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NOTES ON MALAYAN FERNS, WITH DESCRIPTIONS OF FIVE NEW SPECIES.

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At various times during the past few years I have collected notes on ferns of the Malay Peninsula, and have gathered them together here, with descriptions of five new species, *Davallia dimorpha, Diplazium insigne, D. latisquamatum, D. subintegrum,* and *D. velutinum.* The larger Diplaziums, inhabiting the mountain valleys from about 2,000 ft. upwards, still require much field study, and also careful comparison with the species of neighbouring countries. There are certainly several further additions to be made to the Peninsula species of this genus.

The notes here published are of various kinds. Most are additions to the recorded fern flora of the Peninsula, chiefly based on recent collections, but in some cases on redetermination of old collections. Some are critical notes on nomenclature, based either on my own study of type specimens, or copied from other sources, which are duly acknowledged. There are also field notes on many species, based on my own observations.

Acrostichum speciosum Willd. Spec. Plant. 4 Aufl. **5:** 117. 1810. Troll, Flora N. S. **28:** 301 – 327. 1933.

As pointed out by Dr. Troll, this species is quite distinct from *A. aureum,* with which it has been united by most authors. Watson, in *Malayan Forest Records No. 6,* pp. 152–157, gives an account of the two forms of Acrostichum occurring in Malayan mangrove; they are so distinct that local Malays have given them different names. The larger *A. aureum,* which may reach 4 metres in height, is called *Piai raya;* the smaller *A. speciosum* is called *Piai lasa.* Both species are abundant. *A. speciosum* occurs especially "where there are plenty of prawn heaps on which it can grow above the reach of the medium high tides."

Aplenium glaucophyllum v.A.v.R., Bull. jard. bot. Buitenz. II ser. VII : 6. 1912. *A. polystichoides* Bl. Mett. Asplenium 204. 1859 (nomen).

This species, described from Borneo (Nieuwenhuis no. 864), is not uncommon in the lowlands of the Malay Peninsula. The

specimens have hitherto been referred with doubt to *A. nitidum* Sw., to which species Mettenius referred as a variety the specimen of Korthals named *A. polystichoides* in Blume's herbarium. The species has been adequately described by van Alderwerelt van Rosenburgh, but some additional notes may be of interest. These are based on the material in the Singapore herbarium, and on a plant cultivated in the Botanic Gardens, Singapore. The cultivated plant occurred spontaneously on the base of an old Asplenium nidus on an African Oil Palm (*Elæis guineensis*), and was subsequently removed to a hanging basket.

The characteristic features of the species are the very long relatively narrow fronds (lamina commonly about 85 by 30 cm.), and the large pinnules, which are not pinnate but are commonly rather deeply incised once on the upper margin towards the base. Occasionally a specimen has the pinnules quite entire, except for the rather distant teeth (*e.g.* Burkill 17265 from Pekan, Pahang), while on very large fronds the largest pinnules may have several lobes, the lowest almost separated as a distinct leaflet. An extreme example of a lobed form is a specimen of Burkill's from Pulau Tioman (s.n., June 1915), but a quite comparable development is seen on the largest frond of the cultivated plant. The smallest fronds on the cultivated plant are quite small, but are fully fertile. The pinnules are almost all rounded at the apex, whereas on larger fronds the pinnules are gradually narrowed to an acute apex.

The stipes of young fronds are green, blackening with age; on old fronds the rachises are all black. The stipes and rachises are dull, not polished, and when young are clothed with very small narrow dark scales. The densely crowded scales on the apex of the rhizome are thin, dull purplish-brown, to at least 2 cm. long and 1 mm. wide. The colour of dried fronds varies from a rather pale olive to brown, and the colour of stipe and rachis from greenish-grey to black. Specimens in the Singapore herbarium are as follows. The Perak specimens are all small, and were labelled *A. nitidum* var. *obtusatum;* they match very closely the smallest fronds of the cultivated plant above mentioned.

SINGAPORE: Bukit Timah, Ridley s.n. 1906; do. 1907; Woodlands, Matthew s.n.; Mt. Austin, Ridley s.n. 1906. JOHORE: G. Pulai, Hullett s.n. Aug. 1880; Haji Senawi, Tempayan River, Ridley 10965; Tempayan River, Ridley 13286; Gunong Lambak, Holttum 9375; Mengkibol Station, Gossett 8314. SELANGOR: Batu Caves Woods, Ridley 8144. MALACCA: Harvey s.n. PAHANG: Pulau Tioman, Ridley s.n. 1889, Burkill s.n. June 1915; between Pekan and Ayer Tawar, Burkill 17265; Kuala Lipis, Burkill 17078; Tahan River, Ridley s.n. 27-9-1893.

KELANTAN: Sungei Keteh, Md. Nur 12037. PERAK: Gopeng district, King's Collector 8180; Upper Perak, L. Wray Jr. 3657.

Asplenium subnormale Copel. Perk. Frag. p. 183, pl. 4, f.B. 1905.

This species has not hitherto been recorded from the Malay Peninsula. It has been collected by Burkill on Pulau Tioman, S. Cape, close to the sea, no. 1036. I have seen specimens from Sarawak and British North Borneo.

Asplenium subscalare v.A.v.R. Bull. Jard. bot. Buitenz. II ser. XX: 6 1915.

This species was described from a specimen originating from "Malacca", cultivated in the Botanic Gardens, Buitenzorg. The specimen was at first named *A. spathulatum* Bak. by v.A.v.R., whence the statement in his Handbook that *A. spathulatum* occurs in the Peninsula. A specimen of Scortechini's from Taiping, no. 129, labelled in his hand *A. abruptum* (a *nomen nudum*), is apparently the same as this species. Scortechini 243, from Maxwell's Hill, 3,000 ft., is perhaps also to be referred here; the plants are young.

Athyrium macrocarpum (Bl.) Bedd. F.S.I. t. 152. 1863. *Aspidium* Bl. Enum. 152. 1828.

This species has not hitherto been recorded as occurring in the Malay Peninsula. It has been found by me (no. 23462) on wet rocks at Cameron Highlands, beside the stream, with *Lindsaya cultrata.*

Athyrium nigripes (Bl.) Moore, Index XLIX. 1857. *Aspidium* Bl. Enum. 162.

This species was collected by Ridley on G. Berumban, no. 14001, and the specimen was named *Asplenium tenuifolium* by Beddome (Kew Bull. 1909: 423). I collected it later (no. 23275) it Cameron Highlands, where it was abundant in the forest near the stream at about 4,800 ft. altitude. This is the first published record of its occurrence in the Peninsula.

Bolbitis diversifolia (Bl.) Schott, Gen. ad t. 14. 1834.

Bolbitis subsimplex (Fée) Ching in C. Chr. Ind. Suppl. III: 50. 1934. with synonyms.

At the herbarium at Leiden I examined three specimens of Blume's, referred to this species, and I can see no difference from the common fern in the Peninsula which is clearly *Campium subsimplex* as described by Copeland (Phil. Journ. Sci. **37:** 356. 1928). One of Blume's specimens has simple fronds, the others pinnate. The species is common on rocks, usually by streams, in lowland forest throughout the Peninsula. Young plants always have simple fronds, and occasionally simple fertile fronds are produced.

Bolbitis Quoyana (Gaud.) Ching in C. Chr. Ind. Suppl. III: 49. 1934.

This species has not hitherto been reported as occurring in the Malay Peninsula. The only specimens which can now be so referred are from Bukit Timah, Singapore: Ridley 12569, Holttum 19799, Hullett s.n. March 1882. These specimens are not typical of the species, having pinnæ only very slightly lobed, but I do not know any other species to which they could be referred.

Cheilanthes varians (Wall.) Hk. Spec. Fil **2:** 89, t. 103A. 1852.

This species occurs in the north of the Peninsula, but has not hitherto been reported. Collections in the herbarium at Singapore are: KEDAH, Kampong Naka, Holttum 19814; Langkawi, Curtis s.n. I found the fern not uncommon, under the shade of rather open secondary forest.

Cyclopeltis crenata (Fée) C. Chr. Ind. Suppl. III: 64. 1934.

Hemicardion Fée Gen. 283, t. 22A, f. 1. 1852.

Specimens of Cyclopeltis from the Malay Peninsula have previously been referred to *C. semicordata,* the type of which is from tropical America. Fée's description and figure agree well with Peninsular plants which are quite distinct from the Philippine *C. Presliana.*

Cystopteris tenuisecta (Bl.) Mett. Ann. Lugd. Bat. **I:** 241. 1864.

This interesting species has lately been collected at Cameron Highlands (S.F.N. 31297, Holttum). Plants were found growing abundantly on the banks of a path cut in rather moist but lightly shaded forest at 5,000 ft. altitude. The same locality was visited before the path was cut, and no plants of the species noticed; they evidently found the moist newly cut earth a suitable habitat. No other plants were noticed in the neighbourhood, where the species is certainly not common, and no previous collections have been made in the Peninsula.

There are notes on *C. tenuisecta* by Posthumus in Bull. Jard. bot. Buitenzorg, Ser. III, vol. 13, p. 91. In the Malayan region it has been rarely collected, being known from N. Sumatra, a few localities in Java, and Luzon. It evidently requires a specialised habitat.

Davallia dimorpha Holttum sp. nov.

D. Griffithii affinis, differt: frondibus dimorphis, in sicco rufobrunneis, segmentis ultimis laminæ fertilis perangustatis.

Scales of the rhizome red-brown, shining, to 1 cm. long and 3 mm. wide above the peltate base, narrowed gradually to acuminate apex, edges subentire. *Stipes* of large fronds 30–40 cm. long, red-brown to dark purple-brown. *Lamina of sterile frond* deltoid, to about 45 cm. long and 30 cm. wide, pinnæ

subcontiguous, the segments of the pinnules contiguous or subcontiguous; pinnules separated by not more than half their width, more or less elliptical in shape, the edges bluntly serrate, apices rounded; texture coriaceous; colour of dried fronds rather light red-brown (often darker on older fronds); veins distinct, elevated; no spurious veins. *Lamina of fertile frond* to about 45 cm. long and 30 cm. wide, the pinnæ and pinnules of similar shape, size and spacing to those of the sterile frond, but the lamina of the pinnule-segments cut down to a narrow wing on either side of the veins, each segment terminating in a semicircular widened portion to accomodate the sorus; occasionally but not commonly the lamina prolonged into a tooth or horn beyond the sorus on one side; *sori* broader than long, often twice a broad, the indusium almost crescent-shaped, occupying almost the whole of the widened ends of the segments.

Type.—Pahang: Brinchang, Cameron Highlands, alt. 5,000 ft., S.F.N. 31289 (Holttum), in Herb. Singapore.

This remarkable species has only been found at Cameron Highlands, on the Main Range of the Peninsula. It is evidently allied to *D. Griffithii*, with which it agrees in the very broad sori, but differs very strikingly in the much-narrowed fertile pinnule-segments, which carry at their ends the almost crescent-shaped sori. The rather bright red-brown colour of dried fronds which are not too old when collected is also notable.

Diplazium insigne Holttum sp. nov.

Caudex brevis erectus. Stipites 1 m. longi, basin versus aculeati; aculei tenues, ad 2 mm. longi, primo paleas sordides angustas, ad 1.5 cm. longas, margine nigro-dentatas, ferentes, demum nudi. Lamia 1.5 m. longa, bipinnata. Raches minute paleaceæ; paleæ irregulares, majores dentatæ. Pinnæ infimæ 28 cm. longæ, 6.5 cm. latæ, basi angustatæ, medio ad costam lobatæ, lobi leviter obliqui, rotundati vel acuti, margine minute dentati. Pinnæ maximæ ad 60 cm. longæ, 16 cm. latæ, pinnatæ. Pinnulæ leviter obliquæ, omnes ad rachin adnatæ; pinnularum infimarum basis adnata 5 mm. lata, superiorum latior. Pinnulæ maximæ 9 cm. longæ, 2.3 cm. latæ, basi angulo 45° cuneatæ, e basi sensim angustatæ, apice 1.5–2 cm. multo angustatæ, margine leviter serratæ, textura firmiter herbaceæ, colore subtus pallidæ, supra atrovirides. Venulæ more D.accedentis anastomosantes, et soros ferentes.

Type.—Pahang, Fraser Hill, in Tras valley, 3,800 ft., Singapore Field Number 21635 (Holttum), in Herb. Singapore.

This species is in every way closely allied to *D. accedens* Bl., but is bipinnate (with slightly adnate pinnules) instead of simply pinnate. *D. stenochlamys* C. Chr. appears to be an allied but much smaller species. The type of *D. insigne* was a very fine large plant, inhabiting moist shady valley forest.

The mountain valleys of Malaya at 2,000–4,000 ft. altitude have been much less explored than the ridges, and, especially in ferns, contain a very rich flora. It is possible that *D. insigne* may be fairly widely distributed at such altitudes on the main range of the Peninsula. I found a young sterile plant, probably of this species, at about 2,000 ft. altitude near Ginting Simpah, some 25 miles south of Fraser's Hill, on the other side of the range.

Diplazium latisquamatum Holttum sp. nov.

Caudex brevis erectus. Frondes juveniles circinnatae squamis nigris rotundatis vel ovatis peltatis integris imbricatis vestitae. Stipites ad 90 cm. longi, basin versus vel omnino scabridi vel papillati, cum rachibus minute paleacei. Lamina ad 1.5 m. longa et 1 m. lata, tripinnatifida. Costae supra bialata, subtus squamis parvis subrotundatis paucis munitae, lamina cetera glabra. Pinnulæ sessiles basi late cuneatæ vel subtruncatae, apicem versus leviter angustatae, ad alam 2-3 mm. latam lobatæ, apice acuminatæ serratæ, textura firmiter herbaceae; lobi leviter obliquae, plerumque 4 mm. lati, oblingi, apice truncati, subintegri vel serrati. Venulae in lobis 5-6-jugatæ, simplices vel superiores furcatae. Sori dimidium inferum venularum solum occupantes; indusia persistentia.

Type. Pahang, Sungei Terla (Ulu Telom), S.F.N. 31311 (Holttum), in Herb. Singapore.

Other specimens.—Pahang: Cameron Highlands S.F.N. 23297, 23360, 31353, 31381. B. N. Borneo: Mt. Kinabalu, S.F.N. 25429; Clemens 27122, 32952, 32551, 33682, 32454, 32516.

The characteristic features of this species are the broad almost black imbricating scales on the young circinnate fronds, the tripinnatifid habit, and the sori confined to the basal half of the veins. In other characters there is much variation, due in part to the fact that plants immature in size may be fertile. The scales on the stipes, as the frond expands, are mounted on soft papillæ, which remain after the scales have fallen; but the degree to which these papillæ are developed seems to be very variable. S.F.N. 23297 has abnormally broad lobes to the pinnules, the ends rounded, and sometimes lobed again. In other characters it agrees with other specimens, and in view of the variation of cutting which clearly exists in the species, I can only regard it as a local variation. The Kinabalu specimens agree well, the only notable differences being that the scales tend to be ovate-acute, and the stipes on the whole more smooth.

This species is characteristic of moist shady valley forest in the neighbourhood of Cameron Highlands, at 4,000–5,000 ft. The plants often grow in very wet ground.

The Kinabalu specimens were at first identified with *D. atrosquamosum* (Copel.) C. Chr. This is clearly an error, in

view of the very broad scales, the scales of *D. atrosquamosum* being narrow.

A recent collection (S.F.N. 31193, Holttum) from an altitude of 2,500 ft. at Ginting Simpah (on the Main Range, south of Cameron Highlands) appears to belong to this species. The pinnules are broader than in any other collection, but the plants agree in other respects.

Diplazium subintegrum Holttum sp. nov.

Caudex brevis erectus. Stipites ad 80 cm. longi, basin versus squamis brunneis nitidis integris ad 1.5 cm. longis 2 mm. latis acuminatis vestiti, cetera nudi, straminei. Lamina pinnata, ad 70 cm. longa et 40 cm. lata, pinnæ ad 16-jugatæ; apex laminæ basin versus lobatus, cetera more pinnarum serratus. Rachis supra sulcata, in sulco minute papillata, subtus nuda. Pinnæ sub-basales maximæ (infimæ leviter breviores, non deflexæ), petiolutatæ 8 mm., ad 24 cm. longæ et 2.5 cm. latae, basi cuneatæ vel rotundatæ, margine serratæ, apice acuminatæ; textura subcoriaceæ; colore supra atrovirides, subtus pallidæ. Costæ subtus squamis linearibus brunneis paucis munitæ, cetera nudæ; venæ prope costam furcatæ, ramus acroscopicus simplex, ramus basiscopicus 1- vel 2-furcatus. Sori semper in venula acroscopica, e costa ⅔ – ¾ ad marginem, sedentes; rami venulæ basiscopicæ interdum soros breves ferentes. Indusia simplicia vel duplicia, lata, persistentia.

Type. Pahang, Sungei Burong, Cameron Highlands, 5000 ft. S.F.N. 31350 (Holttum), in Herb. Singapore. Frequent in forest.

Other specimens.—Pahang : Cameron Highlands, 4800 ft. S.F.N. 23338 (Holttum); G. Berembun, Ridley 13969; Fraser's Hill, 4000 ft. S.F.N. 8818 (Burkill and Holttum), 21539 (Holttum), G. Hose 15. Perak : The Cottage, Taiping, H. D. Hervey s.n. 1889; G. Batu Puteh, summit, Wray 314. Selangor : Bukit Kutu, 3,000 ft. Ridley 7844.

This species is allied to *D. Prescottianum* (Wall.) Moore, but differs constantly in the pinnæ never being in the least degree lobed nor auriculate at the upper base. It is frequent in the mountain forests on the Main Range, at least at Fraser's Hill and Cameron Highlands and is so constant that I cannot but regard it as a good species, though intermediates between it and *D. Prescottianum* appear to exist at lower altitudes. *D. Prescottianum,* founded on a specimen from Singapore, needs more study in the field. There are some specimens from Ginting Simpah (alt. 1500 ft.) which seem to connect it with *D. subintegrum;* but as *D. Prescottianum* has been rarely collected in true lowland forest we still have no proper understanding of its range of variation.

Diplazium velutinum Holttum sp. nov.

Caudex brevis erectus. Stipites plerumque 20 cm. longi, fusci, omnino pilis mollibus pluricellulis brunneis, basin versus squamis angustis nigris integris vestiti. Lamina anguste deltoidea, ad 25 cm. longa et 15 cm. lata, bipinnata. Raches pilis brunneis omnino dense velutinæ, squamis angustis nigris paucis intermixtis. Pinnæ liberæ 12-15-jugatæ. Pinnæ subbasales maximæ, ceteræ sensim reductæ, superiores in apicem brevem lobatum laminæ confluentes. Pinnæ maximæ ad 8 cm. longæ et 3 cm. latæ, plerumque 6 cm. longæ et 2 cm. latæ, subsessiles, e basi lata ad apicem sensim angustatæ; basin versus pinnatæ, apicem versus ad alam angustam lobatæ. Pinnulæ liberæ paucæ, ceteræ ad rachin plus minusve adnatæ. Pinnulæ vel lobi maximæ oblongæ, leviter obliquæ, margine serratæ vel lobatæ, apice rotundatæ, textura chartaceæ. Venulæ in pinnulis ad 7-10-jugatæ, simplices vel furcatæ. Sori e costa ½ – ⅔ ad marginem in venulis sedentes : in venulis furcatis ramum acroscopicum solum occupantes. Indusia sororum infimorum duplicia, cetera simplicia.

Type.—Pahang, Cameron Highlands (47th mile, Telom Rd) 4800 ft. S.F.N. 31221 (Holttum), in Herb. Singapore. Frequent in shady forest by rocky stream. Also Cameron Highlands, 4800 ft. S.F.N. 23428 (Holttum).

This species is closely related to *D. tomentosum* Bl., and there are a few specimens which are intermediate between the two species, but it differs very strikingly from typical *D. tomentosum* in the following characters : the pubescence on stipe and rachis is more abundant, and the lower pinnæ are always pinnate at the base, even in fronds of moderate size. The most extreme form, represented by one plant, has the pinnules lobed half way to the costa. In most cases the pinnules are serrate, the upper base tending to be auriculate.

D. tomentosum is a common fern of lowland forest in the Malay Peninsula, and there are a large number of collections in the Singapore herbarium. The range of variation is considerable, and in some cases the lower pinnæ are dissected to the costa. This extreme form is connected with *D. velutinum* by a few specimens from altitudes of about 3000 ft. In view of the constancy of *D. velutinum* in the neighbourhood of Cameron Highlands, I regard it as a mountain derivative of *D. tomentosum;* the intermediate specimens are possibly hybrids.

D. velutinum grows in the wettest and shadiest mountain forest, near streams.

I have to thank Dr. Carl Christensen for examining specimens, and for suggesting the name *velutinum*.

Dryopteris brunnea (Wall.) C. Chr. var. *glabrata* (Clarke).

Ching places this species in the genus Thelypteris (Bull. Fan. Mem. Inst. **6:** 272. 1936), in which he is doubtless right, but I am not yet in a position to segregate the Malayan species of this genus. The object of this note is to record the collection of the var. *glabrata* at Cameron Highlands, alt. 5000 ft. (Holttum s.n., May 1936). The specimens are small, but clearly referable here. The solitary plant seen was growing among rocks beside a stream in a recently made clearing. *D. oppositipinna* (see below) is clearly allied, but is much smaller with most of the pinnæ broadly sessile.

Dryopteris crenata (Forsk.) O. Ktze.

This widely distributed species has recently been collected for the first time in the Peninsula, on limestone at Gua Teja in Kelantan (S.F.N. 29682, Henderson).

Dryopteris dissecta (Forst). O. Ktze.

The first recorded collection of this species in the Malay Peninsula is Holttum 31292 from Cameron Highlands, alt. 5000 ft. The plants were found growing on the banks of a stream in shady forest. They are large, and agree with some Philippines specimens. They have the general aspect of Tectaria. For a note on this species *see* C. Christensen in this Bulletin, Vol. 7, p. 253.

Dryopteris glandulosa (Bl.) O. Ktze Rev. Gen. Pl. **2:** 812. 1891.

Aspidium glandulosum Bl. Enum. 144. 1828.

Dryopteris iridescens v.A.v.R. Bull. Jard. bot. Buitenz. II ser. XI : 11. 1913.

Dryopteris malayensis C. Chr. Vid. Selsk. Skr. VII. **10:** 171, nota. 1913.

It appears to me that by the rules of nomenclature Christensen was wrong in transferring *Polypodium glandulosum* Desv. to Dryopteris (see Index Suppl. 33. 1913), when the name *D. glandulosa* was already occupied by Blume's species; the new name *D. malayensis* was therefore unnecessary. I have examined the type of *D. glandulosa* (Bl.) O. Ktze at Leiden, and I am of opinion that certain Peninsular ferns, which I had noted as being identical with *D. iridescens* v.A.v.R. are referable to this species. From description, it appears to me likely that *D. excrescens* Copel, and possibly also *D. Bartlettii* Copel. fall also within the range of variation of the species.

Blume's specimen at Leiden has the lower surfaces very uniformly glandular, with very short hairs on the veins, the upper surfaces uniformly appressed-hairy. Among Peninsular specimens the pubescence of the upper surface is very variable, even on the same plant; fertile fronds may be hairy when the

sterile are almost glabrous. Characters of pubescence can therefore not be relied upon in this species. A character which seems to be uniform and distinctive is the presence of spherical yellow glands on the sporangia; these glands are similar to those on the lamina. In the subgenus Abacopteris, the sporangia are nearly always setose or glandular in some characteristic way. Occasionally neither setæ nor glands are present; I have noted that this is the case in *D. lineata* (Bl.) C. Chr.

The Peninsula ferns of *D. glandulosa* are all of recent collection, and with one exception are from Pahang; there is also a specimen from Patani in Lower Siam. The duplicates of the specimens have been distributed variously as *D. lineata, D. malayensis* and *D. iridescens*. Older collections named and distributed as *D. glandulosa* are mostly *D. mirabilis* Copel. (*see* C. Chr. in Gard. Bull. S.S. **4:** 391. 1929). The specimens are as follows:

Malay Peninsula.—Negri Sembilan: Ulu Bendul, Holttum 9886. Pahang: Base of G. Senyuin, Henderson 22289; K. Tembeling, Holttum 20533; Ulu Sungei Merapoh, Md Nur 11938; Tembeling, abundant near stream, Holttum 24702.

Sumatra.—Mentawi Islands: Siberut, Boden Kloss 13087.

Siam.—Patani: Banang Sta, Eryl Smith 1858.

Dryopteris lineata (Bl.) C. Chr. Ind. Fil.

Aspidium lineatum Bl. Enum. 144. 1828.

As this species has been confused with *D. glandulosa,* the specimens regarded as true *D. lineata* are enumerated below. *D. lineata* is clearly distinct in the absence of glands on the lower surface of the pinnæ, the absence of hairs on the upper surface, the somewhat pustular nature of the surfaces, the upper base of the pinnæ strongly auricled, the pinnæ almost entire. In the Peninsula the species has only been found in the neighbourhood of Cameron Highlands (on the Main Range, near the Perak-Pahang boundary). All specimens of which the altitude is given were collected in the mountains; but a specimen from Patani in Lower Siam was collected at a low altitude. The plants grow on rocks by forest streams. The specimens are:

Perak.—Gopeng, King's Collector 497; no locality, Scortechini. Pahang: Telom, Ridley 13997; Cameron Highlands, 4800 ft., Holttum 23362 and s.n. Patani: Banang Sta, 70 m., in earth on rock in large stream, Eryl Smith 2026; near Betong, on log in stream, 220–270 m., Eryl Smith 2027.

Dryopteris multisora C. Chr. Gard. Bull. S.S. **7:** 241. 1934.

This species, described from Mt. Kinabalu, B.N. Borneo, has been collected also in the Malay Peninsula, at Cameron Highlands, Holttum 23345, 23437 It belongs to a group of species which are only found in mountain forests.

Dryopteris oppositipinna v.A.v.R. MS in Herb. Bog.

Phegopteris oppositipinna v.A.v.R. Bull. Jard. bot. Buitenz. II ser. XVI: 24 1914.

The type of this species was collected by Matthew on Mt. Singgalang, Sumatra (no. 518). I found it for the first time in the Malay Peninsula at Cameron Highlands (Holttum 23261), on wet rocks by a small stream in a rather open place at 4000 to 4,500 ft. altitude. The peculiar almost opposite broadly sessile pinnæ are very distinctive; the lower surfaces of rachis, costæ and lamina bear numerous short stiff pale erect hairs; similar hairs are also sometimes borne by the sporangia. There is no trace of indusium.

Dryopteris Parishii (Hk.) O. Ktze Rev. Gen. Pl. **2:** 813. 1891.

Nephrodium Parishii Hook. Spec. Fil. **4:** 131, t. 260. 1862.

Ridley does not record this species as occurring in the Malay Peninsula, but it was collected by Curtis at Langkawi (Nov. 1889), in crevices of limestone rocks; it has since been found on the mainland, in Perlis, at Bukit Lagi (Corner and Henderson 22876, 23135). Plants were brought to Singapore, and cultivated in pots under glass. The fronds died down periodically; the plants were then dried off and rested until new growth began. The resting habit appears to be obligatory in this species. The same is true of the allied *Dryopteris chupengensis* (Ridl.) C. Chr. Plants from the type locality were brought to Singapore by Messrs. Corner and Henderson in 1929, and grown in pots alongside *D. Parishii*. The two species are so closely similar in form of frond that I thought at first that *D. chupengensis* might be only a young stage. The two remained distinct however, and grew side by side for about three years. The largest dimensions of lamina attained by *D. chupengensis* under cultivation were 10 by 9 cm.

Dryopteris polita Rosenst. Fedde Report. **13:** 218. 1914.

A record of the occurrence of this species in the Peninsula was made in this Bulletin, Vol. 7, p. 252. It has been found only at Cameron Highlands (Holttum 23451), and was distributed as *D. sparsa*. I have seen the Leiden duplicate of the original collection of *D. polita* (Batakerland, F. Winkler; Rosenst. Fil. sumatr. exsic. 178); it is clearly the same as the Peninsula collection above cited.

Dryopteris pseudocalcarata C. Chr. Ind. Suppl. III: 95. 1934.

Aspidium ciliatum Wall. 1828 (nomen); *Nephrodium* Clarke Trans. Linn. Soc. Bot. **1:** 514. 1880 (non Desv. 1827).

Lastrea calcarata var. *sericea* Ridl. Journ. Mal. Br. R. Asiatic Soc. **4:** 65. 1926.

This species is very distinct from *D. calcarata.* It is common on mossy rocks beside mountain streams in the Peninsula, but does not occur in the lowlands; it has not been found in the south of the Peninsula.

Dryopteris sparsa (Ham.) O. Ktze Rev. Gen. Pl. **2:** 813. 1891.

The only specimen of this species I have seen from the Malay Peninsula is Holttum 25303 from Sungei Sengam, Perak, alt. 3500 ft., on rocks and damp ground near stream, in forest. This specimen is near var. *nitidula,* but the segments are more rounded than in Beddome's illustration. The Sungei Sengam is a small stream on the Perak side of the main range, just below the road up to Cameron Highlands. Ridley quotes a specimen of Matthew's (at Kew) from Maxwell's Hill.

Dryopteris stipellata (Bl.) O. Ktze Rev. Gen. Pl. **2:** 813. 1891.

Aspidium stipellatum Bl. Enum. 152. 1828.

I have examined Blume's specimen at Leiden, and find that some specimens from the Peninsula agree with it. The species is rather abundant by streams in shady valleys at Cameron Highlands; the young unexpanded fronds are covered with mucilage, through which the prominent pale aerophores appear. The surfaces beneath are glabrous, not glandular. A characteristic feature is the sudden narrowing of the apices of the pinnæ. The specimens at Singapore are:

PERAK: King's Collector 6345, 7174 (distributed as *D. heterocarpa*). PAHANG: Cameron Highlands 4800 ft. Holttum 23352. JOHORE: Gunong Muntahak, 600 ft., Holttum 19923.

Hymenophyllum exsertum Wall. Hook. Spec. Fil. **1:** 109, t. 38A. 1844.

This species has not hitherto been recorded as occurring in the Peninsula. The following specimens appear to belong to it; the indusia tend to be narrowed to the apex and entire, but there is much variation, and the sori are often aggregated in the apical portion of the frond. PAHANG: Gunong Tahan, Holttum 20738; Fraser's Hill, Holttum 21569.

Hypolepis bivalvis v.A.v.R. Bull. Jard. bot. Buitenz. II ser. XVI: 19. 1914.

Christensen identified a specimen from G. Tahan as this species; I find that other specimens are also referable to it. All have been distributed as *H. tenuifolia.* The type of *H. bivalvis* is from G. Sago, Sumatra. Peninsula specimens are characterised by the presence throughout of viscid glandular hairs; in herbarium specimens these hairs are dried and their viscid character lost. The species has only been found in open places on mountain ridges.

PAHANG: G. Tahan, 6000 ft. Holttum 20763; Fraser's Hill, 4000 ft. Burkill and Holttum 8498, Holttum s.n. 1923, Eryl Smith 817, G. Hose 7.

Leptochilus decurrens Bl. Enum. 206. 1828.

This species is placed in *Campium* by Copeland (Phil. Journ. Sci. 37; 351). In his key to the genera concerned in the paper quoted, Copeland gives as a distinction between Campium and Leptochilus that the former has a creeping terrestrial rhizome, the latter being scandent or epiphytic. It may be interesting to record that I collected at Cameron Highlands a number of plants of *L. decurrens* (Holttum 23546) the rhizomes of which were scandent to the extent of at least one metre from the ground, on small trees by a stream in shady forest.

Leucostegia immersa (Wall.) Pr. Tent. 95, t. 4, f. 11. 1836.

This species has not been recorded as occurring in the Peninsula. There is a specimen in the Singapore herbarium, from Gunong Tahan (Ridley 16088).

Lindsaya javanensis Bl. Enum. 219. 1828.

L. flabellulata var. *gigantea* Hk. Spec. Fil. **1:** 211, t. 63C. 1846.

L. tenera var. *gigantea* Holttum Gard. Bull. S.S. **5:** 65. 1930.

Dr. O. Posthumus has called my attention to this species, and through the courtesy of Prof. Dr. H. J. Lam I have received a photograph of the type. I believe that it is identical with Hooker's variety above cited, of which I have seen the type at Kew. In my paper on the species of Lindsaya in the Malay Peninsula, I maintained this fern doubtfully as a variety of *L. tenera.* I believe that it is quite distinct; it should therefore bear Blume's name.

Lindsaya lucida Bl. Enum. 216. 1828.

L. Lobbiana Hk. Spec. Fil. **1:** 205, t. 62C. 1846. Holttum Gard. Bull. S.S. **5:** 61. 1930.

I have examined the type of this species at Leiden, and I can see no distinction from *L. Lobbiana* Hk., the type of which also came from Java. The Peninsula plants hitherto called *L. Lobbiana* are now therefore referred to *L. lucida;* there is however some possibility that they are distinct from the Java species.

Lindsaya nitens Bl. Enum. 217. 1828.

L. recurvata Wall. Hk. Spec. Fil. **1:** 222, t. 70A. 1846. Holttum Gard. Bull. S.S. **5:** 66. 1930.

I have seen the type of *L. nitens* at Leiden, and find that it is indistinguishable from *L. recurvata;* Blume's name should therefore be adopted for the species. The Leiden specimen has simply pinnate fronds, the lower pinnæ somewhat recurved and their upper edges incised.

Lindsaya nitida Copel. Phil. Journ. Sci. **6c:** 138, t. 21. 1911.

L. integra Holttum Gard. Bull. S.S. **5:** 67. 1930.

I have seen the type of Copeland's species in Brooks's herbarium at the British Museum. It is bipinnate, but in other respects agrees with my *L. integra*. Brooks's specimens was gathered at 3000 ft. on Mt. Penrissen, and it is possible at that this altitude the species grows to a larger size than by the lowland rivers of the Peninsula. Many species of Lindsaya have fully fertile fronds before they are large enough to bear fronds of fully mature size and branching. Christensen in Gard. Bull. **8:** 237 suggests that this species may be identical with *L. nitens* Bl. In my opinion the latter species is quite different, being identical with *L. recurvata* Wall.

Lygodium borneense v.A.v.R. Bull. Jard. bot. Buitenz. II ser. XX : 29. 1915. Holttum, Journ. Mal. Br. R. Asiat. Soc. **6:** 16. 1928.

This remarkable fern, first discovered in Borneo, was collected by Boden Kloss on the Mentawi Islands, off the west coast of Sumatra. The gap in distribution has now to a small extent been filled by the discovery of plants in Johore, by Mr. E. J. H. Corner (Sungei Dohol, Ulu Sedili, Corner 26053). The plants were found in fresh-water swamp forest. This peculiar habitat may be part of the reason that the species has been so little collected. Fresh-water swamp forests are difficult botanical hunting grounds, and have been inadequately explored, a fact which is well shown by several recent discoveries by Mr. Corner.

Microlepia pilosula (Wall.) Pr.

A specimen recently collected at Cameron Highlands (S.F.N. 31293, Holttum) is closely similar to a specimen from Yunnan determined as *M. pilosula* by Mr. R. C. Ching. I have sent a specimen of the Cameron Highlands plant to Mr. Ching, who confirms the identification. The plant was found growing in the bed of a forest stream, under very moist conditions, at about 5000 ft. altitude. Its characteristic feature is the rather stout stiff pale glistening hairs on the rachises and veins beneath. A similar specimen from northern Siam (Doi Sutep, 1250–1400 m., Winit 1212), in the Singapore herbarium, was also found on moist rocks in a stream bed in evergreen forest. This is a great contrast to the dry open habitat favoured by the common *M. speluncæ*.

Nephrolepis barbata Copel. Perk. Frag. 178. 1905.

Christensen has seen the type of this species, and has identified with it specimens from the Peninsula; I am thus able to enumerate the specimens in the Singapore herbarium, which have hitherto been named *N. exaltata*. The species is characterised by relatively narrow fronds (to about 9 cm. wide), often of great length, the pinnæ close, strongly falcate, usually

drying rather pale green. The plants nearly always grow on rocks, or sometimes on trees, their fronds being pendulous, sometimes well over two metres in length.

PENANG : Waterfall, Ridley 7038. PERAK : Bujong Malacca, Ridley 9607; Relau Tujor, L. Wray 2207; Larut, King's Collector 5229, 5220. NEGRI SEMBILAN : Ulu Bendul, Holttum 9820. SELANGOR : Gua Batu Woods, Ridley s.n. Dec. 1896. PAHANG : Tahan River, near K. Teku, Holttum 20807; Gua Tipus, Chigar Perah, crevices in limestone, Henderson 19405.

There are also specimens from Siam.

Ophioglossum simplex Ridl. ex Bower, Nature **64:** 617. 1901.

This curious species, originally reported from Sumatra, has been found on the summit of Gunong Panti, Johore. It was growing on the ground in the shade of a thicket which had grown up on the summit after clearing. This is the first record for the Peninsula.

Osmunda javanica Bl. Enum. 252. 1828.

The first collection of this species in the Peninsula was made by me in the valley of the Sungei Sengam, Perak (Holttum 25302), at about 3500 ft. above sea. The plants were quite abundant in shady forest, on the valley-sides. They are in appearance very like *Cyathea brunonis,* for which reason they may have been overlooked in the past, but when fertile they are naturally quite unmistakable. The very young unexpanded fronds are covered with mucilage, in the manner of Plagiogryria, but there are no aerophores. The pinnæ are articulate, another resemblance to *C. brunonis.* Plants are growing quite well in cultivation in Singapore and have produced spores. It has since been discovered that *Osmunda javanica* is very abundant beside the Telom river at about 3900 ft. alt., growing in large clumps on rocks, and also in the forest near by.

Plagiogyria adnata (Bl.) Bedd. F.B.I. t. 51. 1865.

No record has been made of the occurrence of this species in the Peninsula. There is however a collection of Mr. Ridley's, from Gunong Tahan (Ridley 16002); this was distributed as *Polybotrya appendiculata* var. *subintegra.*

Polypodium albidosquamatum Bl. Enum. 132. 1828.

This species has never been recorded as occurring in the Malay Peninsula. It was collected by Kunstler in Perak, and was distributed as *Polypodium leiorhizon* Wall. The specimen in the Singapore Herbarium is labelled "King's Collector, no. 10703", and bears no exact locality. The species is of wide distribution, and it is rather surprising that it has only once been found in the Peninsula. The Singapore specimen has only fertile pinnæ, which are rather unusually long.

Polypodium grandidentatum (Cesati) Bak. Ann. Bot. **5:** 479. 1891.

P. dilatatum var. *grandidentatum* Ces. Att. Ac. Nap. **7,** 8 : 27. 1876.

This species, allied to *P. Hancockii* (*see* below), appears to be quite distinct. In the Peninsula it is a lowland plant, whereas *P. Hancockii* has only been found at about 5000 ft. *P. grandidentatum* when mature has much larger fronds than *P. Hancockii,* and also differs in having the lower lobes gradually reduced in size, whereas in *P. Hancockii* the lowest lobes are the largest. *P. grandidentatum* was described from a plant from Matang, Sarawak, which I have seen. The species usually grows on rocks, but in my experience has not the stiffly erect habit of *P. Hancockii.*

Polypodium Hancockii Bak. Journ. Bot. 1885 :106.

P. euryphyllum C. Chr. Index.

In the Peninsula this species has only been collected at Cameron Highlands (Holttum 23501); the specimens formerly distributed as *P. dilatatum* Wall. or *P. euryphyllum* are *P. grandidentatum. P. Hancockii* is found on mossy rocks beside small mountain streams at about 5000 ft. altitude, in shady places. The rhizome clings to the rocks and the fronds are erect.

Polypodium insigne Bl. Enum. 127. 1828.

This species has been collected in the Peninsula, but not reported. It is apparently very variable in the width of the pinnæ; in this character Peninsula specimens agree well with the type. The species appears normally to grow on rocks beside forest streams, but two specimens collected at Fraser's Hill were climbing trees to a few feet from the ground. Ridley's specimens were distributed as *Aspidium decurrens.*

PAHANG : Telom River, Ridley 13978; Fraser's Hill, G. Hose 9, Holttum 8789. PERAK : Sungei Sengam, 3500 ft., Holttum s.n. 1931.

Polypodium normale Don, Prodr. Fl. Nepal. 1. 1825.

This species has not yet been recorded as occurring in the Malay Peninsula. I collected it at Cameron Highlands, at 4800 ft., on a tree on the edge of the forest (Holttum 23363). The specimen appears to me quite identical with *P. normale* from Assam, and also with *P. subnormale* v.A.v.R. from Sumatra.

Polypodium malaicum v.A.v.R. Handb. 577. 1909.

Polypodium sessilifolium Hk. Spec. Fil. **4:** 168, pl. 268A. 1863.

The question of the type of this species is a rather difficult one. Hooker in his original description quoted three specimens, but did not indicate a type. The specimens are : Luzon, Cuming

382; Penang, Sir W. Norris; Java, Blume. An inspection of the sheets at Kew indicates that Hooker's figure was drawn from another specimen not cited by him, namely Cuming 222 from Luzon. This figured specimen is on the same sheet at Kew as Cuming 382 and Norris's plant from Penang; both of the latter are very much smaller than the figure, which agrees closely with Cuming 222. Examination of the lists of Cuming's numbers show that Hooker made a mistake in regarding no. 382 as from Luzon; it was actually collected in Malacca, and it is certainly identical with *P. subevenosum* Bak., the type of which is from Penang.

Hooker's description indicates that he included Cuming 222 in his species (he gives the length of the fronds as 3–8–9 inches); in fact, the species is a composite one, including *P. subevenosum* from the Peninsula and a distinct species, represented by Cuming 222, from Luzon. There are clearly two alternatives : either we may regard Cuming 382 as the type of *P. sessilifolium* Hk., in which case that species becomes a synonym of *P. subevenosum* Bak. and a new name is required for the Luzon plant; or we may select Cuming 222 as the type of *P. sessilifolium* Hk., in which case the species is quite distinct, and should bear the name *P. malaicum*. I prefer the latter alternative, more especially as it agrees with the treatment which has usually been given to the species. Christensen refers to the species in this sense in this Bulletin, vol. 7, p. 292, and remarks that a specimen from Kinabalu is identical with Copeland's Pterid. Philip. exsic. 141, distributed as *P. sessilifolium*, and notes the presence on both of setose sporangia. Cuming 222 has not been examined to find out whether it has this character.

My proposal is therefore to regard Cuming 222 as the type of this species, excluding the Peninsula specimens quoted by Hooker (Cuming 382 and Penang, Norris); it is much larger than *P. subevenosum* and most of the veins are forked, with a probable distinguishing character in the setose sporangia.

Polystichum prolificans v.A.v.R. Bull. Jard. bot. Buitenz. III ser. **2:** 170. 1920.

A species of Polystichum is quite common on the large granite boulders in shady gullies on Penang Hill; the same species has been collected in Perak (King's Collector 6258). These plants have been named *P. biaristatum* Bl. (Ridley, Journ. Mal. Br. R. Asiat. Soc. **4:** 61. 1926) I have examined the type of *P. prolificans* (from Sumatra) and find that the Perak specimen is identical; the Penang specimens in the Singapore herbarium are all smaller than the type, but are otherwise similar.

Pteris platysora Bak. Journ. Bot. 1880: 211.

A specimen from Gunong Kerbau (Haniff 14743) in the Singapore herbarium appears to be referable to this species, the

type of which is from Sumatra. The specimen represents a large and handsome plant, quite unlike any other Pteris so far known in the Peninsula. This species is apparently very near *P. insignis* Mett.

Pteris scabripes Wall. Hook. Spec. Fil. **2:** 165. 1858.

The type of this species is Wallich no. 94 from Penang. As stated by Hooker, it is very near the widely distributed *P. cretica* L., and I am not in a position to judge how good its claims may be to rank as a district species. The sterile pinnæ are very close together, so that the frond is often almost flabellate; the edges of the pinnæ are finely serrulate throughout, by which this species is clearly distinguished from the following. The species is rather local in its occurrence, though sometimes fairly abundant. Specimens from the Peninsula are :

Selangor : 15th mile Pahang Track Ridley s.n. July 1897. Penang : Jerantut, Holttum 24791; Tembeling, Holttum 24690. Perak : Upper Perak, growing on rocks, 300 ft., L. Wray Jr. 3699; Telok Pinang, Ipoh, Ridley s.n. Oct. 1898. Kedah : Burau Bay, Langkawi, Ridley 15789; Langkawi, Curtis s.n. Sept. 1890; Foot of G. Raya, Langkawi, Curtis 3381.

Pteris venulosa Bl. Enum. 209. 1828.

It appears probable that the specimens from the Peninsula hitherto referred to *P. pellucida* Pr. are *P. venulosa* Bl. I could not find the type of the latter species at Leiden, but saw several other specimens from Java, with which Peninsula specimens agree, with the exception that most of the latter have fewer pairs of pinnæ, and some have the pinnæ so close as to be almost digitate. In habit, Peninsula plants agree rather closely with *P. scabripes,* with which they have been confused. They differ very strikingly however, in having the margins of the sterile pinnæ entire and slightly wavy or crisped, except towards the apex, where they are broadly and rather bluntly toothed; this contrasts with the pinnæ of *P. scabripes,* which are finely serrate throughout. Peninsula specimens are as follows :

Johore : G. Pulai, Hullett s.n. Aug. 1880; G. Pulai, rocks by the stream, Ridley s.n. Dec. 1905; G. Berhidong, on wet rocks 1,800 ft. by stream, Holttum 10995; G. Pulai, G. A. Best 7721. Negri Sembilan : G. Angsi, 2000 ft. Md. Nur 11582. Selangor : C. Curtis s.n. May 1902. Perak : Larut, 2800–3000 ft., King's Collector 3811; Maxwell's Hill 3000 ft. Scortechini 405 : 444. Penang : Government Hill 2000 ft. Haniff 7590; Hullett s.n. December 1881.

Quercifilix zeylanica (Houtt.) Copel. Phil. Journ. Sci. **37:** 409. 1928.

This species, though of wide distribution, has never been collected on the mainland of the Malay Peninsula. It has been found on the island of Pulau Tioman, where it was collected

at the South Cape, nestling in rocks, by Burkill in 1915 (Burkill 1034).

Rumohra aristata (Forst.) Ching, Sinensia **5:** 50. 1934.

Under *Polystichum aristatum,* Ridley (1926, p. 61) quotes his no. 15966 from Gunong Tahan; this is however *R. puncticulata* (*see* below). The only collections of *Rumohra aristata* known to me from the Peninsula are as follows. In one case plants were found growing on rocks beside the Tahan river at about 500 ft. altitude (Holttum 20805); these were small, but quite similar to specimens from southern China. The other collection (Holttum 24999) was from a more shady position, from rocks beside a small forest stream near the Sungei Sengam, Perak, at about 3000 ft. (just below Renglet); the fronds of this were larger and thinner in texture.

Rumohra puncticulata (v.A.v.R.) Holttum comb. nov.

Polystichum puncticulatum v.A.v.R. Bull. Jard. bot. Buitenz. III ser. **2:** 171. 1920.

I have seen the type of this species, from Sumatra, and I believe that specimens from the Peninsula (also Mount Kinabalu) are also referable to it. It is allied to *R. speciosa* (Don) Ching. The Peninsula specimens are from G. Tahan and G. Kerbau, our two highest mountains. They are : G. Tahan, Ridley 15966, Holttum 20779; G. Kerbau, Haniff 4033.

Stenosemia pinnata Copel. Phil. Journ. Sci. Suppl. II: 146. 1906.

All Peninsula specimens of Stenosemia appear to agree with this species rather than with *S. aurita,* to which they have been previously referred. Typical specimens of *S. aurita* from Java have triangular fronds, the lowest pinnæ largest, and the lowest basiscopic segments longest. In most Peninsula plants the lowest pinnæ are not much larger than the next, and the lowest basiscopic segments of the lower pinnæ are small, the largest ones being at about one-third towards the apex. There is some variation, but the Java form is never found. Stenosemia appears to be confined to limestone rocks in the Peninsula. It is well established in shady rockeries at the Singapore Botanic Gardens, where it grows on old coral and reproduces freely. The type of *S. pinnata* is from Mindanao, and a study of the geographic distribution of the forms of Stenosemia would be interesting.

Tectaria decurrens (Pr.) Copel.

This species has not yet been collected in the Malay Peninsula. The specimens so named by Ridley (1926, p. 79) are *T. crenata* Cav. and *Polypodium insigne* Bl.

Tectaria Keckii (Luerss.) C. Chr. Index Suppl. III: 181. 1934.

Aspidium Luerss. Bot. Centralbl. **11:** 76. 1882.

The type of this species is from "Klang, bei den Gua Batu" I have not seen it, but it seems to me highly probable that it is

the same as *Aspidium amplifolium* v.A.v.R., a common fern of limestone rocks in the Peninsula, formerly referred to *A. subtriphyllum*. It is certainly allied to *A. subtriphyllum*, but is a much large fern. Kehding collected both in the Peninsula and Sumatra, and the locality Gua Batu is probably the same as Batu Caves, near Kuala Lumpur.

Tectaria Maingayi (Bak.) C. Chr. Index Suppl. III: 182. 1934.

For sysnonymy of this species, *see* Holttum in this Bulletin, Vol. 5, p. 207.

Tectaria ternifolia (v.A.v.R.) C. Chr. Index Suppl. III: 185. 1934.

Aspidium v.A.v.R. Bull. Jard. bot. Buitenz. II ser. XI: 3. 1913.

The type of this species is a specimen collected by Matthew at Gopeng. The species has since been collected in Pahang, as a locally common terrestrial fern in forest on "Raub Series" rocks. The fertile fronds are produced seasonally, on much longer stipes than the sterile. Specimens seen are: Tembeling, Holttum 24693; Henderson 21682; G. Senyum, Henderson s.n. Ridley quotes a specimen from Pekan as *Aspidium ternatum;* this species has not otherwise been found in the Peninsula, and the specimen is perhaps *T. ternifolia.*

Trichomanes exiguum (Bedd.) Baker, Syn. Fil. 464. 1874.

Hymenophyllum Bedd. F.B.I. pl. 275. 1868.

A specimen (s.n.) gathered by me at Ginting Simpah appears to be this species, which has not hitherto been recorded as occurring in the Peninsula. The plants were growing on a large boulder beside a stream in forest near 2000 feet above sea level.

Trichomanes radicans Sw.

No specimen of this species, even widely interpreted as in Copeland's recent work (Phil. Journ. Sci. **51,** p. 213), has hitherto been found in the Malay Peninsula, the nearest being a specimen from Siam. A recent collection from Cameron Highlands (S.F.N. 23466, Holttum) fills this gap. The plants are small, with fronds to 7 cm. long.

Vittaria malayensis Holttum Gard. Bull. S.S. **4:** 409. Jan. 1929.

Apparently *V. stenophylla* Copel. from Luzon (name published in October 1929) is the same as *V. malayensis;* there is a specimen of Copeland's (Pterid. Philip. exsicc. 122) in the Singapore herbarium and I have compared it with Malayan specimens. *V. malayensis* is not uncommon as an epiphyte on the main range of the Peninsula.