Noch immer ist also der Druck auf I, ein wenig *oberhalb* des λ-Punktes, etwas *niedriger* als im λ-Punkte selber, was natürlich unmöglich ist. Diese Tatsache ist jedoch nach KEESOM von keiner Wichtigkeit, da in Comm. 184*b* (1926), S. 15 bemerkt wurde: „The melting pressure could be fixed to some few tenths of an atmosphere", sodasz der damals gemessene Druck 29.8 dennoch wohl etwas höher als 29.9 sein kann. Die von K. und Frl. K. gefundenen Werte für T und p im λ-Punkte können somit aufrecht bleiben, wodurch die Abänderung in § 1, S. 613 meines letzten Aufsatzes (Proceed. **39**, N°. 5, 612—622) hinfällig wird.

II

In der Einleitung (S. 612) schrieb ich über die von KEESOM „berechneten" Schmelzwärmen, weil im betreffenden sehr kurzen Aufsatz von K. und Frl. K. in Proceed. **39**, N°. 1, S. 9 steht: „For the melting heat the following values were „derived". Der ausführliche Aufsatz in *Physica* III, S. 105—117 wurde mir erst vor einigen Tagen von Heinn KEESOM gütigst zugesandt, woraus sich ergibt, dasz die betreffenden Schmelzwärmen nicht „berechnet", sondern experimentell bestimmt worden sind.

Es bedarf wohl nicht erwähnt zu werden, dasz die kleine Verbesserung hinsichtlich der Lage des λ-Punktes in keinerlei Weise den Inhalt meines Aufsatzes beëinfluszt, da derselbe sich auf Beobachtungen auf den beiden Schmelzkurven, links und rechts des λ-Punktes, bezieht.

Tavel sur Clarens (Schweiz), Juni 1936.

Botany. — *On some Malayan Ferns.* By O. POSTHUMUS, (Pasoeroean) Java.

(Communicated at the meeting of June 27, 1936).

The following note is the result of a study of the type specimens of some less known Malayan Ferns. I wish to express my sincere thanks to the Directors of the Herbarium of the Botanical Gardens, Buitenzorg, and of the State Herbarium, Leyden, who kindly allowed me to study the material. From the Leyden Herbarium I also received photographs of some type specimens from BLUME.

Dryopteris menisciicarpa (BLUME) ROSENSTOCK.

After examining the specimen of *Dryopteris cordifolia* V.A.v.R. [1]) from Labang, N. Borneo (VAN GENDEREN STORT 522), also the other specimens mentioned from Boekit Aloe Seboekoe (VAN GENDEREN STORT 449 p.p. and 524), and from Sedali (VAN GENDEREN STORT 298) in the Buitenzorg Herbarium, I cannot distinguish this fern from **Dr. menisciicarpa** ROS. [2]).

C. CHRISTENSEN identifies *Dr. cordifolia* V.A.v.R. with *Dr. mirabilis* COPELAND [3]); the latter species has also been identified [4]) with *Dr. holophylla* (BAKER) C. CHR. which represents juvenile specimens with undivided fronds. Both are present in the type material of *Dr. cordifolia* V.A.v.R.; mature fronds with well developed pinnae, with their characteristic truncate base, which are reduced to basal lobes in nearly entire leaves, as is shown in the figures. This species, also including *Dr. verreculosa* V.A.v.R. [5]), consequently has now been found to occur in the Malay Peninsula, Sumatra, Borneo, West and East Java; in the latter region except from the type locality of *Dr. verreculosa* V.A.v.R. at the S. coast, S. of Malang, it has also been found near Kalibaroe, at the S. slope of Mt. Raoeng and on the E. slope of Mt. Merapi above Banjoewangi, at 900 M altitude. The specimens, mentioned in my former paper [2]), CLEMENS 26923 and CLEMENS 27430, which I thought to be the same, I now consider to be really different, though closely allied to **Dr. menisciicarpa** ROS.

Lindsaya javanensis BLUME [6]).

Of this fern, which is commonly considered to be identical with **Lindsaya orbiculata** [7]) METTENIUS, the type specimen in the Leyden Herbarium proved to be characterized by rhomboid, more or less acuminate pinnules, with flabellate venation.

In this respect it quite agrees with the variety gigantea of *L. flabellulata* as described by HOOKER [8]), which has been distinguished also as a variety of *L. tenera* DR. and more recently as separate species, *L. gigantea* (HK.) C. CHR. [9]). If this species be recognized as a distinct one, the old name **Lindsaya javanensis** BLUME, should be used again.

Lindsaya lucida BLUME [10]).

This species, created by BLUME in 1828, was afterwards considered as a variety of **Lindsaya gracilis** BL. only [11]). The specimen in the Leyden herbarium, however, appeared to be clearly distinct in many respects from the latter species, the most important difference being that the rhizome is not longcreeping. In the same way *Lindsaya crenulata* FÉE [12]) and *L. Lobbiana* HOOKER [13]) were considered to be identical with **L. gracilis** BLUME [14]). HOLTTUM was the first to show that *L. Lobbiana* HK. was different from **L. gracilis** BLUME [15]), and identical with *L. propria* V.A.v.R. He argued the possibility of *L. crenulata* FÉE being the same; C. CHRISTENSEN agrees with this standpoint [16]). Examination of the type specimen of **L. lucida** BL. in the Leyden Herbarium convinced me that **L. lucida** BL. is identical with *L. Lobbiana* HK. and *L. propria* V.A.v.R. It is distinguished from **L. gracilis** BL. by its rhizome being shorter, the leaflets bigger; from **L. cultrata** SW., by its lower leaflets being smaller and curved downwards. I do not believe *L. crenulata* FÉE to be identical with **L. lucida** BL.; in the shape of its pirmae it is more like **L. cultrata** SW.

Polypodium trilobum HOUTTUYN [17]).

This name has been given by HOUTTUYN to a fern from Java, collected by THUNBERG on the mountains S. of Batavia. The plate shows a trilobed leaf of characteristic appearance, the lateral lobes of which are placed nearly perpendicular to the petiole, and are rather pointed from a broad base. This is characteristic of the Java Ferns in *Polypodium incurvatum* BLUME only [18]); I have no doubt that the two plants are identical.

C. CHRISTENSEN [19]) refers *Polypodium triphyllum* JACQUIN [20]) to the same species; this name, however, dates from 1788 and that of HOUTTUYN from 1783; the latter, therefore, is the older and should be used.

Pteris umbraculifera METTENIUS.

This fern, described by METTENIUS [21]) on a specimen collected by VAN BEUSEKOM on Mt. Pangerango, has been united by HOOKER—BAKER [22]), CHRISTENSEN and other authors, e.g. VAN ALDERWERELT VAN ROSENBURGH, with **Pt. longipinnula** WALL. The examination of the type specimen in the Leyden Herbarium, however, shows that this fern is different.

Its most prominent feature is the arrangement of the pinnae; in the type specimen on the top of the petiole 4 pinnae are inserted, and the scar of a fifth pinna, probably the same which is pasted separately on the sheet, can be seen. Between the insertion of the pinnae 3 small pinnules, resembling the smaller lowermost pinnules of the pinnae, are inserted. In this feature it differs from **Pt. pellucens** AG. [23]), the leaf of which is tripartite, or, if sometimes 5-partite, the lower pinnae being branched, the leaf is pedate, without basal pinnules.

The same structure of the leaf is said to occur in *Pteris radicans* CHRIST [24]), though the basal pinnules are not indicated in his description. In 1930 I visited the forest at the SW. slope of the Peak of Mt. Bonthain in S. Celebes, where the type material of *Pt. radicans* had been collected, and found this fern to be rather frequent in many places at about 1200—2000 M. altitude. It seems to me quite identical with **Pt. umbraculifera** METTENIUS. At present this species is known to occur in W. Java: Mt. Pangerango, (type locality); East Java; Mt. Dorowati, ca 1500 M., POSTHUMUS 1823, 12-5-1929 (HB, P, POJ); Bali: Bratan caldera, near Bedoegoel, ca 1300 M., POSTHUMUS 3692, 22-11-1933 (P, HB); Flores: Rana mese, POSTHUMUS 3290, 14-11-1932 (P, HB), and SW. Celebes: Mt. Bonthain, SW. slope above Karoenglowe, ca 1500 M., POSTHUMUS 2717, 20-11-1930 (P, POJ).

Thysanobotrya dubia (V. A. VAN ROSENBURGH) nov. comb.

Stenochlaena dubia VAN ALDERWERELT VAN ROSENBURGH, Bulletin Dept. Agric. Indes Néerl., XVIII, p. 26, (1908); Malayan Ferns, p. 721 (1909).

Polybotrya arfakensis GEPP in GIBBS, Contribution to the Phytogeography and Flora of the Arfak Mountains, p. 71 (1917).

Thysanobotrya arfakensis VAN ALDERWERELT VAN ROSENBURGH, Bulletin Jardin Bot. de Buitenzorg, (II) vol. **28**, p. 66 (1918).

Cyathea Gibbsiae COPELAND, Phil. Journ. of Science, vol. **38**, p. 129 (1929).

Alsophila biformis ROSENSTOCK, Fedde's Repertorium, vol. **9**, p. 423 (1911).

Alsophila biformis BRAUSE, Hedwigia, vol. **61**, p. 401 (1920).

Alsophila biformis BRAUSE, Engler's Bot. Jahrbücher, Bd **56**, p. 74 (1920).

Alsophila biformis POSTHUMUS in RANT, Reizen naar Ambon, Natuurk. Tijdschr. voor N. I., vol. **94**, p. 119 (1934).

Cyathea biformis COPELAND, Phil. Journ. of Sci. Bot., vol. **6**, p. 364 (1911).

This is the rather complicated synonymy of the first described species of a well characterized group of Cyatheaceae with thin, scandent stems and dimorphous leaves. The habit of sterile specimens explains it having been included in both the genera *Polybotrya* and *Stenochlaena*.

When I saw the sterile type specimen of *Stenochlaena dubia* V.A.v.R. for the first time in 1931, I already suspected it to belong to *Alsophila biformis* ROSENSTOCK, of which I had before seen good material of New Guinea, collected by DOCTERS VAN LEEUWEN: Rouffaer river, ca 175 M., no. 9821, and no. 10399 (now in the Buitenzorg Herbarium).

Its identity was confirmed afterwards by the beautiful specimens, now in the Buitenzorg herbarium, collected by RANT on Amboyna on the summit of Mt. Salhoetoe, ca 1000 M. (no. 745), the same locality where TEYSMANN collected the specimens described by VAN ALDERWERELT VAN ROSENBURGH as *Stenochlaena dubia*. Similarly to the material, collected by TEYSMANN, the fructifications clearly showed its true nature.

This characteristic species seems to have developed from a group of species in *Alsophila*, which are characterized by dark coloured rachises and by often much contracted fertile pinnules. To this group belong e.g. **Alsophila commutata** METT. (Malay Peninsula, Borneo) and **A. dimorpha** CHRIST. (Celebes). Of New Guinea species belong to this group **A. Ledermannii** BRAUSE, **A. olivacea** BRAUSE, and **A. brunnea** BRAUSE. In this group, however, some species are characterized further by thin stems, ca 1—2 cM thick, scandent, often somewhat flattened on one side as the rhizomes of **Stenochlaena**, from which they can easily be distinguished by the scales.

Though both BRAUSE and COPELAND include *Thysanobotrya* in **Alsophila**, resp. **Cyathea**, because of the structure of the sori being the same as in the above-mentioned forms, it seems to me that the combination of scandent stems and dimorphous pinnules, which has already been mentioned by VAN ALDERWERELT in his diagnosis, fully justifies the separation of the genus **Thysanobotrya** from the rest of the complex group, now known either as **Cyathea** only (COPELAND, HOLTTUM) or as **Alsophila, Hemitelia** and **Cyathea** (C. CHRISTENSEN in his Index Filicum).

The genus **Thysanobotrya** includes two species: 1. **Thysanobotrya dubia**

(V.A.v.R.) nov. comb., mentioned above. COPELAND doubts the identity of *Thysanobotrya arfakensis* (V.A.v.R.) with *Alsophila biformis* ROSENSTOCK, but both BRAUSE and CHRISTENSEN consider both species to be identical. 2. **Thysanobotrya scandens** (BRAUSE) nov. comb. (*Alsophila scandens* BRAUSE, Engler's Bot. Jahrbücher, vol. **59**, p. 77 (1920)).

The position of **Alsophila Rosenstockii** BRAUSE (l.c., p. 64) is not quite certain; it may belong to the same genus.

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1. Bulletin du Jardin Bot. de Buitenzorg, XI, p. 19, pl. V (1913).
2. Bulletin du Jardin Bot. de Buitenzorg (III), vol. **13**, p. 92 (1933); the name Dr. menisciicarpon was used, as was written on the label; it should be, however, Dr. menisciicarpa.
3. Phil. Journal of Science, vol. **6**, c, p. 137, pl. 19 (1911).
4. Gardens Bulletin, VII, p. 249 (1934); Index Filicum, third supplement, p. 91 (1934).
5. l.c., p. 94.
6. BLUME, Enumeratio, p. 219 (1828).
7. C. CHRISTENSEN, Index Filicum, p. 394 (1906).
8. HOOKER, Species Filicum, p. 211, pl. LXIII C (1846).
9. C. CHRISTENSEN in Engler Bot. Jahrbücher, vol. **66**, p. 53 (1933).
10. BLUME, Enumeratio, p. 216 (1828).
11. C. CHRISTENSEN, Index Filicum, p. 395 (1906).
12. FÉE, Genera Filicum, p. 105, pl. 28, fig. 2 (1850—'52).
13. HOOKER, Species Filicum, I, p. 205, pl. 62 C (1846).
14. C. CHRISTENSEN, Index Filicum, p. 392, 395 (1906).
15. HOLTTUM, Gardens Bulletin, Singapore, vol. **5**, p. 61 (1930).
16. C. CHRISTENSEN, Index Filicum, third Supplement, p. 121 (1934).
17. HOUTTUYN, Handleiding tot de Plant- en Kruidkunde, deel **14**, Amsterdam, p. 148, pl. 98, fig. 1 (1783).
18. BLUME, Enumeratio, p. 126 (1828); Flora Javae, Filices, p. 151, pl. 65 (1828).
19. C. CHRISTENSEN, Index Filicum, third Supplement, p. 161 (1934).
20. JACQUIN, Collectanea, vol. **2**, p. 284, pl. 22, fig. 1 (1788).
21. METTENIUS, Ann. Mus. Bot., Lugd. Bat., IV, p. 97 (1868—1869).
22. HOOKER—BAKER, Synopsis Filicum, second ed., p. 158 (1874).
23. Pt. Zollingeriana Mettenius is the same; it is sometimes mentioned as Pteris longipes Don, which, however, according to the description in Agardh, Recensio, seems to be a Lithobrochia.
24. CHRIST, Verh. naturf. Ges. Basel, XI, p. 431 (1896); Ann. du Jardin Bot. de Buitenzorg, XV, p. 110 (1897).
25. HB = Herbarium, Buitenzorg, POJ = herbarium of the Sugar Experiment Station, Pasoeroean; P = my own herbarium.