

## The Flora of Mount Ophir.

BY H. N. RIDLEY.

The isolated group of hills commonly known as Mount Ophir has been visited and explored by a number of naturalists and others, and general accounts of its position, itinerary, etc. have been published from time to time, but no account of its botany has yet been given and it may therefore be of interest especially to those who may be intending to make the ascent to give an account of the more interesting plants to be found there, and in particular those from the uppermost peaks of the mountain.

The Mount Ophir early attracted the notice of the first naturalist in this country, on account of its isolated position and of its being the only high mountain accessible with safety in the early days. Griffith was the first botanist to make a really extensive collection of the plants there. He visited the mountain in 1845, ascending not only to the top of the main peak, but also to a certain height at least on the lower, seldom visited peak, Gunong Mering. A rough-field list of the plants he noticed is published in the *Notulæ*. He only lived a year in Malacca dying there the same year he visited Mt. Ophir.

Cuming, the orchid-collector, who also made extensive collections in the Philippines, and Lobb plant-collector for Veitch also visited Mt. Ophir, but devoted themselves more to cultural plants such as orchids than to less showy plants, and though they both brought down a number of dried specimens as well, no account of their collections nor indeed of their expeditions was, it appears, ever published.

Wallace (1854) marched across to Mt. Ophir from Malacca via Ayer Panas and remained a week there, collecting birds and insects. His letters, notes, and a paper written for the Royal Geographical Society were unfortunately all lost; (the Malay Archipelago Chap. III). Maingay made a very extensive collection of plants in Malacca and did not neglect Ophir. He added

a considerable number of species to its flora as then known, but left no account of them, though they were described in the Flora of British India by Hooker and others. Mr. Hullett later made a small collection here which contained a number of important additions and novelties. His collection is preserved in the Herbarium of the Botanic gardens, Singapore where are also plants collected by R. Derry, and the spoils obtained by myself in two expeditions to this locality.

With all these collections made in so limited a district we may be certain that we have secured at least the greater part of the flora of the uppermost part of the range. The lower woods will still repay the researches of the botanist, but as the flora for the lower thousand or two thousand feet differs but little from that of similar altitudes in other parts of the peninsula, I intend to devote this paper to the characteristic upper flora of from 3,000 to 4,000 feet altitude, only referring to a few of the rarer plants met with at lower levels.

In the flora of British India where plants are referred to as having been collected on Mt. Ophir by Griffith, Maingay and others it frequently happens that the specimens were really obtained quite low down at the foot of the hills, or even some cases, in the plains and not really probably on Ophir at all, I have excluded these plants, they being evidently lowland kinds.

The usual way to arrive at the camping ground at Padang Batu is to start from Chabau and march across the lowland country to the foot of Bukit Besar, where the ascent commences. This district is now for the most part under cultivation or has formerly been so and what remains of the indigenous flora resembles that of other parts of Malacca. But I may note that at Rellau formerly grew two interesting plants in some pastureland which I fear is now under tapioca-cultivation, namely the pretty ground orchid *Geodorum purpureum* R.Br. with its nodding head of pink flowers, and *Knoxia Corymbosaa*, Rubiaceae herb with heads of pale pink flowers which though of wide distribution is not by any means common in the peninsula. Arrived at the foot of Bukit Besar the path ascends somewhat steeply at first, to about 2,000 feet altitude, then after a short steep descent rises steeply to the Padang Batu. The whole of Bukit Besar is densely wooded, and contains many interesting plants. On

a recent visit I rediscovered here the rare and curious saprophytic orchid *Leucolea ornata* Ridl, previously only known from Bukit Sadanen, and also the scarce fern *Pteris Dalhousiæ*. The flora here is that of the higher Malacca hills. *Dipterocarpeæ* and oaks (*Quercus Rassa*) occur quite to the highest point of the ridge, but with these appear some of the typical plants of the range, such as *Gastrochilus scaphochlamys*, *Geostachys elegans*, *Gahnia Javanica*, *Didymocarpus longipes*; and the elegant little palm *Pinanga paradoxa*, as well as *Licuala glabra*. One of the commonest trees here is the Pulawan, *Tristania Merguensis*, with its grey foliage and strange red stem off which the bark peels in long flakes which remain in piles at the foot of the tree. Here also grows the largest of all the *Kopsias* *Kopsia pauciflora* Hook, a big tree with white flowers with a pink eye. After passing the depression between Bukit Besar and Padang Batu, the trees as one ascends become smaller and more slender and more of the typical hill plants appear. Padang Batu is a large sloping rock-face covered in part with thick grass, *Ischaemum Feildingianum*, and with *Matonia pectinata*, among which grow gnarled trees of *Baeckia*, *Leptospermum*, *Podocarpus*, *Rhodoleia* and other mountain forms, while in damp spots, especially near and in the stream are the peculiar Ophir sedges, the white flowered *Hedyotis Maingayi*, dwarf pink Utricularias, *Didymocarpus semitortus*, and the orchids *Arundina speciosa*, *Spathoglottis aurea*, and *Cypripedium barbatum*. The stream which runs down over the rocks to the west is well worth exploring as the flora is rich and interesting, for besides the hill forms which follow the sides of the stream far down, there are many peculiar plants to be found, among them the large yellow flowered shrub *Brachylophon Hulletti*. While in the damp wood by the side of the stream was found the curious *Thismia Chrysops*. Above the Padang Batu the rocks rise covered with a forest of close but small trees, the largest being *Podocarpus*, *Tristania* and *Dacrydium* and from this point to the top one gets the most characteristic part of the Ophir flora. A steady rise brings the explorer to the top of Gunong Tunduk, where there is a large bare rock from which a good view is obtainable. A short descent into a damp valley is made and then Gunong Ledang is ascended, a stiff steep climb through thickly wooded slopes. Just below

the top is a very large rock with one side quite precipitous. At the base of it is a small spring. This is the old camping ground of the earlier explorers, Wallace and Griffith but it is seldom used now as the water supply is very limited. The extreme top is of no great size, in fact a very small space surrounded by stunted shrubs, Rhododendrons crimson and white, *Annesloea*, the biggest tree up here, *Rhodammia*, etc. with pitcher plants scrambling over the bushes and in the damper more sheltered spots, below the top on the north side grow *Habenaria*, *Burmanna*, *Sonerila* and other herbs in dense deep wet moss. I was unable to collect the mosses satisfactorily on either of my visits as most were not then fruiting, and those that were collected have not yet been identified. Two mosses here however are very attractive and merit special mention. One is the very pretty *Hypnodendron arborescens*, with a slender stem from which spread out two or three whorls of golden green branches some distance apart, the whole looking like a toy tree. It occurs in many parts of the range and is indeed to be met with all over the hill ranges of the peninsula. The other is *Pogonatum macrophyllum* a tall stemmed moss 6 inches high covered with close narrow blackish green leaves.

Animal life is by no means common above Padang Batu. I saw tracks and dung of a tiger at the flat rock on the top of Gunong Tunduk, and I have also seen the footprints of a good sized deer on the highest point of Gunong Ledang, but no signs of other Mammals. Elephants were formerly common in the lower woods (Braddell in Logan's Journal vii. 1853 p. 85) and it is said that the wild dog was abundant here but it is probable that this animal has disappeared of late years as the elephants certainly have. Birds are scarce also, swallows, a small tailor bird (*Orthotomus*) and a few others are all I have seen. I captured a small brown frog in the stream and caught a glimpse of a lizard's tail disappearing in the long grass. Butterflies are few and chiefly belong to common lowland species. Beetles are not very abundant. The big stag beetle *Odontolabis Gazella* may be met with, and I have also obtained a single example of a small but very beautiful blue *Buprestis*, and a number of very small brown chafers. A large black wasp with a yellow band across its body, somewhat resembling the common *Vespa cincta*,

is abundant and swarms of bees often fly over the mountain. A few grasshoppers, crickets, flies and other insects occur. Dragon flies and a species of May-fly haunt the stream. Termites occur nearly to the top of the highest point. Mosquitoes appear to be quite absent. I found a small species of scorpion in a decaying piece of wood on Padang Batu and Braddell mentions an enormous scorpion on the road to the top of Gunong Ledang. A small fresh water crab frequents the stream. It is brown with reddish claws. Land shells are mentioned as having been collected here both by Wallace and Braddell.

The lower peak of the range known as Gunong Mering I ascended with Mr. Hervey in 1892 from Lubok Kedondong. The Malays declared that it had never been ascended by Europeans, and that it was inaccessible. However the ascent proved merely a stiff climb though in parts it was found necessary to make hand rails or ladders to enable us to cross the smooth steep rocks. The camp was pitched on a Padang Batu across which ran a stream that fell in a cascade over the end of the rocks. Except at this point the stonefield was surrounded by the rising cliffs which were covered with forest. This spot was about half way up Gunong Mering. As to our being the first Europeans to ascend it, this may be considered doubtful as Griffith mentions numerous plants from Gunong Mering.

The flora of Mering is to all intents and purposes the same as that of Ledang, but a few met with here were not found upon the latter. In treating of the flora of this mountain, it may first be pointed out that in many respects it differs from that of the high lands of Perak and Selangor and more closely resembles that of Kedak Peak. It is possible, however, that this is rather due to climate than to anything else. The isolated position of both mountains their comparative proximity to the sea, and probably their greater dryness has had some effect in modifying the flora, but it should also be pointed out that neither mountain belongs to the central range but both appear to belong to quite a different system. Practically at present nothing is known as to the geology of the peninsula nor can we at present formulate even roughly any theory as to the relationships of the different hill ranges to each other. We do know, however, that the denudation of the Western side of the Peninsula has even in

comparatively modern times been enormous and that the hills now small and isolated were formally of much greater attitude and formed part of a chain or extended range

The Ophir flora may be divided into three elements; 1, a purely Malayan element of lowland types which have ascended the hills, and in some cases have been so far modified as to form peculiar species; 2, an alpine element characteristic of all our hill ranges at this altitude, including the following plants, *Illicium*, *Rhododendron*, *Microtropis*, *Burmannia disticha*, *Diplycosia*. Of what may be called the northern Alpine flora we have only one example and that is a most remarkable one being *Linaria alpina*, a plant once collected on the top by Mr. Hullett and never found before or since. It is especially remarkable as the plant has not been recorded from any other part of tropical Asia, nor has any other species of the genus been met with in the Malayan region even at much higher altitudes. The third element is perhaps the most interesting. It is the Australian element, and is represented by the following genera and species. *Boeckia*, *Leptospermum*, *Tristania*, *Leucopogon*, *Dianella*, and most remarkably in the case of the *Cyperaceae*, of which six species occur here. One is a species of *Scleria* a genus of world wide distribution. Another a species of *Fimbristylis* which occurs also in Ceylon and China, but the remaining four, are two species of *Gahnia*, a *Lepidosperma*, both typical Australian genera, and a remarkable *Cladium* apparently related more to a west Indian plant than to anything else.

This Australian element is not by any means confined to Mount Ophir. It is to be found all along the mountain ridges of the Malay Archipelago, gradually dying out as it goes westward. It is also not exclusively to be found on the hill ranges but occurs along the sandy coasts also. With the single exception of *Dianella*, however, it is completely absent from the forests of the lowlands. The following is a list of typical Australian genera of the peninsula to illustrate this peculiar element in our flora.

*Boeckia*, hills at 3000—4000 feet; on the sea coasts in Tringanu and Borneo.

*Leptospermum*, hills at 3000-4000 feet;

- Tristania*, hills at 3000-4000 ; sea coasts Singapore etc.
- Melaleuca*, ,, ; sea coasts.
- Leucopogon*, hills ; sea coast Singapore, Labuan.
- Dischidia Rafflesiana*, Mt. Ophir, ; common on sea coasts.
- Nepenthes*, common in the low country near the sea, and in the hills from 2000 feet upwards, absent from forest region.
- Dianella*, hills and lowland woods, but especially near the sea.
- Cryptostylis*, hills.
- Corysanthes*, ,,
- Philydrum*, sea coasts ; Singapore and Malacca.
- Podocarpus*, hills and sea coasts.
- Dacrydium*, hills.
- Dammara*, hills.
- Lipocarpha microcephala*, sandy spots.
- Schoenus calostachyus*, sea shores.
- Cladium glomeratum*, sea shores.
- Lepidosperma*, hills.
- Gahnia tristis*, hills and shores.
- G. javanica*, hills
- Casuarina*, sea shores.

The interesting thing about these is that they are quite absent from the forest country between the sea coast and the hill tops, and that they mostly represent a sand loving, or dry country flora. We know as previously mentioned that the denudation of high land at least on the West coast of the peninsula has been of very great extent and that large areas of the plain

country are depositions of very recent date (geologically), and it is quite possible that these plants are the relics of a flora which formerly grew on the sandy coasts of a sea which washed the foot of Ophir.

### Plants of the Upper Part of the Range.

*Illicium cambodianum*, Hance. (*Magnoliaceæ*). A small tree, flower pink occurs also on all the higher hill ranges of peninsula and in Cochin China.

*Alsodeia lanceolata* var. (*Violaceæ*). A small shrub with longer narrower leaves and less villous fruit than the Penang form, close to the Padang Batu.

*A. sp.* near *A. Hookeriana*. Shrub with the leaves drying black entire and few nerved, and fruit an inch long black glabrous blunt, the seed dotted all over. I have only seen fruit of this, the plant grew on Gunong Mering.

*Calophyllum microphyllum* Anders. (*Guttiferæ*). A small tree very abundant on all the upper part of the hill, only recorded from this locality, but I found what I take to be the same tree without flowers or fruits on Gunong Panti in Johore.

*C. sp.* Tree with narrow elliptic lanceolate coriaceous leaves very closely and inconspicuously nerved 3-3½ inches long ½ inch broad narrow into a petiole ¼ inch long (No. 3223) not seen elsewhere.

*Garcinia montana* n sp. A small tree about 15 feet tall with four-angled branches. Leaves lanceolate usually obtusely acuminate 2 inches long. ¾ inch wide or often much smaller, thickly coriaceous, veins invisible, except the midrib which is raised on the upper surface, petiole ¾ inch long. Male flowers solitary terminal small ¼ inch across on thick pedicels ⅛ inch long. Sepals 4 decussate unequal ovate obtuse concave green. Petals 4 rounded striate yellowish green. Stamens connate into a sessile subglobose head, anthers numerous crowded linear, no rudiment of the pistil. Female flowers terminal on very



short stalks, sepals resembling those of the male flower) Pistil cylindric, stigma capitate. Berry (hardly ripe) flask-shaped beaked  $\frac{3}{4}$  inch long, stigma flat warty. Padang Batu. Not uncommon but producing very few flowers. The plant is remarkable for its thick small leaves quite veinless except for the midrib which is elevated on the upper surface and impressed on the lower. The flowers too are remarkably small, the smallest known to me in the genus, greenish yellow and solitary on the ends of the branches.

*Anneslea crassipes* Hook. fil. (Ternstroemiaceæ). A small straggling tree or large bush with leathery leaves and large white flowers, common all over the top of Gunong Ledang and Gunong Mering. Also met with in hills in Perak.

*Adinandra dumosa* Jack. This common lowland tree occurs on Padang Batu.

*Archytea Vahlia* var. Shrub on Padang Batu. Common in the low country. The form here is more stunted with bare corky white stems, the leaves crowded at the tops of the branches and the flowers on shorter stalks.

*Cratogeomys microphyllum* (Hypericineæ). A shrub growing on rocks at Padang Batu also on Gunong Mering. It is found also in Lingga and in Borneo at Sitam. (Dr. Haviland). This has not hitherto been recorded from the peninsula.

*Elaeocarpus Mastersii* King (Tiliaceæ). A shrub here quite dwarf, the leaves are smaller than in the lowland form and the nerves finely reticulate.

*Impatiens Griffithii* Hook. (Balsamineæ). A pretty pink balsam with slender red straggling stems common in damp massy spots.

*Ixonanthes reticulata* Jack (Lineæ). A small tree on Gunong Mering and Padang Batu. It attains a considerable size in low country where it is common.

- Euthemis leucocarpa* Jack (*Ochnaceæ*). Above Padang Batu, and on Gunong Mering. Common in the low country in sandy woods near the sea.
- Gomphia sumatrana* Miq. Gunong Mering and Ledang common tree in the low country.
- Lepionurus sylvestris* Bl. (*Olacineæ*). Mt. Ophir (Hullett). Not rare in woods in the low country, possibly collected on the lower part of the range.
- Gomphandra penangiana* Wall. On Gunong Mering.
- G. lanceolata* King. Mt. Ophir (Griffith). Both common shrubs in the low country also.
- G. sp.* With thick ovate leaves 2 inches long and one inch wide. Fruit nearly half an inch long, on Gunong Mering. A very distinct plant but I have seen no flowers.
- Ilex sclerophylla* Hook fil. (*Ilicineæ*). A shrub or small tree with rather large thick leaves. Above Padang Batu rare and confined to Mt. Ophir.
- I. Griffithii* Hook fil. A shrub with pink flowers common all over the upper part of the hills, occurs also in India, Java, and Sumatra.
- I. sp.* near *Malabarica*. Collected both by Mr. Hullett and myself. Above Padang Batu. Unfortunately the specimens are hardly adequate for description.
- Microtropis Ophirensis* n. sp. A tree with whitish bark, leaves opposite lanceolate or ovate lanceolate blunt narrowed at the base coriaceous 2-3 inches long,  $1\frac{1}{2}$  inches wide, nerves above invisible, beneath 7 or 8 pairs interarching within the margin, petiole  $\frac{1}{8}$  to nearly  $\frac{1}{4}$  inch long, thick. Cymes very shortly peduncled axillary or with long peduncles about an inch long and dichotomously branched. Flowers few together small white. Calyx lobes 5 scale like rounded with a subscarios irregularly toothed margin. Petals 5 in two whorls ovate sub-acute. Stamens

5 attached to the petals free portion of filament short, anther-cells separated oblong obtuse. Style thick, stigma broad curved. Fruit  $\frac{3}{4}$  inch long elliptic narrowed at the base with a curved acute beak. Gunong Mering and Gunong Ledang. Allied to *M. elliptica* King, a Penang hill plant, but with much more coriaceous leaves with inconspicuous nerves. The leaves vary, however, one form from the lower part of the range has much larger leaves elliptic or ovate acuminate 4 inches long by  $1\frac{1}{2}$  wide, while those from the top of the mountain are much smaller and narrower.

*Euonymus Javanicus* Bl. Close to Padang Batu; a widely distributed shrub occurring on most of our higher hills as well as in the low country.

*Pygeum brevifolium* Hook. fil. (*Rosaceæ*). A bush or small tree with small white flowers and globular one or two seeded green fruits. Common all about the top of the hills, only known from this locality.

*P. Griffithii* Hook. fil. A slender little tree or bush with larger red tomentose branches, flowers small white. Peculiar to Mt. Ophir.

*Weinmannia Blumei* Planch. (*Saxifragaceæ*). A tree with pinnate leaves and racemes of pinkish white flowers occurs on the Perak hills also.

*Drosera Burmanni* Vahl. (*Droseraceæ*). Mossy spots on Gunong Mering. The plants here all had green not red leaves, as they have in the lowland district. This our commonest sun dew, occurs usually in sandy spots near the sea and rivers. It is very widely spread from West Africa all through the East Indies to China, Japan and Australia.

*Rhodoleia Teysmannia* Miq. (*Hamamelideæ*). A tree with small pink flowers occurs also on Kedah Peak in Perak and Sumatra. The only other species known grows in Hongkong.

*Boeckia frutescens* L. (*Myrtaceæ*). "Daun Chuchor atap." A tree or shrub with rough flaky bark, and narrow setaceous leaves strongly aromatic, and small white flowers. The wood is exceedingly hard and compact, dark brown. The leaves used as tea give a refreshing aromatic drink and are much used as medicine by Malays. It is common all over the lower and the upper part of the range and occurs in most of the hill ranges of the peninsula.

*Leptospermum amboinense* Bl. A shrub with stiff lanceolate leaves and fairly large white flowers. Like the last is very aromatic and the leaves are used in the same way.

*Tristania Merguensis* Griffith. Pulawan. A big tree with very grey foliage, flowers yellowish. Common.

*Rhodamnia trinervia* Bl. A compact bushy form with rounder ovate leaves. It is common in the low lands.

*Decaspermum* sp. A shrub with coriaceous alternate ovate or broadly lanceolate leaves blunt about 2 inches long and one wide, flowers small white, petals five. Fruit small globose terminated by the calyx lobes, seeds 5 hard and bony, punctate, backs rounded, inner edge angled. Common on Ledang. Also occurs on Kedah Peak. I can find no description to suit this species, but as Sir George King will shortly describe the *Myrtaceæ* of the peninsula I think it not advisable to name it.

*Eugenia* sp. A shrub with slender branches, ovate or elliptic leaves with a long blunt point, an inch and a half long  $\frac{1}{2}$  inch wide, petiole very short and slender. Cymes terminal and axillary. Flowers small, crowded, with pedicle and tube  $\frac{1}{4}$  inch long white. Common

*E. Maingayi* Duthie? What I suppose to be this plant was collected on Mt. Ophir by Mr. Hullett.

*Melastoma decemfidum* Roxb. (*Melastomaceæ*). The beautiful large flowered species common on all the hills.

*M. Malabathricum* var. *appressum*. Padang Batu. The common hill form of this variable plant.

*Dissocharta annulata* Hook. fil. Climber with rosy flowers on Padang Batu. Common in the low country.

*Medinilla Hasseltii* Bl. On trees, the large and fine variety *Griffithii* occurs here. Common in the low country.

*M. Maingayi* C. B. Clarke. Epiphytic. Common in the low country.

*M. Clarkei* King. A shrub with waxy flowers, common on the top of the mountain.

*Pachycentria tuberculata* Korth. Epiphytic. Common in the low country.

*Sonerila tenuifolia* Bl. A slender herb with rosy flowers above Padang Batu. Also occurs in Perak, Sumatra, Java, and Borneo.

*S. Griffithii* C. B. Clark. A very delicate succulent herb with deep mauve flowers, damp spots. Only known locality.

*S. picta* Korth. Verh. Nat. Gesch. Bot. p. 243. Pl. 52. Occurs in the depression between Padang Batu and Gunong Tunduk. This is apparently a widely distributed and very variable plant. In large plants the leaves are long and elliptic lanceolate narrowed at the base into rather a long petiole. They are usually green with paler backs, and with 5 to 7 conspicuous veins on the back, but the leaves are also sometimes beautifully banded on the centre and lateral veins with silver, or again they may be ornamented with white spots. Smaller plants often only three or four inches tall have rounded leaves almost ovate. One of these dwarf forms is distributed in Dr. Haviland's Bornean collection under the number 1284 and Dr. Stapf describes this in the flora of Kinabalu as *Sonerila maculata* var. *glabrata* but it does not appear to me to be at all related to the plants named *Sonerila maculata* in Wallich's Catalogue. (Silhet 4091 B.) nor figured in the *Plante Asiaticæ variores*.

I have met with the plant on Gunong Panti (Johore). Bukit Hitam (No. 7,321), Bukit Kutu (7,316 a large form); the

Tahan valley woods and Kota Glanggi (Pahang) dwarf forms, with spotted leaves; Maxwell's hill (Perak) as also on Mt. Ophir (dwarf form). In Sumatra at Sungei Kelantan, Siak, I found the beautiful silver barred form figured by Korthals, (8,994, 8,968) and Mr. Hullett collected a dwarf form similarly coloured at Sungei Bei in Lingga. In Borneo Dr. Haviland collected it at Tawarar, and also in Quop (Sarawak) and I found it at Bongaya in Sandakan.

*Memecylon acuminatum* Sm. Shrub, flowers blue.

*M. campanulatum*? Shrub.

*Hydrocotyle Asiatica* L. (*Umbelliferae*). The Pegaga occurs near the camping ground where it has evidently been accidentally introduced. It is however mentioned in Griffith's list.

*Homalium longifolium* Benth. Gunong Mering.

*Dendropanax Maingayi* King. (*Araliaceae*). A small shrub 1 to 2 feet tall with green flowers and grey fruit at length becoming black. Common. Also occurs in Perak and on Kedah Peak.

*Arthrophyllum pinnatum* Clarke. Shrub 3 to 4 feet tall with pinnate leaves. Common. Padang Batu and also above on occurs on Penang Hill and in Perak.

*Argostemma hirta* n. sp. (*Rubiaceae*). Herb with a creeping stem ascending for about 6 inches. Leaves numerous unequal one of each pair much larger than the other lanceolate acuminate base inequilateral, 3 inches long 1/2 inch wide, petiole 1/8 inch long; all covered with long white hairs; smaller leaf ovate acute 1/4 inch long or less, light green above white beneath. Cyme terminal shorter than the leaves, peduncle 1/2 inch or less, branches few. Calyx lobes lanceolate acuminate 3/8 inch long, all covered with white hairs. Corolla lobes lanceolate acuminate sparsely hispid white. Stamens connivent, anthers nearly 1/4 inch long subulate. Style very slender. Stigma min-

ute capitate. On Gunong Tunduk, also Perak, Maxwell's Hill, Bujong Malacca; Penang Hill; Selangor, Pahang track. A remarkably hairy species.

*A. equifolia* n. sp. Stem creeping and rooting ascending portions short only three or four inches tomentose. Leaves in many equal pairs, leaves of each pair similar and equal lanceolate or ovate  $1/2$  inches long  $1/2$  inch wide, acute base rounded, above sparsely tomentose, chiefly on the nerves, beneath scabridly tomentose, nerves ascending about 6 pairs, petiole tomentose  $1/2-1/4$  inch. Stipules ovate. Cyme terminal few flowered. Flowers rather large 3 or 4 together, pedicels  $1/4$  inch long. Calyx lobes ovate pubescent short. Corolla lobes lanceolate glabrous nearly  $1/2$  inch long white. Anthers connivent acuminate, not subulate. Fruit hairy. Creeping on rocks in the stream on Padang Batu and up to Gunong Tunduk.

In general appearance this somewhat resembles *A. elatostemma* of the Penang Hills, but its leaves are equal with long petioles and the flowers are much larger.

*A. Ophirensis* Maing. Common especially in the woods below Padang Batu.

*Hedyotis congesta* Br. A narrow-leaved form of this common lowland plant grows above Padang Batu.

*H. Maingayi* Hook. fil. A little shrubby plant with white flowers, common in the rocks, in the stream and elsewhere all over the hill, not known elsewhere.

*H. flexuosa* n. sp. A tall slender herb over a foot tall simple or branched stem obscurely angled. Leaves ovate lanceolate coriaceous acuminate narrowed at the base into the petiole, 3 inches long by one wide nerves very indistinct, drying light green, petiole  $1/4$  inch long, stipules small ovate entire. Inflorescence terminal or axillary laxly paniced branches very slender zigzag. Flowers very small  $1/8$  inch long, white on short pedicels. Calyx campanulate lobes ovate acute. Corolla tube half as long again

shorter than the limb, lobes obtuse tube hairy in the mouth. Stamens anthers long linear, capsule subglobose dehiscent along one side, less than 1/8 inch long terminated by the calyx lobes. Seeds one in each cell.

Gunong Ledang on Padang Batu, Gunong Mering (3,212) Hullett (766). Allied to *H. viscida* Bedd.

*Pavetta humilis* Hook. fil. Dwarf shrub flowers white. Gunong Ledang.

*Urophyllum* sp. Shrub with a white corky stem, leaves elliptical lanceolate coriaceous acuminate flowers white. Common above Padang Batu.

*U.* sp. near *U. streptopodium* Bl. But with small subterminal corymbs and flowers. Mt. Ophir (Hullett).

*Timonius Jamboselli* Thw. Common low country tree. A shrub on Mt. Ophir.

*Chasalia curviflora* var. *longifolia*. The narrowed leaved form of this very common white flowered shrub occurs about Padang Batu.

*Cephaelis cuneata* Korth. Shrublet with honey yellow flowers and blue fruit. Common near the top. Not rare in the low country.

*Lasiacanthus Chinensis* Benth. Shrub. Common.

*L. Wightianus* Hook. fil. Mt. Ophir (Griffith) not seen.

*Psychotria sarmentosa* Bl. Climber with greenish flowers. The form here has thicker and brighter green leaves than the common low country form.

*Ps. stipulacea* Wall. A shrub, Gunong Mering. Common in the low country.

*Hydnophytum formicarium* Jack. The common ant plant, epiphytic on Mering and Ledang.

*Vaccinium bancanum* Miq. (*Vacciniaceae*). Mt. Ophir. (Maingay), I have not met with this here. It is not rare in the low country, near the sea, and on Kedah Peak.



*V.* sp. Shrub with elliptic coriaceous leaves  $1\frac{1}{2}$  inch long  $\frac{1}{2}$  inch wide with a pair of nerves running from base upwards from above the mid rib parallel to the edge, fruit globose flattened at the top on slender pedicels; only 4 or 5 on a raceme. Gunong Tunduk. I only found a very little in fruit but it seems distinct from *V. Bancaum*.

*Diplycosia microphylla* Becc. (*Ericaceae*). Common. Occurs on all the higher hills.

*Rhododendron Malayanum* Jack. A shrub with tubular crimson flowers. Common up to the top. Occurs on most of the higher hills of the peninsula.

*R. jasminiflorum* Hook. Shrub flowers white, leaves elliptic thick. Common.

*Leucopogon Malayanus* Jack (*Epacridaceae*). Shrub with stiff narrow leaves, small white flowers, and very small orange coloured fruit. Padang Batu. Griffith distinguishes the Mt. Ophir plant from the sea shore one, under the name of *L. ophirensis* (Journ. As. Soc. Bengal XXIII 623-650.)

*Myrsine capitellata* Wall. (*Myrsinaceae*). Shrub or small tree flowers small white, fruit globular small white. Upper part of the hill. Common in the low country especially near the sea.

*Embelia Myrtillus* Kurz. A scandent shrub with small rounded leaves and very small flowers white. Common. Above Padang Batu.

*Ardisia Andamanica* Kurz. Gunong Mering and Ledang.

*A. oxyphylla* Wall. Above Padang Batu.

*A. colorata* var. *polyneura*. Padang Batu. A shrub with ovate acute leaves strongly and finely reticulate on both surfaces. It looks very different from the low land form.

*A. tuberculata* var. *ophirensis*. Mt. Ophir (Griffith) not seen as high up as Padang Batu.

- A. crenata* Roxb. var. *angusta*. A slender branched plant with lanceolate leaves narrowed at both ends, crenate. Fruit on long slender pedicels as big as a pea. Above Padang Batu. I have also met with this on the Pahang track in Selangor.
- A.* sp. With lanceolate leaves narrowed at both ends, coriaceous nerves invisible above, panicle terminal rusty-scaly with rather large numerous flowers. Calyx lobes large rounded. Gunong Tunduk.
- Diospyros lucida* Wall. (*Ebenaceae*). On Gunong Ledang. Common in the low country.
- Symplocos Ophirensis* Clarke. (*Styracaceae*). Shrub flowers white, not rare on Gunong Ledang. Only known locality.
- S. crassipes* Clarke. Only known locality, and collected by Maingay.
- S. Henscheli* Benth. Shrub with blue fruit, and var. *hirtistylis* Clarke. Only known locality.
- Jasminum laurifolium* Roxb. (*Oleaceae*). Climber flowers white. Gunong Ledang to the top. Also occurs in India, Burma and Perak.
- Alyxia pilosa* Miq. (*Apocynaceae*). Climber. Gunong Mering and Ledang. Also Selangor on Bukit Kutu, Sumatra and Borneo.
- A. pumila* Hook. fil. Climber. Common on the slopes above Padang Batu also occurs on Kedak Peak. Both of these have very sweet scented bark used by Malays in medicine under the name of Pulasari, Ampelas Wangi, etc.
- Kopsia pauciflora* Hook. fil. Mt. Ophir (Maingay). What I take to be this is a big tree, with white flowers with a pink eye. It grows below Pahang Batu in the forest.
- Alstonia macrophylla* Wall. A tree flowers white about Padang Batu.

*Wrightia laevis* Hook. fil. Mt. Ophir (Maingay). I have not found this here.

*Hoya caudata* Hook. fil. (*Apocynaceæ*). Climber, flowers small pinkish white with long tails to the petals. "Akar Supah". on Gunong Mering.

*H. multiflora* Bl. Epiphytic not climbing; Mt. Ophir. (Maingay) I have not seen this here.

*Dischidia albida* Griff. Creeping on trees Gunong Tunduk. I have also met with it in Singapore at Bajau, but nowhere else.

*D. Rafflesiana* Wall. Common on both peaks. Abundant on sea shores and near the sea, in the low country.

*Fagraea obovata* var. (*Loganiaceæ*). Shrub, rocks just below Padang Batu.

*Utricularia Ophirensis* Ridl. (*Lentibulariaceæ*). A small pink flowered plant common in damp spots on Padang Batu etc.

*U. minutissima* Vahl. A very small mauve flowered kind.

*U. orbiculata* Wall. A minute plant in the drip under the big rock on the top of the hill.

*U. Wallichiana* Wight. A slender climbing plant among grasses, flowers yellow.

*Linaria alpina* L (*Scrophulariaceæ*). Top of Mt. Ophir (Hullett). No one else has found this little plant in the Malay Peninsula, nor has it been recorded from India.

*Aeschynanthus Lobbii* Br. (*Cyrtandrea*). Grows just below Padang Batu.

*Didymocarpus semitorta* Clarke. A pretty little plant with silky silvery leaves and white or violet flowers. Common on rocks in the stream only known locality.

*D. marginatu* Clarke. Creeping plant with violet flowers in the wood below Padang Batu.

- D. cordatus* var. *ophirensis*. Flowers white; rocks just below Padang Batu.
- D. longipes* Clarke. A very distinct plant with a rosette of dark green leaves purple on the back and bright yellow tubular flowers. All over the hills, peculiar to Mt. Ophir.
- Nepenthes Rafflesiana* Jack. (*Nepenthaceæ*). Very fine and large. Abundant to the top with the following.
- N. phyllamphora* Willd.
- N. sanguinea* Lindl. The red pitcher plant, for which Mt. Ophir has long been famed.
- N. albomarginata* Lobb. Also occurs in Penang.
- Balanophora multibrachiata*. Fawc. (*Balanophoreæ*). This is apparently parasitic upon *Dacrydium* here. It appears to have been overlooked by all the Ophir collectors, probably from the fact that the tuberous rhizome is most entirely subterranean and the flower spikes only appear at certain times. The large warty rhizome is yellowish brown, the scale leaves and flower-spikes red. It is not rare on Gunong Ledang, and occurs also in Java.
- Litsea zeylanica*. Nees. (*Laurineæ*). Mt. Ophir (Griffith) I have not met with this. It is a common plant in the low country country, near the sea.
- L.* sp. with rather large leaves glaucous and pubescent beneath. Specimens too incomplete.
- Loranthus retusus* Jack. (*Loranthaceæ*). Parasitic on *Dacrydium*. Gunong Mering and Ledang.
- L. Lobbii*. Hook. fil. Flowers yellow. Gunong Ledang.
- Viscum japonicum* Thunb. A very odd little mistletæ parasitic on *Rhododendron* here. I found it parasitic on *Alyxia* in Kedah Peak. On the top of Gunong Tundok.
- Henslowia Lobbiana* A. Dec. (*Santalaceæ*) The Mt. Ophir form of this climber seems to me the same as that of the sea coasts,

- but the leaves are on the whole a little larger. Common above Padang Batu.
- H. buxifolia* Bl. On Gunong Mering. This is an erect shrubby plant entirely yellow. It occurs in sandy woods in Singapore and elsewhere.
- Phyllanthus frondosus* Wall. (*Euphorbiaceae*). A bright green shrub or small tree. Fruit globose or three lobed red. Common all the hill, and also in the low country.
- Ph. gomphocarpus* King. Shrub, flowers red Gunong Mering, and Ledang.
- Cleistanthus Maingayi* Hook fil. Mt. Ophir. (Hullett).
- Breynia discigera* Muell. By the stream, Gunong Mering.
- Gelonium* sp. Shrub with white branches, very narrow lanceolate leaves and very small white flowers, male only seen. Gunong Mering.
- Croton erythrostachys* Hook fil. Shrub on Padang Batu.
- Trema angustifolia* Bl. (*Urticaceae*). Shrub, Padang Batu. Not rare in the low country.
- Phyllochlamys Wallichii* King. Thorny shrub. All over the hills.
- Ficus diversifolia* var. *spathulata*. Common on the hills.
- Gnetum Brunonianum* Griff. A low slender shrub by Padang Batu. In the flora of British India this is classed as a synonym of *Gnetum Gneon*, but that (which is only cultivated here) is quite a tall tree. *G. Brunonianum* occur in Malacca, Pahang, etc.
- Podocarpus neriifolia* Don. A tree common on Padang Batu. This form has longer and more acuminate leaves than the one so common in sandy places by the sea.
- Dacrydium elatum* var? The tree on Mt. Ophir seems to be entirely different from the *Dacrydium elatum* of Penang hill. It is a dwarfer tree with finer narrow and softer leaves,

and has no strictly fertile branchlets with the appressed scaly leaves so characteristic of that species. The fruit is produced on the ordinary branchlets with long leaves. The seeds are as large as those of the Penang plant but the cuplike scale at the base is quite twice as large, forming a regular cup extending half way up the seeds. The tree itself resembles a young or stunted spruce fir. It occurs also on Bujong Malacca. Can it be the plant described as *Dacrydium beccarii* A Dec. from Mt. Poe in Sarawak?

*Orchids* are by no means as abundant here as on Kedah Peak and on other hills of this altitude, but there are some very beautiful ones which are well known in cultivation.

*Liparis Maingayi* Ridl. grows on the rocks below Padang Batu in wet spots.

*L. elegans* Wall. A widely distributed epiphytic species common above Padang Batu.

*Platyclinis linearifolia* Ridl. *Dendrochilum linearifolium* Hook. fil. Flor. Brit. Ind. V. 702. A small insignificant plant, with crowded pseudobulbs and small brownish flowers, common on trees from Padang Batu upwards. Also met with in Perak.

*Dendrobium Kelsalli* Ridl. Common on trees, Gunong Tundok.

*D. uniflorum* Griff. This is the prettiest *Dendrobium* here. Its large white lips making it quite attractive, though the flowers are not large. Common high up, and occurs also in Perak.

*D. villosulum* Wall. One of the few terrestrial species, of the genus, with tall slender stems narrow leaves and inconspicuous flowers, common above and below Padang Batu. It grows also in Singapore, Penang and Kedah in dry woods.

*Cirrhopetalum vaginatum* Lindl. Gunong Ledang.

*C. citrinum* Ridl. Gunong Mering and Ledang.

- Eria nutans* Lindl. This common plant grows up as far as Gunong Tundok.
- E. tuberosa* Hook. fil. Gunong Tundok and Padang Batu.
- E. monticola* Hook. fil.
- E. vestita* Lindl.
- E. velutina* Lindl.
- E. pellipes* Rehb. f. "Angrek Gading," so called from its tusk-like leaves, common on trees Padang Batu.
- Ceratostylis gracilis* Bl. Above Gunong Tundok.
- Cladonia viridiflora* Hook. fil. Common up to Padang Batu.
- Spathoglottis aurea* Lindl. This beautiful yellow flowered terrestrial orchid grows in and about the stream on Padang Batu.
- Tainia speciosa* Bl. On mossy stumps above Padang Batu.
- Cælogyne tomentosa* Lindl. Common all over the hill.
- C. Cumingii* Lindl. This beautiful plant is abundant on Gunong Mering growing in huge masses on the rocks. It occurs all over the peninsula but in the low country grows only on the branches of lofty trees.
- Calanthe angustifolia* Lindl. Occurs in the woods below Padang Batu and more sparingly above.
- Arundina speciosa*. Bl. Still fairly abundant on and round Padang Batu though much persecuted by orchid collectors. The local form is a very good one.
- Bromheadia pungens* Ridl. On trees above Padang Batu the only known locality.
- Br. rupestris* Ridl. Rocks and trees, Gunong Mering and Padang Batu, occurs also on Kedah Peak.
- Br. alticola* Ridl. Trees on Padang Batu.

- Br. aporoides* Rehb. fil. Also grows here.
- Renantherella histrionica* Ridl. Gunong Mering. It also occurs in Singapore near the sea.
- Podochilus microphyllus* Lindl. Common on the trees.
- Appendicula callosa* Bl. Gunong Mering.
- Tropidia squamata* Bl. Widely distributed about Padang Batu.
- T. Maingayi* Hook fil. Just below Padang Batu. Rare. The only known locality.
- Macodes petola* Lindl. Damp spots.
- Anoectochilus geniculatus* Ridl. Gunong Tundok and below.
- Heteria elata* Hook. fil. Lower slopes of Gunong Tundok.
- Habenaria zosterostyloides* Hook fil. Gunong Mering and Gunong Ledang. Also Perak.
- H. monticola* Ridl. A small green flowered species around Padang Batu in wet spots, also on Kedah Peak.
- Cypripedium barbatum* Lindl. Less common than formerly but still to be found at Padang Batu. Occurs also in Penang, Kedah Peak, and Johore, Gunong Panti.
- Apostasia nuda* Br. (*Apostasiaceæ*). Common.
- A. latifolia* Rolfe. Rare, woods below Padang Batu, also Perak.
- Gastrochilus scaphochlamys* Ridl. (*Scitamineæ*). Very abundant below Padang Batu, rather scarcer above. The only known locality.
- Zingiber gracile* Jack. Just above Padang Batu, common in many parts of the peninsula.
- Geostachys elegans* Ridl. Common to the top of the mountain. Only known locality.
- Dioscorea laurifolia*. Wall. (*Dioscoreaceæ*.) On Mering and Ledang.
- Curculigo latifolia* Dryand. (*Amaryllideæ*). Above Padang Batu Common.



*Burmammia disticha* L. (*Burmamiaceæ*) Common. The flowers are often bright blue, here they are sometimes nearly white except for the green calyxlobes.

*B. tuberosa* Becc. Just below Padang Batu.

*Thismia Chrysops* Ridl. On rotten logs below Padang Batu near the big rock.

*Dianella ensifolia* Red. (*Liliaceæ*). Common to the top.

*Dracaena gracilis* Wall. Common, also in the low country.

*Smilax calophylla* Wall. Small erect shrub common in the lower woods ascending above Padang Batu.

*S. mysotiflora* Dec. Climber, flowers green. Gunong Ledang. Widely scattered in the peninsula.

*S. laevis* var. *ophirensis*. Mt. Ophir (Griffith).

*Homalomena angustifolia* Hook fil. var. *ophirensis*. Stem long creeping with numerous woolly roots. Leaves ovate to almost lanceolate blunt or acute with a rounded not cuneate base, nerves 3 to 5 pairs ascending 2-3 inch long, 1-1/2 inch wide, dark green, petiole 3-6 inches long slender sheath 1/2 inch long, and base of petiole red. Spathe on a short peduncle green 1/2 inch long, fusiform beaked. Male portion of spadix slender 3 times as long as the female portion. Pistils 2 or 3 whorls, round, stigma disc shaped. Abortive flowers one to each pistil. In crevices of the rocks in the stream Padang Batu. (also Kedah Peak). This variety differs really solely in the form of the leaf, which, however, keeps true under cultivation. I have seen leaves quite intermediate between the narrow lanceolate leaves acuminate at both ends, the Penang Hill form and the broad leaved Ophir form.

*Pinanga paradoxa* Scheff. (*Palmæ*). A very elegant little palm with a slender stem about 8 feet tall. Common below Padang Batu rarer above. Also occurs in Perak.

*Licuala glabra* Griff. Stems short to about 4 feet tall, stout, occurs also in Perak.

*Calamus exilis* Griff. A very slender rattan, "Ratan Batu." Common. It occurs also in Perak. I am doubtful as to its being distinct from *C. ciliaris* Bl. of Java.

*Plectocomia* sp. Occurs above Padang Batu. I have never seen flowers or fruit.

*Pandanus ornatus* (*Pandanae*). I believe this is the Pandan common above Padang Batu, but have not got flowers or fruit. It is very common all over Malacca.

*Freyinetia angustifolia* Bl. Above Padang Batu.

*F. insignis* Bl. The common low country plant.

*Fimbristylis actinoschoenus* Clarke. (*Cyperaceae*). Common on Padang Batu.

*Cladium Maingayi* C. B. Clarke. A broad leaved sedge very common on Padang Batu, only known locality.

*Lepidosperma Chinense* Nees. On Padang Batu and by the big rock on the top of the hill. Also occurs in Southern China. The other species of the genus between 30 and 40, are all Australian.

*Gahnia tristis* Nees. Padang Batu. Common in Singapore near the sea.

*G. javanica* var. *penangensis*. A handsome tall sedge with narrow grassy leaves and a large black panicle, common, also occurs in Penang, Perak, etc.

*Scleria multifoliata* Boeck. var. *ophirensis*. Common on Padang Batu. Occurs also in Pahang and most other hill regions of the peninsula, and also in Singapore.

*Ischaemum Feildingianum* Rendle. (*Gramineae*). A coarse grass very common on Padang Batu. Only known locality.

*Isachne Javana* Nees. Padang Batu, also found in Burmah, Perak and Java.

*Paspalum conjugatum* Berg. I found this grass once by the stream at the camp, doubtless introduced accidentally.

### Ferns.

*Gleichenia circinnata* Sw. Common on wet rocks.

*Gl. flagellaris* Spr.

*Alsophila commutata* Mett. Above Padang Batu. A dwarf tree fern.

*Matonia pectinata* Br. This fine fern is very common round Padang Batu.

*Hymenophyllum polyanthos* L. var. *Blumeanum*.

*H. Neesii* Hook.

*Trichomanes digitatum* Sw.

*Tr. rigidum* Sw.

*Tr. gemmatum* Sw. Common.

*Tr. pallidum* Bl. Gunong Tundok.

*Tr. obscurum* Bl. „

*Tr. apifolium* Presl. Mt. Ophir. (Dr. Kings' collector, fide Beddome).

*Hanata angustata* Wall. Common.

*H.* sp. Rocks. Padang Batu (3,339).

*Microlepia pinnata* Cav.

*Lindsaya cultrata* Sw.

*L. orbiculata* Lam.

*L. lancea* L.

*L. rigida* Sm.

- L. Walkeræ* Hook. Wet spots Mering.  
*Schizoloma davallioides* Bl.  
*Pteris aquilina* L.  
*Oleandra nerifformis*. Cav.  
*Polypodium hirtellum* Bl.  
*P. cucullatum* Nees.  
*P. Malaccanum* Bak. On the top of the hill. Only known locality.  
*P. trichomanoides* Sw.  
*P. decorum* Brack.  
*P. altermidens* Ces.  
*P. nutans* Bl. Mt. Ophir (Moore's Herb Beddome,) not seen.  
*Niphobolus acrostichoides* Sw.  
*Dipteris Horsfieldii* Br. Common. This fern also occurs on the sea shore in Singapore.  
*D. Lobbiana* Hook. Common in the stream.  
*Vittaria fulcata* Kze. On trees.  
*V. sulcata* Kuhn.                    "  
*Toenites blechnoides* Sw. Common.  
*Elaphoglossum Norrisii* Hook.  
*Chrysodium bicuspe* Hook. On the ground near the stream Padang Batu.  
*Schizæa Malaccana* Bak. On the top of the hill.  
*Lycopodium cernuum* L. (*Lycopodiaceæ*).  
*L. phlegmaria* L. Gumong Mering.  
*L. Casuarinoides*. Climbing on trees, up to the top of the hill.  
*Selaginella atrociridis* Spring. Padang Batu and above.  
*Se. oligostachya* Spr. Creeping on the ground.  
*Se. monospora* Spr.  
*Se. trichobasis* Bak.  
*Se. Ridleyi* Bak. In the stream on Mering, only known locality.