A MONOGRAPH OF
THE GENUS DRYOPTERIS
PART I
THE TROPICAL AMERICAN PINNATIFID-BIPINNATIFID SPECIES

BY

CARL CHRISTENSEN


KØBENHAVN
HOVEDKOMMISSIONÆR: ANDR. FRED. HØST & SØN, KGL. HOF-BOGHANDEL
BIANCO LUNOS BOGTRYKKERI
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Introduction.

The present work is the first part of a monographical review of the genus of ferns, Dryopteris, and it deals with the tropical American species having the lamina from subentire to bipinnatifidly cut. This delimitation is, of course, artificial, as the degree of cutting is of no greater value as systematic character, but it is chosen from practical reasons.

In earlier papers I have published a review of the species belonging to the two subgenera Lastrea and Stigmatopteris. Since the publication of these papers I have received for determination or examination a large number of specimens of species belonging to the two subgenera mentioned; several of these species were previously unknown to me, and some others were found to be undescribed. I have now, therefore, not a few additions to my earlier papers, and as my former keys consequently now are uncomplete, I give in the present work new keys to all known species of the two subgenera. In this work 280 species are dealt with; about 100 of these were treated in detail in my earlier papers.

The systematic grouping of the 280 species into 10 subgenera is entirely new and it is, as to several points, very different from all older classifications. I dare maintain, however, that my classification is the most natural that has been proposed. It is based on a minute examination of not lesser than about 10,000 specimens belonging to about 500 species. Further, the study of that enormous material has enabled me to unravel the real relationship of several critical forms and to get an idea of the value as species of nearly all described "species". Not a few of these were described from very imperfect specimens, and many of them were described in such a way, that it is impossible from the descriptions alone to see, what the form in question may be. If I should, therefore, make myself any hope of clearing the synonymies of several species, it would be necessary to have for examination type-specimens, or, at least authentical specimens of as far as possible all species described. By the kindness of the curators of several collections I have succeeded in obtaining for study original specimens of all described species some few excepted. These original specimens are to be found in various museums and private collections, as follows:


In Muséum d'Histoire naturelle, Paris, are to be found the type-specimens of species described by Lamarck, Poiré, Desvaux, Fournier and some of those described by Fée. I paid a visit to the museum in the summer 1909 and found the majority of the type-specimens mentioned. The original specimens of the species described by Fée in his 5.—10. mémoire sur la famille des fougères were not found there, and I dare not know, where they are.

Prince Roland Bonaparte's comprehensive herbarium, no doubt the largest private collection in existence, contains numerous authentic specimens; especially are Spruce's South-American collections richly represented. The type-specimens of the species recently described by Dr. Rosenstock from Spruce's collections are in Herb. Bonaparte, and I have had them for study.

In February 1909 I was at Stockholm, where I found in »Riksmuseets Afdeling för Fossila Växter och Archegoniater« the original specimens of species described by O. Swartz a hundred years ago 1). Authentical specimens of not a few of the Swartzian species are to be found in the Botanical Museum of Copenhagen.

On loan I have received from

Kgl. Botanisches Museum, Dahlem bei Berlin, the type-specimens of species described by Willdenow, Link, Klotzsch, Mettenius, Kuhn and Hieronymus.

The University Museum of Prague, the genera Nephrodi um and Lastrea from Presl's herbarium, which besides the original specimens of species described by Presl also contains several authentical specimens of species described by Kunze.

The University Museum, Vienna, some original type-specimens of species described by Christ.

Royal Botanic Gardens, Kew, all type-specimens of species described by Hooker and Baker, besides several authentical specimens of species described by Sodiro and Jenman.

Botanisk Museum, Copenhagen, Liebmann's Mexican collections.

New York Botanical Garden, some original specimens of Jenman's herbarium, kindly sent to me by Miss Margaret Slosson.


Finally I have received from Dr. H. Christ, Basle, and Dr. E. Rosenstock, Gotha, the type-specimens of the species described by these two celebrated pteridologists. From Dr. Christ I have received also several authentical specimens of species described by Sodiro.

As it will be seen from the enumeration above there remain only some few type-specimens, which I have not seen. The "species", which I have not seen, are enumerated partly under each subgenus, partly at the end of the work.

Besides the type-specimens I have had for examination the whole material of the species dealt with, that is contained in the museums of Copenhagen, Stockholm, Berlin, Washington, Herb. Presl, and the large collections in Herb. Rosenstock and Herb. Christ. Dr. Christ’s very valuable collection of ferns is now incorporated in Herb. Roland Bonaparte, Paris. Smaller collections I have received from Prince Bonaparte, the museums of Lund, Bruxelles, München and Vienna.

To the curators of the museums enumerated above I owe my most sincere thanks for the kindness they have shown to me by lending me such comprehensive collections for study. My special thanks I must convey to His Highness, Prince Roland Bonaparte, for the great aid I received during my sojourn in Paris, to Dr. H. Christ and Dr. E. Rosenstock for numerous courtesies, to Miss Margaret Slosson, New York, and to Mr. W. R. Maxon, Washington, for his most valuable assistance by sending to me the very comprehensive collections from Central America and the West Indies contained in the U. S. National Herbarium. These collections, consisting nearly exclusively of specimens collected during the last twenty years, f. inst. the large collection gathered in Central America by J. Donnell Smith and his collectors, are very rich in beautiful and complete specimens.

Finally I beg Dr. C. H. Ostenfeld, curator of the Botanical Museum, Copenhagen, accept my best thanks for his never failing benevolence, without which I scarcely should have got such a large material for examination.

Under each species I quote the specimens seen by me, indicating in a parenthesis where the specimen is to be found. The letters in parenthesis mean:

\[ B = \text{Herbarium Berolinense, Berlin.} \]
\[ RB = \text{Herb. Roland Bonaparte, Paris.} \]
\[ C = \text{Herb. H. Christ, now in Herb. Bonaparte.} \]
\[ CC = \text{Herb. Carl Christensen, Copenhagen.} \]
\[ H = \text{Herb. Hauniense, Copenhagen.} \]
\[ Kew = \text{Royal Botanic Gardens, Kew.} \]
\[ L = \text{Herb. Lundense, Lund.} \]
\[ R = \text{Herb. E. Rosenstock, Gotha.} \]
\[ Rg = \text{Herb. Regnellianum, Stockholm.} \]
\[ S = \text{Herb. Holmiense, Stockholm.} \]
\[ W = \text{U. S. National Herbarium, Washington.} \]

The 46 figures, illustrating 88 species, are about all illustrations of type-specimens and show, as a rule, a pinna reduced to \( \frac{1}{3} \) of its natural size, and two or three segments enlarged \( 1 \frac{1}{2} \).
General Remarks.

The 280 species, dealt with in this work, are grouped into ten subgenera. In a recent preliminary paper 1) I have characterized the subgenera and pointed out the principles, upon which my classification is based. Referring to that paper I shall here remark only, that the kind of the trichomes, the most important character, is not absolutely constant within each subgenus. That character is, like all other characters, not sufficient for basing a natural classification upon it alone, but it is, no doubt, the best and most constant character, by which groups of related species can be distinguished from each other. Against my classification that objection may be made that I, when using a single character as distinguishing mark, cannot omit errors similar to those so evident in all earlier classifications based upon a single character. To this I want to say that my classification is not based upon a single character, the structure of the trichomes. By examining again and again and comparing the thousands of specimens I rather quickly succeeded in being able to group the different forms thus, that the species referred to each group were no doubt intimately related. The affinity is not shown by a single common character, but by a certain conformity in the structure, colour and general habit of the related species. That conformity is easily seen by the trained eye, but it is very difficult to describe. Having sorted my material after that method I then found, that the structure of the trichomes of species referred to a certain group was remarkably alike and on further examination I found, that no other character is so constant as that mentioned. The find was of much value to me, for now it became an easy work to characterize my new subgenera in such a manner, that each pteridologist can refer with approximate accuracy a given form to its right systematic position. As a matter of fact I shall point out that all the 280 species, four or five perhaps excepted, could be determined to subgenus from an examination of the scales and hairs alone.

Qualitatively the ten adopted subgenera are not of exactly the same value. If

Dryopteris were to be divided into smaller genera, a very natural treatment indeed, the ten subgenera could not all be considered good, natural genera. Such are, in my opinion:

1. Eudryopteris.
2. Stigmopteris.

These three are very different from the following and it is in reality highly unnatural to unite them all under a single genus. Intermediate forms with de-compound lamina seem to exist between Stigmopteris and Ctenitis, but the two groups are as a whole very well defined.

4. Lastrea.
   Under this fall as specialized groups Glaphyropteris and Steiropteris; the latter approaches:
5. Cyclosorus.
   Leptogramma can scarcely be separated from Cyclosorus as genus.
   A most natural genus, probably also including Meniscium.

In the treatment of the single species I have followed the principles, which I have explained in my paper on the group of *D. opposita*. Instead of giving detailed descriptions of all species I have chosen to describe certain central species under each narrower group, while I for all other species have confined myself to point out those characters, by which they differ from their nearest relatives. If the original diagnosis of a species does not mention essential characters, what very often is the case, I add the necessary notes.

My keys are elaborated so detailed as possible. Several species being exceedingly variable I have considered all forms known to me, and, therefore, you will find not rarely the same species occurring twice or even several times in the key.

Finally I shall make a few remarks on the geographical distribution of the species. As previously pointed out by me there are only some few species, which are common to Andes-West-Indian islands and South Brazil. Out of the 280 species the following 14 are common to the two regions:

**Dryopteris:** *D. paleacea, D. patula.*
**Stigmopteris:** *D. rotandata.*
**Ctenitis:** *D. submarginalis.*
**Lastrea:** *D. opposita, D. oligocarpa, D. pachyrachis, D. cheilanthoides.*
**Glaphyropteris:** *D. decussata.*
**Cyclosorus:** *D. patens, D. oligophylla, D. mollis, D. gongylodes.*
**Goniopteris:** *D. vivipara.*
The forms of these 14 species occurring in Andes-West-Indian islands and South Brazil respectively are, however, very rarely quite uniform, but, on the other hand, not so different that they can be separated from each other as species. Thus a pronounced difference between the fern-flora of the two regions is clearly seen, but there is also a distinct resemblance, indicating that the whole tropical American flora was in earlier periods not so specialized as in recent times. This resemblance is shown mainly thereby that each of the two regions is inhabited by a long series of species, which are, in the other region, superseded by other, but closely related species. This circumstance can mean that the floristic separation of the two regions took place so long ago, that the species, which were originally common to both regions, have had time to be segregated into several daughter-species, but, on the other hand, the segregation is till now not so far proceeded that separate genera or groups of specially characterized species could have been developed. In every case, such a specialization is in first beginning.

277 species out of the 280 are found in America only. Two, D. mollis and D. gongylodes, are cosmopolitan within the tropics and subtropics, and one, D. eriocaulis from Brazil, is not specifically distinct from the West-African D. cirrhosa. It is possible that some others of the South-Brazilian species occur also in tropical West-Africa.
Key to the Subgenera.

1. Lamina without true hairs consisting of a single row of one or some few cells; rhizome, stipe and rachises more or less clothed with scales, which can be very narrow, hairlike. Veins free, at least not regularly goniopteroid or meniscioid. Aerophore none.

2. Costulae II—III or IV run out from the costa under a very acute angle. Sori with large, reniform, generally persistent indusia. Lamina not pellucido-punctate but often glandular beneath. Most species bipinnate-decompound with furcate veins.

Subgenus 1. **Eudryopteris** (Species 1—11).

2. Costulae run out from the costa under an open angle. Sori exindusiate, or (in the section *Pelltochlaena*) covered by deciduous, large, peltate indusia. Lamina pellucido-punctate by immersed glands. Most species pinnate-bipinnatifid with simple veins, which do not reach the margin. Apex of pinnae sharply serrate to the very point.

Subgenus 2. **Stigmatopteris** (Species 12—28).

1. Lamina more or less hairy by true hairs of different structure. Costulae run out from the costa under an open angle. Veins simple, rarely furcate, free or anastomosing (goniopterooid or meniscioid veins).

2. Hairs articulated, cylindrical, rufous, consisting of 2—4 short cells (unicellular hairs are found in *D. leptosora* and *D. platyloba* only); scales often many, never pubescent, their margins generally more or less dentate or limbriate (not ciliated by hairs). Veins free, simple or forked, the basal ones not truly connivent to sinus, i.e. their apices do not meet at the sinus. Aerophore none; glandular hairs common. Lamina bipinnatifid-decompound, rarely reduced downwards.

Subgenus 3. **Ctenitis** (Species 29—53).

2. Hairs unicellular or pluricellular (in the latter case they are long, soft and thin, subulate), simple or branched. Scales entire or subentire, seldom many,
often ciliated by simple or branched hairs or pubescent throughout. Lamina pinnatifid-pinnate-bipinnatifid, rarely bipinnate.

3. Veins free, the basal ones run out to the margin above sinus, rarely furcate. Lamina bipinnatifid or bipinnate, often much reduced toward the base, the lower pinnae being auriculiform or reduced to mere warts along the stipe. Aerophores frequent. Hairs nearly always simple.

4. No keel below the sinus. Sessile glands common.

5. Without aerophores at the base of the secondary veins (costulae) beneath. Lamina nearly always reduced downwards. Veins not very close. Indusium often present but generally small.

Subgenus 4. Lastrea (Species 34—170).

5. Large aerophores at the base of the pinnae beneath and smaller ones at the base of the secondary veins. Veins very numerous and close, simple. Indusium not seen.

Subgenus 5. Glaphyropteris (Species 171—176).

4. A carinate fold (keel) below the sinus extending toward costa, parallel to the secondary veins. Sessile glands none.

Subgenus 6. Steiropteris (Species 177—189).

3. Veins free or anastomosing, nearly always simple; the lower basal ones either run to the sinus, more or less connivent, or they are truly united in the leaf-tissue and send a common-branch to the sinus; in the two last subgenera often several pairs of veins are goniopteroid or all meniscioid. Lamina rarely reduced below.

4. Sori round or linear, not confluent. At least the uppermost veins not meniscioid.

5. Hairs simple, at least not branched with 2—6 branches on a short stalk, the scales not furnished with branched hairs.

6. Sori round, as a rule with reniform, persistent, setose indusia. Sporangia glabrous.

7. Lower basal veins run to the sinus, below which is a cartilaginous membrane, that in dried specimens becomes folded and forms a keel running from the sinus toward the costa. All veins free. Aerophores at the base of the pinna frequent; glands none.

Subgenus 6. Steiropteris (Species 177—189).

7. Lower 1—4 pairs of veins run to sinus or to a membrane, which scarcely forms a keel but is often protruded beyond the sinus as an apophysis, or the basal pair of veins are united in the leaf-tissue and send an excurrent veinlet to the sinus. Aerophore none; under-surface often glandular.

Subgenus 7. Cyclosorus (Species 190—202).

6. Sori oblong or linear, exindusiate; sporangia setose.

Subgenus 8. Leptogramma (Species 203—205).
5. Scales always with few or many branched hairs; branched, short-stalked hairs are found also on the rachis and, in some species, also on ribs and leaf-tissue. Veins free or anastomosing, goniopteroid or meniscoid. Lamina often proliferous.

Subgenus 9. Goniopteris (Species 206—267).

4. Sori confluent, exindusiate, all veins meniscoid.

Subgenus 10. Meniscium (Species 268—280).

The typical species of this subgenus is our common *D. filix mas*, and most species of *Dryopteris* from the northern temperate region also belong here. In tropical America the subgenus is fairly well represented in Mexico, where a series of decompound forms occur, while South America is poor in species. As I have specimens of all but one known from tropical America, I give here a short review of all species of this subgenus, although I intended to include in the present work the pinnatifid-bipinnatifid species only).

*Eudryopteris* is a very natural group, or, I firmly believe, a distinct, well delimited genus, *Dryopteris* sens. strict. It is well characterized by venation, structure of scales and the total absence of common hairs. The venation is the best character. The veins are free and generally forked; costules (of II.—III. or IV. order) run out from the costa under very acute angles, at first nearly parallel to the costa. By this character the subgenus agrees with *Cystopteris* and I shall in connection herewith call attention to the fact, that certain Mexican forms, which no doubt belong to *Dryopteris*, not rarely have perfectly cystopteroid indusia. Also in pubescence *Eudryopteris* agrees very closely with *Cystopteris*. The scales are thin, entire or fimbriate, consisting of long, narrow often very irregular cells with small lumina and flexuose cell-walls, their margins often glandulose (*paleae cystopteroidae*). The scales of the costa and veins, if present, are generally very narrow and hairlike, but they consist of 2—3 rows of cells and are therefore scales, not hairs. The leaf of several species is glandulose by short-stalked, capitulate glands; the hairs of *D. Karwinskyana* are a peculiar kind of such glands. All species have a short oblique rhizome, which like the fasciculated stipites below is clothed with a dense mass of large, thin, mostly ovate scales. It will be seen from the above that *Eudryopteris* in most characters agrees with *Cystopteris*; the main difference between the two is found in the position and shape of the indusium, but even here we find intermediate forms, as already mentioned above. To me it is probable that *Eudryopteris* and *Cystopteris* are closely allied to each other and that it is unnatural to place them in two different tribes.

Eudryopteris is not nearly related to the other subgenera of Dryopteris. In the lack of simple hairs and in the structure of the scales it agrees with Stigmatopteris, but the venation and indusia are very different. Most species of Eudryopteris have large, persistent, reniform, often glandulose indusia, while Stigmatopteris includes a larger number of exindusiate species and some few species having large, circular, peltate indusia. Some species of Eudryopteris resemble closely certain species of Ctenitis, but they differ always by venation and lack of articulated, reddish hairs on the costa above.

Eudryopteris includes, as delimited here, the genus Dichasium of A. Braun and Fée and at least partly Hypodematum Kunze. Most of the species are large, with a bipinnatifid-decompound, lanceolate or deltoid lamina. In D. Saffordii the lamina is narrowed downwards about as in a species of § Lastrea. Commonly the leaf is fresh-green above and pale beneath, thick of texture and not rarely coriaceous; still thinly herbaceous forms are also to be found, f. inst. some of the Cystopteris-like small Mexican forms.

Key.

1. Lamina bipinnatifid; segments entire or toothed.
   2. Larger. Lamina lanceolate.
   3. Lamina coriaceous, glandular throughout.
      1. D. Saffordii, C. Chr.
   3. Lamina membranous-chartaceous, eglandulose.
      4. Segments rectangular with parallel, entire edges and truncate toothed apex, the upper basal one rarely enlarged and free. Rachis densely chaffy by long glossy scales.
         3. D. paleacea (Sw.) C. Chr.
      4. Segments attenuate, toothed throughout, the upper basal one generally enlarged and free. Rachis less scaly.
         2. D. filix mas (L.) Schott.

1. Lamina bipinnate-quadripinnatifid.
   2. Indusium flat or absent.
   3. Small species; lamina 10—30 cm. long, pinnae rarely more than 8 cm. long often 3—5 cm. only. Both surfaces more or less glandular.
   4. Lamina deltoid or ovate-deltoid (the basal pinnae not conspicuously shorter).
      5. Indusium large, reniform, grey. Surfaces finely glandulose. Most upper pinnae decurrent; secondary segments or pinnules broad, ovate or oblong, subentire or toothed, the teeth close, rather obtuse . . . . . . . . . . 4. D. mexicana (Pr.) C. Chr.
   5. Indusium small, brown or absent. Both surfaces densely glandulose. Pinnae not decurrent; secondary segments or pinnules narrow, linear, sharply and remotely toothed.
      5. D. glandulifera (Liebm.) C. Chr.
4. Lamina lanceolate (basal pinnae shorter).
5. Sori not close to the secondary veins; stipe reddish; segments unequal-sided, more deeply cut on the anterior side.
   Underside paler. 7. D. indecora (Liebm.) C. Chr.
5. Sori in two rows close to the secondary vein; stipe stramineous; segments equal-sided, deeply cut on both sides. Both surfaces concolorons. 6. D. cinnamomea (Cav.) C. Chr.
3. Large species. Lamina often 50 cm. or more long, pinnae 10–25 cm.
4. Indusium persistent. 8. D. palpula (Sw.) Und.
2. Indusium very large, coriaceous, hemispherical, perfectly concealing the sporangia.
3. Surfaces not mealy-glandular. Leaf with age coriaceous, the segments broad.


Type from Peru, mountains back of Lima, Arroyo Railway, leg. William E. Safford 1892, nr. 994 (W).

Dryopteris rhizomatous ignoto. Stipitibus brevibus, 7–8 cm. longis, stramineis, squamis ovatis, pallide-luteis, tenuibus sparse instructis. Lamina lanceolata, 30 cm. longa, medio 10 cm. lata, versus basin attenuata, papyracea vel coriacea, infra pallida, bipinnatifida, rachi straminea superne sulcata minute glandulosa et sparse squamosa. Pinnis oppositis, sessilibus, attenuatis, acutis, mediis 5 cm. longis, 1–1 1/2 cm. latis, inferioribus sensim reductis, magis remotis, infinis 2 cm. longis, utrinque minute glandulosus, ad alam 1 mm latam pinnatifidis. Lacinis obliquis, triangularibus, acutis, leviter serratis, basali acroscopica longiore et latiore, subpinnatifida. Venis immersis, indistinctis, saepe furcatis. 3–4 jugis. Soris majusculis, mediaлизibus; indusiis reniformibus, persistentibus, rulis, minute glandulosis.

A near relative of D. filix mas, different by the less cut lamina, which is nearly coriaceous and densely viscid throughout by minute, glossy glands.

2. Dryopteris filix mas (L.) Schott.

Our common European Male Fern is widely distributed in North America, from New Foundland to Greenland and Alaska, south to Michigan and South Dakota and along the Rocky Mountains and the Pacific coast to Arizona and Mexico. It varies in North America quite as much as in Europe, and some of the European forms are also to be found in America. I shall not here try to name and describe the different forms, but only mention that some of the forms of the Rocky Mts. differ not a little from the type. Thus a peculiarly looking variety is found in Washington (Suksdorf nr. 1230, W) and a large-growing tripinnatifid variety, which
closely resembles the var. affinis (Fisch. and Mey.), occurs in the Rocky Mts. (Montana, Idaho), where rather typical forms also are met with (Utah, New Mexico, Arizona, California).

In Mexico, where the following species is frequent, true D. filix mas is rare; the specimens referred here belong to a form, which approaches the following species, but it does not differ from D. filix mas in the main characters. This Mexican form varies considerably in the degree of cutting, from merely bipinnatifid to deeply tripinnatifid. Very large specimens collected by Schaffner (B, without exact locality) are not unlike the subspecies elongata (Sw.) and belong perhaps to a distinct variety.

State of Oaxaca: Sierra de San Felipe, Charles L. Smith, nr. 2076 (W).
State of Puebla: Ixtacihuatl, 2610 m., F. Nicolas, nr. 5550 (RB).


Syn.: Aspidium paleaceum Sw. Syn. 52, 1806; Fourn. Mex. pl. 1: 92, 1872.
Dichasium parallelogrammum Fée, Gen. 302 tab. 23 B fig. 1. 1850—52.
Aspidium resp. Nephrodium filix mas var. parallelogrammum resp. paleacea auctt. plur.
Aspidium Pseudo-Filix-mas Fée, 8 mém. 103, 1857.
Aspidium chrysocarpon Fée, 8 mém. 103, 1857.

Type from Peru (Lagasca). Not seen.

It is beyond question that A. paleaceum Sw. is identical with A. parallelogrammum Kze. from Mexico, leg. Karwinsky (B1). The specific name has been attributed to Don, who under that name described a similar form from Himalaya (Prod. Fl. Nepal. 4, 1825), which is A. patentissimum Wall.

In treating this widely distributed American fern as a species, which by most authors is referred to D. filix mas as a variety, I have several reasons for doing so. It is very often identified with Central-Asiatic forms of D. filix mas, especially with the varieties patentissima and fibrillosa Clarke; I have, however, never seen Asiatic forms, which entirely agree with the American one. D. paleacea is a rather uniform species, which constantly differs from D. filix mas by the following characters: 1) Stipe and rachis very densely clothed with 1—2 cm. long, narrow, blackish or reddish, glossy, divaricating scales, 2) lamina always bipinnatifid, never bipinnate, 3) pinnae not widened at base, long acuminated and sharply serrated to the very apex, the lower ones, which are somewhat reduced, not subdeltoid, 4) segments with parallel, entire or very faintly toothed edges, the apex truncate with 3—5 short teeth, the basal ones not enlarged and lobed (still often with an interne auricle), rarely free, 5) texture chartaceous or coriaceous. — The indusium is large and often biscutelloid (as Fée termed it), which is especially the case in the an-
dine specimens. It is not fixed exactly in the centre; the sinus extends over the middle and reaches nearly a shallow sinus on the opposite side of the indusium, thus the indusium appears to be cleft into two halves. Fée’s figure (Gen. Fil. tab. 23 B) gives a good illustration of an extreme form. A. Braun founded a new section *Dichasium* on this character (Flora 1841: 710), and Fée considered it being of generic value. I can not at all agree in this; in young specimens the indusium are of the common *filix-mas* type, but growing older it is cleft, before falling, in the said manner. Still it seems to be a good specific character.

*D. paleacea* varies in size and colour of the scales but is otherwise fairly constant. It is apparently not rare in the Andes from Mexico to Peru and Bolivia; it is found at high mountains of Jamaica and Haïti, and again in Southern Brazil. The Hawaiian plant referred hereto, *Lastrea truacata* Brack., is scarcely identical.

I have seen the following specimens:

San Domingo: infra Valle nuevo, 1900 m., Egggers nr. 2306 (B).
Jamaica: Summit of Blue Mountain Peak, Maxon nr. 1411 (W = Underwood nr. 2541); W. Harris nr. 7486 (W); Hart nr. 670 (W).
Mexico: Valle de Mexico, Schaffner nr. 85 (B), Hartweg nr. 570 (B), Uhde nr. 180 et 236 (B) — Forêt de San Nicolas, Bourgeau nr. 1041 (B, H, W) — Pico de Orizaba, Liebmann nr. 2393 (H) — Oaxaca, Galeotti nr. 6348 (B = A. crinitum M. et G.) — Ehrenberg (B = A. parallle logrammum Kze. — Hidalgo, Trinidad, Pringle nr. 8750 (B, H, W) — Ixtaccihuatl, C. A. Purpus nr. 10 (W) — Oaxaca, Cerro de San Felipe, C. Gonzatti and V. Gonzalez nr. 530 (W) — Chiapas, San Cristobal, Collins and Doyle nr. 136 (W).
Costa Rica: Forêts de Barba, Pittier nr. 1933 (B, W) — Cerro de Las Vueltas, Pittier nr. 10604 (W) — El Paramo, Pittier nr. 10621 (W) — forêts de Copey, 2670 m, Tonduz nr. 11806 (W) — J. J. Cooper (W).
Panama, Maxon nr. 5275 (W).
Colombia, Hartweg nr. 1512 (B) — Boqueron-Bogotá, Stébel nr. 457 (B) — Bogotá, Karsten (B).
Venezuela, prov. de Pamploa, Funk & Schlim nr. 1372 (RB, L).
Peru, Domrey (B), Ruiz (B, W), Agapata, Lechler nr. 2020 (B).
Bolivia, Mandon nr. 71 (B) — Tumari Mts., O. Kuntze (B) — M. Bang nr. 1784 (B, W).
Argentina: Sierra de Tuchoyan, P. G. Lorentz (B).
Brazil: Río, Glaziou nr. 4432, 7333 (B, H) — E. Brumet nr. 53 (B) — Serra de Itatiaia, P. Dusén nr. 428 (Rg, W) — Theresopolis, Th. de Moura nr. 60 (B) — Minas Geraes, Caldas, Regnell nr. 11451 (B, RG, W), Mosén nr. 2180 (H, Rg).

4. *Dryopteris mexicana* (Pr.) C. Chr. comb. nov. — Fig. 1.

Syn.: *Nephrodium mexicanum* Pr. Rel. Haenek. 1: 38, 1825 (non auctt.).
*Dryopteris Fournieri* C. Chr. Ind. 266, 1905.

The type-specimen of this species was collected in Mexico by Hænke. I have seen in Herb. Presl a single leaf labelled: “*Nephrodium mexicanum* Presl, rel. haenek. 1: In Mexico (Hænke)”, which I regard as typical. It does not agree with the forms generally referred to *D. pataia* v. *mexicana*, but it is not essentially
from *A. flaccidum* Fourn., based on *Schaffner* nr. 85, 1877, San Luis Potosi (herb. Paris!). *Pringle* nr. 11773 from Eslaba, Federal District, is probably the same. The species is perhaps not different from *D. cinnamomea*, with which it agrees by its small size, thin texture and large, grey indusia; it differs mainly by its deltoid lamina, lanceolate scales of the stipe and the less cut lamina; most pinnae are decurrent in a narrow wing to the rachis, and only the basal pinnules of the lower pinnae are free.

5. *Dryopteris glandulifera* (Liebm.)
   C. Chr. Ind. 267. 1906.
   Mexico, inter Comaltepec et Trapiche de la Concepcion, Dep. Ojaca, leg. *LIEBmann* nr. 2395 (H, type). — Morelos, Cuernavaca, H. Ross nr. 287 (CC).
   Perhaps a small form of the large *D. patula* var. *Rossii*. In the specimens leg. Ross indusia are clearly seen. The species resembles very much *D. hirta* and allied species of *Ctenitis*, but the venation and pubescence is that of *Endryopteris*.

   **Syn.** *Tectaria cinnamomea* Cav. Descr. pl. 252. 1802.
   *Dryopteris athyrioides* O. Ktze. Rev. 2: 811. 1891; C. Chr. Ind. 253.
   *Aspidium agalolepis* Fée, 8. mém. 106. 1857.
   *Aspidium mexicanum* Kze. Linn. 13: 147 (ex descr.).


   Type from Mexico: Chalma, leg. Luis Née (fragment in Herb. Sw. S.!).
   In Ark. för Bot. 9: 43 I have said that *T. cinnamomea* Cav. probably is the same as *Asp. athyrioides* M. et G.; now I have no doubt that the two names are synonyms. I add here the original description of *T. cinnamomea* Cav.
   Tectaria cinnamomea foliis tripinnatis glabris, foliolis linearibus acutis: fructificationibus solitariis. 

   La planta es lampiña; los peciolos delgados, amarillentos; las hojas de color de canela tres veces pinadas, de un pie de largo con mas de medio de ancho, sin contar los peciolos; las hojuelas son estrechas, de dos á cuatro líneas de largo,

The best character of the species, the position of the sori, was clearly described by Cavanilles. Fée renamed the species of Martens and Galeotti, referring it to *Athyrium*, because the indusium is sometimes subhippocrepiform. *A. agatolepis* is the same according to specimens so named by Fournier (Bourgeau nr. 1164). *D. cinnamomea* is exclusively a Mexican species and is very variable. The typical form can shortly be described thus: Rhizome oblique, like stipe densely clothed with large (up to 2 cm. long), ovate-acuminate, concolorous, red-yellow, thin and glossy, entire scales. Stipe stramineous, 10—15 cm. long. Lamina lanceolate or subdeltoid, firmly herbaceous or membranous, without hairs but more or less finely glandular on both sides by minute, glossy, whitish glands, especially on the costa beneath. Fully tripinnate, about 20 cm. long by 10 cm. broad; the pale rachis and the green costa beneath with some few small scales. Pinnae opposite, the lower somewhat shortened, the longest 5—8 cm. long, 2—3 cm. broad, delloid-oblong, mostly equal-sided or somewhat reduced on the lower side at base. Pinnules oblong or subdeltoid, the lower ones free, the upper decurrent; free pinnules equal-sided, fully pinnate at base; segments III entire or toothed, acute, ascending. Veins indistinct, forked in the segments. Sori nearly always solitary in the segment close to the secondary midrib, furnished with a large, flat, greyish, finely glandulose indusium, which is as a rule truly reniform but sometimes subhippocrepiform. In mature leaves the indusium appears often to be lateral (*cystopteroid*), because the sporangia come out at one side only, viz. that opposite the sinus.

This typical form seems to be well-marked and not easily to confound with the much larger and less finely cut *D. patula mexicana*; the best characters are the position of the sori and shape of indusium, the equal-sided free, lower pinnules and the finely glandular surfaces. — The following specimens seen are typical:

Mexico: State of Mexico, near Toluca, J. N. Rose and Painter nr. 6807 (W) — Durango, Tejamén, Edw. Palmer nr. 506 (W) — Hidalgo, Sierra de Pachuca, Pringle nr. 13815 (H, W) and J. N. Rose and Painter nr. 6745 (W) — Morelos, Sierra de Tepoztlan, Rose and Painter nr. 7257 (W) — Michoacán, hills of Patzcuaro, Pringle nr. 3362 (W) — Chihuahua, Arroyo Ancho, Sierra Madre, Pringle nr. 1445 (W), 1712 (S) — Britanca de Santa Fée, Bourgeau nr. 1164 (H) — Montezuma près Guantepec, Bourgeau nr. 1165 (H).

7. *Dryopteris indecora* (Liebm.) C. Chr. Ind. 272. 1905.

*Aspidium inquinans* Fée, 8 mém. 106. 1857 (teste Fournier).

Mexico, Yavesia, Dep. Oajaca, 7—7500 ft., leg. Liebmán nr. 2417 (H!)

A very doubtful species based on three imperfect leaves. It may be a form of *D. cinnamomea*. Hieronymus describes (Hedwigia 46: 346. 1907) a var. *obtusa* from Colombia, Stübel nr. 110, which I have not seen.


Lastrea polyphleides Pr. Epim. 38. 1849!

Aspidium imbecile Kze.; Ellingsh. Farnkr. tab. 107, fig. 10, tab. 109 f. 1. 1865!

Type from Brazil: Minas Geraes, leg. FREYREISS (S!).

To this species I refer a long series of forms, several of which are no doubt good species. The Brazilian type is thin-leaved, finely glandular throughout, the under-surface not much paler than the upper one; pinnae about equal-sided, the pinnules more deeply lobed on the anterior side, the segments broad, shallowly toothed; indusium rather small, reddish, densely glandulose.

Minas Geraes: Caldas, Mosén nr. 2183 (H) — Serra da Piedade, WARMING nr. 871 (H). — GLAZIOW nr. 15759 (H).

Best agreeing with the type is a plant from Jamaica, HART nr. 153 (W). It is smaller and densely glandular throughout.

In Mexico and the Andes southwards a number of forms occur, which are described under several names but which I have failed to distinguish with certainty. The nomenclature is very confuse. Most authors refer the different forms to a single species, D. patula or Nephr. mexicanum; as shown above I believe that PRESL's species is the same as Asp. flaccidum Fourn. and probably specifically different from D. patula. I shall mention some of the more characteristic forms.

1. Very near the Brazilian type, but larger; pinnae up to 25 cm. long, like the pinnules unequal-sided at base; surfaces slightly glandulose, the indusia large, flat, often peltate, finely glandular. Here I refer:

Aspidium papyruimum Kze. Linn. 18: 345. 1844, and

Aspidium apertum Fée, 8 mém. 106. 1857;

Dryopteris aperta C. Chr. Ind. 252. 1905.

Mexico: Oaxaca, inter Comaltepec et Trapiche de la Concepcion, LIEBMANN nr. 2404 (H) — Orizaba, Izihuatlanzillo, BOURGEAU nr. 2360 (H).

Aspidium leptorachis Kze. Linn. 18: 346. 1844 is evidently a less cnt form of the same. The short, obtuse pinnae are deeply serrated, scarcely pinnatifid. Aspidium roseum Fourn. Mex. pl. 1: 97. 1872 is probably also belonging here.

2. var. chaerophylloides (Moritz) Bak. SYN. 276.

Like the preceding form, but surfaces and indusia not glandulose. It varies in size and cutting.

Guatemala: Alta Vera Paz, Cubilquitz, v. TUERECKHEIM ed. DONN. SMITH nr. 8643, 8645 (W) — Jalapa, Laguna de Ayazza, HEYDE et LUX ed. DONN. SMITH nr. 4081 (W) — Alta Vera Paz, Coban, v. TUERECKHEIM, ed. DONN. SMITH nr. 703 (W); v. TUERECKHEIM nr. II 1370 (W) — Dept. Santa Rosa, Samborrito, HEYDE et LUX ed. DONN. SMITH nr. 6498 (W).

Nicaragua: Île d'Omotopé, LÉVY nr. 207 (H).

Costa Rica: Bords du Río Torres à San José, TONDZ nr. 9791 (W) — Haie près San José, TONDZ 9780 (W) — Haies a la Verbenia près Alajuelita, TONDZ nr. 8790 (W) — Alajuelita, ALFARO ed. DONN. SMITH nr. 6081 (W) — Alto del Sacatal, PITTIER nr. 10547 (W) — San José, BOLLEY nr. 102 (C, CC, H, W) — Tablazo, BOLLEY nr. 74 (C, CC, W).
var. **Rossii**, n. var.

Under the name *D. Rossii* I have described a Mexican fern as a new species after specimens collected in Morelos: Cuernavaca, Santa Maria by H. Ross *nr. 279* (Herb. Munich, CC); my description is till now not published. Comparing my specimen with several other specimens from Mexico I fear that my proposed new species cannot be distinguished specifically from the Mexican form of *D. patula*, *Aspid. apertum* Fée, although the typical form looks very distinct. It differs by the deeply cut lamina, which is distinctly glandular on both surfaces, by its very unequal-sided pinnæ and pinnules, and especially by its narrow, toothed segments; under surface pale or even glaucescent; stipe and rachis reddish, clothed with narrow scales. Indusium small, reddish. — The lamina is generally deltoid in outline, firm. — This is nearly exactly a *D. glandulifera* on an enlarged scale, — the basal pinnæ are up to 15 cm. long — and it also comes near to certain forms of *D. cinna-nawomea*, from which it differs by its larger, deltoid lamina, pale-green underside, position of sori and unequal-sided pinnules.

**Mexico**: State of Mexico, Hac. de la Encarnacion, Rose and Painter *nr. 8477* (W); near Tultenango, Rose and Painter *nr. 7861* (W) — Puebla, Ixtacihuatl, 2160 m. F. Nicola s *nr. 5549* (RB) — Jalisco, near Guadalajara, Edw. Palmer *nr. 288* (W), Rose and Painter *nr. 7319* (W); Rio Blanco, Edw. Palmer *nr. 149* (W); between Colotlan and Bolanos, J. N. Rose *nr. 2837* (W) — Morelos, Cuernavaca, H. Ross *nr. 279* (CC) — Michoacan, M. Patamban, E. W. Nelson *nr. 6590* (W); Patzcuaro, Pringle *nr. 3362* (W); near Morelia in different localities, F. Arsène (RB).

**Arizona**: Huachuca Mts., Conservatory Canyon, Lemmon (W) — (A small form near *D. glandulifera*).

9. **Dryopteris ulvensis** Hieron. *Hedwigia* 16: 346 tab. 7 fig. 18. 1907.

Type from Ecuador, in valle Pastaza, Stübel *nr. 848* (B).

This I have not seen. It is certainly closely allied to *D. patula* but is described as exindusiate.


Type from Mexico: Morelos canyons above Cuernavaca, 5500 ft., leg. Pringle *nr. 6190* (W! also S). —

Other specimens seen: type locality, J. N. Rose and Painter *nr. 6920* (W); Tlatzalan bei Tepoztlan, Morelos, C. et E. SeIer *nr. 4518* (B) — Michoacan: Corn Station, Pringle *nr. 8846* (S, W) — Jalisco: near Etzatlan, Rose and Painter *nr. 7597* (W) — Very numerous specimens were collected in different localities near Morelia by J. Arsène (RB, CC).

*Eudryopteris* rhizomate crasso, obliquo, sparse squamoso. Stipitibus crassís, stramineis, 3—4 dcm. longis, teretibus, squamis integris, ovalis, siccís, pallidís (vel in centro atrofascis) sparse instructís. Lamina deltoidea vel deltoideo-ovata vel ovato-lanceolata, 4—6 dcm. longa, chartacea vel coriacea, pallide viridi, pilis omnino destituta, ad rachin costasque infra squamis pallidis, parvis onusta, bipinnata-
tripinnatifida. Pinnis suboppositis, parum erectis, basalibus subovatis vix abbreviatis, medialibus a basi ad apicem acutum attenuatis, omnibus breviter petiolatis equilateralibus, maximis ad 15 cm. longis, Pinnulis remotis, equilateralibus, inferioribus liberis basi contractis, medialibus decurrentibus superioribus confluentibus, fere ad costulam pinnatifidis. Laciniiis oblongis integris vel ad apicem truncatum saepè dentatis. Venis furcatis. Soris 1—2 in lacinia; indusiis magnis, coriaceis, hemisphaericis, reniformibus, minute glandulosis.

A very distinct species, well-marked by the very large, coriaceous, hemispherical indusia, which perfectly conceal the sporangia. By this character it resembles *D. Karwinskyana*, which is quite different in habit and pubescence. — Very characteristic are the thick, straw-coloured, somewhat fleshy stem and rachis.

   C. Chr. Ind. 272.


A most distinct species with a finely cut, thin lamina, which throughout is covered by unicellular, cylindrical, hairlike glands. The sori are hemispherical and conceal the sporangia.

**Mexico**: Comaltepec, Dept. Oaxaca, Liebmann nr. 2396 (H).


**Nicaragua**: Ile d’Omotépé, Lévy nr. 132 (H).

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**Unknown species of uncertain position.**

*Dryopteris Wolfii* Hieron. Hedwigia 46: 344 tab. 7 fig. 17. 1907.

Type from Ecuador, Strübel nr. 770, 919 et 998 (B).

By the author compared to *D. marginalis*, but the description and the figure do not agree perfectly with the characters of *Endryopteris*.

*Aspidium Huberi* Christ, Hedwigia 45: 192. 1906.

Type from Amazonas, Alto-Purus, Huber nr. 4514.

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In 1909 (loc. cit.) I proposed to refer to a proper genus, *Stigmatopteris*, a number of tropical American ferns, which show several characters by which they differ from species of *Dryopteris*: the lack of simple hairs, the serrated apex of the pinnae, the pellucido-punctate lamina and the peculiar venation, the veins
terminating in the leaf-tissue in a clavate apex, not reaching the margin and, in some species, irregularly anastomosing. In lack of simple hairs and in the structure of the scales Stigmatopteris resembles Eudryopteris, but the venation and the exindusiate sori are quite different. I am fully convinced that Stigmatopteris is a very natural genus (perhaps even not a member of the Dryopterideae), but as the same can be said of several other subgenera of Dryopteris dealt with in this paper it is best for the sake of uniformity of treatment to place Stigmatopteris here among the other subgenera.

Since the publication of my paper on Stigmatopteris I have seen some other species, which belong here. It is very interesting to note that some of these species are indusiate, but the indusia are not reniform as in Dryopteris but peltate, large and circular, fixed at the centre, as a rule coriaceous and glabrous, the edges often upcurved. Species with such indusia have commonly been referred to Polystichum, but there exists no species of true Polystichum having a similar habit. In general habit the species here in question do not differ from Stigmatopteris rotundata and allied species, and as to all other characters they fully agree, inter alia also in the variable venation and in the presence of immersed glands. Fée has named provisionally a plant from Guiana Pellochlaena nephrodiiformis, which no doubt belongs here. I can not say definitely what his species may be, but I use here his name Pellochlaena for a section of Stigmatopteris including those species having peltate indusia. It must be remembered that the very large indusia soon fall, and a fertile leaf with all indusia fallen could as well be referred to Eustigmatopteris.

The genus (subgenus) thus can be divided into two groups:

1. Eustigmatopteris. Sori exindusiate. Leaves as a rule thin.

2. Pellochlaena (Fée). Sori furnished with large, circular, peltate indusia. Leaves generally papyraceous to coriaceous.

In my former paper I have exclusively dealt with the species of the former group and I have there mentioned and illustrated 12 species. Since then I have examined the type-specimens of some species described by Hooker and Baker, and the number of species known to me is now 17, which are all enumerated below and arranged in a key. For descriptions, synonymy and distribution of the 12 species I refer to my former paper.

Key.

1. Sori exindusiate. Lamina of most species herbaceous or membranous. Eustigmatopteris.

2. Pinnæ nearly entire, serrated or lobed not more than \( \frac{1}{2} \) of the way down to the midrib, seldom a little more.

3. Sori round, not confluent; veins free.

4. Only the uppermost pinnæ with a shortly decurrent base.
5. Pinnae linear, slightly lobed; lobes broader than long, oblique, as a rule faintly crenulate or obtusely dentate. Veins 2—5.
6. Veins short. Pinnae not or shortly auricled at the upper base.
7. Pinnae 25 cm. long by 2 1/3 cm. broad; veins 4—5-jugate, rather patent; sori medial ... 12. S. rotundata (Willd.) C. Chr.
7. Pinnae 12—18 cm. long by 1 2/3—2 cm. broad; veins 2—4-jugate, more erect, often very short and distant; sori near the midrib ... 13. S. Carrii (Bak.) C. Chr.
6. Veins longer, ascending. Pinnae with a large, broad auricle.
27. D. sancti gabrielii (Hk.) C. Chr.
5. Pinnae linear or lanceolate, lobed 1/3—1/2 of the way down; lobes generally longer than broad. Veins 5—7 jugate.
6. Pinnae lanceolate, 12—18 cm. long, 3 cm. broad, with close, entire, falcate lobes. Veins 6—7-jugate. Light-green ... 14. S. tijuca (Raddi) C. Chr.
6. Pinnae linear or lanceolate with more or less repand or dentate lobes. Colour dark-green.
15. S. prionites (Kze.) C. Chr.
7. Pinnae linear-lanceolate, broadest at the middle; lobes falcate, rather close. Andine species.
8. Sori medial without paraphyses. Lobes falcate, more or less dentate ... 16. S. nephrodioides (Kl.) C. Chr.
8. Sori inframedial with articulated paraphyses. Lobes narrow, falcate, repand ... 17. S. Michaëlis (Bak.) C. Chr.
4. Most pinnae with a long decurrent base, those of the upper third of the leaf connected by a broad wing to the rachis.
5. Pinnae deeply lobed with narrow, repand lobes.
17. S. Michaëlis (Bak.) C. Chr.
5. Pinnae subentire, serrate or slightly lobed.
6. Pinnae approximate, linear, serrate, about 15 cm. long, 2 1/3 cm. broad ... 18. S. longicandata (Liebm.) C. Chr.
6. Pinnae distant, about 15 cm. long, 3—4 cm. broad, subentire or irregularly crenate or slightly lobed; veins frequently anastomosing ... 19. S. alloeoëptera (Kze.) C. Chr.
3. Sori confluent; venation meniscioid ... 20. S. opaca (Bak.) C. Chr.
2. Pinnae incised to a narrow wing to the costa, or lamina bipinnate-tripinnatifid. Veins often furcate.
3. Lamina bipinnatifid with toothed or lobed segments.
4. Sori without indusium-like, inferior scale.
5. Segments generally toothed throughout, separated by broad, open sinuses, somewhat contracted above the widened base, 5—7 mm. broad. Lower basal segment of most pinnae considerably reduced. Brazil ... 21. S. caudata (Raddi) C. Chr.
5. Segments close, up to 1 cm. broad, sharply toothed at their apex, the edges entire or faintly crenate. Lower basal segment scarcely abbreviated. Andes ... 24. S. pellucido-punctata C. Chr.
4. Most sori with an inferior, indusium-like scale; Andine and West Indian species.
5. Lower basal segment of most pinnæ abbreviated. Segments patent or oblique, not contracted above their base; costa and costula beneath rather scaly .... 22. *S. ichthiosma* (Sod.) C. Chr.

5. Basal segments both much enlarged; sterile leaf tripinnatifid, fertile one with narrow, crenate segments; costa beneath sparsely scaly. 23. *S. contracta* (Christ) C. Chr.


1. Sori furnished with large, circular, peltate indusia, which are deciduous and often not found. 25. *Peltochlaena*


2. Veins free. Pinnae regularly serrulate or lobed.

3. Lamina membranous. Pinnae 15—20 cm. long, broadly and shallowly serrate with a broad auricle at the upper base. 27. *D. sancti-gabrieli* (Hk.) C. Chr.

3. Lamina coriaceous. Pinnae 10—12 cm. long, lobed about halfway down to the midrib, scarcely auricled. 28. *D. subobliquata* (Hook.) O. Ktze.

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**Group 1. Eustigmatopteris** (species 12—25).


Area: Lesser Antilles from Montserrat to Trinidad. South Brazil.

*Nephrodium Inramanum* Hk. spec. fil. 4: 86. 1862 from Dominica, Imray (Kew!) is exactly this species. The specimen is absolutely exindusiate.

13. **St. Carrii** (Bak.) C. Chr. l. c. 298 fig. 3.

Area: Brazil.

The type-specimen from Rio, leg. Carr (Kew!) shows that I have rightly understood this species, which is perhaps not specifically different from *S. rotundata*.

*Aspidium brachynevron* Fée, Cr. vasc. Brés. 1: 133. 1869 from Bahia, Blanchet, is probably this species.

14. **St. tijuccana** (Raddi) C. Chr. l. c. 298, fig. 4.

Area: Brazil, Rio-S. Paulo.

15. **St. prionites** (Kze.) C. Chr. l. c. 298, fig. 5, 6.

Area: Brazil. — *Phegopteris Ulei* Christ, Bull. L'Herb. Boiss. II. 2: 634. 1902; *Dryopteris Ulei* C. Chr. Ind. 299 from S. Catharina, Ule nr. 70, is probably a form of this species.

16. **St. nephrodioides** (Kl.) C. Chr. l. c. 299, fig. 8.

Area: Venezuela Costa Rica.
17. St. Michaëlis (Bak.) C. Chr. l. c. 300, fig. 9.

Area: Ecuador-Colombia.


The type-specimen of P. sylvicolum Bak. from Colombia, Prov. Antioquia, Kalbreyer nr. 1807 (Kew!) is nearly exactly identical with the type from Ecuador. It is not so deeply cut, but the segments are similarly falcate and broadly crenate-repand, and the sporangia are intermixed with brown articulate paraphyses just as in the type.

18. St. longicaudata (Liebm.) C. Chr. l. c. 300, fig. 10.


Area: Mexico along the Andes to Peru and Bolivia.

19. St. alloëoptera (Kze.) C. Chr. l. c. 300, fig. 11.

Area: Costa Rica—Peru.


The specimens on which Baker founded his two first named species are rather typical S. alloëoptera. P. heterophlebium from Costa Rica, leg. Harrison (Kew!) has narrower pinnae and approaches S. longicaudata, from which it differs by its shorter and broader pinnae with many veins anastomosing. — P. oligophlebium from Peru, Tarapoto, Cerro de Guayrapurima, Spruce nr. 4653 (Kew!) is that form with few but very broad pinnae, which I have figured. In general habit and cutting it is nearly identical with S. opaca. The long stipe is clothed with several large, brown scales.

P. coalescens Bak. was founded on a most wonderful mixture of different things collected by Sodiro in Ecuador (Kew!). The type-specimen (a single sheet) consists of three young sterile plants and one fertile pinna. The latter is no doubt a pinna of S. alloëoptera, and two of the young plants are probably belonging to the same species. The third plant is entirely different and does not belong to Stigmatopteris; what it may be, I dare not decide. I should not hesitate to make P. coalescens Bak. a synonym of S. alloëoptera, had Sodiro (Cr. vasc. quit. 302) not described the species more fully, and his description does not agree perfectly with the specimen seen; thus he describes the stipe and rachis as pulverulento-pubescent, both surfaces pubescent and lamina impari-pinnate with the terminal pinna stalked, broader and shorter than the 5—7 pairs of lateral ones. These characters do not correspond to any species of Stigmatopteris. On the other hand his description very well agrees with the fertile pinna seen in other characters: size and shape of the pinna, venation and position of the sori.

20. **Stigmatopteris opaca** (Bak.) C. Chr. comb. nov.

*Dryopteris Christii* C. Chr. Index 257, 1905.

**Type from Ecuador**, leg. Sodiro (authentical specimens in C!).

Closely allied to *St. alloëoptera*, resembling it in size and its broad partly decurrent pinnae, differing by its thick texture, meniscioid venation and confluent sori. By these characters it resembles very much species of *Meniscium*, to which genus or subgenus it was hitherto referred. A minute examination of a specimen will, however, clearly show great differences between it and species of *Meniscium*, and further that it is in nearly all characters a true *Stigmatopteris*. The lamina is distinctly pellucido-punctate, simple hairs are wanting but rachis and costa beneath are sparsely clothed with small, reddish scales similar to those of other species of *Stigmatopteris*. The veins anastomose richly but not so regularly as in species of *Meniscium*, and the outer veinlets do not reach the margin but end in a clavate apex in the parenchyma; in *Meniscium* the outer veinlets always are united with the thickened margin. The sori are large and generally confluent as in *Meniscium*.

21. **St. caudata** (Raddi) C. Chr. l. c. 302 fig. 12.

**Area: South Brazil.**

22. **St. ichtiosma** (Sod.) C. Chr. l. c. 302 fig. 13.

**Area: Ecuador-Colombia. Cuba, Jamaica.**

*Dryopteris longipetiolata* C. Chr. Index 275, 1905.

**Baker's proposed new species**, founded on a part of a leaf gathered in Ecuador by Sodiro (Kew!), is absolutely identical with Sodiro's species. Sodiro remarks (Cr. vasc. quit. 642) that Baker's species does not exist in his herbarium, and he believes that it may be his *Nephotrium crinitum ‡ glanscens*, l. c. 251. It must be granted that it is impossible from Baker's description to see, what his species may be; he compares it with *P. decussatum* and *P. rude* (!), which species *St. ichtiosma* is not at all related to. *N. crinitum* Sod. with its variety are forms of *D. submarginalis*.

23. **St. contracta** (Christ) C. Chr. l. c. 304, fig. 14.

**Area: Costa Rica.**

24. **St. pellucido-punctata** C. Chr. l. c. 304, fig. 15.

**Type from Peru, Tarapoto, Mt. Guayrapurima, Spruce nr. 4720 (Kew!)** A very large species, but bipinnatifid only. Stipe 1 cm. thick, rather scaly; pinnae up to 45 cm. long, 7 cm. broad.
25. *Stigmatopteris prasina* (Bak.) C. Chr. comb. nov.


*Dryopteris prasina* C. Chr. Index 285, 1905.

Type from Peru, Tarapoto, Mt. Guayrapurima, leg. *Spruce* nr. 4719 (Kew!, also RB). I consider *Spruce* nr. 4719 the type-number of this species, to which the first name of the plant, *Pol. punctatum* Spruce, was given by *Spruce*; his nr. 5714 from Chimborazo (Kew, RB) belong to *St. ichtiosma*. *S. prasina* is fully bipinnate; the lower pinnae are free but broadly adnate to costa, lobed nearly half of the way down to the midrib into square or rectangular, entire or faintly serrated lobes; veins pinnate in the lobes, 3–4 to a side, simple. Sori about medial, without an indusium-like scale as in *S. ichtiosma*. — Plant very large, up to 2 m. high; stipe at base with many squarrose scales, which are up to 3 cm. long. Rachis, costa and costæ beneath richly fibrilllose by reddish scales. Pinnae 35 cm. or more long, lanceolate, short-stalked, 6 cm. broad at the middle; pinnae about 4 cm. long, 1 cm. broad. Lamina thin, grass-green, paler beneath, very distinctly pellucido-punctate.

A specimen from Ecuador, Andes of Quito, *Sodiro* (B) may be specifically different. It is *Pol. prasinum* Sod. Cr. vasc. quit. 292. It is much larger than the Peruvian type and less scaly. The pinnae are distinctly stalked, the pinnules sessile, 10 cm. long by 2 cm. broad, incised 3/4 of the way down to the midrib into obtuse, serrulate segments. Veins in about 5 pairs to a segment, as a rule forked near the middle, the anterior branch very short and soriferous. In texture, colour and immersed glands the specimen agrees with *S. prasina*.


Fig. 2 c.

Syn. *Nephradium varians* Fée, 11 mém. 88 tab. 24 fig. 2, 1866.


This is a most distinct species. Leaves somewhat dimorphous, the sterile ones being considerably broader than the fertile ones, about 10 cm. long by 2 cm. wide, short-stalked, truncate at the upper base but scarcely auricled, cuneate at the lower one, the margins subentire or repand or broadly serrulate, always sharply serrate towards the apex. Fertile leaves with pinnae scarcely more than 1 cm. broad, very variable in cutting, being from almost entire (the serrated apex ex-

1) The species of this group I have not named *Stigmatopteris* but use the names of Index Filicum.
cepted) to deeply and irregularly pinnatifid. The variations are often to be found in the same leaf. — Lamina with a subdistinct terminal pinna, herbaceous-membranous, perfectly glabrous and naked, dark-green. Veins 3—4 to a side, anastomosing about as in certain species of Goniopteris. Sori small, furnished with a deciduous, membranous, glabrous, reddish, wrinkled, peltate indusium. — The Guiana-specimens differ from the type from Trinidad by more numerous pinnae, which have a longer petiole and are more equally cuneate at the base on both sides.

D. varians is in some characters, f. inst. the wide-creeping rhizome and perhaps in the lack of immersed glands, rather different from the general type of Stigmatopteris. In the Trinidad-specimens I have not found immersed glands, while they are seen indistinctly in the specimens from Essequibo. As to other characters it does not differ materially from Stigmatopteris, and I think it best to place the species here. From all other groups of Dryopteris it is widely different.

27. Dryopteris sancti-gabrieli (Hook) O. Ktze. Rev. 2: 813, 1891;
C. Chr. Index 290. — Fig. 2 a.

Nephrodium Sancti-Gabrieli Bak. Flor. bras. 1^2: 469, 1870.
Aspidium Imrayanum Fée, Cr. vasc. Brés. 1: 133, 1869.

Type from Amazonas, São Gabriel, Spruce nr. 2153 (Kew!).

Venezuela, Merida, Engel nr. 231 (B).
Trinidad, Fendler nr. 97 (W).

Fig. 2. a. D. sancti-gabrieli (Hook.) O. Ktze. Basal part of sterile and fertile pinna and apex of a pinna, \( \times \frac{4}{5} \). — b. Pinna of D. subobliqueata (Hook.) O. Ktze., \( \times \frac{4}{5} \), and two segments \( \times 1\frac{1}{2} \). — c. Middle part and apex of a pinna of D. varians (Fée) O. Ktze., showing venation, about nat. size.
This is a large species with subdimorphous leaves, the sterile ones being much larger than the fertile. Sterile lamina up to 50 cm. long, 40 cm. broad, truncate at base, upwards gradually narrowed to the pinnatifid apex. Pinnæ 15—20-jugate, short-stalked, 15—20 cm. long, 3 cm. broad, the lower base bluntly rounded, the upper one truncate and with a broad, obtuse auricle; margins broadly and shallowly serrulate, towards the submucronate apex more distinctly serrate. Texture membranous to firmly papyraceous, colour fresh-green, paler beneath. Stipe, rachis and costa beneath sparsely clothed with reddish or blackish small scales. Veins in groups of 3—4, upcurved, not reaching the margin, free. — Fertile lamina similar, but the pinnæ only 10—12 cm. long by 1 1/2—1 3/4 cm. broad. Sori in the lower half of the vein, in most specimens apparently exindusiate, but in a single of Fendler's Trinidad-specimens the sori are covered by large, circular, peltate, glabrous, coriaceous indusia; a single indusium is found in the type-specimen.

D. sancti-gabrieli can with certainty be referred to Stigmatopteris, differing from the general type by its peltate indusia.

28. Dryopteris subobliquata (Hook.) O. Ktze. Rev. 2: 813, 1891; C. Chr. Index 296. — Fig. 2 b.

Syn. Polypodium subobliquatum Hk. spec. 4: 240, 1862.
Nephrodium subobliquatum Bak. Syn. 261, 1867.

Type from Surinam, Hostmann nr. 15 (Kew!).

Closely related to the preceding species, but easily recognizable by several characters. Leaf generally coriaceous, entirely glabrous, lamina lanceolate, about 40 cm. long with 10—15 pairs of rather remote, subopposite, short-stalked pinnæ, which are all alike, 12 cm. long by 2 1/2—3 cm. broad, the lower base shortly cuneate, the upper one truncate, scarcely auricled, the margins lobed about half-way down to the midrib into oblong, obtuse, entire segments; apex of pinnæ mucronate. Veins simple, free, 3—4 to a side, short, not reaching the margin. Sori small, furnished with an early falling, large, coriaceous, glabrous, peltate indusium.

I call here this distinct species D. subobliquata, although I have no doubt that it is identical with Aspidium guianense Kl., Linnaea 20: 364, 1847; Peltochlaena nephrodiiformis Fée, Gen. 289 is probably the same. I have, however, not seen the original specimen of A. guianense, which commonly is referred as a subspecies to Polystichum abbreviatum (Schrad.), and I shall not here create a new combination of name, mainly because the position of the species in Dryopteris is very questionable. It is possible that it may be a free-veined form of Polystichum abbreviatum, still I think it can be regarded as a distinct species forming a connecting link between D. sancti-gabrieli and Polyst. abbreviatum. Its systematic position will naturally be in Stigmatopteris. Some of the specimens seen have distinct immersed glands.
Specimens seen:
French Guiana, Leprieur nr. 42 (C, W); Rich (CC); — Demetaria, Jenman (B, C, W).
Colombia, Cauca, Lehmann nr. 3802 (B).
Brazil, Pará, Approya, J. Huber nr. 755 (C). — Rio, Glaziou nr. 12373 (B, H).

Polystichum abbreviatum (Schrad.) Pr. (for synonymy see Index Fil. 575, the subspecies excluded) should probably also be placed in this group. It is very closely related to D. subobliquata, mainly different by the anastomosing veins. It is known from Brazil and also recorded from Guiana and Ecuador. Besides several specimens from Brazil I have seen one from Colombia, Córdoba, Dagua Valley, 30—100 m., H. Pittier nr. 529 (W).

Subgenus 3. Ctenitis C. Chr.
Biolog. Arbejder tilegnede Eug. Warming, p. 77. 1911.

A natural subgenus including several species all having an erect or oblique rhizome, which like the bases of stipes is clothed at the apex with a dense mass of scales; these are as a rule very large, toothed at the margin or, more rarely, subentire, their apex very long and hairlike; in some species, f. inst. D. strigilosa Dav., the scales are long and narrow, dark-brown and rigid. — Lamina bipinnate-decompound, as a rule brownish green when dry, membranous or herbaceous, rarely coriaceous, not or a little narrowed downwards, more often deltoid and then the basiscop pinnulae of the basal pinnæ are more or less enlarged. Rachis and costæ beneath always furnished with many or few scales, which are differently shaped in the different species (see fig. 3). Rarely they are quite entire, generally the margins are toothed, or, as in D. deflexa, long ciliated; always the apex is long and hairlike, and some few long cilia are to be found at the cordate base; in some species the base of the scale is bullate or subbullate. The cells are as a rule large and regular, most often rectangular, the inner cell-walls often very thickened and dark, while the outer ones are always thin and colourless (clathrate scales). The structure and shape of the scales, especially of those of the costæ beneath are important specific characters. — Besides the scales the species are furnished with short, articulate, reddish hairs, which in all species are to be found on the costæ above; they consist of 2—4 short, cylindrical cells separated by dark, thick walls (see fig. 3,i). If hairs occur elsewhere, on leaf tissue, veins or margins, they are generally of the same structure. Short, unicellular hairs I have met with only in two species, D. platyloba and D. leptosora. Some species are glandulosopubescent by hairs of a similar structure, but often shorter end ending at a gland. Sessile glands as in species of Lastrea scarcely occur. Àérophore none. — Veins simple or, in some species, forked, never anastomosing, the basal ones reaching the margin above sinus, or, in the less-divided species as D. pedicellata, running
towards the sinus but not meeting there and thus not being truly connivent; costulae run out from the costae under open angles. Sori indusiate or not, the indusium rarely large and persistent. Sporangia glabrous.

*Clenitis* is a very natural group, by the peculiar pubescence different from all other groups of the genus, and I have no doubt that the differences are of generic value. The species vary being from bipinnate to decompound, most of them with characteristic obtuse segments, rather small to large. All intermediates between bipinnate and large decmpound species are found, such as f. inst *D. strigilosa* and *D. Hemslayana*. In America the bipinnate species are numerous in Southern Brazil, while only one, *D. vellea*, occurs in the West Indies, where several decmpound species (*D. hirta, D. ampla, D. nemorosa*) etc. are to be found. In the Old World's tropics the subgenus is fairly well represented. Among them is the African *D. cirrhosa* (Schum.) O. Ktze., which I cannot distinguish specifically from the Brazilian *D. eriocaulis* (Fée) O. Ktze., a new example of the well-known relation between the floras of South Brazil and tropical West Africa.

*Clenitis* is not nearly related to the other subgenera of *Dryopteris* and in my opinion it is even not congeneric with them. On the other hand it is intimately related to the genus *Psomiocarpa* Presl., recently restored by Christ1), who referred to that genus two West Indian species, *Ps. aspidioides* (Grisch.) and *Ps. Maxoni* Christ. I know the first named of these species, which in habit, texture, colour and pubescence is perfectly agreeing with *Clenitis*; by its contracted fertile frond it differs, however, so much that it naturally must be placed in a separate genus, which can be regarded as a derivate of *Clenitis*. *Psomiocarpa* was previously united with *Polybotrya*, which genus is more closely related to *Polystichum*.

*Clenitis* is further related to the genus *Aspidium* (*Tectaria*) at least to the majority of the species referred to that genus. The main difference is found in the venation, *Clenitis* having free veins, *Aspidium* reticulated veins; in pubescence, texture, colour and most species of the two genera fully agree. Species intermediate between the two genera exist, f. inst. *Dryopteris Brauniana* (Karst.) O. Ktze. from Colombia (Karsten; Lindig Ht. 261 (B); Lehmann (RB)). It has free veins but is in habit rather a species of *Aspidium*, to which genus I refer it, wherefore it is not included in this paper.

In the following I deal with 24 species. It is, in this subgenus, impossible to draw a sharp line between the bipinnatifid and the more divided species. Some of the species vary considerably in cutting being bipinnatifid, bipinnate or tri-pinnatifid. I have chosen to include in this monograph those species only of which I have had type-specimens and which in the most developed form are scarcely more than bipinnate.

The 24 species can be divided into smaller groups, which are connected by intermediate characters:

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1) The group of *D. submarginalis* including the species 29—40, closely allied species with differently shaped but never bullate scales; stipe at base as a rule with a dense mass of large scales. Veins reaching the margin.

2) The groups of *D. Lindeni*, including the species 44—46, smaller Central-American species with very characteristic bullate scales; base of stipe scaly but not with a dense tuft of large scales; veins often furcate, not reaching the margin. The species 41—42, *D. nigrovenia* and *D. Tnduzii* are intermediate between the first and the second group.

3) The group of *D. platyloba*; hereto the species 48—52, characterized by broad, obtuse segments with normally furcate veins, which do not reach the margin. The lamina is often finely pellucido-punctate; by this character as well as by venation the species of this group resemble *Stigmatopteris*, from which they differ by the non-serrated apex of the pinnae and by the presence of articulated hairs. In some of the species the articulated hairs are subulate, and very short, unicellular hairs are also found. To this group mainly decompound species belong: *D. refulgens* is an intermediate between the first and the third group.

**Key.**

1. Veins normally simple, still often forked in the basiscop enlarged segments of the lower pinnae.

2. Segments normally entire or faintly crenate or serrate; the basal pair of pinnae scarcely enlarged.

3. Pinnae incised 1/3—2/3 of the way to the costa; the lower 2—5 veins run to the sinus.

4. Pinnae incised 1/3—1/2 into broad, obtuse segments; the lower 4—5 veins (2 pairs) run to the sinus.

5. Pinnae 10—15 cm long by 21/2—3 cm broad, abruptly and shortly acuminate; scales few, dark, toothed. Brazilian species

29. *D. pedicellata* (Christ) C. Chr.

5. Pinnae 20 cm long by 4 cm broad, long acuminate; scales numerous, entire, reddish. Andes and Guiana... 30. *D. refulgens* (Kl.) C. Chr.

4. Pinnae incised 1/2—2/3; 2 basal veins run to the sinus. Scales very few and small, dark. Lamina generally with a distinct terminal pinna.

31. *D. alsophilacea* (Kze.) O. Ktze.

3. Pinnae incised to a narrow wing to the costa or larger ones of some species fully pinnate in their basal part.

4. Scales of rachis dark and rigid, not thin, hairlike and not broad and reddish. Indusium persistent.
5. Scales of costa entire or slightly toothed. Lamina often glanduloso-pubescent. Veins 5—10-jugate.
   32. \textit{D. falciculata} (Raddi) O. Ktze.
   41. \textit{D. nigrovenia} (Christ) C. Chr.
7. Both surfaces (costa excepted) glabrous or glanduloso-pubescent.
8. Veins reaching the margin. Lamina thin, light-green.
   32. \textit{D. falciculata} var. paranaensis C. Chr.
4. Scales of rachis reddish or yellowish, thin, hairlike or broad. Lamina mostly light-green.
5. Scales of rachis not many, hairlike. Sori medial or supramedial.
   34. \textit{D. submarginalis} (L. & F.) C. Chr.
   35. \textit{D. Karstenii} (A. Br.) C. Chr.
5. Rachis densely scaly by broad, reddish or dirty-brown scales. Sori medial or inframedial; indusium in most species persistent.
6. Scales toothed or fringed by long cilia, their base flat.
7. Scales with long cilia along the margins. Veins 6—8-jugate.
   36. \textit{D. deflexa} (Klf.) C. Chr.
40. D. cirrhosa var. eriocaulis (Fée)
2. Segments normally distinctly serrated or lobed, at least those of the basal pinnae. Central American and Andine species.
4. Veins reaching the margin.
5. Surfaces with scattered, short, thick hairs, not glanduloso-pubescent. Larger species, generally dark-green 41. D. nigrovenia (Christ) C. Chr.
5. Both surfaces (costæ excepted) glabrous or glanduloso-pubescent. Lamina thin, light-green.
6. Surfaces not glanduloso-pubescent, scales of stipe and rachis rather thin, from a broad base narrowed into a hair-like apex, those of rachis bullate........... 42. D. Tonduzii (Christ) C. Chr.
5. Pinnae pinnatifid only; segments serrated.
44. D. Lindeni (Kuhn) O. Ktze.
5. Pinnae pinnate in the lower half; segments or pinnules ligulate, entire or deeply lobed with 2—3 obtuse lobes.
46. D. lanceolata (Bak.) C. Chr.
3. Basal pinnae the largest, bipinnatifid; upper ones smaller, pinnatifid with entire segments.
4. Small. Veins not reaching the margin. Sori very large, persistent.
46. D. lanceolata (Bak.) O. Ktze. var.
47. D. Hemsleyana (Bak.) C. Chr.
1. Veins normally furcate.
2. Hairs of the common type, short, rarely unicellular. Veins generally not reaching the margin.
5. Andine species.

6. Pinnae scarcely incised to costa, the segments entire (the lower basal one excepted).
7. Sori placed at the base of the anterior branch of the forked vein. Scales narrow, dark. 48. *D. honesta* (Kze.) C. Chr.
7. Sori above the middle of the anterior branch of the forked vein. Scales broader, yellowish. 49. *D. yangensis* Christ et Ros.

52. *D. biserialis* (Bak.) C. Chr.
5. Brazilian species. 51. *D. platyloba* (Bak.) C. Chr.
5. Lamina fresh-green. Basal segments reduced. 50. *D. leptosora* C. Chr.
5. Lamina brownish-green. Basal segments not reduced, the lower one of the upper pinnae decurrent and adnate to rachis.

51. *D. platyloba* (Bak.) C. Chr.


29. **Dryopteris pedicellata** (Christ) C. Chr. comb. nov. — Fig. 4.


*Type from Brazil*: São Paulo, prope Santos, leg. WETTSTEIN & SCHIFFNER. (Original in Herb. Mus. Wien! and C!).

A Brazilian representative of the Andine *D. refulgens* and together with that species different from all other species of the subgenus by the pinnae being incised scarcely more than halfway to the costa. From *D. refulgens* it differs 1) by the dark-green leaf, which is 20–25 cm broad; pinnae 2½–3 cm broad, 2) pinnae from a truncate base oblong-linear with parallel edges suddenly narrowed into a short, acute apex; segments close, 4 mm broad, truncate and often emarginate at the apex; veins 7–9, the lower 2–4 running to the sinuses, all reaching the margin, or often the lower-most pair do not reach the sinus but end in the leaf-tissue below the sinus, 3) rachis and costae beneath sparingly scaly; scales small, dark reddish-brown, mostly ovate with a short apex and shortly toothed margins; cell-walls
dark and thick, the Lamina small; those of the costa beneath adpressed, not patent (fig. 3,5); 4) stipe at the base with some dark-brown, rather long scales. — Sori small, medial, exindusiate. — From D. alsophilaceae, to which it is closely related, it differs by its more numerous and close pinnae, its larger scales and by the short, pinnatifid apex of the lamina.

D. pedicellata is confined to Southern Brazil, where it seems to be a rather common species, I have seen the following additional specimens (for others see ROSENSTOCK Hedwigia 46: 117).

São Paulo: Santos, Mosén nr. 3089 (Rg).
Sta. Catharina, Itapocó, Schwacke nr. 12935 (C). — São Francisco, Ule nr. 75 (RB).
Paraná, Serro do Mar, Ypiranga, Dusén nr. 6753 (S).

30. Dryopteris refulgens (Kl.) C. Chr. Ind. 288. 1905. — Fig. 5a.


Type from Guiana, Schomburgk nr. 1128 et 1183 (B!)

A very distinct species, in cutting very near D. pedicellata, in size, colour and scales near D. eriocaulis. Stipe below with a dense mass of long, reddish scales. Lamina yellowish-green, firmly herbaceous or membranous, 50 - 60 cm long; pinnae about 20 cm long by 4 cm broad, acuminate, incised about halfway to the costa into 7 mm broad, bluntly rounded or subacute, faintly toothed or entire segments. Rachis and costa beneath scaly by red, narrow, entire scales with thin cell-walls, much like those of D. eriocaulis but their base flat; scales of costa patent, mostly at right angles to the costa (fig. 3,6). Margins and veins beneath finely pubescent, the underside sometimes glandular by red, sessile glands. Veins 9-11-jugate, the lower 3-5 running to the sinus, the lowermost much ascending, the upper ones not reaching the margin. Sori medial or slightly inframedial, exindusiate.

Judging from the structure of the scales this very beautiful species is more related to D. eriocaulis than to D. pedicellata, and stands to that species as D. pedicellata to D. ctenitis.

Guiana: Schomburgk nr. 1128 and 1183 (B). — Demerara, Jenman (B).
Colombia: Magdalena, Lindig nr. 382 (B).
Panamá: Schott nr. 7 (B, W).
Brasilia: Rio Negro, São Gabriel, Spruce nr. 2100 (B = Ph. tricholepis Fée).
var. peruviana n. var. — Fig. 5b.


Pinnae incised scarcely more than one third with about 3 pairs of veins running to the sinus; lower veins irregularly flexuose and sometimes united. Scales few and small, ovate with a short apex. Otherwise typical.

Peru: Tarapoto. Spruce nr. 4657 (L, B), 4712 (W) — Stübel nr. 1997 (B).

31. Dryopteris alsophilacea (Kze.) O. Ktze. Rev. 2: 812. 1891. — Fig. 5c.


Nephrodium alsophilaceum Bak. Fl. bras. 17: 474. 1870; Syn. Fil. 495.


Lastrea aspidioides Pr. Epim. 41. 1849!

Dryopteris tenuifolia C. Chr. Ind. 297. 1905, non Ktze.

Aspidium lijucense Fée, Cr. vasc. Br. 2: 72. tab. 102. 1872—73.

Dryopteris italicaensis C. Chr. Ind. 272. 1905.

Type from Rio leg. Pohl (herb. Presl!).

Fée’s plate cited above is a good figure of this species, which is intermediate between D. pedicellata and D. falciculata var. paranaensis; it is marked by its remote and long-stalked pinnae, its distinct terminal pinna and its few and small scales. Pinnae in 6—7 pairs, at distances of 5—6 cm, shortly acuminate, incised \( \frac{2}{3} \) of the way to the costa into falcate, entire, obtuse segments; scales of the costa beneath very few and small, narrow-linear, scarcely toothed, dark-coloured, (fig. 3,10). Surfaces glabrous; colour dark-green; texture membranous. Veins 8—10-jugate, the lower 2 running to the sinus. Sori medial with a subpersistent, reddish, glabrous indusium. Rhizome oblique with numerous red-brown scales at the top, but not with a dense mass of long scales.

A very constant species, which I had identified (following Mettenius) with Lastrea tenuifolia.
Presl and in Ind. Fil. therefore renamed *Dr. tenuifolia*. *L. tenuifolia* Pr. is however a form of *D. submarginalis*, and therefore I must fall back to the specific name *alsophilacea*. The species is confined to the mountains of South-eastern Brazil, and I name here some collector-numbers.

Rio: Schottmüller fir. 35 (B), Mosén fir. 99 (Rg, S), Dusén fir. 1611 (C, W), Glaziou fir. 5262 (B, H, Rg = *A. tijucense* Fée).

S. Paulo: Wacket fir. 185 (R), Rio Tieté, Gerder fir. 87 (R), Hans fir. 127 (R).

Santa Catharina: Joinville, E. Ule fir. 42 (BB).

32. *Dryopteris falciculata* (Raddi) O. Ktze. Rev. 3²; 378. 1898; C. Chr. Ind. 264.


*Dryopteris chrysoloba* O. Ktze.; C. Chr. Ind. 257 (which see).

*Polypodium distans* Ktze. Enum. 113. 1824!

*Aspidium Schomburgkii* Ktze. Linnaea 20: 369. 1847!

*Aspidium Schottianum* Ktze. (Bak. Syn. 262. 1867).

*Aspidium mucronatum* Beyrich msc.!

*Aspidium sericeum* Fée, Cr. vasc. Brés. 1: 144 tab. 42, fig. 1. 1869!

Type from Rio, not seen, but numerous specimens from Rio agree perfectly with Raddi's figure, and I consider them typical. They can be described as follows:

Rhizome obliquely erect. Stipes fasciculated, up to 3—4 dcm long, slender, brownish stramineous, very shortly hairy and like the apex of the rhizome clothed with black-brown, rather thick and rigid, entire and long acuminate scales, which are 1 mm broad and 4—5 mm long; in the upper part of the stipe the scales become fewer and deciduous. Rachis like the stem, somewhat angular and bisulcate above. Lamina deltoid-lanceolate with the lowest pair of pinnae not or a little reflexed, towards the apex rather suddenly narrowed but without a distinct, terminal pinna, herbaceous, generally dark-green, 30—60 cm long, 20 cm broad. Larger pinnae shortly petiolulate, lanceolate, 10—13 cm long, 2—2½ cm broad, subopposite, ciliate, truncate at the base, acuminate, the basal pair often with the lower side enlarged. Costae above densely tomentose by crisped, pluricellular, reddish hairs, which in some forms also occur on the veins and leaf-tissue; costae beneath with some few small, entire or rarely slightly dentate, reddish-brown scales, which are ovate with a long hair-like apex and formed by almost isodiametric cells with rather thick walls (fig. 3²), surfaces glabrous or more or less glandulos-o-pubescent. Basal segments sometimes quite free and very often much reduced. Larger segments a little falcate, as a rule faintly dentate, obtusely rounded at the apex or in some forms submucronate, 3—4 mm broad, connected by a very
narrow wing. Veins simple, 6–8 to a side, the basal ones much upcurved and reach the margin above sinus, the upper ones very oblique and run out in the teeth, about all soriferous. Sori middle-sized, yellowish brown, a little above the middle of the vein. Indusium rather large, yellowish, glandulosos-ciliate, persistent.

The form here described is very common in the mountains round Rio; the original specimens of Pol. ciliatum Pr. (hb. Presl!), Aspid. chrysobulum Klff. (B!) and A. muronatum Beyrich (B!) differ not at all. I have seen numerous specimens, f. inst. Glaziou nr. 7949, Mosén nr. 98, 2696, 2697 etc., and they vary only a little, mainly in pubescence. Two extreme forms can be separated:

f. glabratia Hieron. msc.
Surfaces (costae excepted) quite glabrous.

— Glaziou nr. 12288 (B, H) and others. — This form is probably Neptrodiuwm chrysobulum Bak. Fl. Bras. and Syn. Fil.

f. sericea Fée = Aspid. sericeum Fée, A. Schottianum Kze.
Both surfaces throughout densely and shortly glandulosos-pubescent.

— Glaziou nr. 957, 1658 (H).

Between these two extremes one finds numerous intermediate forms, and I consider them all belonging to the typical form of the species. This seems to be rare in other parts of Brazil. I have seen the following specimens only:

Minas Geraes: Lagoa Santa, Warming (H) — Clauseen (B).
São Paulo: Santos, Usteri (C) — Iguap, Wettstein u. Schiffner (C) — ?Ulebritc'h nr. 57b (R).
Parahyba: Göldi (C) = f. glabratia.
Rio Negro: Ega, Martius (B) — Segments dentate, approaches D. nigrovenia.
British Guiana: Schomburk nr. 1167 (B = A. Schomburkii Kl.; rather typical).

A specimen in B gathered and determined (?) by Raddi as Polypodium falci- 
culatum Raddi, Opusc. sci. Bol. 3: 288. 1819; Pl. Bras. 1: 24 tab. 36 bis, belongs to the typical form of D. falciwalata, but it does not agree perfectly with Raddi's description. What P. falciwalata Raddi may be is questionable; probably it is a form of the present species.

In the southern states of Brazil are to be found a series of forms, which do not differ essentially from typical D. falciwalata, while they in some characters are so different, that it is possible that they belong to a distinct species, intermediate between D. falciwalata and D. eucalius. I refer them to D. falciwalata as

var. paranaensis n. var.

Syn. D. falciwalata Rosenstock, Hedwigiia 46: 116. 1906, where Dr. Rosenstock has given an excellent description of this variety.


It differs from D. falciwalata type by the following characters: 1) Stipe at base with numerous, long scales, almost as in D. submarginalis, 2) lamina larger
and broader: pinnae up to 15 cm long by 3½—4 cm broad; segments 5 mm broad, costae above and margins excepted quite glabrous, 3) stipe, rachis and costae beneath rather densely scaly, the scales rigid, nearly black, more or less dentate with a long fibrillose apex, the cell-walls thick and dark (fig. 3²). 4) veins 10—11, more distinct than in the type.

From D. ctenitis it differs by fewer veins and medial or supramedial sori and by the shorter teeth of the scales.

Besides the specimens enumerated by Rosenstock (l. c.) I have seen:

Santa Catharina: Rajahy, E. ULE nr. 190 (RB).
Paraná: Maréchal Mallet, P. Dusén nr. 3068 (C).
Minas Geraes: Serra do S. José d'El Rey. A. Silveira nr. 358 (C).

Most specimens referred hereto with doubt by Rosenstock belong to D. submarginalis.

33. Dryopteris ctenitis (Link) O. Ktze. Rev. 2: 812. 1891; C. Chr. Ind. 260.

Aspidium squamigerum Mett. msc. (Bak. Syn. 265 nota)! (non Fée nec Mann).
Aspidium amaurolepis Fée, Cr. vasc. Brés. 1: 137 tab. 44 fig. 2. 1869!
Aspidium isabellinum Fée, Cr. vasc. Brés. 1: 137 tab. 45 fig. 2. 1869!
Dryopteris isabella. C. Chr. Ind. 272. 1905.

Link founded this species on plants cultivated in the Botanical Garden of Berlin and the type specimen (B!) belongs to a somewhat abnormal form, which after a detailed analysis of the original specimens of each was found to be identical with A. squamigerum Mett. and A. amaurolepis Fée. The species is well figured by Fée on the plates quoted above. The rudimentary lower pinnae of A. isabellinum (tab. 45 fig. 2) are not normal ones; in some specimens I have found similar abnormal pinnae, which are not always the lower ones; in such pinnae the lower segments only become fully developed, the costa suddenly terminating in a scaly bud.

D. ctenitis is intermediate between D. falciculata and D. submarginalis and it is very difficult to distinguish some of its forms from these species, still I think the following characters mark it sufficiently.

Leaf as dried dark-brown or red-brown, thin. Rachis clothed with dark and stiff, fibrillose scales with a long hair-like apex, shortly pubescent in the furrows above. Pinnae rather distant, up to 20 cm long by 3—4 cm broad, the edges parallel from the base to the middle. Costae beneath more or less short-
hairy and more or less scaly by filiform scales, which are distinctly and sharply toothed by claw-shaped teeth; the cell-walls very dark and thick, the lumina small (fig. 316). Under-surface often glandular. Segments patent or a little oblique, with the edges parallel, the apex truncate or bluntly rounded, entire or finely toothed, not mucronate. Veins 10—15, oblique. Sori inframedial, rarely almost medial, furnished with a persistent, reddish, glabrous or slightly ciliate and glandulose indusium.

From D. falciculata the present species differs by more veins in the patent, obtuse segments, inframedial sori and the different shape of the scales; from D. submarginalis it differs by the dark colour of the lamina and scales, obtuse segments, inframedial sori and persistent indusia.

The specimens examined can be referred to two forms:

1. forma isabellina (Fée).

Scales of rachis and costae few and small, very like those of D. submarginalis f. tenuifolia but darker and more distinctly toothed (fig. 316d); rachis, costae and both surfaces hairy by scattered, red, deciduous hairs. Pinnæ 21/2—3 cm broad; segments rather oblique, finely toothed or often deeply serrate in the lower pinnæ. Veins 10—12, forked in the serratæ segments; sori often nearly medial. — Stipe at base with a dense mass of soft, reddish scales.

This form, to which the original specimen of A. ctenitis Link seems to belong, is very closely related to D. submarginalis f. tenuifolia, from which it differs mainly by colour, structure of the scales and the persistent indusium.

Brazil: Rio, Glaziou br. 2368 (C, H, Rg), 2371 (H), 2372 (H, Rg).
Minas Geraes: Lagoa Santa, Warming (H) — Caldas, Lindberg br. 557 (B), Mosén br. 2146 pt. (B, Rg).
São Paulo: Tieté, Gerder br. 84a (R) — Toledo, Schnapp br. 43 (C).

2) forma amaurolepis (Fée) — (A. amaurolepis Fée, A. squamigerum Melt., Lastrea distans Brack.)

Larger and more scaly than the preceding form, the scales larger and darker. Costae beneath flat and sulcate, furnished with two kinds of scales: 1) lateral ones, which are red-brown and patent (fig. 316b), and 2) frontal ones, which are adpressed and almost black (fig. 316c). Both surfaces generally glabrous. Pinnæ 4 cm broad, the segments close, patent, obtuse; veins about 15; sori inframedial. — Stipe at base apparently without a dense mass of soft scales.

Between this excellent form and f. isabellina numerous intermediates are to be found, the two forms described being the two extremes of D. ctenitis.

Brazil: Rio, Glaziou br. 1680, 2370 (H), Mosén br. 100 (Rg, S), Martius (Hb. Fl. Brazil br. 324 (B), and others.
Minas Geraes: T. de Moura (B).
Bahia: du Pasquin 1851 (B). Luschnath br. 118 (B).
34. **Dryopteris submarginalis** (Langsd. et Fisch.) C. Chr. Ind. 296. 1905.


*Apidium caripense* Mett. et auctt.


(For other synonyms see under the different forms).

**Type from S. Brazil, Sta. Catharina.**

As here understood this is the most variable species of the subgenus. Some of its forms are closely related to *D. falciculata* var. *paranaensis*, others to *D. ctenitis*; certain South Brazilian forms resemble very much *D. deflexa* and an andine form is not unlike *D. refulgens*. All these forms are, however, connected by all possible intermediates, and I have found it impossible to distinguish them specifically, while they all differ, as a rule, from the related species by some few characters, which are common even to the most different forms. The species is distributed from Mexico to Peru and from N. Brazil to Uruguay, and I first succeeded in recognizing the special characters of the different forms by sorting the more than 200 specimens examined by me after locality. Then it was found that almost all specimens from each of these three regions 1) Brazil from São Paulo southwards to Argentina and Uruguay, 2) Brazil from São Paulo northwards, and 3) Andes from Mexico to Peru constantly show some peculiarities, especially in the structure of the scales, by which they differ from specimens from another region but resembling them in size, habit, colour and other characters.

*D. submarginalis* may be distinguished from allied species by the following characters:

Stipe at base with a very dense mass of 3—4 cm long, thin, red-yellow scales. Leaf light-green, firmly herbaceous, ciliate, lower pinnæ generally reflexed; segments oblique, rarely falcate, entire or often faintly toothed, obtuse or mucronate. Rachis and costæ beneath more or less scaly, the scales red-yellow or red-brown with a long hair-like point, their margins toothed by short, mostly not curved teeth, the cell-walls clear. Costæ beneath without hairs. Veins simple, 8—15, the basal ones running out near the sinus. Sori medial or slightly supramedial, reddish-yellow. Indusium small, reddish, glabrous, generally absent. — As a rule the surfaces are glabrous; in some specimens scattered hairs can be found mainly on the veins above, in others the under-surface is slightly glandular.

In the following I shall try to explain the recognized forms. As the species was founded on a Brazilian form I begin with this, although it is not the most developed form of the species.

A. **South-Eastern forms**

1. forma *vera* (Langsd. et Fisch. tab. 13).

*Syn. Dryopteris Sellowii* Hieron. *Hedwigia* 46: 324 tab. 3 fig. 1. 1907!

*D. ctenitis;* var. *soriloba* Christ. in Fedde, Repertor. 6: 350. 1909!

Lamina 4–7 cm long; pinnae rather distant, 10–12 cm long, 2–2 1/2 cm broad; segments oblique or often subfalcate, faintly toothed in the outer half and generally with a mucronate apex. Veins 10–23. Sori supramedial, very often confined to the outer half of the segment (D. soriloba Christ). Rachis and costae more or less scaly; scales of costa ovate with a long, hair-like point, clear and thin, their cells large with thin walls, the edges faintly and distantly toothed (fig. 311a).

This form comes near to D. deflexa in size, habit and colour of scales but is different by the subentire scales. It is confined to the Southern Brazilian States and the neighbour-republics; agreeing best with the original description and figure are the specimens from Rio Grande do Sul and Misiones; some of the specimens from Paraná and Sta. Catharina are intermediate between this and the following form. — D. Sellowii Hieron. is exactly this form.

Argentina: Tucuman, Siambon, Hieronymus u. Lorentz nr. 795 pt. (B) — Misiones, Campament Bosetti, Niederlein (B); Soreto, Niederlein nr. 253 (B); Puerto Tamarac, Niederlein (B); Bonpland, Ekman nr. 1, 2, 3 (Rg). Uruguay: Coronilla, Berro nr. 2382 (C, CC).

Paraguay: Colonia Elisa prope San Antonio, Lindman (Rg) — Cordillère de Mbatobi, Paraguari, Balansa nr. 2917 (B, H) — Sierra de Amambay. Hassler nr. 10454 (C, RB = D. soriloba Christ! and perhaps the same as D. collina Christ).

Brasilia: Rio Grande do Sul: Setra dos Tapes, Cascata, Lindman nr. A. 905 (Rg, W) — Excolonia Santo Angelo, Lindman nr. A. 958 (Rg) — Neu-Württemberg, Estancia L. Gomez, A. Bornmüller nr. 273 (R) — S. Leopoldo, Hamburger Berg, Sröbel nr. 1173 (B = D. Sellowii). — Sta. Catharina: Blumenau, Haerchen nr. 49, 50 (R) — Goeden nr. 43 (R). — Paraná: S. Matheus, Gänzlky nr. 8 u. 35 (R) — Villa Nova, Annies nr. 42 (R), — and others.

Intermediate forms between forma 1 and 2.

Sta Catharina: Blumenau, Haerchen, Kos. Fil. exsicc. nr. 153 (B, R, Rg, W).

São Paulo: Toledo, Stier nr. 32 (R), Schnapp nr. 30 (R), Ulbricht nr. 55 (R) — Campinas, Ulbricht nr. 59 (R).

2. forma tenuifolia (Presl).

Syn. Lastrea tenuifolia Pr. Epim. 37, 1849!

Aspidium caripense f. macroloba A. Br. Ind. sem. ht. Berol. app. 1857: 2!

Phegopteris Oreopteridastrum Fée, Cr. vasc. Br. 1: 97. 1869 (Glaziou 963).

Aspidium Sancti Pauli Christ, Denkschr. Akad. Wien 79: 15. 1907!

Larger than the preceding form, leaf one meter or more long, pinna 20 cm long by 3–3 1/2 cm broad, often contiguous and erect, so that the leaf becomes a very compact habit. Segments slightly oblique or patent, seldom subfalcate, generally bluntly rounded at the apex and faintly toothed, sometimes mucronate. Scales as a rule fewer than in the typical form, those of the costa beneath generally hair-like consisting of a few rows of cells (fig. 311b). — Veins 12–15-jugate. Sori often medial, extindsayiate (always?).

This is the common form of the mountains of the states Rio de Janeiro and Minas Geraes, where it was collected by almost all collectors. The original specimen of Lastrea tenuifolia Presl was collected near Rio by Pohl (Herb. Presl!);
in my Index it was identified with *D. alsophilaca* because Mettenius referred Presl’s species to *A. alsophilacenum*. — I have examined a series of specimens and enumerate here the more important collector-numbers.

São Paulo: Villa Nova, Annies nr. 24 (R) — Rio Tietê, Gerder nr. 84 (R) — Campinas, Heiner nr. 516 (Rg) — Serra de Caracaé, Mosén nr. 4620 (Rg) — Wettstein u. Schiffner 1901 (= A. Sancti Pauli Christ, C. Hb. Wien).

Rio de Janeiro: Glaziou nr. 963, 15767 (H).

Minas Geraes: Caldas, Lindberg nr. 5398 (B), Regnell nr. 475a (Rg, W); Mosén nr. 2146 pt. 2147, 2148, 2149, 2150, 4619 (Rg) — Cortejo d’Olho d’Água del Antonio Pereira, Schwacke nr. 15652 (C) — Ouro Preto, Schwacke nr. 11291 (C); M. Gomes nr. 3113 (C).

Matto Grosso: H. Smith (C).

Goiás: Serra de Baturité, Huber nr. 6.137 (C).

B. Andine forms.

3. forma *caripensis* (Willd.).

Syn. *Polypondium caripense* H. B. Willd. sp. 5; 202. 1810!


Nearly identical with *f. tenuifolia*, but generally with smaller pinnae (15 cm × 2½ cm) and fewer veins (10—12), which are not so close as in the Brazilian forms. The scales of the costa beneath are never hair-like but rather uniform (fig. 314c). Underside often glandulose.

Mexico: Orizaba, Weber B) — Müller (B) — Mirador, Liebmann (H) — Sierra San Pedro, Nolasco, Talea etc. C. Jérgensen nr. 228 (RB).

Guatemala: Coban, Alta Verapaz, v. Tuerckheim nr. II. 1204 (W).

Nicaragua: Cañada Yasia, Dep. Matagalpa, E. Rothseckh nr. 237 (B).

Costa Rica: Turrialba, Donn. Smith nr. 5095 (C, W); Navarry, Wercklé nr. 16780 (RB, CC); Juan Viñas, Reventazon Valley, 1000 m, Cook and Doyle nr. 185 (W); J. J. Cooper nr. 3722. ed. Donn. Smith sub nr. 6018d (W).

Colombia: Caripé, Humboldt (B, herb. Willd. nr. 1970); Linden nr. 1010 (RB).

Venezuela: Tovar, Moritz nr. 38, 39, 207, 208 (B); 106 (G, B, S); Fendler nr. 197 (B), Caracas, Funck et Schlim nr. 270 (RB).

*Aspidium microchlaena* Fée, 8 mém. 102. 1857; *Dryopteris microchlaena* C. Chr. Ind. 278. 1905 from Mexico, Orizaba, Schaffner nr. 459 can, I think, with certainty be referred to this form of *D. submarginalis*. Fournier (Mex. pl. 1: 93) united it with *Aspidium microcarpon* Fée, 8 mém. 105, based on Schaffner nr. 214 from Cordoba, Mexico. *Nephrodium crinitum* a Sod. is most probably the true *caripensis*.

4. forma *glaucescens* (Sodiro).


Under-surface more or less glaucous and often glandular. Sori often found furnished with a somewhat glandulose and ciliate indusium; segments acute and faintly toothed. Otherwise like *f. caripensis*.

Ecuador: Qualea, Sodiro (C).

Colombia: La Vega, Lindig nr. 337 (B).

Venezuela: Lansberg (B).

Costa Rica: Wercklé nr. 16756 (C).
5. var. tarapotensis (Hook.).


A form with pinnae resembling in shape exactly those of D. Karstenii, with which Mettenius identified it; it differs from that species by more veins (10—12 to a side) and lack of articulated hairs on veins and costa beneath; from typical D. submarginalis it differs by its very obtuse segments.

Peru: Mt. Campaña, prope Tarapoto, Spruce no. 4016 (Kew).

6. var. Lagerheimii (Sod.).

Syn. Nephrodium Lagerheimii Sodiro, Cr. vasc. quit. 252. 1905.

Dryopteris Lagerheimii C. Chr. Ind. 273. 1905.

Large; stipe and rachis very scaly; scales of the stipe below about 5 cm long, those of the costa beneath numerous and much broader than those of f. caripensis. Leaf 1 m long, pinnae 20 cm long by 3 cm broad; segments rather falcate, finely toothed at the outer part; veins 15—17-jugate; indusium often present. In general habit not unlike D. refulgens.

Ecuador: Andes quitenses, LAGERHEIM, comb. SODRIO (S, C) — Spruce no. 5294 (CC, H, L, RB, S).

Colombia: Cune, 1100 m, Lindig no. 295 (B).

Peru: Ruiz no. 68 (B).

35. Dryopteris Karstenii (A. Br.) C. Chr. comb. nov. — Fig. 6.


Type-specimen in B!, cultivated in Hort. Berol. and raised from spores of plants collected by Karsten in Venezuela.

Closely related to D. submarginalis resembling it in the reddish scales, which form a tuft at the base of the stipes, but receding from it in the direction of D. falciculata. Compared with D. submarginalis the main characters of D. Karstenii are the following: Middle-sized; stipe 3 1/2 dem long, like rachis clothed with hairs, hair-shaped scales and broader scales. Lamina 5—6 dem long, 2—2 1/2 dem broad; largest pinnae 10—12 cm long, 2—2 1/2 cm broad; both sides throughout with short, scattered, reddish hairs, costa beneath furnished with hairs and scales and with all intermediates between these two kinds of trichomes (fig. 3 15). Segments close, slightly oblique, entire, broadly obtuse and often emarginate, upper basal one often quite free and a little shortened. Veins 6—8-jugate, sori medial or a little supramedial furnished with a persistent, ciliate indusium.

— "Truncus erectus sensim supra terram elatus demum fere pedalis una cum phyllopodiis laxius dispositis paleaceus" (A. Braun l. c.), while the caudex of D. caripensis is described thus: "truncus erectus supra terram elevatus demum semipedalis et altior una cum phyllopodiis satis confertis dense paleaceo-lanatus paleis valde elongalic (fere pollicaribus) linearibus in pilum excurrentibus" (A. Braun l. c. pag. 2).

From D. falciculata and D. nigrovenia our species differs by the shape and structure of the scales.

Venezuela: Moritz no. 209, Lansberg, Gollmer, (B), Puerto Cabello, Karsten (C).
36. Dryopteris deflexa (Klf.) C. Chr. Ind. 261. 1905.

Polyopodium vestitum Raddi, Opusc. sci. Bol. 3: 288. 1819; Pl. Bras. 1: 24 tab. 36. 1825 (non Forst. 1786).
Aspidium Raddianum Mett. Pheg. n. Aspid. 91 nr. 221. 1858.
Nephrodium Raddianum Hk. sp. 4: 98 tab. 245. 1862.
Aspidium basilare Fée, Cr. vasc. Brés. 1: 135 tab. 43 fig. 2. 1869!

Type specimen from Brasilia, Mertens communicavit (not seen). It is, however, sure that P. deflexum Klf. is identical with P. vestitum Raddi; the terms of the original diagnosis "costis venisque infra paleis rastero-ciliatis teetis, soris venae adproximatis" show it sufficiently. Whether Polypodium lepigerum Schrad. Gött. gel. Anz. 1824: 868 is the same, as suggested in Ind. Fil., is questionable. The short diagnosis agrees also with other species of this group; perhaps it is identical with var. Aschersonii (see below).

A very distinct species at once to be distinguished from allied species by the very scaly rachis and costae and costulae beneath; the scales are light flat, appressed, formed by large clear cells and with very long hairlike fringes on the margins (fig. 3). By this last character it differs from the more scaly forms of D. submarginalis f. vera, which are very similar D. deflexa in size and colour of the scales; still D. deflexa seems to want the dense tuft of scales at the base of the stipe. — Lower pinnae reflexed; veins about 8 to each side, the basal pair reaching the margin above sinus. Sori inframedial, often close to the costa (A. basilare Fée), furnished with a small deciduous indusium. — Leaf-tissue hairless, underside sometimes slightly glandular.

A fairly constant species, apparently common in the mountains near Rio. I have seen the following specimens:

Rio: Sellow nr. 680 (B); Riedel (B, H, W); Mosén nr. 97, 2704 (H, Rg), 2703 (Rg); Glaziou nr. 2373 (H), 2374 (C, H, Rg); Goeldi (C); Miran (Hb. Presl).
Parahyba: Goeldi (C).

var. Aschersonii Mett. nsc.

Differs from the type by the sessile pinnae and persistent indusia; it is still more scaly than the type, and the scales are formed by small cells with very flexuose cell-walls.

Prov. Espírito Santo, an der Minasstrasse, Prinz zu Wied 1816 (B).
37. Dryopteris Anniesii Rosenstock, Hedwigia 46: 118. 1907. — Fig. 7.

Type from Brasilia, Rio Grande do Sul, Campestre do Seivaes, leg. JÖRGENS u. STIER nr. 158 (R¹).

A large species; leaf 1 m or more long with numerous, alternate pinnae, which are up to 20 cm long by 2¹/₄—2¹/₂ cm broad, the lower ones not or a little shortened. Segments patent or subfalcate, generally broadest towards the apex, separated by round, broad sinuses, the lower ones free or nearly so. Veins 12—15-jugate. Sori numerous subcostular or at least distinctly inframedial, reddish, furnished by a persistent, rather large, reddish, glabrous indusia. Leaf tissue of both surfaces glabrous, the underside often finely glandular, margins ciliate. — In general habit the species is not unlike D. clenitis, probably its nearest ally, which it also resembles in the dense tuft of scales at the base of the stipe, its inframedial sori and persistent indusia, but it differs considerably by the structure of the scales; these are numerous, reddish, soft and clear, not unlike those of D. deflexa, but their margins are toothed only not long-fimbriated (fig. 3¹). — Stipe and rachis dark-coloured densely clothed with adpressed, darker scales.

Fig. 7. D. Anniesii Ros. Base of pinna × 4/₅ and segments × 1⅛. (Orig.)

var. Ottonis Rosenstock in herb.

Lamina ad basin sensim decrescens: pinnis inferioribus 3—4 jugis reflexis, infinis 4—5 cm longis; paleis costarum structura f. typicae sed ad marginem ciliis nonnullis instructis, fere ut in D. deflexa.

São Catharina: Joinville, MÜLLER (R); GERLACH nr. 80b (R).

38. Dryopteris fenestralis sp. nov. — Fig. 8.

Type specimen from Brasilia: Rio, Petropolis, Alto do Imperador, leg. GLAZIOU nr. 7026, 21/₃ 1878 (H, also B).

Stipitibus 4¹/₂ dcm longis, ⅛ cm crassiss, rufis, ad basin paleis 2—3 cm longis, 3—4 mm latis densissime vestitis, supra cum rachi paleis sordide brunneis tenuissimis, 2—3 mm latis, 8—10 mm longis, laxe dispositis dense vestitis. Lamina ovato-lanceolata, ca. 7 dcm longa, infra medium 3¹/₂—4 dcm lata, atro-viridi, firma-herbacca. Pinnis alternis, inferioribus petiolulatis, acuminatis, ad 20 cm longis, 3¹/₂ cm latis, utrinque costis exceptis glabris, supra ad costas rufo-pilosis et squamis parvis longis filiformibus nonnullis instructis, infra ad costas costulas venasque squamis tenuibus latis vestitis, fere ad costam incisis vel inferioribus versus basin fere pinnatis. Lacinii falcatis basi recte truncata, apice acuto serrato, marginibus

parallelis, 4 mm latis, basali posteriore aequali vel parum reducta, anteriore sæpe valde prolongata lobata, rachi parallela vel eam tegente. Venis 15–20-jugis, parum obliquis. Soris parvis medialis vel paulo inframedialis, exindusialis (?); sporangii pilis articulatis intermixtis.

Allied to D. Anniesii, from which it differs by its numerous, not adpressed, dirty-brown, very large scales of stipe and rachis and by its small, medial sori without distinct indusia. The scales of the costa beneath are larger than in any other species and formed by large, isodiametric cells with thin walls; their margins are irregularly toothed. Seen in the microscope a scale resembles not a little an old window, hence the specific name (fig. 3').

To this species I refer a plant from Sta. Catharina: S. Joaquin, leg. SPANNAGEL DR. 174 (C, R); it is smaller but still more scaly and the scales larger and reddish-yellow; base of stipe with a dense tuft of very large, thin scales, the largest 3 cm long, 6 mm broad. It can be named var. Spannagelii Ros.


Syn. Aspidium velleum Willd. sp. 5: 255. 1810.
Nephrodium aureovestitum Hk. sp. 4: 101 tab. 246. 1862.

This species was founded on PLUMIER tab. 49, which plate illustrates a plant from San Domingo; it is probable that N. aureovestitum Hk. based on LINDEN nr. 1901 from Cuba, Mt. Libanon is the same, but I have, however, not seen any Cuban specimen. It seems to be a rare species, I have seen only a single specimen from Jamaica, leg. JENMAN (W); according to JENMAN it is common in forests on the Manchester mountains at 2000 feet altitude.

D. vellea alone represents the subgenus in the West-Indies. It resembles in size D. deflexa, but in the scales much more D. cirrhosa var. eriocaulis, from which it differs by the glabrous leaf-tissue and fewer veins (8–10). The scales are reddish, entire with a pocket-shaped base, not hair-pointed (fig. 3')

40. Dryopteris cirrhosa (Schum.) O. Ktze. Rev. 2: 812. 1891; C. Chr. Ind. 257.

Nephrodium crinibulbon Hk. sp. 4: 92 tab. 244. 1862.
var. eriocalus (Fée) C. Chr. comb. nov.

Nephrodium eriocalus Bak. Syn. 495. 1874.
Dryopteris eriocalus O. Ktze. Rev. 2: 812. 1891; C. Chr. Ind. 263.
Nephrodium ramentaceum Bak. Fl. bras. 1: 473. 1870.

Type specimen of D. cirrhosa from Guinea, tropical West Africa, leg. Thonning (H!), of var. eriocalus from Brazil, leg. Glaziou nr. 2369 (H, Herb. Cosson, Paris!).

This is the only species of the whole subgenus, which I do not hesitate to unite with an Old-World’s species; the very handsome Brazilian D. eriocalus is nearly quite identical with the African D. cirrhosa; I see no other differences than the African form being less scaly and having more acute segments and smaller sori; in shape of scales, pubescence, texture, position of sori etc. the two forms quite agree.

The South-American form var. eriocalus is very constant and the most beautiful and well-marked form of the whole subgenus; its essential characters are the following:

Stipe beneath with a tuft of scales, upwards like rachis very densely clothed with red-yellow, patent or often characteristically reflexed, entire, hairpointed scales. Lamina in size equal to D. ctenitis and D. Anniesii, shortly hairy throughout on both surfaces, beneath also glandulose; costae beneath densely clothed with red scales, which generally stand at open angles to the costa and narrow from a sub-bullate base rather suddenly into a long narrow point with revolute but quite entire edges (fig. 3). Segments oblique or subpatent, obtuse or subacute, often faintly toothed, 4½—5 mm broad. Veins 10—12. Sori inframedial or almost medial, furnished with a persistent, which is shortly hairy and sparsely glandulose.

Brasilien: Parahyba, Goeldi (C) — Rio, Glaziou nr. 2369 (H), Sellow (B), Lenormand (B) — Sao Paulo: Bella vista ad flumen Rio Pardo, Wettstein u. Schiffner 1901 (C, Hb. Wien — Rio Tieté, Germann nr. 80 (B).

Paraguay: Hassler (C).

Besides these specimens I have seen numerous others originating from plants cultivated in Berlin 1862 and Kew 1868 under the names Lastrea vestita J. Sm. and L. vulpina Kl., which latter very proper name has not been published.

41. Dryopteris nigrovenia (Christ) C. Chr. Ind. 279. 1905 — Fig. 9a.

Aspidium setosum Kl. Linn. 20: 371. 1847 (description; non Sw.).
Aspidium deltoideum Fourn. Mex. pl. 1: 93. 1872 (non Sw.).

Type from Honduras: San Pedro Sula, Depart. Santa Barbara, 1000', leg. Thieme, ed. Donnell Smith nr. 5646 (W!, C).
An andine representative of *D. falciculata*, resembling it in size, habit and texture but differing by the following characters: Stem proportionally long, 5 dcm; lamina 5 dcm long 2 dcm broad, not ciliate and not glanduloso-pubescent, but both surfaces with scattered, short and thick hairs of the common type. Rachis and costae beneath with several, small, dark-brown scales, which from an almost circular, subbullate basal part formed by large isodiamic cells and often furnished with some long cilies are suddenly narrowed into a long, narrow, entire apex, which is formed by longitudinal, narrow cells with thick cell-walls (fig. 3a). Segments subpatent or a little oblique, not falcate, generally distinctly serrate especially towards the mucronate apex, the posterior basal one of the lower pinnae often somewhat shorter, the anterior basal one of the upper pinnae generally enlarged. Veins 6—8 to each side, simple, sometimes dark-coloured. Sori medial or inframedial, small, with a subpersistent, glabrous indusium. — In some specimens the basiscop half of the basal pinnae is much enlarged with deeply lobed segments and furcate veins.

*D. nigrovenia* is distributed from Mexico to Ecuador and it varies only a little; the form described as *A. setosum* Kl. differs only by its somewhat longer petioles of the lower pinnae; to that form belong the specimens from Venezuela-Ecuador. I have seen the following specimens:

**Mexico:** San Luis Potosí, Hac. of Tamasopo, Pringle nr. 3957 (B, C, H, S, W); Vallée de Córdoba, Bourgeau nr. 1644 (B, H, S, W = *A. dettoideum* Fourr.), H. Fink nr. 55 part. (W).

**Honduras:** San Pedro Sula, Thieme ed. Donn. Smith nr. 5646 (C, W).

**Costa Rica:** Wercklé 1904 (C); Turrialba, A. et C. Brade nr. 344 (R); Grenadilla Finca Hermes, A. et C. Brade nr. 414 (R).

**Panama:** Maxon nr. 5712 (W).

**Colombia:** Santa Marta, H. H. Smith nr. 2581 (C).

**Venezuela:** Tovar, Moritz nr. 204 part. (B, G, S, = *A. setosum* Kl.), nr. 457 (B).

**Ecuador:** Andes quitenses, Spruce nr. 5721 (CC, RB).

Further I refer here a specimen from **Trinidad:** Fendler nr. 125 (W).

which, however, is very near *D. falciculata*, especially the specimens of that species from Parahyba and Guiana; thus it seems that the two species are connected by intermediate forms occurring in Northern South America, where they meet.

42. **Dryopteris Tonduzii** (Christ) C. Chr. Ind. 664. 1906.

**Syn.** *Aspidium Tonduzii* Christ, Prim. Fl. Costaric. Ill. 34. 1901.

**Type from Costa Rica:** Forêto de Tuis, Tonduz nr. 11333 (C! also W).

Intermediate between *D. nigrovenia* and *D. Lindeni* resembling the former in venation the latter in size and colour. It differs from *D. nigrovenia* by its thin, light-green leaf, which is about 25 cm long by 13 cm broad, the leaf-tissue of both surfaces glabrous but costa and costulae with scattered, short, thick hairs. Stipe up to 25 cm long, slender, throughout glanduloso-pubescent and fibrillose by thin,
patent, glossy scales, the lower ones being larger, ovate-acuminate, the upper linear and hair-pointed with a bullate base. Rachis similarly slender, glanduloso-pubescent and somewhat scaly. Pinnae 5—8 cm long, the costa and costula beneath more or less glanduloso-pubescent and furnished with bullate-acuminate scales much similar to those of D. nigrovenia. Segments oblique or falcate, the basal ones somewhat reduced, the larger serrate. Veins 5—6-jugate, very oblique, reaching the margins. Sori small, medial or supramedial, indusium small, fugacious, glandulose.

D. Lindeni is different by the veins not reaching the margins, D. strigilosa by different scales and glandular under surface.

Besides the type-specimen I refer here:

Costa Rica: Meseta, 2000 m, Alfaro nr. 16863 (C, RB), Navarro, Werckle (C).

43. Dryopteris strigilosa Davenport, Bot. Gaz. 21: 257. 1896; C. Chr. Ind. 295. — Fig. 10a.

Syn. Aspidium strigosum Dav. l. c.

Type from Mexico: Vera Cruz, dry calcareous cliffs, barranca of Metlac, 3000 ft., leg. Pringle nr. 6077 (C, H, S, W).

Near D. Tonduzi, resembling it in size, colour and texture, but the lower pinnae incised to costa and the scales different. The scales of stipe and rachis, very numerous at the base of the stipe, are up to 1 cm long, patent, dark-brown, glossy, very narrow and scarcely widened at base, entire but the margins furnished with small, capitulate glands (fig. 34a). When the scales fall they leave a scar by which the stipe becomes rough. Scales of the costa beneath are similar but smaller with a broader, still scarcely bullate base (fig. 34b). Whole leaf densely glandular-pubescent. Lower pinnae about 4 cm long, broadest at base, fully pinnate at the lower half; segments (or pinnules) distinctly serrate, generally truncate at apex, veins 4—5 to each side, simple, reaching the margin; sori inframedial furnished with a glandulose indusium.
**Polypodium subincisum** Mart. et Gal. Mém. Acad. Brux. 15: 43. 1842 from Vera Cruz, Galeotti nr. 6290 (B, a single leaf only) is rather this species than the following, to which Kuhn referred it.

**var. Cookii** Maxon in sched. (pro specie).

Exactly *D. strigilosa* in pubescence and scales but in cutting almost identical with *D. Tonduzii*; all pinnae pinnatifid only and the segments entire or faintly toothed, oblique and acute, the basal ones shortened. Lower pinnae with rather long petioles.

**Guatemala:** Alta Verapaz, near the Finca Sepacuite, on limestone cliffs, Cook and Griggs nr. 507 (W).

### 44. *Dryopteris Lindeni* (Kuhn) O. Ktze. Rev. 2: 813. 1891; C. Chr. Ind. 275 — Fig. 9b.

**Syn.** *Aspidium Lindeni* Kuhn, Linnaea 36: 116. 1869.


**Dryopteris Moreletii** C. Chr. Ind. 278. 1905.

*Type from Mexico:* Tabasco, Teapa, leg. *Linden* nr. 1489 (Kew!, Mus, Paris!).

This beautiful species was described under the same name both by Kuhn and Fournier. The type-specimen in Mus. Paris from Teapa, Linden sine num., after which Fournier named his new species, is exactly identical with the Kew specimen of *Linden* nr. 1489, which I regard as the type-number of Kuhn’s species.

**Rhizome oblique; stipites fasciculated, 15—20 cm. long, slender, at base clothed with numerous, brown, entire, from a broad base narrowed into a hair-like apex, patent scales, upwards like rachis deciduously scaly by similar but shorter scales, which from a bullate base are suddenly contracted into a long hair-shaped, rather flaccid apex, 2—2 mm long. Lamina lanceolata, 15—25 cm long, 6—9 cm broad, thinly herbaceous, fresh-green, both surfaces (costae above excepted) glabrous, costa beneath with several small, light-brown, bullate scales. Pinnae 15—20-jugate, short-stalked, the lower ones somewhat abbreviated, middle ones 3—4 cm long, 1—1½ cm broad, broadest at the base, incised to a narrow wing to the costa into oblique, obtuse, distinctly serrated segments. Veins 2—3-jugate, very oblique and not reaching the margin, simple or more commonly furcate with a posterior branch running into the teeth or lobe and an anterior one which is very short and soriferous. Sori small, medial, medial apparently apical on the short anterior branch of the furcate veins or dorsal somewhat below the apex of the simple veins, furnished with a persistent, reniform, glandulose indusium.

*D. Lindeni* is certainly a most distinct species, by its scales not essentially different from *D. Tonduzii*; it is very closely related to *D. Salvini*, resembling it in colour, shape of scales and its peculiar venation, by which it at once can be distinguished from the three preceding species. Besides the type-specimen I have only seen one more, which is absolutely identical.

**Guatemala:** Alta Verapaz, Cubilquitz, 350 m, v. Tuerckheim nr. II 839 (W).
45. *Dryopteris Salvini* (Bak.) O. Ktze. Rev. 2: 813. 1891; C. Chr. Ind. 290. — Fig. 10b.

**Syn.** Nephrodium Salvini Bak. Syn. Fil. 274. 1867.

Type from Guatemala, Savlin et Godman (Kew!), and identical specimens from the same country, Alta Verapaz, Cubilquizt, 350 m were collected by H. v. Tüerckheim, ed. DONN. Smith nr. 8647 (C, W).

In most characters: scales, venation, shape of lamina nearly identical with *D. Lindeni*, but a larger and more robust plant, lamina up to 50 cm long by 12 cm broad, the stipe and rachis rather strong; segments more deeply serrated with about 5 pairs of furcate or simple veins; basal segments nearly quite free. Indusium large, persistent.

46. *Dryopteris lanceolata* (Bak.) O. Ktze. Rev. 2: 813. 1891; C. Chr. Ind. 273. — Fig. 10c.

**Syn.** Nephrodium lanceolatum Bak. Syn. 498. 1874.

Type from Guatemala, Coban, Savlin et Godman (Kew!), also Pansamalá, Depart. Verapaz, 3800 ft., Tüerckheim ed. DONN. Smith nr. 626 (B, C, W).

In size, texture and scales not materially different from *D. Salvini*, distinguished by its partly bipinnate lamina and larger, obtuse tertiary lobes. Pinnæ
rather distant, short-stalked, fully pinnate in the lower half; segments or pinnules oblique, deeply lobed with 2–3 oblique, obtuse lobes on each side, those of the anterior side the largest, the anterior side generally entire in the lower half and decurrent at base. Veins 2–4 to a side, simple, one to each lobe and not reaching the margin, each bearing a sorus, which is placed at the base of each lobe. Indusium very large, glabrous, brown, persistent. — Surfaces (costae above excepted) glabrous, but costae and often also costule beneath furnished with rather numerous bullate scales, which resemble those of the two preceding species but are larger and more numerous. Scales of stipe and rachis rather many, from a broad, subbullate base ovate-acuminate, brown, glossy.

var. tricholepis (Bak.) — Fig. 10d.


Dryopteris tricholepis C. Chr. Ind. 298. 1905.

A smaller plant than the type, otherwise scarcely different. Lamina 10–15 cm long, 3–5 cm broad at base where generally broadest (type 25 × 10 cm, somewhat narrowed below). Pinnæ pinnate; pinnules mostly fully entire, ligulate, or the larger ones with one or two obtuse lobes. Scales typical in shape; in several specimens they are of a peculiar, metallic lustre, not unlike the scales of Polypodium moniliforme. Sori often one or two only to each segment or pinnule.

Guatemala: Ms. of Verapaz, Salvin (Kew!, type-specimen); Pansamalá, Alta Verapaz, 3800 fl., Donn. Smith nr. 1563 (W) and v. Türbkheim ed. Donn. Smith nr. 626 (B, C, W); near the Fina Sepacuite, Senaju, Cook and Griggs nr. 482 (W).

I have not seen Tonduz nr. 13764 from Costa Rica, Nicoya, by Christ referred to Aspidium tricholepis (Bak.) (Bull. L’Herb. Boiss. II. 5: 259).

var. deltoideo-lanceolata n. var.

Lamina decidedly deltoid in outline, 20 cm long, 8 cm broad at base. Basal pinnæ the largest with the lower side enlarged with pinnules 1 1/2 cm long, 6 mm broad and nearly incised to the midrib into oblique, ligulate tertiary segments. Segments or pinnules of upper pinnæ mostly entire, the upper basal one large and broad.

A characteristic form, in most characters agreeing with var. tricholepis but tending to a tripsinate state and approaching the following species, which however is very different in venation and scales.

Guatemala: Alta Verapaz, Coban, H. v. Türbkheim nr. II. 1621 (W).

47. Dryopteris Hemsleyana (Bak.) C. Chr. Ind. 270. 1905.


Type from Guatemala: Chilasco, Godman and Salvin (Kew!).
In its most developed form a very distinct species but not essentially different from *D. nigrovenia* and *D. Lindeni*. Stipe, rachis and costa beneath with many, castaneous, narrow scales, which have a broad, but scarcely bullate base and a long filiform apex, which is sometimes ciliolate. Stipes fasciculated from an erect rhizome, 25—35 cm long, castaneous, glossy. Lamina deltoid, 20—30 cm long, firmly herbaceous, dark-green, glabrous, nearly tripartite in the most developed form. Basal pair of pinnæ much the largest, up to 15 cm long, bipinnatifid, their basiscop pinnule much enlarged, 4—6 cm long; incised nearly to the costa into oblong, acute, entire or faintly toothed segments, their acroscop pinnule smaller often only 1 or 1½ cm long, sometimes not quite free, serrated or lobed halfway down to the midrib. Other pinnæ pinnatifid or fully pinnate at the base, 6—8 cm long, 2—2½ cm broad, equal-sided, their segments acute, entire or toothed in the outer part. Veins 5—8, simple, reaching the margin. Sori inframedial, small, apparently exindusiate.


*Costa Rica*: Tablazo, 1900 m, Biolley nr. 64 (C, CC, W); shades nr. 144 (B) — Surubres, Biolley (W) — La Palma, Wercklé nr. 17078, 17087 (C, CC, W) — Bord de l’aguacaliente 1300 m, Pittier nr. 2416 (B) — Forests of Virris, near la banilla, 800 m, Biolley (W).

*Panama*: Maxon nr. 5412, 5435 (W).

48. *Dryopteris honesta* (Kze) C. Chr. Index 271. 1905. — Fig. 11 b.


*Dryopteris fibrillosa* C. Chr. Ind. 264. 1905.

Type from Peru, prope Pampayaco, leg. Poeppig. — I have not seen an authentical specimen of the type-collection, but the three figures of Ettingshausen quoted above, which agree excellently with the descriptions of Kunze and Mettenius, illustrate a form that is quite identical with a specimen in Herb. Mus. Paris of Spruce’s collection nr. 4772 from Tarapoto, Peru, the type-number of *P. fibrillosum* Bak. The same form was collected in Bolivia, Antahuacana, O. Buchtien nr. 2191 (R).

Stipe below densely clothed with patent 1—2 cm long, narrow and acute, castaneous or black-brown, faintly toothed scales. Pinnæ opposite, short-stalked, 10 cm long by 3 cm broad, at distances of 6—7 cm, the lowest pair deflexed with their lower side somewhat enlarged. Rachis and costa beneath furnished with several, narrow, linear-acuminated, black-brown, faintly toothed scales (fig. 317), costa on both sides sparsely hairy or almost glabrous, surfaces otherwise glabrous. Texture firmly herbaceous, colour brownish, leaf-tissue finely pellucido-punctate. Segments broad, obtuse, shallowly repand or crenate, the basal posterior one of the
lower pinnae nearly or quite free, lobato-pinnatifid. Veins about 7—8 to a side, once or twice forked, the branches occasionally anastomosing, not reaching the margin. Sori at the base of the anterior branch of the vein, small, a little oblong exindusiate.

In general habit, colour and texture very like *D. refulgens* but totally different in venation and scales and much more deeply cut.

49. **Dryopteris yungensis**
Christ et Ros.: Rosenstock in Fletde. Repert. 5: 234. 1908. — Fig. 11a.

*Type from Bolivia: Yungas australis, Sirapuya pr. Yanacachi, 2000 m, leg. O. Buchtien nr. 493 (auth. specim. in RB!).*

Closely related to *D. honesta* and perhaps not specifically distinct. It differs by the position of the sori, which are placed at the middle of the anterior branch of the forked vein, and by the structure of the scales of rachis and costae beneath, which are broader, yellowish, the cells with large, clear lumina (fig. 3'). In all other respects the two species are nearly identical.

50. **Dryopteris leptosora**
C. Chr. Index 274. 1905. — Fig. 11d.

*Syn. Nephrodium microsorum* Hook. spec. fil. 4: 106. 1862; Syn. fil. 271.

Dryopteris microsora O. Ktze. Rev. 2: 813. 1891.

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**Fig. 11.**

a. *D. yungensis* Christ. et Ros. (orig.).

b. *D. honesta* (Kze.) C. Chr. (Spruce 4742).

c. *D. platyloba* (Bak.) C. Chr. (orig.)

d. *D. leptosora* C. Chr., two segments seen from the underside and one seen form above (orig.) — All pinnae $\times \frac{4}{3}$, segments $\times 1\frac{1}{2}$. 

Type from Ecuador, Chimborazo, Spruce s.n. (Kew!).

Stipe 35 cm long, \( \frac{1}{2} \) cm thick, trisulcate above, throughout (at base densely) fibrillose by narrow, lanceolate, hair-pointed, toothed, brown, glossy scales. Lamina bipinnatifid or subbipinnate, 60—70 cm long, grass-green, finely herbaceous, finely pellucido-punctate; rachis fibrillose like the stipe and densely brown-tomentose above by short, articulated hairs. Pinnae 12—15 cm long, 3\( \frac{1}{2} \)—4 cm broad, short-stalked, the lower ones not reduced; upper surface glabrous, the costa and basal part of the costulae excepted, which are densely setose by antrorse, subulate, articulated hairs; costae and costulae beneath rather densely pubescent by patent, short subulate hairs, which are unicellular or consisting of two or rarely three cells, lower part of costa fibrillose by narrow, brown, hair-like scales, leaf-tissue minutely pubescent by very small hairs. Pinnae incised nearly or the lower ones quite to the rachis into close, patent, obtuse, entire or shallowly crenated segments, 6 mm broad; basal segments reduced. Veins distant, rather indistinct, 7—8-jugate, most of them forked with the branches not reaching the margin but terminating in a phyllod which is seen on the upperside within the edge as an oblong, pale-brown dot. Sori small, on the middle of the anterior branch of the forked vein, exindusiate, Hooker says (I. c. 107): "involucere minute but apparently persistent reniformi-rotundate"; in the original specimen the sori are young and only a few of the sporangia developed; the receptacle bears rather many short, reddish, articulate hairs, which in the dried plant may be mistaken for a small indusium.

A very distinct species of uncertain relationship. It differs from the following species by its colour and especially by its upper pinnae, which are not broadly adnate to rachis with the lower basal segments decurrent.

51. *Dryopteris platyloba* (Bak.) C. Chr. Index 285. 1905. — Fig. 11c.

*Syn.* Polypodium rotundatum Hk. spec. 4: 238. 1862 (non Willd.).
*Polypodium biseriale* Bak. Syn. 309. 1867, pro parte.
*Polypodium tarapotensis* Bak. Syn. 505. 1874.
*Dryopteris tarapotensis* C. Chr. Ind. 297. 1905.

Type from Peru, Tarapoto, Mt. Guayrapurima, Spruce nr. 4656 (Kew!, also RB).

In *Syn. Fil.* Baker cited Spruce nr. 4656 as type-number for his three species quoted above. I have the original-specimens of all three species for examination from Kew Herbarium, and I come here upon an instance of species-making, which fortunately is rather uncommon. Certainly the three specimens are not quite identical, that of *P. platylobum* being bipinnatifid with entire segments while the two others are bipinnate below with lobed segments, but the former specimen is only a smaller leaf of the same species of which the other two are a more developed state; there is not the slightest difference to find between the specimens as
to texture, colour, pubescence and other characters. The type-specimen of *P. tarapoteuse* and that referred to *P. biseriale* are fully identical or rather they belong to the same specimen; *P. tarapoteuse* was described from the upper half of a single leaf, of which the lower part with the stipe 7 years before was described as *P. biseriale*. The explanation of this Baker’s making a third species on the same collector-number is however quite clear: on the sheet with the upper part of a leaf described as *P. tarapoteuse* is affixed the lower part of a stipe with “large brown lanceolate scales with a sudden grey edge” (Baker, l. c. 505). This stipe belongs to a species of *Alsophila* or *Cyathea*!

*D. platyloba* is a distinct species closely allied to *D. subiacísa* but less cut. It agrees with different forms of that collective species by the upper pinnae being broadly adnate to rachis with the lower basal segment decurrent, in the larger pinnate-pinna tifid pinnae the basal posterior lobe is similarly adnate and decurrent on the costa. — Stipe 40—50 cm long, trisulcate above, densely clothed below with 1—1½ cm long, glossy, dark-brown, rigid, toothed, linear-lanceolate scales, upwards like rachis fribillose by similar but smaller scales and rather densely pubescent by subulate, articulated hairs. Lamina up to 1 m long, lanceolate, grey-green or brownish-green when dry, paler beneath, thickly membranous. Pinnae up to 20 cm long, 2½—4 cm broad, long-acuminate, the lower ones short-stalked, the upper adnate to rachis. Costae and costulae above setose by antrorse, subulate, articulated hairs, upperside otherwise glabrous; costaé rather hairy by patent hairs, which are partly short and unicellular, partly longer and pluricellular, subulate, leaf-tissue of underside very minutely and sparsely pubescent; scales of costae very few, hairlike, brown. Most pinnae pinnatifid only, still in large specimens fully pinnate at base, those of the basal pair with the basiscop side enlarged. Segments or pinnules 6—10 mm broad, obtuse, entire or deeply lobed, the posterior basal lobe decurrent and adnate to costa. Veins once forked in the entire segments, pinnate in the tertiary lobes not reaching the margin. Sori small, exindusiate, nearer the edge than the midrib, generally on the middle of the anterior branch of the forked vein, or near the apex of the simple veins of the tertiary lobes, 2—3 to each lobe.

52. *Dryopteris biserialis* (Bak.) C. Chr. Index 254. 1905.


*Nephrodium subglabrum* Sodiro, Cr. vasc. quit. 259. 1893.

*Dryopteris subglabra* C. Chr. Ind. 295. 1905.

*Type from Ecuador*, Mt. Tunguragua, *Spruce* sine num. (Kew!); *prope San Nicolas*, *Sodiro* (G).

As stated above the Peruvian specimen (*Spruce* 4656) referred to *P. biseriale* by Baker belongs to the preceding species. I regard here the two other specimens which in Kew are referred to *P. biseriale* by Baker as the type-specimens of a species, for which I use Baker’s name. It is a species closely allied to *P. platyloba*;
it differs a little in pubescence, the costa beneath being furnished with some scattered, articulated hairs only, and especially by the position of the sori, which are placed near the base of the branches of the forked vein and nearer the costa and the margin. Generally both branches are soriferous and the sori therefore are in pairs, from which character Baker took his specific name. The species is somewhat smaller than the preceding but fully tripinnatifid; in colour, texture, the adnate and decurrent segments and upper pinnae the two species fully agree.

_D. grandis_ (Pr.) _subsp. macroptera_ (Kl.) (see Ind. Fil. 269) is a species of the same relationship as the two preceding ones; it is often bipinnatifid only but can be much larger, bipinnate with deeply lobed pinnules. It differs from the species mentioned by its glabrous rachis and costa. It is common in South Brazil.

**Species of uncertain position.**

53. **Dryopteris hirsuto-setosa** Hieron. Hedwigia 46: 343 tab. 6 fig. 16. 1907.

_Type from Ecuador:_ Baños-Pintuc, Stübel nr. 903 (Bl).

A bipinnatifid species excellently described and figured by Hieronymus and I have nothing to add. It is certainly related to some of the sub-species referred to _D. subincisa_ (Ind. Fil. 295), especially _Polypodium Blanchetianum_ Kze. and _P. Karstenianum_ Kl., with which "subspecies" it agrees in pubescence. As the two sub-species mentioned certainly are closely allied to the true _D. subincisa_, which can be regarded as the typical species of a proper group to which _D. platyloba_ and _D. biseriata_ also belong, it is very likely that _D. hirsuto-setosa_ belongs to the same group. It differs from all the species in this paper referred to _Ctenitis_ by its pubescence; the whole leaf is densely pilose by very long, soft, flexible, pluricellular hairs but apparently without scales.

The Brazilian _D. hirtula_ (Kze.) C. Chr. is clothed with very similar hairs and is another species of a very doubtful systematic position. It is fully tripinnatifid and, therefore, excluded from the present monograph.

_Unknown species of § Ctenitis._

1. **Phegopteris Blanchetiana** Fée, Gen. 245. 1850—52 — Bahia, Blanchet nr. 2928.
2. **Aspidium oblusilobum** Fée, S mém. 105. 1857; _Dryopteris huatuscensis_ C. Chr. Ind. 271. 1905. — Mexico, Huatusco, Schaffner nr. 105.

This is perhaps a form of _D. submarginalis_.

3. **Phegopteris fluminensis** Fée, Cr. vasc. Br. 1: 97. 1869 — Rio de Janeiro, Glaziou nr. 965. — In Ind. Fil. referred to _D. deflexa_, but judging from the description it can be every other species.

4. **Aspidium nervatum** Fée, Cr. vasc. Br. 1: 136. 169. — Brazil, Serra os Orgaos, Glaziou nr. 1764. — In Ind. Fil. referred to _D. submarginalis_, it is perhaps the same as _D. pedicellata_.


Subgenus 4. **Lastrea** Bory, emend. C. Chr.

Biologiske Arbejder tilegnede Eng. Warming p. 79. 1911.

This subgenus is nearly identical with the group of *Dryopteris opposita* monographically dealt with in my former papers on American species of *Dryopteris* (quoted above pag. 55). I have there in some details mentioned the characters of the group, and I have only a little to add to my earlier treatment. Still my delimitation of the group must be somewhat changed, partly by including some species, which have not a decrescent lamina, partly by excluding some few species, which I now refer to the subgenus *Glaphyropteris*.

The character: a *lamina decrescens* is, like all other single characters, not available as standard-character, which all species of this subgenus have in common and which is found only here. It is evident that a species as *D. blanda* (Fée) C. Chr. is a near relative of *D. oligocarpa*, although it has not the lamina narrowed downwards. Our common *D. thelypteris* is another instance of a species having a non-attenuate leaf. Still such species are exceptions which affirm the rule. Out of the 118 species enumerated below only 3 or 4 have not auriculiform pinnæ. On the other hand species with a *lamina decrescens* are to be found also within other subgenera, f. inst. *Glaphyropteris* and *Steiropteris*. In some species of § Cyclosorus, f. inst. the typical *D. mollis*, the lamina is so much narrowed downwards as in most species of § Lastrea, and the same can be said on *D. Saffordii* a species of § Eudryopteris.

The best and most constant character of § Lastrea is the venation, as explained in my "Revision". The veins are always free, as a rule simple (in some few species normally furcate), the basal ones nearly always reaching the margins above sinus and not separated by a cartilaginous membrane as in species of § Steiropteris and Cyclosorus. The frequent occurrence of sessile glands on the leaf-tissue beneath and of ærophores at the base of the pinnæ are also characteristic for the subgenus. In this paper I have excluded those species having ærophores at the base of the segments and referred them to § Glaphyropteris, viz. *D. Cañadazii*, *D. Thomsonii* and *D. macradenia*. Most species are rather hairy by simple and, as a rule, unicellular hairs; only in some very long-hairy species (*D. mertensioides*, *D. Ruziana*, *D. nilens*, *D. multiformis* and some others) the long hairs consist of 2—4 cells, but such hairs are not very like the short, pluricellular hairs so characteristic in species of § Ctenitis. The sori are in several species exindusiate, in others furnished with a small, rarely persistent indusium.

Since the publication of my earlier papers I have examined numerous specimens of species belonging to § Lastrea, some of which belong to species previously unknown to me and some others to species new to science. In the following pages I give another supplement to my first paper, and the number of species is now increased to 120. As seen from that number the subgenus is extraordinarily
rich in species occurring in tropical America; each new collection received contains new forms. As the key in my "Revision" includes 82 species only I have worked out an entirely new key including all the species known to me. After the key follows a systematical enumeration of all species including descriptions of several new species or of species not seen, as I worked out my "Revision". As will be seen the order of the species is not exactly the same as in "Revision, and further that I have not arranged the species in sections and subsections. I think that my present arrangement is a natural one in that sense that species intimately related to each other are placed side by side. It is possible to separate out smaller groups of closely related species, but such groups are connected with other groups by several intermediate species that a thorough grouping of all the species should be very defective. As rather distinct small groups I shall here mention

1°) the group of D. rudis, which includes the species 151—160 and probably others. They are large-grown species with generally dark-green, coriaceous or papyraceous, more or less hairy but always eglandulose lamina, which downwards is suddenly narrowed, the lower 3—5 pinnae being fully abortive and like small warts along the stipe; the basal segments of the lower pinnae are similarly reduced; aerophore present; sori exindusiate. In most species the rhizome seems to be creeping. This group appears to be a most distinct one, its species being widely different from those allied to D. oligocarpa and D. opposita. Still the difference between these and such species as D. Sprengelii and D. Christensenii is only small and these species again are closely allied to D. panamensis, D. pachyrachis, D. tablaziensis and others, which no doubt are intimately related to D. opposita and D. oligocarpa. On the other hand D. rudis and its relatives are connected with the large bipinnate species D. pteroidea by a species as D. euchlora, and it is perhaps unnatural to place species as D. Thomsonii, D. macradenia in another subgenus, Glaphyropteris, as they are as to essential characters very near D. rudis.

2°) the group of D. cheilanthoides, including the species nr. 165—170. Large species of thick texture and numerous veins; glanduliform pinnae as in the former group and aerophore as a rule present. Rhizome erect; hairs long, soft, pluricellular; underside often glandulose and viscid; basal segments of most species not much reduced, the lower one often prolonged; sori often indusiate. Species of a characteristic texture and colour, which I can not explain. This group is through D. limbata and D. consanguinea connected with D. opposita and D. sancta.

3°) The group of D. rivulatioiides, including the species nr. 132—137, characterized by a long-creeping rhizome and occasionally furcate veins. All the species are from South-Brazil and adjacent countries.

4°) The group of D. sancta, including the species nr. 56—62, small species of thin texture and often with unequal-sided pinnae.
Key.

1. Tertiary veins 1—10-jugate. Lamina towards the base gradually, rarely abruptly attenuate, or, in some few species, not at all narrowed downwards.

2. Rhizome erect or decumbent with the stipites fasciculated. Veins nearly always simple.

3. Pinnae rarely more than 1\(\frac{1}{2}\) cm broad, 10 cm long.

4. Lamina towards the base very gradually narrowed; reduced pinnae numerous, stipe very short (type II). Basal segments, especially the upper one, generally longer and often broader than the others. Most species small.

5. Pinnae entire or subentire, 1\(\frac{1}{2}\)--1\(\frac{1}{2}\) cm long.

6. Pinnae short-stalked, about 1 cm long; rachis without scales ........................................ 54. D. pusilla (Mett.) O. Ktze.

6. Pinnae sessile, 1\(\frac{1}{2}\) cm long; rachis scaly .................................................. 55. D. brachypoda (Bak.) C. Chr.

5. Pinnae deeply lobed, or, as a rule, pinnatifid.

6. Rachis scaly.

7. Pinnae scarcely 2 cm long, auricled on both sides of the base, subentire or subpinnatifid; stipe nearly none .................................................. 55. D. brachypoda (Bak.) C. Chr.

7. Pinnae 3—4 cm long, regularly pinnatifid; stipe 3—4 cm long ........................................ 102. D. Funckii (Mett.) O. Ktze.

6. Rachis without scales.

7. Veins not prominent above; lamina herbaceous or thinly membranous.

8. Pinnae unequal-sided, the anterior (upper) side being broader than the posterior one.


10. Indusium absent or minute. 56. D. sancta (L.) O. Ktze.

10. Indusium large, persistent.

11. Lamina herbaceous; sori about medial; reduced pinnae few ......... 57. D. sanctiformis n. sp.

11. Lamina membranous to coriaceous; sori close to the margin 59. D. consanguinea (Fée) C. Chr.

9. Stem epigeous, very long and scaly; pinnae with a straight, cuneate, entire base on the lower side, not deeply cut, eglandulose 58. D. longicaulis (Bak.) C. Chr.

8. Pinnae equal-sided, but sometimes auricled at the upper base only.

9. Leaf thinly herbaceous. Small species with pinnae 2—3 cm long; veins 2—3-jugate.

10. Segments entire, the margins not revolute.

11. Sori supramedial; lamina scarcely 30 cm long ...................... 60. D. delicatula (Fée) C. Chr.

11. Sori medial; lamina up to 50 cm long .......................... 61. D. pseudosancta C. Chr.

10. Segments crenate with revolute margins .......................... 62. D. phylsematiooides (Kuhn et Christ) C. Chr.

9. Leaf firmly herbaceous or membranous. Most species larger with pinnae 3—10 cm. long.
10. Segments short, obtuse; veins 3—7 to a side.
11. Pinnae obtuse ... 65. *D. coarctata* (Kze.) C. Chr.
11. Pinnae acuminate.
   12. Lamina glabrous or hairy on the rachis and costae only.
   13. Sori medial. Under surface slightly or not glandular ... 64. *D. riopardensis* Ros.
   13. Sori near the margin. Under surface densely glandulose.
   14. Pinnae close; segments entire, the basal ones not auricled
   14. Pinnae distant; segments toothed at the apex, the basal ones with an interne auricle
59. *D. consanguinea* var. *aequalis* C. Chr.
12. Lamina more or less hairy on the surfaces.
13. Under surface glandular. Pinnae auricled at the upper base
65. *D. coarctata* (Kze.) C. Chr.
13. Under surface not glandular. Pinnae not auricled, shortly pubescent throughout; indusium very pilose
66. *D. leucothrix* C. Chr.
10. Segments long, linear, falcate or very oblique; veins 7—9-jugate.
11. Lamina downwards gradually narrowed.
12. Under surface glandular
67. *D. parvamensis* (Pr.) C. Chr.
12. Under surface not glandular
144. *D. scalaris* (Christ) C. Chr.
7. Veins prominent above, occasionally furcate. Lamina chartaceous or coriaceous.
8. Lamina chartaceous or membranous, nearly glabrous; pinnae as a rule unequal-sided 59. *D. consanguinea* (Fée) C. Chr.
8. Lamina coriaceous, hairy on the ribs; pinnae scarcely unequal-sided ............ 69. *D. sculpturoides* (Fée) C. Chr.
4. Lamina towards the base shortly attenuate with 1—4 pairs of reduced pinnae (type I), or, in some species, without auriculiform pinnae. Basal segments equal or shorter than the others, seldom a little longer. Middle-sized species.
5. All pinnae sessile. Sori round.
6. Rachis (and costae beneath) without scales, at least the scales are very few and deciduous.
7. Sporangia setose. Indusium absent or rarely found.
8. Rachis and costae beneath densely pulverulent by very short hairs, long hairs absent
70. *D. concinna* (Willd.) O. Ktze.
8. Rachis and costae beneath sparsely pubescent by longer hairs.
9. South Brazilian species. Pinnae alternate, herbaceous; veins about 5-jugate .... 72. D. Stierii (Ros.) C. Chr.
7. Sporangia glabrous.
8. Lamina herbaceous or membranous.
9. Rachis subglabrous or more or less pubescent by long hairs, not densely pulverulent by very short hairs.
10. Lower pinnae not or a little reduced, not auriculiform.
11. Pinnae 3—4 cm long; rachis and costa on both sides pubescent. Indusium none 73. D. blanda (Fée) C. Chr.
11. Pinnae 6—7 cm; rachis and costa beneath glabrous. Indusium present
74. D. tablana (Christ) C. Chr.
10. 1—5 pairs of lower pinnae much reduced, auriculiform or glanduliform.
11. Stipe at base with many long, brown, squarrose scales.
12. Pinnae about 6 cm long, rigidly membranous or papyraceous.
13. Reduced pinnae few (1—2 pairs). Veins above with long setae 75. D. Rimbachii Ros.
13. Reduced pinnae in 4—5 pairs. Veins above without long setae.
14. Lower pinnae gradually reduced. Upperside hairy, not glossy 76. D. brachypus (Sod.) C. Chr.
12. Pinnae about 12 cm long, not glossy above, thinly membranous 78. D. tablaziensis Christ.
11. Stipe at base with a few scattered, short scales or scaleless.
12. Hairs of rachis beneath none or few, early deciduous.
13. Pinnae unequal-sided, the anterior (upper) side being broader than the posterior one.
14. Pinnae regularly pinnatifid on both sides. Underside glandulose. Veins 3—4-jugate
57. D. sanctiformis n. sp.

14. Lamina thinly herbaceous. Segments broad, very oblique.
15. A distinct tuberculiform aerophore at the base of the pinnæ beneath. Sori infra-medial. Guadeloupe
81. *D. hydrophila* (Fée) C. Chr.
15. No distinct aerophore. Sori supramedial. Argentina
82. *D. Lorentzii* (Hieron.) C. Chr.
15. Veins 4–6-jugate; rachis and surfaces almost quite glabrous.
16. A single pair of auriculiform pinnæ
74. *D. tablana* (Christ) C. Chr.
16. 3—4 pairs of auriculiform, often tripartite pinnæ 79. *D. Lindigii* C. Chr.
15. Veins 8—10-jugate.
16. Lamina downwards abruptly narrowed, chartaceous, sparsely hairy beneath on costæ and costulae only
80. *D. tustrata* (Hieron.) C. Chr.
16. Lamina downwards gradually narrowed, firmly herbaceous or membranous.
17. Indusium persistent, very setose. Rachis glabrous
17. Indusium small, deciduous, Rachis sparsely hairy.
18. Veins indistinct. Lamina firmly membranous, the underside nearly glabrous throughout, the upperside sparsely pubescent
110. *D. Hieronymusii* C. Chr.
18. Veins distinct.
   Lamina firmly membranous; the underside sparsely pubescent, the upperside subglabrous

83. *D. argentina* (Hieron.) C. Chr.

12. Hairs of rachis beneath persistent, often many and sometimes pluricellular.
13. Indusium none or very small, rarely seen.
14. Rhizome erect or obliquely erect.
15. Hairs of rachis long, patent, often pluricellular.
16. Stipe more or less hairy, not clothed with a dense mass of woolly hairs.
17. Lamina herbaceous; basal segments without auricles

84. *D. oligocarpa* (H. B. W.) O. Ktze.
17. Lamina thickly membranous; basal segments with an intern auricle
   170. *D. multiformis* n. sp.
16. Stipe and lower part of rachis very densely hairy by woolly, patent, long hairs . . . 166. *D. lanipes* C. Chr.
16. Veins 7—8 to a side in the slightly oblique segments . . 86. *D. rivulariformis* Ros.
16. Veins 10—11 to a side in the falcate-ligulate segments
   112. *D. utañagensis* Hieron.
14. Rhizome decumbent or short-creeping. South Brazil
   87. *D. Regnelliana* C. Chr.

13. Indusium persistent.
14. Rachis densely pilose by long, patent hairs
   85. *D. pilosula* (Kl. et Karst.) Hieron.
15. Indusium black. Guatemala
   118. *D. melanochlaena* C. Chr.
16. Leaf-tissue of both sides glabrous. Indusium glabrous. 88. *D. rioverdensis* C. Chr.

16. Leaf-tissue of both sides finely pubescent. Indusium setose. 86. *D. riolariformis* Ros.

9. Rachis densely pulverulent by very short hairs, long hairs being absent or few among the short ones. 

10. Lamina towards base gradually and shortly attenuate. West-Indian and Andine species. 


11. Indusium none or small. Underside not or sparsely glandular. 

12. Leaf throughout hairy by rather rigid hairs. 


13. Veins above with solitary, long setæ. 91. *D. colombiana* C. Chr.

12. Leaf glabrous or very inconspicuously hairy between the veins. 


10. Lamina towards base abruptly attenuate. 


11. Brazilian species. 95. *D. Lindmani* C. Chr.

8. Lamina coriaceous or rigidly papyraceous. 

9. Stipe and rachis glossy, atropurpureous. 


10. Costæ beneath strigose.... 97. *D. Crossii* (Bak.) C. Chr.

9. Stipe and rachis stramineous or greyish. 

10. Pinnae scarcely 2½ cm long, often subentire; veins 2—4-jugate. Stipe much longer than the lamina. 99. *D. Millei* n. sp. 

10. Pinnae 4—10 cm long, deeply pinnatifid; veins 4—10-jugate. Stipe as a rule shorter than the lamina. 

11. Rachis densely pulverulent by very short hairs, without long hairs. 92. *D. piedrensis* C. Chr. 

11. Rachis subglabrous or more or less hairy by longer hairs. 

12. Lamina with a rounded base, the lower 1—2 pairs of pinnae being auriculiform and rather closely placed.
13. Stipe at base with a few scattered short scales.
14. Rachis and costae villous by long, pluricellular hairs

170. *D. multiformis* u. sp.

12. Several pairs of distant gradually or abruptly reduced pinnae.
13. Stipe very densely clothed with woolly hairs............. 166. *D. lanipes* C. Chr.
13. Stipe very densely clothed with woolly hairs
14. Lamina gradually narrowed downwards

98. *D. Galanderi* (Hieron.) C. Chr.
14. Lamina abruptly narrowed

80. *D. lastrata* (Hieron.) C. Chr.

6. Rachis (and costae beneath) more or less scaly.
7. Scales rather few, small and narrow-subulate, brown.
8. Whole leaf throughout hairy by short pseudo-stellate hairs, i.e. the hairs are often found in bundles of 2–5 originating from the same epidermal cell

100. *D. phacelothrix* C. Chr. et Ros. u. sp.

8. Leaf with ordinary simple hairs.
9. Lamina coriaceous. Segments broadly triangular

101. *D. caucæensis* (Hieron.) C. Chr.
9. Lamina firmly herbaceous. Segments oblong

102. *D. Funckii* (Mett.) O. Ktze.

7. Scales of rachis very numerous, broad, yellowish, glandulose.......................... 103. *D. velata* (Kze.) O. Ktze.

5. Lower pinnae petiolulate.
6. Pinnae entire or subentire, \( \frac{1}{2} - 1\frac{1}{2} \) cm long. Indusium persistent, densely setose .......... 54. *D. pusilla* (Mett.) O. Ktze.
6. Pinnae 2–cm long, deeply lobed or pinnatifid. Indusium absent or minute.
7. Pinnae with a truncate base. Sori oblong-linear

104. *D. aspidioides* (Willd.) C. Chr.
7. Pinnae with a cuneate base. Sori oblong-linear or round

105. *D. plarmica* (Kze.) O. Ktze.

3. Pinnae 2–5 cm broad, 10–15 cm long, the lower 3–5 pairs as a rule reduced (type III). Most species large.
4. Sori all round.
5. Rachis without scales. Segments rarely 5 mm broad.
6. Leaf-tissue glabrous, at least not densely pubescent by adpressed hairs.
7. Lamina papyraceous or membranous.
8. Pinnae pinnatifid only; most segments entire.
9. Rachis glabrous beneath or deciduously hairy.
10. Lamina beneath with large, red glands. Sori medial, indusium large, glandulose.

106. *D. pachyrachis* (Kze.) O. Ktze.
10. Lamina eglandulose.
11. Costæ beneath without scales.
   12. Indusium very large, persistent; sori medial . . . . 106. D. pachyrachis (Kze.) O. Ktze.
   12. Indusium small or none.
   13. Sori supramedial or submarginal.
   14. Indusium present; pinnae about 1½ cm broad; veins above sparsely setose 119. D. Hieronymusii C. Chr.
   14. Indusium none; pinnae 2 cm broad; veins above glabrous 111. D. roraimensis (Bak.) C. Chr.
11. Costæ beneath with scattered, brown scales.
   12. Segments with open spaces between; indusium very large, persistent, glandular 106. D. pachyrachis var. Sprucei (Bak.) C. Chr.
   12. Segments close, acute; indusium smaller, not glandular . . . . 113. D. ilicita Christ.
10. Sori medial. Lamina papyraceous or subcoriaceous.
   11. Segments 2 mm broad, falcate-ligulate 112. D. utaianagensis Hieron.
   11. Segments 3—4 mm broad, patent.
   12. Basal segments (of larger pinnae) overlapping the rachis or with interne auricles.
   13. Rachis short-hairy; costae beneath without scales; indusium persistent 107. D. supina (Sod.) C. Chr.
   13. Rachis long-hairy; costae beneath somewhat scaly; indusium none 170. D. multiformis n. sp.
10. Sori near the margin. Lamina firmly membranous.
   11. Lamina gradually narrowed downwards with 2—3 pairs of auriculiform pinnae. Veins 8—9-jugate 120. D. demerarana (Bak.) C. Chr.
8. Pinnae with the lower segments free; segments crenate 114. D. atropurpurea Hieron.

7. Lamina thinly herbaceous.
8. Costæ beneath glabrous or sparsely pubescent by unicellular hairs, without scales.
9. Sori medial. Rachis glabrous or nearly so; under surface generally glandulose.
10. Indusium glabrous, glandulose.
11. Jamaica . . . 106. D. pachyrachis var. Jenmani (Bak.)
10. Stipe and rachis strong. Basal segments enlarged 63. *D. opposita* var. *amphioxyp teris* (Sod.) C. Chr.
8. Costæ beneath densely soft-hairy by long, patent, pluricellular hairs and sparsely scaly
   123. *D. nitens* (Desv.) C. Chr.
6. Leaf-tissue, especially above, densely and finely puberulous by adpressed hairs.
7. West-Indian species. Indusium small, setose or absent.
8. Segments 3—5 mm broad, both surfaces densely downy. Stipe and rachis slender, not scaly
   116. *D. rustica* (Fée) C. Chr.
8. Segments 5—7 mm broad, underside subglabrous.
   Stipe strong, scaly ............ 117. *D. Germaniana* (Fée) C. Chr.
7. Continental species.
8. Indusium persistent.
8. Indusium absent.
9. Sori near the margin. Lower pinæ auriculiform
   120. *D. demerarana* (Bak.) C. Chr.
5. Rachis more or less scaly. Segments often 5—7 mm broad.
6. Pinæ incised to a narrow wing to the costa.
7. Lamina pubescent, at least on the costæ and costulae beneath. Basal segments not enlarged.
8. Sori medial or inframedial.
9. Lamina firmly herbaceous to chartaceous. Costæ beneath strigose or hairy by patent, rather stiff, unicellular hairs.
10. Leaf-tissue finely pubescent. Costæ beneath patently hairy .............. 121. *D. dominicensis* C. Chr.
9. Lamina very thin; costæ beneath and margins with numerous soft, patent, pluricellular hairs
   123. *D. nitens* (Desv.) C. Chr.
8. Sori supramedial. Leaf-tissue finely pubescent above.
   120. *D. demerarana* (Bak.) C. Chr.
4. Basal sori oblong or linear, the upper ones roundish, oblong or linear.
5. Lamina gradually narrowed downwards.
6. Basal veins running to the sinus. Reduced pinnae few.
    7. Veins immersed, 10—12-jugate. Leaf throughout shortly pubescent, 50—60 cm long. Sori medial, oblong-linear 125. D. consimilis (Fée) C. Chr.
    7. Veins raised above, 10—15-jugate. Leaf sparsely pubescent by longer hairs, 80—100 cm long. Sori supramedial, roundish or oblong... 126. D. heteroclita (Desv.) C. Chr.
5. Lamina downwards abruptly narrowed.
6. Lamina finely puberulous between the veins. Indusium small.
    7. Veins immersed, 10—12-jugate. Leaf throughout shortly pubescent, 50—60 cm long. Sori medial, oblong-linear 125. D. consimilis (Fée) C. Chr.
    7. Veins raised above, 10—15-jugate. Leaf sparsely pubescent by longer hairs, 80—100 cm long. Sori supramedial, roundish or oblong... 126. D. heteroclita (Desv.) C. Chr.
5. Lamina downwards abruptly narrowed.
6. Lamina finely puberulous between the veins. Indusium small.
    7. Veins immersed, 10—12-jugate. Leaf throughout shortly pubescent, 50—60 cm long. Sori medial, oblong-linear 125. D. consimilis (Fée) C. Chr.
    7. Veins raised above, 10—15-jugate. Leaf sparsely pubescent by longer hairs, 80—100 cm long. Sori supramedial, roundish or oblong... 126. D. heteroclita (Desv.) C. Chr.
5. Lamina downwards abruptly narrowed.
6. Lamina finely puberulous between the veins. Indusium small.
    7. Veins immersed, 10—12-jugate. Leaf throughout shortly pubescent, 50—60 cm long. Sori medial, oblong-linear 125. D. consimilis (Fée) C. Chr.
    7. Veins raised above, 10—15-jugate. Leaf sparsely pubescent by longer hairs, 80—100 cm long. Sori supramedial, roundish or oblong... 126. D. heteroclita (Desv.) C. Chr.
5. Lamina downwards abruptly narrowed.


4. West Indian and Andine species.

5. Lamina herbaceous or membranous; margins plane or slightly revolute.

6. Rachis not or very slightly scaly.

7. Segments entire or inconspicuously toothed, the basal ones without auricles.

8. Rachis glabrous or with few, deciduous hairs.


9. Lamina eglandulose.

10. Segments 2–4 mm broad. Leaf-tissue of both sides minutely puberulous. Sori close to the edge. Veins 10–15-jugate.

11. 3–4 pairs of lower pinnae auriculiform. Segments very close entire.... 141. *D. struthiopteroides* C. Chr.

11. 3–4 pairs of lower pinnae glanduliform. Segments not close, often serrate.

143. *D. conformis* (Sod.) C. Chr.

10. Segments 5–7 mm broad. Leaf entirely glabrous; costa beneath with some scattered light-brown scales........ 161. *D. euchlora* (Sod.) C. Chr.

8. Rachis and costa more or less pilose.

9. Sori indusiate. Lamina glandulose beneath

142. *D. Mercari* (A. Br.) Hieron.

9. Sori exindusiate, or indusium very small. Lamina eglandulose.

10. Lower pinnae very gradually reduced.

11. Sori oblong or linear. see nr. 125. *D. consimilis* and nr. 126. *D. heteroclita*.

11. Sori round........ 144. *D. scalaris* (Christ.) C. Chr.

10. Lower pinnae abruptly reduced, the lowermost glanduliform.

11. Leaf-tissue of upperside glabrous.


12. Sori supramedial. Rachis densely ochraceo-tomentose without scales

154. *D. rudis* (Kze.) C. Chr.

11. Leaf-tissue of upperside finely pubescent.


12. Sori near the margin. Rachis and costa beneath very shortly and densely pulverulent........... 148. *D. Christlense* C. Chr.

7. Segments crenate or more or less lobed.

8. Basal segments with an interne auricle which overlaps the rachis.

9. Sori close to the margin. West-Indian species
   149. D. limbata (Kze.) O. Ktze.
8. Basal segments without interne auricle.
9. Lamina rather gradually reduced downwards
   140. D. Sprengeli var. Sherringii (Jenm.).
9. Lamina abruptly reduced, the lowermost pinnae glanduliform.
10. Both surfaces finely pubescent. Segments 2—4 mm broad . . . . 143. D. conformis (Sod.) C. Chr.
10. Lamina quite glabrous. Segments 5—7 mm broad . . . . 161. D. euchlora (Sod.) C. Chr.
6. Rachis rather scaly. Lamina suddenly with 5—8 pairs of auriculiform pinnae . . . . 150. D. corazonensis (Sod.) C. Chr.
5. Lamina coriaceous or chartaceous with the margins more or less revolute, downwards abruptly narrowed with 2—5 pairs of distant, glanduliform pinnae. Costae beneath often with some few scales.
6. The revolute margins not covering the sori. Basal segments of larger pinnae generally much reduced.
7. Costae beneath glabrous or more or less pilose by short, unicellular hairs.
8. Lamina quite glabrous . . . . 151. D. seminana (Sod.) C. Chr.
8. Lamina (at least rachis) more or less pilose.
9. Pinnae about 5 cm long with very oblique segments . . . . 152. D. canelensis Ros.
9. Pinnae 10—20 cm long, the segments often falcate but not very oblique.
10. Costae beneath setose by more or less antrorse stiff hairs and generally furnished with scattered small, brown scales. Indusium none.
11. Sori medial. Largest pinnae scarcely 12 cm long. Lamina (costa excepted) subglabrous.
   153. D. nervosa (Kl.) C. Chr.
11. Sori supramedial. Largest pinnae 15—20 cm long. Lamina, especially beneath, setose.
12. Segments rather close with acute sinuses between . . . . 154. D. rudis (Kze.) C. Chr.
10. Costae beneath pilose by patent hairs.
11. Largest pinnae 10—18 cm long, horizontal or ascendent, sparsely strigose beneath on costae and costulae only. Receptacle glabrous. Segments close, oblique or subfalcate.
12. Basal segments with an interne auricle
   170. D. multiformis n. sp.
11. Largest pinnae up to 30 cm long, often pendent, rather densely hairy by shorter hairs and longer patent “strigæ” on the costa beneath; segments patent separated by broad sinuses. Receptacle with long hairs. 160. *D. piloso-hispida* (Hook.) C. Chr.

7. Costæ beneath patently and softly hairy by long pluricellular hairs.

8. Stipe glabrous or shortly pubescent.

9. Basal segments not auricled, sori close to the edge.

10. Pinnae 10—15 cm long, scarcely 2 cm broad; costæ beneath with numerous long, pluricellular hairs. 168. *D. mertensioides* C. Chr.


Sori about medial.

10. Segments linear-falcate with revolute margins, obtuse, the basal ones considerably reduced. Costæ beneath with several large, light-brown scales. 165. *D. Ruiziana* (KL.) C. Chr.

10. Segments from a broad base tapering to the acute point, the lower basal one not or a little reduced. Costæ beneath very sparsely scaly. 170. *D. multiformis* n. sp.

8. Stipe, especially below, with a dense mass of woolly hairs. 166. *D. lanipes* C. Chr.

6. Sori, at least the upper ones, covered by the revolute margins of the segment. Basal segments not or a little reduced, the lower one often prolonged.


7. Segments entire.

8. Margins densely ciliate; lower basal segment not prolonged and not auricled. 168. *D. merlensioides* C. Chr.

8. Margins scarcely ciliate; lower basal segment always prolonged and auricled at the inner side. 169. *D. cheilanthoides* (Kze.) C. Chr.

3. Sporangia setose. Species closely allied to *D. rudis*.


2. Lamina bipinnate or the lower segments of the larger pinnae quite free.

3. Basal segments or pinnules much reduced, not auricled. Hairs unicellular.

4. Lamina rigidly coriaceous, quite glabrous. 151. *D. semilunata* (Sod.) C. Chr.

4. Lamina herbaceous or membranous, at least the costa pubescent.

5. Only the basal segments free. 161. *D. euchlora* (Sod.) C. Chr.

5. Several free pinnules.

6. Pinnules (and segments) about 2 cm long, 2—3 mm broad, finely pubescent throughout, grass-green, herbaceous. Veins simple. 145. *D. Bonapartii* Ros.

6. Pinnules 3—5 cm long, 1½ cm broad, often deeply lobed, membranous, dark-green. Veins furcate.
7. Rachises and costae glabrous or sparsely setose.
8. Andine species. Sori close to the edge

163. D. pteroidea (Kl.) C. Chr.
7. Rachises and costae villous. Sori about medial

164. D. cochaensis n. sp.

3. Basal segments, at least the lower one, not reduced and auricled
at the inner side. Hairs long, pluricellular ..... 170. D. multiflorum n. sp.

Ind. 287. — Fig. 12a.

Type from Colombia, Fusagasuga, 1900 m, leg. Lindig nr. 92 (B!), Bogotá,
Stubel nr. 413 part. et 427 (B).
Peru, St. Gavan, Lechler nr. 2242 (B); Sachapeta, Lechler nr. 2691 (B).

A species of doubtful position, not nearly related to any other. It is possible
that it belongs to § Cyclosorus, which the very hairy, persistent indusia seem to
indicate, still I place it here provisionally. The lamina is narrowed downwards
gradually and the stipe is very short, but the lowermost pinnae are not so small
as could be expected in a species belonging to the group of D. opposita.

55. Dryopteris brachypoda (Bak.) C. Chr. Ind. 255. 1905. — Fig. 12b.

Type from British Guiana, upper slope of Mt. Roraima, in Thurn nr. 275
(Kew!).

A small species in general habit very much resembling D. sagittata, but a
true Lastrea intermediate between D. pusilla and D. coarctata.
Rhizome erect, sparsely scaly. Leaves densely fasciculate, practically without
stipe, lanceolate, 15 cm long, 2½ cm broad at the middle, narrowed very gradually
towards the base through several pairs of dwindling pinnae, firmly membranous,
dark-green: rachis strigose, especially on the sides, glabrous in the furrow above,
and clothed with many small, brown scales. Pinnae sessile, alternate, horizontal,
the largest 1½ cm long, 5–6 mm broad, obtuse, auricled on both sides of the
base, slightly pilose on the costae and main veins beneath, underside finely gland-
dulose, the upper and lower ones entire, the middle and largest ones crenate or
lobed one third of the way to the midrib, margins somewhat revolute. Secondary
veins forked in the entire pinnae, in the lobed pinnae with 2–3 tertiary simple
veins. Sori supramedial, furnished with rather large, persistent, at least red-brown,
subglabrous indusia. Sporangia glabrous.
Fig. 12.  

a. *D. pusilla* (Mett.) O. Ktze. Lower part of two leaves, \( \times \frac{4}{5} \), and two pinnae, fertile and sterile, \( \times 1 \frac{1}{2} \) (orig.).  
b. *D. brachypoda* (Bak.) C. Chr., entire leaf, \( \times \frac{4}{5} \), and two pinnae, \( \times 1 \frac{1}{2} \) (orig.).  
c. *D. pseudosanctula* C. Chr., base and middle part of a leaf, \( \times \frac{4}{5} \), pinna, \( \times 1 \frac{1}{2} \) and two segments, \( \times 3 \) (orig.).  
d. *D. sanctiformis* n. sp., entire leaf, \( \times \frac{4}{5} \), pinna \( \times 1 \frac{1}{2} \) and two segments \( \times 3 \) (orig.).  
e. *D. leucothrix* C. Chr., pinna \( \times \frac{1}{6} \), three segments seen from the underside and one seen from above, \( \times 1 \frac{1}{2} \) (orig.).
This is a more robust plant than *D. pusilla* with all free pinnae auricled on both sides of the base and the central ones lobed with subpinnate secondary veins. *D. coarctata* has most pinnae regularly pinnatifid and a scaleless rachis. *D. sugittata* is apparently similar, but it belongs to § *Goniopteris* and its hairs are stellate.

56. **D. sancta** (L.) O. Ktze.; C. Chr. Revision nr. 32 fig. 20; Smiths. Misc. Coll. 52: 378.

**Area:** Dominica, Porto Rico, Haiti, Jamaica, Cuba, Guatemala.

57. **Dryopteris sanctiformis** n. sp. — Fig. 12d.

*Type from Panama*, eastern slope of Chiriqui Volcano, 2100—2300 m; leg. **Maxon** nr. 5294 (W).

Rhizomate erecto, breve, dense radicante, squamis parvis ovatis parce onusto. Stipitibus dense fasciculatis, gracilibus, rubrescentibus, nitidis, ad basin sparse paleaceis, glabris, 6—10 cm longis. Lamina anguste lanceolata, ad 22 cm longa, medio 3—4 cm lata, versus basin breviter attenuata, gramineo-viridi, firmo-herbacea, bipinnatifida; rachi gracili, brevissime et tenuissime puberula. Pinnis multijugis, sessilibus, alternis vel inferioribus suboppositis, falcatis, infinis 2—3 paris auriculiformibus, medialebus maximis, 2—2½ cm longis, basi 5—8 mm latis, acutis, supra ad costas sparse setosis, infra ubique glandulosus, inaequaliter pinnatifidus. Laciniiis 6—7-jugis, ovato-oblongis, obliquis, acutis, anterioribus majoribus, basali anteriore semper maxima, posterioribus minoribus, basali minima. Venis simplicibus, 3—4-jugis. Soris supramedialibus, induiso late affixo glandulosos persistente obtectis. Sporangis glabris.

This new species resembles very much certain forms of *D. sancta*, mainly in size and its unequal-sided pinnae; it differs by its indusiate sori and its lamina being shortly narrowed downwards about as in *D. conicima* or *D. Linügii*, but its real affinity is with *D. sancta* and *D. pseudosancta*. The indusium is peculiar; it is glossy, red-brown and impressed in the centre, while the free edges are greenish or whitish and glandular; it is not exactly reniform but rather variable in shape.

To this species I refer **Spruce** nr. 5297 (RB) from Ecuador that is rather typical and further two other specimens, which are not glandular beneath and somewhat more pubescent but agree in size and shape of pinnae:

**Venezuela,** Eggers nr. 13260 (H).

**Ecuador,** Andes of Quito, **Spruce** nr. 5297A (H, L).

58. **Dryopteris longicaulis** (Bak.) C. Chr. Index 275. 1905.


*Type from Colombia*, Province of Antioquia, leg. **Kalbreyer** nr. 1454 (Kew!).

A remarkable species well figured by Baker. It belongs to the small group of *D. sancta* by its narrow leaf and unequal-sided pinnae differing from all other
species by its very long, epigeanous caudex, about \(20 \text{ cm long, } \frac{1}{2} \text{ cm thick, clothed throughout with squarrose, glossy, castaneous, lanceolate-acuminate, narrow, pubescent scales. Stipe glossy, glabrous, about 5–6 \text{ cm long to the lowermost pair of auriculiform pinnae. Lamina } 40–50 \text{ cm long, } 5 \text{ cm broad, downwards rather suddenly narrowed, light-green when alive, brownish when dried, firmly herbageous, the rachis slender, very slightly strigose above. Pinnae very numerous, sessile, the lower 4–5 pairs opposite, very remote and very small, auriculiform; above them a single pair of larger, auriculiform pinnae, the next following scarcely shortened; middle pinna alternate, } 3 \text{ cm long, } 7–8 \text{ mm broad, acute, auricled at the upper base, cuneate on the lower side, very finely pubescent on the upper surface, glabrous and eglandulose beneath, entire in the outer third, the upper margin lobed in the lower two-thirds about } \frac{1}{3} \text{ of the way to the midrib, the lower one lobed in the centre only. Upper basal lobe the largest, making the pinnae auricled, central lobes about as broad as long, obtuse. Veins pinnate in the lobes with 1–3 pairs of tertiary simple veins. Sori medial, small; indusium subpersistent, brown, glabrous. Sporangia glabrous.}

In general habit this species resembles not a little a species of *Asplenium*, f. inst. *A. unilaterale* Lam., because the lower half of the basiscop side of the pinnae is nearly cut away. The peculiar scaly stem not considered it differs from *D. sancta* and *D. sanctiformis*, its nearest relatives, by the less cut pinnae and the lamina not being gradually but suddenly narrowed downwards.


This species may be a small form of *D. limbata*. I refer to it a peculiar variety from Panama, Chiriqui, 1000–1300 m; Maxon nr. 5243a (W). It is in habit perfectly typical, but the underside is eglandulose and the sori are very small, consisting of some few (3–4) sporangia, without trace of indusia and placed very close to the margin nearly apical on the veins.

60. **D. delicatula** (Fée) C. Chr. *Revision* nr. 30.

*Area*: Guadeloupe. — The lamina is about 30 cm long, not 3 cm as erroneously stated in “Revision” 295.

*D. hydrophila* (Fée) C. Chr. and *D. caribaea* (Jenm.) C. Chr. do not belong here.


**Dryopteris negligens** (Jenm.) C. Chr. Index 279. — *Nephrodium negligens* Jenn. Bull. Bot. Dept. Jam. n. s. 3: 20. 1896. — Jamaica, is according to a photograph of the type-specimen in Jenman’s type-herbarium in New York Bot. Garden, together with a small fragment kindly sent me by Miss Slosson a small species allied to *D. sancta*, but not unlike small forms of *D. oligocarpa*; it agrees with the latter in pubescence; some of the pinnae (3 × 1 cm) are rather unequal-sided. It may be a valid species.
62. **D. physematioideis** (Kuhn et Christ) C. Chr., Revision nr. 31.

Area: San Domingo.

63. **D. opposita** (Vahl) Urban; C. Chr. Revision nr. 25 fig. 15, 16; Smiths. Misc. Coll. 52: 375.

Area. Type: Lesser Antilles, common. Different forms occur in Jamaica, Cuba, Florida, Mexico, Colombia—Peru. var. rivulorum (Raddi): Southern Brazil.

I now regard *D. amphioxypetris* (Sod.) C. Chr., Revision nr. 52 as a variety of *D. opposita*, at least I cannot distinguish specifically from that species an authentic specimen in Kew. It has the basal segments considerably enlarged and often lobed, and it has 8—10 veins to a side, but as to other characters it agrees very well with the typical form.

64. **D. riopardensis** Ros.; C. Chr., Revision nr. 26 fig. 17.

Area: South Brazil, Rio Grande do Sul.

This is most probably a form of *D. opposita* var. rivulorum.

65. **D. coarctata** (Kze.) C. Chr., Revision nr. 27 fig. 18.

Area: Venezuela—Colombia. Cuba, Wright nr. 3925 (S, W), previously determined as *D. sagittata*, which it resembles in general habit but totally different in pubescence.

66. **D. leucothrix** C. Chr. Smiths. Misc. Coll. 52: 377. — Fig. 12e.

Area: Bolivia.


Area: Porto Rico, Jamaica, Cuba; Mexico to Panama, very common.

Additional synonyms of this variable species are, according to the original specimens, the following:

*Lastrea Leiboldiana* Pr. Epim. 41. 1849, Mexico, Leibold (Hb. Presl!), exactly identical with *P. litigiosum* Liebm.


*Dryopteris caribaea* C. Chr. Ind. 257. 1905.

Jamaica; Mt. Diabolo, SHERRING (Kew, authentical specimen; New York Bot. Gard., a leaf of Jenman's type collection received from Miss Slosson). Nearly identical with the narrow form of *D. panamensis* upon which Presl founded his new species. Jenman does not mention the glandular underside.
*Polypodium gracilentum* Jenm., Bull. Dept. Jam. n. s. 4: 129. 1897; *Dryopteris gracilenta* C. Chr. Ind. 268, which I believed (Revision p. 294) to be *D. panamensis* is not that species according to two pinnae of the type-specimen in the Jenman collection in New York Bot. Garden, kindly sent me by Miss Margaret Slosson. It may be a distinct species, allied to *D. scalpturoides*. The sori are apparently indusiate, but the indusia are very small with long hairs, which nearly completely conceal the young sporangia.

68. **D. silviensis** Hieron.; C. Chr. Revision nr. 29.  
*Area*: Colombia.

69. **D. scalpturoides** (Fée) C. Chr., Revision nr.34, fig.22; Smiths. Misc. Coll. 52: 381.  
*Area*: Cuba, Jamaica.

70. **D. concinna** (Willd.) O. Ktze.; C. Chr. Rev. nr. 1 fig. 2; Smiths. Misc. Coll. 52: 369.  
*Area*: Guadeloupe, Jamaica, Cuba, Mexico to Ecuador.

71. **Dryopteris rufa** (Poir.) C. Chr. Ind. 290. 1905.  
*Syn*: *Polypodium ruffum* Poir. Enc. méth. 5: 532. 1804.  
*Type* from Peru, Lima (Herb. Lamarck, Mus. bot. Paris!); another specimen from Lima, Watson nr. 818 (RB) is perfectly typical.  
In my "Revision" pag. 274 I suggested this to be the Chilene form of *D. argentina*, which is not the case. *D. rufa* is a distinct species, in general habit resembling *D. concinna* and *D. oligocarpa*, well-marked by its setose sporangia as in *D. concinna*, but rachis and costæ of both sides are sparsely pubescent by short hairs, not densely pulverulent as in *D. concinna*; leaf otherwise glabrous. — Lamina 40—50 cm long by 10 cm wide, narrowed downwards as in the two species mentioned; pinnae opposite, firm; segments close, patent, acute; veins about 8 to a side; sori about medial; indusium not seen.

72. **D. Stierii** (Ros.) C. Chr., Revision nr. 2 fig. 3.  
*Area*: Brazil, Rio Grande do Sul.

73. **Dryopteris blanda** (Fée) C. Chr. Index 254. 1905. — Fig. 13.  
*Syn*. *Phegopteris blanda* Fée, 8. mém. 91. 1857.  
*Dryopteris caespitosa* C. Chr. Index 256. 1905.  
*Type* from Mexico, Mirador, leg. Schaffner nr. 222 (specim. auth. in Kew!).  
A small species, not unlike small forms of *D. oligocarpa*, but the lower pinnae not or very slightly reduced. — Rhizome erect or decumbent, small, scales very few. Stipes very slender, 15—20 cm long, stramineous, glabrous. Lamina 12—15 cm
long by 7 cm broad at the middle, ovate-lanceolate, acuminate, somewhat narrowed downwards, herbaceous, dark-green. Rachis slender, short-hairy. Pinnae 7—8 to a side, sessile, suddenly narrowed into a short, entire apex, 3½ cm long, 1½ cm broad, the lowest pair generally somewhat shortened and reflexed; costae on both sides sparsely pubescent by a few longer and more numerous very short hairs, surfaces otherwise glabrous. Segments 9—10-jugate, oblong oblique, connected by a wing 1⅛ mm broad, the sinuses between acute, entire or slightly repand, the basal ones of lower pinnae shortened, of upper ones equal or a little prolonged. Veins 5—6 to a side, simple, oblique. Sori a little below the middle of the vein, exindusiate. Sporangia glabrous.

A very distinct species not easily to be confounded with others. It is not probable that Fournier had seen an authentical specimen of Ph. blanda, since he described his Ph. caespitosa as new; the two are exactly the same species. Fée described the rhizome as "rampant", but on the label to the specimen at Kew is written: "rhizome decumb. terminal fronds".

Specimens seen:

Mexico: Vera Cruz, Jared G. Schmith nr. 63 (W); Cordova, Bourgeau nr. 2005 (H, W, Mus. Paris. Ph. caespitosa Fourr.); H. Fink nr. 96a (W).

Guatemala: vicinity of Cacao, Barber nr. 171 (W, pinnae acuminate). Alta Verapaz, near the Finca Sepacuite, Cook and Griggs nr. 57 (W).

Costa Rica: Werncklé nr. 130 (C) — Grenadilla, Finca Hermes, Brade nr. 412 (R).

74. Dryopteris tablana (Christ) C. Chr. Ind. 297. 1905. — Fig. 14.


Type from Mexico: Chiapas, San Pablo, tierra templada "auf Lehmboden", leg. Munch nr. 146 (C!). — The Costa Rican specimen mentioned by Christ belongs to D. blanda.

Very like D. blanda, but larger: stipe 20 cm long, lamina 25 × 12 cm, slightly ciliate and costae above strigose, otherwise entirely glabrous. Pinnae opposite, linear, shortly acuminate, 6—6½ cm long, 12—13 mm broad, the lower ones reflexed and not shortened, but below them I find in a single leaf a pair of small auricles. Segments very obtuse, almost with a truncate apex that is crenato-dentate. Veins 4—5-jugate, not very oblique. Sori supramedial with a distinct, glabrous indusium. Sporangia glabrous. — Rhizome erect, 1 cm thick, 8 cm high, scaleless.

Fig. 13. D. blanda (Fée) C. Chr. Pinna × ⅛ and segments × ⅞ (Bourgeau 2005).

Fig. 14. D. tablana (Christ) C. Chr. Pinna × ⅛ and segments × ⅞ (orig.)
75. **Dryopteris Rimbachii** Ros. Fedde, Repert. 7: 147. 1909.

*Type* from Ecuador, Mt. Tunguragua, 2500 m, leg. Rimbach nr. 119 (R! CC).

Well-marked by its coriaceous lamina and long basal scales; the leaf is very shortly narrowed towards the base and bears 2—3 pairs of close, auriculiform pinnae. In general habit it resembles closely *D. Pavoniana*, specimens of which were collected at the same locality by Dr. Rimbach (nr. 118, R, CC), but that species has a long-creeping, branched rhizome and wants the long basal scales and auriculiform pinnae.

76. **Dryopteris brachypus** (Sod.) C. Chr. comb. nov.

*Syn.* *Nephrodium brachypus* Sod. Rec. 43. 1883; Cr. vasc. quit. 228. 1893.

*Type* from Ecuador, ad viam Quito-Guayaquil, leg. Sodiro (specim. auth. in Kew!).

Rhizome erect, up to 15 cm long, 1 cm thick, like the base of stipe densely clothed with narrow, subulate, brown, firm, finely hairy, squarrose scales; similar scales are scattered along the stipe and rachis, but they are deciduous and not always found. Stipites fasciculated, about 10 cm long, finely hairy. Lamina 40—70 cm long, 10—15 cm broad, downwards gradually but rather shortly attenuate, firmly membranous, not glossy above, pale-green beneath, the underside finely pubescent by adpressed hairs, the channelled costa more decidedly strigose, the underside nearly glabrous; rachis sulcate and hairy above. Middle pinnae 6—9 cm long, 1 1/2—1 3/4 cm broad, shortly acuminate, the lower ones gradually shortened, the lowermost auriculiform, about 1 cm long. Segments a little oblique, acute, larger ones often faintly toothed, the basal ones equal. Veins 5—7-jugate, simple, rather indistinct. Sori close to the margin with glabrous sporangia; indusium not seen; according to Sodiro it is puberulous.

*D. brachypus* is in general habit not unlike *D. oligocarpa*; it is best characterized by its numerous basal, squarrose scales, agreeing in this character with the two following species; these three species (and perhaps *D. Rimbachii*) form a proper little group marked by the said character.

77. **Dryopteris supranitens** Christ, Fedde, Repert. 8: 19. 1910.

*Type* from Costa Rica, Tablazo, Finca Haberl, A. et C. Brade nr. 270 (R!); specimens from Panama; Chiriqui, Maxon nr. 5244 (W) are very alike.

Closely related to *tablaziensis* with similar basal scales; it differs by its rigid texture, glossy upperside, narrower lamina that is suddenly narrowed downwards with 4—5 pairs of distant glanduliform pinnae (type IV), by its sparse pubescence and long-acuminated pinnae. From *D. brachypus* it differs in shape of lamina and nearly glabrous upperside. — A peculiar form with the segments distinctly serrated is Maxon's nr. 5524 from Panama (W).
78. *D. tablaziensis* Christ; C. Chr. Revision nr. 7 fig. 6.

Area: Costa Rica and Panama (Maxon nr. 5287 and 5336, W).

The rhizome is erect, about 10 cm high, 1 cm thick. In Maxon's specimens I find small, castaneous scales on the costæ beneath.

79. **D. Lindigii** C. Chr., Revision nr. 15.

Area: Costa Rica, Colombia, Venezuela.

80. **D. lustrata** (Hieron.) C. Chr., Revision nr. 14.

Area: Colombia, Peru.

81. *Dryopteris hydrophila* (Fée) C. Chr. Index 271. 1905.

Syn. *Phegopteris hydrophila* Fée, 11 mém. 56 tab. 13 fig. 3. 1866.


Type from Guadeloupe, leg. L'Herminier (Herb. Cosson, Paris!); Mazé nr. 363 et 843 (Kew!).

In my Revision pag. 294—295 I believed that *Ph. hydrophila* and *Ph. delicatula* were forms of one species; this is not the case, *Ph. hydrophila* being a distinct species closely related to *D. oligocarpa*, while *Ph. delicatula* is allied to *D. sancta*. *D. hydrophila* was well figured by Fée; it resembles in general habit very closely *D. oligocarpa* and *D. Lorentzii* differing from both by its inframedial sori, which are furnished with minute, ciliate indusia, not seen by Fée. Rachis slender, subglabrous beneath; pinnae with a large, tuberculiform aërophore at the base beneath, broadest at the base, very finely and rather sparsely pubescent above, the costæ and veins beneath shortly and sparsely hairy. Segments very oblique, broad, acute, the basal ones equal-sized, the upper one parallel to rachis, the lower one much oblique. Veins 5-jugate, distant, oblique. — Fournier (Pl. mex. 1: 89) referred to this species a plant from Mexico, San Luis Potosi, Virlet nr. 44.

82. **D. Lorentzii** (Hieron.) C. Chr., Revision nr. 3 fig. 4.

Area: Argentina.

83. **D. argentina** (Hieron.) C. Chr., Revision nr. 4.

Area: Argentina, Chile—Peru, Bolivia.

84. **D. oligocarpa** (H. B. Willd.) O. Ktze.; C. Chr. Revision nr. 5 fig. 5; Smiths. Misc. Coll. 52: 370.

Area: Mexico—Bolivia; Cuba, Jamaica, Haiti, St. Kitts. — South Brazil (var. *retusa* (Sw.)). Beautiful specimens of this species were recently collected in Panama by Maxon, nr. 4936, 4970, 5242 (W). It varies considerably in pubescence and I now regard *D. navarrensis* Christ; C. Chr. Misc. Coll. 52: 371 as a very hairy variety with several of the longer hairs consisting of 2—4 cells.
85. *D. pilosula* (Kl. & Karst.) Hieron.; C. Chr. Revision nr. 6.

_Area:_ Mexico—Peru.

This, also, is most probably only a variety of *D. oligocarpa*.


_Syn._ *Dryopteris stenophylla* Ros., Fedde, Repert. 5: 233. 1908 (non C. Chr.).

_Type_ from Bolivia, Yungas, Sirupaya pr. Yanacachi, leg. Buchtien nr. 495.

Of this I have seen only a single pinna, kindly sent me by Dr. Rosenstock.

It appears to be a good species.

87. *D. Regnelliana* C. Chr., Revision nr. 20 fig. 12.

_Area:_ Brazil, Minas Geraes.

88. *D. rioverdensis* C. Chr., Revision nr. 19 fig. 11.

_Area:_ Brazil, Minas Geraes.

89. *D. Nockiana* (Jenm.) C. Chr., Revision nr. 8 fig. 7; Smiths. Misc. Coll. 52: 371.

_Area:_ Jamaica.

90. *D. muzensis* Hieron.; C. Chr. Revision nr. 10.

_Area:_ Colombia.

91. *D. columbiana* C. Chr. Revision nr. 9 fig. 8; Smiths. Misc. Coll. 52: 372.

_Area:_ Colombia—Panama.

Specimens of Maxon's recent collection from Panama (nr. 5202, W) shows that this is clearly distinct from *D. oligocarpa*.


_Area:_ Cuba, Gran Piedra, Oriente, Maxon nr. 4041 (W); J. A. Shafer nr. 8954 (C. Chr.).

93. *D. boqueronensis* Hieron.; C. Chr. Revision nr. 11.

_Area:_ Colombia.

94. *D. lepidula* Hieron.; C. Chr. Revision nr. 12.

_Area:_ Colombia.

95. *D. Lindmani* C. Chr., Revision nr. 13 fig. 9.

_Area:_ Brazil: Sao Paulo, Mosen; Heiner nr. 523 (Rg).

96. *D. laevigata* (Mett.) C. Chr., Revision nr. 17 fig. 10.

_Area:_ Peru.
97. **Dryopteris Crossii** (Bak.) C. Chr. Index 259. 1905.


_Type from Ecuador, Sierra de Roritroche, Andes of Loja, leg. Cross, Oct. 1861 (Kew!)._

A very fine plant very near (too near?) to _D. laevigata_, which it resembles by its purplish-castaneous stipe and rachis, size and texture of lamina, but the lamina is more gradually narrowed downwards and the costa are strigosely hairy beneath.

_Rhizome?_ Stipe to the lowest pair of glanduliform pinnae up to 15 cm long, like rachis purplish-castaneous, glossy and quite glabrous. Lamina lanceolate, 25—35 cm long, 6—7 cm broad at the middle, narrowed towards both ends, coriaceous, brown when dry. Pinnae close, sessile, subopposite or alternate horizontal or slightly ascending, the lower 3—4 pairs very small, like tubercles on the stipe at distances of 3—4 cm; above them 2—3 pairs of gradually larger auriculiform pinnae, middle ones the largest, 3—3 1/2 cm long, about 8 mm broad, acute but scarcely acuminate, glabrous above, strigose on the costa beneath, furnished with a large, 2—3 mm long aërophore at the base beneath, incised to a wing 1—1 1/2 mm broad. Segments a little oblique, close, obtuse but the margins being revolute apparently acute, and triangular of shape, the basal ones equal or a little longer. Veins about 6 to a side; sori a little above the middle of the vein, exindusiate, small, consisting of a few sporangia only.

98. **D. Galanderi** (Hieron.) C. Chr. Revision nr. 16.

_Area:_ Argentina, Minas Geraes.

99. **Dryopteris Millei** sp. nov.

_Ecuador, in pascuis gelidis Andium Paluguillo, 3300 m, leg. A. Mille nr. 125 (RB!)._

_Rhizomate breve, decumbente, apice squamis lanceolatis castanis hirtis onusto. Stipitibus longissimis, usque ad 40 cm longis, fasciculatis, brunneo-stramineis basi fuscescentibus et sparse squamosis, nitidis, decidue hirtis denique glabris, vix ultra 1 1/2 mm crassis. Lamina lanceolata, ulrinque attenuata, raro ad 20 cm longa, medio 2—5 cm lata, rigide coriacea, pallide viridi. Rachi straminea, pilis albidis patentibus decidue hirta. Pinnis 10—20-jugis, inferioribus sensim reductis more _D. oligocarpicae_ (typus l), saepe reflexis, medialibus maximis, raro ultra 2 cm longis, sessilibus, horizontalibus vel leviter falcatis, apice integro acuto, ciliatis, costis utrinque et costulis infra setis antrorsis setulosis, inter venas glabris et eglandulosis, infra apicem integrum vel serratum ad alam 2 mm latam pinnatifidis. Laciniis 5—6-jugis, ovatis, subobtusis, oblique, marginibus dense ciliatis revolutis, basalibus eequalibus vel parum auctis. Venis 2—4-jugis, indivisis. Soris infra medium venularum sitis, rotondis, exindusiatis; sporangiis glabris._
A distinct new small species, remarkable by its very long stipe and small lamina of coriaceous texture. It is related to *D. laevigata*, from which it differs by its stramineous rachis and setulose costae.

100. *Dryopteris phacelothrix* C. Chr. et Ros. n. sp. — Ros. Fedde, Repert 11: 56. 1912.

*Bolivia*: Yungas borealis, Unduaví, 3300 m, leg. O. Buchtien nr. 2707 et 2709 (R).

*Lastrea* rhizome oblique adscendente seu suberecto, paleis ferrugineo-brunneis, lanceolatis, dorso marginque pilosulis vestitis. Stipitibus fasciculatis, c. 15 cm longis, 2 mm crassis, stramineis, paleis adpressis, iis rhizomatis similibus ornatis pilisque brevibus, strictis, 2—6 fasciculatis vel simplicibus dense hirtis. Laminis elongato-ovalibus utroversus breviter et gradatim attenuatis, ad 50 cm longis, 12 cm latis, pinnato-pinnatifidis, subcoriaceo-chartaceae, utrinque viridibus, in rachibus, costis nervisque densius, inter nervos parcius hirto-pilosis, pilis iis stipitís similibus, rachibus costisque paleis ovato-lanceolatis brunneis persistentibus adspersis. Pinnis infra apicem brevem pinnatifidum c. 30-jugis, subapproximátis, infra oppositis, sursum alternis, recte patentibus, subsessilibus, profunde pinnatifidis, medialibus c. 5½ cm longis, 1¼ cm latis, e basi subèquali vel anteriore paullisper aduacta lineari lanceolatis, breviter acuminatis, inframedialibus sensim brevioribus, inferioribus remotis et citius abbreviatis, infinis auriculiformibus, superioribus sensim diminutis et minus profunde incisis, postremis basi lata sessilibus, demum confluentibus et in apicem laminae secretum sensim transeuntibus. Segmentis pinnarum majorum subrecte patentibus, linearibus, obtusis, c. 5 mm longis, 2 mm latis, margine crenulato, subrevoluto seu integerrimo, plano, sinibus acutis interstíctis, ala 1 mm fere lata confluenteribus; venulis lateralibus ad 6-jugis, supra prominentibus, subtus prominulis, simplicibus, parallelis, basalibus longe supra sinum marginem attingentibus. Soris medialibus, exindusiatis, pilis fasciculatis sporangiis intermixtis. (Rosenstock descriptus.)

I am due to Dr. Rosenstock a specimen of this species unique by its peculiar pubescence. Without a minute examination several of the hairs appear to be stellate but the whole aspect of the species is that of *Lastrea* not of *Goniopteris*. By microscopical analysis I found, however, that the hairs are not stellate, i.e. branched, but fasciculate, as Dr. Rosenstock expresses it, i.e. 2—6 hairs spring out from the same epidermal cell from nearly the same point.

101. *D. caucaensis* (Hieron.) C. Chr., Revision nr. 21 fig. 13.

*Area*: Costa Rica—Colombia, and it is now also found in Bolivia, Buchtien nr. 2697 (R).

102. *D. Funckii* (Mett.) O. Ktze.; C. Chr. Revision nr. 35 fig. 23.

*Area*: Venezuela—Colombia and it is now also recorded from Costa Rica: Volcano Barba, Brade nr. 289 (R). — The species has its proper position here.
103. D. velata (Kze.) O. Ktze.; C. Chr. Revision nr. 22; Smiths. Misc. Coll. 52: 373.

Area: Cuba.

104. D. aspidioide (Willd.) C. Chr., Revision nr. 23.

Area: Costa Rica—Peru.

105. D. ptarmica (Kze.) O. Ktze.; C. Chr. Revision nr. 24 fig. 14.

Area: Southern Brazil.

106. D. pachyrachis (Kze.) O. Ktze., C. Chr. Revision nr. 44 fig. 31; Smiths. Misc. Coll. 52: 382.

Area: Panama—Venezuela—Ecuador. Southern Brazil (var. platyrachis (Fée) C. Chr.). — Jamaica, St. Vincent (var. Jenmani (Bak.) C. Chr.).

The specimens from Panama collected by Maxon nr. 5274 (W) are very similar to var. bogotensis C. Chr. Revision 306, which differs from typical D. pachyrachis by its pubescent rachis and upperside. Similar more hairy forms occur in Ecuador and I think I was right in referring Nephrodium crassipes Sod. and N. stramineum Sod. to D. pachyrachis. A third variety is no doubt


Dryopteris Sprucei O. Ktze. Rev. 2: 813. 1891; C. Chr. Index 294.

Ecuador, Mt. Tunguragua, Spruce nr. 5299, Llalla, Spruce nr. 5299 A, Montañá de Canelos, Spruce nr. 5301 (all Kew).

Baker founded his new species on these three specimens, which were all referred to N. resinoso-foetidum by Hooker; they are, however, not quite identical. Best agreeing with Baker’s description are nr. 5299 A and 5301. Nr. 5301 is as to all characters the eglandulose underside excepted typical D. pachyrachis; nr. 5299 A is nearly the same, but the upperside is rather pubescent, the underside and indusium sparsely glandular with the characteristic large, red glands, and the costa beneath bear some few thin, brown scales. Nr. 5299 looks very different, but it is certainly a large-growing, thin-leaved form of D. pachyrachis. Its pinnae are 20 cm long, 3½ cm broad, rather densely hairy above, glabrous and slightly glandular beneath, the costa rather scaly, and the irregular (sometimes subathyrioid) very large indusia slightly ciliate and glandular by large, red glands. Segments 5 mm broad with about 10 veins to a side.

The var. Jenmani (Bak.) C. Chr. may be specifically different (see Smiths. Misc. Coll. 52: 382—383); still it differs scarcely more from the type than do some of the Andine forms. The most different form is the large, very thin-leaved and densely glandulose variety that I erroneously in “Revision” referred to D. Germaniana as var. glandulosa. It was also collected by W. Harris nr. 7485 (B), Jamaica, Blue Mountain Peak.
107. *D. supina* (Sod.) C. Chr., Revision nr. 46 fig. 32.
*Area*: Ecuador—Colombia.
The var. *Biolleyi* Christ is a small form of *D. cheitanthoides*.

108. *D. tenerrima* (Fée) Ros.; C. Chr. Revision nr. 50.
*Area*: Southern Brazil.

109. *D. palustris* (Mett.) O. Ktze.; C. Chr. Revision nr. 49 fig. 33.
*Area*: Southern Brazil.

110. *D. Hieronymusii* C. Chr., Revision nr. 45.
*Area*: Colombia.

111. *D. roraimensis* (Bak.) C. Chr.; Smiths. Misc. Coll. 52: 383. — Fig. 15a.
*Area*: Guiana, Mt. Roraima, in Thurn nr. 168 (Kew!).
In the type-specimen the segments are scarcely falcate but often faintly crenate.

112. *D. utanagensis* Hieron.; C. Chr. Revision nr. 47.
*Area*: Ecuador.

*Type* from Costa Rica, La Palma, Wercklé (not seen).
To this species I refer specimens from Candelaria, Costa Rica, A. et C. Brade nr. 410 (R). It is a very large species remarkably resembling a glabrous form of *D. patens*, but the venation and the decrescent lamina show that it is a member of the subgenus *Lastrea*. The thick, quadrangular, stramineous rachis and the costa are sparsely pubescent above, otherwise the leaf is quite glabrous and eglandulose, but the costa and costulae bear beneath some thin, light-brown scales. Segments close, subfalcate, acute, the basal ones both prolonged and parallel to rachis as in *D. patens*. Veins about 10 to a side. Sori supramedial with sub-persistent, glabrous indusia.

114. *D. atropurpurea* Hieron.; C. Chr. Revision nr. 48.
*Area*: Colombia. — See remarks under *D. euchlora*.

115. *D. recumbens* Ros.; C. Chr. Revision nr. 51.
*Area*: South Brazil.

*Area*: Guadeloupe, St. Vincent. Jamaica (var. *nimbata* (Jennm.), indusiate; authentical specimen in Kew!).

**Area**: Guadeloupe, Porto Rico (t. W. R. Maxon), Cuba.  
The variety *glandulosa* Revision 311 belongs to *D. pachyrachis*.

118. **D. melanochlaena** C. Chr. Smiths. Misc. Coll. 52: 384. — Fig. 15b.  
**Area**: Guatemala.

119. **D. atrorubens** (Mett.) C. Chr., Revision nr. 54 fig. 34.  
**Area**: Peru.

120. **D. demerarana** (Bak.) C. Chr., Smiths. Misc. Coll. 52: 385. — Fig. 15d.  
**Area**: Guiana, Mt. Roraima, in Thurn ur. 356 (Kew!).  
Best marked by its subopposite very distant pinnae. Closely allied to *D. rustica*.

121. **D. dominicensis** C. Chr. Smiths. Misc. Coll. 52: 384. — Fig. 15c.  
**Area**: Dominica; Martinique, Husnot nr. 356 (CC); Guadeloupe, Mazé nr. 647.

122. **D. Moritziana** Urban; C. Chr. Revision nr. 56 fig. 35.  
**Area**: Venezuela.

123. **Dryopteris nitens** (Desv.) C. Chr. comb. nov. — Fig. 15e.  
**Syn.**: *Polypodium nitens* Desv. Prodr. 240. 1827.  
**Dryopteris bañiensis** Ros. Fedde, Repert. 7: 301. 1909!  
**Type** from Peru, (Herb. Mus. Paris!). — **Ecuador**, Baños, Spruce sine num. (RB).  
This was founded on an incomplete specimen but is apparently a very distinct species. The original specimen consists of the lower half of a lamina with a part of the stipe, which is stramineous and glabrous. Lowest pair of pinnae deflexed and below them a pair of auriculiform pinnae. Pinnae opposite, sessile, 12 cm long by 2 cm broad, acuminate, thinly herbaceous, the costa above pilose, costa, costule and veins beneath long- and soft-hairy by whitish, thin, pluricellular hairs, the costa besides furnished with a few small, red, thin scales. Rachis stramineous, deciduously hairy. Segments close, connected by a wing 1½ mm broad, bluntly rounded at the apex, the margins obscurely crenate, ciliate, 6–7 mm broad, the lower pair not reduced. Veins simple, 8-jugate. Sori medial, reddish, exindusiate.  
**D. bañiensis** Ros. based on a single leaf with a pinnatifid apex is quite the same.

124. **D. diplazioides** (Desv.) Urban; C. Chr. Revision nr. 58.  
**Area**: Mexico—Colombia, Bolivia (Buchhien nr. 1126, 1130, R). San Domingo, Guadeloupe. South Brazil (var. brevisora Ros.).
125. **D. consimilis** (Fée) C. Chr., Revision nr. 59 fig. 37, Smiths. Misc. Coll. 52: 386.
   Area: Guadeloupe, Jamaica.

126. **D. heteroclita** (Desv.) C. Chr., Revision nr. 60 (vix fig. 38 = D. consimilis?); Smiths. Misc. Coll. 52: 386.
   Area: Jamaica.

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Fig. 15.  
a. **D. roraimensis** (Bak.) C. Chr. (orig.). — b. **D. melanochlora** C. Chr. (orig.). —  
c. **D. dominicensis** C. Chr. (orig.). — d. **D. demerarana** (Bak.) C. Chr. (orig.). —  
e. **D. nilens** (Desv.) C. Chr. (orig.). — f. **D. Bradei** Christ (orig.). — All pinnae $\times \frac{1}{4}$,  
segments $\times \frac{1}{16}$, those without sori seen from above.
127. *D. atrovirens* C. Chr.; Revision nr. 61 fig. 39.
Area: Guatemala, Costa Rica; Panama, Maxon nr. 5649, 5651 (W).

Type from Costa Rica, La Palma, A. et C. Brade (R!).
A critical species founded on a part of a single leaf. It is near large forms of *D. atrovirens*.

129. *D. firma* (Bak.) C. Chr., Revision nr. 36 fig. 24; Smiths. Misc. Coll. 52: 381.
Area: Jamaica.

130. **D. Pavoniana** (Kl.) C. Chr., Revision nr. 18.
Area: Peru, Bolivia; Ecuador, Mt. Tunguragua, Rimbach nr. 118 (R, CC).
As shown by the specimen quoted this has a wide-creeping, branched rhizome like *D. firma*. Together with that species and *D. Rosenstockii* it forms a narrow group of species, which are not nearly allied to the South Brazilian species with a wide-creeping rhizome.

131. **D. Rosenstockii** C. Chr. Revision nr. 43 fig. 30.
Area: Ecuador.

132. **D. Santae Catharinae** Ros.; C. Chr. Revision nr. 37 fig. 25.
Area: South Brazil.

133. **D. Jürgensii** (Ros.) C. Chr.; Revision nr. 38 fig. 26.
Area: South Brazil.

134. **D. Mosenii** C. Chr., Revision nr. 33 fig. 27.
Area: Brazil: Minas Geraes.

135. **D. rivularioides** (Fée) C. Chr., Revision nr. 41 fig. 29.
Area: Brazil (Minas Geraes to Rio Grande do Sul), Paraguay, Uruguay, Argentina: Misiones (Ekman, S).
A series of specimens received from M. B. Berro, Montevideo, shows that *D. pseudomontana* (Hieron.) C. Chr., Revision nr. 40 fig. 28 is only a form of the variable *D. rivularioides*.

136. **D. scariosa** Ros.; C. Chr., Revision nr. 42.
Area: South Brazil.

137. **Dryopteris tremula** Christ in Lecomte, Notulæ Syst. 1: 234. 1910.
Type from Mexico: state of Michoacan, Morelia, leg. G. Arsène nr. 3106.
I have not seen the type-specimen but numerous specimens from the type-locality collected by Arsène (RB). Unfortunately they are all sterile and without rhizome. Judging from these specimens I cannot with certainty distinguish them from *D. thelypteris*, which has not been found in tropical America; Dr. Christ however, finds that it differs from *D. thelypteris* by its plane fertile segments and minute, remote sori. I, therefore, prefer to let it stand provisionally as a species. It is widely different from all other tropical American species of § *Lastrea* by its non-attenuate lamina and normally furcate veins.

138. *D. siambonensis* (Hieron.) C. Chr., Revision nr. 63 fig. 41.
   **Area:** Argentina.

139. *D. achalensis* (Hieron.) C. Chr., Revision nr. 64.
   **Area:** Argentina.

140. *D. Sprengelii* (Kff.) O. Ktze.; C. Chr. Revision nr. 65 fig. 42; Smiths. Misc. Coll. 52: 387.
   **Area:** West Indian Islands, common; Mexico along the Andes to Ecuador.

   *Nephrodium Sherringii* Jenm. Journ. Bot. 1879: 261, from Jamaica, of which I have now seen an authentical specimen (Kew), I regard as a large, luxuriant variety of *D. Sprengelii*. It agrees with typical *Sprengelii* in colour, texture and pubescence, but it is much larger with pinnae 12–20 cm long, 3–5 cm broad, the segments of larger pinnae about 3 cm long, \( \frac{1}{3} \) cm broad, deeply lobed with the tertiary veins furcate or even pinnately branched in the lobes.

   **Area:** Guatemala.

142. *D. Mercurii* (A. Br.) Hieron.; C. Chr. Revision nr. 66 fig. 43; Smiths. Misc. Coll. 52: 389.
   **Area:** Mexico along Andes to Ecuador.

   It is highly questionable, whether this is specifically distinct from *D. Sprengelii*. I am nearly sure that it is not. Specimens from Panama (Maxon nr. 4696 and 5767) show the pubescence of *D. Mercurii* but are otherwise not different from *D. Sprengelii*.

143. *Dryopteris conformis* (Sod.) C. Chr. Index 258.\(^{\frac{2}{5}}\)1905. — Fig. 16h.

   **Syn.** *Nephrodium conforme* Sodiro. Rec. 45. 1883; Cr. vasc. quit. 240. 1893.

   **Type** from Ecuador, leg. Sodiro (Kew!); very typical specimens were collected at Mt. Pifi by A. Mille (RB).

   In texture, habit and size very like *D. Sprengelii*, but lamina throughout shortly pubescent, mostly so on the costae of both sides but the leaf-tissue of both
surfaces is also minutely hairy and without glands. Stipe long, up to 30 cm to the lowermost pair of glanduliform pinnae, these in 3—4 very distant pairs and above them 3—4 pairs of auriculiform pinnae. Larger segments often serrate, linear-oblong or ligulate, 3—4 mm broad with 10—15 pairs of veins that are more distant than in *D. Sprengelii*; basal segments of lower pinnae not much reduced. Sori very close to the margin; indusium small, hairy, soon falling. Sporangia glabrous.

144. *D. scalaris* (Christ) C. Chr.; Revision nr. 72 fig. 47; Smiths. Misc. Coll. 52: 390.
Area: South Mexico to Costa Rica.

145. *Dryopteris Bonapartii* Rosenstock in Fedde Repert. 7: 303. 1909. — Fig. 16 a.
Type from Ecuador, Mt. Tunguragua, Spruce nr. 5254 (RB!).
A most distinct species with long slender pinnae of thin texture and fully pinnate in the lower half. Evidently a near ally of the preceding species and of *D. Mercurii*, in pubescence and lack of glands resembling *D. conformis*, but basal pinnae much reduced, veins more numerous and sori not so close to the margin.

146. *Dryopteris Bradei* Christ, Bull. Soc. bot. Génève II. 1: 225. 1909. — Fig. 15 f.
Type from Costa Rica, Irazu, leg. Brade nr. 245 (R!).
Of this I have seen a single leaf only and I dare not decide with certainty whether it is a good species or not. It is not improbable that it is a thin-leaved form of *D. rudis* or *D. nervosa*.

Area: Bolivia.

148. *D. Christensenii* Christ; C. Chr. Revision nr. 70 fig. 46.
Area: Costa Rica, Biolley nr. 67 part. (CC), Candelaria, A. et C. Brade nr. 418 (R); Panama, Chiriqui, Maxon nr. 5202 bis (W).

Area: St. Kitts, Guadeloupe; Jamaica (?).
*D. consanguinea* (Fée) C. Chr. (see above nr. 59) may be a small form of this.

150. *D. corazonensis* (Sod.) C. Chr. Revision nr. 57 fig. 36.
Area: Ecuador.

151. *Dryopteris semilunata* (Sod.) C. Chr. Index 291. 1905. — Fig. 16 d.
Syn: *Nephrodium semilunatum* Sodiro Rec. 46. 1883; Cr. vasc. quit. 245. 1893.
Type from Ecuador leg. Sodiro (Kew!).
Stipe to lowest developed pinnae 50 cm long and bears 3—4 pairs of very distant pairs of glanduliform pinnae, the lowermost ones not more than 5—6 cm from
the base of the stipe. Pinnae opposite, coriaceous, like rachis quite glabrous, 10—
12 cm long, 2 cm broad, arcuate-ascending, the lower ones at base with a pair of
glanduliform free pinnules and above them a pair of auriculiform segments, basal
segments of medial pinnae reduced. Segments 5—6 mm broad, acute, falcate, their
margins revolute. Veins not very distinct, 10—12-jugate, simple. The specimen
seen is sterile; according to Sodiro the so are near the margin and furnished
with a deciduous indusium.

Differs from the allied species (D. rudis, D. piloso-hispida etc.) by its entirely
glabrous leaf and the pale underside.


Type from Ecuador, in silva Canelos, Spruce (RB!).

A species allied to D. rudis but well marked by its short and narrow pinnae,
coriaceous texture, very oblique segments with about 11 pairs of veins and its very
tomentose rachis.

153. D. nervosa (Kl.) C. Chr., Revision nr. 75.

Area: British Guiana, Costa Rica; Panama, Maxon nr. 4966 (W).

Rizome creeping. Much like a glabrescent form of D. rudis and perhaps it
should be united with that species.


Area: Mexico along Andes to Ecuador and Bolivia. Jamaica (P. ctenoides
Jenm.).

A widely spread and rather uniform species, of which I have recently recei-
vved several specimens, f. inst. from Panama, Maxon nr. 5675 (W) and Bolivia,
Buchten nr. 494 (R). It varies mainly in texture and pubescence; generally the
whole lamina is rather densely setose by stiff hairs and the costae beneath are
furnished with some brown scales, still the upper surface can be nearly quite
glabrous and such specimens are scarcely to distinguish from D. nervosa by any other
character than the supramedial sori. This more glabrous and generally smaller
form is D. lasiopteris (Sod.) C. Chr. Revision nr. 69 fig. 45, which I now do not
hesitate to reduce to a synonym of D. rudis. About the same form, still with fewer
(9) veins is

Dryopteris caeca Rosenstock, Fedde, Repert. 7: 302. 1909, from Ecuador,
Spruce nr. 5261 (RB).


Dryopteris subdecussata C. Chr. Index 295. 1905.

Costa Rica, Alfaro nr. 16556 (C) is rather typical D. rudis.

Aspidium exsudans var. myriocarpum Fourn. Mex. Plant. 1: 94 is also, accord-
ing to specimens in Herb. Mus. Paris so named by Fournier, a synonym of the
present species.
Dryopteris gleichenioides C. Chr. Ind. 268. 1905.
Costa Rica, Forêts du Barba, Tonduz nr. 1935 (C).
In Smiths. Misc. Coll. 52: 395 I referred this to D. pterifolia, it is, however, a rather common form of D. rudis with the upperside nearly glabrous.
It can scarcely be doubted that the true Nephrodium tetragonum Presl. Rel. Haenk. 1: 85. 1825 is the same as D. rudis. Unfortunately the original specimen in Herb. Presl (!) is very defective and it may belong to another related species.

155. D. Engelii Hieron.; C. Chr. Revision nr. 74.
Area: Venezuela. Colombia.
Additional specimens from Venezuela, Funck et Schlim and Gollmer (B), show that rachis and costae beneath bear several small scales. Lamina with a pair of reduced pinnæ and 2—3 pairs of glanduliform warts.
My new species D. Pittieri C. Chr. Smiths. Misc. Coll. 52: 393 from Colombia, Pittier nr. 1200 (W) I regard now as a very coriaceous form of D. Engelii with rather numerous scales along the costae beneath.

156. Dryopteris peruviana Rosenstock, Fedde, Repert. 7: 298. 1909.
Type from Peru, Cerro de Campana, Spruce nr. 4655 (RB!).
Very like D. rudis in habit, size and pubescence, different by setose sporangia.

157. Dryopteris Heineri C. Chr., Fedde, Repert. 6; 380. 1909; Smiths. Misc. Coll. 52: 392 (erroneously as D. Heimeri). — Fig. 16c.
Type from Brazil, São Paulo, Campinas, A. Heiner nr. 540 (Rg).
The only Brazilian representative of the group of D. rudis and a very distinct species with setose sporangia.

158. D. strigifera Hieron.; C. Chr. Revision nr. 76.
Area: Colombia.

159. D. Brausei Hieron.; C. Chr. Revision nr. 77.
Area: Colombia.

160. Dryopteris piloso-hispidula (Hook.) C. Chr. comb. nov.
Dryopteris pterifolia (Mett.) O. Ktze.; C. Chr. Revision nr. 78 fig. 49 with synonymy; Smiths. Misc. Coll. 52: 395.
Area: Mexico along Andes to Bolivia.
The original specimen of N. piloso-hispidum Hook. from Ecuador, Spruce sine num. (Kew!) is exactly what I previously have named D. pterifolia and it is absolutely identical with Alsophila pilosa Mart. et Gal. according to authentical
specimens in Herb. Mus. Paris. It is perhaps the largest species of the whole subgenus. The receptacle is clothed with some long hairs which are seen between the sporangia and may be mistaken for an indusium.

Fig. 16. a. D. Bonapartii Ros. (orig.) — b. D. conformis (Sod.) C. Chr. (orig.) — c. D. Heineri C. Chr. (orig.) — d. D. semitunata (Sod.) C. Chr. (orig.) — e. D. euchlora (Sod.) C. Chr. (orig.) — f. D. euchlora var. inaequans C. Chr. from Nicaragua. All Pinne $\times \frac{1}{3}$, segments $\times \frac{1}{12}$, those without sori seen from above.
161. Dryopteris euchlora (Sod.) C. Chr. Index 263. 1905. — Fig. 16 e.

Type from Ecuador, Mt. Pululahua, leg. Sodiro (specim. auth. in Kew!); also Mt. Pichincha, Srübel nr. 751 (B).

A very large species with a stipe 60—70 cm long and a lamina of equal length. Rhizome apparently creeping; stipe brownish-stramineous, glabrous and clothed with scattered, adpressed scales, in the upper part bearing 4—5 pairs of tuberculiform, very distant abortive pinnae. Developed pinnae numerous, the lowest 1—2 pairs much abbreviated (Type IV), the following alternate at distances of 4—5 cm, the upper ones closer, fresh-green, membranous but thin, very sparsely strigose on the costae above, otherwise like the straw-coloured rachis quite glabrous, but costae beneath furnished with small, scattered, deciduous scales. Largest pinnae up to 20 cm long, 3—3 1/4 cm broad, the lower ones very contracted at base, incised to a wing 1—2 mm broad. Segments patent, linear, 5 mm broad the apex rounded or subacute and generally faintly toothed, the basal ones of lower pinnae much reduced, of the upper equal or the anterior one somewhat shortened. Veins 15—18 jugate, simple, not very close. Sori medial, small, exindusiate; sporangia glabrous.

In size, shape of segments, reduction of lamina and contracted base of lower pinnae allied to D. piloso-hisipida but very different by thin texture, glabrous frond and medial sori. Together with D. Glaziovii it is intermediate between the bipinnatifid species of the group of D. radis and the bipinnate D. pteroides.

D. atropurpurea Hieron. (supra nr. 114) I fear should be referred to D. euchlora. It has fewer veins, distinctly crenate segments and atropurpureous rachis, otherwise it is not essentially different.

A Central-American fern, fragments of which I have known for a long time, and which was collected recently by Maxon in Panama, I can now with certainty refer to D. euchlora as

var. inaequans nov. var. — Fig. 16 f.

Agrees perfectly with the type in size and texture, its practically glabrous frond, reduction of lamina and base of lower pinnae, that are very remote, in shape of segments, number of veins, etc. It differs from the type by its opposite pinnae and the segments being often crenate (like those of D. atropurpurea), but the main difference is the unequal-sided pinnae, the basiscop side of which is broader than the acroscop one (2 1/2 cm and 2 cm in the lower pinnae) with 15—16 veins to a side in a basiscop segment, 11—13 in an acroscop one. — Rhizome creeping 1 1/2 cm thick, slightly scaly at the growing apex.

Panama, Canal Zone, humid forests, Chiriqui, 1650 to 1925 m, Maxon nr. 5674 (W).


By its unequal-sided, very distant, opposite pinnae this variety looks very diffe-
rent, but I cannot consider it specifically distinct. Stübel's nr. 751 from Ecuador shows to some extent the same peculiarities and even in the authentical specimen of the type one can find a difference of some few millimeters between the length of the segments of the upper and lower side of the lower pinnae.

162. D. Glaziovii Christ; C. Chr. Revision nr. 62 fig. 40,

 illustr. Brazil, Minas Geraes and Rio.

Since the publication of my Revision I have seen the type-specimen of this species, Glaziovii nr. 5267 (C) and specimens from Minas Geraes, Itacolumi, 1400 m, Schwacke nr. 14109 (C). In these specimens the veins are simple and the basal segments not free; the stipe bears 3—4 pairs of glanduliform pinnae. Our specimen (H) has furcate veins and the lower segments often quite free, thus belonging to a more divided form that like the preceding species has the basiscop side of the pinnae enlarged. But the species can be much more divided, fully bipinnate or even tripinnatifid. The bipinnate form with simple or furcate veins is

Gymnogramme patula Fée, Cr. vasc. Brés. 1: 59 tab. 14 fig. 3 1869.
Serra os Orgaos, Glaziovii nr. 2822 (H); Serra de Ouro Preto, Schwacke nr. 15022 (G). Fée's figure is as a whole excellent, but the lower pinnae should be reduced gradually. This form is closely allied to the Andine D. pteroidea to which species Baker in Flor. bras. referred it; it differs by the sori being placed not so close to the margin and not being confluent. Unfortunately I have not seen the base of the lamina, but if I am right in considering it a form of D. Glaziovii it very likely has the lower pinnae abortive and glanduliform.

A still more cut form has the pinnae deeply lobed and the veins pinnatifid in the lobes; this is

Gymnogramme expansa Fée, Cr. vasc. Brés. 1: 60 tab. 14 fig. 4. 1869.

Another specimen of Glaziovii's nr. 2822 (H) agrees perfectly with Fée's figure; it is sterile.

Comparing Fée's two figures with that of mine we see here a series of forms quite corresponding to those of D. multifloris.

While the bipinnatifid forms of the last two species, D. euchlora and D. Glazovii certainly are related to D. piloso-hispida the species are, on the other hand, also and perhaps more intimately related to the bipinnate D. pteroidea. Together with this they belong to a separate little group of large species of rather thin texture, and dark colour. Most species belonging here have a nearly entirely glabrous frond, opposite and sessile pinnae, which are narrowed towards their base, where a distinct ærophore is to be found. D. euchlora stands next to D. piloso-hispida and resembles not a little the bipinnatifid form of D. Glazovii while the more cut forms of this latter species are closely allied to the two following species, which are, as it seems, constantly bipinnate. They represent the highest development of cutting in the subgenus, at least as for as American species are concerned.
163. *Dryopteris pteroeidea* (Kl.) C. Chr. Index 287. 1905.


*Phegopteris pteroeidea* Mett. Aspid. u. Pheg. nr. 3. 1858.

Type from Colombia, Moritz nr. 291 and Karsten nr. 40 (B!)

Hooker's figure represents very well this characteristic species, still the lower pinnules are generally much more reduced than shown in Hooker's plate. It varies mainly in size and cutting; I have seen specimens with pinnae 50 cm long and pinnule 5—7 cm long by 1 cm broad. The pinnules vary from being fully entire or faintly crenate to deeply lobed especially at the middle. Texture membranous, colour dark-green, surfaces (the sparsely setose costa excepted) glabrous rachis slender, sparsely and deciduously pilose. Veins generally once furcate bearing the small, exindusiate sori just within the margin; in lobed pinnule the veins are pinnately branched. — I have not seen rhizome and stipe; I believe that the rhizome is creeping and Mettenius says (l.c.) that the lower pinnae are abbreviated or abortive.

Colombia, Karsten nr. 40, Moritz nr. 291, Lindig nr. 157, Stübel nr. 478 a et 687 (B), Schlim nr. 3681 (C).

Venezuela, Funck et Schlim nr. 491 (C).

Ecuador, Spruce nr. 5260, Stübel nr. 894 (B).

164. *Dryopteris cochaensis* n. sp.


Type from Colombia: Cocha, leg. Stübel nr. 231 (B!)

*D. pteroeidea* magnitudine, habitu, textura, colore valde similis, differt: rachi rachillisque dense setosis, pinnis supra ubique minute pubescentibus, soris fere medialibus.

I think this can safely be distinguished from *D. pteroeidea* by the characters pointed out above. It is certainly very closely related to the former species, very much resembling large forms of it. Pinnae 35—45 cm long; pinnule 4 cm long by 1½ cm broad, broadly sessile (in *D. pteroeidea* generally subauriculately), the lower ones gradually reduced, central ones the largest and more or less lobed especially in the middle. Veins furcate or pinnate in the lobes, black and pellucid, bearing the round or oblong exindusiate sori just above the furcation at a considerable distance from the edge.

Prof. Hieronymus identified the only specimen of this new species with *D. biserialis* (Bak.) C. Chr. Baker's species however is a member of the subgenus *Ctenitis* and, of course, totally different from our species. This is a new instance of the impossibility of determining specimens with certainty after Syn. Fil.

165. *Dryopteris Ruiziana* (Kl.) C. Chr. comb. nov.


Type from Peru, ad Panatalhua, leg. Ruiz nr. 70 (B!).
This was founded on a fragment, the upper part of a leaf, but I have no doubt that it is a very distinct species allied to *D. multiformis* and that its proper position is here.

Rachis stramineous, trisulcate above with light brown scales in the furrows, scarcely pubescent. Pinnæ opposite, 15 cm long, 2\(\frac{1}{2}\) cm broad, coriaceous, glabrous above (the sparsely setose costa excepted), margins, costæ and costulae beneath rather densely soft-hairy by very long, thin, whitish, pluricellular, patent hairs and with several light-brown thin scales. Segments rather close, linear-falcate, obtuse, the basal ones reduced and auricled at the inner side. Veins simple, 15—17-jugate. Sori about medial, exindusiate.


Area: Guatemala.

167. *D. horrens* Hieron.; C. Chr. Revision nr. 80.

Area: Ecuador.

168. *D. mertensioides* C Chr. Revision nr. 81 fig. 50.

Area: Costa Rica; Guatemala: San Miguel Uspantán, Depart. Quiché, 6000 ft., HEYDE et LUX ed. DONN. SMITH nr. 3243 (W).

The specimens quoted have indusiate sori.

169. *D. cheilanthoides* (Kze.) C Chr. Revision nr. 82 fig. 51; Smiths. Misc. Coll. 52: 396.

Area: Southern Brazil. Jamaica. Mexico along Andes to Peru.

The Andine forms of this most distinct species do not agree perfectly with the Brazilian type, still I can not make them a separate species. The differences are only small; perhaps the most constant is the presence of an auricle on the inner side of the lower basal prolongated segments, which overlaps the rachis above; in the Brazilian form this auricle is very small or absent. As to pubescence and glandulosity the Andine forms are somewhat variable. They have been described under several names, but I cannot see any clear difference between the forms, and I refer them all to a single variety:

var. *resinoso-foetida* (Hook.).


(Ecuador, SPRUCE nr. 5300, Kew! RB; nr. 5299 and, 5301 quoted by Hooker I refer to *D. pachyrachis*).

*Lastrea grossa* Presl, Epim. 41. 1851. nomen. (Mexico, LEIBOLD, hb. Presl!)

*Aspidium Kunzei* Fée, 10 mém. 37 tab. 41 fig. A, B.

*Dryopteris oochlamys* C. Chr. Ind. 280. 1905.

**Dryopteris decrescens** O. Ktze.; C. Chr. Ind. 261. (Venezuela, Funck & Schlimg. nr. 1229, L!)

**Nephrodium atomiferum** Sod. Rec. 48. 1883. (Ecuador, Sodiro, Kew!)


**Dryopteris supina** var. **Bolleyi** Christ, Bull. L’Herb. Boiss. II 7: 262. 1907; C. Chr. Revision 308.

170. **Dryopteris multiformis** n. sp. — Fig. 17.

Ecuador, in præruptis montis Pichincha, 3000 m., leg. A. Mille (RB!).

Rhizomata oblique erecto, parce squamoso. Stipitibus subfasciculatis, strictis, griseo-stramineis basi fuscescentibus, sulcatis glabris, squamis brunneis sparse onustis, 15–25 cm longis. Lamina ovato-lanceolata, ad apicem pinnatifidum sensim decrescente, versus basin subito attenuata, 40–70 cm longa, 10–30 cm lata, firmo-herbacea vel membranacea, opaca, griseo-viridi, valde variabilia: bipinnatifida-bipinnata-tripinnatifida, subglabra vel dense pubescente, rachi costis costulisque utrinque pilis albidis tenuissimis, longis, pluricellularibus, patentibus plus minusve hirtis, marginibus ciliatis, faciebus glabris, costis subtus squamis parvis nonnullis instructis. Pinnis semper oppositis, sessilibus, intimis 2–3 paribus valde reduced, auriculiformibus, sequentibus 2–3 paribus parum abbreviatis, reflexis, mediahis maximis, recte patentibus, inter se 3–4 cm remotis, oblongis vel lanceolatis, acuminatis, plus minusve partiti, segmento vel lacina basali posteriore semper aucto, falcato, basi auriculam rachin tegentem ferente. In eadem planta formæ sequentes repertæ sunt: 1) **forma bipinnatifida**, dense pilosa (fig. 17 a–b); pinnis 6–8 cm longis, 1½–2 cm latis, ad alam 2 mm latam pinnatifidis; lacinis acutis, subfalcatis, marginibus integris revolutis; venis simplicibus, 6–7-jugis. 2) **forma bipinnatifida** major subglabra (fig. 17 c–d); pinnis ad 20 cm longis, 3 cm latis, ad alam 3 mm latam pinnatifidis; lacinis acutis, subfalcatis, marginibus subintegris, vix revolutis; venis simplicibus, 10–12-jugis. 3) **forma bipinnata** vel tripinnatifida subglabra (fig. 17 e); pinnis ad 20 cm longis medio ad 6 cm latis, versus basin attenuatis, a basi ad medium pinnatis, a medio ad apicem pinnatifidis; pinnulis ad costam late adnatis, subremoatis, basi utrinque auriculatis, auriculis ovatis acutis, sursum integris vel plus minusve profunde lobatis; pinnula basali anteriore reducta, venis in pinnulis maximis ad 16-jugis, plerumque furcatis vel subpinnatis. — Soris medialibus extensusatis, sporangiis glabris.

This remarkable species is certainly closely allied to *D. cheilanthes*; the second form described above resembles very much the large Mexican form of *D.*
cheilanthoides described as *Aspidium Kunzei* Fée (*Lastrea grossa*, Pr.), but it differs by its medial, exindusiate sori, fewer veins and eglandulose underside. The bipinnate form resembles in habit not a little *D. pteroides* differing by the not reduced, auricled lower basal segment, pubescence, position of sori. The two species are, I believe, very remotely related.
Unknown species of Lastrea.

The following species, of which I have seen no specimen, can with approximate certainty be referred to the present subgenus.

1. Aspidium Fischeri Mett. Aspid nr. 192. 1858; Dryopteris Fischeri C. Chr. Ind. 296. — Brazil. — Closely allied to D. ptarmica.
2. Phegopteris leptoptera Fée, Gen. Fil. 244. 1850–52. — San Domingo, De Tussac. According to the description this has setose sporangia. Most likely it is identical with D. concinna.
3. Aspidium sanctoides Fée, Gen. 292. — Guadeloupe, Duchassaing. — In Ind. Fil. referred to D. opposita. Fée compares it to D. sancta.
4. Aspidium confluent Fée, Gen. 293. — South America, Pampin nr. 75. Fully indeterminable from the description alone.
5. Aspidium pachychlamys Fée, 11 mém. 77 tab. 21 fig. 2. 1866. — Guadeloupe, L'Herminier. — A form of D. opposita?
6. Nephrodium rigescens Sodiro, Cr. vasc. quit. 239. 1893; Dryopteris rigescens C. Chr. Ind. 289. — Ecuador, Corazon. — Near D. cheilanthoides?
7. Nephrodium elegantulum Sodiro, Cr. vasc. quit. 243. 1893; Dryopteris elegantula C. Chr. Ind. 263. — Ecuador, valle de Pallatanga. — ? —
Subgenus 5. *Glaphyropteris* (Presl) C. Chr.


A small subgenus of mostly large species with a bipinnatifid lamina and an often very large (1 cm or more long), acute aërophore at the bases of the pinnæ beneath and similar but smaller aërophores at the bases of the midribs of the segments (not found in *D. mapiriensis*).  

Segments close, rectangular with broad, bluntly rounded apex and entire margins, rarely the apex is acute. Veins very close and numerous, simple, the basal ones reaching the margins above sinus. Pubescence somewhat variable (see below), the under-surface of most species covered with numerous, sessile, red glands, which are deciduous and therefore not found in older specimens.

By these characters the six species referred to *Glaphyropteris* differ from *Lastrea*, but I fear that the characters mentioned are not sufficient for the segregation of the two proposed subgenera. If one should prefer to treat *Lastrea* as a genus, which would be a very natural treatment, *Glaphyropteris* ought to be referred to it as a subgenus. It is true that the typical species of *Glaphyropteris*, *D. decussata*, is very different from all species referred to *Lastrea*, but it is no doubt intimately related to the three first species mentioned below. These three species show both the characters of *Lastrea* and *Glaphyropteris* besides some others peculiar to them alone; with the same right they could be referred to *Lastrea*, to a proper subgenus or to *Glaphyropteris*. I prefer here to refer them to a proper section of *Glaphyropteris*, which they are perhaps nearest related to. The subgenus thus is divided into two groups each including three species:

1. Group of *D. Thomsonii*. The three species belonging here resemble species of *Lastrea*, especially those related to *D. rudis*, by the shape of the lamina, which is abruptly narrowed downwards with 3–4 pairs of glanduliform warts along the stipe, and further by the shortly and antrorsely setose costæ above; the veins are not so close as in the species of *Glaphyropteris* proper, which they resemble by the presence of aërophores at the base of the midribs beneath.

The pubescence of the costæ beneath (partly also of the rachis) is peculiar and different from all species of *Lastrea* and *Eu-Glaphyropteris*. The costæ beneath are, namely, shortly and often densely cinerco-tomentose by sessile, 2–3-branched hairs, which do not resemble the stalked, branched hairs of *Goniop-teris*. Further the sori seem to be indusiate at least in *D. Cauadasisi* and *D. macradenia*. The three species belonging here were in my former papers referred to the group of *D. opposita*. ("Revision" nr. 67, 68 and 79).

1 The most important function of the aërophores or better "pneumatophores" appears to be during the development of the leaf, while the growing parts of this are covered by muélage. Very likely they are provisions for the aération of the young parts; in the developed leaf they are shrieveled. See Bower, Annals of Botany 24: 427–428, foot-note, 1910.

2. **Group of** *D. decussata* (*Glaphyropteris* proper). Lamina not narrowed downwards and without glanduliform pinnae. Still I find along the stipe of a specimen named *Polypodium Percivalii*, which is no doubt a form of *D. decussata*, several long, projecting aërophores which certainly indicate the place of non-developed pinnae. Rachis and costæ beneath finely downy by short, simple hairs that are deciduous; costæ above and margins very characteristically villous by long, soft hairs. Veins very close and numerous. Sori exindusiate.

*Glaphyropteris* is probably confined to tropical America. I do not know any Old-World's species which can safely be referred hereto. The Himalayan *D. erubescens* (Wall.) C. Chr. is similar in habit but otherwise quite different.

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**Key.**

1. Lamina with 3—4 pairs of small, tuberculiform, abortive pinnae along the stipe. Costæ above antroserly setose, beneath cinereo-tomentose by sessile, branched hairs. Veins 15—20-jugate, not very close.

2. Under surface not glandular. Indusium present, but rarely seen.

3. Sori medial or inframedial. Segments broadly obtuse, membranous, shortly and rigidly setose above

171. *Dryopteris Canadasii* (Sod.) C. Chr.; Revision nr. 68 fig. 44.

_Area:_ Ecuador. — _Sodiro_ describes the species as exindusiate; I have failed to find indusia in authentic specimens.

172. *Dryopteris macradenia* (Sod.) C. Chr.; Revision nr. 79.

_Area:_ Ecuador, _Sodiro_ (authentic specimens in _C_ and _Kew_!)

Closely related to the preceding species, but the lamina coriaceous, the segments acute and the sori supramedial. Basal segments much reduced.

Syn. *Dryopteris Stiibelii* Hieron., C. Chr. Revision nr. 67.

Area: Jamaica, Colombia; Ecuador, Llalla, Spruce nr. 5651 (Kew, L, RB).

174. **Dryopteris mapiriensis** Rosenstock, Fedde, Repert. 6: 315. 1909. — Fig. 18.

Type from Bolivia: San Antonio prope Mapiri, 800 m, Buchlien nr. 1131 (R!). A most distinct species, different from the allied *D. decussata* by its small size, fewer veins, densely villous rachis and costa, thin texture and lack of aërophores at the base of the costules.

Fig. 18. *D. mapiriensis* Ros. — Pinna $\times \frac{4}{15}$; two segments from the underside and one seen from above, $\times 1\frac{1}{2}$; fragments seen from both surfaces $\times 4$. (orig.)

175. **Dryopteris decussata** (L.) Urban, Symb. Antill. 4: 19. 1903; C. Chr. Ind. 261.


Gymnogramme microcarpon Fée, 7 mém. 43 tab. 20 fig. 5. 1857.
Polypodium velutinum Sod. Rec. 59. 1883; Cr. vasc. quit. 292. 1893!
Polypodium Percivalii Jenm.; Bak. Ann. of Bot. 5: 456, 1891!
Dryopteris Percivalii C. Chr. Ind. 284. 1905.

Linnaeus founded this well-known species on “Petiv. fil. 61 t. 2 f. 5”, a work
to which I have no access, but all later authors quote also Plumier tab. 24, which
plate illustrates a plant from Martinique and which is our species.

A very large species with fronds up to 3½ m long and pinnae 30—45 cm
long by 4 cm broad. Stipe strong, generally muricate, scaly below and like the
rachis downy by short, simple, deciduous hairs; in some (or all?) specimens the
stipe bears some long, projecting aërophores. Margins and costa above densely
hairy by long, soft hairs, costa and costulae beneath slightly and shortly pubescent
becoming glabrous; under-surface covered with red, sessile, deciduous glands.
Pinnae sessile, linear with nearly parallel edges, the aërophore at base thorn-like,
1 cm long. Segments patent, 2 cm long, 3—4 mm broad with an obliquely
rounded apex, i.e. the posterior side being bluntly rounded, the anterior one
forming about a right angle with the anterior edge, a threadlike aërophore, 2—3
mm long, is found at the base of the costules beneath; basal segments generally
somewhat reduced. Veins 25—40-jugate, very close. Sori inframedial or subcostu-
lar, exindusiate: receptacles somewhat elevated, oblong; sporangia glabrous, red-
dish, loose.

The form described here is the typical one, to which belong the following
specimens:

West-Indian Islands: Martinique, Iseert (H); Sieber nr. 189, 349 (B = P. grammicum Spr.);
L. Hahn nr. 41 (B) — Guadeloupe, L’Herminier nr. 173 (B, C); Lenormand (B); Dechas-
saing (B) — Montserrat, Ryan (H) — Dominica, Eggers nr. 629 (B); F. E. Lloyd nr.
349 (W) — St. Vincent, Eggers nr. 6805 (W); H. H. & G. W. Smith nr. 43 (W) —
Grenada, Eggers nr. 6388 (C, W); Broadway (W) — Porto Rico, Sintenis nr. 1787
(C), 4592 (B, W) — Jamaica, H. Smith nr. 436 (B); Hart nr. 195 (W); Clute nr. 163
(W); A. Fredholm nr. 3343 (W); Underwood nr. 1361 (W).

Guiana, Lefebvre (B, W) — Mt. Russell, Pomeroon River, Demarara, Jenman nr. 2080 (Kew =
P. Percivalii Jenm.),
Venezuela, Funck nr. 771 (B); Karsten nr. 166 (B).
Costa Rica, La Palma, Maxon nr. 443 (W); Wercklé (C, CC).

Most Andine specimens differ from the type by the more densely pubescent
rachis and costa, more remote and more acute segments and apparently fewer
glands on the underside.

A specimen from Sodiro, named by himself P. velutinum Sod. belongs to
this form, which I therefore call
f. velutina (Sod.)

Ecuador, Sodiro (C) — Peru: San Gavan, Lechler nr. 2356 (B).
Costa Rica: La Palma, Tonduz nr. 12639 (C, W) — Carillo, Pittier et Tonduz nr. 1165 (C).
var. brasiliensis n. var.

A typo differt: stipite spinis acutis instructis; rachi costisque subitus pilis longis patentibus vestitis.

All the Brazilian specimens seen differ from the type by these two characters; otherwise they fully agree.

Brazil: Sta. Catharina, Joinville, O. Müller (R) — Schwacke nr. 13320 (C) — Am Rio Comprido bei Ignape, Wettstein u. Schiffner IX. 1901 (Herb. Mus. Wien).

176. Dryopteris polyphlebia n. sp. — Fig. 19.


Type from Ecuador, leg. Sodiro (B, type specimen, C).

I agree with Sodiro in considering this species distinct from D. decussata, which Sodiro described as a new species (P. velutinum). It resembles it in most characters but may be distinguished by the following.

Very large (I have not seen a complete frond); pinnae up to 45 cm. long by 7 cm broad with the costa beneath more than 2 mm broad. Pinnae oblong-elliptical or lanceolate, shortly stalked and narrowed towards the base, in the specimens seen without glands. Segments close with parallel edges, their apex equally rounded to both sides, 3½ cm long by 7 mm broad; veins 50–60 to a side. Sori a little above the middle of the vein, oblong. — Texture coriaceous, fragile, colour grey-green; rachis 8 mm broad, castaneous as young very finely puberulous, soon glabrous.

Besides the specimens from Equador I have seen the following from Costa Rica: Carillo, Pittier nr. 2474 (B, C, W) — Talamanca, Tonduz nr. 9453 (C, W).

Subgenus 6. Steiropteris C. Chr.

Biolog. Arbejder tilegnede Eug. Warming pag. 81. 1911.

Rhizome wide-creeping, ligneous, scaly at the apex; scales firm, castaneous or dull-brown, entire but generally with some few short, acute hairs on the margins. Lamina deltoid or somewhat narrowed below, rarely (in D. deltoidea) with several pairs of auriculiform pinnae, firm to rigidly coriaceous, of a characteristic greyish or brownish colour, more or less pubescent by simple hairs, which partly are short and unicellular, partly long and pluricellular. In most species both kinds of hairs are found intermixed on rachis and costae beneath, in others only one kind is found; seldom the leaf is quite glabrous. Lamina pinnatifid, or, as a rule, bipinnatifid with sessile or shortly stalked pinnae, in most species with a distinct acute aerophore at the base. Veins simple, often raised above, those of the basal pair running out to the sinus, more or less connivent and with a cartilaginous
membrane between them; this membrane is in leaves of thick texture often folded and forms on the underside an often hairy keel running from the sinus towards the costa and parallel to the costules. Indusium in most species large, reniform, as a rule persistent. Sporangia glabrous.

A natural group including 13 known species of middle-size or large-grown and partly closely related to each other. The majority of them resemble in habit not a little *D. rudis* and allied species, in venation, indusium and rhizome *D. oligophylla*; the subgenus thus connects the two groups of which the two species named are typical members. From both it can be distinguished by the characteristic carinate fold below the sinus, the grey colour and the pluricellular hairs. From the free-veined species of *Goniopteris* all species are different by the lack of stellate hairs. Glands are absent in all species.

The two last species, *D. glandulosa* and *D. Fendleri*, are somewhat different from the others. Their position in this subgenus is doubtful; see below.

**Key.**

1. Pinnae sessile or the lower ones very shortly stalked. All veins free.
   2. Lamina pinnatifid (or pinnate below only) with entire segments
      177. *D. Wrightii* (Mett.) O. Ktze.
   2. Lamina bipinnatifid.
   3. Lower pinnae more or less reduced.
      4. Lamina suddenly narrowed downwards with several pairs of
         auriculiform, reflexed pinnae ............ 178. *D. deltoidea* (Sw.) O. Ktze.
      4. Lower pinnae abbreviated but not auriculiform.
      5. Lamina membranous-papyraceous, pinnae incised to a narrow wing to costa .................... 179. *D. L'Herminieri* (Kze.) C. Chr.
      5. Lamina rigidly coriaceous; pinnae incised about halfway to the costa .......................... 180. *D. lonchodes* (Eat.) O. Ktze.
   3. Lower pinnae not reduced, generally reflexed.
      5. Rachis and costae beneath with many short hairs with some few long, pluricellular hairs intermixed. Pinnae incised to a wing 3—5 mm broad; veins 9—10-jugate
         181. *D. densiloba* C. Chr.
      5. Rachis, margins, costae and veins beneath with many very long, pluricellular hairs, short hairs few. Pinnae incised nearly to costa; veins 10—11-jugate
         182. *D. incana* (Christ) C. Chr.
   4. Aërophore present. Lamina firm, membranous or papyraceous.
      5. Fronds dimorphous. Stipe and rachis very densely clothed
with woolly, long, pluricellular hairs, under which is a
layer of short hairs............. 186. *D. valdepiłosa* (Bak.) C. Chr.
5. Sterile and fertile fronds similar. Long hairs few or none.
6. Pinnae incised to a narrow wing to the costa; segments
rarely 6 mm broad.
7. Pinnae with unequal base, i.e. the lower basal
segment shorter than the upper
    179. *D. L'Herminieri* (Kze.) C. Chr.
7. Basal segments equal and often very reduced in
the lower pinnae. Indusium persistent.
8. Leaf-tissue of both surfaces finely pubescent.
Rachis and costae with several long hairs. Sori
medial ..................... 183. *D. Leprieurii* (Hk.) O. Ktze.
8. Leaf-tissue glabrous. Costae beneath glabrous or
short-hairy.
9. Veins raised above. Sori submarginal
    184. *D. praetervisa* (Kulm.) O. Ktze.
9. Veins scarcely raised above. Sori subcostular
    185. *D. densisora* C. Chr.
6. Pinnae incised to a wing 5–8 mm broad; segments
7–9 mm broad ................. 187. *D. insignis* (Mett.) O. Ktze.
1. Most pinnae distinctly stalked, scarcely incised halfway down to the
costa; segments 6–8 mm broad; lower 2–6 veins on the same side
of the costa united along a cartilaginous membrane or keel below
the sinus, thus forming 2–4 areoles on each side of the costa. Long,
pluricellular hairs none. Lamina upwards suddenly narrowed into a
hastate, terminal pinna.
2. Indusium very small, rarely seen; 3–4 pairs of lower veins connive-
rent to the membrane or keel............. 188. *D. glandulosa* (Desv.) C. Chr.
2. Indusium persistent, glabrous, 6 pairs of connivent veins
    189. *D. Fendleri* (Eat.) O. Ktze.

177. *Dryopteris Wrightii* (Mett.) O. Ktze. Rev. 2: 814, 1891; C. Chr. Ind. 301.
    *Nephrodium Wrightii* Hk. sp. 4: 64 tab. 239. 1862; Hk. Bak. Syn. 288;
    Type from Cuba orient., Monte Verde, *Wright* nr. 824 (S), and collected
in the same region by *Maxon* nr. 4482 (W). — *Jenmann* has found the species in
Jamaica, but I have seen no specimens.
    A very distinct species, which by authors generally is placed near *D. scolo-
pendrioides, but it agrees in all characters with the other species of § Steiropteris, and we here come upon an excellent illustration of the unnatural manner of arranging the species after the degree of cutting. Hooker’s plate cited above is a good figure of the species, and it is unnecessary to give here a new description. Aerophore is not present. It differs from all pinnatifid species of Dryopteris by the characters ascribed to § Steiropteris and from the other species of this group by its pinnatifid, not bipinnatifid lamina.


Syn. Polypodium deltoideum Sw. Prod. 133. 1788 — (for other synonyms see Ind. Fil.).

Type from Jamaica; leg. Swartz (S! H).

A well-known species, which is the type species of § Steiropteris. The pinnæ of the lower half of the lamina are reduced to mere lobes, which are reflexed and auricled at the base.

St. Thomas: Le Dru (H).
Porto Rico: Eggers nr. 814 (B, C), Sintenis nr. 1001 (S); 2411 (B), 2033, 2256, 2873 (C) — Ventenat (H).
Jamaica: Maxon nr. 915 (H W), 2907 (C, W).
Cuba: Wright nr. 823 (B, S) — Palmer and Riley nr. 506 et 1028 (H).
Trinidad: Don (L).

179. Dryopteris L’Herminieri (Kze.) C. Chr. Ind. 275. 1905.

Aspidium trichophorum Fée, 11. mém. 81 tab. 23 fig. 2. 1866.
Dryopteris trichophora O. Ktze. Rev. 2: 814; C. Chr. Ind. 298.
Aspidium asperulum Fée, 11. mém. 80 tab. 23 fig. 1. 1866.
Dryopteris decumbens C. Chr. Ind. 261. 1905.
Aspidium Capitainei Fée et L’Herm.; Fée, 11. mém. 80 tab. 22 fig. 3. 1866.
Dryopteris Holmei C. Chr. Ind. 271. 1905.

Type from Guadeloupe, leg. L’Herminier (B!).

A distinct species resembling in size and general habit D. mollis and D. normalis, but really a near ally of D. deltoidea and D. Leprieurii, showing all the characters of § Steiropteris:

The wide-creeping rhizome is clothed at the apex with brown scales, which are lighter and thinner than those of D. deltoidea and D. lonchodes. The stipe is 15—20 cm long, glabrous or finely pubescent. Lamina 2½—4 cm long, 12—15 cm broad, slightly narrowed downwards, membranaceous, grey-green or brownish. Rachis, costae and both sides and costules beneath densely villous by short, uni-
cellular and long, pluricellular hairs, the margins and veins above with solitary long setae. Aërophone large, acute, hairy (as in *D. deltaidea*). Lower pinnæ more or less reduced, seldom equal to the next pair, sessile or very shortly stalked. Pinnæ alternate, about 8 cm long by 1½ cm broad, the apex acute or acuminate, the base unequal-sided, truncate on the upper, cuneate on the lower side, incised to a narrow wing 1—2 mm broad into falcate or oblique, entire or faintly crenate, acute segments, 4 mm broad. Upper basal segment generally a little longer and almost parallel to rachis, the lower (especially in the lower pinnæ) shorter and oblique. Veins 7—8-jugate, simple, the basal ones running out to the sinus or a little above it with a hyaline, hairy membrane or (in dried specimens) a distinct keel between them. Sori supramedial, furnished with a large, reddish, persistent indusium, which is glabrous or more often pubescent by short hairs and a few long, deciduous setæ.

*D. L'Herminieri*, with which *A. trichophorum* Féée is absolutely identical, is a fairly constant species, mainly varying in pubescence. *A. Capitainei* Féée is a form with a glabrous indusium and without long, pluricellular hairs on rachis and veins above, but the rachis and costæ beneath are more densely tomentose by the short hairs; to this form belong all specimens from St. Vincent and Grenada, while the specimens from Guadeloupe are partly this form partly typical. *N. Holmei* Bak. is the typical form and *A. asperatum* Féée is intermediate between the two extremes. According to a note in Herb. Berol. by Mettenius *Nephródium clypeolutatum* Desv. is this species; if so the name of course has priority. — The species seems to be confined to the Lesser Antilles, from which I have seen the following specimens. Mettenius mentions a specimen from Jamáica, leg. Breutel, which I have not seen, and Jenmann does not know the species as Jamaican. The Brazilian specimens referred hereto by Baker in Fl. bras. belong to *D. lugabris*.

St. Kitts: Britton and Cowell nr. 398 (W).
Montserrat: Ryan (H); Holme (Rw = *N. Holmei* Bak.).
Guadeloupe: L'Herminier (B. hb. Féée, Paris) — Mazé nr. 40 (C), Jenman (W), Père Duss nr. 4044, 4405 (W).
Martinique: Père Duss nr. 1583, 1584 (W) — Bordaz (C).
[St. Lucia: Gray according to Jenman, not seen.]
St. Vincent: Jenman (W), Eggers br. 6883 (C, W), Checkley br. 10 (C) — Herb. Bot. Gard. Trinidad nr. 6182 (C).
Grenada: Sherring br. 222 (W); Murray and Elliott (B, W); Eggers br. 6102 (C, W), Jenman (W), Broadway br. 3767 (RB).

180. **Dryopteris lonchodes** (Eat.) O. Ktze. Rev. 2; 813. 1891; C. Chr. Ind. 275. — Fig. 20.

*Nephródium lonchodes* Hk. sp. 4; 99. 1862; Hk. Bak. Syn. 270.

Type from Cuba orient. Monte Verde, Wright nr. 1007, 1008 (B, S, W) — Specimens from the same region (Vicinity of Baracoa) were collected by Pollard, E. and W. Palmer nr. 239 (W).

Closely allied to the two preceding species, distinguished by its rigid, grey frond, which upwards is suddenly narrowed into a long pinnatifid apex. Scales of rhizome dark-castaneous, rigid. Pubescence mainly as in D. L’Herminieri, still the costa beneath are lacking the short hairs, and the upperside hairy on the costae only. Pinnae sessile with an equal, cuneate base, incised \( \frac{1}{2} - \frac{2}{3} \) of the way to the costa into falcate, obtuse or acute lobes. Veins about 10-jugate occasionally forked, raised on the upperside; the basal ones connivent to the sinus; keel distinct. Sori medial, rather small, with a reddish, persistent, slightly setose indusium. — The pinnae are few, 6–8 to a side, the lower ones more or less abbreviated; middle ones 10–15 cm long, 2–2 \( \frac{1}{4} \) cm broad.

181. Dryopteris densiloba C. Chr. Index 261. 1905. — Fig. 21 a.

Syn. Nephrodium Gardnerianum Bak. Fl. bras. 1\(^{2} \): 474. 1870; Syn. Fil. 496.


Type from Brazil, Organ Mls., Gardner nr. 190 (Kew!). Other specimens were collected near Rio by Glaziou nr. 15760 (B, H) and Ohans (R), and in the state of São Paulo, Serro da mar, Wacket nr. 212 (R = D. supralineata Ros.).

D. densiloba is apparently a rare species, closely related to D. L’Herminieri, resembling it in size, colour and pubescence. It is of a thinner texture and without aerophore; lower pinnae not conspicuously reduced, reflexed, the upper ones with a characteristic upcurved apex; pinnae less incised, the often very close, acute segments being connected by a wing 3–5 mm broad; the keel distinct but not reaching the costa. Veins 9–16 to a side; sori medial or a little above the middle of the vein; indusium persistent, shortly pilose (not glabrous as described by Baker). — The basal segments of the lower pinnae are much reduced.

182. Dryopteris incana (Christ) C. Chr. Ind. 272. 1905.


A critical species of doubtful position; provisionally I place it in this section, because it in colour and pubescence best agrees with the other species. Still it lacks aerophores, and the rhizome is described as erect; the vein-like keel is inconspicuous but present. From the nearest species, *D. Leprieurii*, it differs further by its thin texture, much reduced lower segments of the lower pinnae, and pubescence, stipe, rachis, costae on both sides being long-hairy by patent, grey, pluricellular hairs with a few short hairs intermixed. Segments linear, somewhat oblique, acute, connected by a very narrow wing; veins 10–11-jugate; sori small, medial, with a small, short-hairy indusium.

183. **Dryopteris Leprieurii** (Hook.) O. Ktze. Rev. 2: 813. 1891;  
C. Chr. Ind. 274. — Fig 21c.  

**Syn. Nephrodium Leprieurii** Hk. sp. 4: 106. 1862; Hk. Bak. Syn. 266; Jenman, W. Ind. and Guiana Ferns 216.  

**Type from French Guiana, Leprieur (Kew! specim. auth. also in B and W).**  
The typical form of this species is closely related to *D. L'Herminieri*, differing from it by its non-reduced lower pinnae and the basal segments of lower pinnae being considerably reduced; also it is much larger, lamina $\frac{1}{2} - \frac{3}{4}$ m long by $2\frac{1}{2}$–3 dcm broad, the opposite pinnae 12–15 cm long, $2\frac{1}{2}$–3 cm broad. In pubescence it agrees with *D. L'Herminieri*, still the leaf-tissue of both surfaces is finely pubescent by adpressed hairs. Veins 10–12-jugate, raised above, the basal ones reaching the margin a little above the sinus; keel inconspicuous in some specimens, distinct in others. Sori medial, indusium large, more or less hairy.

**Jenman** (l. c.) describes the rhizome as being erect; unfortunately all the specimens from Guiana seen by me want rhizome, but in the Brazilian specimens are found parts of the rhizome, which appears to have been creeping with scattered leaves.

*D. Leprieurii* is apparently a very variable species, at least if the specimens referred to it really belong to a single species. Even the specimens from Guiana vary not a little, and some of them belong perhaps to *Nephrodium subfusca* Bak. Syn. Fil. 267. 1967; Jenman, W. Ind. and Guiana Ferns 217; **Dryopteris subfusca** O. Ktze., C. Chr. Ind. 295 from Cayenne, Leprieur, which I cannot distinguish from *D. Leprieurii* from the descriptions alone. **Jenman** says that it is intermediate between *N. Leprieurii* and *N. stipulare* (= *D. patens*). The type-specimen of it was not found in the Kew Herbarium.

Besides the authentical specimens of *D. Leprieurii* I have seen some others from Guiana, f. inst.: Demerara, **Jenman** (W); Maraval, Bot. Gard. Herb. Trinidad nr. 335 (W). Further I refer here some specimens from Brazil and the central South American Andes, which probably belong to var. $\beta$ Hook. spec. 4: 106. They differ from the typical form by more numerous veins (16–18 to a side), more deeply incised pinnae (wing $1 - 1\frac{1}{2}$ mm broad), large fronds ($3/4 - 1$ m long,
30—40 cm broad), glabrous leaf-tissue and less pubescent ribs; keel inconspicuous or absent, but then a broad, cartilaginous membrane is seen between the basal veins. Sori medial, indusium glabrous or finely pubescent.

Having not seen two specimens, which are quite identical, and not being able of distinguishing the forms from *D. Leprieurii* by several characters, I prefer to refer all the specimens hereto, although it is very probable that at least some of them belong to a distinct species.

**Brazil:** Matto Grosso, Santa Anna da Chapada, MALME 11092 (Bg. — very beautiful and large specimens with very acuminate pinnae) — Minas Gerais: Lagoa Santa, WARMING (H).

**Bolivia:** Mapiri, Rusby nr. 426 (CC, thin leaved; sori supramedial).

**Peru:** St. Gavan, LECHLER nr. 2468 (B).


**Ecuador,** in valle Pastaza, Stübel nr. 965 (B).

**184. Dryopteris praetervisa**

(Kuhn) O. Ktze. Rev. 2: 813. 1891; C. Chr. Ind. 285. — Fig. 21 b.


*Neprodiium praetervisum* Bak. Syn. Fil. 495. 1874.

*Type from Venezuela,* TOVAR, FENDLER nr. 371 (Kew).

A critical species and perhaps a variety of *D. Leprieurii*. It differs from that species by the perfectly glabrous leaf-tissue, the coste and costulae only being sparsely setose by short hairs; rachis rather densely but shortly pubescent. Veins 10—12-jugate, much raised above. Keel distinct beneath but not reaching the costa. Sori supramedial, sometimes close to the margin, in the only specimen seen confined to the lower two anterior veins and to two or three upper veins at the apex of the segment. — Lamina firm, papyraceous, glossy above, very gradually narrowed upwards into a long-acuminated apex. This last character is perhaps the most marked one. Aerophores distinct.
185. **Dryopteris densisora** C. Chr. Ind. 261. 1905.


*Nephrodium costale* Bak. *Syn.* 495. 1874.

**Type** from *Venezuela*, **Fendler** nr. 476 (not seen, not found at Kew). Although I have not seen an authentically specimen I do not hesitate to refer to this species several specimens from Costa Rica, which exactly correspond to the original description. Most of these specimens I have previously determined as *D. Leprieurii* var. *palmensis* (Christ) considering them not specifically different from *D. Leprieurii* and using a MS name of Dr. Christ for the variety.

*D. densisora* is very closely allied to *D. Leprieurii* and it is perhaps only a variety of it. It differs by the glabrous surfaces, being sparsely strigose along the costa only, and especially by the *inframedial* or subcostular sori, which are furnished with a very large, subbullate and subglabrous indusium. Veins about 12-jugate, scarcely raised above. As to all other characters it agrees with *D. Leprieurii*.

**Costa Rica**: La Palma, **Tonduz** nr. 12576 (C, W), **Weckle** (C, CC), A et C. *Brade* nr. 347 (B).

**Panama**: **Maxon** nr. 5605 (W).

186. **Dryopteris valdepilosa** (Bak.) C. Chr. Ind. 299. 1905. — Fig 22.


**Type** from *Colombia*, province of Antioquia, **Kalbreyer** nr. 1347 and 1871 (Kew!), and very typical specimens were collected in *Costa Rica* by J. J. **Cooper** (W).

A most distinct species, remarkable by its stipe and rachis being very densely clothed with long, soft, patent light brown, pluricellular hairs; similar hairs but shorter and fewer are found on the costa, costulae and veins of both sides. These long hairs are (as seen in nr. 1871) deciduous and under them is a rather dense layer of very short, unicellular hairs; costa above also with many long but antrorse hairs; leaf-tissue of both surfaces pubescent by minute adpressed hairs. Fronds dimorphous, if the fertile frond of nr. 1347 really belongs to the same plant as the sterile one. Sterile lamina on a stipe 20 cm long, lanceolate, 40—50 cm long, 15—20 cm broad at the middle, membranous, greyish green. Pinnae close, sessile, lower ones much reflexed, scarcely
reduced, central ones about 10 cm long, 2\(\frac{1}{2}\) cm broad, shortly acuminate, a
distinct aërophore at the base beneath, incised to a wing 4—5 mm broad into
close oblong segments, which are as broad at the rounded apex as at the base.
Veins 10—12, keel distinct. — Fertile lamina much narrower, 20 cm long by 8
cm broad; pinnae distant, obtuse, 3—3\(\frac{1}{2}\) cm long, 1 cm broad, incised nearly to
costa. Sori near costule, furnished with a persistent, long-ciliated indusium.

_D. valdepilosa_ is intermediate between _D. Leprieurii_ and _D. insignis_, abundantly
different from both by its dimorphous fronds and woolly pubescence of stipe
and rachis.


*Nephrodium insignis* Bak. Syn. 262. 1867.

_Type_ from Colombia, Triana (B, where only a pair of basal pinnae is to
be found).

A true _Steiropteris_, by Hieronymus unrightly identified with _D. brachyodus_
(Hedwigia 46: 323). It differs from the other species of the subgenus by its entirely
glabrous pinnae, which are only incised \(\frac{1}{2}—\frac{2}{3}\); keel very distinct; segments 7—8
mm broad; veins 12—16-jugate, prominent, sori medial, small. Texture firm, mem-
branous, colour grey.

A hairy form of this species is no doubt _Dryopteris lata_ Hieron. Hedwigia
46: 327. 1907, from Ecuador, in valle Pastaza, StüBEl ur. 999 part (B1). It differs
by its strigose costæ and veins beneath and the caudate apex of the pinnae. Hiero-
nymus identified it with *Lastrea lata* J. Sm. a name attributed to *Cuming* pl. phi-
lipp. nr. 266, which certainly came from the Philippine Islands. I have seen au-
thentic specimens of *Cuming* nr. 266 in herb. PreSl and they differ from _D. lata_
Hieron. _inter alia_ by the stalked pinnae. I agree with Baker in considering _L. lata_
J. Sm. a form of _D. crassifolia_ (Bl.) O. Ktze.

The following two species are as to several characters very different from the
species of _Steiropteris_ dealt with above, still I think their proper place must be in
this subgenus, although it is not improbable that they belong to a proper subgenus.
In general aspect they resemble much more species of _Goniopteris_ f. inst. _D. nicara-
guensis_ and _D. megalodus_, and at first I referred them to that subgenus. They
differ, however, from _Goniopteris_ and agree with _Steiropteris_ in the presence of
distinct aërophores and in pubescence, stellate hairs being entirely wanting, rachis
and costæ beneath are very finely pubescent by minute, simple hairs, which do
not differ from the short, unicellular hairs of most species of _Steiropteris_. Long
pluricellular hairs of the common kind do not occur, but the costæ and costule
beneath are more or less furnished with narrow, brown fibrils, which are scale-
like hairs consisting of a single row of cells; such fibrils are often found in large
number round the aërophore and at base of the costules and have here fully the aspect of scales. These "scales" are, however, not true scales; under the microscope they are seen to consist of an entangled mass of the long, brown fibrils, probably brought together by mites and thus forming Acarodomatis, but not very much resembling those common on the leaves of Tiūa. — Very remarkable and quite unique is the venation. Below the sinus extends to the costa a cartilaginous membrane, which in dried specimens often is folded and form a keel quite as in the preceding species; the pinnae being incised scarcely to the middle the lower 4—6 pairs of veins run out to the membrane, and those coming from the same side of the costule are united near the edge of the membrane into a common-vein running along the membrane to the sinus (see fig. 23). — Other peculiarities of the two species are the not deeply cut, stalked pinnae and the subdistinct terminal pinna.

188. Dryopteris glandulosa (Desv.) C. Chr. comb. nov., non O. Ktze.1)

Goniopteris abbreviata Presl, Tent. 183. 1836 (nomen).
Phegopteris abbreviata Mett. Pheg. nr. 45. 1858.
Goniopteris rostrata Fée, 11 mém. 64 tab. 17 fig. 3. 1866 (bona!)
Nephrodium brachyodon auctt. quod pl. Ind. occ.; Jenman, W. Ind. and Guiana Ferns 235.

Dryopteris dejecta C. Chr. Ind. 261. 1905.

Type from the West-Indies without exact locality (Herb. Desvaux, Mus. Paris!).

A most distinct species, very well described by Mettenius and Jenman (loc. cit.) and well figured by Fée. It can at once be distinguished from D. megalodus, with which it often has been confounded, by its coriaceous texture, yellowish or greyish underside, its falcate lobed, its simple not stellate hairs of the costae beneath and by the presence of aërophores and scale-like fibrils on the costa beneath. Further D. megalodus and related species have a terminal pinna like the lateral ones, while the terminal pinna of D. glandulosa is hastate, i. e. below its broad base and often confluent with it are to be found a pair of short, lateral pinnae; the next following pair of pinnae are much larger.

Rhizome 2—3 cm thick, ligneous, short-creeping, naked. Stipe often 60—80 cm long, stramineous, deeply sulcate above, glabrous. Lamina 30—60 long with 8—10 pairs of very remote (6—8 cm), opposite pinnae, up to 25 cm long by 4 cm broad, distinctly stalked with a prominent dark, acute or obtuse aërophore beneath.

1) D. glandulosa (Bl.) O. Ktze. = Aspidium glandulosum Bl. 1828 must subsequently be renamed. I propose for it the new name Dryopteris malayensis C. Chr.
the apex caudate, the base of lower pinnae reduced; lower pinnae not shortened. Rachis slender, finely downy by minute hairs, soon glabrous. Pinnae above slightly strigose on the deeply channelled costae, elsewhere glabrous, the generally flat costae and costulae beneath microscopically puberulous, by simple hairs, the leaf-tissue glabrous. Scale-like fibrils of the costae beneath few and scattered. Pinnae incised scarcely to the middle into broad, falcate, entire segments. Veins simple, 12—16-jugate, the lower 3—4 forming areoles between the costule and the membrane; sometimes those of the basal pair are truly anastomosing (nervation Goniopteris). Sori small, medial or somewhat inframedial. I have failed to find an indusium, which Jenman describes as small and ciliate. Sporangia glabrous.

Desvaux identified Plummer's plate 21 with this species and was no doubt right; Ph. Plamieri was based on the same plate. D. glandulosa is in its typical form a common fern in the Lesser Antilles. Jenman records it also from Jamaica and Guiana. Neph. dejectum Jeum. is according to a photograph of Jenman's original specimen kindly sent me by Miss Slosson together with a small fragment of the same not to distinguish from the type. Jenman describes the rhizome as erect and the sori as indusiate. — I have seen the following specimens:

West-Indian Islands: St. Kitts, Britton and Cowell nr. 407 (W); Mrs. Robinson (B) — Montserrat, Ryan (H, RB); H. H. Holme (B) — Guadeloupe, L'Herminier (B, C); Père Duss nr. 4110, 4112 (W) — Dominica, Eggers nr. 767 (B, C, RB) — Martinique, Isert (H); Bélanger (RB); Hahn nr. 36 (B, RB), nr. 1075 (B); Père Duss nr. 1656, 1585 (W); Sieber, Syd. Fil. exs. nr. 168 (B) — (Santa Lucia, Jenman, not seen) — St. Vincent, Eggers nr. 6741 (W); H. H. and G. W. Smith nr. 451 (B, C) — Grenada, Sherrington nr. 103 (C, W) — Tobago, Eggers nr. 5823 (C); Broadway (BB) — Trinidad, Bot. Gard. Herb. Trin. nr. 34 (W); Broadway nr. 2524 (RB).

Demerara, Jenman (N. dejectum Jenm.).

Nephroidium Grayii, Jenman, W. Ind. and Guiana Ferns 235 1908 from St. Lucia, Gray nr. 17, is, judging from the description, this species.

In Central America and South-American Andes a plant occurs, which perhaps is specifically different from D. glandulosa but which I now regard as a variety of this species. It is

var. brachyodus (Kunze).


Phegopteris brachyodus Mett. Phed. nr. 38. 1858.

Dryopteris brachyodus O. Ktze.; C. Chr. Ind. 255.


Type from Peru: Pompayaco, leg. Poeppig (not seen).

In pubescence, size, cutting and venation scarcely different from D. glandulosa type; it differs mainly by its thinner texture, darker upperside, alternate pinnae and its less falcate lobes. The costae and costulae beneath are more decidedly fibrillose by red-brown fibrils, which often cover the aërophore. Mettenius found the difference between this variety and the type in the goniopteroid venation of
the latter (his *Ph. abbrevialis*), but this difference does not exist constantly. In the type one can find occasionally the basal veins truly anastomosing as in *D. megalodorus*, what never is the case in the variety.

**Guatemala**: Cubilquitz. Alta Verapaz, v. Törckheim ed. Donn. Smith nr. 8813 (W); Bernoulli et Cario nr. 272 (C); vicinity of Cacao, H. S. Barber nr. 168 and 170 (W).

**Costa Rica**: Vicinity of Turrialba, Maxon nr. 175 (W); forêts de Tsuki, Talamanca, Tonduz nr. 9476 (C, W); Tuis, Pettit nr. 11292 (C); Wercklé (C).

**Panama**: Maxon nr. 5774 (W).

**Colombia**: Sta. Marta, H. H. Smith nr. 2690 (C).

In Syn. Fil. 295 *Nephrodium brachyodus* is said to occur also in Malayan Peninsula and Isles. I have seen several specimens from the former locality determined at Kew, but they belong all to a species, which in pubescence and venation is totally different. It is figured by Beddome (Ferns brit Ind. Suppl. tab. 379) and is probably an undescribed species belonging to *Cyclosorus*.

189. **Dryopteris Fendleri** (Eaton) O. Ktze. Rev. 2: 812. 1891:
C. Chr. Ind. 264. — Fig. 23.


**Nephrodium Fendleri** Hook. spec. 4: 82. 1862; Bak. Syn. 295.

Type from Venezuela, Tovar leg. Fendler nr. 372 (B, and a photograph of Eaton's specimen in W!)

Closely related to *D. glandulosas*, with which it agrees in size, cutting and texture, opposite pinnae, pubescence, presence of aërophores and brown fibrils on costa beneath and in its hastate, terminal pinna. The main differences are 1) the stramineous costæ and costulse and light-green surfaces, 2) the supramedial sori, which are furnished with a corrugated, glabrous indusium, and 3) the larger number of veins, about 6 to each side of the costule, running to the cuneate, cartilaginous membrane, which upwards is nearly 1 mm broad.

**Jenman** referred *D. Fendleri* to *D. venusta* (Bull. Bot. Dept. Jamaica n. s. 3: 188). *D. venusta* is, however, not at all related to the present species, easily distinguished from it by venation, pinnatifid apex, stellate pubescence and other characters.
Subgenus 7. Cyclosorus (Link) C. Chr.
Biolog. Arbejder tleegnele Eng. Warming pag. 81. 1911.

The American species of this subgenus are all bipinnatifid and closely related to each other. The rhizome is erect or creeping, clothed with lanceolate or ovate, as a rule hairy and entire scales. Lamina with a broad base or shortly narrowed downwards. Aërophore none; under-surface often glandular, especially on the ribs. Most species rather pubescent by simple, unicellular hairs, only in some few species the longest hairs consist of 2—3 cells, or some of the hairs of the rachis are forked from the very base (f. inst. in certain forms of D. oligophylla). In some species rachis and the costa beneath bear some few minute, lanceolate scales, which often bear long hairs along the edges. Veins simple, the basal ones either connivent to sinus, where they meet or more often are separated by a cartilaginous membrane that can protrude between the segments as a projecting apophysis, or truly united in the leaf-tissue and sending a branch to the sinus. Sori often large, indusiate. Indusium reniform, generally persistent and pilose, often also glandular. Sporangia glabrous (D. Martini excepted, which see).

Cyclosorus is allied to Lastrea and Steiropteris. Its best characters are venation, non-decrescent lamina and large, persistent indusia. In America it is represented by a dozen species, most of which are very variable and connected by intermediate forms. The subgenus is as a whole the most difficult to deal with and several of the species can be distinguished from each other by certain characters, which can not be explained by words or figures but which are easily observed by the trained eye. Two of the species, D. mollis and D. gongylodes, are not exclusively American but widely distributed in the Old-World, where the subgenus is richly developed.

Key.

Lamina pinnate only, see D. pusilla nr. 54 under $h$ Lastrea.
Lamina bipinnatifid:
1. Basal tertiary veins free or connivent to sinus, not normally united in the leaf-tissue.
2. Rhizome erect. Rachis not scaly.
   3. Basal scales broad, thin, yellowish or brown, as a rule glabrous. Lower pinnae not reduced. Basal segments both prolonged and parallel to rachis ........................................... 190. D. patens (Sw.).
   3. Basal scales narrow-acuminate, ferruginous, glossy, hairy. Lower pinnae somewhat reduced. Basal segments (at least the posterior one) not conspicuously prolonged.
4. Pinnae 4—6 cm long by 1 cm broad, rather firm. 191. D. Goedenii Ros.
4. Pinnae 15—20 cm long by 2—2½ cm broad, thinly herba-
ceous. 199. *D. urens* Ros.

2. Rhizome creeping.

3. Rachis not or very indistinctly scaly. Basal scales ferruginous, narrow-acuminate, as a rule hairy.

4. Lower pinnae not shortened.

5. Basiscop lower segments of lower pinnae not or slightly reduced. Pinnae seldom more than 10—15 cm long, 2 cm broad; veins 6—10-jugate.

6. Veins not prominent beneath. Lower pinnae not nar-
rowed towards their base. No scales on rachis and costae. 192. *D. normalis* C. Chr.

6. Veins more or less prominent beneath. Lower pinnae more or less narrowed towards their base. Rachis and costae beneath often with small hairy scales.

7. Lamina herbaceous or membranous without a dis-

tinct terminal pinna. Veins not close.


7. Lamina coriaceous with a distinct terminal pinna. Veins close, the lower 4 connivent to sinus. Pinnae generally long and narrow. 195. *D. serru* (Sw.) O Ktze.

5. Basiscop lower segments of lower pinnae abortive or per-
fectly obsolete. Pinnae up to 50 cm long by 3—4 cm broad. Veins 15—20-jugate, the lower 2—4 connivent to sinus. 196. *D. oligophylla* Maxon.

4. Lower pinnae shortened. Leaf throughout much hairy.

Lamina firm often coriaceous. Habit of *D. palens*. 198. *D. Bangii* C. Chr.


1. Basal tertiary veins normally united in the leaf-tissue, sending an ex-
current branch to the sinus.


3. Rhizome oblique or short-creeping with narrow, ferruginous scales at the apex. Costae beneath without scales. Lamina gene-

rally narrowed downwards. Pinnae sessile.


4. Leaf firm to coriaceous. Rachis strong, quadrangular, very hairy. 198. *D. Bangii* C. Chr.

201. D. gongylodes (Schkuhr) O. Ktze.

2. Sporangia setose. A tuberculiform ærophore at the base of the pinnae beneath. Above the lowermost anastomosing pair of veins are 3—4 pairs of veins connivent to sinus.

202. D. Martini C. Chr.


Syn. Polypodium patens Sw. Prod. 133. 1788; Fl. Ind. occ. 1673.

Aspidium patens Sw. Schrad. Journ. 1800: 34. 1801 et auctt. pro parte.

Polypodium arculatum Poir. Enc. 5: 528. 1804 (Grenada. Mus. Paris!).

Aspidium stipulare Willd. sp. 5: 239. 1810 (Plum. t. 23).


Nephrodium macrourum Scott, Gen. ad t. 10. 1834; Bak. Syn. 262.


Aspidium conspersum Kze. Flora 1839: Beibl. 32.

? Nephrodium polytrichum Schrad. l. c.

Nephrodium dissimile Schrad. l. c.

Nephrodium alboescens Desv. Prod. 258. 1827 (Mus. Paris!).

Lastrea Kohautiana Pr. Tent. 76. 1836!

Lastrea scabriuscula Pr. Tent. 75. 1836; Epim. 35!

Nephrodium schizotis Hook. sp. 4: 107. 1862!


Type from Jamaica, leg. Swartz (SI).

In my paper on Swartz's type-specimens of ferns (Ark. för Bot. 9: 28) I have proved that the true Pol. patens Sw. is synonymous with A. stipulare Willd. and A. macrourum Klf. The type-specimens are rather small, while A. macrourum is a large-growing form, and A. stipulare a form with the upper basal segments very enlarged and deeply lobed, but there is no limit between these forms, which agree exactly in all characters, the size excepted.

The genuine D. patens as here understood can be distinguished from related species by these three characters: 1) the erect rhizome, 2) the large, ovate, light-brown, opaque, entire and commonly glabrous scales of the rhizome and stipe; generally they are rather numerous, and 3) by the basal pair of segments, which are much prolonged, acute and both parallel to rachis. Otherwise the species varies very much and it is scarcely possible to give a description, which covers all
its forms. — The fasciculated stipites are deciduously hairy, scaly below, stramineous, the lamina up to 1 m long, firmly herbaceous or even papyraceous, generally dark-green; rachis quadrangular slightly hairy; pinnae up to 20 cm long, 3—4 cm broad, the lower ones somewhat reduced and reflexed, strigose on the costa above, more or less softly pubescent and glandular beneath, especially on costa and veins; segments subacute, as a rule falcate, the edges often revolute; veins 10 to 16 to a side often somewhat prominent beneath, the lower pair not meeting at sinus but separated by a cartilaginous membrane below the sinus; sori medial or supramedial, the indusium persistent, softly hairy by whitish hairs.

*D. patens* is distributed over the whole tropical America, common in the West-Indies, Central-America and South Brazil, apparently rather rare in Mexico and the South-American Andes. 1 have failed to find characters by which forms from different regions may be distinguished from each other, f. inst. most Brazilian specimens agree exactly with the Central-American ones; below I describe four varieties, which however are connected with the type by intermediate forms. It is often impossible to determine with certainty specimens which lack rhizome and lower part of the stipe.

Specimens from Africa and Polynesia are often determined *D. patens*; this species are however no doubt confined to America; the Polynesian plant is partly *D. Harveyi* (Mett.), partly *D. Brackenridgei* (Mett.), the African *D. Bergiana* (Mett.) and *D. Gueinziiana* (Mett.).

Below I enumerate some of the specimens examined, mainly such which bear a collector-number.

West-Indian Islands: Trinidad, Fendler 18 B, W; Herb. Trin. Bot. Garden 335, 336 (W); 6252 (G) — Grenada, W. E. Broadway 1623 (B); Eggers 6478 (C, W) — St. Vincent, Gilding 716 B, H. et G. Smith 789 (B) — Barbados, (H); Eggers 7312 (W) — Martinique, Sieber 354 (B); L. Hahn 35 (B); Bélanger 78 et 80 (B); Pére Duss 19, 24, 221 (G); 1578 (B); Isert (H) — Dominica, Imray (B); Eggers (B) — Guadeloupe, L. Herminier 157 (B); Pére Duss 291 (C); 4030 (C); 4031, 4035, 4038, 4041—43, 4046, 4047, 4344, 4424 (W) — Montserrat, Ryan (H) — Saba (S) — St. Croix, Eggers (H) — St. Thomas, Eggers 455 (B, G); Raenkler 13 (C) — Porto Rico, Sintenis 1975 (C); 2829, 5868 (W); Mr. et Mrs. Heller 518a, 927 (W); A. A. Heller 6343 (W); Underwood and Griggs 273, 632 (W) — San Domingo, Eggers 1866 a (B); Prenleloup 726 (G) — Haiti, Weinland 32 (B) — Jamaica, Dav 18 (B); G. L. Fisher 983 (R); Underwood 2791, 2522, 3235 (W); Hart 316 (W); Maxon 830, 932, 1398, 1825, 1928, 2263, 2559 (W) — Cuba, Orient, Wright 1002 (B, S, W); 2118 (W); Eggers 4906 (R, W); Maxon 3924, 4101, 4102, 4252, 4280 (W); Prov. Santa Clara, R. Combs 284 (B); Prov. Habana, Baker 3804 (W) — Prov. Piñar del Río, Palmer et Riley 138, 165, 346, 809 (W); Caldwell et Baker 7006 (W); without locality, E. Otto 81 (B); Lindén 1396 pt. (B).


Florida: South of Miami, Dade Co, A. A. Eaton 13065 (W).

Mexico: Dept. Vera Cruz, Jalatepec, Tlapacoyo, Colipa et Mirador, Liermann (H); Izuatlantillo, Bourgeois 2779 (H); Misantla, Schiede 761 (B); Kerber 435 (W); Cordoba, H. Funck 56 (W).


Nicaragua: Nandaime, P. Lévy nr. 3 (H).

Costa Rica: Navarro, Wercklé (C, CC); Rivière, P. Bolley 44 (C); La Lima, Wercklé (G); Agua cate, C. Hoffmann nr. 722 (B); Río Ciruelas, Tonduez nr. 2196 (B, C); Tuis, Tonduez nr. 11327 (C, W); La Verbenas, Tonduez nr. 8810 (C, W); Juan Viñas, Pittier 4812 (W); Río General, Pittier nr. 3340: W; Buenos Aires, Pittier nr. 4851 (B, W); San Francisco de Guadeloupe, Pittier nr. 7154 (W); Río Turrialba, J. Donn. Smith nr. 6901 (B; Juan Viñas, Cook et Doyle nr. 179, 233, 243 (W); Río Jirivi, Maxon nr. 130 (W); Meseta central, Alfaro nr. 16848 (C, RB); Sabanilla de Los Granados, Alfaro nr. 16556bis (RB).

Panama: Maxon 4781 (W).

Colombia: Santa Marta, H. H. Smith nr. 2453 (B, C, Rg) — Moritz nr. 38, 208 (B); 718 (B, C, H = A. riparium Moritz).

Venezuela: Caracas, Linden nr. 199 (B); E. Otto nr. 424 (B) et alii; La Guayra, Engel nr. 20 (B); Tovar, Moritz nr. 410 (B).

Ecuador: Lehmann nr. 5054 (B); Baños, Spruce nr. 5303 (H, L, RB), 5304 (H, RB).

Peru: Lima (W); Ruiz (B); Tarapoto, Spruce nr. 4830 (Kew, L = N. schizoïdis Hk. very typical).

Chile: Ceming (hb. Presl).

Brazil: Rio, Glaziou nr. 389 (H), 4669 (B, H, 13553 (H); Sellow nr. 688 (R; Mosén nr. 2700, 2701, 104, 115 (Rg); Jelinek nr. 185 (B); Schenck nr. 3783 (C); Casaretto nr. 2002 (C) — Para hyba, Göldi (C) — Minas Geraes, Lagoa Santa, Warming (H); Onro Poiö, M. Gomes nr. 2663 (C); Clausen nr. 136 (B, CC) — São Paulo, Río Claro, Löfgren nr. 111 (H); Serra de Cubitao, Lindberg nr. 22 (B); Soroqocaba, Mosén nr. 3087 (Rg, S); Serra de Caracal, Mosén nr. 4621 (Rg); Toledo, Ulbricht nr. 3 (R); Rio Grande, Wacket nr. 93 (R); Alto da Serra, Wacket nr. 201 (R) — Paraná, Icarehý, Desén nr. 6611 (Rg) — Sta. Catharina, Itapocu, Schwacke 12961, 12958 (C); Passo Mauá, F. Haerchen ed. Rosenstock, Fil. cxs. austr. bras. nr. 199 (C, R, Rg, W); Haerchen nr. 201, 203, 205, 207, 209, 210, 211, 212, 213, 216, 217, 218 (R); San José, Goltz nr. 27 (R) — Río Grande do Sul, Sta. Cruz, Jürgens ed. Rosenstock, Fil. cxs. austr. bras. nr. 81 et 85 (B, B, Rg, W); Río Parde, Jürgens et Stier nr. 36 et 239 (R); Serra do Meio, Jürgens nr. 369 (R); Porto Alegre, Stier nr. 307 (R).

Argentina: Salto del Encuentro, Río Piray, Niederlekn nr. 1929 (R) — Corrientes, E. Palmer (W).

**Varieties of D. patens.**

var. dependens n. var.

Rhizome and scales as in the type, but the leaf much smaller; stipe 20 cm long, lamina 25 cm long by 15 cm broad, herbaceous, light-green; pinnae opposite, close 8—9 cm long, about 1 cm broad, the basal ones generally reflexed and somewhat abbreviated; upper basal segment of the lower pinnae broadly ovate, deeply lobed and reflexed over the rachis, the following ones gradually increasing in size to the middle of the pinna. Pubescence thin, underside generally densely glandu lose by shining glands. Veins 6—9-jugate, the posterior basal one reaching the margin above the sinuses. Sori near the margin, indusia very slightly pubescent or even glabrous.
A characteristic form, which resembles not a little *D. augescens*, but it is thin-leaved and the rhizome and scales different. It seems to be common in Venezuela and similar forms occur in the West Indies, where intermediate forms between the type and the variety are to be found. Such a form is that from St. Kitts, leg. Breutel, on which Presl partly founded his *Lastrea scabriuscula*, which name I retain for a Brazilian form.

**Venezuela:** La Guaira, Robinson et Lyon (W); E. Otto nr. 467 (B); Eggers nr. 13245 (H); Caracas, Moritz nr. 79 (B) et ali; Tovar, Fendler nr. 192 (B); Moritz nr. 119 et 245 (B).

**Colombia:** Lindig nr. 369 (B).

**Barbados:** Guadeloupe, Isert (H) — Montserrat, Ryan (H) — San Domingo, Sierra del Polo Quemado. Eggers nr. 1866 à et c (B) — Haïti, Marmelade, Nash et Taylor nr. 1294 (W) — Jamaica, J. Day nr. 227 (B) — Cuba, Lindén nr. 1936 (B).

**Guatemala:** Dept. Santa Rosa, Zamorona, Heyde et Lux ed. Donn. Smith nr. 3246 pt. (W) — Guatemala, Donn. Smith nr. 2463 (B; very small; lamina 10 cm long, 4 cm broad, glabrous).

**var. scabriuscula** (Pr.).

*Lastrea scabriuscula* Pr. Epim. 35. 1849 (pt.).

**Aspidium nephrodioides** Fée, Cr. vasc. Br. 1: 138 tab. 46 fig. 1. 1869.

Not essentially different from var. *dependens*, but much larger; it differs from the type by the thin texture, light colour and sparse pubescence, the upper basal segment of the lower pinnae is nearly always deeply lobed but not always very prolongated; underside, especially on costa and costules densely glandular; indusia thin, flat, rather setose.

**Rio:** Mikan [herb. Presl.]; Glaziou nr. 2359 (H); Mosén nr. 2699 (Rg, S); Lindman nr. A. 221 (Rg) — Minas Geraes, Ouro Preto. M. Gomes nr. 3008 (C); Tombadouro, Schwacke nr. 13543 (C).

**Lagoa Santa,** Warming nr. 789 (H) — São Paulo. Santos, Mosén nr. 3087 (H).

**var. deversa** (Kze. pt., Mett.).


**Aspidium patens** Link, Fil. sp. 100. 1841; Raddi, Pl. bras. 1: 32 tab. 48.

**Nephrodium deversum** Ros. Hedw. 43: 224. 1904.


*A. deversum* Kze. is partly *D. mollis* partly this variety, which latter was described by Mettenius under the name *A. deversum* and by him supposed to originate from Cuba; it was described after cultivated specimens, which I have seen (B), but I have not seen a Cuban specimen resembling it, while not a few specimens from South Brazil quite correspond with the original one. It is *A. patens* Link, who quoted the locality: Rio de Janeiro and Raddi’s plate. I also believe that this form is *Raddi’s A. patens*; Raddi says namely: “Indusii paueis supra pilis albidis, sed plerumque nudis”. — I cannot agree with Rosenstock and Hieronymus in considering this form a species distinct from *D. patens*; the var. *scabriuscula* connects it with the type. It differs mainly from true *D. patens* by its almost quite glabrous leaf and indusia; the underside it rather glandular.
D. _deversa_ var. _tarapoiensis_ Ros. Fedde, Repert. 7: 298. 1909 from Peru, Tarapoto, Spruce nr. 4066 pt (RB) is a peculiar form with distant pinnæ, the lowermost pair much reduced; it belongs scarcely to the var. _deversa_ (Kze.) as here understood, but may be named _D. palens_ var. _tarapoiensis_ (Ros.). It is densely glandulose beneath,

var. _lanosa_ n. var.

A large form of the _macroura_-type; characterized by its very dense pubescence of the veins and indusia; the hairs are very long and the indusia are perfectly concealed by a dense mass of long white hairs.

_Costa Rica_: Navarro, Wercklé (C).

_Aspidium Germani_ L’Herm.: Fée, 11 mém. 82 tab. 23 fig. 3 from Guadeloupe, L’Herminier (Herb. Cosson, Mus. Paris!) is probably a form of _D. palens_. The specimen seen does not agree perfectly with Fée’s figure but appears to be a young plant with very thin leaves and crenate segments. Certainly the general habit of the plant and the scales resemble more _D. normalis_ than _D. palens_, but the rhizome is erect. It must provisionally stand among the species _dubia_.


_Type_ from Brazil, Sta. Catharina, Blumenau, G. Goeden (R! also CC).

A rather problematic species, resembling very much small forms of _D. Bangii_, but the rhizome is erect and the lamina not so decidedly narrowed downwards. The scales of the rhizome is like those of _D. mollis_.


_Aspidium palens_ Eaton Ferns N. Amer. t. 70 et auctt. (pro parte).

As type of this species I take the Jamaican form, well described by Jenman and first rightly understood by him. He says (loc. cit.): “this is distinguished absolutely from all its creeping under-ground root stock, upon which the fronds are arranged in a bi-linear series”. To this must be remarked that _D. augescens_ has a similar rhizome.

_D. normalis_ is in general habit very near small forms of _D. palens_, and specimens without rhizome can not always be determined with certainty. Besides the rhizome the scales show a constant specific character. The scales of the rhizome and the basal part of the stipe are few, mainly confined to the growing apex.
of the rhizome; they are narrow-linear, thin, glossy castaneous, ciliated and hairy on the surfaces. A single scale is generally sufficient for determination. Compared with *D. patens* the leaf of *D. normalis* show some peculiarities, which are however not very constant. The lamina is rarely over 4—5 decm long, gradually narrowed into the pinnatifid apex, pinnae 10—12 cm long by 11/2—2 cm broad, firmly herbaceous or membranous. Segmentsacute or rather obtuse, a little oblique but not falcate, the basal ones generally enlarged, especially the upper one, which is parallel to rachis but rarely lobed; the lower one as a rule not very enlarged and forming an angle of 45° with rachis. Upperside glabrous or sparsely pubescent, the costa softly hairy, underside rather densely and softly pubescent on costa and veins, and generally glandulose by shining glands, which are most numerous on the veins.

Veins 8—10-jugate, not prominent, the lowest pair meeting at the sinus, where they are not separated by a hyaline membrane. Sori as a rule supramedial; indusium shortly pubescent.

Although *D. normalis* by most authors is believed to be a near relative of *D. patens* I am inclined to believe that it is more closely related to *D. mollis*, which it resembles in the structure of the scales and also in venation; it is, namely, not rare to find truly anastomosing veins as in *D. mollis*, but the lower pinnae of *D. normalis* are not gradually reduced as in *D. mollis*. To the other side *D. normalis* is through *D. augescens* by intermediate forms connected with *D. serra* and through *D. Feei* with *D. oligophylla*.

JENMAN (W. Ind. & Guiana Ferns 240) says that *D. normalis* is distributed from Florida and Texas to Brazil and in the West-Indies from Bermuda and Bahamas to Trinidad and Dominica. I have examined hundreds of specimens but I have seen none from the Lesser Antilles or South America. As far as I have learned the species is distributed from Porto Rico to Mexico and Guatemala, Texas and Alabama. It is rather variable and below I describe a couple of varieties. Here I enumerate the more important collector-numbers of specimens, which I refer to the type.

**Porto Rico:** Mr. and Mrs. Heller br. 82 (W); G. P. Goll br. 120, 896, 897 (W).

**Jamaica:** Maxon br. 713, 1005, 1503, 1703, 1782, 2100, 2366, 2536 (W); Underwood br. 128, 2568, 2761 (W); Fredholm br. 3346 (W); Clute br. 100 (W); Levison br. 2 (Bg); Day (B).

**San Domingo:** L. A. Prenleloupe br. 724 (C); M. Fuertes br. 780 (B).

**Cuba:** Prov. Habana, Baker and Wilson br. 309 (W); H. Leon br. 142 (W); Abarca and O’Donovan nr. 4095, 5305 (W); van Hermann br. 3304 (W); A. H. Curtiss br. 696 (W); Baker and O’Donovan br. 4107 (W) — Prov. Santiago, Pollard and Palmer br. 96 and 315 (W) — Prov. Pinar del Rio, Palmer and Riley br. 106, 294, 624 (W); Caldwell and Baker br. 7107 (W).

**Florida:** S. M. Tracy br. 6630, 7632, 9142 (W); F. Rugel br. 254 (W); Geo. V. Nash br. 840, 861 (B, W); Underwood br. 181 (W); A. H. Curtiss br. 3743 (B, W), 4810 (W).

**Georgia:** R. M. Harper br. 1062 (W), 1192 (B, W), 1924 (W).

**Alabama:** Harper br. 131 (W).

**Mississippi:** S. M. Tracy br. 8634 (W); J. Donn. Smith br. 672 (W).
Louisiana: B. F. Bush nr. 26 (W); A. B. Langlois nr. 141 (W).
Texas: B. F. Bush nr. 1466 (W); Curtiss ed. Baenitz, Herb. Americ. nr. 860 (S); E. Palmer nr. 1433 (W).

While most specimens from the Southern U. S. do not differ materially from the Jamaican type, some of them show a tendency to variation in the direction of D. augescens; they are often of a firmer texture, sometimes even coriaceous, and the lower pinnae are sometimes slightly narrowed towards the auricled base. This latter character is still more pronounced in the two following varieties.

var. Harperi n. var.

Lower pair of pinnae rather reduced and, like the following pair conspicuously narrowed toward the base, the upper basal segment still not very reduced. Pinnae incised nearly to rachis, the segments oblique, acute, the edges often revolute. The basal anterior vein only runs to sinus, the posterior one reaching the margin about 1 mm above sinus. Sori small, near the edge; indusium subglabrous.

Georgia: Hawkinsville, Pulaski Co., B. M. Harper nr. 1382 (type, W); rocky bank of Chattahoochee River, Clay Co., Harper nr. 1788 (W); near Albany, Dougherty Co., Pollard and Maxon nr. 531 (W).

var. Lindheimeri A. Br. pro specie sub Aspidio, ms. in Herb. Berol.

Intermediate between typical D. normalis and D. augescens, and some specimens could as well be referred to the latter. It differs from D. normalis type by the firmer texture, the more distant and often opposite pinnae, the lower ones scarcely reduced but distinctly narrowed towards their base as in the preceding variety and in D. augescens; segments acute, often subfalcate; veins generally somewhat prominent beneath, the two lower ones meeting at sinus; sori near to the edge; in some specimens some few small scales are found on the costa beneath, quite as in D. augescens, from which species it differs by its broader pinnae and by its lamina not being so abruptly narrowed upwards.

Texas: F. Lindheimer nr. 742 (B. type, W), 1276 (H); Houston, E. Hall nr. 855 (W); near Kerrville, V. Bailey nr. 470 (W); near mouth of Pecos River, V. Havard (W); San Antonio, Bexar Co., A. A. Heller nr. 1835 (W); near Laredo, E. Palmer nr. 1432 (W); Edwards Co., R. J. Hill nr. 41 (W).

193. Dryopteris augescens (Link) C. Chr. comb. nov.

Syn. Aspidium augescens Link, Fil. sp. 103, 1841; Kze. Farnnkri. 134 tab. 59; Mett. Fil. Lips. 91.

Originally described after plants cultivated in the Botanical Garden of Berlin and raised from spores of plants collected by E. Otto in Cuba; Link says “Caracas” and Mettenius “Mexico”, but Otto’s original specimens are from Cuba: auf Felsen, Via Tumbadero nr. 89 (B1), with which Link’s original specimens exactly agree like several other specimens from Cuba.
D. augescens is a very critical species, very well described and figured by Kunze. It is almost exactly intermediate between D. normalis and D. serra, agreeing with both in the creeping rhizome and the shape and colour of the scales. In general habit it resembles D. normalis, from which it differs by 1) the firmer lamina, which rather suddenly narrows upwards into a pinnatifid apex but not having a distinct terminal pinna as D. serra, 2) the narrower pinnae, about 1 cm broad, the lower ones a little narrowed towards the shortly auricled base, 3) the presence of small, hairy scales on the costa beneath, exactly resembling those of D. serra, similar scales are often found on the rachis, 4) the very acute, oblique or patent but not falcate, oblong-triangular segments with somewhat revolute edges, and 5) by the veins being prominent beneath. — From D. serra, which it resembles very much in pubescence by hairs and scales, it differs by 1) the shorter pinnae, which are rarely more than 12 cm long, less acuminate and more deeply cut, 2) the want of a distinct terminal pinna, 3) the lower basal segment of most pinnae not adnate to rachis, 4) thinner texture and less prominent costa, 5) the non-falcate segments, and 6) the basal anterior vein only running to sinus, the posterior one generally reaching the margin a little above the sinus.

— Stipes slightly scaly downwards, rather slender, 30–50 cm long; lamina of the same length, fresh- or darkgreen; costa above more or less pubescent, the upperside elsewhere glabrous; underside not glandulose. Veins about 8 to a side; sori a little supramedial, furnished with persistent, setose indusium.

The following specimens are typical:


Mexico: San Luis Potosí, near Rascon, Edw. Palmer no. 661 (W); near Tancanhuitz, C. et E. Seler no. 695 (B); Schaffner sine nm. (B) — Jalisco, near Guadalajara, Edw. Palmer no. 76 (W) — Colima, San Marcos, M E. Jones no. 529 (W) — Tamaulipas, near Victoria, Edw. Palmer no. 569 (W).


The following specimens from Bahama Islands resemble very much D. serra in size and are perhaps belonging to that species; still they agree best with D. augescens in most differential characters.

Andros, Nicols, Town, J. and A. Northrop no. 411 (B); Providence, Nassau, J. and A. Northrop no. 173 and 240 (B); Rawson W. Rawson (B); Eggers no. 4178 (H).

While the Mexican specimens enumerated above are very typical some other specimens are scarcely to distinguish from D. normalis var. Lindheimeri; these specimens again are intermediate between the type and the larger, common Mexican fern registered in my Index as D. Feei C. Chr. It is impossible to me to distin-
guish this *D. Feei* specifically from *D. augescens*, as the two are connected by all intermediate forms. I call the large Mexican form

var. puberula (Fée).

**Syn.** *Aspidium puberulum* Fée, 10. mém. 40. 1865.

*Nephrodium puberulum* Bak. Syn. 495. 1874.

*Dryopteris Feei* C. Chr. Ind. 264. 1905.

In structural characters scarcely different from *D. augescens*, but generally larger: stipe up to 70 cm long, stramineous, glabrous, lamina 40—60 cm long: pinnæ 15—20 cm long by 2 cm wide. Veins about 10, prominent beneath, the lower 2—3 meeting at sinus, where as a rule a distinct apophysis is to be found. Undersurface softly villous and sometimes glandulose. The rhizome is very long-creeping. Segments generally very acute and close.

An extremely variable variety; I refer hereto specimens coming very near to typical *augescens*, others very much resembling *D. normalis* and *D. palens*, and others again which are not unlike smaller forms of *D. oligophylla*. Still I have no doubt that all these forms must be referred here and united with *D. augescens*. The most difficult problem to solve is, however, whether the whole series of forms is to refer to a separate species or ought to be united with *D. normalis*. The form from Texas called *D. normalis* var. *Lindheiuera* seems to show that we have only one very variable species, which should be named *D. augescens*, but on the other hand it is unnatural to unite into a single species the typical forms of *D. normalis* and *D. augescens*, and I prefer here to refer the different forms to two species.

It is interesting to note that we here have another example of a series of forms which in their distribution is quite analogous with the series *D. opposita* — *D. panameensis* and *D. Sprengelii* — *D. Mercurii*, all dealt with in my previous papers, and with *D. tetragona* and the intricate forms of it from Mexico — Central America. In all these series the first named species is found in the West-Indies, where it varies only a little, while the second species is mostly developed in Central America, where it varies extraordinarily and where some forms occur, which scarcely can be distinguished from the corresponding island-species.

*Aspidium puberulum* Fée was described after specimens from Mexico, near Huatusco, *Schaffner* nr. 247 part., which I have not seen. *Fournier* (Pl. Mex. 1: 95) refer here some specimens of the *Bourgeau* collection which I have seen in the museum of Paris. With these specimens agree more or less the following;

var. geropogon (Fée).

Syn. Aspidium geropogon Fée, 10. mém. app. 1865.

Dryopteris geropogon C. Chr. Ind. 267. 1905.

Differs from var. puberula only by the almost glabrous frond and perfectly glabrous indusia.


194. Dryopteris Berroi n. sp. — Fig. 24.

Type from Uruguay, in locis umbrosis ad ripam San Antonio, leg. M. B. Berro nr. 5243 (CC).

Rhizomate repente paleis bruneis sparse onusto. Stipitibus 4—6 dem longis, stramineis, glabras. Lamina 4—5 dem longa, herbacea vel membranacea, gramineo-viridi, rachi costisque subtus sparse pubescentibus exceptis glabra, bipinnatifida. Pinnis sessilibus, suboppositis, 15—18 cm longis, 1 1/2—2 cm latis, longe acuminatis, basatisus vix reductis, versus basin parum attenuatis, ad alam 2—3 mm latam pinnatifidis. Lacinis falcatis, acuti, integris, marginibus revolutis. Venis simplicibus, 10—14-jugis, subtus prominentibus, basatisus ad apophysem callosam distinctam, saepè acutam excurrentibus. Soris supramedialibus vel margini approximati, parvis; indusiis persistentibus, reniformibus, glabras vel breviter hirtis.

Intermediate between D. palens var. deversa and D. oligophylla, resembling the former in size, texture, colour and nearly glabrous frond, the latter in the creeping rhizome, prominent veins and the distinct yellowish apophysis, which often resembles a tooth at the sinus. I regard it as a near relative of D. oligophylla, like a very reduced form of that species. The lower segments of the lower pinnae are in large specimens rather reduced but never to the same extent as in D. oligophylla; the basal segments of the middle and upper pinnae are a little prolonged. I have found on the costa beneath some minute scales, which resemble those of D. oligophylla. The rachis and costa are straw-coloured.

I refer here the following specimens:

Uruguay: Berro nr. B (C = nr. 5243 of my collection) — Frey Bentos, Arecha-valeta nr. 2025 (C).
Argentina: Misiones, Loreto, Ekman nr. 10 (Rö. S); Boupland, Ekman nr. 11 (S) — Alta Graecia, Prov. Córdoba, Th. Stuckert nr. 2605 (G).
Paraguay: Arroyo Fogatingo-mi and San Salvador, J. D. Anisits nr. 2700 (B, W — a form of thinner texture and veins 8—9-jugate).


Syn. Polypodium serra Sw. Prod. 132. 1788; Fl. Ind. occ. 1665.
Aspidium serra Sw. Schrad. Journ. 18002: 33. 1801; Mett. Asp. n. 226 (C. Chr. Ark. för Bot. 911: 34 fig. 9 et tab. 2 fig. 1, illustrating the type-specimen).

Type from Jamaica leg. Swartz (S!).

In its typical form a most distinct species characterized by its hard, coriaceous texture, long and narrow pinnae and a distinct terminal pinna. The type-specimen belongs to a small form with a proportionally very long terminal pinna and only 6—8 pairs of lateral pinna, but the species grows much larger. The dimensions of the largest specimen seen from Jamaica are: stipe 130 cm long, over 1 cm thick at base, lamina about 1 m long, about 40 pairs of lateral pinnae, which are 25 cm long by 8 mm wide, the terminal pinna 17 cm long; this large form does not differ otherwise from the Swartzian type. — Rhizome creeping rather densely clothed by hairy scales. Stipe and upper surface of the light-green lamina glabrous, rachis deciduous and shortly puberulous by thin hairs, which are often furcate, and very sparsely furnished with small scales. The very prominent stramineous costae and veins beneath rather densely woolly-pubescent and the costae moreover clothed by rather numerous, very narrow and thin ciliated scales. Pinnae scarcely reduced towards the base, sessile, the upper basal segment about 1 mm remote from the lower one adnate to rachis, very acuminated towards the apex, regularly and sharply serrated, most deeply at the middle. Teeth triangular, the edges revolute, those of the lower part of the lower pinnae often nearly obsolete. Veins very close, prominent beneath, stramineous, 7—12-jugate, the lower 2—4 connivent to sinus. Sori a little above the middle of the vein, furnished with a pale or reddish, setose, persistent indusium.

D. serra differs from the related D. oligophylla by its much narrower pinnae, coriaceous texture and the terminal pinnae, the lower pinnae are never reduced towards the base in the same manner as in D. oligophylla, with which Mettenius and Kuhn united it. The typical form is apparently confined to the larger islands and both the small and the large form are found in all islands.

I have seen the following specimens:

Porto Rico, Sintenis nr. 5826 (B, C, S, W), 5827 (C, W); Underwood and Griggs nr. 37 (W).
Jamaica, near Troy, Underwood nr. 2906 (W) — Mt. Diabolo, Maxon nr. 2330 (W) — Hart nr. 232 (W) — Hollymount, Underwood nr. 3460 (W).
San Domingo: Wright, Parry and Brummeir nr. 8 (W); H. von Türeikhew nr. 2721 (B = Haiti, near La Batterie Couchant, Nash and Taylor nr. 1075 (W) = Jaeger nr. 202 (W).

Cuba: Wright nr. 923 (S, W) = Oriente, Santa Ana, north of Jagney, Maxon nr. 4130 (W) = south of Jagney, Maxon nr. 4169 (W) = Rio Seco. Eggers nr. 4726 (W) = Mt. Liban, Lindsten nr. 1904 (or 1901) RB.

In Haiti a form occurs, which is intermediate between D. serra and D. oligophylla; pinnae 1½ cm broad, incised about halfways into falcate, very acute segments; in texture and colour it comes nearest to D. oligophylla.


In Cuba and the Bahamas a form grows, which perhaps belong to D. serra, but which I refer to D. augescens (see under that species).

196. Dryopteris oligophylla Maxon, Contr. U. S. Nat. Herb. 10: 489. 1908. — Fig. 25.


Aspidium invisum Sw. Schrad. Journ. 18002: 34. 1801; Mett. Aspid. nr. 211.


Dryopteris sloanei O. Ktze. Rev. 2: 813. 1891.

Dryopteris patens subsp. invisum C. Chr. Ind. 283.


Tyne from Jamaica, leg. Swartz (S!). — In my paper in Arkiv för Bot. 911: 24—25 I have dealt with the type-specimens of this species.

Rhizome wide-crawling finger thick, clothed with rather thick, dark-brown, hairy scales. Slipits at distances of 5—6 cm, slightly scaly at base, glabrous or finely pubescent, 1 cm thick, often over 1 cm high. Rachis glabrous or more or less pubescent. Lamina 1—2 m long, membranous, chartaceous or coriaceous; pinnae rather numerous, up to 5 den long, 3—4 cm broad, the lower ones scarcely reduced, short-stalked, upper ones sessile, long acuminate, the lower 2—3 pairs attenuated towards the base, incised to a narrow wing into subfalcate or oblique entire, acute segments with acute sinuses between, the lower ones of the lower pinnae gradually reduced, those of the basiscop side abortive and often entirely obsolete. Surfaces eglandulose, glabrous or more or less pubescent, especially on the ribs; minute hairy scales are often to be found on the costa beneath. Veins 15—20 to a side, simple, prominent beneath; the lower 2—4 run together to a callose membrane, which often forms an apophysis beyond the sinus. Sori rather small, about medial, furnished with large, persistent, glabrous or pubescent indusia.

This very large species is a near relative of D. serra, with which Mettenius united it, but abundantly different from D. patens, to which Baker in Flor. bras.
referred it. From *D. serra* it differs besides by size by the characteristic base of the lower pinnae, the lower basiscop segments being fully obsolete. The species is distributed over the whole tropical America, but the specimens from different regions do not agree exactly with the West-Indian type. I can distinguish the following forms:

1. **typica**. The common Jamaican form is marked by its very characteristic reddish lamina when dried and by its flesh-coloured indusia, it is often quite glabrous and glossy on the upperside, some specimens are very finely pubescent on the costa and veins beneath; indusia glabrous or minutely pubescent. — With this form agree most specimens seen from other islands, still some of them, especially those from Porto Rico, are scarcely different from the continental form.

2. **var. pallescens** C. Chr. n. var.

**Syn. Aspidium giganteum** Moritz msc. non Bl.

The continental form, differing from the type by the grey-green, coriaceous lamina and the pale or yellowish, more distinctly hairy indusia; rachis and ribs beneath more distinctly hairy and the costa beneath furnished with some small, ciliate, brown scales. It grows larger than the West-Indian form. Some of the smaller forms are scarcely to distinguish from *D. angescens* var. *puberula*.

**Mexico**: Angangueo, v. Chrismar (B).


**Panama**: Maxon nr. 4993, 5763 (W).

**Colombia**: Santa Marta, H. H. Smith nr. 2454 (C, Rg) — Ibiquí, Stübel nr. 13 (B) — Tolima, Schmidtchen (B).

**Venezuela**: Moritz nr. 424 (B, C, H), 412 (B).

**Ecuador**: Balao, Eggers nr. 14660 (W); El Recreo, Eggers nr. 15037 (W).

3. **var. lutescens** C. Chr. n. var.

Smaller than the preceding variety, as a rule yellowish green; lower pinnae less reduced towards the base.
4. var. Kunzeana (Hook.).

Syn. Nephrodium Kunzeana Hook. sp. 4: 102. 1862.

Dryopteris Kunzeana C. Chr. Ind. 273. 1905.

Aspidium abruptum Kze. Linnaea 9: 93. 1834 (non Blume) etc., see Index.

Closely allied to var. pallescens and certainly not specifically distinct from D. oligophylla. Rachis and costae and veins beneath densely but very shortly downy by simple or sometimes forked hairs; scales rather frequent beneath. Sori just within the margin, furnished with a subglabrous indusium.

Peru: Poepigg (specim. auth. lb. Presl, B) — Tarapoto, Spruce nr. 4066 (Rg) — Schenke nr. 17 (R).
Ecuador: Rio Balao, Eggers nr. 14523 ("S'high" L).

5. var. aequatorialis n. var.

Rachis, costae and veins beneath and indusia densely but shortly hairy. Scales on the costae beneath rather numerous. Pinnae numerous, about 30 to a side, rather close, 25 cm long by 2 cm broad.

A most distinct variety, different from the Jamaican type but connected with it by the var. pallescens.

Ecuador: Andes quitenses, Sodiro (C, by Sodiro named Nephr. patens) — Santa Jues, Rio Pastaza, Jivaria de Pintuc, Stübel nr. 871 (B) — prope Niebl, Lehmann nr. 5053 (B; "Laub frisch-gelbgrün") — Baños ad fl. Pastaza, Spruce nr. 5296 (Rg).

Peru: Schenke 1909 (R).
Bolivia: M. Bang nr. 2313 (B, W).

197. Dryopteris Tuerckheimii (Donn. Smith) C. Chr. Ind. 299. 1905.


Type from Guatemala, Dept. Alta Verapaz, near Cobán, leg. H. v. Tuerckheim, ed. J. Donn. Smith nr. 704 (W!, B); beautiful specimens were collected at the same locality in 1906—1907 by the same collector, nr. II. 1200 (W) and in the same region, Tamajú, ed. Donn. Smith nr. 1568 (W).

Perhaps the most distinct species of the whole group, intermediate between D. patens and D. oligophylla; it resembles the former in the sessile pinnae, which are not reduced towards the base, the basal segments being enlarged and the upper one often very large and lobed, and by the two basal veins only running to the sinus; it resembles the latter by its creeping, scaly, thick rhizome, by its strong stems and coriaceous texture; from both it differs by the densely scaly stipe, rachis and costae beneath. The scales are dull-brown, ovate or oblong-acuminated, glabrous and resemble mostly those of the rhizome of D. patens. In some specimens the stipe and rachis are entirely covered by such scales. The upper-surface is slightly pubescent, while the underside is densely soft-hairy on the ribs by long,
whitish hairs. Segments falcate with revolute edges. Veins 18–20 to a side. Sori supramedial, furnished with a very densely hairy indusium. Dimensions: Stipe 6–8 cm long, 1 cm thick; lamina 1 m or more long; pinnae up to 35 cm long, 3 1/2 cm broad, but generally smaller.


Type from Bolivia, near Coroica, A. Miguel Bang nr. 2321 (H!, B). Differs from all forms of D. palens and D. mollis by its creeping rhizome, its thick quadrangular, very tomentose rachis, its whole hairy appearance and rigid texture, the lamina is narrowed downwards, and the venation is variable, even in the same leaf, the lower veins now being united, now free.

To this species I now refer a number of specimens from Southern Brazil. Among these are some that perfectly agree with the Bolivian type, while others are more thin-leaved with the basal veins rather constantly united. A majority of the specimens were named Dr. palens var. decrescens by ROSENSTOCK (Hedwigia 46: 114. 1907) and Aspidium conspersum Fée, Cr. vasc. Br. 1: 143. 1869 (vix Schra- der) is apparently the same. Some of these specimens are very large, having pinnae up to 20 cm long by 2 cm wide, in general habit very much resembling D. palens, from which species they differ by creeping rhizome, basal scales (which resemble those of D. mollis) and the downwards narrowed lamina.

This form can be named var. patentiformis Ros. — (The specimens determined by me during these last years are named on the labels Dryopteris patentiformis Ros.)

Besides the specimens enumerated by ROSENSTOCK (loc. cit.) I have among others seen the following, all from Brazil:

Minas Geraes, Caldas, Mosén nr. 2172 (H, L, Rg, S), 2173 (Rg); Lagoa Santa, Warming nr. 788 (H); Serra de Ouro Preto, SCHWACKE nr. 10231 (C): Itacolumy, SCHWACKE nr. 14899 (C) — Rio, GLAZIUS nr. 2360 (H); BLANCHET nr. 2635 (H) — Sta. Catharina, Blumenau, HAERCHEN ed. ROSENSTOCK, Fil. austr. bras. exs. nr. 198 (Rg) - Paraná, Serra do Mar, DUSEN nr. 3725 (C) — Rio Grande do Sul, Rio Pardo, C. JÜRGENS ed. ROSENSTOCK, Fil. austr. bras. exs. nr. 264 (B, C, R, Rg, W).

Another critical form is that named D. parasitica var. procurrens by ROSENSTOCK (Hedwigia 46: 131. 1907) and distributed by him in his Fil. austr. bras. exs. nr. 356 (R, Rg). It is of a thinner texture, with a more slender rachis and the veins constantly anastomosing. It may be a form of D. mollis with creeping rhizome, but I am inclined to consider this and several other critical forms all being forms of a single, very variable species. D. Bangii.

199. Dryopteris urens Ros. in Fedde, Repert. 4: 5. 1907, C. Chr., Vid. Selsk. Skr. VII. 4: 332. 1907, with fig.

Type from Uruguay, Punta Ballena, AREHAVALETA (R) and Berro (CC). Resembles very much some of the thin-leaved forms referred to under the
preceding species, it may perhaps be best known from its soft pubescence by long, whitish, shining hairs, which are said to burn. Under-surface and indusium glan-
dulose, veins free.


*Dryopteris parasitica* O. Kize.; C. Chr. Ind. 282 with synonymy.

*Nephrodium quadrangulare* Fée, Gen. 308. 1850—52.

*Aspidium purasense* Christ, Hedwigia 45: 192. 1906.

*Dryopteris Limonensis* Christ, Fedde, Repert. 8: 18. 1910.

Jacquin described he species from specimens cultivated in the gardens of Schoenbrunn and I have seen a leaf therewith in Herb. Sw. (S). In Ark. för Bot. 9¹: 26—28, fig. 4—5. 1910 I have pointed out that *Pol. parasiticum* L. from China can not be identified with *P. molle* Jacq., which is that "molle" form occurring in the West-Indies and West Africa and later on described as *Aspidium violascens* Link, characterized by the downwards narrowed lamina.

*D. mollis* is closely allied to *D. normalis*; in size, texture, pubescence, structure and colour of the scales of the rhizome, sori and other characters the two species are much alike, but the rhizome of *D. mollis* is obliquely erect or short-creeping, not wide-
creeping, in the typical forms the lower 2—3 pairs of pinnae are considerably shortened and the basal pair of veins is truly anastomosing. Still the species varies with regard to the two last named characters. The typical West-Indian form is rather small, thin-leaved and soft-hairy, the lamina gradually attenuate down-
wards, the basal pair of veins anastomosing; in some continental forms the lamina
is not at all narrowed and, as a rule, larger, but otherwise they agree with the
type. I have tried to separate such forms as varieties or species but I have failed to find good distinguishing characters, and now I prefer to refer all the different forms to one species, *D. mollis*.

*D. mollis* is in America distributed from Alabama to Paraguay and Argentina, thus of the same range as *D. patens*. In the Old World very similar forms occur, which probably must be referred to the same species. The West African form, so common in Madeira, is exactly identical with the West-Indian form; the Polynes-
ian form (*Pol. nymphale* Forst.) is somewhat different but scarcely more so than the American forms differ from each other.

Below I enumerate a part of the specimens examined, especially such which were distributed with numbers. Some of the Costa Rican specimens were deter-
mined by Christ as *Aspidium prominalum* Christ, Bull. L'Herb. Boiss. 4: 656. 1896; Bull. Soc. bot. Belg. 35: 212 = *Dryopteris prominula* C. Chr. Ind. 286, but they do not at all agree with the description; the species was founded on Pittier n. 8198, which I have not seen; judging from the description it belongs to *Goniopteris*. — *Asp. purasense* Christ from Amazonas (Huber n. 4459) is a rather common, large form with the upper basal segments enlarged and lobed.
Dryopteris Limonensis Christ, from Costa Rica, A. et C. Brade nr. 273 is, judging from the description, the typical form of *D. mollis* with the lower pinnule reduced.

West-Indian Islands: Trinidad, Fendler nr. 17 (R, W); hh, Trin. Bot. Gard. nr. 327 (W) — Tobago, Eggers nr. 104 (C) — Grenada, R v. Sherring nr. 18 (W); Broadway nr. 3751, 3770 (RB) — St. Vincent, Eggers nr. 6565 (C); H. H. Smith nr. 830 (W) — St. Lucia, Lee (W) — Martinique, L. Hahn nr. 466 (B); Père Duss nr. 1586, 4130, 4153 (W), 4424, 4426, 4427 (C), 4616 (W) — Dominica, F. E. Lloyd nr. 690, 721 (W) — St. Thomas, Eggers nr. 10 (C, H, W) et ali(î) (H) — St. John (H) — Porto Rico, Underwood and Griggs nr. 909 (W); Gold nr. 304 (W); Percy Wilson nr. 250 (W); Sintenis nr. 62 (S), 1792 (C, W) — San Domingo, Sierra Palo, Quezado, Eggers nr. 1866 (B); Wright, Parry et Brumel nr. 31 (W) — Haiti, Weinland nr. 73 (B) — Jamaica, Maxon nr. 1715 (= Underwood nr. 2679), 2364 (W); Underwood nr. 1541 (W) — Cuba, Oriente, Wright nr. 1001 pt. (B, S, W); Santiago, Pollard, E. et W. Palmer nr. 63 (W); Pinar del Rio, Palmer et Riley nr. 135 (H, W), 299, 516 (W).


Mexico: Jalisco, near Guadalajara, Pringle nr. 8793 (B, H, S, W) — Tepic, E. Palmer nr. 1939, 1940 (W); J. N. Rose nr. 3323, 3326 (W); F. H. Lamb nr. 592 (W) — Sinaloa, Rosario, F. H. Lamb nr. 494 (W) — Orizaba, Bourgeau et nr. 2363 (B, H, S, W).

Guatemala: Dept. Escuintla, Concepcion, J. Donnell Smith nr. 2458, 2738 (W); Cubilquitz, v. Türckheim nr. 8357 (C).


Costa Rica: environs d'Alajuela, Pittier nr. 542 (C); Térraba, Pittier nr. 3559 (W); Ile Cocos, Pittier nr. 12363 (C, W); Ujarras, Pittier nr. 10566 (C, W) — Navarre, Wercklé (C) — Attiro, Donnell Smith nr. 5085 (W) — Cartago, J. J. Cooper ed. Donn. Smith nr. 6027 (W) — Tuis, Tondez nr. 11331 (C); Las Vueltas, Tondez nr. 12826 (W), 11582 (W) — San José, Cook and Doyle nr. 108 (W); Alfaro nr. 16898 (RB); Brade nr. 416 (R) — Sabanilla de los Grados, Alfaro nr. 16227 pt. (W) — Río Sombres, Bolley nr. 1 (C); Tablazo, Bolley nr. 64 (B) — Río Tíriri, Bolley nr. 100 pt. (C, CC).

Panama: Boca de Cupe and Cana, R. S. Williams nr. 851, 852 (W) — Bocas del Toro, Hart nr. 51 (W); Chiriquí, Hart nr. 251 (W) — E. Otto nr. 17 (B).

Colombia: Sta. Marta, H. H. Smith nr. 1001, 1003 (C) — Stübel nr. 372 (B).

Venezuela: Caracas, Moritz nr. 114 (B) — Puerto Cabello, Karsten nr. 143 (B) — La Guaira, Robinson and Lyon (W).

Guiana: Cayenne, Leprieur nr. 26 (B, W) — Cagnai, Leprieur nr. 8 (H) — Appun nr. 4 (B).

Ecuador: Balao, Eggers nr. 14179 (W).

Peru: Tarapoto, Spruce nr. 4039 (RB); rather glandulose throughout = var. glanduligera Ros. Fedde, Rep. 7: 304, 1909).

Galapagos Islands: Charles Island, A. Lee (W — doubtful).

Brazil: Amazonas, Alto Purus, Huber nr. 4459 (C) — Bahia, Salzmann (H); Blanchet (W) — Pará, J. V. Hernandez Jr. F (W) — Rio, Mosén nr. 4819 (S, S); Regnell nr. 251 (Rg); Glaziou nr. 10184 (H) — Minas Geraes, Caldas, Mosén nr. 2190, 2191 (Rg), 2192 (H, Rg, S), 4615 (Rg); Regnell nr. 1450 (Rg, W) — Casa da Pedra, Silva 358a (C) — Lagoa Santa, Warming nr. 784 (H) — São Paulo, Campinas, A. Heiner nr. 522 (Rg) — Santos, Mosén nr. 3746 (Rg) — Rio Grande do Sul, Rio Grande, Lindman nr. 2 (Rg, W) — Excoloni Santo Angelo, Lindman nr. 2 (Rg, W) — Porto Rico, Pardo, C. Jürgens, Rosenstock, Fil. exsic. austr. bras. nr. 356 (R, Rg) — further numerous specimens from the southern states of Brazil in (R).

Argentina: Misiones, Posadas, E. L. Erman nr. 4, 5, 6, 7 (Rg).

Paraguay: Paraguari, Lindman nr. A 3785 (Rg); ad flum. Ríacho Mbopi, Lindman nr. 1947 (Rg) — L'Assomption, Balansa nr. 312 (S).
C. Chr. Ind. 268.

**Syn.** *Aspidium (goggilodus)* Schkuhr, Kr. Gew. 1: 193 tab. 33 c. 1809.
*Aspidium obtusatum* Schkuhr 1806.
*Goniopeteris cheilocarpa* Fée, Gen. 251. 1850—52.

(For other synonyms see Index Filicium).

**Type from Essequebo.**

In Herb. Swartz (S) I have seen a specimen no doubt of the type collection, named by Swartz *Aspidium obtusatum*, under which name it was figured by Schkuhr on his plate 33 c. Later on Schkuhr renamed the species acknowledging that it were not the original *A. obtusatum* Sw. Most pteridologists have called the species *Aspidium* (resp. *Nephrodiun*) *unitum* identifying it with *Polypodium unitum* L., but the species of *Linnaeus* is said also to be the same as *Nephrodiun cuccalatum* Bl., and it is, therefore, best to let Schkuhr’s name stand for our species, also because it was applied to the most common American form.

*D. gongylodes* is a well-known bog-fern, found in almost all tropical and subtropical regions. Its long creeping, black and nearly naked rhizome, its papyraceous to coriaceous lamina, which is not narrowed below, its rather distant and narrow pinnae with obtusely rounded lobes, its close veins with the two basal ones always truly united, make it easily recognizable from the allied species of this section, of which it is the nomenclature type. It varies mainly in pubescence, and one can refer most of the American forms to two varieties, which, however, are connected with intermediate forms:

1. var. *glabra* Mett. As a rule quite hairless but often rather scaly on the costa and costulae beneath and most often more or less glandulose by large, capitate glands. These glands are often very numerous on the costulae and veins and indusia and are here sessile, and in some forms they also are found on the receptacle, intermixed with the sporangia, but here they are stalked. In the common South Brazilian form described as *Aspidium Pohlianum* Pr. (t. sp. orig. Herb. Presl), which is often exindusiate, these glands are, as a rule, very numerous, but they are also to be found in several specimens from the West Indies and Florida.

2. var. *hirsuta* Mett. Lower surface and indusia rather hairy by short hairs; glands absent or some few are found, mostly among the sporangia; the receptaculum is sometimes also hairy. This form occurs in Southern Brazil, Mexico and in the Lesser Antilles, while the specimens from the Larger Antilles, Florida and Central America mostly belong to var. *glabra*, which is the typical form as figured by Schkuhr. In size and general habit the two varieties quite agree. They are
rather small, the pinnae about 10 cm long by 1 cm wide with 6–8 pairs of tertiary veins. A more different form occurs in Southern Brazil and adjacent countries. I call it

var. longipinna nov. var.

It is much larger than the type, having pinnae up to 40 cm long by 30 cm wide with about 15 pairs of veins; further it differs by its thinner texture and scarcely raised veins; it is hairless and, as a rule, also eglandulose.

D. gongylodes is found in America from Florida to Argentina and from Mexico to Panama, while it apparently is unknown from the South American Andes. In the Old World it occurs in about all tropical and subtropical countries, extending to Japan and Corea. The South African form (Aspid. Ecklonii Kze.) is nearly quite identical with the American var. glabra and similar forms are found in Asia. The Australian and Polynesian form originally described as Nephrodium propinquum Rr. B., of which I have seen an authentic specimen (S), corresponds to the var. hirsuta, but it may perhaps be considered a different species.

American specimens seen:

Florida: various localities; Curtiss nr. 3740 (B, W), 6760 (S, W); Underwood nr. 276 (W); Donnell Smith (W); A. P. Garber nr. 19 (W); Mary C. Reynolds nr. 187 (W).

West-Indian Islands: Guadeloupe, Duss nr. 4058 (W) — Martinique, Duss nr. 1387 (W) — Porto Rico, Eggers nr. 22 (W), 457 (C); Sintenis nr. 6642 (C, S, W) — Jamaica, near Cincrona, Hart (W); Underwood nr. 156 and 3104 (W): Salt Pond, Clute nr. 241 (W); Content Gap, D. Watt nr. 9 (Rb) — Cuba, Wright nr. 1100 (S, W); Pinar del Rio, Palmer and Riley nr. 351 (W).

Mexico: San Antonio Huentisco, Liebmann (H = Nephrod. paludosum Liebm. = var. hirsuta).

Costa Rica: Marais de Matina, Pittier nr. 10266, 10268 (C, W) — Cañas Gardas, Pittier nr. 11204 (W) — Rio Surubres, Brade nr. 420 (R).


Brazil: Rio, Glaziov nr. 2362, 2363 (H) — S. Paulo, Santos, Mosén nr. 3060 (Rg, S); Campinas, Mosén nr. 3938 (H, Rg, S) — Paraná, Jearchy, Dusén nr. 6646 (Rg) — S. Catharina, Blumenau, Harken ed. Rosenstock, Fil. Bras. austr. nr. 88 (Rg, W).

Paraguay: Guarapí, Balansa nr. 2193 (H) — Asunción, Anisitz (S) — Central Paraguay, Th. Morong nr. 250 (W).

Argentina: Misiones, Posadas, Ekman nr. 9 (Rg) — Jujuy, Quinta, Rob. E. Fries nr. 255 (Rg).

var. longipinna.

Brazil: Rio Grande do Sul (W) — San Luzia de Rio das Velhas, Schwacke (C).

Uruguay: Puerto del Sauce, Berro nr. 1250 (CC) — Nueva Palmira, Aechavaleta nr. 402 (C).

Paraguay: Santa Barbara, Balansa nr. 3143 (S).
Species of doubtful position.

202. Dryopteris Martini C. Chr. Index 276. 1905. — Fig. 26.

Syn. Nephrodium connexum Kuhn; Bak. Fl. bras. 1: 489. 1870; Syn. Fil. 502. Type from Cayenne, leg. Martin (B!).

I have seen only an imperfect specimen of this, which shows it being a very distinct species but of a very doubtful position. It is with the greatest doubt only 1 place it here under Cyclosorus; it could as well be referred to Steiroptheris. Still it does not resemble at all any species of Steiroptheris, while it in general habit closely resembles certain forms of D. oligophylly. It differs from all American species of Cyclosorus by the presence of a callose aerophore at the base of the pinnae beneath and by the sporangia being deciduously setose.

Rachis quadrangular, finely puberulous by hamate, deciduous hairs. Pinnae up to 30 cm long by 3 cm broad, papyraceous; costa above somewhat strigose, costa and costulae beneath setose by spreading, stiff, unicellular hairs; scales and glands none. Margins cut about two-thirds of the way down into falcate, acute segments with the edges somewhat revolute. Veins simple, about 16 to a side, those of the lower 4–5 pairs connivent to sinus, below which is a narrow, cartilaginous and hairy membrane but no keel extending to the costa as in Steiroptheris, the lowermost pair of veins generally truly united in the leaf-tissue and sending an excurrent branch to the membrane. Sori inframedial, furnished by a subpersistent, reddish, slightly setose inclusion. Sporangia with 1–2 short, deciduous hairs. — I have not seen the lower pinnae and can not say whether the basal lower segments are reduced or obsolete as in D. oligophylla.

Unknown species of $\S$ Cyclosorus.

1. Aspidium albicaule Fée, 8 mém. 102. 1857 — Mexico, Schaffner nr. 245.
2. Aspidium conspersoides Fée, l. c. 105 — Mexico, Orizaba, Schaffner nr. 335 and 463.
3. Aspidium pallidum Fourn. Mex. Pl. 1: 96. 1872; Dryopteris chlorophylla C. Chr. Ind. 257 — Mexico, Orizaba, Bourgeois nr. 2779 bis. These three are all, I believe, forms of what I have called D. augescens var. puberula.
4. Aspidium Orizabae Fée, l. c. 104; Dryopteris Orizabae C. Chr. 281 — Mexico, Orizaba, Schaffner nr. 464. Probably D. oligophylla var. palliduccius.
5. Aspidium pauper Fée, l. c. 103 — Martinique, Mlle. Rivoire. A small form of D. patens?

On this see Maxon Contr. H. S. Nat. Herb. **10**: 489. I believe that the type-specimen of it is at Kew, and I have seen it. It is sterile and undeterminable. It is not improbable that Jenman was right in considering it a young plant of *D. oligophylla*.


*Biolog. Arbejder tilegnede Eug. Warming* pag. 82. 1911.

A small group, in America represented by three species. I confine it to include the species of *Gymnogramme* § *Leptogramma* of Syn. Fil. only having more or less soft-hairy lamina, oblong to linear, exindusiate sori and setose sporangia. The lamina is not or slightly narrowed downwards, the rhizome generally long-creeping, at apex furnished with few hairy scales. The hairs of most species are long, thin, pluricellular. In general habit and venation the species resemble mostly species of *Cyclosorus*, thus the American *D. pilosa* and *D. dasyphylla*, while the third *D. polypodioides* comes very near to species of *Goniopteris*, but I have not found stellate or forked hairs, which constantly are to be found in species of *Goniopteris*. — The typical species of *Leptogramma* is the common *D. africana* (Desv.) C. Chr. (*Gynm. tollta* Schlech.) from Africa and Asia.

**Key.**

1. Lamina soft-hairy by long pluricellular hairs, herbaceous.
2. Lamina gradually narrowed towards the apex, several of upper pinnae confluent at base. Stipe glabrous. *Mexico.*

203. *D. pilosa* (Mart. et Gal.) C. Chr.

2. Lamina upwards suddenly narrowed into a pinnatifid apex, lateral pinnae all free at base; stipe as well as the whole leaf very hairy.

204. *D. dasyphylla* C. Chr.

1. Lamina practically glabrous, membranous. *Brazil.*

205. *D. polypodioides* (Ratti) C. Chr.


*Type from Mexico: Orizaba, leg. Galeotti nr. 6167 and 6268 (Mus. Paris!).*
The figure quoted above gives a good illustration of the common form of this characteristic species, which scarcely can be confounded with any other Mexican Dryopteris. In general habit it resembles forms of D. normalis or of D. augescens, but its generally less cut pinnae, pluricellular hairs, linear to oblong, exindusiate sori and setose sporangia mark it at once. Veins simple, 3-6 to a side, the two basal ones running to sinus. Galeottis's and Liermann's specimens belong to a small form having the most pinnae confluent at base and scarcely incised more than halfway down to the costa, the lower ones often distinctly reduced. This form occurs at altitudes of 2-3000 m, while the species at lower altitudes grows considerably larger. I have seen specimens measuring 30 cm in length (lamina only) and 20 cm in breadth and having the pinna incised two-thirds of the way down. Such large forms are exactly intermediate between the typical form and the var. procurrens. — D. pilosa seems to be confined to Southern Mexico: I have seen the following specimens:


var. procurrens (Fée) Bak. Syn. Fil. 515. 1874. — Fig. 27.

Syn. Gymnogramma procurrens Fée, s. mém. 78. 1857.

Gymnogramma pilosa var. major Fourn. Mex. pl. 1: 73. 1872.


Differs from the type by its broad (2-2½ cm) pinnae, which are deeply cut, most of them free at base, the lower ones not reduced, often shortly petiolate. Veins 6-10 to a side, often furcate, somewhat prominent beneath.

Forêt de la deserta Vieja, Bourgeau nr. 921 (H, S) — Ixtaccihuatl, Purpus nr. 16003 (W) — Oaxaca, Cerro San Felipe, González et Gonzatti nr. 711 (W) — Chiapas, S. Cristobal, G. Munch nr. 5 and 23 (G).

204. Dryopteris dasyphylla C. Chr. Ind. 260. 1905.

Syn. Gymnogramma villosa Link, Hort. Berol. 2: 51. 1833; Fil. sp. 137.

Based on plants cultivated in Hort. Berol. I have seen Link’s type specimens (B) and several others, but all from cultivated plants. In handbooks of ferns it is said to be a Brazilian species, but I have never seen a specimen from Brazil. Link, however, says (in Fil. sp. 137): “Hab. in provincia Caracas, Brasilia?” It has, I think, never been stated, where the species grows wild.
D. dasypylla is closely related to D. pilosa var. pubescens and I have been inclined to consider it the same plant; still it is much more hairy, the lamina upwards suddenly narrowed into a pinnatifid apex and with 6—8 pairs of opposite or subopposite, sessile or very short-stalked pinnae, about 8 cm long by $2\frac{1}{4} - 2\frac{3}{4}$ cm wide, the lower ones not reduced but narrowed towards their base, all cut about halfway down into close, broad subacute segments. Veins 6—7 to a side, simple. Sori short, often nearly round, the sporangia setose. Rachis, costa and veins of both sides with many long, soft, pluricellular hairs.

205. Dryopteris polypodioides (Raddi) C. Chr. Ind. 285. 1905.


Type from Brazil, Rio, Raddi (not seen). The following specimens seen are all from the mountains of Rio and are very uniform. Mosen nr. 2656 (H, Rg, S); Glaziou nr. 7252 (B, H); Rathbun (W); U. S. Explor. Expedition 1838—42 (W); Sellow (B).

In colour, cutting and shape of pinnae very similar to D. monosora of the subgenus Goniopteris and also resembling D. alsophilacea of the subgenus Ctenitis, still very different by the oblong to linear sori and the setose sporangia. The creeping rhizome is naked and the whole leaf practically glabrous, only the costa and costula are finely downy beneath. Lower pinnae with a short, cuneate, entire base, acuminate, at both sides equally incised about $\frac{2}{3}$ of the way down to the midrib into broad, obtuse, subfalcate segments; veins about 10 to a side, the lower two running to the sinus.

Subgenus 9. Goniopteris (Presl) C. Chr.

Biolog. Arbejder tilegnede Eug. Warming pag. 83. 1911.

A large subgenus including about sixty good species and not closely allied to other Dryopterides. Its best and most constant character is the presence of unicellular, forked or stellate hairs. Such hairs are to be found always on the scales of the rhizome and lower part of the stipe and in most species they also cover the rachis, especially upwards and above, and the costa beneath. In some species (D. nephrodioides and its relatives) the rachis is very densely but very shortly pulvinate by stellate hairs, in others (D. sclerophylla, D. aterothrix, D. replans and others) the surfaces (veins and leaf-tissue) bear minute hairs with horizontal branches. The stellate hairs are, as far as I have found, never sessile but consist of a short stalk, which bears at the point 2—6 branches. The shape of the branches
seem to be rather confined within the species and it is to a certain degree of value as specific character. The branches can be short or long, simple or again forked /D. Eggersii/, erect /D. asterothrix/, horizontal or recurved /D. glochidiata/. Besides stellate or forked hairs simple, unicellular, longer hairs occur in most species; some few species are practically glabrous /D. vivipara, D. paucipinnata/, others densely pubescent throughout /D. curta, D. Ghiebregthii/. The longer hairs are in most species confined to rachis, costa and margins; generally the rachis bears as well stellate as simple hairs. Scales are, as a rule, few and mostly confined to rhizome and lower part of the stipe; rarely small, stellate-pubescent scales are also found on rachis and costa beneath /D. monosora, D. lugubris/. Glands as well as aerophores are always absent.

The pubescence is the main character of the subgenus, but the species show besides other characteristic common features, which can not be described so clearly as to be understood easily by others. Most species are dark-green or greyish-green, membranous or chartaceous, rarely thinly herbaceous or rigidly coriaceous, not much divided, the lamina entire, pinnatifid, pinnate or bipinnatifid. Bipinnate or decompound species I have not seen. Several species, perhaps the majority, are proliferous by buds on the rachis or the rachis is prolongated and rooting at the apex. The species of the section Eugoniosteris have impari-pinnate lamina. These two characters, proliferous leaves and impari-pinnate lamina, so common within Goniosteris, are unknown or, at best, very rare in all other subgenera.

With regard to venation the species vary not a little, still a certain uniformity can be pointed out. The venation is in correlation to the degree of cutting. In deeply cut pinnae the veins, which nearly always are simple, are all free with those of the basal pair running to the sinus (f. inst. D. scabra), but more often they are connivent to sinus i.e. the lower 1—4 pairs of veins are upcurved and run side by side to the sinus, below which they are very often separated by a cartilagineous membrane. It is often difficult to state whether the veins are connivent or truly anastomosing, i.e. two veins being united into a single excurrent branch (nervatio Goniosteridis). In several species both kinds of venation can be found in the same leaf. Seen from the underside the veins often appear to be united, while they, seen from above, are found to be connivent but running very closely side by side. In several species the lower veins (1—3 pairs) are constantly united, while other species (f. inst. D. nephrodioides) are very variable in venation, some forms having free, others of the same species anastomosing veins. Within the second action, Eugoniosteris, we find an unbroken row from free-veined forms to D. Ghiebregthii and D. meniscioides, the venation of which is perfectly meniscioid.

The species are partly indusiate, partly exindusiate. Large indusia are rare /D. paucipinnata, D. venusta/, in most species the indusia are small and more or less setose by simple or forked hairs, often very small and only seen in the young sori. In some species the receptacle bears long hairs between the sporangia; these
hairs are sometimes mistaken for ciliate indusia. The sporangia of several species are setose by simple or forked hairs. In *D. asplenioides* and others the head of the sporangium is glabrous while its pedicel is furnished with a single, stiff hair.

*Goniopteris* is a very distinct subgenus, or, I firmly believe, a very natural genus, not nearly related to the other subgenera, *Meniscium* excepted. The relation between *Goniopteris* and *Meniscium* will be explained under the latter. Between the sixty species dealt with below there are, however, two, *D. macrotis* and *D. semin HASLATA*, the position of which as members of *Goniopteris* is rather doubtful. It is possible that these two species belong to * Cyclosorus*. I have not been able to find in the specimens seen stellate hairs, still they agree in colour and texture with *Goniopteris* rather than with *Cyclosorus*. Two other species, *D. glandulosa* and *D. Fendleri*, which resemble very much species as *D. nicaraguensis* and *D. megalodus*, I have referred to *Steiropteris*; they differ from *Goniopteris* in several minute characters.

All the species enumerated below are exclusively American. The subgenus is represented in the Old World by two species only, as far as I know, *D. silbatia* (Pappe et Raws.) C. Chr. from South Africa and *D. prolifer* (Retz.) C. Chr. from Africa, Asia and Australia. The American species can be divided into two rather natural sections:

1. **Asterochlaena**. Lamina upwards gradually narrowed into a pinnatifid apex.
2. **Eugoniopteris**. Lamina terminating in a terminal pinna resembling the lateral ones.

Under the latter group I unite into a small group, *Microdictyon* Fée, those species having meniscioid venation and connecting *Goniopteris* with *Meniscium*. Between the two sections no absolute limit is to be found.

**Key.**

1. **Asterochlaena**. Lamina entire bipinnatifid, upwards gradually narrowed into a pinnatifid apex.
2. Lamina entire, pinnatifid or with some few free pinnae below.
3. Lamina without free pinnae below or casually with a single pair of small free auricles.
4. Lamina lanceolate, crenate or broadly serrulate, scarcely 2 cm broad, shortly cuneate at base; midrib, veins beneath and indusium setose by simple hairs.
5. Lamina entire or crenate.
7. Lamina regularly and broadly serrulate or lobed
   207. *D. Francoana* (Fourn.) C. Chr.
4. Lamina broadest above the middle, often irregularly pinnatifid, long and gradually narrowed downwards. Costa, veins beneath and indusium stellato-puberulous
3. Lamina pinnate below but rarely to the middle.
4. Midrib, veins beneath and indusium setose by long, simple hairs. Stellate hairs few.
5. Free pinnae entire or subentire, not auricled at the upper base.
6. Free pinnae in 1—2 pairs, auriculiform, 1/2—1 cm long

208. D. Skinnieri (Hk.) O. Ktze.

6. Free pinnae several, 2—4 cm long

209. D. Levyi (Fourn.) O. Ktze.

7. Upper surface finely pubescent. Lower free pinnae sessile with free base. Lower pair of veins often united

212. D. Peripae (Sod.) C. Chr.

5. Pinnae lobed, auricled at the upper base.

222. D. Jamesonii (Hk.) C. Chr.

4. Midrib and veins beneath stellato-puberulous; indusium small, stellato-pubescent, or none.
5. Free pinnae small, entire, the lower gradually reduced downwards.
6. Free pinnae close, numerous, gradually reduced to mere auricles. Leaf coriaceous. Most veins free.

213. D. dissimulans Maxon.

6. Free pinnae few (1—4 pairs) and distant. Leaf membranous or chartaceous. Veins normally anastomosing and forming low meshes along the midrib of the lamina.

211. D. guadalupensis (Wikstr.) C. Chr.

5. Free pinnae large, serrulate, lower ones not reduced.

227. D. hastata (Fée) Urb.

2. Lamina pinnate to short of the apex.
3. Pinnae entire or serrulate or shallowly lobed, lobes as a rule broader than long.
4. Smaller species. Pinnae seldom over 4 cm long, 1 cm broad.
5. Rachis and veins more or less stellato-puberulous, often also hairy by longer, simple hairs.
6. Pinnae entire or faintly crenate, chartaceous. Veins normally free. Leaves not terminating in a long, rooting apex. Leaf-tissue nearly glabrous.

214. D. cordata (Fée) Urb.

7. Pinnae with a rounded, cordate base, oblong 1—1 1/2 cm long, 1/2 cm broad

149

215. D. sagittata (Sw.) C. Chr.

6. Pinnae serrulate or lobed. Lower veins anastomosing.
7. Surfaces, especially the veins, more or less greyish-pubescent by stellate hairs.
8. Lamina herbaceous or membranous. Pinna short-stalked.
9. Sporangia glabrous. Leaves often prolonged into a long rooting tail.

216. D. reptans (Gmel.) C. Chr.

9. Sporangia setose by forked hairs. Leaf not proliferous. Surfaces densely pubescent by stellate and simple hairs.

217. D. asterothrix (Fée) C. Chr.

218. *D. sclerophylla* (Kze.) C. Chr.

7. Surfaces hairy on the veins only, leaf-tissue glabrous, at least not pubescent by minute, stellate hairs.  
8. Costae beneath stellato-puberulous.  

215. *D. sagittata* var. *tenedica* (Jennm.)

8. Costae beneath setose by simple hairs or glabrous.  
10. Veins simple, often prominent beneath. Leaf-tissue glabrous; indusium setose.

219. *D. asplenioides* (Sw.) O. Ktze.  
10. Veins often forked. Leaf-tissue pubescent.  
220. *D. bermudiana* (Bak.) Gilb.


10. Lamina terminating in a long pinnatifid apex. Rachis and costae beneath rather setulose; upper surface pubescent.

11. Pinnae not auricled at base.  

212. *D. Peripae* (Sod.) C. Chr.

11. Pinnae auricled at base, the basal ones reflexed.

222. *D. Jamesoni* (Hk.) C. Chr.

223. *D. Warnigii* n. sp.

10. Lamina pinnate to short of the apex, practically glabrous throughout.

5. Stellate hairs none, but rachis, ribs and indusium setose by simple hairs. Pinnae auricled at the upper base.  
221. *D. semihastata* (Kze.) O. Ktze.

4. Larger species: pinnae 8—15 cm long, 1 1/2—2 1/2 cm broad, broadly serrate. Rhizome not creeping.

5. Most pinnae auricled at their upper base, all sessile, the lower ones reflexed. Stellate hairs few or none; upper surface strigose by adpressed hairs.

6. Under surface pubescent by short, non-adpressed hairs. Only the basal pair of pinnae reflexed. Rachis with few stellate hairs. Pinnae scarcely more than 5 cm long ........................................... 223. *D. Warnigii* n. sp.


5. Pinnae not auricled. Stellate hairs on rachis and often on costae beneath. Leaf-tissue generally glabrous.

6. Lower veins as a rule connivent to sinus, rarely united.  

7. Most pinnae sessile, lower ones much reflexed.  
230. *D. paucijuga* (Kl.) C. Chr.

7. Most pinnae stalked, lower ones scarcely reflexed.  
228. *D. pyramidalata* (Fée) Maxon.

6. Basal pair of veins normally united, or at least running side by side to the sinus.
7. Lamina terminating in a long, broad pinnatifid apex equal in length to the lower pinnate portion.
8. Upper surface minutely pubescent. Veins about 3-jugate, those of basal pair the anastomosing.

212. *D. Peripate* (Sod.) C. Chr.

8. Upper surface glabrous. Veins about 6-jugate, the lower 2–3 pairs alternately united.

227. *D. hastata* (Fée) Urb.

7. Lamina pinnate to short of the apex.
8. 2–3 pairs of veins alternately united. Pinnae about 4 cm broad... 264. *D. leucophlebia* (Christ) C. Chr.
8. Only the two basal veins united, the following 2–4 connivent to sinus. Pinnae rarely 2 cm broad.

9. Lower pinnae not or slightly reflexed, more or less shortened.

225. *D. serrulata* (Sw.) C. Chr.


3. Pinnae incised 1/3 of the way to the midrib (lobes longer than broad) or to a narrow wing to the costa.

4. Rachis and costae beneath subglabrous or slightly pubescent by short, stellate hairs and a few longer, simple hairs, not densely pulverulent by stellate hairs or tomentose by simple hairs.

5. Branched hairs with erect or horizontal branches.

6. Rhizome erect or oblique. Pinnae rarely incised to the middle.

7. Most pinnae sessile.
8. Lamina terminating in a long, pinnatifid apex. Sporangia setose by branched hairs.

227. *D. hastata* var. *leptocladia* (Fée).

8. Lamina pinnate to short of the apex. Sporangia glabrous.

9. Lower pinnae not reduced. Veins connivent, not united. Lobes oblique or falcate, close. Stipe in length equal to lamina.
10. Lamina not gradually tapering from base to apex. Pinnae few (8–10-jugate).

11. Lower pinnae with a short, cuneate, entire base, not much reflexed.

229. *D. magdalenica* Hieron.

11. Lower pinnae lobed to the base, much reflexed... 230. *D. paucijuga* (Kl.) C. Chr.
10. Lamina gradually tapering from base to apex. Pinnae numerous (15–25 to a side), incised to or above the middle.


7. Most pinnae short-stalked.

8. Veins all simple, the lower ones connivent to sinus, rarely united. Leaf-tissue glabrous. 228. *D. pyramidata* (Fée) Maxon.


7. Pinnae scarcely incised to the middle, their base truncate, hairy beneath; veins 6–7-jugate. 242. *D. Schueckeana* Christ n. sp.

7. Pinnae incised above the middle, lower ones narrowed towards the base.

8. Rachis and costae beneath without scales. Lower pinnae sessile, lobed to the base. 236. *D. scabra* (Pr.) C. Chr.


4. Rachis and costae beneath densely pulverulent by short, stellate hairs, which are often intermixed with longer, simple hairs, or, the latter predominating, densely tomentose.

5. Indusium hairy by simple hairs or glabrous. Leaf-tissue of both sides glabrous or hairy by simple hairs.

6. Indusium setose.

7. Andine species. Rhizome erect (always?). Rachis and costae beneath without scales.

8. Rachis (and costae beneath) without thick, long hairs, but densely stellato-pulverulent.

9. Veins 10–16-jugate, the basal ones connivent to sinus. Upperside (costae excepted) glabrous.

10. Fertile pinnae and segments not contracted; rachis not gemmiferous. Most pinnae sessile. 238. *D. Eggersii* (Hieron.) C. Chr.


9. Veins 6–8-jugate, the basal ones truly anastomosing. Upperside shortly pubescent. 240. *D. equitans* (Christ) C. Chr.
8. Rachis and costae beneath besides the mostly once branched stellate hairs clothed with thick hairs, which are often cleft at the point. Most or all pinnae sessile.
9. Pinnae 6—7 cm long by 1½ cm broad, sessile, the lowest ones reflexed and scarcely narrowed towards their base .............. 241. D. curta Christ.
9. Pinnae 10—14 cm long by 2½—3 cm broad, the lower ones not reflexed, narrowed towards their base.
10. Grass-green, thin leaved; only the basal pair of veins run to sinus; long hairs of rachis and costae few, reddish.

242. D. heterodicha C. Chr. n. sp.
10. Grey-green, firm; 3—4 lower pairs of veins connivent to sinus; long hairs very numerous, thin, rarely reddish; rachis upwards very tomentose... 243. D. lugubriforis Ros.

7. South-Brazilian species. Rhizome creeping.
8. Pinnae 4—6 cm long by 1½ cm broad, scarcely incoalescent to the middle. Rachis and costae beneath without scales ........ 244. D. Schwaetzeana Christ n. sp.
8. Pinnae 15—18 cm long by 2—3 cm broad, incoalescent above the middle. Rachis and costae beneath with small scales ............. 245. D. lugubris (Kze.) C. Chr.

6. Indusium glabrous ............... 234. D. venusta (Kze.) C. Chr.
5. Indusium with stellate hairs, rarely absent. Underside throughout with scattered, minute, branched hairs.
6. Lamina rigidly coriaceous, narrowed downwards; pinnae 4—8 cm long. Basal veins united. 218. D. sclerophylla (Kze.) C. Chr.
6. Lamina herbaceous or membranous; lower pinnae not shortened, 10—25 cm long.
7. Branched hairs with 3—5 cm long, erect or horizontal branches. Sori medial, sporangia glabrous.
8. Veins 10—14-jugate, lower ones often united.

No scales on rachis and costae beneath.

248. D. nephrodioides (Kl.) Hieron.
8. Veins 15—16-jugate; scales on rachis and costae beneath ........ 245. D. lugubris var. quadrangularis (Fée).
7. Branched hairs of the underside erect, anchor-shaped (i. e. with 2—3 short recurved branches at the top).
8. Sporangia with similar hairs. Veins free, sori inframedial. Brazil ....... 246. D. glochidiate (Mett.) n. sp.


1. Eugoniopteris. Lamina pinnate-hipinnatifid with a terminal pinna, which in most species resembles the lateral ones, in others it is larger and often hastate, i. e. with one or two larger lobes below.
2. Pinnae without aérophore beneath. Stellate hairs occur always on the scales of the rhizome and in most species also on rachis. Veins free or anastomosing.

3. Veins all free or the lower 1–3 pairs united and sending an excurrent vein towards the sinus; in some species the lowermost pair (rarely the two lower pairs) is menisciod, i.e. the excurrent branch being interrupted before reaching the next pair of anastomosing veins.


5. Sori near the margin.

6. Lamina coriaceous, glabrous; pinnae scarcely incised ⅓. Indusium reniform, whitish, glabrous.


6. Lamina thinly membranous, hairy on the ribs; pinnae incised about ⅔. Indusium reniform, atheryroid or asplenioioid in the same pinna or even segment.

   254. *D. Schaffneri* (Fée) C. Chr.

5. Sori medial.


6. Basal pinnae with a long cuneate, entire base; fertile pinnae and segments not contracted.


   249. *D. tristis* (Kze.) O. Ktze.


4. Indusium none or minute, rarely found.

5. Under surface without minute stellate hairs on costula and leaf-tissue.

6. Lower 2–4 pairs of veins connivent to sinus, only occasionally the lowermost pair is united.

7. Smaller plant; pinna 2–4 to each side, serrulate, densely warty on both surfaces. 258. *D. juruenensis* n. sp.

7. Larger with about 10 pairs of pinnae, not or inconspicuously warty, more deeply cut.

8. Lower pinnae with a long cuneate, entire base, incised about halfway down; 2 pairs of veins connivent to sinus. Sori medial. 249. *D. tristis* (Kze.) O. Ktze.

8. Lower pinna lobed to the very base, scarcely incised to the middle; 3–4 pairs of veins connivent to sinus. Sori inframedial or about medial.


9. Rachis and costa beneath glabrous or nearly so.

10. Leaf papyraceous, light-green; costae and costules prominent, stramineous. Lower pinnae not reflexed.

11. Pinnae 2 cm broad, crenate or slightly lobed; veins 3–5 jugate. Rachis gemmiferous, glabrous. 256. *D. straminea* (Bak.) C. Chr.

11. Pinnae 3 cm broad, lobed halfway down, veins 12–18 to a side. Rachis minutely pubescent, not gemmiferous.

   250. *D. nicaraguensis* (Fourn.) C. Chr.
10. Leaf thinner, dark-green; costa and costules not stramineous. Pinnae in very distant, opposite pairs, the basal ones reflexed.

252. D. Fraseri (Mett.) O. Ktze.

6. Basal pair of veins normally united; in most species the next 2—3 pairs of veins are connivent to sinuses and often alternately anastomosing into a flexuose common-branch, which runs to sinus.

7. Pinnae entire, serrulate or lobed but never cut 1/3 to the costa. Basal veins upcurved and anastomosing under acute angles, the following pair as a rule also anastomosing.

8. Leaf practically glabrous; in some species the rachis and costa beneath are minutely puberulous. Sporangia glabrous, or (in D. oblitterata) deciduously setose.


9. Surfaces not warted. Several pairs of pinnae.

10. Pinnae entire or very shallowly serrulate. Basal veins spring out from the costa 1 mm above the costa.

255. D. vivipara (Raddi) C. Chr.

10. Pinnae broadly serrate or lobed 1/3 or a little more. Basal veins spring out from the base of the costa or the posterior one from the costa.

11. Only the lowermost pair of veins anastomosing, or all free. Rachis gemmiferous.

12. Veins 4—6 jugate, the two basal one as a rule not united and not reaching the sinuses.

256. D. straminea (Bak.) C. Chr.

12. Veins 8—9 jugate, those of the basal pair united ...... 257. D. Göldii n. sp.

11. At least 2 pairs of anastomosing veins. Rachis rarely gemmiferous.

12. Terminal pinna small, often abortive. Pinnae few, wrinkled, 5—8 cm long. Veins 4—5-jugate.

260. D. nigrescula (Jenm.) C. Chr.

13. Terminal pinna confluent with the upper lateral ones.

227. D. hastata (Fée) Urb.

13. Terminal pinna distinct.

259. D. oblitterata (Sw.) C. Chr.


7. Pinnae incised to the middle or deeper. Only the basal pair of veins anastomosing under broad angles.

8. Costae beneath puberulous by stellate hairs.

240. D. equitans (Christ) C. Chr.
8. Costae beneath setose by simple hairs.

5. Under surface with minute stellate hairs throughout, especially on costae and costules, but also on the leaf-tissue.

6. Terminal pinna stalked, distinct. Pinnae incised 1/3 or deeper; as a rule the lowermost pair of veins only are anastomosing under a broad angle.

262. D. tetragona (Sw.) Urban.

6. Terminal pinnae confluent with the upper lateral ones, which are adnate to rachis. Pinnae broadly serrulate (lobes scarcely longer than broad). 2–3 pairs of alternately united veins.

263. D. megalodus (Schkuhr) Urb.

3. Microdictyon. 3–10 pairs of meniscioid veins. Pinnae entire or crenate, seldom shallowly lobed, mostly more than 4 cm broad.

4. Lamina beneath more or less soft-hairy.

5. Veins 6–8-jugate, the 3–4 lower pairs meniscioid. Sporangia when young setose.


267. D. Ghiesbrechtii (Lind.) C. Chr.

4. Lamina glabrous. Meniscioid veins several.

5. Pinnae narrowed from the middle to base, crenate or serrulate.

266. D. meniscioides (Liebm.) C. Chr.


268. D. ensiformis n. sp.

2. Pinnae with an acute or obtuse aërophore at the base beneath. Stellate hairs none. Several pairs of veins connivent to a cartilaginous membrane below the sinus, the opposite pairs not anastomosing, but two subsequent veins of the same side of the costule generally united near the membrane; see D. glandulosa and D. Fendleri under § Steiropteris.

1 Asterochlaena C. Chr.

Biolog. Arbejder tilegnede Eug. Warming 84. 1911.


Syn. Aspidium Cumingianum Kze. Farrukr. 1: 17 tab. 9 fig. 2. 1840.


Type from Panama, leg. Cuming nr. 1123 (Kew! a small leaf only).

Apparently a very distinct species, well figured on the plates quoted, still it is possible that it and the following species are forms of one species. D. Cumingiana is less hairy, the lamina faintly crenate and 1–2 veins generally joint alternately the excurrent branch from the united basal veins. It appears to be a rare species, which is not found in the large recent collections from Panama.
207. *Dryopteris Francoana* (Fourn.) C. Chr. Biol. Arb. ilegu. Eng. Warming 84. 1911. — Fig. 28a.

*Nephrodium Harrisoni* Bak. Ann. of Bot. 5: 326. 1891.
*Dryopteris Harrisoni* C. Chr. Ind. 269. 1905.
*Nephrodium subintegrum* Sodiro, Rec. 54. 1883; Cr. vasc. quit. 263. 1893.
*Dryopteris subintegra* C. Chr. Ind. 296. 1911.

**Type from Nicaragua:** Chontales, leg. P. Lévy nr. 506 (Herb. Cosson, Mus. Paris!).

Diffs from the preceding species, its only near relative, by its regularly lobed lamina and by the basal veins being much ascending and not always truly united; also it grows much larger; I have seen leaves measuring 40 cm in length including the stipe, that is equal to lamina in length but generally the leaves are much smaller.

The erect or ascendent rhizome, which is nearly destitute of scales bears several (10–20) fasciculated leaves; young stipes furnished at base with a few small scales with some bi-trifurcate hairs at the margins, glabrous or very sparsely and minutely pubescent by stellate hairs, sulcate above. Lamina lanceolate, 1–1½ cm broad below the middle, tapering gradually to the acuminate point, at base short-cuneate, dark-green, papyraceous or subcoriaceous. ciliate, midrib above strigose by antrorse hairs, midrib and principal veins beneath setose by simple, rigid, patent hairs, otherwise glabrous, the margins incised regularly about 1½ to the midrib into oblique, broad, obtuse or subacute lobes. Veins about 7-jugate, simple (or rarely furcate), the lower two pairs connivent to sinus, or, the two basal ones truly united and sending a branch to sinus. Sori inframedial, furnished with a subsistent, setose indusium. Sporangia glabrous.

*D. Francoana* is a very constant species. The numerous Central-American specimens seen are all alike and the Ecuadorian one (*P. subintegrum* Bak.) differs only by its somewhat thinner texture and smaller, deciduous indusia. Baker referred *A. Francoanum* to *N. Skinneri* Hk. (Syn. Fil. 288), but later he described the present species as new. — Specimens seen:

**Nicaragua:** Chontales, Lévy nr. 506 (Mus. Paris, Kew).
**Costa Rica:** Jiménez, Donnell Smith nr. 5097 (B, C, W); Alfaro nr. 153 (W), 16521 (C) — Tuis près Turrialba, Pittier nr. 11236 (C, W) — Vallée de Durui, Talamanca, Pittier nr. 9406 (C, W) — Chilamate, Pittier nr. 7501 (W) — Carrillo, Pittier nr. 1176 (W) — Llanuras de Santa Clara, Donnell Smith nr. 6898 (B, W), 6899 (W) — Forêts de Tsáki, Tonduz nr. 9463 (W) — Wercklé (C).

**Ecuador:** near S. Miguel, Peripa River, Sodiro (C = *P. subintegrum* Bak).

208. *Dryopteris Skinneri* (Hook.) O. Ktze. 2: 813. 1891; C. Chr. Ind. 293.

**Syn.** *Aspidium Skinneri* Hook. lec. plant. tab. 924. 1854.

*Nephrodium Skinneri* Moore; Bak. Syn. 287 (excl. syn.).
Type from Guatemala, leg. Skinner (Kew!). A nearly identical plant was collected in Ecuador, ad fluv. Bombonasa, by Spruce nr. 5293 (RB).

Fig. 28. a. D. Francoana (Fourn.) C. Chr. Entire leaf × $\frac{1}{5}$ and fragment × $1\frac{1}{2}$ (orig.).

b. D. guadalupensis (Wikstr.) C. Chr.; fragment of a well-developed form, showing the venation, × $\frac{4}{5}$.

c. D. Lenyi (Fourn.) O. Ktze. Habit of a leaf × $\frac{1}{6}$ with parts of it, × $\frac{1}{5}$, and a fragment of the largest pinna, × $1\frac{1}{2}$ (orig.).

d. D. Peripae (Sod.) C. Chr. Habit of a leaf × $\frac{1}{6}$, a pinna × $\frac{1}{5}$ and fragments seen from both surfaces, × $1\frac{1}{2}$ (orig.).

e. D. asplenioides (Sw.) O. Ktze. Pinna × $\frac{1}{5}$, fragment × $1\frac{1}{2}$ and sporangium.
Hooker's figure of this species is excellent and it is sufficient here to refer to that figure. The species is closely related to \textit{D. Francoana}, agreeing in size, colour, texture and pubescence, still the midrib beneath is more distinctly stellato-puberulous but also setose by patent, rigid, simple hairs; lamina pinnatifid about \(\frac{2}{3}\) of the way to the midrib and below it bears about 2 pairs of free, small pinnae.

209. \textbf{Dryopteris Levyi} (Fourn.) O. Ktze. Rev. \textbf{2}: 813. 1891. C. Chr. Ind. 275. Fig. 28 e.


\textit{Type from Nicaragua: Chontales, leg. P. Lévy} nr. 463 (Herb. Coisson, Mus. Paris!, also Kew!).

Certainly closely related to \textit{D. Skinneri}, to which species I have referred it previously as a variety, while I now think it is a valid species intermediate between \textit{D. Skinneri} and \textit{D. guadalupensis}. From the latter it differs by venation, pubescence; indusium and by its lamina being broadest below the middle; it agrees with it in size and general habit. It resembles \textit{D. Skinneri} in pubescence, and the upper pinnatifid portion of a leaf is not to distinguish from a leaf of \textit{D. Skinneri}. Still it is a much larger species: stipe 15—20 cm long, lamina 20—30 cm long, 5—8 cm broad below the middle, the larger leaves pinnate in the lower half; basal pair of pinnae reduced, \(\frac{1}{2}\) cm long, the following 3—4 cm long, \(\frac{3}{4}\)—1 cm broad, adnate to rachis, obtuse or acute at the point, entire or crenate or the larger ones pinnatifid cut about \(\frac{1}{3}\) to the costa. Veins simple or furcate, in the larger pinnae about 4 to each side of the lobe, the basal ones connivent to sinus, more rarely truly united. Lamina papyraceous, light-green, somewhat warded beneath. ribs pubescent by long, simple, and short stellate hairs intermixed. Indusium setose by simple hairs.


\textit{Aspidium scolopendrioides} Mett. Aspid. nr. 235, var. 1. \textit{incisa}. 1858.

\textit{Polypodium incisum} Sw. Prod. 131. 1788; Fl. Ind. occ. 1640 (vide C. Chr. Ark. för Bot. 9\textsuperscript{1}: 22 tab. 3 fig. 1. 1910).

\textit{Aspidium incisum} Gris. Fl. br. W. Ind. 694. 1864.


\textit{Polypodium praeflongum} Poir. Enc. 5: 521. 1804 (t. sp. orig. in Herb. Lamarck).

\textit{Aspidium stenopteris} Kze. Farnkr. 2: 48 tab. 120. 1849.

\textit{Nephrodium stenopteris} Eat. Amer. Journ. Sci. II. \textbf{27}: 199. 1859; Hk. sp. fil. \textbf{4}: 64. 1862.
Gonioplepis striigosa Fée, 11 mém. 39 tab. 15 fig. 1. 1866.

Type from San Domingo, Plumier Fil. tab. 91.

To this species I refer all specimens without free pinnae but with the lamina narrowed below gradually into an entire or faintly toothed wing, \( \frac{1}{2} \) cm broad. By this character it is always different from D. guadalupensis (Wikstr.) with which Mettenius united it, and i have not found intermediate forms between the two species. In Ark. fôr Bot. 91 I have given my reasons for my considering Pol. incisum Sw. and Aspidium stenopteris identical with the true D. scolopendrioides (L.), which was based on Plumier tab. 91, but later by Linnaeus confounded with my D. guadalupensis (Wikstr.). The confusion in the nomenclature of these two species was due to Swartz, who rightly distinguished the two species but unfortunately used the specific name scolopendrioides for the latter species and renamed the former Pol. incisum, and most authors have followed Swartz in his nomenclature. D. scolopendrioides varies mainly in size, especially in breadth, but it is otherwise a rather uniform species, which shows several good distinctive characters. The leaves are densely fasciculate on an erect or shortly oblique rhizome, sometimes 20—30 to a rhizome. The short stem (1—4 cm) is when young clothed with brown or blackish, stellato-pilose scales. Some of the leaves, which are normally sterile, are short and spreading, others up to 4 cm long, erect and fertile and sometimes ending in a retuse viviparous apex with a rosette of small leaves. The lamina, which tapers gradually from the middle to both ends, is generally linear, ca. 3 cm broad at the middle, and varies from being deeply and broadly serrate to pinnatifid \( \frac{1}{2} \) or \( \frac{1}{2} \) of the way to the midrib with triangular, acute lobes, which are often very unequal in size, some of them being lengthened, 3—4 cm long. Texture more or less coriaceous, often very rigid. Stem, midrib and veins beneath generally densely stellato-pubescent by short multibranched hairs; upperside and leaf-tissue beneath as a rule glabrous, but the under-surface distinctly verrucose. Veins raised beneath, simple or rarely forked, the basal pair anastomosing. Sori supramedial in a single row — seldom in two rows — furnished with a small stellato-pilosu indusium. Sporangia glabrous.

The common Cuban form (A. stenopteris Kze.) differs from the type by a longer stem and much lengthened middle segments with furcate veins, which in the largest forms are sometimes found anastomosing, and by its very long decurrent base of the lamina, but I can not consider that form different from the type even as a variety. Pol. praelongum Poir. is essentially the same, but its veins are more branched and the sori in the lengthened segments often biserial.

Specimens examined:

Haiti: Port au Prince, Picarba Dr. 383 (C) — Stengel (B).
San Domingo: Balnes B. Petit Trou, Barabona, v. Tuerckheim Dr. 2843 B.
Jamaica: Swartz (S = Pol. incisum Sw.)
211. *Dryopteris guadalupensis* (Wikstr.) C. Chr. Biolog. Arb. tilegn. Eng. Warming 84. 1911 (non O. Kize). — Fig. 28 b.


*Polypodium scolopendrioides* L. sp. ed. 11. 1585. 1763 (non ed. 1); Sw. Fl. Ind. occ. 1641 et auctt.

*Aspidium scolopendrioides* var. 2. *subpinnata* Mett. Aspid. nr. 235. 1858.


*Dryopteris scolopendrioides* C. Chr. Index 291. 1905.

*Polypodium domingense* Spr. Syst. 4: 51. 1827 (t. spec. orig.).

*Goniopieris affinis* Fée, Gen. Fil. 250. 1850–52 (t. spec. auth.).

*Goniopieris ferax* Fée, Gen. Fil. 250. 1850–52.


**Type from Guadeloupe, leg. Forsström (Sl).**

A variable species, especially in size and degree of cutting, but fairly constant in several characters, by which it can be distinguished from *D. scolopendrioides*. It resembles that species in its mode of growth, scales and stellate pubescence, but it differs by 1) thinner texture and generally not verrucose under-surface, 2) venation, 3) inframedial sori and 4) by the lamina being fully pinnate below with several pairs of free pinnae, which diminish gradually downwards. Real intermediates between the two species I have not found. The veins are, as a rule, forked or, in the larger form, pinnate in the lobes, always forming a row of very narrow arcoles on both sides of the midrib of the lamina and generally also anastomosing in the segments with a single row of meshes along the main-veins or costa (fig. 28 b). The sori are always inframedial, in the smaller forms in a single row, in the larger ones bi- or pluri-serial, furnished with a small stellato-pilose indusium. According to Jenman the barren fronds are viviparous near the apex. I have seen some fronds from Porto Rico, which are fertile and viviparous at the apex.

To this species I refer a long row of forms, which Jenman referred to three varieties; these are however connected with so numerous intermediates, that I dare not consider them good varieties, although there is a great difference in habit between the small form figured by Plükenet tab. 290 fig. 1 (= Pol. *scolopendrioides* L. ed. II and Sw.) and the large plants described as *Goniopieris affinis* Fée, var. *portoricensis* Kuhn and var. *litorale* Jenn. In the former the leaves are numerous on very short stems, the fertile ones scarcely more than 20 cm long, 2—2½ cm broad,
at the middle incised a little more than halfway to the midrib with entire, obtuse lobes; the veins once forked and the sori uniserial. This is the common form in Jamaica. In San Domingo the form described as Pol. domingense Spr. is apparently very common. Its leaves are longer (30 cm or more) but scarcely broader than in the Jamaican form and on longer stems but otherwise not materially different. In Porto Rico and Guadeloupe the most common forms are the large var. portoricensis Kuhn (Porto Rico) and the true P. guadalupense Wikstr. (syn. Goniopteris affinis Fée) (Guadeloupe). The leaves of these forms are up to 50 cm long on long stems, often more than 10 cm broad at the middle, incised almost to the midrib in broadly linear segments, which are 4—5 cm long, 1 cm broad and often again deeply lobed. Veins pinnate in the lobes and sori in several rows or even in a distinct row on each side of the secondary veins. The middle segments are often considerably and unequally lengthened.

Specimens examined:

Guadeloupe, Forsström .; L'Herminier nr. 128 (B. C = G. affinis Fée) — Père Duus nr. 4059 (CC, H, BB, W, 4389 (C).

Martinique: Lenormand (B).

Porto Rico: Sintenis nr. 877, 2450, 5452, 5664, 5820, 5840, 5841, 5949, 6108, 6234, 6247 (B and partly C, CC, S, W) — G. P. Goll nr. 271, 870, 881, 948, 1015 (W) — A. A. Heller nr. 6174 (W) — Mr. and Mrs. Heller nr. 354 (W) — Underwood and Griggs nr. 52, 76, 883 (W).

San Domingo: Bertero (B = Pol. domingense Spr.), Balbis (B) — Weinland nr. 44 (B) — Picarda nr. 155, 209, 387, all from Haiti B — inter Butay et Jampy, Eggers nr. 2605 (B) — in fluminè Maranges, Eggers nr. 2657 (B) — in monte Isabel de la torre, Eggers nr. 2733 (B, BB) — La Cambara, Bauncker nr. 102 (CC, H) — v. Tuerckheim nr. 2517, 2644, 2845 (B).

Jamaica: P. Browne (S, ex herb. Linn.) — Swartz (S) — Blue Hole, A. Fredholm nr. 3192 (W) — near Port Antonio, Maxon nr. 1985, Underwood nr. 2989, 1703 (W) — near Priestman's river, Maxon nr. 2495 (B), W — Mt. Diabolo, 750 m., Maxon nr. 2259 (W) — Wilson nr. 43 (B) — J. Day nr. 68 (B).

Cuba: E. Otto nr. 38 (B), Lenormand (B), Rüegg (B) — San Antonio de los Baños, Prov. Habana, v. Hermann nr. 3357 (W).

The plant described as Goniopteris gracilis Moore et Houlst. Gard. Chron. 1856: 301, fig., of which I have seen authentical specimens (B), can, I think, safely be regarded as a form of D. guadalupensis, while several other forms, cultivated under the name G. gracilis, are to refer to D. replans. The true G. gracilis is a form with many free pinnæ and with a proliferous bud in the upper part of the midrib.

212. Dryopteris Peripae (Sod.) C. Chr. Index 284. 1905. — Fig. 28.d.

Syn. Nephrodium Peripae Sodiro, Rec. 52. 1883; Cr. vasc. quit. 265. 1893.

Type from Ecuador, seccus flum. Peripa, leg. Sodiro (Kew!)

A distinct species, perhaps nearest related to D. Leyi and D. guadalupensis; it resembles also D. hastata in its long pinnatifid apex, which is not much shorter than the lower pinnate portion of the lamina, but otherwise it is very different. — The short creeping or decumbent rhizome bears some few stellato-pubescent scales.
Stipes fasciculated, up to 25 cm long, glabrous. Lamina papyraceous, narrow-lanceolate, 30–40 cm long, 4–10 cm broad, pinnate about to the middle, upwards gradually tapering into a long pinnatifid apex. Lowest pinnae considerably short-ended, larger ones sessile and the upper adnate to rachis, distant, opposite, 3–5 cm long, 1½ cm broad, obtuse, shallowly serrulate. Rachis, costae and veins beneath rather densely setulose by long, rigid hairs and with fewer short, stellate hairs; leaf-tissue of upper-surface minutely pubescent by adpressed hairs of under-surface glabrous, not verrucose. Veins prominent beneath, 3–4 to a side, those of the basal pair much upcurved and generally united before reaching sinus. Sori inframedial, mostly confined to the anterior basal vein. Indusium subpersistent, setose by simple hairs. Sporangia glabrous; receptacle setose.

—213. *Dryopteris dissimulans* Maxon et C. Chr. n. sp.

— *D. scolopendrioides* (L.) O. K. × *D. sagittata* (Sw.) C. Chr.? 

Type from Cuba: Arroyo de Pedro, ad Jaguey, 600 m., *Eggers* nr. 4958 (W!)

Rhizomate erecto, dense radiculoso, squamis bruneis sparse stellato-ciliatis omunsto. Stipitibus fasciculatis, 3–5 cm longis, strictis, minute stellato-pulverulentis et sparse squamosis, Lamina ad 30 cm longa, supra medium 4 cm lata, versus apicem breviter acuminata, versus basina longe et gradatum attenuata, coriacea, griseo-viridi, ad medium pinnata, supra medium fere ad rachin pinnatifida. Rachis tereti, stellato-puberula. Pinnis liberis multijugis sensim reductis, inferioribus 2–3 mm longis et latis, omnibus basi utrinque subauriculatis, adnatis; segmentis supramidibus ad 2½ cm longis, a basi, 6 mm lata, versus apicem acutum sensim attenuatis, parum obliquis, sinibus acutis separatulis, supra glabris, infra prasertim ad costas venasque breviter stellato-puberula. Venis bi-trifurcatis, ramis versus marginem non raro anastomosantibus. Soris parvis, in segmento biserialibus, fere medialibus. Indusii parvis, stellato-ciliatis. Sporangii glabris.

In general I am not inclined to consider a form intermediate between two known species a hybrid between them, but in this case I am not far from believing that the present plant is a hybrid between *D. scolopendrioides* and *D. sagittata*. In almost every respect it is exactly intermediate between the two species. In the presence of an indusium and in cutting it resembles the former species, in the shape of the segments and in the large number of downwards gradually dwindling pinnae, which show a tendency to becoming auricled on both sides at base, it is very like the latter. In venation it is also intermediate. Here to comes the fact that the sporangia are partly abortive and do not produce spores, and further that *Eggers* has gathered both true *D. sagittata* (nr. 4950) and *D. scolopendrioides* (nr. 4887) in the same locality. From *D. guadalupensis* (Wikstr.) *D. dissimulans* differs by coriaceous texture, grey-green colour, somewhat verrucose under-surface, by the large number of free and closely placed pinnae and by the basal veins rarely being gono-opteroid.

28°
214. **Dryopteris cordata** (Fée) Urban, Symb. Antill. 4: 18. 1903; C. Chr. Ind. 258.

Syn. *Phegopteris cordata* Fée, Gen. 244. 1850—52; 6. mém. 13 tab. 6 fig. 3.


*Polypodium cubanum* Bak. Syn. 304. 1867.

**Type from Cuba**, leg. LINDEN nr. 1873 (not seen).

Rhizome erect, with a few stellato-ciliate scales. Leaves fasciculated; stipe 3—5 cm long, like rachis slightly stellato-puberulous and with some few longer, simple hairs. Lamina up to 30 cm long, 3 cm broad, linear, pinnate from base to short of the apex; larger leaves sometimes terminating in a scaly bud, which produces a rosette of young leaves, grey-green, chartaceous, opaque. Pinnae numerous (20—30 to a side), close horizontal, distinctly stalked, oblong, $\frac{1}{2}$—$\frac{1}{2}$ cm long; $\frac{1}{2}$ cm broad, their base cordate, the apex bluntly rounded. The lower ones often gradually shortened, both surfaces, especially on veins, with not many small stellate hairs. Veins about 8 to each side, generally forked, free. Sori a little above the middle of the vein in a single row on each side of the midrib, exindusiate, but the receptacle with several branched hairs. Sporangia with some bi-trifurcate, deciduous setae, soon glabrous.

The typical form from Cuba of this species is widely different from most forms of *D. replans*, with which Mettenius united it. In Porto Rico a form was collected by SINTENIS (nr. 6380, 6588) referred hereto by Urban, which resembles *D. cordata* in shape of the pinnae; still I am inclined to regard the specimens as young states of *D. replans*. The pinnae are shorter, more ovate, scarcely cordate at base, and the sori are distinctly exindusiate.

**Cuba**: El Yunque, Mt. Baracua, Underwood and Earle nr. 725 (W) — Monte Verde, Wright nr. 1014 (B, S) — Josephina, Yateras, Oriente, Maxon nr. 4117 (W).

**Related forms**, but doubtfully belonging here:


San Domingo: ad flum. Mameges, Eggers nr. 2656 (B).

215. **Dryopteris sagittata** (Sw.) C. Chr. Ind. 290. 1905.


*Polypodium hastatum* Sw. Fl. Ind. occ. 1653. 1806.

*Aspidium replans* var. 2. *hastaefolia* Mett. Aspid. nr. 237. 1858.

*Aspidium hastifolium* Gris. Fl. br. W. Ind. 694. 1864.

**Type from Jamaica**, leg. SWARTZ (S!).

A distinct species, not closely related to *D. replans*, with which Mettenius united it; the plate cited above gives a fair illustration of it. Most pinnae short stalked and bearing a pair of acute spreading auricles at base, entire or faintly crenulate, the lower ones gradually reduced to mere auricles. Rachis and costae
beneath rather densely pulverulent by very short-branched stellate hairs, surfaces otherwise glabrous. Leaf greyish-green, chartaceous. Veins simple or forked or subpinnate. Sori apparently exindusiate, about medial. Sporangia glabrous.

Jamaica: Maxon hr. 1176, 1828, 1930 (C), 2544 (W).
Cuba: Arroyo de Pedro, Eggers hr. 4950 B, C; Monte Verde, Wright hr. 812 (S).

var. tenebrica (Jenman).


Dryopteris tenebrica C. Chr. Ind. 297. 1905.

A much larger plant than the type but scarcely different by other characters than the size. "Plant shuttle-cock-like in habit with sometimes as many as 45 developed fronds to one rootstock" (Harris in sched.). Stipe 10-12 cm, lamina up to 30 cm long by 8 cm broad. Pinnae 4-5 cm long, 3/4-1 cm broad, serrulate or shallowly lobed. Veins pinnate in the lobes, 2-4 jugate, the basal pair anastomosing and sending a branch to the sinus. Jenman describes the sori as indusiate, the indusium being minute, soon obliterated.

Jamaica: Sherrington (type, Kew! — Holly Mount, Mt. Diabolo, Harris hr. 8998 (B).
San Domingo: prope Jérémie, Weiland hr. 55 (B).

216. Dryopteris reptans (Gmel.) C. Chr. Ind. 288. 1905.

Syn. Polypodium reptans Sw. Prod. 132. 1788 (not 130).

Polypodium reptans Gmel. Syst. Nat. 27: 1309. 1791; Sw. Fl. Ind. occ. 1655; Bak. Syn. 316.

Aspidium reptans var. 3 radicans Mett. Aspid. nr. 237.


Polypodium reptandum Sw. Schrad. Journ. 18002: 25. 1801; Fl. Ind. occ. 1654; (C. Chr. Arkiv för Bot. 911: 31 fig. 7, tab. 4 fig. 2. 1910; illustrations of Swartz's type-specimens).

Type from Jamaica, leg. Swartz (S!).

When excluding the subsp. sclerophyllum, which is our D. asplenioides, Jenman's treatment of this extraordinarily variable species under the name Nephrodium asplenioides is very good, when the Jamaican forms only are concerned. Other forms occur in Cuba and Central-America, but I have failed to find good characters by which these forms may be distinguished from the typical form described by Swartz. I can, however, not agree with Mettenius in considering D. cordata, D. sagittata and D. asplenioides forms of the same species: they are all in this paper dealt with as good species; also D. asterothrix, in my Index referred to D. reptans as a subspecies, appears to be a good species. Separating out these four forms as
distinct species there remains a good number of forms, which I refer to a single species, *D. replans*. Although very different in habit and size they show some common characters: 1) the long radicant apex of some leaves, 2) the pubescence of the surfaces, especially the upper one, by forked hairs, 3) the glabrous sporangia; the head of the sporangia appears always to be glabrous, but the pedicel often bears a single hair; the receptacle is as a rule setose by long hairs, which often are longer than the sporangia, 4) the presence of a small indusium consisting at a few cells bearing long simple or forked hairs.—In developed fronds the lower pair of veins, which spring out from the secondary vein 1—2 mm above its base, are goniopteroid and send a branch to the sinus; in young leaves the veins are sometimes all free. The rhizome is erect, clothed at the top with proportionally few glossy, brown, stellate-pubescent scales. Stipites fasciculated, slender, stramineous. Lamina generally herbaceous but frequently chartaceous or even coriaceous, more or less hairy on rachis and ribs by long, simple hairs. Most pinnae short-stalked, the lower ones not or slightly reduced, the margins cut into shallow rounded lobes or subentire. Veins 2—5 to a side, not very prominent beneath. Sori below the middle of the vein. As to size and shape of leaves and pinnae nothing can be said, which agrees even with two specimens from the same locality. It seems that leaves from same rhizome but of different age vary very much.

Maxon has recently tried to show that the right name of this species is *D. radicans* (L.). It is illustrated by Sloane pl. 29 and 30 fig. 1 and by Plukenet pl. 253 fig. 4, which plates were cited by Linnaeus under his first description of *Asplenium radicans* (Syst. Nat. ed. X. 2: 1323. 1759), as well as by Swartz under his *P. replans*. If Linnaeus really founded his *Asplenium radicans* (= *Aspl. radicans* of my index) on Sloane’s plate, Maxon is certainly right in changing the name, but we have here a case, which exactly corresponds with that at *Asplenium erosum* L., which name Maxon uses for the well-known *A. auritum* Sw. This latter case I have dealt with in some detail in my paper on Swartz’s species of ferns (Arkiv för Bot. 911: 14—17). It is right that Linnaeus under the first description of his *Aspl. radicans* quoted the said plates only; but in Spec. plant. ed. II. 1540. 1763, where the name is changed to *Aspl. rhizophyllum*, he immediately after the description cites “Brown. Jam. 92”. This additional citation is important, because it proves that Linnaeus founded his species on dried specimens, not on Sloane’s plates. Linnaeus bought namely, in the year 1758 a collection of Jamaican plants gathered by P. Browne, and described in Browne’s work on Jamaica. This work from 1758 Linnaeus did not know during the preparation of the tenth edition of *Systema Naturae* and therefore it could not, of course, be cited in this edition. It is natural that Linnaeus tried to determine Browne’s specimens by aid of Sloane’s and Plukenet’s works, and when finding a plate, which he believed to illustrate the species, he quoted that plate. Knowing Browne’s work while preparing the second edition of *Species plantarum* he then always cited this work before the citations given in 1759 and always immediately after the description, which proves
that his new species was founded on a specimen from Browne, not on the plates quoted. Subsequently Aspl. radicans L. (= A. rhizophyllum L.) is not the same as P. reptans Sw., and the right name of our species must be D. reptans (Gmel.).

D. reptans is a common species in Jamaica and Cuba and occurs also but more rarely in some other islands, Florida and Central America. The smallest form occurs in the eastern islands, the largest in Cuba and Florida. I shall here mention some of the more characteristic forms.

1. var. tenera (Fée).

Syn. Goniopteris tenera Fée, 11 mém. 60 tab. 15 fig. 3. 1866.

A small, thin-leaved form: leaves apparently never radican. Stipe very slender, shorter than the lamina, this 6—12 cm long, 5 cm broad at the base; pinnæ short-stalked, close, the lower ones reduced or not, about 2½ cm long by 1 cm broad, obtuse at the point, rather deeply lobed, broadest at the truncate base. Veins about 3 to each side. — Differs from the next variety by its not radican leaves and uniform fronds, from D. asplenioides by its thin texture, not prominent veins and especially by the leaf tissue of both surfaces being rather densely but minutely pubescent by stellate hairs.

Jenman’s var. teuera is probably not the same; I have seen no Jamaican specimens, which exactly corresponds with Fée’s type, although single leaves from rhizomes, which also bear radican or differently shaped leaves, are very slightly different.

Guadeloupe: L’Herminier (type; Herb. Cosson Paris); B.
Porto Rico: Sintenis f. 1770 (B. C. W)

2. var. eu-reptans Jenman, loc. cit.

Hereo a good many forms which I have tried in vain to distinguish from each other. Not only are two identical specimens not to be found but the leaves from the same rhizome also are often very different. Very often the sterile and fertile leaves are different, the former being very short-stalked, prostrate, rooting or not, the latter much higher on long stalks and often of a much more rigid texture, radican or not, the pinnæ generally distant; in other specimens also the short, prostrate leaves are fertile. The pinnæ are very differently shaped, even in leaves of the same rhizome; in the short-stalked leaves they resemble those of var. tenera, i. e. short-stalked, obtuse at the apex, rather deeply lobed, 2—4 cm long, 3/4—1 cm broad, but not so closely placed. The long-stalked, most often fertile and often radican leaves are more varying, the pinnæ being sessile or stalked, entire or crenate or lobed, often hastate at base, acute or rounded at the apex, etc. A peculiar form is that described as Pol. repandum Sw.; here the short-stalked, prostrate, sterile leaves are radican, while the fertile leaves are very long-stalked (stipe up to 20 cm high), not radican, pinnæ very distant, scarcely 1½ cm broad, 2 cm long, almost coriaceous, the margins revolute, crenate or almost entire; veins
2—3. Probably such leaves develop only in old plants. In quite young plants the pinnae are sometimes quite entire, ovate or nearly circular, the veins free: such forms have been referred to _D. cordata_. — Some forms are nearly destitute of stellate hairs.

The following specimens are typical, if such a term may be used here.

**Jamaica:** Maxon nr. 2104 (C, H, Bg, W), 2102, 2191 (C, W), 2344, 2557 (W, 2943 (CC, Bg, W); Clute 334 (W); Underwood nr. 1784 (W); and others.

**Haïti:** Marmelade, Nash and Taylor nr. 1232 (W) — St. Domingo: Puerto Plata, Eggers nr. 1577 (C) — Picarda nr. 228, 358 (B).

**Cuba:** Oriente, Farallones de la Perla, Maxon nr. 4407 (W) — Yateras, Maxon nr. 4429 (W) — Prov. Santiago, El Yunque; Pollard and Palmer nr. 122 (W) — Prov. Habana, San Antonio de los Baños. Abarca nr. 4531 (W), Baker nr. 2755 (W) — Prov. Pinar del Río, near El Guama, Palmer and Riley nr. 126 pt (W) — E. Otto nr. 85 (B).

**Bahamas:** New Providence, Rawson W. Rawson (B).

**Venezuela:** Caripe, Moritz nr. 213 (B).

3. var. _angusta_ n. var.

Fronds rather uniform, often radicant, very short-stalked, linear, often considerably narrowed downwards. Pinnae distant, small, rarely more than 1 1/2 cm long, often only 1/2 cm, scarcely 1/2 cm broad, obtusely rounded at the apex, the margins entire or slightly crenated, rounded or auricled at base; secondary veins once or twice forked, free or united near the edges.

Very characteristic by the long, very narrow, flaccid leaves, which are often rooting as in _eureptans_. It approaches _D. cordata_, from which it differs by its distal pinnae, thinner texture, long proliferous apex and pubescence.

**Cuba:** Oriente, Monte Verde, Wright nr. 813 (B, type!); C, S — Bejucal, Liermann (II) — Nazarene, Baker nr. 1899 B, W).

**Jamaica:** Wilson nr. 54 (B).

**Porto Rico:** Utuado, Sintenis nr. 6380 (C), 6588 (CC; pinnae nearly circular).


4. var. _conformis_ n. var.

_differs from var. _eureptans_ by its mostly uniform leaves, which have the general habit of the short-stalked mostly sterile leaves of _eureptans_, but the stipites are rather long and the lamina often much larger. Long-stalked, differently shaped leaves are not to be found, but often the radicant leaves are somewhat narrower than the non-radicant ones. — All leaves long-stalked, stipe often as long as the lamina or even longer. Lamina mostly lanceolate in outline, often 20 cm or more long but as a rule shorter, 5—8 cm broad, shortly narrowed downwards. Pinnae very short-stalked the lower ones mostly rather shortened, distant, the largest up to 5 cm long, often cut 1/2 or more to the costa and cordate at base. — It is less proliferous than _eureptans_, still one or two radicant leaves are to be found in most
specimens. It approaches *D. asterothrix*, from which it differs by its not so densely pubescent fronds, glabrous sporangia and proliferous leaves. From *D. asplenioïdes* it differs by its obtuse pinnae, stellate pubescence of the leaf-tissue, scarcely prominent veins and nearly sessile pinnae; from var. *tenera* by the distant lower pinnae and proliferous leaves.

Most specimens from Cuba, Central America and Florida belong to this variety, which represents the most developed state of the species; in the largest form it is very different from *eureptans*, but there are numerous intermediate forms between the two varieties.

**Florida:** Hammock on left bank of Withlacoochee, near Brooksville, cavernous, calcareous rocks, J. Donnell Smith (type collection, W) — Dade Co., Castella’s hammock, A. A. Eaton nr. 262 (W) = Isthacatta, L. M. Underwood nr. 277 (W) and A. H. Curtiss nr. 5965 W. approaching var. *eureptans*.

**Bahamas:** Andros, John J. and Alice R. Northrop B.


**Mexico:** in spelunèis près Orizaba, Bourgeau nr. 2514 (B, H, S, W); base of calcareous cliffs, near Orizaba, Pringle nr. 5594 (W) — Yucatan, Schott nr. 779 (W).

**217. Dryopteris asterothrix** (Fée) C. Chr. comb. nov. — Fig. 29.

**Syn.** Goniopteris asterothrix Fée, Gen. 253. 1850—52.

*Phegopteris asterothrix* Melt. Pheg. nr. 40. 1858.

*Dryopteris reptans* *ast erothr i x* C. Chr. Ind. 288. 1905.

This seems to me a very distinct species, although some forms of the protean *D. reptans* resembles it very much. The accompanying figure will give an idea of its habit. The oblique or short-creeping rhizome, which bears some few stellato-pilose scales, bears a small number of leaves, which are of a very thin texture and throughout clothed with small stellate hairs. The stipe is slender, stramineous and like the rachis densely soft-hairy by patent, whitish hairs under which numerous small stellate hairs are to be found. Lamina 15 cm × 5—6 cm, bipinnatifid, the apex obtuse. Pinnae opposite or subopposite, 6—10 on each side of rachis, the lower ones short-stalked, the upper ones sessile, at least confluent, 2 1/2—3 cm long, 1—1 1/4 cm broad, obtusely rounded at the apex, slightly broader at the base, the lowest pair generally a little shorter and deflexed; and below them a pair of small, reduced pinnae are often seen; both surfaces densely and shortly stellato-pilose and costæ and veins besides with long, soft, patent hairs. Lobes or segments broad, obtuse, the middle one soften a little lengthened. Veins rather indistinct, about 4 to each side of the midrib of the lobe, the lower pair united. Sori small, exindusiate, medial or a little inframedial; receptacle with numerous, long-stalked branched hairs; sporangia very loose, at the bearing 2—3 erect 2—3 branched hairs, which are very deciduous, and therefore the sporangia may be found to be glabrous.

From *D. reptans* *D. asterothrix* can be distinguished by its size, never rooting apex, its soft-hairy rachis and stipe, setose sporangia and its whole habit. The rhizome bears often under the long-stalked fertile leaves a rosette of small sterile ones. — The following specimens are very uniform; several of them from various herbaria were determined by Dr. Christ as *A. dissidens* Mett., under which name the Guatemalan specimens were distributed by DONNELL SMITH.

**Cuba:** Prov. Oriente, caverns of Thermopylae, Monte Libano, 600 m, MAXON nr. 4210 (W)

**Jamaica:** Mt. Diabolo, UNDERWOOD, nr. 1798 (W) — near Bath, MAXON nr. 1869 (W).


**Costa Rica:** WEBERLÉ (C, W).

**Venezuela:** TOVAR, FENDLER nr. 201 (B).

var. **bibrachiata** (Jenman).

**Syn.** *Nephrodium bibrachiatum* Jenman, Gard. Chr. III 15: 230. 1894; W. Ind. and Guiana Ferns 228.

*Dryopteris bibrachiata* C. Chr. Ind. 254. 1905.

Not essentially different from the type, but the basal pinnae the largest (small, reduced pinnae always absent), on longer petioles (2 mm long), stipe and rachis with fewer or no long soft hairs. JENMAN describes the indusium as distinct; I have failed to find it.

**Jamaica:** JENMAN (W; type) — John Crow Peak, 5500–6000 ft; MAXON nr. 1317 (= UNDERWOOD nr. 2443) (W) — Mt. Diabolo, MAXON nr. 1940 (W; Rg).

= **218. Dryopteris sclerophylla** (Kze) C. Chr.

**Biol. Arbejder tilegn.** Eug. Warming 84. 1911.

**Syn.** *Aspidium sclerophyllum* Kze in Spr. Syst. 4: 99, 1827; Linn. 9: 92. 1834.

*Aspidium scolopendrioides* var. 3. *pinnata* Mett. Aspid. nr. 235. 1858.

*Aspidium dissidens* Mett. Aspid. nr. 275b. 1858; C. Chr. Ind. 71.


Dryopteris jamaicensis C. Chr. Index 272. 1905.

Nephrodium asplenioides Bak. Syn. 293 (part?).


Dryopteris Sintenisii Urban, Symb. Ant. 4: 19. 1903; C. Chr. Ind. 293.

Type from Cuba leg. Poeppig (specim. auth. vidi in Herb. Berol. et Herb. Presl).

A distinct but very misunderstood species, by Mettenius considered the most developed form of his A. scolopendrioides, while Baker (Syn. Fil. 293) very improperly referred it to his Nephrodium asplenioides. As the above list of synonyms shows, the species has been described under at least three new names, of which A. dissidens was placed in Syn. Fil. under the subgenus Pleocnemia (!). It is beyond question that the forms referred by me to D. sclerophylla are closely related when not absolutely identical. The main-characters of the species are 1) the coriaceous or papyraceous texture of the lamina, which is of a characteristic grey colour due to the dense pubescence of stellate hairs throughout both surfaces, 2) the thick, undulato-crenate margins of the teeth or lobes, which generally seem to be acute or even mucronate because the margins of the lobes are revolute, 3) the prominent veins, 4) the supramedial or even submarginal sori, and 5) the glabrous sporangia.

The erect or oblique rhizome is at the top densely clothed with red-brown or nearly black, glossy, stellato-pilose scales. The lamina varies in size and degree of cutting but it is always fully pinnate from base to the middle. The basal pair of veins is always truly anastomosing. Sori with a distinct, stellato-pubescent indusium. I can distinguish two forms.

1. (typical sclerophylla). Leaves on short stems, long and gradually narrowed below. Pinnæ short (3 cm × 2 cm) the lower ones gradually smaller almost as in D. opposita, the fully developed ones sessile with a cordate base, the upper ones confluent all broadly serrat, scarcely pinnatifid. Veins simple; sori medial. Scales of rhizome few, brown.


2. Leaves on longer stems, ovate or elliptic, shortly narrowed downwards. Pinnæ short-stalked or sessile with cordate base, up to 8 cm long, 1 1/4—2 cm broad, pinnatifid to a narrow wing to the costa. Veins pinnate in the lobes, often furcate and forming costular areoles, very prominent beneath. Sori supramedial or submarginal. Scales of rhizome nearly black, 2 cm long, glossy.

This form looks very different from the type, but it can not be distinguished even as variety; in some specimens are to be found young leaves, which are fully identical with the typical form. With this large form agree the Porto Rico and Jamaican original specimens of A. dissidens Mett. (Syn. A. Sintenisii Kuhn) and N. jamaicense Bak. The latter differs from the Cuban form only by its lighter scales of the rhizome, more distinctly stalked pinnae, which are often unequal, at the base, and by less stellato-pilose leaf-tissue and somewhat sided thinner texture. A. dissidens is almost quite identical with jamaicense. I have not seen the original specimen of it, which was collected in Porto Rico by Balbis, but a sketch of it is found in Herb. Berol, which is from the hand of Mettenius and perfectly agrees with the original diagnosis. It is absolutely identical with A. Sintenisii from the same island. In this form the veins frequently are united in the lobes, so that they form costular areoles; Baker, therefore, placed it in the subgenus Pleocnemia. The sori are perhaps closer to the margin than in the other forms of the species.

Jamaica: Jenman (B) — Hart nr. 347 (W).

219. Dryopteris asplenioides (Sw.) O. Ktze. Rev. 2: 812, 1891;
C. Chr. Ind. 253 (part.). — Fig. 28 e.


Aspidium replans var. 4. asplenioides Mett. Aspid. nr. 237. 1858.
Nephrodium asplenioides (Bak. Syn. 293?) part. and 1. sub-sp. sclerophyl-

Ind. and Guiana Ferns 230.

Woodsia pubescens Spr. Nova Acta 10: 233 tab. 16 fig. 5—7 1821!

Type from Jamaica, leg. Swartz (S).

I think that this species is distinct from D. replans, although it is difficult to give good characters by which it can be distinguished from not-rooting forms of that species. The main characters are: Leaf pinnate to short of the never rooting apex, often long tapering almost from the base, 3—5 cm long, chartaceous or firmly membranous, fresh-green, often glossy, rachis more or less pubescent by as well long, simple hairs as minute stellate ones. Pinnae very numerous; often 25 to a side, most of them distinctly stalked, often characteristically falcate, the base generally cordate, the point obtuse or acute, 4—6 cm long, 3/4—1 1/2 cm broad, the margins subentire, crenate, or, often more or less lobed into rounded, somewhat oblique lobes, often auricled on both sides of the base, ciliate, upperside glabrous, coste and veins beneath hairy by long, simple hairs and small, stellate hairs, leaf-tissue glabrous. Lower pinnae not or only slightly reduced. Veins simple, 3—4 jugate, prominent beneath, the basal pair always anastomosing. Sori near the midvein of the lobe, furnished with a small indusium, which is ciliated by simple
or forked hairs. Head of sporangium glabrous, but its pedicel bears a single simple or furcate hair. — None of the specimens referred hereto shows small short-stalked sterile leaves, which are often to be seen in specimens of D. reptans; all leaves from the same rhizome are always uniform, the stipes are stramineous, glabrous. 8—15 cm long, slightly scaly below, fasciculated on an erect rhizome, which is rather scaly at the top by glossy, brown, acuminate, stellato-pubescent scales. Larger specimens may be confounded with D. serrulata, but I think, that it always can be distinguished from that species by its more decidedly pubescent rachis and costa and its rounded lobes. From D. sclerophylla it differs by its fresh-or-dark-green colour, thinner texture and non stellato-pilose surfaces.

Maxon, believing that P. asplenioides Sw. was founded on Sloane's plate 43 fig. 2, quoted by Swartz, reduced Swartz's name to a synonym of D. serrulata. Granting that Sloane's plate illustrates our D. serrulata rather than D. asplenioides I must say again that Swartz never founded a species on old figures; his P. asplenioides is founded on specimens collected by himself in Jamaica. A specimen from Herb. Sw. (S), which belongs to the present species, agrees very well with Swartz's description in Fl. Ind. occ. 1659, but unfortunately it is not labelled with certainty by Swartz.

D. asplenioides varies especially in size and texture, which probably is due to age and outer conditions. It is in its true form apparently confined to Jamaica.

Jamaica: Maxon nr. 875, 1406 (= Underwood nr. 2531), 1507, 1894, 2208, 2258, 2270, 2338, 2866 (W); Underwood nr. 1890, 320, 2978, 3106 (W); Clute nr. 120; Harris nr. 7342, 7592 (B); Hart nr. 171a, 211 (W).

Haiti: Port au Prince, Picarda nr. 734 (B) (doubtful).

Cuba: Wright nr. 1801 (S, W).


Type from Bermuda (not seen).

Closely related to D. asplenioides and the smaller forms difficult to distinguish from that species. Still the pinnae are generally larger (8—10 × 2 cm) and cut more than half-way to the costa. Both surfaces with scattered, whitish, simple or forked hairs, most numerous on the ribs; rachis rather hairy by short stellate hairs and longer, simple ones. Veins 6—7-jugulate, the lower pair united or more often running side by side to the sinus, the others very often furcate. Sori medial or supramedial, furnished with a ciliate indusium; hairs of indusium simple, or, rarely forked. Sporangia without hair on the pedicel. The scales of the oblique rhizome are stellato-pilose throughout; they are not so large as shown in the plate quoted, which otherwise illustrate the species very well.

Endemic in Bermuda Islands, Gilbert (W, G. B. Goode (W); W. G. Farlow (S) - Hein nr. 90 (B).
Dryopteris semihastata
(Kze.) O. Ktze. Rev. 2: 291. 1891;
C. Chr. Ind. 291. — Fig. 30 a.
Syn. Aspidium semihastatum
Kze. Linnaea 9: 91. 1834; Mett. Aspid. nr. 179.
LastreaPoeppigianaPresl,
Epim. bot. 40, 1849.

Type from Peru, ad flum. Pampayaco, leg. Poeppig. A figure of the type-specimen (by Mettenius) is to be found in (B), and with it agrees perfectly the type-specimens of L. Poeppigiana Pr. (hb. Presl!), which also was collected by Poeppig "in Cuba"; there is no doubt that Presl's specimen is of the type-collection, and the locality erroneous; Poeppig collected in 1829 both in Peru and in Cuba.

D. semihastata resembles much a small form of D. macrotis, and together with that species its position within the genus is doubtful. It lacks, namely, stellate hairs, and it is possible that the two species are less cut members of the group of D. patens; still in general aspect they resemble other species of the present group in which I place them. The accompanying figure will give an idea of D. semihastata; in pubescence, auricled, subentire pinnae, of which the lower ones are reflexed, and also in venation it agrees with D. macrolis, but it is much smaller and with only 2—3 pairs of veins, and the auricles are much shorter.

Fig. 30. a. D. semihastata (Kze.) O. Ktze., l. Poeppig. Leaf × 4/5; pinna × 1/5; fragment from above with free veins and fragment from the underside with anastomosing veins, × 5. — b. D. Jamesoni (Hk.) C. Chr. Two lower pairs of pinna, × 1/5, segments from both surfaces × 1/5 (orig.). — c. D. Warmingii n.sp. pinna × 4/5 and segment from both surfaces, × 1/5.
222. Dryopteris Jamesoni (Hook.) C. Chr. comb. nov. — Fig 30 b.


Type from Ecuador, ad ripam fl. Napo, Jameson nr. 761 (Kew!) a very similar plant was collected in Peru, Tarapoto by Spruce nr. 3946 (L).

A small species closely related to D. semihastata, which it resembles in size, colour, pubescence and the auricled upper base of the pinnae, but the lamina is fully pinnate scarcely to the middle, upwards pinnatifid only. Largest leaf seen: stipe 9 cm, lamina 17 cm long, 4 cm broad below the middle. Stipe and rachis rather pilose by long, stiff, simple hairs, between which some very small, stellate hairs can be found. Upper surface densely and adpressedly pubescent, costa and veins beneath setose by patent setae. Lowest pair of pinnae reflexed and considerably reduced. Veins in about 3 pairs in the lobe of the larger pinnae, the basal ones normally united. Sori inframesial furnished by a setose indusium.

It is possible that D. Jamesoni is a small variety of D. macrotis, which it resembles closely in pubescence of the surfaces, the auricled pinnae and other characters. Baker referred it in Syn. Fil. 293 to Neph. molle, to which it is, of course, not at all related.

223. Dryopteris Warmingii n. sp. — Fig. 30 c.


Type from Brazil: Minas Geraes, Lagoa Santa, leg. Warming 1864 (H!) and the same from Sao Paulo, Cajuru, Regnell. nr. III. 1449 b. (Rg, W).

Rhizomate crasso, ad 5 cm alto, 1 cm crasso, squamis bruneis sparse stellato-ciliatis praedito. Stipitibus fasciculatis, ad 20 cm longis, tenuibus, pilis minutis stellatis puberulis vel subglabratis, supra sulcatis. Lamina 15—20 cm longa, ovato-oblonga, sursum in apicem pinnatifidum sensim attenuata, membranacea vel firmo-herbacea, atro-viridi. Rachi dense pilosis; pilis simplicibus longioribus pilis minutis stellatis intermixtis. Pinnis suboppositis, sessilibus, basalibus reflexis vix abbreviatis, medialibus horizontalibus apicibus curvatim ascendentibus, 3—5 cm longis, 1—1½ cm latis, basi superiore distincte auriculatis, acuminatis, grosse lobatis, dense ciliatis, supra pilis simplicibus adpressis subdense strigosis, subitus ubique (praesertim ad costas venasque) pilis simplicibus pubescentibus. Lobis contiguis, falcatis, obtusis, basali anteriore duplo majore, subacuto. Venis simplicibus, 5—6-jugis, basalibus aut anastomosantibus aut ad sinum convinentibus. Sori inframesialibus, parvis; indusiis parvis, dense setosis, mox deciduis. Sporangiis pilis longioribus maxime in pedicellis sedentibus intermixtis.

I am convinced that this new species is specifically distinct from the Andine D. Jamesoni, with which Baker united it. It is true that the two species agree as to almost all characters, still our new species is larger, has a larger number of veins, the basal pinnae scarcely reduced, and the lamina is generally fully pinnate at the lower two-thirds.
224. Dryopteris macrotis (Hook.) O. Ktze. Rev. 2: 813. 1891; C. Chr. Ind. 276.


Type from Peru: Tarapoto. Spruce nr. 3979 (auth. specimens in RB and L.).

The most developed form of a small group, which includes also the three preceding species, characterized by the strigose upper surface of the lamina tomentose rachis and the reflexed lower pinnae which like the upper ones are distinctly auricled at the upper base and setose indusia. D. macrotis differs from the three other species by its size; stipe and lamina 30–40 cm each, pinnae 10–15 cm long by 1½–2 cm broad, the lower 2–3 pairs much reflexed, both surfaces adpressedly strigose, rachis apparently without stellate hairs, in some specimens proliferous like several other species of Goniopteris; veins 5–6-jugate, very ascending, free and connivent or not reaching the sinus, the basal ones sometimes truly united. Rosenstock has named the forms with anastomosing veins var. nephrodioides in Fedde, Repert. 7: 298. 1909, based on Spruce nr. 4658 from Peru Mt. Campaña (RB!); the same character is found in specimens of Spruce nr. 3979.

225. Dryopteris serrulata (Sw.) C. Chr. Ind. 292. 1905; Maxon, Contr. U. S. Nat. Herb. 10: 491. 1908.

Syn. Polypodium serrulatum Sw. Schrad. Journ. 1800: 25. 1801; Fl. Ind. occ. 1663. (C. Chr. Arkiv för Bot. 9: 34 fig. 8 et t. 5 fig. 1; photograph of the type-specimen).

Aspidium serrulatum Mett. Aspid. nr. 252. 1858.


? Polypodium Smithianum Hew. 1. c. 459 (t. Mett. ms.).

Type from Jamaica, leg. Swartz (S!)

A well-marked species, distinguished from related species by its pinnae being broadly serrate only, not pinnatifid, and its inframedial sori. The pinnae resemble in cutting those of D. pyramidalata, from which it differs by its lower pinnae being reduced, by its sessile or subsessile pinnae and by its few veins. The whole leaf is practically glabrous, the rachis and costa beneath alone slightly puberulous by minute stellate hairs. Most pinnae with truncate base, or the lower ones a little narrowed and often auricled. Lobes generally broader than long, often emarginate. Veins 4–5-jugate, the lower 3–4 curved up to the sinus and the basal pair normally united and sending a branch to the sinus. Sori very often confined to the lower veins (still in some specimens all veins are soriferous), distinctly inframedial, often close to the costa. Indusium small, deciduous, furnished with a few furcate hairs. Sporangia glabrous. — Generally the lower 2–3 pairs of pinnae are gradually shortened, but this is not the case in all specimens. The species varies considerably in size. The largest specimens measure: stipe 30–40 cm, lamina 8 cm,
pinnae 10—13 cm long by $1^{1/2}$—2 cm broad. The erect rhizome is at the top clothed with many castaneous, acuminate scales.

Maxon (loc. cit.) says that P. serrulatum Sw. was founded upon Sloane's pl. 43 fig. 1 and that P. asplenioïdes Sw., founded upon Sloane's pl. 43 fig. 2 is the same species. As I have shown in my paper on Swartz's species of ferns, Swartz has never founded a species upon figures alone but always described them after specimens. The two named Swartzián species were described after specimens collected by Swartz himself in Jamaica and Maxon is, therefore, not right in identifying the two species from an examination of the figures quoted only.

D. serrulata seems to be endemic in Jamaica, where a beautiful series of specimens was collected by Maxon (numbers quoted by Maxon loc. cit.), Underwood, Hart and Jenman (W).

226. Dryopteris anoptera (Kze.) C. Chr. Ind. 252. 1905 (excl. syn.). — Fig 31 d.

Syn. Aspidium anopterum Kze.; Kuhn, Linnaea 36: 113. 1869 (excl. syn.).
Nephrodium nitidulum Bak. Fl. bras. 1: 597. 1870; Syn. Fil. 502. (excl. syn.).
Dryopteris nitidula O. Kze. Rev. 2: 813. 1391.
Goniopteris hastata Fée, Cr. vasc. Br. 1: 107 tab. 33 fig. 2 (non 11 mém. 1866).
Goniopteris bahiensis Fée, 1. c. 2: 61. 1872—73.

Type from Brazil: Bahia, leg. Moricand (B1, RB); Riedel (W).

An imperfectly known species, confounded with Aspidium catacolobum Kze. and A. nitidulum Kze. figured by Ettingshausen, which no doubt belong to D. lugubris. The type-specimen belongs to a species closely related to D. serrulata, while other specimens from the same locality, often determined as D. anoptera, seem to me to belong to D. pyramidata. In size, texture and cutting D. anoptera, as understood here, does not at all differ from D. serrulata, but it differs by the presence of very small and few scales on the costae beneath, by its more numerous veins, 7—8 to a side, the lower ones truly united, and by its sporangia being setose by bi- or trifurcate hairs. — I have no doubt that Gon. hastata Fée (G. bahiensis Fée) is this, although the plate shows a plant with a distinct terminal pinna.


Syn. Goniopteris hastata Fée, 11 mém. 65. tab. 18 fig. 1. 1866.

Type from Guadeloupe, leg. L'Hermineer (Herb. Cosson, Paris!; B).

Rhizome short-creeping or decumbent, like the lower part of the stipes with some stellato-pilose scales. Stipe and rachis shortly puberulous by forked and simple hairs, sometimes nearly glabrous. Lamina up to 5 cm long, but generally much shorter, pinnate in the lower half or two-thirds suddenly narrowed into a long, broad, pinnatifid or lobed apex, herbaceous, strigose on the costae above, slightly puberulous by furcate and simple hairs on costae and veins beneath,
ciliate, dark-green, often glossy. Pinnae few, 4—8-jugate, 8—10 cm long (or shorter), 2 cm broad, broadest at the middle, the basal ones not or a little shorter, not reflexed, nearly sessile, the upper ones adnate, at least confluent, the uppermost pair shorter and form like a hastate base of the pinnatifid or lobed apex of the lamina, which is 1—2 dm long by 3—4 cm broad and often exceeds in length the pinnate lower part of the lamina. Pinnae broadly serrate or even crenate only, the teeth broader than long, oblique, bluntly rounded or their outer margin straight. Veins about 6 to each side, the lower 2—3 pairs united alternately into a flexuose branch running to the sinus, or sometimes the lower pair is meniscioid; often some of the following do not reach the excurrent branch but end in the leaf-tissue. Sori inframedial, exindusiate. Sporangia furnished with bi- or trifurcate hairs.

In several characters, especially in venation and pubescence, D. hastata resembles D. oblitterata, to which species Baker (Icon. plant. t. 1669) referred it, but it differs considerably by the shape of the apex of its lamina and by its setose sporangia. By these two characters connected it is also different from allied species with a pinnatifid apex (D. serrulata and others).

Porto Rico: Sentenis dr. 5819 (B, C, W), 6268 b, 6668 (B); G. P. Goll dr. 133, 862 (W); A. A. Heller nr. 6200 (W); Underwood and Griggs nr. 869 (W).
Trinidad: Broadway nr. 3432 (B).

*var. leptocladia* (Fée).

Syn. Goniopteris leptocladia Fée 11. mém. 63 tab. 16 fig. 3. 1866.

Diffs from the type, with which it agrees in pubescence and setose sporangia, by its more numerous pinnae (10—12 pairs), which are more deeply cut into sub-acute lobes generally longer than broad; the pinnatifid apex is proportionally shorter than that of the type; base of pinnae as a rule subcordate; only the two, rarely three lower veins united.

Guadeloupe: L’Herminier nr. 131 (B, C, authentical specimens); Père Duss nr. 234 (C), 4115 a (W).
Martinique: Père Duss nr. 4146 (RB).
Porto Rico: Underwood and Griggs nr. 888 (W; form approaching the following variety).

*var. sub-auriculata* Kuhn in sched.


 Likely a new species, but in pubescence, setose sporangia and long pinnatifid apex agreeing with D. hastata, from which it differs by its large number of much smaller pinnae, 4—8 cm long, 1 cm broad, the lower ones rather reduced, sub-sessile, the middle ones adnate to rachis, obtuse auricled on both sides of the base, the upper ones confluent, crenate or shallowly and bluntly lobed. Veins
4—5-jugate, the lowermost pair anastomosing. In size, colour and venation it resembles very much *D. asplenioides*, which, however, is indusiate and pinnate to short of the apex with most of the pinnae stalked; in our variety long simple hairs are few or none on rachis and costa beneath, which are stellato-puberulous, in *D. asplenioides* long hairs as a rule are more numerous than the stellate ones.

Haïti: Port au Prince, Picarda nr. 386 (C), 734 (B: — prope Mariani, Picarda nr. 377 (B) — San Domingo, ad Rio Mameges, Eggers nr. 2656 (B, C) — v. Tuerckheim nr. 2576 (B).

Porto Rico: Sintenis nr. 5661 (B, C, CC); Goll nr. 1616 (W).


*Syn. Goniopteris pyramidata* Fée, 11 mém. 61, tab. 16 lig 2. 1866.


*Nephrodium subcuneatum* Bak. Flor. bras. 12: 487. 1870; Syn. Fil. 503.

Jenman, W. Ind. and Guiana Ferns 234. 1908!

*D. subcuneata* O. Ktze. Rev. 2: 813. 1891; C. Chr. Ind. 295.


Type from Guadeloupe, leg. L'Herminier (Herb. Cosson, Paris! and authentic specimens in B and C).

A most distinct and uniform species, excellently described by Jenman and Maxon (loc. cit.). It resembles in size, colour and texture *D. tetragona*, from which it can be distinguished at once by the lamina being gradually narrowed upwards and by its venation. From the allied species without terminal pinnae it differs by its most pinnae being distinctly stalked. The lamina is glabrous, the rachis and costa beneath excepted, which are puberulous by very minute forked or simple hairs. Lower pinnae narrowed towards the base, generally not reflexed or abbreviated, upper ones with a truncate base, all scarcely incised one third to the costa. Lobes scarcely longer than broad, truncate and often emarginate at the apex. Veins 8—10-jugate the lower 3—4 much curved, connivent to sinus, or the lower pair occasionally united and sending a branch to the sinus; often the anterior basal vein ends in the leaf-tissue, not reaching the opposite posterior one. Sori medial, furnished with a small, ciliate indusium; head of sporangium glabrous, but its pedicel bears normally a stiff hair. — Rhizome obliquely erect or decumbent; stipe 40—60 cm long, lamina 35 cm × 20 cm; pinnae 12 × 2½ cm. Rachis is sometimes gemmiferous in the upper part.

*D. latiuscula* Maxon is exactly typical and *N. subcuneatum* Bak. is the same. The specimen from S. Domingo referred by Maxon to this species and to which the combination *Dryopteris pyramidata* first was applied, is not so typical, still scarcely different. It has the rachis and costa beneath clothed with numerous long, whitish hairs, and its pinnae are incised about halfway to the costa. — *D pyramidata* seems to be a rather common species in Guiana and the southern West-Indian islands. I have examined the following specimens:
Guadeloupe: L'Herminier (B, C), Père Duss nr. 4054, 4116 (W), Mazé nr. 989 (B).
Martinique: Père Duss nr. 1757 (W).
St. Vincent: H. et G. Smith, nr. 89 (B), W., nr. 785 (W).
Grenada: R. V. Sheering (W), Broadway nr. 3757, 3761, 3763, 3764, 3768 (RB).
Trinidad: Fendler nr. 54 (B), Broadway nr. 3292 (RB).
British Guiana: Jenman (W) — Lower Orinoco, Eleanor Creek, Rusby and R. W. Squires nr. 128 (W)
— French Guiana: Leprieur (B, C, W), Kew = N. subeuneatum, Sagot (B).
Surinam in savannis: A. Kappler, ed. Hohenacker nr. 1776 (B) — Hostmann nr. 15 (B), 465 (B, S).
San Domingo: Wright, Parry and Brummel nr. 12 (W).
Bahía: Luschnath nr. 167 (B), Blanchet (L).

229. Dryopteris magdalenica Hieron. Hedwigia 46: 325 tab. 3 fig 2. 1907.

Type from Colombia, ad Rio Magdalena, leg. Stübel nr. 371 (B!).

A small species, founded on a single leaf and perhaps not different from the following, from which it recedes by such small differences as the distinctly cuneate base of the lower pinnae and the more oblique or subfalcate and not very obtuse segments. The rachis is very slightly stellato-pubescent, and the young sporangia are setose. The rachis is gemmiferous below the apex (not figured by Hieronymus). The stipe is short, shorter than the lamina, and the basal pinnae not much reflexed.

230. Dryopteris paucijuga (Kl.) C. Chr.

Biol. Arbejder tilegn. Eng. Warming 84. 1911. — Fig. 31 c.

Nephrodium deflexum J. Sm. (Hk. Bak. Syn. 292, note under N. refractum);
Jenman, W. Ind. and Guiana Ferns 234. 1908.

Type from Venezuela: Caripé, Moritz nr. 205 (B!).

A distinct species, excellently described by Jenman and Maxon (loc. cit.) It is well-marked by its long stipe, which is considerably longer than the lamina, its sessile mostly opposite pinnae, the lower ones much reflexed, their base truncate or, in the lower ones, more or less narrowed. Lamina practically glabrous, the rachis upwards setose and slightly stellato-pubescent above, sometimes with a bud in the upper part. Pinnae scarcely incised to the middle into bluntly rounded or even truncate, a little oblique lobes. Veins 8—10 to each side the lower 2—3 much upcurved and running out to the sinus. Sori medial with a setose indusium. Sporangia with a single long hair on the pedicel.

Venezuela: Island of Margarita, J. R. Johnston nr. 192 (W, type of D. Johnstoni Maxon) — Caracas, Gollmer (B).
Trinidad: St. Ann's Hill, Hart nr. 316 (B) — Jenman (W) — Fendler nr. 54 (W).
Trinidad: Eegers nr. 5628 (B, W), 5807 (B).
Mexico: Chiapas, Ixtacomitan Mts, 120 m, J. M. Rovirosa nr. 51 (W).
Fig. 31. a. *D. usitata* (Jemm.) C. Chr.; middle pinna (Maxon 1823). — b. *D. veauata* (Hew.) O. Ktze., base of middle pinna (Maxon 1854) — c. *D. paneijuga* (Kl.) C. Chr. (Fendler 54) — d. *D. anoptera* (Kze.) C. Chr. (orig.) — All pinnae × 1/2, fragments × 1 1/2.
1891: C. Chr. Ind. 288 pt.

Nephrodium refractum Hk. sp. 4: 162 tab. 252. 1862; Bak. Syn. 292.

Type. Founded on cultivated specimens. The species was commonly cul-
tivated in the botanical gardens in the middle of the last century, and I have seen several authentical specimens from various herbaria. It is supposed to be a Bra-
zilian species, but I have seen no specimens from Brazil. Generally it is confounded with D. riograndensis (Lindm.), which species is, however, widely different. Baker (Syn. Fil. 292) supposed N. deflexum J. Sm., which is our D. paucijuga (Kl.), to be the same, and I am inclined to believe that he was right in this. As a fact D. re-
fracta is closely allied to D. paucijuga, still there are some differences between the two species, which do not allow me to unite them. In D. refracta the lower pair of veins are as a rule truly anastomosing and the 2—3 following veins are con-
vent to sinus. The peculiar shape of the base of the lower reflexed pinnae is fairly illustrated on Hooker’s plate 252. Sporangia without setae on the pedicel.

232. Dryopteris gemmulifera Hieron. Hedwigia 46: 326 tab. 4 fig. 3. 1907.


Type from Venezuela: Tovar, leg. Moritz nr. 204 pro parte (B!).

Closely related to D. scabra and D. paucijuga, but very characteristic by its lamina narrowing very gradually almost from the very base to apex. It is less cut than D. scabra, more than D. paucijuga; generally the three lower veins run to sinus. It is also larger: stipe 30—40 cm, lamina up to 60 cm. The rachis and costae excepted the leaf is entirely glabrous, even not ciliate; the hairs of the rachis and costae beneath are partly simple and longer, partly very short and stellate.

Colombia: Stübel. nr. 366, 554, 625 a, 642, 666 (B, for exact localities see Hieronymus I. e.); Órsted (H) — Santa Marta, H. H. Smith nr. 994 (C, Rg. W).

233. Dryopteris usitata (Jenm.) C. Chr. Index 299. 1905. — Fig. 31 a.

3: 188. 1896; W. Ind. and Guiana Ferns 232.

Type from Jamaica, leg. Jenman (non vidi).

Scarcely different from D. venusta, and probably it is a form of it with nar-
rower pinnae. Its best distinguishing marks are: the long-acuminate apex of the lamina and pinnae, its herbaceous texture, its numerous (20—30 to each side) long and narrow pinnae, which are up to 20 cm long by 1½—2 cm broad, sessile, the lower ones generally shorter, incised ½ or more to the costae into broad, blunt oblique lobes, which are a little longer than broad. Both surfaces naked or very
slightly hairy on rachis and costae by minute stellate and a few longer, simple hairs. Veins 6—8-jugate, the lower ones connivent to sinus or more often united into a branch to the sinus. Sori about medial; indusium small, soon evanished. — The erect, thick rhizome is clothed with dull-brown ovate scales and a few small fibrils are found on the stem and the lower part of the rachis.

To this species I refer some few specimens from

Jamaica: Hart nr. 315 (W) — Mansfield, MAXON nr. 1823 (= UNDERWOOD nr. 2789 (W) — Bath, MAXON nr. 1866 (= UNDERWOOD nr. 2826) (W) — Cascade Portland, D. WATT nr. 227 (RB).

From this species I cannot with certainty distinguish *Nephrodium calcareum* Jenm. Journ. Bot. 1886: 271. Bull. Dept. Jam. II. 3: 162. 1896, Jamaica, Sherring (Kew, auth. specimen), Hart 344 (W). It has the lower pinnae more distinctly reduced, the most pinnae are somewhat auricled on both sides and the rachis and costae beneath more densely stellate-puberulous; the pinnae are shorter and like the apex of the lamina not so long-acuminate.

     C. Chr. Ind. 300. — Fig. 31 b.

     Type from Jamaica (non vidi).

A handsome species, in its most developed form well-marked by its size, submarginal sori and glabrous indusium. It resembles not a little *D. Fendleri*, but it is easily distinguished from that species by its pinnatifid apex. — The thick erect rhizome is clothed with large, brown scales. Stipe strong, quadrangular, up to 50 cm long, slightly scaly like the lower part of rachis. Lamina 7—9 cm long, gradually narrowed into a pinnatifid apex, downwards a little reduced. Rachis minutely puberulous by stellate hairs. Pinnae 20 or more to each side, up to 25 cm long by 4 cm broad, incised halfway to the costa or more, sessile, or the lower ones very shortly stalked, acuminate, the lower generally more or less shortened; surfaces glabrous except the costa beneath, which are minutely stel late-puberulous, the margins ciliate. Texture firm, membranous, colour dark-green; underside often minutely warted. Lobes broad, oblique, subacute or obtuse. Veins about 10-jugate, the basal pair connivent to sinus or frequently united into a branch to sinus. Sori supramedial or submarginal, furnished with a large, persistent, glabrous indusium Sporangia glabrous.

Known from Jamaica only; I have seen the following specimens: Mt. Diabolo, MAXON nr. 1855, 1933, 1954, 2318 (W).
235. **Dryopteris riograndensis** (Lindm.) C. Chr. Ind. 289. 1905.


*Nephrodium reflexum* auctt. plur. quoad pl. brasil.


Type from Brazil: Minas Geraes, Caldas, leg. Mosén nr. 2170 (S! Rg).

A very uniform, small species, which unrightly has been identified with *Aspidium reflexum* A. Br. It is however certainly a near ally of *D. scabra*, from which it differs by the pinnae being serrate only and the lower pair of veins being constantly anastomosing. The rachis is above rather densely stellato-puberulous, otherwise the leaf is almost quite glabrous; sometimes the costae beneath bear some white hairs. The rhizome is decumbent or shortly creeping, a little scaly. Stipes 1—2 dcm long, stramineous like the rachis and costae. Lamina 12—20 cm long, scarcely narrowed downwards, rather suddenly narrowed into a pinnatifid apex upwards. Pinnae all sessile, opposite, 5—7 cm long, 1 cm broad, dark-green, herbaceous, the margins only serrate, rarely subentire or lobed. Veins about 3 to a side, the basal ones united or running side by side to the sinus. Sori medial, exindusiate. Sporangia glabrous. — The rachis is often gemmiferous.

Evidently a common species in South Brazil and adjacent countries. I have the following specimens:

Brazil: Minas Geraes, Caldas, Mosén nr. 2170, 4636 (Rg) — Sta. Catharina, Parst nr. 798 (B) — Rio Grande do Sul: Piratining, Lindman nr. A. 865 (Rg); Cachoeira, Malme nr. 984 (Rg); Lindman nr. 1167a; Silveira Martins, Lindman nr. 1167b (Rg). — Further the specimens quoted by Rosenstock loc. cit. and distributed by him as *Nephrodium reflexum*, Fil. austr. bras. exs. nr. 84 and 250 (B, C, Rg, W).

Uruguay: Puerto del tarce, Berro nr. 1260 (C) — Isla San Gabriel, Berro nr. 2367 (C, CC).

Argentina: Misiones, Bonpland, Ekm. nr. 8 (Rg, S) — Entrerios, Arroyo Yuchuchico, Lorentz nr. 797 (B).

Paraguay: Coaguazu, Balanza nr. 310 (CC).

236. **Dryopteris scabra** (Presl) C. Chr. Biolog. Arbejder tilegn. Eng Warming 84. 1911 — Fig. 32.


*Lastrea scabra* Presl, Epim. bot. 41. 1849.

*Polypodium tetragonum* auctt. quoad plant. austro-brasil.

*Nephrodium tetragonum* auctt. quoad plant. brasil. (Bak. Fil. bras.; Syn. Fil. etc.).


Type from Brazil, ad Mathias Ramos, leg. Pohl (hb. Presl!).

Rhizome creeping, clothed at the apex with brown, stellato-pilose scales. Stipe greyish-yellow, bisulcate, shortly pubescent, 20 cm long. Lamina ovato-lanceolate, 20—25 cm long, 15 cm broad, dark-green, firmly herbaceous, upwards rather suddenly narrowed into a pinnatifid apex and generally proliferous at the base of the upper pinnae. Rachis slender, rather densely and shortly hairy by simple and stellate hairs, which latter mostly occur on the upperside of the upper part of the
rachis. Pinnæ opposite or nearly so, sessile 8—9 cm long, 1—2 cm broad acuminate, the basal pair deflexed and narrowed towards their base, the upper ones divaricating and broadest at the base, ciliate, the costæ above strigose, the upper-side glabrous or very slightly and shortly hairy, costæ and costulae beneath with patent, simple hairs, the underside otherwise nearly glabrous. Segments oblique or subfalcate, obtuse or subacute, the lower ones of the basal pinnæ short. Veins simple, 10—11-jugate, the lower 2 running to the sinus, where their apices are separated by a pale membrane. Sori medial, with a pilose, persistent indusium. Sporangia glabrous.

The diagnosis above is of the original specimen. With this agree a large number of specimens from Southern Brazil in almost all characters, although I have not seen another specimen, which exactly matches the original one, but it is sure that all these specimens belong to the same species, which is evidently very common from Rio to Rio Grande. Several of the specimens were labelled Nephrodium tetragonum Hk. resp. Dryopteris pseudotetragonum Urb., others Polypodium tetragonum. From the andine form of the former as previously understood, now D. gemmulifera Hieron., D. scabra differs by the short pinnatifid apex of the lamina, from the latter, which it resembles in habit and colour, by its free veins, sessile pinnæ and its pinnatifid apex without a distinct terminal pinnæ.

D. scabra is a very variable species; the specimens seen can be grouped as follows:

var. incompleta (Lindm.)

Syn. Polypodium tetragonum var. incompletum Lindm. Ark. för Bot. 1: 229 tab. 9 fig. 7. 1903.


Identical with the type in most characters, differing by a longer stem (up to 5 decm long), the very slender rachis, which is practically quite glabrous (only stellate hairs above), and the almost glabrous leaf. Sori yellow, apparently exindusiate. Rachis as a rule with gemmæ and in some specimens gemmæ also on the costa of the pinnae above.

Río Grande do Sul: Silveira Martins, Lindman nr. A 1311 (Rg, W) — Campeste dos Sairaes, C. Jürgens, Rosenstock: Fil. austr. bras. exs. nr. 375 (B, R, Rg) — Sta. Cruz, Jürgens nr. 200 (R); ibid., Rosenstock: Fil. austr. bras. exs. nr. 86 (B, R) — Porto Alegre, Malme nr. 1441 (Rg).

São Paulo: Río Tieté, Gerder nr. 82 (R).

To this variety I also refer the majority of the specimens by Rosenstock named *D. pseudotetragona* var. *gemmalifera* Hier. with the forma major (*Hedwigia* 46: 119). Some of them are larger and of a more firm texture and a greyish colour, but they do not differ materially probably; they are old stages of the common form.

**var. Caesariana** (Christ).


Differs from the type and the var. *incompleta* by the less incised pinnae, segments close, acute; 2 pairs of veins connivent to sinus. Resembles in habit perfectly *D. lugubris* var. *devolvens* from which it differs in pubescence.

São Paulo: Cerqueira Cesar, 500 m, Wettstein & Schiffner (hb. Wien!) — Tieté, Gerder nr. 85 a (R).

Río Grande do Sul: Sta. Cruz, Jürgens, ed. Rosenstock: Fil. austr. bras. exs. nr. 87 (R, Rg).

With this variety agrees closely an authentical specimen of *Dryopteris bifrons* Christ in Fedde, Repert. 6: 350. 1909, which was collected by Rojas in Paraguay, ed. Hassler nr. 10455 (RB!). The indusium is very small and bears some few long stiff setæ. Another specimen from Paraguay: Cordillera de Altos, Fiebrig nr. 95 (B) is the same. It is a large form, leaf said to reach 1—1,2 m, and the rachis is richly bulbiliferous, but it does not differ materially from *D. scabra* var. *Caesariana*.

**237. Dryopteris monosora** (Pr.) C. Chr. Biolog. Arbejder tilegn. Eng. Warming 84. 1911. — Fig. 33.

**Syn. Polypodium monosorum** Presl, Tent. 181. 1836 (nomen).

*Lastrea monosora* Presl, Epim. 36. 1849.

*Aspidium monostichum* Kze.; Mett. Aspid. nr. 228. 1858.

*Dryopteris tristis* part. C. Chr. Ind. 298. 1905.

**Type** from Rio leg. Pohl (Herb. Presl!).

A distinct species, improperly referred to *D. tristis* by Baker in Flor. bras. and Syn. Fil. It resembles *D. tristis* in the cuneate base of the lower pinnae, but differs by its creeping rhizome, pinnatifid apex and by the presence of small scales on
rachis and costae beneath. It is excellently described by Mettenius and I add here only the following comparative remarks.

The short-creeping rhizome is at the apex rather densely clothed with ovate, brown, stellato-pilose scales. The strong stipes are up to 4 dcm long, and like the rachis and costae beneath furnished with some small, brown scales. The rachis is minutely pulverulent by stellate hairs, and the costae of both sides bear a few long hairs, otherwise the lamina is practically glabrous. Lamina 6—7 dcm long, 2—3 dcm broad, upwards rather suddenly narrowed into a pinnatifid apex. Pinnae 15 cm long, 2\frac{1}{2}—3 cm broad, the lower ones shortly stalked and their base distinctly cuneate but shorter than in D. tristis, the upper ones sessile with truncate base, their basal segments somewhat abbreviated. Pinnae incised a little above the middle into close, subfalcate, acute or often submucronate segments, 5 mm broad. Veins simple, 9—10-jugate, the basal ones connivent to sinus. Sori medial, furnished with a small, deciduous, ciliate indusium.

— Texture membranous, colour dark- or greyish green, generally brown when dried, surfaces often shining.

The nearest Brazilian relative of D. monosora is D. scabra, which is smaller and has all the pinnae sessile, their base not cuneate, entire; further it has fewer veins, of which only the basal pair run to sinus.

D. monosora seems to be restricted to the forests of Rio and São Paulo; it occurs in two forms:
1. f. typica.

Rachis without buds; veins 9—10-jugate, the lower 4—5 connivent to sinus; only the anterior basal vein soriferous. Segments generally more acute than in the following form.

Here to the type-specimen and the following: São Paulo: Rais da Serra, Wacket nr. 224 (R) — Ins. S. Sebastian, Casaretta nr. 130 (Hb. Presl; B).

2. var. Schiffneri n. var. (D. Schiffneri mihi in Herb. plur.).

Rachis often gemmiferous. Veins 13—15-jugate; the lower 3—4 connivent to sinus, about all soriferous. Segments often with rounded apices. Costa less scaly.

I had described this variety as a new species, but I now consider it the fully developed form of *D. monosora*.

São Paulo: prope Rio Grande ad São Paulo Railway, 800 m., Wettstein et Schiffner nr. 462 (Herb. Mus. Wien) — prope Fazenda bella vista ad flumen Rio Pardo, c. 500 m., Wettstein & Schiffner VII, 1901 (Herb. Wien) — Santos, Mosén nr. 3088 (Rg) — Rais da Serra, Wacket nr. 200 (R) — Burchell, Cat. pl bras. nr. 3065 (B) — Dr. Bienning (B).

238. Dryopteris Eggersii (Hieron.) C. Chr. Ind. 263. 1905. — Fig 34 a.


*Nephrodium tetragonum* Sod. Cr. vasc. quit. 249. 1893 (pro parte?).

Type from Ecuador, El Recreo, leg. Eggers nr. 15319 (B!).

A weakly characterized species of the same general aspect as *D. nephrodioides*, *D. lugubris* and allied species. From *D. nephrodioides* it differs by the absence of stellate hairs on the leaf-tissue and by the presence of large, brown scales on the erect rhizome and the basal part of the stems. From *D. lugubris*, which it resembles closely, it differs by its erect rhizome, thinner texture, fewer veins and, especially, by the absence of scales on rachis and costa beneath. A good character is also the shape of the stellate hairs of rachis; they bear on a stalk 3—4 branches, which are again forked. Lamina 7—8 cm long with 20—25 pairs of pinnae, 15 cm long by 2 cm broad. Rachis densely pulverulent by short stellate hairs and upwards furnished with several long, white hairs. Upper surface glabrous except the strigose costa and ciliate margins, under-surface throughout finely pubescent by simple hairs, the costa besides densely stellato-pulverulent. Veins 10—12-jugate, simple, the 2—3 lower ones connivent to sinus. Sori medial, the indusium sub-persistent, setose by simple hairs. Sporangia glabrous or rarely furnished with a few setae. — From *D. gemmullifera* it differs by its denser pubescence of stellate hairs, absence of gemmæ and by its lamina being shortly narrowed upwards, not gradually tapering to the point.

*D. nutans* Christ from Costa Rica is this species: the specimens are larger than the original one, dark-green and less pubescent beneath. *N. tetragonum* Sod.,
represented by an authentical specimen (C), is a large form of *D. Eggersii* with pinnae 25 cm long.

**Ecuador:** El Recreo, Eggers nr. 13319 (B); Llalla, Spruce nr. 5668 RB; Andes quitenses Sodiro (C). **Colombia:** Smidtchen (B); Schlam (B). **Costa Rica:** Navarro, Wercklé (C, W); Llanuras de San Carlos, C. Brade nr. 483 (R).

239. **Dryopteris bifomata** Rosenst., Fedde, Repert. 7: 300. 1909. — Fig 34 c.

Type from **Perú:** Tarapoto, Spruce nr. 4037 (RB!).

A rather doubtful species, marked by its contracted fertile pinnae and segments; this may be an individual character, and the species can not be said to be well understood from the original specimens alone. The very remote, stalked

![Fig. 34. Segments of a. *D. Eggersii* (Hieron.) C. Chr. (orig. of *A. nutans* Christ, with a hair from the rachis). — b. *D. equitans* (Christ) C. Chr. (orig.). — c. *D. bifomata* Ros. (orig., with a fragment × 4). — d. *D. lagubriformis* Ros. (orig.) — all × 1 1/2.

pinnae give the leaves a peculiar habit; the sterile pinnae resemble those of *D. tristis*, but they are much more hairy and the lower ones not with a cuneate, entire base. The rachis is gerrniferous. The mature sori form a continuous line. Rachis densely stellato-pulverulent without long hairs.

240. **Dryopteris equitans** (Christ) C. Chr. comb. nov. — Fig 34 b.


Type from **Costa Rica:** Navarro 1400 m, leg. Wercklé (Cl).

Although this species resembles *D. tetragona* in having a rather distinct terminal pinna and the basal pair of veins being truly anastomosing, it no doubt is a near ally of *D. Eggersii* and its proper place is in this section. It differs from *D. tetragona* in its erect rhizome, distinct indusium and densely pulverulent rachis and costa beneath, from *D. Eggersii* in its anastomosing basal veins and apex of frond, from *D. nephrodioides* var. *Bobollegi* by the absence of stellate hairs on the leaf-tissue and indusium. — The dark-green, membranous pinnae, which are up to 15 cm long, 1 1/2—2 cm broad, are scarcely incised to the middle, above very slightly and shortly pubescent, the costa and costulae beneath pulverulent by stellate hairs but without long hairs. The rachis is pulverulent by very small stellate hairs, which on a short pedicel bear 3—4 very short and generally simple branches. Lobes a little oblique, obtuse with open sinuses between. Veins 6—8-jugate, those
of the lower pair truly anastomosing and sending a branch to the sinus, where
the next pair meet. Sori medial, small, furnished with a small, ciliate indusium.
Sporangia glabrous. — The terminal pinna is not so distinct as in *Eugoniopteris*;
it is broader and deeply lobed at base, but the basal lobes is much shorter than
the uppermost pair of lateral pinnae.

A have seen the type-specimens only.

**241. Dryopteris curta** Christ, Bull. L'Herb. Boiss. II. 7: 263. 1907. (p. p.) — Fig. 35.

*Type from Costa Rica*: buissons et broussailles de Tuis, 650 m, leg. A. TONDUZ nr. 11323 (CI, W).

Habit of *D. Eggersii* and *D. scabra* but smaller and its rachis very hairy
by hairs of two kinds intermixed: 1) numerous, short stellate hairs with 3—5
short, simple branches on a short stalk, and 2) rather numerous, much longer, patent hairs, which are often cleft at the apex. — Stipe 3—4 dcm long, sulcate, stellato-pulverulent and
with scattered small, flat scales. Lamina membranous, 3—4
dcm long, broadest at the base, upwards gradually narrowed
into a pinnatifid apex. Pinnae all sessile, 6—7 cm long, 1½ cm broad, the edges nearly parallel, truncate at base, shortly obtuse at the point, the basal pairs reflexed, the upper
ones horizontal, the upperside throughout hairy by numerous
adpressed antrorse simple hairs; costae beneath very hairy
like rachis, veins and leaf tissue finely pubescent by simple,
erec hairs. Pinnae incised scarcely more than halfway down
to the midrib into close, falcate, obtuse, entire segments.
Veins 8—9-jugate, simple or, not rarely, forked, the lower 2—3
connivent to sinus. Sori medial, furnished with a subpersistent, setose indusium. Sporangia glabrous.

In the most complete specimen (W) the rachis bears a
small gemma.

**242. Dryopteris heterotricha** n. sp. — Fig. 36.


*Type from Ecuador*, Mt. Tunguragua, leg. SPRUCE nr. 5298 (H, L, RB),
and gathered in the same locality by STÜBEL nr. 849 (B) and in valle Pastaza by
the same nr. 931 a (B).

Rhizomate?. Stipitibus ad 1 dcm longis, quadrangularibus, brevissime stellata-
lim pulverulentis, versus basin sparse squamosis, squamis adpressis, ferrugineis,
sparse stellato-ciliatis. Lamina 6—7 dcm longa, bipinnatifida, versus apicem pinna-
tifidum sensim attenuata, herbacea, atroviridi. Rachi pilis stellatis brevissimis dense
pulverulenta et pilis cylindricis, crassis, rufis, nitidis apicibus sepe furcati onusta,
ad basin pinnarum superiorum interdum bulbillifera. Pinnis remotis, alternis, subhorizontalibus, inferioribus breviter petiolutatis, superioribus sessilibus, oblongis, 10—14 cm longis, 2¹/₂ cm latis, longe acuminatis, inferioribus vix brevioribus versus basin breviter attenuatis, superioribus basi truncatis, supra ubique pilis adpressis simplicibus deciduis sparse strigosis, ad costas pilis cylindricis rufis dense setosis, infra inter venas glabris, ad costas costulasque pilis similibus pilis stellatis brevissimis intermixtis hirsis, ad alam 4—5 mm pinnatifidis. Laciniis parum obliquis, obtusis vel subacutis, versus apicem leviter crenatis. Venis simplicibus, 10—11-jugis, basaliibus duabus ad sinum conniventibus. Soris medialibus. Indusiis subpersistentibus, pilis simplicibus dense setosis. Sporangiis glabris.

By its peculiar pubescence different from all allied species with exception of D. curta and D. lugubriformis. Dr. Hieronymus referred Stübel's specimens to D. nephrodioides, the pubescence and venation of which are totally different.

243. Dryopteris lugubriformis
Rosenst. Fedde, Repert. 7: 299. 1909. — Fig. 34 d.

Type-specimen from Peru orient.: Tarapoto, Spruce nr. 4749 (RB1).

Closely allied to the preceding species, but leaf firmer, grey-green, throughout more densely hairy, especially above, terminating in a subsimilar terminal pinna, and the lower 2—3 pairs of veins connivent to sinus; by these two last characters it resembles D. tristis and allied species, but its proper place seems to be here. Rachis gemmiferous above, sori inframedial, small, clothed with a hirsute, persistent indusium. The long hairs of rachis and costae are rarely red and far more numerous but thinner than in D. heterotricha; rachis upwards especially densely hirsute, the edges densely ciliate.

244. Dryopteris Schwackeana Christ msc. n. sp. — Fig. 37.

Type from Brazil: Minas Geraes, Ouro Preto, locis humidis, leg. Schwacke nr. 14892—14893 (C!).
Rhizome repente, squamis brunneis stellato-ciliatis instructis. Stipitibus quadrangularibus, griseis, ad 20 cm longis, brevissime stellato-pulverulentis et squamis paucis deciduis onustis. Lamina ovato oblonga, 15—25 cm longa, medio ad 10 cm lata, bipinnatifida, in apicem pinnatifidum abrupte attenuata, herbacea, luteo-viridi. Rachis pilis simplicibus longioribus pilis stellatis minutis intermixtis subdente tomentosa. Pinnis 9—10-jugis, alternis, inferioribus reflexis, medii horizontalibus, sessilibus, oblongis, mediis 6 cm longis, 1 1/2 cm latis, apice abrupte acutis, rarius acuminatis, basi truncatis, inferioribus versus basin parum attenuatis, supra costa excepta strigosa glabras, subitus ad costas costulas venasque pilis mollibus albidis simplicibus et stellatis (his brevioribus) hirtis, vix ad medium pinnatifidis. Lacinis approximatis, obliquis, acutis, basali superiore sepe longiore. Venis simplicibus, 6—7-jugis, 3—4 ad sinum conniventibus. Soris medialibus, indusiis dense setosis. Sporangii glabris.

A small species in habit not unlike certain forms of _D. mollis_, but venation and stellate pubescence show clearly that it belongs to the group of _D. lugubris_. By its reflexed lower pinnæ it resembles _D. lugubris_ var. _devolvens_ and _D. scabra_, from the first it differs by its small size, few veins, herbaceous texture etc., from the latter by 3—4 connivent veins the pinnæ scarcely narrowed towards the base and less incised and in its not gemmuliferous rachis. — Further specimens:

Minas Geraes: Caldas, Mosén no. 4616 (Rg) — Lagoa Santa, Warming (H).
São Paulo: Campiñas, Heiner no. 551 (Rg).

245. _Dryopteris lugubris_ (Kze.) C. Chr. Ind. 276. 1905. — Fig. 38.

*Syn. Polypondium lugubre* Kze. msc.

_Aspidium lugubre_ Mett. Aspid. nr. 230. 1858.

_Aspidium catacalobum_ Kze.; Ettingsh. Farnkr. 182 tab. 126 f. 9, 10 1865 (t. spec. in hb. Presl).

*Type from Rio, leg. Pohl (Herb. Presl!)*

In general habit very like _D. nephrodioides_ and _D. Eggersii_ but well-marked by its creeping rhizome and the presence of small brown scales on the rachis and costa beneath. Stipe 20—30 cm. long and like the rachis quadrangular and densely pulverulent by very short stellate hairs. Lamina up to 1 m long, dull-green, firmly herbaceous or membranous, the upperside throughout shortly pubescent, the costa strigose by antrorse hairs, the underside less hairy, most so on costa and veins, the hairs generally simple; costa beneath pulverulent by short stellate hairs and furnished with some few stellato-ciliare small scales. Pinnæ sessile 15—18 cm long, 2 1/2—3 cm broad, acute or shortly acuminate, alternate, remote, subhorizontal, the lower ones not reflexed, their base shortly attenuate in the lower, truncate in the upper ones, incised about 2/3 of the
way down into entire, acute or subobtuse segments; upper basal segment of lower pinnae generally a little prolonged and close to the rachis, the lower basal one shorter and remote from rachis. Veins simple, 14—16-jugate, often prominent on the upper side, the basal pair connivent to sinus. Sori medial; indusium small, deciduous, setose. Sporangia glabrous.

The typical form of D. lugubris here described is rather common in Southern Brazil. It was referred to Nephr. tetragonum by Baker in Flor. bras. which also includes our D. scabra, from which species it differs in pubescence and size. I have seen the following specimens:

Minas Geraes: Caldas, Mosén nr. 2157, 2159 (Rg), 2160 (H, Rg); G. A. Lindberg nr. 558 (B); Regnell nr. III 1450 c (Rg) — Lagoa Santa, Warming (H). — São Paulo: Serra de Caracal, Mosén nr. 2158 (Rg, S) — Matto Virgem, Rio Claro, Løfgren nr. 652 (H).

In some of these typical specimens the hairs of the surfaces sometimes are stellate; therefore I refer the following form as a variety to D. lugubris.

var. quadrangularis (Fée).


Underside of lamina throughout like rachis and costae above densely greyish puberulous by stellate hairs. The lower 3—4 veins run to sinus. Scales fewer. Otherwise typical.


Sta. Catharina: Joinville, Schmalz nr. 100 (R).

A very large form: pinnae 25 × 4 cm; veins 18—20 to a side. Rachis gemmiferous. Pubescence about as in the former variety, but stellate hairs fewer and scales more numerous.

var devolvens (Bak.) — Fig. 39.


Dryopteris devolvens C. Chr. Ind. 261. 1905.

Differs from the type by 1) size: lamina 3—4 decm long; pinnae 12—15 cm long, 2½ cm broad, 2) the basal pinnae being distinctly reflexed, 3) lamina upwards suddenly narrowed into a broad, pinnatifid apex, 4) segments close, even contiguous, acute, subfalcate; veins 10—12 to a side. In pubescence it does not differ materially; still the scales of rachis and costa beneath are very few, and the rachis and costa beneath are clothed with fine, simple hairs besides the stellate hairs. The upperside is hairy towards the margins, the underside finely downy by simple hairs. Veins not prominent.

A distinctly looking variety, well-marked by its close, acute segments and the upwards suddenly narrowed lamina, but I find it impossible to distinguish it specifically from D. lugubris. Several of the specimens referred to the type show now one now another of the characters, which mark the variety.

The following specimens are rather uniform:

Rio: Glaziou nr. 15766 (B. H, type-number) — Minas Gerães: Caldas, Mosén nr. 2156 (Rg, Hb. Brux.) — São Paulo: Piritaibo (?) F. W. Bauer nr. 49 (R) — Capivary, Gerder nr. 88 (R) — Campiães, Heiner nr. 568 (Rg) — Toledo, Ulbricht nr. 51 (Rg: proliferous) — Matto Grossó: Santa Anna da Chapada, Málme nr. 2131 (Rg).

Synonyms of D. lugubris are probably:

Aspidium coadunatum Klf. Enum. 239. 1824 and

Nephrodium inaequale Schrad. Göt. gel. Anz. 1824: 869, both from the vicinity of Rio. A description of the former by Mettenius is to be found in MS in (B) and from this description it seems to be identical with var. devolvens. The name of Kaulfuss has priority, if his species is a form of our D. lugubris, and I have no doubt that this is the case. We have thus here a common Brazilian species, which is described as new at least 6 times, viz 1824 by Kaulfuss (coadunatum) and Schradier (inaequale), 1858 by Mettenius /lugubre/, 1869 by Fée /quadrangulare/, 1885 by Baker /devolvens/ and 1907 by Rosenstock /joinvillensis/. This shows how necessary it is to compare specimens with descriptions and authentical specimens of described species before describing them as new.

Aspidium nitidulum Kze.; Ettingsh, Farnkr. 188 tab. 123 f. 3. 1865 is perhaps the same.
246. *Dryopteris glochidiata* (Mett.) C. Chr. n. sp. — Fig. 40 a.

_Syn. Aspidium glochidiatum_ Mett. msc.
_Type from Southern Brazil, leg. Sellow (B!).

Species _D. nephrodioidi_ (Kl.) habitu, magnitudine proxime affinis, differt: lamina subus pilis minutis erectis glochidiformibus ubique praedita, supra pilis maxime simplicibus brevissimis pubescente; sori subcostularibus, sporangiis setis glochidiformibus instructis.

It is possible that this proposed new species is a form of the common Brazilian _D. lugubris_, which it resembles as well as _D. nephrodioides_ in habit, size and venation. Still it lacks the scales of rachis and costae beneath, which are found in _D. lugubris_, the sori are distinctly inframedial, and the sporangia are setose by anchor-shaped hairs similar to those, occurring on the under surface. Rhizome short-creeping; stipe 4—4 1/2 cm long, quadrangular. Rachis and costae beneath densely stellato-pulverulent. Pinnae 10—11 cm long, 1 1/2—1 3/4 cm broad. Veins 10 each side, the two lower ones connivent to sinus.

247. *Dryopteris ancyriothrix* Ros. in Fedde, Repert. 7: 305. 1909. — Fig. 40 b.

_Type from Ecuador: in monte Guayapurima, Spruce nr. 4748 (RB!).

A peculiar, thin-leaved species, resembling _D. glochidiata_ by the anchor-shaped, erect hairs of the underside and rachis but otherwise very different by the longer pinnae, the glabrous upperside and sporangia, exindusiate medial sori, the basal veins united etc. The rachis is not densely pulverulent as in _D. nephrodioides_ and related species, still the species has its proper place here.

249. *Dryopteris nephrodioides* (Kl.) Hieron. Hedwigia 46: 327. 1907 (excl. var.).

_Type from Venezuela, Caripe, in sylvis humidis, Moritz nr. 206 (B!).

A variable species but easily distinguished from almost all other species by the dense pubescence of stellate hairs throughout the whole plant; the hairs of the rachis bear on a short stalk 5—6 short, normally simple branches, those of the surfaces are sessile and bear 3—5 long horizontal branches, which are adpressed to the leaf tissue: generally these hairs can only be seen by aid of the microscope; in certain forms rachis upwards, costae and veins above and the margins are furnished with some few, deciduous, long, simple setae.

The oblique rhizome bears at the top several leaves on long stalks; the leaves have a pinnatifid apex and a large number of alternate short-stalked linear pinnae, which are long acuminate, a little reduced towards the base and incised
about 2/3 of the way down to the costa; texture herbaceous, colour dark-green or grey-green. Segments numerous, oblique, obtuse or subacute. Veins 10—11-jugate, the basal ones connivent to sinus. Sori inframedial or submedial, furnished with a persistent, stellato-pilose indusium. Sporangia glabrous.

This species is closely allied to *D. linguaris*, from which it differs mainly by the absence of scales on rachis and costa beneath and by fewer veins. Klotzsch’s original specimen is apparently a small leaf of a species, which is known by pteridologists under other names. Best agreeing with the type are some plants from **Trinidad**, heights of Aripo, Bot. Gard. Herb. nr. 325, 326, 327 (W).

The common West-Indian form of the species is probably quite typical; it differs from the original specimen by its large size; lamina 1 m or more long with 25 or more pairs of pinnae, which are 20—25 cm long, 2 cm broad; costa above densely stellato-pubescent but without long, simple hairs; sori medial; basal pair of veins often united, which especially is to be found in the Jamaican and Cuban specimens, but in the same pinna one may find the basal veins free, connivent and anastomosing. This form is

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**f. guadalupensis** (Fée).

*Syn. Nephrodium guadalupense* Fée 11 mém. 89 tab. 24 fig. 3. 1866.

*Dryopteris guadalupensis* O. Ktze.; C. Chr. 269.

**Trinidad**: Bot. Gard. Herb. nr. 4118 (C).

**St. Vincent**: H. H. & G. W. Smith nr. 1348 (C).

**Guadeloupe**: L’HERMINIER nr. 34 et 132 (B); Père Duss nr. 4040 (B, C, W), 4032 (RB), 4453 (B, W).

**Martinique**: Père Duss nr. 4750 (W).

**Porto Rico**: BALS (B).

**Jamaica**: Brighton near Hope Bay, ALEX. MOORE (W); JENMAN (W); HART nr. 303 (W).

**Cuba**: Monte Verde nr. 1009 (B, S), 1010 pt. (B).

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**var. Biolleyi** (Christ).


*Dryopteris asterothrix* Rosenstock, Fedde Repert. 7: 305. 1909.

This is the most developed form of the species and it can be easily confounded with *D. megalodus*, from which it scarcely can be distinguished by other characters than its pinnatifid apex and its generally narrower but larger and more deeply cut pinnae. From **f. guadalupensis**, which it resembles in most characters it differs 1) by the hairs of the underside; they are anchor-shaped, i. e. they bear on a short stalk 2—3 very short recurved branches; the costa beneath are besides the stellate hairs furnished with long, simple ones; the hairs of the upper surface are like those of the type; 2) basal pair of veins almost constantly united, and 3) indusium small, deciduous, often not seen.
Guatemala: Cubilquilz, v. Tuerckheim ed. J. D. S. nr. 8812 (C); nr. II. 1173 (B)
Panama: Hayes nr. 65 (B, W); Maxon nr. 5772 (W), 5748 (W).
Colombia: Sta. Marta, H. H. Smith nr. 996 (C) — Salto del Diablo, Stübel nr. 677 (B) — Muzo, Stübel nr. 326 (B) — La Vega, Lindig nr. 332 (B) — Tocarema, Lindig nr. 237 B.
Ecuador: Andes quitenses, Canelos; Spruce nr. 5258 (RB) — Ballo, Eggers nr. 14729 (B, W) — Fraser (B).
Peru: species rivulm Cachi-yacen, Spruce nr. 4659 (RB = D. asterothrix Ros.; a form with the underside more decidely stellato-pubescent, else typical).
Amazonas: Rio Jurúa, Miry, Ule nr. 5760 (B, C).
Bahía: Luschnath nr. 116 et 117 (B).

2. Eugoniiopteris

C. Chr. Biolog. Arbejder tilegnede Eug. Warming 84. 1911.

249. Dryopteris tristis (Kze.) O. Ktze. Rev. 2: 814. 1891; C. Chr. Ind. 298. (pl.). — Fig. 41 c.

Aspidium triste Mett. Aspid. nr. 229. 1858.
Nephrodium triste Hk. sp. 4: 104. 1862; Hk. Bak. Syn. 266 (pt.).
Type from Peru; in sylvis primævis Huallagæ ad Mission Tocache, leg. Poeppig 1959 (non vidi).

In Herb. Mett. (B) there is found a sketch of the original specimen and from this and the original diagnosis I have got a fair idea of this species, which has been said to have a wide distribution throughout the whole tropical America. — Rhizome obliquely erect or creeping with a few scales, which bear stellate hairs. Lamina with terminal pinna, dark-green, membranous (not coriaceous); rachis and stem pubescent by stellate hairs; costa and veins of underside with several patent, long, whitish hairs, which, however, are deciduous, and several specimens appear to be glabrous. Lower pinnae shortly stalked and with a characteristic long cuneate entire base, the upper ones mostly truncate at the base. Pinnae 15—20 cm long, 21/2—3 cm broad, much acuminated, incised 1/2 to 1/3 of the way down into subfalcate, acute, close segments. Veins simple, 12—14 to a side, the lower 4 running out to the sinus. Sori small, medial; indusium very small, ciliated by long, simple hairs, soon falling and in several specimens not found. Sporangia glabrous.

D. tristis is distributed from Guiana to Peru, while it does not occur in Southern Brazil; the plants therefrom referred to D. tristis belong to D. monosora and D. cuneata. I have not seen the true form from Central-America, although it
is possible that some of the doubtful forms referred as varieties to *D. tetragona* really belong to *D. tristis*. For the present I prefer to refer to *D. tristis* the specimens only which have medial sori and lower pinnae with a long cuneate base. They are the following:

**Peru:** Tarapoto, Spruce nr. 4091 (RB) — in valle fluv. Rio Húallaga, Stübel nr. 1090 (v. *glabrata* Hieron. Hedwigia 46: 324), 1090 a (B).

**Ecuador:** Fraser (B).

**Colombia:** Castañal, Sonntag (B, C) — Magdalena, Lindig nr. 377 b, 383 (B) — Ocaña, Engel nr. 256 (B); Schlim nr. 129 et 657 (B) — inter Honda et Bogotá, Stübel nr. 391 (B); Linden nr. 1010 (B) — Sta. Marta, H. H. Smith nr. 2562 (C).

**Panama:** Hillebrand nr. 195 (B, C) — Bocas del Toro, Hart nr. 21 a (W); Maxon nr. 4651, 4682 4705, 5756 (W).

**Costa Rica:** Rio Hondo, plains of Sta. Clara, 100 m, Cook and Doyle nr. 561 (W).

**Surinam:** Paramaribo, Kappler nr. 1776 (B).

**Brasil:** Pará, Rio Maracá (near Guiana), M. Guedos nr. 567 (C — bud on rachis) — in sylvis fl. Marañon, Spruce s. n. (RB).

**250. Dryopteris nicaraguensis** (Fourn.) C. Chr. Ind. 279. 1905. — Fig. 41 d.


**Type** from Nicaragua: Chontales, leg. P. Lévy nr. 460 bis (Herb. Cosson, Paris!).

The type-specimen, with which agree a few other specimens, belongs to a species, which seems to be a very distinct one. It is marked by its large size: stipe up to 8 dcm long, lamina 5 dcm, pinnae 20—24 cm long by 3½—4 cm broad at the middle, by the grey-green or yellowish green colour and firm, papyraceous texture of the lamina and by the prominent, stramineous costa and costulae. Veins 12—18-jugate, those of the three lower pairs connivent to sinus, below which they are separated by a hyaline membrane, folded in the dried specimens. Rachis very finely downy, especially upwards, like the costa beneath, or nearly glabrous; surfaces otherwise glabrous, opaque. Pinnae 8—10 to a side, at distances of 4—5 cm, the inferior ones shortly stalked, (terminal pinna similar in shape), incised about halfway to the costa into falcate, subacute, entire segments, 8 mm broad, the lower ones of the lower pinnae gradually reduced, those of the basal or two lower pairs forming a sinuate wing to the costa. Sori small, inframedial, apparently exindusiate. Sporangia glabrous.?

The main differences between the typical form and *D. tristis* are seen in the colour and texture of the lamina, in the base of the lower pinnae and in the position of the sori. Unfortunately all these characters seem to be combined in different ways, and I have examined a number of specimens, which as well may be referred to *D. nicaraguensis* as to *D. tristis*. Other specimens, partly mentioned under *D. tetragona*, connect this species with *D. nicaraguensis*, and I have failed to find good distinctive characters, by which these intermediate forms can be referred to their proper species. To *D. tetragona* var. 3 and 5 I have referred the forms having
setose sporangia and thinner texture; the doubtful forms enumerated below agree
with *D. nicaraguensis* in having glabrous sporangia and firmer texture.

Fig. 41. Base of normal pinna (*× 4/3*) and segments (*× 11/3*) from the middle of a pinna of
C. Ktze. — d. *D. nicaraguensis* (Fourn.) C. Chr. — e. Segment of *D. Schaffneri* (Fée) (*× 11/3*)
from the type with a fragment showing three different indusia and a fragment of the
hairy form (*× 4*).
As typical I consider the following specimens:

Nicaragua: San Juan del Norte, Charles L. Smith nr. 2098 (exactly typical).

Formae:
Guatemala: Heyde nr. 731 (W; segments acute).
Panama: Chagres, Fendler nr. 403 (= Hayes nr. 36 (W, texture thinner, lobes narrower, base of lower pinnae about as in D. tristis).

var. minor. Pinnae ca. 15 cm long by 2 cm broad, dark-green. Veins about 10 to each side, the lower 4 connivent to sinus. — Resembles very much D. tetragona var. 2, from which it differs by its erect rhizome, which is up to 10 cm high.
Guatemala: Alta Verapaz, Vicinity of Secanquim, about 450 m., Maxon and Hay nr. 3196, 3217 (W).


Type from Guatemala: Alta Verapaz, Petet, leg. H. von TüRCKHEIM, ed. Donn. Smith nr. 667 and 767 (W, B). Other specimens from the same region were collected by Donnell Smith nr. 1556 (W) and v. TüRCKHEIM nr. 11. 1690 (W).

Described in detail by Maxon (loc. cit.) and by him rightly separated from D. Fendleri as a distinct species. It is not at all allied to D. Fendleri, which belongs to a different group, but intermediate between D. Schaffneri or D. tristis and D. oblitarata. It resembles D. Schaffneri in its submarginal sori and distinct, persistent indusia, D. tristis in the cuneate base of the pinnae and in venation, D. oblitarata in the general habit. It differs from all these species by its practically quite glabrous leaf, rigid to coriaceous texture and warted under-surface, from the two first-named species by its less incised pinnae, which is pinnaefidly cut about 1/3. From D. Fendleri it differs inter alia by its remote, alternate pinnae with a cuneate base, venation and lack of aërophore and febrils beneath. Generally the lowermost 4—6 veins are connivent to sinus, but occasionally the lower pair are united. Sporangia glabrous.

252. Dryopteris Fraserti (Mett.) O. Ktze. Rev. 2: 812. 1891; C. Chr. Ind. 266.

Nephrodium Fraserti Bak. Syn. 495. 1874.
Nephrodium brachyodon Sodiro, Cr. vasc. quit. 268. 1893!

Type from Ecuador, leg. Fraser 1859 (B!); identical specimens from the same country were collected by StübEL nr. 762 (B) and Sodiro (C).

A large species, very characteristic in habit but otherwise closely allied to the other large species of this group. Pinnae at distances of up to 10 cm., opposite,
dark-green, membranous, 15—20 cm long, 4—5 cm broad, sessile or very shortly stalked, lower ones much reflexed, incised scarcely halfway to the costa into a little falcate, obtuse lobes. Terminal pinna rather distinct with a bud at base. Rachis slender, sparsely soft-hairy, lamina otherwise quite glabrous, but the surfaces often minutely warted. Veins 15—16-jugate, the lower 3—4 pairs connivent to a cartilagineous membrane below the sinus; the basal posterior vein raises always from the costa. Sori a little inframedial, indusium small, deciduous, ciliate. Sporangia glabrous.

253. **Dryopteris cuneata** n. sp. — Fig. 42.

Type from Brazil: São Paulo, Santos, H. Mosén nr. 3545 (Rg fol. fert.; S fol. ster.).

Rhizomate repente, dense radicante, apice squanis ruis, latis pilis furcatis sparse ciliatis, dense onusto. Stipite 6½ decm longo, angulato, stramineo, glabro. Lamina ovata, ca. 4 decm longa, pinnata cum impari, pure viridi (infra pallidiore), herbacea vel submembranacea, glaberrima. Pinnis lateralibus 7-jugis, inferioribus oppositis, 4 cm inter se remotis, breviter petiolulatis, superioribus alternis, superioris sessilibus, mediis 20 cm longis, medio 3 cm latis, acuminatis, basi cuneata subintegra, ad medium pinnatifidis. Laciniiis approximatis, subfalcatis, 5 mm latis, obtusis vel subacutis. Venis simplicibus, 9—11-jugis, inferioribus 4—5 ad sinum conniventibus. Soris inframedialibus, parvis, indusiis persistentibus ruis sparse ciliatis tectis. Sporangiiis glabris.

This new species seems different from all other Brazilian species. It is nearest *D. monosora*, which it resembles in shape of pinnae and venation, but it is entirely glabrous and without scales on rachis, has a distinct terminal pinna, the sori are inframedial and the stipe much longer. In general habit it resembles *D. paucipinnata*, but it is much more thin-leaved and the sori are inframedial.

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254. **Dryopteris Schaffneri** (Fée) C. Chr. Ind. 291. 1905. — Fig 41 e.

**Syn.** *Nephrodium Schaffneri* Fée, 8 mém. 108, 1857; 10 mém. 44. tab. 43.

*D. varians* Mett.; Kuhn, Linnaea 36: 114. 1869!

*D. imbricatum* Fourn. Mex. pl. 1: 96. 1872!

**Dryopteris imbricata** C. Chr. Ind. 271. 1905.

**Type from Mexico:** Mirador, leg. *SCHAFFNER* nr. 244 (non vidi).

A distinct species, in habit not unlike *D. tristis*, but well-marked by its peculiar indusia: in other respects it is very variable. Rhizome creeping. Lamina with 3—6 pairs of lateral pinnae and a similar terminal one. Pinnae 15—25 cm long, 3—4 cm broad, stalked, incised about halfway to the midrib into falcate, acute or obtuse segments. Pubescence variable; some specimens are practically quite glabrous (= *var. glabrescens* Fourn. l.c.); others have long, whitish, patent hairs on costa and veins beneath; rachis shortly pulverulent; under-surface verrucose. Venation variable; veins about 15 to a side, simple or, not rarely furcate, the lowest 3—6 con-nivent to sinns, those of the basal pair often truly anastomosing. Sori nearest the margin, furnished with a persistent, flat, ciliate, variable indusium; in same pinnae one can find as well reniform as athyrioid or even asplenoid indusia.

I have no doubt that *A. varians* Mett. = *A. imbricatum* Fourn. (not *Polypodium imbricatum* Liebm., which is *D. tetragona*) is identical with *N. Schaffneri* Fée: this is the glabrescent form, while *A. varians* is hairy as described above. — The species is apparently a rare one and confined to the humid forests of south-eastern Mexico. I have seen the following specimens:


255. **Dryopteris vivipara** (Raddi) C. Chr. Index 300. 1905 — Fig. 43 c.

**Syn.** *Polypodium viviparum* Raddi, Pl. bras. 1: 22 tab. 32. 1825.

*Polypodium diversifolium* Sw. Vet. Akad. Handl. 1817: 60 (non *alior*).


(For other synonymy see Index Filicum).

**Type from Southern Brazil.** I have seen the original specimens of *P. diversi-folium* Sw. from Minas Geraes, leg. *FREYRENS* (S), which no doubt is the same as *P. viviparum* Raddi.

One of the most distinct species of the whole group, easily distinguished from related species by its glabrous frond, proportionally small (8—10 cm × 1—2 cm) pinnae, which are nearly entire or very shallowly serrulate or crenate, and by the cartilaginous, often thickened margins. The short-creeping or decumbent rhizome is clothed with stellato-pilose scales; rachis often gemmiferous. Pinnae alternate, the lower ones short-stalked, rounded or short-cuneate at base, not warted beneath. Veins 3—6-jugate, the two lower pairs generally united, the lowermost pair, which
always spring out from the costa 1 mm above the costa (fig. 43c), occasionally mieniscioid. Sori about medial, the lowest ones still often near the point, where the basal veins meet and generally 2—3 mm remote from the costa, thus leaving a disc along the middle of the pinna free of sori. Indusium not seen; sporangia glabrous.

*D. vivipara* varies mainly in texture and shape of pinnae. Some forms are thinly membranaceous, others coriaceous. From the type I cannot distinguish certainly *Aspidium macropus* Mettenius Fil. Lechli. 2: 20. 1859, based on Clausen nr. 112 (B). Mettenius found it different from *D. vivipara* by its having a small indusium, which I have not found. It is a large form with pinnae up to 15 cm long; the rhizome seems to be erect and is densely clothed with red-brown scales. To me it is only a large form of typical *D. vivipara*. A more distinct variety is

var. *platytypes* (Fée).

Syn. *Goniopteris platytypes* Fée, Cr. vasc. Br. 1: 106 tab. 33 “fig. 3”, left-hand figure. 1869.

Differs from the type by its glossy, dark-green papyraceous leaf and large size. Pinnae up to 20 cm long, 3—3½ cm broad, cuneate at base, margins serrulate. Veins about 6, much upcurved, the anterior basal one often springing out from the costa. — The type specimen of this variety (Glaziou nr. 2402), which Baker most remarkably referred to *D. tetragona* looks a distinct species, but it is connected with the type by numerous intermediate forms.

*D. vivipara* is a common species in Southern Brazil and it is one of the very few species, which occur in almost identical forms in the Andes. I name some collector-numbers:

**Brazil:** Rio, Glaziou nr. 409 (H), 7321 (B); Sellow nr. 198 (B); Burchell nr. 936, 968 (B); Clausen nr. 2112 (B); Mosén nr. 85 pt. (B, H, Rg), 2682 Rg; Regnell nr. 260 (Rg) — Sta. Catharina, Blumenau, H. Schenk nr. 171 (C) — Parana, Villa Nova, Annies, Rosenst. Fil. Austr. Bras. nr. 104 (Rg, W).

**Columbia:** Cundinamarca, Wercklé 1906 (G); Karsten nr. 60 (B); Lindig nr. 193 (B).

**Costa Rica:** Rio Surubres, 400 m., A. et C. Brade nr. 420 (R).

var. *platytypes* (Fée).

**Brazil:** Rio, Glaziou nr. 2402 (Herb. Gosson, Paris, H); Mosén nr. 85 part. (H) — Jelinek nr. 140 part. (B).

256. *Dryopteris straminea* (Bak.) C. Chr. Index 294. 1905. — Fig. 43 b.


*Polypodium stramineum* Bak. Syn. 316. 1867.

Type from *Venezuela*: Tovar, leg. Fendler nr. 474 (Kew!).

Nearly exactly *D. vivipara* in size, texture, entirely glabrous frond, the cartilaginous margins and genniferous rachis, but veins all free, about 4 to a side, the two basal ones terminating in the leaf-tissue and the posterior one springing out from the costa. Pinnae crenate or slightly lobed. It is not unlikely a variety of *D. vivipara*.
257. **Dryopteris Goeldii** n. sp. — Fig. 43 a.

Type from Brazil: Linkes Ufer d. Parahyba, leg. Goeldi 1887 nr. 3 (C).

Rhizomate oblique-erecto, squamis paucis stellato-ciliatis instructo. Stipitibus ad 30 cm longis, glabris. Lamina ovata, 30—40 cm longa, 20 cm lata, pure viridi, firmo-herbacea, rachi minute stellato-puberula excepta glaberrima, ad insertionem pinnae lateralis supremae gemmulifera, pinnata cum pinna terminali subhastata. Pinnis 6—7-jugis, inter se 3 cm remotis, breviter petiolulatis, lanceolatis, 10 cm longis, 1½ cm latis, acuminatis, ad basin parum attenuatis, saepe auriculatis, ad tertiam partem incisis. Lobis obliquis, acutis vel obtusiusculis. Venis 8—9-jugis, basalius duabus semper anastomosantibus, sequentibus duabus ad sinum conniventibus. Soris fere medialis vel potius inframedialis. Indusiis minimis, pilis bi-trifurcati ciliatis, mox evanidis. Sporangii glabris.

A critical species, in certain characters resembling several other species. It differs from *D. tetragona* by its less cut pinnae and glabrous costæ, from *D. juruenensis* by more pinnae and not warty surfaces, from *D. pyramidata* by distant pinnae, terminal pinna, glabrous costæ and venation, from *D. anoptera*, which it resembles in venation, by glabrous sporangia and absence of scales, from *D. vivipara* by thinner texture and distinctly lobed pinnae, from *D. scabra* by venation, glabrous frond etc. Still its nearest ally is *D. straminea* and it may be the same species and like it a variety of *D. vivipara*; it differs by its united basal veins and more numerous veins, more deeply cut pinnae of thinner texture and margins not so thickened.

258. **Dryopteris juruenensis** n. sp. — Fig. 43 d.

Type from Amazonas: Auf Erdboden, im Walde bei Bom Fim, Rio Jurua, Oct. 1900, leg. E. Ule, Herb. Brazil. Amazonas expedition nr. 5325 (B!, C) — Spruce nr. 3905, ad fluv. Marañón (B) is exactly the same.
Rhizomate oblique-erecto, squamis stellato-pilosis sparse onusto. Stipitibus subfasciculatis, foliorum sterilium 10—20 cm, fertilium 30—40 cm longis, angularibus, sparse et decidui squamosis, glabris. Lamina ovata, 15—18 cm longa, 12—15 cm lata, griseo-viridi, membranacea, rachi minute stellato-puberula costis pinnarum subitus sparse et microscopice hirtis exceptis glaberrima, sed paginis densissime verrucosis, ad insertionem pinnae lateralis supremae gemma magna squamosa bulbillosa, pinnata cum impari. Pinnis lateralisibus 2—4-jugis, alternis, insinuit breviter petiolulatis, supremis sessilibus, lanceolato-ellipticis, 12 cm longis, 2—2½ cm latis, ad basin breviter contractis, versus apicem acuminatis, grosse serrulatis vel lobulatis. Lobis approximatis, subfalcatis, obtusis vel antice acutis, 5—6 mm longis, 4—5 mm latis. Venis simplicibus, valde ascendentibus, 8—9-jugis, inferioribus 3—4 ad sinum conniventibus, omnibus liberis et saepe interruptis, insinuit interdum anastomosantibus meniscioides. Soris parum inframedialibus, indusiis minimis, ciliatis, raro repertis. Sporangiis glabris.

This new species agrees with D. obliterate in shape and cutting of the pinnae and partly also in venation, but it differs considerably from that species, its nearest relative, by the few pinnae, geminiusae rachis, thinner texture, both surfaces being densely warted by small raised points, and by its variable venation. Most often the veins are all free, but one can in the same pinna find all intermediate states of venation, from all veins being free to 2—3 pairs anastomosing and then the lowermost pair is often meniscioid. The anterior basal vein springs constantly out from the costa, which is not the case in D. obliterate. In all specimens seen the fertile leaves have a longer stipe than the sterile ones.

259. Dryopteris obliterate (Sw.) C. Chr. Ind. 280. 1905.


Phegopteris obliterate Mett. Pheg. nr. 46. 1858.


Type from Jamaiica, leg. Swartz (S1).

Rhizome shortly creeping with a few densely stellato-pilose scales. Stipes subdistant, 4—5 dec long, quadrangular, greyish-stramineous, glabrous. Lamina with 6—10 pairs of shortly stalked, alternate, lateral pinnae and a similar but often larger terminal pinna, firmly membranous or papyraceous, sometimes nearly coriaceous, generally greyish green, microscopically puberulous on rachis and costa beneath, otherwise glabrous; hairs of rachis stellate. Pinnae 12—20 cm long by 2—3 cm broad, acuminate, shortly attenuate towards the base, serrate or shallowly lobed. Teeth oblique, acute, not much longer than broad. Veins 6—8-jugate, the lower two pairs generally thinly anastomosing and sending a branch to the narrow membrane, to which the next 2—3 pairs are connivent; in Central-American specimens the lowest or sometimes the two lower pairs of veins are meniscioid. Sori in two convergent rows, the lower ones being about medial, the upper ones gradually approaching the
costule. Sporangia with a few simple, deciduous setae or in some specimens glabrous. "In the early stage of growth trace of a rudimentary involucre is observable, which however soon disappears" (Jenman loc. cit.). I have not found indusia.

This species, of which the plate of Hk. Icon. t. 1669 gives a fair illustration, can be considered the type of a small group including the species nr. 257—261 of this monograph, which connect _D. tetragona_ with _D. Poiteana_. From _D. tetragona_ they differ by venation and less cut pinnæ, from _D. Poiteana_ by few or no meniscioid veins. The Central-American specimens of _D. obliteratora_ approach _D. Poiteana_ more than the West-Indian ones, and they also resemble _D. paucippinnata_, from which they differ by position of sori, venation, texture and generally exindusiate sori.

_D. obliteratora_ is confined to Jamaica, Cuba, Mexico and Northern Central-America. I have seen the following specimens:

**Jamaica:** Swartz (H, S); Maxon nr. 831, 1799 (= Underwood nr. 2772), 1846, 1924, 2876 (W), 2375 (C, W); Underwood nr. 117 (W); Clute nr. 246 (W); Hart nr. 336 (W); O. Hansen (CC, H).

**Cuba:** Wright nr. 1010 (C, CC, S, W) — Santiago, Pollard and E. & W. Palmer nr. 96 (W) — Pinar del Río, Palmer and Riley nr. 72 (C, H, W), 251 (W) — Santa Catalina, Caldwell and Baker nr. 7028 (W) — Isla de Pinos: A. H. Curtis sr. 345 (W); A. A. Taylor nr. 9 (W); Palmer and Riley nr. 1040 (W).

**Mexico:** Barranca de Jovo, Liebmann (H, P. fauciuni Liebbl.) — Schaffner (B) — Coatzacoalcos, isthmus of Tehuantepec, Chas. L. Smith nr. 2052 (W).

**Guatemala:** Puerto Barrios, Maxon and Hey nr. 3059 (C, W) — Rio Dulce, Donnell Smith nr. 1559 (W) — Livingston, Kellesmann nr. 4856 (W) — Puerto Barrios, B. L. Robinson nr. 472 (W) — near Cacao, H. S. Barber nr. 186 (W).

**Honduras:** Bonacca, Godman and Salvin (B) — San Pedro Sula, C. Thieme, ed. Donn. Smith nr. 5685 (W); 5693 part. (B, not W).

260. _Dryopteris nigrescentia_ (Jenman) C. Chr. Ind. 279. 1905 — Fig. 44.


_Type from Jamaica_, leg. _Jenman_ (W!).

A doubtful species, of which I have seen 5 leaves only. It may be an abnormal, local form of _D. obliteratora_, which it resembles in the essential characters. It differs by the stouter rhizome, smaller leaves (10 cm long and broad at base), dark-green colour, wrinkled, serrulate, opposite and sessile pinnæ, and shortened often rudimentary terminal pinnæ. Veins 4—5 to each side, the lowest 2—3 pairs anastomosing. Sporangia glabrous. Rachis more conspicuously stellato-puberulous.

261. _Dryopteris Rolandi_ n. sp. — Fig. 45.

_Ecuador:_ Rio de Ventanas prope Guayaquil, leg. Spruce nr. 5718 (type in RB).

_Rhizome?_ Stipitibus validis, brunneo-stramineis, supra trisulcatis, 6 m longis, ubique dense stellatim puberulis ad insertionem sparse squamosis: pilis brevissimis 3—6 furcatis, squamis angustis pilis stellatis dense instructis. Lamina 4 cm longa, pinnata cum impari, herbacea, pure viridi; rachi tenui stellatim pilosa; pinnis 7- jugis, suboppositis vel superioribus alternis, sessilibus, inter se 5—6 cm
Fig. 44. Entire leaf of *D. nigrescentia* (Jenn.) C Chr., ×4/5 and fragment ×11/2.

remotis, lanceolatis, 15 cm longis medio 3 cm latis, inferioribus e medio utrinque attenuatis, superioribus basi subtruncatis, breve acuminatis, supra ad costam pilis antrorsis simplicibus vel furcatis setosis, ad venas setis paucis instructis, inter venas glabris, subitus ubique — præsertim ad costam — pilis brevibus mollibus raro furcatis sparse pubescentibus, marginibus ciliatis, grosse lobatis. Lobis obliquis, approximatis, obtusis, leviter crenatis, mediis 1–2 cm longis et latis, basali superiore rachin tangente, inferiore a rachi 4–5 mm remoto. Venis simplicibus, 9–10 jugis, inferioribus 2–3 jugis anastomosantibus, basaliibus meniscioideis. Soris luteis, medialibus, exindusiatis, sporangiis pilis 5–6 simplicibus acutis setosis.
Closely allied to *D. tetragona*, *D. megalodus* and *D. Poiteana*; it resembles *D. megalodus* in venation and cutting but differs by its densely setose capsules and lack of the adpressed stellate hairs on the leaf-tissue of the under-surfaces; from *D. Poiteana* it differs by the dense stellate pubescence of stipe and rachis, the deeper incised pinnae and fewer anastomosing veins; as a rule only the basal pair of veins are united into a free excurrent vein. From *D. juruensis* it differs by its not-granulose surfaces and the not-bulbiferous rachis.

262. **Dryopteris tetragona** (Sw.) Urban, Symb. Ant. 4: 20. 1903; C. Chr. Ind. 297.


*Polypodium subtetragonum* Link, Hort. Berol. 2: 105. 1833!


(For other synonyms see Index Fil.).

**Type from Jamaica leg. Swartz (Sl).** As Swartz has named different forms *D. tetragonum* I consider that form typical, which is figured by Schkuhr and which agrees perfectly with the original diagnosis.

*D. tetragona* has been considered a very variable species of a wide distribution, and this is to a certain degree true, but I have found that about half the number of the hundreds of specimens named *tetragona* and examined by me belong to more or less allied species, which it is not difficult to distinguish from *D. tetragona*. The common West-Indian typical form of this shows the following specific characters:

Rhizome shortly creeping or obliquely erect with brown scales, which are covered with stellate hairs. Stipes fasciculated like the rachis stramineous, quadrangular, slightly and very shortly hairy by stellate hairs. Leaves somewhat dimorphous, the pinnae of the fertile leaves being narrower (2 cm br.) than those of the sterile ones (2 1/2 cm br.). Lamina ovate with 6—12 pairs (generally 8) of lateral pinnae and a similar terminal one. Pinnae opposite or nearly so, short-stalked, oblong, acuminate, the lower ones narrowed towards the base, about 10 cm long by 2—2 1/2 cm broad, incised 1/2 or 2/3 of the way down into close, acute, entire segments, herbaceous, dark-green, the under-surface generally nitid, glabrous on both surfaces, excepting the coste (which are flat with two low furrows) and costule beneath, which are slightly hairy by spreading, simple, acute hairs, ciliate at the margins. Veins simple, 8—10-jugate, the basal pair united and sending a branch to the sinus, the two next free and reaching the margin immediately above the sinus. Sori inframedial, exindusiate; sporangia setose.

The form here described is very common in the West-Indies and there fairly constant; nearly identical forms are found on the continent from Mexico to Ecuador; the specimens herefrom have, however, generally a more dull under-surface. In the following I enumerate the islands and countries, from which I have seen specimens and add some of the more important collector-numbers.
West-Indian Islands: Trinidad, Crüger (B), Broadway nr. 3294 (B) — Grenada, Eggers nr. 6331 (C) — St. Vincent, Eggers nr. 6540 (W) — Barbados, Eggers nr. 7113 (C), 7194 (C, RB) — Martinique, Séguier, Fl. Mart. nr. 240 (B, Pére Duss nr. 1567 (RB, W), 1580 (W) 37 (C “arboricole”) — Dominica, F. E. Lloyd nr. 538, 886 (W) — Guadeloupe, Pére Duss nr. 4032, 4113 (W) — Montserrat (H) — St. Kitts (S) — Antigua B) — Saba (S) — St. Croix (H, W) — St. Thomas, Eggers nr. 85 (B, C, H, W) — San Juan, Eggers nr. 3956 (H) — Porto Rico, Sintenis nr. 883 (S, W), 2498 (W), 2164 (C, Goll nr. 935 (W), Underwood and Griggs nr. 274 (W), Mr. and Mrs. Heller nr. 613 (W) — Haiti, Nash and Taylor nr. 1230 (W), Dr. Weinland nr. 9 (B) — Jamaica, Maxon nr. 826, 2184, 2565 (W), Underwood nr. 2911 (W), Hart nr. 330 (W) — Cuba, Prov. Oriente, Wright nr. 817 (S), Maxon nr. 4228 (W), Linden nr. 2191 (B) — Prov. Sta. Clara, Pringle nr. 129 (W); Prov. Pinar del Rio, Palmer and Riley nr. 291 (H, W), van Hermann nr. 2069 (W); Prov. Habana, van Hermann nr. 5653 (W) — Isle of Pines, Palmer and Riley nr. 865 (W).

Florida: Marion Co., Miss Reynolds (W).

Mexico: Palmer nr. 1129 (W) — Laguna del Negro, Rovira kos nr. 566 (W) — S. Luis Potosi: Tamasopo, Pringle nr. 3599 (B, C, S, W) — Vera Cruz: Papantla, Liebmann (H = Pol. pimclcatum Liebm.; this was by Fournier identified with Asp. varians Melt., which, however, is the same as D. Schaffneri; Liebmann’s type specimen consists of a single sterile leaf and belongs to typical tetragona. P. tetragorum Liebm. is D. tetragona var. 2 (see below).

Guatemala: Escuintla, Donnell Smith nr. 2439, 2440 (W) — Los Amates, C. et E. Selé nr. 3360, 3361 (B) — Mazatenango, Maxon and Hay nr. 3629 (W).


Nicaragua: Cerro Granada, P. Lévy nr. 55 (Brux.).

Costa Rica: Port Limon, Cook and Doyle nr. 435 (W).

Panama: Chiquihi, Hart (W).

Colombia: Magdalena, Lindig nr. 377 (B, Sta. Marta, H. H. Smith nr. 995 (C) — Galipan, Moritz nr. 292 (B).

Venezuela: Moritz nr. 205 (RB), 210 (B) — Pto. Cabello, Karsten nr. 71 pt. (B) — La Guayra, E. Otto nr. 424 pt. (B) — San Julian, Lyon (W).

Surinam: Hostmann & Kappler nr. 1775 (B).

Ecuador: El Recreo, Eggers nr. 14900 (B).

var. guadalupensis (Fée).

Syn. Goniopteris guadalupensis Fée, 11 mém. 64 tab. 17 fig. 2. 1866.

Like typical tetragona in colour and pubescence but larger: pinnae 3—3½ cm broad, incised only ½ of the way down, and 2—3 pairs of veins anastomosing. Not unlike D. megalodus but without stellate hairs beneath.

Guadeloupe: L’Herminier nr. 127 (B, C), Pére Duss nr. 233 (C).

Grenada: Rawson W. Rawson (B).

Trinidad: Broadway nr. 3293 (B).

Jamaica: Hart (W).

In Central-America a long series of forms is to be found, which I dare not refer to any of the accepted species. As most of these forms are known only from a single or a few specimens, which rarely are fully identical, I prefer to place them under D. tetragona as formae dubiae instead of describing them as new species. In these forms the most important characters of the species tetragona, oblirerata, nicaraguensis and tristis are combined. A special mark of the majority of these forms is that the basal veins do not anastomose but are connivent to sinus, although the leaves in other respects very much resemble D. tetragona, and it is possible that
this species varies in venation, still it is remarkable that the West-Indian common form always has the basal pair of veins anastomosing. These free-veined Central-American forms were mentioned before, f. inst. by FOURNIER (Bull. Soc. Fr. 19: 253), who only with doubt referred them to *D. tetragona*. I am inclined to consider var. 2, 5 and 6 distinct species, and var. 1 a variety of *D. tetragona*.

**var. 1.** Resembles in size and colour the common *tetragona*, but the basal veins connivent to sinus; 12—14 veins; sori subcostular; sporangia glabrous.

**Guatemala:** San Felipe, Depart. Retalhuleu, 2050', **DONNELL SMITH** fl. 2733 (W).

**var. 2.** Size of *D. tetragona*, colour intense, green, opaque not shining; lower veins occasionally anastomosing but more often the 2—3 lower ones are connivent to sinus. Sori small, dark, almost medial; sporangia glabrous.

This is *Polyp. tetragonum* Liebm. Mex. Bregn. 211, and it is probable that LIEBmann was right in considering it specifically distinct from *D. tetragona* = *P. imbri-catum* Liebm.

**Mexico:** Vera Cruz, Buenaventura, H. Ross fl. 1073 (CC); — La Junta, H. Ross fl. 1113 (CC), Roviro-sa (W), **LIEBmann** (H).

Similar forms are

**Guatemala:** San Felipe, Dep. Retalhuleu, coffee-plantation, Maxon and Hay fl. 3513 (W); Rhizome long horizontally creeping; sori costular.

**Honduras:** San Pedro Sula, C. Thiene ed. J. D. S. fl. 5694 (C); Pinnae narrower and very remote; sporangia setose.

**var. 3.** Very like var. 2, but segments falcate and veins about 15; lower pinnae with a cuneate entire base and all long acuminate. Sporangia setose; rhizome erect.

Perhaps a variety of *D. nicaraguensis*.

**Guatemala:** Cabilquitz, 350 m. v. Tuerckheim ed. J. D. S. fl. 8646 (C, W) — Volcan Tecuamburro, Heyde et Lux ed J. D. S. fl. 4685 (B, C, W) — San Felipe, **DONNELL SMITH** fl. 2733 (W) — near the Finca Sepacuite, Cook and Griggs fl. 372 (W).

**var. 4.** Intermediate between *D. tetragona* and *D. oblitterata*. Pinnae incised 1/2, basal pair of veins anastomosing with a short meniscioid branch; above them 2—4 pairs of veins connivent to sinus; sori medial; sporangia densely setose.

**Guatemala:** Gualan, Depart. Zacapa, W. A. KELLERMANN fl. 4869 (W).

**var. 5.** Here I place a number of rather different forms, which are intermediate between *D. tetragona* and *D. nicaraguensis*. They resemble the former in size, the setose sporangia, and the truncate or slightly narrowed base of the pinnae, and the latter in venation, the light colour and the semiterete costa of the pinnae beneath. As a rule the pinnae are incised 1/3—1/2 with 6—8 veins connivent to sinus. Sori inframedial, small, yellowish. Texture firmer than *D. tetragona*, thinner than *D. nicaraguensis*.

**Costa Rica:** Puerto Viejo, Pittier fl. 7489 (B, W), 6937 (C, W) — Guacimo, Llanos de Sta. Clara, TONDUZ fl. 14578 (W) — forêts de Bornea, Pittier fl. 4824 (W) — Suerre, Llanuras de Sta. Clara, **DONNELL SMITH** fl. 6897 (W) — forêts de Tuis, TONDUZ fl. 11312 (C) — Jiménez, ALFARO fl. 16479 (C).

**Panama:** Bocas del Toro, J. HART fl. 55 (W).
var. 6. Not unlike *D. nicaraguensis* but texture thinner and segments less falcate, acute; lower pinnæ with a long cuneate, entire base as in *D. trisils*. Rachis and costæ beneath very shortly pulverulent by stellate hairs. Sori subcostular, setose by many multibranchied hairs. Probably a new species, but the specimens are too fragmentaric for a description.

**Honduras**: San Pedro Sula, 1500', C. Thieme ed. J. D. S. nr. 5693 part. (C, W).

In Brazil several forms occur, which most authors have referred to *D. tetragona*, but which are positively specifically different; see *D. scabra*, *D. incompleta* and others.

*Nephrodium aureo-viridum* Jenman, W. Ind. and Guiana Ferns 238. 1908 is, as far as I can judge from a photograph and a fragment of *Jenman*’s type-specimen (from British Guiana), received from Miss Slosson, not safely distinguishable from *D. tetragona*. Its sori are said to be indusiate when young.

263. *Dryopteris megalodus* (Schkuhr) Urban, Symb. Ant. 4: 21. 1903; C. Chr. Ind. 277. — Fig. 41 a.


*Goniopteris quadrangularis* Fée, 11 mém. 63 tab. 16 fig. 3. 1866.

(For other synonyms see Ind. Fil.).

*Schkuhr* characterized this species by pointing out the presence of stellate hairs on the underside; as the species here named *D. megalodus* differs from other species of *Eugoniopteris*, *D. leucophlebia* excepted, by that character, and as *Schkuhr*’s plate very well illustrates our species, I have no doubt that I understand the species of *Schkuhr* rightly. As suggested in Index Fil. *Polypodium pennatum* Poir. Enc. 5: 535. 1904 is probably the same species and, if so, *Poiret*’s name has priority. I have seen the original specimen of it in Herb. *Lamarck* (Mus. Paris) but unfortunately my notes do not permit me to identify it with *D. megalodus* with absolute certainty; it may be also *D. nephrodioides*. I prefer, therefore, to name the species by that name, under which it has been known for a century.

*D. megalodus* is not closely allied to *D. tetragona*, with which *Baker* united it. It resembles that species mostly by its lower pair of veins anastomosing under a broad angle. From *D. glandulosa*, with which it has very often been confounded, it differs by its stellate hairs, venation and absence of aerophores.

The short-creeping rhizome is sparsely clothed with castaneous, small scales, which are stellato-pubescent throughout. Stipe and rachis often quadrangular and slightly puberulous by very small and soon deciduous stellate hairs. Pinnæ few, seldom 10 to a side, distinctly stalked, 15—25 cm long, 3—4 broad, herbaceous, dark-green, incised about 1/3 to the costa into falcate, obtuse, faintly crenate, close lobes, glabrous above, costa and veins beneath minutely puberulous by stellate hairs, leaf-tissue of the underside with microscopic stellate hairs or glabrous. Venation somewhat variable; veins 12—16 to a side, simple, the basal pair always anastomosing and sending a branch to a cartilaginous membrane, which extends from the sime...
one third of the way to the costa; along the edges of this membrane run the following 2—3 veins from the same costa to sinus; as a rule they run closely side by side, but sometimes they are found to be united. This being the case the venation is very similar to that of D. glauchnosa. Sori medial, small, exindusiate. Sporangia glabrous; receptacle with stellate hairs.

The typical form of D. megalodus is probably common in most of the Lesser Antilles. In Central-America a larger form occurs, which can not always easily be distinguished from D. nephrodioides var. Biolleyi, especially if the apex of the frond is wanting. True D. megalodus has a distinct terminal pinna similar to the lateral ones and is exindusiate. Mettenius says that he has seen indusium in D. megalodus (Fil. Lechli. II. 21.), but the specimens examined by him (now in B) all belong to D. nephrodioides.

Specimens seen:

Trinidad: Hart n\r. 3771 (W), 4120 (C); Fendler n\r. 21 (W); Preuss n\r. 1463 (B); Broadway n\r. 3648 (RB).
St. Vincent: H. H. and G. W. Smith n\r. 858 (C); Eggers n\r. 6641 (W).
Martinique: Sieben Syn. Fil. exs. n\r. 160 (B).
Porto Rico: Ballis (B); Eggers n\r. 974 b (B, RB).
San Domingo: Mayerhoff n\r. 103 (B); PheneÌéloup n\r. 727 (C); Wright, Parry and Brummel sine n\r. (W).
Cuba: Valley of Rio Bayamita, Maxon n\r. 3973 (W) — Farallones de la Perla, Maxon n\r. 4387 (W) — above Jaguey, Yateras, Maxon n\r. 4415 (W) — Monte Verde, Wright n\r. 1010 pt. (S).
Venezuela: Caracas, Moritz n\r. 50 (B) — Lower Orinoco, Rusby and Squires n\r. 388 (B, W); Stevens (W) — Puerto Cabello, Appun n\r. 29 (RB).
Colombia: Sta. Marta, H. H. Smith n\r. 2690 (C).
Ecuador: Rimbach n\r. 104 (B).
Costa Rica: Wercklé (C).
Guatemala: Cabilquitz, Alta Verapaz, v. Tuerckheim, ed. J. Donn. Smith n\r. 8812 (W).

264. Dryopteris leucophlebia (Christ) C. Chr. Ind. 274. 1905. — Fig. 41 b.


Type from Costa Rica, leg. Wercklé 1904 (C).

A most distinct species, in cutting not unlike D. hastata, but much larger, in pubescence like D. megalodus, but less cut. In the type specimen, the leaf differs in shape from the other species of this section, with which it otherwise best corresponds, by its upper pinnae being sessile with a broad base, adnate to rachis, widest on the lower side, and upwards at least confluent with the hastate lobed apex, thus not having a distinct terminal pinna. Such a one, however, present in another specimen from Costa Rica, which otherwise does not at all differ. — Pinnae (the lower ones shortly stalked and cuneate at base) about 20 cm long by 4 cm broad, shallowly lobed, pale-green, firmly herbaceous, apparently glabrous, but by using a strong lense both surfaces are seen to be furnished with scattered, microscopical 4—6 branched hairs, which are best seen on the costa and costule beneath. Rachis very finely puberulous by sessile, branched, deciduous hairs. Lobes obtusely rounded, subfalcate, crenate. Veins 10—12, the two basal opposite ones anastomosing under
a subacute angle in an excurrent branch, to which the next 2–3 alternately joint, and which run to the base of a hyaline membrane, to which the following 3–4 veins run out. Sori medial, small; sporangia setose by 2–4 short, simple setæ. I have seen a trace of a small, ciliate indusium.

Costa Rica, without locality, Wercklé 1904 and 1905 (C. - Jiménez, Llanos de Santa Clara, Comarca de Limón, 200 m, Donnell Smith br. 5094 (W) — Sherre, Llanuras de Santa Clara, 300 m, Donnell Smith br. 6928 (W).


Syn. Lastrea Poiteana Bory, Dict. class. 9: 233. 1826.

Polypodium crenatum Sw. Prod. 132. 1788; Fl. Ind. occ. 1661. Hk. Bak.


[Plomer, Fil. tab. 111].

The type of Lastrea Poiteana Bory I have not seen, but there is no reason to doubt that it is the same as Polypodium crenatum Sw., which was collected by Swartz in Jamaica (Sl) and which I take for the type of the species.

A well-known species, well described by Jenman (loc. cit.) and others. The creeping rhizome is naked or clothed with some few scales, which bear some furcate hairs on the edges. The lamina, consisting of 3–6 pairs of lateral pinnae about 4 cm broad and similar terminal one is more or less soft-hairy beneath, especially on costa and veins, glabrous or with a few setæ on the veins above; hairs simple. Costules prominent, stramineous. Margins subentire, crenate or broadly and shallowly serrate, rarely lobed. Veins 6–8-jugate, distant, the lower 2–4 pairs up-curved and anastomosing under an acute angle and meniscioid, the next 2–3 pairs alternately united into a common branch or often interrupted before meeting the opposite vein. Sori a little below the middle of the vein; sporangia when young furnished by 4–6 long, simple hairs. In the same sori one finds as well quite young sporangia as rife ones and intermediate states.

D. Poiteana varies mainly in pubescence; some specimens are almost glabrous and then resemble D. meniscioides, others, especially the andine specimens, much hairy and difficult to distinguish from D. Ghiesbrechtii; still I think it possible to determine specimens of these three species by the venation; in D. Poiteana rarely more than 4 pairs of veins are meniscioid and meet under acute angles; in the two other species 8–10 or more pairs of veins are meniscioid and meet under broad angles, and their sporangia seem to be glabrous even as young.

Goniopteris Rivoirei Fée, Gen. 2535 1850–52; 11 mém. tab. 18 fig. 2 from Guadeloupe seems according to the figure and a specimen in (B) so named to be a small form of D. Poiteana with large sori. Jenman believed it to be D. obliteratora, while Baker (Ann. of Bot. 5: 460. 1891) restored it as a species. It must, however, be remarked, that the two reduced figures of the whole plant of Gon. Rivoirei and
"G. hastata" on Fée's plates 18 f. 1—2 are confounded. — The veins of "G. Rivoirei" are not so upcurved as in typical "D. Poiteana."

"D. Poiteana" has a wide distribution; it is found in most West-Indian islands and from Guatemala to Peru and Northern Brazil. I enumerate here some of the more important collector-numbers seen by me.

**West-Indies.** Trinidad: Hart nr. 560 (C); Bot. Gard. Herb. nr. 36 (W); Fendler nr. 20 (W); Eggers (H) — Tobago: Eggers nr. 5808 (W) — Grenada: Eggers nr. 6114 b (C); Searing br. 110 (W) — St. Vincent: Eggers nr. 6650 (W) — Martinique: Père Duss nr. 1565 (C, W), 4118 (W) — Dominica: Eggers s. n. (W) — Guadeloupe: L'Herminier nr. 124 (B); Père Duss nr. 16 (C; proliferous), 4069 b (W) — Montserrat: Ryan (H) — St. Croix: Isert (H); Ryan (H); Borgesen (C) — St. Thomas: (H) — Porto Rico: Sintenis br. 8751 (W), 5865 (C, W); Eggers nr. 1342 (B, C); Goll nr. 131, 315, 340 (W); A. A. Heller nr. 6178 (W); Mr. and Mrs. Heller nr. 612 (W); Underwood and Griggs nr. 887 (W) — Haiti: Meyerhoff (B); Wright, Parry and Brummel (W) — Jamaica: Swartz (S); Hart br. 237 (W); Clute nr. 245 (W) — Cuba: Pinar del Río, Palmer and Riley nr. 499 (W); Oriente, Wright nr. 3963 (S).

**Guatemala:** Los Amates, Dept. Izabal, Kellelbann nr. 4855 (W).

**Honduras:** San Pedro Sula, C. Thieme, ed. Donn. Smith nr. 5866 (B, C, W).

**Costa Rica:** Matina, Pittier nr. 9749 (W). — A variety with the sori close to the costaule, multisessose sporangia and the veins often interrupted, not confluent. — Wercklé (CC).

**Panama:** Bocas del Toro, Hart nr. 56 (W).

**Colombia:** Sta. Marta, H. H. Smith nr. 1043 (C, B).

**Ecuador:** Andes quitenses, Sodiro (C) — El Recreo, Eggers nr. 15123 (B, W) — Balao, Eggers nr. 14207 (W).

**Peru:** Tabalosos, Stüb bel nr. 1088 (B).

**Venezuela:** Carípe, Mortiz br. 57, 192, 197 (B) — San Julian, M. W. Lyon (W) — Puerto Cabello, Lansberg br. 67 (B); Funck br. 7 (B).

**Guyana:** Surinam, Paramaribo, Kapper br. 1755 (B) — Cayenne, Leprieur (B).

**Brazil:** Pará, Serra de Baturité, Hucer br. G. 129 (C) — Bahia, Salzmann (C); Luschnath nr. 122 (B).

> 266. Dryopteris meniscioides (Liebm.) C. Chr. Ind. 277. 1905.


1849. Hk. Bak. Syn. ed. II. 314; Rovirosa, Pteridographia del Sur de Mexico 241 pl. 41 (bona!).

**Type from Mexico:** Teotalcingo, Dept. Oajaca, leg. Liebmann nr. 2407 (H!). Besides the specimens of Liebmann's collection I have only seen one more from Chiapas, G. Munch nr. 149 (C).

Perhaps a variety of "D. Poiteana," which does not seem to occur in Mexico. It differs 1) by its perfectly glabrous frond, which is rigidly membranous or subcoriaceous, 2) its crenate or very shallowly serrulate pinnae, which are gradually narrowed from the middle to the base (in "D. Poiteana" the pinnae have a short cuneate or rounded base), and 3) by venation. Veins 8—10-jugate, of which about the 8 pairs are meniscioid, but united under more acute angles than in the following species. Sori a little inframedial, small and not rarely oblong; sometimes 2 or even 3 sori are found on the same vein, and these being confluent the species resembles
a Meniscium. It is really an intermediate link between Goniopteris and Meniscium and therefore I agree with Mettenius in reducing Meniscium to a subgenus of Dryopteris. The difference is found mainly in the position of sori; if the sori are born on the vein near the point, where two opposite veins unite, the two opposite sori become with age confluent and thus we have a meniscoid sorus. — *D. meniscioides* has 8–10 lateral pinnae, about 20 cm long and 3½ cm broad. Their edges are cartilaginous, a little thickened and sparsely ciliate. — Goniopteris *rostrata* Fée, referred hereto in my Index, belongs to *D. glaufulosa*.

267. Dryopteris Ghiesbrechtii (Linden) C. Chr. Ind. 267. 1905.


*Goniopteris mollis* Fée, Gen. 252. 1850–52; 11 mém. tab. 24 fig. 1. 1866.

*Polypodium crenatum* Hk. Fil. exot. tab. 84. 1859.

Type from Mexico: Teapa, Tabasco leg. Lindén nr. 1499 (Bl).

A larger plant than *D. Poiteana* with only 2–5 pairs of lateral sessile pinnae, which are 20–30 cm long by 5–8 cm broad, from subentire to irregularly serrulate or lobed. Stipe 3–4 dm long, raised from a creeping, nearly scaleless rhizome, glabrous. Pinnae slightly strictog, on the veins above, densely soft-hairy beneath. Costae and costules as a rule not stramineous. Veins in 10–12 pairs, all, the 2–3 uppermost pairs excepted, anastomosing under broad angles, generally all meniscoid. Sori about medial on the vein, in some specimens distinctly inframedial, in others nearer the anastomosing point. Sporangia glabrous even as young but intermixed with long hairs from the receptacle.

Apparently a very distinct species when only the typical form is considered, but it is not always easy to distinguish from the andine forms of *D. Poiteana*. The best characters are the venation and the glabrous sporangia. The species is confined to Central-America, from Southern Mexico to Costa Rica, a region where *D. Poiteana* does not occur (Mexico) or is rare. I have seen the following specimens besides numerous cultivated ones.

**Mexico**: Tabasco, Lindén nr. 1499 (B); Rovira nr. 575 (W).

**Guatemala**: Alta Verapaz, Cabilquitz, v. Tuerckheim, ed. Donnell Smith nr. 8648 (C, W); II 876 (W); Sacatal, v. Tuerckheim ed. Donnell Smith nr. 1407 (W); Chamiquín, v. Tuerckheim nr. 550 (W); near Finca Sepacuít, Cook and Griggs nr. 281 and 664 (W); Secanquín, Maxon and Hay nr. 3132 (W); Puerto Barrios, Chas. C. Dean nr. 450 (W); near Cacao, Barber nr. 194 (W).

**Nicaragua**: Canada Yasira, Dept. Metagalpa, E. Rothschild nr. 117 (B).

**Costa Rica**: Talamanca, Tonduz nr. 8659 (W); Hacienda de Guácimo, Tonduz nr. 14572 (W); Puerto Viejo, Pittier nr. 7503 (W); Jiménez, Alfaro nr. 157 (W); 16517 (C); Port Limón, Cook and Doyle nr. 419 (W); Rio Hondo, Cook and Doyle nr. 496 (W).
Unknown species of Goniopteris.

1. Goniopteris macrocladia Fée, Cr. vasc. Brés. 1: 106 tab. 33 right-hand figure ("fig. 1"). 1869 — Brazil: Sta Catharina, ALBUQUERQUE. It seems to be distinct from all Brazilian species known to me.
2. Nephrodium nemorale Sodiro, Cr. vasc. quit. 267. 1893; Dryopteris nemoralis C. Chr. Ind. 279 — Ecuador.
3. Polypodium Urbani Sod. l. c. 301; Dryopteris Urbani C. Chr. Ind. 299 — Ecuador.

Subgenus 10. Meniscium (Schreber).

The old genus Meniscium is a well-known and apparently one of the most distinct groups of ferns. The species from the Old and the New World referred to it are, however, certainly not very close relatives, and I now firmly believe that they are even not congeneric, and, moreover, that the American species can not be generically separated from Goniopteris. In this view I agree with Mettenius (see Fil. Lechli. II. 19). Within the second group of Goniopteris, Eugoniopteris, we find an unbroken row of species, from free-veined species to such species as D. Ghiesbreghtii and D. meniscioides, the venation of which is perfectly meniscioid. The other important character of Meniscium: the confluent sori, also is insufficient as distinguishing mark between Goniopteris and Meniscium. Two species as D. meniscioides and D. ensiformis described below are really so closely related that it should be very unnatural to place them in two different genera. Still I have failed to find stellate hairs in all species of Meniscium and this together with the whole uniform character of the species justify the segregation of the species from the subgenus Goniopteris and the referring of them to a proper subgenus, Meniscium. If one should prefer to separate both these subgenera from the others, they should certainly be united into a single genus.

The Old World's species of Meniscium, as commonly understood, are considerably different from the American ones, and I have no doubt that they must be referred to Cyclosorus being a specialized group of that subgenus. Thus the two subgenera (or genera) Cyclosorus and Goniopteris includes each a series of species, from free-veined forms to such having meniscioid venation. The American species of Cyclosorus do not show a venation intermediate between the simple, goniopteroid venation of D. mollis and meniscioid veins, but such forms we find in Asia. I shall here only refer to such forms as Polypodium urophyllum Wall. and Meniscium cuspidatum Bl.

My material of the American species of Meniscium is not so comprehensive as that of the other subspecies of Dryopteris. I can not, therefore, give here a review of the species. The group is represented in America by perhaps a dozen species,
not a few of the forms in Ind. Fil. referred to *D. reticulata* being valid species. *Mettenuis* (Fil. Leschl. II. 21—25) has given a review of the species known till 1859; and I can, as far as I know the species, fully agree with his treatment. Since then several species have been described, and below I describe two others as new, the first of these being an interesting intermediate between the true species of *Meniscium* and *D. meniscioides* belonging to *Goniopteris*.

268. *Dryopteris ensiformis* n. sp. — Fig. 46.

Type from Costa Rica: Lisières des pâturages à La Palma, 1459 m, leg. Ad. Tonduz nr. 12533 (C).

Rhizomate? Stipitibus ad basin 2 cm crassis, ad 1 m longis, glabris. Lamina visa incompleta, pinnata, omnino glabra, coriacea, brunneo-viridi. Pinnis inter se 6 cm remotis, ensiformibus, 30—35 cm longis, ad 5 cm latis, apice caudata, basi abrupte rotundata, subcordata subsessilibus, infra aërophoro instructa (?); marginibus irregulariter repandulis, cartilagineis. Venis secundariis 4 mm circiter inter se remotis, curvatis, tertiariis simplicibus, 10—12-jugis, omnibus more *Meniscii* anastomosantibus; radiis late clavatis, liberis vel saepè omnibus confluentibus venam venis secundarioribus parallellam formantibus. Soris parvis, atrorufis, in venis medialibus, rotundis, raro confluentibus, exindusiatis. Sporangia receptaculisque glabris.

This new species is a peculiar fern, in general habit a *Meniscium*, but in venation and sori not unlike *D. meniscioides*, from which it differs by the much closer secondary and tertiary veins and by the subcordate base of the pinnæ, which have nearly the same breadth from base to short of the apex. It also resembles *D. (Meniscium) Andreana* (Sod.) C. Chr., which in sori is a true *Meniscium*. The most remarkable features of our new species are 1) the presence of an aërophore, 2) the edges of the pinnæ and 3) the venation. Ad 1). At the insertion of the costa is to be found a large, blackbrown spot, which evidently is the scar of a fallen aërophore. Ad 2). The pinnæ are bordered by a broad, cartilagineous line. Ad. 3). The excurrent veinlet formed by two anastomosing veins is always much longer than found in other species of *Meniscium*; often it reaches nearly to the next cross-vein and then ends in a broad clavate apex, in which a brown, oblong pellucid spot is seen on the upperside; but often the veinlet is continued to the next cross-vein and the veinlets between two secondary veins then together form a continued vein parallel to the secondary veins. In this case the veinlets are thickened above the middle and enclose a brown pellucid spot as described, above which they again narrow.
269. Dryopteris Andreana (Sod.) C. Chr. Ind. 252. 1905.

Syn. Meniscium Andreanum Sodiro, Rec. 71. 1883; Cr. vasc. quit. 392. 1893.
Type from Ecuador, Andes quitenses, leg. SODIRO (C!).

Closely related to the preceding species, but its sori all meniscioid, the base of the sessile pinnae not subcordate but bluntly rounded with the lower side of the upper pinnae adnate to rachis, without aërophore (?), rachis, costa on both sides and secondary veins beneath sparsely pubescent by very short, simple hairs and the venation somewhat different. Secondary veins at distances of 4–6 mm with about 17–18 transverse, close and rather convex tertiary veins; the free, included veinlet short, rarely extending beyond the middle of the areole, sometimes nearly obsolete, its apex seen from above often broadly clavate as in D. ensiformis. Receptacle glabrous. — Pinnae 20–40 cm long, 5–7 cm broad (18–24 by 3–5 cm according to SODIRO). — The species is not very near D. reticulata.


Type from Ecuador, Mt. Abitagua, STRÜBEL nr. 897 (B1).

Differs from D. Andreana but agrees with the following two species by its long-stalked pinnae with a subequally cuneate base. Transverse veins 12–14, the free veinlets long, extending beyond the middle of the areole, its apex scarcely clavate, or occasionally reaching the next cross-vein. The confluent sori very short and thick. Costa above very sparsely setose, the leaf otherwise glabrous.

271. Dryopteris falcata (Liebm.) C. Chr. comb. nov.

Phegopteris falcata Mett. Fil. Lecl. II. 23. 1859.
Type from Mexico: Depart. Oaxaca, Lacobe, LIEBMAN (H!). Also Costa Rica, Buenos Ayres, PITTIER nr. 4839 (C).

A very large species, widely different from typical D. reticulata. Rachis angular, glabrous, brownish-stramineous. Pinnae linear-elongate, 40 cm long, 3½ cm broad, dark-green, thinly membranous, apex long acuminate, margins undulato-crenulate, base subequally cuneate, long-stalked (petiole 2–2½ cm long), upper surface, the very sparsely setose costa excepted, glabrous, costa beneath short-hairy. Secondary veins at distances of about 3 mm with 12–13 transverse, a little convex veins; the included veinlets as a rule free but terminating in a subclavate apex above the middle of the areole, or not rarely prolonged and united with the next cross-vein. Sori small, nearly round, placed at the base of the free veinlet. Receptacle glabrous.

Differs from D. pachysora by its much longer pinnae of thinner texture, the costa hairy beneath and its small sori, from D. reticulata by its long and long-stalked pinnae with a cuneate, subequal base, pubescent costa and short sori.
272. **Dryopteris lingulata** n. sp.

**Syn.** *Phegopteris Andreana* Christ, Prim. Fl. Costar. 3: 35. 1901.

**Type from Costa Rica:** Forêts de la vallée du Rio Hondo près Madre de Dios, 200 m, leg. PITTIER nr. 10349 (C).

Rhizonate? Stépite incompleto 60 cm longo, griseo, glabro, anguloso. Lamina 60–70 cm longa, chartacea, laete-viridi, costis supra minute puberulis exceptis omnino glabra, impari-pinnata. Pinnis lateralibus, 5-jugis, 12 cm inter se remotis, lingulatis seu elliptico-lanceolatis, 30–35 cm longis, medio 7 cm latis, caudato-acuminatis, marginibus undulatis, subintegris inferioribus, petiolo 2–4 cm longo stipitatis, basi cuneata, suprema sessilibus basi inferiore ad rachin adnata, superiore rotundato-cuneata. Venis secundarii 6–8 mm inter se distantibus, tertiaris 16–17 inter se 3 mm remotis convexis; venulis liberis apice late clavato ultra medium areolae in parenchymate desinentibus, seu ad venam transversam superiorem productis. Soris lunatis, angustis, sape 4–5 mm longis. Receptaculis glabris.

Differs from the two preceding species, which it resembles by the long-stalked inferior pinnae with a cuneate base, by the shape of the pinnae and its long, narrow, convex sori. A single pinna resembles not a little an entire, small leaf of *D. gigantea*, from which it differs by its glabrous rachis and costa beneath.

273. **Dryopteris gigantea** (Mett.) C. Chr. Index 267. 1905.


**Type from Peru:** St. Gavan, LECHLER nr. 2292 (B!, S). Other specimens from Ecuador, Sodiro (C), Columbia, Costa Rica, PITTIER nr. 1163 and 9448 (C).

Well-marked by its entire frond, hairy midrib and principal veins, and by the cross-veins being covered with sporangia from end to end. It appears that the species also can be pinnate with 1–3 pairs of lateral pinnae.

The following forms, in Index Fil. referred to *D. reticulata*, are certainly good species (for synonymy see Ind. Fil.).

274. **Dryopteris reticulata** (L.) Urb.

The typical form of this is West-Indian, but very similar forms are found in Central-America. In Brazil the species scarcely occurs.


**Area:** Mexico along the Andes to Peru.

**Hieronymus** refers to this species *Meniscium arborescens* Willd. and *M. Kappelianum* Förster and he regards *Phegopteris mollis* Mett. as a variety.

276. **Meniscium macrophyllum** Kze. — Bahia and Guiana.

277. **Phegopteris membranacea** Mett. — Peru, LECHLER nr. 1785. 

35*

*Meniscium longifolium* Fée, Cr. vasc. Brés. 1: 84 tab. 25 fig. 2 (in Desv. Prodr. 223. 1827). — Brazil, Glaziou nr. 1714 (C) and several other specimens.

This is not very near *D. reticulata*; it resembles in general habit *D. falcata*, but the petioles of the pinnæ are shorter and their base rounded or very shortly cuneate, the main difference is, however, the pubescence. The underside is finely pubescent throughout and the receptacle is rather densely setose. By this last character it differs from all species mentioned above but agrees with a specimen from Plateau de Goyaz, Glaziou nr. 22631 (C), which probably belongs to an undescribed species. It is scarcely different from *D. longifolia* in pubescence, in shape of pinnæ it resembles closely typical *D. reticulata*. A third form, also from Goyaz, Glaziou nr. 22633 (C) has similarly pilose receptacles but long, narrow pinnæ not unlike those of *D. angustifolia*.

The following two species have always been considered good species.

279. **Dryopteris angustifolia** (Willd.) Urban.
West-Indies, Honduras, Ecuador.

280. **Dryopteris serrata** (Cav.) C. Chr. Ind. 291.
Brazil, Guiana, Costa Rica—Ecuador.

**Unknown to me are**

*Meniscium Salzmanni* Fée, Gen. 223 — Bahia.
*M. elongatum* Fée, Cr. vasc. Brés. 1: 83 tab. 25 fig. 1. 1869 — Brazil, Glaziou 1169.
*M. sessilifolium* Pohl; Fée, l. c. 84 — Brazil, Pohl.

**Unknown species of uncertain position.**

The descriptions of the following species are too short or do not mention such characters, which might indicate the right position of the species described in my classification.

1. **Goniopteris lucida** Fée Gen. 253 — Guadeloupe.
2. **Phegopteris ciliata** Fée, Gen. 248 — Cuba, Lindén nr. 270.
3. **Aspidium tenuiculum** Fée, Gen. 292 — Cuba?, Lindén nr. 2.
4. **Phegopteris amplificata** Fée, 8 mém. 89 — Mexico, Schaffner nr. 219.
5. **Phegopteris melanorachis** Fée, 8 mém. 91 — Mexico, Schaffner nr. 238.

Known as sterile only; probably an *Alsophila*.

6. **Aspidium cheiloplotium** Fée, 8 mém. 163 — Mexico, Schaffner (nr. 499 l. Fourn.).

*Additional notes to § 1* Eudryopteris.

(1) Recently I have received from Dr. H. Ross, Munich, a copy of his paper: Contributions à la flore du Mexique (Société scientifique “Antonio Alzate”, Mémoires 32. 1912), wherein my new species *Dryopteris Rossii*, mentioned above pag. 72, is described on pag. 179 and figured on plate XI.

(2) To § Eudryopteris beloning our common European *D. spinaulosa* with its subspecies *di*-latata. A specimen of the subspecies was collected by Mrs. Valentiner in 1909—1911 on the Falkland Islands. The specimen, which I have seen (Kew), is so exactly like our commonest North-European form, that I am nearly convinced, that the species was introduced into the far Islands.
INDEX

Names of accepted species in italics. An asterisk before the name indicates that the species is illustrated in the present work or in my other papers on American Dryopteris. In the following list both the number of the species and the page are quoted. The names without reference to page are synonyms, which are to be found in my earlier papers. Aspidium lasiethes Kze, f. inst., is a name not found in the present work; the figure 84 below indicates that the name is a synonym of species nr. 84 D. oligocarpa. Under this species we find (p. 136) a reference to "Revision nr. 5", where the synonym is quoted.

<table>
<thead>
<tr>
<th>Aspleniaceae Kze</th>
<th>Nr.</th>
<th>Pag.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alsophila</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pilosa Mart. et Gal.</td>
<td>160</td>
<td>148</td>
</tr>
<tr>
<td>Amauropelta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breutelii Kze.</td>
<td>149</td>
<td></td>
</tr>
<tr>
<td>Aspidium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>abruptum Kze.</td>
<td>196</td>
<td>189</td>
</tr>
<tr>
<td>abruptum Mart. et Gal.</td>
<td>190</td>
<td>176</td>
</tr>
<tr>
<td>achaenite Hieron.</td>
<td>139</td>
<td></td>
</tr>
<tr>
<td>agatoplepis Fée</td>
<td>6</td>
<td>69</td>
</tr>
<tr>
<td>allicaule Fée</td>
<td>195</td>
<td></td>
</tr>
<tr>
<td>Alfarii Christ</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>alsophilaceum Kze.</td>
<td>31</td>
<td>90</td>
</tr>
<tr>
<td>amaurolepis Fée</td>
<td>33</td>
<td>93</td>
</tr>
<tr>
<td>anotermum Kze.</td>
<td>226</td>
<td>229</td>
</tr>
<tr>
<td>apertum Fée</td>
<td>8</td>
<td>71</td>
</tr>
<tr>
<td>Archavaetae Hieron.</td>
<td>135</td>
<td></td>
</tr>
<tr>
<td>argentin Hieron.</td>
<td>83</td>
<td></td>
</tr>
<tr>
<td>asplenium Fée</td>
<td>179</td>
<td>164</td>
</tr>
<tr>
<td>asplenoides f. exin-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dusiatum Kuhn</td>
<td>227</td>
<td>230</td>
</tr>
<tr>
<td>asplenoides varr. por-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>toricense et subpin-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>nata Kuhn et Christ</td>
<td>211</td>
<td>213</td>
</tr>
<tr>
<td>athyroidees Mart. et</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gal.</td>
<td>6</td>
<td>69</td>
</tr>
<tr>
<td>atrorubens Met.</td>
<td>119</td>
<td></td>
</tr>
<tr>
<td>augescens Link</td>
<td>193</td>
<td>182</td>
</tr>
<tr>
<td>basilare Fée</td>
<td>36</td>
<td>99</td>
</tr>
<tr>
<td>Berteroanum Fée</td>
<td>106</td>
<td>140</td>
</tr>
<tr>
<td>Aspidium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biolleyi Christ</td>
<td>248</td>
<td>248</td>
</tr>
<tr>
<td>brachynevron Fée</td>
<td>13</td>
<td>78</td>
</tr>
<tr>
<td>Breutelii Met.</td>
<td>149</td>
<td></td>
</tr>
<tr>
<td>Caesarianum Christ</td>
<td>236</td>
<td>238</td>
</tr>
<tr>
<td>Capitalini Fée</td>
<td>179</td>
<td>164</td>
</tr>
<tr>
<td>carpipense Met.</td>
<td>34</td>
<td>95</td>
</tr>
<tr>
<td>catarolobum Kze.</td>
<td>245</td>
<td>244</td>
</tr>
<tr>
<td>caudatum var. co-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tractum Christ</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>cheloplotium Fée</td>
<td>272</td>
<td></td>
</tr>
<tr>
<td>chrysocarpon Fée</td>
<td>3</td>
<td>67</td>
</tr>
<tr>
<td>chrysoelobum Kff.</td>
<td>32</td>
<td>91</td>
</tr>
<tr>
<td>coadunatum Kff.</td>
<td>245</td>
<td>246</td>
</tr>
<tr>
<td>coarctatum Kze.</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>confluens Fée</td>
<td>156</td>
<td></td>
</tr>
<tr>
<td>consanguineum Fée</td>
<td>59</td>
<td></td>
</tr>
<tr>
<td>conspersoides Fée</td>
<td>195</td>
<td></td>
</tr>
<tr>
<td>conspersum Fée</td>
<td>198</td>
<td>190</td>
</tr>
<tr>
<td>conspersum Kze.</td>
<td>190</td>
<td>176</td>
</tr>
<tr>
<td>conterminum Wild.</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>costale Met.</td>
<td>185</td>
<td>169</td>
</tr>
<tr>
<td>erinitum Mart. et Gal.</td>
<td>3</td>
<td>67</td>
</tr>
<tr>
<td>etenitis Link</td>
<td>33</td>
<td>93</td>
</tr>
<tr>
<td>Cumingianum Kze.</td>
<td>206</td>
<td>208</td>
</tr>
<tr>
<td>de crescens Kze.</td>
<td>169</td>
<td>154</td>
</tr>
<tr>
<td>deltoidium Fourn.</td>
<td>41</td>
<td>102</td>
</tr>
<tr>
<td>deltoidium Sw.</td>
<td>178</td>
<td>164</td>
</tr>
<tr>
<td>deversum Kze.</td>
<td>190</td>
<td>179</td>
</tr>
<tr>
<td>diplazioides Moritz</td>
<td>122</td>
<td></td>
</tr>
<tr>
<td>Aspidium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dissidens Met.</td>
<td>218</td>
<td>222</td>
</tr>
<tr>
<td>elatior Fée</td>
<td>108</td>
<td></td>
</tr>
<tr>
<td>eriolepidion Fée</td>
<td>40</td>
<td>102</td>
</tr>
<tr>
<td>eriosorus Fée</td>
<td>136</td>
<td></td>
</tr>
<tr>
<td>exsudans Fourn.</td>
<td>67</td>
<td></td>
</tr>
<tr>
<td>v. myriocar-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pum Fourn.</td>
<td>154</td>
<td>147</td>
</tr>
<tr>
<td>falciculatum Raddi</td>
<td>32</td>
<td>91</td>
</tr>
<tr>
<td>Fendleri Fée</td>
<td>189</td>
<td>173</td>
</tr>
<tr>
<td>Fischeri Met.</td>
<td>156</td>
<td></td>
</tr>
<tr>
<td>falcidium Fourn.</td>
<td>4</td>
<td>68</td>
</tr>
<tr>
<td>Francoanum Fourn.</td>
<td>207</td>
<td>209</td>
</tr>
<tr>
<td>Frascri Met.</td>
<td>252</td>
<td>252</td>
</tr>
<tr>
<td>frigidum Christ.</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td>Funckii Met.</td>
<td>102</td>
<td></td>
</tr>
<tr>
<td>Galanderi Hieron.</td>
<td>98</td>
<td></td>
</tr>
<tr>
<td>Germani Fée</td>
<td>190</td>
<td>180</td>
</tr>
<tr>
<td>geropogon Fée</td>
<td>193</td>
<td>185</td>
</tr>
<tr>
<td>Ghesbregthii Fourn.</td>
<td>67</td>
<td>132</td>
</tr>
<tr>
<td>glanduliferum Karst.</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>Glaziovii Christ.</td>
<td>162</td>
<td></td>
</tr>
<tr>
<td>gleichenioides Christ.</td>
<td>154</td>
<td>148</td>
</tr>
<tr>
<td>gogiglodus Schkuhr.</td>
<td>201</td>
<td>193</td>
</tr>
<tr>
<td>guadalupense Christ</td>
<td>248</td>
<td>248</td>
</tr>
<tr>
<td>guianense Kl.</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>hastifolium Gris.</td>
<td>215</td>
<td>216</td>
</tr>
<tr>
<td>helveolum Fée</td>
<td>106</td>
<td></td>
</tr>
<tr>
<td>hemiotis Christ.</td>
<td>268</td>
<td></td>
</tr>
<tr>
<td>Huberi Christ</td>
<td>73</td>
<td></td>
</tr>
</tbody>
</table>

INDEX
<table>
<thead>
<tr>
<th>Aspidium</th>
<th>Nr.</th>
<th>Pag.</th>
</tr>
</thead>
<tbody>
<tr>
<td>imbecile</td>
<td>8</td>
<td>71</td>
</tr>
<tr>
<td>imbricatum</td>
<td>254</td>
<td>254</td>
</tr>
<tr>
<td>Inrayanum</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>incanum</td>
<td>182</td>
<td>166</td>
</tr>
<tr>
<td>incisum</td>
<td>210</td>
<td>211</td>
</tr>
<tr>
<td>indecorum</td>
<td>7</td>
<td>70</td>
</tr>
<tr>
<td>inquinans</td>
<td>7</td>
<td>70</td>
</tr>
<tr>
<td>insigne</td>
<td>187</td>
<td>170</td>
</tr>
<tr>
<td>invisum</td>
<td>196</td>
<td>187</td>
</tr>
<tr>
<td>isabellinum</td>
<td>33</td>
<td>93</td>
</tr>
<tr>
<td>Karstenii A. Br.</td>
<td>35</td>
<td>98</td>
</tr>
<tr>
<td>Karwinskianum</td>
<td>11</td>
<td>73</td>
</tr>
<tr>
<td>Kaulfussii Link</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td>Kunzei</td>
<td>169</td>
<td>153</td>
</tr>
<tr>
<td>lasiethes</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td>leptarachis</td>
<td>8</td>
<td>71</td>
</tr>
<tr>
<td>leucophaeum</td>
<td>264</td>
<td>264</td>
</tr>
<tr>
<td>Levyi Fourn.</td>
<td>209</td>
<td>211</td>
</tr>
<tr>
<td>L'Herminieri Kze.</td>
<td>179</td>
<td>164</td>
</tr>
<tr>
<td>limbatum</td>
<td>149</td>
<td></td>
</tr>
<tr>
<td>Lindeni Kuhn. Fourn.</td>
<td>44</td>
<td>105</td>
</tr>
<tr>
<td>lonchodes Eat.</td>
<td>180</td>
<td>165</td>
</tr>
<tr>
<td>Lorentzi Fourn.</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>lugubre Mett.</td>
<td>245</td>
<td>244</td>
</tr>
<tr>
<td>macropus Mett.</td>
<td>255</td>
<td>255</td>
</tr>
<tr>
<td>macorum Kf.</td>
<td>190</td>
<td>176</td>
</tr>
<tr>
<td>mexicanum</td>
<td>6</td>
<td>69</td>
</tr>
<tr>
<td>microcarpon Fée</td>
<td>34</td>
<td>97</td>
</tr>
<tr>
<td>microchaena Fée</td>
<td>34</td>
<td>97</td>
</tr>
<tr>
<td>molliculuma Mett.</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>monostichum</td>
<td>237</td>
<td>238</td>
</tr>
<tr>
<td>mucronatum Beyr.</td>
<td>32</td>
<td>91</td>
</tr>
<tr>
<td>navarrense Christ</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td>nervatum Fée</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td>nephrodioides Fée</td>
<td>190</td>
<td>179</td>
</tr>
<tr>
<td>nephrodioides</td>
<td>248</td>
<td>247</td>
</tr>
<tr>
<td>nitidulum</td>
<td>245</td>
<td>246</td>
</tr>
<tr>
<td>nutans Christ</td>
<td>238</td>
<td>240</td>
</tr>
<tr>
<td>obtusilobum Fée</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td>oligocarpum HKB.</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td>Orizaba Fée</td>
<td>195</td>
<td></td>
</tr>
<tr>
<td>pachychniimys Fée</td>
<td>156</td>
<td></td>
</tr>
<tr>
<td>pachyrrhachis</td>
<td>106</td>
<td></td>
</tr>
<tr>
<td>paleaceum Sw.</td>
<td>3</td>
<td>67</td>
</tr>
<tr>
<td>pallidum Fourn.</td>
<td>195</td>
<td></td>
</tr>
<tr>
<td>palustre Mett.</td>
<td>109</td>
<td></td>
</tr>
<tr>
<td>parallelogrammum Kze.</td>
<td>3</td>
<td>67</td>
</tr>
<tr>
<td>patens Eat.</td>
<td>192</td>
<td>180</td>
</tr>
<tr>
<td>patens Sw.</td>
<td>190</td>
<td>176</td>
</tr>
<tr>
<td>patulum Sw.</td>
<td>8</td>
<td>71</td>
</tr>
<tr>
<td>Aspidium</td>
<td>Nr.</td>
<td>Pag.</td>
</tr>
<tr>
<td>paucijugum Kl.</td>
<td>230</td>
<td>232</td>
</tr>
<tr>
<td>pauper Fée</td>
<td>195</td>
<td></td>
</tr>
<tr>
<td>pauperinum Kze.</td>
<td>8</td>
<td>71</td>
</tr>
<tr>
<td>pedicellatum Christ</td>
<td>29</td>
<td>88</td>
</tr>
<tr>
<td>physesioides Kuhn et Christ</td>
<td>62</td>
<td></td>
</tr>
<tr>
<td>pilosulmum Kt. et Karst.</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>platyrachis Fée</td>
<td>106</td>
<td></td>
</tr>
<tr>
<td>Polianum Pr.</td>
<td>201</td>
<td>193</td>
</tr>
<tr>
<td>polyphyllum Kf.</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>praetervisum Kuhn</td>
<td>184</td>
<td>168</td>
</tr>
<tr>
<td>prominulum Christ</td>
<td>200</td>
<td>191</td>
</tr>
<tr>
<td>Pseudo-filix-mas Fée</td>
<td>3</td>
<td>67</td>
</tr>
<tr>
<td>pseudonontannum Hieron.</td>
<td>135</td>
<td></td>
</tr>
<tr>
<td>ptaurica Kze.</td>
<td>105</td>
<td></td>
</tr>
<tr>
<td>pterifolium Mett.</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>puherulum Fée</td>
<td>193</td>
<td>184</td>
</tr>
<tr>
<td>purpurascens Christ</td>
<td>200</td>
<td>191</td>
</tr>
<tr>
<td>pusillium Mett.</td>
<td>54</td>
<td>128</td>
</tr>
<tr>
<td>quadrangulare Fée</td>
<td>245</td>
<td>245</td>
</tr>
<tr>
<td>Raddianum Mett.</td>
<td>36</td>
<td>99</td>
</tr>
<tr>
<td>reductum A. Br.</td>
<td>230</td>
<td>234</td>
</tr>
<tr>
<td>reductum Hieron.</td>
<td>235</td>
<td>236</td>
</tr>
<tr>
<td>reptans var. cordata Mett.</td>
<td>214</td>
<td>216</td>
</tr>
<tr>
<td>reptans var. hastefolia Mett.</td>
<td>215</td>
<td>216</td>
</tr>
<tr>
<td>reptans var. radicans Mett.</td>
<td>216</td>
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</tr>
<tr>
<td>reptans var. aspileioides Mett.</td>
<td>219</td>
<td>224</td>
</tr>
<tr>
<td>rigidulum Mett.</td>
<td>69</td>
<td></td>
</tr>
<tr>
<td>Rivoirel Fée</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>rivialioides Fée</td>
<td>135</td>
<td></td>
</tr>
<tr>
<td>roseum Fée</td>
<td>8</td>
<td>71</td>
</tr>
<tr>
<td>Sancti Pauli Christ</td>
<td>34</td>
<td>96</td>
</tr>
<tr>
<td>sanctoides Fée</td>
<td>156</td>
<td></td>
</tr>
<tr>
<td>sanctum Mett.</td>
<td>56</td>
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</tr>
<tr>
<td>scalare Christ</td>
<td>144</td>
<td></td>
</tr>
<tr>
<td>Schomburgkii Kl.</td>
<td>32</td>
<td>91</td>
</tr>
<tr>
<td>Schottianum Kze.</td>
<td>32</td>
<td>91</td>
</tr>
<tr>
<td>sclerophyllum Kze.</td>
<td>218</td>
<td>222</td>
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<tr>
<td>scolopendrioides var. incisa Mett.</td>
<td>210</td>
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</tr>
<tr>
<td>scolopendrioides var. subpinnata Mett.</td>
<td>211</td>
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<tr>
<td>scolopendrioides var. pinnata Mett.</td>
<td>218</td>
<td>222</td>
</tr>
<tr>
<td>semihiastatum Kze.</td>
<td>221</td>
<td>226</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Aspidium</th>
<th>Nr.</th>
<th>Pag.</th>
</tr>
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<tbody>
<tr>
<td>scriceum Fée</td>
<td>32</td>
<td>91</td>
</tr>
<tr>
<td>serra Sw.</td>
<td>195</td>
<td>186</td>
</tr>
<tr>
<td>serra var. incidum Mett.</td>
<td>196</td>
<td>187</td>
</tr>
<tr>
<td>serrulatum Sw.</td>
<td>225</td>
<td>228</td>
</tr>
<tr>
<td>setosum Kl.</td>
<td>41</td>
<td>102</td>
</tr>
<tr>
<td>siamboneuse Hieron.</td>
<td>138</td>
<td></td>
</tr>
<tr>
<td>simplicissimum Christ</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>Sintenisii Kuhn</td>
<td>218</td>
<td>223</td>
</tr>
<tr>
<td>Skinneri Hook.</td>
<td>208</td>
<td>209</td>
</tr>
<tr>
<td>Sprengelii Kf.</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>squamigerum Mett.</td>
<td>33</td>
<td>93</td>
</tr>
<tr>
<td>stenopterus Kze.</td>
<td>210</td>
<td>211</td>
</tr>
<tr>
<td>stipulare Wild.</td>
<td>190</td>
<td>176</td>
</tr>
<tr>
<td>strigilosum Daven.</td>
<td>43</td>
<td>104</td>
</tr>
<tr>
<td>strigosum Christ</td>
<td>85</td>
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</tr>
<tr>
<td>strigosum Fée</td>
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</tr>
<tr>
<td>subdecussatum Christ</td>
<td>154</td>
<td>147</td>
</tr>
<tr>
<td>tabulatum Christ</td>
<td>74</td>
<td>134</td>
</tr>
<tr>
<td>tenerrimum Fée</td>
<td>108</td>
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<td>tenuiculum Fée</td>
<td>272</td>
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<td>tetragonum auctt.</td>
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<td>31</td>
<td>90</td>
</tr>
<tr>
<td>Touzuzi Christ</td>
<td>42</td>
<td>103</td>
</tr>
<tr>
<td>trichophorum Fée</td>
<td>179</td>
<td>164</td>
</tr>
<tr>
<td>triste Mett.</td>
<td>249</td>
<td>249</td>
</tr>
<tr>
<td>Van Heurckii Fourn.</td>
<td>273</td>
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</tr>
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<td>varians Mett.</td>
<td>254</td>
<td>254</td>
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<td>velatum Kze.</td>
<td>103</td>
<td></td>
</tr>
<tr>
<td>velleum Wild.</td>
<td>39</td>
<td>101</td>
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<tr>
<td>venustum Hew.</td>
<td>234</td>
<td>235</td>
</tr>
<tr>
<td>Wrightii Mett.</td>
<td>177</td>
<td>163</td>
</tr>
</tbody>
</table>

| Asterochlaena (section) | 200 |
| Athyrium | 66  |
| sphearoecarpum Fée | 66  |
| Ceterach | 198 |
| polypodioides Raddi. | 205 |
| Ctenitis (subgenus 3) | 82  |
| Cyclosorus (subgenus 7) | 174 |
| Dichasium | 36  |
| parallelogrammum Fée | 66  |

| Dryopteris | 19  |
| achatensis (Hieron.) | 139 | 145 |
| Alfarii (Christ) | 85  |
| allocoptera (Kze.) | C. Christ. | 19 |
**Dryopteris**

<table>
<thead>
<tr>
<th>Species</th>
<th>Nr.</th>
<th>Pag.</th>
</tr>
</thead>
<tbody>
<tr>
<td>*aldruphilae (Kze.) O.</td>
<td>272</td>
<td></td>
</tr>
<tr>
<td>*amphioxypterus (Sod.) C.</td>
<td>132</td>
<td></td>
</tr>
<tr>
<td>*amplifiçata (Fée) C.</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>*annieae Ros.</td>
<td>247</td>
<td></td>
</tr>
<tr>
<td>*angustifolia (Willd.) Urb.</td>
<td>272</td>
<td></td>
</tr>
<tr>
<td>*Annisii Ros.</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>*anopera (Kze.) C.</td>
<td>226</td>
<td></td>
</tr>
<tr>
<td>*aperta (Fée) C.</td>
<td>71</td>
<td></td>
</tr>
<tr>
<td>*Arehavalaet (Hieron.) C.</td>
<td>135</td>
<td></td>
</tr>
<tr>
<td>*argentina (Hieron.) C.</td>
<td>83</td>
<td></td>
</tr>
<tr>
<td>*aspidioides (Willd.) C.</td>
<td>114</td>
<td></td>
</tr>
<tr>
<td>*asplenioides (Sw.) O.</td>
<td>219</td>
<td></td>
</tr>
<tr>
<td>*Basianteii Urb.</td>
<td>227</td>
<td></td>
</tr>
<tr>
<td>*var. portoricensis et var. subpinnata Urb.</td>
<td>211</td>
<td></td>
</tr>
<tr>
<td>*asterothrix (Fée) C.</td>
<td>217</td>
<td></td>
</tr>
<tr>
<td>*asterothrix Ros.</td>
<td>248</td>
<td></td>
</tr>
<tr>
<td>*athyrioides (Mart. et Gal.) O. Kz.</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>*atropurpurea Hieron.</td>
<td>114</td>
<td></td>
</tr>
<tr>
<td>*atoconia C.</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td>*atropurpurea (Hieron.) C.</td>
<td>135</td>
<td></td>
</tr>
</tbody>
</table>

**Dryopteris**

<table>
<thead>
<tr>
<th>Species</th>
<th>Nr.</th>
<th>Pag.</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Cinnamomea (Cav.) C.</td>
<td>6</td>
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</tr>
<tr>
<td>*cirrhosa var. eriocaulis (Fée)</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>*coalycascens (Bak.) C.</td>
<td>19</td>
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</tr>
<tr>
<td>*concreta (Kze.) C.</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>*cohaecensis C.</td>
<td>164</td>
<td></td>
</tr>
<tr>
<td>*collina Christ</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>*colubrina C.</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td>*concinna (Willd.) O.</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>*confusis (Sod.) C.</td>
<td>143</td>
<td></td>
</tr>
<tr>
<td>*consanguinea (Fée) C.</td>
<td>59</td>
<td></td>
</tr>
</tbody>
</table>

**Dryopteris**

<table>
<thead>
<tr>
<th>Species</th>
<th>Nr.</th>
<th>Pag.</th>
</tr>
</thead>
<tbody>
<tr>
<td>*consimilis (Fée) C.</td>
<td>125</td>
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</tr>
<tr>
<td>*corazonensis (Sod.) C.</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>*cordata (Fée) Urb.</td>
<td>214</td>
<td></td>
</tr>
<tr>
<td>*crassipes (Sod.) C.</td>
<td>106</td>
<td></td>
</tr>
<tr>
<td>*crenulae (Hieron.) C.</td>
<td>156</td>
<td></td>
</tr>
<tr>
<td>*Crossii (Bak.) C.</td>
<td>197</td>
<td></td>
</tr>
<tr>
<td>*ctenitis (Link O. Ktze.)</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>*ctenoides (Fée) C.</td>
<td>154</td>
<td></td>
</tr>
<tr>
<td>*Cumingiana (Kze.) O.</td>
<td>206</td>
<td></td>
</tr>
<tr>
<td>*Cuneata C.</td>
<td>253</td>
<td></td>
</tr>
<tr>
<td>*curta Christ</td>
<td>241</td>
<td></td>
</tr>
<tr>
<td>*dasyphylla C.</td>
<td>204</td>
<td></td>
</tr>
<tr>
<td>*deccrescens (Kze.) O.</td>
<td>169</td>
<td></td>
</tr>
<tr>
<td>*decumbens C.</td>
<td>179</td>
<td></td>
</tr>
<tr>
<td>*deccesata (L.) Urb.</td>
<td>175</td>
<td></td>
</tr>
<tr>
<td>*deflera (Klf.) C.</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>*dejecta (Jemm.) C.</td>
<td>188</td>
<td></td>
</tr>
<tr>
<td>*delicatula (Fée) C.</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>*deltaidea (Sw.) O. Ktze.</td>
<td>178</td>
<td></td>
</tr>
<tr>
<td>*demeraranus (Bak.) C.</td>
<td>129</td>
<td></td>
</tr>
<tr>
<td>*densiloba C.</td>
<td>181</td>
<td></td>
</tr>
<tr>
<td>*densisora C.</td>
<td>185</td>
<td></td>
</tr>
<tr>
<td>*deflera (Klf.) C.</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>*dejecta (Jemm.) C.</td>
<td>188</td>
<td></td>
</tr>
<tr>
<td>*diplazoides (Moritz) O. Ktze.</td>
<td>122</td>
<td></td>
</tr>
<tr>
<td>*divisiakensis (Mason et C.)</td>
<td>218</td>
<td></td>
</tr>
<tr>
<td>*divisiakensis (Mason et C.)</td>
<td>218</td>
<td></td>
</tr>
<tr>
<td>*Dominicensis C.</td>
<td>121</td>
<td></td>
</tr>
<tr>
<td>*Eggersii (Hieron.) C.</td>
<td>238</td>
<td></td>
</tr>
<tr>
<td>*eunica C.</td>
<td>268</td>
<td></td>
</tr>
<tr>
<td>*equita (Christ) C.</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td>*erioceylalis (Fée) O. Ktze.</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>erioceylalis (Fée) C.</td>
<td>136</td>
<td></td>
</tr>
<tr>
<td>*euchlora (Sod.) C.</td>
<td>161</td>
<td></td>
</tr>
<tr>
<td>*falcata (Lieb.) C.</td>
<td>271</td>
<td></td>
</tr>
<tr>
<td>*falciculata (Raddi) C.</td>
<td>91</td>
<td></td>
</tr>
</tbody>
</table>
**Dryopteris**

<table>
<thead>
<tr>
<th>Nr.</th>
<th>Pag.</th>
</tr>
</thead>
<tbody>
<tr>
<td>193</td>
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</tr>
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</tr>
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</tr>
<tr>
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</tr>
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</tr>
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<td>156</td>
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</tr>
<tr>
<td>227</td>
<td>229</td>
</tr>
<tr>
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</tr>
<tr>
<td>47</td>
<td>107</td>
</tr>
<tr>
<td>126</td>
<td>143</td>
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</tbody>
</table>

<table>
<thead>
<tr>
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<tr>
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<tr>
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</tr>
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<tr>
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<td>170</td>
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<td>231</td>
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<tr>
<td>91</td>
<td>137</td>
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**Dryopteris**

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Dryopteris

rustica (Fée) C. Chr. 116 141
Saffordii C. Chr. 1 66
sagittata (Sw.) C. Chr. 215 216
*Salvini (Bak.) O. Ktze. 45 106
*sancta (L.) O. Ktze. 56 150
*sanctiformis C. Chr. 57 130
*sancti-gabrielli (Hk.) O. Ktze. 27 80
*Santae Catharinae Ros. 132 144
*scabra (Pr.) C. Chr. 236 236
*scclaris(Christ) C. Chr. 144 146
*scapuliformes (Fée) C. Chr. 69 133
scarious Ros. 136 144
*Schafferi (Fée) C. Chr. 254 254
Schifferi C. Chr. 237 210
*Schoeckeana Christ 244 243
sclerophylla (Ktze.) C. Ros. 218 222
*scolopendroides (L.) O. Ktze. 210 211
scolopendroides C. Chr. 211 213
Sellowii Hieron. 34 95
*semiastata (Ktze.) O. Ktze. 221 226
*semilunata (Sod.) C. Chr. 151 146
*serrata (Sw.) O. Ktze. 195 186
serrata (Cav.) C. Chr. 280 272
*serrulata (Sw.) C. Chr. 225 228
*staminonensis Hieron. C. Chr. 138 145
silvicensis Hieron. 68 133
simplicissima (Christ) C. Chr. 79
Sintenisii (Kuhn) Urb. 218 223
Skinneri (Hk.) O. Ktze. 208 209
Sloanei Bak. O. Ktze. 196 187
sorribofolia Jacq. Hieron 275 271
soriloba Christ 34 95
*Sprengeli (Krf.) O. Ktze. 140 145
Sprucei (Bak.) C. Chr. 106 140
stenophylla Sod.) C. Chr. 70
stenophylla Ros. 86 137
*Stierii (Ros.) C. Chr. 72 133

Dryopteris

stipularis (Willd.) Maxon. 190 176
*straminea (Bak.) C. Chr. 256 255
strigiorea Hieron. 158 148
*strigilosa Dav. 43 104
struthiopterides C. Chr. 141 145
Stühelli Hieron. 173 159
subcuneata (Bak.) O. Ktze. 228 231
subdecussata (Christ C. Chr. 154 147
subfuscus (Bak.) C. Chr. 183 167
subglabra (Sod.) C. Chr. 52 111
subintegra Sod.) C. Chr. 207 209
submarginalis (L. et F.) C. Chr. 34 95
*subobliquata (Ktze.) O. Ktze. 28 81
-supina (Sod.) C. Chr. 107 141
supina var. Bolleyi C. Chr. 169 154
supraineata Ros. 181 166
supranitens Christ 77 135
sylvicola (Bak.) C. Chr. 17 77
*tablana (Christ) C. Chr. 74 134
*tabliziansis (Christ 78 136
tarapotensis (Bak.) C. Chr. 51 110
tenebriaca (Jemn.) C. Chr. 215 217
tenerrima (Fée) Ros. 108 141
tenuvigial Ca. Chr. 31 90
tetragon (Sw.) Urb. 262 260
*Thomisoni (Jemn.) C. Chr. 173 159
*tijucaena (Raddi) C. Chr. 14
Tondutii (Christ) C. Chr. 42 103
tremula Christ 137 144
tricholepis (Bak.) C. Chr. 46 107
trichophora (Fée) O. Ktze. 179 164
*tristis (Kte.) O. Ktze. 249 249
Tuckerheinii (Donn. Smith) C. Chr. 197 189

Dryopteris

Ulei Christ. C. Chr. 15 76
utensis Hieron. 9 72
Urbani (Sod.) C. Chr. 262
*urens Ros. 199 190
*utulata(Jemme) C. Chr. 233 234
uaeagenesis Hieron. 112 141
*valdepilosa (Bak.) C. Chr. 186 169
*vanities (Fée) O. Ktze. 26 79
velata (Ktze.) O. Ktze. 163 140
vello (Willd.) O. Ktze. 39 101
*vulvata (Hew.) O. Ktze. 234 235
*violivora (Raddi) C. Chr. 255 254
*Warmingii C. Chr. 223 227
Wolfii Hieron. 73
Wrightii (Mett.) O. Ktze. 177 163
*zygogenis Christ et Ros. 49 109

Endryopteris (subgenus) 64
Eugoniopteris (section) 200
Glaphyropsis (subgenus 5) 157
Goniopteris (subgenus 9) 198
Goniopteris abbreviata Pr. 188 171
affinis Fée 211 213
asterothrix Fée 217 221
babiosis Fée 226 229
cheilocarpa Fée 201 193
ferax Fée 211 213
gracilis Moorcroft Houlst 211 214
guadalupensis Fée 262 261
hastata Fée 226 et 227 229
leptochadia Fée 227 230
lucida Fée 272
macrocladia Fée 268
mollis Fée 267 267
platypes Fée 255 255
pyramidata Fée 228 231
quadrangularis Fée 263 263
Rivoirei Fée 265 265
rostrata Fée 188 171
strigosa Fée 210 212
tenera Fée 216 219

36*
Gymnogramma

asplenioides Sw. 105
consimilis Fee 125
diplazioides Desv. 124
cantria Fée 162 151
gracilis Hew. 126
Linkiana Kze. 124
microcarpon Fée 175 160
oppositans Fée 124
patula Fée 162 151
pilosa Mart. et Gal. 203 196
polypodioides Link 124 198
polypodioides Spr. 205
procurrens Fée 203 197
rupestris Kze. 124
Stierii Ros. 72
villosa Link 204 197

Lastrea (subgenus 4) 113

Lastrea
aspidioides Pr. 31 90
Cumingiana Pr. 156
distans Brack. 33 93
grossa Pr. 169 153
indecora Liebm. 7 70
Kohautiana Pr. 190 176
Leiboldiana Pr. 67 132
monosora Pr. 237 238
Poiteana Bory 265 265
polystichoides Pr. 8 71
Poppigiana Pr. 221 226
scabra Pr. 236 236
scabriuscula Pr. 190 176
tenuifolia Pr. 34 96

Leptogramma (subgenus 8) 196

Meniscium (subgenus 10) 268

Meniscium
Andreamum Sod. 269 270
arborescens Willd. 273
chorschoides Fée 272
elongatum Fée 272
falcatum Liebm. 271 270
giganteum Mett. 273 271
Jungersenii Fée 271 270
Kapplerianum Fée 275 271
longifolium Fée 277 272
macrophyllum Kze. 276 271

Meniscium
opaceum Bak. 20 78
Salzmanni Fée 272
sessilfolium Fée 272

Nephrodium
albescens Desv. 190 176
alsophilaceum Bak. 31 90
amphiophyteris Sod. 63
asplenioides Bak. 218 223
asplenioides subsp.
reptans Jenn. 216 217
asplenioides subsp.
sclerophyllum Jenn. 219 224
atomiferum Sod. 169 154
aureo-vestitum Hook. 39 101
aureo-viridum Jenn. 262 263
basiliaeetatum Jenn. 156
bemudianum Bak. 220 225
bibrachiatum Jenn. 217 222
brachydon Jenn. 188 171
brachydon Sod. 252 252
brachypodium Bak. 55 128
brachypodium Sod. 76 135
calcarium Jenn. 233 235
Cañadasii Jenn. 171
Caribaecum Jenn. 67 132
caripense Hr. 34 95
caucaense Hieron. 101
cinerum Sod. 156
elepolutatum Desv. 179 164
conforme Sod. 143 145
connexum Kuhn 202 195
conspersum Schrad. 190 176
coronense Bak. 150
costale Bak. 185 169
crassipes Sod. 106 140
crenulaceum Jenn. 156
crinotum Sod. 34 97
Cumingianum J. Sm. 206 208
decrescens Bak. 169
deflexum Pr. 79
deflexum J. Sm. 230 232
dejunctum Jenn. 188 171
deversoni Sod. 190 179
devolvens Bak. 245 246
diplazioides Hook. 122
dissimilis Schrad. 190 176
dissimilis Schrad. 190 176
Eggersii Hieron. 238 240
elegantulum Sod. 156

Nephrodium
ericeolatum Bak. 40 102
equitas Christ. 210 241
Fendleri Hook. 189 173
Fendleri var. paucipinate Donn. Smith 251 252
firmum Bak. 129
Fournieri Bak. 4 68
Fraseri Bak. 252 252
Gardnerianum Bak. 181 166
Grayii Jenn. 188 172
guadalupense Fée 248 248
Harrisoni Bak. 207 209
Holmei Bak. 179 164
Imrayanum Hook. 12 76
inacqua Schrad. 245 246
incisum Bak. 210 211
insigne Bak. 187 170
jamaicensis Bak. 218 223
Jamesoni Hook. 222 227
Jenni Bak. 106 140
Jurgenii Ros. 133
Karwinskianum Bak. 11
Kaufussi Hook. 84
Kunzeanum Hook. 196 189
Lagerheimi Sod. 34 98
laeceolatum Bak. 46 106
lasiopteris Sod. 154
Leprieurii Hook. 183 167
Levyi Bak. 209 211
Lindeni Bak. 44 105
lonchodes Hook. 180 165
longicaule Bak. 58 130
longipilosum Sod. 156
lustratum Hieron. 80
macaradenum Sod. 172
macrotis Hook. 224 228
macourum Schott 190 176
mexicanum Pr. 4 68
microsorum Hook. 50 109
neglevii Jenn. 131
nemorale Sod. 268
nigrovennum Christ. 41 102
nimbatus Jenn. 116
nudidulum Bak. 226 229
Nockianum Jenn. 89
oppositum Fée 195
pachyrachis Bak. 106
paludosum Liebm. 201 193
panamensis Pr. 67
patens Jenn. 192 180
Nephrodium
patulum Bak. 8
paucijugum Jenm. 196
Peripae Sod. 212 214
piloso-hispidum Hook. 160 148
polytrichum Schrad. 190 176
praetervisum Bak. 184 168
pseudo-thelypteris Ros. 135
puberulum Bak. 193 184
quadrangulare Fée. 200 191
Raddianum Hook. 36 99
ramentaceum Bak. 40 102
refractum Hook. 231 234
resinoso-foitidum
Hook. 169 153
retrorsum Sod. 160
rigescens Sod. 156
rigidulum Bak. 69
Salvini Bak. 45 106
Sanetti-Gabrieli Bak. 27 80
Schaaffneri Fée. 254 254
schizotis Hook. 190 176
scolopendrioides Hook. 211 213
semihastatum Hook. 221
semilunatum Sod. 151 146
serra Desv. 195 186
serrulatum Jenm. 225 228
Sherringii Jenm. 140 145
Skinneri Moore. 208 209
Sloanei Bak. 196 187
sphaerocarpum Hook. 6 69
Sprengelii Hook. 140
— var. persiciunum
Jenn. 169 154
Sprucei Bak. 106 140
squamigerum Ros. 33 93
stenophyllum Bak. 207 209
stenophyllum Bak. 70
stenopteris Eat. 210 211
stipulare Jenm. 130 176
stramineum Sod. 106 140
strigosum Jenm. 210 212
suhecematum Bak. 223 231
subfuscum Bak. 183 167
subglabrum Sod. 52 111
subintegrum Sod. 207 209
suboliquatum Bak. 28 81
subovatum Jenm. 228 231
supinum Sod. 107
tarapotense Hook. 34 98

Nephrodium
Nr.  Pag.
tenobryum Jenm. 215 217
tetragonum Pr. 154 148
tetragonum acut. 232 234
tetragonum Sod. 236 236
tricholepis Bak. 46 107
trichophorum Bak. 179 164
triste Hook. 249 249
Tuerckheimii Donn. Smith 197 189
unitum Bak. 201 193
usitatum Jenm. 233 234
valdepilosum Bak. 186 169
varians Fée. 26 79
velleum Desv. 39
venustum Moore 234 235
vestitum Bak. 36 99
Wrightii Hook. 177 163
Peltochaena(section) 74
nephrildiformis Fée. 81
Phygopteris
Nr.  Pag.
abbreviata Mett. 188 171
adenochrysa Fée. 70
amplicata Fée. 272
Andreana Christ. 272 270
aspidioidges Mett. 104
asterothrix Mett. 217 221
Blanchetiana Fée. 112
blanda Fée. 73 133
brachyodus Mett. 188 172
brevinervis Fée. 15
caespitosa Fourn. 73 133
ciliata Fée. 214 216
cordata Fée. 214 216
crenata Mett. 265 265
etenoides Fée. 154
deflexa Mett. 79
delicatula Fée. 60
denticulata Fée. 15
diplazioides Mett. 124
Duchassaigniana Fée. 124
elongata Fourn. 70
falcata Mett. 271 270
flammensis Fée. 112
Germaniana Fée. 117
gracilis Mett. 126
honesta Mett. 48 108
hydrophila Fée. 81 136
laevigata Mett. 96
Phygopteris
Nr.  Pag.
leptoptera Fée. 156
Linkiana Mett. 124
melanorachis Fée. 272
membranacea Mett. 277 271
mollis Mett. 275 271
nicargauensis Fourn. 250 250
obliterata Mett. 259 257
Oreopteridastrum Fée 34 96
Plumieri J. Sm. 188 171
pteroida Mett. 163 152
refugens Mett. 30 89
rustica Fée. 116
sculpturoides Fée 69
Seemannia J. Sm. 188 172
tenella Fée. 56
tenis Fée. 14
tricholepis Fée 30 89
Ulei Christ. 15 76
Polyodium
alloëopterum Kie. 19
androgynum Poir. 262 260
arcuatum Poir. 190 176
aspideides Pr. 31 90
asplenioides Sw. 219 224
Balbisii Spr. 56
biserial Bak. 151 110
brachyodus Kie. 188 172
caesiptum Bak. 73 133
camporum Lindm. 135
caripense H. B. Willd. 34 97
Carriii Bak. 13
caudatum Raddi 21
cilatiitum Pr. 32 91
coleescens Bak. 19 77
concinnum Willd. 70
consanguineum Kl. 84
crenatum Sw. 265 265
crenatum Hook. 267 267
Crossii Bak. 97 138
cetenoides Jenn. 154
cuhanum Bak. 214 216
decussatum L. 175 159
decussatum Sod. 176 161
deflexum Klf. 36 99
deltoides Sw. 178 164
demeraranum Bak. 120
dentatum Bak. 22 78
diataux Klf. 32 91
Polypondium

diversifolium Sw. 255 254

domingense Spr. 211 213
euchlorum Sod. 161 150

falciculatum Liehm. 32 91
fautilum Liebn. 259 257

flabillosum Bak. 48 108

flavopunctatum Klf. 12

Ghiesbrechtii Linden. 267 267

glanduliferum Liebm. 5 69

glandulosum Desv. 188 171

gracilicentrum Jenm. 133

grammicum Spr. 175 159

guadalupense Wikstr. 211 213

hastatofolium Sw. 215 216

hastatum Sw. 215 216

Hemsleyanum Bak. 47 107

heteroclitum Desv. 126

heterophlebium Bak. 19 77

honestum Kze. 48 108

hydrophilum Bak. 81 136

ichtiossum Sod. 22

imbricatum Liebm. 262 260

incisum Sw. 210 211

invisum Sw. 196 187

Lechleri Bak. 96

lepigerum Schrad. 36 99

litigiosus Liebm. 67

longicostatum Liebm. 18

Lunanianum Hew. 225 228

macrophylhum Hook. 214 213

megalodus Schkuhr. 263 263

menisoleides Liebm. 266 266

Michaelis Bak. 17

molle Jacq. 200 191

mollicum Kze. 70

monosorum Pr. 237 238

nephrodioides Kf. 16

nervosum Kl. 153

nigrescentium Jenm. 260 258

nitens Desv. 123 142

obliteratum Sw. 259 257

oligocarpum Willd. 84

oligophlebium Bak. 19 77

oligosorum Kl. 84 85

oppositum Vahl 63

patens Sw. 190 176

Pavonianum Kl. 130

pennatmum Poir. 263 263

Percivali Jenm. 175 160

plaelyoherum Bak. 51 110

Polypodium

Plumieri Desv. 63

praerognum Poir. 210 211

prasinum Bak. 25 79

priorites Kze. 15

proliferum Klf. 255 254

pteroidemum Kl. 163 152

pubescentus Raddi 84

punctatum Spruce 25 79

refractum Fisch. et Mey. 231 234

refulgens Kl. 30 89

repandum Sw. 216 217

repens Sw. 216 217

replaus Gmel. 216 217

retusum Sw. 84

riograndense Lindlm. 235 236

rivulorum Raddi 63

roraimense Bak. 111

rotundatum Willd. 12

rotundatum Bak. Fl. bras. 15

rotundatum Hook. 51 110

rupe Kze. 154

ruftum Poir. 71 133

Ruizianum Kl 165 152

rusticum Bak. 116

sagittatum Sw. 215 216

salicifolium Hook. 256 255

Saneti Gabrielli Hook. 27 80

saxicola Sw. 105

seabrum Pr. 236 236

scopendrioides L. sp. ed. I. 210 211

scopendrioides L. sp. ed. II, Sw. 211 213

serra Sw. 195 186

serrulatum Sw. 225 228

Smithianum Hew. 225 228

straminem Hook. 256 255

subincisum Mart. et. Gal. 43 105

subintegrum Bak. 207 209

submarginal L. et F. 34 95

subnobiliquatum Hk. 28 81

subtetragonum Lk. 262 260

sylvicolium Bak. 17 77

tarapotense Bak. 51 110

tetragonum Sw. 262 260

tetragonum var. incompletum Lindm. 236 237

Polypondium

Thomsonii Jenm. 173

tijucanum Raddi 14

triste Kze. 249 249

Urani Sod. 268

velutinum Sod. 175 160

vestitum Raddi 35 99

viviparum Raddi 255 254

Polystichum

abbreviatum (Schrad.)

Pr. 82

cystopteroides Nees. 6 69

Steiropteris (subgenus 6) 161

Stigmatopteris (subgenus 2) 73

Stigmatopteris

*alopecora (Kze.) C. Chr. 19 77

*Carrii (Bak.) C. Chr. 13 76

*caudata (Raddi) C. Chr. 21 78

*contracta (Christ) C. Chr. 23 78

*ichtiosma (Sod.) C. Chr. 22 78

*longicaudata (Liebm.) C. Chr. 18 77

*Micaelis (Bak.) C. Chr. 17 77

*nephrodioides (Kl.) C. Chr. 16 76

opaca (Bak.) C. Chr. 20 78

*pellucideo-punctata C. Chr. 24 78

prasina (Bak.) C. Chr. 25 79

*priorites (Kze.) C. Chr. 15 76

*rotundata (Willd.) C. Chr. 12 76

*tijucana (Raddi) C. Chr. 14 76

Tectaria

cinamomea Cav. 6 69

Woodzia

pubescens Spr. 219 224
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13. 75.
2. 2.
3. 80.
10. 85.
13. 75.
1. 10.
1. 50.
1. 60.
1. 50.
1. 25.
1. 25.
12. 25.
3. 30.
1.*
2. 25.
3. 3.
3. 75.
1.*
3. 90.
2. 50.
5. 35.
10. 50.
2. 80.
1. 80.
6.*
1. 40.
15. 05.
2. 15.
4.*
2.*
3. 40.
1. 60.
3. 85.
10. 50.
4. 75.
3. 45.
3. 25.
1. 33.
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udgivne af Det Kgl. Danske Videnskabernes Selskab
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