

Mr. Holtum has sent me specimens from Penang, which he has compared with the type specimen at Kew and declares to be typical. As in the type some veins are produced and forked. The same specimens further fully agree with the type of *P. Maxwellii* Bak. from Borneo (Hose 296, Kew!) and with several other Bornean specimens recently examined; and *P. kinabaluense* Copel. from Mt. Kinabalu (Mrs. Clemens 10649, Herb. Copeland!) seems to me the same. The differential character of short, simple, or produced forked veins is not a stable one. More different from the type is a specimen from Pahang (G. Kajang, P. Tioman, Henderson 18944; herb. Singapore). It is larger; leaves 10-12 cm. long by 0.5 cm. wide, all veins forked and the sori distinctly oblong, almost linear and somewhat immersed. This form evidently approaches the genuine *P. sessilifolium* Hook.—*P. malaicum* v. A. v. R. (Handb. 577) a Philippine plant that may be different from *P. subevenosum* (t. Holtum). *P. subevenosum* var. *sessilifolium* Ridley (p. 81) is certainly *P. subevenosum*.

Polypodium minutum Bl., Enum. 130; Fl. Javae 188, pl. 87 D.

P. callophyllum C. H. Wright, Kew Bull., 1909, 362. Ridley 83.

PERAK: Gunong Hijau (C. G. Matthew, herb. Kew!).

I do not hesitate to refer this specimen to *P. minutum* Bl.; it agrees very perfectly with Blume's figure. In habit it resembles not a little *P. consociatum* from the same locality, differing from it by the oblong fertile segments, which are repand-crenate at the upper edge, and by the presence of two sori in several segments, one near its base, another in the outer half; sporangia mixed with many long hairs. Leaf grass-green, thin.

Polypodium consociatum v. A. v. R., Bull. Jard. Buitenzorg, II S, VII, p. 41, pl. 4, fig. 1. 1912. Handb. Suppl., 352.

Plectopteris gracilis Fée, Gen. 230, pl. 19B.

Calymmodon hirtus Brack., U. S. Expl. Exp., 16, 2.

Polypodium cucullatum Ridley 82 (pro parte?). (an Bedd. Handb. 307).

PERAK: Gunong Hijau, 3000 ft. (C. G. Matthew 925).

I have seen the only specimen quoted, but likely most or all of those quoted by Ridley under *P. cucullatum* belong to the same species that is abundantly different from *P. cucullatum*. The said specimen is perfectly identical with a beautiful lot of specimens from Mt. Dulit, Borneo (Mjöberg), which Prof. Copeland has named for me, giving the synonyms cited above. His identification may be right, but figures of Fée and v. A. v. R. do not show the characteristic shape of the upper fertile segments of my specimens; they are normally flat, rarely folded, and almost circular with a central sorus.

Polypodium Leysii Baker, Journ. Bot. 1879, 66.

Prosaptia semicrypta Copeland, Philipp. Journ. Sci., 9 C, 231. 1914.

Polypodium semicryptum C. Chr., Ind., Suppl. prélim. 1912-16, 28.

PAHANG: Teku, G. Tahan (Haniff & Nur 8066); G. Rokam, P. Tioman (Henderson 18777).

The specimens were received from Mr. Holtum under the names *P. obliquatum* (8066) and *P. contiguum* var. (18777); they are nevertheless identical and agree perfectly with the type specimens of *P. Leysii* Baker from Sulu Archipelago, leg. Burbidge (Kew!) and of *Prosaptia semicrypta* Copel. from Benkoelen, Sumatra, leg. C. J. Brooks. (no. 93, Herb. Copeland!). The species is intermediate between *P. obliquatum* Bl. and *P. contiguum* (Forst.) differing from the former by the narrower, repand-crenate segments with submarginal sori; these sunk in deep cavities with raised, naked edges ("craters"), the craters oblique with the mouths nearly round. The genuine *P. obliquatum*

has broader, entire segments with the sori not close to the edge, the craters oblong; the genuine Polynesian *P. contiguum* (Forst.) (Davallia Ind. Fil.) has marginal sori with the craters protruding beyond the edge. Both species occur in the Malay Peninsula, but it seems probable that some specimens at least referred to them belong either to *P. Leysii* or to *P. Burbidgei* Bak., with which species *P. decipiens* Kuhn=*P. cryptosorum* C. Chr. (Ridley 84) must be united.

All these species are members of a narrow group of closely related species, some of which form the genus *Prosaptia*, very improperly referred by several authors, and in my Index, to *Davallia* as a subgenus, others belonging to *Eupolypodium*, forming a specialized group, *Cryptosorus*. All modern pteridologists agree, I think, in uniting *Cryptosorus* with *Prosaptia*, and either restore *Prosaptia* as a genus, or make it a subgenus of *Polypodium*. The alliance with *Davallia* is the furthest possible. To *Prosaptia* also belongs *P. barathrophyllum* Bak., found in Perak by Bishop Hose (Kew!); it is doubtfully different from *P. khasyanum* Hook.

Polypodium mollicomum Nees et Bl.

P. fuscatum Ridley, l. c. 84 (and also Blume?).

P. malaccanum Bak., Ann. Bot. 5, 129. Ridley. l. c. 84 (excl. var.)

A co-type specimen of *P. malaccanum* Bak. from Gunong Mering (Ridley 3345, Herb. Singapore) is to me typical *P. mollicomum*. It differs from the following species by the more or less coriaceous leaves with indistinct veins, and with both surfaces throughout setose with rather short dark brown hairs.

Polypodium brevivenosum v. A. v. R., Bull. Jard. Bot. Buitenzorg, II S, XXVIII, 40. 1918. (ex descr.)

P. malaccanum var. *pahangense* Ridley, l. c. 84.

PAHANG: (Herb. Singapore 8147, 15974, 17744).

Mr. Holtum has identified these specimens with *P. brevivenosum* from Sumatra, and I believe rightly. The species very much resembles in size and cutting *P. mollicomum*, but the leaves are thinner, the short lateral simple veins clearly visible, of a lighter colour, and the pubescence different; margins ciliated with long reddish hairs and few similar ones are scattered over the surfaces. Also the scales of the rhizome are much more numerous and conspicuous, light-castaneous, lanceolate, entire. I have the same species from Sarawak.

Polypodium sarawakense Baker, Journ. Linn. Soc., 22, 228. 1886.

Pleopeltis superficialis var. *latifrons* Bedd., Journ. Bot., 31, 226.

Pl. peltata Scort.; v. A. v. R., Handb. Suppl. 376
Ridley l. c. 91.

Polypodium peltatum v. A. v. R., Handb. 632.

PERAK: Larut (Kunstler 2180).

Perfectly identical with specimens from Borneo. The rhizome of *P. sarawakense* Bak. (type in Kew!) is not naked as described by Baker, but clothed with easily deciduous almost orbicular blackish scales with brown edges, just as described by v. A. v. R. under his *P. peltatum*.

Polypodium regulare Mett., C. Chr., Ind. 558.

Gymnogramme campyloneuroides Bak., Journ. Linn. Soc. Bot., 24, 261. 1887.

Selliguea campyloneuroides Bedd., Handb. Suppl., 101.

Polypodium Hosei C. Chr., Ind. 534.

PAHANG: Sedagong, Pulau Tioman (Henderson 18895).

A comparison of the type-specimen of *P. regulare* Mett. (Borneo, Korthals, Herb. Leiden) and *G. campyloneuroides* Bak. (Sarawak, Hose 208, Kew) shows that they are absolutely identical. In his Handb. Suppl., p. 404, v. A. v. R. has reduced both *P. regulare* and *P. selliguea* Mett. (= *Selliguea membranacea*) to forms of *P. macrophyllum* Bl., and he may be right. In Ridley's paper this species is placed by error under *Syngramma* (p. 105).

Polypodium heterocarpum Bl., Fl. Javae, Fil., 167, pl. 75.

P. Zollingerianum Kunze; C. Chr., Ind. 575.

Pleopeltis Zollingeriana Moore. Ridley 93.

Nephrodium pteropodum Baker, Journ. Bot., 1888, 325.

Aspidium pteropodum Diels; C. Chr., Ind. 662

Polypodium Scortechinii Bak., Ann. Bot., 5, 477.

Pleopeltis Scortechinii Beddome, Handb. Suppl., 95.
Ridley 93.

I have examined both the type specimen of *N. pteropodum* Bak. from Sarawak (Kew!) and a co-type specimen of *P. Scortechinii* from Perak (Scortchini 216, Herb. Singapore) and find them perfectly identical. Both agree closely with Blume's figure of his *P. heterocarpum*, and I do not hesitate to reduce both names to synonyms of that species. According to modern rules of nomenclature this species must be named *P. heterocarpum* Bl.; *P. heterocarpum* (Bl.) Mett. (C. Chr., Ind.) must be called *P. Mettenianum* Cesati or *Selliguea heterocarpa* Bl.

Loxogramme subecostata (Hook.) C. Chr. comb. nov.

Polypodium subecostatum Hook., Spec., 5, 59, pl. 283 A.

Loxogramme Brooksii Copeland, Philipp. Journ. Sci., 9 C, 232. 1914; 11 C, 44, pl. 2 fig. 6. 1916.

PAHANG: Sedagong, Pulau Tioman (Henderson 18896).

An examination of the type-specimen of *P. subecostatum* Hook. in Kew from Sarawak, leg. Lobb, has shown that it is a genuine *Loxogramme*. Hooker's figure does not show the young linear submarginal slightly immersed sori, nor the velutinous roots so characteristic of this genus. *L. Brooksii* Copel. from Sumatra is certainly the same. It is probable that Ridley referred specimens belonging here to *L. lanceolata* (p. 104), under which name the specimen quoted was received. The species differs from *L. lanceolata* by its smaller size, much more coriaceous texture and the short sori being placed nearer the margin than the obscure midrib.

Cyclophorus angustatus Desv.

To this species belong probably the sterile specimens from Perak (Kunstler 8275) referred by Beddome and Ridley (p. 98) to *C. heteractis* C. Chr., which species consequently is not known from the Peninsula.

Cyclophorus varius Gaud.

C. pannosus Ridley 98.

SINGAPORE: Kranji (Ridley 6919, not 6419 as quoted by Ridley).

This specimen wrongly referred to *C. pannosus* by Ridley was rightly renamed *C. varius* by Holttum.

SCLEROGLOSSUM v.A.v.R.

This small genus was created by van Rosenburgh in 1912 (Bull. Jard. Buitenzorg, II S, XII, 39) and he referred to it three species: *S. debile*, *S. pusillum* and *S. sulcatum*, all previously considered species of *Vittaria*. The genus is very remotely, if at all, related to *Vittaria*, and forms with its sister-genus *Cochlidium* Klf. (*Pleurogramme* auctt.) of Tropical America, a distinct tribe of ferns, presumably of high age. The woody-coriaceous leaves, which are not articulated to the rhizome and apparently long-living, the peculiar light brown thin scales of the rhizome, hidden among the densely tufted leaves, lack of paraphyses, venation, and other characters make these species totally different from all *Vittarieæ*. I shall discuss this genus in another paper, and here confine myself to mentioning briefly the species known from the Malay Peninsula. All species described are very closely related, and might naturally be regarded as forms of a single species.

Scleroglossum debile (Mett.) v.A.v.R., l.c.

Vittaria debilis Mett.; Kuhn, *Linnaea*, 36, 67. 1869.

The smallest species; leaves rarely more than 3 cm. long, 1.5 mm. wide; veins simple; the sori short, near the

tip, not very deeply immersed, distinctly inframedial, the leaf edge outside the soral groove mostly broader than the costal parenchyma. Probably a small form of *S. pusillum*.

JOHORE: Gunong Panti (Holttum 17493). BORNEO.

Scleroglossum pusillum (Bl.) v.A.v.R., l.c.

Vittaria pusilla Bl. Ridley 108.

Leaves 5-10 cm. long, 3-4 mm. wide; veins forked or irregularly branching; sori in the upper third of the lamina, distinctly intramarginal, the inner edge of the soral groove acute and somewhat produced, the outer attenuate towards the edge and generally half as broad as the costal parenchyma. In specimens of this species one often finds scattered stellate brown hairs on the lamina; they are very deciduous and occur probably in all species.

MALACCA: Mt. Ophir (Ridley 9864). Singapore. Penang. Scattered through the Malayan region.

var. **intermedium** (Copeland)

Monogramme intermedia Copeland, Philipp. Journ. Sci., 1 Suppl., 255. 1906.

Intermediate between the type and *S. debile*, resembling the former in size, the latter by the inframedial sori with the leaf-edge beyond the soral groove about as wide as the parenchyma but thicker than in *S. debile*.

PERAK: (Scortechini). Philippines.

Scleroglossum crassifolium (Baker) C. Chr. comb. nov.

Vittaria crassifolia Baker, Kew Bull., 1893, 212.

V. sulcata Ridley, 108 (pro parte?)

Leaves up to 20 cm. long, 4-6 mm. wide, sometimes still larger, the upper half fertile, linear and generally narrower than the lower sterile half. Mouth of the soral groove marginal with the leaf edge not or very slightly protruding beyond the sorus. It is no doubt this form Ridley calls *V. sulcata*, which is a Ceylonese form with a distinct thick leaf-edge outside the sori; it is very doubtfully different from *S. pusillum*.

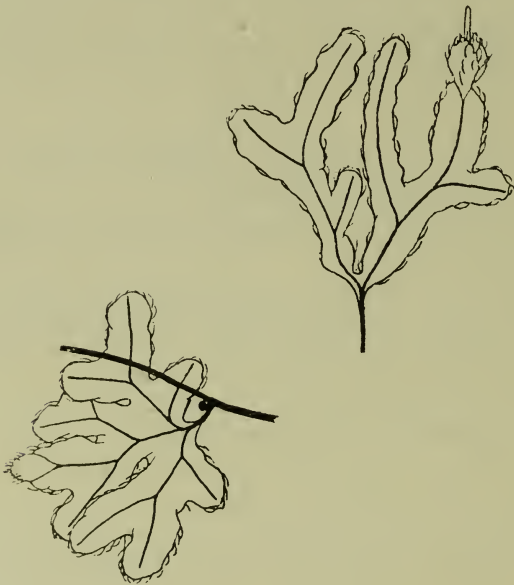
SELANGOR: (Ridley). BORNEO.

NEW SPECIES OF FERNS FROM THE
MALAY PENINSULA

By R. E. Holttum.

Hymenophyllum johorenses Holttum, sp. nov.

Rhizoma tenue repens. Stipites 2-5 mm. longi, glabri. Frondes raro plus quam 1 cm. longae et 1 cm. latae; ramuli dichotomi fere regulariter; ramuli tertiarii plerumque praesentes, quaternati non visi. Ramuli ultimi 1.5-2 mm. lati, usque ad 9 mm. longi. Margines leviter crispatae, pilis simplicibus numerosis rufo-brunneis deciduis munitae.



Hymenophyllum johorenses, x 2.5.

Valvae indusii extra pilosae, apice rotundatae, margine dentatae, dentes pilosi, basi angustatae et $\frac{2}{3}$ basin versus conjunctae; receptaculum tandem indusium longe 1 mm. superante.

JOHORE: Gunong Belumut, 3000 feet. (Holttum 10755), in a close mat on tree trunk, among liverworts.

Rhizome slender creeping. Stipes 2-5 mm. long, glabrous like the main veins. Fronds rarely more than 1 cm. by 1 cm.; branching almost equally dichotomous; branches of third order usually present, but of fourth order not seen. Ultimate branches 1.5-2 mm. wide, and up to 9 mm. long in unequally branched fronds. Edges slightly crisped, bearing numerous simple red-brown hairs, which are somewhat deciduous on old fronds. Valves of indusium with hairy outer surface, rounded above, and toothed, the teeth bearing

hairs like the edges of the frond; narrowed below and united for $\frac{1}{3}$ of their length, the base forming a conical sheath round the receptacle which in age projects 1 mm. beyond the indusium.

This is perhaps nearest to *H. borneense* Hk., of which I have seen the type at Kew. The latter species differs however in having more palmate fronds with more slender segments, which are very hairy, and the indusial lips are much smaller.

***Leptochilus simplicifolius* Holttum, sp. nov.**

Rhizoma repens, squamis brunneis non-nitidis, lanceolatis, munitum. Stipites conferti, frondis sterilis 5-10 cm., fertilis 20-30 cm., longi, in sicco pallidi, glabri. Frondes steriles simplices, herbaceae, glabrae, 10-25 cm. longae, 3-5 cm. latae, lanceolatae, basi cuneatae, apice acuminatae, margine undulatae. Venae laterales 5-10 mm. distantes, leviter obliquae, fere rectae, subtus prominentes, pallidae, glabrae; venulae fuscae, aerolas irregulares 2-3-seriatis inter venas primarias formantes; venulae liberae paucae. Frondes fertiles 8-10 cm. longae, 1-2 cm. latae, irregulariter crenatae.

PAHANG: Robinson's Falls, Cameron's Highlands, 4500 ft., on wet rocks (Henderson 17977: type); Fraser Hill, 3800 ft., on rocks by stream (Holttum 11489).

PERAK: Gunong Hijau, 4200 ft. (Burkill 12756).

Rhizome creeping, scales dull brown, lanceolate. Stipes closely placed, 5-10 cm. long in sterile fronds, 20-30 cm. in fertile fronds, slender, pale when dried, glabrous. Sterile fronds simple, 10-25 cm. long, 3-5 cm. wide, lanceolate, base cuneate, apex acuminate, edge undulate; lateral veins pale, prominent beneath, 5-10 mm. apart, slightly oblique, almost straight, glabrous. Veinlets dark, forming 2-3 rows of aerolae between the main veins with very few free included veinlets. Texture herbaceous. Fertile fronds 8-10 cm. in length, 1-2 cm. in width, rather irregularly crenate. Sori completely covering lower surface.

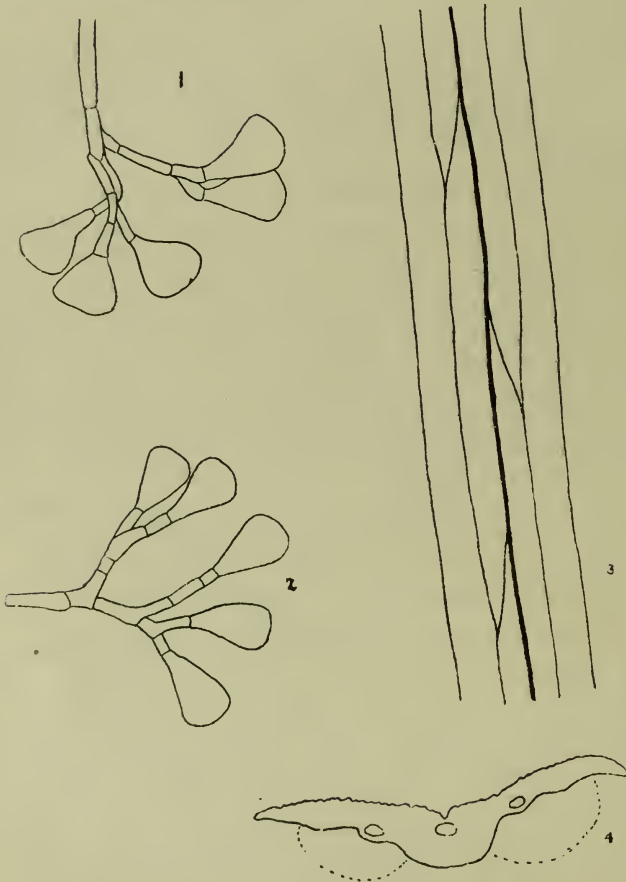
Nearly allied to *L. heteroclitus* (Pr.) C. Chr.

***Vittaria (Taeniopsis) malayensis* Holttum, sp. nov.**

Rhizoma breve repens, squamis angustis fuscis clathratis setosoacuminatis vestitum. Frondes confertae, sessiles, usque ad 25 cm. longae et 2 mm. latae, basin versus semisim contractae. Costa supra canaliculata, subtus leviter prominens. Venae laterales duae, sub soris, cum costa parallalae. Venulae paucae, obliquae, cum venis lateralibus confluentes. Venulae liberae nullae. Sori lati, paulo immersi inter costam et marginem, $\frac{2}{3}$ partem superiorem frondium occupantes, continui vel interrupti. Sporangia paraphysibus ramosis clavatis intermixta.

PAHANG: Fraser Hill, 4000 ft. (Burkill & Holttum 8705 (type), E. Smith 891); Cameron's Highlands, 4800 ft.

(Henderson 17702); Gunong Berumban, 5500 ft. (Henderson, F.M.S. Mus. No. 11744).



Vittaria malayensis. 1 & 2, paraphyses, x 100. 3, venation, x 6. 4, transverse section of frond, showing position of sori, x 20.

Rhizome short-creeping, densely covered with narrow dark hair-pointed clathrate scales. Fronds closely placed, sessile, to about 25 cm. long and 2 mm. wide, very gradually narrowed to base. Midrib grooved above, slightly prominent beneath. Veinlets few, forming a single row of long aerolae between the midrib and a continuous vein lying below the sorus. No free veinlets. Sori in shallow grooves, occupying most of the space between midrib and edge, on the upper $\frac{2}{3}$ of the frond, continuous or interrupted. Sporangia mixed with numerous branched paraphyses, the branches capitate. Spores about 64 to a sporangium. Stomata occur on the lower surface, on either side of the grooves occupied by the sori.

ADDITIONS TO THE FLORA OF THE
MALAY PENINSULA.

STERCULIACEÆ.

Sterculia alata, Roxb. Hort. Beng. 50; Pl. Corom. iii, 84. t.287.

Kelantan, Gua Panjang at Gua Ninik, Henderson 19613; Perak, no locality, Scortechini 1783; Negri Sembilan, Senawang Reserve, Forest Department 1995.

Helicteres lanceolata, DC., Prod. i, 476.

Pulau Langkawi, Holtum 17430, August, 1925.

MELASTOMACEÆ.

Sonerila johorensis, Hend., sp. nov.

S. prostratae Ridl. affinis, sed foliis, antheris, petalisque majoribus differt.

Prostrate creeping herb, rooting at intervals, stems filiform, red with long white hairs. Leaves in subequal pairs, broadly triangular ovate acute, serrate, base broad and abruptly narrowed into the petiole, red below when alive, purplish when dry, white hairy above and below; up to about 15 mms. long and 10 mms. broad; petioles about 2 mms. long.

Flowers 2 to 4 on a terminal peduncle 2-3 cms. long. Calyx narrowly funnel shaped, 4 mms. long, teeth broad, acute. Petals pink, 6-8 mms. long, ovate oblong apiculate. Stamens 3, anthers yellow, curved, acuminate, 2 mms. long, filaments slender 3 mms. long. Capsule smooth or minutely hairy, cylindrical oblong, narrowed at base, 5-6 mms. long.

JOHORE, Gunong Panti at 1600 ft. altitude, on rocks, Holtum 17500 (type), Feb. 1926.

RUBIACEÆ.

Pomazota rivularis, Hend., sp. nov.

A *P. sylvestre* Ridl., foliis maioribus minus hirsutis, stipulis latioribus, corolla cylindrica, stylo tenuiore differt.

A creeping and erect herb, woody at base, stems at base as much as 8 mms. through, rooting at lower nodes.

Leaves oblong-lanceolate or oblanceolate, acute, narrowed to base, up to 18 cms. long and 6.5 cms. broad, glabrous above except for a few coarse thick hairs between the nerves, sparsely hirsute below on the midrib and nerves, margin with a row of multicellular hairs. Nerves prominent on both sides, up to 17 pairs. Stipules broad triangular-ovate with long points.

Peduncles variable in length, reaching 6 cms., subtended at base by a pair of ovate acute bifid bracts hairy on their edges. Involucral bracts broadly oblong or rhomboid, 3-nerved, sparsely hairy, up to 2 cms. long and 1 cm. broad. Outer floral bracts narrow spatulate, 6-8 mms. long with long multicellular hairs. Inner floral bracts linear oblong,

also hairy. Calyx lobes 4, narrow oblong with long multicellular bristles on their edges. Corolla white, cylindric, 4 mms. long, constricted below the lobes, mouth with a dense ring of hairs; lobes 4, patent, triangular ovate, with a strongly marked midrib from which arise two or three multicellular bristles. Stamens 4, about half the length of the corolla tube, anthers oblong. Style slender, stigma large globose, prolonged below the insertion of the style into two lobes. Disc conspicuous.

Capsule ovate oblong 2-3 mms. long, crowned by the persistent calyx lobes. Seeds small, numerous, angular, punctate.

JOHORE: Gunong Muntahak, c.600 ft., by a stream in dense shade, abundant, Holttum 19922 (type), March, 1928.

COMPOSITÆ.

Eupatorium conyzoides, Vahl, Sym. Bot. iii, 96.

A Brazilian composite of recent introduction into the Peninsula, now common on roadsides near Taiping.

LOGANIACEÆ.

Fagraea speciosa, Bl. Rumphia ii, 35, t. 81.

Kelantan, Sungai Ketch at Gua Ninik, Henderson 19658, October 1927.

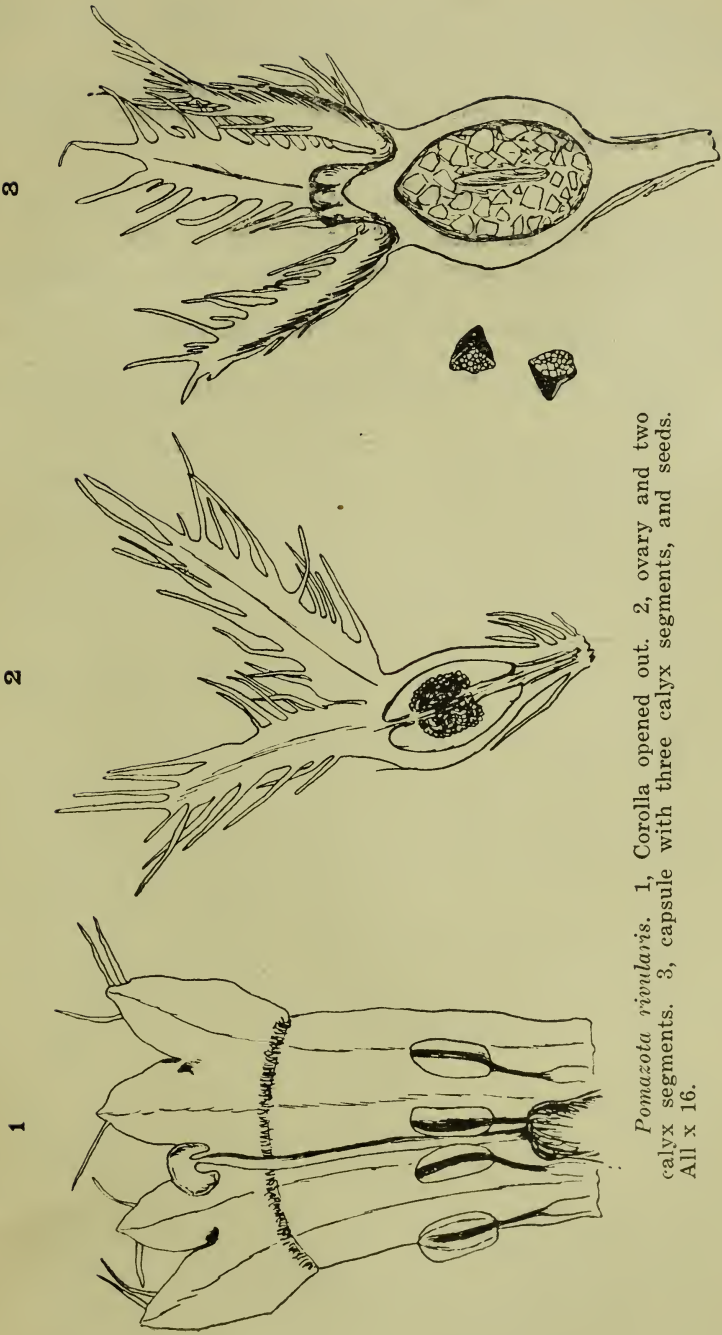
GESNERACEÆ.

Loxocarpus Holttumi, Hend., sp. nov.

L. semitortae Ridl. affinis, foliis cordatis, latioribus, pedunculis longioribus, calycis majoribus, pedunculis floribusque extra glanduloso-hirtis differt.

Leaves in a rosette, broadly ovate, cordate, blunt, edge serrulate, upper surface covered with white silky hairs, lower surface densely covered on the prominent veins with long slender ferruginous hairs, between the veins more sparsely covered with short white hairs; about 4-5 cms. long and 4 cms. broad. Petioles up to 5 cms. long, densely ferruginous hairy.

Peduncles to 15 cms. or more, covered with short purple glandular slightly viscid hairs, pedicels drooping, 1.2 cms. long. Inflorescence of about 7 flowers. Sepals triangular, blunt, 1 mm. long, hairy as the peduncle and pedicel. Corolla uniformly pale mauve-blue, slightly paler at the base, two-lipped, lobes round blunt, the two upper lobes much smaller than the three lower ones; 13 mms. long and broad. Outside of corolla sparsely white glandular-hairy. Filaments rather slender, curved, white to greenish, anthers yellow, or the same colour as the corolla, connivent. Staminodes white, club-shaped, about one-third the length of the stamens.



Pomazota rivularis. 1, Corolla opened out. 2, ovary and two calyx segments. 3, capsule with three calyx segments, and seeds. All x 16.

Capsule conic, dehiscent along the upper edge, sepals persistent, reflexed. Seeds brown, narrowly ovoid and pointed at both ends, minutely reticulate.

JOHORE, Gunong Panti at 1600 ft. altitude on rocks, Holttum 18097 (type), Feb. 1926; same locality, Holttum 19863, Dec. 1927.

ORCHIDACEÆ.

Eria rigida, Bl. Mus. Bot. Lugd. Bat. ii, 183.

Pahang, Gua Tipus near Chegar Perah, Henderson 19465, Oct. 1927.

Eria Teysmanni, J. J. Smith in Bull. Dép. Agric. Indes Néerl. xxii, 29.

Kelantan, Kuala Pertang, Haniff and Nur 10364, February 1923.

M. R. Henderson.

FURTHER ADDITIONS TO THE FLORA OF THE MALAY PENINSULA.

(1) *HYPTIS CAPITATA*, Jacquin in *Collectanea I* (1786) 102.

Pycnanthemum decurrens, Blanco, in *Flor. Filip. Ed.* 3, II (1878) 251, t. 294.

A stout annual herb, erect, 4 feet tall, hairy, green, or purplish especially at the nodes and in the upper side of the leaf-mid-veins, with four-angled stem. Leaves lanceolate, toothed, about 4 inches long, and 1 inch broad. Flowers numerous, crowded into subglobose heads, on long peduncles, peduncles solitary, axillary, four-angled, about 3.5 inches; heads 0.5 to 0.7 inch long. Calyx pale green. Corolla white, dotted pink in the tube, inferior lip yellowish white. Stamens exsert; filaments white; anthers darkish; pollen yellow. Style linear, white, exsert.

This plant is quite common in waste places along the Cluny Road, in the vicinity of the Old Arboretum of Singapore, and has been observed there for the last five years. The plant agrees well with plate given in Blanco's *Flora*, l.c.

Distribution—A plant of Mexican origin now found as a weed in the Marianne and Caroline Islands, the Philippines, Formosa, Amboina, Java, Borneo and India.

The key given in Ridley's *Flora II* (1923) 645, for the identification of *Hyptis spp.* occurring in the peninsula may be modified to include the above species thus:—

A. flowers few in racemose cymes, corolla violet; herb strongly aromatic, pubescent with spreading hairs; leaves ovate, serrulate. *H. suaveolens*, Poir.

AA. flowers numerous in axillary globose or subglobose heads, corolla white; herb little or not aromatic, more or less pubescent with non-spreading hairs; leaves ovate-oblong to lanceolate, serrate:

(a.) Peduncles about 0.5 inch long, more or less as long as the flower heads. *H. brevipes*, Poir.

(aa.) Peduncles 3.5 inches long, about three or more times as long as the flower heads. *H. capitata*, Jacq.

(2) *RIVINIA HUMILIS*, Linn. *Spec. Plant.* (1753) 121; H. Walter in *Engl. Pflanzenreich IV* 83 (1909) 102, fig. 30; Sims in *Bot Mag.* (1816) t. 1781.

Perennial herb or shrub, woody below, up to 3.5 feet tall, glabrous or pubescent. Leaves alternate, occasionally sub-opposite, entire, ovate or broadly elliptic, apex long acuminate, base rounded or obtuse, sometimes slightly acute or sub-cordate, 1 to 4 inches long, 1 to 2 inches broad; petiole more or less hairy or tomentose, roundish, with a little groove above, 1 to 1.5 inch long. Flowers bisexual in subterminal or axillary racemes, little longer or shorter than the leaves.

Perianth of a single series, 4 cleft, white or pinkish, 1/12 inch long, increases and turns green in fruit. Stamens as many as perianth segments; filaments white, persisting green on fruits. Ovary monocarpellary, white, style one, short with capitate, white stigma. Fruit a globose red berry, with fleshy pericarp; seed hard, black.

Varieties occurring here *orientalis* (Moq.) Walt. and *canescens*, L.

As early as the year 1890 (or 1896?) Ridley collected a specimen of this species which was then noted by him as an escape from the Singapore Botanical Gardens. This species is still found persisting as weed in the Garden's hedges and is seen flowering and fruiting throughout the year. The other records for the Peninsula are:—

Malacca at Malacca Hill (Ridley, Dec. 1899). Singapore, Yo Chu Kang (Ridley, 1902); Paya Goyang (Hassan, May, 1905).

Singapore, (Mayer, no. 884 fide Walter l.c.) [Mayer's name is not included in the list of Malayan Plant Collectors made by Burkill and published in Garden's Bulletin IV (1927) nos. 4 and 5].

Distribution—Native of tropical and subtropical America, but now pantropic.

Rivina (also spelt as Rivinia) is a Linnean genus of the Phytolocoaceae—a family not included in Ridley's Flora.

For the purpose of tracing the family of this plant, the following synopsis may be used as an Addendum to the synopsis of the families given by Ridley in the *Flora*, I (1922) xxxi:

CXa—*Phytoloccaceae*—Herbs or shrubs, woody at base. Perianth of a single series, 4-cleft. Leaves alternate, entire. Ovary of one carpel. Style one, capitate stigma. Fruit a berry.

C. X. FURTADO.

OCIMUM, LINN. IN THE MALAY PENINSULA.

In the peninsula all *Ocimum* species are cultivated plants, but frequently one comes across them as escapes and weeds in the settled areas. They are grown chiefly for the purposes of worship or for their medicinal value, or again for the purpose of scenting cooked preparations. *O. sanctum*, L., is sacred to the Hindu deities Krishna and Vishnu, and is frequently cultivated by the Hindus from northern India near their dwellings, in places where they usually say their prayers. Some believe that the mere presence of the *Ocimum* round about the houses keep away mosquitoes. An infusion of its leaves is used, either alone or mixed with that of other plants, internally to cure the minor disorders of the respiratory system and also irregular

menstruation in women, and externally as a cure for skin diseases, headache and earache. Medicinally leaves of any of the *Ocimum* species are considered good, but leaves of *O. sanctum*, L. and *O. Basilicum*, L. are regarded as superior to others. Leaves of *O. canum*, Sims, and of the white-flowered, hairy varieties of *O. Basilicum*, L. are used in culinary preparations. The leaves and calyces of *O. Basilicum*, L. var. *pilosum*, Benth. has been reported to be a frequent adulterant of the patchouly (*Pogostemon Cablin*, Benth.) prepared for export from this country. [Gildemeister & Hoffmann in the *Volatile Oils* Engl. Ed. (1900) 657; and Prain in *Journ. As. Soc. Bengal* LXXIV pt. 2 Extra No. (1907) 702 & 709]. In his notes on the Malayan drugs, Ridley notes that the flowers of *O. Basilicum*, L. form one of the ingredients used in the root decoction of *Phyllanthus Niruri*, L. given to cure cough in children, and that an infusion of the seeds of *O. gratissimum*, L. is drunk for gonorrhoea, and also in the morning as laxative. (*Agri. Bull. S.S. & F.M.S.* V, -1906-248 & 278.)

Being introduced plants in the peninsula, the Malays have no fixed vernacular name for the *Ocimum* species. *Kemangi* is the usual name for *O. canum*, Sims, but it may also be used for the white-flowered varieties of *O. Basilicum* that are used in cooking. *Selasi* or *Selaseh*, a corruption of the Sanskrit name *Tulasi* for the *Ocimums*, *Pokoh* derived from the Chinese name *Poh Hok* for peppermint, and *Ruku* are used indiscriminately to all the species of the *Ocimum*, but rarely to *O. canum*, Sims. The last two names are usually used in the plural form as *Ruku-Ruku* and *Pokoh-Pokoh*, the singulars being seldom used. As in the Malay language the plural form, when applied to plants, usually implies that the plants bear in some way a resemblance to the one to which the singular belongs, the genuine *Ruku* may be some other plant native of Malaya, as for instance, the aromatic *Adenosma capitatum*, Benth., which is now known to the Malays as *Ruku hutan*. The word *Kemangi* is usually used alone, but all the others may be applied alone or with the adjective *merah*, *hitam*, *puteh* or *besar* to describe the general size or colour of the plants in the living condition. *Oku* or *Oku-Oku*, are apparently corruptions of the *Ruku* or *Ruku-Ruku*. The white-flowered, hairy varieties of *O. Basilicum*, L., approach so near to *O. canum*, Sims, that botanically it is very difficult to separate them as distinct species except by the larger size of all the parts of *O. Basilicum*, L. The Malays also do not seem to make any difference between them, and the varieties of *O. Basilicum*, L. have the same vernacular name and uses as *O. canum*, Sims. All the above names are also applied by the Malays to *Hyptis suaveolens*, Poir, another aromatic plant of foreign origin belonging to the same family as the *Ocimums*. The most usual adjective that accompanies the

names in this case is *hutan* to show that the plant is a weed or wild in the Peninsula.

The key and the descriptions of *Ocimum* species given by Ridley in the *Flora of the Malay Peninsula* II (1923) 643, are not very satisfactory for the identification of the species occurring in the peninsula, and hence the key given below has been prepared after a study of the plants in the herbarium as well as in the living condition.

KEY.

1. a. Shrubby plants 1 to 2 m. tall. Leaves more than 7.5 cm. long, 5 cm. wide, broadly serrate. Lower calyx lip shorter than the upper one. Corolla white, pubescent....
.....*O. gratissimum*.

b. Herbs or woody undershrubs, 30 to 100 cm. tall. Lower calyx lip longer than the upper one. Leaves usually less than 6.5 cm. in either dimensions, entire or serrate
..... (2)

2. a. Leaves somewhat rhomboidal, obtuse, often apiculate, hairy on both sides. Pedicels as long as, or longer than, the calyx, spreading out almost at right angles to the axis so that the calyces face outwards. Calyx glabrous within. Stem often reddish pubescent with spreading, white hairs. Corolla purplish, pink or white with purplish or pink lobes, or yellowish lip (fide Ridley) Anthers yellow
.....*O. sanctum*.

b. Leaves acute or acuminate at both ends, rarely with an obtuse apex. Pedicel shorter than the calyx, growing upwards closely adpressed to rachis so that the calyces on decurved tips face downwards and appear sessile. Calyx hairy within; patellate lobe obstructs the view of the remaining parts. Anthers white..... (3)

3. a. Corolla white, 4 to 5 mm. long. Patellate lobe of the calyx 2.5 to 4 mm. long and as much broad. Leaves 2.5 to 4 cm. long, acute at both ends or rhomboidal. Plant pubescent often densely in the upper parts, low branched, 30 to 45 cm. rarely 60 cm. tall herbaceous, whitish without any purplish tints.....*O. canum*.

b. Corolla white, purplish or pink, 7.5 to 12 mm. long. Patellate lobe of the calyx 5 to 7 mm. long, 6 mm. broad. Leaves 2.5 to 7.5 cm. long, very variable, usually lanceolate, cuneate at base, or hairy glabrous plant 45 to 90 cm. tall, branching in the upper two-thirds, bushy, sometimes hairy but usually glabrous, and purple with dark purplish tints even in the calyx.....*O. Basilicum*

(Polymorphous species).

O. gratissimum, Linn.

Lower Siam, Kopah (Haniff & Nur, n. 2987) Perak, Sungei Siput (Haniff & Nur, n. 6923) Singapore, Botanic

Gardens, (Ridley, in 1905; Deshmukh, in 1921; Furtado, in Nov. 1927, known in the vernacular as *Ruku-Ruku hitam*, and *Selaseh besar*).

O. sanctum, Linn.

Langkawi, (Curtis, n. 2126). Perak, Matang, (Wray, n. 558, as Selassay). Province Wellesley, Pagar Tras, (Ridley, n. 7168); Prai, (Nur, n. 6226). Pahang, Pekan, (Ridley, as Selaxa antan and no. 187); Kuala Tahan, (Seimund, n. 831). Malacca, Gombeya Bath, (Hervey, Sept. 1890). Selangor, Kuala Lumpur, (Ridley, n. 10214); Port Swettenham, (Burkill, n. 2700). Johore, Pulau Tingii, (Burkill, June 1915, as Oku). Singapore, (Hullett, in Nov. 1884 n. 374; Ridley, in 1903, as Ruku-Ruku); Pulau Ubin, (Furtado, n. 18622); Botanic Gardens (Furtado, Nov. 1927, as Selaseh hitam and Ruku-Ruku merah).

O. canum, Sims.

Langkawi, (Curtis, n. 2492). Perak, Kuala Kangsar, (Haniff n. 14930) Singapore, (Hamilton, in Oct. 1926, as Kemangi); Botanic Gardens, (Ridley, in Aug: 1898; Furtado, in Aug: 1928, as Kemangi). This plant frequently appears for sale in the Singapore bazars, as also the white-flowered hairy varieties of *O. Basilicum*, L. known to the Malays as the Kemangi.

O. Basilicum, Linn.

Penang, Tanjong Tokong, (Curtis, n. 2492); Waterfall Gardens (Nur, in Sept. 1918) Selangor, Kuala Lumpur, (Ahmat in 1889, as Kemangi). Pahang, Kuala Tembeling, (Ridley, in Aug: 1891); Pulau Tiunan, (Henderson, n. 18428). Malacca, Bukit Panchur, (Alvins, as Ruku-Ruku Itam). Singapore, (Ridley, in 1903, as Selasih); Bukit Mandai, (Ridley, as Ruku-Ruku); Botanic Gardens, (Furtado, in Nov. 1927, as Selaseh puteh, Selaseh hitam, Pokoh, Pokoh-Pokoh hitam, and Kemangi).

C. X. FURTADO.

PALAQIUM STELLATUM, KING & GAMBLE.

PALAQIUM STELLATUM, King & Gamble in *Journ. As. Soc. Bengal* LXXIV, pt. II (1905) 198; Ridley in *Flor. Mal. Pen.* II (1923) 277; and H. J. Lam in *Bull. Jard. Bot. Buitz.* VII (1925) 71 and VIII (1927) 402.

Bassia Watsoni, Ridley l.c. p. 267.

Madhuca Watsoni (Ridl.) Lam l.c. VII (1925) 179 and VIII (1927) 462.

In the *Materials for a Flora of the Malayan Peninsula*, King and Gamble (l.c.) used Scortechini's specimen numbered 1855, from Perak, to found a new species which they called *Palaquium stellatum*. The specific name for the plant was suggested by Scortechini himself who

thought the hairs on the leaf-nerves were stellate. Having probably no occasion to test the accuracy of Scortechini's observations regarding hairs on the leaf nerves, King and Gamble retained the specific name suggested by the Schortechini whom they also held responsible for the description of the hairs. A co-type specimen of the number cited by King and Gamble is in the Singapore herbarium. It answers to the description of the species in all respect except the hairs on the leaf-nerves, which are not stellate. In his monographic work on the sapotaceous plants of the Dutch East Indies, the Malay Peninsula and the Philippines, Lam points out this error in the description of the hairs on the leaf-nerves of *P. stellatum*, and adds that he has never come across a *Palaquium* species having stellate hairs on leaves (Lam, l.c. VII, p. 71). Hitherto *P. stellatum* was believed to occur in the Malay Peninsula only, and to be very rare. But from the citations given by Lam (op. cit. VII, p. 71, and VIII p. 402) one notes that it is not so rare in the Peninsula, and that it also occurs in Sumatra.

In working out the sapotaceous plants for his Flora, Ridley was not able to see the type specimen of *P. stellatum*, and so he borrowed the specific description for the Flora from the original description in the Materials (Ridley, l.c. p. 277). He had, however, with him unnamed material of this species, which he used to found his *Bassia Watsoni* (l.c. p. 267). He does not cite the numbers of the type specimens, but thanks to Mr. Burkill who has looked them up at Kew, we know that the type specimens of *Bassia Watsoni*, Ridley, are C. F. nos. 869 and 2755, both of which numbers are represented in the Singapore herbarium. An examination of this material leaves no doubt that it is *Palaquium stellatum*, King and Gamble, though the leaves resemble somewhat of the *Bassia* group. The calyx is distinctly of six sepals, and Ridley himself had noted correctly that the outer whorl consists of three sepals, whereas the *Bassia* (*Madhuca*) species have two sepals in the outer whorl of the calyx. The cotype specimens of *Bassia Watsoni* in the Singapore herbarium closely agree with the type specimen of *Palaquium stellatum* and with its description as corrected by Lam.

While working on the sapotaceous plants in Malaysia, Lam (op. cit) could not see any authentically named specimen of *Bassia Watsoni*. But considering that the generic name *Madhuca*, GMELIN, is the only valid name for the *Bassia*, KOENIG, the word *Bassia* being preoccupied by ALLIONI for a group of Chenopodiaceae, he renamed *B. Watsoni*, Ridley as *Madhuca Watsoni* with a note indicating his doubts of its being a true *Madhuca* (op. cit. VII, p. 179). Later on he had with him a specimen collected by Watson at Baloh Reserve, numbered C. F. 2755, which he determined

correctly as *Palaquium stellatum* (l.c. VIII, p. 402); but he did not know that this was from the type collection cited by Ridley for *Bassia Watsoni*. Lam, therefore, still retained the name *Madhuca Watsoni* in this later publication with a note that he has not seen any specimen of the species. (l.c. VIII, p. 462).

C. X. FURTADO.

SPECIES OF NEESIA IN THE MALAY PENINSULA.

The primary object of this note is to restore to its proper rank, the species *Neesia synandra*, Masters, the specific status of which has long been in doubt, and also to show the limits of distribution of all the three species found in the Malay Peninsula. That Masters had made a careful examination of the type specimen of his species is quite clear from the generic characters given by him under *Neesia* in Hook f. Flor. Brit. Ind. I pt. 2 (1874) 352, which, as far as the leaves and flowers were concerned, were all a result of his own observations made of the type specimen of his species. But the confusion occurred owing to a mistake he made in giving almost all the important characters of his species under the generic description, where they escaped the attention of the botanists who tried to study his species, giving the minor ones under the description of his species. It was probably his intention to show the characters of the genus *Neesia* as he had found it in the Malay Peninsula; for he was fully aware that his generic description was not applicable, at least in the characters of the filaments, to *Neesia altissima*, Bl., the only other *Neesia* species known then; in fact he himself draws attention to this fact under the description of his species. The result of the transference, which Masters unwittingly made, of the important specific characters to the generic description was that *Neesia synandra*, Mast., was either regarded as a doubtful species, or confused with others quite distinct. Hence a detailed description of *Neesia synandra*, Mast., and a sufficient synonymy of all the three species occurring in the peninsula together with an artificial key are given below so as to make their distinctions and their specific ranks quite clear.

KEY.

1a. Leaves up to 24 x 12 cm., glabrous, with 12–15 pairs of nerves. Flowers in the axils of fallen leaves. Peduncle 0.2 cm. thick, pedicels 1–2 cm. long. Calyx globose in the bud abruptly contracted towards the apex, later somewhat compressed with margins inflexed inwards, not involute
.....*Neesia malayana*.

1b. Leaves over 30 x 15 cm. glabrous to distinctly hairy beneath, with 18–26 pairs of nerves. Flowers axillary, or in the axils of fallen leaves. Peduncle 0.3–0.4 cm. thick;

pedicels up to 1 cm. long. Calyx globose in the bud contracted or not towards the apex, later saucershaped with margins involute or not.....(2)

2a. Leaves up to 45 x 17 cm. glabrous or subglabrous. Branchlets and petioles hairy or glabrous, rarely covered with a few scales. Stipules glabrous, subglabrous or rarely with a few scales. Flowers axillary or in the axils of fallen leaves. Calyx globose in the bud abruptly contracted towards the apex, later saucershaped with involute margin, wholly or partly pubescent within.....*N. altissima*.

2b. Leaves over 45 x 20 cm. distinctly hairy beneath. Branchlets and petioles scaly, not hairy. Stipules thickly covered with scales outside, tomentose within. Flowers in the axils of fallen leaves. Calyx globose in the bud with cuneate apex, later convexly saucershaped with margin spreading, not involute, glabrous within.....*Neesia synandra*.

Neesia synandra, Masters in Hook. f. Flor. Brit. Ind. I pt. 2(1874) 352; Mast. in Journ. Linn. Soc. Bot. XIV(1875) 504; Becc. Malesia III (1889) 263; King Mat. Flor. Mal. Pen. in Journ. As. Soc. Beng. LX, pt. 2(1891) 56, reference to Maingayi's specimen only; Ridl. Flor. Sing. in Journ. Roy. As. Soc. Str. Br. XXXIII(1900) 51 pro parte; Ridl. Flor. Mal. Pen. 1(1922) 265 pro parte; Merr. in Journ. Roy. As. Soc. Str. Br. LXXXVI(1922) 328?

Arbor c. 20 m alta, 60-70 cm. diametro. Ramuli crassi, tereti, inferne delapsu foliorum conspicue cicatrisati, glabri, superne foliosi, lepidoti. Folia alterna, petiolata; stipulis deciduis, foliaceis, sessilibus, lanceolatis uni vel obsolete multi-nerviatis, 5 cm. longis, extus squamatis, intus tomentosis; petiolo usque 10 cm. longo, 0.7 cm. crasso, lepidoto, terete, basi dilatato trigono, apice inflato; lamina adulta 45-55 cm. vel magis longa, plus 20 cm. lata, coriacea obovato-oblonga, basi attenuata, saepissime cordulata, raro rotundata, apice semper emarginata, margine integra subundulata supra glabra costis nervisque sparse pilosis exceptis, subrugosa, dense punctulata, subtus aspera, pilosa, costis nervisque lepidotis exceptis; juvenilis utrinque dense tomentosa subtus costis nervisque lepidotis exceptis; nervis (lateralibus) 20-24 parallelibus, prope marginem arcuatis, in pagina superiore depressis, inferiore valido-prominentibus. Inflorescentia subterminalis, ad axillas foliorum delapsorum, corymboso-multiflora divaricata, usque 3.5 cm. longa. Pedunculi ad singulum pulvinum 1-3, ramosi, densissime squamati, angulati, basi 0.4 cm. crassi; bracteis minimis (0.3 cm. longis), densissime lepidotis, caducissimis. Pedicelli usque 1 cm. longi, angulati, densissime lepidoti. Involucellus trilobatus, caducus, extus lepidotus, intus glaber. Calyx primum globosus, apicem

versus sensim angustatus, sub anthesi convexo-disciformis margine obsolete crenulato, haud fisso, haud involuto, extus squamis densissime obtectus, intus glaberrimus, circiter 1–1.5 cm. diametro, persistens. Corolla pentapetala, petalis liberis, contortis, in calyptram cohaerentibus, mox deciduis, utrimque obtusis, extus basi glabro excepto timentosis, intus glabris, 1 cm. longis, 0.4 cm. latis. Stamina numerosa ($\pm 20-30$), monadelpha, in 5 acervos obsolete divisa, quam corolla breviora, omnia fertilia; filamentis ad medium connatis; antheris extrorsis, bilocularibus visu. Pistillum stamina superans, 0.7 cm. longum; stylo brevi, tereti, glabro; stigmatibus crasso, capitato secus marginem minute puberulo; ovario subsessili, quinqueloculari, oblongo, ciliato. Fructus pedunculatus; immaturus quinquangularis obovatus basi apiceque obtusus, pyramidato-tuberculatus; submaturus partim virescens partim purpurascens, muricatotesselatus, quinquejugatus, sectione transversa stellatus, 15 cm. longus, ellipticus, apice obtusus, ima basi acutus; maturus ad angulos prominentes ad apicem valvatim dehiscens; valvis 5, lignosis, medio septiferis, basi connatis, superne hiantibus, extus lividis, intus pilis rigidis prurientibus luteis densissime tectis, ad margines axiales plures semines utrimque ferentibus; seminibus ellipsoideis, apice obtusis, basi cuneatis, horizontalibus, nudis, nigris, usque 2 cm. longis, 1 cm. crassis. Indumentum pro magis parte stellulatum. Squamae peltatae.

Tree about 20 metres tall, 60–70 cm. through. Branchlets thick, terete, marked with conspicuous scars of fallen leaves, glabrous, but covered with scales in the terminal leaf-bearing parts. Leaves alternate, petioled; stipules deciduous, foliaceous, sessile, lanceolate, one or obscurely many-nerved, 5 cm. long, scaly outside, tomentose inside; petiole up to 10 cm. long, 0.7 cm. thick, scaly, terete, dilated trigonal at base, inflated at apex; adult leaves 45–55 cm. or more long, more than 20 cm. broad, coriaceous, obovate-oblong, narrowed into a very often cordulate, rarely obtuse, base, always with an emarginate apex, with entire, slightly undulate margin, glabrous above except for a few hairs along the midrib and nerves, and minutely and thickly punctate; in the under surface rough and hairy except for the scaly midrib and very often scaly nerves; nerves (lateral) 20–24 pairs, parallel arched near the margins, sunk above, raised beneath. Corymbs many-flowered, divaricate, subterminal, in the axils of fallen leaves, up to 3.5 cm. long. Peduncles 1–3 on each pulvinus, branched, densely covered with scales, angled, 0.4 cm. thick at base; bracts small (0.3 cm. long), thickly covered with scales, caducous. Pedicels up to 1 cm. long, angled, thickly lepidote. Epicalyx trilobed, caducous, scaly outside, glabrous within. Calyx globose in the bud, with gradually cuneate apex, later dilated and compressed into a convex disc with obscurely crenulate, but

not split nor involute, margin, thickly coated with scales outside, glabrous within, about 1–1.5 cm. in diameter, persistent. Petals 5, contorted, free but cohering together, deciduous, obtuse at base and apex, 1 cm. long, 0.4 cm. wide. Stamens numerous (\pm 20 to 30) monaldehyous, but obscurely arranged in 5 bundles, shorter than the corolla, all fertile, each bundle alternate with the petals, divided half-way into numerous filaments; anthers apparently all bilobed, extrorse. Pistil longer than the stamens, 0.7 cm. long; style short, terete, glabrous; stigma thick, capitate, minutely puberulous along the margins; ovary subsessile, oblong, 5-locular, ciliate with long persistent hairs; ovules numerous 2-seriate, horizontal, anatropous. Fruit peduncled; very young pentagonal, obovate obtuse at base and at apex, covered with pyramidal spines all over; half-ripe fruits partly green and partly purplish faintly suffused with blue, muricate-tesselate, 5-ridged, star-shaped in transverse section, 15 cm. long, elliptic, obtuse at apex, cuneate at the very base; ridges 6 cm. high from the axis of the fruit, the furrows 2.5 cm. deep; mature fruits open along the ridges into 5 valves; valves woody, carrying the septum in the middle, united at the base, opened at apex, blue-black outside, densely covered within with rigid, stinging, yellow hairs; seeds many, borne horizontally on both sides along the axial margins of the valves, ellipsoid, obtuse at apex, cuneate at base, smooth, naked, black, up to 2 cm. long, 1 cm. thick. Hairs on the vegetative parts of the plant mostly stellate; scales always peltate.

PENANG, Sungei Telok Bahang (Burkill, n. 4556, flrs. in Feb. 1919); Telok Bahang, (Forest Guard under Curtis, n. 3081 leaves only); Penara Bukit, (Forest Guard under Fox, flrs. in March 1905).

SELANGOR, Weld Hill in Kuala Lumpur (Hamid no. C.F. n. 2301 leaves only).

SINGAPORE, Bukit Timah, (Ridley, flrs. and very young fruits in Feb. 1890; ripe fruits in Oct. 1904 and Sept. 1908; Holttum & Furtado, n. 19788, flrs. & fruits in all stages in Nov. 1928).

Distribution—Borneo?

I have not seen the Bornean specimen referred to by Merrill, but he says that it agrees in its vegetative characters with Fox's specimen from Penang, which is *N. synandra*, Mast. He describes its fruits (not quite mature) as ellipsoid, 20 x 10 to 12 cm. when dry.

Neesia altissima (Bl) Bl. in Nov. Acad. Cur. XVII (1835) 75 & 83, t. 6; Becc. Malesia III (1889) 261; Bakhuizen in Bull. Jard. Buitz. VI (1924) 221 & 246 (for fuller bibliography and synonymy of this species see this work).

Esenbeckia altissima, Bl. Bijdr. Flor. Ned. Ind. 1 (1825) 119.

Neesia ambigua, Becc. Malesia (1887—1889) 261, t. 31 fig. 1.

Neesia glabra, Becc. 1. c. 263, tt. 30 et 31 figs. 2-4.

N. synandra, Mast. sensu King Mat. Flor. Mal. Pen. in Journ. As. Soc. Beng. LX, pt. 2, (1891) 56, exclusive of reference to Maingay's specimen; Ridley Flor. Mal. Pen. I(1922) 265 pro parte.

PERAK, Sungei Larut (Wray, n. 2271, flrs. in July 1888; n. 2875, small fruits in Aug. 1888); Gopeng (Kunstler, n. 5768, fruits in April 1884); Batu Kurau in Taiping (Haniff, n. 13265, flrs. in May 1924); Tukang Sidin in Teluk Anson (Haniff, n. 14161, young fruits in Sept. 1924); Bagan Serai in Krian, (Mitchell, C.F. n. 5679, flrs. in April and fruits in June of 1922, vern. name Bengang).

• *Distribution*—Lower Siam, Borneo, Java, and Sumatra.

I have taken the name *N. altissima*, Bl., *sens. lat.*, to include the various forms or varieties of this species. Wray n. 2271 has an obscurely 3-5 lobed epicalyx glabrous within except for a thin tomentose ring at base, petals lightly tomentose in the upper half and glabrous in the lower half and along the margins and inside, and glabrous stigma. Haniff's n. 13265 has a deeply trilobed, larger epicalyx tomentose within, petals tomentose outside almost to the base and pilose stigma as in Bakhuizen's specimen n. 5884 cited under *var. typica*, Bakh. l.c. 246. The specimen from Lower Siam (Haniff and Nur, n. 3905, from Khaw Poh Hill, flrs. in Dec. 1918) has its epicalyx like Wray's specimen, but the petals and the stigma as in Haniff's specimen. *Neesia* has not been credited for Lower Siam even in Craib's list of the Siamese plants (Flor. Siam. Enum. 1925, pt. I).

Neesia malayana, Bakh. in Bull. Jard. Bot. Buitz. VI (1924) 221 et 247, tt. 34 et 35.

Neesia synandra, Mast. sensu Ridl. Flora of Sing. in Journ. Roy. As. Soc. Str. Br. XXXIII(1900) 51 pro parte; Ridl. Flor. Mal. Pen. 1(1922) 265, pro parte.

Singapore, Chan Chu Kang (Ridley, n. 3770, flrs. in 1890); Kranji (Mat. n. 5846, flrs. 1894); near Cluny Road in Tanglin (Furtado, flrs. in Feb. 1924).

Distribution—Sumatra.

C. X. FURTADO.

ANISOPHYLLEA GAUDICHAUDIANA, Baill. is
A. GRANDIS, Benth.

About 1823 (the date is unrecorded) George Porter, at one time Head-Overseer of the East India Company's Botanic Garden in Calcutta and then a schoolmaster in Penang, collected in this island and sent to Calcutta a curious plant to which Wallich gave the number 4454 and the name *Strychnos grandis*. But Bentham when he elaborated his account of the Loganiaceae, to which family *Strychnos* belongs, pointed out (Journ. Linn. Soc., 1, 1857, p. 79) that Porter's plant is not even a member of the Loganiaceae, but a species of the genus *Anisophyllea* or *Anisophyllum* in the Rhizophoraceae: and he described it under the name of *Anisophyllum grande*.

In 1836 Gaudichaud collected in Penang specimens of the same plant, and these served as the basis of Baillon's description of *Anisophyllea Gaudichaudiana* (*Adansonia*, 11, 1875, p. 311), a name found in our text books, whereas Bentham's has been overlooked. But Bentham's name long antedates Baillon's, and must be restored as *Anisophyllea grandis*.

Porter collected other specimens of the same plant which Wallich distributed as no. 4976 under another singularly unfortunate name—*Cocculus flavicans*. These specimens are dated 1823. Maingay also collected it; and yet a fifth name, *Anisophyllea grandifolia*, G. Henslow, was bestowed when his specimens were examined for the Flora of British India.

I. H. Burkill.

OBITUARY.

CHARLES CURTIS.

Charles Curtis had charge of the Waterfall Gardens, Penang, from their foundation in 1884 until 1903, when he was obliged to retire through ill health. He died on Aug. 16th, 1928, at the age of 75 years, at Barnstaple, Devonshire.

From 1878 until 1884 he was employed by the firm of James Veitch & Sons as travelling collector, visiting Madagascar, Borneo, Sumatra, Java and the Moluccas. During these years he obtained many fine plants for cultivation, notably *Nepenthes Northiana*, one of the most remarkable of Bornean pitcher plants.

His initial appointment at Penang was that of Assistant Superintendent of Forests, and the Waterfall Gardens was then started primarily as a nursery for economic plants. From the first, however, some ornamental gardening was carried out, and it soon developed into a garden of great beauty, in its naturally beautiful setting. When the administration of Forests passed from the Gardens Department in 1895, Mr. Curtis was able to devote most of his time to the Waterfall Gardens, which remain as a monument of his service. He was a very capable horticulturist, and devoted himself with great energy and enthusiasm to his duties. He was also an active botanical collector, and added considerably to our knowledge of the Malayan Flora. Numerous plant species are associated with his name, and the genus *Curtisina*. He published a list of the plants of Penang Island in the Journal of the Straits Branch, Royal Asiatic Society, no. 25 (1894) and various papers on horticultural topics in the Agricultural Bulletin of the S.S. and F.M.S.

CHARLES FULLER BAKER.

We record with great regret the death of Charles Fuller Baker, Dean and Professor of Tropical Agriculture, College of Agriculture, Los Banos (University of the Philippines), who during a period of leave in 1917 acted as Assistant Director of the Botanic Gardens, Singapore. He died on July 22nd 1927, of chronic dysentery, within a few months of the date fixed for his retirement. He was 55 years of age. Throughout his life he devoted the greater part of his spare time to the accumulation of enormous and very valuable collections of insects and plants (particularly fungi) chiefly from the oriental tropics. While in Singapore he collected numerous insects and fungi, and contributed various short papers to Volume 2 of this Bulletin.

Rainfall.

At the head of the Waterfall Gardens, Penang during the first half of the year, 1927. in inches.

Readings taken at 8 a.m. and credited to the date in which the twenty-four hours begin. Data kindly supplied by the Municipal Commissioners of George Town, Penang.

Date.	Jan.	Feb.	March	April	May	June
1	...	...	·44	·26	·12	...
2	...	...	·04	1·97	·04	...
3	·17	·03	·92	6·05	·03	1·85
4	·03	·03	·56	·26	·14	...
5	·07	...	·36	·11	...	...
6	·11	·09	·30	·10	...	...
7	·97	·06	...	...	...	·02
8	·05	·03	·80	·14	·32	·33
9	1·56	·43	...	2·92	·72	·37
10	·48	...	...	...	·67	·30
11	...	...	...	·15	3·90	·25
12	...	...	...	·03	·88	...
13	...	...	...	·04	·12	...
14	...	·49	·23	·14	·40	·12
15	...	...	·48	2·11	·02	...
16	·21	...	·53	...	·33	·09
17	·04	...	·35	·03	·33	...
18	...	·98	·50	...	...	·57
19	...	·30	...	2·67	...	·72
20	·06	·03	·06	·05	·39	·77
21	...	·06	·05	·47	·35	·02
22	...	·03	·03	...	...	·65
23	...	·14	·03	1·59	...	·07
24	·07	·03	·03	·83	·27	·03
25	·22	·03	·12	·15	...	2·33
26	...	·04	·52	1·15	...	·05
27	·08	·03	·80	1·18	·19	...
28	...	·62	...	·18	·60	...
29	...	...	1·29	·46	...	...
30	...	...	·03	·27	...	...
31	...	...	·48	...	...	...
	3·64	3·45	8·95	23·25	9·82	8·54

Rainfall.

429

At the head of the Waterfall Gardens, Penang during the second half of the year, 1927, in inches.

Readings taken at 8 a.m. and credited to the date in which the twenty-four hours begin. Data kindly supplied by the Municipal Commissioners of George Town, Penang

Date.	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	...	·25	...	...	2·32	...
2	1·32	·10	...	1·28	...	...
3	·11	1·20	·03	·26	·09	...
4	·97	1·66	·46	·62	2·48	...
5	·48	·75	1·41	2·10	1·20	...
6	...	·08	·16	1·79	·30	...
7	1·53	...	·13	1·64	...	...
8	·03	...	·98	·06	·03	...
9	...	...	...	·36	·17	2·46
10	·03	...	·12	·41	·31	·02
11	·07	...	·74	·58	·12	·55
12	·73	...	·59	·03	...	...
13	·23	...	·33	...	·05	...
14	...	...	...	·10	·03	·04
15	...	...	·58	·28	..	...
16	..	...	·75	·02	...	·02
17	·25	...	·90	...	·15	...
18	·14	2·15	1·08	...	2·55	...
19	·21	·38	1·28	...	·06	...
20	·75	1·99	·67	1·12	...	·02
21	...	·24	4·98	...	...	...
22	·09	·59	·05	·42	·16	...
23	·05	·03	..	·07	·13	·29
24	...	·24	·90	·66	·22	1·78
25	·05	·32	·84	·05	...	...
26	...	·32	·17	·64	...	...
27	...	...	·63	·27	...	...
28	...	...	·03	·03	...	·60
29	...	...	...	·08	..	·18
30	...	...	1·89	·38	·63	·03
31	·04	·14	...	1·22	...	1·72
	7·08	10·44	19·70	13·87	11·00	7·71

Rainfall.

At the Botanic Gardens, Singapore, during the first half of the year 1927.
Readings taken at 9 a.m. and expressed in inches.

Date.	Jan.	Feb.	March	April	May	June
1	3·94	2·07	...	·79	·01	...
2	·91	·40	...	·01	·70	...
3	·24	1·22	...	·01	1·60	·01
4	·06	·05	·99	·03	·66	·25
5	trace	·07	3·76	·07	trace	·16
6	·01	·07	·29	trace	trace	...
7	...	trace	·27	..	·57	...
8	·02	...	·31	·06	·03	...
9	·14	...	1·21	·13	1·39	·45
10	·99	·01	·02	·30	...	1·39
11	·03	·31	...	...	...	trace
12	1·27	·12	...	...	·62	·11
13	trace	·15	...	1·64	...	...
14	1·01	·19	...	...	...	...
15	2·35	·03	·11	...	·45	...
16	·06	1·29	...	..	·07	...
17	·18	trace	...	·08	·28	·03
18	trace	...	·21	·14	·26	...
19	1·41	...	2·89	1·89	...	·05
20	·21	·60	2·01	1·47	1·12	·12
21	·08	·82	·06	·13	·23	·38
22	...	·20	·05	1·27	·13	·04
23	·06	...	1·87	·55	...	·13
24	1·37	·01	·04	·84	...	trace
25	·01	...	·06	·89	·03	·37
26	...	·01	...	·16	·02	·15
27	trace	·95	trace	...	·21	·94
28	1·68	2·40	·09	·06	...	trace
29	·62	..	...	1·72	·76	..
30	·03	...	·41	·68	...	...
31	1·64	...	2·15	...	...	...
	18·32	10·97	16·80	11·83	9·14	4·58

Rainfall.

431

At the Botanic Gardens, Singapore, during the second half of the year 1927.
Readings taken at 9 a.m. and expressed in inches.

Date.	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	...	trace	...	2·45	...	·09
2	·02	...	·02	·40	1·15	·24
3	1·31	·13	·08	·20	·20	·08
4	·06	...	trace	·91	...	·06
5	·52	...	1·31	trace	·50	·01
6	·10	·11	trace	·50	·31	·09
7	·01	·07	..	·17	·08	trace
8	·13	...	...	·56	1·13	·01
9	·04	...	...	·36	·71	...
10	·89	...	...	...	trace	...
11	trace	...	...	...	3·18	1·52
12	·03	·27	·14	...	trace	·59
13	...	...	·03	·01	·02	·21
14	...	·01	...	..	·01	·07
15	...	trace	...	·11	·27	...
16	·29	·02	...	...	trace	·15
17	·41	trace	·44	...	·13	...
18	·07	...	...	...	·01	·01
19	...	...	·09	...	·05	trace
20	·16	·92	...	...	·04	·08
21	...	·19	·03	trace	·13	·02
22	...	1·46	·46	·16	...	·04
23	...	1·31	·07	...	·07	·49
24	...	trace	·54	trace	·99	2·59
25	...	·04	·06	·22	·13	·01
26	...	...	1·22	·34	·12	3·67
27	...	·80	·36	·70	·01	·51
28	...	·04	·02	·01	...	·57
29	...	...	...	·03	·04	·22
30	...	...	·78	·35	trace	trace
31	...	..	...	·49	...	·02
	3·98	5·37	5·65	7·97	9·28	11·35

Summary of Rainfall 1927.

	SINGAPORE.				PENANG.			
	No. of rainy day	Amount of Rain.		Longest spell without rain.	No. of rainy days.	Amount of Rain.		Longest spell without rain.
		Inches.	mm			Inches.	mm	
Jan.	28	18·32	465	1 day	14	3·64	92	5 days
Feb.	22	10·97	279	2 days	18	3·45	88	4 ..
Mar.	20	16·80	427	4 ..	23	8·95	227	5 ..
April	23	11·83	360	3 ..	25	23·25	590	1 ..
May	21	9·14	232	2 ..	19	9·82	249	3 ..
June	18	4·58	116	4 ..	17	8·54	217	4 ..
July	15	3·98	101	11 ..	18	7·08	180	5 ..
Aug.	17	5·37	136	4 ..	16	10·44	265	11 ..
Sept.	18	5·65	143	5 ..	24	19·70	500	2 ..
Oct.	21	7·97	202	5 ..	25	13·87	352	3 ..
Nov.	26	9·28	236	1 day	18	11·00	279	5 ..
Dec.	27	11·35	289	2 days	12	7·71	196	8 ..
Total.	256	115·24	2926		229	127·25	3215	

Greatest amount in 24 hours 3·94"
or 100 mm.

Greatest amount in 48 hours 4·90"
or 124 mm.

Greatest amount in 72 hours 6·27"
or 159 mm.

6·05 inches or 154 mm.

8·02 inches or 204 mm.

8·28 inches or 210 mm.

Periods in which more than 5 ins. fell
in 72 hours. 3 (Jan. Mar. Dec.)

4 (April, May, Sept., Oct.)

Periods in which less than ·02 ins. fell
in 120 hours. 6 (May-June, July, Aug.,
Sept., Oct. (2)).

9 (Jan., Jan.-Feb., March, May-
June, June-July, Aug., Nov., Dec.)

Relative Humidity of the air at the Botanic Gardens, Singapore, from wet and dry bulb hygrometer readings made daily at 9 a.m. during the year 1927.

Date.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	95	100	73	81	83	81	85	79	81	100	77	72
2	80	81	76	77	91	79	75	73	72	95	91	76
3	93	93	76	79	95	80	95	75	79	78	78	80
4	74	90	83	90	85	95	98	75	76	91	83	73
5	76	82	91	81	78	83	98	81	100	78	92	86
6	86	83	87	83	83	76	85	83	81	90	83	86
7	76	75	77	83	98	83	75	89	70	98	68	79
8	75	71	87	86	85	79	95	75	84	71	87	82
9	70	79	91	76	90	91	81	68	79	91	100	67
10	90	83	79	91	73	93	98	72	64	65	72	83
11	67	82	85	81	71	72	79	70	72	74	98	83
12	86	75	79	83	84	93	87	75	81	70	79	85
13	73	75	74	81	70	81	83	79	77	74	79	95
14	75	75	68	71	83	79	85	76	75	77	83	93
15	76	84	68	78	87	74	81	76	70	79	75	79
16	86	79	73	76	90	76	83	76	69	66	74	68
17	82	72	75	79	83	73	95	72	89	70	72	84
18	71	72	76	77	79	68	81	72	71	67	93	79
19	77	76	87	83	79	79	79	75	77	69	91	76
20	77	87	74	97	83	95	79	95	76	72	93	86
21	75	95	75	72	76	91	83	89	79	65	95	72
22	82	74	83	98	79	91	79	97	95	72	62	74
23	82	75	76	83	83	95	79	86	75	81	76	95
24	84	75	91	85	72	81	81	82	79	75	97	84
25	86	70	84	77	87	95	79	86	82	72	89	85
26	87	83	70	76	87	71	79	75	93	70	91	95
27	79	76	74	79	91	85	77	95	95	85	80	74
28	95	87	83	83	79	75	76	79	83	75	71	89
29	78		72	98	77	76	76	83	72	76	79	86
30	80		67	87	80	76	79	75	72	76	66	79
31	95		81		76		76	68		77		72
	80.8	80.2	78.5	82.6	82.4	82.2	83.2	79.0	78.9	77.3	82.5	81.4

Average for the year 80.7

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