

ON THE SYSTEMATICAL VALUE OF THE STEM ANATOMY IN THE POLYPODIACEAE

by

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The appearance of a new supplement to the Index Filicum of C. Christensen (1934) affords a good opportunity to review the data about the anatomy of the *Filicales*, especially of the *Polypodiaceae*.

The Index now gives a new arrangement of the genera, according to the investigations of the last 25 years; it is interesting to see how far the anatomical data agree with the criteria, used for the systematic arrangement.

That C. Christensen, when compiling his Supplement, and making his new arrangement, was not much influenced by the anatomy, is shown e.g. by the fact, that the new combination *Arthropteris orientalis*, which was made by me because of its anatomy, was made independently by him, in this supplement; my paper „On stelar morphology” (Posthumus, 1924) is mentioned in the appendix of the supplement only.

In the following list, all data, known to me, are arranged a new according to this new supplement. From those, mentioned by me formerly, the reader is referred to my former publication; if a new name is used, the former name is added too.

The literature, appeared after 1924, and a few papers which have been overlooked, are also quoted, the complete titles are given in the list at the end.

A comparison of the old list and the remarks at the end of it, with the new arrangement, as given below, shows some interesting results.

The anatomy of *Diacalpe foeniculacea* (after the Index Filicum, 1906) differs much from *D. aspidioides*; therefore in my list, (Posthumus, 1924, p. 214), it was left in the genus *Polystichum*, where it had been placed by J. Smith; at present it is known as a separate genus, *Lithostegia Ching*. It differs from most species of *Polystichum* by its dictyostele being dorsiventral,

not radially built; a dorsiventral dictyostele is known in the other species of *Polystichum* from *P. adiantiforme* only.

In *Dryopteris* the aberrant structure of *Dryopteris punctata* was discussed, and the shifting to *Hypolepis* proposed (Posthumus, 1924, p. 258). I had overlooked however, that Christensen had already done the same in the first supplement to his Index (C. Christensen, 1913, p. 116).

In *Dryopteris orientalis* the dorsiventral dictyostele is different from the structure usual in *Dryopteris*. The affinity with species of *Arthropteris* was discussed, the value of the indusium for generic distinction questioned and the new combination *Arthropteris orientalis* proposed. It is interesting to see, as mentioned above, that Christensen came to the same conclusion, independently, on other grounds.

Neochheiropteris is placed at the end of the list; close to the reticulate veined species of *Polypodium* and its derivatives, where perforations in the stele are of common occurrence.

The genus *Leptochilus* has quite been broken up; the Tectariid components (*Bolbitis* and *Quercifilix*) kept their place near *Stenosemia*, the Polypodioid components (*Leptochilus* and *Christiopteris*) were placed behind *Polypodium*; perforations in the stele are mentioned from both groups. *Leptochilus guianensis* became a *Lomagramma*.

Dipteris also shifted from the *Aspidieae* to a place in the rear; its anatomy has some analogy with that of *Christiopteris* and *Neochheiropteris*, though perforations in the stele are wanting.

From the *Davallieae* *Prosaptia* has now been placed by Christensen in *Polypodium*; this is supported by anatomical facts insofar, that the anatomy does not agree with that of other species of the genus *Davallia*, in which it was included formerly. With *Polypodium* it agrees by its perforated stele; however it seems to me better to consider it as a separate genus, placed near *Polypodium*, and allied with the subgenus *Cryptosorus*.

The internal structure shows also much agreement in the groupe of respectively *Saccoloma* - *Ithycaulon*, *Humata* - *Davalloides*, *Dennstaedtia* - *Leptolepia* and *Stenoloma* - *Lindsaya*; *Taenitis* has been placed in the latter group; its structure, being a dictyostele, differs from that of the other genera; but it fits here better than in its former place, near *Drymoglossum* and *Polypodium*; still better seems to me to place it near *Pteris*, as has been advocated by Goebel; it comes then near *Acrostichum* and *Pteris*, sect. *Lithobrochia*.

The two sections of *Odontosoria*, which differed in anatomy,

are now considered as two distinct genera, *Odontosoria* and *Stenoloma* respectively.

In the *Aspleniinae*, and the *Blechninae*, in which the anatomy was mentioned to be rather homogenous, hardly any alterations have been made.

In the former group of the *Gymnogramminae* a solenostele or a dictyostele transitional to it, is mostly found; the structure of *Monachosorum*, here merged into *Anogramma*, gives no arguments against it being placed here. In this groups, as in the *Cheilanthinæ* no further alterations have been made, except *Plagiogyria* being placed at the beginning of the list; the structure of *Plagiogyria* was quite different from the other genera, which were formerly included in the same group.

In the *Adiantinae* and in the *Pteridinae* no alterations have been made, except *Acrostichum* being placed near *Pteris* and especially near *Litobrochia*; it agrees with the latter group in the structure of the stele, a solenostele with an internal system and anastomosing veins; these characteristics are here of more importance than the place of the sori or sporangia.

In the *Polypodiæ* the former exception of *Taenitis*, has already been mentioned. Further evidence is necessary to prove if some of the free veined *Polypodiums* (*Calymmodon*, *Xiphopteris*, *Cryptosorus*) really belong here; there are some indications that this is not the case. Perforations occur frequently in this group, sometimes even giving a solenostele the appearance of a dictyostele in transverse sections; the place of *Dipteris* is not quite satisfactory yet.

The artificial group of *Acrosticheæ* of which at a former occasion *Stenochlaena*, *Leptochilus*, *Stenosemia* and *Polybotrya* had already been removed, has now ceased to exist. The true position of *Cheiropleuria* is not quite sure; *Platycerium* is perhaps best placed near *Christiopteris* and *Neocheiropteris*; *Elaphoglossum* together with *Rhipidopteris*, is now rather isolated.

From the above mentioned data we see that in many points in the new system, though the study of the anatomy had not much influence on its construction, the anatomical facts are better in accordance with it, than in the former one. We may therefore consider the new system to be an improvement, and the anatomical characters of a great systematical value.

A great number of questions still remain to be answered, for instance, the place in the system of *Hypoderris*; the homogeneity of *Polybotrya*; furthermore, it is interesting to see, though anatomical data are known from 110 of the 171 genera of the

Polypodiaceae, how little or sometimes even nothing is known from some rather big genera, species of which are of common occurrence in many countries. The study of these genera e.g. *Bolbitis*, *Polypodium* sect. *Grammitis*, *Cryptosorus*, *Acrosorus*, *Goniophlebium*, *Lepisorus*, *Selliguea* and of the genus *Cyclophorus* will no doubt give interesting results, not only for the interrelationships of these genera, but also for stelar morphology in general.

From *Tectaria*, *Oleandra* and *Loxogramma* some anatomical details have been mentioned, but these are too incomplete to give a good idea of the structure.

Theoretical discussions on stelar structure has been given by Hayata, (1931); his theory was quite similar to mine, as published in my paper on Stelar Morphology (Posthumus, 1924, p. 111-296; 1931, p. 309-310).

1. *Plagiogyria*

adnata Bedd., Posth., 1924, p. 237.

pycnophylla Mett., Posth., 1924, p. 237; Bower, 1926, p. 278, fig. 544.

semicordata Chr., Posth., 1924, p. 237.

radial dictyostele with relatively short gaps; leaf-trace simple.

2. *Matteuccia*

intermedia C. Chr., Posth., 1924, p. 210.

japonica C. Chr., Hayata, 1928, p. 345; Hayata, 1929 a, p. 52, fig. 14 (*Pentarhizidium japonicum*).

orientalis Trev., Posth., 1924, p. 210; Bower, 1928, p. 154, fig. 679; Hayata, 1927 a, p. 716, fig. (*Pentarhizidium orientale*).

Struthiopteris Tod., Posth., 1924, p. 210; Hayata, 1927 a, p. 716, fig.; Hayata, 1929 a, p. 53, fig. 15, pl. I, fig. 5; Mekel, 1933, p. 661-715, fig. 15-37, pl. 3-7.

radial dictyostele; leaf-trace double; epidermal pockets.

3. *Onoclea*

sensibilis L., Posth., 1924, p. 212.

radial dictyostele; leaf-trace double.

4. *Diacalpe*

aspidioides Bl., Posth., 1924, p. 209; Bower, 1928, p. 105.

radial dictyostele; leaf-trace double.

5. **Peranema**
cyatheoides Don, Posth., 1924, p. 209; Bower, 1928, p. 107, fig. 652; Hayata, 1928, p. 309, fig.; Hayata, 1929a, p. 41, fig. 3, pl. I, fig. 4; (*P. formosana*).
 radial dictyostele; leaf-trace double or with many bundles.
6. **Woodsia**
ilvensis R. Br., Posth., 1924, p. 209.
obtusa Torrey, Posth., 1924, p. 209.
polystichoides Eaton, Posth., 1924, p. 209.
 radial dictyostele; leaf-trace double, simple in the young plant.
7. **Hypoderris**
Brownii J. Sm., Posth., 1924, p. 209; Bower, 1928, p. 105.
 dorsiventral dictyostele; leaf-trace bundles four in number.
8. **Cystopteris**
fragilis Bernhardt, Posth., 1924, p. 210; Bower, 1928, p. 252.
japonica Luerssen; Hayata, 1929a, p. 43, pl. II, fig. 3.
 radial dictyostele, leaf-trace double, simple in the young plant; epidermal pockets.
10. **Acrophorus**
stipellatus Moore, Posth., 1924, p. 210; Hayata, 1928, p. 302, fig.; Hayata, 1929a, p. 42, fig. 4, pl. I, fig. 6.
 radial dictyostele, leaf-trace bundles numerous.
11. **Lithostegia**
foeniculacea Ching, Posth., 1924, p. 214 (*Polystichum foeniculaceum*).
 rhizome short, inclined, with a dorsiventral dictyostele.
12. **Dryopteris**
 Sect. *Lastraea*.
crinata Gray, Posth., 1924, p. 211.
decomposita O. K., Posth., 1924, p. 211.
decursive-pinnata O. K., Posth., 1924, p. 211.
gracilescens O. K., Posth., 1924, p. 212.
hirtipes O. K., Posth., 1924, p. 212.
japonica C. Chr., Posth., 1924, p. 212.

- Miqueliana* C. Chr., Hayata, 1929 a, p. 44, pl. II, fig. 4.
oreopteris Maxon; Bower, 1928, p. 120.
uliginosa Chr., Posth., 1924, p. 212; Hayata, 1929 a,
 p. 49, pl. II, fig. 120 (*D. setigera*).
spinulosa Chr., Posth., 1924, p. 212; Bower, 1928,
 p. 121.
thelypteris Gray, Posth., 1924, p. 212; Bower, 1928,
 p. 120.
tokyoensis C. Chr., Hayata, 1927 a; p. 713, fig.;
 Hayata, 1929 a, p. 39, fig. 1, pl. II, fig. 2.
 radial dictyostele; leaf-trace bundles two or more (*D. uli-*
ginosa).
- Sect. 2. *Gymnocarpium*
Linneana C. Chr., Posth., 1924, p. 213; Bower, 1928,
 p. 120.
phegopteris C. Chr., Posth., 1924, p. 213; Bower, 1928,
 p. 120; Hayata, 1929 a, p. 47, pl. II, fig. 5.
Robertiana C. Chr., Posth., 1924, p. 213.
 rhizome creeping, thin, with long internodes; radial dictyostele
 with long and narrow gaps; leaf-trace double.
- Sect. 4. *Cyclosorus*
gongylodes O. K., Posth., 1924, p. 213.
sophoroides O. K., Posth., 1924, p. 213.
 rhizome creeping, with long internodes; radial dictyostele;
 leaf-trace double.
- Sect. 5. *Leptogramma*
africana C. Chr., Posth., 1924, p. 213.
 rhizome creeping, with a radial dictyostele with double leaf-
 trace.
- Sect. 8. *Meniscium*
triphylla C. Chr., Posth., 1924, p. 214.
 rhizome creeping, with a radial dictyostele; leaf-trace double.
- Sect. 9. *Eudryopteris*
filix Mas Schott, Posth., 1924, p. 212; Bower, 1928
 p. 121.
 radial dictyostele; leaf-trace bundles numerous.
- Sect. 10. *Hypodematium*.
crenata O. K.; Hayata, 1927 a, p. 715, fig. (*Hypodema-*
tium crenatum).

dictyostele; leaf-trace bundles numerous.

Sect. 13. *Polystichopsis*

Standishii C. Chr., Posth., 1924, p. 215 (*Polystichum Standishii*).

varia O. K., Posth., 1924, p. 215 (*Polystichum varium*).
radial dictyostele; leaf-trace double.

13. *Monachosorella*

flagellaris Hayata; Hayata 1929 a, p. 50, fig. 10, pl. II, fig. 100.

Maximowiczii Hayata; Hayata 1927 c, p. 572, fig.; 1927 b, p. 642-648, fig.; Hayata, 1929 a, p. 44, fig. 6.
a radial dictyostele; leaf-trace double.

23. *Didymochlaena*

truncatula, J. Sm., Posth., 1924, p. 214.
radial dictyostele; 4 leaf-trace bundles.

25. *Polystichum*

aculeatum Schott, Posth., 1924, p. 214; Bower, 1928, p. 121; Hayata 1929 a, p. 47, pl. II, fig. 9.
rhizome erect; radial dictyostele; 3 leaf-trace bundles.

adiantiforme J. Sm., Posth., 1924, p. 214.
rhizome creeping, with a dorsiventral dictyostele; leaf-trace bundles numerous.

aristatum Pr., Posth., 1924, p. 214.

tripteron Presl; Hayata 1927 a, p. 708, fig.; Hayata, 1929 a, p. 45, fig. 7, pl. II, fig. 7 (*Ptilopteris triptera*).
rhizome creeping; dictyostele; leaf-trace bundles numerous.

auriculatum Presl, Hayata, 1927 b, p. 571, fig.

lepidocaulon J. Sm., Posth., 1924, p. 215.

lobatum Pr., Posth. 1924, p. 215.

radial dictyostele, leaf-trace bundles 2 or 3

craspedosorum Diels; Hayata, 1927, p. 709, fig. (*Ptilopteris craspedosora*).

lonchitis Roth, Posth., 1924, p. 215; Bower, 1928, p. 121.

radial dictyostele; leaf-trace bundles 2 or more.

27. *Cyrtomium*

falcatum Pr., Posth., 1924, p. 215; Hayata, 1927 a, p. 709, fig.; Hayata, 1929 a, p. 47, fig. 8, pl. II, fig. 11.

radial dictyostele; leaf-trace bundles 2, 3 or more.

30. **Polybotrya**

cervina Klf., Posth., 1924, p. 215; Zschiesche, 1929, p. 480.

osmundacea H. B. Willd.; Zschiesche, 1929, p. 478, fig. 15.

serratifolia Klotzch, Posth., 1924, p. 215; Fée 1850—1852, p. 50 (*Soromanes serratifolium*).

rhizome creeping; a radial dictyostele; leaf-trace simple or divided or with many anastomosing bundles (*P. cervina*).

33. **Tectaria**

chattagramica Ching; Landmann, 1931, p. 410 (*D. chattagramica*).

irregularis Copeland; Landmann, 1931, p. 408 (*Dictyopteris irregularis*; *D. pteroides*).

macrodongta C. Chr.; Landmann, 1931, p. 408 (*Dictyopteris macrodongta*).

Moorei C. Chr.; Bower 1928, p. 258 (*Deparia Moorei*).

tenerifrons Ching; Landmann, 1931, p. 410 (*Dictyopteris tenerifrons*).

a radial dictyostele; leaf-trace bundles 3 or more.

36. **Hemigramma**

latifolia Copeland; Zschiesche, 1929, p. 502, fig. 31 h. (*Hemionitis Zollingeri*).

radial dictyostele; leaf-trace simple.

37. **Quercifilix**

zeylanica Copel., Posth., 1924, p. 216 (*Leptochilus zeylanicus*).

rhizome creeping, with a dictyostele approaching a solenostele; leaf-trace double.

38. **Stenosemia**

aurita Pr., Posth., 1924, p. 216.

rhizome erect, with a dictyostele; leaf-trace bundles 5 in number.

39. **Bolbitis**

aliena Alston, Posth., 1924, p. 216 (*Leptochilus alienus*).

heteroclita Ching, Posth., 1924, p. 217 (*L. heteroclitus* C. Chr.).

nicotianifolia Ching, Posth., 1924, p. 216 (*L. nicotianifolius* C. Chr.).

- Quoyana* Ching, Posth., 1924, p. 217 (*L. cuspidata* C. Chr.).
rhizome creeping, with a dorsiventral dictyostele, the lower part developed as a gutter shaped strand, sometimes with perforations (*B. Quoyana*); leaf-gaps about 2 internodes long; leaf-trace bundles numerous (or about 7: *B. Quoyana*).
40. **Egenolfia**
appendiculata J. Smith; Zschiesche, 1929, p. 484.
a solenostele.
41. **Oleandra**
articulata Pr.; Zschiesche, 1929, p. 468, fig. 4 c, d.
neriiformis Cav.; Zschiesche, 1929, p. 468.
a radial dictyostele; leaf-trace bundles 3 in number.
42. **Arthropteris**
altescandens J. Sm., Posth., 1924, p. 218.
obliterata J. Sm., Posth., 1924, p. 218.
orientalis Posth., 1924, p. 218.
tenella J. Sm., Posth., 1924, p. 218.
rhizome creeping, with a dorsiventral dictyostele; leaf-trace double.
44. **Nephrolepis**
acutifolia Desv., Posth., 1924, p. 218.
biserrata Schott; Chase, 1932, p. 270, fig. A-D.
cordifolia Presl, Posth., 1924, p. 218.
rhizome with a radial dictyostele; leaf-trace bundles numerous.
46. **Saccoloma**
elegans Klff., Posth., 1924, p. 219; Bower, 1926, p. 270, fig. 538.
rhizome with a radial solenostele, with a system of internal strands.
47. **Ormoloma**
Imrayanum Maxon; Arbelaez, 1928, p. 78, fig. 33.
(*Lindsaya Imrayana*).
48. **Ithycaulon**
domingense C. Chr., Posth., 1924, p. 219 (*Saccoloma domingense*).
inaequale Copel., Posth., 1924, p. 219. (*S. inaequale*).
rhizome creeping, with a radial solenostele, with one or more internal strands; leaf-trace simple.

50. **Humata**

heterophylla Desv., Posth., 1924, p. 218; Arbelaez, 1928, p. 44, fig. 16 k.

parvula Mett., Posth., 1924, p. 221. (*Davallia parvula*).

repens Diels, Posth., 1924, p. 208.

vestita Moore; Arbelaez, 1928, p. 44, fig. 18 (*H. bipinnatifida*).

rhizome long, creeping, with a dorsiventral dictyostele; leaf trace bundles numerous, anastomosing.

51. **Leucostegia**

immersa Pr., Posth., 1924, p. 221 (*Davallia immersa*); Arbelaez, 1928, p. 49, fig. 18 b, fig. 19.

pallida Copeland, Arbelaez, 1928, p. 53, fig. 22 f. 9. rhizome with a solenostele and with cortical strands.

51a. **Araiostegia**

hymenophylloides Copel.; Arbelaez, 1928, p. 46, fig. 17 c (*Humata affinis*).

pulchra Copel., Posth., 1924, p. 221 (*Davallia pulchra*). rhizome creeping, with a dorsiventral dictyostele; leaf trace bundles 2 or numerous.

52. **Davallia**

bullata Wallich, Posth., 1924, p. 220.

canariensis J. Sm., Posth., 1924, p. 220.

divaricata Bl., Posth., 1924, p. 220.

Marieši Moore, Posth., 1924, p. 220.

pyxidata Cavan., Posth., 1924, p. 221.

solida Sw., Arbelaez, 1928, p. 18, fig. 1 f. (*D. fejeensis*).

trichomanoides Bl., Posth., 1924, p. 220; Arbelaez 1928, p. 18, fig. 1 a, b, c, e. (*D. dissecta*).

rhizome creeping, the leaves in 2 rows; dorsiventral dictyostele; leaf-trace bundles two, or two with some smaller strands, or numerous.

53. **Scyphularia**

pentaphylla Fée, Posth., 1924, p. 220 (*Davallia pentaphylla*).

rhizome creeping, with long internodes, with a dictyostele.

55. **Davallodes**

hirsutum Copel.; Arbelaez, 1928, p. 26, fig. 5, e fig. 6 (*Davallia hirsuta*).

dorsiventral dictyostele; leaf trace bundles numerous.

57. *Dennstaedtia*

- adiantoides* Moore, Posth., 1924, p. 223; Bower, 1926, p. 69, fig. 536 B; Arbelaez, 1928, p. 68, fig. 27 bcd.
consanguinea Moore, Posth., 1924, p. 224.
cornuta Mett., Posth., 1924, p. 224.
davallioides Moore, Posth., 1924, p. 224.
dissecta Moore; Bower, 1926, p. 269, fig. 537.
ordinata Moore, Posth., 1924, p. 224.
punctilobula Moore, Posth., 1924, p. 224; Bower, 1926, p. 269, fig. 536 A.
rubiginosa Moore, Posth., 1924; Bower, 1926, p. 269, fig. 536 C.
rufescens Moore, Posth., 1924, p. 224.
scabra Moore, Posth., 1924, p. 225.
 rhizome creeping, with a dorsiventral solenostele; in some American species (*D. cornuta*, *D. dissecta*, *D. rubiginosa*, *D. rufescens* with an internal system); leaf-trace simple.

58. *Microlepia*

- hirta* Pr., Posth., 1924, p. 221.
marginata C. Chr., Posth., 1924, p. 221; Arbelaez, 1928, p. 74, fig. 31 h-l. (*M. marginalis*).
pilosella Moore, Posth., 1924, p. 222.
platyphylla J. Sm., Posth., 1924, p. 222.
speluncae Moore, Posth., 1924, p. 222.
strigosa Pr., Posth., 1924, p. 222.
trichosticha J. Sm., Posth., 1924, p. 222.
Wilfordi Moore, Posth., 1924, p. 222.
 rhizome creeping, with long internodes; dorsiventral solenostele; leaf-trace simple, facing the medial plane.

59. *Leptolepia*

- Novae-Zelandias* Kuhn, Posth., 1924, p. 219; Bower, p. 13; Arbelaez, 1928, p. 72, fig. 26, l-p.
 rhizome creeping, with a dorsiventral solenostele; leaf-trace simple.

61. *Stenoloma*

- chusanum* Ching, Posth., 1924, p. 222 (*Odontosoria chinensis*); Arbelaez, 1928, p. 56, fig. 24, 9 (*Lindsaya chinensis*).
clavatum Fée, Posth., 1924, p. 223 (*Odontosoria clavata*); Bower, 1928, p. 31, fig. 600 bis I (*Lindsaya clavata*).
retusum Fée, Posth., 1924, p. 223; Bower, 1928, p. 31,

figa 600 bis V (*Odontosoria retusa*).

rhizome creeping, with a *Lindsaya* stele or a solenostele;
leaf-trace simple.

62. **Odontosoria**

aculeata J. Sm., Posth., 1924, p. 223; Bower, p. 29, 31,
fig. 495 a, fig. 600 bis III.

fumarioides J. Sm., Posth., 1924, p. 223; Bower, 1928,
p. 29, 31, fig. 600 bis IV.

rhizome creeping, with a solenostele, leaf-trace simple.

63. **Tapeinidium**

Brooksii C. Christensen; Copeland, 1920, p. 283
Protolindsaya Brooksii).

moluccanum C. Chr.; Arbelaez, 1928, p. 65, fig. 26
h. c. (*Wibelia amboynensis*).

pinnatum C. Chr., Posth., 1924, p. 223; Bower, 1928,
p. 24, fig. 594 B; Arbelaez, 1928, p. 65.

rhizome creeping, with a *Lindsaya* stele, transitional to a
solenostele; leaf-trace simple.

64. **Schizoloma**

ensifolium J. Sm.; Arbelaez, 1928, p. 78, fig. 33. i. m.
Lindsaya stele.

65. **Taenitis**

blechnoides Sw., Posth., 1924, p. 243; Goebel, 1926,
p. 139; Bower, 1928, p. 256.

a radial, dictyostele, transitional to a solenostele.

67. **Lindsaya**

Blumeana Kuhn, Posth., 1924, p. 226.

cuneata C. Chr., Posth., 1924, p. 226.

cultrata Sw., Posth., 1924, p. 225.

decomposita Willd., Posth., 1924, p. 226.

guianensis Dr., Posth., 1924, p. 225.

hymenophylloides Bl., Posth., 1924, p. 226.

lancea Bedd., Posth., 1924, p. 225; Bower, 1928, p.
31, fig. 600 bis III (*Lindsaya trapeziformis*).

linearis Sw., Posth., 1924, p. 226; Bower, 1928, p. 31,
fig. 600.

microphylla Sw., Posth., 1924, p. 226.

orbiculata Mett., Posth., 1924, p. 226.

parkeri Kuhn, Posth., 1924, p. 226.

reniformis Dr., Posth., 1924, p. 226.

repens Bedd., Posth., 1924, p. 226.

- rigida* J. Sm., Posth., p. 226; Arbelaez, 1918, p. 54, fig. 23.
rhizome creeping, with a Lindsaya stele.
68. **Athyrium**
alpestre Rylands, Posth., 1924, p. 227.
filix femina Roth, Posth., 1924, p. 227.
nipponicum Hance, Posth., 1924, p. 227.
yokoscense Chr., Posth., 1924, p. 227.
rhizome with a radial dictyostele; leaf-trace simple.
69. **Diplazium**
celtidifolium Kze, Posth., 1924, p. 228.
esculentum Sw., Posth., 1924, p. 228; Ogura, 1927, p. 172-180, 4 fig.
japonicum Bedd., Posth., 1924, p. 228.
marginatum Diels, Bower, 1928, p. 140, fig. 670 a.
proliferum Thouars, Posth., 1924, p. 228.
Pullingeri J. Sm., Hayata, 1928, p. 343, fig. (*Monome-langium Hancockii*).
striatum Pr., Posth., 1924, p. 228.
Wichurae Diels, Posth., 1924, p. 228.
radical dictyostele; in *D. esculentum* with internal strands; leaf-trace double.
70. **Diplaziopsis**
javanica C. Christensen; Landmann, 1931, p. 421.
radial dictyostele; leaf-trace double.
71. **Diplora**
longifolia C. Christensen; Landmann, 1931, p. 415, fig. 25 c.
schizocarpa C. Christensen; Landmann, 1931, p. 417 (*Phyllites schizocarpa*).
d'Urvillei C. Christensen; Landmann, 1931, p. 415, 419 (*Triplebia linzae*; *Diplora integrifolia*).
solenostele or dictyostele transitional to it.
72. **Phyllitis**
scolopendrium Newmann, Posth., p. 228; Hayata, 1927 a, p. 710; fig.; Hayata, 1929 a, p. 51, fig. 12, pl. II, fig. 8.
a radial dictyostele, with relatively short gaps; leaf-trace double.

73. *Camptosorus*

sibericus Ruprecht, Hayata, 1927 a, p. 711, fig.
radial dictyostele; leaf-trace simple.

74. *Asplenium*Sect. 1. *Thamnopteris*

cardiophyllum Baker, Hayata, 1927, p. 710, fig.; Hayata, 1928, p. 336, fig.; Hayata, 1929 a, p. 50, fig. 11, pl. II, fig. 6 (*Boniniella Ikenoi*).

nidus L., Posth., 1924, p. 228; Hayata, 1927 a, p. 713, fig. (*Neottopteris Nidus*).
dictyostele; leaf-trace double.

Sect. 2. *Acropteris*

germanicum Weiss, Posth., 1924, p. 229.

ruta muraria L., Posth., 1924, p. 229.

septentrionale Hoffm., Hayata, 1928, p. 335, fig. (*Ameisium Sasakei*).

radial dictyostele; leaf-trace simple.

Sect. 4. *Euasplenium*

Adiantum nigrum L., Posth., 1924, p. 229.

alatum H. B. Willd., Posth., 1924, p. 229; Bower 1928, p. 140, fig. 671 b.

incisum Thbg., Posth., 1924, p. 229.

fontanum Bernh., Posth., 1924, p. 229.

obtusatum Forst., Posth., 1924, p. 229.

trichomanes L., Posth., 1924, p. 229.

radial dictyostele; leaf-trace double.

bulbiferum Forst., Posth., 1924, p. 229.

radial dictyostele; leaf-trace bundles numerous.

obtusifolium L., Posth., 1924, p. 229.

unilaterale Lam., Posth., 1924, p. 229; Hayata, 1927 a, p. 712, fig. (*Hymnasplenium unilaterale*).

rhizome creeping, with a dorsiventral dictyostele, transitional to a solenostele; leaf-trace bundles numerous.

viride Hudson, Posth., 1924, p. 229.

Sect. 5. *Caenopteris*

fragrans Sw., Posth., 1924, p. 230.

tenerum Forst., Posth., 1924, p. 230.

radial dictyostele; leaf-trace double.

scandens J. Sm., Posth., 1924, p. 230.

dictyostele, transitional to a solenostele.

76. *Diellia*

erecta Brack.; Arbelaez, 1928, p. 42, fig. 14 c.

falcata Hk., Bower, 1928, p. 27.

radial dictyostele, transitional to a solenostele; leaf-trace double.

78. *Ceterach*

officinarum DC., Posth., 1924, p. 230.

radial dictyostele; leaf-trace double.

81. *Blechnum*Sect. 1. *Eublechnum*

brasiliense Desv., Posth., 1924, p. 230.

plagiogyrifrons Hayata; Hayata 1927, p. 704, fig. (*Diploblechnum plagiogyrifrons*).

radial dictyostele with long narrow gaps; leaf-trace bundles two or four in number.

Sect. 2. *Lomaria*

attenuatum Mett., Posth., 1924, p. 230.

capense Schlecht., Posth., 1924, p. 231.

discolor Keys., Posth., 1924, p. 231.

filiforme Ettingsh., Posth., 1924, p. 231.

integripinnulum Hayata; Hayata 1927 a, p. 704, fig. (*Diploblechnum integripinnulum*).

nipponicum Hayata; Hayata, 1927 a, p. 701, fig. (*Spicanta nipponica*).

Patersoni Mett., Posth., 1924, p. 231.

penna-marina Kuhn., Posth., 1924, p. 231.

punctulatum Sw. var. *Krebsi* Kze., Posth., 1924, p. 231.

spicant Withering, Posth., 1924, p. 231.

tabulare Kuhn, Posth., 1924, p. 231; Bower 1928, p. 166, fig. 689.

radial dictyostele; leaf-trace bundles usually 2, sometimes 5 (*B. tabulare*) or many (*B. capense*, *B. integripinnulum*).

82. *Sadleria*

cyatheoides Klf.; Ogura, 1930, p. 475, fig. 6.

radial dictyostele; leaf-trace bundles numerous.

83. *Brainea*

insignis J. Sm., Posth., 1924, p. 231; Hayata, 1928, p. 338—340, fig.; Hayata, 1929 a, p. 57, fig. 17, pl. I, fig. 2. (incl. *B. formosana*).

radial dictyostele; leaf-trace bundles 2, 4, or more.

84. **Woodwardia**
radicans Sm., Posth., 1924, p. 232.
 radial dictyostele, leaf-trace bundles 2 or more.
85. **Doodia**
aspera R. Br., Posth., 1924, p. 232.
maxima J. Sm., Posth., 1924, p. 232.
 radial dictyostele; leaf-trace double.
86. **Stenochlaena**
tenuifolia Moore, Posth., 1924, p. 232.
 dorsiventral perforated dictyostele with accessory cortical bundles.
- 86a. **Lomariopsis**
sorbifolia Fée, Posth., 1924, p. 232; Bower, 1928, p. 177, fig. 698 (*Stenochlaena sorbifolia*).
 radial dictyostele; leaf-trace bundles 4—6.
89. **Lomagramma**
guianensis Ching, Posth., 1924, p. 217 (*Leptochilus guianensis*).
 a dorsiventral dictyostele; leaf-trace bundles numerous.
91. **Syngamma**
alismaefolia J. Sm.; Landmann, 1931, p. 372.
cartilagidens Diels; Landmann, 1931, p. 372.
 solenostele.
92. **Craspedodictyum**
quinatum Copeland; Landmann, 1931, p. 372 (*Syngamma quinata*).
 solenostele.
93. **Anogramma**
subdigitatum Posth., 1924, p. 225; Hayata, 1927 b, p. 571, fig.; Hayata, 1928, p. 304, fig.; Hayata, 1929 a, p. 47, fig. 9, pl. I. fig. 3. (*Monachosorum subdigitatum*).
 according to Mettenius with a creeping rhizome, with a solenostele and an internal strand; according to Bower with a rhizome with short internodes, and a radial dictyostele; leaf-trace double; according to Hayata with a dictyostele, transitional to a solenostele; leaf-trace double.
94. **Pityrogramma**
Calomelanos Link, Posth., 1924, p. 233; Landmann,

- 1931, p. 361 (*Ceropteris calomelanos*).
peruviana Maxon; Landmann, 1931, p. 361 (*Ceropteris peruviana*).
tartarea Maxon; Landmann, 1931, p. 361 (*Ceropteris tartarea*).
triangularis Maxon see *Notochlaena triangularis* Landmann.
- radial dictyostele, transitional to a solenostele, or a solenostele; leaf-trace double or simple.
95. **Trismeria**
trifoliata Diels, Posth., 1924, p. 234; Landmann, 1931, p. 377.
 solenostele; leaf-trace double or simple.
98. **Jamesonia**
imbricata Hk. et Grev., Posth., 1924, p. 233.
scalaris Kze., Posth., 1924, p. 233.
 solenostele; leaf-trace simple.
99. **Hemionitis**
palmata L. Posth., 1924, p. 233; Zschiesche, 1929, p. 496, fig. 27.
 radial dictyostele, transitional to solenostele; leaf-trace simple.
101. **Gymnopteris**
rufa Schrader; Landmann, 1931, p. 365.
vestita Und., Posth., 1924, p. 233.
 dorsiventral dictyostele, transitional to a solenostele, or a solenostele (*G. rufa*).
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103. **Aspleniopsis**
decipiens Mett.; Landmann, 1931, p. 375.
 solenostele; leaf-trace bundles 2, uniting near the base.
104. **Coniogramme**
fraxinea Diels, Posth., 1924, p. 233; Hayata, 1927 a, p. 699, fig.; Landmann, 1931, p. 363.
japonica Diels, Posth., 1924, p. 233; Hayata, 1927 a, p. 700, fig.; Hayata, 1929 a, p. 40, fig. 2; Landmann, 1931, p. 364.
 a radial dictyostele, in *C. japonica* with perforations; leaf-trace double or simple at the base.
105. **Pellaea**
 Sect. 1. *Platyloma*
falcata Fée, Posth., 1924, p. 234.

- rotundifolia* Hk., Posth., 1924, p. 234; Bower, 1928, p. 83, fig. 637.
dorsiventral solenosteles, transitional to a dictyostele; leaf-trace simple.
- Sect. 2. *Eupellaea*
andromedifolia Fée, Posth., 1924, p. 235.
atropurpurea Link, Posth., 1924, p. 235.
cordata J. Sm., Posth., 1924, p. 235.
dorsiventral dictyostele; leaf-trace simple.
106. *Doryopteris*
ludens J. Sm., Posth., 1924, p. 235; Bower, 1928, p. 85
solenosteles; leaf-trace simple.
109. *Notholaena*
ferruginea Hk., Posth., 1924, p. 235.
Marantae R. Br., Posth., 1924, p. 235.
sinuata Klf., Posth., 1924, p. 235.
triangularis Landmann; Landmann, 1931, p. 375.
trichomanoides R. Br., Posth., 1924, p. 235.
dorsiventral dictyostele, transitional to a solenostele, or a solenostele; leaf-trace simple.
110. *Cheilanthes*
Sect. 1. *Eucheilanthes*
microphylla Sw., Posth., 1924, p. 235.
dorsiventral solenostele, transitional to a dictyostele; leaf-trace simple.
- Sect. 3. *Physapteris*.
Féei Moore., Posth., 1924, p. 235.
Fendleri Hk., Posth., 1924, p. 235.
gracillima Eaton, Posth., 1924, p. 236.
lendigera Sw., Posth., 1924, p. 236.
a dorsiventral dictyostele, transitional to a solenostele; leaf-trace simple.
persica Mett., Posth., 1924, p. 236.
a radial dictyostele; leaf-trace simple.
- Sect. 4. *Hypolepidopsis*
Bergiana Schlecht., Posth., 1924, p. 236 (*Hypolepis Bergiana*).
a dictyostele; leaf-trace double.

113. *Hypolepis*

distans Hk., Posth., 1924, p. 236.

millefolium Hk., Posth., 1924, p. 236.

punctata Mett., Posth., 1924, p. 236; Hayata, 1927 a, p. 717; Hayata, 1929 a, p. 43, fig. 5.

repens Pr., Posth., 1924, p. 236; Bower, 1928, p. 91, fig. 583.

tenuifolia Bernh., Posth., 1924, p. 236.

a dorsiventral solenostele; leaf-trace simple, double in *H. punctata*.

114. *Llavea*

cordifolia Lag., Posth., 1924, p. 236; Bower, 1928, p. 65.

solenostele, leaf-trace simple.

118. *Adiantum*Sect. 1. *Euadiantum*

macrophyllum Sw., Posth., 1924, p. 237.

monochlamys Eaton, 1924, p. 237.

peruvianum Klotzsch, Posth., 1924, p. 238.

petiolatum Desv., Posth., 1924, p. 238.

trapeziforme L., Posth., 1924, p. 238.

a dorsiventral solenostele, transitional to a dictyostele; leaf-trace simple or double (*A. macrophyllum*).

philippense L., Posth., 1924, p. 237 (*A. lunulatum*).

radial dictyostele, transitional to a solenostele; leaf-trace simple.

Sect. 2. *Adiantellum*

patens Willd., Posth., 1924, p. 238.

pedatum Linn., Posth., 1924, p. 238.

Farleyense Moore, Posth., 1924, p. 239.

a dorsiventral solenostele.

aethiopicum L., Posth., 1924, p. 238.

neoguineense Moore, Posth., 1924, p. 238.

gracillima Moore, Posth., 1924, p. 238.

a radial dictyostele; leaf-trace double or simple (*A. aethiopicum*).

121. *Anopteris*

hexagona C. Chr., Posth., 1924, p. 239.

radial dictyostele, transitional to a solenostele.

123. *Pteris*Sect. 1. *Eupteris*

arguta Ait., Posth., 1924, p. 239.

cretica L., Posth., 1924, p. 239.

dentata Forst., Posth., 1924, p. 239.

longifolia L., Posth., 1924, p. 239.

pellucida Pr., Posth., 1924, p. 239.

tremula R. Br., Posth., 1924, p. 239.

umbrosa R. Br., Posth., 1924, p. 239.

a radial solenosteles or a dictyostele transitional to a solenosteles; leaf-trace simple or double (*P. umbrosa*).

Sect. 1a. *Campteria*

biaurita L., Posth., 1924, p. 240.

radial solenosteles; leaf-trace simple.

Sect. 2. *Heterophlebium*

grandifolia L., Posth., 1924, p. 240; Bower, 1928, p. 52.
solenosteles; leaf-trace simple.

Sect. 3. *Lithobrochia*

gigantea Willd., Posth., 1924, p. 240.

Kunzeana Ag., Posth., 1924, p. 240; Bower, 1928,
p. 53, fig. 617.

orizabae Mart. et Gal., Posth., 1924, p. 240.

podbphylla Sw., Posth., 1924, p. 240; Bower, 1928,
p. 53, fig. 618.

a radial solenosteles; in mature stems with an internal system;
leaf-trace simple.

127. *Acrostichum*

aureum L., Posth., 1924, p. 247; Bower, 1928, p. 58,
fig. 628.

a radial solenosteles with an internal system.

129. *Lonchitis*Sect. 1. *Eulonchitis*

aurita L., Posth., 1924, p. 241; Bower, 1928, p. 46.

hirsuta L., Posth., 1924, p. 241; Bower, 1928, p. 46.

radial solenosteles, in *L. hirsuta* with some perforations;
leaf-trace double.

130. *Histiopteris*

incisa J. Sm., Posth., 1924, p. 240; Bower, 1928, p. 48,
fig. 613.

a dorsiventral solenosteles; leaf-trace simple.

131. *Pteridium*

aquilinum Kuhn, Posth., 1924, p. 241; Bower, 1928, p. 34, fig. 607.

a perforated dictyostele with a internal system; leaf-trace bundles numerous.

132. *Paesia*

scaberula Kuhn, Posth., 1924, p. 242.

viscosa St. Hil., Posth., 1924, p. 242.

a dorsiventral solenostele; leaf-trace simple.

133. *Monogramma*

graminea Schkuhr; Williams, 1927, p. 187, fig. 12.

a dorsiventral guttershaped strand; leaf-trace simple, given off alternately at both sides.

134. *Vaginularia*

paradoxa Fée; Williams, 1927, p. 184 (*Monogramma paradoxa*).

trichoidea Fée; Williams, 1927, p. 185 (*Monogramma trichoidea*).

a dorsiventral guttershaped strand; leaf-trace simple, given off alternately from both sides; this structure, as in *Monogramma*, may be considered as a *Vittaria* stele, with the upper strand absent by reduction.

135. *Vittaria*

elongata Sw., Posth., 1924, p. 242; Williams, 1927, p. 178, fig. 5, 6.

the xylem as in a dorsiventral solenostele or dictyostele; the endodermis is often not decurrent through the leaf-trace.

lineata Sm., Posth., 1924, p. 242; Williams, 1927, p. 242.

a dorsiventral dictyostele, transitional to a solenostele; leaf-trace double.

stipitata Kze; Posth., 1924, p. 242.

a dictyostele transitional to a solenostele; endodermis decurrent through the leaf-gaps, but not continuous; leaf-trace double.

136. *Ananthacorus*

angustifolia Underwood et Maxon; Williams, 1927, p. 180. (*Vittaria angustifolia*).

a dorsiventral dictyostele.

137. *Hecistopteris*

pumila J. Sm.; Williams, 1927, p. 201, fig. 24.

The structure seems to be of the same type as in *Monogramme graminea*.

138. *Anthrophyum*

brasilianum C. Chr.; Williams, 1927, p. 200.

lanceolatum Klf.; Williams, 1927, p. 199.

lineatum Klf.; Williams, 1927, p. 198; Bower, 1928, p. 241, fig. 741 A.

plantagineum Klf., Posth., 1924, p. 243; Williams, 1927, p. 194, fig. 18; Bower, 1928, p. 241.

reticulatum Klf., Posth., 1924, p. 243; Williams, 1927, p. 189, fig. 13.

semicostatum Bl., Posth., 1924, p. 243.

a dorsiventral solenostele, more or less reduced, or a dictyostele. (*A. brasilianum*, *A. plantagineum*); endodermis sometimes not penetrating into the stele (*A. plantagineum*); leaf-trace simple or double (*A. semicostatum*).

139. *Anetium*

citriifolium Kunze; Williams, 1927, p. 202, fig. 27—29, pl. 3, fig. B—E; Bower, 1928, p. 244, fig. 741 b.

a creeping rhizome with a dorsiventral dictyostele with perforations; leaf-trace double.

140. *Cochlidium*

seminudum Maxon; Goebel, 1924, p. 123, fig. 10 XIII (*Pleurogramma seminuda*).

The occurrence of a protostele is mentioned; this structure is perhaps similar to that in *Monogramma* and *Vaginularia*.

144. *Polypodium*

Subgenus 1. *Grammitis*

caespitosum Mett., Posth., 1924, p. 244.

a dorsiventral dictyostele, the lower part perforated; leaf-trace bundles numerous.

Subgenus 2. *Eupolypodium*

Okuboi Yatabe; Hayata 1928, p. 303, fig.; p. 341, fig.; Hayata, 1929 a, p. 55, fig. 15 B (*Micropolypodium pseudotrichomanoides*).

a solenostele with a simple leaf-trace.

paradisae Langsd. et Fischer, Posth., 1924, p. 244.

vulgare L., Posth., 1924, p. 244.

a dorsiventral dictyostele, the lower part perforated; leaf-trace bundles numerous.

Subgenus 7. *Goniophlebium*

fraxinifolium Jacq., Posth., 1924, p. 244.

latipes Langsd. et Fisch., Posth., 1924, p. 244.

loriceum L., Posth., 1924, p. 244.

a dorsiventral dictyostele, the lower part with perforations; leaf-trace bundles numerous.

Subgenus 8. *Phlebodium*

aureum L., Posth., 1924, p. 245.

a dorsiventral dictyostele, the lower part with perforations; leaf-trace bundles numerous.

Subgenus 9. *Campyloneuron*

angustifolium Sw., Posth., 1924, p. 245.

decurrens Raddi, Posth., 1924, p. 245.

a dorsiventral dictyostele, the lower part with perforations; leaf-trace double.

Subgenus 10. *Marginaria*

ciliatum Willd., Posth., 1924, p. 245.

piloselloides L., Posth., 1924, p. 245.

tectum Klf., Posth., 1924, p. 245.

a dorsiventral dictyostele, the lower part with perforations; leaf-trace double.

Subgenus 11. *Pleopeltis*

fuscipunctatum Hooker; Landmann, 1931, p. 393 (*Pleopeltis fuscipunctata*).

lycopodioides Linn., Landmann, 1931, p. 393 (*Pleopeltis lycopodioides*).

percussum Cavan., Posth., 1924, p. 246; Landmann, 1931, p. 390 (*Pleopeltis percussa*).

persicariaefolium Schrad., Posth., 1924, p. 246.

squamulosum Klf., Posth., 1924, p. 246.

Swartzii Baker; Landmann, 1931, p. 393 (*Pleopeltis Schwartzii*).

a dorsiventral dictyostele, the lower part with perforations; leaf-trace bundles 2 or more.

Subgenus 14. *Microsorium*

accedens Blume; Landmann, 1931, p. 397 (*Pleopeltis accedens*).

Buergerianum Miquel; Landmann, 1931, p. 399 (*Pleopeltis Buergeriana*).

damunense Rosenstock; Landmann, 1931, p. 397 (*Pleopeltis damunense*).

drymoglossoides Baker; Landmann, 1931, p. 397 (*Pleopeltis drymoglossoides*).

musifolium Bl., Posth., 1924, p. 245.

pteropus Bl., Ernst, 1908, p. 118-121, pl. 14, fig. 6.

punctatum Sw., Posth., 1924, p. 246.

subhastatum Baker; Landmann, 1931, p. 399 (*Pleopeltis hederacea*).

subrostratum C. Christensen; Landmann; 1931, p. 397 (*Pleopeltis rostrata*).

a dorsiventral dictyosteale, the lower part with perforations; leaf-trace bundles numerous.

Subgenus 16. *Colysis*

hemionitideum Wallich; Landmann, 1931, p. 382 (*Selliguea hemionitidea*).

digitatum C. Christensen; Landmann, 1931, p. 386 (*Selliguea digitata*).

a dictyosteale.

Subgenus 17. *Selliguea*

Feei Mett.; Landmann, 1931, p. 379, fig. 9 (*Selliguea Feei*, *S. caudiformis*).

Mettenianum Cesati; Landmann, 1931, p. 381 (*Selliguea heterocarpa*).

pedunculatum Mett.; Landmann, 1931, p. 383 (*Selliguea pedunculata*).

Wrightii Mett.; Landmann, 1931, p. 383 (*Selliguea Wrightii*).

a dictyosteale.

Subgenus 18. *Myrmecophylla*

sinuosum Wal., Posth., 1924, p. 246.

a dorsiventral dictyosteale, the lower part with perforations; leaf-trace bundles numerous.

144a. *Calymmodon*

cucullatus Pr., Hayata, 1929 a, p. 57 (*Polypodium cucullatum*).

a dictyosteale; leaf-trace simple.

144b. *Prosaptia*

alata Chr., Posth., 1924, p. 219 (*Davallia alata*).

contigua Pr., Posth., 1924, p. 220; Bower, 1928, p. 17; Arbelaez, 1928, p. 76, fig. 32 h. (*D. contigua*).

radial dictyosteale, transitional to a solenosteale, with perforations; leaf-trace double.

149. *Loxogramma*
avenia Presl; Landmann, 1931, p. 402, 405 (*L. Blumeana*).
grammitoides C. Christensen; Landmann, 1931, p. 402 (*L. spatulata*).
involuta Presl; Landmann, 1931, p. 402.
lanceolata Presl; Landmann, 1931, p. 402.
malayana Copeland; Landmann, 1931, p. 402.
parallela Copeland; Landmann, 1931, p. 402.
mexicana Landmann; Landmann, 1931, p. 402.
perakense V. A. v. Rosenburgh; Landmann, 1931, p. 402.
Raciborskii C. Chr.; Landmann, 1931, p. 402.
dictyostele; leaf-trace bundles 2-4 in number.
152. *Hymenolepis*
revoluta Bl.; Bower, 1928, p. 222 (*H. spicata*).
dictyostele; leaf-trace bundles numerous.
153. *Leptochilus*
axillaris Klff., Posth., 1924, p. 216.
decurrens Bl., Posth., 1924, p. 216.
rhizome creeping with a dorsiventral dictyostele, sometimes with perforations (*L. axillaris*); leaf-trace bundles 2 or numerous (*L. decurrens*).
156. *Aglaomorpha*
heraclea Copeland, Posth., 1924, p. 246 (*Polypodium Heracleum*).
drynarioides Kuhn., Posth., 1924, p. 246.
a dorsiventral dictyostele, the lower part with perforations; leaf-trace bundles numerous.
157. *Drynaria*
quercifolia J. Sm., Posth., 1924, p. 246.
a perforated dictyostele.
158. *Merinthosorus*
drynarioides Copel., Posth., 1924, p. 246 (*Dryostachyum drynarioides*).
a dorsiventral dictyostele, the lower part with perforations; leaf-trace bundles numerous.
161. *Cyclophorus*
lanceolatus Alston; Giesenhagen, 1901, p. 25, fig. 3, 4; Goebel, 1926, p. 142 (*Niphobolus adnascens*).

- rhizome long creeping with a dorsiventral dictyostele; leaf-trace bundles 3 or more.
163. *Drymoglossum*
heterophyllum C. Chr., Posth., 1924, p. 243; Goebel, 1926, p. 142.
 dorsiventral perforated dictyostele.
164. *Dipteris*
conjugata Reinwardt, Posth., 1924, p. 217; Nakai, 1928, p. 215.
lobbiana Moore, Posth., 1924, p. 217.
novo-guineensis Posthumus, Posthumus, 1928, p. 246.
Wallichii Moore, Posth., 1924, p. 217.
 rhizome creeping, with a solenostele; leaf-trace simple (*D. conjugata*) or double.
165. *Christiopteris*
tricuspis Chr., Posth., 1924, p. 216 (*Leptochilus tricuspis*); Bower, 1928, p. 214.
 rhizome creeping, dorsiventral; solenostele with many profuse perforations; leaf-trace bundles numerous.
166. *Neocheiropteris*
palmatopedata Chr., Posth., 1924, p. 214; Bower, 1928, p. 220.
 rhizome creeping with a perforated solenostele; leaf-trace bundles numerous.
167. *Cheiroleuria*
bicuspis Pr., Posth., 1924, p. 248; Nakai, 1928, p. 210, fig. 4; Bower 1928, p. 202, fig. 712, 713.
 protostele; leaf-trace simple.
168. *Platynerium*
bifurcatum C. Chr., Posth., 1924, p. 248; Bower 1928, p. 209, fig. 718 (*Platynerium alcicorne*).
stemaria Desv., Posth., 1924, p. 248.
 a dorsiventral dictyostele, the lower part perforated; leaf-trace bundles numerous; in *P. stemaria* with a medullary system.
169. *Elaphoglossum*
brevipes Moore, Posth., 1924, p. 247.
hybridum Moore, Posth., 1924, p. 247.

latifolium Moore, Posth., 1924, p. 247; Bower, 1928, p. 237, fig. 738.
lingua Brack., Posth., 1924, p. 247.
Sieberi Moore, Posth., 1924, p. 247.
simplex Schott, Posth., 1924, p. 247.
tomentosum Chr., Posth., 1924, p. 247.
 a dorsiventral dictyostele; leaf-trace 3—5 in number or numerous.

171. Rhipidopteris

peltata Schott., Zschiesche, 1929, p. 489, fig. 24 c.
 a dorsiventral dictyostele, transitional to a solenostele.

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