

IV.—The Ferns of Mount Penrissen.—BY CECIL J. BROOKS.

The following list of ferns collected on Mount Penrissen during the month of April 1910 makes no claim to completion, indeed the short period at the writer's disposal was sufficient only for him to follow one trail to the summit and return by the same route; to make a comprehensive collection of the ferns of this large area would entail a very prolonged residence on the mountain.

The large number of new species* discovered shows that this somewhat isolated group of mountains is botanically in its fern flora as interesting as its fauna has proved to be; and it appears just to conclude from this small collection that the ferns of the Penrissen group are not so closely connected with those of the other well-known mountains of Sarawak proper—Mounts Matang, Santubong, Poe and the Bungo Range—as the ferns of those mountains are connected with one another.

According to the most recent determination † Penrissen has an elevation of 4100 feet; it is the highest of three peaks, Mounts Seruru and Prang being the names of the other two; it is situated at the source of the—so-called—left-hand branch of the Sarawak river, within fairly easy access of Kuching and distant from the sea about 60 miles. Several naturalists have visited it, including Dr. G. D. Haviland, who, I believe, devoted no special attention to the fern flora.

In considering the local distribution of these ferns the conditions are similar to those existing on all mountains in Sarawak; where the foot-hills are covered with old jungle, an extremely humid atmosphere is always maintained and ferns are numerous; above, for an elevation of 1000 to 2000 feet, where the atmosphere is comparatively dry and the trunks develop to their greatest proportions, thus creating a gloom, they become scarce

* In a collection of five species of Selaginellas determined by Professor Hieronymus four proved to be new to science.

† *Sarawak Gazette*, January, 1910, p. 5, "Mount Penrissen," by J. C. Moulton.

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or almost absent; this is succeeded by a zone of smaller timber and rocks, on which filmy ferns are especially numerous; also in the moss forest above where the trees are stunted or of small growth, they become most numerous and continue so to the summit, which in the case of Penrissen is a plateau with an area of 50 to 60 acres, but here ferns are conspicuously absent; two or three species only are sufficiently hardy to stand the exposed situation.

I have to thank Dr. E. B. Copeland of the College of Agriculture, Los Bânos for kind help with identifications and for describing the new species.

[At Mr. Brooks' request I have added the names of other Penrissen ferns which were collected on that mountain by Mr. R. Shelford in May 1899, and by myself in November 1909. A list of the former collection was given by Bishop Hose as an appendix to Mr. Shelford's account of his expedition in the *Journal of the Straits Branch, Royal Asiatic Society*, 1910 (No. 33, p. 25). The few species taken by myself on Penrissen were identified by Dr. E. B. Copeland. Both collections are preserved in the Sarawak Museum herbarium.

These few additions to Mr. Brooks' list are given in square brackets, duly authenticated by the initials of the collector, viz., Mr. Shelford or myself].—J. C. MOULTON.

MARATTIACEAE.

Angiopteris, Hoffmann.

Angiopteris ferox, Copel. spec. nova.

An enormous fern, the hairy stipe and rachis render it a conspicuous plant. Common near summit. Alt. 3500–4000 feet.

Macroglossum, Copeland.

Macroglossum alidæ, Copel.

Dense clumps on ridge in moist old jungle. Alt. 300 feet, at foot of Penrissen.

Bau, Mount Singie.

Marattia, Swartz.*Marattia fraxinea*, Sm.

On ridge in damp jungle. Alt. 500 feet.
Tropical Asia, Africa and Australia.

GLEICHENIACEAE.

Gleichenia, Smith.*Gleichenia vestita*, Bl.

Common. Alt. 4000 feet.

Mt. Matang, Mt. Santubong, Mt. Dulit, Mt. Poe
and Mt. Bengkarum, Malaya.

Gleichenia japonica, Spr. (*Glongissima*, Bl.).

A very large long-leaved form, which appears to be a
variety peculiar to this mountain. One of the few ferns
found growing on the summit. Alt. 4100 feet.

Japan to India, Polynesia, Australia.

HYMENOPHYLLACEAE.

Hymenophyllum, Smith.*Hymenophyllum* spp.

Four species as yet unidentified.

[*Hymenophyllum demissum*, Sw.

Mt. Penrissen; November, 1909.

Malaya; Polynesia, New Zealand]. J. C. M.

Trichomanes, Linné.*Trichomanes digitatum*, Sw.

Alt. 3000 feet.

Mt. Santubong, Mt. Poe, Mt. Matang.

Asia, Polynesia, Mascarenes.

[*Trichomanes maximum*, Bl.

Mt. Penrissen, lower slopes to 3800 feet; May 1899
and November 1909.

Malaya; Polynesia, Queensland]. R. S. and
J. C. M.

[*Trichomanes javanicum*, Bl.

Mt. Penrissen; November 1909.

Tropical Asia, Polynesia and Australia]. J. C. M.

Trichomanes apiifolium, Pr.

Very common on rocks in shady jungle. Alt. 3000 feet.

Mt. Matang, N. Borneo. Natuna Islands.

Malaya, Philippines, Polynesia, Norfolk Island.

[*Trichomanes parviflorum*, Poir.

Mt. Penrissen; November 1909.

Malacca, Australia, Madagascar and Mascarenes].
J. C. M.

Trichomanes pluma, Hk.

On rocks in mossy jungle. Alt. 3000 feet.

Mt. Matang, Santubong, Bungo Range. N. Borneo.

Perak, Malaya, Samoa, New Caledonia.

Trichomanes, spp.

Three more species as yet unidentified.

CYATHEACEAE.

Cyathea, Smith.

Cyathea paraphysata, Copel. spec. nova.

On ridge at foot of Penrissen in damp old jungle.
Alt. 500 feet.

Cyathea borneensis, Copel. spec. nova.

In fairly open forest. Alt. 3500 feet.

Cyathea Brooksii, Copel. spec. nova.

Common; fronds seldom fertile. Alt. 3500-4000 feet.

Cyathea recommitata, Copel. (Mett).

Common on marshy plateau. Alt. 3000 feet.

Malacca, Batjan.

Balantium, Kaulfuss.*Balantium Copelandi*, Christ.

A single plant found growing on a recent landslip
Alt. 4000 feet.

New to Borneo. Luzon, Negros.

POLYPODIACEAE.

Dryopteris, Adanson.*Dryopteris crassifolia*, O. Ktze.

Alt. 3000 feet.

Mt. Matang, Bungo Range.

Malaya, Burmah, Philippines.

Dryopteris calcarata, O. Ktze.

Common on the banks of the Sarawak River near
Pankalan Ampat.

Mt. Matang, Mt. Dulit.

Malaya, India, Philippines, Hong Kong.

Dryopteris athyriocarpa, Copel.

Common in open jungle. Alt. 3000 feet to near
summit.

Bungo Range, Benkarum mountain. Borneo.

Dryopteris paucisora, Copel. spec. nova.

Small clumps on nearly vertical rock-face under
water drip. Alt. 3000 feet.

Dryopteris amboiensis, O. Ktze.

On limestone rocks Sarawak River near Pankalan
Ampat.

Generally common.

India and Malaya.

Dryopteris acanthocarpa, Copel. spec. nova.

On moist rocks. Alt. 2700 feet.

Dryopteris lineata, C. Ch.

On rocks in torrent. Alt. 2500 feet.

Bungo Range.

Malaya.

Diplazium, Swartz.*Diplazium* (near) *bantamense*, Bl.

On ridge at foot of mountain. Alt. 200 feet.
Santubong.

Diplazium hosei, Christ.

Common. Alt. 3000 feet to summit.

Diplazium acuminatum, Bl.

Terrestrial in moss jungle. Alt. 3500 feet.
Malaya.

Diplazium cyatheifolium, Pr.

In damp old jungle on ridge at foot of mountain.
Alt. 400 feet.

Philippines, New Guinea, Polynesia.

Diplazium, sp.? (sent away for identification).

A large fern. Alt. 3500 feet.

Asplenium, Linné.*Asplenium squamulatum*, Bl.

Sennah ; epiphyte on trees over river.
Generally common in Sarawak.
Malaya.

Asplenium trifoliatum, Copel.

Abundant on moist rocks. Alt. 2500 feet.
Tringos.

Asplenium vulcanicum, Bl.

Epiphyte on trees over torrent. Alt. 2000 feet.
Santubong, Mt. Matang, Lundu, Niah, Bau, Bidi.
Malaya, Ceylon, South India, Philippines.

Asplenium sp. (sent away for determination).

On tree over mountain stream.
Sarawak River, Tipong.

Phegopteris, Fée.

[*Phegopteris (Goniopteris) firmula*, v. A. v. R.

Mt. Penrissen, May 1899]. R. S.

[*Phegopteris Hosei*, v. A. v. R.

Mt. Penrissen; November 1909.

A variety occurs in Sumba Island]. J. C. M.

Dennstaedtia, Bernhardt.

Dennstaedtia ampla, Bedd.

In old moist jungle on ridge near foot of mountain.
Alt. 500 feet.

Sena Serin River.

Malacca, Perak.

Tapeinidium, C. Chr.

Tapeinidium pinnatum, C. Chr.

A very broad form occurring also on the Bungo Range; this fern appears to vary considerably, each locality producing its characteristic form. Alt. 3000 feet.

Mt. Poe, Mt. Santubong, Mt. Matang.

Malaya and Polynesia.

[*Tapeinidium gracile*, v. A. v. R.

Mt. Penrissen; lower slopes, November 1909.

Malaya]. J. C. M.

Humata, Cavanilles.

[*Humata repens*, Diels (*nec* J. Sm.).

Mt. Penrissen. Alt. 3500 feet, May 1899.

Tropical Asia and Australia, Japan, South China, Mascarenes and Seychelles]. R. S.*

Humata sp.? (near *repens*, Diels.); sent for determination.

Mt. Bengkarum.

A constant form of constant occurrence.

Alt. 2500 feet to summit.

* Mr. Shelford's collection of ferns from Penrissen, described by Bishop Hose consists of twelve species. For the sake of completeness, the whole list is here appended together with Bishop Hose's comments.

Odontosoria, Presl.*Odontosoria chinensis*, J. Sm.

On moist rock in shade; not common. Alt. 3000 feet.

Matang, N. Borneo.

Tropical Asia, Polynesia, Japan, China, Comore and Mascarene Islands, Madagascar.

Lindsaya, Dryander.*Lindsaya repens*, Bedd.

A large mass, on moist rock over torrent. Alt. 1200 feet.

Tropical Asia, Polynesia, Mauritius.

Lindsaya sp.? (sent for determination).

On moist rocks. Alt. 3000 feet.

There is also a minute form, probably young plants of the above, growing on moist rock near summit. Alt. 3900 feet.

[Extracted from the *Journal of the Straits Branch, Royal Asiatic Society*, No. 33, 1900, p. 25]:—

" 1. *Trichomanes maximum*, Blume. 4100 feet, common.

" 2. *Davallia (Humata) pedata*, Smith [= *repens*, Diels] 3500 feet.

" 3. *Lindsaya cultrata*, Swartz.

" 4. *Lindsaya concinna*, Smith.

" 5. *Lindsaya scandens*, Hk.

" 6. *Polypodium (Goniopteris) firmulum*, Baker. Previously recorded from Mt. Dulit only.

" 7. *Polypodium (Eupolypodium) decorum*, Brack, 3500 feet.

" 8. *Polypodium hirtellum*, Bl. This species is new to Borneo being previously recorded from Java, Perak, Ceylon, Philippines and China.

" 9. *Polypodium obliquatum*, Bl. Also new to Borneo.

" 10. *Polypodium (Goniophlebium) (?)* sp. nov. This is a very interesting fern. 'No other simple form of the sub-genus has been found in this part of the world, so far as I know.' (G. F. S. & S.).

" 11. *Nephrodium (?) lineatum*, Coleb.† None of the fronds fertile. If correctly identified, new to Borneo.

" 12. *Acrostichum (Chrysodium) sp. (?)* near *blumeanum*, Hk. No fertile fronds."

† [Malayan Ferns by Capt. C. R. W. K. van Alderwerelt van Rosenburgh, 1909, makes no mention of an author of this name; the species is possibly *Dryopteris (Nephrodium) lineata*, C. Christensen, which is given with the distribution "Malaya." The only other *Nephrodium lineatum* is that described by Beddome in *Ferns of British India*, a species which has been sunk as a synonym of *Dryopteris urophylla*, C. Chr. by the author of *Malayan Ferns.*]—]. C. M.

[*Lindsaya concinna*, J. Sm.

Mt. Penrissen. Alt. 3500 feet. May 1899.
Malaya]. R.S.

Lindsaya montana, Copel. (or near it).

On rocks in torrent. Alt. 1000 feet.
Philippines.

Lindsaya cultrata, Sw.

On rocks. Alt. 3000 feet.
Common throughout Sarawak.
Tropical Asia, North Australia, East Africa.

Lindsaya scandens, Hk.

Scandent near base of trunks. Alt. 3000 feet and
higher.

Common on most mountains of Sarawak.
Malaya, Tropical Asia.

Lindsaya orbiculata, Mett.

On rocks. Alt. 1000 feet.
Common in Sarawak.
Tropical Asia, Australia.

Lindsaya nitida, Copel. spec. nova.

Terrestrial; a very attractive fern. Alt. 3500 feet.
Common.

Lindsaya davallioides, Bl.

Common in shady jungle. Alt. 3000 feet and above.
Common in Sarawak.
Malaya.

Adiantum, Linn.

Adiantum pulcherrimum, Copel. spec. nova.

On dry sandstone ledge below overhanging rock.
Alt. 3700 feet.

Pteris, Linn.*Pteris rangiferina*, Pr.

On dry sheltered rocks. Alt. 4000 feet.

New to Borneo. Described from Java.

Pteris sp. near *pellucida*, Pr.

On scattered rocks in small stream. Alt. 3000 feet.

Malaya, North India.

Pteris Grevilleana, Wall.

Terrestrial in shady jungle. Alt. 3500 feet.

The plants are seldom fertile, and the fronds always digitate.

Malacca, Philippines, North India, Siam.

Antrophyum, Kaulfuss.[*Antrophyum latifolium*, Bl.

Mt. Penrissen. November 1909.

Malaya, North India and South China]. J. C. M.

Antrophyum plantagineum, Klf.

On mossy rock, shady jungle. Alt. 3500 feet.

Bungo Range.

Malaya, India, Philippines, Polynesia.

Antrophyum subfalcatum, Brack.

A common epiphyte on trees overhanging river near Pankalan Ampat.

Malaya, Polynesia.

Antrophyum reticulatum, Klf.

A common epiphyte. Alt. 2500 feet.

Very generally distributed in Sarawak.

Malaya, Polynesia, Tropical Australia, Philippines, North India, Madagascar.

Vittaria, J. Smith.*Vittaria longicoma*, Christ.

On trees in moist old jungle over small stream.
Alt. 300 feet.

Bau, Tringos.

Confined to Borneo.

Vittaria elongata, Sw. (probably).

Alt. 3000 feet.

Vittaria sp.? This may be a large form of *V. sulcata*,
Kuhn. (sent away for determination). Epiphyte on
trunk. Alt. 3000 feet.

Loxogramme, Presl.*Loxogramme involuta*, Presl.

Common on trunks. Alt. 2500 feet.

Mt. Matang, Bau, Sarawak River, Bidi.

Tropical Asia, China, Melanesia, Philippines.

Polypodium, Linn.*Polypodium hirtellum*, Bl.

On base of mossy trunk. Alt. 3500 feet.

Bungo Range.

Malaya, New Caledonia, South China.

Polypodium congenerum, Pr. (*nec* Hk.).

On trunk. Alt. 3500 feet.

Tringos.

Malaya.

[*Polypodium streptophyllum*, Bk.

Mt. Penrissen, foot of mountain, November 1909.

Also recorded from Singapore]. J. C. M.

[*Polypodium decorum*, Brack.

Mt. Penrissen. Alt. 3500 feet. May 1899.

Malaya, Ceylon, Polynesia]. R. S.

[*Polypodium soridens*, Hook.

Mt. Penrissen, lower slopes, November, 1909.

Confined to Borneo]. J. C. M.

Polypodium obliquatum, Bl.

A large form. Alt. 3000 feet.

Malaya; Ceylon, South India.

Polypodium oodes, Kze.

Identical with specimen in Sarawak Museum, *P. oodes*, Kze., but more nearly resembles the description of *P. rudimentum*, Copel.

On sheltered sandstone rock. Alt. 3700 feet.

North Borneo, Baram district, Sarawak.

Philippines.

Polypodium incurvatum, Bl.

A rare fern. Alt. 3000 feet.

Mt. Bengkarum, Mt. Matang, Baram district.

Malaya, Himalayas.

Polypodium palmatum, Bl.

A very common fern from 3000 feet to summit.

Bengkarum, Bungo Range.

Malaya, Sulu and Philippine Islands.

Aglaomorpha.

Aglaomorpha brooksii, Copel. spec. nova.

Growing in immense masses at some height on trunks. Alt. near foot to 3000 feet.

Mt. Bengkarum.

Hymenolepis, Kaulf.

Hymenolepis spicata, Pr.

A very long form. Alt. 3000 feet.

Common in Sarawak.

Tropical Asia, Australia, Polynesia, Philippines, Madagascar, Mascarene Islands.

Cheiropleuria, Presl.*Cheiropleuria bicuspis*, Pr.

On rock hanging over ravine. Alt. 3000 feet.

This form is so large with conspicuous difference from the small type that it may well rank as a variety.

Mt. Lingga, Mt. Dulit, Mt. Poe, Mt. Bengkarum, Bungo Range.

Philippines, Malaya to Liu Kiu and New Guinea.

Leptochilus, Kaulf.*Leptochilus decurrens*, Bl.

Common on moist rocks, seldom fertile. Alt. 3000–3500 feet.

Tropical Asia.

Leptochilus cuspidatus, C. Chr.

On moist rocks. Alt. 1000 feet.

Bungo Range.

Tropical Asia, Australia, Polynesia, Seychelles.

