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MAR 29 1957
SPECIES FILICUM.
SPECIES FILICUM;

BEING DESCRIPTIONS OF THE KNOWN FERNS, PARTICULARLY OF SUCH AS EXIST IN THE AUTHOR'S HERBARIUM, OR ARE WITH SUFFICIENT ACCURACY DESCRIBED IN WORKS TO WHICH HE HAS ACCESS;

ACCOMPANIED WITH NUMEROUS FIGURES:

BY


CORRESPONDING MEMBER OF THE ACADEMY OF SCIENCES OF THE IMPERIAL INSTITUTE OF FRANCE, AND DIRECTOR OF THE ROYAL GARDENS OF KEW.

VOL. IV.

CONTAINING

SCLOPENDRION—POLYPODIUM.

PLATES CCXI.—CCLXXX.

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CONTENTS
OF THE FOURTH VOLUME.

SCOLOPENDRIÆ.

<table>
<thead>
<tr>
<th>Scolependrium</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

ASPIDIACEÆ.

<table>
<thead>
<tr>
<th>Didymochlæna</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Aspidium</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nephrodium</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nephrolepis</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>151</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Oleandra</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>156</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fadyenia</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>159</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Onoclea</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>160</td>
</tr>
</tbody>
</table>

POLYPODIEÆ.

<table>
<thead>
<tr>
<th>Polypodium</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>163</td>
</tr>
</tbody>
</table>

PLATES CCXI—CCLXXX.
SPECIES FILICUM.

Subord. VII.—SCOLOPENDRIÆ, Pr.

Sori as in Aspleniceæ (Subord. VI. vol. ii. p. 76), except that the involucres are arranged in pairs, opposite to each other, one originating on the superior side of a veinlet, the other on the inferior side of the opposite veinlet or branch.—A small group, with one exception, having undivided fronds. Venation free, or more or less anastomosing.

I have ventured to unite under one genus Scolependrium, Sm., Antigrame, Pr., Camptosorus, Lk., and Schaffneria, Fée. The chief distinctions depend on the nature of the venation, and, certainly, in proportion as the veins anastomose, the sori become scattered and the involucres are not always connivent in pairs, opening face to face. Mettenius excludes the group from Aspleniceæ, while Moore incorporates the two.

1. Scolependrium, Sm.


Character of the genus the same as the Suborder.

§ Euscolependrium.—Veins free or occasionally anastomosing.


Hab. Shady banks, woods, etc., throughout Europe, from Scandinavia ("ubi rarissima filix") in the north, to Italy, Greece, Spain, Madeira, and the Azores in the south; the Caucasus and Asia Minor (Nicomedia, Aucher-Eloy). N. America, State of New York, Dr. Torrey, and Lake Onondaga, Pursh. A small form is in my herbarium from Chiapas, Mexico, Linden; and I possess fine specimens from Hakodadi, Japan, Wilford.—A species easily recognized, yet liable to sport and to take peculiar and monstrous forms, especially in a state of cultivation. Rarely sori are found on both sides of a frond (see Hook. Brit. Ferns, under t. 37).—M. Fée's S. minus, from the Pyrenees, is merely a young and dwarf state of S. vulgare.


Hab. South of France, Italy, Sicily, Spain, Greece, Heldreich.—This is a very different species from the S. vulgare, and appears to be peculiar to the south of Europe, not extending to any of the opposite coasts of Africa or to the African islands.


Hab. Luzon, Hænke; S. Camarines, Cuming, n. 187, and Leyte, 311.—I possess fine specimens of the fronds of this noble species; but neither the caudex nor the perfect stipes. Hænke represents the stipes of the young simple-fronded specimens as scandent and creeping.

There has been referred to true Scolopendrium the S. Durvillei of Bory in Duperrey, Voy. of the Coquille, Bot. p. 273. t. 37. f. 1, which represents a long linear-lanceolate frond, with sori (if sori they are) more like those of a Gymnogramme than of Scolopendrium; and most imperfectly described. It is from the Pacific island of Ualan, and the caudex is said to be scandent. The same plant
is taken up by Kunze, Sekh. Fil. p. 9. t. 5, where a very different and very abnormal state of the Fern is given, with "sori" equally unlike those of a Scolopendrium, and which Mr. Smith is disposed to refer to a diseased state of his Sphenochitona scadens. He is probably right in this conjecture.—Another supposed species of Scolopendrium, S. Krevsii, Kze., I consider to be a form of our Lomaria punctulata, vol. iii. p. 31, where see the observations under that species.

§ Antigrame.—Veins free at the base, anastomosing towards the margin; fronds costate.


Hab. Brazil; most frequent in the south.


Hab. Brazil, about Rio, Douglas, Morieand; Organ Mountains, Gardner. n. 148.—This is the finest of the Scolopendrioid group. Some of my specimens have the fronds 10 inches long and nearly 5 inches broad; the broadest much resemble a large poplar-leaf.

§ Schaffneria.—Veins falcellate, free at the base, anastomosing towards the margin; fronds costate.

6. S. (Schaffneria) nigripes, Hook.; caudex short erect clothed with black subulate scales, stipites tufted short thick ebony-black articulated at the summit, fronds $1\frac{1}{2}$-$1\frac{3}{4}$ inch long obovate carnoso-subcoriaceous entire ecostate, veins

Hab. Mexico, between Vera Cruz and Orizaba, Müller, Schaffner.—The habit of this little plant is very remarkable; but as far as the fructification and venation are concerned, it quite corresponds with Antigrame of authors, which I consider a section of Scolopendrium rather than as forming a genus distinct from it.

§ Camptosorus.—Veins anastomosing near the costa, free and forked at the margin. Sori usually in opposite pairs, but more or less divaricating.


Hab. United States of America, as it would appear, widely dispersed, yet local; “New England to Wisconsin, and southward, rare” (Asa Gray). Our herbarium possesses specimens from New York, Vermont, Schuylkill, Wisconsin, Kentucky, Pennsylvania; in British N. America, from Canada to the Saskatchewan, Gouldie, Drummond.—A very remarkable plant, which by means of copious plantlets produced from the long slender proliferous apices of the fronds, traverses a good deal of ground, and is known in the United States by the name of the “Walking-leaf.”


Hab. Siberia, River Angura, Steller. Kamtschatka, Georgi. Island of Tsus Sima, Strait of Korea, Wilford, n. 790.—A rare and very little-known species. Our collector, Mr. Wilford, secured only one specimen, which quite accords with
the description of the Russian botanists. Linnaeus had probably this plant in view, when he gives his Aspl. rhizophyllum as a native of Siberia.

**Subord. VIII.—Aspidiace.e, Pr.**

* Sori dorsal, subglobose, rarely elliptical. Involucre superior, orbicular and fixed by the centre (peltate), or cordate or reniform and fixed by the sinus, or elliptical and attached by a longitudinal receptacle; the margins free all round or nearly so.—Ferns very various in habit; veins free or variously anastomosing.

The genera I am disposed to admit under this Order are as follows:—1. Didymochlæna. 2. Aspidium, mainly distinguished by its more or less orbicular peltate involucres, with the following sections or subgenera:—§ Polystichum, § Cyclocladium, § Cyrtomium, § Euaspidium, next to which I am disposed to place § Sagenia. 3. Nephrodium, Rich. and Br., chiefly distinguished by its cordate or reniform involucre, fixed at the sinus. Subgenera. § Lastrea, with free veins. § Euneuhrodium, with connivent veins, including Pleochnemia. 4. Nephrolepis. 5. Oleandra. 6. Padyenia. 8. Onoclea. It is true a synopsis of their character is not to be given a few words; but they appear to me to have sufficient marks of distinctness natural or artificial.

1. **Didymochlæna, Desv.**

(Hook. Gen. Fil. tab. VIII.)

*Sori* dorsal, terminal on a veinlet, elliptical. Involucre elliptical, emarginate at the base, attached by a longitudinal receptacle, free all round at the margin. Veins subflabellate, several times forked, free, the apices of the veinlets clavate. —Caudex erect, stout, arboreous. Fronds tufted, terminal, 4–6 feet long, stipitate, erecto-patent, subcoriaceous, bipinnate. Pinnules 3/4–1 inch long, obliquely rhomboid. Sori submarginal mostly on the superior half of the pinnule.

Hab. Tropical America; Brazil, N. Granada, Andes of Ecuador and Peru, West Indian islands. East Indies; Java, Luzon, S. Africa; Natal, Madagascar, Goudot. Peak of Fernando Po, G. Mann. Fiji Islands, Milne, Brackenridge.

2. ASPIDIUM, Sw. (in part), Br.


Sori dorsal, subglobose, involucrate. Involucræ orbicular or nearly so, peltate (fixed by the centre), on the back of free veins, or terminal, sometimes on the back or junction of reticulated veins (then called compital). Veins free, acute at the apex, or variously anastomosing.—Ferns very various in form and size and composition, inhabiting both the tropical and temperate parts of the world. Caudex also very variable, erect and stout, or ascendent, or long and creeping.

An extensive genus, even as it now stands reduced, mainly distinguished by the nearly globose sori and the orbicular and peltate involucræ. I follow mainly the views of Richard in Michaux, Brown, and Desvaux, in maintaining the genera Aspidium and Nephrodium as thus limited, and I make use of the venation for the sections or subgenera. Entire dependence is not however to be placed either on the exact uniformity of the venation, nor even on the shape of the involucres. These latter do occasionally vary, sometimes orbicular sometimes cordate on the same species, and sometimes the form and the point of insertion seem to be intermediate between the two.

§ POLYSTICHUM.—Veins simple or pinnated or variously dichotomous, free. Sori generally dorsal. Pinnæ and pinnules usually rigid and spinuloso-serrate.

* Frond simple, more or less lobed.


Hab. Jamaica, Dr. Bancraft; above the old Botanic Garden, rare, when freshly-gathered very viscid, Purdie. Cuba, east side of the island, C. Wright, n. 1052.
—A most distinct and well defined, apparently exceedingly rare species, and for a long time supposed to be peculiar to Jamaica. Recently I have received beautiful specimens from Mr. C. Wright, gathered in Cuba.

2. A. (Polystichum) *Plaschnichianum*, Kze.; caudex small erect, stipites tufted slender laxly paleaceous 4–6 inches long, fronds from a broad cuneate base lanceolate gradually acuminate 4–5 inches long rooting at the obtuse apex subcoriaceous entire cuneate at the base or more or less pinnatifid with the lobes rounded suberenate rarely with the lowest pair free sessile and decurrent, sori scattered or in two series one on each side the costa (*Tab. CCXI.*).—*Kze. in Linnea*, xxiii. p. 302.

Hab. Jamaica, *Wilson*; wet shady places, St. George’s parish, *Purdie*.—This is a very rare plant, only known to the author, Kunze, by a solitary cultivated specimen. I have been more fortunate in possessing specimens direct from Jamaica. It is the most simple-fronded of all the *Polystichum* group of *Aspidium*, and is certainly naturally nearly allied to *A. rhizophyllum*, L., but truly distinct (see our No. 3). The veins are fascicled, and we have seen some veinlets anastomosing, the superior one soriferous.

**Fronds pinnate, or subbipinnate; pinnae often deeply anastomosing.**


Hab. Jamaica, *Wiles, Wilson, Purdie*; Cuba, *Peppig*.—This, with much the general habit and proliferous apex of *A. Plaschnichianum*, may at once be known by its smaller size, thinner frond, the lower half or more pinnate, with the pinnae often petiolate and by the very long and finely attenuated ultimate pinna.

4. A. (Polystichum) *Thomsoni*, Hook.; caudex short thick scaly, stipites tufted 1–3–4 inches long paleaceous with large scales, fronds 6–8 inches long lanceolate acuminate chartaceous-membranaceous pinnate, pinnae subsessile 3–4 inches long deltoid-ovate or semiovate acute subauricled and deeply pinnatifid (especially at the superior margin), lobes small ovate inciso-serrate, teeth setoso-spinulose, sori solitary on each
lobe, involucre subovate membranaceous peltate pedicellate, the margin suberose.—*Hook. 2nd Cent. of Ferns.* t. 25.

Hab. Sikkim-Himalaya, *Hooker fil. and Thomson.* Kumaon, elevation 9–13,000 feet, *Strachey and Winterbottom.* Simula, *Col. Bates.*—This will rank among the smallest of the *Polystichums*, approaching perhaps nearest to some small forms of *Aspid. Preccottianum*, Wall., among the bipinnate species. The involucre, if constant in structure, is very remarkable.

5. A. (Polystichum) *Lachenense*, *Hook.*; caudex short oblique stout scaly above, stipites very densely tufted numerous and compact stout marcescent 2–4 inches long subflexuose glossy black or dark brown scaly, fronds 4–8 inches long linear-lanceolate coriaceous pinnate, pinnae, the largest less than ½ an inch long, patent rather distant sessile deltoideovate subpinnatifido-crenate rather obtuse subpinuloso-serrate or unarmed, sori in two rows on each pinnule, rachis stramineous setaceo-paleaceous with whitish appressed scales (Tab. CCXII.).

Hab. Sikkim-Himalaya, elev. 13–16,000 feet; Lachen and elsewhere, *Hooker fil. and Thomson.*—This has all the appearance of a very alpine Fern. The fronds, and consequently the stipites are very densely tufted, and though most of the fronds seem unable to bear the severity of the winter's cold or the long covering of snow, the stipites remain, stout, black, glossy, and withered at the points. It wants the wiry habit of *Asplenium Trichomanes*, otherwise the general size and form of the pinnules are not much unlike those of a form of that species.


Hab. Abundant in the temperate and cooler parts of Europe, chiefly on the elevated mountains in the south, and it appears to have an extensive range generally in the northern hemisphere, from Greenland (Disco, *Dr. Lyall*) in the north to Switzerland, Spain, Portugal, and Italy, Greece (Mount Olympus, *Aucher-
Eastward we possess it from Davuria (Turczaninow), and a decided specimen of the species, gathered by Jaegemont in N. W. India, among Birch, on high mountains, at Pye Pando. In the New World, the only localities recorded are, Michigan, U. States, and Lake Superior (Dr. Asa Gray); East side of Rocky Mountains. B. N. America, apparently rare, Drummond; and I have recently received, from British Columbia, splendid specimens 2 feet long, gathered by Dr. Lyall, of the Oregon Boundary Commission, at the Cascade Mountains, 49° n. lat., at 5000–6000 ft. elev. above the sea.—This species is the least variable of all the Polystichums.


Hab. Jamaica, Swartz, Bancroft, Wiles, March, Wilson, Purdie; Port Royal Mountains, Hartweg, n. 1584. St. Domingo (Mettenius). Guadeloupe (Grisebach).—A well-marked species among the truly pinnated group of Polystichum, recognized by the stout and very strict stipites, with their dense clothing of two or indeed three kinds of scales, the copious setaceo-paleaceous rachis, pinnae villous beneath, and the singular form and colour of the involucræ.

8. A. (Polystichum) acrostichoides, Sw.; caudex short stout or nearly so densely paleaceous, stipites a span long and as well as the rachis stramineous more or less paleaceous, fronds 1½ inch and more long subcoriaceous bright green, pinnae horizontal rather distant petiolate 2–3 inches long straight or subfalcate, from a broad obliquely cuneated base truncated and sharply auricled above oblong acute mucronate, serratures setoso-pinulose, fertile pinnae occupying more or less of the upper and contracted portion of the frond reduced in size from ½–1 inch long of the same shape as the sterile ones, sori in 2–4 rows near the costa, eventually confluent and covering the whole back of the pinnae. —Sw. Syn. Fil. p. 44. Willd. Sp. Pl. v. p. 225. Aspid. auriculatum, Schk. Fil. p. 31. t. 30. Nephrodium acrostichoides, vol. iv.

Hab. N. America, from Canada to the Rocky Mountains, southward through the United States, and along the Alleghanes, and from Florida westward to the Mississippi.—A species well distinguished by its always contracted fertile pinnæ when the sori are copious, less so when the fructification is partial.


Hab. California, Chamisso; from Monterey in the south, Wm. Lobb, through Oregon Territory, Menzies, to Nutka in the north, Seouler, Dr. Gairdner, Beechey, Bridges, n. 303, Dr. J. M. Bigelow, Hartweg, n. 2040, Geyer (Nez Percez Mountains), Dr. Sinclair, Dr. Lyall, Douglas (who observes that the roots are roasted by the Indians and form an article of food, and that they are used as garlands by them). Well distinguished from Aspid. falcinellum by the colour and texture of the scales, by the less coriaceous, less opaque, and broader and more acuminated pinnules, and by their setoso-spinulose serratures.

10. A. (Polystichum) falcinellum, Sw.; caudex short thick densely paleaceous with very ovate or lanceolate falcate black-brown glossy finely acuminated scales continued up the tufted stipites which are a span and more long, fronds 1–2 inches long broad-lanceolate or oblong acuminate coriaceous pinnated, pinnæ horizontal subfalcato-ensiform petiolate 2–3 inches long sharply (not spinulosely) serrated, the superior base truncate and auricled, inferior base excised rarely auricled above, sori biserial between the costa and margin, involucre orbicular almost cup-shaped fringed at the margin with a dark

Hab. Madeira; summits of the mountains, especially in cool shady places, Masson, Lowe; Ribeiro Priio and Curral, Vogel, Lippold, Lemann, J. D. Hooker.—Var. β. North side of Paul de Serra, near 5000 feet elev.; Lowe in Herb. Nostr., Lemann.—This Fern was long mistaken for the Ceylon A. auriculatum, till the Rev. Thos. Lowe cleared up all the difficulties respecting it. It is also allied to the two North American species, A. acrostichoides and A. munitum.

11. A. (Polystichum) auriculatum, Sw.?; caudex short thick erect or oblique more or less copiously scaly, stipites brown or stramineous 4 inches to a span long more or less paleaceous as is the rachis, fronds ½ a foot to 2 feet long oblong- or broad-lanceolate pinnated submembranaceous or coriaceous, pinnae horizontal varying much in size and form 1–3 inches in length sessile or nearly so, in the normal state from a broad cuncate base truncated and sharply auricled above excised beneath falcato-lanceolate acuminate subentire or serrated especially on the upper margin and towards the apex unarmed, or varying extremely in length and breadth and becoming more or less pinnatifid with the segments or lobes or teeth variously spinulose often deeply pinnatifid and even again pinnate at their base, sori in two rows nearer the margin than the costa, involuces very fugacious brown membranaceous.—Normal form: pinnae submembranaceous nearly entire at the margin or serrated, teeth rarely spinulose. (Tab. CCXVIII.)—Sv. Syn. Fil. p. 44? (excl. syn. Schk.). Willd. Sp. Pl. v. p. 227. Metten. Aspid. p. 40. Polypodium, Linn. Sp. Pl. p. 1548. Fil. Zeyl. p. 383. Filix Zeylanica, etc., Burm. Zeyl. p. 98. t. 44. f. 2.—Var. coriaceum; pinnae coriaceous broad the margin more or less strongly lobed or serrated and spinulose, fronds sometimes viviparous at the apex.—A. marginatum (auricle sometimes free), Wall. Cat. n. 366. Metten. Asplen. p. 59.—Var. subhipinnata; pinnae subcoriaceous variously and deeply lobed and toothed, below frequently again pinnated, the lobes and pinnules spinulose (thus bordering upon A. aculeatum, var. lobatum).—A ocellatum, Wall. Cat. n. 98. A. lentum, Don, Syn. Nep. p. 4.

Hab. India. Normal form; abundant in Ceylon and the Madras Peninsula, Burmann, Wallich, Gardner, Thwaites, Wight, etc., less common in other parts of India; Khasya, Hook. fil. and Thomson; Bhotan, Griffith, and there more fre-
12. ASPIDIUM, § POLYSTICHUM.

quently assuming other forms.—Var. coriacea. Nepal, Kumaon, Wallich, elev. 9000 ft., Devali, Strachey and Winterbottom; above Simla, Col. Bates, Edgeworth; Sikkim-Himalaya, Hook. fil. and Thomson (some with the lower scales on the stipes larger and intensely black); Bhotan, 9000 ft., Griffith, Booth.—Var. subbipinnatum, Nepal, Wallich, n. 360; Kumaon, elev. 2600 ft., Strachey and Winterbottom. Khasya, Griffith, Hook. fil. and Thomson, often mixed with the true auriculatum, Thos. Lobb; N. W. Himalaya, Harabagh, Edgeworth.—The earliest certain authority for this little-understood but common Indian Fern, is Burman's figure above quoted; and that, though only exhibiting the apex of a frond, is so characteristic, that we feel confident of its identity with the normal state we have here figured, and which is particularly common in Ceylon and the adjacent Madras Peninsula, where it seems to be pretty constant to its type; but in the Bengal Presidency, Northern Provinces, it is so variable that we do not wonder Dr. Wallich and others constituted new species. The difficulty indeed is to know where to stop, for in several the fronds become more compound, more or less bipinnate to an extent which almost unites our original type with Aspid. aculeatum, especially the least compound state of that, the var. lobatum.

12. A. (Polystichum) lepidocaulon, Hook.; stipites 6-9 inches and as well as the rachis densely clothed with brown membranaceous broad ovate scales of two kinds the one small and pressed the other large and more or less spreading, fronds 8-10 inches long ovate acuminate broad and truncated at the base pinnated, pinnae not numerous (10-12 pairs) chartaceous 2-2½ inches long sessile or shortly petiolate from a broad cuneate base truncated and distinctly and sharply auricled above, lanceolate gradually acuminate scaly beneath entire or obscurely crenate the inferior base rounded, uppermost pinnae short and confluent into an acuminate pinnatifid apex, sori in two or more series near the costa, involucres brown membranaceous deciduous, veins fasciuled rarely here and there anastomosing. (Tab. CCXVII.)

Hab. Near Simoda, Japan, J. Small; Ringgold and Rogers, U. S. N. Pacif. Eryl. Exped. (from the herbarium collected by C. Wright). Tsus Sima, Strait of Corea, Whiford.—A very distinct and well marked species, with a habit and texture somewhat approaching narrow pinnated forms of Cyrtomium falcatum; but with the almost entirely free venation of true Polystichum. The two sets of broad scales copiously clothing the rachis as well as the stipes, and less numerous on the under side of the pinnae are very peculiar.

13. A. (Polystichum) stimulans, Kze.; caudex short stout oblique very scaly, stipites densely tufted 2-4 inches long often chaffy flexuose slender and tawny as is the rachis, fronds subcoriaceous 4-6-8 inches long linear or oblong-lanceolate acute pinnate, pinnae lax distant distinctly petiolate from an oblique truncate cuneate base rhomboideo-triangular with generally a spinose auricle at each base and with two or three large sharp serratures which as well as the apex are terminated with a spine, rarely one of the auricles becomes a free

Hab. Northern India; Nepal and Kumaon, Wallich, Strachey and Winterbottom, elev. 9000 feet; Simla, Col. Bates. N. W. India, Edgeworth; Valley of the Jumna, 9–1000 feet elev., Jacquemont, n. 74, 75. Sikkim, Changtam, Tambur river, Hook. fil. and Thomson.—This has a lax and flexuose habit not common among genuine Polysticha; and, taking the more ordinary forms, such as we have represented in our Plate CCXIV., it seems very distinct; but even in this state it has its representative, especially in the peculiar triangular shape of the pinnae, in the West Indies, in the Aspid. triangulum, Sw., figured at t. 33 of our 'Filices Exoticae;' there however the frond is more coriaceous, the pinnae are less spinoso-labile and sessile, and the scales of the caudex and lower part of stipes are very different, large, and with a deep glossy black disk. Again, some of our specimens from Mr. Edgeworth and from Sikkim, have the pinnae more elongated, more pinnatifid, and more disposed to be bipinnate. In our ordinary form we here and there find a pinnule which bears a distinct pinnule.

14. A. (Polystichum) diaphanum, Zoll.; “frond thin-membranaceous subpellucent flaccid ferrugineo-pilose on the nerves oblong-lanceolate acuminate pinnato-subpinnatifid, pinnae shortly petiolate approximate divergent or patulous trapezio-ovate oblong auriculate obtuse, the adult plant at the base (partly only deeply pinnatifid) with the auricle free, segments obliquely ovate lobed or toothed all of them obliquely costate aristato-serrate or toothed, sori at the base of the laminae or of the lobes or teeth solitary, of the lower ones and of the auricle binate or quaternate subrotund with lax capsules, petiole rachis short stipes and rhizome densely ferrugineo-paleaceous.” Kze. in Bot. Zeit. vi. p. 260. Metten. Aspid. p. 42.

Hab. Java, Zollinger, m. 330.—Mettenius places this in the same subsection with Aspid. stimulans and A. ocellatum, Wall. (our A. auriculatum, var.). I am not acquainted with it. Kunze says that in habit it resembles Polypodium reptans, Sw. (Aspidium, Metten.).

15. A. (Polystichum) cespitosum, Wall.; caudex a short thick scaly rhizome, scales often ciliated, stipites tufted slender 2–6 inches long stramineous as well as the rachis, fronds 4 inches to a span and more long oblong- or linearlanceolate acute rather than acuminate chartaceo-membranaceous often glossy pinnated, pinnae rather distant horizontal ¼-1¼ inch long petiolate from an entire obliquely cuneate truncate and obtusely auricled, superior base trapezoideo-

Hab. Northern India, especially in the Himalaya, at elevation of 4-10,000 feet. Nepal, Wallack. North-west Provinces, Edgeworth. Simla, Col. Bates. Kumaon, Strachey and Winterbottom; Lachen and Sikkim, Hook. fil. and Thomson. Bhotan, Griffith.—This has, I think, sufficiently marked characters to merit rank as a species, and my specimens exhibit few variations.


Hab. Jamaica, Sloane, Purdie (Cedar Valley, St. George), N. Wilson, Dr. Alex. Prior. Cuba, Linden, n. 2175 (Fée), n. 1866 (in Herb. Nostr.).—Var. β. St. Jago de Cuba, Linden, n. 2193 (Fée), C. Wright, Pl. Cub. n. 829.—I must refer to my figure of this species, in ‘Filices Exotica,’ and to my description and remarks, for my reasons for uniting Fée’s Polyst. cyphochlamys and his P. ilicifolium with it. I have seen no authentic specimen of the true trapezioides, Sw., but suspect it to be the same as this.

17. A. (Polystichum) viviparum, Fée; “fronds below bipinnate, above pinnate virgate radicanti-viviparous, rachis stout channelled rufescent, scales lanceolate acuminate black
in the centre, pinnæ obtuse, lower ones pinnate at the base
segments mucronate, mucro short thick, upper pinnæ sub-
rhomboïd auricled above crenulate mucronate at the apex.”
Pulystichum viviparum, Fée, Gen. Fil. p. 280; 6me Mém.
Foug. p. 21. t. 3. f. 3. Aspid. Metten. Aspid. p. 44. P. tra-
pezioides, β, Moore, Ind. Fil. p. 108 (name only).

Hab. Cuba, Linden, n. 1742. Jamaica, Purdie.—I had occasion to remark
in the ‘Filices Exotice,’ under Aspid. (Polystichum) triangulun, Sw., that it
would be no enviable task for any one to undertake to describe the different
exotic kinds of the Polystichum-group of Aspidium. I now feel very sensibly
the truth of that statement. M. Fée has given a faithful representation of this
Fern, and I have copied his correct specific character; but different as this form
assuredly is from the ordinary form of Aspid. triangulun, my var. γ, I am quite
disposed to consider it as an intermediate state; in short, passing by its more
compound (partially bipinnate) into the ubiquitous and polymorphous Aspid. acu-
leatun. (See observations on a form of our Aspidium aculeatun, under the S. Ame-
rican (West Indian) localities from Cuba.) Mr. Moore refers Fée’s viviparum to
his P. trapezioides; but what his trapezioides is we are not informed. The speci-
men which I believe to be Swartz’s trapezioides, he has, and rightly too, referred
to triangulun.

18. A. (Polystichum) tridens, Moore, MSS.; caudex short
erect clothed with conspicuous intensely ebeneus-black
scales with brown margins often ciliated, stipites 3–6 inches
long tufted fusco-palaceous below, fronds 6–12 inches long
oblung-lanceolate coriaceous acuminate, pinnæ 1 inch long
deply tripaltilte (rarely trifoliolate) the cuneate base taper-
ing into a petiole, segments (or pinnules) linear-lanceolate
acuminate spinulose the margin subspinuloso-serrate, upper-
most pinnules linear-lanceolate and nearly entire, veins almost
obsolete, sori in two rows submarginal, involucres peltate pedi-
cellate fringed. (Tab. CCXV.)—Polystichum tridens, Moore,
MS. in Herb. Hook.

Hab. Jamaica, rare; near Woburn Lawn, Port Royal, Purdie, 1840. Arntilly Gap,
Blue Mountains, elev. 3000 ft., Wilson—Unwilling as I am to sanction a specific
name written in a private herbarium, without any character or description, the
present one is too appropriate to be rejected. It will be seen by our figure, how
extremely unlike it is to any known Polystichum; yet upon one of my specimens
of P. triangulun, β, a considerable number of pinnæ are regularly trifurate,
though broader and shorter than these. I cannot think it possible it can be an
abnormal form of that variable plant. My several specimens of this, indeed, from
two different collectors are very uniform.

19. A. (Polystichum) tripteran, Kze.; caudex short erect
palaceous with brown ovate scales, stipites tufted a span to
a foot high scaly below and as well as the rachis stramineous
glossy, fronds 1–1½ foot long submembranaceous flaccid
hastato-lanceolate acuminate pinnate, the lowest pair of pinnae elongated 4–6 inches long and again pinnate, pinnae and pinnules all horizontal subsessile from a broad obliquely cuneated base auricled above subexcised below lanceolate inciso-serrate (scarcely subpinnatifid), serratures bristle-pointed, sori biseriate or scattered, involucres at length almost concealed by the capsule.—Kze. Bot. Zeit. vi. p. 509. Metten. Aspid. p. 51. Hook. 2nd Cent. of Ferns, t. 56.

Hab. Japan, Goring, C. P. Hodgson, Esq. Island of Tsus Sima, Gulf of Corea, Wilford.—This again is a most distinct and well-marked Fern, and one of great elegance, not likely to be confounded with any other. It is only the lowest pair of pinnae that are much elongated and again pinnated; in that respect therefore it is more compound than several that follow in this “pinnated” section; but not enough so to be considered strictly bipinnate.

20. A. (Polystichum) Tsus-Simense, Hook.; caudex short thick oblique crowned with large black lanceolato-subulate falcate black scales, stipites tufted slender a span long stramineous, at the base scaly with the same black scales as the caudex mixed with slenderer subulate ones and black hairs, fronds (the very young and undeveloped ones 2 and more inches high clothed with long circinate black subulate and long pointed scales) a span to a foot long finely acuminated chartaceous bipinnate pinnate above, pinnae 1–1½ inch long shortly petiolate from a broad base gradually acuminated falcate superior base truncated and forming a large spinulose-pointed auricle, pinnules very compact ovate spinulose at the apex entire or with very minute mucronate serratures ultimate ones confluent, superior pinnae simple lobato-pinnatifid, the lobes, spinulose ultimate ones confluent into a long-attenuated apex, lowest pair of pinnae scarcely smaller than the rest deflexed, sori 2–4–6 on each side the costule, involucre thin-membranaceous orbicular and flat. (Tab. CCXX.)

Hab. Island of Tsus Sima, in the Straits of Corea, C. Wilford.—I find no described species to accord with this. The scales of the caudex are singular in shape and peculiarly black; the upper portion of the frond is pinnated, the rest regularly bipinnate, the lowest pair of pinnae deflexed.

21. A. (Polystichum) semicordatum, Sw.; caudex thick horizontal creeping (?) very densely clothed with long (3 of an inch) subulate scales, stipites solitary (not tufted) stout a span and more long shaggy with long slender paleaceous scales at length deciduous, fronds 2–3 feet long broad or ovato-lanceolate (8–10 inches wide) coriaceo-membranaceous blackish-

Hab. a. Americanum. Tropical America: West Indian Islands, probably universal; throughout Venezuela, New Granada; Esmeraldas, Ecuador; Seemann; Central America, Cuming, n. 1244; Panama, Sinclair, Hayes, n. 74; Galápagos Islands, Capt. Wood. Valley of the Amazon, Rio Managuiry, Spruce, n. 1610, and Tarapota, Eastern Peru.—β. Persilianum. Luzon, Presl, Cuming, n. 68. Solomon Islands, Milne, (superior basal lobe divaricated, as that from Ambon, Labilliardière, Herb. Hook. ex Herb. Webb).—γ. crenatum. Cochin China, Gauli- chaud; Borneo, Wallace, Thos. Lobb (Sarawak).—δ. truncatum. Twa Kahun, Moulmein, Rev. C. S. P. Parish.—This species has no near affinity with any of the Polystichum-group, but it is not therefore needful to constitute a genus: nor, whether a genus or not, is there any need for constituting five species of the original semicordatum. Presl was quite right in uniting the Luzon plant (since called Persilianum) with the American semicordatum. Hemicardium crenatum and subhastatum of Fée (both oriental Ferns) differ in nothing but the greater or less development of the lobes at the base of the pinnæ, quite obsolete in those of my var. truncatum (as indeed Plumier has represented them in his American plant).—

H. Cochinchinense, Fée, is nowhere described or in any way characterized. My
authentic specimens of _H. macrosorum_, Fée (Schldn. New Granada, n. 658), do not exhibit the shadow of a difference from _semicordatum_. The fronds, although apparently articulated upon the rachis, and although the dilated base of the short petiole has a dark mark and a depression around it, as if the pinnae would fall away there, yet in all my numerous specimens the latter are singularly persistent.

*** Fronds bi-rarely tri-pinnate.

22. A. (Polystichum) _aculeatum_, Sw.; caudex short suberect, stipites tufted and rachises more or less clothed with ferruginous scales of two forms, one slender and resembling hairs, on the stipes especially, mixed with large ovate or lanceolate ones sometimes two-coloured, fronds 1–2–3 feet long oblong-lanceolate acuminate sometimes prolific bi-rarely tripinnate subcoriaceous, primary pinnae approximate from a broadish subpetiolated base oblong- or linear-lanceolate subfalcate, pinnules close subrhombo-ovate or lanceolate free subpetiolulate or decurrent at the very base with the adjacent ones spinosely or setosely serrated or lobate, the superior base more or less auricled, sori generally in two rows on each pinnule and usually nearer the costa than the margin, costae and costules more or less villosopaleaceous beneath.—Polypodium _aculeatum_, Linn.

I lab.* Almost every part of the known world;—


* With my perhaps peculiar views of the universal distribution of this species which has been described under so many different names in the Floras of different regions, I should despair of making myself intelligible unless I include the synonyms under the different countries they inhabit; and these localities I shall take almost exclusively from specimens preserved in my own herbarium. I shall offer a few remarks as I proceed, in order to explain my reasons for thus uniting so many species which have been preserved by many able botanists as distinct. It is certain that the very extensive suites of specimens in my possession give me an advantage in forming an opinion, such as perhaps none of my predecessors or cotemporaries have enjoyed; but I am compelled to omit a considerable number of synonyms of very trustworthy authors, because of the difficulty of ascertaining the exact forms they intend, or to admit them only with a doubt.

2. NORTH AMERICA. United States, apparently rare: (not in Chapm. Fil. of S. U. St.) Mountains of New Hampshire, Vermont, probably nowhere south of New York. Not found in Canada: but it appears in N. W. America, near the sources of the Columbia, Drummond. Sitka (Asp. vestitum, Bongard, Veg. of Sitka, p. 57, and in Herb. Nostr.); Nutka, Huenke.

3. AFRICA and adjacent islands. North Africa: Madeira, abundant (mostly angulare form); Teneriffe, Webb, Bourgeau (Aspid. angulare, Webb); Azores, abundant, Seubert (A. angulare, Seub.); Mount Silke, Abyssinia, Schimper, It. Abyss. n. 680 (typical form); Fernando Po, on the Peak, elev. 9000 feet, G. Mann, the common European form. South Africa: Cape Colony, frequent, Cape to Natal (Aspid. pungens,* Kauff. Schlecht. Adumbr. p. 21. t. 10); generally larger and broader than the European form, with a tendency to be tripinnate, and with more distant pinnae and pinnules; the latter more elongated and more falcate. Aspid. lactuosum, Kze., and Pappe and Rawson, is quite our European and typical form. Pappe and Rawson (Syn. Fil. Afr. Austr.) bring into the Cape Flora "Aspid. angulare, Kit.;" and my specimen of A. lactuosum, from Sir George Grey, would, I think, be referred to that by some botanists: and Mr. Moore remarks, in Herb. Nostr., my Natal specimen of angulare is quite a normal English form. From the Cape, Milne, and from Natal (Captain Garden), I possess specimens quite according with the Aspid. stramineum, Kauff., of Mauritius. Bourbon, Carmichael, and

* Possibly I may be wrong in referring the Aspid. pungens, Kauff., to the present species, especially if, as Schlechtendal says, the caudex is really "horizontalis pro-reps, which I have no means of confirming. One of my specimens, indeed, from Ecklon (under n. 4610) is so extremely unlike the figure of Schlechtendal (Tab. X.), that I had long considered it totally distinct from pungens or aculeatum, in its great size (between 4-5 feet long, including the densely paleaceous stipes), its very compound, though narrow-lanceolate and accumatated pinnules, deeply pinnatifid and even again pinnatifid, quite tripinnate; but I find intermediate forms which it must be confessed too much resemble aculeatum to induce me, in the present state of my knowledge, to keep them separate.
ASPIDIUM, $\&$ POLYSTICHUM.

Mauritius, Sieber, Syn. Fil. n. 34, Bojer and others; fronds broad, pinnae large rhomboe-ovate: this is Aspid. stramineum, Klf. in Spreng. Syst. Veg. iv. p. 105, Metten. Aspid. p. 50. An Polystich. Sieberianum, Pr. which I hardly venture to consider distinct from aculeatum. In general the chaffy scales are all pale brown as in the European aculeatum, but, what is very remarkable, some of my specimens (with no other difference) have an admixture of the large black rigid curved scales, with pale margins, on the stipes, characteristic of some of the Antarctic states of the so-called Aspidium vestitum (Polyp., Forst.) of the more extreme southern portion of the southern hemisphere. Some of our fronds, on the other hand, from Mauritius exactly correspond with the typical Aspid. aculeatum.

4. INDIA proper: the Indian continent, excluding the Malay Peninsula and Islands. In this vast territory this species, in my extended views of it, abounds, and, as may be expected, it assumes various forms, according to the amount of heat and moisture and elevation upon the mountains, so that many supposed species have been formed of it. I find some of the chief differences depend on the paleaceous clothing; this however is deceptive, for it is more or less deciduous, sometimes entirely so. Among the most remarkable is the Aspidium rufo-barbatum, Wall. Cat. pp. 369 and 370. Polystichum, Pr. Aspid. squarrosum, Don, Prodr. Nep. p. 1. Metten. Aspid. p. 46. Also Aspid. setosum, Wall. Cat. n. 371. Polyst. Wallachianum, Pr. Aspid. lentum? and discretum, Don. The large and the copious fine villiform pales are often of a rich ferruginous colour; and the young undeveloped fronds, when about a foot high, are most densely clothed with long silky hairs of a truly golden hue, but which disappear in age. In India Aspid. aculeatum has a very extended range in mountain regions of the north, from Nepal (Aspid. discretum, Don), Kumaon, and Sylhet, all along the Himalayan range, from the extreme west to Bhotan in the east, varying extremely in size; some merging into the large forms of the Cape of Good Hope and Mauritius, others quite according with true aculeatum, or the angulare form, while some of our specimens tally with the strongest marked lobatum, Wallich, Griffith, Hooker fil. and Thomson (Sikkim, etc.), Edgeworth, Strachey and Winterbottom (elev. 8–10,000 feet), Jacquemont, Colonel Bates. Nilghiri hills, Dr. Wight, Cat. n. 110, Schmid, (Aspid. brachypterum, Kze. in Linnaeæ, xxiv. p. 288, and in Hohenacker, Pl. Ind. Or. n. 906, and Aspid. subinermæ, Kze. in Linnaeæ, xxiv. p. 200), G. Thomson, M’Ivor. Khasya and Assam, Mrs. Mack (angulare), Simmons, Hooker fil. and Thomson (some specimens with very large black scales edged with rufous).

5. CEYLON. Specimens generally large, paleaceous tawny scales often mixed with black ones; others quite the European aculeatum, Mrs. General Walker, Gardner, Thwaites, C. P. n. 1376. 3303. Some specimens cannot be distinguished from the Javanese Aspid. acutifolium and Aspid. Moluccense, Blume.


7. CHINA and JAPAN, Bonin Islands (from Imp. Acad. Petersb.). Common Indian form. Island of Tsus-Sima, off the coast of Korea, Wilford; typical acu-

8. TROPICAL AMERICA. Much of the Aspid. aculeatum of tropical America is the Aspid. Moritzianum, Kl. in Linnaea, xx. p. 367, and Aspid. ordinatum, Kze. in Linnaea. xviii. p. 347, between which I can perceive no difference; and they quite tally, some with the typical forms of aculeatum and var. angulare, others, from the larger size, correspond with the usual tropical condition of the species. Abundant in Columbia and Venezuela, Moritz, n. 580. Linden, n. 157 and 154, 539, 1025. Schlimg. n. 481 (large and numerous scales on the rachis). Fediller, n. 172, 173 (some with large brown scales on the rachis, an inch long), and 174 (with very large black glossy scales, and fulvous margins at the base of the stipes); Boqueta, Veragmas, Seemann, n. 1118. Antioquia, Jurise.—Brazil, Selton (angulare), Gardner, n. 133, and Organ Mountains (quite Aspid. Moritzianum).—Peru, Tarapata, Spruce, n. 4743. Chacapoyas, Mathews, n. 3285 (var. angulare). Tabina, Leecher, n. 2087, with glossy membranaceous scales on the stipes, an inch long and more than half an inch wide. Ecuador: Quito, Jameson (angulare); Tunuguragua, Spruce, n. 5305. Mexico, Jurgensen, n. 901. Galeotti, n. 64, 74. Liebold (Aspid. ordinatum, Kze., Liebm.). Linden, n. 1536.—Guatemala, Hartweg, n. 631 (Aspid. Hartwegianum, Kl. in Linnaea, xx. p. 366, Skinner (copious specimens, varying from angulare to Moritzianum or ordinatum); Volcano de Fuego, 7000 feet elev. Osb. Salyen (Aspid. Moritzianum).—Andes of Mendoza, Sierra del Portezuela, Gillies (angulare). An Polyst. Sellowianum, Pr. Tent. Pterid. p. 83. n. 757?


10. WEST INDIAN ISLANDS. It is remarkable that I have seen no well-pronounced form of our present species from these islands; unless a plant I have received from Dr. Cruger of Trinidad, "Serro de Arila," be from that island, as it probably is, though the same package contained plants avowedly from the opposite mainland of Venezuela. The specimens quite resemble a rather small form of the South American aculeatum, with pinnales a little more entire than usual. This I possess also from C. Wright, Planta Cubenses, n. 1056 (omitted in Eaton, Fil. Wright et Fedl.)—it is prolificus at the apex, and the Polystichium heterolepis, Fée, Gen. Fil. p. 279, allied to Polystichum viviparum, Fée, n. 17 of this work, also from Cuba; but it is throughout (except at the apex) bipinnate, and in all other respects quite accords with aculeatum. This seems to confirm an opinion we have expressed under Aspid. viviparum, that this latter may be an imperfectly developed state of Aspid. aculeatum.

11. SANDWICH ISLANDS. I possess no plant of the aculeatum-group from these islands; but Brackenridge's Polystichum Haleakalense, Fil. U. S. Expd. Exped. p. 204. t. 28, is from Hawaii. This I have little hesitation in referring to aculeatum, and no peculiar form of it. Indeed, the author says, "Allied to Aspid. vestitum of Sw. (our aculeatum), from which, however, it is sufficiently distinct, in the much smaller size of the whole plant, the shorter pinnae, and the deeper incised pinnales."
12. New Holland, New Zealand, and Southern Antarctic Regions. These countries are rich in plants of the aculeatum-group; and the first perhaps published was under the name of Polypodium vestitum, Forst. Prodr. v. 445. Aspidium, Sw. Syn. Fil. pp. 53 and 254. Schk. Fil. t. 43. Wildl. Sp. Pl. v. p. 261. Forster unfortunately gives no locality for his plant. Schkuhr, who is generally considered to have derived his specimens of Forster's Ferns from Forster himself, is equally silent: his figure faithfully represents Aspid. aculeatum. Swartz says, "Insule Maris Pacifici," but he offers no authority; Willdenow, "New Zealand and New Holland." It would indeed appear that nearly all the aculeatum growing in countries whose shores are washed by the Pacific, have borne the name of vestitum. Their fronds are not unfrequently proliferous, and then they become the Aspid. proliferum, Br. Prodr. p. 147. In New Zealand (Northern Island, Colenso; Middle Island, Joliffe, Dr. Munro). In Banks's Island is a variety well worthy of notice, from its rigid habit, extreme regularity and uniformity of the pinnae and pinnules, the very straight rachis, and this covered on the under side with lanceolate, rigid, incurved, somewhat distichous, rather large, glossy black scales, edged with brown, giving great richness of colouring and beauty to the plant; to this Colenso has in his MSS. given the name Aspid. pulcherrimum. These scales are more or less uniform on other forms. I fear Dr. Hooker's Polystichum aristatum, Fl. N. Zeland. ii. p. 57, t. 78 (not Aspid. aristatum, Sw.), can only be considered as the lobatum form of aculeatum. Aspid. aculeatum, then, as we venture to call the species, is common in mountain districts throughout the Northern and Southern Islands of New Zealand, Banks and Solander, Colenso, J. D. Hooker, Lyall, Joliffe, Munro, Sinclair, Travers, etc. It is variable in the margins of the pinnules, sometimes almost entire, sometimes spinuloso-serrate, sometimes again pinnate, so that the fronds are then tripinnate.—In Australia it is known only, I believe, on the south-eastern portion, from Sydney to Hunter's River; this is the Aspid. proliferum, Br., as we have before observed (not of Hook. and Grev.) and Metten. Aspid. p. 49, and Aspid. radicans, Sieb. Syn. Fil. p. 104.—In Tasmania it is more common in subalpine situations, as on Mount Wellington, from 3000 feet elev. to the summit.—In the subpolar regions Aspid. aculeatum is more uniform as far as we yet know, always stout, firm and coriaceous, very paleaceous, and the large scales varying much in colour from rich tawny to entire black, or with a paler and sometimes well-defined edge; pinnules often very convex on the upper side. It is the Polystichum venustum, Hombr. and Jacquemont, Voy. au Pôle Sud, t. 5. N. (without description); Lord Auckland's and Campbell's Islands, from the level of the sea to 1200-1400 feet, caudex 2–4 feet high; and Falkland Islands, J. D. Hooker; Macquarrie Island, Fraser; Tierra del Fuego, Darwin.

23. A. (Polystichum) Prescottianum; caudex short thick erect or declined paleaceous with very large brown scales, stipites densely tufted stout 1–4 inches long and as well as the stramineous glossy rachis and costae and veins especially beneath villous with soft lax hair-like pale-coloured scales, on the stipes mixed with large ovate membranaceous ones, fronds 1–2 feet long rarely in the broadest part 2 inches wide elongato-lanceolate acuminate soft and membranaceous gradually narrowing at the base pinnate or subpinnate, pinnae ovato-oblong sessile tapering to an obtuse apex deeply pinnatifid (except at the very apex) almost to the costa (some of the inferior ones pinnate), lobes or pinnules ovate or oblong without auricule strongly and uniformly serrated the
serratures with long soft hair-like points, sori chiefly on the
superior half of the frond in two rows near the costule,
involucres peltate entire membranaceous. (Tab. CCXXXIII.)
p. 48. Polypodium Pseudo-Lonchitis, Jacquemont, MSS. in
Herb. Hook.—β; frond bipinnate.

Hab. Kumaon, Wallieh. Inhabiting the whole range of Himalaya from the
extreme west, to Bhotan in the east; elev. 10—12,000 feet, Jacqemont, n. 72,
73, 76, 77, Edgeworth, Stracey and Winterbottom, Hooker fil. and Thomson,
Griffith.—A well marked species in the soft palisade-setaceous clothing, in the
very narrow and elongato-lanceolate flaece fronds, and above all in the very long
hair-like points to the sharp serratures. It seems peculiar to northern India, but
there, apparently at great elevations, has been detected throughout the whole
range of the Himalayas.

24. A. (Polystichum) Richardi; caudex short thick scaly,
stipites tufted 1/2—1 foot long hirsuto-paleaceous, scales mixed
with larger and almost black deciduous ones, fronds of the
same length as the stipes, very rigid and coriaceous (brown
when dry) oblong-ovate suddenly and finely acuminate sub-
sfurfuraceous beneath with minute subulate scales ciliated at
their broad base, pinnate (rarely subbipinnate), pinnae 2—3
inches long petiolate close and compact lowest 2—3 pair only
rather distant lanceolate finely acuminate deeply pinnatifid
nearly to the costa (inferior ones sometimes free but decurrent
at the base), segments lanceolate numerous close-placed mu-
cronato-acuminate the margin entire or obsolescently crenate
rather than serrated, acuminated apices of the fronds and
pinnae pungently and sharply serrated, sori in two rows on
each segment, involucres orbicular, main rachis subulato-pa-
leaceous beneath with blackish scales. (Tab. CCXXXII.)—
Aspid. aristatum, var., Hook. Fl. N. Zeal. p. 37 (in part); and
f. 5. of t. 78, corresponds with a segment of our plant; and Dr.
Hooker on our specimens here figured, has written “Aspid.

Hab. New Zealand; Northern Island, D’Urville; Sides of cliffs, Tanguruuru
Bay, Colenso; rocky shores of an island in the Wyaro River, Hook. fil.—I have
in my remarks under Aspid. aculeatum, observed that Dr. Hooker’s principal
figure of his aristatum of New Zealand, is not that of Swartz and Schkuhr, but
what we consider a form of A. aculeatum. With that he includes the plant I
here describe and figure, whose whole aspect and character are so unlike both
aristatum and aculeatum, that Richard considered it a very sharply toothed var.
of Aspid. coriaceum, but from that also it is widely distinct. If not a peculiar
species, it must be united, as Dr. Hooker has done, with one of the forms of
A. aculeatum; and there are specimens in our herbarium which almost connect
it with a broad-lobed form of that species: thus adding one more to the aber-
rant forms of A. aculeatum.

Hab. Java, Blume, Zollinger, n. 408 z.—Blume's character is much too brief for any practical use. Kunze says, "e grege A. vestiti," a plant which we refer to A. (Polyst.) aculeatum.—May not the East Indian A. tacticopterum, Kze. l. c., be the same? or some form of aculeatum? Again, of his A. amblyotus, from Java, Kunze says, "precedenti (A. microphyllum) affine; sed pinnulis basi lobatis, medio et apice acute serratis diversum et multo majus." It is a hopeless task to determine them without access to authentic specimens or faithful figures.

26. A. (Polystichum) obtusum, Mett.; caudex a short thick scaly rhizome, stipites 4-5 inches long square rose with copious ferruginous ovate very long pointed soft scales mixed with narrow subulate ones which continue up the rachis, fronds a span to nearly a foot long coriaceo-membranaceous slightly villous above ferrugineo-hirsute beneath oblong bipinnate, the apex long gradually acuminated, inferior pinnæ 2-3 inches long linear obtuse, their pinnules ⅓ of an inch long obovato-rhomboid very obliquely cuneate at the base, superior margin and apex chiefly spinuloso-serrulate, superior pinnæ oblong-rhomboid obliquely cuneate at the base, auricled above, veins forked close indistinct, involucres fringed at the margin. (Tab. CCXXI)—Metten. Aspid. p. 52. Polystichum, Presl, Epimel. Bot. p. 53. J. Sm. in Hook. Journ. of Bot. iii. p. 412 (name only). Mettenius refers hither Polyst. discretum, J. Sm., and P. horizontale and P. acutifolium, Pr. Epimel.

Hab. Luzon, Cuming, n. 234, Thos. Lobb.—Mr. J. Smith speaks of this as a doubtful species. My specimens are very uniform. Thomas Lobb has found the same plant in the same island. It is remarkable in the lower half or rather more being bipinnate, the rest pinnate. Mr. J. Smith does not say to which species of the genus the present is most allied; I should say it cannot be far removed from some of the protean forms of Aspid. aculeatum.

27. A. (Polystichum) oculatum, Hook. (not Wall.); caudex ? stipes a span long rather stout stramineous flexuose paleaceous with rather large rigid subulato-lanceolate black pale-margined scales, these scales are continued on the rachises but are smaller less deeply coloured and are mixed with
soft woolly hairs, fronds a foot long firm-coriaceous oblong-ovate moderately acuminate pale beneath, partially clothed above with woolly hairs entirely so beneath tripinnate, primary pinnae ovato-lanceolate acuminate 2–3½ inches long, secondary ones 1 inch long of the same form bearing 9–11 pinnules ¼ of an inch long confluent at their base towards the apex, they and the segments ovate obtuse entire or more or less obtusely toothed mucronate at the apex, sori universal even to the narrow acuminate apex of the pinnae 2–4 on each side the costa, involucre rather small orbicular and peltate quite black with a red-brown margin. (Tab. CCXXVIII.)

Hab. New Zealand (Wairarapa), Northern Island, Rev. W. Colenso; Middle Island, Raoul.—This is assuredly a very distinct species from any with which I am acquainted. It has something of the habit of small specimens of Aspid. coriaceum, with very small segments to the fronds, but the clothing, the ramification and the involucres are quite different. The segments are entire or very sparsely and obtusely toothed, the apex only mucronate. Although we have received this species from M. Raoul's collection (Herb. Mus. Paris), it does not appear in his 'Choix des Plantes,' unless he has combined it with Aspid. coriaceum.

28. A. (Polystichum) amabile, Bl.; caudex decidedly creeping thick as a swan's quill paleaceous with ferruginous scales, stipites solitary a span to a foot long slender subflexuose paleaceous below, fronds 6–12 inches long subdeltoideo-ovate acuminate bipinnate submembranaceous, primary pinnae 5–11–12 rather distant terminal one as large as or larger than the rest all long petiolate, lowest pair often bipartite so as to form a pedate frond, pinnules petiolulate ½–¾ of an inch long obliquely rhombeo-ovate subfalcate acute subauriculate at the superior truncated base and coarsely spinuloso-serrate except at the inferior base, sori a single series at the sinuses of the serratures close to the superior margin and apex of the pinnules, involucres orbicular. (Tab. CCXXV.)—Bl. En. Fl. Jav. p. 165 (in Herb. Nostr.). Aspid. rhomboideum, Wall. Cat. n. 364. Metten. Aspid. p. 66. Polystichum, Schott (name only), and Presl, Tent. Pterid. p. 84. Epinet. Bot. p. 54. Lastrea, Moore.

Hab. Nepal, Wallich, n. 364. Java, Blume, Thos. Lobb. Luzon, Cuming, n. 131. N.E. coast of Formosa, C. Wilford.—A very distinct and well-marked species, perhaps first detected in Nepal, and named by Wallich, but since found more abundantly in the islands of the Indian Ocean. The primary pinnae are all petioled, and these do not gradually contract into an acuminate point, but there is a terminal petiolated pinna resembling, but larger than, the lateral ones. Mettenius and Moore assign to this species a rotundato-reiniform involucre; such may be occasionally produced; but our perfect ones are clearly orbiculari-peltate.

Hab. South Chili, *Paeppig.* Antuco, summit of the Pico de Pilque, Cordillera de Chillón, *Ph. Germain,* of Zalcareque, Province of Colchagua, *Claude Gay,* and of Aculeo, *Dr. Philippi.* Falkland Islands, *D'Ureville, Darwin, Hook. fil., Capt. Abbot, R.N.* Patagonia and Straits of Magellan, *Capt. Ph. King, R. N., Lecler.* Orange Harbour, Tierra del Fuego, *Brackenridge.*—A very distinct species, but very variable, and the texture sometimes thick and coriaceous, sometimes simply pinuate, or partially bipinnate or wholly bipinnate. It is quite peculiar to the southern hemisphere, and chiefly confined to high southern latitudes, what may be called South Patagonia embracing the Falkland Islands. *Paeppig* and M. Germain indeed met with it in Chili proper; but the one on the summit of a very lofty mountain, Antuco, the other on the Andes of Chillón: and their specimens are of a green colour and with much less of a coriaceous texture. Mettenius offers the remark, "fortasse speciei sequentis var." (*Aspid. vestitum, aculeatum, nobis,* from which I think the muticosus serratures will always keep it distinct. Mr. Brackenridge's specimens from Orange Harbour, its most southern locality, were only 3–4 inches high, growing very dense and compact.

30. *A.* (Polystichum) *Cystostegia,* *Hook.*; stipites apparently tufted 1–3 inches high tawny-brown and as well as the broad rachis and undeveloped portions of the frond paleaceous with copious long lanceolato-subulate pale ferruginous scales quite slender upwards, fronds 4–6 or 8 inches long oblong-lanceolate firm-membranaceous bipinnate, pinnæ
patent moderately distant (more crowded upwards) rarely exceeding an inch long, their rachises compressed subulate, pinnules scarcely $\frac{1}{4}$ of an inch long ovate-lanceolate pinnatifid with few erecto-patent obtuse or acute muticous entire or subdentate segments, sori copious large for the size of the plant 2–3 on each pinnule, involucres thin-membranaceous hemispherical vesiculose peltate ferruginous. (Tab. CCXXVII.)

Hab. New Zealand, on elevated mountains: Northern Island, Dicffenbach; Middle Island, Discovery Peaks, 3800 feet, Travers; Rocks in Waira gorge, alt. 4400 feet, in extremely exposed cold situations, Sinclair. Between Lake Tennyson and the west coast, C. Mailing.—A new and very peculiar small species, with soft but stout stipites and rachises, which are very palaaceous; the ramification approaches that of A. mahroidees and A. Prescottonium; but the involucres are unlike those of any other species, being singularly thin and membranaceous, covering the sori with a large (in proportion to the size of the plant) hemispherical peltate bladdery lid.

31. A. (Polystichum) anomalum, Hook. and Arn.; caudex erect?, stipites tufted 1–2 feet long stout at the base densely palaaceous with very narrow long flexuose ciliated scales (the lowest ones) and very large ciliated lanceolate thin broad-lanceolate ones almost an inch long, the latter kind (but smaller) continue upwards upon the stipites and main rachis and are deciduous, fronds ample 1½ foot and more long subco- 

soriaceous ovato-lanceolate bi- rarely below tripinnate, primary pinnæ 6–8 inches long lanceolato-acuminate, pinnules shortly petiolate subfalcate obliquely ovate or ovato-lanceolate acute lobato-pinnatifid coarsely serrated towards the apex rarely obtuse or mucronate, superior truncated base auriculate, sori biseriate terminal on the veinlets usually on the superior face!, involucres when present orbicular peltate very frequently wanting.—Polypodium anomalum, Hook. and Arn. MSS. Hook. in Kew Gard. Misc. viii. p. 360. t. 11. Metten. Aspid. p. 12. Polystichum anomalum, Thwaites.

Hab. Ceylon, Mrs. General Walker, Thwaites; Horton Plains and Hapootelle, alt. 5–6000 feet, n. 3504. A state of this, as it appears to me, with the sori all dorsal, is found by Mr. Thwaites, n. 3286: this is quite destitute of scales and has some of the pinnules 1½ inch long. The species is in cultivation in Kew, and retains its usual peculiarity of bearing the sori on the upper or anterior side of the frond. Mr. Thwaites has sent specimens with involucres, and the habit is very much that of Aspid. aculeatum.

*** Tri-quadripinnate or decompound.

32. A. (Polystichum) aristatum, Sw.; caudex long stout creeping densely erinite with long subulate ferruginous scales,

ASPIDIUM, § POLYSTICHUM.


A widely dispersed species in India and the Indian Pacific Ocean, and I fear very variable; but much misunderstood, and mainly so perhaps in consequence of the imperfect character given by its discoverer (Forster), and from Swartz having given New Zealand as its native country. There is reason to believe that Schkuhr's plant is a true and authentic one, most probably derived from Forster himself, and the locality there given (for it is omitted in Forster's Prodromus) is not New Zealand, but the Pacific Islands; nor, familiar as I am with the Ferns of New Zealand, have I ever seen a specimen from that country. With regard to the synonymy, Mr. Moore is the first to unite the A. conifolium, Wall., with A. aristatum, correctly so, I believe. Some of the forms of this gradually pass into what I take to be Aspid. Hamiltonii, and some forms of this approach the less robust states of Aspid. coriaceum.

33. A. (Polystichum) biaristatum, Bl.; caudex erect?, stipites tufted a span to a foot long stout very palaeaceous below with long subulate castaneous scales (sometimes having a black central line) mixed higher up with large broad-lanceolate intensely black glossy ones, the rest of the stipes with more or less deciduous and copious erinite scales at length glabrous, fronds 1–2 feet high very firm-coriaceous glossy from a broad base ovate-oblong suddenly acuminate at the apex (hence subcaudate) bipinnate, pinnae sessile or nearly so oblong acuminate (acumen serrated) lowest ones often 6 inches long, pinnules oblique semi-ovate or rhomboid rarely sublanceolate subfalcate acute serrate sublobate at the superior truncated base ½ an inch to an inch long, terminal serratures chiefly mucronato-spinose, veins more or less forked, sori copious on the upper half of the frond general marginal, involucres rather small orbicular peltate soon becoming cup-shaped.—Bl. En. Fil. Jav. p. 164.

(see under A. aculeatum, p. 20). It is certainly the A. biaristatum of Blume (so named perhaps from the paucity of the spinulose serratures), and I do not find it to be noticed by any other author. It seems constant to its character, in the broad base of the frond, the basal pinnæ being in general the longest, the sudden acumination of the apex of the frond (not gradually tapering towards the apex), and the great tendency of the sori to be marginal.


Hab. China, Osbeck, Petersen; Chusan and Tanglan, Alexander; Hongkong and Loochoo Islands, C. Wright, Colonel Urquhart. Japan, Thunberg, Langsdorff, Babington; Kinsin and Hakodadi, C. Wright, U. S. N. P. Expl. Exped. Nangasaki, Miss Nelson.—A very distinct species and yet not easily defined by words, and hence, though noticed in the days of Linnaeus, little understood to the present time. It varies in the outline of the frond, sometimes broad and pedately divided at the base, the superior portion of the frond always suddenly acuminate. Occasionally I find the involucres lastreoid, but certainly generally aspidioid, as Langsdorff and Fischer describe and figure them. Their plate represents a more lax plant than is usual in this Fern, and the pinnules more acute.

35. A. (Polystichum) Championi, Benth.; “fronds broadly lanceolate twice pinnate, the stipes and rachis covered with brown lanceolate scales, lower pinnæ 4-5 inches long not
longer or more compound than the 2–3 next pairs which afterwards pass gradually into the short pinnatifid apex, segments lanceolate-falcate distinct sessile and broadly rounded at the base but not adnate seldom 1 inch long serrato-crenate or the lowest pinnatifid, the inner lowest lobe rather larger, veins scarcely conspicuous pinnate with forked veinlets, sori rather large in two rows on each segment, indusium peltate or rarely reniform.” Aspid. (Lastrea) Championi, Benth. in Fl. Hongkong, p. 456. Polystichum vestitum?, Hook. in Kew Gard. Misc. ix. p. 339.

Ilab. Hongkong, Champion, Urquhart, in Herb. Nostr.—“Not known out of the island. Colonel Urquhart’s specimens are old, and Colonel Champion’s too young. They evidently belong to Lastrea, and are allied to Aspid. opaeum (varium, nobis), but differ in the scales and in the general shape of the frond as well as in that of the segments,” Benth.—Unfortunately my specimens of this plant are mislaid, and I can offer no remarks other than Mr. Bentham has given, further than to say that the involucre, as stated by Mr. Bentham, being “peltate in both, with an occasionally indented sinus,” I prefer retaining the two species, in the Polystichum-group, to which they naturally belong, rather than that of Lastrea (Nephroidium, nobis).


Ilab. Madeira, rocky places, R. de St. Jorge, elev. 3500 feet, Masson, Low, Lemann, etc.—This handsome species is, as far as I know, peculiar to the island of Madeira; not extending south to the Canary Islands, nor am I aware it has ever been seen on continental Africa. It is true that Mettenius gives “Canary Islands” as a locality, but there is no authority for it, that I am aware of, nor is it included in Webb’s Fl. Can. It must rank near to the eunifolium-form of Aspid. aristatum, with which it has altogether the habit in stipes and fronds; but here the rachises beneath have rather copious bullate scales, terminating in a subulate point: such are never seen in eunifolium.
37. A. (Polystichum) *adscendens*, Hew.; caudex very long ("20–30 feet") scandent as thick as one's finger branched clothed with copious linear-subulate ferruginous fringed paleaceous scales, of two kinds from the same caudex, fronds 1–3–4 feet long by 2 feet wide in the broadest specimens thin-coriaceous (on stipites 1–2 feet long brown furrowed on one side scaly only at the base 3–4-pinnate); *sterile* ones, pinnae all petiolate, primary ones ovato-lanceolate, secondary ones oblong-lanceolate acuminate, pinnules lanceolate very acute obliquely cuneate at the base inferior ones pinnatifid or rarely again pinnulate with short acute lobes their apices serrated penniveined, veins prominent beneath; *fertile* fronds with pinnules all much contracted linear deeply pinnatifid with rounded lobes each bearing a sorus as large as itself and covered by an orbicular-cordate peltate involucre, rachises all glabrous. (Tab. CCXXIV.)—Heward, in Mag. Nat. Hist. N. S. 1838, pp. 13, 454.

Hab. Jamaica, mountain forests about "Old English plantation," Manchester, climbing 20–30 feet up the trunks of trees, R. Heward. It is also sent from Manchester by Purdie, from Woodside, St. Mary's, by Wilson, and from Moneague by Dr. Alexander Prior.—This, which may be reckoned among the rarest, and at the same time the most distinct of known Ferns, was discovered by our friend Mr. Heward, and though accurately described by him in the Nat. Hist. Journal above mentioned, it has never been taken up by Fée or Mettenius. Its affinity is clearly with *Aspid. coriaceum*, from which however it is abundantly distinct, as will be at once seen by our specific character and figure. It is remarkable that though "common in the mountain forests, and the caudex climbing upon and over trees" to the extent it does, Mr. Heward only twice met with the sterile fronds. Most of our fronds, whether they are sterile or fertile, are very much larger than what came under his observation. Some of these sterile fronds are partially fertile, that is, their pinnules are changed into fertile ones. From the shape of the involucres this might almost claim to be a *Lastrea*, but the habit is that of a *Polystichum*.

38. A. (Polystichum) *coriaceum*, Sw.; caudex very long creeping branched as thick as one's finger densely clothed with large tawny silky subulate scales, stipites solitary distant 1–2 feet long stout and as well as the main rachises deciduously paleaceous, fronds generally very large from 6 inches to 2–3 feet long deltoideo-ovate acuminate very coriaceous rigid 3-pinnate, pinnae all erecto-patent petiolate lower ones unequally deltoid acuminate, lowest inferior secondary pinnae longer than the superior ones, pinnules an inch or more long ovate or lanceolate entire or more or less obtusely serrate or pinnatifid, segments oblong acute (but not mucronate) entire or bluntly serrated, ultimate ones of the primary

Hab. Pacific Islands, Forster. New Zealand, Banks and Solander, Menzies, A. Cunningham, Hook. fil., etc. Tasmania, Brown, A. Cunningham, R. Gunn, Hook. fil., etc. S. Africa; Cape, frequent, and eastward to Uitenhage and Natal (our largest-growing living plants are from S. Africa). Tristan d'Acunha, Cav. Michael. Mauritius, Wallich and others; "Bourbon," Madagascar. S. America: Sierra de Toudil, Argentine Republic, Tweedie. S. Brazil, Fox, n. 211; Sellow; Minas Geraes, Gardner, n. 5321. W. Indies: Jamaica, Swartz, Purdie; Cuba, C. Wright, n. 999. British Guiana, Schomburgk, n. 1151. Cayenne, Appin. Chili, frequent, especially in the south; Valdivia, Lechler, Bridges, n. 811; Patagonia, Port St. Elena, Capt. Ph. King; Port Desire, 49° south, Darwin.—This plant varies extremely in size, with stipites from 6 inches to 3 feet long, and with fronds the same; the pinnae and pinnae are more or less narrow, but the species is a very peculiar one, scarcely likely to be confounded with any other, singularly thick and fleshy in texture, when dry quite leathery, as its name implies. Its nearest affinity is with Aspid. Berteroanum, from which however it is abundantly different.

39. A. (Polystichum) Berteroanum, Colla; caudex stout long creeping densely clothed with long linear subulate almost black glossy scales, brown at the margin, stipites 6 inches to 1 foot long stout palaecous with deciduous ferruginous membraneous crisped scales mixed with some blacker and longer ones, fronds 6 inches to 1 and 2 feet long firm-cornaceous when dry dark-brown above paler and brown beneath and copiously palaecous-squamulosse (as are the rachises) broad triangular-ovate moderately acuminate bi- below often tri-pinnate, primary and secondary pinnae long-petioled, pinnae sessile obliquely ovato-oblong obtuse decurrent at the base entire or crenato-lobate subauriculate, lobes partially and obtusely serrated, costules and veins prominent beneath, sori copious in two series on the pinnules and larger lobes between the costa and the margin, involucres orbicular peltate

* Ex hoc venit "Radix Calahuala" officinalis, Willd.

VOL. IV.
firm red-brown very dark in the centre. (Tab. CCXXIX.) —Collo, Pl. Chil. fasc. ult. p. 42. t. 70. Aspid. flexum, Kze. Annal. Pteridogr. p. 44.

Hab. Juan Fernandez, Bertoro, n. 1529; "caudex creeping over stones and the roots of trees in woods," Cuming, n. 1336, Douglas, Scouler.—Allied to A. coriaceum, as it is also to the following, Aspid. Seemanni.

40. A. (Polystichum) Seemanni, Hook.: caudex? stipes? frond (in my solitary specimen) nearly 1¼ foot long broad deltoideo-ovate acuminate bipinnate coriaceous, beneath on the rachises minutely subglandulosose-pubescent regularly bipinnate, primary pinnae petiolute lower ones a span long distant, pinnules also distant ¼ an inch to 1¾ long, the largest petiolate oblong obtuse truncate but subauricled at the superior base lobato-pinnatifid, the lobes entire smaller and upper ones sessile subdecurrent and entire or only slightly sinuate, costule beneath very prominent straight, veins pinnated with fine veinlets also prominent and flexuose, each veinlet soriferous at the apex, involucres convex subumbonate orbicular and peltate deciduous. (Tab. CCXXX.)

Hab. Bay of Ardita, tropical Pacific America, Seemanni.—I have seen only one specimen of this very distinct Aspidium, and this destitute of caudex and stipes, which will be found probably to resemble those of A. coriaceum and Berteroanum, to which group this plant undoubtedly belongs. The venation is very peculiar, and the frond seems to be quite destitute of scales.


Hab. Mexico: Cuesta grande de Chicanquiao, temperate region, Schiede; Xalapa, Gallootti, n. 6320, Harris.—My specimens, though otherwise very perfect, are, like those of Kunze, destitute of caudex and stipes. The author describes it as "species insignis habitu Aspid. catopteri mihi (Lastrea lanuginosa,
Moore), sed characteribus abunde distinctum." It has nothing of the usual habit of Polystichum, and may very well rank next the following species, Aspidium melanochlamys. In both of these my specimens possess the involucre of Polystichum. The present species is almost black when dry.

42. A. (Polystichum) melanochlamys, Féé; caudex stout suberect clothed with silky long subulate purplish-brown soft membranaceous scales, stipites tufted (?) a span to a foot long crinite with long spreading setaceous scales such as clothe the caudex but shorter and which appear on the rachises too, fronds 1½-1 foot long oblong remotely bipinnate membranaceous green when dry, primary pinnæ 4-5 inches long oblong-acuminate sessile adnate and subdecurrent, pinnules about an inch long obtuse often broadest upwards lobato-pinnatifid, lowest small obtuse quite entire monosorous rarely disorous, costules with minute bullate scales beneath, veins few pinnate, sori often confined to two or three of the lower lobes sometimes on all, involucre orbicular black in the centre the margin castaneous. (Tab. CCXXXIII A B.)—Féé, Gen. Fil. p. 294. Aspidium (Lastrea) melanostictum, Eaton, Fil. Wright. et Fendl. p. 209 (who also quotes as syn. A. melanochlamys, Féé). Lastrea melanochlamys, Moore.

Hab. Cuba, Mont Liban, Linden, n. 1865, in Herb. Nostr. Eastern Cuba, near the town of Monte Verde, C. Wright.—Féé well observes of this: "Felix squamosa, distinctissima, partitionibus omnibus remotis, indusio centro nigrescente, in ambitu rufescente notata." That its near affinity is with the preceding is however quite certain; but I think Mr. Eaton is in error in considering them the same. A. melanostictum is a native of Mexico, of large dimensions, with crowded pinnæ and pinnules, black when dry, with much larger and toothed or incised segments, with several sori on a segment: and though it is true we are not acquainted with the stipes so as to say if that is densely crinite as in the present species, yet the entire absence of the same clothing on the upper part of the stipes and on the rachises, would lead to the conclusion that the whole plant was free from them. Here the soft hair-like scales are frequent on the rachises.

43. A. (Polystichum) multifidum, Mett.; caudex robust horizontal densely clothed with long subulate dark ferruginous scales, stipites a span to a foot long stout, at the very base clothed with the same ferruginous scales, higher up with these are mixed very large broad-ovate intensely black firm scales subulate at the point castaneous at the margin full ¾ of an inch long, the rest of the stipes and the very stout rachises are almost shaggy with copious narrow-subulate tawny scales mixed with the black but of a smaller size, fronds 1½-2 feet long oblong-lanceolate subcoriaceo-membranaceous 3-subquadripinnate, primary pinnæ about 4 inches long horizontal oblong acuminate sessile, secondary and tertiary ones
sessile obliquely ovate obtuse decurrent at the base pinnatifid chiefly at the superior margin or again pinnate, ultimate pinnae or segments small short obtuse or acute, veins solitary or forked, sori dorsal one near the base of the lobe or pin-
nule, involucres peltate.—Metten. Fil. Leclh. Chil. et Per.
p. 20. t. 3. ff'. 14-17.

Hab. Peru, watercourses; Sichahue, Cordill. de Ranco, Lechler, n. 3060.—A rare and extremely well-marked species, of which portions are well represented by Mettenius, Lc. The fronds are more compound than in *Aspid. melanochlamys*, which is perhaps its nearest ally.

44. A. (Polystichum) *funiculaceum*, Hook.; caudex stout creeping densely clothed with tawny satiny ovate-acuminate paleaceous scales, stipites a span to a foot long stout below and there paleaceous like the caudex, fronds pergamentaceous glossy translucent when fresh 1-2 feet and more long ob-
long-ovate acuminate supradecompoundly pinnate, primary pinnae (inferior ones) from 4 inches to almost a foot long long-petioloed ovate finely acuminate, secondary ones 1-3 inches long also petioloed, these are broken up into a succe-
sion of smaller and lesser pinnae or pinnules and all finely cut into linear acute obscurely costate segments simple or once or twice forked or having a lateral short tooth which ge-
nerally bears the solitary rather small sors, sori globose as broad as the segment or tooth, involucres small dark-brown convex peltate of a subcoriaceous texture, rachises with a few scattered flexuose setae. (Tab. CCXXXVII.)

Hab. North-eastern India: Chola, Sikkim, alt. 8-10,000 feet, Hook. fil. and Thomson, n. 274.—This is perhaps the most remarkable of all the polystichoid *Aspidia*, and one of the most elegant, if the plant be in its normal state. Mr. Moore throws some doubts on this by naming Dr. Hooker's specimens as "*Lastrea* (Polystichum, nobis) *aristata, γ dissecta,*" while Mr. J. Smith considers them as a variety of the West Indian *Aspidium denticulatum*, Sw. In regard to the first of these opinions, the fronds have not the outline of that species (*aristatum*), and unless I could see intermediate states in the form of the pinnae and pinnules, I can hardly credit such a transformation. All Dr. Hooker's numerous specimens are very uniform in the finely cut fronds, and nearly all have copious fructifica-
tion. As to its being the West Indian *A. denticulatum*, I am not prepared to agree to such a union, but there certainly is a very common form of the latter plant which is very closely allied to it.

§ Cycloodium.—Primary veins pinnated, opposite branches uniting at an angle and sending out a free veinlet in the areole above; pinnae of the fertile frond contracted. (Hook. Gen. Fil. Tab. XLIX. C.)

45. A. (Cycloodium) *meniscioides*, Willd.; caudex stout asc-
cendant or creeping scaly, stipites stout glossy brown 1-2
and more feet long clothed with brown paleaceous scales at
the base, fronds 2–3 feet long oblong coriaceous pinnated,
pinnæ numerous, terminal one similar to the rest; sterile ones
oblong acuminate unequally and obtusely cuneate at the
base subessile entire or sinuate or crenated 6–7 inches long;
fertile ones smaller and much narrower oblong-lanceolate
plant). Hook. and Grev. Ic. Fil. t. 121 (excellent, but incom-
Hookeri, Kl. in Linnæa, xx. p. 364. Soromanes integrifolia,
Fée, Acrost. p. 82. t. 42 (sterile frond only).

Hab. Tropical America, chiefly however in Brazil and Guiana, all collectors,
and extending as far westward as Tarapota, Eastern Peru, Spruce, n. 4736 and
4989. From Brazil we possess fine specimens from Uaupés, n. 2770; Pará,
Spruce, n. 25, 26, (one specimen with the fertile pinnæ not contracted, Gard-
ner, Milhe; Illinois, Moricand (fertile and sterile pinnæ on the same frond),
Guiana, Le Prieur; Surinam, from Herb. Miquel, fertile pinnæ pinnatifido-dentate,
Sagot, n. 722, Appin, n. 160, 164, and 166, superior pinnæ contracted in the
upper half only, and there fertile; Berbice, Schomburgk, n. 316; Trinidad, Per-
die.—A very fine and well marked species. Kaulfuss is probably incorrect in refer-
ing to this A. meniscioides, a Fern of Tranquebar and of the island of Guahan,
especially when he says of it that the lowest pinnæ are "bifid." He probably
quite misunderstood Willdenow's plant, and thence was led to make a distinct
species of the Cayenne plant, his A. confertum. The venation is variable,
and the united branchlets or venules occasionally are prolonged into a free veinlet,
which sometimes extends to the union of the pair above, and sometimes it is
altogether wanting; the primary veins are stouter and more horizontal in the
fertile than in the sterile pinnæ.

Obs. Cycodium Cumingianum, Moore (Anisacampium, Pr., Aspidium Otaria,
Kze. in Metten., Gonopteris aristata, Fée), having the involucre of Nephrodium,
Rich. Br., I place it in that genus, the venation is that of Nephrodium, Schott,
§ Pleocenia. Cycodium acrostichoides, J. Sm., also belongs to the Nephro-
dium-group. Cycodium heterodon of Brazil (Aspid., Schrad.) is unknown to
me. Moore refers it to Polystichum in his 'Index Filicum,' p. 93, as Presl had
done in his Epim., but he places it in Cycodium at p. 275 of the same work.
May it not be our Aspidium (Cycodium) abbreviatum?

§ Cyrtomium.—Primary veins pinnated; the branches or veinlets more or less
united, forming acute angles, often quite free; sori dorsal on the free or united
veins; fronds sterile and fertile uniform or nearly so. When the venation is
all free, as in some specimens of this section, it does not differ from § Polysti-
chum.

46. A. (Cyrtomium) abbreviatum, Schrad.; caudex creeping
scaly at the extremity with brown subulate scales, stipites
distant pale brown a little scaly at the base, fronds 1–2 feet
high coriaceo-membranaceous pinnated pinnatifid at the apex, pinnæ numerous shortly petiolute 3–6–8 inches and more long lanceolate acuminate entire or crenate or lobate at the margin the apices strongly serrated varying in breadth from \( \frac{1}{4} \) an inch to an inch the lower half sometimes in the middle suddenly of one and the same pinna deeply pinnatifid even to the rachis with oblong or linear segments, venation exceedingly variable, primary veins sometimes pinnated the branches often free throughout or the lowest opposite pair only is combined or nearly all meet and join so as to form an irregular network between the costa and the margin, all the veins more or less fertile, sori irregularly biseriate between the primary veins. (Tab. CCXXXIV.)—Schrad. Gött. Gel. Anz. 1824, p. 809. Kunze, Flora, 1839, p. 332, note. Metten. Aspid. p. 33. Nephrodium, Fée, Gen. Fil. p. 306. Polystichum, Pr. Epimel. Bot. p. 58. J. Sm. in Hook. Lond. Journ. Bot. i. p. 199. Cycloclonium, Pr. Epimel. Bot. p. 200. Aspid. (Polyst.) Guianense, Kl. in Linnaea, xx. p. 364 ("differt ab A. abbreviato, Schrad., venis ramosis, ramis omnibus liberis").

Hab. Tropical Eastern America: British Guiana, Parker, Appim, n. 177 (one specimen with the lower portion of some of the pinnae pinnatifid to the rachis), R. Schomburgk, n. 1157; Brazil, Bahia, Wetherell; Ilhios, Moricand, n. 2208; Rio, Corcovado, Gardner, n. 5671. Pernambuco, n. 1218; New Granada, Rio Hacha, elev. 9000 feet, Schlim, n. 856; Jamaica, Wilson.—The varied venation of this plant will afford chararcters for almost as many different species, if not genera, as there are specimens.

47. A. (Cyrtomium) juglandifolium, Kze.; caudex stout erect very scaly with large brown ovate or lanceolate scales darker in the centre, stipites 1–2 feet long strawmienous equally scaly with the caudex while young, scales patent or reflexed, fronds 1–2 feet and more long firm-coriaceous ovate or oblong pinnated, pinnæ 2–10 pairs distant petiolute often scaly at the setting-on of the petiole, terminal one long-petioted, ovato-lanceolate or lanceolate or oblong subfalcate more or less serrated acuminated 4–6 inches and more long 1–2 inches broad the base obtuse sometimes unequally short-cuneate, primary veins copious horizontally patent slender pinnated, the branches or veinlets sometimes all free but generally more or less united so as to form elongated areoles which generally include a free or united veinlet, sori dorsal forming several series on each side the costa less regular and more scattered as they approach the margin.—Kze. in Linnaea,

Hab. Mexico and the northern parts of tropical S. America. The following localities are from my herbarium:—Mexico, Linden, n. 1551 and 1552 (small, triphyllous, but fertile); Galeotti, n. 6243 (with twenty-one oblong-lanceolate pinnae), 6554, Dr. Coulter, n. 1712 and 1713, Liebmnn (Phanerophlebia nobilis); Guatemala, Skinner, one specimen with pinnae 10 inches long; Caracas, Linden, n. 164, Birschel, and ex Herb. Miguel, n. 201, Otto, n. 644; Venezuela, Fwack, n. 211, Fendler, n. 233.—Ever since I possessed sufficiently copious specimens of this plant, I have in vain endeavoured to detect any character which can justify their being separated into species; nor do any descriptions and figures I have seen, appear to me to warrant such a conclusion. It is quite certain that, as in others of this group, the venation is variable, often on one and the same plant. The error was perhaps encouraged by Presl's placing them in two different genera in his Tentamen. His genus Amblio is the same as Phanerophlebia, the involucres having fallen from the latter.

48. A. (Cyrtomium) caducum, Wall.; caudex suberect stout, stipites a foot and more long stramineous very palaceous with black large lanceolate scales below with a brown edge above these are broader membranaceous lax brown ones, fronds coriaceous 1—1½ foot long broad-lanceolate acuminate pinnate (or subbipinnate), pinnae numerous 3—5 inches long ½ an inch to an inch wide falcato-lanceolate acuminated unequally so at the base, superior base truncated and dilated with a more or less distinct obtuse or acute auricle acutely subaristato-serrated not frequently lobato-pinnatifid and in some inferior pinnae quite pinnate with obovate rather obtuse pinnules, veins copious approximate erecto-patent pinnate free or with the veinlets more or less combined forming elongated arbores generally including a long free veinlet and sometimes the whole frond is bipinnate and the veinlets are then always free, and the plant has no very distant resemblance to some forms of Aspid. (Polystichum) aculeatum, sori large scattered, involucres very conspicuous orbicular peltate but sometimes with a small sinus.—Wall.

Hab. North of India, frequent; Nepal, Wallich; Sikkim, Khaya, Assam, and Bhotan, Griffith, Hook. fil. and Thomson.—Metteniuus remarks, "Species fortasse ad Phegopteridum amandanda;" but unmistakable involucres are seen on our specimens. The S. American specimens noticed by Mr. Moore, in my herbarium, from Ecuador (Jameson), I am satisfied, possess no involucres; nevertheless they have the partially anastomosing venation of our present plant, and the fronds equally vary from pinnate to bipinnate, the latter form approaches some states of Aspid. platyphyllum, Willd., Phegopteris, Metten. All have a true polystichoid habit.


Hab. Japan (mountains of Nagasaki, etc.), Thunberg, Langsdorff, Miss Nelson, Babington, Oldham; Amahirina, J. Smead; Niphon, Mr. Consul Alcock; China and adjacent islands, Loochoo, Bonin, etc., Alexander, Hinds, Lay and Collie, C. Wright, Wilford.—Apparently common in the Chinese and Japanese iscas.

50. A. (Cyrtomium) caryotideum, Wall.; caudex short thick erect densely palaeaceous with large erect scales, stipites tufted 10–12 inches long very scaly below, fronds ½ a foot to 2 feet long oblong subcoriaceo-carnose (when recent) of a pale yellowish-green colour opaque (not glossy) pinnated, pinnae 3–4 or 6 inches long petiolate ovate much acuminated (sometimes repando-lobate) falcate sharply serrated, superior base

Hab. India, chiefly in mountain regions: Nepal, Wallich; Kumaon, Griffith, Strachey and Winterbottom (at Dwali, elev. 8200 feet), Edgeworth, T. Thomson; Bhotan, Griffith, Booth; Sikhim-Himalaya, Hooker fil. and Thomson, n. 261; above Simla, Col. Bates; Nilghiri, Dr. Wight, n. 108, Sir F. Adams; Zenker, Hohenacker, in Pl. Nilgh. n. 919 and 913, M'vor. South Africa: Natal, Major Garden; forests in Caffraria, Captain Espinause, 1856 (Rowson and Pappe).—Distinct as the Indian A. caryotideum may be from the Chinese and Japanese specimens of A. falcatum, I confess I have sometimes a difficulty in distinguishing them, especially in the dried state. The extremes of form are distinct enough in general appearance. The Cape species undoubtedly belongs to caryotideum rather than to falcatum. Of the normal state of this plant, and that which gave rise to its specific name of Dr. Wallich, the pinnae have a good deal the form of the leaflets of Caryota urens.

51. Asp. (Cyrtiumium) Teijsmannianum, Hook.; caudex? stipes a foot and more long sulcate slightly scaly below and as well as the rachis brown, fronds about a foot long very coriaceous when dry, (probably succulent when recent) pinnate, pinnae about 9 subpetiolate especially the terminal one ovate smaller and narrower above long acuminated variously sinuately subincised, lateral ones with the inferior half more dilated (so as to be somewhat semiovate) glabrous superior surface embossed from the fructifications beneath, primary veins spreading slightly flexuose united by transverse veinlets which anastomose, the secondary ones bearing the copious sori (in our specimens on every pinna) two upon each veinlet and forming two series between the primary veins not frequently confluent, involucres orbicular peltate subcoriaceous in age. (Tab. CCXXXVI.)

Hab. Isle of Pooi Pulang, on the west side of Sumatra, E. J. Teijsmann (ex Herb. Miquel).—A very peculiar Fern, at first sight resembling a Meniscium, but the sori are globose and there are involucres orbicular and peltate. The shape of
the pinnae much resembles some forms of Aspid. (Cyrtomium) falcatum; but
the venation is very different, and the terminal pinnae are not confluent.

52. A. (Cyrtomium) nephrodioides, Hook.; stipites a span and
probably much more long sulcated as well as the rachis
dirty straw-colour, frond 2 feet long ovate submembrana-
ceous acuminate glabrous pinnated throughout, pinnae nu-
umerous spreading 3–6–8 inches long by 1 broad sessile from
a broad base oblong-lanceolate uniformly and deeply pina-
tifid three-quarters of the way down to the rachis into nume-
rous subhorizontally patent oblong acute subfalcate segments
obliquely serrated ½ an inch long 1½ line wide slightly hirsute
beneath and on the costules and veins which are very patent,
the lowest pair of veins uniting and forming a single vein
which is prolonged to the sinus of the segments, the rest,
quite free, extend from the costule to the margin each bear-
ing a sorus nearer to the margin than to the costule, invo-
lucres distinctly orbicular peltate very thin and membrana-
ceous ochraceous dark brown in the centre the margin ci-
liated. (Tab. CCXXXV.)

Hab. Indian Archipelago, Seemann.—This is a very beautiful and most distinct
Fern, brought home by Dr. Seemann on his return from the voyage of H. M. S.
Herald, but which by some accident was omitted to be noticed by that author in
his Botany of the Voyage. It has all the habit and venation (of the simplest kind)
of Euneaphrodium of Schott and many recent authors; but the involucres are per-
fectedly orbicular and peltate.

§ Euaspidium.—Primary veins arising from the costa generally straight, the
rest variously and compendiously anastomosing, the areoles with or without free
veinlets. Sori dorsal or terminal upon a free veinlet or compital. Involucres
orbicular, or not unfrequently more or less cordate or hippocrepiform. Fronds
often large, simple, pinnate or bi-tripinnate, or subpedately pinnate. Aspidi-
dium, J. Sm. in Cult. Ferns (not elsewhere). Aspidium, Schott, and Sagenia,
Pr. Bathmium and Cardioclæna, Fée.

* Fronds simple, undivided.

53. A. (Euaspidium) Singaporianum, Wall.; caudex more
or less creeping very fibrous, stipites approximate sometimes
tufted 6–12–14 inches long sparsely setoso subulato-palea-

* By the term Euaspidium here, I mean the Aspidium of Schott, and of most
modern authors who favour the great multiplication of Fern genera, none of them
unfortunately taking the same views, nor working in harmony with others. Met-
tenius adopts Swartz’s Aspidium, including Nephrodioides of Michaux and Brown;
in other words, making no distinction between orbiculari-peltate involucres and
those which are cordate or reniform; and such is the difficulty of distinguishing
in the present section between cordate and orbicular involucres, that I am, as it
were, compelled to unite Sagenia, Pr., under the head of Euaspidium; and, in-
deed, it is the opinion of many that both kinds of involucres may be found on the

Hab. Malay islands: Singapore, Wallich, Seemann; Penang, Sir W. Norris (one frond 18 inches long), Hance; Malacca, Cuming, n. 403.—An extremely distinct and very handsome species.

54. A. (*Euaspidium*) *plantagineum*, Griseb.; caudex creeping woody, stipites approximate stout 3–12 inches long (and as well as the costa beneath) palaceous with dark brown patent deciduous lanceolate scales, fronds blackish-green firm-membranaceous a span to a foot long oval or broad-lanceolate or broad-oblanceolate entire or submarginate obtuse generally emarginate and proliferous at the apex, the base more or less decurrent often very much so, thus forming a winged stipes, primary veins of the costa straight rather stout, secondary ones tranverse and arcuate forming curved areoles which are filled up with anastomosing veinlets, ultimate ones free, sori forming two rather irregular series between each pair of primary veins with or without a peltate involucre.—Griseb. *Pl. Carib.* p. 138. *Metten. Aspid.* p. 126. Eaton, *Fil. Wright. et Fendl.*

same species, and even on one and the same specimen. The author of the genus *Sagenia* figures and describes it with the involucre “orbicular and peltate.” Others endeavour to restrict *Sagenia* to those species with cordate involucres, and Moore says this affords the best mark of distinction; whereas Presl’s chief distinguishing character depends on the free veinlets in the areoles of *Aspidium*; all united in *Sagenia*, whence the name, from *σαγήνη, a net*. Mr. J. Smith has, I think, pursued the wisest course, in his ‘Catalogue of Cultivated Ferns,’ by uniting the two, and embracing under “Aspidium,” species with the varied venation and the two forms of involucre. Of two difficulties (and indeed in this case of twenty difficulties), we must endeavour to choose the least.—The species are not more easy of definition than these groups or subgenera, and the size of our plates does not allow of figures that would do justice to subjects so large as many of them are.

Hab. Mossy rocky places near water, tropical America: Martinique, St. Vincent, Dominica, Plomier, Sieber, n. 353, Dr. Imray, L’Herminier; French Guiana, Leprieur (fronds lobato-sinuate); Venezuela, Fendler (one specimen 2 feet 4 inches long, 6 inches wide; the margin slightly sinuate). Brazil; Amazon, Serra de São Gabriel, Spruce, n. 2189 (ordinary form oval, moderately decurrent at the base, or with rather broad lanceolate fronds very decurrent on the stipes); Tarapota, Eastern Peru, Spruce, n. 4648 (fronds obovate-lanceolate, very decurrent upon the stipes); Uria Bay, Pacific coast of Panama, Seemann, same form as Spruce’s n. 4648.—My copious specimens from the West Indies and the continent of S. America, have satisfied me that the Polypodium plantagineum, Jacq., and our Aspidium plantagineum, are one and the same Fern, varying a good deal in outline, as above noted, and varying in the presence or absence of the involucre, whether from being quickly deciduous, or, as I apprehend, its entire suppression at times, it is hard to say.

** Fronds palmately 3-5-lobed or 3-5-foliolate.

55. A. (Euaspidium) angulatum, J. Sm. MS.; caudex? stipes a span and more long ebeneous-chestnut as are the rachis and principal costae beneath, frond cordate 12-15 inches long and nearly as much broad subcoriaceous-membranaceous glabrous palmately 5-cleft or 3-foliolate, lateral pinna petiolate semiobicular deeply but unequally 2-lobed, terminal pinna with a long petiole (4 inches long) very large orbicular in outline 7 inches broad deeply 3-lobed, middle lobe the largest, all the lobes broad-ovate suddenly and very sharply acuminate, margins entire, costae three in the terminal pinna, two in the lateral ones prominent towards the base beneath, primary veins patent rather distant straight or only slightly curved, secondary ones forming zigzag arches connecting the primary ones, the rest of the venation copiously anastomosing and forming irregular areoles with free simple or forked and divaricating veinlets bearing the sori invariably at the apex, sori small very abundant and even crowded but not confluent scattered over the surface of the frond to the very margin, involucre minute (J. Sm.) not visible in my specimens, possibly none.—Polypodium angulatum, Willd. Sp. Pl. v. p. 185.

Hab. Java (Willdenow); Amboyna, Barclay, in Herb. J. Smith; Borneo, Mr. Wallace, in Herb. Nostr., the palmately 5-fid form.—Mr. Smith, I cannot doubt,
is quite correct in referring this very fine and peculiar Fern to the *Polypodium aquatulum* of Willdenow, for it well accords with the description; and surely Presl is in error in asserting that this Java plant of Willdenow, is identical with the West Indian "Hemionitis maxima quinquefolia" of Plumier, Fil. t. 146, and consequently the *Aspid. Plumieri*, Pr. (Reliq. Henk. p. 20). Mettenius adopts the views of Presl, but quotes Plumier, t. 149 (instead perhaps of 146, for he elsewhere quotes t. 149 as probably a form of *Aspid. trifoliatum*). I only regret that our small pages will not allow us to do justice to a figure of a plant like this. I think I may venture to say it has no near affinity with the American Fern of Plumier, though, according to Kunze, that is found in Java by Zollinger (n. 2432).


Hab. Tropical America: West Indies: Bahama, Fraser (pentaphyllous); Martinique, Cuba, C. Wright, n. 835, Otto, n. 80 and 232 (small pinna deeply pinnatifid); Jamaica, Dominica, Guadeloupe, St. Vincent (var. ampla, frond 2 feet long, terminal pinna 8 inches wide, one specimen 5-foliolate), L. Garding (probably *Aspid. Plumieri*, Pr.). Tropical continental America: Venezuela, Fendler, n. 164, Funek, n. 239; Panama, Seemann, and Isle of Gorgona; Amazon, Mana- quiry, Spruce, n. 1624; Guatemala, Skinner; Mexico, Vera Cruz, Linden, n. 29 (frond 5-foliolate, Galeotti, n. 6312, thence approaching some states of *Aspid. macrophyllum*); Ecuador, n. 5726, Spruce (pentaphyllous); and Peru, Mathews. —In general the specimens of this species are very uniform; but some, large in size and exhibiting 5 pinnae, I am puzzled to distinguish from *Aspid. macro-
phyllum, unless the perfect involucres are present, which are quite orbicular and peltate in the present plant, in the other cordate, but with a broad point of attachment, which extends as far as, or beyond the disk.

*** Fronds compound, 3-5-foliolate or more or less pinnate or bi-tripinnate, rachis often much winged.

57. A. (Euaspidium) calcareum, Pr.; caudex subrept, stipites approximate 4-6 inches long, fronds 6-14 inches long ovate-lanceolate long-acuminate coriaceo-membranaceous pinnate above bipinnate below, primary pinnæ distant long-petioled ovate acuminate again distantly pinnated below, the upper half pinnatifid with long lanceolate pinnatifid segments decurrent at the base, superior pinnæ corresponding with the pinnules just described the long narrow points all sinuated, upper part of the main rachis winged, veins reticulated with large costal areoles many of which have free veins within them, sori in the lobes of the margin of the segments solitary dorsal on the network or terminal on short free veinlets, involucres small orbicular peltate.—Presl, Epimel. Bot. p. 63. Metten. Aspid. p. 120. t. 18. f. 1-3 (a good representation of a small specimen; my larger frond is more compound). Sagenia calcarea, J. Sm. in Hook. Journ. Bot. iii. p. 410 (no description).

Hab. Isle of Leyte, Cuming, n. 310.—Mr. Smith implies that he had under his eye more than one plant which he has called Sagenia calcarea. Dr. Mettenius's figure exhibits one of these, and which clearly indicates what he intends. It seems very different from any other of this difficult group.

(The following species here brought under § Euaspidium, 58-75 are for the most part referred to Sagenia* by Authors.)

58. A. (Euaspidium) Pica, Desv.; caudex? stipites a span to a foot long and as well as the rachis and principal costæ beneath intensely ebeneeous, frond cordate with a deep sinus puberulous firm coriaceo-membranaceous 6-18 inches long simple or trifid or 3-5-foliolate, lowest pair half-ovate bipartite or deeply pinnatifid in the lower margin, intermediate pair broad oblong-lanceolate more or less adnate at the base, terminal pinna very large petiolate subrhomboid trifid, the terminal segment large lobato-pinnatifid, primary veins springing from the costæ flexuose conspicuous, the rest of the venation anastomoses into hexagonal areoles with lesser ones within them including free short veinlets some of which

* See foot-note at p. 42, in reference to the genus Sagenia.


Hab. East Indies, mountains; Silhet, Wallich; and Khasya and Assam, Grifiths, Hook. fil. and Thomson, n. 223. Java, Blume; Malacca, Griffith; Singapore, Sir W. Norris; Borneo, Low.—A very fine species, very distinct from A. pteropus, its near ally.

60. A. (Euaspidium) pteropus, Kze.; caudex stout erect, stipites tufted short or (if you include the decurrent wing below the frond) 1–3 feet long stout partially scaly at the base, fronds 2–3 feet and more long firm-membranaceous subcoriaceous broad-oblong deeply pinnatifid with 3–4 or 6 pair of long (6 inches to 1 foot, 1 inch and more broad) oblong or oblong-lanceolate more or less acuminated segments, lowest pair bi-tripartite at the inferior margin, terminal lobe often


61. *A. (Sagenia) cicutarium, *Sw.; caudex stout ascending clothed at the apex with black subulate falcate scales, stipites more less tufted from 1–2 inches to a foot and a half long stramineous or castaneous or ebeneous scaly, scales lanceolato-subulate spreading deciduous, fronds 4–6 inches to 2–3 feet long oblong or ovate in the smaller and even fertile specimens quite membranaceous green when dry, larger ones coriaceo-membranaceous brown or black when dry, pinnate (young plants 3-foliolate) or below bi- and even tripinnate, the apex variously pinnatifid, pinnae often opposite usually oblong subsessile obtuse or acuminate variously lobed and pinnatifid often very unequally, lowest pair in the more simply pinnated forms semiolate at the inferior base pinnatifid with much longer segments than the rest of the pinnae showing a disposition to become compound there, and in our largest specimens the lowest pair is not unfrequently pinnate (and sometimes the pair above) each division long-petioled and bearing pinnules resembling the superior pinnae, segments everywhere more or less acute or


Hab. Tropical America: West Indies, abundant probably in all the islands; Jamaica (Hartweg, n. 1585); Porto Rico, Schwanecke, sori immersed, sunk in a cavity (probably A. dilaceratum of Kunze; the same state is found by Mr. Wiles in Jamaica); and Mr. Purdie's specimens from thence have scaly gemmae in the axis of the pinnæ. Mr. C. Wright's specimens from Cuba are especially variable, the var. nanum, for example, (n. 996) of Eaton, with perfectly fructified fronds 2-4 inches high, others a foot high (n. 995), and others (n. 833) 2-3 feet high. Guatemala, Skinne (fronds broad-ovate and subtriangular). Mexico, Galeotti, n. 6184, Liebm. in Herb. Nostr. (Aspid. latifolium, Pr.). West coast of Panama and adjacent islands in the Pacific, Seemann. Ecuador, Lindes. Foot of Chimborazo, elev. 3000 feet, Spruce (only one specimen found). East Indies, appa-

*β. apifolium.* Sandwich Islands, *Gaudichaud, Lay and Collie, Barclay, Sinclair.* Sumatra, *Teschemacker, in Herb. Nostr.*—A very universally dispersed species in tropical regions in the Old and in the New World, but most difficult to define in words, because so variable. I am not satisfied with the result of my examinations; but can offer nothing better.

62. A. (Euaspidium) *giganteum*, Bl.; caudex? stipites 1–2 feet long brown as well as the rachises generally glossy, fronds ample 1–2 or more feet long submembranaceous dark greenish-brown when dry, pinnæ below bipinnate, pinnæ numerous 4–5 pairs 6–12 inches and more long broad-lanceolate deeply pinnatifid, the uppermost ones gradually smaller and confluent into a pinnatifid apex, superior pinnæ generally having the basal segment decurrent upon the rachis, lowest pair of pinnæ (and base of the next pair) often very long a foot and more and again more or less pinnated, segments more or less acute or acuminate serratodentate or lobato-pinnatifid, veinlets forming oblong areoles near the costa and costules then variously anastomosing in the pinnæ and partially in the segments, the veinlets in the segments nearly all free flexuose more or less divericating and once or twice forked, areoles including free simple or forked *fertile* veinlets (rarely any *sterile* ones) and generally with a terminal sori, within the segments the lowest veinlet on the superior side bears a terminal sorus, sori submarginal, involucres subcordate.—*Bl. En. Fil. Jav. p. 159* (and in *Herb. Nostr.*). *Metten. Aspid. p. 117.* *Sagenia, Moore.* *Polydictryum, Pr.* *Aspidium intermedium, J. Sm. in Hook. Journ. Bot. iii. p. 410* (Mr. Moore considers this to be a *var.* of his *Sagenia* coadunata, *Wall.* our cicutarium, from which the vegetation and position of the sori are very different).

scarcely a foot long, others resembling the normal state.—I have been guided by an authentic specimen of this Fern from Dr. Blume, and refer hither the above synonyms and localities. The peculiar features of this species are its rather numerous pinnae, of which the lower ones are very often again pinnate, and their deep segments more or less acuminated, and the nature of the venation together with the position of the sori. Next the costa (and, in the more compound pinnae the costule) the veins anastomose, forming large areoles and small ones next to them; in these areoles are very rarely any sterile veinlets, often fertile ones terminated by a sorus (the sori being rarely compact); in the segments of the pinna the veins unite, and form areoles only near the base, one or more, rarely two, on each side the costule; above them the veins are somewhat pinnate, or once or twice forked and quite free, the sori here being solitary on a basal superior veinlet. The venation is indeed intermediate between Sagenia and Pleoecnema, approaching the latter in the paucity of anastomosing veinlets: and it is not a little remarkable that another Fern of Ceylon (where A. giganteum is far from unfrequent) bears so close a resemblance to this, that, but for its having all free veins, it might well pass for it: this I believe to be the Aspid. (§ Lastrea) Gardnerianum of Mettenius.


Hab. Mexico, Hänke, Galeotti, Sartorius; Guatemala, Fredericksthal; and Trinidad, Sieber, Syn. Fil. n. 187 (Mettenius).—This is quite unknown to me from any authentic source. Presl’s figure of the segment, including the venation (of which the areoles have no free veinlets), very much resembles that of Aspid. cicutarium, Sw. Presl indeed compares it with apifolium (A. cicutarium, β, of us), and also with Polypod. latifolium, Forst. (our A. melanocaulon, Bl.). Mettenius says of this, “Differt ab A. cicutario lamina deltoidea, segmentis acuminitatis, sori minutis, indusiius rotundato-reniformibus, ab A. coadunato (which I have ventured to unite with A. cicutarium) soris dorsalibus.”

64. A. (Euaspidium) variolosum, Wall.; caudex stout creeping, stipites approximate subcespitose a span to 1–1 ½ foot long sparingly paleaceous at the base, fronds coriaceous-membranaceous a span to a foot and more long glabrous cor- date or cordato-ovate acuminate trifoliolate or more frequently pinnate with two or three nearly opposite pairs of pinnae and a larger terminal one more or less petiolate, lowest pair large half-ovate bifid or bipartite or bifoliolate, intermediate pairs lanceolate lobato-pinnatifid, inferior lobes the longest, terminal one subrhomboidal below deeply pinnatifid
with long acuminated entire or lobed segments, primary veins from the costa patent slender more or less waved remote, the rest of the veins uniformly anastomosing with areoles enclosing free simple or forked veinlets, sori scattered most copious near the margins of the pinnae compital or more frequently terminal on a vein within a large areole.—Wall. Cat. n. 379. Sagenia variolata, Moore? Aspidium coadunatum? (in part), Metten. Aspid. p. 281.

Hab. India: Amherst, Tavoy and Penang, Wallich, n. 379; Moulmein, Parish, n. 6; Chittagong, Hook. fil. and Thomson, n. 225 (two inferior pairs of pinna again pinnae); Mergui, Griffith; Telyn, above Silhet, Hook. fil. and Thomson, n. 225.—Although I believe a good species and long known in herbaria, this has never yet been described. Mettenius has united it with Aspid. coadunatum, Wall., and Bentham, in Fl. Hongkong., has referred it to his A. trifoliatum (our A. subtriphyllum); but it has characters which induce me to keep it distinct.

65. (Euaspidium) subtriphyllum, Hook.; caudex creeping and as well as the base of the stipites moderately scaly, stipites a span to 1½ or more long generally brownish, fronds glabrous or pubescent subcoriaceo-membranaceous, when young entire or 3-lobed cordate acuminate, in maturity 3-foliolate or pinnate with five or seven pinnae, terminal pinna large subrhomiboid variously pinnatifid lower lobes the longest, intermediate ones sessile or petiolate oblong more or less acuminate, lowest pair distant large semiovate more or less acuminate and pinnatifid, lowest segments (especially at the inferior base) generally very much elongated patent or deflexed or not unfrequently (unless I am mistaken in the limits of species) the lowest pinnae are pinnate and even subbipinnate, all costate, veins uniformly anastomosing with areoles having free simple or forked veinlets, sori scattered all compital (on the back of the anastomosing veins), involucres cordiform.—Polypodium subtriphyllum, Hook. and Arn. Bot. of Beech. Voy. p. 256. t. 50. Aspidium trifoliatum, Hook. in Florul. Hongkong. Kew Gard. Misc. ix. p. 341. Benth. Fl. Hongkong. p. 450 (excl. syn. of A. variolosum, Wall.). Eat. in C. Wright, Herb. of U. St. Pacif. Expl. Exp. (in Herb. Nostr.). Drynaria latifolia, Brack. Fil. U. St. Expl. Exp. p. 50?

Hab. China: Samla Bay, Alexander, Lay and Collie (Camoes Cave and elsewhere, frequent). Hongkong, C. Wright, Col. Urquhart. Moulmein, Parish, n. 87 (very large, 3 feet high, lowest pair of pinnae a foot long, on long petioles and again pinnate). Ceylon, small, Gardiner, n. 1300. Tropical Africa: Johanna Island, Lieut. Speke, large, and very much resembling n. 87 of Mr. Parish; Mauritius, Telfair, Bonton. Pacific Islands: Frankland Islands, South Pacific?, M'Gillivray, Voy. of the Rattlesnake; Island of Mallecally, C. Moore; Tahiti, Mathews, Barclay, Bidwill (fronds large, pinnae deeply pinnatifid), Brackenridge.
Tropical America: Panama, Fendler, n. 406 (quite corresponding with the Tahiti specimens); coast of Ecuador, Lieut. Wood; and Bay of Utria, Seemann.—Whether or not all the specimens I have brought together here, from widely different countries, really constitute one and the same species, I must leave others to determine. The doing so has been at no small sacrifice of time and trouble. It is not myself alone, but Mr. Bentham, and Mr. Eaton, in the United States, all working independently of each other, have referred some states of this to Aspid. (Euaspidium) trifoliatum, usually considered a production of the New World only. It has sagenoid involucres and a creeping caudex. In general outline and external structure it entirely accords with Dr. Wallich's Aspid. variolosum, but the position of the sori is wholly at variance, here always compital, on the back of the anastomosing venation; in A. variolosum the sori are usually terminal on free veinlets, each one within its own proper areole: a difference too striking to allow us to unite the two, and, indeed, more than sufficient in the opinion of many modern pteridologists to constitute generic distinctions. Still nearer does this Fern approach to the following species, A. melanocaule, in the sori and their compital attachment, and perhaps the chief distinction will be found in the colour of the stipites and rachises, there intensely ebeneous-black and glossy, here a dull brown, and the colour of the frond, too, is there of a much brighter green when dry. Still on the latter circumstance no great stress can be laid, and under A. melanocaule I have admitted some specimens with brown stipites, yet it does not appear to be the normal colour.


* A specimen in my possession from Forster's herbarium, has the stipites and rachises glossy indeed, as described by Forster; but pale brown and exactly corresponding with my large and compound form of Asp. subtriphyllum.
Hab. Pacific Isles, Forster. Jav. Borneo and adjacent islands, Milne, Seemann, n. 747 and 749 (named Sagenia repanda, in Dr. Seemann’s Cat. of Féejee Plants published in the ‘Bomplandia’), Dr. Harvey. Solomon’s Group and Tanna, New Hebrides, Milne. Java, Blume, in Herb. Nostr., De Vriese, and Teijsmann, n. 9 and 297. Luzon, Cuming, n. 57. Madagascar, Boivin. Fernando Po, Gustav Mann, n. 142 (one specimen with livid-brown stipes and rachis, but very glossy; also from the same place and with the same coloured yet glossy stipes and rachis, and from the Gaboon River, G. Mann.—Like so many of the Sagenia-group of Aspidium, this varies in the size and still more in the composition of its fronds; but the generally intensely black stipites and rachises are very remarkable. Brackenridge, under his Drynaria latifolia, by his references intends this plant; but he expressly, in two places, describes the stipes as straw-colour, and as well as from the fact of his giving Tahiti as the locality, it is more than probable his Fern is the same as that from the same country, which I have referred to Aspid. subtriphyllum.

67. A. (Euasplenium) polymorphum, Wall.; caudex creeping, stipites from a few inches to 1-2 feet long fuscous a little scaly at the base, fronds very variable in size from 3-6 inches (when they are generally cordate or 3-lobed or trifoliate) to 1-2 or more feet long, adult coriaceo-membraneous pinnate with 4-8 pairs of pinnæ and terminated by an odd one as large as or larger than the rest (sometimes confluent with the two below it), basal ones very large and long and generally unequally bifid or bipartite or more frequently bifoliate, the segments curved upwards, intermediate ones 5-6 or 8 inches long oblong acute or acuminate subopposite in distant pairs subpetiolate, inferior base unequal, the lowest often dilated, primary or costal veins horizontally patent slightly arcuate, these are connected by arched veins transversely, the meshes or areoles are occupied by copiously anastomosing veinlets, and their areoles with free sterile simple or forked veinlets, sori copious generally small all compital, involucres cordate.—Aspidium polymorphum, Wall. Cat. n. 382. Moore, Ind. Fil. p. 100. Pr. Tent. Pterid. p. 88. J. Sm. in Hook. Journ. Bot. iv. p. 183. Aspid. rostratum, Wall. Cat. n. 383. Aspid. repandum, Wildl. Sp. Pl. v. p. 216? Pr. Rel. Hauk. i. p. 29. Brack. Fil. U. St. Expl. Ex. p. 179? Bl. Enum. Fil. Jav. p. 144. Bathmiun, Fée? Sagenia, J. Sm. in Hook. Journ. Bot. iii. p. 410. Aspid. rostratum, Wall. n. 383 (a common form, with narrow acuminate spicis to the pinnæ).

Hab. India: Nepal, Wallach, n. 382, Winterbottom; Kumaon, elev. 2000 feet, Strachey and Winterbottom; Sikkim, Hook. fil. and Thomson, elev. 2-4000 feet; Bhotan and Mishmee, Griffith; Assam, Khasya, elev. 4000 feet (some with very large pinnæ laciniato-pinnatifid), Griffith, Simons, Hook. fil. and Thomson; Nil-
Aspidium, § Euaspidium.

55

ghiri, Wight, G. Thomson, Beddoo; Chittagong, Hook. fil. and Thomson; Mouleine, Parish, n. 145, 147, and 89 (var. pentaphylla); Trogla and Chittagong, Wallich, n. 383. Ava, Griffith. Pulo Pisang, Sumatra (sterile, but with copious scaly bulbs in the axils of the pinnae). Borneo, Lahuan, Molley, Thos. Lob (one specimen quite undivided, others triphyllous). Ternate, De Vriese and Teijmann, n. 314. Ceylon, Mrs. Genl. Walker, Garden, n. 1577, 1096. Tropical Africa: Fernando Po, G. Mann, n. 143, quite the Indian form and texture, Barter (rather more coriaceous, darker coloured, uppermost pinnae sometimes very decurrent and confluent).—A distinct and well-marked species, with something of the habit of Aspid. macrophyllum, but the terminal pinna is almost invariably quite free and petiolate (not confluent). The venation is very close, the areoles small, the free sterile veins numerous; sori copious, always compitall, sometimes in two series between the primary costal veins, at other times irregularly scattered.

Specimens apparently of this species in my herbarium, with black stipes and main rachis, are marked, by Mr. Moore, "A. polymorphum, B. ebeneum." They are from India: Tangree and Mishnee, Griffith; Assam, Simons.

68. A. (Euaspidium) grande, J. Sm.; stipes rufescens shining, "frond 2–3 feet long membranaceous glabrous sterile and fertile uniform ovato-oblong pinnated pinnatifid at the apex, pinnae 5–6 pair 10 inches long 2½ wide oblong-lanceolate caudato-acuminate slightly sinuated, lowest ones petiolate cuneately attenuated and decurrent upon the petiole unequally bipartite attenuated at the base sessile or adnate with the inferior base, venation of Drynaria, the primary areoles on each side the costa of the segments 8-seriate bisorous, sori between the secondary costae (primary veins, nobis) biseriate and approximate to them, rather large, terminal sori in the rays of the areoles, involucre reniform plane with a short sinus coriaceous." Metten. J. Sm. in Hook. Journ. Bot. iii. p. 410. Metten. Aspid. p. 121. Sagenia, Moore. Aspid. grandifolium, Pr. Epim. p. 64. Cardiochilæna laevis and sinuosa, Fée, Gen. Fil. p. 316 (Mettenius).

Hab. "Luzon?" Cuming (without number).—I find nothing in my herbarium entirely corresponding with the noble specimen of this Fern in Mr. Smith's herbarium. It is however well described by Mettenius. The frond is quite 3 feet long; the pinnae are 10 inches long; habit and texture of large specimens of Aspid. polymorphum, but the terminal pinna is 3-lobed (or, in other words, composed of three confluent pinnae). Some of the sori are arranged as in Asp. pachyphyllum, especially towards the apex of a pinna, that is, terminal on veins, and included within areoles; but the majority of them are compitall. Mettenius says that A. pachyphyllum differs in its contracted fertile fronds.

69. A. (Euaspidium) macrophyllum, Sw.; caudex erect stout, stipes 1–2 feet long paleaceous below, fronds 2–3 feet long coriaceo-membranaceous glabrous or pubescenti-hirsute oblone or ovato-oblong acuminate pinnated, pinnae spreading 4–6 pairs 6 inches to 2 feet long 1–2–3 inches wide suboppo-
site oblong acuminated entire or sinuate or subpinnatifid, lowest pair bipartite and subpetiolate, inferior segment falcate acute, upper pinna sessile and subdecurrent, terminal one generally subrhomboi d more or less tripartite and pinnatifid (formed of three or more confluent ones), the base cuneate and decurrent, primary veins flexuose slender patent connected by irregular transverse ones of which the areoles are reticulated, with free veinlets in their areoles, sori terminal or dorsal often at the junction of veinlets forming two rows near the primary veins, involucres orbicular and subpetiolate but with a narrow sinus hence cordate.—Sw. Syn. Fil. p. 43 and 239. Wild. Sp. Pl. v. p. 217. Metten. Fil. Hort. Lips. p. 95. t. 22. f. 13 (venation). Aspid. p. 122. Sagenia, Moore. Bath. Link. Cardioclaena, Fée, Gen. Fil. t. 24 B. 1 (venation and sori very good). Aspid. fraxinifolium, Schrad. A. bifidum, Pr. A. Pœppigii, Pr. ? and Metten. Aspid. p. 123. Plum. Fil. t. 145. Hab. Tropical America: Martinique, Plumier, and probably all the West Indian Islands; St. Vincent, Jamaica, Porto Rico, Cuba, C. Wright, n. 834; Dominica, Trinidad, Mexico, Galeotti, n. 6475, pinnae small, lanceolate, Liebmann, Jurgenson, n. 767; Panama, Hayes, Cuming, n. 1289, Fendler, n. 407; Cupica, Seemann, n. 993, and Coyba (pinnae much attenuated at the base and finely acuminated); Galapagos, Lieut. Wood; Guiana, Le Prieur, Hostmann, n. 239, Appmu, n. 168 (basal pinnae with a superior antricle at the base); Peru, Ruiz and Pavon, Mathews, n. 1825; Tarapota, Spruce, n. 3981; Ecuador, foot of Chimborazo, 3000 feet, n. 5724 and 5725, at elev. 4000 feet (“between 7 and 8 feet high; lowest pair of pinnae ½ foot long and 4½ inches wide; a noble Fern”), Spruce; Esmeraldas, Seemann; Quitinian Andes, banks of the Napo, Jamieson, with very narrow lanceolate pinnae ¼-½ inch wide, and forest of Archodena (ordinary form); New Granada, Schlümm., n. 62, 231, 640; Venezuela, Fendler, n. 165; Caracas, Linden, n. 159, 510; Brazil, Sellow, Gardner, n. 52.—This species has a very extensive range in tropical America, and varies much in size and in the form of its pinnae and segments. Plumier’s figure (t. 145) is a very faithful representation of the species.

ing to garden specimens Mettenius says: the native plant of

Hab. Java, Zollinger, n. 580 Z (Kze.). Philippine Islands, Cuming, n. 224, Mindanao, n. 290, Zebu, n. 339 and 340 (according to Mr. J. Smith). New Guinea, Hindes. Amboyna (Delessert in Herb. Nootr.). Fejee Islands, Ovalau, fertile pinnæ broad, not evidently contracted, Naviti Levu, and Solomon's group, Milne Moluccas, De Vries and Teijsmann, n. 76 and 208.—My specimens from Cuming, as numbered from his catalogue, present very different appearances, but without figures I could hardly hope to render any notes upon them intelligible. In most, but not in all, the fertile fronds put on a very different appearance from the sterile ones; my n. 224 however is the most singular, 2–3 feet long, having the basal pinnæ on the lower side deeply laciniate-pinnatifid with lanceolate segments 6 and 7 inches long.

Mettenius' figures admirably represent what may be considered the normal form of this species, especially in the venation and position of the sori. On this subject this author says: "Secondary " (primary with us) "veins costiform; tertiary conspicuous, constituting the primary areoles: the rest forming secondary, irregular, appendiculated areoles. Sori in two series between the secondary costa, always terminal on the clavate apex of the anterior branch of the tertiary veins, the posterior branch more or less forked, free, or forming primary and also secondary areoles between the secondary costa, regularly biseriate, and their areoles include the soriferous branches."—Accurate as this description may be in some specimens of this variable plant, it does not seem to hold good in all. Indeed, in alluding to Mr. Cuming's series of this very plant, Mr. Smith speaks of the variable character of the venation, according as the pinnæ are more or less contracted.

71. A. (Euaspidium) Menyanthidis, Pr.; caudex? stipes a span to a foot long, frond oblong or subovate 1½ foot long (in my specimens) coriaceo-membranaceous pinnate, pinnæ 10 inches to a foot long 1–1½ inch broad lanceolate finely acuminate entire or eroso-subsinuate below gradually tapering into a short petiole in the lowest pinnæ, terminal one long-petiolate uniform in my specimens all undivided ("lowest pinnæ abbreviated or bisected") costate, costa prominent beneath, primary costal veins patent subfalcate connected by flexuose transverse secondary veins whose areoles are occupied by anastomosing veinlets forming angles and including in their areoles numerous free simple or forked veinlets, sorî copious small irregularly placed all compital, involucres "subrotund or oval fixed by the centre" (Presl; reniform, Metten.)—Pr. Reliq. Hænk. i. p. 28. Metten. Aspid. p. 124 (excl. syn. Aspid. iriguum;* J. Sm.). Sagenia, Moore. Polydictyum, Pr. Epim.

* This has little affinity with Aspidium Menyanthidis, and is Microsorum trifidum, Fée, Gen. Fil. p. 269, with the sorî of Dryomenis, Fée.

Hab. Isle of Sorsogon, Hcneke. S. Camarines, Cuming, n. 183 (in Herb. Nostr. and n. 31, according to Mettenius, A. irrygium, J. Sm.). Java, “Zollinger, 2368.”—I possess only two fronds of this, n. 183 of Cuming. The venation and sori resemble those of Aspid. polymorphum, but the pinnæ are long and narrow, finely acuminate, and much attenuated at the base. Too near Asp. pachyphyllum.


Hab. Nepal, Wallich, n. 282 (Mettenius).—Unknown to us. We should have been glad if the author, whose character we have given above, had made some observations on its affinities, which appear to be very dubious, to judge of the different genera in which it has been placed. Blume compares his Aspid. siifolium with his A. sanctum, a very little-known species, though from a garden specimen from Holland in my herbarium I suspect it to be a form of Asp. pachyphyllum.

73. A. (Euaspidium) immersum, Hook.; caudex? stipites 6–10 inches long and as well as the rachis stramineous, fronds broadly ovate scarcely acuminate 6–8 or 10 inches long subcoriaceo-membranaceous subbi- below tripinnate, primary pinnæ 5–7 obliquely ovate acuminate but obtuse in distant pairs long-petioled 2–4 inches long deeply and irregularly pinnatifid below pinnate, lowest pair at the base subpinnate, segments or ultimate pinnæ oblong obtuse sinuato-lobate at the margin, veins prominent anastomosing into suborbicular large areoles not more than two series in each segment, these are so depressed as to form a cavity (pustuled on the upper
surface) and each areolar cavity is occupied by a rather large sorus attached to the apex of a free veinlet, involucre rather large with a broad membranaceous margin orbicular and sub-peltate but with a small sinus at the lower margin.—Phlebignonium impressum, Griff. Pl. Ind. n. 34 (according to Fée). Fée, Gen. Fil. p. 314. t. 24 A. f. 2. Aspidium, an trifoliatum Sw. (Wall. MS.)

Hab. India, Wallich, in Herb. Nostr., no locality given.—M. Fée observes: "Cette fougère a un port spécial très-distinct de celui des autres Aspidiées?" this is very true, but to me this seems to be an abnormal state: a fertile frond unusually contracted and unnaturally irregular in outline, and with a good deal the habit of small contracted specimens of Aspid. coadunatum, Wall., so that could we see the sterile fronds, they would perhaps exhibit the ordinary venation of Sagenia. My only two specimens are, as regards venation, quite uniform.

74. A. (Euaspidium) semibipinnatum, Hook.; caudex creeping scaly, stipites a span to foot high striated with prominent angles reddish-brown as well as the rachis and costa, fronds 1-1½ foot long oblong-ovate in circumscription coriaceo-membranaceous dark brown when dry glabrous subbi-tripinnate, pinnae 9-11 6-9 or 10 inches long linear-lanceolate subflexuose acuminate tapering at the base quite entire strongly costate, the lowest pair or two pairs long-petiolate tripartite or 3-foliolate sometimes again divided so as to be twice trifoliolate, primary veins subhorizontal united by arches within the margin the rest variously anastomosing, the areoles appendiculate, sori (only young and imperfect) compital, involucre subreniform. (Tab. C.CXXXI.)—Polypodium semibipinnatum, Wall. Cat. n. 388 and 2229.

Hab. Penang, Wallich. Borneo, De Vriese and Teijsmann, n. 46.—The only specimens I have seen of this rare and yet undescribed sagenioid Aspidium, are from Penang and from Borneo; the specimens are destitute of caudex, and are remarkable for the long, narrow, ribbon-like pinnales. The pinnae are opposite or alternate, the lowest pair are compound and the divisions long-petioled. The venation is that of Cardiochlaena, Fée, that is, with free veinlets in the areoles of the venation. I regret the fructification is very scanty and too young to enable me to form an idea of the perfect form of the involucre; probably it would be like that of Aspid. Lobbii, an allied yet very distinct species in the venation, etc.

75. A. (Euaspidium) Lobbii, Hook.; caudex ?, stipites a span long tawny-brown subangular, fronds (the only two in my possession) 10 inches long subdeltoid in circumscription subcoriaceo-membranaceous dark brown above (when dry) paler and green beneath pinnae subbipinnate at the base, pinnae spreading 5-6 inches long remote opposite narrow-lanceolate finely acuminate attenuated below subsessile quite entire costate, the costa much and densely pubescent above,
lowest pair of primary pinnæ compound with two or three pinnules resembling the superior pinnæ, primary veins erecto-patent united by arches a little within the margin, the rest variously anastomosing and having no free veinlets in the areoles (inappendiculate), sori very copious scattered, apparently indiscriminately, over the whole under side of the pinnæ and pinnules moderately large, involucre permanent suborbicular and peltate but often exhibiting a shallow sinus as in Sagenia in general. (Tab. CCXXXII.)

Hab. Borneo, Sarawak, Thos. Lobb.—In outline and general aspect this comes near Aspid. semibipinnatum, Wall. (our n. 74); but it is less compound, has more spreading pinnæ, and pinnules of a different colour, and the venation is considerably different, having no free veinlets.

Many supposed species of authors might be added to the Ennepodium- and Sagenia-groups, if such a list could be in any way instructive. One supposed Aspidium, however, from N. Granada, I am anxious to notice here, the "A. dicranopterum" of Mr. Eaton, in his 'Filices Wrightianæ et Fendleriæ.' The excellent description and a fragment which Mr. Eaton was so good as to send me from his only specimen, suffice to show that it is the same as a Polypodium (§ Phymatoses) in my possession, first detected by Mr. Purdie, in 1845, at the emerald-mines of Maso, N. Granada, specimens of which, including the stipes, are 6 feet long; and at Tarapota, Eastern Peru, n. 4065; and at foot of Chimborazo, alt. 3000 ft., in woods, n. 5723, Spruce.


Sori dorsal, subglobose, involucrate. Involucre cordate or reniform, fixed by the sinus on the back of free or combined veins, or terminal on a free veinlet. Veins either free or variously conjoined, and more or less anastomosing.—Ferns of very varied form and character, seldom simple (undivided) or pinnatifid, very frequently pinnate, with the pinna pinnatifid, or compound and decompound. Caudex erect or creeping. Stipites and pinnules rarely articulated. (Fadyenia, Olean-
dra, and Neprolepis, are here excluded from this genus, but more on account of habit and the general opinion in favour of their being kept apart, than from any decided technical characters.)

§ Pleocnemia.—Primary opposite veins next to the costa, one or more pairs, uniting and forming angular, costal, elongated areoles, the others more or less anastomosing, remote from the costa. Pleocnemia and Haplodictyum, Pr.


Hab. Moluccas, Gaudichaud. Java, Blume, De Vriese and Teijsmann, n. 24, n. 107, and n. 114 (pinnales small, sori at the margin of the segments). Ceram, De Vriese and Teijsmann, n. 132. Luzon, Cuming, n. 33, 34, 107, 289. China, Beechey. Hongkong, Wilford, n. 152. Mishnee and Assam, Griffith, Simons. Sylhet, Wallich, Hook. fil. and Thomson. Samoan and Feejee Islands, Braackenridge, Harvey. Dr. Harvey’s specimens from the Feejee Islands, in a dried state, are very dark-coloured, blackish-green above, paler beneath, with more deeply pinnatifid pinnales, and consequently longer segments and narrower in proportion. Braackenridge’s Feejee Island specimens are in all probability the same.—This Fern must be a very noble one. Cuming speaks of it as a “Tree Fern”; Braackenridge says the trunk is short, thick, erect, surmounted by large, spreading, bipinnated fronds from 12–15 feet in length. In regard to the venation, many of the pinnae, especially the fertile ones, have segments with entirely free venation, as in Lastrea, while others have an opposite lower pair of branches or veinlets united so as to form an oblong costal areole, as in Ennephrodium; while others have, in addition, one or more series of areoles near the margin, as in Sagenia.
2. N. (Pleocnemia) aristatum, Hook.; caudex creeping, stipites close-placed a span to 1 foot long, fronds of the same length as the stipites ovate submembranaceous pinnate, pinnae 7–13 spreading all petiolate especially the large terminal one 4–6 inches long 1–1 ½ broad oblong-lanceolate falcate finely acuminate lobato-pinnatifid obliquely cuneate at the base rarely with two or three obovate auricles or distinct pinnules, their lobes triangular-ovate acute and as well as the apices of the pinnae subaristato-serrate, primary veins (or costules of the lobes) pinnated with obliquely patent veinlets of which two or three pairs of the lower ones unite and form a very acute angle, sori dorsal on free or united veinlets, involucres reniform small ciliated sometimes elongated and curved at one end (as is frequent in Athyrium) with an elongated attachment. (Tab. CCXXXVIII.)—Goniapteris aristata, Fée, Sme Mém. Foug. p. 253. Anisocampium Cumingianum, Pr. Epinol. Bot. p. 58. Cyclodium, Moore. Aspidium Otaria, Kze. Herb. Metten. Aspid. p. 34.

Hab. Luzon, Cuming, n. 239. Ceylon, Gardner, n. 1299. Nilghiri, Beddome. E. Indies, Wallich (no locality recorded).—A very well marked Fern, but of doubtful genus. The venation may be considered as that of Pleocnemia; the involucres vary in shape. There is already a Nephrodium Cumingianum, which is the oldest specific name. I cannot adopt that of Otaria (bearing ears), for that is only characteristic of a form which, among my numerous specimens, is only found in Cuming’s plant, the only one perhaps known to Kunze.

3. N. (Pleocnemia) heterophyllum, Hook.; caudex creeping, stipites crowded villous and partially scaly 2–3 inches long, fronds 5–6 inches long oblong-strapshaped shortly acuminate lobato-pinnatifid, at the very base imperfectly pinnate with dwarfed pinnae, villous on the rachis and margins, lobes ovate obtuse; sterile ones with the veins irregularly anastomosing; fertile ones with one or two of the lowest pairs only united (as in Eunephrodium) the rest free, sori copious dorsal in two lines or series on each lobe between the costule and the margin, involucres?—Aspidium (Nephrodium) heterophyllum, Hook. Jc. Pl. t. 920. Nephrodium Blumei, J. Sm. in Hook. Journ. Bot. iii. p. 411 (name only) excl. the synonyms. Aspidium, Metten. Aspid. p. 98. t. 22. f. 5 (excl. var. 2, pinnate). Haplodictyum heterophyllum, Pr. Epinol. Bot. p. 51. Fée, Gen. Fil. p. 309. t. 18 C. f. 2.

Hab. Samaar, Philippine Islands, Cuming, n. 322.—Mr. J. Smith considered this Fern to be the same with the Gymnogramme caesecens, Bot. Fil. Jav. t. 183, but I think hardly correctly so. Mettenius, however, holds the same opinion, and makes Cuming’s n. 251 from S. Ilocas, a pinnated var. This however appears
Nephrodium, § Eunephrodium. 63

quite distinct as far as I can judge from fronds with very imperfect fructification. It is Lastrea exigua, J. Sm. (name only), and Physematium Philippinum of Pr. Epimel. Bot. p. 34, according to his reference.


Hab. Java, Blume.—Although possessing an authentic specimen of this from Dr. Blume, I can add little more than the author has stated in the work above quoted, for the specimen is confined to two pinnae only, nearly a foot long; these appear different from any other Fern known to me. The venation quite resembles that of Pleocnemia, and in my specimen the very small involucres are reniform; but Presl says, “oval, rarely orbicular, at the base often slightly emarginate, prolonged at the apex into an acute scarious process.” Blume alludes to its near affinity with his Aspidium (Euaspidium) giganteum, differing indeed, as he says, in the nature of the venation.

§ Eunephrodium.—Costules or primary veins pinnate, secondary ones or veinlets, one (the lower one) or more pairs angularly connivent, and from those united ones producing an excurrent veinlet, which is free or extends to the angles above, thus forming, as it were, a pseudo-costule, which continues to the sinus. Nephrodium, Schott, Presl, and others.

The union of one or more of the opposite veinlets is the characteristic of this group, or genus as many consider it. But there are cases, as is well known to the attentive student of Ferns, in which it is difficult to say if the union is complete; and in not a few cases there are free and united veinlets on the same individual specimen; hence many incorporate Lastrea with Nephrodium whether as a genus or a section, both having cordate or reniform involucres.

* Fronds simple, more or less pinnatifid, rarely pinnate at the base.


Hab. Tropical America, Panama, Cuming, n. 1123, Fendler, n. 391. Isle of Coyba, Seemann.—A small, delicate, but well-marked species, accurately figured by Kunze, and in Dr. Seemann’s ‘Botany of H. M. S. Herald.’
6. N. (Eunephrodium) *Skinneri*, Hook.; caudex erect or ascending apparently proliferous clothed with the bases of former years' stipites, stipites terminal tufted 2–4 inches long with a few scattered scales, fronds submembranaceous firm lanceolate finely acuminate deeply (more than halfway down) pinnatifid, at the base pinnate, the apex entire, segments and pinnules oblong-ovate subfalcate rather acute entire, veins numerous lowest pair united, sori small dorsal between the costule and the margin, involucres reniform thin and membranaceous reticulated finely ciliated, rachis and veins beneath pubescenti-hirsute.—*Aspidium* (Nephrodium) *Skinneri*, Hook. Cent. of Ferns, t. 25. Ic. Plant. t. 925. Metten. Aspid. p. 92.

Hab. Guatemala, Skinner. Bombinasa, Andes of Ecuador, Spruce.—Specimens of this, recently sent from the Andes of Ecuador, by Mr. Spruce, precisely correspond with those of Mr. Skinner. In the former country, it inhabits declivities which are occasionally flooded; and this circumstance perhaps explains the proliferous appearance of the caudex or rootstock.

7. N. (Eunephrodium) *Wrightii*, Hook.; caudex creeping branched paleaceous with dark-brown scales, stipites scattered 4–6 inches long rather stout stramineous dark-brown and scaly at the base, fronds 6–7 inches to 1 foot long coriaceous oblong-lanceolate short acuminate upper half or more deeply (beyond the middle) pinnatifid, segments numerous oblong obtuse ½ an inch to 1 inch long subfalcate entire, pinnae oblong obtuse truncate at the base and often auricled above and sometimes also beneath, the auricles acute, veins prominent beneath whitish simple or forked, inferior pair combined, sori marginal, involucres small reniform or lunate subciliate, rachis and veins beneath pubescenti-hirsute. (Tab. CCXXXIX.)—*Aspidium Wrightii*, Metten. MS. Eat. Fil. Wright. et Fendl. p. 210.

Hab. Dense woods near Monte Verde, eastern Cuba, C. Wright, n. 824.—Eaton, who has well described this new species, notices its affinity with my *Nephrodium Skinneri*, from which, however, it is extremely different, in its creeping caudex, different form and texture of the fronds, the short acumen, and the marginal sori.

8. N. (Eunephrodium) *stenopteris*, Hook.; caudex short stout ascending, stipites tufted 2–4 inches long scaly below, fronds coriaceous 1–2 feet long elongato-lanceolate acuminate and often proliferous at the apex long-attenuated and decurrent upon the stipes at the base, more or less deeply pinnatifid most deeply above the middle with oblong-

Hab. W. Indies: Cuba, Linden, C. Wright, n. 825; N. Grenada, Purdie.—Kunze's is an excellent representation of this plant, and I cannot agree with those who consider it a variety of N. scolopendrioides. My numerous specimens of the two exhibit no intermediate forms.


Hab. West Indies: St. Domingo, Pluken; Jamaica, Plukenet, Purdie, Wilson; Gandelombe, Duchassaing; Cuba, Otto, Poppig.—It is true our own specimens do not exhibit any trace of involucres; but Mettenius describes them, and there is no reason to question his accuracy. The species appears to be peculiar to the West Indian islands.

10. N. (Eunephrodium) sclerophyllum, Pr.; "frond oblong-sublinear subrigid pinnated above pinnatifid, the rachis beneath
and the stipes stellato-pubescent, pinnæ lanceolate obtuse grandi-dentate or pinnatifid, the lowest abbreviated and as well as the intermediate ones subsessile, cordate and subauriculate at the base, superior ones adnate with the base decurrent, uppermost confluent, sori uniserial on the segments on the middle of the veins minute, involucres stellato-hirsute." Aspidium, Kze. in Linnaea, v. p. 92. Nephrodium, Pr. Tent. Pterid. p. 81. Aspidium scolopendrioides, var. 3, pinnata, Metten. Aspid. p. 97 (not Ear. in Fil. Wright et Fendl. p. 211).

Hab. Cuba, Poppig.—I possess a solitary specimen of this Nephrodium, from Kunze, which well accords with his description. The two nos. 1005 and 1006 of Wright’s Cuba Ferns, referred to this, seem to me rather to accord with some of the numerous forms of Nephrodium molle.

11. N. (Eunephrodium) Jamesoni, Hook.; caudex short erect copiously rooting, stipites tufted 4–6 inches long patently villous slightly and deciduously scaly, fronds 6–10 inches long 1–2 inches broad firm-membranaceous villous on both sides oblong-lanceolate gradually acuminated upper half or nearly so pinnatifid the rest pinnated, segments and pinnæ oblong-falcate obtuse coarsely and obtusely serrated (scarcey pinnatifid), the latter (pinnæ) shortly petiolate the base truncated subauricled above, lowest pair generally deflexed, base of the costa with a large brown gland beneath, veins pinnated flexuose, veinlets remote simple or once or twice forked, 2–3 inferior pairs united at very acute angles (subpleocnemoid), sori in general copious in several series, involucres small hairy.

Hab. Ecuador, near the River Napo, Jameson; n. 761; Tarapota, Eastern Peru, Spruce, n. 3916.—Had I possessed only one or two specimens of this Fern, I might have been disposed to consider it an unusual state of N. molle; but I have half-a-dozen tufts from two widely-different localities, which are perfectly uniform. It may be possibly related to Aspid. dissidens, near to which I place it. This belongs as much to the next group of Eunephrodium as to the present.

** Fronds pinnate, sometimes pinnatifid at the apex, and sometimes bipinnate at the base.

12. N. (Eunephrodium) dissidens, Metten.; "frond 8 inches long flaccido-membranaceous pubescenti-hirsute on both sides as well as the costa and stipes (5 inches long), with forked hairs oblong-lanceolate pinnate, pinnae 2½ inches long 9 lines wide shortly petiolate from a cordate and broader base gradually attenuated pinnatifid, at the apex pinnatifido-serated, segments ovato-oblong acute the basal superior ones largest crenato-pinnatifid, tertiary veins on each side eight or
nine, lowest ones forming costal arches, superior ones undivided free or forked, hence forming costular areoles, uppermost ones fertile, sori on each side the costule of the lacinie four to six in one series near the margin, indusium reniform very small fringed with undivided or forked hairs longer than the indusium. — Aspidium dissidens, Metten. Aspid. p. 116. Polypodium oligocarpum, Herb. Spreng.

Hab. Portorico (Metten.).—This is quite unknown to me. Mettenius groups it with the Pleocnemia-section, but he does not allude to its affinities.

13. N. (Eunephrodium) Javanicum, Hook.; caudex short stout erect paleaceous, as are the short robust tufted stipites, with finely acuminated deciduous scales, fronds 2 feet and more long villous especially on the veins and rachides beneath subcoriaceous ovato-oblong long caudato-acuminate much attenuated below, pinnate, pinnae numerous approximate spreading 4–5 inches long 1/3 of an inch wide from a broad truncated sessile base gradually tapering into a fine acuminated entire point pinnatifid, scarcely auricled at the base, many of the lowest ones contracted small subtriangular and these extend almost to the base of the stipes, lobes oblong-ovate obtuse ciliated the margin entire sometimes recurved, veinlets numerous approximate two or three lowest pairs united all soriferous near the middle, involucre subhippocrepiform hairy on the back fringed with glandular hairs and attached beyond the middle to an elongated receptacle.—Hook. Fil. Exot. tab. 61. Mesochlrena Javanica, Br. Mss. Metten. Fil. Hort. Lips. p. 96. t. 18. f. 13 (excellent). Aspid. p. 103. M. asplenioides, J. Sm. in Gen. of Ferns, p. 71. Sphærostephanos, J. Sm. in Hook. Gen. Fil. t. 24 (the analysis by Bauer very faulty). Polypodium caudigerum, Wall. Cat. n. 298. Stegnogramme Mesochlrena, Fée, Gen. Fil. p. 204. Aspidium polycarpum, Bl. En. Fil. Jav. p. 156.

Hab. Malay Islands: Java, Blume, De Vriese and Teijsmann, Millett, Thos. Lobb; Singapore and Penang, Wallich, G. Porter, Sir Wm. Norris; Island of Nusa Kambarang, Blume; Moluccas (Brown in Herb. Carmichael).—A Fern of the Malay Islands, whose fructification had, till lately, been greatly misunderstood. It is a true Nephrodium, with the receptacle of the involucre more elongated than usual, hence giving it a horseshoe-like form, as is not unfrequent in Eunephrodium, and showing no small affinity with that of Didymochlrena. (See more full description in *Filices Exoticae,* l. c.)

14. N. (Eunephrodium) molle, Desv.; caudex stout horizontal short densely rooting, stipites a span to a foot and more long, fronds rather soft-membranaceous 1–2 feet long

Hab. In tropical and subtropical countries; the most cosmopolitan, perhaps, of all Ferns.

1. AFRICA and adjacent islands: Algeria, Boné; Madeira and all the West-African tropical and extratropical islands, abundant; Sierra Leone, Niger, Forbes, Vogel, Brunner, Barter, Mann; South Africa, Cape Town to Macalister in the interior, Natal, East Coast, Zambezi. Dr. Kirk; Abyssinia, Schimper; Bourbon, "Aspid. pulchrum, Bory," Carmichael; Mauritius, Sieber, n. 49; Asp. Helsinbergii, Bojer, etc.

2. CEYLON, Thwaites, Gardner, Genl. Walker.

3. INDIAN CONTINENT, most abundant from the West to the extreme East, and from the South to the Himalayas, Wallich, including his A. canescens, Cat. n. 334, A. canum, n. 337, a large var. with small tubercles bearing subulate paleaceous scales; Nepal, Hooker fil. et Thomson, n. 240 a. Polypod. mollusculum, Wall. Cat. n. 332, a common form, with deeper and narrower segments. Polypod. appendiculatum, Wall. Cat. n. 349, almost identical with the latter. Polypod. nemorale, Wall. Cat. n. 1317. Aspid. parasiticum, Wall. Cat. n. 2239; many of the larger states from the Indian continent are sometimes quite glabrous.


5. CHINA, Beechey: Hongkong, abundant, Formosa, Wilford, terminal pinna very long; Kinsin, Japan, C. Wright, Babington, Miss Nelson. (N. sophoroides, Desv.) Bonin, Mertens, and Loochoo, C. Wright.


7. AUSTRALIA, R. Brown, Capt. Sturt; Moreton Bay, Mueller; Teviot River, Fraser; Brown's River, Macquillvay; Sydney, Bynoe.

8. SOUTH AMERICA. West Indian Islands, probably universal: Jamaica, Cuba, C. Wright, n. 1005 and 1006; those which Mr. Eaton refers to A. scolopendriae, var. pinata (A. sclerophyllum, Kze.) I rather consider a form of N. molle. From the continent of the new world, I possess specimens from New Mexico, C. Wright; Mexico proper, Linden, n. 1505; from various parts of Central America; Ecuador, Esmeraldas, Jameson, Col. Hall, Spruce (no number); Peru, Cuming, n. 1080; Tarpota, Eastern Peru, Spruce, 4039 (narrow pinnae and narrow segments), and 4749, "4660 affin." (broad pinnae, 1 inch broad, and broad segments), and 4919, and 4659; Brazil, frequent, Gardner, n. 1107 and 1902, Sellow; Cayenne, Lepriviex, and others; New Granada, Venezuela, Findler, n. 176 and 190 (A. patens, Eat.), Steetz, n. 114, Schlim, n. 497.

9. In NORTH AMERICA, I do not find N. molle anywhere recorded as a native, save by Kunze, in Silliman's Journal, as inhabiting the Southern U. States; but this proved to be A. (Lastrea) patens, Sw., as stated in Chalm. Fl. of S. U. States, p. 594, and at Sitka, Mertens, in Russian America, between lat 56° and 58° N.; but this latter surely needs confirmation.

It was only to be anticipated that with a plant having so widely extended a geographical range, there should be considerable variations under the different influences of soil, climate, etc., and this has led to the formation of many supposed species; some of these states, it must be confessed, border closely on several others, both of this and of the Lastreæ-group, and it needs a very experienced eye to distinguish them, and an able hand clearly to define them. Jacquin's figure well represents the type of the species. Some fronds are truncated and abrupt-as it were at the base, others have the base contracted and the pinnae there dwarfed and distant. The texture is usually membranaceous, but others are subcoriaceous. The pinnae vary much in number, and in being hairy or glabrous, in the length and breadth, and in the depth of the sinuses between the segments; the latter are sometimes short and as broad as long, sometimes narrow-oblong. The sori are sometimes sparse, at other times densely crowded and almost confluent.

15. N. (Euneuphrodiwm) angustifolium, Pr.; "frond oblong-lanceolate" (a span to 1½ foot long subcoriaceo-membraneous) "pinnated, pinnae (2-5 inches long of an inch broad) sessile narrow linear shortly caudato-acuminate pinnatifid obtuse at the base lowest ones minute subovate, veins soriferous in the middle the lowest pair anastomosing, indusium ciliate and hairy" (caudex in one of my specimens, a young plant, short erect sending down copious wiry roots).

Hab. Luzon, Cunning, n. 268, in part.—I retain this as a species with great hesitation, and mainly because my only specimen with any root to it shows a short erect caudex; but as this is on a young though fertile plant, it may not be in a perfect state. If the perfect state should prove to be a creeping root, then I do not see how it is to be distinguished from Asp. molle. I have already observed that this species has not unfrequently several of the lower pinnae dwarfed and minute.

16. N. (Eunephrodium) stipellatum, Hook.; "frond bi-pinnatifid subcoriaceous pubescent on each side the rachis and on the veins beneath, pinnae (fertile ones narrower) sessile (furnished beneath at the union with the rachis with a palea) linear-lanceolate acuminate truncate at the base pinnatifid, the segments subfalcato-oblong obtuse entire united by a pellucid thin membrane, lowest one above a little longer than the rest, sori biseriate approximate, involucres glabrous, stipes glabrous channelled above."—Aspid. Bl. En. Fil. Jav. p. 152.

Hab. Java, Blume.—Possessing, as I do, from the author only a fragment with four sterile pinnules of this Fern, I can throw no new light on this Fern. Dr. Blume gives its affinity as with Asp. sophoroides (A. molle, Sw.), with which indeed the sterile pinnae and the venation quite agree; there are, however, present at the base of each pinna beneath, not what I should call a "palea," but a subulate fleshy gland, quite unlike that of N. hirsutum, our next species.

17. N. (Nephrodium) hirsutum, J. Sm.; stipes and principal portion of the rachis villous with long soft close-pressed hairs, fronds 3–4 feet long ovato-lanceolate acuminate membranaceous 1½ foot and more wide pinnated slightly hairy on the costa above glabrous and minutely glanduloso-resiniferous beneath, pinnae very numerous approximate sessile 10 inches long in the broadest part of the frond and nearly an inch wide linear-oblong finely acuminate truncated at the base uniformly pinnatifid about halfway down to the costa, at the base beneath on the rachis is a large conspicuous disciform scale or gland chiefly present on the lower half of the frond, segments ovato-oblong subfalcate entire rather obtuse, one or two of the lowest pairs of veinlets combined, sori most copious on the upper half of the frond near the middle of all the veinlets, involucres glabrous. (Tab. CCXL. B.)—J. Sm. in Hook. Journ. Bot. iii. p. 412 (name only). Pr. Epimel. Bot. p. 48. Aspid., Metten. Aspid. p. 107.

Hab. Luzon, Cunning, n. 82. Assam, Simons, n. 279?—First described by Presl, who entirely overlooked the remarkable glandular disc at the base of the pinnae, but says "affine Neph. appendiculato, N. molli, et N. nymphali" (all one species with us). The upper half of the frond, where this gland is wanting, can indeed scarcely be distinguished from N. molli; but, taking into consideration the great size of the frond, the presence of this large gland on the inferior half of the rachis, and the minute resinous glandular dots beneath, it may safely rank as a
species. The specific name is hardly applicable to the Assam plant. I possess only the upper part of a frond, whereon there are no glands to enable me to verify the species.

18. N. (Eunephrodiurn) venustum, J. Sm.; "fronds glabrous lanceolate" (pinnate, the pinnae pinnatifid), "pinnae lanceolate truncate at the base subsessile alternate, segments falcate, sori minute marginal."—Ferns in Ferns of Jamaica, p. 112 (Aspid.). J. Sm. Cat. Gard. Ferns, p. 54.

Hab. Mayday Mountains, Jamaica, R. Howard.—I fear this may prove only a var. of N. molle, with larger and broader pinnae, and the sori more marginal than usual.

19. N. (Eunephrodiurn) crinipes, Hook.; stipes nearly 1 foot long and as well as the rachis stout and singularly erect and stiff stramineous the former shaggy with copious long spreading flexuose subulate dark brown scales which extend some way up the rachis, frond more than 2 feet long submembranaceous quite glabrous from a broad base oblong acuminate copiously pinnated, pinnae 5–6 inches long less than \( \frac{1}{2} \) an inch broad sessile horizontally patent from a broad base linear-oblong finely acuminated pinnatifid more than halfway down to the rachis with oblong subfalcate obtuse entire segments, lowest segments a little longer than the rest, lowest pair of veinlets united, sori on all the veinlets and on nearly every pinna large cordato-reniform very membranaceous.

Hab. Sikkim Himalaya, alt. 1000 feet, Hook. fil. and Thomson.—This Fern, of which we possess only a solitary specimen, has the shaggy erinace scales of the stipes and rachis of Aspidium (§ Lastre) potentissimum of Wallich (but the stipes is much longer), the pinnae of N. (Lastr.) patens, and the venation of N. molle. The stipes and rachis are remarkably stiff and straight, and the pinnae of a pale yellowish-green, horizontally patent.

20. N. (Eunephrodiurn) venulosum,* Hook.; quite glabrous, stipes 1\( \frac{1}{2} \) foot and more long stout and together with the rachis sharply angled brownish-green, frond 4\( \frac{1}{2} \) feet long broad ovato-lanceolate acuminate subcoriaceous-membranaceous dark green glabrous copiously pinnated, pinnae 6–9 inches long 1 inch broad mostly opposite sessile oblong gradually and very finely acuminated deeply more than halfway down pinnatifid with oblong subfalcate subcrenate segments serrated at their apex superior ones approximate inferior pairs distant 2 inches apart somewhat contracted at the base, lowest four or five pairs suddenly and very much dwarfed 4 inches apart auricled at the base above conspicuously veined, costules

* Not Aspidium venulosum, Wall., which is Nephrod. multilinearum.
above pale almost silvery, one or two of the lowest pairs of veinlets united, sori very copious on nearly all the veinlets and on nearly all the pinnae in two rows from the rachis to the apex, involucres very small convex firm reniformi-cordate soon obliterated by the copious capsules.

Hab. Fernando Po, G. Mann.—It is with much hesitation I make of this a new species; and yet I cannot satisfactorily refer it to any described one. Its venation closely resembles that of N. molde, but the primary veins are conspicuous on the upper side; and it may be a gigantic and very copiously pinnate state of that plant, glabrous in every part. The involucres are small, but distinctly present, or I might have considered it a form of the very little understood Polypodium (Goniopteris) tetragonum. The specimen is a remarkably fine one 6 feet long, including the stipes, wanting only the caudex.

21. N. (Nephrodium) extensum, Bl.; caudex long creeping black (in African specimens), stipes 1-1½ foot long slightly scaly at the base, fronds 1½—2—3 feet and more long 1—1½ foot broad oblong-lanceolate acuminate submembranaceous copiously pinnate pinnatifid at the apex, pinnae numerous approximate subhorizontal 8—12 inches long in the broadest part ½—¾ of an inch wide from a broad sessile base linear-oblong finely acuminate glabrous pinnatifid about half-way down to the rachis, the acumen entire, segments narrowly or oblong or oblong-linear subfalcate entire subacute, lowest pairs of veinlets angularly uniting the rest free, sori copious but solitary on the veinlets between the costule and the margin often strictly confined to the segments (as in Dr. Blume’s original specimen in my herbarium) at other times extending to the lowest veinlets so that the disk is soriferous, involucres small orbiculari-cordate glabrous often appearing quite orbicular and peltate. (Tab. CCXL. A.)—Aspidium, Bl. En. Fil. Jav. p. 156. A. multijugum, Wall. Cat. n. 348. N. caudicatum, Sieb. Syn. Fil. n. 47. Nephrod. Pr. Epimel. Bot. p. 46. J. Sm. in Hook. Journ. Bot. p. 411 (perhaps only in part). N. Hudsonianum, Brack. Fil. U. S. Expl. Exp. p. 189. t. 25.

from two authentic sources: 1. copious and fine specimens from Dr. Wallich, by whom it has been largely distributed with the name of Aspid. multijugum; and 2. two pinnae from Dr. Blume, as his published species, Aspid. extensus, and to this latter name I am bound to give the preference. Fine a plant as it is, it is difficult, save in its larger and more luxuriant growth, the elongated and narrower pinnae and segments, to distinguish it from Asp. molle. The venation is the same, and I fear many intermediate forms exist. Some, and indeed many, specimens have the sori quite confined to the segments, and then a good deal resembling Aspid. terminans, Wall., with all the disk free from sori; at other times the sori extend below the segments; and in not a few samples the very lowest veinlets (the united ones) are soriferous, so that the whole disk is fructiferous. In general, the more copious the fructifications the more contracted the pinnae and segments.

—Many will perhaps be surprised that I have introduced the Nephrod. caudiculatum of Presl, and J. Sm., and Mettenius, but I really have no choice; I must either place it here, or with Asp. molle. The original authority for this is a large Fern from the Mauritius, Sieber, Syn. Fil. n. 47, which is a dilated and flaccid form of the present species, and precisely agrees with Blume’s Asp. heterocarpum, which I have placed under A. molle, and which I believe to be a safe place for it. My authority for the other specimens of caudiculatum is Mr. J. Smith, than whom few botanists have a keener eye for distinguishing species among Ferns. I possess specimens he has brought under that name from Cuming’s Philippine Island plants, of these n. 10 and one of the number 338 are what I consider typical of A. extensus; another, n. 338, and n. 84, has a more or less acuminate base to the pinna and lobes; my specimens are neither of them fertile. My n. 317 and one numbered 83 (Luzon, Cuming), not noticed by Smith, have a very different primâ facie appearance (but they are evidently young though fertile), and they have the base of the pinna subhastate, with a rather acute auricle above and a short rounded lobe below, and the lobes at the margin short, rather coarsely serrated than lobed. I suspect the truth to be that these, and not a few others bearing different specific names, would be best united with A. molle. Brackenridge’s Nephrod. Hudsonianum may, I think, be safely referred here.

Hab. East India: Kamoun, Wallich, n. 386 and 1362; Nilgiri, G. Thomson (young involucre often quite orbicular and peltate), Beddome, n. 137; Ceylon, Gardner, n. 1106; Moulmein, C. S. P. Parish, n. 52; Malacca, Cumings, n. 391, and Luzon, 293 and 48, Griffith; Java, Blume, De Vriese, n. 214. Thos. Lobb, Zollinger, n. 118; Singapore, Thos. Lobb. China, Beechey.—Authentic specimens in my herbarium, justify me, I think, in bringing most of the above synonyms and localities under the Aspid, terminans of Wallich, and certainly these specimens have a peculiar aspect, mainly arising from the sori being apiculate, if I may so say, confined to the rather short lobes of the pinnae, and often not extending so far down as to the sinus, but leaving a broad longitudinal disk, with the costa in the centre, quite free from sori. But, again, I have specimens with sori approaching the costa, and then the difficulty is to distinguish it from some forms of what I have here called N. unitum.


Hab. Mauritius, Sieber, Syn. Fil. n. 45, Fl. Mixta, n. 289, Baier. Ceylon, Mrs. Genl. Walker, Gardner, n. 1109. India: Dindigul, elev. 4000 feet, Dr. Wight; Nepal and Pundua, Wallich, Falconer (dwarfed pinna triangular-acuminate).—A recent attentive study of the Nephrod. Arbuscula, has satisfied me that Dr. Wallich’s Aspid. Hookeri (figured in the ‘Icones Plantarum’) does not differ from it; and striking as are the dwarfed lower pinnules upon our specimens, we know that in N. molle, and other Aspidiaceous species, they are not always constant.

24. N. (Eunephodium) lineatum, Pr.; “rhizome ascending, fronds dimorphous, sterile stipites 4-5 inches long hairy above, fronds rigid, 6½ inches to 1 foot long pubescent at length nearly glabrous ovate or lanceolate pinnated, pinnae five to eight pairs sessile 1-4 inches long 1/6 of an inch wide from a truncated base generally auricled above oblong entire or serrated repando-serrate towards the apex which is rather obtuse or shortly cuspidato-acuminate confluent into a pinnatifid apex, or the lateral pinnae are 4 lines long
abbreviated and the terminal pinna very large elongated coarsely crenate or entire, of the fertile plant the stipes is 8–10 inches long, the pinnae narrower acuminate, five to eight of the veinlets united in pairs, sori approximate at length confluent, involucres reniform persistent corrugated on the back and margin shortly setose or glandulose.”


Hab. Java, Blume. Bantam, Blume (A. affine, in Herb. Nostr. from Blume). Luzon, Cuming, n. 149 (Nephrod. acrostichoides, J. Sm.). Ceram, De Vriese and Teijsmann, n. 589. Indian Archipelago, Seemann, n. 2297 (exactly corresponding with Blume’s A. affine). Bootan, Griffith (corresponding with J. Smith’s Nephrod. acrostich.). Amboyna (ex Herb. Webb), fertile fronds quite those of Cuming’s n. 149. Large form? Java, Blume, Asp. obscurum, Bl.?—Possessing, as I do, authentic specimens of most of the synonyms brought by Mettenius under this species (and they are by no means few), I yet feel utterly incompetent to define it, there are so many trifling variations in the different specimens, so that I prefer giving Mettenius’s character of the species. I am most doubtful of the A. obscurum of Bl., which I have referred hither; but, except in size, I do not see how it differs. It has the abbreviated lower pinna very decided.


Hab. Java and the Moluccas, Blume, in Herb. Nostr., Millett, Zollinger, n. 1601 (Metten.).—Mettenius’s character here given, sufficiently accords with my Java specimen from Blume, and from Mr. Millett; yet these have not the ap-
pearance of having arrived at full maturity. I could fancy it possible they might be young yet fertile states of N. lineatum, or even of very young N. Arbuseula.

26. N. (Eunephrodium) glandulosum, J. Sm. (not Hook. et Arn.) ; stipites a foot and more long, fronds firm-membranaceous 1–1½ foot long asperous on the surface with minute raised points (scarcely glandulose) and slightly villous on the veins beneath ovate-oblong subdimorphous pinnated, pinnae 5–18, those of the sterile frond 3–6 inches long and 1–2 inches wide from a broad truncated sessile or petiolated base elliptical-oblong shortly and suddenly acuminated subentire or more or less coarsely lobato-serrate at the margin, the apices entire, fertile fronds with pinnae smaller 2–3½ inches long from an obtuse or truncated base sometimes with a small auricle above oblong gradually but obtusely acuminated entire or crenato-serrate at the margin, veinlets numerous (10–12 pairs) which are all united in the large sterile pinnae, four or five pairs in the fertile ones all soriferous in the middle, involucres small cordato-reniform. —Aspidium, Bl. En. Fil. Jav. p. 144. Metten. Aspid. p. 111. Nephrodium, J. Sm. in Hook. Journ. Bot. p. 411. N. latifolium, Pr. Epim. Bot. p. 45. Cyclododium, Pr. Tent. Pterid. p. 85. Abacopteris Philippinarum, Fée, Gen. Fil. p. 310. t. 18. c. G. f. 1.

Hab. Java, Blume, in Herb. Nostr. Island of Leyte, Cuming, n. 298. Assam, Griffith.—A well-marked and handsome species, more or less dimorphous; one of my specimens however has large and sterile pinnae on one half the frond, and smaller and fertile ones on the other.—From Madagascar I have a fragment of a frond of a Nephrodium allied to this, but unquestionably distinct, yet too imperfect for description; the portion includes the base, and is 16 inches long, with eight very distinct pairs of opposite, horizontal, petiolated pinnae, 4½ inches long, oblong-lanceolate, crenato-sinuate, perfectly glabrous and smooth on both sides; venation as in N. glandulosum, but the veinlets are more distant; the sori are larger and of a very dark brown colour. The pinnae are 2 and 2½ inches apart. The species may be called N. distans; Hook.

27. N. (Eunephrodium) cyatheoides, Kaulf.; caudex? stipites a span and probably much more long stout castaneous glossy, fronds 1½ foot and more long subcoriaceo-membranaceous dark blackish-green when dry glabrous in age 1½–2 feet and more long and more than a foot wide pinnated to the very apex, pinnae numerous approximate petiolate 6–8–10 inches long ⅔–1 inch broad from a truncated base elongato-oblong finely acuminated often falcate subentire or pinnatifid dentate at the margin, teeth or segments various in length and very irregular acute sometimes giving a ragged or laciniated appearance to the margin, costules slender horizontal ter-

Hab. Sandwich Islands, Chamisso. Oahu, Beechey, Seemann, n. 1697, Captain Haynes, Douglas, n. 42, Dr. Diell, n. 23. Sumatra, Tuschemacher, in Herb. Nostr. —This is a striking Fern, with large pinna spreading almost horizontally, and these have a remarkably banded appearance from the transverse lines of brown sori, which though arranged in two lines one on each side of, but close to the costule, yet in age unite as it were into one, and extend almost from one margin to the opposite, but rarely are the small teeth or segments soriferous.

28. N. (Eunephrodium) ferox, Moore; stipites robust 2 and more feet long erinite with coarse long subulate blackish scales which more or less extend to the rachides each bristle-like hair seated on a tubercle, fronds ample probably several feet long very rigid and coriaceous glossy 2–3 feet broad (judging by the length of the pinna) glabrous pinnate, pinnae numerous sessile approximate 1–1½ foot long often an inch broad sessile from a truncated base elongato-oblong falcate finely acuminated regularly (about one-third of the way down from the margin) pinnatifid with ovate acute pungent falcate segments, costa and costules prominent beneath, veinlets close placed elevated six to eight pairs united and excurrent forming a pseudo-costule as distinct as the costule from which they spring and which terminates at the sinus, sori in two rows close to the costule apparently forming a single brown transverse line or band not prolonged into the segments.—Aspidium, Bl. En. Fil. Jav. p. 153. Goniopteris aspera, J. Sm. in Hook. Journ. Bot. iii. p. 396. Polypodium asperum, Roxb. in Herb. Linn. (fide J. Sm.). P. scabrum, Herb. Roxb. (fide Wall. Cat. n. 2225).

Hab. Java, Blume, in the western provinces, De Vriese and Teijsmann, n. 217, Thos. Lobb. Luzon, Cuming, n. 272. Kamaon, Wallich.—A noble species, in many respects approaching N. cyatheoides, but much larger, and different in various particulars.

29. N. (Eunephrodium) abruptum, Pr.; caudex?, stipes
very stout 2 feet and more? long glabrous pubescent in age, fronds ample 2–3 feet long 1–1½ foot broad firm coriaceous chartaceous glabrous pinnate, pinnae large 6 inches to 1 foot long ¾–1½ inch broad sub sessile from a truncated or short-cuneate broad base oblong finely acuminated shortly lobate–pinnatifid at the margin, lobes rounded obtuse and suberoso truncate or acute sub flate (inclined towards the apex of the pinnae), lowest pinnae often dwarfed, costules slightly elevated numerous, veinlets six eight or ten pairs (according to the space between the costa and the sinus of the lobes) united and then forming a spurious intermediate costule, three or four only of the veinlets free within the short lobes, sori copious each on the middle of the veinlets in two distinct lines or series between each pair of costules never extending to the lobes, involucre rotundato cordate succiliate or glabrous soon deciduous. (Tab. CCXLII B.)—Aspidium, Bl. En. Fil. Jav. p. 154 (not A. abruptum, Kze., which is of the Lastrea-section). A. multilineatum, Wall. Cat. n. 353. Metten. Aspid. p. 108 (in reference to Wall. Cat., but excl. N. micerca tum, J. Sm., and the references to Cuming’s nos. 182 and 278). Aspid. prionophyllum, Wall. Cat. n. 355 (a trifling var. with the base of the pinnae contracted and these sterile). A. pinnigerum, Bl. En. Fil. Jav. p. 153, not of others. A. truncatum, Gaud. in Freyc. Voy. Crypt. p. 333. t. 10.

Hab. Java, Blume, in Herb. Nostr., De Vriese and Teijsmann, n. 4(5?)45, 543, 537, Millett. Sumatra, n. 14, and Island of Menado, n. 231, De Vriese and Teijsmann. Penang, Hance, and Singapore, Wallich, Cat. n. 353. Dahumbang River, Borneo, H. Low. Moluccas, Gaudechaud. Ceylon, Mrs. Goul. Walker, Gardner, n. 1252 and 1104, Thuwaites, n. 3271, elev. 2000–4000 feet. Indian Continent: Mishmee and Sylhet, Griffith; Nilghiri, Beddome. Pacific Islands: Feejee, Harvey; Solomon’s group, San Christoval, Milne, n. 507 and 531. Tropical Africa: Fernando Po, Vogel, n. 62 and 124, G. Mann, n. 140, Barter; Prince’s Island, Barter, n. 1924.—A very fine species, little understood because imperfectly described. It is somewhat allied to A. cyathoides and to A. ferox, but the texture and the arrangement of the sori, etc., are very different; here the rows or series are equidistant, not only each pair belonging to the respective lobes of the pinnae are equidistant between the costules and the sinuses, but equidistant as regards the adjacent pairs belonging to the adjacent lobes; thus exhibiting a series of equidistant lines on the pinnae throughout. Some of my specimens sufficiently accord with the description and figure of A. truncatum, Gaud., to induce me to refer that plant here.

30. N. (Eunephrodium) sagittæfolium, Moore; "frond bi–pinnatifid" (pinnate, pinnae pinnatifid) "membranaceous on both sides and as well as the rachis and stipites hirsute, pinnae sessile (subcallose at the base of their insertion beneath, lowest ones reflexo-imbricate dwarfed semisagittate) linear-lanceolate

Hab. Mountains of Java, Blume, in Herb. Nostr., De Vriese and Teijsmann, n. 202, hairy on the veins beneath, and in every respect identical with Blume’s plant. Malacca, Griffith, frond quite glabrous, stipes below hairy with copious subulate scales.—The very reduced sagittæform inferior pinnae are indeed very remarkable, but the general structure of the pinnae and the venation and arrangement of the sori are almost identical with our N. abruptum. I do not find dwarfed lower pinnae in this group of Ferns to be constant. Blume says, “a tribus preceedentibus (A. stipellatum, A. callosum, and A. pennigerum) differt lurisie frondis, lacinae infima sursum elongata sepe reflexa, stipite pinuulus semiagittatis quasi-imbricato.”


Hab. Jamaica, Sloane, Wilson, Purdie. Cuba, C. Wright, n. 923.—A very peculiar species, well represented both in Sloane and by Kunze, varying extremely in size, from a span to 4 feet long, including the stipes.

32. N. (Eunephroidium) propinquum, Br.; caudex very long creeping sometimes copiously and luxuriantly rooting as if growing in watery places, stipites varying much in length from 1–2 feet, fronds subcoriaceous 1–2 feet long glabrous or often more or less pubescent resinoso-glandulose especially beneath reddish-brown when dry rather glossy pinnate, pinnae numerous shortly petiolate 3–5 inches long ¼–½ an inch or more wide linear-lanceolate acute rather than acuminate sometimes broader and cuneate at the base sometimes contracted pinnatifid one-third or halfway down to the costa, the segments rounded or ovate obtuse or acute, veinlets curved one or two of the lowest opposite pair united, sori near the middle of the veins or submarginal sometimes con-

IIab. Ceylon, (Burman.) Gardner, Thwaites, n. 705. Probably throughout the Indian Continent, Wallich (Hindustan, Oude), Khasya and Assam, Griffith, Simons, and Chittagong, Hooker fil. and Thomson. Madras Peninsula, Wright, n. 14 and 124, Beattone, n. 142. Malay Peninsula and Islands: Singapore, Wallich; Moluccas, Griffith; Java, Blume (A. unitum), Thos. Lobb; Borneo, Molley, De Vries and Teijsmann, n. 12, N. ilicos, Cuming, n. 209 (Nephrod. unitum, J. Sm.). China, Beechey (Aspid. resiniferum, Kaufl.). Hongkong, Dr. Diell, Uryhart, n. 47, C. Wright. Sandwich Islands, abundant, Beechey, Barclay, Dr. Diell, Seemann, Nuttall. New Holland (Brown), All. Cunningham. Arnhem’s Land and Melbourne, Mueller; Brisbane (proliferous, the young plants still attached, and the upper part of the main frond with linear-hastate pinnae). Lizard Island, Macgillivray. Mauritius, Bojer, etc. Island of Don Diego Garcia, Borton. Africa: Cape and Natal, Krauss, Sutherland, and Drège (Aspid. Ecklonii, Kze.), Zeyher. East Tropical Africa: Luabo River and Zambezi, Dr. Kirk, in Livingstone’s Exp. West Tropical Africa: Fernando Po, Vogel; Algeria, Boré. Mexico. Liebmann (Nephród. paludosum, Liebm. Fil. Mex. p. 123). Brazil, Raddi (Aspid. Serra, Fil. Bras. p. 31), Fox, Burchell, Armstrong, etc. Para, Spruce, n. 459. Guiana, Sagot, Leprieur, Parker. Jamaica, Dr. Wright, Wilson, n. 743. Guadeloupe, L’Herminier.—All the specimens from the above localities are remarkably uniform. The names of Aspidia unitum, propinquum, gongylodes, and Serra, have been long familiar; but it has never been in our power to distinguish them at all satisfactorily. The first and last of them (A. unitum and A. Serra), as regards the plants of Schkuhr, are figured by that author on the same plate of his Filices, Tab. 33 b, and so like each other that I had considered them one and the same; but A. Serra is referred by Presl and Moore to Lastrea, and if that is correct, as I believe it to be, it needs not be considered here. In the matter of A. unitum, I follow Mettenius’s views, and consider Sieber’s plant so called as the authority. A. gongylodes I fear must be united with propinquum; but propinquum itself has been a puzzle to many. In this I am willing to take the accurate Brown for my guide, and I presume that Swartz, in his ‘Adnotationes’ (published in 1829), has adopted Brown’s propinquum (published in
1810). But I do not see, from Brown's brief characters, how it differs from his
unitum, except that it is said to be downy beneath, whereas unitum is described as
glabrous. Burmann's figure well represents our plant; my reference to
Schkuhr's Aspid. gongylodes is equally satisfactory for the pubescent state. And
I have now little hesitation in considering most of the above synonyms and the
localities, entirely taken from my own herbarium, correct.

33. N. (Eunephrodium) unitum, Sieb.; root long creeping
underground densely rooting, stipites a span to a foot and
more long stout glossy brown, fronds 1–2 feet long rigid-
coriaceous oblong acuminate suddenly contracted and atten-
tuated at the base (by the dwarfing of the pinnae there) glabrous above cano-tomentose beneath especially on the ra-
chis costae and veins, pinnated, pinnae numerous approximate
4–6 inches long erecto-patent from a truncated sessile sub-
hastate base linear-oblong gradually acuminated 3–6 lines
wide the margin pinnatifid, lobes short triangular ovate acute
rigid the margins a little reflexed, veinlets very prominent
beneath, three or four of the lowest pair uniting and at their
junction excurrent and forming as it were a false or interme-
diate vein reaching to the sinus, sori copious on all the veins
crowded at length confluent, involucres small reniform at
107. Wall. Cat. n. 358 (not of Sw. Syn. Fil. p. 47, nor of
Schk., which is A. propinquum, Sw.). Nephrodium, Schott.
callosum, Bl. Aspid. lanuginosum, Bory, in Herb. Hook. (not
of Willd. in Kaulf. En. Fil. p. 244, which is a tripinnate spe-
352. Polypod. scabridum, Wall. n. 302. Aspid. cucullatum,
Journ. Bot. iii. p. 411 (not Wall.). Aspid. pteroides, Bl. (not
Sw.? Nephrodium mucronatum, J. Sm. 'N. Smithianum,
Pr.

Hab. Mauritius, Sieber, n. 43 and 292, Bojer, Wallich, Cat. n. 358, Telfair,
Madagascar. Forbes, Lyall. India, frequent: Himalaya, etc., Hook. fil. and
Thomson; Nilgiri, Wight, n. 115, Beddome, n. 138. Malay Islands: Java, 
Blume, Thos. Lob, De Vries and Teijsmann, n. 256, 521, 534, 544, 549, and 
429; Malacca, Griffith; Borneo, Barber; S. Ilocos, Cuming, n. 254 (Nephrod.
canescens, J. Sm.); Luzon, Cuming, n. 278 (N. mucronatum, J. Sm.).
Ceylon, Gardner, n. 53. China: Hongkong, C. Wright. Feejee Islands, Harvey;
Sey-
mann, n. 736, Brackenridge, Milne. Tewiot River, N. Iollo, Fraser. Pacific
Islands, Coral Islands, Beechey (N. propinquum, Hook. et Arn.). New Caledonia
C. Moore. Isle of Pines, Milne. Friendly and Society Islands, Cuming, Night-
ingale, Mathews; and Loo Choo ("Nephr. sorooides, Desr.").—A well-marked
and very distinct species of singularly rigid habit, and very prominent venation

VOL. IV. M
on the under side of the frond. Moore refers the Aspid. Hookeri, of Wallich, to this species, but I think incorrectly.

34. N. (Eunephrodium) pennigerum, Bl., sub Aspid., not Sw.; “frond bipinnatifid (pinnate, pinnae pinnatifid) membranaceous subpubescent on the costa above and the veins beneath, pinnae (inferior ones remote smaller and subtriangular) sessile (subcallous at the point of insertion beneath) linear-lanceolate elongated very acuminate subcuneate at the base pinnatifid, segments falcato-ovate obtuse entire united by a pellucid membrane lowest ones subequal, sori biseriate approximate, involucres minute, rachis and stipes tetragonal puberulous furrowed above.”—Bl. En. Fil. Jav. (excl. Syn.).

Hab. Java, Blume, Millett. Penang, Lorraine, Hance, n. 136. Malay Archipelago, Sir Wm. Norris. Johanna Island, East Coast of Tropical Africa? Sir F. Grey.—This is evidently a very large-growing Fern, but belonging to a group of which the species are extremely difficult to define. All my specimens from the above localities quite correspond with Blume’s authentic ones. Save that from Johanna Island, which, however, chiefly differs in its dark full green colour; whereas the Malayan specimens are reddish-green. About four pairs of the veinlets of each segment unite, and there is a uniting membrane between the segments as in N. brachyodon. I do not find the smaller subtriangular lower pinnae which Blume speaks of; and there is certainly in some an approach to N. abruptum, to which indeed I had referred it, at p. 78, perhaps incorrectly; others look quite peculiar, and are a foot long, falcate or straight, with very acuminate points.

35. N. (Eunephrodium) Fendleri, Hook.; stipes 3 feet and more long brown glabrous, at the base only slightly downy and scaly, frond of about the same length and more than a foot broad coriaceo-membranaceous oblong-ovate pinnated, pinnae (29 in my specimen) large rather distant, terminal pinnae free large and petiolated, lateral ones all opposite sessile oblong very finely acuminate 1–1 ½ inch broad pinnatifid more than halfway down to the costa with ovate subfalcate segments, but the very narrow sinus is united by a brownish pellucid membrane, veins very conspicuous four or five pairs uniting but again prolonged and running up on each side the uniting membrane as far as the free portion of the sinus, sori large very conspicuous all marginal confined to the segments or not extending further down than the united portions of the sinus, involucres reniform (?) corrugated in age and much concealed by the copious pulvinate mass of capsules.—Eat. Fil. Wright et Fendl. in Mem. Acad. An. Sc. N. Ser. vol. viii. p. 210.

Hab. Tovar, Venezuela, Fendler, Fil. n. 372.—A very fine and remarkable species, yet so closely resembling our next species in form and size, and in the
opposite pinnae, that, but for the constant presence of distinct involucres in the
species before us, and the large sori quite confined to the margin of the lobes, one
would say the two were identical. The position of the sori here bears nearly the
same relation to the following species as our N. terminaus does to N. propinquum.

36. N. (Eunephrodium) brachyodon, Hook.; “frond ovate-oblong subglabrous glossy above pinnated, pinnae subopposite shortly petiolate elongato-lanceolate acuminate pinnatifid with a deep membranaceous line at the sinuses (sinibus alte mem-
branacis), costa glabrous sulcated flexuose towards the apex, with a gland at the base, the teeth or laciniae very short sub-
falcate margined obtuse, sori uniseriate, rachis puberulous,” Kze.; to which may be added from my own specimens, cau-
dex short stout erect knotted, stipites 1–2 feet long glabrous, frond 1½–2 feet, pinnae almost always opposite large six to
eleven pairs and a terminal petiolated one 6–8 inches long, generally subfalcate often 2 inches broad, segments rather
variable in length, sometimes the two lowest pairs of veinlets unite below the membranaceous sinus sometimes two or three
pairs approximate and run parallel and scarcely unite, sori equidistant between the margin and the costule (never mar-
ginal), involucre reniformi-cordate soon deciduous or want-
ing.—Polypodium brachyodus, Kze. in Linnaea, ix. p. 48.
Phegopteris brachyodus, Metten. Phegopt. p. 21. Ph. See-
Felix non ramosa, etc., Plum. Fil. t. 21?

Hab. Tropical America: Pampayaco, Peru, Pappig; Coast of Ecuador, and
Panama, various parts of the coast, Seemann, Lieut. Wood; foot of Chimborazo,
Jameson, Spruce, n. 5720; Galapagos, Lieut. Wood; St. Vincent, Rev. L. Guild-
ing; Dominic, Dr. Imray.—Mr. Smith’s figure of Phegopteris Seemannii well
represents one form of this plant, and which Mettenius, I think, correctly refers
to Polypod. brachyodus, Kze.; but in one of Dr. Seemann’s specimens from the
Bay of Chico, in my herbarium, and on one from Mr. Spruce, it is clearly to be
seen that it is an indusiate Fern, and, as I have already observed, nearly allied to
Nephrodium Fendleri, next to which I place it.

37. N. (Eunephrodium) stipulare, Moore; “fronds pin-
nate, pinnae pinnatifid entire, stipules pinnatifid acuminate,
sori approximate.”—Willd. Sp. Pl. v. p. 239. Filix ad alas
foliosa, Plum. Fil. xviii. t. 23.

Hab. Martinique, Plumier.—A very large Fern, 6 feet high, and a very remark-
able one, if there be no exaggeration in the figure; for each pinna (many of them
a foot long) bears a lesser one, 1–2 inches long, from its superior base. It is
probably a monstrosity of some well-known species.
§ Lastrea.—Veins and veinlets free, not connected or connivent, except in some very rare or exceptional cases. Lastrea, Pr. and others. (See my remarks on the limits of the genera of Aspidiaceae at p. 5 of this volume, and p. 6, for my views on Aspidium and Nephrodium.)

* Fronds not compound; that is, the divisions do not extend quite to the rhachis. Sp. 38, 39.


Hab. West Indies: Jamaica, Wilson, Bancroft, etc.; Cuba, Linden, n. 1906, Wright, n. 997.—A small plant with the habit of Euaspidium or Sagenia (and hence Mettenius places in the same section with Aspid. cicutarium), but the veins very rarely Anastomose.

39. N.? (Lastrea?) Braunianum, Hook.; “frond membra-naceous cordato-ovate acute deeply bipinnato-partite pilose on the costa and veins, primary segments lanceolate acuminate diminishing in size upwards, the lowest ones oblique, all of them confluent with a broad wing, secondary segments connected by acute sinuses, superior ones falcato-ovate entire, lowermost ones oblong acute serrate, lowest ones of the inferior side of the lowest segments elongated pinnatipartite, tertiary veins generally forked soriferous at the apex of a superior branch and generally abbreviated, sori in the middle between the costa and the margins of the segments, involucres glanduloso-pilose horseshoe-shaped or auriculate.” Aspidium Braunianum, Kæst. Fil. Colomb. p. 63. t. 31.

Hab. On trees and stones in shady woods of the eastern Cordillera of Bogotá, near Villavizenceo, Karsten.—This is quite unknown to me. The beautiful figure represents a frond rather more than a foot long, with somewhat of the habit of the Sagenia-group of Euaspidium, but with free veins, and, however deeply bipinnatifid, it is still a simple (not a compound) frond, all the segments being united by a broad and acutely-lobed wing. The involucre (at least at f. 7, though not at f. 6) represents that kind with a decurrent lobe, common in many species of Athyrium, especially Ath. (or Asplenium) Filix-femina.

** Pinnate, pinnae pinnatifid. Stipites jointed above or below the middle. Arthropteris, J. Sm. Sp. 40-42.

40. N. (Lastrea) albo-punctatum, Desv.; caudex very long

Hab. Var. a. Bourbon and Mauritius, frequent. β. Tropical Africa: West Coast, Sierra Leone, and ascent of the Quorra, Barter; Fernando Po, Gustav Mann. γ. Feejee and adjacent islands, Brackenridge, Milne, Seemann.—The above are trifling variations of one and the same species.

41. N. (Lastrea) Webbianum, Hook.; caudex very long creeping filiform tomentose rather than scaly, stipites distant, fronds 2–4 inches long jointed near the middle, fronds 6–9 inches long glabrous broad-oblong acuminated pinnated, pinnae alternate horizontal from an obliquely cuneate base with a superior auricle oblong-lanceolate obtuse lobato-pinnatifid at the margin, the apex entire dotted with white above, sori in a single series between the margin and the costa, involucres?

Hab. Ambayna (P. B. Webb, Esq., I believe, collected by Labillardiére).—The glabrous fronds, the shallow lobes of the pinnae, and the very distinct auricle, together with the single range of sori on the disk between the margin and the costa, are the characteristics of this species.

42. N. (Lastrea) subbiauritum, Hook.; stipites jointed?, frond 14 inches long lanceolate acuminated pubescent especially beneath submembranaceous pinnate, pinnae numerous opposite horizontally patent from a truncated sessile base oblong-lanceolate acuminated crenato-serrate at the margin with an auricle above and below, bearing white dots on the upper side, sori scattered not extending to the lobes or teeth, involucres very small cordate.
NEPHRODIUM, § LASTREA.

Hab. Bourbon, in Herb. Hook., from Herb. Mus. Par.—My only specimen has the appearance of the stipes being broken off at the joint. That circumstance, together with the white cretaceous dots, induce me to refer it to the Arthropteris-group. It is well distinguished by its large size, dark colour, pubescent fronds, minute sori, toothed rather than pinnatifid, and pinnae which have two auricles at the base, a superior and inferior one.


43. N. (Lastrea) Imrayanum, Hook.; caudex?, stipes?, frond (imperfect at the apex) 2½ feet long subcoriaceo-membranaceous pinnated, pinnae numerous 6 inches long ⅛ of an inch wide horizontally patent from an obliquely-cuneated ses-sile base lanceolato-ensiform very finely serrated (not at all lobed or pinnatifid) towards the apex, lower ones subopposite subauricled, upper ones subfalcate with the lower base decurrent superior base rounded, veins all pinnated, sori (quite young) very minute copious dorsal or terminal on the veinlets scattered, involucres cordate? (Tab. CCXLII. A.)

Hab. Dominica, Dr. Irway.—A very fine species, and very distinct from any with which I am acquainted. The rachis is stout, firm, of a dirty-brown colour, semiterete at the back.

44. N. (Lastrea) macrotis, Hook.; caudex short erect copiously rooting, stipites tufted a span to 1½ foot long, fronds subcoriaceo-membranaceous 1½–2 feet long dark-green pubes-centi-villous on both sides especially on the costa beneath ovato-lanceolate acuminate pinnate, pinnae 3–6 inches long ⅛ an inch or more wide sub sessile from a truncated base furnished with a very large acuminated auricle above, rounded beneath oblong-lanceolate acuminate subfalcate, lowest ones deflexed, margins crenato-lobate, lower ones pinnatifid with rather short ovate segments, upper ones entire, veins free, but lowest veinlets very approximate, sori copious subtris-riate between the margin and the costa, involucres very hairy. (Tab. CCXLII. B.)

Hab. Eastern Peru, near Tarapota, Spruce, n. 3979.—This has somewhat the habit of large specimens of N. molle, but the veins and veinlets are all free, and the very large acuminated auricles, out of all proportion to the other short lobes of the pinnae, are very characteristic.

45. N. (Lastrea?) decipiens, Hook.; stipes (imperfect) slender scarcely paleaceous, fronds 8–10 inches long coriace-ous ovato-lanceolate acuminated glabrous pinnated pinnatifid at the apex, pinnae horizontally patent 2–2½ inches long sub-falcate from a truncate or subcordate subpetiloid inauriculated base rounded above and below narrow-oblong acuminate
entire or serrated chiefly above the middle, lower pinnae distant, lobes of the apex obtuse, veins pinnated twice or thrice forked, sori solitary dorsal on the lowest superior veinlet, involucres coriaceous rotundato-cordiform and subptate, rachis erinite with dark brown subulate scales. (Tab. CCXLIII.)

Hab. China: Foo-chow-foo, Alexander.—It is difficult to say if the involucres is that of a Polystichum or Lastrea. The veins are free. The habit is very much that of our N. podophyllum (n. 48), but the frond is very much smaller, the stipites are more slender and, as well as the rachis, want the large brown peculiar scales of that species, the auricles of the pinnae are entirely absent, and the superior pinnae gradually become coadunate into a pinnatifid apex with blunt segments.

46. N. (Lastrea) semihastatum, Hook.; caudex short copiously rooting, stipites tufted 2–3 inches long hairy, fronds 6–8 inches long pubescenti-hirsute especially beneath oblongo-lanceolate pinnated pinnatifid at the apex, pinnae less than an inch long horizontal approximate subsessile oblong-falcate very obtuse crenate at the margin auricled at the base above rounded beneath, veins pinnate, sori small, involucres "ciliated," rachis villous with patent hairs.—Aspidium, Kze. in Linnaea, ix. p. 91. Metten. Aspid. p. 75.

Hab. Peru, dense woods at Pamayaco, Pceppig.—This appears to be a good species, hitherto found by no one but Pceppig.

47. N. (Lastrea) Sieboldi, Hook.; caudex short thick densely paleaceous, stipites tufted 6 inches to a foot long, fronds about a span long carnoso-coriaceous pinnate, pinnae 3–7–9 subpetiolar, lateral ones horizontally patent 6–8 inches long an inch wide elongato-oblong acuminate subfalcate truncate or subcordate at the base hirsutulous beneath irregularly crenato-lobate and serrated, sterile ones broader, terminal pinna very large lobed or subpinnatifid at the base, veins dichotomosely fascicled terminating within the margin, sori dorsal on the veinlets very large and prominent, involucres reniform convex.—Hook. Fil. Exot. t. 31. Aspidium, Van Houtte. Metten. Fil. Hort. Lips. p. 87. t. 20. f. 1–4. Lastrea and Pycnopteris, Moore. Lastr. podophylla, J. Sm. (not Hook.)

Hab. Japan, Siebold.—A well-defined and most distinct species, but at present, strange to say, better known in gardens than in the herbarium.

48. N. (Lastrea) podophyllum, Hook.; caudex a thick scaly rhizome, stipites tufted a span to a foot long with in-
tensely black subulate falcate scales at the base, fronds coriaceous a span to a foot long coriaceous ovato-oblong glossy pinnate, pinnæ remote 10–13, terminal one often longer than the rest, all petiolate lanceolate 3–6 inches long \( \frac{1}{2} \)–1 inch wide coarsely serrated or lobato-subpinnatifid obtuse at the base or with two rounded or orbicular lobes there, veins internal pinnated variously soriferous on the back, involucres orbicular with a narrow sinus, rachis and costæ stout pale brown glossy.—Aspidium (Lastrea) podophyllum, Hook. in Kew Garden Misc. v. p. 236. t. 1, and vol. ix. p. 339 (excl. Syn. of Metten.). Metten. Aspid. p. 53. Bentham, Fl. Hongkong. p. 454.

Hab. China: Hongkong, frequent, Champion, Bowering, Urquhart, Harland, Wilford, C. Wright, Lorraine; Chusan, Alexander.—A most distinct species, by no means to be confounded with N. Sieboldi.


Hab. Boggy marshy ground throughout Europe and North America. In Asia: Kashmir, Jacquemont, n. 35, T. Thomson; Khasya, Hook. fil. and Thomson, n. 246; Manchuria, Wilford; Amur, Maximovicz.—Var. B. Cape of Good Hope, frequent, New Zealand, Colenso, Hawtane.—A well-known Fern, chiefly of temperate regions in the northern hemisphere; but occurring in a slightly-altered form in South Africa and New Zealand.

Hab. North America: swamps and moist thickets, common in the North United States. Asa Gray; low grounds, North Carolina and northward, Chapman; Canada (Linn.), Goldie, in Herb. Nostr.—Of this species, common as it is said to be in the North United States, I have never received it but once from an American botanist, with any name of authority, and that was from my friend Dr. Torrey: in this there is no difference in the outline of the frond from that of our common N. Thelypteris, and the pinnae are equally deeply pinnatifid; but the costa beneath are hairy, with longish white hairs; the veins are all entire; the sori are less abundant, apparently a little more remote from the margin, in consequence of that margin not being revolute, as is the case in the older state of N. Thelypteris. I have precisely the same form from Canada (Goldie), and I considered the difference so slight, that I believed that I was justified in saying, in my Fl. Boreali-Americana, that the “two supposed species were identical.” Other botanists, however, are of a different opinion, and Dr. Asa Gray has expressed the differences in his specific character as above quoted, and added, “nearly the same as Thelypteris, except the points mentioned.” But allowing this to be distinct, I think we have something yet to learn from American botanists. Neither my numerous British nor American specimens of Thelypteris have the inferior pinna of the frond the longest, “the frond diminishing in length from near the base to the apex”; and one of my finest specimens of true Thelypteris from Connecticut has the four lowest pairs of pinnae very much dwarfed, giving quite a tapering outline to the lower part of the frond, as dwelt upon in the character of N. Noveboracense; we have there the simple veinlets, except in the lowest pairs, where they may be “forked,” the plane margin of the segments, and the non-confluent sori, not in themselves very important characters as the chief marks of distinction. Mettenius dwells on the same distinctions: “Ab Asp. Thelypterida differt, segmentis inferioribus sensim decrescentibus, nervis tertiaribus tantum ad basin laciniarum recurvis, soris distinctis margini laciniarum subapproximatis.”—I now turn to the Noveboracense in Mr. Chapman’s ‘Flora of the Southern States.’ His specimen now before me from Florida, is much larger in all its parts than my plant from Dr. Torrey, the pinnae much less deeply pinnatifid, little more than halfway down to the rachis, and the opposite basal veinlets (all of them simple) instead of being directed to the margin of the segments, meet and closely approximate, if they do not sometimes join, below the sinuses. In short, this plant, certainly very distinct from Thelypteris, and equally so from Noveboracense, I refer along with similar specimens from southern North America, to N. (Lastrea) patens (n. 61), the same as Aspid. molle of Silliman. Journal, and further recorded under that name by Chapman as a native of “Florida to South Carolina.”

51. N. (Lastrea) Oreopteris, Desv.; caudex short erect or decumbent copiously scaly, stipites short (2–4 inches) tufted scaly at the base, fronds 1½–2 feet long firm-membranace-

Hab. Europe, frequent in hilly mountain regions, Norway in the north to Spain in the south; quite confined apparently to temperate and northern regions. —The fronds yield a balsamic fragrance, residing no doubt in the copious resinous glands.


Hab. Peru, Columbia, Venezuela (Mettenius), Ecuador, Jameson, Spruce, n. 5721. Brazil, Raddi, Gardner, n. 113, 5319, Peppig, Mathews, Herb. Ruiz and Pavon. Columbia, Fueck and Schlim, n. 974, Moritz, n. 41 and 44 bis (Pol. consanguineum, Kl.). West Indies, Mexico.—Raddi’s figure of his Polypod. pubescens is quoted as an authority for the Aspid. oligocarpum of Kth. It differs from the rivulorum of Raddi in the smaller (not a foot long) fronds, oblong-ovate in form, that is, only having one pair of short basal pinna, and consequently no long attenuated base to the fronds; the segments of the pinnæ are of the same shape as those of A. rivulorum, with six sori instead of eight, but equally destitute of involucere.—Now tropical America, from the Atlantic to the Pacific, unfortunately abounds in all sorts of intermediate forms, and I find it impossible, in the absence
of any useful diagnostic remarks of authors, to say which belongs to the one and which to the other species. I fear the two are not really different; and so difficult is it to see an involucere, that but for Mettenius having so accurately described it, I should have preferred to retain it in *Polypodium* (§ Phegopteris).


*Hab. Tropical America.* Specimens in my herbarium I refer to this are from West Indies, Guadeloupe, *L’Herminier;* Cuba, *C. Wright,* n. 721 and 820; Jamaica, *Macfadyen, Bancroft, Wilson, Alexander;* Martinique, *Belanger,* n. 417; Porto Rico, *Venezuela, Fendler,* n. 178; Peru, *Mathews,* n. 1248, 1849, 3286, *Lechler,* n. 1565; Ecuador, *Spruce,* n. 5711, *Tunguragua,* n. 5372, *Rio Verde,* n. 5297 and 297 *A* n. 5717, *Tarapota,* n. 4038; *Valparaiso,* *King;* Bolivia, *Bridges,* *Venezuela, Fendler,* n. 178; Mexico, *Galileo,* n. 6306; Brazil, *Mr. Fox, Forbes, Gardner,* n. 5318, 5316.—Var. *ß. Thouarsianum;* Tristan d’Acunha, *Thouars, Carmichael.*—Best distinguished perhaps by the copious dwarf pinnæ at the lower part of the frond, and the rigid habit. This species has been confounded with N. *rivulorum,* from which it is distinct, Mettenius assures us, by the absence of the gland at the insertion of the pinna, and by the oblique antrorse segments.—I refer hither, with some little hesitation, the *Polypod. tomentosum* of Thouars, because Carmichael places it under *Aspidium,* although Thouars says, twice over, "punctis fructiferis nudis," and my own ex-
cellent specimen does not show the trace of an involucre. The frond, however, is very coriaceous and hairy, and the caudex is stout but subreptive.

54. N. (Lastrea) crinibulbon, Hook.; caudex stout ascending, stipites tufted dark brown 7-10 inches long subflexuose thickening at the base glanduloso-pilose as well as the rachis and crinite with blackish hair-like spreading scales which arise from a minute tubercle or bulb, 10-16 inches long dark green membranaceous firm viscido-pilose especially beneath and on the veins above pilose with long white pellucid hairs ovate acuminate pinnate pinnatifid at the apex, pinnae rather distant 2-4 inches long spreading lowest pairs deflexed and distinctly petiolate the rest sessile oblong-lanceolate acuminate deeply pinnatifid nearly to the costa, the acuminate apex nearly entire, segments oblique scarcely falcate subacute nearly entire, veinlets about five on each side the costule oblique each bearing a sorus near the apex and just within the margin, involucres membranaceous brown reniform sometimes with a deep sinus and the lobes unequal. (Tab. CCXLIV.)

Hab. Island of St. Thomas, West Coast of Tropical Africa, on mountains, alt. 2000 feet. Gustav Mann.—A very distinct species, with fronds not much unlike in general appearance Nephrod. (Lastrea) crinitum; but the clothing of the stipes and rachises, and of the costa and veins, is very different. There is a short and viscid pubescence on the stipes and rachis of a yellowish hue, and longish black hair-like scales arising from a little tubercle or minute bulb.


Hab. Philippine Islands, Cuming.—Of Cuming’s specimens, M. Fée (whose figure shows what plant he means) quotes Cuming, “sine numero;” Mr. J. Smith, “Cum. Luzon. n. 251 and 272.” Dr. Mettenius the same, but he makes two varieties, a and β; to the former he attaches Cum. XXI., and to β he gives Cum. 251 and 272. Presl for his Physematium refers to Cum. “n. 251, in part.” My own specimens (among the first selected from Cuming’s collections) of 251, from S. Ilocos, and n. 274, Luzon, are, I suspect, like those of other authors, in a very imperfect state of fructification, and have hence given rise to different views as to the genus; yet I believe all are referable to one species, and that one possessing no striking characteristic features. The general habit, size,
etc., are a good deal those of our *Nephrod. Webbianum* from Amboyna, but these want the creeping filiform caudex, and the joint of the stipes.


Hab. Java, Blume, in Herb. Nostr., *De Vriese and Teijsmann*, n. 548? Nepal? *Wallich* (large). *Khasya*, *Griffith*. *Simula*, *Hooker fil. et Thomson*, n. 247, b. North-west India?, *Edgeworth* (frond downy). *Hongkong*, *Harland, Hance*, *Wilford*, n. 170. *North China*, *Alexander*.—Mr. Bentham refers this to the European *N. Thelypteris*, but of the correctness of this I feel doubtful; the venation is that of the North American *Novelboracense* rather than of *Thelypteris*, and the margins of the segments are not revolute, nor the sorii so near the margin. Nor am I sure but what I have myself brought here specimens which are at variance with the true *gracilescens* of Blume, viz. such as have the lower pinnae more or less dwarfed.


them; but as there is considerable diversity in size and form, I cannot be responsible for the accuracy of my conclusions. The caudex is erect, thick and large for the size of the plant, densely rooting, with wiry fibres. Stipites tufted, 4 inches to a foot long. Fronds 5–6 inches to almost a foot in length, blackish-green when dry. Pinnae more or less deeply pinnatifid; the segments more or less falcate. Perhaps its nearest affinity is *N. falciferum*, Hook.—Mr. J. Smith’s *Lastrea viscosa*, nowhere noticed but by giving it a name, has no marked character or feature by which to distinguish it from the present plant, or two or three of its allies.


Hab. Guadeloupe, *L’Hermindier*, *in Herb. Nostr.* St. Kitts, *Breutel, in Herb. Nostr.*, from Kunze (not Jamaica, as stated by Mettenius).—I believe a very rare Fern; I possess it only from the two localities already published, namely, from Guadeloupe and St. Kitts. The constantly opposite pinnae, with a very conspicuous gland at its base beneath, and the position of the sori at the apex of a veinlet, and the peculiar shape of the involucres, are all remarkable in this plant, and induced Kunze to constitute of it a new genus.


Hab. Martinique and Porto Rico (*Kaulf*), Antilles, Schwannecke, Sieber. Columbia, *Karsten (Klotzsche)*. St. Vincent, *L. Guilding, in Herb. Nostr.*—I am not familiar enough with this plant to pronounce an opinion on it. The author, Kaulfuss, does not, in his specific character, allude to the very evident gland, or
"aërophore," which Mettenius notices; nor does my authentic specimen from Schwanecke exhibit it; nor do I find the trace of an involucre. But the gland is very conspicuous in a St. Vincent's plant in my herbarium; yet, in both, several pairs of the lower pinnae are dwarfed as in N. conterminum, a circumstance neither mentioned by Kaulfuss nor by Mettenius.

60. N. (Lastrea) thelypteroides, Hook.; "stipes?" (short 3–4 inches long in my specimens), "fronds on both sides pubescenti-hirsute glandulose beneath 1½ foot long oblong attenuated at both extremities pinnated, pinnae subopposite patenti-divergent sessile with a conspicuous rounded gland (aërophore) at the base beneath, 3½ inches long 8 lines wide from a broader subcordate base or truncate above elongato-oblong gradually attenuated acminate deeply pinnatifid, the lower ones decreasing in size, segments approximate oblong obtuse obliquely patent coadunate into a wing 1½ line wide, carina from the sinus directed towards the costa, lowest ones largest at the lower base elongated into an auricle overlapping the rachis rarely pinnatifido-crenate, veinlets on each side 6–9 the lowest extending to the margin above the sinus, sori intermediate between the costule and the margin, involucre small reniform ciliated at the margin." Metten.—Polypod., Desv. Sieb. Schlecht. Phegopteris, Féé. Lastrea, Moore. Aspid. thelypteroides, Metten. Aspid. p. 81 (not Sw.).

Hab. Mauritius, Sieber, Syn. Fil. n. 50; lofty mountains of the island, Bojer, Bourbon, Herb. Nostr. from Herb. Mus. Pas.—This species appears to be peculiar to the two islands just mentioned.

(Patens-group, Sp. 61–98, scarcely different from the Thelypterus-group, except in the generally more vigorous fronds and larger segments of the pinnatifid pinnae.)

61. N. (Lastrea) patens, Desv.; caudex creeping under-ground, frond membranaceous or subcoriaceous glabrous pubescent and more or less glandulose beneath, oblong or lanceolato-oblong acuminate pinnate, pinnae from a truncated broad sessile base linear-oblong finely acuminated 4 inches to a span long patent deeply (two-thirds of the way to the costa) pinnatifid, segments approximate oblong subfalcate at the oblique apex obtusely rounded or shortly acute entire or crenulate, lowest pair generally larger entire crenate or pinnatifid lying parallel with the main rachis, sori copious in the middle between the costule and margin of the segments, involucres cordate-reniform subcoriaceous glabrous or pilose persistent.—Aspidium, Sw. Syn. Fil. p. 49. Willd. Sp. Pl.
Nephodium, § Lastrea.


Hab. Tropical America and West India Islands, frequent: Brazil, Gardner, n. 2989, 5320, 5316 ?, Tweedie (Salto, South Brazil); Rio, Milhe, etc.; New Granada, Linden, n. 1526, 1529, 91, 199, Otto, n. 463; Jamaica, Hartweg, n. 1511, March, Wilson; Guadeloupe, L’Herminier; Dominica, Iraway; Cuba, Wright, n. 192, 818, 821 (Aspid. molle, Eat.); Bahamas, Herb. Nasi. r.; Mexico, Liebmann; Peru, Beechey, Mathews, n. 1248, 1844; Ecuador, Jameson, Spruce, n. 5717; Chili, Guatemala, St. Helena, etc., Cuming, n. 422, Lefroy. S. Africa, Harvey, Zeyher, Burke, etc. Philippine Islands: Samar, Cuming, n. 233. Society Islands: Tahiti, Brackenridge. Sandwich Islands: Oahu, Douglas, Seemann. Feejee Islands, Milhe, Harvey, Seemann, Cairns, etc. North America: San Francisco, California, Sinclair; Texas, Lindheimer, n. 742; Florida, Chapman; New Orleans, T. Drummond, n. 499.—I do not profess to understand the limits of the present species, the Aspid. patens of Sw.; I have therefore been cautious in introducing synonyms, and equally so with the localities, and have only noticed a portion of a large series of specimens, which I yet believe may safely rank here. I have little hesitation in considering the Pacific island patens the same as this (of which Forster’s plant is well-represented by Schkuhr), as well as the Lastrea attenuata of Brackenridge, who has given an excellent figure; but he does not appear to have met with it among the Feejee-group, whence I possess numerous specimens from all visitors.


Hab. Hawaii, Sandwich Islands, in dense forests, Brackenridge.—“This is very distinct from the preceding species (L. attenuata, a var. of N. patens with us), nor do we know of any one to which it is closely allied.” Brack. l. c.

63. N. (Lastrea) macrorhurum, Hook.; “caudex erect, fronds 2 feet long membranaceous together with the stipes above and the costa sparingly pubescent lanceolate-oblong pinnated, pinnae sessile 4 inches long linear-lanceolate deeply pinnatifid serrate at the apex, inferior segments rounded at the sinuses distinct from a broad base oblong falcate entire
acute, basal ones longer straight crenated at the base on both sides auricled, sori between the costule and margin of the segments subapprimate, involucres reniform subcoriaceous persistent,” Metten. Fil. Hort. Lips. p. 90; to which he adds in Aspid. p. 87, “caudex epigeous creeping elongate palmaceous, plant varying with subglabrous or densely hirsute fronds, tertiary anticous lowest veins reaching to the callose sinuses of the segments or to a little above the margin of the sinus, carina rather broad or very narrow, involucres subglabrous or long and densely setose.”—Aspidium macrourum, Kifs. En. Fil. p. 239. Éat. Plant. Fendl. and Wright, p. 209.—Mettenius adduces the following synonyms; Lastrea, Pr., L. Leiboldiana, L. grossa, and L. Kohautiana, Pr. Eptim., Aspid. invisum, Papp. Fl. Cub., Nephrodium compressum, Schrad.?, Polypod. subincisum, Sieb. Fl. Mart. n. 354.

Hab. Brazil (Metten.), Columbia, Otto, n. 434 (L. Kohautiana, Pr.), Seemann, n. 976. Venezuela, Fendler, n. 189, Moritz, n. 410 (Aspid. riparium, Moritz; this is given by Moore as A. Kaufussii). Ocaña, Schlim, n. 197 and 220, Spruce, n. 5303 and 5304 (rhizome capspilose), n. 5371. Peru, Mathews. Ecuador, Spruce. West Indies: Cuba, Pappig (Asp. macrourum of Kze.), Wright, n. 822 (pinna 1½ foot long), n. 822 (caudex creeping), and n. 1002 (caudex erect); Martinique, Belanger, n. 1004? (caudex certainly creeping, rachis and coste beneath very villous), Liebm. Fil. Mex. p. 119 (Lastrea macroura, Liebm.).—In so very difficult a group as § Lastrea of Nephrodium, that to which the present Fern belongs, and of which N. (Lastrea) patens may be considered the type, I rely much on the views of Dr. Mettenius, who has the best opportunity of knowing the species of the German botanists. I make use therefore of his specific character here as upon some other occasions, and I shall only further remark, that the individuals I consider belonging to this species scarcely differ from N. patens, except in their generally larger and more luxuriant fronds, and more rigid texture.

64. N. (Lastrea) Kaufussii, Hook. ; “caudex erect, fronds 1½–2 feet long rigidly membranaceous together with the stramineous or violaceous stipes pubescent lanceolate or oblong-lanceolate acuminate pinnated, pinnae 2–4 inches long sessile from a truncated base oblong-linear or lanceolate acuminat pinнатifid, segments oblong straight or subfalcate approximate oblique and obtusely rounded at the apex entire or repand, lowest ones larger crenate or inciso-crenate rarely abbreviated, involucres reniform subcoriaceous setosely hairy persistent.” Metten.—Aspidium, Link. Sp. Fil. p. 101. Metten. Fil. Hort. Lips. p. 90. Aspid. p. 79. Lastrea, Pr.

Hab. Brazil (Metten.).—My only specimens named Aspid. Kaufussii of any authority, are those from Dr. Klotzsch, collected in Cuba by Otto; but whatever VOL. IV.
may be the differences in words between the two plants, I cannot see the shadow of a difference between this and *N. macrourum*.


Hab. Venezuela, Moritz, n. 412 (Aspid. giganteum, Moritz), Fendler, n. 188. New Granada, Holton, n. 75: Boqueta, Veraguas, Seemann, n. 1552. Ecuador, Baños, Spruce, n. 5296 (caudex apparently scandent, very thick and scaly), and Chimborro, elev. 4000 feet, Spruce, n. 5296. Cuba, Wright, n. 1003, 1004.—This species is perhaps best recognized by its rigid texture and usually brighter green colour, than by any technical characters, many of which are common to all the *patens*-group, and I am in some cases at a loss to decide whether some of my specimens belong to this or to *Kaulfussii* or *macrourum*. One thing is quite certain, that none of the recognized samples at all accord with the figure of *Aspidium Serra* in Schkuhr.

66. N. (Lastrea) *Raddiyanum*, Hook.; stipes a span to a foot long stout and as well as the stout straight rachis dressed with ferruginous lanceolate scales very woolly at their base, fronds subcoriaceous 1—2 feet long blackish-green when dry, ovato-oblong acuminate pinnatifid at the apex, pinnae numerous sessile 3—4 inches long 1 inch wide oblong shortly and bluntly acuminate deeply almost to the rachis pinnatifid, the segments oblong-falcate very obtuse entire, lowest pairs of pinnae deflexed, costa and costules dressed with lanceolate paleaceous scales and bullate cellular ones, veinlets simple each bearing a sorus so near the costule as to be partially covered with the scales, involucres small reniform. (Tab. CCXLV.)—*Aspidium, Metten. Aspid. p. 91. Polypodium vestitum, Raddi, Fil. Bras. p. 24. t. 36. P. deflexum, Kaulf. En. p. 114. P. lepigerum, Martius, in Herb. Nostr.*
Hab. Brazil, about Rio, Douglas, Martius, "Pohl," Milne and McGillicray.—This species is well distinguished by its peculiar clothing: the stout stipes and rachis are shaggy with woolly scales, the costa and costules have the appearance of being infested by some kind of scale-insect, so copious and conspicuous are the scales there. The species is well named, by Martius, lepiigerum.


Hab. Carape, Venezuela, Humboldt and Bonpland. Tovar, Fendler, n. 371. Brazil, Langsdorff.—Langsdorff and Fischer's figure well represents the general character of this Fern. My specimens are from Fendler.

68. N. (Lastrea) *lonchodes*, Hook.; caudex creeping elongated as thick as a goose-quill scarcely chaffy, stipes brownish a foot long glabrous or pubescent above, frond subcoriaceous rigid 1-1 1/2 foot long pubescenti-hirsute at the costa and costule the rest glabrous lanceolate pinnate, the apex long acumin ate pinnatifid, pinnae 12-18 pairs smaller towards each extremity, lowest ones not deflexed oblong or oblongo-lanceolate crenate or pinnatifid, the apex entire acumin ate, segments short falcate obtuse, veinlets 5-8 in each segment the two lowest connivent (but not conjoined), keel prominent from the sinus nearly to the costule, sori between the margin and the costule of the segments."—Aspidium, *Eat. Fil. Wright. et Fendl. p. 210.

Hab. Cuba, near Monte Verde, Wright, n. 1007, 1008.—A Fern of rigid texture, and, in that respect, resembling *N. deltoideum*; but, as Mr. Eaton remarks, the pinnae are not suddenly dwarfed towards the base of the frond. One of my specimens of n. 1007 has the lowest pairs of segments dilated at the base into two auricles, so as to give the pinna a hastate form, with blunt lobes. No. 1008 has very much the habit of *N. (Euneprodium) molle*, but I do not find any of the veinlets truly conjoined.

69. N. (Lastrea) *diplozioides*, Hook.; "caudex erect, stipes 3-4 inches long subsquamosely paleaceous, frond
membranaceous deep green slightly hairy 2–3 feet long lanceolate pinnated, pinnæ numerous subrectangularly patent sessile with a large distinct squamiform adpressed gland (aërophore) at its base becoming shorter at each extremity the middle ones 6 inches long 10 lines wide from the inferior rounded base truncated above elongate oblongo-lanceolate acuminate pinnatifid repand at the apex, superior ones approximate, inferior ones remote and suddenly smaller, lowest ones triangular-ovate dwarfed, segments united by a wing 2½ lines wide approximate separated by an acute sinus oblong obtuse plane entire or towards the apex repando-crenulate, veinlets eight on each side the costule, lowest ones prolonged above the margin of the sinus equally curved and the nearest (proximi) or all soriferous, sori oblong nearer the costules than the margin, capsules few loosely clustered, involucre reniform membranaceous setose at length contracted persistent.”—Aspidium, Moritz, in Metten. Aspid. p. 83. Eat. Fil. Fendl. et Wright. p. 209.

Hab. Columbia, Tovar, Moritz, n. 408, Fendler, n. 149.—“Differt ab antecedente (N. pachyrachis) ala laciniarum lata, soris oblongis indusiiis tenuerimis margin setosis, non glandulosis;” very slight distinctions, but to which may be added the paleaceous stipes and rachis, which is perhaps at best a fugacious character.

70. N. (Lastrea) pachyrachis, Hook.; “stipes hairy above, frond subcoriaceous 2–3 feet long at length nearly glabrous lanceolate pinnated, pinæ alternate sessile with a squamiform conspicuous gland (aërophore) at the inferior base 4½ inches long 7 lines wide in the middle gradually shorter towards each extremity from a broad truncated base elongato-oblung gradually attenuated deeply pinnatifid entire at the apex, the segments united by a wing 1½ line wide approximate oblong obtuse entire the margin at length revolute, veinlets immersed on each side 8–12 lowest ones extending to the sinus of the margin somewhat equally curved, sori near the costule subapproximate, involucre reniform conspicuous somewhat rigid glandulose.”—Aspidium, Kze. in Metten. Aspid. p. 83. Eaton, in Fil. Fendl. et Wright. p. 209.

Hab. Venezuela: Merida, Moritz, n. 409. Tovar, Fendler, n. 472.—I possess a noble frond of this Fern from Mr. C. Wright, named by Mr. Eaton; it is 3 feet long, exclusive of the stipes; many of the pinæ are 6 inches long, and many are opposite, and the base of the frond is much attenuated below, in consequence of the gradual reduction of several of the lowest pairs of pinæ. It possesses, however, no very striking characteristic mark, except it be in the “pinæ infra insertionem acrophoro manifesto squamæformi instructæ,” which is not indeed very manifest in my specimen; perhaps because, in the dried and pressed state
the broad flattened rachis overlaps it; nor do I find the pinnae to be broadest in
the middle, but at the base.

71. N. (Lastrea) aureo-vestitum, Hook.; caudex short apparently erect densely clothed with dark golden-brown silky
subulate flexuose scales $\frac{3}{4}$ of an inch long, stipes 4 inches to a span long clothed at the base with the same long satiny scales
as the caudex, the rest of it and all the rachides are shaggy with shorter copious flexuose aureo-nitent subulate scales,
while the costa beneath are clothed with rather small ovate bullate appressed scales, fronds 1½–2 feet long ovato-lanceo-
late membranaceous acuminate and deeply pinnatifid at the apex the rest pinnate, pinnae sessile 4–5 inches long oblong
gradually acuminated deeply very nearly to the costa pinnatifid with acute sinuses, segments $\frac{1}{2}$ an inch long oblong ob-
tuse rarely subsalicate entire or crenate or in age rather strongly serrated, veinlets oblique somewhat distant 7–8 on
each side the costule simple bearing a sorus on each veinlet between the margin and the costule, involucres? (probably
quickly deciduous). (Tab. CCXLVI.)

Hab. “Mt. Leban, St. Yago de Cuba, 1844. Linden, n. 1901.” Jamaica, Wil-
son.—At different periods I received from Mr. Linden two different Ferns under
n. 1901; one, the species following this, well described by Mettenius, under the
name of Aspidium velatum, and with the ticket there recorded; the other with
the inscription here copied: the two are totally different, as the specific charac-
ters and figures will show. N. velatum I have seen from no one else; of the
present I possess a larger and more fully developed specimen from Jamaica
(Wilson), with pinnae and segments twice as large, and many of them strongly
serrated, but unfortunately without fructification.

72. N. (Lastrea) velatum, Hook.; caudex “oblique,” stipes 3–4 inches long and as well as the subflexuose rachis shaggy
with rather membranaceous very cellular ovate lax finely acuminated and often fimbriated tawny scales passing on the
under side of the costa into smaller bullate often obtuse ones, fronds 1–2 feet long oblong-lanceolate membranaceous
when young especially minutely and pellucidly glandulose pinnate deeply pinnatifid at the apex, pinnae rather distant
especially the lower pairs spreading 2–3 inches long little more than $\frac{1}{2}$ of an inch wide from a broad base linear-oblong
obtuse deeply pinnatifid almost to the costa, segments oval-
oblung obtuse slightly falcate often opposite crenate, the two
basal ones larger than the rest close to and parallel with the
rachis resembling two ears or wings and affording a striking
character, veinlets 4–5 on each side the costule 3–4 of the
upper ones in general only bearing sori at their apices and
consequently quite marginal, involucres orbicular-reniform brown permanent. (Tab. CCXLVII.)—Aspidium, Kze. in Metten. Aspid. p. 79.

Hab. "Cuba, 1843-4, Linden, n. 1901."—A very distinct and well-marked species, in its ample scaly clothing somewhat resembling N. Raddeanum; but in other respects very different, especially in the nature of the scales, which in Raddeanum give an unduly look to the plant, as if injured by parasitic insects.


Hab. Colombia, "Moritz, n. 114, and Venezuela, Wayener," Fendler, n. 178, β.—My only specimen of this is from Fendler (not 178, which is N. conterminum), and the only allusion I can find to its affinity is in Mettenius, "Trunco erecto congruit cum A. oligocarpo, soris majoribus indusioque manifeste diversum." Is it really distinct from A. patens?

74. N. (Lastrea) Kunzeanum, Hook.; "frond broad-lanceolate truncated at the base pinnated, pinnae sub sessile linear-lanceolate acuminate pinnatifid with the margined rachis and elevated veins hairy beneath, segments lanceolate falcate acute repando-marginate ciliated, lowest ones dwarfed (deorsum subdeficientibus) pellucid at the sinuses, rachis and stipes tetragonous pubescent, sori submarginal, involucres hairy."—Aspidium, Kze. in Linnaea, ix. p. 93. Metten. Aspid. p. 93. Lastrea, Pr.

Hab. Pampayaca, Peru, Pappig.—Neither the specific character, nor my authentic specimen from Kunze, seems to offer any difference from my equally authentic specimens of N. macrourum.

75. N. (Lastrea) fulciculatum, Desv.; caudex stout erect thickly clothed with subulate scales, stipites a span long deciduously scaly, rachis slender ferrugineo-pubescent, frond from a broad base ovato-oblong 12-14 inches long membranaceous flaccid pubescenti-glandulose viscid especially be-

Hab. Brazil, Rio, Raddi, Douglas, Sellow, Milne, McGillivray, Gardner, etc. Mexico, Galeotti, n. 6290.—I cannot quite satisfy myself of the presence of an involucre in this Fern. The fronds are flaccid and membranaceous, and beneath, especially, viscid and glanduloso-pubescent; the segments are long, crenato-serrate; the sinuses extending very nearly to the costa.

76. N. (Lastrea) tetragonum, Hook.; "stipes a foot long puberulous with minute stellated hairs, frond membranaceous above (the costa excepted) glabrous below puberulous with very minute stellated hairs 1\(\frac{1}{4}\) foot long oblong acuminate pinnate, pinnæ 10–15 pairs obliquely patent subopposite 6–\(\frac{1}{2}\) inches long 1 inch broad petiolate broad-lanceolate acuminate pinnatifid attenuated at both extremities, segments approximate confluent into a wing 2–3 lines broad oblong obtuse tapering from the middle towards each extremity, lower ones abbreviated, basal ones very much dwarfed or obliterated, tertiary veins curved twelve on each side (the costule), the lowest anterior ones as well as the posterior ones proceeding from the costa and those adjacent connivent at the sinus of the segments, sori nearer the costules than the margin." Metten.—"Lastrea tetragona, Pr. Tent. Pterid. p. 76?" Aspidium, Metten. Aspid. p. 95. "Aspidium setosum, Kl. in Linnæa, xx. p. 371."

Hab. Tropical America: "Paramaiba, Keppler; New Granada, Funk, n. 450;" Tovar, Moritz, Aspid. setosum, Kl., consequently authority for Mettenius’s plant; and with this agree specimens from Venezuela, Fendler, n. 446, n. 193 and 193 γ; St. Vincent, L. Guilding; Berbice, Schomburgk; Brazil, Gardner, n. 16 and 190?; Esmeraldas, Jameson, but most of the upper pinnæ exactly opposite; and Guadeloupe, L’Herminier, n. 22? (bordering more closely on N. falcifolium).—This is comparatively a new species. Dr. Mettenius adopts the name from Presl, but with a mark of doubt. It must not be confounded with Polypodium tetragonum, though has considerable general resemblance to the plant so called. I fear it is a very variable species.

77. N. (Lastrea) deltoideum, Desv.; caudex stout erect or ascending densely paleaceous above with dark brown su-
bulate scales copiously rooting at the base, stipites tufted generally short 2–3 inches and sometimes a span long copiously paleaceous with lanceolate acuminate at length deciduous scales, fronds 1½–2 feet and more long coriaceous upper half or more ovate acuminate lower portion (or one-half) suddenly contracted into an elongated linear outline pinnatid at the apex, the larger pinnae 3–4 inches long 1 inch broad sessile truncated at the base oblong (the sides nearly parallel) shortly and rather obtusely acuminate pinnatifid rather more than halfway down the rachis, segments oblong-ovate obliquely subacute scarcely arcuate entire, veinlets prominent on the under side 8–10 on each side the costa the lowest opposite pairs closely approximating near the sinus but not conjoined, lower pinnae sometimes 13–14 pairs nearly uniformly and very suddenly dwarfed and subsemihastate having a large auricle at the superior base, sori copious nearer the margin of the segments than the costa, involucres soon deciduous.—Pr. Tent. Pterid. p. 81. Aspidium, Sw. Syn. Fil. p. 49. Willd. Sp. Pl. v. p. 238. Metten. Aspid. p. 93. Polypod., Sw. Fl. Ind. Occ. Lastrea, Moore.

Hab. West Indies, probably in most of the islands : Jamaica, Wilson, March, etc.; Guadeloupe, L'Herminier; Cuba, Wright, n. 823; Porto Rico, Schranecke. —One of the most easily recognized of Ferns. At first sight it might be taken for a Eunephrodium.


Hab. Peru : Huallaga, Poppig, in Herb. Nostr.; Tarapota, Eastern Peru, Spruce, n. 4037, 4066, 4091, 4343, 4748, Tangaranguas, Andes of Ecuador, Spruce, n. 5298 (judasium purpurato-punctatum) and 5608. Mexico: Calipa, Liebmann. New Granada, Holton, n. 43. Surinam, Hostmann, n. 466.—I have little doubt of all the specimens from the above localities being identical with Kunze's plant from Poppig. It is perhaps a common tropical South American species, and may rank near to N. (Lastrea) tetragona (our n. 76), chiefly distinguished by its larger size, more deeply pinnatifid pinnae, and their much attenuated base. Kunze compares
it with *Polypodium tetragonum*, which has considerable affinity with it, but differs in the venation and absence of involucres, etc. All my specimens are of a peculiarly dark-green colour, paler beneath.

79. N. (Lastrea) *resinoso-fetidum*, Hook.; caudex ?, stipes 1½-2 feet long very stout angled when dry, glabrous (as is the rachis) slightly scaly near the base, frond 3-4 feet long coriaceous broad-oblung acuminate attenuated below in consequence of the dwarfing of several of the distant inferior pinnae pinnate, pinnae numerous 6-12 inches long 1 inch wide from a broad sessile base which has a brown fleshy gland beneath elongato-oblung or sublanceolate acuminated three-quarters of the way down to the rachis pinnatifid, segments linear-oblung but gradually acuminate from the base, the margins entire at length reflexed, veinlets all simple slender dark-coloured (hence conspicuous), sori copious submarginal, involucres when young large membranaceous cordato-suborbicular persistent, the disk dark-coloured where the attachment to the receptacle takes place.

Hab. Foot of Chimborazo, alt. 3000-4000 feet, *n*. 5300, in moist woods, Spruce, *n*. 5299, 5300, 5301, 5302 (“Felix odorae resinoso-fetido”).—The presence of a very conspicuous gland at the inner base of the pinnae, and the narrow segments of the latter, with some minor characters, such as the contraction of the lower pinnae, are all I have to offer as the specific distinctions of this fine Fern. Mr. Spruce observes, when recent, that it had a peculiarly “fetid resinous smell.”

80. N. (Lastrea) *piloso-hispidum*, Hook.; caudex ?, stipes ?, frond 4 feet long ovate-oblung firm but not very thick coriaceous subvernicose hispid with short white spreading hairs on both sides longer and more copious on the rachis costa veins and veinlets, pinnate, pinnae very numerous crowded less so towards the base from 6 inches to 1 foot long and 1-1½ inch wide having a black transverse gland at the base beneath, from a truncate or rounded base (the two lowest pairs of segments being often a little shorter than the rest) broad-oblung acuminate deeply to within a short distance from the costa pinnatifid, segments approximate oblong or linear-oblung straight scarcely subfalcate the margins entire and in age slightly reflexed, veinlets numerous simple bearing the small sori towards the apex consequently forming a marginal series upon the segments, capsules few lax, involucres minute hispid very deciduous.

Hab. Foot of Chimborazo, alt. 3000 feet, Spruce (without number).—Tropical Western America seems to abound in very large fronded forms, with broad pinnae, of a group which may be said to belong to the *patens*-section of our Nephrodium; but of which, however different from N. *patens*, it is very difficult to define their
specific limits. The present is allied to the *N. triste*, but has a distinct gland, though not a prominent one, at the base of the pinnae beneath, and none of these pinnae taper into a petiole below. The surface of the frond is glossy, as if varnished on both sides; the sori are very small; and the involucres so minute, that I feel doubtful whether they really exist. If absent, this Fern would belong to the *Phegopteris*-group of *Polypodium*. The hispido-pilose frond, stipes, rachis and veins are remarkable.

81. *N.* (Lastrea) *Leprieurii*, Hook.; caudex?, stipes two feet or more long stout without scales glabrous, frond 1½–2 feet long from a broad truncated base ovate-oblong acuminated coriaceous-membranaceous glabrous but more or less hairy or pubescent on the rachis upwards and on the costae and veins beneath pinnae, pinnae 4–6 inches long 1–1½ inch wide from a broad truncated base having a conspicuous elongated tongue-shaped gland beneath broad-oblong rather suddenly acuminated deeply for three-quarters of the way down to the rachis pinnatifid, segments approximate broad-oblong obtuse entire or subdentate at the apex, veins all simple bearing the sori in the middle forming lines upon the segment equidistant between the margin and the costa, involucres (most perfect in the Tarapota specimen) exactly reniform very conspicuous convex pubescent and more or less villous.—Var. *a*, subglabrous, gland much elongated.—Var. *β*, more coriaceous subciliated more hirsute on the costae and veins beneath.

Hab. Tropical America: var. *a*, marshy woods of central French Guiana, *Le Prieur*; var. *β*, Mount Campana, Tarapota, Eastern Peru, Spruce, n. 4660.—Whether I am correct in-uniting the two plants, respectively from Eastern Peru and from Cayenne, I must leave others to judge, or whether I am correct in considering the species itself distinct. Of large species of Ferns it is seldom that a good suite of specimens is collected, to enable one to judge how far there may or may not be intermediate forms, or of the value of what we may consider specific marks. Our var. *β* is much more coriaceous than *a*, and more hairy or hirsute: there is a slightly elevated line on the under side, passing downward from the base of the sinus towards the costa, with quite the appearance of a costule, but it is rather a line of union to the base of the segment with its neighbour, as if there had been a separation, and has no corresponding line on the upper side.

82. *N.* (Lastrea) *microsorum*, Hook.; caudex?, stipes 1½ foot long rather stout angulato-striate when dry at the base rather thickly palaceous with reflexed subulate soft scales the rest and the rachis (pubescent in the upper half) somewhat sparingly setoso-palaceous, frond submembranaceous 2½ feet or more long oblong-ovate acuminate (the apex imperfect) pinnate, pinnae rather distant sessile or nearly so with no gland at the base beneath, 4–6–8 inches long 1½ inch broad in the broadest part from a slightly contracted and
Nephrodium & Lastrea.

rounded base broad-oblong acuminate very deeply pinnatifid quite to the rachis pinnate in the lower half, pinnae and segments close-placed oblong subfalcate obtuse and subangular-dentate at the apex, the rest of the margin entire, veinlets rather obscure forked, sori small distant cinnamon-coloured always on the superior branch of the fork and halfway between the slightly pubescent costule and the margin, involucre minute but apparently persistent reniformi-rotundate.

Hab. At the foot of Chimborazo, Ecuador, Spruce (without number).—This is probably a rare plant. I cannot refer it to any described Nephrodium, and am inclined to consider it a distinct species. The frond is of rather a bright-green colour; the pinnae are not attenuated at the base; but two or three of the lowest pairs of pinnules or segments are shorter than the rest, so as to give a rounded and not truncated form to the base. The broader pinnules or segments are thus nearly in the middle. All the segments (except at the apex) are cut very deeply down to the very rachis, and the inferior ones are clearly distinct, so that the frond is in that part of it bipinnate; but the pinnules and segments are both equally approximate.

83. N. (Lastrea) *schizotis*, Hook.; caudex ?, stipes long stout ½ of an inch broad near the base and there only sparsely and deciduously scaly glabrous, rachis and costae on both sides pubescent-hirsute, frond 3–4 feet or more long ovato-oblong acuminate coriaceo-membranaceous pinnate, pinnae spreading from 6 inches to a foot long sessile (with no gland beneath) from a broad base elongato-oblong much and long-acuminated pinnatifid three-quarters of the way down to the costa with very numerous lanceolate subfalcate acute entire segments, the basal ones above and below especially those of the lower half of the fronds much the largest forming large auricles parallel with and close to the rachis laciniato-pinnatifid, veinlets simple 10–12 on each side of the costules bearing prominent sori forming two series on the segments from the rachis nearly to the apex, involucres small rotundato-reniform canescently hairy.

Hab. Near Tarapota, Eastern Peru, Spruce, n. 4030.—My single specimen of this has the frond 4 feet long, and 2 feet wide in the broadest part; and but for its great size, and the large and laciniato-pinnatifid auricles or basal segments, I might have been disposed to have referred it to *N. patens*. It is however, I think, quite distinct.

84. N. (Lastrea) *Tarapotense*, Hook.; caudex ?, stipes 1½ foot and more long moderately stout angled when dry, at the dilated base densely clothed with brown linear-subulate rather long crisped scales less copious and smaller higher up
and on the rachis, frond 2–3 feet long oblong-ovate acuminate glabrous or nearly so firm-membranaceous full-green pinnate, pinnae spreading sessile or subsessile 4–6 inches long scarcely an inch broad from a nearly truncate base (determinate of gland) oblong-lanceolate finely acuminate deeply pinnatifid about two-thirds of the way to the costa (which has a few appressed small lanceolate scales), segments broad-oblong obtuse subfalcate entire or very obscurely subdeterminate, sinuses very narrow, veinlets all simple 8–10 on each side the costa, sori copious on the back of the veinlets rather nearer the margin than the costa, involucre “very small reniform-orbicular soon deciduous” (Spruce).

Hab. Near Tarapota, Eastern Peru, Spruce, n. 4016; and Montana de Canelos, near Rio Verde, foot of Chimborazo.—This, again, is one of many South American lastreoid Nephrodia, which presents no very striking feature or distinguishing specific character, and yet I cannot refer it safely to any described species. In habit it partakes of N. patens and N. triste, nearer perhaps to the last, but is much more paleaceous with very narrow scales, and the pinnae are not so much attenuated at the base.

85. N. (Lastrea) fulcilobum, Hook.; caudex short thick tufted copiously rooting, stipites tufted a span to a foot long free from scales, fronds 1–1½ foot long firm rigid coriaceous-membranaceous ovato-lanceolate finely acuminate pinnate, pinnae 4–6 inches long numerous rather distant sessile linear-lanceolate deeply nearly down to the costa pinnatifid, the apex coarsely serrated, segments oblong-linear more or less falcate acute the margin in fertile specimens generally revolute when dry that of the superior base longer than the rest, involucre small glabrous.—Lastrea, Hook. in Kew Gard. Misc. ix. p. 338. Benth. Fl. Hongkong. p. 455.—Var. β, pinnae small 2–3 inches long tapering at both ends and only pinnatifid halfway down in the middle.

Hab. Hongkong, Harland, Bowring. Various parts of continental India, especially eastern Bengal to Sikhim, Griffith, Hooker fil. and Thomson; Nilgiri, Beddome; Ceylon, Gardner, n. 1363, Thwaites, n. 3273; Moulmein, Parish (some of the smaller specimens, I fear, passing into N. calcareatum). Feejee Islands, Milne (larger, pinnae 8 inches long, tapering at the base into a winged petiole).—Var. β. Ceylon, Thwaites, n. 3050. Malay Islands, Thos. Lobb.—It is not willingly that I retain this as a species, but because I do not know where else to refer some of the specimens I have brought hither. Mr. Bentham very justly, i.e., throws doubts on the species, and observes, “very near the N. gracilescens,” which he refers to the European N. Thelypteris, but that is remarkable for a long creeping root. I am more disposed to consider this a large form of N. calcareatum, while some specimens I can almost imagine passing into the Lastrea attenuata, Brack., and thus scarcely differing from N. patens.—Var. β at first sight looks very distinct, but I believe it to be only one of the protean forms, I will not say of this species, but of this group.
86. N. (Lastrea) appendiculatum, Hook.; "frond membranaceous setose at the costa the rest pubescenti-pilose 2 1/2 feet long pinnate, pinnae subapproximate patent sessile with a small gland at the base beneath, from the middle gradually diminishing towards each extremity, the middle ones 3 1/2 inches long 7 lines wide elongato-oblong gradually attenuated caudato-acuminate deeply pinnatifid the apex entire, segments approximate with narrow sinuses linear-oblong obtuse the basal ones equal to those next to them or especially upon the lowest pinnae with the lowest enlarged ones, tertiary veins 10–14 on each side the lowest ones reaching the margin above the sinus, involucres?, capsules with a simple hooked seta." Metten.—Aspidium, Wall. Cat. n. 249. Metten. Aspid. p. 81 (who quotes "Lastrea, Pr. Tent. Pterid. p. 75?").

Hab. Nepal, Wallich.—Moore gives three Ferns of Wallich, under the name of Aspid. appendiculatum; one he refers to Lastrea appendiculata, he does not say of whom, another to Polypondium erubescens, and the third to Neprod.molle. As far as I know, Mettenius is the only author who has described Wallich's plant from Nepal; but my specimen of Wallich thus localized does not agree in size with Mettenius's description, for the pinnae are 10–11 inches long and 1 1/2 inch broad; but the Fern affords so little of a tangible character, that any remarks I make will not clear up the difficulty about the species. I have other specimens, places may be the same as those so named, but on no good authority. Mettenius which it next before N. ochthodes.

87. N. (Lastrea) ochthodes, Hook.; "rhizome short, stipites crowded moderately long flexuose fusco-paleaceous towards the base, frond subcoriaceous firm, on both sides at the costules on the veins beneath and at the margin sparingly canescently hispidulous olivaceous above paler beneath, lanceolate acuminate at the base gradually and long attenuated pinnate, pinnae deeply pinnatifid sessile with a callous gland at the base beneath patent or divergenti-patent from a broad subequal base linear-attenuated compound the lower ones gradually abbreviated and dwarfed the lowest abortive, segments falcato-oblong or linear rather acute margin reflexed subrepan the lowest ones on each side longer distinctly but slenderly pinnately veined lowest pair confluent at the pellucid sinus bearing sori at the apex, sori minute extended to the margin and continued to the apex soon contiguous the series united at the base, involucres minute reniform brown hairy, rachis obtusely angular furrowed above hispidulous." Kze.—Var. a, frond much attenuated at the base by the dwarfing of the pinnae. Aspidium ochthodes, Kze. in Linnaea, xxiv. p. 282. Metten. Aspid. p. 82.—Var. β,
the lowest pinnae (several pairs) suddenly abortive reduced to large tuberculated glands. Aspid. tyloides, Kze. in Linnae., xxiv. p. 281. Metten. Aspid. p. 82; "vie ab Aspid. ochthode diversum videtur." Aspid. glanduliferum, Wall. Cat. n. 347.

Hab. A common Fern in most parts of India, particularly in Nilghiri, Wight, n. 157, 128: in Assam, Khasya, Beddome, n. 123; Bootan, Griffith, etc.; Darjeeling, Hooker fil. and Thomson; Nepal, Wallich, n. 347: Ceylon, Mrs. Gent. Walker (small ear.). Mauritius, Bojer.—A very variable plant, it must be confessed, long found in our collections under the name of A. glanduliferum, Wall., best known by the very distinct gland generally seen at the inner base of the pinnae, and the dwarfing of several of the lower pairs of pinnae (as in the N. conterminum of South America), so that the frond is in such case very much attenuated below; or, the pinnules become suddenly and completely abortive, their place being taken by large tuberculiform glands; or the two kinds are seen on the same tuft. I apprehend the former is the A. ochthodes of Kunze, and the second his A. tyloides; but they are clearly one and the same species.

88. N. (Lastrea) melanopus, Hook.; caudex?, stipes a little scaly below a span or more long rather slender and as well as the rachis glossy ebeneous-black, fronds 12–14 inches long membranaceous bright-green obsolescetely subglandular-pubescent especially on the costa pinnate, pinnae subopposite sessile 4–6 inches long 1–1 ¼ inch wide oblong shortly acuminated pinnatifid, segments oblong obtuse rarely subfalcate entire or nearly so, lowest pair of pinnae semiovate subfalcate the inferior half of the pinnae with much longer segments 1–1 ¼ inch long lobato-pinnatifid, veinlets forked distant, sori small on the superior branch of the veins equidistant between the margin and the costule, involucrc small membranaceous reniform ciliated.

Hab. Moulmein, Parish. Amboyna, ex Herb. Webb, in Herb. Nostr.—My most perfect specimens of this plant are from the Rev. C. S. P. Parish, in which, besides the intense ebony-black of the stipes and main rachis, the lowest pairs of pinnules differ considerably from all the rest, as above described. Although I have no specimens with a caudex, one of the clever sketches of a growing plant sent me by the discoverer clearly shows that it is short, erect, and scaly, and that the stipites are tufted; against the whole of the lower part of the stipes, including the caudex, is marked "all black." In general habit it may rank near N. immersed. The Amboyna specimen is a larger plant, yet not, I think, specifically different; but it wants the lower pinnae.

89. N. (Lastrea) crinitum, Desv.; stipes a span and more long fusco-stramineous and as well as rachis very crinite with long spreading dark-brown subulato-setaceous scales arising from a tubercle, fronds subcoriaceo-membranaceous a span to 18 inches long ovate or oblong-ovate acuminate pinnate, pinnae approximate 3–5 inches long often an inch and more

Hab. Mauritius, abundant. Bourbon, in Herb. Nostr. ex Herb. Mus. Paris. Java, Blume, in Herb. Nostr. (marked "Aspid. setosum"), Millet, Thos. Lobb.—This plant varies much in size, and a good deal in the relative breadth of the lobes, but perfect specimens are easily recognized; in an old state, the involucres and the remarkably criniate scales are equally deciduous.—Dr. Blume's "Aspid. setosum" in my herbarium from Java, though an indifferent specimen, seems quite the same as crinitum from Mauritius.

90. N. (Lastrea) Borneense, Hook.; caudex procumbent criniate with scattered subulate long scales and hair-like setæ, stipes 4–5 inches long terete as well as the rachis, frond oblong-ovate 1–1 ½ foot long subcoriaceo-membranaceous acuminate glabrous pinnate pinnatifid at the apex, pinnæ 3–4 inches long subopposite lanceolate acuminate straight or subfalcate lower ones petiolate (the petiole winged) the rest sessile and subdecurrent so that the rachis is winged in the upper part of the frond deeply pinnatifid, lobes oblong acute pinnatifid with obtuse lobules, veinlets oblique simple each bearing a sorus near the middle, involucres rather broad reniform subcoriaceous firm persistent (often rich scarlet) the axis not in the direction of the vein but oblique rather inclined towards the costule, upper part of the rachis and costules beneath glanduloso-pubescent.—Lastrea, Hook. Ic. Pl. t. 993 (or Century of Ferns, t. 93).

Hab. Sarawak, Borneo, on limestone rocks, Thos. Lobb.—This is a very remarkable plant. The only specimen I possessed at the time my figures and descriptions were made, had a considerable tinge of red on the frond, and especially on the involucres. I have since received a more perfect specimen from the same locality, from "limestone hills," of which the stipes and rachis and the frond, the under side espe-
Nephrodium \& Lastrea.

cially, including the involucres, are deeply tinged with almost a vermilion colour. This specimen has a portion of the caudex attached, about 1½ inch long, which would appear to be procumbent or scandent, stramineous, with numerous but sparse subulate scales, mixed with needle-shaped bristles; this caudex, together with the peculiarity of the texture and the obliquity of the involucres, induce me to think it may prove to be a Davallia.—Perhaps no part of the world, at this time, would yield a finer harvest of Ferns than Borneo.


Hab. Philippine Islands: Isle of Samar, Cuming, n. 343, and Luzon, n. 74.—This is a large handsome Fern, with fronds of a delicate texture, 2-3 feet long and pinnae 7-9 inches long and 1 inch broad, the segments long and narrow, obtuse, with no very striking characters.


Hab. Java, Blume, in Herb. Nostr., De Vriese and Teijsmann, n. 600, 72 (?), and 461 (with involucres apparently quite orbicular-peltate), Lobb, n. 214. Luzon, Cuming, n. 438 and n. 72 (some specimens less than a foot long, others with pinnae more than 1½ foot long). Assam, Griffith. Johanna Island, East Coast of Tropical Africa (involucres sulphate), Speke.—None of the fronds of my specimens can be called "coriaceous;" there is a swelling around the base of the pinnae, but scarcely an articulation. The species is closely allied to N. ligulatum.

93. N. (Lastrea) apiciflorum, Hook.; caudex short stout erect clothed above with subulate scales, stipites stout a span to a foot and more long scaly with appressed lanceolate scales at the base the rest and the stout very straight rachis
clothed with numerous close-pressed scales varying in shape from small-ovate to long-lanceolate, fronds 2-3-4 feet long oblong or suboval lanceolate acuminate coriaceo-membranaceous pinnate, pinnae numerous alternate horizontal subfalcate 5-6 inches long often an inch broad from a broad sessile base oblong acuminate deeply even to the rachis pinnatifid (almost again pinnate), segments approximate parallelogram-oblong straight obtuse or retuse angulato-dentate at the apex, veinlets numerous simple or forked, sori 5-6 only at the apex of the frond, involucres firm-membranaceous reniform, costae very paleaceous with appressed subulate scales beneath. (Tab. CCXLVIII.)—Aspidium, Wall. Cat. n. 345. Metten. Aspid. p. 54.

Hab. Nepal, Wallich. Sikkim-Himalaya, 9000 feet, Hook. fil. et Thomson, n. 254 a.—A very distinct species, with pinnae resembling those of Neph. F.-mas. The segments of the pinnae are singularly obtuse, or truncate, or retuse, and only bear a few sori, 5-6, at the apex. The stout stipes and peculiarly stout rachis have a dirty and scurfy appearance, from the copious differently-sized scales. In drying, the fronds become deep brown, paler beneath.

94. N. (Lastrea) Brunonianum, Hook.; caudex short thick erect clothed as are all the nascent fronds with a dense mass of large subulato-lanceolate brown scales $\frac{1}{2}-\frac{3}{4}$ of an inch long, stipites tufted 4 inches to a span long swollen at the base and as well as the (usually) black rachis squamose with long dark-brown glossy lanceolato-subulate patent flexuose scales mixed with others quite setiform, fronds subcoriaceous-membranaceous a span to 12-14 inches long 2 inches broad moderately attenuated at the base very obtuse at the apex oblong-lanceolate pinnate, pinnae approximate sessile horizontally patent oblong very obtuse deeply sometimes quite to the rachis pinnatifid, segments $\frac{1}{4}$ of an inch long horizontal broad-oblong or oval very obtuse lobato-pinnatifid the margins strongly and very sharply serrated, the teeth spreading subulate at the points, principal veins (or costules) flexuose, veinlets forked distant, sori 3-4 on each side the costule between it and the margin, involucres reniform. (Tab. CCLI.)—Aspidium, Wall. Cat. n. 344. Metten. Aspid. p. 54.

Hab. Kamaon, Wallich, on high mountains, Strachey and Winterbottom, n. 8, elev. 12,000 feet. Sikkim-Himalaya, 13,000-15,000 feet, Hooker fil. et Thomson, n. 259. Punjaub, Jacquemont, n. 1189 c.—See remarks on N. barbigerum, our next species.

95. N. (Lastrea) barbigerum, Hook.; caudex stout erect short and together with the young nascent fronds clothed
with a dense mass of very large satiny scales mixed with soft golden and silky hairs, stipites a span to a foot long stout black brown only at the base (the rest and the rachises) clothed with very large satiny scales ovate and acuminate mixed with narrower ones, those upwards gradually pass into rich golden soft hair-like and flexuose scales, fronds 1½-2 feet long 10 inches to a foot wide broad ovate-oblong scarcely acuminate pinnate or almost universally bipinnate, primary pinnæ subpetiolate oblong obtuse 4-5 inches long 1½ inch broad, pin- nules sessile oblong deeply pinnatifid, lobules strongly dentate, the teeth divaricating with a very sharply acuminated and setaceous point, veinlets forked, sori mostly on the upper half of the frond as many as there are lobules to the pin- nule.—Lastrea barbigera, T. Moore, in Herb. Hook.

Hab. Kamaon (mixed with Brunonianum, Wallich, n. 344, Strachey (same locality as Brunonianum). Simla, Col. Bates. Sikkim-Himalaya, 12,000-13,000 feet, Hooker fil. et Thonson, n. 258.—The scaly clothing of this plant is the most beautiful of any Fern I know, especially in the young and nascent state of it. I have before me a specimen of a quite undeveloped frond, 5 inches long, the frondose portion still rolled in like the head of a crosier; the young stipes is a mass of the brightest chestnut coloured scales that can be conceived, 1½ inch long, and some of the scales ¼ of an inch broad, the head or crosier-part 2 inches broad is a golden mass of similar scales. In another young frond, quite erect, the pinnae, 1-1½ inch long, resemble a fox’s tail in miniature; these are clothed with rich golden silky hairs concealing all that is green. In the fully developed fronds, much of this vestiture still remains attached to the rachises and costa. But beautiful as all this is, and bipinnate as is almost every specimen, I fear that it is only a more perfect form of N. Brunonianum, and as such I believe it was considered by all the collectors; the latter form being more alpine (elev. 15,000 feet), thence becoming stunted, contracted, and black in the stipes and main rachis.

96. N. (Lastrea) crassifolium, Hook.; stipites 1½ foot long and as well as the rachis dirty-brown glossy, fronds 1½ foot long ovato-lanceolate acuminated firm-membranaceous olive-green pinnate pinnatifid at the apex, subdimorphous, pinnæ 4-5 inches long finely acuminated, sterile ones elliptical-oblong 1-1½ inch broad with one or two pairs of the inferior veins united (subnephrodioid), fertile ones oblong-lanceolate ¾ of an inch broad with the lower veinlets approximate but free (lastreoid), both with a truncate or more or less cuneate subpetiolated base, the margin about halfway down pinnatifid with oval subfalcate lobes, sori copious dorsal near the middle of all the veinlets.—Aspidium, Bl. En. Fil. Jav. p. 158. Lastrea latæ, J. Sm. in Hook. Journ. Bot. p. 412 (name only). Aspid., Kze. Metten. Aspid. p. 95. L. similis, J. Sm. l. c. (name only.)
Hab. Java, Blume, in Herb. nostr. Luzon, Cuming, n. 266, and Malacca, n 390. Malay Peninsula, Sir Wm. Norris. Penang, Dr. Lorraine, n. 155, 137 (lower pinnæ much petiolated, and all of them much elongated and tapering from near the middle). Labuan, Motley.—Of this Fern my only sterile specimen is from Labuan, and that is larger in all its parts than the fertile, and has some veinlets which are quite nephrodioid. As a species, its nearest affinity among the Indian species is, perhaps, with N. spectabile. Mr. J. Smith compares it to Aspid. falciculatum of Raddi; but to the known species of the new world, it comes, perhaps, nearest to N. triste.

97. N. (Lastrea) spectabile, Hook.; "caudex erect $\frac{1}{2}$ an inch in diameter and together with the base of the stipes clothed with long brown ovate acuminated scales, stipites 1 foot and more long and with the rachis and primary costæ elongated stramineous glabrous, fronds 1$\frac{1}{2}$—2—3 feet long 1—1$\frac{1}{2}$ foot broad membranaceous firm broad-oblong or ovate acuminated pinnate, pinnæ patent 1—2 inches broad from a truncate or subcuneate base oblong acuminated deeply pinnatifid three-quarters or four-fifths of the way to the costa, segments oblong or broad-oblong rather obtuse subfalcate rather sharply serrated the sinuses rounded at the base and there furnished with a short ligulate but very distinct tooth or gland, veinlets conspicuous flexuose forked, sori small on a superior branch rather nearer the margin than the costule, involucre small rotundato-reniform."


Hab. Java, Blume, in Herb. nostr. Luzon, Cuming, n. 1314. Moulmein, Parish, n. 153. Malay Peninsula, Sir Wm. Norris. Khasya and Assam, Griffith, Simons. Sikkim, Hooker fl. and Thomson, n. 152. Nilghiri, Beddome, n. 129.—The specimens from the Malay Peninsula of Sir Wm. Norris are of a firmer and more coriaceous texture, and in that respect more resemble N. crassifolium; but all have the essential character of the tooth, or gland, as Kunze calls it, in the sinus of the segments.

98. N. (Lastrea) hirtipes, Hook.; caudex short thick erect and as well as the stout tufted stipites and rachis densely crinite with large long subulate intensely black flexuose scales (more or less deciduous), fronds 2—3 feet long subcoriaceous ovato-lanceolate pinnate confluent pinnatifid at the apex, pinnæ 3—6—8 inches long more or less remote horizontally patent from a truncated or subcordate and nearly sessile inauriculated base oblong long-acuminated variously lobed or pinnatifid or crenated or even serrated at the margin, lobes obtuse or acute, veins pinnated, sori dorsal upon the veinlets remote from the margin, involucre small reniform subcoriaceous. (Tab. CCXLIX.)—Aspidium, Bl. En.

Hab. India, very abundant: Nepal, Wallich; Eastern Bengal to Himalaya, Griffith, Hooker fil. and Thomson; Nilgiri, Wight, M'Ilv. Schmidt, Beddome. Ceylon, Walker, Thwaites, Gardiner. Java, Blume, in Herb. nostr. Moulmein, Parish.—Quite distinct from any other of this section, readily recognized by the very peculiar intensely black scales on the caudex, stipes, and rachis, giving them a shaggy appearance.

*** Bi-tripinnate or decompound. Sp. 99-152. (Felix-mas-group, Sp. 99-115.)

99. N. (Lastrea) Felix-mas, Rich.; caudex short stout erect densely paleaceous with broad-lanceolate scales varying much in colour, stipites tufted short (a span or more long) copiously scaly below with the same large scales as the caudex, higher up the scales become narrower and at length on the rachis subulate very abundant dark-brown to rich golden-tawny, fronds firm-membranaceous or coriaceous a span to 2–3 feet or more long broadly oblong-lanceolate acuminate pinnate, pinnae 3–5 inches long $\frac{1}{2}-\frac{2}{3}$ of an inch wide approximate sessile from a broad base oblong acuminate usually deeply nearly to the rachis pinnatifid, segments oblong obtuse sometimes truncated at the apex and thus forming a parallelogram more or less toothed or serrated, or bipinnate or even tripinnate with the ultimate pinnules in shape resembling the segments but sometimes elongated and inciso-serrate, veinlets simple or forked, sori dorsal arranged in two series nearer the costae than the margin, involucres generally large very convex orbiculari-reniform with a deep sinus glabrous.—Rich. in Desv. Mém. Soc. Linn. vi. p. 260. Hook. Brit. Ferns, t. 15. Hook. Fil. Exot. t. 98 (a large form that has been called paleaceum). Aspidium, Sw. Syn. Fil. p. 55. Schk. Fil. p. 45. t. 44. Willd. Sp. Pl. v. p. 259. Engl. Bot. t. 1458, and t. 1949 ("Aspid. cristat."). Engl. Fl. iv. p. 275. Hook. et Arn. Brit. Fl. ed. 8. p. 584. Lastrea, Pr. Polypodium, Linn. Polystichum, Roth. (The following are the varieties which I deem worthy of notice, the normal form (or a) being considered that which is represented at tab. 15 of our 'British Ferns,' with the pinnae pinnatifid rarely again pinnate, the segments oblong obtuse rounded at the point, not truncated.)

Var. $\beta$, parallelogrammum; pinnate or rarely subbipinnate their segments oblong-parallelogram very close and compact. Aspid. parallelogrammum, Kze. in Linneae, xiii. p. 140.

Var. \( \delta \), cochleatum; bi-tripinnate often very large, primary divisions sometimes long-petioled or in other words the rachis is branched, sori large so that they cover and conceal the whole under side of the pinnules, involucres remarkably large very convex their margin singularly inflected (possibly diseased). N. cochleatum, Don, Prodr. Fl. Nep.

I shall give other synonyms under the following localities, chiefly derived from my own herbarium.

Hab. Europe. Throughout Great Britain and Ireland, and equally common throughout Europe. The var. paleacemum of Mr. Moore, of which the rachis is richly clothed with spreading, subulate, long, slender, glossy scales, approaches in form, pinnae, and segments, the var. \( \beta \), but is smaller and not at all coriaceous. From Pembroke and from Surrey, Mr. Moore, from Dunkeld, Mr. Black, and from Somerset, Mr. Clarke, have sent me specimens of var. \( \gamma \); and I have the same from the Caucasus, and the South of Russia and Persia, under the name of Aspid. affine, Fischer, mss. Asia Minor, var. \( \beta \), Forbes.

Africa. The var. paleacemum, more closely resembling var. \( \beta \), was found in Madeira by the late Dr. Lemann, and is named in my herbarium, N. affine, Lowe (mss.); but far more common there is var. \( \gamma \) (A. elongatum, Sw.). It is equally abundant in Canar, Azores, Webb, and others (Asp. Canariense, A. Braun), and in the Cape de Verde, Forbes. Island of St. Thomas, alt. 6000 feet (quite our var. \( \beta \)). Cape of Good Hope, var. \( \gamma \), Doom-kop, Burke, var. \( \beta \) (quite tripinnate, closely approaching N. inequale). Abyssinia, Schimper, n. 6, and n. 523. Tropical West Africa: Marambala, alt. 2500 feet, Kirk, Zambesi Mission, var. \( \gamma \). Bourbon, var. \( \gamma \), tripinnate (in Herb. nostr.).; also in Mauritius, Bauton.

North America. Woods, Mouterrey in California, Hartweg, n. 2039, common form; but this does not appear to have been found anywhere in the United States or in British North America, from the Atlantic to the Pacific, but now that I have seen more of the varied forms of this species from other countries, I am disposed to refer my N. Floridanum (Fil. Exot. t. 99) to it. It partakes of the common form in the inferior and sterile portion, whilst the superior and fer-

* Kunze, however, says (Sillim. Journ. 2d. ser. v. 6. p. 83), “I have seen the true Filix-mas from Newfoundland.”
tile portion is bipinnate, as in our var. $\gamma$, with the pinnules contracted. It is from East Florida, Buckley. The Asp. Ludovicianum, Kze., I have not seen (native of Florida to Louisiana); but since Mettenius places it with A. Canariense, it is probably what I should call var. $\gamma$ of Filix-mas. Pursh's Asp. Filix-mas. (in Herb. nostr.) proves to be my N. Goldieanum; his var. $\beta$, from South Carolina, is no doubt our var. $\gamma$.

Tropical America. All my specimens from Mexico and Guatemala, from Skinner, Hartweg, n. 570, Gallootti, n. 6348, with the single exception of Liebmann's, which has narrower and distant segments to the pinna, rounded at the apex (which yet is his Aspid. parallelogramnum, Kze.); and all from Ecuador, Spruce, n. 5648, Jameson, Hartweg, n. 1512; Peru, Mathews, n. 1848, Lechler, n. 2020; from New Granada, Holton, n. 68, Hartweg, n. 1512, Linden, n. 521, Schlim, n. 311 (Aspid. crinitum, Mart. and Gal. Fil. Mex. t. 17. f. 2); and Brazil, near the summit of the Organ mountains, n. 5944: all are true var. $\beta$, parallelogramnum, Kze., with long, crinate, paleaceous scales, and quite parallelogrammic close-placed segments and coriaceous fronds.

East India. The normal European form is perhaps the least common, and mainly confined to North-West India, often at great elevations, Jacquemont, Edgworth, Strachey and Winterbottom, Wallich (Aspid. patentissimum, Wall. Cat. p. 340). Sikkim, alt. 8,000–10,000 and even 15,000 feet (and then small), Hooker fil. et Thomson. Nilghiries, Wight, Beddome. Nepal, Wallich.—Var. $\beta$ is perhaps the next most common, and from localities too numerous to be worth recording, generally in mountain and northern districts, yet by no means confined to them.—The most abundant form of all is assuredly our var. $\gamma$, elongatum, varying exceedingly in size and composition, and is Asp. marginatum, Wall. Cat. n. 391; from the Nilghiries (Beddome, n. 127) to Khasya, and along the Himalayas, most common, to Boutan in the East. But there is a peculiarity in many of them in the large size, and the great convexity of the rotundato-cordate involucres, as above noticed under var. $\delta$ (it should rather perhaps be a subvar. of $\gamma$), not unfrequently produced on dimorphous fronds; that is the pinnules of the sterile fronds are unusually large, while those of the fertile fronds are much contracted, or the upper half of the frond is fertile and the pinnules there alone contracted, such plants at first sight remind one of Osunda regalis. They seem not to be confined to any particular locality, and I think it is Mr. Moore has suggested that the fructifications are in some degree diseased. Even in Europe the involucres of Filix-mas are often larger and more convex in some specimens than others. The Indian state with the large involucres is Arthrobotrys avara, Wall. Cat. n. 1034, Nephrod. cochleatum of Don, and Arthrobotrys macrocarpa, Wall. Cat. n. 395.


Japan. I have fine specimens from Hakodadi, gathered by C. Wright, of Filix-mas in the really normal state, and I am tempted to bring bither the Lastrea lacera, Eat. in the Proc. Acad. Sc. Philad. 1859. p. 110, which that able peritologist has ascertained to be the Polypodium lacernum of Thunberg; “frondibus e caudice brevi crasso pluribus stipite breviori valde paleaeo insidentibus subcoriaceis glabris subitus albicantibus oblongis acutis bipinnatis; pinnis late lanceolatis acuminatis pinnatis v. pinnatifidis, intermediiis longioribus, superioribus contractis fructiferis; segmentis oblongis vel falcatis acutis serratis, basilariis nunc utrinque subauriculatis; soris confertis denum confluentibus; indusio orbiculari usque ad medium fesso sinu clauso lateribus inflexis. Simoda, Japan, C. Wright” (Eaton). My specimens from Tsus-Sima are identical with these.—Mr. Eaton has favoured me with two perfect specimens; both have the glossy paleaceous clothing of the handsomest states of Filix-mas. One has the pinnæ scarcely more than pinnatifid, and the upper fructified portion slightly contracted; the other
Nephyodium, § Lastrea. 119

has the upper fertile portion contracted, but the whole is bipinnate with sublanate and subpinnatifid pinnales, and may safely, I think, take place with our var. γ.

Ceylon. Var. β, Gardner, n. 1364.

Malay Islands and Peninsula. Java, Blume, var. β (Aspid. uliginosum, Blume, in Herb. nostr., and A. adnatum, Bl. in Herb. nostr.), De Vriese and Teijsmann, n. 587, γ; Penang, Lady Dalhousie; Java, De Vriese and Teijsmann, n. 289 and 588.

Sandwich Islands, alt. 8,000–10,000 feet, Brackenridge, in Herb. nostr. (Lastrea truncata, Brack. Fil. U. S. Expl. Exped. p. 195, t. 27, excellent). The appearance of this plant (which Brackenridge justly says is closely allied to Aspid. elongatum, Sw., our F.-mas) is remarkable, for the species has hitherto been detected nowhere else in the Polynesian Islands, nor in any part of the great Australian continent.

When it is considered that N. Filix-mas, in England alone, has fourteen "principal variations" enumerated, it will not surprise any one to learn that the same species found in very different parts of the globe, especially of the southern hemisphere, varies in a still more remarkable degree; and hence the numerous synonyms here adduced, mostly from authentic specimens in my herbarium; many more might be added if it was worth the trouble. I would, in particular, wish to direct the attention of South African botanists to the N. (Lastrea) inequale of Schlechtendal, to endeavour to determine if that be not a very compound form of F.-mas.

Mr. Bentham's Aspid. Championi (our Aspid. n. 35), taken up from imperfect specimens in my herbarium, is, I regret to say, only N. Filix-mas, a common bipinnate form. I spoke, under n. 35 of my specimens having been mislaid. I have since detected them in their right place, along with other specimens of F.-mas, which I had overlooked in my search.

100. N. (Lastrea) microstegium, Hook.; caudex?, stipes a span long stout tawny-brown laxly scaly, rachis and costae stout stramineous, frond 2–2½ feet long broad-lanceolate membranaceous glabrous acuminate bipinnate, pinnae sessile 4–5 of the lowest pairs shorter 4 inches long sterile and with broader and more approximate pinnae intermediate ones 6–8 inches long from a broad base oblong gradually acuminate, pinnales 3 to nearly an inch long from a broad sessile and quite adnate base pyramidal and obtusely acuminated pinnatifid about halfway down to the costa all connected at the very base by a narrow costal wing, lobes or segments small ovate blunt entire, veinlets distant, sori minute 4–6 on each lobe in two series halfway between the costa at the margin, involucrum very small reniform pale greenish-brown. (Tab. CCL.)

Hab. Khasia, temperate region, Hooker fil. and Thomson.—I find only one specimen of this in Hooker and Thomson's Indian collection. It is remarkable for the broad adnate base of the pinnales, which, tapering gradually from that base towards the apex, have quite a pyramidal form, and there is always a very narrow membranaceous margin or wing to the secondary rachises, which connects the several pinnales. The lower and shorter pinnae of the frond, which are sterile, have broader segments, and are rather pinnatifid than pinnate.

Hab. South of Germany, Alps of Switzerland and Savoy, and mountainous districts in the west of England and in Ireland. In Asia Minor and the islands of the Mediterranean, it is usually larger and of a paler colour, and becomes the Aspid. pallidum of Link. The American form is again much larger, and seems to be peculiar to California and Sierra Madre, North-west Mexico.—As a species, this has a close affinity with the more narrow-pinnaled forms of the elongatum-var. of *F.-mas*. (See observations on *N. rigidum*, in ‘British Ferns,’ l. c.)

102. N. (Lastrea) *erythrosorum*, Eat.; “fronds bipinnate ovato-oblong, pinnæ subopposite lanceolate a little narrower at the base, pinnules oblong obtuse or truncated serrated, veins forked, sori distant from the margin upon a superior veinlet, involucre reniform intensely red the margin white entire, scales of the rachis narrow-linear, of the secondary costae linear from an orbicular base crisped.” Eat. (Tab. CCLIII.) —Eat. in Williams and Morrow’s Pl. of Japan, p. 330.

Hab. Simoda, Japan, C. Wright, Oldham. Tsus-Sima, Gulf of Corea, C. Wilford, n. 759.—This is a very beautiful species, owing to the fine red colour of the involucres. In habit it approaches the Aspidium varium, Sw., and as I have described that as having nephrodiaceous involucres, so this has some involucres which ap-
Nephehodium, § Lastrea. 121

pear to me quite aspidacean. In all my perfect specimens, the base of the stipes is thickly clothed with very long, glossy, black, lanceolate-subulate scales, having brown margins. The involucres are quite plane.


Hab. Temperate and colder parts of Europe and the United States, Canada and the Hudson's Bay territories, east of the Rocky Mountains.—I have always considered this a well-marked species, although a plant called Lastrea uliginosa has been united with it, which I believe rather to be a state of N. spinulosum.

104. N. (Lastrea) Goldieanum, Hook.; caudex stout sub-erect, stipites tufted a span to a foot long bright stramineous very paleaceous at the base with large ovate acuminate glossy scales some dark-brown others pale ferrugineous, fronds large 1½-2½ feet long ovato-oblong acuminate submembranaceous pinnate, at the base subpinnate, pinnae 5-6½ inches long 1½-2 inches wide petiolate deeply pinnatifid all except the superior ones nearly to the base, segments rather distant oblong subfalcate acute sharply and coarsely serrated the base decurrent, the lowest pinnule may be said to be pinnated but the decurrent bases form wings which extend more or less to the petioles, veinlets once or twice forked, sori on the superior branch distant forming two series much nearer the costa than the margin, involucres rather small mem- branaceous reddish-brown cordato-reniform plano-convex.—Hook. et Grev. Ic. Fil. t. 102. Aspid., Hook. in Ed. Phil. vol. iv.

Hab. Canada, Goldie, Pursh, Herb. apud nos. United States, rich and moist woods, from Connecticut to Kentucky and northwards, Asa Gray.—Pursh mistook this for N. Filix-mas, from which, as from every other species, it is very distinct.


Hab. Middle United States and Canada, common.—Well distinguished by its uniform structure and marginal sori.


Hab. High arctic or subarctic regions, Europe, Asia, and America. The Caucasian Alps (Dr. Fischer) are the most southern latitude in Europe; as, in North America, Penohee Iron range, Wisconsin, lat. 46° 15' N. (J. A. Lapham): and
it is remarkable that the only specimens from those regions are what I here consider
the var. B.—It is one of the most beautiful of all Ferns, in the minutely-divided
fronds, full-green, destitute of scales above, while the whole of the rest of
the plant is richly paleaceous with aureo-nitent scales. My finest specimens are
from Russian North-west America (Seemann), and from Manchuria (Wilford),
and the Amur (Maximowicz).

107. N. (Lastrea) Falconeri, Hook.; caudex ?, stipites a
foot long very coarse and stout quite squarrose for nearly its
whole length with large broad silky ferruginous soft scales
mixed with smaller subulate ones, these latter only still
smaller also clothe the main and secondary rachises, fronds
1 2 foot long oblong scarcely acuminant firm rigid coriaceous
slightly villous bipinnate, pinnae 4–6 inches long an inch
wide erecto-patent oblong-lanceolate, pinnules sessile linear-
oblong 1 2–3 of an inch long about halfway down pinnatifid
with short round entire lobes, the margins reflexed, sori
rather large copious one to each lobe, involucres brown very
membranaceous cordato-reniform very convex so as to be al-
most hemispherical. (Tab. CCLIV.)

Hab. Kashmir, Falconer.—This is a most distinct and very beautiful species,
with not a little of the habit of N. fragrans, but, if I may so say, upon a gigantic
scale; the pinnae are lobed, so as to resemble those of the small Gleichenias
of South Africa. The rachises appear to be resinoso-glandulose.

108. N. (Lastrea) Napoleonis, Bory; caudex a short thick
rhizome densely crinete clothed with very long erect flexuose
linear subulate glossy brown scales, stipites tufted 4 inches
to a span and more long smooth and glossy scaly only at the
very base (as is the caudex), fronds 6–12 inches and more long
coriaceous deltoid or deltoid-ovate acuminant glabrous and
scaleless pinnae or usually more or less bipinnate below,
pinnae sessile oblong acuminant deeply pinnatifid with oblong
segments very obtuse and toothed at the margins, those of
the lower pinnae and the pinnules of the lowest pinnae more
elongated, those of the lowest pair on the lower side most
elongated especially at the base subacuminata and pinnatifid
the lobes coarsely serrated, veinlets simple or forked, sori
copious large close to the costule, rachis and costae rigid and
polished. (Tab. CCLV.)—Aspid., Bory, in Belang. Voy. Ind.

Hab. St. Helena. close to Napoleon’s tomb, Wallich, Belanger, Cuming, n.
434; on walls, rocks, and in woods near Diana’s Peak, alt. 2000 feet, J. D.
Hooker, Harvey, Seemann, etc.—This rare and distinct species is peculiar, we
believe, to the locality above-mentioned.

109. N. (Lastrea) cognatum, Hook.; caudex stout short
erect densely squamose, stipites tufted a span to 1 foot long stout sometimes \( \frac{1}{2} \) an inch broad very densely clothed with dark-brown opaque scales of two kinds some large and ovato-acuminate squarrose others much smaller appressed and more subulate but similar ones are copious on the rachis and on the costae beneath, fronds 1–3 feet long very coriaceous almost black when dry ovate or subdeltoid acuminate pinnate or below bipinnate, pinnae approximate 4–6 inches long subpetiolate 1–2 inches broad from a broad base oblong acuminate deeply pinnatifid, the segments (or the pinnules where bipinnate) oblong very obtuse those of the upper pinnae entire, those of the inferior ones crenate or pinnatifid more or less deeply, the basal pinnules of the lowest pair of pinnae are longer than the rest. veinlets simple or forked, sori copious halfway between the costule and the margin, involucre cordato-reniform membranaceous convex entire. (Tab. CCLVI.)—Lastrea, Pr. Epimel. Bot. p. 40. Aspid., Metten. Aspid. p. 61.

Hab. Diana's Peak, alt. 2700 feet, St. Helena, Roxburgh, Cuming, n. 428, J. D. Hooker, Seemann.—A very distinct plant of extremely coarse and robust character, calculated to brave the storms and sea-blasts of its very exposed position. Dr. Hooker observes, "spreading habit of a Tree-fern, but not arborescent; fronds 4–5 feet high," including the rather short stipites.

110. N. (Lastrea) *Ascensionis*, Hook.; caudex a stout thick ascending rhizome perfectly shaggy with the thick covering of linear-subulate dark-chestnut paleaceous scales many full an inch long, stipites densely tufted 4–6 inches long stout more than \( \frac{1}{4} \) of an inch wide quite squarrose with patent scales like those of the caudex but smaller and similarly mixed scales abound upon the rachis and on the under side of the costae, fronds 6–8 inches long ovate or oblong-ovate obtusely acuminate probably thick and fleshy when fresh lurid-green very coriaceous and quite black when dry especially on the upper side, dark-brown beneath, bipinnate pinnate at the apex, pinnae 3–4 inches long lower ones ovato-lanceolate upper ones lanceolate and pinnatifid more than halfway down with ovate obtuse coarsely serrated segments, pinnules of the lower pinnae exactly resembling the superior pinnae, veinlets few simple or forked, sori one to each lobe of the pinnae or pinnules, involucere cordato-reniform membranaceous. (Tab. CCLVII.)

Hab. Top of Green Mountain, Ascension Island, alt. 1200–1800 feet, J. D. Hooker, Dr. Lyall, Seemann.—The very coriaceous texture, short and thick
stipites, coarsely squarrose with narrow patent scales, readily distinguish this from N. Napoléonis, as the much smaller size and very different scales do from N. cognatum.

111. N. (Lastrea) inequale, Hook.; "fronds glabrous pinnate, pinnae diminishing in size towards the apex confluent pinnate or pinnatifid, pinnules oval obtuse obliquely cuneate at the base the lower margin decurrent toothed incised or pinnatifid all fructiferous, stipes and rachises subpaleaceous, caudex prorepent." Schlecht.—Aspidium, Schlecht. Fil. Cap. p. 23. t. 12. Kze. in Linnaea, x. p. 549. Metten. Aspid. p. 64. Lastrea, Pr.

Hab. Frequent in various parts of South Africa, all travellers; first detected by Bergius, Mund and Moire.—I possess specimens of this from various botanists, Drége, Capt. Garden, All. Cunningham, Harvey, etc., and several of them well-corresponding with Schlechterdahl's figure; others so closely allied to some of the common European forms of the bipinnate N. Filix-mas, that I am doubtful whether to refer them to the one or to the other. The same is the case with a fine specimen from Fernando Po (Gustav Munn), which is subtripinnate, with a very large frond. I have, indeed, one specimen, "B. montanum, Kze.; contractum pusillum coriaceum pinnatum pinnis pinnatifidis, soris copiosis confluentibus," from Drége, which is quite the normal form of N. Filix-mas. No one seems to have noticed its close resemblance to states of that species; but Mettenius places it next to Canariense, which I consider not to be specifically different from F.-mas. It is true, the only portion of a caudex I possess is subhorizontal, and the scales are longer and more uniformly narrower than in F.-mas, and the stipites appear less tufted and longer, and nearly free from scales; but we know how the paleaceous covering varies in many Ferns, and in F.-mas in particular.

112. N. (Lastrea) athamanticum, Hook.; caudex?, stipes a foot or more long testaceous stout as well as the primary and secondary rachises very paleaceous at the base with copious long linear scales and numerous ferrugineous hair-like ones, fronds 1–2 feet long oblong shortly acuminate coriaceo-membranaceous tripinnate, lower primary pinnae remote long-petioled upper ones crowded all erecto-patent 5–6 inches long, secondary pinnae sessile oblong acute ultimate ones lanceolate deeply pinnatifid with oblong-lanceolate entire or sinuato-serrate segments the larger ones contracted at the base distant but decurrent sometimes subpinnatifid, veinlets forked, sori copious on the upper portion of the frond one on each small lobe or lobule 2–4 on the larger ones, involucres very orbicular subreniform nearly plane. (Tab. CCLVIII.)—Aspidium, Kze. in Linnaea, xviii. p. 123. Metten. Aspid. p. 65. Lastrea Plantii, Moore, in Hook. Journ. Bot. v. p. 226.

Hab. South Africa: eastern districts of the Cape Colony, Natal, Pappe, Gueinzius, Plant, Capt. Garden, to the interior, Macalisberg, Sanderson.—Kunze
justly remarks of this, "Planta jam habitu notabilis, rachibus flexuosis, pinnis erecto-patentibus stipite brevi rachique primaria validis rufo-paleaceis, colore frondis late viridi et nulli species mihi adhuc note vere affinis." I may add, too, that it is a species more easily recognized by the eye than by written characters, it is so peculiar in habit.—It is remarkable that the natives of Natal employ the root-stock of this plant as a vermifuge, under the name Umkomo-komo, for destroying the tape-worm, as *N. Felix-mas* is used for similar purposes in England.


Hab. Bourbon, Bory, Carmichael, in *Herb. nostr.*—Carmichael's specimen sufficiently accords with Willdenow's very brief character and description, and has a good deal the appearance of a large form of the Cape *N. inaequale*.

114. *N.* (Lastrea) *splendens*, Hook.; caudex?, stipes 1–2 feet (and probably much more) long $\frac{1}{2}$–$\frac{3}{4}$ inch broad especially at the base, more or less clothed with close-pressed deciduous scales dark chestnut-brown or often (as well as the principal rachis) ebeneous-black and polished, frond ample 2–4 feet long coriaceous broad-lanceolate acuminate bipinnate, primary pinnae 6 inches to more than a foot long 1$\frac{1}{2}$–2 inches wide subpetiolate oblong finely acuminated and pinnatifid at the very apex, pinnae sessile oblong-ovate acute or generally broader at the base and subauricled above the rest crenate or lobato-pinnatifid, the lobes short obtuse entire or dentate, veinlets 2–3-furcate, sori 8–14 large conspicuous forming two lines close to the costule, involucres rather large orbicular-reniform coriaceous dark-brown often paler at the margin.—"Lastrea splendens, Wall." in *Hook. fil.* *Ms. Cat.* *of Ind. Ferns*, *n.* 267.—β, *angustifrons*; smaller, stipes black or testaceous-brown, frond copiously 3-pinnate. Lastrea angustifrons, *Moore*, *Mss*.

Hab. Sikkim-Himalaya, Hooker *fil.* et Thomson. Bhotan, Griffith. Malay Peninsula, Sir Wm. Norris.—β. Nepal, Wallich (1821, no number; one of the specimens has a long, black, creeping subterraneous caudex, thicker than a swan's-quill).—This has the look of a very distinct species; and its large and long, very deep, bright-chestnut or ebeneous-black stipites, and the sori contiguous to the costule, would appear to be characteristic. If my var. β be the same, specifically, then it has a strong creeping caudex; and in this, though it is a small form, the stipes is 2$\frac{1}{2}$ feet long, black or pale-brown.

115. *N.* (Lastrea) *spinulosum*, Desv.; caudex short stout suberecet paleaceous, stipites tufted stramineous brown at the base scaly, fronds ovate or oblong-ovate 1–2 feet and more
long bi-tripinnate, primary pinnæ rather distant upper ones from a broad truncated base oblong inferior ones ovate both gradually acuminate, secondary ones and pinnules close-placed ovate or oblong sessile more or less coarsely spinulososerrate or pinnatifido-serrate, sori chiefly on the upper half of the frond in two rows on each pinnule, involucres entire or fringed with glandular hairs. Hook. Brit. Ferns, t. 18.


γ, ænumulum; "fronds triangular or triangular-ovate spreading tripinimate, pinnules concave, pinnules pinnatifid, the nucronately-serrate lobes curved upwards, scales of the stipes concolorous narrow-lanceolate laciniate or fimbriate contorted, involucres margined with minute sessile glands." Moore.

Nephrodium, § Lastrea.


Hab. Almost universal throughout Europe, from the Mediterranean to Sweden and Norway, and eastward through the Russian dominions to Ta-Lien-whan, North China (Col. Urquhart), and to Kamtchatka; and in similar latitudes in North America, from the southern states to the northern lakes of Canada, and across the Rocky mountains to British Columbia. Cape of Good Hope, Drège. Var. γ. Madeira, Azores, England and Ireland and Scotland, in Herb. xostr.—Perhaps no group of Ferns has occasioned more difference of opinion than the supposed species I have here brought under the Aspidium spinulosum of Sw. Being all natives of Britain, I devoted my best attention, and with large suites of specimens before me, to the consideration of them for publication in my 'British Ferns,' and the results of my present further investigations do not induce me to alter my views.—The var. δ, dumetorum, does bear a great resemblance to some of the more compound or bipinnated forms of N. Filix-mas; and a very attentive student of British Ferns, Mr. Clowes (see Hook. British Ferns, under N. remotum, t. 22, which I am now disposed to refer to a state of F.-mas), concludes his remarks on that Fern, by observing that "as this Fern appears to connect the two forms Lastrea spinulosa and L. Filix-mas, we have now, it would seem, a continuous series from typical F.-mas to L. dilatata,—as the latter and spinulosa are apparently united by glandulosa." I am not prepared at present to adopt this opinion; but founded as it is on close observation on living specimens, it should be a caution to what are called "straw-splitters.”

(Variously decompound, but not polystichoid. Sp. 116-143.)

116. N. (Lastrea) hirtum, Hook.; caudex short rounded erect shaggy with long silky ferruginous subulate scales, stipites flexuose wiry 4–6 inches to a span long tufted glandular and paleaceous with brown subulate flexuose scales, fronds

Hab. Jamaica, Swartz, Purdie, March, Wilson. Cuba, C. Wright, n. 1015, 886, and 1016 (Aspid. nemorosum, Eat.). Pappig, Otto, Linden, 1876 and 1877. Mountains of Vara Paz, Guatemala, Saleyn. Tropical West Africa, south of the line (12–15 inches long), Curror.—A very peculiar and well-marked species, not to be confounded with any other. My tropical African specimens are very fine, yet in no way otherwise different from the West Indian ones.


Hab. South America: particularly abundant in Brazil, Martius, Gardner, Spruce, etc. Guiana, all collectors. Porto Rico, De Schach. Guadeloupe, L’Hermintier. Trinidad, Sir Ralph Woodford.—"Species," observes Professor Kunze, "ab omnibus adhine descriptis distin(t)issima! Frondis forma Cistopt. montanam æmulat." The author must mean in outline only. In size the frond
is a span to a foot and more long; pinnules from ½ an inch to an inch long.—It has however some affinity with our Nephrod. subquinquefidum from tropical Africa; and I am not sure but future observation may prove them to be identical. Our N. variabile is another allied species, but far more compound; and that is a native of tropical America as well as of tropical Africa, and these may possibly all be forms of one and the same species.

118. N. (Lastrea) subquinquefidum, Hook.; caudex long creeping slightly pellaeaceous with blackish subulate scales, stipites distant 6–12 inches long slightly pellaeo-pilose at the base only, fronds a span to a foot long and as much broad subcoriaceous-membranaceous blackish-green when dry, glabrous normally cordately five-angled more or less acuminate (or cordate tripartite the lateral divisions with the lowest inferior pinnæ very much elongated) tripinnaate, primary superior pinnæ deeply pinnatifid with obvate very obtuse sub-sinuated segments the lowest pair bipinnate with the basal inferior pinnæ much elongated deflexed and pinnated, veinlets twice or thrice forked, sori small rather distant intermediate between the costule and the margin, involucres very small reniformi-orbicular.—a, tripinnatum; five-angled, pinnules numerous subobovate or unequally obovate or sub-rhomboïd obtuse. Aspid. subquinquefidum, Beav. Fl. Owari. et Benin. i. p. 34. t. 9 (1804). Willd. Sp. Pl. v. p. 214. Metten. Aspid. p. 71. Lastrea, Pr. Aspid. protensum, Sw. Syn. Fil. p. 51 (1806).—β, elongatum; five-angled subbipinnate, pinnæ and ultimate pinnules generally much elongated and acuminated.—γ, securidiforme; frequently only tripartite, two inferior angles suppressed, pinnules very large almost uniformly hatchet-shaped.

Hab. Very common in tropical western Africa and islands, from Senegambia (Brunner) to the south of the line (Curror), Palisot de Beauvais, Afzelius, Vogel, Irving (Abeokuta), Baikie and Barter, Mann.—Palisot de Beauvais’s figure well represents what may be considered the normal state of this plant; but I possess some remarkable varieties. In β, some of the pinnules are lanceolate, finely acuminated, 3 inches long, entire or scarcely lobed. In γ, the pinnules are almost uniformly 2 inches long, ½ an inch broad, obtuse, with a truncated base, so as to be almost exactly hatchet-shaped.

119. N. (Lastrea) Vogelii, Hook.; caudex slender creeping, stipites slender filiform 1–2 inches long pilose rather than pellaeaceous at the base, fronds 2–4 inches long subtrianular-ovate acuminate membranaceous pinnate subbipinnate below, pinnæ oblong-lanceolate current at the base lobato-pinnatifid obtuse the lowest pair again subpinnate, veinlets twice or thrice forked, sori on a superior branch of the veinlet nearer
the costule than the margin, involucre reniform delicate membranaceous denticulate at the margin bearing a few long hairs on the surface. —Aspidium, Hook. *Ic. Pl. t. 921* (or *Century of Ferns, t. 21*).

Hab. Fernando Po. —Although this little plant bears copious sori, yet I suspect my rather numerous specimens are only seedlings of some known tropical African species, and I almost think I can trace a passage into *N. subquinquefidiun*, near which I consequently place it. The caudex is slender and creeping, as in that species; and it is not unfrequent for the young fronds of Ferns to be more or less villous or pubescent, which pubescence is thrown off in maturity.

120. N. (Lastrea) Parishii, Hook.; caudex creeping (in all the specimens a coating of limestone soil adheres firmly to it and to the descending radicles), stipes solitary lax soft slender glabrous and quite scaleless a little downy at the summit, fronds 4–6 inches long and as much broad pale-green pellucid succulent membranaceous when dry, pubescently hairy on the costa, pentangular-deltoid acuminate ternately tripin-nate pinnatifid at the apex, primary pinnae oblong-acuminate subopposite deeply nearly to the rachis pinnatifid, inferior ones pinnate at the base and petioloed, segments and pinnules \( \frac{1}{2}-\frac{3}{4} \) of an inch long strongly serrated or acutely pinnatifid and all decurrent so as to form a winged rachis, basal pair of primary pinnae twice or thrice as large as the rest and remote from them half-ovate acuminate, the lowest basal pinnae much longer than the rest and more compound, veinlets lax distant twice or thrice forked, sori equidistant between the costule and the margin, involucre small rotundato-reniform one of the lobes sometimes a little elongated, rachis fusco-pubescent. (Tab. CCLX.)

Hab. Moulmein, Rev. G. S. P. Parish, “an elegant, delicate, succulent, and transparent Fern, most sensitive of drought, only growing in the wettest and shadiest nooks of the limestone rocks during the rains, perishing immediately the rains are over,” Thos. Lobb.—A most remarkable and very distinct species, with somewhat the habit of *Cistopteris montana* or *Polypodium Dryopteris*, but infinitely more delicate than either.

121. N. (Lastrea) membranifolium, Pr.; caudex a thick erect rhizome with black subulate scales, stipites tufted a span to a foot long often squamose with similar scales, fronds 1–2–3 feet or more long firm-membranaceous dark-green deltoid ovate somewhat five-angled acuminate, primary pinnae 3–6 inches long 1\( \frac{1}{2} \)–2 inches broad middle ones sessile deeply pinnatifid uppermost ones coadunate into a deeply pinnatifid apex with more or less entire segments lower ones more
compound and petiolate, lowest pair the largest half-ovate acuminate, their lowest basal pinnæ the longest and deflexed, secondary pinnæ and pinnules resembling the middle pinnæ similarly pinnatifid with oblong subacute and slightly falcate large spreading lobes often an inch long and \( \frac{1}{4} \) of an inch wide, veins pinnatifid all free rarely a few irregularly anastomosing, veinlets simple or forked, sori in general forming a single series close to and chiefly upon the lobes or segments rarely on the disk and then scattered, involucres rather small reniformi-cordate (some appear to be orbicular and petiolar). 

(Tab. CCLXI.) — Pr. Reliq. Hænk. p. 36. t. 5. f. 3 (small, but accurate). 


Hab. Malay Peninsula and Archipelago: Tenasserim, Wallich; Moulmein, Parish, n. 144; Malay Islands, Hænke, n. 36, 249, and 354, Falconer; Chittagong, Hooker fil. and Thomson, n. 224 d; Assam, Khasya, Boutan, Sylhet, Griffith, Hooker fil. and Thomson; Nilghiri, Beddome, n. 119, Simons, Booth; Ceylon, very abundant, Mrs. Gent. Walker, Gardner, 1357. — It is remarkable that this plant, apparently common in Eastern India, distributed by Dr. Wallich, under the name here adopted, thirty-five years ago, should be so little known to botanists. It is assuredly the N. membranifolia of Presl, and equally, I think, the Aspid. sagenioides, Metten. Its habit is indeed so completely that of the Sagenia-group of Evaspidium, that it may have been mistaken for some of the forms of Aspidium cicutarium (no. 61 of our Aspidium, p. 48, or of the next following, A. giganteum, under which I have briefly noticed the present one, and which I then supposed might have been referable to A. Gardneriavum, Mettenius. It does not, however, sufficiently accord with that author's description). If the nature of the venation is at all to be depended upon, this Fern must be referred to the lastreoid section of Nephrodium, rather than to the sagenioid-group of Aspidium.

122. N. (Lastrea) purpurascens, Hook.; caudex short erect stout densely rooting below, paleaceous with copious ovate acuminate scales above, stipites tufted a span to 1–2 feet long more or less scaly as is the rachis, fronds 1–1½ foot long subcoriaceous ovate acuminate bi-tripinnate, primary pinnæ 3–5–6 inches long distant much petiolate ovate or oblong-acuminate, secondary ones ovate or ovato-oblong obtuse petiolate those above the middle of the frond subobliquely rhomboid cuneate at the base all more or less pinnatifid especially in the lower half with rounded obtuse entire lobes, superior basal segment generally the largest hence subauriculate, ultimate pinnules (when tripinnate) of the same character, veinlets simple or mostly forked, sori rather irregular nearer the costule than the margin, involucres rather large

Hab. East Indies, almost universal in mountain districts: Nepal and North-west Bengal, and throughout the Himalaya-range to Khasya and Assam, Wallich, Griffith, Hooker fil. and Thomson, Simons, Thos. Lobb; Mahalaleshwar, Bates; Nilgiri, Beddome, n. 120 and 72. Ceylon, abundant, Gardiner, n. 263 a, 1148, 1369, 1253, 1097, 1370. Mauritius, Wallich, 1820. Java, Blume (Aspid. scytodes, Bl. in Herb. nostr.), De Vriese and Tejsmann, n. 268, Thos. Lobb, n. 272 b. —A rather coarse-looking species, with much of the habit of the less coriaceous forms of Aspid. (Polyst.) coriaceum, much more easily recognized by the eye than by any specific character, varying much in composition and in the length and breadth of the pinnules.

123. N. (Lastrea) flaccidum, Hook.; caudex short erect sending down a dense mass of fibrous roots, stipites tufted stramineous black at the very base slender scarcely scaly a span to a foot long, fronds 1–1⅓ foot long broad-lanceolate acuminate membranaceous pubescenti-hirsute with long white hairs on the costae and costules beneath, bipinnate pinnatifid at the apex, primary pinnae remote opposite or alternate 3–4 inches long ⅓–⅔ inch wide sessile lanceolate acuminate, pinnules horizontally patent oblong-lanceolate distant decurrent at the base forming a winged rachis, obtuse or acute lobato-pinnatifid, the segments short entire, veinlets once or twice forked, sori in two rows between the costule and the margin, involucres small pale-coloured orbiculari-reniform depressed in the centre, rachis and costae stramineous shining. (Tab. CCLXIII.)—Aspidium, Bl. En. Fil. Jav. p. 161. “Lastrea remissa,” Moore, in Herb. nostr.

Hab. Java, Blume (in Herb. Nostr.), Millett. Moulmein, Parish, n. 159. Khasya, Kunawar, Griffith, Hooker fil. and Thomson.—A distinct enough species, as may be seen by our figure, yet, though apparently common in India, very little noticed in books. Authors often mislead by comparing a new species with an old one with which it has no similarity, as in this case, where Blume alludes to its affinity with N. Filix-mas.

124. N. (Lastrea) dicisum, Hook.; caudex?, stipites 2–3 feet long nearly ½ an inch or more in diameter brown glossy scaleless, frond ample 3 and probably more feet long triangular-ovate firm-membranaceous glabrous (or a little pubescent on the costae), primary pinnæ very distant long petioled
below broad-oblong acuminate varying in length from 3–4 inches above to 1½ foot in the lowest or basal pair their rachises stramineous glossy singularly and broadly winged towards the apex and decurrent till the wing gradually disappears, secondary ones also distant subsessile 2–3–4 inches long broad-lanceolate often finely acuminate, pinnules oblong ¼–⅔ inch long horizontal lobato-pinnatifid with entire short segments approximate with very narrow acute sinuses (in this case the secondary pinnæ may be said to be pinnatifid) but more frequently they are distant with a broad sinus and are all united by a wing on each side the costae analogous to the wing at the extremity of the main rachises, veinlets simple or forked, sori in two series between the costule and the margin, involucres orbicular-reniform.—Aspidium divisum, Wall. Cat. n. 393. Lastrea, Moore.

Hab. Nepal, Dr. Wallich, Hooker fil. (alt. 4000–6000 feet). Simla, Kamaon, to Boutan (Griffith), Assam, and Khasya (alt. 5000 feet), Hooker fil. and Thomson, Stracey and Winterbottom, Col. Bates, Edgeworth (North-west India). Anamally Hills, Madras Presidency, Beddome, n. 175.—This is, as far as I know, quite an undescribed species, nor have I ever received a named specimen; but it is, according to Mr. Moore, the Aspid. divisum of Dr. Wallich’s catalogue. It is indeed very distinct as a species, and must, judging from the specimens in my herbarium, attain a very large size. In structure, and in the winged rachis, the secondary pinnæ very much resemble the pinnæ of N. flaccidum; but that is small and slender, and only bipinnate, and wants the decurrent wing towards the apex of the main rachis. Although I have not seen a perfect caudex, one of my specimens has a stipes which throws out stoloniferous wiry roots, like those of Nephrolepis.

125. N. (Lastrea) villosum, Pr.; caudex?, stipites 4–6 feet long (8–10, Wilson) 3 inches broad (Plum.) copiously subulato-palaeaceous, fronds most ample 12 feet long (Purdie, 16–18, Wilson) firm-membranaceous more or less villous or pubescent especially on the costæ often glandular beneath tripininate, primary pinnæ distant from a span (near the apex) to 2–6 feet long (in my herbarium) petiolate broad oblong-lanceolate acuminate, secondary pinnæ very numerous approximate 2–6–8 inches long 1½ inch wide sessile oblong finely acuminate deeply almost to the rachis pectinato-pinnatifid or below quite pinnate, segments nearly horizontal approximate ¼–⅔ of an inch long obtuse entire or crenate or more or less deeply lobato-pinnatifid the lobes entire, veinlets simple or forked, sori copious in two series on each pinnule or large segment between the costule and the margin one to each lobule, involucres large plane persistent orbicular with a very obscure sinus (apparently often quite peltate), rachises pubes-

Hab. West Indies: Jamaica, Swartz. Bancroft, Alexander, Purdie, March, Wilson, alt. 4000 feet; New Granada, Linden, n. 843; Ecuador, foot of Chimborazo, alt. 4000 feet, Spruce.


Hab. Java, Blume (in Herb. nostr.), Thos. Lobb. Luzon, Cuming, n. 80 and 151 (quite young). Bonin Isles, a much larger and more compound state. C. Wright, and from Herb. Imp. Acad. Petersb. n. 36. Ceylon (?), Gardner, n. 1280, Thwaites, C. P. n. 3142. Sikkim, alt. 1000 feet, Hooker fil. and Thomson?—J. Smith and Presl refer to their Lastrea propinqua, nos. 255, 252, 151, and 80; I confine my references to the two latter. No. 252 is a Microlepia, and n. 255 is undoubtedly N. membranifolia, Presl, who himself remarks, "affinis quodammodo L. membranacea," which can only be said of 255. The specimen of Aspid. intermedium, Blume, in my herbarium, Mr. Moore ascertained to be identical with this, and Blume observes, "F.-mas, Sw., diversum lacinis serrulatis pinnisque inferioribus haud bipinnatifidis." Our specimens from Bonin are much larger and more compound, and Mr. C. Wright's (Lastrea propinqua, J. Sm.), as well as our n. 151 of Mr. Cuming, have the base of the long stout stipes clothed with very long erect setaceous bristles, 4 of an inch long. It is clearly a variable Fern, which requires a good suite of specimens in order to define the species accurately. Great injury is done to this department of botany, above all others, by hastily describing from imperfect individuals.

127. N. (Lastrea) recedens, Hook.; caudex (of a very young specimen) a short thick ascending rhizome paleaceous with subulate ferruginous scales, stipes tufted a span to a foot long rather slender very scaly at the base the rest and the rachises rather densely fusco-pubescent, fronds a foot long and equally broad at the base firm-membranaceous deltoid more or less pubescent on both sides subglandulose beneath, bi- below tripinnate, primary pinnae broad-oblong acuminate petiolate patent (but not horizontal) from 3–6–8 inches long the basal ones much the largest 2½ inches broad, secondary ones oblong sessile and recurrent at the base so as to form a
narrow wing to the rachis oblong an inch and more long very acute coarsely and very acutely almost pungently serrate or pinnatifid, veinlets simple or once or twice forked, sori generally one or two to each tooth or lobule of the pinnule. (Tab. CCLXV.)—Polypodium, J. Sm. En. Fil. Philipp. in Hook. Journ. Bot. iii. p. 394. Lastrea, Cat. of Gard. Ferns, p. 57. Metten. Aspid. p. 114. Lastrea elegans, "Moore, En. of Cult. Ferns." J. Sm. Cat. Gard. Ferns, p. 57 (according to Mr. Moore).

Hab. Philippine Islands, Cuming, n. 96. Java, De Vriese and Teijmann. Ceylon, Gardner, 1374, 1110 (some specimens 2 feet and more long, copiously tripinnate). Tonglo, Moulmein?, Parish, n. 98 (rachises and fronds glabrous, pinnules less decurrent). Nilgherries, Sir F. Adam. Dindigul, Wight (2-3 feet long). Sikkim-Himalaya and Simla. Hook. fil. and Thomson, n. 264 a ? (larger, rachises which bear the pinnules more broadly winged, stipites and main rachises quite glabrous.—Fern-hortany is unfortunately overwhelmed with published names of gardens ("Hortulanorum") and of private herbaria, which are largely circulated, unaccompanied by description or specific character. The labour of all that is left to others, while their names are expected to be adopted. Happily in the present case, we can refer to the original authority for the plant, in Mr. Cuming's n. 26, from Luzon, from which I have drawn up my character. Lastrea elegans is a Fern of Moore and Houlston, which Mr. Moore himself now refers to J. Smith's L. reedens. I believe my Ceylon specimens to be identical with those from Luzon, but I am doubtful of those from Simla and Sikkim, and from Moulmein; they seem to pass into other forms, which I cannot venture to name satisfactorily.

128. N. (Lastrea) furcatum, Hook.; "frond tripinnatifid (tripinnate), rachises and stipites brown evanescently puberulous furrowed above densely clothed with small lanceolate acuminated scales, pinnae bi- or tripinnatifid (tripinnate?) petiolate oblong subobtuse patent the lower ones auricled, pinnules pinnatifid or bipinnatifid (bipinnate?) oblong subcordate at the base obtuse decurrent towards the apex, segments oblong obtuse pinnatifid serrated repand or entire, involucre reniform glabrous brown." Kl.—Aspidium, Kl. in Linnae, xx. p. 371. Lastrea, Moore.

Hab. Tropical America: Columbia, Moritz, n. 37 (Kl.), Linden, n. 124, 177, and 1020; Panama, Cuming, n. 1300, S. Hayes, n. 376; Organ Mountains, Brazil, Gardner, n. 189; Tarapota, Eastern Peru, Spruce, n. 3942; foot of Chimborazo, alt. 3000 feet, Spruce, n. 5716 ?—I possess an authentic specimen of this species, which enables me to give other stations besides that of Moritz. If I am correct in referring Spruce's two Ferns and Mr. S. Hayes's n. 376 (which I have no reason to doubt) here, the base of the stipites is for several inches clothed with a very dense mass of ferruginous long silky wool, and the pinnae and pinnules vary much in size, especially in breadth.

129. N. (Lastrea) oppositum, Hook.; caudex ?, stipites and main rachis pubescent and paleaceous with rather sparse
spreading linear-subulate brown scales 2–3 lines long, frond broad triangular-ovate 1–1 ½ foot long coriaceous-membranaceous glabrous (except on the secondary rachises and costa, which are downy) bipinnate, primary pinnæ petiolate 6–9 inches long 2–3 inches broad moderately acuminate, lowest pair subopposite, pinnules sessile 1–1 ½ inch long oblong acute deeply nearly to the rachis pinnatifid, segments approximate obtuse a little falcate entire, veinlets simple or forked, sori 3–4 on each side the costule between it and the rachis, involucres small membranaceous brown reniform-cordate. (Tab. CCLXVI.)—Aspidium oppositum, Kaulf. in Spreng. Syst. Veget. iv. p. 108. Metten. Aspid. p. 115. Lastrea, Pr;

Hab. Mauritius, Sieber, Syn. Fil. n. 36. Bourbon (Mettenius). Cape of Good Hope (Sprengel).—I have drawn up my character from Sieber's specimen, n. 36 of his 'Synops. Filicum,' from Mauritius, and which sufficiently accords with Kaulfuss's character in Sprengel. Pappe and Rawson do not acknowledge it as a Cape species. The firm, narrow, linear, paleaceous scales of the stipes and main rachis are remarkable; their presence and the entire segments of the pinnules, and the absence of long hairs, readily distinguish the species from N. catopteron.

130. N. (Lastrea) catopteron, Hook.; stipes 3–4 feet long dark-brown below, stramineous above destitute of scales, frond ample 3 feet and more long subtriangular-ovate firm-membranaceous pubescent-hirsute beneath and even villous especially on the costules and veins tripinnate, primary pinnæ petiolate oblong or broad-lanceolate acuminate all petiolate, the lowest ones 1½–2 feet long, their secondary pinnæ also petiolate, pinnules sessile oblong 1–2 inches long obtuse or subacuminate, the segments entire or more frequently deeply and bluntly serrated or subpinnatifid or even again subpinnate, veinlets simple or rarely forked, sori rather small generally one to each of the lesser segments, involucres dark-brown membranaceous cordato-reniform.—Aspidium, Kze. in Linnea, x. p. 550 (who quotes “A. odoratum, Sieb. Fl. Maurit. nec Willd.”). Lastrea, Pappe and Rawson, En. Fil. Cap. p. 12. A. odoratum, Metten. Aspid. p. 115, who considers it true odoratum of Willd. Sp. Pl. v. p. 286. (Moore refers the A. catopteron to A. lanuginosum, Willd.)

Hab. South Africa, chiefly in the eastern districts of the Cape Colony, Drège, Bowie, Major Garden. Mauritius, Sieber, Syn. Fil. n. 48. West Tropical Africa: Island of St. Thomas and Fernando Po, on Clarence Peak, alt. 5000 feet, G. Mann. South of the line, Curror (pinnules large).—Var. glabra; pinnules distant on winged rachises. Fernando Po, G. Mann. Madagascar, Bovin.—Var. minor; pinnules thrice larger. Prince's Island, West Coast Tropical America, Barter, n. 1906.—I am a little doubtful about the last-mentioned tropical African localities, but we must allow for considerable variation, as in other Ferns.
131. N. (Lastrea) latifrons, Hook.; caudex?, stipes a span and probably much more long deciduously scaly, fronds 2–3 feet long firm-membranaceous dark-brown when dry, beneath minutely glandular, ovate pinnate upwards bipinnate below, lower primary pinnæ petiolate a span to a foot long lowest pair semi-anate, pinnæ above sessile oblong moderately acuminate deeply pinnatifid, segments oblong subfalcate, pinnules of the inferior primary pinnæ 1½–3 inches long sessile their bases often decurrent and as well as the pinnules oblong pinnatifid, veinlets simple or forked, sori submarginal, involucres large membranaceous entire, rachis and costæ beneath pubescent and paleaceous with soft ferruginous lanceolate scales.—Aspidium, Brack. Fil. U. S. Expl. Exp. p. 196.

Hab. Oahu, Sandwich Islands, Brackenridge (high mountains behind Honolulu), Douglas, Seemann.—Readily distinguished by the large size of its pinnules and of the lobes of the pinnæ.

132. N. (Lastrea) Mexicanum, Hook.; caudex a short thick erect rhizome densely clothed with soft ferruginous linear-lanceolate scales, stipites tufted a span to 1–1½ foot long stramineous laxly scaly at the base, fronds subcoriaceous-membranaceous pale-green glabrous a span to 1–1½ foot long broad oblong-lanceolate acuminate bi- below tripiniate, primary pinnæ petioled rather distant from an obliquely cuneate base broad-lanceolate their upper half pinnatifid pinnate towards the base the lowermost mostly bipinnate towards their base, segments and pinnules obliquely obovate or rhomboid subacuminate or oblong obtuse often spatulate entire or more or less deeply pinnatifid subauricled the base tapering and more or less decurrent and confluent, veinlets once or twice forked, sori few distant small rather nearer the margin than to the costa, involucre when young a white orbicular membrane with a brown spot in the centre when older more coriaceous reniform or subhippocrepiform. (Tab. CCLXVII.)—Pr. Reliq. Hænk. i. p. 38. Kze. in Linnae, xiii. p. 37. Metten. Aspid. p. 64. Lastrea, Pr. Aspid. paupertinum, Rœm. Kze. in Linnae, xviii. p. 341. Lastrea, Liebm. Fil. Mex. p. 120. Polypodium angustifrons?, Kze. in Linnae, xiii. p. 134. Aspid. lepororachis, Kze. in Linnae, xviii. p. 341. Lastrea, Liebm. Fil. Mex. p. 120.

vision of the pinnae, pinnules, and segments. Mettenius has distinguished three varieties as *obtusilobum*, *serratum*, and *acutilobum*; but these three forms, and others, too, may be seen on one and the same frond.

133. N. (Lastrea) *sphaerocarpum*, Hook.; caudex ?, stipites slender 4–5 inches long laxly palaceous with large scales at the base stramineous as well as the main rachis and glossy, fronds ovato-lanceolate rarely subdeltoid acuminate a span to a foot long membraneous uniformly tripinnate, primary pinnae distant petiolate 3–4 inches long from a broad base oblong acuminate, secondary pinnae also shortly petiolate ovato-oblong bluntly acuminate distant ½ an inch to 1 inch long rarely more, deeply pinnatifid in the upper half pinnated below, segments or pinnules 2–3 lines long oblong contracted at the base entire or sublobato-serrate, serratures acute, veinlets forked, sori general one at the base of each lobe or pinnule, involucres large cordato-reniform at first plane at length very convex with a deep sinus, one of the lobes sometimes elongated.—*Athyrium sphaerocarpum*, Fée, *Gen. Fil.* p. 186. *Moore, Ind. Fil.* p. 188. *Aspid. athyroides*, *Mart. et Gal. Fil.* *Mex.* p. 67. t. 18. *Lastrea*, *Liebm. Fil.* *Mex.* p. 122.—*Var. glandulosum*; frond larger subdeltoid punctato-glandulose beneath. *Lastrea Mexicana*, *Liebm. in Herb. nostr.*

Hab. Mexico, *Galeotti*, n. 6425, **1699 and 1710.—Var. glandulosum; Mexico (Lastr. Mexicana, *Liebm. in Herb. nostr.†).—Different as are the specimens of *Galeotti* and **1699 and 1710** from *N. Mexicana*, I am far from feeling sure that this Fern is not one of the many forms of that variable species. Liebmann, who seems to know Galeotti's plant, has, according to my views, taken a broad-fronded and glandulose var. of this for true *Mexicana*. It is evidently of the same group with that, and the involucres are of the same nature.

134. N. (Lastrea) *deparioides*, Hook.; stipes slender 1–1½ foot long very palaceous below with large lanceolato-subulate brown scales, frond 2 feet long ovato-acuminate membraneous glabrous bipinnate, primary pinnae 4–5 inches long broad-lanceolate petiolate acuminate, pinnules about an inch long rather distant obliquely rhombo-ovate acuminate laciniato-pinnatifid unequally cuneate at the base and there subauricled above, the segments or teeth each bearing a solitary sorus at the very extremity terminating a veinlet, involucre larger than the tooth which bears it convex cordiform with a deep sinus.—**Hook. Fil. Exot. t. 3. Dielisodon deparioides**, *Moore, Ind. Fil.* p. xcv. and 316.

Hab. Ceylon, *Thwaites, C. P.* n. 3062. Anamally Hills, S. Penins. of India,
Beddome (Moore).—I willingly adopt Mr. Moore's specific name for this rare and very interesting Fern, but I do not at all concur in his views of its place in the system, viz. among the Dicksonia-tribe.

135. N. (Lastrea) variabile, Hook.; caudex a stout creeping underground rhizome scaly in the younger portions, stipites more or less approximate from a span to 2 feet long brown subglandularly crispato-pilose as are all the rachises and costae (the rest glabrous), fronds rather membraneous than coriaceous olive-green or black when dry deltoid acuminate or rather five-angled in circumscription from a span to 2 feet long tri-quadrripinnate or supradecompound, lowest primary pair of pinnae very large and their basal inferior secondary pinna much elongated and deflected, tertiary pinnae oblong more or less wide in proportion to the length obliquely cu- neate and decurrent at the base pinnatifid or pinnulated, ultimate pinnules obliquely subovate or in the most compound fronds spatulate, in all the tertiary divisions the inferior half is narrower and less deeply divided than the superior, costules of the ultimate pinnules excentric, veinlets forked, sori generally one to each lobule or segment sometimes small and appearing to be destitute of involucre at other times large with a small membraneous involucre or with a very conspicuous firm involucre flat quite orbicular or with a very small sinus not extending to the point of attachment.—Two forms of this are deserving of notice: var. a, normale, with the ultimate pinnules 1/2 an inch long obliquely subrhomboid; and b, Barteri, very decompound, ultimate pinnules about two lines long subspathulate. But I possess several intermediate grades.

Hab. Tropical Western Africa and Islands, north and south of the line, Ansell, Barter, Curror, G. Manu (Gaboon River; large, the stipites very stout, chestnut-colour, quite glabrous). Tropical East Coast of Africa, Isle of Nissobe, Boivin. British Guiana, Appun. n. 178. São Gabriel, Amazon, Spruce, n. 2129.—Var. b. Prince's Island, West Africa, Barter.—The mode of growth, and outline or circumscription, resembles N. subquanguefidiun; but the fronds attain a much larger size, are much more compound, even supradecompound, and the ultimate pin- nules small. The specimens from tropical America differ in no respect from those of Africa.

136. N. (Lastrea) squamisetum, Hook.; caudex short thick erect or nearly so very paleaceous with ferruginous rather linear scales, stipites tufted firm terete stramineous glossy a span to a foot long scaly as is the caudex at the base, the rest and the rachises and costules sparingly setose with subulate ferruginous firm spreading persistent scales, fronds a span to
14 inches long ovate acuminate subcoriaceo-membranaceous palish-green when dry, tripinnate, primary pinnae 4-6 inches long petiolate two lowest pairs semiovate (the lower half the broadest) acuminate the rest oblong acuminate pinnatifid at their apices with oblong entire segments, pinnules obovate or oblong obtuse obliquely cuneate and subdecurrent scarcely \( \frac{1}{2} \) an inch long subpinnatifid on the superior margin, costules and veinlets subflexuose the latter forked, sori generally one to each lobe or segment near the costule, involucre very conspicuous exactly cordato-reniform subconvex with a rather deep sinus. (Tab. CCLXVIII.)

Hab. Clarence Peak, Fernando Po, alt. 4000 feet, Gustav Mann.—With much of the habit and shape of segments and ultimate pinnules resembling the smaller and least compound state of our \( N. \) variabile, this is in reality very distinct. The caudex is a stout, nearly erect rhizome, with copious paleaceous scales; stipites crowded, tufted, all, except the base, together with the rachises, stramineous and quite setose, with firm, small, subulate, spreading, ferruginous scales. The involucres, too, are quite different.

137. \( N. \) (Lastrea) eriocarpum, Decaisne; caudex ascending stout clothed with a very dense cushion-like mass 1–3 inches thick of auraceous subulate scales from \( \frac{1}{2} \)-1 inch long not extending to the stipes, stipites a span to a foot long pale-brown glossy quite glabrous and scaleless as are the main rachises, frond firm-membranaceous pale-green \( \frac{1}{2} \)-1\( \frac{1}{2} \) foot long subquinquefidly deltoid acuminate very pilose on all the costa and costules on both sides and on the veins beneath with white hairs tripinnate, primary pinnae oblong or ovate acuminate 4 inches to a span long petiolate lowest pair especially on petioles or branches 2–3 inches long semiovate the lowest basal secondary pinnae the longest, pinnules oblong-ovate \( \frac{1}{2} \)-1 inch long obtuse deeply pinnatifid decurrent at the base, the segments oblong-ovate toothed or subinciso-pinnatifid, veinlets forked, sori most copious, involucres large pale-coloured membranaceous cordato-reniform convex very villous.—Aspidium, Wall. Cat. p. 324. Metten. Aspid. p. 60. Nephrod., Decaisne, Archiv. Mus. ii. p. 185. Lastrea, Pr. Nephrod. hirsutum, Don, Prodr. Nep. p. 6. Lastrea, Moore. Hypodematium onustum, Kze. in Flor. 1833. p. 689. Analect. Pterid. p. 45. t. 28. Aspid. pilosulum, Wall. Cat. n. 337 (not Kze.). A. subdiaphanum, Wall. Cat. n. 343. Hypodematium RupPELLIANUM, Kze. in Schk. Fil. Suppl. t. 21. Cystopteris odorata, Pr. Tent. Pterid. p. 93.

Hab. India, probably very general in the mountain ranges: North-west Ben-

Hab. Apparently common in all parts of the continent of India to Assam and Mishmee and throughout the Malay Islands, all collectors, most abundant in mountain-districts, Wallich, Griffith, Hooker fil. and Thomson, etc. Java, De Vriese and Teijsmann, n. 582 (caudex and main rachis very stout and quite erinaceous with stout setaceous squamæ), 80, 213, 53, 582, 201, 208. Borneo, Motley, De Vriese, n. 22. Philippine Islands, Cuming, n. 1, 75, 114, 212, 335, 412. Ceylon, Gardner, Thwaites, who sends specimens with distinct involucres. Society Islands,
**Nephtiodium, $$^5$$ Lastrea.**

Nightingale, Bidwill. Otaroka Island, Cuming, n. 1417. China, Fortune, n. 100, Alexander. Kakeah Island (Chinese seas?), Herb. of U. S. North Pacif. Expl. Exp., C. Wright. Hongkong, Wilford, Urykhart; Western Provinces of China, Col. Saul.—A really good species, I believe, but very difficult to describe satisfactorily, it is so variable, and has hence given rise to many different names. I should have preferred that of Reinwardt, though it has not been described under that name, for the long white silky hairs on the under side of the frond are very peculiar, yet not constant, any more than the large and coarse setae on the stipes and rachises on some forms; this character is very fallacious. The presence of copious setæ on some specimens of the Polypond. ornatum, Wall., mainly induced me to maintain and characterize that species in the Ferns of Hongkong, l. c., but I am now satisfied that the two are one. Very frequently in drying, the margins of the segments of the pinnules are involute, and have probably induced some botanist to place the genus in Cheilanthes and Hypolepis.

139. N. (Lastrea) rubiginosum, Hook.; caudex ?, stipes a span long paleaceous with large lanceolate ferruginous scales at the thickened base, the rest with the stipes and rachises coarsely ferrugineo-hirsute, fronds 1–1$$\frac{1}{2}$$ foot long subcoriaceous-membranaceous brownish when dry, broadly ovate or subdeltoid acuminate bipinnate above tripinnate below, primary pinnæ 4–6 inches long the basal ones petiolate broad-ovate or half-ovate acuminate the inferior side the broadest especially at the base, superior primary pinnæ sessile oblong-acuminate, pinnules oblong-lanceolate deeply pinnatifid or again pinnate with the segments or pinnules oblong-ovate ciliat glabrous at the margins 2–4 lines long entire or lobato-pinnatifid, veinlets remote simple, sori dorsal near the middle of the veinlet, involucre orbiculari-reniform entire often ciliated.—Lastrea rubiginosa, Brack. Fil. U. S. Expl. Exp. p. 201. Nephrodium (Lastrea) Fijienae, Hook. 2d Century of Ferns, t. 67.—$$\beta$$, nudicaule ?; stipes and rachises destitute of paleaceous hairs.

Hab. Sandwich Islands, Brackenridge. Naviti Levu, Fiji Islands.—$$\beta$$, nudicaule ?. Oahu, Beechey, Diet, Douglas.—I am indebted, along with a most valuable series of many of the rarest of Mr. Brackenridge's Ferns of the U. S. Expl. Exp., for a fine specimen of that author's Lastrea rubiginosa, which satisfies me that my Nephrodium (Lastrea) Fijienae is a very slight variety of it, though from widely distant islands.—I am doubtful about the var. $$\beta$$, which however chiefly differs in the absence of coarse paleaceous hairs on the stipes and rachises; they may probably be very deciduous.

140. N. (Lastrea) Milnei, Hook.; caudex ?, stipes and primary rachises intensely ebeneous-black glossy, frond 1$$\frac{1}{2}$–2 feet long broad-ovate acuminate membranaceous black-green when dry glabrous bi-tripinnate, primary pinnæ ovate 6–10 inches long petiolate, secondary ones lanceolate 3–4 inches broad lanceolate deeply pinnatifid, segments as well as the
ultimate pinnules distant linear-oblong acute sinuato-dentate or subpinnatifid, the sinuses often having a sharp lobule which forms a zigzag wing to the costa, veinlets distant simple or forked, sori generally one to each lobe of the segment, involucre very cellular cordato-reniform, the margin with glandular hairs. *Hook.* 2d *Cent. of Ferns*, t. 62.

Hab. Wooded mountains of Naviti Levu, Fiji Islands, *Milne.*—I cannot refer this to any hitherto described species, nor does it appear to be known to Brackenridge. The stipes and main rachises are singularly eburneous, and the wing, if I may so say, of the main costae, which unites the segments, has a zigzag appearance, from the frequent presence of an angle or short lobe in the broad sinuses of the segments.

141. N. (Lastrea) *tenuisetum*, *Hook.*; "stipes angular squamoso-hirsute, fronds membranaceous subtriplinlinate at the base above bipinnate, the apex pinnatifid, pinnules oblong-lanceolate acute pinnato-partite with the base oblique adnate-decurrent, the segments linear-oblong lower ones inciso-serrate, rachis costa and veins on both sides paleaceous glanduloso-hirsute, sori small, involucre reniform lacerate." *Lastrea, Brack. Fil. U. S. Expl. Exp.* p. 199.

Hab. Ovalau, Fiji Islands, in mountain forests, *Brackenridge, Milne.*—I have seen no authentic specimen of this species, but my specimens collected by Milne, in similar localities of Ovalau, sufficiently correspond with the description. It possesses no peculiarly tranchant character. *Brackenridge* compares it with *Aspid. tenuisectum* of *Blume.*

142. N. (Lastrea) *squamigerum*, *Hook. et Arn.*; caudex (imperfect) short stout erect, stipites tufted a span to a foot long very paleaceous as well as the rachises with soft ferruginous scales varying in size, fronds 1–1 ½ foot long membranaceous broad-ovate acuminate bi-triplinlinate, primary pinnæ often opposite 4 inches to a span long broad-oblong or ovate acuminate, uppermost ones sessile pinnatifid, secondary ones oblong obtuse an inch or more long nearly ½ an inch wide sessile and decurrent more or less pinnatifid at the margin, ultimate pinnules of the same shape but smaller, veinlets distant simple or forked, sori subbiserial between the costule and the margin, involucres reniform very membranaceous cordato-reniform fimbriato-ciliate, costæ and costules beneath densely clothed with ovato-lanceolate subulate close-pressed obtuse scales different from those of the stipes. *(Tab. CCLXX.)—*Hook. et Arn. *Bot. of Beech. Voy.* p. 106. *Brack. Fil. U. S. Expl. Exp.* p. 198.

Hab. Oahu, *Lay and Collie, Seemann, Brackenridge,* who also collected it in
NEPHRODIUM, & LASTREA. 145

Eimeo, Society Islands, and Ovalau, Fiji Islands.—Well distinguished by the copious scales (quite different from those of the rachis, which clothe the back of the frond) upon the costa and costules, almost looking as if they were infested with minute scale-insects.—From Assam and Khasya (Griffith) I have a Nephrodiun which I can hardly distinguish from this.

143. N. (Lastrea) velutinum, Hook. fil.; caudex?, stipes a foot and more long pubescent reddish-brown, clothed at the base with very long and broad subulate scales, frond 1-1 ½ foot long (brownish when dry) soft membranaceous velvety on both sides clothed with copious soft silky hairs and often pellucidly and glandularly beneath, deltoid or five-angled acuminate tripinnate rarely and only at the base subquadripinnate, primary pinnæ 4 inches to 1 foot long-petioled as well as the secondary ones broad-oblong acuminate, the basal pair half-ovate, the lowest inferior pinnæ being the longest deflexed and most compound, pinnules sessile scarcely anywhere decurrent oblong acute deeply pinnatifid, the segments and ultimate pinnules ovate obtuse serrate or subpinnatifid, pinnules simple or forked, sori small one to each segment, involucres hairy red-brown sometimes fringed with glands, rachis and costa generally rufo-velutinous.—Hook. fil. Fl. Nov. Zel. ii. p. 39. t. 80 (excellent; “N. molle” on the plate by mistake). Aspid., A. Rich. Nov. Zel. p. 70.

Hab. New Zealand, D’Urville (A. Richard), Colenso, All. Cunningham, Hooker fil. Middle Island, Hauraki Gulf, and Banks’ Peninsula, Dr. Lyall.—Well described by Achille Richard, and well figured by Dr. Hooker, except that the large scales at the base of the stipes are not sufficiently copious. It is very distinct from N. decompositum, Br.

(Polystichoid: habit of Polystichum. Sp. 144-151.)


Hab. Brazil, “Beyrich,” Sellow, in Herb. Nostr., Gardner, n. 191 and 5946 (I can hardly distinguish from this the Phegopteris divergens, Eat. Plant. Wright and Fendl., Cuba, C. Wright. n. 831, save that the sori appear destitute of involucre).—I must refer to the characters and descriptions of Presl and Mettenius for all that is written on this species. My authentic specimens come very near narrow-segmented forms of N. exculatum, and to Phegopt. divergens among the Nudisori.

VOL. IV.

Hab. Var. a, macrophyllum. Australia, probably universal, Brown (Port Jackson), Victoria, Mueller, Robinson, and as far north as Moreton Bay, Mueller, Hill, etc. North-west Australia, Byrne. Tasmania, Gunn, Hooker fil. Norfolk Island, common, Menzies, Bauer, etc.—Var. β, microphyllum. Rare in Australia, Clarence River, Dr. Beckler (Mueller), specimens large, 2 feet and more long. New Zealand, Northern Island, abundant, Cook’s Straits, Dr. Lyall, the only form of the plant in these islands. Tahiti, Brackenridge. Ngau, Fiji Islands, Milne. Tasmania, Stuart (Mueller).—An extremely variable species, as Dr. Hooker has justly observed; and such variations are more common among the compound Ferns than the less ramified ones.

146. N. (Lastrea) pubescens, Desv.; caudex creeping the thickness of a goose-quill scaly, stipites solitary a span to 1½

Hab. Jamaica, Swartz, Wilson, Purdie. Cuba, C. Wright, n. 815, n. 1000, large, 1 foot long. Porto Rico, Baron de Schack. Guadeloupe, Beauguet, n. 1164 (ex Herb. Mus. Hist. Nat. Paris).—Very variable in size. The Phegopteris Portorieensis of Eaton, in C. Wright's Pl. Cub. n. 1000, is a large form of this species, in which the involucres have been overlooked or, possibly, are suppressed.

147. N. (Lastrea) acutum, Hook.; caudex?, stipes 2 feet and more long thicker than a goose-quill chestnut-brown smooth without scales (unless at the base, which I have not seen), fronds ample 2 feet long broad-ovate firm subcoriaceous-membranaceous acuminate, primary pinnae petiolate ovato-lanceolate finely acuminate pinnatifid at the apex the rest pinnate, pinnules sessile 1-3 inches long lanceolate long-acuminate deeply pinnatifid, segments oblong very acute subfalcate acutely and often pungently serrated, veinlets simple distant, sori in two series between the costule and the margin, involucere dark-brown cordato-reniform. (Tab. CCLXXI.) —Lastrea acuta, Kl. in Herb. nostr.

Hab. Brazil, Sellow, in Herb. nostr. Near Tarapota, Eastern Peru, Spruce, n. 4662.—This has the largest pinnae and pinnules of any of the polystichoid Nephrodia known to me. I am indebted to the late Dr. Klotzsch for an authentic specimen. Spruce's n. 4662, from Tarapota, appears to me to be quite the same species. I cannot find that Klotzsch has anywhere published it.

148. N. (Lastrea) denticulatum, Hook.; caudex short stout oblique densely clothed with long linear-subulate dark-brown falcate glossy scales ¼-½ inch long, stipites tufted scaly at the base 1½ foot long brown or stramineous, frond

Hab. Tropical America, frequent: Jamaica, Wilson, Purdie; New Granada, all collectors; British Guiana, Brazil, Gardner, n. 1881 and 5943, etc.—Var. β. Jamaica, Purdie, Wilson (who observes, "I mistook this at first for the leaf of a carrot"). St. Domingo, Schomburgk. New Granada, Linden, n. 1297. Schlim, n. 323.

149. N. (Lastrea) *macrostegium,* Hook.; caudex ?, stipes (lower portion only in my possession a span long) stout ½ of an inch in diameter brown very paleaceous at the base with dense soft long subulate crisped scales the rest crinite with longer more scattered firmer often falcate ones, frond ample deltoid 2 feet long very broad deltoid-ovate acuminate coriaceous everywhere glabrous quadripinnate, basal primary pinnae 12–14 inches long semiovate their lowest secondary pinna very long 6–8 inches resembling the rest of the primary pinnae bipinnate, tertiary pinnae more or less petiolate unequally oblongo-ovate obtuse or acute pinnatifid below pinnate and cuneate subauriculate, the lowest superior pinnule and segment rather the largest, ultimate pinnule 2–3 lines long ovate obtuse and obtusely crenato-serrate, veinlets once or twice forked, sori 4–6 on each pinnule in two rows between the costule and margin, involucre so large that they cover nearly the whole underside of the segments or ultimate pinnules pale-brown membranaceous reniform substipitate persistent with a deep depression at the sinus and waved at the margin.
Hab. Rio Urupês, a tributary to the Amazon, Spruce ("gregaria caespitosa, stipes 3-pedalis et ultra; frons bipedalis").—This new species is justly entitled to rank among the polystichoid Nephrodia, and is readily distinguished from N. excultum by the smaller ultimate pinnules, their muticous teeth, and, above all, the very large size and colour of the involucres, which are depressed near the centre and have the margin waved.

150. N. (Lastrea) platyptus, Hook.; "caudex?, stipes in the upper part terete testaceous glabrous slender, frond 1½ foot long thin-coriaceous glossy subdeltiodeo-ovate acuminate bipinnate tripinnate below, primary pinnæ 6–10 inches long petiolate, superior ones ovato-oblong acuminate subfuscate, basal ones the longest and bipinnate, pinnae and ultimate pinnules all obliquely ovate acuminate at the base, superior base auricled the rest subpinnatifid with pungent and serrated lobes, veinlets twice or thrice forked, sori in two series halfway between the costule and the margin, involucre large convex cordato-reniform membraneous finely fimbriated on a short stipes." Aspidium, Kze. Bot. Zeit. vi. p. 262. Metten. Aspid. p. 69.

Hab. Java, "Zollinger, n. 3845." Mountains, Moulmein, alt. 5000 feet, Thos. Lobb.—The general aspect of this Fern is that of Aspid. (Polystichum) aristatum, but the frond is more compound and the sori are never near the margin. The only specimen I have seen possesses neither caudex nor the entire stipes, but the frond and fructification are very perfect. I need hardly say it has no close affinity with any known Nephrodium.

151. N. (Lastrea) excultum, Hook.; caudex short thick, "stipes 1½ foot long laxly paleaceous glandulosely hirsute above, frond subcoriaceous 1½ foot long bright-green glabrous above beneath sprinkled with minute cylindrical sub-glandulose hairs ovate acuminate, proliferous below the apex, tripinnate, primary segments distant suberecto-patent curved upwards, lowest ones 8 inches long petiolate unequally ovate acuminate the prolonged apex sharply serrated, secondary pinnæ rectangularly patent, lower ones petiolate ovate acuminate superior ones tapering and adnate at the base from the inferior cuneate base the superior truncate and broader oblong acutely attenuate at the apex, basal ones of the inferior side very large, tertiary pinnules approximate coadunate ovate or oblong submucronate, lowest ones pinnatipartite, superior ones inciso-serrate, segments subfuscate acute, branches of the veins undivided soriferous, sori between the costule and margin, involucre rotundato-reniform black in the middle, the margin brown coriaceous glabrous persistent."

Hab. Tropical America: Caraccas, Moritz, n. 433, Linden, 122; Venezuela, Fendler, 350; Rio, Gardner; Jamaica, M'Fadyen; Cuba, C. Wright, n. 831, Linden, n. 1743; Peru, Mathews, n. 1830; Tarapota, Eastern Peru, Spruce, n. 4663; Ecuador, foot of Chimborazo, alt. 3000 feet, Spruce, n. 5722; Mexico, Liebm., in Herb. nostr. (at least I cannot distinguish sterile specimens from the author of Aspid. melanostichum, Kze., which is also prolificous at the apex, like excultum).—This, like our N. platypus and the following species, has quite the habit of a Polystichum. Our specimens from Peru and Ecuador seem to attain a much larger size than those from other parts of America.

152. N. (Lastrea) hispidum, Hook.; caudex stout creeping densely paleaceous with long subulate red-brown scales, stipites distant stout a foot and more long hispido-crinite with long deflexed bristles bulbose at the base and almost black, the same but smaller and spreading bristles are continued up the main and secondary rachises and costae, fronds a span to 1½ foot long coriaceo-chartaceous ovate acuminate 3–4-pinnate subsericeo-pubescent beneath, primary pinnæ 3–6 inches long ovate acuminate all petiolate, lowest pair deltideo-acuminate, secondary ones of the same shape or narrower, ultimate pinnules narrow-lanceolate ½–1½ an inch long deeply pinnatifido-serrate, the segments pungently acute, all the ultimate rachises with a narrow wing so that the pinnules are deurrently adnate, veinlets central solitary in each division and segment, sori one to each ultimate segment, involucre dark-brown the disk almost black firm persistent orbicular plane more frequently polystichoid than lastreoid, the sinus very indistinct.—Aspidium hispidum, Sw. Syn. Fil. p. 56. Willd. Sp. Pl. v. p. 266. Metten. Aspid. p. 70. Schk. Fil. p. 49. t. 49. Polystichum, J. Sm. Hook. fil. Fl. Nov. Zel. ii. p. 38. Polyst. Schkuhrii, Pr. Polypodium setosum, Forst. Prodr. p. 82.

Hab. New Zealand, Forster, in Herb. nostr., Menzies, A. Cunningham, Colenso, Fraser, J. D. Hooker; Middle Island, Bidwill, Dr. Lyall.—A very fine and very distinct species, quite peculiar to New Zealand.

Of the Aspidium-group, including Euaspidium, Polystichum, Nephrodium, Lastrea, there are many imaginary and, no doubt, some good species found in books more than are here noticed. Many of them could not be introduced with any prospect of benefiting science, and the difficulty would be to know where to stop—how to sift the chaff from the wheat.

(Hook. Gen. Fil. tab. XXV. Aspidium and Nephroleium, Auct. Lepidoneuron, Fée.)

Sori dorsal, arising from the apex of the superior branch of a veinlet, generally at or near the margin. Involucres cordiform or reniform or almost crescent-shaped, attached by a broad base to the receptacle, hence resembling some of the Humata-group of Davallia.—Tropical or subtropical Ferns with a creeping caudex or, more generally, it is slender, suberect, flexuose, apparently a prolongation of the stipes, and sends out strong sermantose and often rooting fibres, in one species bearing large fleshy tubers. Fronds generally coriaceous, pinnate. Pinnae entire or mostly pinnatifid, articulated upon the rachis, and having a strong central costa.—Ferns with a peculiar habit in most of the species, and the Genus is maintained by most Fern-authors.

1. N. tuberosa, Pr.; caudex indistinct, apparently wiry root-fibres frequently bear large oval scaly tubers, stipites 1–4 inches and more long deciduously palaceous, fronds 1–2–3 feet long linear-lanceolate coriaceous-submembranaceous acuminate pinnate, pinnae numerous approximate $\frac{1}{2}$–1 inch long glabrous horizontal from a truncate or cordate base more or less auricled above, oblong obtuse or especially the fertile ones crenated rarely acuminate often subfalcate, lower and sterile ones shorter and more obtuse, auricle acute, sori transverse about equidistant from the margin and the costa, involucres firm coriaceous reniform or nearly halfmoon-shaped brown opening towards the apex of the pinnae, the base and point of insertion broad and generally black.—Aspid., Bory, in Willd. Sp. Pl. v. p. 234. Nephrolepis, Pr. Metten. Fil. Hort. Lips. (who refers to it N. imbricata, Kauff. N. undulata, J. Sm. and Sw.) Aspid. sublanosum, Wall. Cat. n. 365 (in part).—Var. $\beta$, pendula; elongated and pendulous from trees. Aspid. pendulum, Raddi, Fil. Bras. p. 30. t. 45. Nephrolepis, Pr.—Var. $\gamma$, delicatula; small, pinnae membranaceous. Nephroedium delicatulum, Dcne. in Jacquem. Voy. Bot. p. 178. t. 179. Aspid. Tavoyanum, Wall. Cat. n. 1032.

Hab. Bourbon and Mauritius, Sieber, F.I. n. 41 (Asp. imbricatum), and Klfs. and Sieber, F.I. Mixta, n. 246. Western Tropical Africa, Vogel, Irving, G. Mann (both broad and narrow fronds). East Indies: Madras Peninsula, Wight, n. 114; Northern India, Wallich, Griffith, Jacquemont, Hooker fil. et Thomson; and Khasya and Assam to Moulincein, Parish, n. 20; Ceylon, Gardner, n. 1877; Java,
**Nephrolepis.**

**Branch** (Aspid. imbricatum and A. obtusifolium, Bl.), *De Vriese and Teijsmann; Luzon, Cuming, n. 213; Hongkong, Urguart, C. Wright. Louchoo, Beechey. Formosa, Wilford. South Japan, J. Smill. Fiji Islands, Milne, R. Oldham, Brackenridge (N. obtusifolia, Pr.). New Zealand, S. W. Templeton; Norfolk Island, Simmonds. New Zealand, Sinclair. South America: West Indies, Jamaica, Hartweg, n. 1508 and 1583; Mexico, Liebmann (N. occidentalis, Kze.) Brazil, common, Gardner, n. 4081, Sellow ("N. exaltata," from Herb. Hort. Reg. Berol.); New Granada, Moritz, Fendler, n. 161, Linden, n. 318 and 6374; Peru, Mathews, n. 3290, 1106, Spruce (Tarapata), n. 4082, Peppig (from Kunze), Lechler, n. 2155; Ecuador, Jameson; Guiana, De Vriese ("N. solidula").—β, pendula. Brazil, Rachini, Fox. Pichinchia, Ecuador, Jameson. Venezuela, Linden, n. 1690.—γ, delicaula. North-west India, between Carli and Cauderla, Jaquemont; Maturan, Col. Bates; Tavoy, Wallich, n. 1032; Khaya, Hooker fil. and Thomson; Mouleine, on trees, Parish, n. 26.—A species very variable in the breadth of the frond and in the more or less crowded pinnules, and, though difficult to define, easily enough distinguished when the curious tubers are present on the frond, from which the species derives its specific name. On the Cameroons Mountains, Mr. G. Mann has detected it on an elevation of 4500 feet. White, waxy, small, circular scales form dots on the upper sides of the pinnae of this and other species of the genus.


Nephrolepis.


—I have long foreseen the difficulty attending the successful study of the species of this genus, of which Presl alone enumerates twenty-nine species. My extensive series of specimens, from various parts of the world, will not justify me in following his steps, and if I have under-estimated the amount, it is yet, I believe, the safest and wisest course to pursue. As hitherto described, many of them are utterly unintelligible. Of the present species, different as it may appear in its most perfect form (as represented, for instance, by Schkuhr) from some states of *N. exallata*, there are intermediate grades which I cannot safely refer to the one or the other.


5. *N. davallioides*, Kze.; caudex very short erect stolo-

Hab. Java, in wooded mountains, Thunberg, Millett, Thos. Lobb, De Vriese and Teijsmann, n. 337.—This and the following are very peculiar species. The present, as far as yet known, is only found in the mountain-woods of Java.

6. N. floccigera, Moore; caudex?, stipites?, frond 2—3 feet long coriaceo-membranaceous broad-lanceolate furfuraceous-paleaceous beneath, pinnate, pinnæ numerous patent 4—6 inches and more long from a subtruncated and sometimes slightly auriculated base oblong acuminated, inferior and sterile ones ½—¾ of an inch broad entire or serrated only towards the apex, upper and fertile narrower and longer much and finely acuminated crenato-dentate or at the apex pinnatifido-dentate, teeth usually bidentate, segments of the apex entire, sorî marginal, one on each tooth or lobule.—Aspidium, Bl. En. Fil. Jav. p. 149.

Hab. Island of Celebes, Blume, in Herb. nostr. Java, Millett, Thos. Lobb. —Blume compares this with "Aspid. bidentatum, Spr." However nearly it may be allied to that (whatever that may be), it has a close affinity with our preceding species; so much so, that were the flocculose pubescence the only character, I should be disposed to consider it a variety of that; but the pinnæ are never more than crenato-lobate, and the teeth are again bidentate, the superior ones only subpinnatifid: in both species the sorus is upon the tooth or lobule, whereas in most of the species of Nephrolepis the venule that bears the sorus is directed to the sinus of the teeth or lobes. My specimens of Aspid. floccigerum, Blume, from Celebes, are quite uniform with those of Millett and Thos. Lobb from Java.

Of the genus Nephrolepis, I have no authentic knowledge of N. rhizodes, Kze. Bot. Zeit. vi. p. 236; N. Zollingeriana, paleacea, pendula, and depauperata, of De Vriese; nor of N. occidentalis, Kze. in Linnæa, xviii. p. 213.
5. Oleandra, Cav.


Sori dorsal, globose, generally inserted near the base of the very compact free veinlets, and often in a more or less interrupted and chain-like series. Involucres cordato-reniform.—A small but very natural genus of tropical or subtropical Ferns. Caudex creeping. Stipes nodoso-articulate below the middle. Fronds simple, entire, lanceolate or subelliptical, acuminate, coriaceous or membranaceous, often very glossy or satiny.

1. O. neriiiformis, Cav.; caudices suberect or scandent stout woody knotted branched and here and there beset with short spines which are the persistent basal joints of the petioles of fallen fronds, copiously rooting below, densely clothed with appressed imbricated subulate scales at first ferruginous then diaphanous at length deciduous or leaving only small black spots the remains of the persistent scales, fronds 6 inches to 1½ foot long scattered or often in terminal whorls lanceolate caudato-acuminate varying in breadth coriaceous and glossy or firm-membranaceous glabrous or partially villous or pubescent on the veins and costae, petiole 2 lines to an inch long rarely more, jointed very near the base, glabrous or setose or rarely scaly, sori in a continuous but flexuose line, involucres reniform.—"Cav. Præl. 1801. n. 623. et Hort. Reg. Madrit. cum. Tab." (Sw.) Hook. Fil. Exot. t. 58. O. neriiifolia, Pr. Aspid. neriiiforme, Sw. Syn. Fil. pp. 42 and 237. Wildl. Sp. Pl. p. 58. Bl. Eu. Fil. Jav. p. 140. Kunze, in Schk. Fil. Suppl. p. 35. t. 18. Aspidium articulatum, Sw. Syn. pp. 42 and 236. Oleandra, Pr. Aspid. Wallichianum, Belang. et Bory, Fl. Ind. Or. Crypt. p. 56. t. 9. A. Salaciense, Kze. in Bot. Zeit. iv. p. 461. Ophiopoteris verticillata, Reinw. O. micans, Kze. in Bot. Zeit. ix. p. 346.—a, vulgaris; fronds 6–8 inches long firm coriaceous glossy often narrow-lanceolate, petiole ½–¾ of an inch long with the articulation below the middle.—β, brachypus; fronds 4–5 inches long exactly lanceolate very coriaceous and glossy, petiole 2 lines long with the articulation at its summit.—γ, hirtella, Moore; more or less villous with fine soft hairs. Oleandra mollis, Pr. O. pilosa, Hook. in Gen. Fil. t. 45 b. O. Trujulensis, Karst. Fl. Columb. i. t. 73, and Miq. in Herb. nostr. O. hirtella, Miq. in Schk. Fil. Suppl. t. 129.
Hab. Tropical and subtropical Asia. Java, Thunberg, Blume, Reinwardt, Belanger, Thos. Lobbb, De Vriese and Teijsmann, n. 66, 342. Luzon, Née. Mishmi, Assam, Griffith. Khasya and north to Sikkim, Hook. fil. and Thomson. Nepal, Wallisck. Ovalau and Fiji Islands, Brackenridge, Mitre, and Anetteum, C. Moore, all with the sori quite costal. Ceylon, Gardner. Bourbon, Mauritius (Aspid. articulatum, Sieb. Syn. Fil. n. 3), Böjer. Macalister, South Africa, Burke, n. 530 (an O. articulata, Pappe and Rawson?). Tropical West Africa: Fernando Po, G. Mann and Barter (normal state); Prince's Island, Barter, in Batkies Niger Exp. n. 1928. South America: New Granada, Purdie (the same as the Indian form, but petioles scaly), Karsten; Peru, Leechler (O. micans, Kze., costa pubescent beneath.—B. Malay Archipelago and Islands, Griffith, Thos. Lobb, Sir Wm. Norris.—γ. Luzon, Courting, n. 94. "Java (Miquel)," according to Kze. (I possess what I consider the same from Miquel, marked "O. pilosa, Hook., from Surinam"). French and British Guiana, Le Prieur, Schomburgk, n. 416. New Granada, Purdie.—Presl alone enumerates twelve species of Oleandra, and to these M. Karsten has lately added another; but if those species that I am unacquainted with in an authentic form are no better than those I am able to verify, it is quite certain there are more species than there are good ones. It is impossible, with the extensive suites of specimens before me from Asia, Africa, America, and Polynesia, not to see that the individuals of this genus are peculiarly liable to vary. One of the best characters to rely upon is, perhaps, the relative length of the joints of the petiole, though this is not an unerring one. The present species is remarkable for the length and somewhat erect habit of the stont caudex, and the shortness of the petiole, especially of the lower joint.

2. O. nodosa, Pr.; caudex creeping scarcely so thick as a goose-quill moderately branched cinnitne with subulato-setaceous ferruginous flexuose or subsecund spreading scales, stipites distant 2-4-6 and even 8 inches long smooth and polished nodoso-articulate below the middle, lower joint an inch or more long, fronds 8-12 inches long satiny-membranaceous lanceolate finely acuminate 2-2½ inches broad, sori in two or more flexuose series with many scattered ones but not extending to the margin, involucres dark-brown reniform.—Pr. Tent. Pterid. p. 78. Aspid. nodosum, Willd. Sp. Pl. v. p. 211. Hook. Ex. Fl. t. 117. A. articulatum, Schk. Fil. t. 27. Lingua cervina lucida, Plum. Fil. p. 118. t. 136.

Hab. West Indies, frequent: Martinique, Plumier; St. Vincent's, Cuba, Trinidad, Dominica, Jamaica, Guadeloupe, etc. Guiana, Sagot, Le Prieur, Schomburgk, Appun. Tropical West Africa: Fernando Po, on Oil-Palms, Barter; on the Peak, alt. 2000 feet, G. Mann (less satiny, but the costa beneath dark-brown and very glossy); Madagascar, in Herb. nostr. (petioles of O. nodosa, but frond and fructifications of O. neriiformis; the portion of the stipes, too, attached to the fronds, more resembles the latter species.)

Hab. Organ Mountains, Brazil, Brackenridge.—This is the only instance, as far as I know, of any Oleandra having been met with in any part of Brazil. The species found in the adjacent region of Guiana might have been expected here, the *O. nodosa*. And, indeed, the caudex and the setaceous spreading paleae of this (well represented in the figure quoted above) quite accord with that species; the fronds are narrower, less satiny; the sori are in a nearly single series (as in *O. neriiformis*); and there is a degree of pubescence or hairiness, as in my var. *pilosa* of the last-named species. It is hence an instructive plant, and may tend to show that when we have a more intimate acquaintance with the genus, it will have to be reduced in its amount of species still more than I have ventured to do here. The nearest affinity of this is with my Madagascan form of *O. nodosa*, but there the caudex more resembles that of *O. neriiformis*.

4. *O. Wallichii*, Pr.; caudex creeping rooting branched thicker than a goose-quill densely clothed with subulate crisped ferruginous spreading and often reflexed scales thickly tufted at the extremity of the branches, stipites distant ½ an inch to 2 inches long and sometimes palisaceous jointed close to the base so that the very short lower articulation is concealed among the scales, fronds 6-12-14 inches long membranaceous subpellucid opaque on the surface pilosulous subelliptical-oblong, the sides parallel, the base often obtuse and rounded, the apex suddenly and sharply acuminate, sori compact almost imbricated in a continuous line or chain close to and parallel with the costa on each side, involucres reniform eiliated opening towards the margin.—Aspid. Wallichii, *Hook. Ex. Fl.* i. p. 6. t. 5. *Kze. in Schk. Fil. Suppl.* p. 36. 19. Oleandra Wallichii, *Tent. Pterid.* p. 78. *Neuro-nia asplenioides*, *Don, Prodr. Fl. Nep.* p. 6.

Hab. Nepal, *Wallich, in Herb.* North of India, among the mountains, from Simla and Kumaon (alt. 6300 feet) in the West, to Boutan in the East, *Griffith, Strachey and Winterbottom, Col. Bates, Hooker fil.* and *Thomson* (who find a large form at Lachen, 2½ inches wide, with the irregularly scattered sori near, but not close to, the costa). Assam and Khasya, *Griffith, Hooker fil.* and *Thomson*. A most delicate var. is found by *Mr. Oakley* in Himalaya, alt. 7000 feet, 5-6 inches long, 1 inch wide, exactly elliptico-oblong, quite transparent, having a sharp narrow point. One of *Col. Bates*’s specimens from Simla, has the sori apart and forming an irregular series at the distance of a line or more from the costa. Java, *De Vriese and Teljsmann*, n. 78?—This is very distinct in the crisped scales of the caudex, the subelliptical form and membranaceous texture of the frond, and, generally, in the very close proximity of the sori to the costa.

5. *O. Cumingii*, J. Sm.; caudex apparently creeping scarcely so thick as a writing-pen clothed with close-pressed subulate imbricated scales, stipites subterminal and subaggregated 2-3 inches long slightly downy articulated within ⅓-⅓ of an inch from the base, fronds 1-1½ foot long firm-membranaceous elongato lanceolate acuminate very much attenuated and gradually decurrent at the base pubescenti-villous
on the costa and veins, sori rather large forming a single and scarcely interrupted line very near to and on each side the costa.—J. Sln. in Hook. Journ. Bot. iii. p. 413 (name only). Pr. Epinm. Bot. p. 41.—β, longipes; stipites 4-6 inches long inferior articulation 1-2½ inches long, fronds less attenuated at the base, sori quite costal in one instance irregularly scattered at a distance from the costa.—γ, Taihitensis; scales of the caudex (on a small portion only in my possession) laxly patent, stipites 3-4 inches long and as well as the costa very fusco-pubescent and slightly paleaceous, fronds large 2-3 feet long 1½-2 inches broad membranaceous much attenuated at the base, sori in very irregular wavy lines more than ¼ of an inch from the costa. An O. Sibbaldii, "Grev.?, from Tahiti (noticed by Kunze in his description of O. hirtella).

Hab. Luzon, Cuming, n. 60. β, Mergui, on the ground, Parish, n. 59. Moulmein, on rocky hills, Thos. Lobb. Assam, Griffith.—I retain this species with great hesitation, and I have referred other Indian forms to it with no less doubt. The var. γ is perhaps the most peculiar in size, texture, and clothing, and especially in the spreading scales of the caudex; nevertheless Mr. Moore has expressed his opinion in my herbarium, that it is identical with O. Cumingii, and I am far from thinking he is wrong. If so, there is less reliance to be put on the paleaceous covering of the caudex than I had believed; the texture and size of the frond are very variable in all the species, and it is quite certain that no dependence can be placed on the exact arrangement and relative position of the sori with the costa.


6. Fadyenia, Hook.


Sori subrotund, dorsal. Involucre large, orbicular or sub-hippocrepiform, subpeltate, emarginate at the base, attached to an elongated receptacle, nearly free all round at the margin, parallel with the costa, directed towards the apex of the frond. Veins anastomosing, with free veinlets only at the margin in the sterile fronds. Areoles few and large (one series) in the fertile fronds, and those including a free sori-ferous veinlet.—Fern of the West Indies. Caudex short, ascending. Fronds 6-8 inches long, simple, tufted, dimor-
phous; sterile ones lanceolate, much tapering at both extremiti-
ties, proliferous and rooting at the apex, and decumbent; fertile
fronds erect, spatulate, obtuse, tapering below into a winged
stipes.

Aspidium proliferum, Hook. et Grev. Ic. Fil. t. 96 (not Br.).
Aspidium Fadyenii, Metten. Aspid. p. 35. Polystichum Gre-
villeanum, Pr. Tent. Pterid. p. 82.

Hab. Jamaica, high and shady woods, Sloane, Mr. Fadyen, Dr. Alev. Prior.
Mountains of Cuba, C. Wright.—A very remarkable Fern, so unlike anything in
the Nephrodium-group, that I cannot but think it deserves to rank as a genus.
In our figures in 'Icones Filicum' the involucres are incorrectly represented (from
the dried specimens) quite orbicular and peltate.

7. Onoclea, Metten.

Onoclea and Struthiopteris of recent authors.

Gen. Fil. tab. LXIX. Osmundæ sp., Linn.)

Sori dorsal on the changed and contracted pinnæ or pinn-
ules of the fertile fronds, and quite concealed by their re-
volute margins. Involucres very thin, delicate, hemispheri-
cal or half-cupshaped, originating at the inferior side of the 
sorus, or wanting.—Caudex erect or creeping. Fronds stipe
tate, dimorphous, pinnate or pinnatifid with lobed pinnæ or
segments. Veins free or anastomosing.—§ I. Onoclea, L. 
Sw. Fertile fronds bipinnate, pinnules recurvato-globose, in-
volutres pisiform manifest. Veins of the fertile fronds copiously
anastomosing.—§ II. Struthiopteris. Fertile fronds pinn-
ate, pinnæ flattish or torulose. Veins all free, pinnated. In-
volutres very fugacious.

onocleoides, Pr. Tent. Pterid. p. 96. t. 3. f. 9. 10 (fertile 
frond only).—Var. β, obtusiloba, Hook. l. c.; lobes short 
very obtuse, pinnæ subpinnate at the base.—Onoclea obtu-
siloba, Schk. Fil. p. 95. t. 103. Pursh, Am. ii. p. 665. Ragio-
pteris, Pr. Tent. Pterid. p. 96.
ONOCLEA, & STRUTHIOPTERIS.

161

Hab. North America: abundant in the United States, from Florida to the extreme North; Canada, from Lake Huron to the Saskatchewan (B. Pennsylvanica and New Orleans, Drummond). It has not yet been detected on the Pacific side of North America, which is the more remarkable because it exists on the opposite coasts of North China; Amur, Maximowicz, and Manchuria, Wilford.

A solitary species only is known of this section of Onoclea.

(Section Struthiopteris.)


Hab. Northern Europe, Scandinavia and south to Bohemia and Prussia. North Asia: Altai, Manchuria, (Wilford); Amur, Maximowicz. North America: Pennsylvania to Canada and Lake Winipeg.—Few genera of Ferns have found a more unsatisfactory resting-place than Struthiopteris and Onoclea. The former genus was established by Linnæus, and placed near Ophioglossum; Onoclea he ranked with Osmunda, and other equally dissimilar Ferns. Wildegnow, in 1809, constituted a separate genus of Struthiopteris, arranging the two, however, next to each other; and the two genera have remained distinct till 1856, when Mettenius discovered an involucre in Onoclea, to which the presence of a special involucre had always been denied; "indusium infernum dimidiatum basi receptaculi et parenchymati circa basin receptaculi adnatum, fornicatum, margine externe liberum." This discovery Dr. Hooker has satisfactorily confirmed on the living plant, as far as O. Germanica is concerned. Mettenius therefore again unites the two, placing them, on account of the inferior involucre, between Cistopteris and Woodsia, with which they have certainly no natural affinity. It is to be observed that the real structure of this involucre is very difficult to be detected, on account of its fragile nature and the tough and dry substance of the portion of the frond which encloses it.

3. O. (Struthiopteris) orientalis, Hook.; fronds 1–2½ feet long ovato-oblong not attenuated below, fertile fronds oblong often 2 feet long contracted broad linear-oblong flattened 2-edged the refracted margins at first covering the whole back of the frond dark purple-brown glossy involucriform entire at the edge at length spreading torn at the margin and exposing the fructification which is eventually confluent in a continuous line, stipes rachis and costa deciduously paleaceous.—Hook. 2d Cent. of Ferns, tab. 4. Struthiopteris Germanica, Eaton, in Wright's Herb. of V. S. N. Pacif. Expl. Exp. of Ringgold and Rodgers (not of Willd.).

VOL. IV.
Hab. Sikkim-Ilimalaya, elev. 12,000 feet, Hooker fil. and Thomson. Assam, Simons. Hakodadi, Japan, C. Wright.—A most distinct species, with the sterile pinnae exactly as in O. Germanica, but extremely different in the form and size of the fertile ones, not in the least terete or turulose, but remarkably flattened; and with the reflexed or rather refracted margin glossy and membranaceous. Some of the fertile pinnae are 4 inches long, and, when the scariose margin is, in age, spread open, with its lacerated edge, ½ an inch wide. Neither in the old nor young (dried) state of the plant have I found the trace of a proper involucre. Still I cannot hesitate about placing the plant in its present genus.—The three species have a strong natural affinity with each, but with no other Ferns.

At p. 70, after Nephrodium stipellatum, the following species should have been placed:—

16*. N. (Eunephrodium) refractum, Hook.; caudex erect, stipites 1½ foot and more long angular glossy perfectly glabrous (as is the whole plant), fronds 15 inches long subcoriaceous-membranaceous subpellucid glossy above hastato-ovate acuminate pinnated (pinnatifid at the apex), pinnae 4-5 inches long ½ an inch broad horizontally patent the lower ones the longest and singularly deflexed especially the lowest pair, all of them oblong-lanceolate acuminate the margin lobato-pinnatifid their base unequal, the lower pinnae especially cut off as it were at the inferior base, bearing an auricle above appressed to the rachis, veinlets about five pairs all of them united each bearing a purplish sorus in the middle over the whole frond, involucre small cordate dark-purple. (Tab. CCLII.)—Polypodium refractum, Fisch. et Mey. Kze. in Linnaea, xxiii. p. 321. Regel, in Linnaea, xxviii. p. 376. Goniopteris, J. Sm. Cat. Cult. Ferns, p. 20. Aspidium, "A. Braun, Ind. Sem. Hort. Berol. 1836." Metten. Aspid. p. 100.

Hab. "Brazil."—I was wholly unacquainted with this most distinct Fern till after the printing of the preceding pages of Aspidiaceae, and my attention is now directed to it in the stove of the Royal Gardens, bearing unmistakable fructification of Eunephrodium, though no author appears to have described the presence of an involucre. The form as well as the texture of the frond, with the singularly refracted and elongated lower pinnae, are very peculiar. The fructifications are placed with great regularity in the middle of each veinlet over the entire frond, forming a series of inverted V's, corresponding with every lobule of the margin of the frond. The species appears to be unknown to authors except as a garden plant, introduced, it would appear, by Dr. Fischer, from Brazil. Distinct as it is from any known Eunephrodium, it has its analogue in our Nephrod. (Lastrea) macrotis, p. 86 of this volume, Tab. CCXLII. B, from Peru; but, besides the different venation, N. macrotis is a much larger plant, with much longer auricles, and the rachis, and costa, and involucres, are very hairy; the inferior pinnae are similarly refracted. Mrs. Walker informs me that this species bears bulbils in her Fernery at Enfield.
Subord. IX.—POLYPODIACEAE, Pr.

Sori subrotund, rarely oblong, destitute of involucre.

1. Polyodium, Linn.


Sori dorsal, usually subrotund, or more or less oblong. Involucre none. Veins free or variously anastomosing, with sori terminal or medial.—Ferns of very varied form, size, and structure, simple or compound, inhabiting the tropics, as well as temperate and even cold regions. Caudex erect or creeping.

The above generic synonyms of what we here bring under the genus Polyodium are by no means all that might be included, but which are, like many of the above, rejected by the ablest pteridologists; and they will many of them be referred to under the synonymy of the species.

§ Eupolypodium.—Sori subrotund or oblong, terminal or more rarely on the back of the vein. Veins free, rarely partially anastomosing. Fronds simple or very frequently pinnatifid, or pinnate, or decompound. Caudex caespitose, erect, or creeping. Stipes not unfrequently jointed at the base upon the caudex. Polyodium, Pr., including Phegopteris* of authors.

* Fern-authors are divided as to the propriety of considering Phegopteris a
*Fronds simple and entire (not distinctly lobed or divided). Sori not unfrequently oblong; hence, including species of Grammitis of authors, 1–27.

1. P. (Eupolypodium) *bisulcatum*, Hook.; caudex long creeping clothed with subulate scales, fronds distant very coriaceous 8–10 inches long less than a line wide linear ob-tusely five-angled (two longitudinal soriferous furrows at the back) acuminate gradually tapering into a very short stipes articulated on the caudex, veins quite obsolete, sori oval prominent.—Hook. *Ic. Plant.* t. 998 (or *Cent. of Ferns*, t. 98). Holcosorus, Moore, *Ind. Fil.* p. 29.

Hab. Borneo, near Sarawak, *Thos. Lobb.*—A very remarkable species, of which I have seen no specimens but those of Mr. Lobb. The fronds resemble the culms of some very rigid *Junceus*.


Hab. Tropical America. West Indies: Jamaica, Swartz, Bancroft, Wilson; Guadeloupe, L’Hermirier. Venezuela, Schomburgk, Fendler, n. 256. Porto Rico, Schwanecce. British Guiana, Richd. Schomburgk. Near Tarapota, Eastern Peru, Spruce, n. 4643 (Gram. nigro-limbutata, Spruce, MS.). St. Helena, Menzies; Diana’s Peak, J. D. Hooker, Nuttal, and in Herb. nostr. ex Herb. Dicks.—Schkuhr’s figure well represents a small form of this plant, as does that of M. Fée, for the larger-sized specimens. Between this and *P. australis* (our n. 8) I can really point out no difference, save in the generally distinct but slender dark-coloured callose margin, best seen on the under side of the frond of the present species, and which suggested the specific name.

distinct genus from the other free-veined species of *Polypodium*, which, indeed, Presl never intended, but a group or subsection, with the character “sori in dorso medio venarum venularum.” To me there appears to be no tangible character. They are the most compound species of *Eupolypodium*. Mettenius, so cautious of multiplying genera needlessly, nevertheless retains *Phegopteris*. Mr. Moore, on the other hand, unites it with *Eupolypodium*. 

Hab. Sandwich Islands, Gaudichaud, Beechey, Brackenridge.—A well-marked species, peculiar, I believe, to the Sandwich Islands. We had noticed in the ‘Botany of Beechey’s Voyage,’ that this Fern is very tender and membranaceous. It is so, Brackenridge remarks, “when growing in shady localities, but in open and exposed localities the specimens are rigid and coriaceous,” as shown in the specimens of that author sent me by Mr. Eaton.


Hab. Jamaica, Jacquin, Bancroft. St. Vincent, L. Guilding. British Guiana, R. Schomburgk. Java, Blume.—Quite a good species, faithfully represented by Schkuhr, but strangely confounded by Swartz and his followers with the *Asplenium angustifolium* of Jacq. (I.e. *Pl. Rar.* t. 199), which is *Polypod. australis*, from the Straits of Magellan! Klotsch’s *Mecosorus nudus* is identical with this. Mettenius gives St. Helena as a locality for this species, but he does not say upon what authority. Still more remarkable is the fact that this same tropical American species I have received from Blume as his “*Grammitis pusilla*, β. *alpestris*;” so named in error, for the plant is clearly his *Grammitis cæspitosa*. 
above quoted. It is identical with our Pol. gramineum, even to the peculiar pubescence of the elongated stipes.


Hab. Merida, Columbia, Moritz, n. 312. Peru, Lechler, Philippi.—Klotzsch and Mettenius have each given a brief character of this, but unfortunately no observations on the affinity with other species. I therefore place it, as Mettenius has done, next to P. gramineum.


Hab. Java, Blume.—My original specimens of this plant from Blume sufficiently correspond with his figure, and tolerably so with his description. The fronds are 2-3 inches long, lanceolate or subspathulate rather than linear, tapering gradually into a very short stipes, everywhere clothed with rather long ferruginous hairs; veins forked. The var. γ. lasiosorum, of which I also possess specimens from the author, I am disposed to consider a distinct species in consequence of its smaller size and long stipes.

7. P. (Eupolypodium) lasiosorum, Hook.; caudex very small indistinct radiculoso-cespitose, stipites tufted ½ an inch and rather more long slender filiform villous with patent ferruginous hairs, fronds subcoriaceo-membranaceous spathulato-lanceolate obtuse quite entire much attenuated at the base rather densely villous and ciliated with long patent soft ferruginous hairs more or less deciduous in age, veins not discernible, sori globose on all my specimens occupying the upper half of the frond prominent crowded in two lines close to the costa, copious hairs are intermixed with the capsules.—Grammitis pusilla, γ. lasiosorum, Bl. En. Fil. Jav. p. 110. f. 6. Gr. nana, Fée, 6me Mém. p. 7. t. 6. f. 1.

Hab. Java, Blume.—Blume's figure represents the plant nearly twice the size of my specimens, to which it is quite likely to attain; in all else the figure is very characteristic; but there is no analysis.

Hab. South Australia (Port Jackson), Brown. North-east Australia, Mount Lindsay, J. Sim. Tasmania, Labillardière, Brown, and all succeeding travellers, often at elevations of 4000 feet (R. Gun). New Zealand, abundant, all travellers, to the extreme south. Lord Auckland's and Campbell's Islands, J. D. Hooker. Staten Land, Menzies, 1787. Tristan d'Acunha, Carmichael. Falkland Islands, Darwin. Extreme south of South America: Straits of Magellan (Jacquin); Port Famine, Capt. Ph. King; Hermite Island (trunks of trees close to the sea, ascends to 1500 feet), Hook. fil.; Lima, Cuming, n. 1632, undistinguishable from the Antarctic specimens, and I possess a specimen from Madagascar (sterile) which appears to be the same.—I have already, under P. marginellum, Sw., alluded to the close affinity of this with that species. Like that, it is variable in size and in form from the dwarf, perfectly compacted, and exactly spatulate fronds, as it usually grows upon rocks, to the linear-lanceolate ones of 5–6 inches in length, as it commonly grows on trees.

9. P. (Eupolypodium) parasiticum, Mett.; “caudex ascending, stipes 2–4 lines long, fronds coriaceous sparingly clothed with black hairs beneath \( \frac{1}{2} \) to \( \frac{3}{2} \) inches long lanceolate rather obtuse entire or repand, veins immersed forked extending to the margin, sori short oblong on the superior branch in the middle between the costa and the margin on a rather prominent receptacle having a few black setæ.”—Metten. Polypod. p. 36. Grammitis attenuata, Kze., in Linnaeu, xxiv. p. 251.

Hab. Nilghiri Hills, Schmid, Beddome, n. 107; Ceylon, Gardner, n. 1283,
var. ?, with glabrous and pubescenti-hirsute stipites.—I have very little doubt, though I have seen no authentic specimens, that Mr. Beddome’s plant is the same as that of Schmid, and possibly the same as *P. pilosiusculum* of Java.


Hab. Java, Blume.—The author’s figure represents an ascending caudex, with rather distant, lanceolate, obtuse fronds, 3–5 inches long, tapering at the base, with very conspicuous forked veins (at least as seen on the upper side), clavate at the apex of the branches. I am not acquainted with the species.


Hab. On trees, Java, Blume. “3–4 inches high. Caudex creeping (?). Stipes ½–1 inch long. Fronds 2½ inches long, 3 lines wide, linear or narrow-lanceolate, obtuse at the apex, attenuated at the base, coriaceous.”—The figure is a very good representation of our *P. parasiticum* from the Nilghiris. But that and the description are too imperfect to enable me to attempt confidently to refer it to any species known to me.

12. *P.* (Eupolypodium) *sessilifolium*, Hook.; caudex small erect or ascending scaly, stipites scarcely any, fronds tufted membranaceous firm 3–8–9 inches long 2–3 lines wide linear scarcely acuminate obtuse attenuated at the base, veins oblique approximate simple, sori oblong parallel with the costa in lines or series intermediate between the costa and the margin. (Tab. CCLXXII. A.)

Hab. Luzon, Cuming, n. 382 (one specimen with a very indistinct stipes). Penang, Sir W. Norris. Java, Blume, mixed with his *Pol. hirtellum*—The smaller fronds of this a good deal resemble those of *P. graninum*, but they altogether want the decided, even long, stipes of that species.

Hab. "Clefts of rocks in mountains of Hottentots' Holland," Poppig.—I have seen nothing from South Africa I can refer to this, nor does there appear to be anything like it in Pappe and Rawson's En. Fil. Cap.

14. P. (Eupolypodium) *fusciatum*, Metten. ; caudex truly repent thick as a crow's or even a goose's quill paleaceous with subsphagnum scales sparingly rooting, stipites 1–1½ inch long more or less distant black or blackish sometimes deciduously hairy, fronds coriaceous everywhere glabrous or with a few scattered hairs near the base and on the margin 12–16 inches long subflexuose quite entire rather obtusely acuminate long and gradually tapering at the base upon the stipes, costa prominent beneath above having a sunken line or furrow, veins sunk once forked the upper branch bearing the sorus at the base near the costa so that the close-placed oval oblique sori form two lines or series close to the costa occupying chiefly the upper part of the frond.—Metten. *Polypod.* p. 37. Grammitis, Bl. En. Fil. Jav. p. 117. t. 49. f. 1 (very good). Gr. Longa, Féé, Smé Mém. Foug. p. 6. t. 4. f. 1.

Hab. Java, Blume, De Friesen and Teijsmann, n. 6, on mountains, alt. 3000–5000 feet, Thos. Lobb. n. 271.—Blume well observes of this, that the younger sori are more narrow and oblong than the mature ones.


Hab. Java, Blume, Zollinger, n. 1270.—Mettenins refers J. Smith's *Grammitis hirta* to this species, but our specimens of that plant do not accord with the figure of this in Blume, which exhibits a shorter and broader frond, with simple veins (parallelo-venulose).

16. P. (Eupolypodium) *Zeylanicum*, Metten.; caudex creeping as thick as a duck's quill rooting branched clothed with sphagnum scales, stipites scattered but approximate ½–1 inch long black patently hispid, fronds 6–10 inches long ¾ of an inch wide submembranaceous-coriaceous subpellucid linear-lanceolate repando-dentate especially in the upper half glabrous or subciliate and with the remains of hairs here and there on the surface sharply acuminate, below gradually attenuated into the stipes, costa rather slender slightly prominent on both sides, veins rather distant moderately patent

*Vol. IV.*
once forked near or above the middle not extending to the margin, upper branch bearing the sorus chiefly in the upper half of the frond obliquely patent in a line halfway between the costa and the margin and a little distant from each other. (Tab. CCLXXII. B.)—Metten. Polypod. p. 38. Grammitis Zeylanica, Fée, Gen. Fil. p. 234.

Hab. Ceylon, Mrs. Genl. Walker, Gardner, n. 1138, 1283/1.—Allied to, but truly distinct from, P. fasciatum, in the outline of the frond, in the presence of teeth at the margin, and in the shape and position of the sori.


Hab. Java, Blume, Zollinger. Luzon, Cuming, n. 222.—The smaller Indian grammitoid Polypodia, if I may so call them, are attended with great difficulty in their study; and neither the costly figures nor the descriptions of Blume tend so much as they ought to do to remove the difficulties. Mettenius refers to three of Blume's species as belonging to P. hirtum, Bl. That which bears the name of hirtum has the veins twice and thrice forked, or even pinnated, with divericating branches, and Mettenius goes so far as to add (including all the three species of Blume) "hinc inde more Marginarix anastomosantes." Now the plant of Mr. J. Smith, identical with ours, has the veins with one, a single short, branch at the utmost, and in point of outline and sori it best accords with Grammitis setosa of Blume. But if that, as Mettenius would imply, has much branched and somewhat anastomosing veins, which I do not at all infer from Blume's description, then our plant is distinct; and it is this of which we here give a figure.

18. P. (Eupolypodium) obscurum, Metten.; "rhizome creeping, stipites 2-3 lines long, fronds coriaceous firm setose at the margin and costa 3-4 inches long 4 lines wide linear or lanceolate attenuated towards the base obtuse, veins immersed generally repeatedly forked, sori dorsal on the anterior lowest branch close to the costa, capsules setose."—Metten. Polypod. p. 38. Grammitis obscura, Bl. En. Fil.
Polypodium, & Eupolypodium. 171

Jav. p. 113. t. 50. f. 1 (to which Blume himself adds, fig. 2; "β. angustata; fronds narrower subentire shortly stipitate subpubescent on both sides, sori subrotund confluent." Bl.).

Hab. Java, "Blume, Zollinger, n. 1718."—With this I am unacquainted. I confess that Blume's var. β, at fig. 2, has the appearance of a different species, much smaller, and, judging from the figure, destitute of stipes. Mettenius does not include this under P. obscurum, and, as far as I can find, he omits it altogether. Mettenius, moreover, describes the veins as "repetitum furcatæ," whereas Blume says "venis simplicibus vel bifidis." Probably Zollinger's plant may be different from Blume's.


Hab. Epiphytal, on trunks and branches of trees, Java, Blume (in Herb. nostr.). Bourbon (Herb. nostr. from Herb. Mus. Par.).—A beautiful species, quite ferruginous from the copious clothing of long tawny hairs, not confined to the margin. Stipes much elongated.

20. P. (Eupolypodium) Hookeri, Brack.; caudex very small ascending copiously radiculose, stipites $\frac{1}{2}$–$\frac{3}{4}$ inch long patently setose, fronds 3–5 inches long scarcely $\frac{1}{2}$ an inch wide subcoriaceo-membranaceous opaque narrow-lanceolate tapering at both extremities entire long-ciliated at the margin and setose on the costa, veins once or twice forked, sori very close in two compact lines at the costa with setæ among the capsules.—Brack. Fil. U. St. Expl. Exp. p. 4 (according to the reference to Hook. and Arn.). Polyp. setigerum, Hook. et Arn. Bot. of Beech. Voy. p. 103. t. 21. A.

Hab. Sandwich Islands: Owhyhee, Menzies, Bidwell, Beechey, Brackenridge. Luzon, Brackenridge. Fiji Islands, Milne.—At the time Dr. Arnott and myself named this species P. setigerum, we were not aware that an allied, yet possibly different, species bore the same name in Blume. The texture is different, the fronds are much less villous, the sori are very crowded and placed so close to the costa on each side, that the two lines or series almost meet over the costa, the veins once or twice forked. The specimens I have received as P. Hookeri, Brack., are undoubtedly P. setigerum, Bl., not Hook. It is possible that, as Brackenridge gives Luzon (where I have never seen the P. Hookeri) as well as the Sand-
wich Islands as the locality for this species, he may have confounded the two; and there is a very considerable affinity between them. He gives no description or note further than to say that _P. Hookeri_ has the stipites, in many of the specimens, thrice the length of what I have figured, which corresponds with _P. setigerum_, Bl. I retain Brackenridge's name, because the authority for it is expressly our figure and description in the Bot. of Beechey's Voyage. Possibly the two are varieties of each other. If our figures and remarks shall only contribute towards the clearing up some of the difficulties attending the study of this most difficult group, we shall be content.

21. _P._ (Eupolypodium) _congener_, Hook.; "fronds stipitate elongato-linear acuminate at both extremities very entire coriaceous veinless subrevolute at the margin glabrous above, beneath and the stipes subpubescent, sori rotundato-elliptical parallel with the costa, caudex repent."—Grammitis _congener_, Bl. Fil. Jav. p. 108. t. 46. f. 3. a and b.

Hab. Java, _Blume._—Unknown to me. Except that the sori are more globose, the figure exhibits what looks very like a larger form of _Blume's Grammitis caspitosa_, represented on the same plate (our _Polyp. gramineum_).


Hab. Trunks of trees, Brazil, _Raddi._—"Roots caspitose, very slender. Fronds 1½ inch or more long, about a line wide, subcoriaceous, glabrous. Sori near the apex of the frond. Stipes none." The sori are represented as linear-oblong and quite parallel with the costa. Unknown to me.

23. _P._ (Eupolypodium) _parietinum_, Kl.; "fronds thick subspongiose on both sides sparingly rufescenti-pilose linear a little curved shortly attenuated at the apex obtuse (?) long attenuated at the base decurrent into the very short stipes, the margin slightly repand obsolesly costate, veins immersed laxly pinnated, the branches bi- rarely tri-furcate not extending to the margin, sori medial convex ferruginous in a simple series approximate to the margin, rhizome repent evanescently paleaceous, stipites crowded." _Kze._—_Kl. in Linnaea_, xx. p. 373. _Kze. Fil. Schk. Suppl. 2. p. 41. f. 17. Metten. Polypod. p. 39.

Hab. Columbia, _Moritz_, n. 253.—This is unknown to me.

24. _P._ (Eupolypodium) _Sprucei_, Hook.; dwarf, caudex short subfiliform, stipites 1-2 lines long densely tufted, fronds scarcely more than an inch long membranaceous subpellucid bright-green oblong-subspathulate very obtuse quite entire crinite with long scattered fulvous spreading hairs,
costa slender zigzag, veins simple uppermost ones bearing globose terminal sori intermediate between the costa and the margin.—Hook. *2d Cent. of Ferns*, t. 10.

Hab. Near Tarapota, Eastern Peru, Spruce, n. 4746.—Among the smallest of the species of true *Polypodium*, and a well marked one.

25. P. (Eupolypodium) *conforme*, Brack.: “caudex cespitose, stipites short, fronds linear-lanceolate obtuse attenuated at the base membranaceous glabrous slightly repand at the margin and as well as on the costa setose, veins forked, sori biserial approximate plane rounded arranged near the costa, sporangia echinate.”—Brack. *Fil. U. St. Expl. Exp.* p. 4. t. 1. f. 2.

Hab. Ovalau, Fiji Islands, on rocks and trees, alt. 2000 feet, Brackenridge.—“This differs from *P. subspathulatum* by the plane sori and their proximity to the costa; and from *P. Hookeri*, by the membranaceous, smooth (glabrous) fronds, and very short stipes.”—I am not in possession of sufficiently good specimens to form a decided opinion respecting this species, and *P. subspathulatum*, Brack. I fear that two species, or supposed species, are mixed in the *P. Hookeri*, Brack., the Malayan Island one, and that from the Sandwich Islands; and I have intimated that what I have from Mr. Eaton, as *P. conforme*, of Mr. Brackenridge, probably includes two species.


Hab. Tahiti, Society Islands, on trees, Brackenridge.—“Fronds few and very dissimilar in form; sterile ones, including the short stipes, 1-1/2 inch long, spathulate in form, and destitute of setae; the fertile, 4-5 inches in length, which, with the margin of the frond, is sparsely beset with short and brown setae. Veins slender and forked, indistinctly visible on the upper side. The spathulate sterile fronds, and the fertile ones, with partially immersed sori, equidistant between the costa and margin, readily distinguish this from *P. Hookeri*.” I possess two specimens under this name; but one of those of *P. conforme*, from Mr. Eaton, sufficiently accords with the fertile frond above figured.

27. P. (Eupolypodium) *chrysolepis*, Hook.; caudex very long creeping flexuose plicate coriaceous with patent squamose ferruginous subulate scales, stipites distant 1-2 inches long very scaly, fronds 2-3 inches long 1/2 an inch wide subcoriaceous lanceolate obtuse entire tapering gradually below into the stipes pale beneath everywhere clothed with ovate peltate long-acuminate aureo-nitent scales, veins rather obscure once or rarely twice forked free, sori large terminating a
superior veinlet subglobose deep ferruginous.—*Hook. Ic. Pl. t. 721.*

Hab. Andes of Quito, creeping among mosses, *Jameson.*—One of the handsomest of the simple-fronded *Eupolypodium,* the caudex, and fronds, and stipites being alike clothed with copious, bright, ferruginous, or rather aureo-nitent scales, quite unlike any other species known to me. It would appear to be very rare, for I have never received it from any other person than Dr. Jameson, and only on one occasion.

**Fronds pinnatifid (rarely once or twice forked) or occasionally more or less pinnated below. (28-106.)**

28. *P. (Eupolypodium) multifidum,* Bory; caudex minute almost none scarcely scaly radiculose below, stipites tufted a few lines long, fronds 2–3 inches long coriaceous opaque linear lanceolate costate entire tapering below into the short stipes simple or once or twice forked, veins oblique simple, sori between the margin and the costa oval or subrotund very prominent so large that the two series meet at the costa and overhang the margin so as to give an appearance of their being marginal.—*Bory, Voy. Isles d’Afr. ii. p. 103. t. 20. f. 2. Wild. Sp. Pl. v. p. 163. Kze. in Schk. Fil. Suppl. i. p. 90. t. 43. f. 1 (the principal figure copied from Bory). Metten. Polyod. vi. p. 230. Polyp. furcatum, Desv.*

Hab. Bourbon, *Bory (in Herb. nostr., from Herb. Mus. Par.).—A very rare species, apparently only gathered by Bory.* My specimens have fronds mostly simple; they are sometimes forked with divaricating branches or segments, and these segments sometimes bifid.


30. *P. (Eupolypodium) serrulatum,* Metten.; caudex a slender scaly more or less ascending and rooting rhizome, fronds small subhispid tufted (on very short stipites) 2–4–6 inches long 2–3 lines wide more or less curved or flexuose

Hab. Tropical America, apparently universal, Island of Juan Fernandez, Capt. Wood. Sandwich Islands, Menzies, Brackenridge, Hillebrand. Tropical West Africa, Curror, Barter. Mauritius, Bouton.—β. Quito, Jameson.—A very variable species it must be confessed, and I fear my X. Jamesoni is one of the states of it.


Hab. Brazil, Raddi. Organ Mountains, Gardner (without number).—This wants the caudate and nearly entire fertile apex; the teeth or segments of the barren and fertile portion are uniform; perhaps a mere variety of serrulatum. At any rate Raddi has considered the two as one, and the figure of Schkuhr, so generally quoted for that supposed species, seems identical with setosum.

32. P.? (Eupolypodium) binerve, Hook.; caudex creeping? (a dense mass of tufted fibres only appears on our specimen, concealing the rhizome), stipites scarcely any, fronds nearly sessile very numerous caespitose 3–6 inches long ¼ of an inch wide firm-membranaceous lurid-green linear sub-flexuose or a little falcate deeply pinnatifid nearly to the rachis, lobes oblong- or rotundato-quadrate, the narrower ones with a single rarely forked vein, the broader ones with two distant parallel undivided straight veins elavate at the apex.
just within the margin, terminal lobe very large \( \frac{1}{2} - \frac{3}{4} \) of an inch long ovate-oblong very obtuse generally broader than the rest of the frond its veins pinnated, sori? (Tab. CCLXXIII. B.)

Hab. Madagascar, Dr. Lyall.—This has too much the habit and texture of a true Fern for me to omit all notice of it in the present work, although it is quite destitute of fructification; and I trust some early researches of botanical travelers in Madagascar, now happily thrown open to Europeans, may make us better acquainted with it. The remarkable features about the plant are the subquadrate form of the lateral lobes, with one or, far more frequently, two distinct and distant veins, with a large terminal lobe having pinnated veins, somewhat resembling the caudate fertile apex in \textit{P. serrulatum}.


Hab. On trees, among mosses, Java, Blume.—I am not acquainted with this species. If correctly described by Blume, who alone seems to have known the plant, I am perhaps wrong in my conjecture expressed under my description of \textit{P. clavifer}, Hook. in Second Century of Ferns, that it might belong to a form of \textit{P. cucullatum}. The figure is very unsatisfactory.


35. \textit{P. (Eupolypodium) clavifer}, Hook.; caudex rather stout ascending copiously rooting, fronds scarcely stipitate
densely crowded cespitose 4-5 inches long firm rigid-membranaceous narrow- or linear-lanceolate acuminate pinnate, pinnae remote patent terminated by 1-3 long setae, sterile ones very narrow linear, fertile spatulate acute concave the superior margin reflexed, veins solitary simple in each pinna not reaching to the apex soriferous below its extremity occupying the dilated portion of the pinna, rachis very hirsute having a narrow wing on each side connecting the pinnae (or the whole frond may be considered deeply pinnatifid).—Grammitis (Calymmodon) clavifer, Hook. 2d Cent. of Ferns, t. 5.

Hab. Kina-balu, Borneo, H. Low.—An extremely interesting plant, evidently of the same group with P. cucullatum, but remarkably distinct.


Hab. Java, Blume. Sandwich Islands, on trees, Brackenridge.—A well marked species, with no small resemblance to some large Jungermannia. Not only do Brackenridge’s and Blume’s figures well correspond, but authentic specimens from both authors in my herbarium clearly show the specific identity of the two. This circumstance is scarcely to be regretted, considering the very inharmonious specific name given in compliment to a Hawaiian Chief.

37. P. (Eupolypodium) Organense, Metten.; caudex small erect, stipites short a few lines long cespitose, fronds 6-8 inches long 3-4 lines broad firm subcoriaceous-membranaceous linear-lanceolate glabrous coarsely serrato-pinnatifid acuminate much attenuated and decurrent at the base by the very abbreviated segments or teeth, veins forked one to each lobe or tooth, sori copious oval-oblong one to each lobe situated on the superior branch of the fork large close to and obliquely parallel with the costa approximate, capsules mixed with copious hairs arising from the receptacle.—Metten. Polypod. p. 39. Grammitis, Gardn. in Hook. Fl. Pl. t. 509.

Hab. Brazil, rocks and trunks of trees, Organ Mountains, Gardner, n. 5913.—A well marked species, with the habit of P. trichomanoides and trunecola, but
very different in the short teeth-like lobes of the frond, and in the oval or oblong sori, which are large and so approximate as to cover and conceal the whole disk of the frond.


Hab. Tropical America, abundant on the mainland, from Brazil and Guiana to the Pacific, and in the islands. East Indies: Malacea, Cuming, n. 380; Lachen, Sikkim-Himalaya, Hooker, fil.—β. Island of Ascension, summit of Green Mountain, alt. 2800 feet, Hooker, fil.—This is doubtless a very variable Fern in size and texture, and I am not sure that the lobes are always monosorous; nor am I satisfied that the following species, P. truncicola, is really distinct from it.


Hab. Trunks of trees, frequent in New Granada and in the Quitinian Andes, Moritz, n. 333, 252, Jameson, n. 369, 370. Venezuela, Fendler, n. 211, and summit of the Blue Mountains, Jamaica, Purdie (passing into P. trichomanoides). Juan Fernandez, Douglas (scarcely differing from P. trichomanoides).—Some of the Ecuador specimens are very fine, large, and bear long rich brown-coloured hairs very copiously, not only on the margins of the fronds, but on the superficies still I have numerous samples showing, as it appears to me, a passage from the one species to the other.

40. P. (Eupolypodium) trichosorum, Hook.; caudex moderately stout subrepent fulvo-crinite copiously rooting, stipites tufted 2–3 inches long slender filiform villous with long
spreading fulvous hairs, fronds drooping membranaceous subpellucid 3-5 inches long subspathulato-membranaceous yellow-green obtuse entire when young in maturity lobato-pinnatifid, lobes rounded entire, on the upper side sparingly, beneath and at the margins copiously crinite with long patent ferruginous hairs, veins patent flexuose pinnate, veinlets clavate at the apex, sori sub-4-serial small having hairs among the capsules.—Hook. 2d Cent. of Ferns, tab. 13.

Hab. On trees, Forest of Archedona, Quitinian Andes, Jameson, n. 349.—A well-marked species, having some affinity with P. setigerum of Blume, from Java, but abundantly distinct.

41. P. (Eupolypodium) Andinum, Hook.; caudex short ascending copiously rooting, stipites 2-3 lines long tufted, fronds 4-6 inches long membranaceous bright-green pellucid \( \frac{1}{3} \) an inch wide linear-oblong moderately tapering at each extremity crinite with long patent scattered fulvous hairs pinnatifido-lobate with short rounded lobes, veins forked, sori globose or oval forming two series one on each side nearer the costa than the margin.—Hook. 2d Cent. of Ferns, t. 6. P. crispatum?, Willd. Sp. Pl. v. p. 180. Plum. Fil. p. 85. t. 102. B?.

Hab. Andes of Quito, near the River Hondache, Jameson, n. 780, and Cerro de Alitagua, on trees, Spruce, n. 5282. Mount Picöte, near Mayobamba, Peru, C. W. Nelson (Spruce, n. 4780).—A very distinct species, as may be seen by the plate above quoted. Plummer's figure, the P. rispatum, Willd., has no slight resemblance to this species; but that appears to be much more flaccid and pendulous.

42. P. (Eupolypodium) decorum, Brack.; caudex short rather thick creeping densely ferrugineo-squamose, stipites approximate subterminal on the caudex 2-4 lines long rather stout, fronds coriaceous glabrous 6-12 inches long \( \frac{3}{4} \)-1 inch broad narrow-lanceolate much and almost caudato-acuminate the base very gradually attenuated into the short stipes deeply and nearly to the rachis pinnatifid, segments horizontally patent narrow-oblong obtuse quite entire, below gradually becoming shorter and broader and forming shallow elongated lobed wings at the base, costa glabrous or pilosulous, costule and veins quite sunk and inconspicuous, sori oblong 5-8-10 in two rows parallel with the costa and between the costa and the margin partially sunk in a hairy cavity (but with no raised border) at length confluent.—Brack. Fil. U. S. Expl. Exp. p. 7. t. 2. f. 2 (excellent). P.

Hab. Singapore, Walliech, in Herb. nostr. Mount Ophir, Griffith. North-west India, Edgeworth. Luzon, Cuming, n. 398. Borneo, Wallace. Tahiti, Bracken ridge. Gaudalcanau, on trees, Baydo Creek (Fiji?), Milne. Borneo, Thos. Lobb. — The specimens I have referred to this species are quite uniform, and are unquestionably one and the same. Cuming's plant, n. 398, is referred by J. Smith (without any remark) to P. nutans, Bl.; and Mettenius does the same and describes it under that name, but he observes, "Speciminia descripta forma laciniarum ab iconoe laudata Blumeana recedunt." Blume represents a much larger plant, with a rather long stipes, not winged, with the altered segments at the base. I think it better to preserve Blume's species, whatever it may be.

43. P. (Eupolypodium) nutans, Bl.; "fronds subnutant (they are rather subsulfate) deeply pinnatifid subcoriaceous glabrous punctate beneath, segments alternate linear obtuse entire, lower ones subtriangular, sori solitary intramarginal confluent, stipes and raehis puberulous."—Bl. Fil. Jav. p. 182. t. 66. A (scarcely of Mettenius and J. Smith).

Hab. Java, Blume.—"Soris," he says, "non immersis, nudis, et admodum confluentibus, speciem hanc a P. venuloso et obliquato, Bl., forsan facililime distinguere licet."

44. P. (Eupolypodium) blechnoides, Hook.; candex short stout (for the size of the plant) subrepent ferrugineo-paleaceous, stipes subclustered short 1/2-1 inch or more long, fronds firm-coriaceous glabrous 6-10 inches long 1-1 1/2 wide lanceolate acuminate much tapering at the base by the gradual diminution in length of the lower segments deeply almost quite to the dark-brown raehis pinnatifid, segments obtuse all with a broad and decurrent base, upper and fertile ones linear-oblong, lower ones broader and obliquely subtriangular (inferior margin straight), lowest segments forming narrow lobelike wings to the stipes, costules and veins quite sunk and undistinguishable, sori oblong forming two lines one on each side the costa and margin and nearly parallel with them moderately sunk in a depression (without hairs?).—Grammitis blechnoides, Grev. in Edinb. Ann. and Mag. of Nat. Hist. N. Ser. v. 1. p. 328. t. 17. Metten. Polyp. p. 42. P. contiguum, Brack. Fil. U. S. Expl. Exp. p. 6. t. 2. f. 1. Cryptosorus Seemannii, J. Sm. in Seem. Plantae Vitienses, n. 823.

Hab. Island of Raiatea, Friendly Islands, Dr. Sibbald. Mountains, Fiji Islands, Brackenridge, Seemann. Aneiteum, Milne.—Brackenridge not inaptly compares this with some states of Davallia contigua, Sw. (Polypod. contiguum, J.
45. P. (Eupolypodium) pilosissimum, Mart. et Gal.; "caudex creeping clothed with lanceolato-subulate rather rigid blackish scales, stipites 1–2 lines long, fronds coriaceous glabrous above, beneath and at the margin and on the stipes setose with patent blackish hairs at length glabrous 4–8 inches long lanceolate acuminate deeply pinnatifid, segments 6–7 lines long 1–1½ line wide contiguous, from a broad base elongato-oblong obtuse or oblong-lanceolate entire, veins immersed ending in an incrcassated apex on the upper side having a blackish depression, sori dorsal 3–6 on each side the costule intermediate between the costule and the margin, while young surrounded by long blackish setae longer than the sorus." Metten.—Mart. et Gal. Fil. Mex. p. 39. t. 9. f. 2. Metten. Polyp. p. 42.

Hab. Mexico, Galeotti, n. 6379. New Grenada, Fendler, n. 219, Moritz, n. 216, n. 26, n. 382, Schlirn, 399. Surnucuco, Ecuador, Jameson. Oceania, elev. 8000 feet, Seemann, n. 954. Organ Mountains, Brazil, Gardner, n. 111.—This is probably a common tropical American species. It is tolerably well represented by Martens and Galeotti. The specimen is unusually large, and the hairs on the stipes are too long and too lax. In age the hairs sometimes almost wholly disappear.


Hab. On high mountains, Java, Blume.—Of this I have no authentic specimens. A solitary frond from Blume, in Mr. J. Smith's herbarium, very much resembles P. fuscatum, Bl., as does Blume's figure above quoted.

47. P. (Eupolypodium) fuscatum, Bl.; "fronds lanceolate deeply pinnatifid submembranaceous pilolusus, segments alternate linear rather obtuse entire, lower ones narrower, sori solitary submarginal confluent, stipes and rachis villous."

Hab. On trees in mountain-woods of Java, Blume. "Scarcely different from the preceding (P. mollicomum), which it exceeds in size, its fronds are of a thinner texture, segments narrower and longer, lower ones smaller and remote, generally narrow-spathulate." Blume.—My specimens of P. fuscatum, from Miquel and De Vriese, do not seem to verify the observations of Blume. But it requires a more extensive suite of specimens, than has come under my notice, of both, to judge how far the two are really different, and what are their specific distinctions.

Hab. a. Mountain regions of tropical America: Brazil, New Granada, Ecuador, and Peru (at elevations even of 10,000 feet, *Spruce*). Guatemala, Mexico (9000-12,000 feet, *Galeotti*). West Indies: Jamaica, Purdie; Cuba, *Wright*, n. 811 (in part) and 1050.—β. *Bourbon, Bory, in Herb. nostr.* West tropical Africa: Fernando Po, on the Peak, alt. 4000 feet, *G. Mann*, n. 361. Brazil, summit of Organ Mountains, *Gardner*, n. 5915 and 5916. Ocaña, *Schlim*, n. 365. Peru, *Mathews*, n. 977. Tarapota, *Spruce*, n. 4642. Ecuador, Quito, *Jameson*, n. 75. Tunguragua, *Spruce*, n. 5279, *A*., with the caudex 2 feet long, thicker than a swan's quill, extended on the earth among Ericaceous plants, not rooting, densely clothed with imbricated scales; and, from the same locality, *Spruce*, n. 5279, *B*, are specimens with short, thick, branched caudices, squarrose with crisped scales, and fronds a foot long, with segments an inch long, from a broad base, linear-oblong and subacuminate, often glaucous beneath.—The very acute Mr. Spruce remarks, "I think all the specimens marked 5279 belong to the same species." I can quite believe it, and that there is a gradual passage from the small *P. moniliforme*, with its comparatively minute semiobicular segments, to the large narrow acuminated ones just mentioned; and from the small short caudex, scarcely forming a rhizome, to the stout caudex of 2 feet in length.

49. P. (Eupolypodium) *ferrugineum*, Mart. et Gal.; "caudex?", stipites 1 inch long hirsute with ferruginous hairs, fronds membranaceous rather rigid 5-6 inches long hairy at the costa beneath, the rest glabrous lanceolate acuminate pinnatifid to the rachis, segments 5 lines long 1 line wide the broader base adnate and decurrent contiguous lanceolate or linear gradually attenuated acute entire lower ones re-
mote distinct dwarfed narrower, veins manifest soriferous on
the back, sori 5–9 on each side at the costule.” Metten.—
Mart. et Gal. Fil. Mex. p. 36. t. 7. f. 2 (a very small speci-
men with the frond only 2 1/2 inches long). Metten. Polypod.
p. 43. P. xiphopteroides?, Liebm. Fil. Mex. p. 44.

Hab. Mexico, “Gateoti, n. 6380 bis.” Tovar, Columbia, Moritz, Mettenius, in Herb. nostr.—My authentic specimens of Mettenius (from Tovar) I should have
been disposed to refer to the P. apiculatum, Kl., or, what I believe is the same
thing, a small var. of P. Planula. It resembles a good deal Fée’s figure of
the following species, but does not accord well with the description. The two are
from the same country.

50. P. (Eupolypodium) leptostomum, Fée; “fronds nar-
row, stipes short brown clothed with capitate hairs (vis-
cose?), rachis of the same colour but clothed with acute
hairs, segments linear-lanceolate glabrous acute rigid erect,
lateral veinlets simple short, capsules lax 5–7 central, spo-
rangia rounded, ring of twelve joints, prominulous at the open-
ing, spores ovoid, caudex erect woody bearing very long brown

Hab. Mexico, on trees, Orizaba, Schaffner.

51. P. (Eupolypodium) subscabrum, Kl.; “fronds 3–6
inches long pinnatifid broad-linear membranaceous stipitate
adpressedly scabrous viscidulous, segments 3–5 lines long
lanceolato-linear subobtuse horizontal alternate distant mul-
tisorous, veins pinnately branched branches short soriferous,
sori small dirty-brown uniserial opposite, stipes and rachis
filiform brown at length glabrous.” Kl. in Linnaea, xx. p. 377.
Metten. p. 43. (Tab. CCLXXIV. A.)

Hab. Colombia, Merida, Moritz, n. 332. Ecuador, on trees, Valley of Lloa,
Jameson. Bay of Utria, Seemann. New Granada, Sierra Nevada, alt. 10,000
feet, Schlim, n. 843.—Among other difficulties attending the study of the Ferns,
is that arising from not finding the descriptions of authors tally with their own
specimens. In the present case of the plant which is authority for the species, I
possess an original from Klotzsch as 332 of Moritz, and the same is quoted by
Mettenius; but my specimens are not scabrous, nor have they linear (Metten.) or
linear-lanceolate (Kl.) segments, but rather oval-oblong; and certainly none of
my specimens approaches 1–1 1/2 foot in length, with segments 1 1/2 inch long, ac-
cording to Mettenius, as may be seen by our figure. The species is remarkable
for the long purplish hairs on the stipes, and still longer on the margins of the
segments.

52. P. (Eupolypodium) Jamesonoides, Fée; “surculus
slender erect, stipes short filiform, fronds linear multipartite
fasciculate viscid nearly glabrous with the evolution at the
apex indefinite, segments diminishing in size from the base
to the apex obtuse opaque, capsules 6–8 thick confluent covering the entire surface, capsules subrotund, its pedicel broad the annulus of fourteen articulations, spores polymorphic."—Fée, Gne Mén. Foug. Nouv. p. 59. t. 21. f. 4.

Hab. New Grenada, Ocaña, Schl., n. 399.—"A weak, pendulous, narrow Fern, with the indefinite evolution of Jamesonia," the apex of apparently a perfect frond, being circinate, but having few striking characters. Fée compares it to P. subscabrum, KL. (our preceding species), but it accords neither with Klotzsch’s description nor his authentic specimen in our herbarium.


Hab. Bourbon, Bory. Mauritius, Sieber, Syn. 52 (Metten.), Carmichael, in Herb nostr., Dr. Ayres (segments broader). Java, Blume, Millett, Thos. Lobb. —I possess no authenticated specimen of this; but my specimen from Mauritius, gathered by the late Capt. Carmichael, quite accords with Mettenius’s description, better than with Blume’s figure. My Java specimens from Lobb and Millett also seem to be the true plant.

54 P. (Eupolypodium) delicatulum, Mart. et Gal.; caudex short creeping clothed with subulate blackish scales, stipites somewhat clustered 1-1½ inch long patenti-pilose, "fronds rather rigid on both sides and at the margin ferrugineo-setose 4½ (to 6) inches long linear (subattenuate at both extremities) pinnatifid to the very costa, segments 2½-3 lines long ¾ line wide contiguous from a rather broad base oblong obtuse exterior lower ones distinct, veins immersed bearing a sorus at the apex, sori subimmersed with ferruginous hairs in their circumference 4-5 on each side the costule intermediate between the costule and the margin." Metten.—Mart. et Galeotti, Fil. Mex. p. 35. t. 7. f. 1 (very faithful). Metten. Polyp. p. 44.

Hab. Mexico, on Oaks of the Sierra Yavergia, elev. 7000 feet, Galeotti (in Herb. nostr.), Schaffner. Tunguragua, Ecuador, on mossy stones, Spruce, n.
5372, larger, more coriaceous, rather less villous. — The figure above quoted well represents our Mexican specimens; those of Mr. Spruce are slightly different.

55. P. (Eupolypodium) apiculatum, Kze.; "caudex creeping clothed all over with lanceolate-acuminate shortly setose dirty-brown appressed scales, stipites 2–3 lines long shortly pubescent-hirsute, fronds subcoriaceous glabrous 5–7 inches long elongato-oblong acuminate deeply pinnatifid to the costa, segments 7–9 lines long 1–1½ line broad, inferior ones distinct, superior contiguous from a broader base sub-attenuated at the inferior side rather obtuse entire, veins sub-immersed 5–8 on each side all soriferous and incassated at the apex, on the upper side terminating in a minute depression longer than the infra-apical sorus, sori slightly sunk." Metten. — Kze. in Linnaea, xx. p. 378. Metten. Polyp. p. 44. P. Pecten, Fée, Gen. p. 240 (Metten.).

Hab. Venezuela, Linden, n. 239 (Metten.). Columbia, Tovar, Moritz, n. 247 (Herb. nostr., from Mettenius). Venezuela, Berschel, Fendler, n. 217 (P. leptophyllum, Moritz, mst., Eaton) and n. 218. Brazil, Gardner (Mettenius), Organ Mountains, n. 110, in Herb. nostr. Ecuador, Chimboraizo, alt. 3000 feet, Spruce, n. 5713. — The specimens from Venezuela, according to Mr. Eaton named P. leptophyllum, Moritz, mst., seem identical with the plant I have received from Mettenius as the true P. apiculatum; and all from the above localities I should have little hesitation in considering forms of P. Plumula, Willd.


Hab. British Guiana, Richard Schomburgk, n. 1170, in Herb. nostr., from Klotzsch. Andes of Chili, Philippi (Klotzsch). Merida, Columbia, Funck and Schlim, n. 1103 (in part, Mett.). I have the same from Xalapa, Harris, and from St. Domingo, R. Schomburgk. — Caudex as thick as a goose-quill. Stipites slender, 1–3 inches long. Frond 4–6 inches long, 6–14 lines wide. Segments 3–7 lines long, 1–1½ line wide. — I give above the entire description of the author of this species, whose original specimens are in my herbarium; but my materials are hardly sufficient to enable me to form an opinion upon it.

57. P. (Eupolypodium) monticola, Kl.; "caudex filiform elongated, stipites 2–3 lines long setose, fronds 2 inches long sparingly setose linear, almost to the base pinnatifid, segments contiguous 2–2⅔ lines long 1 line wide ovate or ovato-oblong obtuse entire, lower ones abbreviated much decur-...
rent, veins subimmersed abbreviated at the base of the superior half or on both sides the costule mono-di-sorous, sori with a few setae in the circumference." Metten.—Kl. in Linnae, xx. p. 377. Metten. Polyp. p. 45.

Hab. Merida, Moritz, n. 383, "Fortasse status juvenilis speciei sequentis" (P. Peruvianum). Andes of Peru, Herb. Ruiz, n. 58 (Klotzsch).—I give Mettenius's character rather than that of the original describer, Dr. Klotzsch, to whom, nevertheless, I am indebted for the only specimen I possess, for it seems to be the most accurate. If there be any real distinction between this and P. Peruvianum, which Mettenius very properly doubts, it must be sought in the slender, filiform, creeping, scaleless caudex, a foot long in my specimen, with small fronds not 2 inches long and 2–3 inches apart, whereas Klotzsch describes the fronds as cespitose.


Hab. Peru (Desvaux), Huallay, near Pasco, Mathews, n. 978, Cruckshanks. Merida, Moritz, n. 330 (Klotzsch, in Herb. Hook., P anfractuosum, Kl.).—The figure in Ic. Fil. well represents the caudate form of this plant, but the stipites are longer than in any of our other specimens. Most of those from New Granada have shorter stipites and no really visible caudex.

59. P. (Eupolypodium) jubæforme, Klf.; "caudex caespitose clothed with ovato-lanceolate scales, stipes 2–4 lines long, fronds membranaceous and deep-green or coriaceous and pale beneath very glabrous 4–10 inches long linear pinnatifid to the base, segments 2½ lines long 1–1½ line wide contiguous by the inferior decurrent base obliquely ovato-oblong a little produced at the base above obtuse very entire, lowest ones abbreviated much decurrent, veins manifest or
immersed, lower ones sterile, superior and abbreviated ones soriferous, sori 2-5 on each side the costule very protuberant on the upper surface of the frond intermediate between the costule and the margin. Metten.—Klf. Fl. 1823. p. 364. Metten. Poly. p. 45, who also quotes P. suspensum, Sieb. Fl. Mart. n. 353, not n. 242 (which is true suspensum), Syn. Fil. n. 182, and P. saccatum, Fée, 6me Mém. p. 10. t. 7. f. 3.

—P. aliud pendulum minimum, Plum. Fil. p. 68. t. 87. B.

Hab. Tropical America: Antilles, Sieber; British Guiana, Surinam, and Porto Rico (Metten., in Herb. nostr., St. Vincent, Lansdowne Gallining; Straits of Juan de Fuca, Seemann.—This Fern is figured by Fée and described by Mettenius, but the latter offers no observations on its affinities. Fée's figure is very good, and he justly observes that "Cette espèce se rapproche du Calypmann commun par ses sporothèces à demi cachées par le repli de la marge des lobules, et du Ctenopteris par des sporothèces en apparence enfoncées dans la lame; quoi qu'ils soient supracuticulaires."


Hab. Peru, Poppig. Columbia, Moritz, n. 460 (Herb. nostr., from Mettenius). Venezuela, Fendler, n. 207, 208, and 209 (P. sessile, Fée and Eaton). Quitinian Andes, Jameson, n. 405 and 790. Ocaña, Schlim, n. 390 and 637.—β. Ecuador, on trees, Cerro de Abitagua, Spruce, n. 5271, and Tunguragua, on stones, n. 5272 (on this latter Spruce remarks, "a n. 5271 differt pinnis minoribus supra squama unae alterae instructis;" but I fail to see this scale in the dried state of the plant).—Kunze correctly observes of this, "fronde vere lineari, lacinii brevissimis sub-flabellatis, soro solitario, differt a P. jubeiformi, Klfs., eacterum simulilo."

The frond is truly pinnated, and the superior base also is free and parallel with the rachis, hence the pinnae (rather than the segments) take a flabellate form.

61. P. (Eupolypodium) subtile, Kze.; "caudex cespitose, fronds 2-3 lines long membranaceous soft-setose on every side shortly stipitate linear-lanceolate pinnatifid to the costa, segments 1½-2 lines long 1 line wide slightly decurrent at the inferior base contiguous short oblong or produced above ovate obtuse entire, veins manifest abbreviated here and
there (as well as the costule) on the upper side at the incrassated apex having a calcareous scale beneath soriferous, sori near the costule with hairs at the circumference.” Metten. (Tab. CCLXXV. A.)—Kze. Kl. in Linnae, xx. p. 375. Metten. Polyp. p. 46 (excl. P. leucosticton, Fée, Gen. p. 240).

Hab. Merida, “Moritz, n. 325.” Venezuela, Fendler, n. 349. Peru, Mathews, n. 1812. Andes of Ecuador, Jameson, n. 405.—One of the most beautiful and delicate of all this group.


Hab. “Cuba, Jameson.”—I am unacquainted with this Fern. Kunze refers it to P. subtile, while Mettenius considers it quite distinct. I fear there is some error in considering it a native of Cuba, or in Professor Jameson being the discoverer or sender of it. I never knew him to send any plants from Cuba, or from any country but Ecuador.

63. P. (Eupolypodium) minutum, Bl.; “fronds shortly stipitate linear-lanceolate deeply pinnatifid and as well as the stipes pubescent, segments ovate-oblong obtuse short repand 1–3-sorus, lower ones dentiform, sori confluent.” Bl. Fil. Jav. p. 188. t. 87. D (not Metten. Polypod. as far as regards Cuming’s n. 205 from Luzon, the only locality he gives, and which is P. subfalcatum).

Hab. Summit of Mount Gedé, Java, on the trunks of trees, Blume.—“An elegant Fern, 1½ to nearly 4 inches long. Fronds erect, 1–3 inches long, 2–3 lines wide, membranaceous, villous.” This, whatever it may be, is very different from Mettenius’s Luzon specimen (Cuming), to which he refers it. Perhaps too nearly allied to P. parvulum, Bl.

64. P. (Eupolypodium) discolor, Hook.; caudex very small short and erect clothed with firm lanceolate subulate scales, fronds tufted sessile 4–6 inches long ⅔–⅔ of an inch wide lanceolate obtuse tapering at the base glabrous deeply to within 1 line of the rachis pinnatifid naked above or minutely dotted with white beneath clothed white-pulverulent substance all over, segments patent oblong-ovate obtuse the
margins entire a little reflexed, costule and veins quite immersed not apparent, sori 7-9 in two rows near the margin, rachis slightly prominent beneath less so on the upper side. —Hook. *Ic. Pl. t. 4.* Metten. *Polyp. p. 47.*

Hab. British Guiana, *Schomburgk, n. 1031.* — A most distinct and apparently rare species, for I have never seen any specimens save those collected by Schomburgk. In a young state, the white pulveraceous substance probably covers the upper as well as the under surface, and in age disappears.

65. *P. (Eupolypodium) Kegelianum, Kze.*; "frond small lanceolate rather obtuse attenuate at the base decurrent subcoriaceous opaque veinless, on each side especially beneath and at the thickish subreflexed margin fusco-pilose pinnafid, segments triangular-ovate obtuse entire with patent sinuses, sori about five near the margin, stipes very short and as well as the cespitose caudex ferrugineo-setoso-paleaceous." *Kze. in Linnaea, xxi. p. 210.* Metten. *Polyp. p. 47.*

Hab. Surinam, *Kegel.* — "Fronds copious, hygrometric, recurved, 2 inches long, 2-4 lines wide, pale-green, somewhat pellucid." — *P. discolor, Hook. Ic. n. 386,* is nearly allied to this, but abundantly differs in being twice larger, the fronds sessile, more linear than lanceolate, obtuse, powdery, white beneath, glabrous above, opaque, the laciniae are longer, narrower, the sinuses acute, and the sori 7-8 in each segment. No other known to us approaches it." *Kze.*

66. *P. (Eupolypodium) lanigerum, Eat.*., an *Desv.?*; "caudex cespitose, stipes 4 lines to 1 inch long cano-villose, fronds 3-8 inches long all over subvillose with whitish hairs which are at length rufidulous lanceolate attenuated at both extremities here and there lengthening by innovations pinnafid to the costa, segments distinct subcontiguous larger ones in the middle 6-8 lines long 1-1½ line wide from an equal base or above a little produced elongato-oblong obtuse entire, lower ones abruptly decreasing oblong or oval obtuse, the lowest ones abbreviated rotundato-ovate distant, veins scarcely manifest, sori 8-12 on each side the costule intermediate between the costule and the margin, capsules here and there with a single seta." Metten. — *Eat. Fil. Wright. et Fendl. p. 108.* Desv. *Journ. Bot. vi. p. 263? Kze. in Linnaea, ix. p. 43? Metten. *Polyp. p. 49? P. laxum, Pr. Reliq. Hænk. i. p. 23, t. 4. f. 1 (fide Kze. and Metten.).*

Hab. Peru, *Hanke, Poeppig*? Venezuela, *Fendler, n. 212.* — My specimens of *P. lanigerum* of Kunze, collected by Poeppig, and from Klotzsch, and from Jur- gensen (Mexico), I am disposed to consider small states of *P. cultratum.* Fendler’s plant seems quite different from these, and has, I believe, been authenticated by Mettenius, whose character I give above; and it is of a more rigid texture,
the segments often free and more than 1 inch long, the stipes and rachis are rigid. It has some affinity with \textit{P. suspensum}.


Ihab. Tropical America: Martinique, etc., Venezuela, \textit{Moritz}, n. 250, \textit{Schlim}, n. 960, \textit{Fendler}, n. 210; Andes of Ecuador, \textit{Spruce}, n. 5278; Brazil, \textit{Gardner}, n. 112; Fernando Po, alt. 3000 feet, \textit{G. Mann}.—\textit{Var. \( \beta \)}, \textit{Mauritius and Bourbon}, \textit{Bory, Carmichael}, \textit{Sieber, Bojer}. Peru, \textit{Poppig}. Amazon, Casiquiare, etc., \textit{Spruce}, n. 1720 and 3449. Venezuela, \textit{Fendler}, n. 348. Jamaica, \textit{Wilson}. Cuba, \textit{C. Wright}, n. 1018.—A good species, but it is impossible to separate from it the small form which has gone by the name of \textit{P. elasticum}. It is best perhaps distinguished from its allies by the much pinnated, very fusco-villous fronds, and the peculiar shape of the pinnae. The upper base is rounded off and hence a little free and separate from the rachis, while the lower base is decurrent, so that the pinna are unequally sided. The South American specimens from the above localities are identical with those from Mauritius and Bourbon. My authentic ones of \textit{P. xanthotrichum}, \textit{Kl. (P. ellipticosorum}, \textit{Fée, according to Mettenius}), prove that it is the same as \textit{P. cultratum}.

68. \textit{P.} (Eupolypodium) \textit{obliquatum}, Bl.; caudex short creeping rather stout ferrugineo-paleaceous, stipes approximate 2–3 lines to \( \frac{1}{2} \) inch long glabrous, fronds firm-membranaceous scarcely subcoriaceous 6–12–14 inches long \( \frac{1}{2} \)–2 inches broad lanceolate acuminate and subcaudate tapering below deeply pectinato-pinnatifid nearly to the base, segments approximate from a broad base linear-acuminate often acute entire, lower ones gradually shorter, the lowest triangular much abbreviated, costule and simple oblique veins
evident, sori several in two rows one on each side the costa oblique sunk in an oval cavity (which is protuberant on the upper side) and is surrounded by an elevated border.—Bl. Fil. Jav. p. 181. t. 58. B (very good). Metten. Polyp. p. 49. Crypto-


Hab. Java, Blume, Thos. Lobb, De Vriese and Teijsmann, n. 7. Penang, Sir William Norris. Luzon, Cuming, n. 111. Ceylon, Gardner, n. 1147, 1284, 1290, 1146. Madras Peninsula, Wright, n. 3447.—A well marked species ; possibly Mettenius’s P. repandulun from Ceylon (” Gardner, n. 59”). The numbers received by Mettenius of Gardner’s Ferns are invariably different from mine. The present is the only species of the Cryptosorus group I have from Ceylon.

69. P. (Eupolypodium) Celebicum, Bl.; “fronds nutant (subfalcate) long stipitate (3–5 inches) lanceolate deeply pinnatifid coriaceous, segments horizontal alternate linear obtuse ciliated veinless beneath, lower ones abbreviated subtriangular, sori solitary marginal immersed pubescent.”—Bl. Fil. Jav. p. 179. t. 84. B.

Hab. On trees in woody mountains of Celebes Klobat, Reinwardt, in Blume. Borneo, H. Low.—This is the largest and most coriaceous of the Cryptosorus-group, readily recognized by its villous stipes and rachis, and immersed and con-

sequently (externally) indistinct venation. My specimens from Borneo well cor-

respond with Blume’s description and figure, particularly the latter. Sori numer-

ous on each segment or pinna (for this species is rather pinnate than pinnatifid),

distinct (not confluent), 12–16 on each side the costa.

70. P. (Eupolypodium) Khasyanum, Hook.; caudex short creeping scaly, stipites short tufted (articulated upon the caudex as appear to be all of this group), fronds a span to 14 inches long 1–1½ inch broad subcoriaceo-membranaceous hairy below and on the costa deeply nearly to the rachis pin-

natifid with very acute sinuses, segments approximate hori-

zontally patent from a broad and subdecurrent base oblong obtuse or the lower ones subtriangular or short and rounded entire or subsinuate ciliated, costule flexuose, and simple oblique veins apparent, sori short-oval eight or ten on each segment in two rows nearer the margin than the costa sunk into an oval cavity (having an elevation on the opposite or upper side) bordered by a raised margin.—Hook. Ic. Plant. t. 949 (or Century of Ferns, t. 49). Metten. Polyp. p. 50.

Hab. On trees, Khasya, alt. 4000 feet, Hook. fil. et Thomson. Assam, Jenkins.

—Very distinct from any other of the Cryptosorus-group in the somewhat flacacid and hairy nature of the frond, with broad segments extending almost to the caudex.
71. P. (Eupolypodium) tenuifolium, H. B.; caudex repent short thickish in age and clothed with beautifully crisped ferruginous scales, stipites remote 1–4 inches long rather stout erect, fronds 8–12 inches long 2 inches broad firm-membranaceous glabrous or very slightly pubescent on the rachis and costules beneath broad-lanceolate acuminate scarcely at all attenuated at the base pinnated (rather than pinnatifid), pinnae horizontally patent distant \( \frac{1}{2} \) an inch apart 1–1\( \frac{1}{2} \) inch long 1 line wide linear obtuse moderately decurrent (hence a little broader at the base) quite entire or obtusely sinuato-dentate, costule slender sinuate, veins erecto-patent simple or forked, sori slightly sunk in a cavity 6–10 inches on each side the costule and occupying the space between it and the margin.—Humb. and Bonpl. Nov. Gen. i. p. 9. Willd. Sp. Pl. v. p. 185. Metten. Polyp. p. 51. P. camptoneuron, Fée, Gen. Fil. p. 237. Æme Mém. Foug. Nov. p. 60. t. 23. P. tenuius et nodosum, Plum. Fil. p. 66. t. 85.

Hab. St. Domingo, Plummer. New Granada, Humboldt and Bonpland, Jurgensen, n. 664. Cuba, Linden, n. 1886, C. Wright, n. 809.—Probably a rare species, well figured, however, by Fée, under the name of camptoneuron. The fronds, as well as the stipites, are quite erect and firm, but not at all coriaceous.

72 P. (Eupolypodium) pteropus, Hook.; caudex a small scaly rhizome densely rooting with copious fibres suberect, stipites terminal cespitose very short 2–4 lines often none (in other words the stipes is winged with dwarfed lobes or segments to its very base slightly hairy), fronds firm-membranaceous or even subcoriaceous erect 4–18 inches long 1–3 or more inches wide glabrous more or less opaque or subpellucid lanceolate acuminate singularly contracted and decurrent below deeply almost quite to the base pinnatifid rarely subpinnate, segments remote linear and often elongato-linear obtuse or subacuminate entire (not lobed or sinuated) their base broad and much decurrent when within a few inches of the stipes suddenly dwarfed much dilated above and below and forming shallow lobelike wings reaching to the caudex, rachis and costule black, veins short oblique numerous each bearing a small slightly sunk oval or subrotund sorus rather nearer the costule than the margin. (Tab. CCLXXV. B.)

Hab. Mossy trunks of trees, Andes of Quito, alt. 3000–6000 feet, Jameson, n. 348, Spruce, n. 5712, and in Mount Abitagua, Spruce. Roraima, Venezuela, Schomburyk. New Granada, Hartweg, n. 1493.—I do not find this to be noticed by any author; its nearest affinity is perhaps with P. decipiens, but it has an
e erect mode of growth; the lowest segments form so many decurrent shallow lobes or wings upon the otherwise elongated stipes, giving a peculiar aspect to the plant, and the pinnae are quite entire.

73. P. (Eupolypodium) subfalcatum, Bl.; caudex small obliquely erect coriaceous rather than paleaceous, stipes short 3–8 lines long patenti-pilose, fronds firm-membranaceous hairy on both sides and on the costa 6–8 inches long 1–1 1/2 inch broad oblong-lanceolate subacuminate attenuated below deeply almost to the rachis pinnatifid, segments horizontally patent from a rather broad and decurrent base linear-lanceolate acute strongly serrated or pinnatifido-serrate, lower ones remote distinct smaller than the rest, costule slender flexuose, veins evident distant oblique soriferous at the apex, sori small globose one to each serrature equidistant between the costule and the margin.—Bl. Fil. Jew. p. 186. t. 87. A. B. J. Sm. in Hook. Journ. Bot. iii. p. 394. Metten. Polyp. p. 52. P. filipendulifolium, Fée, Gen. Fil. p. 240. 6me Mém. p. 11. t. 5. f. 3.—β, glabrum; fronds glabrous.


74. P. (Eupolypodium) solidum, Metten.; “caudex creeping clothed with reddish lanceolate acuminated scales, stipes 8 lines to 1 inch long, fronds coriaceous firm very glabrous above opaque green pale beneath 4–8 inches long linear attenuated at each extremity acuminate pinnatifid nearly to the rachis, segments 2–4 lines long 1/4–1 1/4 line wide contiguous adnate at the nearly equal base oblong obtuse serrato-dentate, lowest ones abbreviated, veins immersed forked or several times forked extending into the teeth attenuated at the apex on the back of the anterior branch soriferous, trabeculae formed of elongated incrassated brown cells appear at the apex of the ultimate veins in the teeth, sori oblong submersed 1–4 on each side the costule intermediate between the costule and the margin.”—Metten. Polypod. p. 53. t. 1. f. 1–3.

Hab. Java, “Zollinger, n. 165.”—Unknown to me. There is no striking peculiarity in the form, etc., of the frond, except, indeed, the dark lines forming the trabeculae, which are very remarkable. Kunze seems to have considered it a Ctenopteris.

75. P. (Eupolypodium) glandulosum, Hook.; caudex small...
indistinct clinging to the bark of trees by copious rooting fibres, the rest of the plant all over pilos-glandulose most so beneath, stipites tufted 1–3 lines long, fronds 2–4 inches long ¼ inch broad linear obtuse scarcely attenuated at either extremity rather firm-membranaceous subsucculent deeply nearly to the rachis pinnatifid, segments ovate subacute horizontally patent decurrent at the base, lowermost ones free all of them serrato-pinnatifid, costule and rather distant few and oblique simple veins indistinct, sori few globose. (Tab. CCLXXVI. A.)

Hab. On trees, Ceylon, Gardner, n. 1289, Thwaites.—A small species, perhaps most nearly allied to P. subfalcatum, but readily distinguished by the copious glandular hairs, especially clothing the under side of the frond, giving almost a furfuraceous appearance to that part of it.

76. P. (Eupolypodium) *comptoniæfolium*, Desv.; caudex thick creeping densely fusco-paleaceous above, stipites sparse 4–5 inches long black patenti-villous often bent at an angle, fronds 5 inches to a span long sparingly villous an inch and more wide firm-membranaceous pinnatifid about ¼ of the way down to the slender costa, lobes patent obtuse, veins flexuose, veinlets forked bearing the sori beneath the apex irregularly scattered on the surface, sori often oval partially sunk.


Hab. West Indies: Martinique, Plumier; Guadeloupe, L’Herminier; Porto Rico, Schweeneke. On trees, Ecuador, Forest of Archedona, and at Abitagua, Jameson, Spruce, n. 5280.—It seems a pity to preserve the name of *trifurcatum*, although of Linnean origin, for it is derived from a monstrous form of the frond, analogous to that which occurs at the apex of *Scolopendrium vulgar* in Europe.

77. P. (Eupolypodium) *pendulum*, Sw.; caudex small erect paleaceous with ferruginous scales, stipites aggregated 2–3 lines long more or less downy (often winged to the very base), fronds coriaceo-membranaceous 4–5 inches to 1–1½ foot long 1–2 inches broad glabrous oblong-lanceolate acuminate long-attenuated at the base deeply nearly to the rachis pinnatifid, segments very patent ½ an inch to 1½ long 1–3 lines wide from a broad base more or less decurrent below oblong often gradually acuminated but obtuse, inferior ones gradually dwarfed and forming a sinuated or lobed wing nearly to the base of the rachis, veins evident simple or
forked, sori slightly impressed forming two lines between the
costule and the margin, rachis often black.—Sw. Syn. Fil.

Hab. On trees in the mountains, West Indies: Jamaica, Swartz, Dr. Wright
(1½ foot and more long), Wilson; Guadeloupe, Sieb. Syn. Fil. n. 32 (small),
L’Herminier. British Guiana, Richard Schomburgk (varying from 4-12 inches).
Venezuela, Fendler, n. 350. Brazil, Aracas, on trees, Gardner, n. 5914. Peru,
on the Andes, Mathews, n. 1102 (segments 1½ inch long, finely acuminated).—
Schkuhr’s figure (the only one that I know of) represents a very small specimen
of this species, which is best distinguished by the gradual dwarfing of the lower
segments; these are so decurrent as to form a narrow lobed wing to the whole
stipes.

78. P. (Eupolypodium) Adenophorus, Hook. et Arn.; caudex small ascending clothed
with narrow-acuminated scales fibroso-radicant below, stipites tufted less than an inch long
eclavato-glandulose, fronds pendent a span to a foot long an
inch broad subcoriacea-membranaceous elastic elongato-lan-
ceolate moderately acuminated tapering at the base deeply
nearly to the rachis pinnatifid glanduloso-ciliate the rest gla-
brous, segments from a broad decurrent base subtriangulari-
oblong horizontal subfuscate acute entire or sinuato-dentate,
veinlets simple or forked, sori few in the upper half of the
segments intermediate between the costule and the margin.
dulum, Gaudich. in Freyc. Voy. p. 349 (not Sw.), and Adeno-
phorus pinnatifidus, l. c. p. 365.

Hab. Sandwich Islands, Gaudichaud, Beechey, Brackenridge. Peru, Mathews,
n. 1508.—Mettenius gives Guadeloupe (and only Guadeloupe), Fack and Schlim,
n. 217, as the native country of this Fern, which I only know from the
Sandwich Islands and from Peru, Mathews.—Perhaps too nearly allied to P. pen-
dulum.

79. P. (Eupolypodium) sarmentosum, Brack.; caudex very
small scaly rooting below and sometimes sarmentose (Brack.),
stipites solitary or sparingly tufted scarcely an inch long, fronds
subcoriacea-membranaceous subglandulosos-pubescent 3-6
inches long 1-2 inches wide lanceolate or oblong-lanceolate cau-
dately acuminated attenuately decurrent at the base deeply
nearly to the costa pinnatifid, segments subhorizontally pa-
tent 1-1½ inch wide rather obtuse entire or repando-dentate
unequal in length, veins simple, sori globose rather irregular
scarcely forming a continued line or series, capsules mixed

Hab. Sandwich Islands, on rocks and decayed wood, frequent, Menzies, in Herb. nostr., Brackenridge, who justly observes that it is allied to P. Adenophorus, "but distinct and well marked as a species."—It is perhaps still more closely allied to some forms of the New Zealand P. granitidis, Br., but it wants the pinnatifid segments of that species and the more or less elongated sori. Dr. Hillebrand sends me good specimens and a small and narrow variety, which he had named P. Haastianum, Brack. (P. subpinnatifidum, Bl., and of this work).

80. P. (Eupolypodium) suspensum, L.; caudex creeping paleaceous with dark-brown subulato-setaceous scales, stipites sparse 4–8–9 inches long stout villous with patent ferruginous hairs often very densely so erect below, curved above and generally geniculated at or near the apex so as to place the frond in a drooping direction, frond subcoriaceous firm green long-ciliated at the margin glabrous or long-villous on both surfaces a span to 2 feet long 1–3 inches broad lanceolate or oblong-lanceolate elongated acuminate scarcely attenuated at the base deeply nearly to the costa pinnatifid, segments 1–3–4 lines broad from a broader and decurrent base oblong acute rather than acuminate entire, lowest ones a little abbreviated, veins manifest simple or forked, superior and shorter branch soriferous but varying in length so that the series of sori are sometimes nearest the costule sometimes to the margin pseudodorsal.—Linn. Sp. Pl. p. 1544. Sw. Syn. Fil. p. 32. Willd. Sp. Pl. v. p. 181. Metten. Polyp. p. 56. P. arcuatum, Moritz, in Herb. nostr. Metten. Polyp. p. 56. P. laxifrons, Liebm. Fil. Mex. p. 52. P. pendulum et glabrum, Plum. Fil. p. 67. t. 87 (very bad, if really intended for this Fern).

Hab. Tropical America, abundant. West Indies, Plumier, Sieber, n. 242; yet Mettenius refers this to P. asplenifolium. Martineque, Jamaica, Wilson, n. 744 and 584, and others. St. Vincent, Cuba, C. Wright, n. 810. Columbia, frequent, Moritz, n. 334, n. 264 b (P. arcuatum, Moritz), and without n. (named P. Funckii, Raddi, Fil. Brazil, t. 27, f. 2, by Mettenius), Funck and Schlim, n. 589, 855, 962, Fendler, n. 213, 215, and 216 (P. radicale, Moritz, fide Metten.), 467, Linden, n. 186. Mexico, Liebmank, Guatemala, Skinner. Brazil, Rio, Gardiner, n. 128 and 129. Ecuador, Andes of Quito, alt. 8000 feet, Jameson and Spruce, n. 5711 (ordinary forms).—I think the most characteristic mark of this species is the stout, elongated, wiry stipites, erect, but towards the apex suddenly bent or geniculated, so that the direction of the frond is downwards, taken in conjunction with the somewhat coriaceous, firm frond, obtuse, not sensibly attenuated at the base. The veins I find to be usually forked, the superior and shorter branch bearing the sori at its apex. My specimen of P. Schkuhrii from Mettenius (Tovar, Moritz) is assuredly P. suspensum, and does not accord either with Schkuhr's figure of pectinatum or Raddi's P. Schkuhrri.
81. P. (Eupolypodium) asplenifolium, L.; "caudex creeping clothed with ferruginous densely setose scales, stipes 3–4 inches long, fronds villous with patent ferruginous hairs on all sides (at length glabrous) 1–1½ foot long membranaceous flaccid linear nearly to the costa pinnatifid, segments all contiguous 6–8 lines long 4 lines wide obliquely ovate or ovato-oblong obtuse the inferior margin subexcised the superior obtusely auricled entire, the lowest ones a little abbreviated, veins manifest forked, sori (pseudodorsal or rather lateral on the veins, according to Mettenius's figure) nearer the costule than the margin, capsules with four or more setæ." Metten. (the same setæ are attributed to the capsules of P. suspensum by Mettenius).—Linn. Sp. Pl. p. 1554. Sw. Syn. Fil. p. 32. Willd. Sp. Pl. v. p. 180. Metten. Polypp. p. 56. t. 1. f. 116? (venation only). P. suspensum, Sieb. Fl. Martin. n. 242. Asplenium altius et villosum, Plum. Fil. p. 85. t. 102. A (a very unsatisfactory figure).

Hab. On trees, Martinique, Plumier, Sieber. West Indies (Mettenius), Jamaica, Wilson, n. 6.—Great confusion prevails in regard to the two Ferns described in books as P. suspensum and P. asplenifolium. This group of Eupolypodium is rendered difficult enough by nature's variations, but is greatly increased when the exaggerated figures of Plumier are taken as the authority for the species; inasmuch as many of them bear little similarity to any known kinds. I have mentioned what I believe to be the distinguishing feature of P. suspensum, but that plant is quite at variance with Plumier's figure. I give Mettenius's description of P. asplenifolium, because it is the most carefully drawn up, and he is likely to be familiar with the plant of the German botanists.

82. P. (Eupolypodium) villosissimum, Hook.; caudex short thick horizontal or ascending clothed with rather long linear subulate pale-brown membranaceous scales, stipites aggregated 3–4 inches long often obtusely geniculate patent-villous with long ferruginous hairs, fronds subcoriaceous dark-green when dry 3–7 inches long 1–1½ inch wide lanceolate scarcely acuminate deeply nearly to the rachis pinnatifid long ciliated villose above densely so beneath with long dark ferruginous hairs, segments patent ¼ an inch to 1 inch long from a broad decurrent base oblong and obtuse or ovate and oblong and acute, veinlets obscure internal approximate twice or more forked extending to the margin or nearly so, sori subglobose dorsal in two rows nearer the costa than the margin.

Hab. West Coast of Africa: Sugar-Loaf Mountains, Sierra Leone, Barter (1857); Island of St. Thomas, alt. 6000 feet, Gustav Mann, and Fernando Po (hairs equally long, but less copious, and segments linear-oblong and obtuse).—But for the quite shaggy appearance of the normal form of this plant, and for the
very different venation, I should have been disposed to refer this to a state of \textit{P. suspensum}, which it much resembles in habit.

83. \textit{P.} (Eupolypodium) \textit{papillosum}, Bl.; caudex creeping paleaceous with brown subulate scales, stipites 6 inches to a span high sparse erect rather stout and as well as the rachis glabrous brown glossy, fronds a span to a foot and more long 2 inches wide membraneous subpellucid dark-green elongato-oblong moderately acuminate abruptly or scarcely attenuated at the base deeply almost quite to the base pectinato-pinnatifid glabrous, segments linear-oblong obtuse exactly horizontal obscurely serrated only at the apex, veins manifest distant erecto-patent forked, branches spreading, superior one bearing the sorus nearer the margin than the costule sunk in a very deep cavity or sack forming a very elevated papilla on the upper side.—\textit{Bl. Fil. Jav.} p. 191. t. 88. \textit{Br. in Horsf. Pl. Jav. Rar.} p. 6. t. 2. \textit{Hook. Ic. Pl.} t. 946 (or Century of Ferns, t. 46). \textit{Metten. Polyp.} p. 56.

Hab. Java, Blume, Thos. Lobb. Philippine Islands, Cuming, n. 185.

84. \textit{P.} (Eupolypodium) \textit{argyratum}, Bory; ”caudex creeping paleaceous with reddish flaccid scales, stipites 3 inches long, fronds subcoriaceous together with the stipes sparingly above beneath more copiously sprinkled with a white cereaceous substance 4 (–5) inches long elongato-oblong acuminate pinnatifid nearly to the costa, segments 6 lines long 2½ lines wide from a coadunate equally dilated base oblong-lanceolate gradually attenuated acute entire, lowest ones abbreviated, veins sunk forked, the inferior ones here and there confluent, sori near the margin 4–6 on each side the costule.” \textit{Metten.—Bory, in Willd. Sp. Pl.} v. p. 175. \textit{Metten. Polyp.} p. 57. \textit{P. argyrophanes}, \textit{Spr. Syst. Veg.} iv. p. 51.

Hab. Bourbon, Bory, Carmichael.—My only specimens of this apparently rare plant, from Captain Carmichael, have the same white, subpulverulent, cereaceous covering, so conspicuous in my \textit{P. farinosum}.

85. \textit{P.} (Eupolypodium) \textit{leucosorum}, Boj.; caudex thick short creeping clothed with setaceo-paleaceous scales, stipites 4–6 inches long brown glossy slender, fronds a span to a foot long 1½–2 inches wide coriaceous (pendulous?) elongato-oblong acuminate cuneate at the base, of the same colour on both sides (destitute of white cereaceous matter) deeply pinnatifid to within 1–2 lines of the base, segments from a broad base decurrent below oblong gradually acuminate or acute entire, veins sunken generally twice forked,
basal superior branch soriferous, sori intermediate between the costule and the margin, young ones only quite white apparently with a ceraceous substance.—Bojer, Hort. Maurit. (name only) p. 417. Hook. Ic. Pl. t. 942, and t. 943 (more mature specimen, with shorter segments, and with oval sori).

Hab. Bourbon, Carmichael, and in Herb. Hook. from Herb. Mus. Par. Mauritius, Prof. Bojer.—This may possibly be a state of P. argenteum of Bory, and comes from the same country; but the white covering is here entirely confined to the young not fully developed sori.

S6. P. (Eupolypodium) Funckii, Metten.; “caudex elongate creeping, stipes stramineous shining 3–4 inches long sparsely clothed with oval-obtuse appressed scales, fronds membranaceous very glabrous 6–7 inches long lanceolate or elongato-oblong acuminate pinnatifid to the costa, segments contiguous 1–2 lines long 2 lines wide from a broad adnate base (sursum adscendente) linear gradually attenuated subfalcate acute entire, lowest ones deflexed here and there abbreviated, veins manifest forked or the lowest ones bifurcate here and there forming areoles of Marginaria, sori in the middle between the costa and the margin 6–9 on each side the costule.” Metten. Polyp. p. 57.

Hab. “Brazil, Funck et Schlim, 963 and 964.”—Unknown to me.


Hab. “Brazil.”—The above is a very imperfect description of probably some well known Fern. Mettenius has given a more enlarged character, if it be the same species; but since, according to Mettenius, it is the Polyp. Plumula, minor, of Willd. Herb., may it not be really a form of that species?

S8. P. (Eupolypodium) pulchrum, Mart. and Gal.; caudex stout scaly creeping partially paleaceous with subulate scales, stipites subaggregated stout black and glossy as well as the rachis and costules glabrous, fronds subcoriaceous 1–1½ foot long 1½–2 inches wide almost black when dry lanceolate more or less acuminate deeply almost to the rachis pectinato-pinnatifid, segments quite horizontal very close linear or only very slightly tapering from a rather broad base a little decurrent below, costules prominent beneath, veins sunk very obscure simple (?), sori small intermediate between the margin and the costule, rachis beneath with scattered brown ovate

Hab. Mexico, Xalapa, elev. 4000 feet, Galeotti, in Herb. xostr. Cuba, C. Wright, n. 806 (in part). New Granada, La Paila, Holton. Brazil, prov. Pará, Spruce, n. 400.—Clearly allied to our P. Plumula; a coarser plant, with obsolete venation, a black, prominent, straight costule beneath, a very opaque frond, almost black, and many scales scattered on the back of the rachis; and thus probably distinct.

89. P. (Eupolypodium) melanopus, Grev. and Hook.; stipes black (as is the rachis below) wiry curved glabrous in my only specimens, fronds drooping 7-8 inches long 2-3 inches broad (in the broadest part) obovato-oblong cadately acuminate obtuse (not attenuated at the base) deeply nearly to the rachis pinnatifid into numerous very patent linear acute or obtuse entire closely placed segments sparsely ciliated with very long dark-coloured spreading hairs, costules prominent beneath and the erecto-patent forked veinlets black, sori numerous terminal globose on the superior branch of the fork between the costule and the margin.—Grev. and Hook. in Hook. Bot. Misc. iii. p. 384. t. 111.

Hab. Hanging vertically at Surucucho, near Cuenca, Ecuador, from the trunks of trees, elev. 9000 feet above the level of the sea, Jameson.—A very distinct and beautiful species, which I have only once received from my valued correspondent Dr. Jameson. The long narrow segments are very close, but rather unequal in length.

90. P. (Eupolypodium) blandum, Fée; “stipes short curved with rather long rufous hairs, fronds deeply pinnatifid ovoid triangular, segments quite free below very glabrous opaque cartilaginous undulated veinless (enerviis) curved, sori almost marginal remote, sporangiophore ovoid, annulus with 12-14 articulations, spores subtrigonous, sporangiastre racemose unilateral.” Fée, 7me Mém. Foug. Nouv. p. 59. t. 22. f. 5.

Hab. South America, region unknown (Fée).—“Les sporangiastres ont une disposition que nous n'avons vue nulle part ailleurs; ils sont unilatéraux, en grappe, et résultent évidemment de la transformation des anneaux de la sporange.”

91. P. (Eupolypodium) Plumula, H. B. K.; caudex creeping or ascending clothed with subulate paleaceous scales, stipes firm rigid 2-4 inches long clothed with copious soft patent hairs, fronds 4 inches to a foot long 1-2½ inches wide subcoriaceous-membranaceous opaque or subpellucid lanceolate moderately acuminate more or less attenuated below deeply
and regularly pectinately pinnatifid nearly to the very rachis, segments very numerous and close horizontal linear obtuse scarcely dilated or decurrent at the base, costa black generally pilose, costules very slender and very generally black waved, veins also often black approximate patent simple, sori terminal on the veins in a very regular series near the margin or between the costule and the margin.—H. B. K. in Willd. Sp. Pl. v. p. 178. Raddi, Fil. Bras. p. 18. t. 27. f. 1. Metten. Polypod. p. 58? P. taxifolium, Linn.? Sw. Syn. Fil. p. 35? Plum. Fil. p. 69. t. 29.? and t. 83?

Hab. Tropical America; almost universal on the mainland and in the islands. I may mention the following as published specimens:—Berbice, Schomburgk (2 feet long), n. 328. Brazil: Pará, Spruce, n. 1 (downy beneath); Tarapota, n. 4135 (3 inches long); Peru, Mathews, n. 3283; Andes of Ecuador, Spruce, n. 5283, 5634, and 5636 (segments broader); Venezuela, Funck and Schltn, n. 957.—Specimens which I take to be the P. Plumula I can best recognize from others of the pectinatum-group by the quite simple and frequently black veins, and of which Raddi's figure, as regards general outline, is sufficiently satisfactory. Mettenius described the veins as forked and even repeatedly forked. If the simple vein be no character, then the plant must surely be only a form of pectinatum. Some of my specimens, too, from North-west Mexico (Seemann, n. 1936), have a remarkable degree of curvature, showing a near approach to our next species, P. curvatum, Sw.; but the margins of the segments here are entire.

92. P. (Eupolypodium) curvatum, Sw.; caudex rather stout creeping palaceous and rufo-tomentose, stipites approximate 3–4 inches long dark-brown subglabrous and nitent, fronds 6–12–16 inches long 2–3½ inches broad oblong-lanceolate firm coriaceous-membranaceous almost black when dry, singularly curved and flexuose almost circinate curved obtuse or attenuated below, deeply almost to the rachis pectinately pinnatifid (subpinnate towards the base) with close-placed narrow-linear nearly horizontal segments a little dilated and decurrent at the base, the apex acute, the margin sinuato-sublobate or subpinnatifid, sori copious one to each lobule rather bright-yellow oval parallel with the costule and occupying the whole space between the costule and the margin, costule subflexuose, veinlets obsolete probably simple (forked, Metten.), rachis pubescent.—Sw. Syn. Fil. p. 31. Fl. Ind. Occ. iii. p. 1639. Willd. Sp. Pl. v. p. 177. Metten. Polypod. p. 59, and in Lech. Fil. Peruv. p. 7.

Hab. Jamaica, Swartz (probably rare, as I have never seen it from any of the West Indian Islands). Ecuador, mountains near Cuenca, elev. 12,000 feet, on rocks, Jameson. Agapata, Peru, Lechler, n. 2066. New Granada, Ocaña, elev. 8000 feet, Schltn, n. 398.—A very peculiar-looking species and, I believe, quite distinct, in the singularly curved and flexuose and almost circinate fronds, of a dark, almost brown-black colour when dry, quite studded, as it were, with bright
yellow, oval, very close-placed, yet not confluent, sori. Possibly Swartz's plant may be different from ours.

93. P. (Eupolypodium) *griseum*, Liebm.; "caudex horizontal creeping thick as a swan's quill paleaceous with rigid castaneous acute scales a line long, stipes and rachis stout, frond herbaceous entirely canescently pilosulous 1–2½ feet long 2–3 (or 4) inches wide, segments at the apex and base diminishing in size horizontal parallel remote alternate or subopposite linear-lanceolate 1–2 inches long 2–4 (and more) lines wide rather obtuse obsolesly repand dilated at the base decurrent above and below, costa a little prominent on both sides, veins immersed branched, sori yellowish intermediate between the margin and the costa." *Liebm. Fil. Mex.* p. 46.


—Accurately described by Liebmann. My specimens are very uniform. The veinlets are twice or thrice forked, but only the lower superior branch bears a small, yellowish, narrow-oval sorus at its apex.


—Mettenius, in his Polypod., refers this Fern to *P. Paradisae* (P. pectinatum, nobis); but, attached to an original specimen, for which I am indebted to him, he makes the remark, and I think correctly, "injusto inter synonyma *P. Paradisae* enumeratum." It is, however, one of many species of Ferns that are more readily distinguished by the eye than in words.

95. P. (Eupolypodium) *subserratum*, Hook.; caudex short rather stout creeping, stipes 5 inches long erect stout dull black muricato-hispid, rachis black minutely muricato-papillose below, frond erect 8 inches long nearly 2 inches broad oblong rather sharply acuminate truncate at the base firm-membraneous dark-green above, paler beneath, regularly and deeply pinnatifid to within a line of the rachis with rather close-placed horizontal oblong very obtuse segments denticulate
Polypondium, & Eupolypondium. 203

only at the extremity, costule straight black not prominent, veins also black and very conspicuous on the under side of the frond close-placed oblong all extending to the margin once forked below the middle, branches close parallel, sori?

Hab. Borneo, Mr. Wallace.—This very distinct-looking Polypondium is, I regret, only known to me by a solitary specimen, and that destitute of fructification. There can, however, I think, be no doubt of the genus.

96. P. (Eupolypondium) lomarieforme, Kze.; "caudex (creeping?) paleaceous, stipes squamuloso-pubescent, frond oblong-linear pinnate pinnatifid at the apex coriaceous rigid, pinné and segments from an unequally dilated base linear obtuse falcate above, upwards revolute (superne sursum revolutus) inflexed at the margin on the upper side sparingly beneath, and the rachis on both sides squamoso-hirsute, sori in one series large submarginal at length confluent."—Kze. in Linnaea, ix. p. 42. Metten. Polypond. p. 59.

Hab. Cassapi, Peru, Preppig, Leechler.—Very near, according to Kunze, P. molle, H. B. K. (which Mettenius refers, the specimen of Herb. H. B. K., to P. Otites, L., and of the Nov. Gen. Am. and Willd.,) and to P. Paradiseae, F. and M., and says, "Ab hoc distant, prior notas indicatas, fronde magis pinnata quam pinnatifida, pinnis remotioribus, margine non repandis; ab illo, nobis non viso, frondis rigiditate, pinnarum directione et sori confluenter distinctum videtur." Mettenius gives a rather more extended character, and observes, "nervi immersi repetito-furcati, hinc inde more Marginariæ anastomosantes;" but, unfortunately, he makes no allusion to its affinities. I possess authentic specimens both from Kunze and from Mettenius; but, I confess, without their high authority, I should have thought they might have been safely united with P. Paradiseae. The more rigid habit, the closely approximate and copious yellow sori, almost covering the under side of the frond, seem to be the chief characteristics. Identical, as it appears, with them I have specimens from Ecuador, Seemann, n. 958 (fronds glandulose-pubescent beneath), and from Baios, Spruce, n. 5667. The caudex is stout, as thick as a finger, horizontal, subulato-paleaceous, and tomentose.

97. P. (Eupolypondium) pectinatum, L.; caudex stout paleaceous, stipites approximate 1-5 inches long, fronds decurved 1-1½ foot long 2-4 inches broad subcoriaceous-membranaceous broad-lanceolate or ensiform acuminated more or less attenuated at the base pectinato-pinnatifid nearly to the rachis often pinnate below blackish-green when dry, more or less pubescent especially beneath, segments very numerous horizontally patent from a broad adnate base often much dilated upwards gradually but obtusely acuminated entire or subinuate strongly costate, veins rather remote obscure once or twice forked rarely anastomosing so as to form large costular areoles, the lowest superior branch of a fork soriferous, sori globose or suboval forming a continuous series on each

Hab. Tropical America, universal. I have given many localities in the ‘Garden Ferns,’ above quoted, under P. pectinatum, and I have now, after a more attentive study of this pectinatum group, if it may be so called, joined to it—and I may say, with little or no hesitation—P. Paradiseæ, so admirably figured by Langsdorff and Fischer, P. Otites, L., P. recurvatum, Kaufl. (P. mœnurum, Lk.), and I think I might very safely have added P. lomariaiforme, Kze. (see n. 96). I shall now briefly notice specimens in my herbarium, which have been distributed with numbers or authentic names, as authority for what I refer to P. pectinatum, L. Brazil, Gardner, n. 123, 124, 126, 127, 5287, Sellow (P. reclinatum, P. mœnurum, Lk.), Spruce, n. 2220. B. Guiana, Dick. Schomburgh (P. Paradiseæ, L. and F.), n. 1136. New Granada, Schlim, n. 612, 636, 136, 633, 128, Fendler, n. 220 (P. consimile, Metten. mst. fide Eaton), n. 221 (P. Paradiseæ, Eat.), Holton, n. 36 (same as P. reclinatum, Kauf.), Moritz, n. 255 (“P. Otites,” Metten.), and n. 32 (“P. lomariaiforme,” Mett.), Linden, n. 185, 529. Panama, Sutton Hayes, n. 172, Fendler, n. 419, Cuming, n. 1210, 1211. West Indies, Sieber, n. 354 (“P. Otites”), March. n. 33, Wilson (with oval sori), C. Wright, n. 806 (“P. Plumula,” Eat.), n. 1017 (var. with segments irregularly pinnatifidly pectinatum, Pappig (“P. Otites,” Kze.). Mexico, Linden, n. 9, 1504, Galeotti, n. 6333. Ecuador, Spruce, n. 5638 (segments 5–6 inches long, much acuminate, coarsely serrated), n. 5284, 5268. Peru, Spruce, n. 4143, 4146 (much attenuated at the base of the frond, and segments very obtuse or retuse), Mathews, n. 1104. —If it can be shown that P. Plumula (our n. 91) has the veins sometimes once or twice forked, I do not see why that should not be added to the list of synonyms of P. pectinatum, L.

98. P. (Eupolypondium) Schkuhrii, Rad.; “caudex creeping, fronds deeply pinnatifid truncate at the base, segments linear obtuse approximate horizontal parallel slightly repand clothed on both sides with scattered rarely piliform scales, sori solitary, rachis flexuose, and the stipes hairy.”—Raddi, Fil. Bras. p. 19. t. 27. f. 2. P. pectinatum, Schk. Fil. p. 189. t. 17. b (excl. syn.).

Hab. Jamaica and Bourbon (?), according to Schkuhr. Brazil, Raddi.—A Fern with much of the general structure of P. Plumula, but quite truncated at the base; that is, the segments are not gradually reduced in size towards the base. It is quite unknown to me.

Hab. Saint Domingo, Plunier.—This remarkable-looking Fern is only known by Plunier’s figure and description. The former exhibits a large creeping caudex, bearing two fronds and the scars of many fallen ones; stipes about 2 inches long, jointed at the base; fronds 10–12 inches long, 4–5 inches wide; in shape it is half of an oblong cut off, as it were, transversely at the base, pinnatifidly divided to within $\frac{1}{4}$ of an inch of the rachis, in a pectinated manner, into an immense number of narrow-linear, very close-placed, horizontal, parallel, undulato-crispate, obtuse segments, about a line wide. The author describes the margin of the segments, “bordé d’un petit cordon noirâtre tirant tant soit peu sur le roux, et qui leur donne un port tout à fait agréable.” This is probably merely a coloured and thickened crenated border; but it seems to have led Willdenow to believe that the plant had some relation to *Pteris*.


Hab. Common throughout most of the cold and temperate regions of the globe: Europe, to its extreme south; North Africa, Madeira, Canaries, and Azores, where it generally attains a large size; Siberia, the Amur, Manchuria, Japan (unknown in the tropical continent of Asia, or even in the Himalaya). From Erzeroum, Asiatic Turkey, I possess specimens; North America, United States, and Canada, British North America and north to Sitka, rare in California (*A. B. Eaton*), Catawbi, mountains, 5000 feet, *n.* 6552 (frond exactly ovate, 4½ inches long; segments close, nearly $\frac{1}{3}$ an inch broad, very obtuse, two lower segments reflexed), south to Mexico; but I do not know of its existence further south in the new world. It makes its appearance in the Cape Colony, South Africa (*Botan.*).—Although varying a good deal in size, and in greater or less breadth of the segments, etc., this is a species in general easily recognized.

101. *P.* (Eupolypodium) *ellipsoideum*, Fée; “caudex elon-
gated thick as a goose-quill flexuose clothed with lanceolate long acuminate scales broad at their base, fronds pinnatifid (pinnate below according to the figure) hairy, segments lanceolate acute entire slightly curved below ciliated, the sinuses rounded rather broad, sori golden-colour close-placed near the margin but distinct ellipsoidal, capsules subrotund, annulus of fourteen articulations, spores ellipsoidal." Fée, 6me Mém. Foug. Nouv. p. 57. t. 21. f. 1.

Hab. Mexico, on mountains, elev. 12,000 feet, Schaffner.—"A beautiful flexible Fern, habit and size of P. vulgare." The veinlets are represented as patent, once or twice forked obliquely; the elliptical sori have the same direction and terminate the superior basal branch of the vein.

102. P. (Eupolypodium) Abitagua, Hook.; caudex rather stout short creeping, densely clothed with ferruginous erect linear subulate straight somewhat rigid scales, stipites 6 inches to a span long rather stout firm and as well as the rachis purple-black ferruginously pilose, fronds coriaceous-membranaceous subpellucid 1 foot long 3-4 inches broad broad-lanceolate acuminate deeply pinnatifid almost to the rachis, segments 2 inches long ½ of an inch wide from a broad base decurrent below (forming sharp sinuses) sublanceolate gradually acuminate slightly falcate, the margin entire or obscurely repand hairy at the margin and ciliated with dark-brown long hairs the rest glabrous, veins internal black (as well as the costule) distinctly seen on being held between the eye and the light rather distant oblique once-forked, upper and shorter branch bearing the sorus thus forming a series of sori intermediate between the costule and margin.

Hab. On trees, Abitagua, Ecuador, Spruce, n. 5281.—A Polypodium with a good deal of the habit of P. vulgare, but with the segments much more acuminate, the margin strongly ciliated with almost black hairs; the veins are internal, black, and all once forked; the scales of the caudex almost ½ an inch long, peculiarly straight (not at all crisped); and the stipites and rachis are deep, purple-black, and ferruginously pubescent.

103. P. (Eupolypodium) pellucidum, Klfs.; caudex creeping thick ferrugineo-paleaceous, stipites approximate stout testaceous 4-5 inches long, fronds ovate or oblong very firm and coriaceous a span to a foot long 3-5 inches broad deeply nearly to the rachis pinnatifid, segments oblong or linear-oblong ⅓ of an inch wide very obtuse approximate subhorizontally or rarely erecto-patent margined crenato-dentate or serrate the lower base a little decurrent, veins erecto-patent twice or thrice dichotomous pellucid and there are besides

_Hab._ Sandwich Islands, Chamisso, *Douglas, Beechey, Diell, Hillbrand, Brackenridge* (elev. on the mountains, 8000 feet).—There is a peculiarity in this plant which I have not observed in any other Fern. The frond is thick and opaque, but the veins are pellucid, and of a rich tawny colour, when held between the eye and the light; and, besides the free veinlets, clavate at the extremity, of which the first superior branch bears the sori, there are pellucid striae or pseudo-veins, always communicating with a crenature or sinus of the marginal teeth, often as conspicuous as the true veins.

104. _P._ (Eupolypodium) *Hartwegianum*, *Hook._; caudex stout creeping densely clothed with dark-brown glabrous falcate subulate scales, stipes 4 inches long greenish-brown glabrous, frond a foot long 3½ inches broad oblong-lanceolate firm-membranaceous acuminate opposito-pinnate only at the base, the rest deeply pinnatifid upwards, segments alternate and as well as the pinnæ horizontal rather distant with broad sinuses, the bases above and below more or less decurrent oblong-lanceolate somewhat acute entire or subsinuato-crenate, lowest two pairs of pinnæ deflexed scarcely abbreviated at the base, above having a truncated auricle, costule slender black, veins black slender twice forked, sori on every segment and pinnæ nearer the margin than the costule bright-yellow oval transversely oblique, rachis brown and as well as the costule (and occasionally the veins) pubescent.—_P. Hartwegianum, Hook. in Benth. Plant. Hartweg. p. 55, and in Ic. Pl. t. 390._

_Hab._ Mexico, on the mountain Sumata, elev. 9500 feet, *Hartweg, n. 415._

105. _P._ (Eupolypodium) *Martensii*, *Metten._; “caudex creeping stout clothed with rather large reddish membranaceous falcicid acuminated serrulatated scales, stipes 1 inch long pubescent, frond membranaceous pubescent on both sides 5–6 inches long lanceolate or oblong-acuminate pinnatifidate to the costa, segments 10 lines long 2 lines wide elongated-oblong or oblong obtuse entire, lower ones distinct, lowest a little abbreviated adnate at the attenuated base, upper ones contiguous, sori intermediate between the costa and the margin 6–8 on each side, capsules loosely collected bearing 2–4 very long hairs at the top thrice as long as the

Hab. Mexico: Orizaba, 9,000–10,000 feet, Ehrenberg, n. 6453; Xalapa and Real del Monte, Coulter, n. 1708 and 1705: San Felipó, Andrieux, n. 36.—Mettenius unfortunately makes no allusion to the affinity of this species; but Martens and Galeotti candidly acknowledge its close affinity with P. vulgare, “but the frond is pilose and segments subtentire.” My specimens from Coulter and from Andrieux quite agree with the figure above referred to, and I had certainly only considered them a slightly pubescent form of P. vulgare. The specimens, however, want the caudiform apex so common to that species.

106. P. (Eupolypodium) chnophorum, Kze. : “caudex repent clothed with reddish lanceolate acuminated scales, stipes 2 inches long, fronds everywhere especially at the costa clothed with white hairs, 1 foot long lanceolate pinnatifid to the costa, segments 1 1/2–1 3/4 inch long 4–4 1/2 lines wide oblong or elongato-oblong-lanceolate rather obtuse subfalcate acuminate repando-sinuate or subcrenate, the base dilated on both sides, the superior adsectenti-coadunate decreasing at both extremities, lowermost subremote distinct a little deflexed.” Metten.—Kze. Bot. Zeit. 1839. Beibl. 1. 34. Metten. Polyp. p. 60.

Hab. Brazil, Blanchet.

*** Fronds pinnatifid, or pinnate, or even bipinnatifid, more or less furfuraceous, with often peltate fringed scales, of which P. incanum may be considered the type. (Lepidotae.—107–122.)*

107. P. (Eupolypodium) incanum, Sw.; “caudex creeping clothed with adpressed lanceolato-subulate rigid finely ciliated or glabrous scales, stipes 1–4 inches long, fronds subcoriaceous 2–5 inches long ovato-oblong deeply pinnatifid on the upper side sparingly clothed with ovate or rotundate denticulated scales bristle-pointed eventually naked, on the under side together with the stipes densely squamose with membranaceous rotundate or ovate obtuse or acuminate entire or denticulated scales, segments 1/4–1 inch long 1 1/2–2 lines wide diminishing from the base to the apex or the lowest ones a little abbreviated, the superior base broader, inferior base attenuated and decurrently adnate and confluent by means of a narrow wing elongato-oblong obtuse or lanceolato-oblong generally entire, sori impressed generally near the apex of the segments 4–6 on each side the costule near the margin

* A small but natural group, though varying in ramification; the frond, generally thick and opaque, renders it difficult to detect the true character of the venation, which is sometimes considered to be that of § Goniopteris.

Hab. Throughout tropical America, as far south as Atacama in Chili (Philippi); Mexico; the West Indian Islands; frequent in the Southern States of North America, and as far north as Ohio and Illinois (A. Gray). Galapagos Islands, Pacific, Capt. Wood. Tropical East Africa, Moramballe Mountain, alt. 3000–3500 feet, Dr. Kirk, in Livingstone’s Exp.

108. P. (Eupolypodium) Ecklonii, Kze.; "caudex creeping paleaceous with appressed rigid lanceolato-subulate blackish entire scales fuscous at the margin, stipites 2–4 inches long, fronds subcoriaceous above at length naked, below densely appresso-squamose (scales membranaceous ovate obtuse or acute entire brown in the middle pale at the margin) 4–6 inches long ovato-lanceolate deeply pinnatifid, segments 8 lines to 1 1/2 inch long 1 1/2–2 lines wide, the superior base broader, inferior attenuated and decurrent adnate and confluent by a narrow wing elongato-oblong obtuse entire, veins of Eupteris immersed, sori generally occupying the apices of the segments immersed surrounded by scales, 3–6 on each side the costule near the margin." Metten.—Kze. in Linnaea, x. p. 498. Metten. Polypod. p. 68. Pappe and Rawson, En. Fil. Cap. p. 39.

Hab. South Africa, chiefly in the eastern districts, Uitenhage to Natal, Ecklon and Zeyher, Pappe, Garden, Krauss, Sanderson (Macalisberg, alt. 4000–5000 feet, and Glen Ayres, alt. 1000 feet, from J. Ayres, Esq.).—I do not myself at all see how the present species is to be distinguished from the preceding, and yet no one seems to have thrown a doubt on its being different. It is true, Mettenius, who has given very full specific characters (transferred here) of the two, places one (Ecklonii) among free-vine species, the other (incanum) among the Marginaria-group "Nervi anastomosantes:" but his var. a of the latter is characterized by having the "nerves free."

109. P. (Eupolypodium) squamatum, L.; caudex creeping thick as a goose-quill paleaceous with brown appressed subulato-lanceolate imbricating scales, stipites 2–12–14 inches long stout firm furfuraceous with white or tawny scales dark-brown in the centre, fronds 6 inches to 1 foot long 2–4 inches wide thick firm oblong or ovato-oblong subcaudato-acuminate pinnate subpinnatifid at the apex, sparingly fur-

Hab. Hispantiola, Plumier. Mexico, apparently frequent on mountains, alt. 7000 feet, Galeotti, n. 6545 and 6422, Jurgensen, n. 690, Linden, n. 61. Venezuela, Fendler, n. 219, 252. New Grenada, alt. 7000 feet, Schläm, n. 847 (more numerous pinnae, approaching P. furfuraceum, but very different in the paleae). Caracas, Otto, n. 896 (from Klotzsch, an original specimen, quite like the figure of Fée), Linden, n. 515. Chacopoyas, Peru, Mathews, n. 3281. Andes of Ecuador, Spruce, n. 5235, Jameson, n. 3482 (one specimen passing into P. tridens).—The ordinary form, with few segments and subpathulate segments, is a very distinct-looking plant, and the scales are copious and very squarrose beneath. In the so-called P. thysoanelopis they are not close-placed, and are very permanent; such specimens look like overgrown forms of P. incauum, and they certainly are not more unlike that species than the type of the species, Plumier's figure, is to our present plant, if it be not awfully exaggerated in the plate 79, where the frond is given as 2 feet 5 inches long (without the stipes), with 77 pinnae 3 inches long and nearly half an inch wide! Yet in other respects the figure is satisfactory.


Hab. Galapagos Islands, Cuming, n. 112; Chatham Island, of the same group, Capt. Wood.—Kunze has well described and well figured one state of this, with deeply forked or tripartite segments. My very fine specimens in that condition are from Mr. Cuming and Capt. Wood, but accompanied by others of the same
species with perfectly simple and undivided pinnae, which I take to be the really normal state of the plant, as the *Polypod. vulgar* is the type of the *P. Cambricum* and its various abnormal forms. The plant is most variable in size, with fronds not 3 inches long by 2 wide, wholly pinnatifid, to a length of nearly 1½ foot and a diameter of 5 inches. In all, the scales of the upper side of the frond are multifidly ciliate with a long spicule-like apex, or formed of stellate hairs, all more or less deciduous; those of the under side are subovate, close-pressed, ciliated, white with a dark disk. It is very like to prove an abnormal form of *P. squamatum*, L.


Hab. “Chili. A singular elongated Fern, with short segments, resembling the pods of some *Ereum* or *Vicia.*” Fée.

112. P. (Eupolypodium) *lepidopteris*, Kze.; caudex long creeping stout clothed with ferruginous ciliated or glabrous subulate scales, stipites distant short 1–3 inches long scaly, fronds subcoriaceous stout generally very short 1–4 inches long, fronds 3 inches to nearly 1½ foot long 1–2 rarely 3 inches broad lanceolate or linear-lanceolate caudato-acuminatusubcoriaceous in general remarkably attenuated at the base by the dwarfing of the pinnae often to within an inch of the caudex pinnated below, above the middle more or less pinnatifid, while young and the fronds not fully developed clothed with very long glossy almost golden paleaceous hairs, in age the clothing is singularly variable sometimes composed chiefly if not entirely of the ovate ciliated hair-pointed apressed peltate pale scales brown in the disk so common to this group, more frequently accompanied with long paleaceous hairs more or less abundant and very copious and persistent on the under side varying in colour from ferruginous to white, pinnae approximate varying extremely in length and breadth horizontally patent broad-adnate and more or less decurrent at the base ovate and frequently singularly undulato-sinuate at the margin at other times oblong or oblong-linear or subspathulate and entire, lowest ones singularly and gradually abbreviated, (venation of *Marginaria*, Pr.) sori in two rows intermediate between the costule and

Hab. Tropical America, abundant: Brazil, Gardner, n. 5288, 24, Tweedie, n. 559 (South Brazil), Brackenridge, Raddi, n. 41, Spruce, n. 3798 (Rio Negro). Guiana, Schomburgk, and others. Isle of Trinidad, South Atlantic, Lefroy. Central America, Cuming, n. 1284. Panama, Seemann, n. 982. Venezuela, Fendler, n. 343 (a very beautiful var.; the tuft exhibits the young fronds aureo-nitent, and the old ones with scales apparently bleached white with age). Mexico, Seemann, n. 1933 (pinnae not dwarfed at the base: Lepicystis sepultum, J. Sm. in Seem. Bot. of the Herald). Vera Cruz, on Oaks, 3500-5000 feet, n. 6276 and 6308, Galeotti. Tarapota, Eastern Peru, Spruce, n. 4654. Galapagos, Capt. Wood. — If, as I quite think, all the references I have brought under this species be correct, it is hard to say what are the limits of species among Ferns. If we take the opposite extremes here brought under review, they look most distinct even as to form, though I believe the most dependable marks to be derived from the long-attenuated base of the frond, owing to the gradual dwarfing of the lower pinna; yet this character is not constant, and the variation observed in the paleaceous clothing of the fronds is quite remarkable, and may contribute to throw doubts on the stability of other generally acknowledged species of this group.

113. P. (Eupolypodium) sporadolepis, Eat. (not Kze. ?); caudex long creeping thic as a goose-quill almost black thick paleaceous at the extremity with dark-brown close-pressed subulate scales, stipites dark-brown almost black glossy deciduously scaly, fronds 6 inches to a foot long 2-4 inches wide oblong-acuminate truncate at the base coriaceous-membranaceous opaque, naked above, beneath scurfy with small dirty-brown scales, pinnated nearly to the apex and terminated by a caudate pinna pinnatifid at its base, pinnae horizontal remote distant ½-⅔ of an inch apart from a contracted base linear-oblong obtuse entire scarcely repand at the margin (sterile fronds rather pinnatifid than pinnate with broader and subpathulate segments), sori copious in two series halfway between the costule and the margin sometimes covering the whole back of the pinnule, rachis black scurfy with dirty-looking scales. — P. sporadolepis, var. β, Eaton, in Fil. Wright. et Fendl. p. 198, name only (surely not Kze. in Metten. Polyp. p. 67).

Hab. Tovar, Venezuela, Fendler, n. 246, Ecuador, Pichincha, Jameson, n. 17 and 271 (one specimen with the barren fronds deeply pinnatifid, while the fertile ones
are equally pinnate with very remote pinnae); Huataai, on trees, *Spruce*, n. 5674. Mettenius is the only person who has described the *P. sporadolepis* of Kze. Herb., with the following synonyms:—His var. α is *P. Tweedianiwm*, Hook., since properly referred by him to *P. macrocarpum*. His var. β is our *P. muroidum*, and his var. γ is *P. macrororum* of Fée, Mém. vi. p. 11. t. 8, and consequently our *P. onustum*. The species I here introduce is so named by Mr. Eaton, and possibly confirmed by Dr. Mettenius. If so, and if I am correct in my views of the Ferns referred to that species by Mettenius, the name may be preserved to the plant of Eaton. But this again comes so near to some states of *P. plebejum*, that, if left to my own choice, I should perhaps have referred it there. Both of them are the least scaly of the group. My specimen from Jameson and Spruce quite accord with the *P. sporadolepis* of Eaton, l. c.


Hab. Mexico, on mountains, alt. 3,000–11,000 feet, Harris, Galeotti, n. 6277, Liebmann. Guatemala, Vera Paz, Salvyn. New Grenada, Moritz, n. 336, Hartweg, n. 1499, Fendler, n. 252. Andes of Quito, Jameson, n. 14, Spruce, n. 5239 (large). Peru, Maclean. Trees on Organ Mountains, Brazil, Gardner, n. 5920.—*P. plebejum* is the first name of this Fern published with a description, and was so called from its resemblance to our common Polypody (*P. vulgare*). It is however, in reality, more nearly allied to *P. inecanum* and its affinities.

115. *P. (Eupolypodium) furfuraceum*, Schlecht.; "caudex creeping clothed with largish ovato-lanceolate pale-reddish laxly imbricating scales, stipites 1–2 inches long, fronds 4 inches to 1 foot long linear (1½ foot long and 5 inches wide and oblong in our specimen) acuminate deeply pinnatifid (pinnate in the lower half) subcoriaceous on both sides as well as the stipes scaly with whitish (brown in the disk) tender ovate acute elegantly ciliated scales, on the underside most densely imbricated, above sparse acuminato-
setose and long ciliated, segments numerous 6 lines long 1\(\frac{1}{2}\)
line wide (in our specimen 3 inches long \(\frac{1}{4}\) of an inch wide)
at the base on each side especially above manifestly dilated
and confluent linear-oblong (gradually attenuated) rather ob-
tuse, veins immersed of \textit{Eupteris} (free), sori (partly) con-
cealed by the scales submarginal (halfway between the cos-
tule and the margin) extending from the base to the apex
of the segments 8–12 on each side the costa.” Metten.—

\textit{Hab.} Mexico, Schiede et Deppe. Mirador, Liebmann, in \textit{Herb. nostr.}—I pos-
se a very fine specimen of the frond of this from Liebmann, with a portion of the
very stout stipes, and I can verify by it the correctness of the greater part of
Mettenius’s character. The chief differences are in the dimensions; mine mea-
sures more than 1\(\frac{1}{2}\) foot (19 inches) in length, and the segments are large in pro-
portion; the rachis is very stout. Indeed, it exhibits the longest fronds of any of
this group, and is stout in proportion.

116. \textit{P.} (\textit{Eupolypodium}) \textit{Madrense,} J. Sm.; caudex stout
creeping tortuous paleaceous with copious crisped ferruginous
scales, stipites scattered 2\(\frac{1}{4}\)–4 inches long fuscous paleaceous
with subulate scales, fronds subcoriaceous (very yellow when dry)
3–4 inches long 1–1\(\frac{1}{2}\) inch broad oblong-ovate deeply
nearly to the rachis pinnatifid naked above copiously scaly
beneath with appressed ovate subferruginous scales dark in
the disk, segments horizontal linear-oblong obtuse with a
thickened margin, veins immersed twice forked free, sori
copious approximate on the segments in two rows one
on each side the costa, rachis dark-brown paleaceous.—\textit{J.}
\textit{Sm. in Seem. Bot. of the Herald,} p. 338. t. 73 (figure ex-
cellent).

\textit{Hab.} Sierra Madre, North-west Mexico, Seemann.—This clearly belongs to the
same group of \textit{Polypodium} as \textit{P. incaenum} and its allies, and is remarkable for its
peculiarly yellow colour when dry and the thickened margin of the segments.

117. \textit{P.} (\textit{Eupolypodium}) \textit{Skinneri,} Hook.; caudex long
creeping thickness of a crow-quill paleaceous with ferrugi-
nous ovate rather lax erose scales, stipites furfuraceous with
appressed scales 1\(\frac{1}{2}\)–2 inches long distant, fronds subcoriaceo-
membranaceous rather flaccid subfuscate 6 inches to a span
long 1\(\frac{1}{2}\) to nearly 2 inches wide pinnate nearly to the apex
linear-oblong* acuminate and subcaudate, on both sides co-
piously clothed with appressed pale-brown ovate acuminated
beautifully ciliated scales darker-brown in the centre, seg-
ments numerous scarcely an inch long \(\frac{3}{4}\) of a line wide ho-
rizontally patent rather distant linear-subbuicate but obtuse entire subsinuate when fertile, sori rather distant submarginal but the two series almost meet at the costule and project at the margin and are almost entirely concealed by the scales, rachis very furfuraceous. (Tab. CCLXXXVI. B.)

Hab. Guatemala, G. U. Skinner, Esq.—A very elegant and distinct species, the slenderest of the group, very furfuraceous with beautiful scales.

118. P. (Eupolypodium) fallar, Schlecht.; caudex very long creeping filiform rooting with copious tomentose fibres, stipites remote distant 1\(\frac{1}{2}\)-1 inch long scarcely paleaceous, fronds 1-1\(\frac{1}{2}\) inch long 1\(\frac{1}{2}\) an inch wide deciduous scales pinnated, pinnæ 11-15 distant oblong cuneato-attenuate at the base inciso-subpinnatifid erecto-patent, segments unequal entire or subbifid, veins forked once or twice, sori few large near the apex of the segment terminal on a veinlet.—Schlecht. in Linneea, v. p. 609. Fée, Gen. Fil. pp. 99 and 236. t. 10. A. 2. Mart. et Gal. Fil. Mex. p. 44. Metten. Polyp. p. 64. t. 1. f. 4-6 (fragments).

Hab. Mexico, on mountains, 4000-7000 feet of alt., Vera Cruz, Puebla, etc., Harris, F. Müller, Linden, n. 27 and 159, Galeotti, n. 6327.—A most distinct but small species, with long, filiform, entangled, rooting caudices.

119. P. (Eupolypodium) macrocarpum, Pr.; caudex stout for the size of the plant creeping copiously rooting clothed above with ferruginous scales, stipites remote tawny 2-4 inches long rigid scabrous with small scales, fronds 2-4 inches long \(\frac{1}{2}\) an inch to an inch wide thick and fleshy very firm and coriaceous when dry, subovate or oblong bluntly acuminate naked above copiously scaly beneath with ovate acuminate peltate reticulated appressed scales angulato-dentate at the margin deeply beyond the middle pinnatifid, segments patent 5-21 oblong obtuse more or less approximate sub-serrate, costules immersed represented by a depressed line or furrow, veins altogether immersed and invisible, sori large copious occupying most of the segments in two series.—Pr. Reliq. Henk. i. p. 23. t. 1. f. 4. Kze. in Schk. Fil. Suppl. i. p. 25. t. 13. f. 2. Hook. Ic. Pl. t. 934. Metten. Fil. p. 66. Pleopeltis pinnatifida, Gill. in Hook. et Grev. Ic. Fil. t. 57. Polyp. Tweedianum, Hook. Ic. Pl. t. 86 (larger form, with more numerous and narrower segments). Goniophlebium,
J. Sm. Polyp. sporadolepis, a, Metten. Polypod. p. 67 (according to his reference).

Hab. Andes of Peru, Bolivia, and Chili, Henke, Gillies, Mathews (San Luis), n. 600, Tweedie (Tucuman), Cuming, n. 600, Maclean, Brackenridge, Lecher, n. 2009. Island of Massa Fueru, Cuming, n. 1352.—Mettenius, in his monograph of Polypodium, unites my P. Tweedianum with P. sporadolepis, Kze. I agree most fully with him in a subsequent observation, that it should rather be referred to P. macrocarpum, Pr.

120. P. (Eupolypodium) murorum, Hook.; caudex rather stout long creeping paleaceous with linear-subulate rather crisped scales, stipites distant 4–6 inches long furfuraceous as well as the whole under side of the plant with more or less copious and deciduous scales, fronds coriaceous 4–6 inches long ovato-oblong acuminated pinnated pinnatifid at the acuminated apex, pinnæ rather distant 1\(\frac{1}{2}\) inch long from a contracted and subpetiolated base narrow oblongo-lanceolate more or less deeply and regularly pinnatifid (rarely broader near the base in the lowest pair of pinnæ and then very deeply pinnatifid), segments short subovate obtuse mostly entire, veins sunk obscure, sori copious large subglobose one or more on every segment.—Hook. Ic. Plant. t. 70 (very characteristic). P. sporadolepis, β, Metten. Polypod. p. 67 (according to his reference to Hook. Ic. Pl.).

Hab. Quitinian Andes, Jameson (on walls); on trees at Guayrapata, Spruce. New Grenada, Purdie, Moritz, n. 361, Hartweg, Schlim, n. 449 and 874; Bogotá, Holton. Caracas, Linden, n. 507.—The much less compound frond of this, with the almost regularly and not very deeply pinnatifid pinnæ, are what chiefly distinguish this from P. onustum; there are modifications, indeed, of these forms, but I have never had a difficulty in distinguishing the two.

121. P. (Eupolypodium) onustum, Hook.; caudex long creeping branched thick as a duck’s quill clothed with subulate imbricated scales, stipites distant 4–6 inches and more long and as well as the under side of the plant subfurrowaceous with close-pressed deciduous ovate scales, fronds coriaceous 5–6 inches long oblong-ovate acuminate bipinnate, primary pinnæ petiolate ovato-lanceolate, pinnules \(\frac{1}{4}\)–\(\frac{3}{4}\) of an inch long scarcely petiolate oblong pinnatifid with short ovate unequal rather obtuse entire or rarely sublobed segments, venation sunk indistinct, sori very large prominent subglobose one on almost every lobule and generally broader than the segment. Hook. Ic. Plant. t. 749. Metten. Polypod. p. 68. t. 1. f. 15 (fragment). P. macrosorum, Fée, Gen. Fil. p. 241. 6me Mém. Foug. p. 11. t. 8. f. 1.
Hab. Andes of Ecuador, Jameson, Hartweg, n. 1501, Spruce, n. 5327. Parano de Pamplona, New Granada, Purdie. Venezuela, Fawcet and Schlim, n. 1367 (fide Metten.).—This belongs to the same group as P. Fredericksthalianum and P. murorum; it is much less finely divided than the former, and more compound than the latter, yet very distinct, I think, from both. Fée's P. macrosorum is identical with this, and equally with my original specimens of P. owstum from Quito (Jameson), and is an excellent representation of the narrowest-segmented form, while his figure exhibits with that the broader and shorter segments. Mettenius, singularly enough, as it appears to me, places my P. Tweedianum, f.c. Pl. t. 86, and P. murorum (n. 120), together with P. macrosorum of Fée (which he therefore considers distinct from owstum), as separate varieties of P. sporodolepis of Kze. Herb. (a previous unpublished plant), possessing three different kinds of venation and of insertion of the sori; viz. a. P. Tweedianum, Hook., „nervi repetito-furcati; rami antici apice vel dorso medio soriferi;" b. P. murorum, Hook., „laciniae (pinmarum) nervum repetito-furcatum excipientes, plerunque ad furcatam rami antici soriferi;" γ. P. macrosorum, Fée, „laciniae nervum furcatum excipientes, in dorso vel apice rami antici soriferae." The nature and opaety of the frond renders it very difficult to confirm the correctness of these distinctions, and unnecessary, inasmuch as there is, as appears to me, tangible characters, independent of them, for specific distinction.


Hab. Guatemala, Linden (Kze.); Vera Paz, Saleva. Mexico: Chiapas, Linden, n. 1528 and 1540 (in Herb. nostr.).—A very elegant Fern; but I fear the two supposed species described and figured by Kunze, in reality are but slight varieties of one and the same.

**** Fronds pinnate, or pinnatifid only towards the apex. 123–143.

(Caudex scandent. Stipes jointed above the base. Arthropteris, J. Sm. 123–124.)

123. P. (Eupolypodium) tenellum, Forst.; caudex very much elongated scandent woody, the younger portion clothed with black ovate scales bordered with brown, stipites scattered distant generally short 1–3 inches long tawny

VOL. IV.

Hab. Pacific Islands, Forster (Swartz). Isle of Pines and Lord Howe's Island, Milne and Macgillivray. New Zealand, N. Island, Dr. Hooker, Logan, Colenso. Norfolk Island, All. Cunningham, C. J. Simmons, Milne. Australia: Port Jackson, Brown; Brisbane and Hastings Rivers, All. Cunningham, Müller; and Clarence River, Dr. Beckler.—A climbing plant, running over the trunks of trees, very different from the following but equally scandent species.

Mr. J. Smith has an "Arthropyteris filipes, of T. Moore, in Gard. Chron. for 1855, p. 368, native of New Zealand?" I find none such there recorded. On the contrary, Mr. Moore (Index Fil. p. 84) has an "Arthropyteris filipes," of J. Sm., which he refers to "Polypodium filipes."

124. P. (Eupolypodium) alte-scandens, Coll.; caudex very long scandent more or less scaly, stipites scattered 3–4 inches long jointed a little above the base stramineous downy and tapering fusco-squamose, fronds (erect?) firm-membranaceous 6–10 inches long 1½–2 inches broad oblong-lanceolate rather obtuse pinnated, pinnae subhorizontal close-placed from an obliquely cuneate base truncated and mostly auricled above oblong obtuse pinnatifido-serrate, costule slender pubescent, veins conspicuous prominent beneath, one to each lobule or segment which is only once forked (that of the auricle pinnated), sori globose in two series nearer the margin than the costule and each opposite to a sinus of the lobule, rachis stramineous downy.—"Colla, Pl. Chil. Fasc. ult. p. 48." Metten. Polyp. p. 64. P. procurrens, Kze. Annul. Pterid. p. 17.

Hab. Juan Fernandez, Bertero, in Herb. Hook. ("P. tenellum, Bert. mst.," not Forst.).—A near ally of P. tenellum, but extremely different. Both are peculiar to the southern hemisphere.

125. P. (Eupolypodium) macrodon, Hook.; caudex 4 inches (and more?) long stout stramineous brown, fronds ample 14–19 inches long a foot and more broad-ovate
firm subcoriaceous-membranaceous glandulosopubescent on both sides, moderately acuminate pinnated to the very apex, ultimate pinnae subacute pinnatifid at its base, the lateral pinnae 6-8 inches long $\frac{1}{2}-\frac{3}{4}$ of an inch wide not diminishing at the base from a rather contracted obtusely cuneate sessile base elongato-oblong moderately but obtusely acuminate grossly dentato-serrate, serratures obtuse, costa prominent beneath stramineous, veins black when seen between the eye and the light, three or four times forked, sori large copious moderately distant forming two series intermediate between the costule and the margin, rachis rather stout brown.

Hab. Cobar, Vera Paz, Guatemala, Salvyn.—This is among the largest of the Eupolypodium-group; certainly bearing the largest pinnae, and is quite distinct from any other known to me.

126. P. (Eupolypodium) sororium, H. B. K.; caudex stout long repent palaceous with ferruginous ovate sharply acuminate crisped scales, stipites distant stout a span to a foot long brown glabrous as is generally every part of the plant, frond 1-2 feet long 5-9 inches broad firm-membranaceous broad-ovate or ovato-oblong dark-green (when dry) pinnated pinnatifid towards the apex, pinnae 4-6 inches long $\frac{1}{2}-1$ inch broad very patent distant from a narrow contracted but sessile base oblong-lanceolate acuminate entire or obscurely sinuato-subdenticulate, upper ones more or less decurrent at their bases, upper or confluent ones (segments) decurrent at their lower base with broad sinuses, terminal lobe generally caudato-elongate, costa prominent beneath, pale-brown, veins black slender three or four times forked, sori oval or oblong distant obliquely patent (not quite transverse) forming a series halfway between the costule and the margin.—H. B. K. Nov. Gen. Am. i. p. 10. Willd. Sp. Pl. v. p. 191. Metten. Polyp. p. 62. P. dissimile, L. ?, and P. attenuatum, Willd. ?

Hab. Tropical America: New Granada, H. B. K., Moritz, n. 354; Tarapota, Eastern Peru, Spruce, n. 4652; Andes of Ecuador, Montaña de Canelos, Spruce, n. 5270. West Indian Islands, frequent, L. Guilding, Luray (abnormal form, with some pinnae deeply pinnatifid in the middle only, and there 2 inches wide). Cuba, Linden, n. 1890, C. Wright, n. 805.—This and P. macrodon, Hook. n. 125, are the largest of all the Eupolypodium-section. My numerous specimens all exhibit free venation; but Mettenius says of the veins, “hinc inde more Marginariae anastomosantes;” and hence he seems disposed to consider the P. dissimile, Selik. (an Linn.? Goniophleb., Pr.), and Goniophlebium clatum, Fée, Gen. p. 256, the same.
127. P. (Eupolypodium) subpetiolatum, Hook.; caudex rather stout paleaceous with brown subulate scales, stipites distant 4 inches to a span long stramineous, fronds 1–1½ foot long ovato-lanceolate subcoriaceous-membranaceous pinnatifid only at the apex and ending in an elongated caudate lobe, pinnæ alternate remote rather distant 3–3½ inches long about ½ an inch wide lanceolate gradually but generally obtusely acuminated more or less serrulate, inferior ones obliquely truncate at the base and subpetiolate, the petiole winged above, superior ones obliquely cuneate subadnate, uppermost ones decurrent at the rather broad base and confluent, costa pale downy beneath, veins approximate dark-coloured slender 2–4 times forked, sori copious subrotund fulvous in two series each rather nearer the costule than the margin, rachis testaceous stout.—Hook, in Benth. Pl. Hartweg. p. 54, and in Ic. Pl. t. 291, 292. Metten. Polypod. p. 63. P. serratum, Mart. et Gal. Fil. Mex. p. 38. t. 9. f. 1 (according to Mettenius, in Herb. nostr., but the pinnae are very unlike those of that figure; it is probably a variable species). Metten. Polyp. p. 62. P. Cubense, Fée, 6me Mém. p. 61. t. 26. f. 1.

Hab. Mexico, Hartweg, n. 414. Cordillera of Oaxaca, alt. 6500–7500 feet, Mart. et Galeotti. Guatemala, Skinner (pinnae entire or nearly so, and margined, 4 inches long; veins very rarely anastomosing). Cuba, Linden (fide Metten.).


Hab. Mexico, Schiede et Deppe (Schlecht.). Oaxaca, Liebold (in Herb. nostr.).
POLYPODIUM, § EUPOLYPODIUM.

Venezuela, Fendler, n. 254. Chacapoyas, Peru, Mathews.—I have no authentic specimen from Schlechtendal of this plant; but I believe Liebold's specimens to be the same, as they certainly are the P. puberulum of Mettenius and Kunze, and I feel assured I am correct in referring either the P. subpetiolatum (Eat. not Hook.) and my P. biauriculatum.

129. P. (Eupolypodium) sublanosum, Hook.; caudex?, stipites 4 inches long dirty stramineous sublanose as is the whole plant and beneath with whitish crisped hairs, fronds 12-14 inches long 3 inches wide firm but rather thin-membranaceous broad-lanceolate acuminated scarcely attenuated at the base pinnated below pinnatifid upwards, segments and pinnae horizontal approximate from a broad-adnate base slightly decurrent below, above dilated so as to form an obtuse auricle oblong bluntly and very shortly acuminated quite entire, costæ straight stramineous, veins immersed indistinctly visible twice forked, sori subtundt rather distant in two series halfway between the costule and the margin, rachis firm stramineous.

Hab. Organ Mountains, Brazil, Gardner, n. 122.—Allied in size and general form to P. puberulum; but everywhere clothed with crisped hairs, giving the frond a somewhat hoary and woolly appearance: the veins are very inconspicuous, and the sori are quite different in form and position.

130. P. (Eupolypodium) sericeo-lanatum, Hook.; caudex creeping clothed with subulate brown woolly scales, stipites aggregated 1-2 inches long sericeo-villose, fronds 6-12-16 inches long 1 1/2-3 inches wide flaccid pendent firm-membranaceous clothed with silky whitish woolly hairs broad oblong-lanceolate or oblong-acuminate pinnate, pinnae 1-2 inches long 1/4 of an inch broad oblong or linear-oblong alternate approximate from a rather broad base more or less decurrent below adnate more or less tapering to an obtuse point straight or falcately recurved rarely with a blunt auricle or lobe above and more rarely one below also, when the pinnae become subhastate, quite entire, costæ slender straight appearing black when viewed between the eye and the light, veins short rather distant simple indistinct bearing the sorus at the apex in two series nearer the costule than the margin, sori globose, rachis filiform flexuose.

Hab. Ecuador, Pichincha, alt. 12,000 feet, and woods near Baños, Jameson, n. 235, 73, 29, and 394; mountains of Guayrapata, Spruce, n. 5277. New Granada, Ocaña, alt. 10,000-11,000 feet, Schlimg, n. 313 (small, a span long, 1 inch broad, more densely silky with tawny hairs).—Evidently allied to the preceding, yet quite distinct and not far removed from P. cultratum. Some of the fronds resemble in outline those of P. vulgare; but they are truly pinnate, soft and flaccid, pendent, with extremely short, slender, silky stipites.
131. P. (Eupolypodium) *alternifolium*, Hook.; caudex?, stipites aggregated 1-1 1/2 inch long slender clothed as is the whole plant with spreading soft silky hairs, fronds 2-3-10 feet (!) long lax and flaccid-membranaceous pendent linear shortly acuminately moderately attenuated at the base pinnate throughout in the most regularly alternate manner, pinnae distant horizontal long ciliated one inch long almost exactly pyramidal that is from a broad adnate base 1/3 of an inch wide quite entire gradually tapering to a moderately acute point the sides uniform and equal or with the upper base only slightly rounded no way decurrent, pinnae at the apex and base small triangular, costule very slender black when viewed between the eye and the light flexuose, veins quite slender black patent always simple bearing the globose sorus at the apex rather nearer the costule than the margin, rachis filiform flexuose. (Tab. CCLXXVII. A.)

Hab. Ecuador, occurring abundantly on the trunks and branches of trees, at elevations between 3000 and 10,000 feet, near Esmeraldas, and between Cuenca and Guayaquil, fronds very long, occasionally met with of the length of 10 feet, Jameson, Hartweg, n. 1496.—Remarkable as is this plant, and truly pinnate from the base to the summit of its long fronds, and peculiar as is the form of the pinnae, I yet publish it with some doubt, and have, indeed, hesitated whether it should not be referred to *P. cultratum*; the more so as Mettenius has sent me a frond of *cultratum*, Metten. Polypod. p. 47 (=*P. suspensum* of his Fil. Lechlerianae), possessing characters common to both; but the much larger size of our *P. alternifolium*, the pyramidal form of the equal-sided pinnae, with their broad adnate bases, (distant from each other by the diameter of their base, together with their regular alternate insertion,) give the Fern a very peculiar appearance.

132. P. (Eupolypodium) *semiadnatum*, Hook.; caudex small short ferruginous villose, stipites 1-2-3 inches long filiform black and patenti-villose as is the rachis, fronds pendent coriaceo-membranaceous 10-16 inches long 1/2-1 inch wide linear-oblong acuminately attenuated below pinnate, pinnae rather distant ovate or oblong-ovate obtuse or rarely acuminated villous beneath and ciliated with long hairs at the margin crenate or obtusely serrated the base contracted and above a little produced, costule slender and forked, veins moderately conspicuous, superior branch soriferous, sori four or five on each side the costule between it and the margin.


Hab. On trunks of trees, Pilzhum, and near Pasto, Andes of Quito, Jameson, n. 46, 77, and 498. Organ Mountains, Brazil, on trees, Gardner, n. 112. Rio, Brackenridge.—The great peculiarity of this Polypodium, among the group to which it belongs, is the length of the very flaccid frond, and the numerous and
large pinnæ (sometimes more than \( \frac{1}{2} \) an inch long), and the contraction where they
join on to the rachis, so that the point of attachment is comparatively small;
and the margin is by no means decurrent; yet the pinnæ are in no way petiolate.
It is allied, however, to some forms of *P. cultratum*.

133. *P.* (Eupolypodium) *venulosum*, Bl.; caudex short oblique or subreptent ferrugineo-squamose stipites approximate somewhat tufted 1–3 inches long and as well as the purplish-black rachis and costa patently villose with long purplish hairs, fronds a span to 1\( \frac{1}{2} \) foot long 1–1\( \frac{1}{2} \) inch broad firm-membranaceous (young undeveloped ones clothed with dense purplish deciduous hairs) elongato-lanceolate acuminates much attenuated below (by the gradual dwarfing of the pinnæ) pinnate, pinnæ numerous approximate from a rather broad base linear-oblong entire obtuse, costule slender flexuose and as well as the rather distant obliquely erect simple veins very conspicuous, sori oval sunk in an oval cavity with a distinct raised margin in two rows parallel with the costa occupying the whole space between the costa and the margin.—*Bl.* Fil. Jav. p. 180. t. 85. *A.* Metten. Polypod. p. 50. Ctenopteris, Kze. Bot. Zeit. iv. p. 425. Cryptosorus Dionæa and C. elasticus, Fée, Gen. p. 231. t. 19. C. f. 1, 2.—\( \beta \), majus. *P.* Celebicium, *Bl.* Fil. Jav. p. 179. t. 84. B.

Hab. Java, Blume, Thos. Lobb, Zollinger.—Well distinguished by its pinnated and not pinnatifid frond, and very patenti-villous stipites, from *P. obliquatum*, Bl.; and by the submembranaceous fronds and conspicuous venation from *P. Celebicium*. In this, and all the *Cryptosorus*-group, probably, the receptacles of the sori, in age, fall away and leave oval apertures in the segments.

134. *P.* (Eupolypodium) *farinosum*, Hook.; caudex ?, stipes slender filiform 1–1\( \frac{1}{2} \) inch long black farinos, fronds submembranaceous 4–5 inches long 1\( \frac{1}{3} \)–2 inches broad pendent; broad-elliptical-lanceolate moderately attenuated at both extremities white-pulverulent subfarinos on both sides pinnate below, the rest deeply almost to the rachis pinnatifid, pinnæ approximate subhorizontally patent 1–1\( \frac{1}{2} \) inch long nearly \( \frac{1}{4} \) of an inch broad linear-oblong obtuse subexcised at the base below but a little decurrent auricled at the truncate base above, subsinuated otherwise entire, veins once forked clavate at the apex, upper branch soriferous, sori subrotund rather large golden-yellow forming a series halfway between the costa and the margin.—*Hook.* Is. Plant. t. 947 (or Cent. of Ferns, t. 47). *Metten.* Polyp. p. 59.

Hab. Rare; trunk of an old tree on the eastern descent of the Cordillera of Quito, where the forests commence, Jameson.—A very remarkable species.
135. P.? (Eupolypodium) Beckleri, Hook.; caudex slender filiform a foot and more long much branched black villous rather than scaly, stipites numerous but remote \( \frac{1}{4} - \frac{1}{2} \) an inch long and as well as the rachis slender filiform nigropubescent, fronds 2-2\( \frac{1}{2} \) inches long firm-membraneous dark-green but subpellucid sparingly hirsute oblong attenuated below pinnated, terminal pinnæ quite free oblong-oval distinctly petiolate, lateral pinnæ 12-20 obliquely oblong obtuse subexcised at the inferior margin and entire superior margin unequally crenato-sublobate the base obliquely cuneate subpetiolate, superior base truncate scarcely subauriculate, lower pinnæ more distant smaller, costal vein slender flexuose, veinlets distant three or four on each side the costule distant simple or forked not reaching to the margin slightly thickened at the apex, sori?

Hab. River Mackay, Australia, H. Beckler, communicated by Dr. Müller.—This may possibly be an Asplenium, for I possess no sori; but whether Asplenium or Polypodium, I know of no species resembling it from Australia or any other country.

136. P. (Eupolypodium) gracile, Hook.; caudex short horizontal copiously rooting, stipites tufted 1-2 inches long wiry glabrous, fronds 6 inches to a span long \( \frac{1}{2} - 1 \) inch broad coriaceous drooping glabrous lanceolate or linear-lanceolate moderately attenuated at both extremities pinnated, pinnæ distant oblong-lanceolate erecto-patent obtuse contracted at the base but not petiolate sinuato-pinnatifid with rounded lobes recurved when dry, rachis filiform blackish, costule very indistinct, veins immersed not visible, sori one to each lobule rather large nearer the margin than the costule.—Hook. et Grev. Ic. Fil. t. 222. Metten. Polyp. p. 52.

Hab. Hualluay, near Pasco, Andes of Peru, Cruckshanks.—The figure of Dr. Greville in the 'Icones Filicum' is a good representation of the perfect state of the plant, but some of the fronds have much smaller and more erect pinnæ, with only one or two lobes on each side. I do not recognize a near affinity with any other described species, and I have never seen any other specimens than those from Mr. Cruckshanks.

137. P. (Eupolypodium) athyrioides, Hook.; stipites 2 inches (or more) long hispido-hirsute as well as the rachis, frond 10 inches to nearly a foot long 2 inches wide subcoriaceous dark-brown when dry, glabrous (except in the undeveloped portion) lanceolate acuminate attenuated at the base pinnate throughout, pinnæ numerous approximate from a broad quite sessile and adnate slightly auricled base
gradually lanceolate acuminate pinnatifid about halfway down with ovate obtuse lobes except at the apex which is entire, lowest pinnae small triangular, veins internal simple terminating in a very conspicuous swollen clavate apex which bears the oval very prominent dull orange-coloured sori one to each lobe a little distant from the costule. (Tab. CCLXXVII. B.)

Hab. Pangoa, Peru, Mathews, n. 1103.—This pretty species has so much the habit of an asplenioid Fern, that on a hasty examination I had arranged it in that group in my herbarium; and the swollen apex of the veins, before the sori burst through, almost resembles the involucres of an Athyrium; but the sori are truly those of a Polypodium. I possess only two specimens, both destitute of caudex. The fronds appear as if they might be drooping in the living state.

138. P. (Eupolypodium) longisetosum, Hook.; caudex?, stipes 3 inches long slender flexuose deciduously villous, frond 8 inches long 2 inches wide membranaceous pendent very villous on both sides chiefly beneath and at the margin with long dark-brown spreading hairs, broad-lanceolate scarcely acuminate attenuated at the base with dwarfed distant pinnae deeply pinnatifid above, the rest pinnate, segments or pinnae 1 inch long 1 line wide horizontally patent linear-oblong obtuse decurrent at the base, lower ones more distant than the upper ones, all pinnatifid about halfway down to the costa with subtriangular obtuse lobes or teeth, rachis filiform and slender, costule black, veins simple short one to each lobe bearing a globose sorus nearer the rachis than the margin. (Tab. CCLXXVIII. A.)

Hab. Andes of Quito, Jameson, n. 79.—Though I possess only a solitary specimen of this pretty Fern, I am yet bound to consider it a new species, allied to P. achilleaeolium indeed, but differing in the larger size, the slenderer and flexuose rachis, the membranaceous and flacæd and pendent frond, incapable of supporting itself erect, the less deeply cut lobes of the pinne or segments, and, above all, the copious and very long hairs, which render the whole plant conspicuously villous.

139. P. (Eupolypodium) achilleaeolium, Kl. ; "caudex (short) creeping clothed with membranaceous pale ferruginous lanceolate acuminated scales, stipes 4–8 lines long (clustered), fronds coriaceous on both sides as well as on the stipes setose with patent cinnamon-brown at length blackish hairs, 4–5 inches long lanceolate or oblong attenuated at both extremities deeply pinnatifid, segments with the superior base adnate, the inferior attenuate decurrent and forming a narrow wing, 10 lines long 1 line wide linear obtuse deeply serrato-pinnatifid narrower at each extremity, teeth or lobes

Hab. Brazil, Sellow, Gardner (on mossy stems of large trees, Organ Mountains). Pilzhum. Province of Cuenca, Ecuador, Jameson.—Allied to P. funiculum, but habit and texture, etc., very different.

140. P. (Eupolypodium) Lobbianum, Hook.; caudex short creeping clothed with subulate ferruginous crisped scales, stipites tufted short 1–2 lines long and as well as the rachis black and sparingly and deciduously villous, fronds 3–6 inches long 1 inch broad membranaceous but opaque glabrous subfalcate exactly lanceolate moderately attenuated at both extremities pinnated, pinnae numerous approximate horizontally patent narrow-linear not half a line wide obtuse regularly sinuato-pinnatifid with numerous short rounded entire lobes, costule slender blackish, veins one to each lobe indistinct and each bearing a small globose sorus sunk in a cavity in the middle of the lobe, the cavity forming a protuberance on the upper side of the frond. (Tab. CCLXXVIII. B.)

Hab. Sarawak, Borneo, Thos. Lobb, on trees, alt. 2500 feet.—One of the prettiest and most delicate of the Eupolypodium-group.

141. P. (Eupolypodium) funiculum, Fée; caudex small oblique clothed with ferruginous scales copiously sarmentose increasing as it were by adventitious fibre-like runners 1½ foot and more long often parallel with each other and entangled, stipites 1–3 inches long glabrous aggregated, fronds 3–5 inches long 1½–2 inches wide dark-green firm-membranaceous broad- or ovato-lanceolate caudate rather than acuminate glabrous scarcely attenuated at the base pinnate, the pinnae linear ½–1 inch long from a rather broad and slightly decurrent base linear subacuminate quite straight pinnatifido-serrate, lowest ones dwarfed, rachis slightly hairy and costule black, veins one to each tooth bearing each a small yellowish sorus of few capsules.—Fée, Gen. Fil. p. 241. 6me MéM. p. 12. t. 8. f. 2. Metten. Polyp. p. 52.

Hab. Cuba, Linden, n. 1885, C. Wright, n. 807.—A very peculiar species, and very distinct. Fée’s figure well represents all the characteristic features of the plant.
Frods bipinnate, or bipinnatifid, or decompound. 142-151.

142. P. (Eupolypodium) tenuisectum, Bl.; caudex ("creeping somewhat woody." Bl.), stipites 3-4-5 inches long sub-aggregated shaggy with copious long patent ferruginous hairs partially continued up the rachis, fronds a span to a foot long 2-2½ inches broad rigid-subcoriaceous sparsely black-setose broad-lanceolate acuminate moderately attenuated at the base bipinnate (or bipinnatifid), primary pinnae 1-2 inches long rather distant linear-lanceolate acuminate patent, upper ones especially long-decurrent so as to be co-adnate, lower ones distinct, pinnules 1-½ line long, very narrow-linear, all of them decurrent so as to form a winged margin to the costa, veins solitary in each pinnule little more than half its length, sori solitary much below the clavate apex of the veins and near the costule large globose.—Bl. Fil. Jav. p. 189. t. 88. A. Metten. Fil. Lechli. p. 5. t. 2. f. 1-3. Hook. 2d Cent. of Ferns, t. 21. P. myriophyllum, Metten. Fil. Lechli. p. 6 (not Bl.).

Hab. Java, lofty mountains, on trees, Blume, Zollinger, Thos. Lobb. Trunks of trees, near Talanaca, Peru, Lechler.—A beautiful and apparently rare species, yet inhabiting lofty mountains both in Java and in tropical America. Mettenius appears to be in doubt whether this should be considered a Polypodium, in his view of the genus, or Phegopteris, Pr., which he sanctions as a genus.

143. P. (Eupolypodium) millefolium, Bl.; "caudex creeping, stipes 1-3 lines long villous with patent ferruginous hairs, fronds rigid-membranaceous 8 inches long sparingly setose on the costa lanceolate acuminate bi- or tripinnatifid, the primary segments 9 lines long attenuated at the adnate base ovate or ovato-lanceolate diminishing at each end, secondary ones 3-4 lines long, and the tertiary ones confluent with a narrow wing, lowest ones decurrent on the stipes from a cuneately attenuated base linear-oblong or spathulate entire serrated or pinnatifid, veins of Cenopteris ending in an incrassated apex at the middle of the segments, primary superior segments fertile deeply pinnatifid, the segments narrow ovato-oblong rather acute, vein forked monosorous at the apex of a superior abbreviated branch." Metten.—Bl. Fil. Jav. p. 190. t. 78. A. Metten. Polypod. p. 54. t. 1. f. 7-9.

Hab. Java, "Blume, Zollinger, n. 1723."—I have never seen this species, which appears very distinct from P. tenuisectum, but with which Mettenius seems at one time to have confounded it.
(Sori solitary, on a costal vein below the apex of a segment. Fronds small, subtriangulate, with appressed, small, scattered, clavate, red, pellucid glands.—Adenophorus, Gaud. 144-146.)


Hab. Sandwich Islands, Chamisso. Oahn, Beechey, Diell. Sumatra, Teschemacher, in Herb, nostr.—Much more lax in habit than the two following species, and extremely different from them.


Hab. Otaheite, Menzies. Sandwich Islands, Chamisso, Gaudichaud, Diell, Macrae, Douglas, Hildebrand. Java, Thos. Lobb. Sumatra, Teschemacher.—This is a very much larger and stouter growing plant than P. hymenophylloides, and has a long creeping caudex as thick as a crow’s quill. It is variable in its ramification, and my numerous specimens satisfy me that the above names are all referable to one species.

146. P. (Eupolypodium) Hillebrandii, Hook.; caudex thick as a pigeon’s quill creeping paleaceous with brown glossy scales, stipites 4–6 inches long rather stout, fronds 6–9 inches high 2–4 inches broad oblong-ovate submembranaceous subpellucid very minutely glandulose bipinnatifid or only at the base pinnae (or wholly pinnae with most of the pinnae united by a broad wing on the rachis), pinnae or pri-
mary segments patent 1½–2 inches long more than 1⁄4 of an inch broad lanceolate gradually but obtusely acuminated deeply pinnatifid, the segments lanceolate acute erecto-patent entire or subpinnatifidly and acutely serrate, lowest superior segment the largest and often again pinnatifid, costa black, veins one to each segment very distinct reaching nearly to the apex and bearing the sorus below the extremity (hence a Phegopteris), sorus small in proportion to the breadth of the segment. (Tab. CCLXXIX. A.)

Hab. Honolulu, Sandwich Islands, Dr. Hillebrand.—Extremely different from P. tamariscinum in texture, and in the pellucid nature of the frond, and the shape of the segments. The specimens are very uniform.

147. P. (Eupolypodium) heteromorphum, Hook. et Grev.; caudex small short erect very villous, stipites tufted slender filiform very variable in length villous as is the whole plant with copious long ferruginous simple or stellated hairs sometimes quite shaggy, fronds membranaceous simple or several times dichotomously forked from 4–6 inches to a foot and more in length sometimes regularly bipinnate and then they are 4–5 inches in diameter, branches whether forked or bipinnate are 1⁄2–3⁄4 inch in diameter pinnated with rather distant pinnæ from 2–3 lines to 1⁄2 an inch long distant sessile and deciduous or subpetiolate generally obovato-spathulate and entire or oblong obtuse and more or less pinnatifid, costule and rather distant simple veins manifest, sori 1–6 on a pinnule subglobose terminal on the veins and nearer the margin than to the costule. Hook. et Grev. Ic. Fil. t. 108. Metten. Polyp. p. 48.

Hab. Andes of Ecuador, alt. 12,000–15,000 feet, growing in large patches over the face of the dripping rocks, Jameson. New Granada, Linden, n. 75, Purdie, Hartweg, n. 1517. Mexico, Schiede, Andrevix, n. 46, Liebmnn, Linden, n. 51, Galeotti, n. 6, 261.—I must refer to Dr. Greville’s admirable figure of this Fern, in Ic. Fil., for some of the variations of this most singular and heteromorphous species.

148. P. (Eupolypodium) eriophorum, Hook.; caudex as thick as a crow’s quill repent densely clothed with setaceous castaneous scales, stipites numerous approximate 4–5 inches long black patently villous, fronds 2–2½ inches long cordately five-angled deeply three-lobed obtuse bi-tripinnatifid densely villosot-tomentose tawny beneath, middle lobe triangular pinnatifid, the segments oblong obtuse entire or lobulate, lateral lobes semiovate lower half pinnatifid, veinlets forked, sori marginal on the apex of the veinlets. Hook. Ic. Pl. t. 991.

Hab. Shady clefts on the hills near the city of Oeira, Brazil, Gardner, n. 2390. —A very peculiar and well-marked Fern, found by no one, that we know of, except Mr. Gardner, in the locality above mentioned.

149. P. (Eupolypodium) grammithidis, Br.; caudex small suberect clothed with pale-brown scales, stipites aggregated 1–2 inches long glabrous as in the whole plant, fronds 3–6–8 inches long coriaceous 1–2 inches broad pale brownish-green (as well as the stipes) when dry lanceolate or broad-lanceolate acuminate sometimes caudate attenuated below and decurrent upon the stipes deeply almost to the rachis pinnatifid, the upper half more or less bipinnatifid, segments often very unequal in length linear entire 1¼ line wide, lower ones obtuse entire, superior ones generally pinnatifid with unequal subtriangular or oblong lobes or teeth, all of them decurrent distant often an inch apart, costule and veins immersed, the latter simple or forked, sori oblique at the base of each tooth oval rarely subround, when quite young oblong.—Br. Prodr. Fl. Nov. Holl. p. 3. All. Cunn. Fl. Nov. Zeal. p. 363. Hook. Fl. Antarct. p. 111. Fl. Nov. Zeal. ii. p. 41. Metten. Polyp. p. 53. Grammitis heterophylla, Labill. Fl. Nov. Holl. ii. p. 91. t. 239. Xyphopteris, Spr. Polyp. Billardieri, Fée, Gen. Fil. p. 236.

Hab. On trees, Tasmania, Labillardière, and others. New Zealand, Menzies, All. Cunningham, etc.; Northern Island, to the extreme south, and in Lord Auckland and Campbell’s Islands, J. D. Hooker.—The figure of Labillardière scarcely represents the fronds so truly bipinnatifid as they generally are. It is remarkable that this species has not yet been detected in Australia proper.

150. P. (Eupolypodium) pilipes, Hook.; caudex indistinct apparently rather stout erect or ascending densely clothed with the numerous crowded subflexuose stipites 3–4 inches long below densely villous with copious patent bright ferruginous hairs, fronds subcoriaceous glabrous or glanduloso-pubescent 4 inches to nearly a foot long 2–4 inches wide pendulous broad-lanceolate or ovate moderately acuminate with the base attenuated deeply and almost to the rachis pinnatifid or equally deeply bipinnatifid, the segments numerous often crowded linear-elongated varying much from 1–3 inches long and very irregular subfalcate acuminate shortly lobato-pinnatifid, costule and veinlets sunk in the substance of the segments, veins simple erecto-patent one to each
small lobe terminated by an oval or subglobose sorus occupying the lobule.—Hook. *Ic. Pl.* t. 221. *Metten. Polypod.* p. 51, according to the reference to Hook. *Ic. Pl.*; but not according to the localities given.

Hab. Chacapoyas, Province of Myobamba, eastern declivity of the Andes of Peru, Mathews.—I have never seen any specimens of this most distinct species of *Polypodium*, except Mr. Mathews's Peruvian ones; and all that I have seen from Jamaica, Merida, etc., and from Lechler (Peru), under this name, are another species. (See our next number.) My figure above quoted will show it to be quite unique of its kind.

151. P. (Eupolypodium) *decipiens*, Hook.; caudex a horizontal or ascendent copiously rooting rhizome on the apex of which the copious slender subferruginously pilose flexile stipites 1–1½ inch long are aggregated; fronds 4 inches to a foot long 1½–2 inches wide flaccid drooping firm-membranaceous slightly glandulos-pubescent oblong-lanceolate acuminate pinnatifid nearly to the rachis or often quite so and then pinnate, segments or pinnae varying in length 1–2 inches long 1 line wide here and there one appears among the rest 1½ and even 3–4 inches long which is itself in the same manner as the frond pinnatifid, all the segments linear acuminate distant coarsely serrato- or lobato-pinnatifid the base broader and decurrent, costule as well as the rachis generally black, veins simple one to each lobe or serrature and occupied by a small oval sorus scarcely sunk in a cavity. (Tab. CCLXXIX. B.)—P. pilipes, *Kt. in Linnaea*, xx. p. 382, and Metten. *Polyp.* p. 51 (not Hook.). *Fil. Lechl. Peruv.* p. 7.

Hab. Jamaica, Macfadyen, Wiles. Columbia, Moritz, n. 337. Forest of Archedona, Ecuador, Jameson. Trunks of trees, Sachapata, Peru, Lechler, n. 2714.—Although certainly an allied species to my *P. pilipes*, this is, in reality, extremely different, as may at once be seen by the figures respectively quoted. My figure and description of the latter have been quite misunderstood by Klotzsch and Mettenius.

§§ Phegopteris.—Same characters as Eupolypodium, but the fronds are rarely simple, frequently pinnate, generally variously compound. Stipes not articulated upon the caudex.—This group of *Eupolypodium* is merely retained out of respect to those able botanists who consider its character sufficient to establish a genus. Neither habit nor assigned characters appear to me to warrant the distinction. It corresponds with *Lastrea* among involucrate Ferns, and where the involucre is fallen off the latter it is impossible to distinguish the two generically.

* Fronds simple, pinnatifid, rarely subpinnate at the base. 152.

152. P. (Phegopteris) *decursivo-pinnatum*, Van Hall; caudex oblique stout, stipites tufted 4–6 inches long and as well
as the rachis stramineous paleaceous with subulate ciliated ferruginous scales, fronds firm-membranaceous villososquamoso 1-1½ foot long 2-3½ inches broad lanceolate acuminate attenuate and subpinnae below, the rest deeply pinnatifid nearly to the rachis, segments patent approximate and with a very narrow and acute sinus or wider apart and broad sinuses with 1-2 short triangular confluent lobes in these sinuses, from a dilated base oblong-acuminate, those closely placed are entire or crenato-lobulate, the distant ones pinnatifid with ovate or rounded lobes, the axillary lobes (those in the sinuses) entire often fertile, veins pinnated, sori dorsal upon the veinlets small, capsules few mixed with long hairs.—Hook. 2d Cent. of Ferns, t. 49. Phegopteris, Vée, Gen. Fil. p. 242. t. 20. A (fragment only). Aspidium, Kze. Metten. Aspid. p. 75. Lastrea decurrens, J. Sm.

Hab. Japan, Goring. Port Chusan, Korea, Wilford. Ningpo, Oldham. Sz’chuan, Yang-tse Kiang River, extreme west of China, Col. Saut, Formosa, Wilford.—A very peculiar and distinct species. Most of the specimens from Formosa are simply pinnatifid, with close-placed segments, and no intermediate lobes; yet they are mature and copiously soriferous: others of them exhibit a passage to what may be considered the normal form. Kunze and others consider the small tuft of hairs in the sori to arise from a small scale or imperfect involucre.

** Fronds pinnate. Pinnae entire or toothed, rarely pinnatifid. 153-157.

153. P. (Phegopteris) hastæfolium, Sw.; caudex short erect or ascending scaly, stipites tufted short 1-2 inches long partially scaly, fronds 6-10 inches long 1-2 inches broad lanceolate acuminate much attenuated below firm subcoriaceous-membranaceous opaque pinnate often for their whole length, generally pinnatifid at the apex and sometimes the rachis runs out into long nearly naked decurved and rooting apex, pinnae subpetiolate horizontal ½-1 inch long hastate (the margin entire), uppermost oblong sessile without basal lobes and at the apex confluent, lowermost dwarfed ones reflexed, veins simple or forked quite free in the upper half bearing each a dorsal sorus between the costa and the margin.—Sw. Syn. Fil. p. 36. Fl. Ind. Occ. iii. p. 1653. Syn. Fil. p. 36. Hook. et Grev. IC. Fil. t. 203. P. sagittatum, Sw. Prodr. Phegopteris, J. Sm. Aspidium reptans, var. 2, hastæfolia, Metten. Aspid. p. 99. t. 2. f. 5 (a minute scale-like involucre only). Nat. in Fil. Wright et Fendl. p. 211.

Hab. West Indies: Jamaica, Swartz, Macfadyen, Wilson. Cuba, C. Wright, n. 812.—The involucre, such as Mettenius describes and represents, is a most minute fringed scale, a mere apology for an indusium. To me, this appears a very
distinct species from \textit{P. (Goniopteris) reptans}, with which Mettenius unites it, in the different texture of the frond and shape of the pinnae, and in the absence of anastomosing veins.

154. \textit{P. (Phegopteris) cordatum}, Hook.; caudex short erect thick, stipites tufted \(\frac{1}{2}-1\) inch long slender filiform scaleless stramineous and pubescent as well as the slender rachis, fronds 3–4 inches long 1 inch wide firm-membraneous pilosulous subpellucid lanceolate obtusely acuminate attenuated at the base pinnated scarcey pinnatifid at the extremity, pinnae on a very short but distinct petiole oblong very obtuse cordate at the base scarcely \(\frac{1}{2}\) an inch long entirely at the margin rarely with an obscure tooth or auricle at the superior base, veins simple rarely forked all free and each bearing one sorus near the middle between the costule and the margin.—Phegopteris, Fée, 6me Mém. Fong. Nouv. p. 13. t. 6. f. 3. \textit{Aspidium reptans}, var. 1, cordata, Metten. Aspid. p. 99. \textit{Eat. in Fil. Wright. et Fendl.} p. 211.

Hab. Cuba, Linden, n. 1873, C. Wright, n. 1014.—Fée’s figure is very accurate. This has the same venation as \textit{P. hastatum}, our last species, and it may possibly be a form of that; but it cannot belong to \textit{P. (Goniopteris) reptans}, if there is any confidence to be placed in venation.

155. \textit{P. (Phegopteris) Sancti-Gabrieli}, Hook.; caudex?, stipites 1\(\frac{1}{2}\) foot long and more stout pale-brown glossy moderately palaecous at the base with lanceolate acuminate dark-brown scales, fronds oblong-ovate acuminate 2 feet long 10 inches broad truncated at the base coriaceo-membraneous dark-green above paler beneath quite glabrous pinnated pinnatifid at the extremity by the union of the bases of the pinnae, pinnae numerous rather distant 5–6 inches long \(\frac{1}{2}-\frac{3}{4}\) of an inch broad all petiolate horizontally patent from a subcuneato-truncated base with a distinct sharp auricle above elongato-oblong gradually acuminate the margin coarsely crenato-serrate, the serratures sharp towards the extremity, veins copious approximate pinnate subfascicled, veinlets 5–6 most of the inferior ones bearing a dorsal sorus which thus form 3–4 regular lines or series between the costa and the margin, rachis glossy pale reddish-brown scaleless.

Hab. San Gabriel, Valley of the Amazon, Spruce, n. 2153.—Habit and dark colour of our Peruvian \textit{Lastrea macrotis} (p. 86, tab. CCXLII. B), but glabrous, with only a small auricle, and no refracted lower pinnae; nor are the pinnae more than crenato-serrate, nor at all pinnatifid.

156. \textit{P. (Phegopteris) Walkeræ}, Hook.; caudex?, stipites 12–14 inches long stout testaceous brown at the very base
densely squarrose with large ovate acuminate pale-brown glossy scales mixed with very slender linear-setaceous ones which latter continue up the stipes and the rachis, fronds 2½ and more feet long 6–8 inches and more wide firm coriaceous (dark-brown when dry) paler beneath oblong-lanceolate pinnated throughout or gradually shorter coadunate and pinnatifid only at the very apex, pinnae suberecto-patent 5–6 inches long ½ an inch to 1 inch and more broad long-petiolate especially the lower ones lanceolate obliquely cuneate at the base the margin more or less (but never deeply) lobato-pinnatifid rarely subfalcate, lobes (the largest of them) ovate acute, veins copious approximate fasciculato-pinnate, sori dorsal upon the veinlets rather sparse forming two or more rarely three lines or series between the costa and the margin, (scales or paleaceous hairs on the rachis and even stipes very deciduous).

Hab. Ceylon, Adam's Peak, alt. 6000 feet, Mrs. Genl. Walker, Gardner, n. 1256, Thwaites, n. 3276.—A noble and most distinct species, with the texture and venation of Polystichum. I have reason for believing that the species is peculiar to Adam's Peak, and from nearly its highest point.

157. P. (Phegopteris) elongatum, Wall.; caudex?, stipes 1–1½ foot and more long stout tawny-brown very paleaceous below with dark castaneous glossy falcato-subulate long-acuminated scales, fronds ample 2 feet and more long 6–10 inches and more broad thin firm-coriaceous ovato-oblong acuminated pinnated to the very apex, pinnae numerous more or less patent and distant 5–10 inches long ½ an inch broad subpetiolate from an obliquely cuneate but not dilated (rarely subauricled) base linear or elongato-oblong finely acuminated the margin pinnatifid subduplicato-serrate, serratures subspinose, terminal pinna like the rest but more petiolate, veins copious fasciculato-pinnate, veinlets each of them bearing a dorsal sorus and thus copious and irregularly scattered over the back of the frond or in irregular series.—Wall. Cat. n. 309. Aspidium cuspidatum, Metten. Aspid. p. 92.

Hab. Nepal, Wallich. Khasya, Hook. fil. et Thomson, Ceylon, Gardner, n. 1256.—Mettenius places this in Aspidium, but he puts a mark of interrogation to the word (indusium?). On my numerous specimens I am not able to trace the presence of an involucre.

*** Fronds pinnate. Pinnae usually deeply pinnatifid, rarely less than halfway down to the costa. 158–176.

158. P. (Phegopteris) Dianæ, Hook.; caudex stout short
erect or ascending coarsely scaly, stipites a span to 14 inches long stout brown quite squarrose with large broad-ovate acuminate opaque downy scales mixed with smaller scales and with down which are continued up the rachis, fronds ample 1 1/2 foot and more long nearly a foot wide firm-membranaceous broad-ovate acuminate glabrous above very downy and almost woolly beneath pinnated pinnatifid at the apex, pinnae 6–8 inches long 1–2 inches broad horizontally patent sometimes quite opposite often subfalcate, the lowest more or less deflexed subpetiolate from a rather broad truncated base parallel with the rachis oblong gradually and rather finely acuminate deeply beyond the middle towards the costa pinnatifid, segments large 1/2–1 inch long ovate or oblong more or less obtuse entire or serrated, veins approximate once or twice forked, sori dorsal sometimes forming an intermediate line or series between the costa and the margin sometimes rather irregularly scattered, costae beneath very woolly and more or less scaly.

Hab. St. Helena, Cuming, n. 423, on Diana's Peak, J. D. Hooker, in dense woods, where it grows 3–5 feet high.—A fine and well-marked species, which does not appear to have been taken up by any author.

159. P. (Phegopteris) Sieberianum, KLfs.; caudex?, petiole 10–18 inches long stout dark-brown at the base, the rest and the rachis stramineous glossy, frond ample 1 1/2–2 feet long nearly a foot wide firm subcoriaceous-membranaceous broad-ovate or cordate acuminate glabrous pinnate, pinnae 8–10 pairs mostly opposite horizontally patent 5–6 inches long 1–2 inches broad falcate curved upwards, lowest pair deflexed unequal sided (inferior half the broadest) and deflexed all of them from a dilated base somewhat overlapping the rachis broad-oblong acuminate pinnatifid halfway or more down to the costa with oblong subfalcate acute entire lobes, terminal pinna very large long-petioled ovate acuminate and pinnatifid, costa pinnated with 12–14 simple or forked approximate veins of which the lower opposite ones nearly meet at the sinus not unfrequently anastomosing, sori small dorsal sometimes arranged in a regular series between the costa sometimes scattered.—KLfs. En. in Spreng. Syst. Nat. iv. p. 56. Phegopteris, Fée, Gen. p. 243. Metten. Phegopt. p. 21.

Hab. Mauritius, Sieber, Syn. Fil. n. 37, Carmichael, Bouton, Admiral Sir F. Grey.—A noble species, allied in general habit and venation to the South American Phegopteris brachyodus of Mettenius, which I have referred to Eunepho-
Polypodium, caudex? in but firm entire, down into nated and overlapping wide and the broad character Edgworth, from costae, 1-1 a pair length rated, segment to sides long but acuminate costa are 1-2

**Polypodium** From broad Hab. 161. P. (Phegopteris) erubescens, Wall.; caudex?, stipites 1-2 feet and more long stout and as well as the rachis and costa more or less purplish-tawny, fronds in general ample but varying from 1-3-4 feet in length and from 6 inches to more than 2 feet in breadth firm subcoriaceous broad-ovate acuminate pinnated to the extremity, pinnae 3-16 inches long ½-1½ inch wide approximate sessile elongato-oblong the sides parallel for a long way and then gradually acuminate to a serrated apex deeply nearly to the costa pinnatifid, segments oblong subsfalcate rather acute entire or obscurely serrated, veins approximate simple free, two lowermost opposite pair meeting but scarcely uniting at the sinus soriferous always at the very base so as to form two lines or series (at length confluent) one on each side and close to the costa not extending to the apex of the segment, main rachis stout with a broad groove on the upper side (when dry).—P. erubescens, Wall. Cat. n. 330.

Hab. Kamoun, Wallich, and found in all Northern India, through Himalaya, from west to east, Sikkim, etc., Strachey and Winterbottom (alt. 2000 feet), Edgworth, Col. Bates, Thomson, small specimen villous beneath on the rachis and costa, with long white very soft hairs. Khasya, Hooker fil. et Thomson, Griffith. Malacca, Griffith (my largest specimen, with pinna 1 foot 4 inches long).—All my numerous specimens have the sori close to the costule, giving a blechnoid character to the plant.

From Ambonya (Herb. Webb), and from Ceram (De Vriese, n. 469), I possess a *Polypodium* only different from this in having the sori distant from the costule, and the lowest pinna tapering into a long petiole.

161. P. (Phegopteris) *Griffithii*, Hook.; caudex?, stipites 1-1½ foot long rather slender slightly scaly at the very base and as well as the rachis deep glossy chestnut-brown, fronds firm subcoriaceous-membranaceous 1½-2½ feet long 6-8 inches broad oblong-lanceolate acuminate attenuate at the base pinnated pinnatifid only at the apex, pinnae distant especially the lower dwarfed ones 3-4½ inches long ½-2 of an inch wide from a broad sessile base oblong gradually acuminated into an entire apex, the rest pinnatifid halfway and more down to the rachis, segments spreading oblong obtuse quite entire, lowest pair of segments generally the longest and overlapping the rachis, veins about five pairs to each costule
rather distant simple rarely forked soriferous near the middle, sori rather large nearer the margin than the costule, rachis and costules and veins beneath more or less pubescently villous.

Hab. India: Assam, Khasya (Thos. Lobb), and Mishmee, Griffith; Sikkim-Himalaya, Hooker fil. et Thomson.—This has few tangible characters of which to constitute a species; in general habit, especially in the usually elongated lowest pair of segments of the pinna, it resembles Gymnogramme aurita, but it is by no means so robust a plant. The numerous specimens in Dr. Hooker's Indian collection all bear the name of P. brunneum, Wall. (P. paludosum, Bl., of this work); but that is clearly a bipinnate species, with elongated segments, and pinnules quite pinnatifid at the margin. It is the upper and younger pinnæ of the frond that have the greatest resemblance to the same in our plant; but I am far from asserting this may not prove a form of that species.

162. P. (Phegopteris) obscurum, Hook.; caudex ?, stipes (a portion only) 2–3 inches long and as well as the rachis intensely ebeneous-black polished glandelierously pubescent, fronds 1–1 1/2 foot long 6–10 inches broad submembranaceous ovate acuminate pinnate pinnatifid at the apex, pinnae rather wide apart horizontally patent 4–5 inches long 3/4 (in the fertile frond) –1 inch (in the sterile) broad oblong-lanceolate acuminate somewhat contracted in the lower half of the sterile frond uniformly and deeply pinnatifid to near the rachis in the fertile frond, less deeply above the middle in the sterile one where the pinna is broadest, segments oblong obtuse scarcely falcate entire or subserrate, the sinuses obtuse, veins free in my specimens simple or forked, sori copious dorsal or sometimes terminal in two series intermediate between the costule and the margin, costae and costules villous very slender in the sterile plant stouter in the fertile the former black at the base beneath.—Phegopteris obscura, Fée, Gen. Fil. (name only). Stenosemia aurita, J. Sm. in Hook. Gen. Fil. t. 94. ff. 5 and 6 (only, and as regards Cuming's plant, n. 302). Phegopteris Philippinensis, 2d var., Metten. Phegopt. p. 27.


163. P. (Phegopteris) auriculum, Wall.; caudex ?, stipes stout 1 1/2 foot or more long dirty stramineous the upper part auricled as it were by the dwarfed inferior pinnae and as well as the rachis densely villous with yellowish spreading hairs, fronds ample subcoriaceous 3 feet and more long 12–14
inches wide oblong broad-lanceolate acuminate singularly and suddenly attenuated below by the numerous dwarfed ear-like pinnae, pinnated, pinnae approximate above distant below 4-7 inches long $\frac{3}{4}$-1 inch broad sessile oblong suddenly short-acuminated at the apex deeply almost to the rachis pinnatifid truncate at the base, segments horizontal broad-oblong very obtuse entire subfalcate, sinuses acute, veins approximate mostly simple all free, but the lowest opposite pair uniting with a pellucid cartilaginous line at the sinus soriferous in the middle between the costule and the margin, costae and costules and sometimes the segments more or less hirsute.—Wall. Cat. n. 314.—Var. $\beta$, subglabrum; segments narrower, stipites and rachis subglabrous and of a reddish hue.

Hab. Nepal, Wallich, n. 314. Simla, Edgworth. Sikkim-Himalaya, Hooker fil. et Thomson, n. 296.—Var. $\beta$, Assam and Khasya, Griffith.—This belongs to a puzzling group of Ferns of India allied to P. erubescens of Wallich. The P. auriculatum of Wallich has long been distributed by that generous botanist, but I do not find it anywhere noticed. The species is best distinguished by the many dwarfed and distant pinnae, resembling auricles, on the upper part of the stipes, and in the normal state is very villous on the stipes and rachis and on the costae and costules beneath, and more or less on the frond itself. The var. $\beta$, however, here noticed, shows a near affinity with P. erubescens; but there the sorì are costulate, here at a distance between the margin and the costule. I possess specimens quite according with these, but wanting the dwarfed lower pinnae.

164. P. (Phegopteris) rotundatum, Hook.; caudex?, stipes $1\frac{1}{2}$ foot long stout dirty-brown scaly below with very long linear-subulate dark-brown scales (upwards becoming hairy) which are continued up the rachis and on the costae costule etc., frond 2-2$\frac{1}{2}$ feet long nearly a foot broad firm subcoriaceous-membranaceous opaque brownish-green pellucido-punctate with very copious yellowish crowded dots broad-ovato-lanceolate acuminate pinnate pinnatifid towards the apex, lowest pinnae petioled, the rest sessile 4-6 inches long $\frac{1}{2}$-1 inch wide oblong truncated at the base acuminate at the apex with a long entire point deeply pinnatifid almost to the rachis, superior pinnae adnate at the base and slightly decurrent, the lobes shorter, all the lobes oblong subfalcate obtuse or with an oblique acute point, veins with four pairs of rather short veinlets simple or forked soriferous at or near the apex, the sorì thus forming series nearer the margin than the costule. —Aspidium rotundatum, Willd. Sp. Pl. v. p. 247? Plum. Fil. p. 29. t. 38.

Hab. Martinique, Plumier. Near Tarapota, Eastern Peru, Spruce, n. 4656.—
Plumier's figure is the authority for Willdenow's *Aspid. rotundatum*, which has again been referred by authors to *Polyp. flavo-punctatum*. But our present plant seems to accord far better with it. In texture and in the pellucido-punctate character of the frond it exactly accords with *P. Tijuccanum*, but the shape of the pinnae and the venation are very different.

165. *P.* (Phegopteris) *flavo-punctatum* Klfs.; caudex apparently erect stout woody, stipes 1½ foot and more long stout sparingly scaly, frond ample 2–3 and more feet long 1–1½ foot and more wide thin-membranaceous but firm with copious scattered minute pellucid yellow dots, broad-ovate lanceolate sharply acuminate pinnate below the pinnae upward gradually becoming sessile and decurrent and at length quite coadunate at the deeply pinnatifid apex, pinnae inferior ones very long 9–10 inches long from ½–1½ inch broad petiolar all of them from an obliquely cuneate base sharply and long-acuminate subfalcate or subflexuose the margin more or less serrate or lobate-dentate or pinnatifid with ovate obtuse lobes, veins copious all free rather distant pinnated with 6–8 veinlets simple or rarely forked which thus bear the sori in two series corresponding with and parallel to the primary vein but having a scattered appearance upon the disk of the pinnule, rachis often very stout deciduous pachycaul with subulate hairlike scales which sometimes extend to the under side of the costae.—Var. *a*, *Kaulfussii*; pinnae coarsely dentate or sub serrate. *P. flavo-punctatum*, *Kaulf. En. Fil.* p. 108. Phegopteris, *Fée*, and *Metten. Phegopt.* p. 20. Polyp. longicaudatum, *Liebm. Fil. Mex.* p. 57.—Var. *b*, *pinnatifida*; pinnae more or less deeply pinnatifid. *P. Prionitis*, *Kze. in Flora*, 1839, *Beibl. i.* p. 29, and in *Herb. nostr.* Phegopt., *Fée*, *Gen.* p. 243. Phegopteris Tijuccanum, *Eat. in Fil. Wright. et Fendl.* p. 207, and in *Herb. nostr.* (not Raddi).


166. *P.* (Phegopteris) *Tijuccanum*, Raddi; caudex? (a small portion that I possess with fibrous radicles of Mr. Spruce's n. 4654, is most densely covered with a thick floccose mass of delicate ferruginous long linear-subulate flexuose scales), stipes 1–1½ foot long stout crinete with scales
analogous to those just described but of a darker colour and these are continued up the rachis, fronds 2-2½ feet long nearly 1 foot wide subcoriaceous opaque brownish-green when dry copiously dotted with crowded pellucid yellowish points, pinnated pinnatifid only at the very extremity by the union of 2-3 of the upper pinnae, pinnae 3-5 inches long 1-1½ inch broad petiolate from a broadish subunequally cuneate and truncated base oblong rather suddenly acuminated pinnatifid ⅓ or ⅔ of the way down to the costa, segments broad short in comparison to the breadth of the pinna very obtuse at the base but the acute point turning upwards, veins pinnated distant, the branchlets or veinlets 10-12 elongated erecto-patent each bearing a sorus below the middle thus forming a series on each side the primary vein, veinlets all free but the apices approach each other near the sinus without uniting, costa and costules especially beneath subhispido-paleaceous.—Raddi, Fil. Bras. p. 25. t. 37 (not Eat. in Wright. et Fendl. p. 107). Phegopteris, Fée, and Metten. Phegopt. p. 20.

Hab. Brazil, Raddi. San Gabriel, Spruce, n. 2100, and Tarapota, Eastern Peru, Spruce, n. 4657 and 4742 (more deeply pinnatifid). British Guiana, R. Schomburgk, n. 1128 (P. refulgens, Kl. in Herb. nostr.).—I have no authenticated specimen of P. Tijucaecum of Raddi; but Raddi's figure so well represents the specimens I have referred to that species, that I can hardly have a doubt of their identity. As in P. flavo-punctatum, pellucid yellow dots in the fronds (only seen when held between the eye and the light) are very conspicuous; but here, notwithstanding the thicker substance and generally opacity of the frond, the pellucid dots are much more numerous and better defined, exhibiting a more reticulated appearance. The pinnae are, too, much broader, and the pinnatifid character is confined to the apex.—What is P. allomeopterum, Kze. and Schlecht. in Linnaea, xxv. p. 50?, of which it is said, “Non nisi cum P. Tijuccano, Raddi, aliquam ostendit similitudinem,” etc.

167. P. (Phegopteris) subobliquatum, Hook. ; caudex stout ascending, stipites tufted 1-1½ foot long tawny-brown scaleless, fronds 12-14 inches and more long 6-8 inches broad subcoriaceo - membranaceous pellucido - punctate glabrous ovato-lanceolate acuminate pinnae, pinnae distant all petiolate horizontal few (about twenty) 3-4 inches long ¾ to scarcely 1 inch broad from an obliquely cuneated base truncated and auricled above subexcised beneath oblong acuminate lobato-pinnatifid at the margin with short ovate or rounded lobes and acute sinuses, the apex serrated, terminal pinnae broad-ovate acuminate irregularly but not deeply pinnatifid, veins subflexuose pinnate with about 6-8 simple veinlets each bearing a dorsal sorus near the middle, rachis slender.
Hab. Surinam, Hostmann, n. 15. Pará, Spruce, n. 36.—I can find no description to accord satisfactorily with this species. The petiolated, auricled, and oblique base of the pinnae, excised, as it were, at their inferior margin, and their shallow lobes, are its chief distinguishing marks. Spruce's and Hostmann's specimens are identical, and both are perfectly glabrous, and also destitute of scales.

168. P. (Phegopteris) macrophyllum, Hook.; caudex?, stipes very stout thick as one's little finger terete grooved on one side dark-brown glossy 2 feet (and probably much more) long paleaceous below with rather large brown ovato-acuminaté firm scales, upwards and on the stout rachis the scales vary in shape are smaller delicate membranaceous spreading and often fringed, frond ample firm-membranaceous glabrous dark-green pellucido-punctate 3 feet and more long and (judging from the length of the largest pinna) 32 inches wide in the broadest part broad-ovate acuminate pinnate pinnatifid at the extremity, lowest pinnae long-petiolated higher up sessile and gradually more and more adnate and decurrent at length co- adunate, several pairs measure 16–17 inches in length with a breadth of 2 1/2–3 inches from a broad and truncated rarely contracted base oblong finely acuminated into a serrated point deeply and regularly pinnatifid to within 1/4 of an inch of the costa, segments numerous approximate forming narrow sinuses, horizontal 1–1 1/2 inch long oblong or scarcely subfalcate very obtuse entire or obscurely serrated, veins 12–14 on each side the costule short and patent simple and then the sorus is dorsal, or forked and the sorus is terminal or lateral from the extreme shortness of the branch that bears it, thus forming two very regular series one on each side the costule nearer the latter than the margin, the largest sori are always on the disk of the pinnae nearest the main costa.

Hab. Tarapota, Eastern Peru, Spruce, n. 4720.—This is another of the pellucido-punctate species of § Phegopteris, and I cannot but look upon it as a very distinct species, although the characteristic marks are not easily defined in words. The size of the principal primary pinnae is quite remarkable, and the great length of the segments.

169. P. (Phegopteris) caudatum, Klfs.; caudex stout erect, stipites tufted 1 1/2–2 feet long sparsely and deciduously paleaceous with pale lanceolate scales 2–3 feet long 12–14 inches wide broad-ovate acuminate firm-membranaceous opaque pellucido-punctate pinnate pinnatifid at the extremity, pinnae very patent 6–8–10 inches long 1–2 inches broad nearly opposite distant, lowest ones petiolate, upper
ones quite sessile adnate and decurrent (often the entire inferior lobe has more attachment to the rachis than to the pinnae), uppermost ones confluent and also decurrent, all oblong or oblong-lanceolate ending in a finely acuminated serrated point pinnatifid to within a short distance of the rachis, segments distant linear-oblong subfalcate acute coarsely serrated, sinuses very broad and obtuse, veinlets distant simple or forked sometimes pellucid often obscure, sori dorsal or terminal upon a short branch nearer the margin than to the costule, costae and costules quite glabrous.—Kaulf. En. Fil. p. 113. Raddi, Fil. Bras. p. 25. t. 39 (two pinnae only, coarsely represented, but very faithful). Phogo-pteris, Féé, and Metten. Phegopt. p. 27. Polypod. pediculatriefolium, Pr.—Var. β, segments less numerous on the pinnae and broader very obtuse.

Hab. Brazil, Raddi, Gardner, n. 131, Macrae. Jamaica, Wilson, n. 538. Cuba, C. Wright, n. 1053.—β. Venezuela, Fendler, n. 194.—A distinct and well-marked species, varying somewhat in the size of the pinnae and segments, and in the more or less deep serratures. It has the pellucid dots of the three preceding species, but is extremely different in other respects.

170. P. (Phegopteris) salicifolium, Hook.; caudex?, stipites a foot long stramineous smooth and scaleless glossy rather slender, frond 14 inches long 8–10 inches broad firm-coraceo-membranaceous dark-green opaque ovate acuminate pinnated to the very apex, pinnae 4–6–7 inches long distant alternate erecto-patent subfalcate from an obtuse rather contracted unequally cuneate base narrow-lanceolate shortly petiolate tapering above the middle into a long-acuminated entire point, the rest of the margin is pinnatifido-lobate, lobes small rounded obtuse with shallow rounded sinuses, terminal pinna like the rest but more petiolate, veins patent fasciculato-pinnate, veinlets 6–8, sori large copious in the upper half of the frond extending to the very narrow apex dorsal upon the veinlets not arranged in any regular series but scattered sometimes over the whole pinna, rachis slender flexuose firm and glossy and together with the costae (prominent on the under side) very pale straw-colour.

Hab. Tovar, Venezuela, Fendler, n. 474.—I do not find this noticed in Eaton’s ‘Filices Wrightianæ et Fendleriæ.’ It appears to me to be a good and a new species, with the pinnae singularly uniform in character.

171. P. (Phegopteris) pauciflorum, Hook.; caudex short erect woody palaceous, stipites aggregated 6–8 inches long
brown glabrous and scaleless, fronds firm subcoriaceous-membranaceous 8–10 inches long 4–5 inches wide ovate subdelto-toid partially villous above chiefly on the veins, beneath copiously so with rather long soft hairs most so on the costae and veins pinnate pinnatifid at the apex, pinnae 2½–3 inches long ½ to nearly 1 inch wide from a rather broad and rounded base oblong-lanceolate obtuse remote pinnatifid, lower ones petioled and deeply lobed halfway down to the costa gradually less deeply lobed upward and more elliptical the rest coadunate, lobes or segments rounded very obtuse entire or subsinuate-dentate, rachis villous on the upper half alate by a narrow but very distinct wing uniting as it were the bases of the distant pinnae, veins pinnate subflexuose, veinlets 8–10 distant quite free extending to the margin, lowest pairs only soriferous below the middle, sori small very remote and forming an imperfect line or series on the pinna nearer the costa than the margin.

Hab. Surinam, Hostmann.—The four fronds I possess of this Fern are remarkably uniform in the characters above given. I can detect no trace of involucre on the small and unusually distant sori.


Hab. Mettenius gives Mexico, Liebold, and Columbia, Moritz. Authentic specimens of these I possess, and others sufficiently corresponding with them from New Granada, Linden, n. 1010, 502; Venezuela, Fendler, n. 187 and 197; Ecuador, Jameson; Peru, Mathews, n. 975; Galapagos, Wood?; Brazil, Gardner? (too membranaceous and too glabrous).—This appears to me to be very near some forms of P. decussatum, and the only figure quoted (Martens and Galeotti) is as much like the one as the other. Its usually smaller size, more rigid texture, shorter segments to the pinna, and absence of the remarkable scale at the base of the pinna, and the greater degree of hairiness, are probably the chief distinctions. Yet though I do not find a scale on any of my authenticated specimens, I find a scar as if it had been early deciduous.

173. P. (Phegopteris) decussatum, L.; “caudex erect and
as well as the base of the stipites clothed with broadly adnate ovate acuminated glandular scales" (Metten.), stipites 1–2 (and probably much more) feet long pubescenti-villous reddish-brown from the size of a goose-quill to the thickness of one’s little finger, on two opposite sides are several large ovate acuminated membranaceous scales generally attached within a small spine-like process, fronds from 1 foot (and fertile) to 4 feet (and probably much more) long “the tallest specimen 9 feet high and not otherwise distinguishable from the humblest” (Spruce) broad-ovate acuminated membranaceous or more or less coriaceous often minutely resinoso-glandulose beneath, pinnate pinnatifid only at the apex, pinnae very numerous approximate nearly horizontal 10–12–14 (probably much more) inches long 1–1½ inch wide sessile or nearly so with a large scariose brown deciduous scale at the point of insertion beneath, from a broad truncated base elongato-oblong suddenly acuminated into a narrow entire point deeply and nearly to the stout costa pectinato-pinnatifid, the segments ½–⅔ inch long linear-oblong horizontally spreading with great regularity very obtuse entire parallel, sinuses very narrow acute, veins very evident simple close parallel oblique, sori small copious dorsal below the middle so as to form two series nearer the costa than the margin sometimes quite costular, rachis and costa generally downy often mixed with hairs, the segments often ciliated.—Linn. Sp. Pl. p. 1555. Sw. Syn. Fil. p. 40. Willd. Sp. Pl. v. p. 204. Phegopteris, Metten. Phegopt. p. 17. Glaphyropteris, Pr. Polypod. Grammicum, Spr. Gymnogramme microcarpa, Fée, 7me Mém. p. 43. t. 20. f. 5 (very faithful). Plum. Fil. p. 19. t. 24.


174. P. (Phegopteris) paludosum, Bl.; caudex ?, stipes elongated 1½ foot and more long scaleless in all my specimens fusco-stramineous (sometimes bright chestnut-coloured), fronds 1½–3 feet long 6–12 inches wide firm subcoriaceo-membranaceous broad-oblong-lanceolate acuminate bipinnate only below, above pinnate pinnatifid at the apex, pinnae distant subpetiolate alternate 3–8–10 inches long 1–2 inches broad in some cases suberecto-patent elongato-oblong acuminated, those that are again pinnated have
Polyodium, § Phegopteris.

245
distant patent pinnules $\frac{1}{2}$–1 inch long from a broad always adnate but not decurrent base oblong obtusely acuminate always more or less deeply pinnatifid at the margin, basal pair often more elongated, superior pinnæ deeply pinnatifid with oblong obtuse generally entire segments, veinlets rather distant simple or forked, sori rather large not numerous intermediate between the costule or primary vein and the margin, rachis costae costules and principal veins often hirsute.—Bl. Fil. Jav. p. 192. t. 90. Phegopteris, Metten. Phegopt. p. 29. Polyp. brunneum, Wall. Cat. n. 333. P. longipes, Wall. Cat. n. 316. P. adnatum, Wall. Cat. n. 328.

Hab. Java, Blume, De Vriese (the specimens from this locality are among the largest I have seen, and are well represented in Bl. Fil. Jav.). Ceylon, Mrs. Geil. Walker, Gardner, n. 1151 and 1288. Probably common all over Northern India, from the West, Edgeworth, Stracey and Winterbottom, Thomson, to Sikkim, Khasya, and Assam, in the East, Wallich, Griffith, Hooker fil. et Thomson (800–1000 feet in East Himalaya). Nilgirhires, G. Thomson, Beddome.—A really well marked and very common Indian Fern, when seen in a perfect state, invariably bipinnate. In habit it much resembles our Nephrod. (Lastrea) microstegium (see p. 112, Tab. CCL.), but it wants the connecting wing to the pinnules, and is quite destitute of involucre.


176. P. (Phegopteris) hexagonopterum, Mich.; caudex long creeping, stipites 1–1½ foot long very glossy stramineous
POLYPODIUM, § PHEGOPTERIS.

red, fronds 6–10 inches long and quite as much or more broad-triangular acuminate membranaceous pinnate, below subbipinnate, lowest pinnae the largest 4–6 inches long 1 1/2–2 1/2 inches broad semi-ovato-lanceolate bipinnatifid or subpinnate, the rest lanceolate more or less connected by a blunt triangular decurrent intermediate lobe deeply nearly to the rachis pinnatifid with oblong subacuminated coarsely crenato-serrate or entire segments, rachis and costae stramineous and glossy, veins twice or thrice forked, veinlets bearing the marginal sori at the apex, costule and veins beneath often hairy.


Hab. North America, from Canada, Goldie, to New Orleans (Drummond) and Florida (Chapman). —A larger and stronger growing plant than the preceding species and rather more compound, and a triangular lobe is decurrent, as it were, in the sinus, from the base of the pinnae above (often coadunate, with the pinnae below), giving a remarkable appearance to the whole Fern. As far as I know, it is peculiar to eastern North America.

**** Fronds bipinnate, rarely subtripinnate. 177–188.

(Polystichoid. Habit of Polystichum. 177–181.)

177. P. (Phegopteris) rigidum, Hook. et Grev.; caudex short very stout erect or ascending branching upwards densely paleaceous with large reddish-brown ovate long-pointed ciliate scales mixed with smaller lanceolate ones, stipites tufted 3 inches to a foot long more or less densely as well as the rachis clothed with similar but smaller scales as the caudex, fronds rigid-coriaceous from a span to 2 feet long 2–3 inches to a span broad usually oblong or oblong-lanceolate but the larger forms sometimes a span broad bi-tripinnate, ultimate pinnae very variable obliquely ovate or subrotund more or less auricled, the margin nearly entire or dentato-serrate with spinous teeth.—a, vulgare; fronds oblong rather obtuse bipinnate, pinnae obtuse, pinnules ovato-rotundate unequally subrhomboidal generally auricled, serratures few and spinulose as is the short acute apex. P. rigidum, Hook. et Grev. Ic. Fil. t. 163, and in Bot. Misc. p. 239.*

* At the same page of the Bot. Miscellany appear three other very imperfectly described Peruvian species of Polypodium (P. stipitatum, P. gracile, and P. fulvescens, of Hook. and Grev.); but as they do not exist in my herbarium, and as I can offer no further remarks in illustration, it is better to omit them. These were published in 1831, when the Ferns of the Peruvian Andes were very imperfectly known.
Phegopteris, Metten. Phagopt. p. 10 (incorrectly referred to
Aspid. mohrioides, at p. 26 of this volume).—β, polyphyllum;
stipites slender a span to 1½ foot long oblong-lanceolate de-
cidedly acuminate bipinnate, pinnules generally very num-
rous, pinnae rhomboidal ovate acute and mucronate the mar-
gin mucronate serrate. Nephrodium polyphyllum, Pr. Rel.
Hænk. i. p. 37. Polystichum, Pr. Tent. Pterid. p. 83. Ne-
and Kze. in Linnaæa, ix. p. 94. (Mettenius refers the last
three to Aspidium mohrioides.) Aspid. vestitum, Metten. in
—γ, majus: general characters of the last, but with fronds
three to four times as large 1½–2 feet long a span broad with
quite the aspect of Aspid. aculeatum, but destitute of involu-
ieres.—δ, Spruceanum: stipites 1–1½ and more foot long, fronds
the same from 5–10 inches wide broad-lanceolate acuminate
copious but laxly tripinnate, pinnules all petiolate especially
the ultimate one which is always the largest singularly con-
 vex above orbiculari-spathulate the margins much reflexed
copiously spinulososerrate.

Hab. a, vulgare. Andes of Peru and Ecuador, alt. 12,000-16,000 feet,
Hænke, Cruckshanks, Jameson, n. 87, Maclean, Lechler (near Tabina), n. 2087,
Mathews (Obragilla), n. 609. New Granada, Hartweg, n. 1510.—β, polyphyllum.
Andes of Ecuador and Peru, apparently similar localities to the last, Jameson, n.
209 (Pichincha, etc., alt. 11,000-14,000 feet), Poppig (Aspid. trapezoides, Kze.),
Maclean, Lechler, n. 2109 (Aspid. polyphyllum, Metten.) and 2020 a (“Aspidium
parallelogrammum, Kze.”), Cruckshanks (Huayllay, near Pasco). New Granada:
Sierra Nevada, Purdie; Oceana, alt. 8,000–10,000 feet, Schlim, n. 366.—γ, majus.
Mount Guayarapat and Tunguragua, Ecuador, Spruce, n. 5266. New Granada,
Hartweg, n. 1509.—δ, Spruceanum. Mount Guayarapata, Ecuad, Spruce, n. 5267,
but the form above described is accompanied by two other specimens, evidently
considered by Mr. Spruce to belong to one and the same species: of these, one
is a slightly modified form of var. β, the other intermediate between it and the
normal form of var. γ; and again other specimens from Condorasto, marked
by Mr. Spruce “cfr. n. 5627,” are our β and γ.—This one species of poly-
sthoid Polypodium would furnish a rich harvest to one ardently devoted to the
formation of new species on slight grounds, as its near ally Aspid. (Polysti-
chum) aculeatum does among true Aspidiaceae; and from some common forms
of which the present can hardly be distinguished, but by the absence of in-
volute.

178. P. (Phegopteris) pycnolepis, Hook.; caudex short
stout erect and as well as the young circinate shoots densely
and richly covered with large dark-chestnut glossy brown
lanceolate scales mixed with much smaller and narrower
crisped ferruginous ones, stipes a span to a foot and occasionally much more long paleaceous with the scales above described, but smaller ones and also of two kinds often more or less lacerated mixed with them, fronds very firm rigid-coriaceous thick oblong-lanceolate acuminate 1\frac{1}{2}-2 (and even 4) feet long 3-6 inches or a span wide bipinnate, pinnae erectopatent mostly crowded as well as the pinnules which are more patent subpetiolate oblique ovate or rhombeo-ovate cuneate at the subauricled base acute often mucronate, the margin more or less revolute entire or spinuloso-dentate, sori soon confluent, rachis and costules densely squarroso-paleaceous often red ferruginous with scales of different sizes generally much crisped sometimes very large.—Phegopteris, Metten. Phegopt. p. 11. Aspid., Kze. in Kl. Linnaea, xx. p. 365. A. gelidum, Kze. in Kl. l. c. p. 365. Polystichum, Fée, Gen. p. 278. Phegopt. cochleata, Metten. Phegopt. p. 11.

Hab. Columbia, Tovar, Moritz (from Mettenius), n. 294 (A. gelidum, Kze.) and 290. Oceâ­na, Schlim, alt. 10,000-11,000 feet. Bogota, Holton. Caracas, Linden, n. 237, 505. Sierra Nevada, Sâ­ Martha, near the snow, Purdie. Venezuela, Fendler, n. 171 (Aspid. cochleatum, Eat.). Peru: Andes, Maclean; above Titieaca, Lechler, n. 2011 (Aspid. robustum?, Kze. Metten.); Ecuador, Quite, Jameson; Bolivia, Pentland.—β, elatum; stipes as thick as one's finger at the base, together with the lower part of the rachis densely squarrose, with scales of extraordinary size, \frac{1}{2}-1 inch long; fronds 4\frac{1}{2} feet long; pinnules falcate, acuminate, sharply auricled. Ecuador, rocky shady places at the foot of Mount Tungnragua ("Filíx caspitosa pulcherrima, stipite nonnumquam prolongo 5-pedali"), Spruce, n. 5623.—A very stout, compact-growing plant, with much of the aspect of some forms of Aspid. aculeatum, and varying very much in the scariose and scaly covering.

179. P. (Phegopteris) platyphyllum, Hook.; caudex short erect stout paleaceous with large opaque ovate scales, stipples tufted a span to 1-1\frac{1}{2} foot long slender stramineous (as well as the rachis) paleaceous below, fronds 1-2 feet long, in a young but fertile state often oblong-lanceolate much acuminate simply pinnate with the rachis sometimes prolonged rooting and proliferous, lowest pinnae sometimes again pinnate, when mature the fronds are 1\frac{1}{2}-2 feet and more long 8-10 inches to a foot and more wide coriaceo-membranaceous full-green bi-rarely tri-pinnate broadly ovate always ending in a long very acuminate simply pinnated apex, primary pinnae 5 inches to a span long 1-2 inches broad spreading pinna-tifid at the acuminated apex, pinnules horizontal \frac{3}{4}-1 inch long petiolulate from an obliquely cuneated base above truncated and acutely auricled ovate acute sometimes falcate remotely spinuloso-serrate, sori sparse small.—Phegopteris,

Hab. Caracas, Bredemeyer, Moritz, n. 45 and 200, Linden, n. 158, Otto, n. 611. Venezuela, Fendler, n. 175. Guatemala, Skinner. Jamaica, Bancroft, Wilson. Cuba, C. Wright, n. 832, 1057 (simply pinnate, rachis prolonged and rooting). Brazil, Gardner, n. 132, 54 (large, bipinnate, some pinnales 1½ inch long). South Brazil, Sellow, Fox, n. 120. Tarapota, Spruce, n. 3965. Andes of Ecuador, Jameson, n. 696. Chimborazo, alt. 3000 feet, Spruce, n. 3965, and Tunguragua, alt. 7000 feet ("fronds sometimes 6 feet long; stipes long, and stout in proportion, very paleaceous, with broad blackish scales, ¾ of an inch long; rachis also very paleaceous, with ferruginous, subulate, curled, long scales," Spruce, n. 5430.) Peru, Mathews, n. 1848, Madean.—One of the most easily recognized of all this group.

180. P. (Phegopteris) Drepanum, Hook.; caudex ?, stipes a span to 1½ foot long very scaly especially at the base, fronds coriaceous-membranaceous 1½–2–3 feet long 6–10–12 inches wide ovato-lanceolate acuminate bipinnate, primary pinnae spreading petiolate 4–6 inches long from a broad base 1–2 inches wide gradually acuminate, lowest superior pinnae always the largest and petiolate, the rest gradually smaller oblong-lanceolate falcate the base unequally cuneate, superior base truncate and more or less auriculate the margin acutely but not spinulose serrated, from near or below the middle of the pinnae the pinnales become confluent and the upper half pinnatifid, veins erecto-patent usually once or twice forked, sori small in two series nearer the costa than the margin, rachis costa stramineous sparingly paleaceous.—Aspidium, Sw. Syn. Fil. p. 54 and 255. Schk. Fil. t. 43 b. Lowe, Rev. R. T., Fl. Mad. p. 6. Willd. Sp. Pl. v. p. 257. Polydictum, Pr. Phegopteris, Metten. Phegopt. p. 12.

Hab. Madeira, Mason, Lowe (Rio de St. George, alt. 3000 feet), Lemann, etc.—Peculiar, I believe, to the Island of Madeira; but I had myself, at one time, confounded it with a polystichtoid Nephrodium of China.

181. P. (Phegopteris) sylviaticum, Col.; caudex ?, stipites 4–5 inches to nearly a span long and as well as the rachis more or less squarrose with paleaceous ferruginous soft flexuose subulate or crinolate scales varying in size and generally mixed with linear-lanceolate intensely black glossy firm curved ones pale-brown at the margin, fronds subcoriaceous 1–2 feet long 3–8 inches wide lanceolate acuminate bipinnate, primary pinnae distant petiolate 2–4 inches long 3/4–1½ inch broad oblong-acuminate, pinnules 1/2–3/4 inch long 1–2 lines wide from vol. iv. 2 k
an obliquely cuneate sessile base ovato-lanceolate pinnatifid halfway down or more to the costaule with 5–9 acute spinulose subincurved lobes simple or occasionally bifid, veins usually once or twice forked, sori generally as many as there are lobes about equidistant between the costaule and the margin.—Colenso, in Tasman. Phil. Journ. Hook. fil. Fl. Nov. Zeal. ii. p. 41. t. 81 (excellent). Metten. Phegopt. p. 11.

Hab. New Zealand: Northern Island, Colenso; Port Nichol and Akeroa, Middle Island, Lyall.—A very distinct species, and very uniform in its characters.

Polypodium anomalum of Arnott and Hooker, in Hook. Journ. Bot. viii. p. 360, t. 11, which might be expected to be in the above section, has been recently found by Mr. Thwaites to have occasionally involucres of a true Polystichum, and it will consequently be found, at p. 27 of this volume, as Aspidium (Polystichum) anomalum.


Hab. Mountain districts throughout Britain and Europe generally. Northern India, Western Himalaya, T. Thomson. Siberia, Japan, Greenland; Labrador and Hudson's Bay to British Columbia on the Pacific. Rare in the Northern United States; not found in the South.

183. P. (Phegopteris) Robertianum, Hoffm.; caudex long creeping branched scaly, stipes a span to a foot long stramineous slender brown at the base, fronds 6–10 inches long rather firm-membranaceous glandularly pubescent at length glabrous subpentangular-deltoid or triangular-ovate tripartito-bipinnate, primary pinnae long-petioled (especially the intermediate or terminal one) deltoid-ovate, secondary pinnae mostly sessile oblong or ovato-oblong obtuse deeply pinna-
POLYPODIUM, § PHEGOPTERIS.

251


Hab. Limestone débris, northern and western parts of England, J. E. Smith. Stated to be a native of Germany and North America; but this species is often confounded with P. Dryopteris, and, by myself as well as others, is considered as doubtfully distinct.—See, for remarks on the two species, our ‘British Ferns,’ under plate 3.


Hab. Rare in the highland mountains of Scotland; more frequent in Norway, Lapland, Russia, Germany, and on the Alps in the south. In North-west America, Dr. Lyall.—Habit of Asplenium Felix-femina, but a true Polypodium, § Phegopteris.

185. P. (Phegopteris) sessilifolium, Hook.; caudex?, stipites?, frond 2 feet (and more) long a foot broad ovate acuminate firm-membranaceous bipinnate, pinnæ sessile opposite or
very nearly so patent 8–10 inches long 3 inches broad at the base gradually diminishing to the acuminated and subpinna-
tifid apex, pinnules 1–1½ inch long horizontally patent in ge-
neral opposite from a truncato-subcuneate sessile base con-
tracted at the point of insertion (not adnate) oblong-ovate or oblong acuminate but obtuse pinnatifid about halfway
down with oblong obtuse quite entire segments, veins pinn-
nated in each segment with three or four pairs of veinlets,
1–6 sori on each lobe of the pinnules, rachis bright tawny or
stramineous as well as the costae which are winged above with a
narrow margin and as well as the costules more or less villous
with rather long scattered deciduous white soft hairs.

Hab. Bourbon, Carmichael. Mauritius, Bojer.—This is remarkable for the
almost invariably opposite pinnae and pinnules; in that respect somewhat resembling
_P. procerum_, Brack. I have failed to find any published description that corre-
sponds with it.

186. _P. (Phegopteris) sanctum_, Sw.; caudex small short
erect or decumbent concealed by the copious radicles below
and the tufted slender stipites above which are 1–3 inches
long slender stramineous, fronds membranaceous 3 inches to
nearly 1 foot long full green very minutely glandular beneath
1–2 inches wide lanceolate acuminate much attenuated at the
base subbipinnate, pinnae sessile rather distant especially the
lower dwarfed ones oblong or linear-lanceolate generally pinn-
nated at the base with the lowest pair much longer than the
rest especially the superior one (so that the pinnae are hast-
tate) the rest pinnatifid, pinnules and segments linear or ob-
long obtuse pinnatifid with short lobes, veins simple or once
or twice forked, sori dorsal very small forming a line or se-
Nouv. p. 62. t. 25. f. 2 (small form).

Hab. West Indies: Jamaica, Sloane, Bancroft, M'Fadyen, Alex. Prior, Wil-
son; Cuba, Pappig, Linden, n. 1884, 1966, C. Wright, n. 814, 816, 885.—An
elegant small Fern, remarkable for the long ear-like segments or pinnules at the
base of the pinna, giving a hastate form to the latter. I have only seen speci-
mens from Jamaica and Cuba; but it has probably been overlooked in other
islands. I can find no trace of an involucre on any of my numerous fronds.

187. _P. (Phegopteris) glanduliferum_, Liebm.; "caudex
small globose clothed with flesh-coloured (squamis carneis)
scales, stipites 3–4 from the caudex 1–3 inches long, frond
membranaceous on both sides glanduloso-punctate 4–8
POLYPODIUM, § PHEGOPTERIS. 253

inches long 1–3 inches broad lanceolate bipinnato-pinnatifid, primary pinnae subopposite alternate above divergent subsessile rather remote lanceolate sharply acuminate, pinnules clonate inequilateral, lowest ones sessile obliquely and acutely cuneate at the base adnate above decurrent at the inferior base deeply pinnatifid, upper ones gradually confluent, segments spreading rather remote, lowest ones obliquely ovate, the rest lanceolate rather obtuse at the apex, the margin adpressedly denticulate, sinuses arcuate acute, veins simple, sori on the middle of the back of the veins castaneous numerous, universal rachis plane in front and margined convex at the back clothed with lanceolate acute membranaceous hyaline carneous scales black at the base.” Liebm. Fil. Mex. p. 54.

Ihab. Oaxaca, Liebmann, alt. 2500 feet.—My specimens of this from the author, though fertile, are fragments without caudex, and without stipes. I do not, however, recognize it as belonging to any known species, and can only describe it in the author’s own words.

188. P. (Phegopteris) Mannianum, Hook.; caudex short thick erect or oblique densely clothed with ovate long-pointed ferruginous scales, stipites tufted 6–9 lines long slender strawmineous (as well as the rachis) flexuose deciduously paleaceous with rather sparse delicate lanceolate squarrose scales, fronds 6–10 inches long 2–4 inches wide ovato-lanceolate membranaceous glabrous bipinnate below, pinnated in the middle pinnatifid at the acuminated apex, pinnae subsessile and nearly opposite distant, primary (lower) pinnae 2½–3 inches long ¾–1 inch wide from a broad base gradually but obtusely acuminated pinnated near their base, the rest pinnatifid, pinnules and segments ovate-obling very obtuse lobato-pinnatifid, lobes subentire or generally with one or two distant teeth on the margin below the blunt apex, superior pinnae resembling the inferior but the pinnae are united by their decurrent and approximate bases, veins conspicuous pinnated, veinlets distant simple or once or twice forked bearing a sorus on the upper branch so as to form a lax series of sori halfway between the costule or primary vein and the margin.

Ihab. Fernando Po, on the Peak, alt. 2000 feet, G. Mann.—A small species with no very marked character, having somewhat the habit of Nephrodium (Lastrea) cristatum, but very different in other respects.

189. P. (Phegopteris) Barterianum, Hook.; caudex small erect paleaceous, stipites tufted yellow-brown a span long
partially paleaceous below with lanceolato-acuminate scales, fronds 10–12 inches long firm-membranaceous deltoid-ovate very minutely glandulose beneath and hairy, bipinnate below, the rest pinnate, pinnatifid at the long acuminated apex, pinnæ sessile or nearly so, lowest pair of pinnæ half-ovate (pinnules of the inferior side the longest), the rest from a broad base oblong much acuminated deeply almost to the rachis pinnatifid, uppermost ones entire confluent, all subfalcate, segments and ultimate pinnules oblong very slightly falcate obtuse entire or lobato-serrate often subauricled, veins pinnated, veinlets simple or forked, sori rather small in two rows nearer the costule or principal vein than to the margin, rachises and costæ with copious spreading white hairs.

Hab. Fernando Po, Barter.—Allied to *P. Mannianum*, but certainly very different in its larger size, differently shaped segments, the very hairy under-surface, and sharply acuminated apices to the pinnæ. The lowest pair of pinnae have a little disposition to be bipinnate.

190. *P. (Phegopteris) Milnei*, Hook.; caudex long creeping (possibly scandent) densely clothed with close-pressed imbricated subpeltate linear subulate ciliated ferruginous scales black in the disk of their broad base, stipites very remote thick as a crow's-quill and as well as the main rachis dark castaneous-brown glabrous and scaleless subebeneuous, fronds 1½–2 feet and more long dark-green firm-membranaceous quite glabrous deltoid-ovate long acuminate, bipinnate below, the rest pinnate, lowest primary pair of pinnæ 8 inches long ovate acuminate sessile or nearly so, their pinnules 1½–2 inches long oblong-lanceolate pinnatifid more or less deeply, the rest of the primary pinnæ 5–6 inches and more long 2 inches broad deeply almost to the rachis pinnatifid, the segments 1–1½ inch long ¼ of an inch wide suberecto-patent oblong-lanceolate obtuse lobato-pinnatifid, superior and shorter ones entire, veins copious rather distant twice or thrice or more forked, one or more veinlet bearing a sorus (often appearing quite terminal) and thus the sori form two rather irregular series nearer the margin than the costule.

Hab. Futuna, New Hebrides, Milne.—A very fine and, I think, quite distinct species, with unusually long segments.

191. *P. (Phegopteris) Hillebrandi*, Hook.; caudex?, stipes?, frond ample subcoriaceo-membranaceous very dark-green when dry (probably succulent when recent) glabrous mi-
nutely pellucido-glandulose beneath (the glands apparently in age forming copious minute appressed oblong spicules), bipinnate below, the rest pinnate, primary lower pinnae 12–14 inches long 6 inches wide sessile broad-oblong acuminate pinnate pinnatifid at the acuminate apex, pinnules 3 inches long $\frac{1}{2} - \frac{3}{4}$ of an inch wide from a truncated base oblong-acuminate pinnatifid about halfway down with closely placed rounded obtuse or obliquely acute subentire lobes or segments, the rest of the primary pinnae are from 6–8 inches long 1–2 inches wide oblong-acuminate deeply nearly to the costa pinnatifid, the segments often an inch long and $\frac{1}{4}$ of an inch wide oblong obtuse lobato-serrate at the margin, a few of the lowest ones free (forming pinnules) and those more elongated and pinnatifid, veinlets simple or once or twice forked, sori often copious rather large in two rows near the margin, rachis and costa obscurely hirsuto-paleaceous.

Hab. Honolulu, Sandwich Islands, Dr. Hillebrand, n. 42.—This is too striking a Fern to pass by unnoticed, yet I have not the materials for correctly describing the entire plant. It was named *P. procurn* by Dr. Hillebrand; but variable as that Fern no doubt is, this is certainly distinct. Sori all near the margin.

192. P. (Phegopteris) *pteroides*, Kl.; caudex?, stipes 2–4 feet long very paleaceous towards the base with large ovato-lanceolate brown scales, fronds ample 2–3–11 (Spruce) feet long subpendulous or subscendent chartaceous broad-lanceolate acuminate bipinnate 1–3 feet broad, pinnae 6 inches to 1½ feet long 1–3 inches broad oblong acuminated in opposite remote pairs, pinnules also frequently in opposite rather distant horizontal pairs approximate and confluent upwards 1–1½ inch long 3–5 lines wide from a truncated sessile base linear-oblong acute or acuminated quite entire or crenato-serrate, lower ones often deflexed, veins simple in the smaller specimens forked in the larger ones all soriferous near the apex so as to form an intramarginal series very distant from the costaule. (Tab. CCLXXX.)—Kl. in Linnea, xx. p. 389 (not Pol. pteroides, Pr.). Phegopteris, Metten. *Phegopt. p. 9.*

**** Tripinnate (rarely bipinnate), or variously decompound. 193-223.

193. P. (Phegopteris) davalliioides, Mett.; caudex slender suberect flexuose scaleless radicant with wiry fibres terminated by a tuft of scaly stramineous stipites a span to a foot and more high, fronds 1-2 feet high ovate acuminat firm-membranaceous quadripinnate, primary secondary and tertiary pinnae petiolate, ultimate ones ovate cuneate and subpetiolu late at the base about ⅔ of an inch long pinnatifid with few oblongo-ovolate obtuse segments pinnate at the base, the ultimate pinnule broader than the segments and lobed, veins and simple or forked veinlets subflexuose terminating below the apex of a lobe and there bearing the rather small globose sorus.—Monachosorum, Kze. in Schk. Fil. Suppl. ii. p. 1. t. 101. Polypod., Metten. Polypod. p. 32. P. subdigitatum, Bl. Fil. Jav. p. 196. t. 93. Metten. Polypod. p. 32. Aspidium, Bl. Fil. Jav. p. 171. Moore, Index Fil. p. 70. Polypodium coniifolium, Wall. Cat. n. 326.—β, angustilobum; fronds very black when dry, ultimate lobes or segments narrow or acute.

Hab. Nepal, Walllich, 1821. Sikkim, 7000-8000 feet, Hook. fil. et Thomson. Bouthan, Thos. Lobb. Malay Islands, in the mountains, 3000-7000 feet of alt.: Java, Blume, Thos. Lobb. Malay Peninsula, Sir W. Norris.—β. Kina Balou, Borneo, alt. 6000 feet, Low.—I have no means of determining which of the two authors who have described this Fern has the right of priority in regard to specific name, Blume or Kunze; but it is certain the plant was first known to Dr. Walllich, who largely distributed it under the name of Polypodium coniifolium, but which I do not find adopted by any one. On some of that gentleman’s original specimens from Nepal, on Dr. Hooker’s from Sikkim, and on those from Sir W. Norris, are clusters of tuberiform excrescences in the axils of the primary pinnae, three or four together of what may be gemmæ or viviparous buds, or, possibly, fungi, as large as a good-sized pea, but oval in shape, rusty colour externally from a downy covering, hard (when dry); internally is a dark pulverulent mass.

194. P. (Phegopteris) dareaiforme, Hook.; caudex thickish creeping densely ferrugineo-paleaceous with lanceolate much acuminated scales, stipes 4 inches long glossy pale-chestnut coloured, frond a span long ovato-deltoid submembranaceous bipinnate, primary pinnae 4-5 inches long 1⅔ inch wide oblong-lanceolate subsessile acuminate subpinnatifid, segments linear or subspathulate obtuse simple or bifid, veinlets solitary in each segment clavate terminating below the apex bearing a sorus generally much below the clavate apex, capsules very few in each sorus.—Hook. 2d Cent. of Ferns, t. 24.

Hab. Khasya Hills, Simons, n. 98.—This has some affinity with Pol. davalliioides, but is much smaller, and the caudex and the segments of the pinnae are very different.
195. P. (Phegopteris) asperulum, J. Sm.; caudex ?, stipes (a small portion of it) terete brown glandulosose-pubescent as is the whole frond especially beneath and on the slightly (but distinctly) winged rachises, frond 1 ½ foot and probably more long 12–14 inches wide in the broadest part subcoriaceous-membranaceous brown-green subdeltoid-ovate acuminate bisubtripinnate, primary pinnae petiolate 6–8–9 inches long ¾–2 inches wide patent petiolate distant oblong-acuminate, secondary pinnae rather wide apart petiolate subfalcate oblique lanceolate (superior half the broadest) obtuse, those of the lowest primary pinna again pinnate at their base only, superior basal pinnule always the largest forming an auricle, the rest more or less deeply pinnatifid, pinnules and ultimate segments oval-oblong obtuse crenato-serrate most so on the superior margin, veins twice or thrice forked, sori 4–6 on a pinnule or segment, each corresponding to a serrature.— J. Sm. in Hook. Journ. Bot. iii. p. 394 (name only, and a scarcely applicable one).

Hab. Luzon, Cuming, n. 63.—A very distinct species; allied, however, to P. Hasseltii, Bl., in habit, and pubescence, and ramification; but very different in the shape of the pinnules, and having the secondary pinnae pinnatifid, rather than again pinnate.


Hab. Java, "Blume," "Zollinger," n. 1466.—I am unacquainted with this, except through Blume’s figure and description.

197. P. (Phegopteris) rufescens, Bl.; “fronds tripinatipad

Hab. Java, Blume.—Unknown to me, as it appears to be also to Mettenius. The figure has a good deal the general aspect of Aspidium coriaceum.

198. P. (Phegopteris) sericeum, Hook. ; “caudex creeping paleaceous, stipes slender and together with the fronds sericeo-hirsute, fronds subpellucid ovate acuminate bipinnate at the base pinnatifid towards the apex, lowest pinnæ opposite inaequilaterial ovate, lateral pinnules on the lower side larger elongated pinnatifid, on the superior side smaller scarcely incised, superior pinnæ oblongo-ovate pinnatifid, the segments obliquely ovate obtuse larger on the superior side, veins on the costule pinnated free simple or forked, sori on the back of the veins near the costule, capsules mixed with pellucid articulated very long hairs.” Phegopteris, Eat. in Fil. Wright. et Fendl. p. 208.

Hab. Cuba, C. Wright, n. 1054.—“Caudex thick as a crow’s quill, scaly. Stipes nearly a foot long, slender, sericeo-pubescent. Fronds ½ a foot long, 3–4 (and more) inches wide, deltoido-ovate, silky on both sides with whitish articulated hairs.” Eat.—Mr. Eaton justly says of this, “Felix pulchella a ceteris Phegopteridis speciebus plane diversa.” The oblique inaequilateral pinnules give the plant a somewhat polystichoid character.

199. P. (Phegopteris) splendidum, Klfs.; caudex?, stipes in one of our specimens 2 feet and more long thick as a goose-quill furrowed and glabrous, frond ample 4–5 feet long coriaceo-membranaceous opaque glabrous or hirsutulous on the veins bipinnate in the more mature state pinnatifid at the apex (rarely only pinnate with the pinnæ pinnatifid), primary pinnæ 1–1½ foot long, lower ones petioled 3–6–7 inches wide oblong-ovate acuminate copiously pinnate pinnatifid towards the apex, pinnules more or less distant 2–2½ inches long ½–3 inch wide sessile towards the base, upper ones more or less adnate pinnatifid halfway down to the costa with ovate obtuse lobes, superior primary pinnæ often 8–10 inches long 2 inches and more broad deeply more than halfway down to the costa pinnatifid with broad-oblong falcate entire segments, veins immersed (not in the least prominent but conspicuous when seen between the eye and the light) pinnated with rather numerous veinlets many of them

Hab. Brazil, abundant, Martius, Gardner, n. 17, 134, 5918, Moricand, n. 2169.—Remarkable for the large size and variable form of the primary pinnae.

200. P. (Phegopteris) spectabile, Kaulf.; "caudex erect, fronds ample 4–6 feet long rigid-membranaceous on both sides especially on the costa and on the stipes setaceo-paleaceous and pubescent deltideo-ovate tripinnate below, primary segments ovate acuminate, secondary ones oblong-lanceolate acuminate, those of the inferior side 5–7 lines, of the superior side 4 lines long, tertiary ones linear-oblong obtuse, lowest ones free at the base pinnatifid with oblong segments their apex obliquely truncato-rotundate most of them with the lowest segments coadunate and decurrent pinnatifid or entire, tertiary veins forked soriferous on the anterior branch, sori near the margin of the segments globose, capsules glabrous numerous densely compacted." Metten.—Kaulf. En. Fil. p. 121. Phegopteris, Fée, Gen. Fil. p. 243. Metten. Fil. Hort. Lips. p. 83. t. 17. f. 10 (fragment with sori), and Phegopt. p. 30. Polypod. inaequale, Link., and P. vastum, Kze. in Linnaea, ix. p. 50 (fide Metten.).

Hab. "West Indies, Bory, Sieber. Caraccas, Karsten, n. 385, 389, Moritz, n. 202. Venezuela, Fieck and Schlim, n. 407, 412, 282, 1573. Peru, Pöppig. Chili, Leechter, Pöppig." Metten. Ecuador, Tunguragua (without number), Spruce.—The present and not a few of the following species of authors are very puzzling to me. The one now under consideration appears to have an extensive range in South America, from the Atlantic to the Pacific Ocean. It was first described from a Chilian specimen of Chaniüsso.*

* Closely allied to P. spectabile, in general habit, form, and ramification, is the following Nephrodiacean plant, my specimens of which, in consequence of my overlooking the involucres, I had placed in my herbarium with Phegopteris. It should have been inserted at p. 125 of this volume, next after sp. 125 (N. willosum).

125 bis. Nephrodium (Lastrea) catocarpum, Hook.; "stipes at the base densely clothed with flaccid lanceolate long acuminate scales, upwards together with the ramifications and the costa (more densely beneath) paleaceous with lanceolate acuminate-setose appressed scales, fronds rigid-membranaceous ample above (costae excepted) glabrous somewhat glossy beneath 2–3 feet long deltideo-ovate acuminate tripinnate, primary segments approximate imbricated patent curved upwards long-petioled ovato-oblong or oblong obtuse, superior ones with the inferior base decurrent oblong obtuse, tertiary ones approximate oblong
201. P. (Phegopteris) _subincisum_, Willd.; "caudex arbo- 
reous, fronds subtripinnato-partite, stipes and rachises and 
the veins above fusco-strigillose with subulate scales, pinnae 
and pinnules linear-oblong acuminate, segments linear-oblong 
obtuse crenato-pinnatifid crenate sinuato-dentate or suben-
tire, sori (upon a vein or upon a veinlet of a forked vein) 
on the entire segment (of the inferior portion of the frond) 
10–12, one to each of the teeth or lobe of the pinnule." 
_t. 64._ Phegopteris, _Fée, Gen. Fil. p. 243._  _Metten. Phegopt._ 
Sp. Fil. i. p. 48._ 

Hab. Martinique, _Sieber. Brazil, Martius._—This had been placed by Sprengel, 
_Sieber, and others, in Alsophila, among Cyathaceous plants; but it is probably 
more correctly referred to _Polypodium_. I am obliged to have recourse to what I 
am disposed to consider a good authority for this species, especially as it is ac-
 companied by a fine figure; but I confess myself unable to distinguish this from 
my specimens of the preceding one.

obtuse, inferior attenuated at the base adnate pinnatifid, superior ones con-
fluent obtuse crenate, lobes approximate oblong subfalcate or at the apex ob-
lutely obtuse, branches of the pinnated veins undivided each soriferous, sori of 
moderate size, involucre reuniform with the margin _flexed repando-ciliare rigidly 
membranaceous persistent at length reddish._  _Metten._— _Kze. in Linnaea, ix. p. 95._ 
_Metten. Aspid. p. 73._  _Eat. in Fil. Wright, et Fendl. p. 209._  _Aspid. nemophilum, 
Kze. t. e. (fide Metten.)._  _Lastrea, Moore._

Hab. Peru, " _Pappig. Caraccas, Moritz, Linden._"  _Venezuela, Fendler, n. 204._ 

I discover another Lastreoid Fern among my _Phegopteris_-section, referred thither 
by the acute Mr. Spruce as well as myself, which I may here introduce:—

125 _ter._ Nephrodium (Lastrea) _Palatanganum_, _Hook._; stipes thick as a duck's 
quill a span or more long rufous-brown at the base densely clothed with very slender 
silky ferruginous hairlike scales 1–1⅛ inch long, upwards together with the rather 
stout rachises and costa clothed with rather small but copious erect or appressed 
linear-lanceolate dark scales pale-brown at the margin often mixed with broader 
and ciliated ones, frond firm-membranaceous tripinnate probably ample, our solitary 
specimen has two pairs of distantly placed pinnae (the pairs 6 inches apart nearly 
opposite) a foot long 6 inches broad ovate-acuminate petioled slightly falcate 
with an upward curvature, on both sides beset with minute glittering pellucid 
glands, obscurely hairy on the veins, secondary pinnules subpetiolulate nume-
rous very closely placed (mostly overlapping each other with their margins) 2–3 
_inches long 1 inch wide in the broadest part from a broad subtruncated base 
oblong obtusely acuminate, pinnules also all close-placed ⅜–¾ an inch long 2–3 
_lines wide sessile oblong obtuse straight or slightly falcate, pinnatifid nearly half-
way down with ovate obtuse always entire lobes, those of the apex alone entire 
and cadunate, veins usually forked in each lobe the upper branch bearing a pale 
coloured sorus of lax capsules near the base, involucres very thin and membrana-
ceous cordate glanduloso-ciliare soon deciduous.

Hab. Palatanganas, Andes of Ecuador, _Spruce, n. 5256._—This appears to me 
to be a new and very distinct species of the _Lastrea_-group of _Nephrodium_, but 
very difficult of definition, as are so many of the decompound Ferns.
202. P. (Phegopteris) Kurstenianum, Kl.; “caudex erect and together with the base of the stipes (2 feet long) densely paleaceous with long (1–1½ inch) membranaceous ferrugineous lanceolate acuminate finely serrululated scales, fronds ample ovate acuminate on both sides and on the ramifications of the stipes above sparsely and rigidly beneath densely soft cano-hirsute tripinnate, lower primary inferior pinnae ovate acuminate, secondary ones petiolate oblong-lanceolate acuminate, tertiary ones oblong obtuse or acuminate pinnatifid, all or most of them adnate and decurrent at the inferior base, segments oblong obtuse, veins undivided, sori intermediate between the costule and the margin, capsules lax.” Metten.—Polypodium, Kl. in Linneea, xx. p. 390. Phegopteris, Metten. Phegopt. p. 30. Eat. in Fil. Wright. et Fendl. p. 208. “Pheg. hirsuta, Fée, Gen. Fil. p. 248?”

Hab. Columbia, Moritz, n. 454. Venezuela, Funck and Schlim, n. 975 (Metten.), Fendler, n. 447. Ecuador, alt. 7000 feet, Spruce, n. 5257 and 5257 A.—This Fern attains a considerable size. My specimens from Spruce precisely accord with authentic ones from Klotzsch and from Fendler. Of Spruce's specimens, the stipes are at the base as thick as one's thumb, densely clothed with long narrow crisped scales; the entire stipes is 4–5 feet long; the frond 4 feet long; the ultimate pinnae (often slightly coadunate at the base) are ½–¾ of an inch long, crenato-pinnatifid rather than pinnatifid. Still the species is not to me satisfactorily defined.

203. P. (Phegopteris) connexum, Klfs.; “stipes 1 foot long paleaceo-pilose at length naked, frond membranaceous tender, beneath on the costa and costule densely pubescenti-hirsute 1½–2 feet long oblong acuminate, at the base only or throughout bipinnate, primary segments 8–9 inches long petiolate, basal ones ovato-lanceolate, superior ones oblong-lanceolate acuminate, secondary ones 1–2 inches long oblong or elongato-oblong acuminate or obtuse deeply pinnatifid or pinnatifidly crenate, basal ones sessile, lateral ones dilated below, superior ones adnate at length coadunate by the inferior decurrent base, segments oblong obtuse, veins with pinnated undivided branches, the tertiary ones soriferous.” Metten.—Polypodium, Kaulf. En. p. 120. Mart. Crypt. Bras. p. 90. t. 65. Phegopteris, Fée, Metten. Phegopt. p. 29.

Hab. Brazil, Martius, Moricand, n. 2191 and 2169, Spruce? (without number).—I possess authentic specimens from Moricand, according to Mettenius, but they do not satisfy me that the species is a very distinct one.

204. P. (Phegopteris) paleaceum, Anderss., an Hook. fil. ?; “frond broadly ovato-oval tripinnate, primary and secondary

Hab. Summit of the mountain, Charles Island, Galapagos, Andersson, Darwin?—My only specimen of this is from Dr. Andersson, who, as myself, is doubtful if it be identical with the P. paleaceum, Hook. fil. I may here observe that neither has Dr. Andersson nor myself had access to the new Ferns described by Dr. Hooker, l. c., and the specimens were not so good as could be wished; so that Dr. Hooker is satisfied that much reliance cannot be placed on his brief characters. Polypodium (Phegopt.) pleiosorus, Hook. fil. l. c., is thus circumstanced, of which only the apex of apparently a very large frond was preserved; hence that species is here omitted.

205. P. (Phegopteris) punctatum, Spruce; caudex?, stipes 2–3 feet and more long thick as one’s little finger glossy brown in the lower half densely coarsely long black setos-squamose (the same setiform scales are seen upon the rachis and at the base of the costa but they appear to be soon deciduous), frond very ample 5–6 feet and more long firm-membranaceous dark bright green pellucido-punctate glabrous below bipinnate, primary pinnæ subopposite petioled 1–2 feet long 5–8 inches wide ovato-oblong acuminate pinnated pinnatifid at the apex with copious horizontal sessile oblong-lanceolate very numerous pinnæ pinnatifid nearly halfway to the rachis, lobes ovate obtuse entire, intermediate primary pinnæ of the frond equally long but narrower and deeply nearly to the costa pinnatifid with spreading linear-lanceolate segments 1–1⅓ inch long ½ inch wide sharply inciso-pinnatifid a few only of the basal ones free but decurrent, apex of the frond pinnatifid with segments as just described, veins and veinlets pellucid, the latter mostly simple bearing a dark-brown sorus on the back, one to each of the lesser lobes, lobes or segments of the pinnules 3–5 on the larger ones.—P. punctatum, Spruce, mst.

Hab. Tarapota, Eastern Peru, Spruce, n. 4719, and foot of Chimborazo, Ecuador, in woods, alt. 3000 feet,—A very fine and distinct species, of which Mr. Spruce says, "Filix pulcherrima espitosa, 9-pedalis."

206. P. (Phegopteris) canescens, Kze. Herb.; "caudex?,
stipes 1½ foot long densely clothed at the base with blackish coriaceous subulate serrate scales 6 lines long, fronds membranaceous, on both sides cano-pubescently villosulous 2 feet long ovate acminate tripinnate at the base, primary segments ovate acminate, secondary ones shortly petiolate oblong-lanceolate acminate dilated at the inferior side, tertiary or superior secondary ones adnate with the decurrent inferior base oblong or elongato-oblong obtuse or acute pinnatifid or pinnatifid, the lobes oblong rotundato-obtuse entire, veins undivided, sori intermediate between the costule and the margin, capsules lax."—Phegopteris, Metten. Phegopt. p. 30.

Hab. "Bahia, Brazil, Moricand, n. 2454.—Distinguished from its affinities by the form of the scales." Metten.

207. P.? (Phegopteris) Sloanei, Kze.; stipes 2½ feet and more long rufous-brown (and as well as the rachis) subpaleaceous or quite glabrous, the base for 4–5 inches most densely clothed with beautiful long flexuose silky ferruginous tow, rather than scales, the hairs often more than an inch long resembling those on the stipes of Woodwardia radicans, frond firm-membranaceous ample 3–4 feet and more long 2 feet and more broad tripinnate, primary pinnæ often a foot long broad ovate-oblong acminate, ultimate pinnæ or pinnae sessile 2–4 inches long oblong-acminate deeply almost to the rachis pinnatifid, segments oblong subobtuse entire or crenate or more generally again more or less deeply pinnatifid, veinlets usually forked, one to each tooth or lobule the upper branch bearing the sorus, sori forming two series intermediate between the costule and the margin large in an old state small when young and then (according to Mettenius) exhibiting a minute hairy lastroid indusium.—Kze. in Linnæa, ix. p. 51, and xviii. p. 322. P. amplum, H. B. K. in Willd. Sp. Pl. v. p. 207? Aspid., Metten. Aspid. p. 74? (not Eat. Fil. Wright. et Fendl. p. 209). Polypod. lachnopod. J. Sm.

Hab. Cuba, Poppig (from Kze. in Herb. nostr.). Abundant in Jamaica, Wilson, Purdie, March, n. 161, Prior. St. Vincent, L. Guiding. Dominica, Imray. Trinidad, De Shack. Volcan de Fuego, alt. 7000 feet, Guatemala, Salzyn.—This is a very abundant plant in Jamaica, and may well be honoured with the name of Sloanei; but the figure of Sloane quoted by Mettenius can surely have nothing to do with it, and I am doubtful of most of the synonyms adduced by the latter author; I am not even sure that our plant is his Aspid. amplum, though it is probable our plant may be an Aspidacean one. It is certainly not identical with the Aspid. amplum of Eaton, n. 1035 (which is acknowledged by Mettenius to be the
same as his). Similar as the fronds of the two may be in structure, the stipes in Eaton's plant are dark brown and tubercled, and the scales are dark chestnut, very large, and lanceolate, long-acuminate. The most distinctive of this species is the beautiful dense and long stipule silky clothing of the base of the stipes.*

208. P. (Phegopteris) honestum, Kze.; "frond lanceolate pinnato-pinnatifid, pinnatifid at the apex, pinnae lanceolate subfalcate acuminate shortly petiolate, lowest ones remote, segments oblongo-falcate obtuse subrepend and ciliated at the margin, stipes rachis and costa patent-paleaceous beneath, sorile uniseriate near the margin." Kze. in Linnaea, ix. p. 49. Phegopteris, Metten. Phegopt. p. 28.

Hab. Pampayaco, Perú, Paypipig, in Herb. nostr., from Kze.—A rather obscure plant. My only specimen of this is an original one from Kunze. It has very much the structure of P. spectabile, and still more perhaps with our Pol. Sloanei, but I do not know if it has the very villous silky scales of the latter species. The "venae inferiores repetito-furcatae" of Mettenius do not accord with our plant from Kunze, so that perhaps Mettenius had a different species in view. It is recorded only as a Peruvian plant.

209. P. (Phegopteris) dilatatum, Liebm.; "stipes 1 ½ foot long, frond herbaceous ample 3–4 feet long broad-lanceolate supradecom-pound quadripinnato-pinnatifid, primary pinnae alternate remote petiolate, secondary alternate petiolate lanceolate acuminate acute, tertiary ones alternate short-petiolate inaequilateral about 1 ½ inch long ½–⅔ of an inch wide lanceolate acute, quaternary ones sessile alternate, lowest

* I take the opportunity of here introducing the Aspidium (Lastrea) amplum of Eaton, which should have been given immediately after our Nephrodium (Lastrea) calopterum, p. 137 of this volume.

130 bis. Nephrodium (Lastrea) amplum, Hook.; caudex ?, stipes 1 ½ foot long tawny-brown thick as a duck's quill obscurely tubercled and bearing sparse subulate small patent scales (which are continued on the rachises), the base densely clothed with long (1–1 ½ inch) dark-brown glossy lanceolate long-acuminated scales, frond 3 feet and probably more long deltoid-ovate submembranaceous laxly triplinate, primary pinnae distant, lowest ones a foot long and bipinnate broad-oblong, secondary ones 2–3 inches long sessile nearly to the rachis pinnatifid, segments and the ultimate pinnae or pinnules of the lower primary pinnae oblong acute entire or more or less deeply pinnatifid from ¼–1 inch long, veinlets simple subpellucid one to each lobe or lobule, sorile rather small while young evidently furnished with a small cordate slightly hairy or ciliated membranaceous involucre.—Aspidium amplum, Metten. Aspid. p. 74 (an Polyp. amplum, H. B. K. in Willd. Sp. Pl. v. p. 207 ?). Eat. Fil. Wright. et Fendl. p. 209 (fide Metten.).

Hab. Caripe, Venezuela (if the plant of Willdenow), Cuba, C. Wright, n. 1055. Dominica, Dr. Imray, n. 56 (as far as can be judged by the frond).—I derive the above character from Mr. Wright's Cuban specimen. I dare not introduce the several synonyms referred to by Mettenius, which may or may not belong to the same plant. The scales of the base of the stipes here are quite different from those of our Polyp. ? Sloanei.
ones cuneate on both sides, at the base adnate above gradually confluent, all alato-decurrent obliquely ovate or elongato-ovate acute pinnatifid, the segments falcato-lanceolate acute thickened at the margin and a little revolute absolutely subrepend, sinuses narrow acute, colour green on both sides, veins simple or forked, sori on the middle of the veinlets cinnamon-coloured solitary on each segment, costa a little prominent on both sides glabrous, quaternary rachises prominent on both sides cinnamomeo-pubescent winged, tertiary secondary and main rachises stramineous glossy grooved in front, the furrow cinnamon-puberulous margined convex on the back and glabrous, stipites bisulcate glabrous.” 


Hab. Mexico, Liebm. — This Fern, of which I possess an authentic specimen from Liebm., the author compares to P. divergens and effusum. It appears distinct, and is perhaps more nearly allied to P. Sloanei. I possess what appear to correspond with it from Guadeloupe (L'Hermitier), from Jamaica and St. Vincent, from Brazil, Guatemala, and Guayaquil.


Hab. Tropical America, both a and β frequent. Var. a. Brazil, Gardner, n.


Hab. Tahiti, Society Islands, *Brackenridge*, Bidwill, *Nightingale*.—I fear this will not prove distinct from the very variable *P. tenericaule*, Wall. (now generally referred to *Lastrea*). It is certainly the same as Nightingale’s and Bidwill’s plants, which I had no hesitation in placing under that species at p. 142 of this volume.


Hab. Tahiti, Society Islands, and Tutuila, Samoan Islands, *Brackenridge*; Island of Otaroha, *Cuming*, n. 140 and 1417.—My specimens from Cuming (noticed at p. 143 of this volume, referred to *N. (Lastrea) tenericaule*) are identical with a fine specimen I have received from Brackenridge: but I must confess that, except in the more lax and membranaceous fronds, I do not see how it differs from the preceding, *P. pallidum*.

213. P. (Phegopteris) *crinale*, Hook. et Arn.; “plant from 4–6 feet high, caudex tufted, stipites tufted thick sulcated densely paleaceous,” fronds quite coriaceous rigid bi-tripinnate, pinnæ all horizontally patent, primary ones probably a span and more long, lowest ones semiovate (broadest on the inferior half), their lowest pinnæ again pinnate, the secondary pinnæ oblong deeply almost to the costa pinnatifid obtuse, segments and ultimate pinnules ⅓ of an inch long oval or oblong entire or crenato-lobate very obtuse, veinlets once or twice forked in the upper portion of the plant one or two veinlets only bearing sori at the superior base of the seg-
ment, “as many as six sori on the inferior segments,” all the rachises rough and copiously setose with almost black flexu-

Hab. Hawaii. Forests in the Sandwich Islands, *Beechey, Brackenridge.*—This very distinct Fern was recognized by Dr. Arnott and myself as a new spe-
cies from the fragments of a specimen, and I have only received two lesser frag-
ments from my valued Hawaiian correspondent, Dr. Hillebrand. From Bracken-
ridge’s work, however, I have been able to improve the specific character.

214. P. (Phegopteris) *unidentatum*, Hook. et Arn.; cau-
dex apparently subrepent short, stipes 1 \( \frac{1}{2} \) foot long strami-
neous subscabrous subpaleaceous the very base clothed with long (almost 1 inch) dark-brown glossy scales, frond 1 \( \frac{1}{2} \)-2 feet and more long firm-membranaceous deltoideo-ovate acuminate glabrous bi- below tripinнате, lowest primary пинне subopposite 8-10 inches long half-ovate much acumi-
nated, those near the middle 4-5 inches long, secondary пинне 1 \( \frac{1}{2} \)-2 inches long (lower ones especially) sessile oblong acute or subobtuse rarely acuminated more or less deeply pin-
natifid, segments oblong obtuse serrated chiefly towards the apex, teeth subspinulose and often one tooth or serrature is larger than the rest, veinlets once (or at the base of the pin-

Hab. Sandwich Islands, Oahu, *Beechey, Brackenridge, Hawaii, Dr. Hille-
brand.*—This also was first described from fragments of specimens. I have received perfect ones from Dr. Hillebrand, showing that the base of the stipes is densely paleaceous, and the sori invariably close to the margin, at the base of a sinus of the segments or of the lobules.

215. P. (Phegopteris) *Sandwicense*, Hook. et Arn.; cau-
dex ?, stipes (upper portion only seen) and rachises and costae beneath castaneous more or less furfuraceo-paleaceous, frond membranaceous deltoid-ovate 2-4 feet or more long bipin-
nate tripinнате below, lower primary пинне often a foot long all of them broad ovato-oblong acuminated, пиннules sessile 1-2 inches long 1 \( \frac{1}{2} \)-3 of an inch wide subovato-oblong obtuse or shortly acuminated deeply pinnatifid almost to the rachis (less so in those of the upper portion of the frond), segments oblong obtuse subpinnatifid or crenato-dentate, veinlets forked, sori 1-3 on a segment nearer the margin than the costule. *Hook. et Arn. Bot. of Beech. Voy.* p. 105. *Brack. Fil. U. S. Expl. Exp.* p. 17.
Polypodium, § Phegopteris.

Hab. Sandwich Islands, Beechey (frond and upper portion of stipes quite glabrous and scaleless), Brackenridge. Society Islands, Bidwell (glabrous, and with the pinnules falcate and less deeply pinnatifid). Pitcairn's Island, Cuming, n. 1388. Otaheite, Cuming, n. 1414. Ovalau, Fiji Islands, Mitre, n. 303.—Brackenridge (who does not appear to be acquainted with the perfect stipes) observes that "the whole plant has a good deal the habit of P. unidentatum, but is withal distinct." He may possibly have another plant in view, for he says the ultimate divisions are pellucido-punctate. Truly, however, more perfect, and suites of specimens are required of these large-fronded decompound Polypodia before the correct limits of the species can be defined.

216. P. (Phegopteris) Aneitense, Hook.; caudex ?, upper portion of stipes and primary and slender secondary rachises pale-brown glabrous and scaleless, frond membranaceous bright-green 18–20 inches long 12–14 inches broad at the base subdelteo-ovate acuminate bipinnate tripinnate below, primary pinnæ 6–8 inches long 2–3 inches broad distant, all petiolate broad-oblong acuminate, secondary pinnæ all petiolate distant ½–1 inch long from a broad obliquely cuneate base ovate more or less acuminate deeply pinnatifid especially on the superior half, segments oblong or subovate, lowest superior one generally the largest and forming an auricle, entire or subpinnatifid, superior ones entire or with a strong spinelike tooth at its inner margin, ultimate pinnæ or pinnules resembling these but smaller, veinlets once or twice forked one to each segment bearing a solitary sorus on the lower superior branch distant from the margin and always terminal on the veinlet, secondary rachises with a narrow green marginal wing.

Hab. Aneitenum, one of the New Hebrides, Milne and Macgillivray.—This has a very peculiar aspect, and seems quite a new species; the greater number of the segments or lobes are furnished with a solitary strong spinelike tooth in the inner margin, and the species certainly merits the name of unidentatum rather than the preceding one.

217. P. (Phegopteris) Keraudrenianum, Gaud.; "caudex* subarboreous prostrate," stipes ? glabrous, main rachis thick as a swan's quill stramineous brown and as well as the secondary rachises very glossy, fronds ample "12–15 feet long" subscandent coriaceo-membranaceous bi-tripinnate, primary pinnæ distant opposite or alternate subsessile 1½–2 feet long 10–12 inches wide oblong acuminate at the young and tender

* "Cette fougère forme, par la réunion de ses rudiments pétioles persistants, une sorte de tronc de plusieurs pieds de hauteur sur 5 à 6 pouces de diamètre, qui n'ayant pas assez de force pour se tenir droit, se courbe et se contourne sur le sol. La partie supérieure, qui se redresse, est couronnée de feuilles longues de 5 à 7 pieds," etc.—Gaudichaud.
apices, secondary pinnæ sessile opposite or alternate distant but in the younger pinnæ often united by a narrow wing, from a broad truncated base oblong acuminate deeply nearly to the costules (which are smooth hairy beneath) pinnatifid with oblong subfalcate gradually tapering but obtuse entire opposite or alternate segments entire at the margins which are a little reflexed, the sinuses very acute, veinlets rather distant pellucid once or twice forked, sori on the superior branch of the veinlet forming two series nearer the margin than the costule.—Gaudich. in Freyc. Voy. Bot. p. 362. t. 7 (very good). Brack. Fil. U. S. Expl. Exp. p. 15. Phegopteris, Metten. Phegopt. p. 29.—Var. β, tripinnate, segments and ultimate pinnules an inch long acuminate dentato-pinnatifid.

Hab. Sandwich Islands, Gaudichaud, Brackenridge, Dr. Diell, Hillebrand.—β, Hillebrand.—A very remarkable species, with a pteroid habit; perhaps in this respect more allied to P. pteroides than to any other Fern. Brackenridge estimates the length of the fronds at 12–15 feet: "they are sustained in a more or less erect position by the reflected points of the pinna, which bend over and around the branches of neighbouring plants. These fronds also continue to grow at the points, while at the same time, for a distance of 2–3 feet and upwards from the ground, they are fully developed and bear ripe sori." My var. β is certainly tripinnate, and the ultimate segments or pinnules are deutato-pinnatifid, like the segments in the following species, P. procerum; but they are more acuminate, and the frond is glabrous. Some of the specimens, or, rather, portion of a specimen, of this, have also secondary pinnæ quite like those of P. Keradrenianum.


Hab. Sandwich Islands, in the thickets and low trees, Brackenridge, Hillebrand.—Brackenridge remarks that, "in habit, this bears a strong resemblance to the P. Keradrenianum, Gaud. (our previous species), but is very distinct in the form and size of the divisions." It is true that the form represented by Brackenridge does look very distinct from the P. Keradrenianum, as figured by Gaudichaud; but in my remarks on the latter species I have had occasion to notice a state which indicates a passage from the one to the other, and further observations will, I think, prove the two to be identical.

219. P. (Phegopteris) Berteroanum, Hook. not Spr.; caudex?, stipes?, rachis striamineous brown setoso-paleaceous, base of the setæ tuberculate, frond 1½–2 feet and probably more long 8–18 inches wide coriaceo-membranaceous more or less
POLYPODIUM, § PHEGOPTERIS.

hairy on the costules and veins especially beneath (where they are often hispid) broad-oblong ovate or deltoid-ovate acuminate tripinnate sometimes viscid beneath opaque, primary lower pinnae sometimes nearly a foot long and bipinnate, all the pinnae sessile, ultimate ones or pinnules quite adnate 1 1/2—2 inches and more long 1 1/2—3 inches wide oblong bluntly acuminate deeply almost to the costa pinnatifid, segments semiovate suberecto-patent subacute, the inferior basal one shorter than the superior and always adnate with and decurrent upon the rachis, the margin entire or dentato-pinnatifid, veinlets simple distant, sori more or less copious one to each tooth or segment dorsal, secondary rachises often villous.

Hab. Juan Fernandez, on wooded hills, Bertera, n. 1660, Cuming, n. 1326, Douglas, Scouler, Philippi ("Phegopt. rugulosa"), very large form. Conception, Cuming, n. 823. Valdivia, Bridges. Chile. Capt. Ph. King. Chatham Island, Galapagos, Capt. Wood (submembranaceous, segments elongated, lobes shorter, lowest inferior often forming an axillary lobe between two segments, probably distinct).—Var. β. Valdivia, Philippi. It is remarkable that so distinct a looking species as this, and collected by so many Chilian travellers, should, as far as I can find, be hitherto unpublished.

220. P. (Phegopteris) aquilinum, Th.; caudex ?, stipes 1—2 feet long stout dusky-brown clothed at the base with linear-acuminated imbricated glossy scales 1/2—3/4 of an inch long, the rest tuberculate and downy and appresso-paleaceous with small scales, fronds 1—4 feet long sometimes 1—1 1/2 foot broad hard thick coriaceous and dark-brown when dry broad deltoid-ovate bi-tripinnate, primary inferior pinnae often opposite 6—10 inches long obliquely ovate, their inferior secondary pinnae the longest, ultimate pinnae or pinnules 1 1/2—3 inches long oblong linear sessile rather obtuse deeply pinnatifid almost to the rachis, segments ovate subfalcate entire, lowest inferior one especially adnate with and often wholly attached to the rachis thus forming an intermediate lobe, veinlets sunk very indistinct apparently simple, sori forming two series between the costule and the margin, main and secondary rachises very stout straight pubescent partially and minutely scaly and tubercled, costules beneath very pubescent.—Thouars, Fl. Trist. d'Acun. p. 32. Carm. Trist. d'Acun. in Linn. Trans. xii. p. 40. P. tomentosum, Thouars, l.c. Aspid. bifidum, Carm. l. c. p. 511.

Hab. Tristan d'Acunha, growing in large tufts, Thouars, Carmichael, Milne and Macgillivray.—A very harsh, rigid, almost unsightly-looking Fern; yet with something of the ramifications of Pteris aquilina, which no doubt suggested the
specific name, and more perhaps the aspect of Polyp. Berteroanum, so caused by the lowest inferior lobe being adnate with the rachis, and, in a measure, separated from the pinnules. Carmichael's name of bifidum was probably given from an accidentally forked specimen; the one from him in my herbarium is not so, nor do I find any indiumus on the sori; and Aubert du Petit Thouars says especially, "punctis fructiferis parvis et nudis."

221. P. (Phegopteris) Vogelii, Hook.; caudex?, stipes 2 feet or more long nearly as thick as a writing pen stramineous glossy furrowed when dry paleaceous at the base with sparse spreading subulate dark-brown scales \( \frac{1}{2} \) an inch long, frond ample 4 feet or more long firm-membranaceous glabrous or hairy only on the veins beneath deltoid-ovate tripinnate, primary inferior pinnæ 12–15 inches long almost a foot wide long-petioled their secondary pinnæ and the superior primary pinnæ uniform 4–6 inches and more long 2 inches wide short-petioled oblong acuminated deeply (except near the apex) pinnatifid nearly to the costa pinnated in the lower portion, segments and pinnules about an inch long \( \frac{1}{3} - \frac{1}{2} \) of an inch wide oblong-ovate obtuse with a truncated superior base, the margins lobato-pinnatifid generally more deeply on the upper margin, the inferior base decurrent, the rachis winged, veinlets one to each tooth or lobe of the pinnule or segment forked, the superior branch soriferous near its base, sori rather distant forming a series between the costule and the margin.

Hab. West tropical Africa: Fernando Po, Vogel, n. 229, Gustav Mann, n. 352; Aboh, on the Quorra, Barter, in Baikie's Exp. n. 158; Isle San Nicol, Cape de Verdes, Forbes.—Forbes's plant has the ultimate segments and pinnules decurrent, and may probably prove a distinct species.

222. P. (Phegopteris) vestitum, Hook.; "frond robust oval tripinnatifid pilose on the veins beneath, pinnæ alternate lanceolate long-acuminate, pinnules linear pinnatifid acuminate rather obtuse at the apex, lobes (segments and pinnules) alternate oblong obtuse, the margins revolute confluent at the apex, sori uniseriate, capsules subglobose flexuose, stipes and rachis densely puberulous cineraceous and besides clothed beneath with elongated blackish scales." Phegopteris vestitum, Philippi, Pl. Chil. in Linnexa, xxii. p. 107 (not Polyp. vestitum of Forster or Raddi).

Hab. South Chili, Valdivia, Philippi, in Herb. nostr.—"Pinnules 2 inches long, \( \frac{1}{3} \) of an inch wide; lobes 5 lines long, 3 lines wide: a species easily distinguished by the alternate character of the pinnæ, pinnules, and lobes, and no less so by the two kinds of indumentum on the stipes." Philippi. The specimens in my herbarium, for which I am indebted to the author, are two (apparently) pri-
mary coriaceo-membranaceous pinnae a span to a foot long, glandulosoi-viscid beneath, together with a portion of the main rachis; this latter is as thick as a goose-quill, striato-sulcate, and, as well as the secondary rachises and costae, densely pubescent, not sensibly glandular, the pubescence mixed with many scattered, small, subulate, dark-brown scales; secondary pinnae 2½-3 inches long, sessile, from a broad base, oblong, gradually acuminate, pinnated below, pinnatifid in the upper half; segments oblong, subentire; pinnales ½-3 of an inch long, adnate, with subdecurrent base, oblong, obtuse, lobato-pinnatifid; lobes rounded; venation obscure; sori copious, scattered, often marginal, and often two or three on each lobule. In habit it resembles a large form of _P. rugulosum_, yet it seems quite distinct.

Hab. Van Diemen's Land, Labillardière; since found very abundantly there and in the south and east of Australia, from Victoria to Moreton Bay, Brown, Mueller, and others. New Zealand, north and middle island, as far south as Houraki Gulf and Acheron (Lyall). Lord Auckland's group, Hook. fil. Norfolk Island, Bauer, Dr. V. Thomson. India, very abundant, especially in Himalaya, etc., Wallich (P. marginale, Wall. Cat. n. 322, Aspid. marginatum, n. 391, and Aspid. divisum, n. 393). Java (Miquel), De Vries and Teijsmann, n. 11, 479, and 481, Thos. Herb., n. 261. Chiuia, Chusan, Alexander. Ceylon, Mrs. Genl. Walker. South America: Chili, Pooppig. Cuming, n. 203, 149, 653, Bridges, n. 552, Philippi (who, as well as Bridges and Bertero, considers it identical with Polyp. spectabile of Kaulfuss, certainly a Chilean plant, but certainly not the Polyopt. spectabilis of Fée, which Mettenius considers the plant of Kaulfuss, see p. 259), Gille; Chiloé, Capt. Ph. King; Valdivia, Bridges, n. 813; Juan Fernandez, Bertero (“Pol. spectabile”), n. 1664, Cuming, n. 1348; Ecuador, Jameson, Spruce, n. 5716 (very large, secondary pinna pinnatifid rather than pinnate, segments less pinnatifid); Peru, Pasco, Mathews, Cruckshanks (Pol. fulvescens, Hook. and Grev.). St. Helena, Cuming, n. 1348 and 433, Hook. fil., Nuttall, Lefroy. Tristan d'Acunha, Thouars, Carmichael. Bourbon (ex Herb. Mus. Par.). Fernando Po, Barter, Mann.—Perhaps no Fern has been so generally misunderstood as the present, both in regard to genus and to the limits of the species; and this is partly owing to its being very variable, both in size and texture, and to the close proximity of the sori to the margin of the pinnales, and the frequent inflection of the lobes of those pinnales, which give the appearance of an involucre of a Cheilanthes or Hypolepis, to which also may be added the wide extent of geographical distribution. Labillardière has well described and well figured the plant; yet I have myself often found it difficult to distinguish between some forms of Hypolepis hostilis, Kze., and H. pteroides, Mett., especially H. Purdieana, Hook. In the localities I have here given, taken exclusively from specimens in my own herbarium, I have been as careful as possible to exclude any forms which showed the smallest trace of a true involucre; yet I am far from satisfied with my decisions.

In bringing to a close this portion of my labours which treat of the Polypodia which have free veins, I must entreat indulgence for its many imperfections, especially in what concerns the decompound species. There are difficulties occasioned by variations common to Ferns in general, to which must be added those peculiar to specimens of large size, such as are manifest in different parts of the same specimen; and last, and not least, the possibility that our plant may, in some stages of its progress to maturity, be possessed of involucres, proving it to be not Polypodiaceous, but Aspidiaceous. Here, as elsewhere, I have excluded not a few doubtful species, of my own among the rest.

N.B.—The first part of the next Volume will commence with the species of Polypodium which have connivent or anastomosing veins.
INDEX TO THE PLATES.

Aspidium
 abbreviatum, Schrad., tab. 234
 adscendens, Hew., tab. 224
 amabile, Bl., 225
 auriculatum, Sw., tab. 218
 Berteroanum, Colla, tab. 229
 cæspitosum, Wall., tab. 213
 cystostegia, Hook., tab. 227
 feeniculaceum, Hook., tab. 237
 Lachenense, Hook., tab. 212
 lepidocaulon, Hook., 217
 Lobbi, Hook., tab. 232
 melanochlamys, Fée, tab. 233
 melanostichum, Kze., tab. 233
 mueronatum, Sw., tab. 216
 munitum, Kls., tab. 219
 nephrodioides, Hook., tab. 235
 obtusum, Mett., tab. 221
 oculatum, Hook., tab. 228
 Plaschnickianum, Kze., tab. 211
 Prescottianum, Wall., tab. 223
 Richardi, Hook., tab. 222
 Seemanni, Hook., tab. 230
 semibipinnatum, Hook., tab. 231
 stimulans, Kze., tab. 214.
 Teijmannianum, Hook., tab. 236
 tridens, Hook., tab. 215

Tsus-Simense, Hook., tab. 220
 varium, Sw., tab. 226

Nephrodiophyllum
 abruptum, Pr., tab. 241
 acutum, Hook., tab. 271
 apiciflorum, Hook., tab. 248
 aristatum, Hook., tab. 238
 Ascensionis, Hook., tab. 257
 athamanticum, Hook., tab. 258
 aureovestitum, Hook., tab. 246
 Brunonianum, Hook., tab. 251
 cognatum, Hook., tab. 256
 crinibulbon, Hook., tab. 244
 cyatheoides, Kls., tab. 241
 decipiens, Hook., tab. 243
 erythrosorum, Eut., tab. 253
 exstensum, Bl., tab. 240.
 Falconeri, Hook., tab. 254
 flaceidum, Hook., tab. 263
 funestum, Hook., tab. 259
 hirsutum, J. Sm., tab. 240
 hirtipes, Hook., tab. 249
 Imrayanum, Hook., tab. 242
 macrotis, Hook., tab. 242
 membranifolium, Pr., tab. 261
 Mexicanum, Hook., tab. 267
 microstegium, Hook., tab. 250
 Napoleoniis, Bory, tab. 255
 oppositum, Hook., tab. 266
INDEX TO THE PLATES.

Parishii, *Hook.*, tab. 260
purpurascens, *Hook.*, tab. 262
Raddianum, *Hook.*, tab. 245
recedens, *Hook.*, tab. 265
refractum, *Hook.*, tab. 252
squamigerum, *Hook. et Arn.*, tab. 270
squamisetum, *Hook.*, tab. 268
tenéricaule, *Hook.*, tab. 269
velatum, *Hook.*, tab. 247
villosum, *Hook.*, tab. 264
Wrightii, *Hook.*, tab. 239

POLYPODIUM
alternifolium, *Hook.*, tab. 277
athyrioides, *Hook.*, tab. 277

binerve, *Hook.*, tab. 273
decipiens, *Hook.*, tab. 279
glandulosum, *Hook.*, tab. 276
Hillebrandii, *Hook.*, tab. 279
hirtum, *Hook.*, tab. 273
Lobbianum, *Hook.*, tab. 278
longisetosum, *Hook.*, tab. 278
parvulum, *Bory*, tab. 274
pteroides, *Kt.*, tab. 280
pteropus, *Hook.*, tab. 275
sessilifolium, *Hook.*, tab. 272
Skinneri, *Hook.*, tab. 276
subscabrum, *Kt.*, tab. 274
subtile, *Kze.*, tab. 275
Zeylanicum, *Mett.*, tab. 272
INDEX.

Abacopteris Philippinarum, Fée . . . . 76
Acorstichum lepidopteris,
Langsd. . . . . 212
polypodioides, L. . . . . 209
sanctum, L. . . . . 252
Adenophorus bipinnatus,
Gaud. . . . . 228
hymenophylloides, Kls. . . . . 228
minutus, Gaud. . . . . 228
pinnatifidus, Gaud. . . . . 195
Tamarisci, Hook. et
Grey. . . . . 228
tripinnatifidus, Gaud. . . . . 228
Alsophila Martinicensis, Sieb. . . . . 260
pilosa, Mart. et Gal. . . . . 213
Amauropelta Brentellii, Kze. . . . . 94
Ambila juglandifolia, Pr. . . . . 39
latifolia, Fée . . . . 39
Amphoradenium australis,
Desv. . . . . 228
Gaudichaudii, Desv. . . . . 228
hymenophylloides, Desv. . . . . 228
Anisocampium Cuminia-
num, Pr. . . . . 62
Antigramme Brasiliense,
Moore . . . . 3
populifolia, Pr. . . . . 3
repanda, Pr. . . . . 3
subsessilis, Fée . . . . 3
Arthropteris albo-puncta-
ta, J. Sm. . . . . 85
tenella, J. Sm. . . . . 218
Aspidium
abbreviatum, Schrad. 37

Aspidium
abruptum, Kze. . . . . 78
acrostichoides, Sw. . . . . 9
aculeatum, Sw. . . . . 18
aculeatum, var. lobata-
tum, Hook. . . . . 19
acuminatum, Lowe . . . . 146
acutifolium, Bl. . . . . 20
acutum, Schk. . . . . 153
adscendens, Hew. . . . . 32
amnulum, Sw. . . . . 127
pline, Bl. . . . . 75
 affine, Fisch. . . . . 117
alatum, Wall. . . . . 47
alpestris, Sw. . . . . 251
amabile, Bl. . . . . 25
ambliatus, Kze. . . . . 24
Ambotinense, Willd. . . . . 75
amplum, Mett. . . . . 264
angulare, Willd. . . . . 19
angulatum, J. Sm. . . . . 44
anomalum, Hook. et Arn. . . . . 27
anomophyllum, Zenk. . . . . 41
apiciflorum, Wall. . . . . 113
apultfolium, Schk. . . . . 49
appendiculatum, Wall. . . . . 68
argutum, Klfs. . . . . 120
aridum, Don . . . . 81
aristatum, Sw. . . . . 27
articulatum, Schk. . . . . 157
articulatum, Sw. . . . . 156
athamanticum, Kze. . . . . 125
athyroides, Mart. et Gal. . . . . 139
atratum, Wall. . . . . 116
augescens, I.k. . . . . 79
auriculatum, Sw. . . . . 11
<table>
<thead>
<tr>
<th>Aspidium</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>auriculatum, Schk.</td>
<td>9</td>
</tr>
<tr>
<td>Bergianum, Mett.</td>
<td>96</td>
</tr>
<tr>
<td>Berteroanum, Colla</td>
<td>33</td>
</tr>
<tr>
<td>biaristatum, Bl.</td>
<td>29</td>
</tr>
<tr>
<td>biaristatum, Bl.</td>
<td>20</td>
</tr>
<tr>
<td>bifidum, Carm.</td>
<td>91, 270</td>
</tr>
<tr>
<td>bifidum, Pr.</td>
<td>56</td>
</tr>
<tr>
<td>blepharochlæa, Kze.</td>
<td>91</td>
</tr>
<tr>
<td>brachypetrum, Kze.</td>
<td>20</td>
</tr>
<tr>
<td>Braunianum, Karst.</td>
<td>84</td>
</tr>
<tr>
<td>Brunnii, Spen.</td>
<td>19</td>
</tr>
<tr>
<td>Bridgesii, Schott.</td>
<td>21</td>
</tr>
<tr>
<td>Brongniartianum, Gay</td>
<td>21</td>
</tr>
<tr>
<td>Brunonianum, Wall.</td>
<td>113</td>
</tr>
<tr>
<td>caducum, Wall.</td>
<td>39</td>
</tr>
<tr>
<td>caducum, H. B. K.</td>
<td>17</td>
</tr>
<tr>
<td>calcareaum, Bl.</td>
<td>93</td>
</tr>
<tr>
<td>calcareaum, Pr.</td>
<td>46</td>
</tr>
<tr>
<td>callipteris, Ehrh.</td>
<td>121</td>
</tr>
<tr>
<td>callosum, Bl.</td>
<td>81</td>
</tr>
<tr>
<td>campylotetrum, Kze.</td>
<td>127</td>
</tr>
<tr>
<td>Canariense, Braun.</td>
<td>117</td>
</tr>
<tr>
<td>canescens, Wall.</td>
<td>68</td>
</tr>
<tr>
<td>capense, Willd.</td>
<td>33</td>
</tr>
<tr>
<td>carvifolium, Kze.</td>
<td>28</td>
</tr>
<tr>
<td>caryotideum, Wall.</td>
<td>40</td>
</tr>
<tr>
<td>catophoron, Kze.</td>
<td>133</td>
</tr>
<tr>
<td>catopteron, Kze.</td>
<td>137</td>
</tr>
<tr>
<td>Championi, Benth.</td>
<td>30</td>
</tr>
<tr>
<td>Championi, Benth.</td>
<td>119</td>
</tr>
<tr>
<td>chrysobolus, Lk.</td>
<td>103</td>
</tr>
<tr>
<td>cicutarium, Sw.</td>
<td>48</td>
</tr>
<tr>
<td>var. β, apiifolium, Hook.</td>
<td>49</td>
</tr>
<tr>
<td>cicutarium, Willd.</td>
<td>129</td>
</tr>
<tr>
<td>ciliatum, Wall.</td>
<td>93</td>
</tr>
<tr>
<td>coadunatum, Wall.</td>
<td>49</td>
</tr>
<tr>
<td>cæspitosum, Wall.</td>
<td>13</td>
</tr>
<tr>
<td>cognatum, Mett.</td>
<td>124</td>
</tr>
<tr>
<td>coniifolium, Wall.</td>
<td>28</td>
</tr>
<tr>
<td>conjugatum, Bl.</td>
<td>61</td>
</tr>
<tr>
<td>consanguineum, Kl.</td>
<td>90</td>
</tr>
<tr>
<td>cordifolium, Pr.</td>
<td>53</td>
</tr>
<tr>
<td>coriaceum, Sw.</td>
<td>32</td>
</tr>
<tr>
<td>coriaceum, Pr.</td>
<td>25</td>
</tr>
<tr>
<td>coriandrifolium, Sw.</td>
<td>49</td>
</tr>
<tr>
<td>crossifolium, Bl.</td>
<td>114</td>
</tr>
<tr>
<td>cristatum, Sw.</td>
<td>121</td>
</tr>
<tr>
<td>cuellatum, Bl.</td>
<td>81</td>
</tr>
<tr>
<td>Cumingianum, Kze.</td>
<td>63</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Aspidium</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>cuspidatum, Mett.</td>
<td>234</td>
</tr>
<tr>
<td>cystostegia, Hook.</td>
<td>26</td>
</tr>
<tr>
<td>decurrens, J. Sm.</td>
<td>48</td>
</tr>
<tr>
<td>decurvato-pinnatum, Kze.</td>
<td>232</td>
</tr>
<tr>
<td>densum, Wall.</td>
<td>133</td>
</tr>
<tr>
<td>depastum, Schk.</td>
<td>117</td>
</tr>
<tr>
<td>derozum, Kze.</td>
<td>49</td>
</tr>
<tr>
<td>diaphanum, Zoll.</td>
<td>13</td>
</tr>
<tr>
<td>dilaceratum, Kze.</td>
<td>49</td>
</tr>
<tr>
<td>dilatatum, Willd.</td>
<td>127</td>
</tr>
<tr>
<td>diplazioides, Moritz</td>
<td>100</td>
</tr>
<tr>
<td>discolor, Langsd.</td>
<td>33</td>
</tr>
<tr>
<td>discretum, Don</td>
<td>20</td>
</tr>
<tr>
<td>dissemens, Mett.</td>
<td>67</td>
</tr>
<tr>
<td>divisum, Wall.</td>
<td>134</td>
</tr>
<tr>
<td>Drepanum, Sw.</td>
<td>249</td>
</tr>
<tr>
<td>dumetorum, Sm.</td>
<td>128</td>
</tr>
<tr>
<td>elatum, Bory</td>
<td>126</td>
</tr>
<tr>
<td>elongatum, Sw.</td>
<td>117</td>
</tr>
<tr>
<td>erosum, Schk.</td>
<td>117</td>
</tr>
<tr>
<td>exalatum, Sw.</td>
<td>152</td>
</tr>
<tr>
<td>exiguum, Kze.</td>
<td>92</td>
</tr>
<tr>
<td>extensus, Féé</td>
<td>34</td>
</tr>
<tr>
<td>Fadyenii, Mett.</td>
<td>160</td>
</tr>
<tr>
<td>falcatum, Sw.</td>
<td>40</td>
</tr>
<tr>
<td>falciiculatum, Raddi</td>
<td>103</td>
</tr>
<tr>
<td>falcinellum, Sw.</td>
<td>10</td>
</tr>
<tr>
<td>ferox, Bl.</td>
<td>77</td>
</tr>
<tr>
<td>Filic-mas, Pursh</td>
<td>122</td>
</tr>
<tr>
<td>Filic-mas, Sw.</td>
<td>116</td>
</tr>
<tr>
<td>fimbriatum, Willd.</td>
<td>45</td>
</tr>
<tr>
<td>fissum, Kze.</td>
<td>56</td>
</tr>
<tr>
<td>flaccidum, Bl.</td>
<td>133</td>
</tr>
<tr>
<td>flexum, Kze.</td>
<td>33</td>
</tr>
<tr>
<td>forniculacrum, Hook.</td>
<td>36</td>
</tr>
<tr>
<td>fraxinifolium, Schrad.</td>
<td>56</td>
</tr>
<tr>
<td>frondosum, Low</td>
<td>31</td>
</tr>
<tr>
<td>frustum, Kze.</td>
<td>129</td>
</tr>
<tr>
<td>furcatum, Kl.</td>
<td>136</td>
</tr>
<tr>
<td>fusipes, Wall.</td>
<td>132</td>
</tr>
<tr>
<td>gelidum, Kze.</td>
<td>248</td>
</tr>
<tr>
<td>giganteum, Bl.</td>
<td>50</td>
</tr>
<tr>
<td>glanduliferum, Karst.</td>
<td>94</td>
</tr>
<tr>
<td>glanduliferum, Wall.</td>
<td>110</td>
</tr>
<tr>
<td>glanduligerum, Kze.</td>
<td>93</td>
</tr>
<tr>
<td>glandulosum, Hook. et Grev.</td>
<td>6</td>
</tr>
<tr>
<td>glandulosum, Bl.</td>
<td>76</td>
</tr>
<tr>
<td>gongylodes, Schk.</td>
<td>80</td>
</tr>
<tr>
<td>gracilescens, Bl.</td>
<td>93</td>
</tr>
<tr>
<td>ASPIDIUM</td>
<td>PAGE</td>
</tr>
<tr>
<td>---------------------</td>
<td>------</td>
</tr>
<tr>
<td>grande, J. Sm.</td>
<td>55</td>
</tr>
<tr>
<td>grandifolium, Mett.</td>
<td>58</td>
</tr>
<tr>
<td>grandifolium, Pr.</td>
<td>55</td>
</tr>
<tr>
<td>Guianense, Kl.</td>
<td>38</td>
</tr>
<tr>
<td>Hamiltonianum, Wall.</td>
<td>28</td>
</tr>
<tr>
<td>Hamiltonii, Spr.</td>
<td>28</td>
</tr>
<tr>
<td>Hartwegianum, Kl.</td>
<td>21</td>
</tr>
<tr>
<td>hastulatum, Ten.</td>
<td>19</td>
</tr>
<tr>
<td>haeaclefolium, Willd.</td>
<td>45</td>
</tr>
<tr>
<td>hirsutum, Mett.</td>
<td>70</td>
</tr>
<tr>
<td>hirtipes, Bl.</td>
<td>115</td>
</tr>
<tr>
<td>hirtum, Sw.</td>
<td>128</td>
</tr>
<tr>
<td>hispidum, Sw.</td>
<td>150</td>
</tr>
<tr>
<td>Hookeri, Kl.</td>
<td>37</td>
</tr>
<tr>
<td>Hookeri, Wall.</td>
<td>74</td>
</tr>
<tr>
<td>ilicifolium, Don</td>
<td>13</td>
</tr>
<tr>
<td>immersum, Hook.</td>
<td>58</td>
</tr>
<tr>
<td>immersum, Bl.</td>
<td>112</td>
</tr>
<tr>
<td>inequale, Schlecht.</td>
<td>125</td>
</tr>
<tr>
<td>intermedium, J. Sm.</td>
<td>50</td>
</tr>
<tr>
<td>incisum, Forst.</td>
<td>88</td>
</tr>
<tr>
<td>invisiis, Popp.</td>
<td>97</td>
</tr>
<tr>
<td>juglandifolium, Kze.</td>
<td>38</td>
</tr>
<tr>
<td>Klotzschii, Hook.</td>
<td>148</td>
</tr>
<tr>
<td>Kunzeanaum, Mett.</td>
<td>102</td>
</tr>
<tr>
<td>Lachenense, Hook.</td>
<td>8</td>
</tr>
<tr>
<td>latum, Sw.</td>
<td>148</td>
</tr>
<tr>
<td>Lanicastriense, Sw.</td>
<td>121</td>
</tr>
<tr>
<td>lanuginosum, Bory</td>
<td>81</td>
</tr>
<tr>
<td>lanuginosum, Willd.</td>
<td>137</td>
</tr>
<tr>
<td>lasiastes, Kze.</td>
<td>102</td>
</tr>
<tr>
<td>latifolium, Pr.</td>
<td>51</td>
</tr>
<tr>
<td>latifrons, Brack.</td>
<td>138</td>
</tr>
<tr>
<td>Lechleri, Mett.</td>
<td>21</td>
</tr>
<tr>
<td>lentum, Don</td>
<td>11, 20</td>
</tr>
<tr>
<td>lepidocaulon, Hook.</td>
<td>12</td>
</tr>
<tr>
<td>leptorachis, Kze.</td>
<td>138</td>
</tr>
<tr>
<td>leucostictum, Kze.</td>
<td>85</td>
</tr>
<tr>
<td>Lenzcaeanum, Kze.</td>
<td>61</td>
</tr>
<tr>
<td>ligulatum, Mett.</td>
<td>112</td>
</tr>
<tr>
<td>limbatum, Sw.</td>
<td>94</td>
</tr>
<tr>
<td>lineatum, Bl.</td>
<td>75</td>
</tr>
<tr>
<td>lobatum, Mett.</td>
<td>18</td>
</tr>
<tr>
<td>Lobbit, Hook.</td>
<td>59</td>
</tr>
<tr>
<td>lobata. Bl.</td>
<td>43</td>
</tr>
<tr>
<td>Lonchitis, Spr.</td>
<td>8</td>
</tr>
<tr>
<td>lonchodes, Eaton</td>
<td>99</td>
</tr>
<tr>
<td>lucnctosum, Kze.</td>
<td>19</td>
</tr>
<tr>
<td>Ludovicianum, Kze.</td>
<td>117</td>
</tr>
<tr>
<td>macrophyllum, Sw.</td>
<td>55</td>
</tr>
<tr>
<td>macrophyllum, Bl.</td>
<td>48</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ASPIDIUM</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>macrocnorum, Kfis.</td>
<td>97</td>
</tr>
<tr>
<td>marginale, Sw.</td>
<td>122</td>
</tr>
<tr>
<td>marginatum, Wall.</td>
<td>11</td>
</tr>
<tr>
<td>melanocaulon, Bl.</td>
<td>53</td>
</tr>
<tr>
<td>melanochlamys, Fée</td>
<td>35</td>
</tr>
<tr>
<td>melanostichum, Kze.</td>
<td>150</td>
</tr>
<tr>
<td>melanostictum, Kze.</td>
<td>34</td>
</tr>
<tr>
<td>membranifolium, Mett.</td>
<td>132</td>
</tr>
<tr>
<td>meniscioides, Willd.</td>
<td>36</td>
</tr>
<tr>
<td>meniscioides, Kfis.</td>
<td>37</td>
</tr>
<tr>
<td>Menyanthidis, Pr.</td>
<td>57</td>
</tr>
<tr>
<td>microphyllum, Bl.</td>
<td>24</td>
</tr>
<tr>
<td>microsorum, Endl.</td>
<td>146</td>
</tr>
<tr>
<td>microsorum, Pr.</td>
<td>53</td>
</tr>
<tr>
<td>mohrioides, Bory.</td>
<td>26</td>
</tr>
<tr>
<td>mohrioides, Mett.</td>
<td>247</td>
</tr>
<tr>
<td>molle, Sw.</td>
<td>68</td>
</tr>
<tr>
<td>Moluccense, Bl.</td>
<td>20</td>
</tr>
<tr>
<td>Moritzianum, Kl.</td>
<td>21</td>
</tr>
<tr>
<td>mucronatum, Sw.</td>
<td>9</td>
</tr>
<tr>
<td>mucronifolium, Bl.</td>
<td>20</td>
</tr>
<tr>
<td>multifidum, Mett.</td>
<td>35</td>
</tr>
<tr>
<td>multijugum, Wall.</td>
<td>72</td>
</tr>
<tr>
<td>multilinatum, Wall.</td>
<td>78</td>
</tr>
<tr>
<td>munitum, Kfis.</td>
<td>10</td>
</tr>
<tr>
<td>Napoleonis, Bory.</td>
<td>123</td>
</tr>
<tr>
<td>nemophylum, Kze.</td>
<td>260</td>
</tr>
<tr>
<td>nemorosum, Willd.</td>
<td>129</td>
</tr>
<tr>
<td>nephrodioides, Hook.</td>
<td>42</td>
</tr>
<tr>
<td>neriforme, Sw.</td>
<td>156</td>
</tr>
<tr>
<td>nitidulum, Wall.</td>
<td>133</td>
</tr>
<tr>
<td>nitidum, Bory</td>
<td>111</td>
</tr>
<tr>
<td>nobile, Schlecht.</td>
<td>39</td>
</tr>
<tr>
<td>nodosum, Willd.</td>
<td>157</td>
</tr>
<tr>
<td>Noveboracense, Sw.</td>
<td>89</td>
</tr>
<tr>
<td>nymphale, Forst.</td>
<td>68, 96</td>
</tr>
<tr>
<td>obliquum, Don</td>
<td>14</td>
</tr>
<tr>
<td>obscureum, Bl.</td>
<td>75</td>
</tr>
<tr>
<td>obtusatum, Willd.</td>
<td>80</td>
</tr>
<tr>
<td>obtusum, Mett.</td>
<td>24</td>
</tr>
<tr>
<td>ocellatum, Wall.</td>
<td>11</td>
</tr>
<tr>
<td>ochthodes, Mett.</td>
<td>109</td>
</tr>
<tr>
<td>ocellatum, Hook.</td>
<td>24</td>
</tr>
<tr>
<td>odoratum, Willd.</td>
<td>137</td>
</tr>
<tr>
<td>oligocarpum, Künth</td>
<td>90</td>
</tr>
<tr>
<td>opposition, Kfis.</td>
<td>136</td>
</tr>
<tr>
<td>ordinatum, Kze.</td>
<td>21</td>
</tr>
<tr>
<td>Oreopteris, Sw.</td>
<td>90</td>
</tr>
<tr>
<td>orientale, Desv.</td>
<td>33</td>
</tr>
<tr>
<td>Otaria.</td>
<td>62</td>
</tr>
<tr>
<td><strong>Aspidium</strong></td>
<td><strong>Page</strong></td>
</tr>
<tr>
<td>----------------</td>
<td>---------</td>
</tr>
<tr>
<td>pachyphyllum, Kze.</td>
<td>56</td>
</tr>
<tr>
<td>pachytragis, Kze.</td>
<td>100</td>
</tr>
<tr>
<td>pallidum, Lk.</td>
<td>120</td>
</tr>
<tr>
<td>palmpes, Kze.</td>
<td>28</td>
</tr>
<tr>
<td>paludosum, Raddi</td>
<td>153</td>
</tr>
<tr>
<td>parallelogrammum, Kze.</td>
<td>117</td>
</tr>
<tr>
<td>parasiticum, Lk.</td>
<td>88</td>
</tr>
<tr>
<td>parasiticum, Sieb.</td>
<td>68</td>
</tr>
<tr>
<td>patens, Lk.</td>
<td>68</td>
</tr>
<tr>
<td>patens, Sieb.</td>
<td>78</td>
</tr>
<tr>
<td>patens, Lk.</td>
<td>151</td>
</tr>
<tr>
<td>patens, Wall.</td>
<td>78</td>
</tr>
<tr>
<td>pihylorum, Kf's.</td>
<td>111</td>
</tr>
<tr>
<td>pendulum, Raddi</td>
<td>151</td>
</tr>
<tr>
<td>pennigerum, Bl.</td>
<td>78</td>
</tr>
<tr>
<td>Pica, Desv.</td>
<td>46</td>
</tr>
<tr>
<td>pilosulum, Kl.</td>
<td>102</td>
</tr>
<tr>
<td>pilosulum, Wall.</td>
<td>141</td>
</tr>
<tr>
<td>pilosum, Langsd. et Fisch.</td>
<td>152</td>
</tr>
<tr>
<td>plantagineum, Griseb.</td>
<td>43</td>
</tr>
<tr>
<td>Plaschnickianum, Kze.</td>
<td>7</td>
</tr>
<tr>
<td>platynotus, Kze.</td>
<td>48</td>
</tr>
<tr>
<td>platypodium, Pr.</td>
<td>249</td>
</tr>
<tr>
<td>platypus, Hook.</td>
<td>149</td>
</tr>
<tr>
<td>plicatum, Pappe</td>
<td>26</td>
</tr>
<tr>
<td>plicatum, Poep.</td>
<td>247</td>
</tr>
<tr>
<td>podophyllum, Hook.</td>
<td>88</td>
</tr>
<tr>
<td>Pupipigii, Pr.</td>
<td>56</td>
</tr>
<tr>
<td>Pohlianum, Pr.</td>
<td>80</td>
</tr>
<tr>
<td>polygasarum, Bl.</td>
<td>67</td>
</tr>
<tr>
<td>polymorphum, Wall.</td>
<td>54</td>
</tr>
<tr>
<td>polyphyllum, Kf's.</td>
<td>91</td>
</tr>
<tr>
<td>Prescottianum, Wall.</td>
<td>22</td>
</tr>
<tr>
<td>Presliianum, Mett.</td>
<td>17</td>
</tr>
<tr>
<td>prionophyllum, Wall.</td>
<td>78</td>
</tr>
<tr>
<td>proliferum, Br.</td>
<td>22</td>
</tr>
<tr>
<td>proliferum, Hook. et Grev.</td>
<td>160</td>
</tr>
<tr>
<td>propinquum, Sw.</td>
<td>81</td>
</tr>
<tr>
<td>protensum, Sw.</td>
<td>130</td>
</tr>
<tr>
<td>pteroides, Bl.</td>
<td>81</td>
</tr>
<tr>
<td>pteroides, Sw.</td>
<td>80</td>
</tr>
<tr>
<td>pteropus, Kze.</td>
<td>47</td>
</tr>
<tr>
<td>puberulum, Desv.</td>
<td>47</td>
</tr>
<tr>
<td>pubescens, Sw.</td>
<td>147</td>
</tr>
<tr>
<td>paneisspiss, Sturm</td>
<td>21</td>
</tr>
<tr>
<td>pulcherrimum, Col.</td>
<td>22</td>
</tr>
</tbody>
</table>
# INDEX.

## ASPIDIUM

<table>
<thead>
<tr>
<th>Species</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspidium sloanei, Mett.</td>
<td>263</td>
</tr>
<tr>
<td>Aspidium sparsum, Spr.</td>
<td>133</td>
</tr>
<tr>
<td>Aspidium spectabile, Bl.</td>
<td>115</td>
</tr>
<tr>
<td>Aspidium spinulosum, Sw.</td>
<td>127</td>
</tr>
<tr>
<td>Aspidium splendidens, Willd.</td>
<td>153</td>
</tr>
<tr>
<td>Aspidium sporadosorum, Kze.</td>
<td>28</td>
</tr>
<tr>
<td>Aspidium sprengelii, Kf.s.</td>
<td>94</td>
</tr>
<tr>
<td>Aspidium squamatum, Willd.</td>
<td>5</td>
</tr>
<tr>
<td>Aspidium squarrosum, Don.</td>
<td>20</td>
</tr>
<tr>
<td>Aspidium stipellatum, Bl.</td>
<td>70</td>
</tr>
<tr>
<td>Aspidium stenopteris, Kze.</td>
<td>65</td>
</tr>
<tr>
<td>Aspidium stimulans, Kne.</td>
<td>115</td>
</tr>
<tr>
<td>Aspidium stigmaticum, Sw.</td>
<td>127</td>
</tr>
<tr>
<td>Aspidium stramineum, Kf.s.</td>
<td>19, 29</td>
</tr>
<tr>
<td>Aspidium subalpinum, Wall.</td>
<td>141</td>
</tr>
<tr>
<td>Aspidium subintegratum, Kze.</td>
<td>21</td>
</tr>
<tr>
<td>Aspidium sublanosum, Wall.</td>
<td>151</td>
</tr>
<tr>
<td>Aspidium sublobatum, Bl.</td>
<td>20</td>
</tr>
<tr>
<td>Aspidium subquinquefidum, Beauv.</td>
<td>130</td>
</tr>
<tr>
<td>Aspidium subtripliyllum, Hall.</td>
<td>52</td>
</tr>
<tr>
<td>Aspidium sulcatum, Ke.</td>
<td>111</td>
</tr>
<tr>
<td>Aspidium taeiopterum, Kze.</td>
<td>24</td>
</tr>
<tr>
<td>Aspidium Tejssmannianum, Hook.</td>
<td>41</td>
</tr>
<tr>
<td>Aspidium Taviyanum, Hall.</td>
<td>151</td>
</tr>
<tr>
<td>Aspidium Thelypteris, Sw.</td>
<td>88</td>
</tr>
<tr>
<td>Aspidium Thelypteroides, Sieb.</td>
<td>94</td>
</tr>
<tr>
<td>Aspidium Thomsonii, Hook.</td>
<td>7</td>
</tr>
<tr>
<td>Aspidium Trapezioioides, Sw.</td>
<td>14</td>
</tr>
<tr>
<td>Aspidium triangulum, Sw.</td>
<td>14</td>
</tr>
<tr>
<td>Aspidium tridens, Moore</td>
<td>15</td>
</tr>
<tr>
<td>Aspidium trifoliatum, Hall.</td>
<td>52</td>
</tr>
<tr>
<td>Aspidium trifoliatum, Sw.</td>
<td>45</td>
</tr>
<tr>
<td>Aspidium trifurcal, Kze.</td>
<td>15</td>
</tr>
<tr>
<td>Aspidium trístí, Mett.</td>
<td>104</td>
</tr>
<tr>
<td>Aspidium truncatulum, Sw.</td>
<td>5</td>
</tr>
<tr>
<td>Aspidium truncatulum, Gaud.</td>
<td>78</td>
</tr>
<tr>
<td>Aspidium Tsus-Simense, Hook.</td>
<td>16</td>
</tr>
<tr>
<td>Aspidium tylodes, Kze.</td>
<td>110</td>
</tr>
<tr>
<td>Aspidium uliginosum, Kze.</td>
<td>142</td>
</tr>
<tr>
<td>Aspidium uníatum, Hall.</td>
<td>73</td>
</tr>
<tr>
<td>Aspidium uníatum, Sw.</td>
<td>80</td>
</tr>
<tr>
<td>Aspidium variolosum, Wall.</td>
<td>51</td>
</tr>
<tr>
<td>Aspidium varium, Sw.</td>
<td>30</td>
</tr>
<tr>
<td>Aspidium vastum, Bl.</td>
<td>47</td>
</tr>
<tr>
<td>Aspidium velatum, Kze.</td>
<td>102</td>
</tr>
</tbody>
</table>

## ASPIDIUM

<table>
<thead>
<tr>
<th>Species</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspidium venulosum, Wall.</td>
<td>71, 81</td>
</tr>
<tr>
<td>Aspidium vestitum, Bl.</td>
<td>20</td>
</tr>
<tr>
<td>Aspidium vestitum, Brong.</td>
<td>19</td>
</tr>
<tr>
<td>Aspidium vestitum, Mett.</td>
<td>247</td>
</tr>
<tr>
<td>Aspidium viscidulum, Mett.</td>
<td>6</td>
</tr>
<tr>
<td>Aspidium viviparum, Kze.</td>
<td>15</td>
</tr>
<tr>
<td>Aspidium viviparum, Fée</td>
<td>14</td>
</tr>
<tr>
<td>Aspidium Vogelii, Hook.</td>
<td>131</td>
</tr>
<tr>
<td>Aspidium Wallichianum, Belang.</td>
<td>156</td>
</tr>
<tr>
<td>Aspleniun angustifolium, Jacc.</td>
<td>167</td>
</tr>
<tr>
<td>Aspleniun Brasilense, Sw.</td>
<td>3</td>
</tr>
<tr>
<td>Aspleniun Dubium, Gaud.</td>
<td>3</td>
</tr>
<tr>
<td>Aspleniun migipes, Hook.</td>
<td>4</td>
</tr>
<tr>
<td>Aspleniun rhizopodium, Linn.</td>
<td>4</td>
</tr>
<tr>
<td>Aspleniun Scolopendrium, Linn.</td>
<td>2</td>
</tr>
<tr>
<td>Aspleniun var. angustum</td>
<td>2</td>
</tr>
<tr>
<td>Aspleniun servulatum, Sw.</td>
<td>175</td>
</tr>
<tr>
<td>Athyrium alpestre, Roth.</td>
<td>251</td>
</tr>
<tr>
<td>Athyrium sphaerofernum, Fée</td>
<td>139</td>
</tr>
<tr>
<td>Bathmiun alatum, Fée</td>
<td>47</td>
</tr>
<tr>
<td>Bathmiun Billardieri, Fée</td>
<td>49</td>
</tr>
<tr>
<td>Bathmiun ebeneum, Fée</td>
<td>47</td>
</tr>
<tr>
<td>Bathmiun macrofernum, Fée</td>
<td>44</td>
</tr>
<tr>
<td>Bathmiun sinuatum, Fée</td>
<td>44</td>
</tr>
<tr>
<td>Bathmiun trifoliatum, Fée</td>
<td>45</td>
</tr>
<tr>
<td>Calypsoemon cucullatum, Pr.</td>
<td>176</td>
</tr>
<tr>
<td>Camptodium pedatum, Fée</td>
<td>84</td>
</tr>
<tr>
<td>Camptosorus rhizopodium, Lk.</td>
<td>4</td>
</tr>
<tr>
<td>Cardioglena levis, Fée</td>
<td>48</td>
</tr>
<tr>
<td>Cardioglena macrophylla, Fée</td>
<td>56</td>
</tr>
<tr>
<td>Cardioglena sinuosa, Fée</td>
<td>55</td>
</tr>
<tr>
<td>Cardioglena subpinnatifida, Fée</td>
<td>53</td>
</tr>
<tr>
<td>Cheilanthes ambiguus, A. Rich.</td>
<td>272</td>
</tr>
<tr>
<td>Dicksonioides, Endl.</td>
<td>272</td>
</tr>
<tr>
<td>Ericaëphora, Mett.</td>
<td>230</td>
</tr>
<tr>
<td>Rugulosa, Carm.</td>
<td>272</td>
</tr>
<tr>
<td>Cryptosorus Blumei, Fée</td>
<td>191</td>
</tr>
</tbody>
</table>

VOL. IV.
Cryptoaorus
Dioncea, Fée . . . 223
elasticus, Fée . . . 223
Secmanni, J. Sm. . . . 180
Ctenopteris rufescens, Kze.
191
venulosa, Kze. . . . 223
Cyclodium abbreviatum, Pr. 38
acrostichoides, J. Sm. 37
aristatum, Moore . . . 62
confertum, Pr. . . . 37
Cumingianum, Moore 37
heterodon, Moore . . . 37
meniscioides, Willd. . . . 37
Cyclopeltis semicordata, J. Sm.
223
Cystopteris odorata, Pr.
141
Diclisodon deparioides, Moore
139
Didymochlena
dimidiata, Kze. . . . 5
lunulata, Desv. . . . 5
sinuosa, Desv. . . . 5
squamata, Desv. . . . 5
truncatula, J. Sm. . . . 5
Diplazium pulcherrimum,
Raddi . . . . 5
Drynaria cordifolia, Fée . . . 45
latifolia, Brack. . . . 52
Dryomenis plantaginea, J. Sm.
. . . . . . . . 44
Fadyenia
prolifera, Hook. . . . 160
Glaphyropteris decussata, Pr.
. . . . 244
rude, Pr. . . . . 243
Goniophlebium incanum, J. Sm.
209
pectinatum, J. Sm. . . . 204
lepidopteris, J. Sm. . . . 212
macrocarpum, J. Sm. . . . 215
rhagadiolopis, Fée . . . 210
Goniopteris aspera, J. Sm. . . . 77
scolopendrioides, Pr. . . . 65
Grammitis adpersa, Bl. 168
attenuata, Kze. . . . 167
australis, Br. . . . . 167
Billardieri, Willd. . . . 167
clavifer, Hook. . . . . 177
caspitosa, Bl. . . . . 165
congner, Bl. . . . . 172
crassa, Fée . . . . 167
curvata, Bl. . . . . 176
denticulata, Bl. . . . . 176
fasciata, Bl. . . . . 169
fasciculata, Bl. . . . . 171
fucata, Hook. et Grev. . . . 174
heterophylla, Lab. . . . 230
hirta, J. Sm. . . . . 170
humilis, Hombr. . . . 167
limbata, Fée . . . . 164
linearis, Sw. . . . . 165
longa, Fée . . . . 169
Magellania, Desv. . . . 167
marginella, Sw. . . . . 164
myosuroides, Schk. . . . 175
nana, Fée . . . . 166
nana, Brack. . . . . 167
obscura, Bl. . . . . 170
Organeuse, Gardn. . . . 177
pilosiscula, Bl. . . . . 168
punctata, Raddi . . . . 172
pusilla, Bl. . . . . 166
pusilla, var. y, Bl. . . . 166
Reinwardtii, Mett. . . . 169
repanda, Kze. . . . . 166
rigida, Hombr. . . . . 167
serrulata, Sw. . . . . 175
setosa, Bl. . . . . 170
setosa, Pr. . . . . 175
subpinnatifidum, Bl. . . . 177
tenella, Klfs. . . . . 165
Zeylanica, Fée . . . . 170
Gymnogramme macrotis, Kze.
75
microcarpa, Fée . . . . 244
Haplodictyum heterophyllum,
Pr. . . . . 62
Hemicardion crenatum, Fée . . . 17
macroorum, Fée . . . . 17
subhastatum, Fée . . . . 17

INDEX.
<table>
<thead>
<tr>
<th>Page</th>
<th>Hemidictyon Cumingianum, Fée</th>
<th>17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page</td>
<td>Douglasii, Pr.</td>
<td>3</td>
</tr>
<tr>
<td>Page</td>
<td>Holocarpos bisulcatus, Moore</td>
<td>164</td>
</tr>
<tr>
<td>Page</td>
<td>Hypodematum onustum, Kze.</td>
<td>141</td>
</tr>
<tr>
<td>Page</td>
<td>Ruppellianum, Kze.</td>
<td>141</td>
</tr>
<tr>
<td>Page</td>
<td>Hypolepis Dicksonioides,</td>
<td>272</td>
</tr>
<tr>
<td>Page</td>
<td>Hook.</td>
<td></td>
</tr>
<tr>
<td>Page</td>
<td>Poppiigiana, Mett.</td>
<td>272</td>
</tr>
<tr>
<td>Page</td>
<td>rugulosum, J. Sm.</td>
<td>272</td>
</tr>
<tr>
<td>Page</td>
<td>uliginosum, Fée</td>
<td>142</td>
</tr>
<tr>
<td>Page</td>
<td>Hypopeltis coriacea, Bory</td>
<td>33</td>
</tr>
<tr>
<td>Page</td>
<td>lobulata, Bory</td>
<td>19</td>
</tr>
<tr>
<td>Page</td>
<td>Jamesonia adnata, Kze.</td>
<td>182</td>
</tr>
<tr>
<td>Page</td>
<td>Lastrea aenta, Kl.</td>
<td>147</td>
</tr>
<tr>
<td>Page</td>
<td>emula, Brack.</td>
<td>127</td>
</tr>
<tr>
<td>Page</td>
<td>albo-punctata, Desv.</td>
<td>85</td>
</tr>
<tr>
<td>Page</td>
<td>angustifrons, Moore</td>
<td>126</td>
</tr>
<tr>
<td>Page</td>
<td>appendiculata, Pr.</td>
<td>109</td>
</tr>
<tr>
<td>Page</td>
<td>aristata, Moore</td>
<td>28</td>
</tr>
<tr>
<td>Page</td>
<td>articulata, Brack.</td>
<td>85</td>
</tr>
<tr>
<td>Page</td>
<td>atroviens, J. Sm.</td>
<td>146</td>
</tr>
<tr>
<td>Page</td>
<td>barbigera, Moore</td>
<td>114</td>
</tr>
<tr>
<td>Page</td>
<td>Blumei, Moore</td>
<td>135</td>
</tr>
<tr>
<td>Page</td>
<td>Bornensis, Hook.</td>
<td>111</td>
</tr>
<tr>
<td>Page</td>
<td>Boryana, Moore</td>
<td>126</td>
</tr>
<tr>
<td>Page</td>
<td>Champiophi, Benth.</td>
<td>31</td>
</tr>
<tr>
<td>Page</td>
<td>cognata, Pr.</td>
<td>124</td>
</tr>
<tr>
<td>Page</td>
<td>cristata, Moore</td>
<td>127</td>
</tr>
<tr>
<td>Page</td>
<td>cristata, Pr.</td>
<td>121</td>
</tr>
<tr>
<td>Page</td>
<td>davallioides, Brack.</td>
<td>146</td>
</tr>
<tr>
<td>Page</td>
<td>decurrens, J. Sm.</td>
<td>232</td>
</tr>
<tr>
<td>Page</td>
<td>deltoida, Moore</td>
<td>104</td>
</tr>
<tr>
<td>Page</td>
<td>dilatata, Pr.</td>
<td>127</td>
</tr>
<tr>
<td>Page</td>
<td>dumetorum, Moore</td>
<td>128</td>
</tr>
<tr>
<td>Page</td>
<td>eriocarpa, Pr.</td>
<td>141</td>
</tr>
<tr>
<td>Page</td>
<td>exulta, Moore</td>
<td>150</td>
</tr>
<tr>
<td>Page</td>
<td>exigua, J. Sm.</td>
<td>92</td>
</tr>
<tr>
<td>Page</td>
<td>fulveiculata, Pr.</td>
<td>103</td>
</tr>
<tr>
<td>Page</td>
<td>fulciloba, Benth.</td>
<td>108</td>
</tr>
<tr>
<td>Page</td>
<td>fittif, Hort.</td>
<td>145</td>
</tr>
<tr>
<td>Page</td>
<td>Ficil-nas, Pr.</td>
<td>116</td>
</tr>
<tr>
<td>Page</td>
<td>Feniocci, Watson</td>
<td>128</td>
</tr>
<tr>
<td>Page</td>
<td>fragrans, Pr.</td>
<td>122</td>
</tr>
<tr>
<td>Page</td>
<td>funesta, Moore</td>
<td>129</td>
</tr>
<tr>
<td>Page</td>
<td>Goldiana, Pr.</td>
<td>122</td>
</tr>
<tr>
<td>Page</td>
<td>grossa, Pr.</td>
<td>97</td>
</tr>
<tr>
<td>Page</td>
<td>hirta, Pr.</td>
<td>129</td>
</tr>
<tr>
<td>Page</td>
<td>Lastrea Hookeriana, Pr.</td>
<td>40</td>
</tr>
<tr>
<td>Page</td>
<td>inequalis, Pr.</td>
<td>125</td>
</tr>
<tr>
<td>Page</td>
<td>Kaulfussii, Pr.</td>
<td>97</td>
</tr>
<tr>
<td>Page</td>
<td>Kohutiana, Pr.</td>
<td>97</td>
</tr>
<tr>
<td>Page</td>
<td>Kunzeana, Pr.</td>
<td>102</td>
</tr>
<tr>
<td>Page</td>
<td>lata, J. Sm.</td>
<td>114</td>
</tr>
<tr>
<td>Page</td>
<td>Leiboldiana, Pr.</td>
<td>97</td>
</tr>
<tr>
<td>Page</td>
<td>leucoplepis, Pr.</td>
<td>143</td>
</tr>
<tr>
<td>Page</td>
<td>ligulata, J. Sm.</td>
<td>112</td>
</tr>
<tr>
<td>Page</td>
<td>Malacensis, Pr.</td>
<td>73</td>
</tr>
<tr>
<td>Page</td>
<td>marginalis, Pr.</td>
<td>122</td>
</tr>
<tr>
<td>Page</td>
<td>melanochlamys, Eaton</td>
<td>35</td>
</tr>
<tr>
<td>Page</td>
<td>melanosticta, Eaton</td>
<td>35</td>
</tr>
<tr>
<td>Page</td>
<td>Mexicana, Liebm.</td>
<td>138</td>
</tr>
<tr>
<td>Page</td>
<td>mueronata, Pr.</td>
<td>103</td>
</tr>
<tr>
<td>Page</td>
<td>nemophila, Moore</td>
<td>260</td>
</tr>
<tr>
<td>Page</td>
<td>Noveboracensis, Pr.</td>
<td>89</td>
</tr>
<tr>
<td>Page</td>
<td>opaca, Hook.</td>
<td>30</td>
</tr>
<tr>
<td>Page</td>
<td>Oreopteris, Pr.</td>
<td>90</td>
</tr>
<tr>
<td>Page</td>
<td>pedata, Moore</td>
<td>84</td>
</tr>
<tr>
<td>Page</td>
<td>Philippina, Pr.</td>
<td>112</td>
</tr>
<tr>
<td>Page</td>
<td>pilosula, Moore</td>
<td>102</td>
</tr>
<tr>
<td>Page</td>
<td>Plantia, Moore</td>
<td>125</td>
</tr>
<tr>
<td>Page</td>
<td>podophylla, J. Sm.</td>
<td>87</td>
</tr>
<tr>
<td>Page</td>
<td>propinqua, J. Sm.</td>
<td>135</td>
</tr>
<tr>
<td>Page</td>
<td>remissa, Moore</td>
<td>133</td>
</tr>
<tr>
<td>Page</td>
<td>rigida, Desv.</td>
<td>120</td>
</tr>
<tr>
<td>Page</td>
<td>rubiginosa, Brack.</td>
<td>143</td>
</tr>
<tr>
<td>Page</td>
<td>semicordata, Pr.</td>
<td>17</td>
</tr>
<tr>
<td>Page</td>
<td>Serra, Pr.</td>
<td>98</td>
</tr>
<tr>
<td>Page</td>
<td>Sieboldi, Moore</td>
<td>87</td>
</tr>
<tr>
<td>Page</td>
<td>similis, J. Sm.</td>
<td>114</td>
</tr>
<tr>
<td>Page</td>
<td>spectabilis, J. Sm.</td>
<td>114</td>
</tr>
<tr>
<td>Page</td>
<td>spinulosa, Pr.</td>
<td>127</td>
</tr>
<tr>
<td>Page</td>
<td>splendens, Wall.</td>
<td>126</td>
</tr>
<tr>
<td>Page</td>
<td>squamosa, Kl.</td>
<td>103</td>
</tr>
<tr>
<td>Page</td>
<td>thelypteroides, Moore</td>
<td>95</td>
</tr>
<tr>
<td>Page</td>
<td>verrucosa, J. Sm.</td>
<td>112</td>
</tr>
<tr>
<td>Page</td>
<td>villosa, Pr.</td>
<td>135</td>
</tr>
<tr>
<td>Page</td>
<td>viscosa, J. Sm.</td>
<td>93</td>
</tr>
<tr>
<td>Page</td>
<td>Lepicystis incana, J. Sm.</td>
<td>209</td>
</tr>
<tr>
<td>Page</td>
<td>Lophodium collinium, Newm.</td>
<td>128</td>
</tr>
<tr>
<td>Page</td>
<td>Marginaria incana, Pr.</td>
<td>209</td>
</tr>
<tr>
<td>Page</td>
<td>lepidopteris, Pr.</td>
<td>212</td>
</tr>
</tbody>
</table>
Marginaria

minima, Bory . . . 209
pletbeja, Pr. . . . 213
Mecosorus marginellus, Kl. 164
nudus, Kl. . . . 165
Mesochloena asplenioideis,
J. Sm. . . . 67
Javanica, Br. . . . 67
Microbrachys apiifolia, Pr.
49
Microsorium trisidum, Fée
58
Monachosorum davallioideis,
Mett. . . . 256
Monochloena sinuosa, Gaud. 5

Nephrodium

abbreviatum, Fée . . . 38
abruptum, Pr. . . . 77
acrostichoides, Mich. 9
acrostichoides, J. Sm. 75
aecum, Hook. . . . 147
albo-punctatum, Desv. 84
Amboinense, Pr. . . . 75
amplissimum, Hook. 145
amplum, Hook. . . . 264
angustifólium, Pr. . . . 69
apicifólium, Hook. 112
apiifólium, Hook. et Arn.
49
appendiculatum, Hook.
109
Arbuseula, Desv. . . . 74
aristatum, Hook. . . . 62
Ascensionis, Hook. . . . 124
athamanticum, Hook. 125
augescens, Fée . . . . 79
auriculare, Pr. . . . 75
auro-vestitum, Hook. 101
barbigerum, Hook. . . . 113
Blumei, Hook. . . . 135
Blumei, J. Sm. . . . 62
Borneense, Hook. 111
Boryanum, Hook. 126
brachyodon, Hook. . . . 83
Braunianum, Hook. 113
Brunonianum, Hook. 113
calecaratum, Hook. 93
canescens, J. Sm. . . . 81
Caripense, Hook. . . . 99
catocarpum, Hook. . . . 259
catopteron, Hook. 137

caudiculatum, Sieb. . . . 72
decipiens, Hook. . . . 86
decompositum, Br. . . . 146
deliciatulum, Dene. . . . 151
deltoideum, Desv. . . . 103
denticulatum, Hook. 147
deparioides, Hook. . . . 139
diplazioideis, Hook. . . . 99
dissidens, Mett. . . . 66
diversilobum, Pr. . . . 68
divisum, Hook. . . . 133
delongatum, Hook. et Grev.
117
eriocarpum, Dene. . . . 140
erythrosorum, Eaton 120
ecellens, Bl. . . . 63
executum, Hook. . . . 149
exiguum, Hook. . . . 92
extension, Bl. . . . 72
falciellatum, Desv. . . . 102
falcilobum, Hook. . . . 108
Falconeri, Hook. . . . 123
Fendleri, Hook. . . . 82
ferox, Moore . . . . 77
Fijianese, Hook. . . . 143
Filix-mas, Rich. . . . 116
flaeclidum, Hook. . . . 133
floridanum, Hook. . . . 117
Fouiuseii, Lowe . . . . 127
fragans, Rich. . . . 122
funestum, Hook. . . . 129
furcatum, Hook. . . . 136
glandulosum, J. Sm. 133
globuliferum, Hook. . . . 96
Goldieanum, Hook. 121
graceleseens, Hook. . . . 93
Helsingbergii, Pr. . . . 68
<table>
<thead>
<tr>
<th>Nephrodium</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>heterophyllum, Hook.</td>
<td>62</td>
</tr>
<tr>
<td>hirsutum, Don</td>
<td>141</td>
</tr>
<tr>
<td>hirsutum, J. Sm.</td>
<td>70</td>
</tr>
<tr>
<td>hirtipes, Hook.</td>
<td>115</td>
</tr>
<tr>
<td>hirtum, Hook.</td>
<td>128</td>
</tr>
<tr>
<td>hispidum, Hook.</td>
<td>150</td>
</tr>
<tr>
<td>Hudsonianum, Brack.</td>
<td>72</td>
</tr>
<tr>
<td>immersum, Hook.</td>
<td>112</td>
</tr>
<tr>
<td>Imrayanum, Hook.</td>
<td>86</td>
</tr>
<tr>
<td>inaequale, Hook.</td>
<td>125</td>
</tr>
<tr>
<td>Jamesoni, Hook.</td>
<td>66</td>
</tr>
<tr>
<td>Javanicum, Hook.</td>
<td>67</td>
</tr>
<tr>
<td>Kaulfussii, Hook.</td>
<td>97</td>
</tr>
<tr>
<td>Kunzeanum, Hook.</td>
<td>102</td>
</tr>
<tr>
<td>latifolium, Pr.</td>
<td>76</td>
</tr>
<tr>
<td>latifrons, Hook.</td>
<td>138</td>
</tr>
<tr>
<td>Leprieurii, Hook.</td>
<td>106</td>
</tr>
<tr>
<td>Lenzeanum, Hook.</td>
<td>61</td>
</tr>
<tr>
<td>ligulatum, Hook.</td>
<td>112</td>
</tr>
<tr>
<td>limbatum, Desv.</td>
<td>94</td>
</tr>
<tr>
<td>lineatum, Pr.</td>
<td>74</td>
</tr>
<tr>
<td>lonchodes, Hook.</td>
<td>90</td>
</tr>
<tr>
<td>macrostegium, Hook.</td>
<td>148</td>
</tr>
<tr>
<td>macrotis, Hook.</td>
<td>86</td>
</tr>
<tr>
<td>macourum, Hook.</td>
<td>96</td>
</tr>
<tr>
<td>marginale, Mich.</td>
<td>122</td>
</tr>
<tr>
<td>melanopus, Hook.</td>
<td>110</td>
</tr>
<tr>
<td>membranifolium, Pr.</td>
<td>131</td>
</tr>
<tr>
<td>Mexicanum, Hook.</td>
<td>138</td>
</tr>
<tr>
<td>microsorum, Hook.</td>
<td>106</td>
</tr>
<tr>
<td>microstegium, Hook.</td>
<td>119</td>
</tr>
<tr>
<td>Milinei, Hook.</td>
<td>143</td>
</tr>
<tr>
<td>molle, Desv.</td>
<td>67</td>
</tr>
<tr>
<td>molle, Liebm.</td>
<td>104</td>
</tr>
<tr>
<td>mucronatum, J. Sm.</td>
<td>69</td>
</tr>
<tr>
<td>Napoleonis, Bory.</td>
<td>123</td>
</tr>
<tr>
<td>Noveboracense, Desv.</td>
<td>89</td>
</tr>
<tr>
<td>obliteratorum, Br.</td>
<td>151</td>
</tr>
<tr>
<td>occidentalis, Kze.</td>
<td>155</td>
</tr>
<tr>
<td>ochthodes, Hook.</td>
<td>109</td>
</tr>
<tr>
<td>oligocarpum, Hook.</td>
<td>90</td>
</tr>
<tr>
<td>oppositum, Hook.</td>
<td>136</td>
</tr>
<tr>
<td>Oreopetis, Desv.</td>
<td>89</td>
</tr>
<tr>
<td>pachyrrhizus, Hook.</td>
<td>100</td>
</tr>
<tr>
<td>Palatanganum, Hook.</td>
<td>260</td>
</tr>
<tr>
<td>Panamense, Pr.</td>
<td>91</td>
</tr>
<tr>
<td>Parishii, Hook.</td>
<td>131</td>
</tr>
<tr>
<td>patens, Desv.</td>
<td>95</td>
</tr>
<tr>
<td>pedatum, Hook.</td>
<td>84</td>
</tr>
<tr>
<td>pennigerum, Bl.</td>
<td>82</td>
</tr>
<tr>
<td>Nepheodium</td>
<td></td>
</tr>
<tr>
<td>piloso-hispidum, Hook.</td>
<td>105</td>
</tr>
<tr>
<td>pilosulum, Hook.</td>
<td>102</td>
</tr>
<tr>
<td>platypus, Hook.</td>
<td>149</td>
</tr>
<tr>
<td>Plumula, Pr.</td>
<td>10</td>
</tr>
<tr>
<td>podophyllum, Hook.</td>
<td>87</td>
</tr>
<tr>
<td>polyphyllum, Pr.</td>
<td>127</td>
</tr>
<tr>
<td>propinquum, Br.</td>
<td>79</td>
</tr>
<tr>
<td>pubescentis, Desv.</td>
<td>146</td>
</tr>
<tr>
<td>purpurascens, Hook.</td>
<td>132</td>
</tr>
<tr>
<td>Raddianum, Hook.</td>
<td>98</td>
</tr>
<tr>
<td>reedens, Hook.</td>
<td>135</td>
</tr>
<tr>
<td>refractum, Hook.</td>
<td>162</td>
</tr>
<tr>
<td>repens, Brack.</td>
<td>154</td>
</tr>
<tr>
<td>resinoso-fetidum, Hook.</td>
<td>105</td>
</tr>
<tr>
<td>rigidum, Desv.</td>
<td>120</td>
</tr>
<tr>
<td>rigidum, Bory.</td>
<td>120</td>
</tr>
<tr>
<td>rubiginosum, Hook.</td>
<td>143</td>
</tr>
<tr>
<td>sagittatifolium, Moore</td>
<td>78</td>
</tr>
<tr>
<td>Schaffneri, Fee</td>
<td>80</td>
</tr>
<tr>
<td>schizotis, Hook.</td>
<td>107</td>
</tr>
<tr>
<td>sclerophyllum, Pr.</td>
<td>65</td>
</tr>
<tr>
<td>secolpendioides, Hook.</td>
<td>65</td>
</tr>
<tr>
<td>semicordatum, Pr.</td>
<td>17</td>
</tr>
<tr>
<td>semibastatum, Hook.</td>
<td>87</td>
</tr>
<tr>
<td>Serra, Desv.</td>
<td>98</td>
</tr>
<tr>
<td>Sieboldi, Hook.</td>
<td>87</td>
</tr>
<tr>
<td>Skinneri, Hook.</td>
<td>64</td>
</tr>
<tr>
<td>Smithianum, Pr.</td>
<td>68, 81</td>
</tr>
<tr>
<td>sophoroides, Desv.</td>
<td>69</td>
</tr>
<tr>
<td>spectabile, Hook.</td>
<td>115</td>
</tr>
<tr>
<td>spherocarpum, Hook.</td>
<td>139</td>
</tr>
<tr>
<td>spinulosum, Desv.</td>
<td>126</td>
</tr>
<tr>
<td>spinulosum, Hook.</td>
<td>123</td>
</tr>
<tr>
<td>splendid, Hook.</td>
<td>126</td>
</tr>
<tr>
<td>Sprengelii, Hook.</td>
<td>94</td>
</tr>
<tr>
<td>squamigerum, Hook.</td>
<td></td>
</tr>
<tr>
<td>squamisetum, Hook.</td>
<td>144</td>
</tr>
<tr>
<td>stenopteris, Hook.</td>
<td>64</td>
</tr>
<tr>
<td>stipellatum, Hook.</td>
<td>70</td>
</tr>
<tr>
<td>stipulare, Moore</td>
<td>83</td>
</tr>
<tr>
<td>subbiauritum, Hook.</td>
<td>85</td>
</tr>
<tr>
<td>subpectinatum, Bl.</td>
<td>154</td>
</tr>
<tr>
<td>subquinquefidiurn, Hook.</td>
<td>130</td>
</tr>
<tr>
<td>Tarapotense, Hook.</td>
<td>107</td>
</tr>
<tr>
<td>tenericaule, Hook.</td>
<td>142</td>
</tr>
<tr>
<td>tenericaule, Hook.</td>
<td>266</td>
</tr>
<tr>
<td>Nepheodium</td>
<td>Oleandra</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>tenuifolium, Hook.</td>
<td>neriiformis, Cav.</td>
</tr>
<tr>
<td>terminans, J. Sm.</td>
<td>nodosa, Pr.</td>
</tr>
<tr>
<td>tetragonum, Hook.</td>
<td>pilosa, Hook.</td>
</tr>
<tr>
<td>Thelypteris, Desv.</td>
<td>Sibballi, Grev.</td>
</tr>
<tr>
<td>thelypteroides, Hook.</td>
<td>Trichitiens, Karst.</td>
</tr>
<tr>
<td>thelypteroides, Mich.</td>
<td>Walliehui, Pr.</td>
</tr>
<tr>
<td>trapezioides, Pr.</td>
<td></td>
</tr>
<tr>
<td>trichomanoides, J. Sm.</td>
<td></td>
</tr>
<tr>
<td>unitum, Sieb.</td>
<td>nodulea, Schk.</td>
</tr>
<tr>
<td>variabile, Hook.</td>
<td>obtusiloba. Schk.</td>
</tr>
<tr>
<td>velatum, Hook.</td>
<td>orientalis, Hook.</td>
</tr>
<tr>
<td>velutinum, Hook. fil. 145</td>
<td>sensibilis, L.</td>
</tr>
<tr>
<td>venulosum, Hook.</td>
<td>Struthiopteris, Sw.</td>
</tr>
<tr>
<td>venustum, J. Sm.</td>
<td></td>
</tr>
<tr>
<td>villosum, Pr.</td>
<td>Ophioglossum acuminatum,</td>
</tr>
<tr>
<td>Vogelii, Hook.</td>
<td>Houtt.</td>
</tr>
<tr>
<td>Webbiana, Hook.</td>
<td>Ophioglossum micans, Kze.</td>
</tr>
<tr>
<td>Wrightii, Hook.</td>
<td>verticillata, Reiuw.</td>
</tr>
<tr>
<td></td>
<td>Osmunda Struthiopteris, L.</td>
</tr>
<tr>
<td>Nephrolepis</td>
<td></td>
</tr>
<tr>
<td>acuta, Pr.</td>
<td>Phanerochloia juglandifolia, J. Sm.</td>
</tr>
<tr>
<td>biserrata, J. Sm.</td>
<td>Phegopteris, Pr. (§) 152-272</td>
</tr>
<tr>
<td>davallioides, Kze.</td>
<td>Phegopteris alpestris, Mett.</td>
</tr>
<tr>
<td>depauperata, De Vr.</td>
<td></td>
</tr>
<tr>
<td>exaltata, Schott.</td>
<td>brachydus, Kze.</td>
</tr>
<tr>
<td>floccigera, Moore.</td>
<td>polygalichiformis, Fée.</td>
</tr>
<tr>
<td>hirsutula, Pr.</td>
<td>Portoricensis, Fée</td>
</tr>
<tr>
<td>imbricata, Klfs.</td>
<td>rigida, Mett.</td>
</tr>
<tr>
<td>intramarginalis, Kze.</td>
<td>Seemannii, J. Sm.</td>
</tr>
<tr>
<td>neglecta, Kze.</td>
<td>thelypteroides, Fée</td>
</tr>
<tr>
<td>obliterata, Hook.</td>
<td>trickodes, J. Sm.</td>
</tr>
<tr>
<td>paleacea, De Vr.</td>
<td>Phlebognium impressum, Griff.</td>
</tr>
<tr>
<td>pendula, De Vr.</td>
<td></td>
</tr>
<tr>
<td>platyotis, Kze.</td>
<td>Phymatodes grandifolia, Pr.</td>
</tr>
<tr>
<td>rhizodes, Kze.</td>
<td>plantaginea, Pr.</td>
</tr>
<tr>
<td>tuberosa, Pr.</td>
<td>Phymatodium Philippium, Pr.</td>
</tr>
<tr>
<td>undulata, J. Sm.</td>
<td></td>
</tr>
<tr>
<td>Zollingeriana, De Vr.</td>
<td>Plectopterus gracilis, Fée</td>
</tr>
<tr>
<td></td>
<td>Pleocenia conjugata, Pr.</td>
</tr>
<tr>
<td>Neuronia asplexioides, Don</td>
<td>Cumingiana, Pr.</td>
</tr>
<tr>
<td></td>
<td>Javanica, Pr.</td>
</tr>
<tr>
<td></td>
<td>Phloepelitis grandifolia, Moore</td>
</tr>
<tr>
<td>Nothochloëa criophora, Fée</td>
<td></td>
</tr>
<tr>
<td>pinnatifida, Kze.</td>
<td>pinnatifida, Gill.</td>
</tr>
<tr>
<td></td>
<td>Podopelitis Singaporeana, Fée</td>
</tr>
<tr>
<td></td>
<td>plantaginea, Fée</td>
</tr>
<tr>
<td></td>
<td>Polydictyum cicutarium, Pr.</td>
</tr>
</tbody>
</table>

INDEX.
<table>
<thead>
<tr>
<th><strong>Polydictyum</strong></th>
<th><strong>POLYPODIUM</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>giganteum, Pr.</td>
<td>brunneum, Wall.</td>
</tr>
<tr>
<td>Menyanthis, Pr.</td>
<td>calcarum, Sm.</td>
</tr>
<tr>
<td><strong>POLYPODIUM</strong></td>
<td>cambriicum, L.</td>
</tr>
<tr>
<td>Abitaguce, Hook.</td>
<td>camptoneuron, Fée</td>
</tr>
<tr>
<td>achilleofolium, Kls.</td>
<td>cawellatum, Fée</td>
</tr>
<tr>
<td>aculeatum, L.</td>
<td>canescens, Kze.</td>
</tr>
<tr>
<td>Adenophorus, Hook. et Arn.</td>
<td>Caripense, H. B. K.</td>
</tr>
<tr>
<td>adiantiforme, Forst.</td>
<td>caudatum, Kf's.</td>
</tr>
<tr>
<td>adnatum, Wall.</td>
<td>candigerum, Wall.</td>
</tr>
<tr>
<td>adspersum, J3I.</td>
<td>Celebium, Bl.</td>
</tr>
<tr>
<td>adamantum, Sol.</td>
<td>ceterachium, Mich.</td>
</tr>
<tr>
<td>affne, Mart. et Gal.</td>
<td>chloophorum, Kze.</td>
</tr>
<tr>
<td>alpestre, Hoppe</td>
<td>chrysoplepis, Hook.</td>
</tr>
<tr>
<td>alternifolium, Hook.</td>
<td>clavifer, Hook.</td>
</tr>
<tr>
<td>alte-seaudens, Colla</td>
<td>comptoniacefolium, Desv.</td>
</tr>
<tr>
<td>amplum, H. B. K.</td>
<td>comtonioides, Desv.</td>
</tr>
<tr>
<td>Andinium, Hook.</td>
<td>concinnum, Sieb.</td>
</tr>
<tr>
<td>Aneitense, Hook.</td>
<td>conforme, Brack.</td>
</tr>
<tr>
<td>angulatum, Willd.</td>
<td>congener, Hook.</td>
</tr>
<tr>
<td>angustijrons, Kze.</td>
<td>coniifolium, Wall.</td>
</tr>
<tr>
<td>anisopteron, Kze.</td>
<td>connectilc, Mich.</td>
</tr>
<tr>
<td>anomatum, Hook. et Arn.</td>
<td>connexum, Kf's.</td>
</tr>
<tr>
<td>antifraetuosum, Kze.</td>
<td>contiguum, Brack.</td>
</tr>
<tr>
<td>apiculatum, Kze.</td>
<td>corium, Hook.</td>
</tr>
<tr>
<td>aquilinum, Th.</td>
<td>coriaceum, Sw.</td>
</tr>
<tr>
<td>arcuaturn, Moritz.</td>
<td>crinale, Hook. et Arn.</td>
</tr>
<tr>
<td>argyratum, Bory</td>
<td>erininitum, Poiret</td>
</tr>
<tr>
<td>argyrophanes, Spr.</td>
<td>erisapatum, Willd.</td>
</tr>
<tr>
<td>aristatum, Forst.</td>
<td>eristatum, L.</td>
</tr>
<tr>
<td>asperulum, J. Sm.</td>
<td>crystallinum, Kze.</td>
</tr>
<tr>
<td>asperum, Roxb.</td>
<td>Cibense, Fée</td>
</tr>
<tr>
<td>asplenifolium, L.</td>
<td>cucullatum, Nees</td>
</tr>
<tr>
<td>athyrioides, Hook.</td>
<td>cucullatum, Bl.</td>
</tr>
<tr>
<td>attenuatum, Willd.</td>
<td>eultratum, Willd.</td>
</tr>
<tr>
<td>auriculatum, Wall.</td>
<td>curvaturn, Sw.</td>
</tr>
<tr>
<td>australre, Mett.</td>
<td>darentiforme, Hook.</td>
</tr>
<tr>
<td>australre, Fée</td>
<td>davallloïdes, Mett.</td>
</tr>
<tr>
<td>barbatum, Kze.</td>
<td>decipiens, Hook.</td>
</tr>
<tr>
<td>Barterianum, Hook.</td>
<td>decorum, Brack.</td>
</tr>
<tr>
<td>Beckleri, Hook.</td>
<td>decursivo-pinnatum, Van Hall</td>
</tr>
<tr>
<td>Berteroanum, Hook.</td>
<td>decussatum, Linn.</td>
</tr>
<tr>
<td>Berteroanum, Spr.</td>
<td>deflexum, Kils.</td>
</tr>
<tr>
<td>biariculatum, Hook.</td>
<td>delicatulum, Mart. et Gal.</td>
</tr>
<tr>
<td>Billardieri, Fée</td>
<td>deltoidenum, Sw.</td>
</tr>
<tr>
<td>binerve, Hook.</td>
<td>denticulatum, Pr.</td>
</tr>
<tr>
<td>bisuleatum, Hook.</td>
<td>175</td>
</tr>
<tr>
<td>blandum, Fée</td>
<td>180</td>
</tr>
<tr>
<td>blechnoides, Hook.</td>
<td>180</td>
</tr>
<tr>
<td>brachyodus, Kze.</td>
<td>83</td>
</tr>
<tr>
<td>Polypodium</td>
<td>Page</td>
</tr>
<tr>
<td>---------------------</td>
<td>------</td>
</tr>
<tr>
<td>Diane, Hook.</td>
<td>234</td>
</tr>
<tr>
<td>dilatatum, Liebm.</td>
<td>264</td>
</tr>
<tr>
<td>dilatatum, Hoffm.</td>
<td>127</td>
</tr>
<tr>
<td>discolor, Hook.</td>
<td>188</td>
</tr>
<tr>
<td>dissimile, L.</td>
<td>219</td>
</tr>
<tr>
<td>distans, Klfs.</td>
<td>99</td>
</tr>
<tr>
<td>divergens, Sw.</td>
<td>265</td>
</tr>
<tr>
<td>diversifrons, Kl.</td>
<td>68</td>
</tr>
<tr>
<td>Domingense, Spr.</td>
<td>65</td>
</tr>
<tr>
<td>Drepanum, Hook.</td>
<td>219</td>
</tr>
<tr>
<td>Dryopteris, L.</td>
<td>250</td>
</tr>
<tr>
<td>Dryopteris, Dicks.</td>
<td>251</td>
</tr>
<tr>
<td>Eekloni, Kze.</td>
<td>209</td>
</tr>
<tr>
<td>effusum, Sw.</td>
<td>265</td>
</tr>
<tr>
<td>elasticum, Bory</td>
<td>190</td>
</tr>
<tr>
<td>ellipsoidalum, Fée</td>
<td>205</td>
</tr>
<tr>
<td>ellipticosorum, Fée</td>
<td>190</td>
</tr>
<tr>
<td>elongatum, Wall.</td>
<td>234</td>
</tr>
<tr>
<td>eriophorum, Hook.</td>
<td>229</td>
</tr>
<tr>
<td>erubescens, Wall.</td>
<td>236</td>
</tr>
<tr>
<td>falcatum, Sw.</td>
<td>9</td>
</tr>
<tr>
<td>falcatum, Thunb.</td>
<td>40</td>
</tr>
<tr>
<td>fallax, Schlect.</td>
<td>215</td>
</tr>
<tr>
<td>farinosum, Hook.</td>
<td>223</td>
</tr>
<tr>
<td>fasciatum, Mett.</td>
<td>169</td>
</tr>
<tr>
<td>ferrugineum, Mart. et Gal.</td>
<td>182</td>
</tr>
<tr>
<td>Filicula, Kl.</td>
<td>199</td>
</tr>
<tr>
<td>filipendulifolium, Fée</td>
<td>193</td>
</tr>
<tr>
<td>Filix-mas, L.</td>
<td>116</td>
</tr>
<tr>
<td>firmum, Kl.</td>
<td>185</td>
</tr>
<tr>
<td>flabelliforme, Lam.</td>
<td>187</td>
</tr>
<tr>
<td>flavo-punctatum, Kl's.</td>
<td>239</td>
</tr>
<tr>
<td>flexile, Fée</td>
<td>190</td>
</tr>
<tr>
<td>flexile, Moore</td>
<td>251</td>
</tr>
<tr>
<td>formosum, Raddi</td>
<td>259</td>
</tr>
<tr>
<td>fragrans, Vill.</td>
<td>120</td>
</tr>
<tr>
<td>Frédéricksthalianum, Kze.</td>
<td>217</td>
</tr>
<tr>
<td>frondosum, Sol.</td>
<td>31</td>
</tr>
<tr>
<td>fulvescens, Hook.</td>
<td>272</td>
</tr>
<tr>
<td>Funki, Mett.</td>
<td>190</td>
</tr>
<tr>
<td>funiculum, Fée</td>
<td>226</td>
</tr>
<tr>
<td>fucatatum, Mett.</td>
<td>174</td>
</tr>
<tr>
<td>fucatum, Desv.</td>
<td>174</td>
</tr>
<tr>
<td>furfuraceum, Schlecht.</td>
<td>213</td>
</tr>
<tr>
<td>fuscatum, Bl.</td>
<td>181</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Polyodium</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>fusco-setaceum, Bojer</td>
<td>111</td>
</tr>
<tr>
<td>gibbosum, Fée</td>
<td>178</td>
</tr>
<tr>
<td>glanduliferum, Liebm.</td>
<td>252</td>
</tr>
<tr>
<td>glandulosum, Hook.</td>
<td>103</td>
</tr>
<tr>
<td>gracile, Hook.</td>
<td>224</td>
</tr>
<tr>
<td>Gymnium, Spr.</td>
<td>214</td>
</tr>
<tr>
<td>graminidis, Br.</td>
<td>230</td>
</tr>
<tr>
<td>grandifolium, Wall.</td>
<td>58</td>
</tr>
<tr>
<td>Griffithii, Hook.</td>
<td>236</td>
</tr>
<tr>
<td>griseum, Liebm.</td>
<td>202</td>
</tr>
<tr>
<td>Haaliloanum, Brack.</td>
<td>177</td>
</tr>
<tr>
<td>Hartwegianum, Hook.</td>
<td>207</td>
</tr>
<tr>
<td>Hartwegianum, Hook.</td>
<td>220</td>
</tr>
<tr>
<td>Hasseltii, Bl.</td>
<td>257</td>
</tr>
<tr>
<td>hastaeolium, Sw.</td>
<td>232</td>
</tr>
<tr>
<td>heteromorphum, Hook. et Grec.</td>
<td>229</td>
</tr>
<tr>
<td>hexagonopterum, Mich.</td>
<td></td>
</tr>
<tr>
<td>Hillebrandii, Hook.</td>
<td>254</td>
</tr>
<tr>
<td>Hillebrandii, Hook.</td>
<td>228</td>
</tr>
<tr>
<td>Hippocrepis, Jaq.</td>
<td>49</td>
</tr>
<tr>
<td>hirsutissimum, Raddi</td>
<td>212</td>
</tr>
<tr>
<td>hirtellum, Bl.</td>
<td>166</td>
</tr>
<tr>
<td>hirtum, Hook.</td>
<td>170</td>
</tr>
<tr>
<td>hirtum, Sw.</td>
<td>129</td>
</tr>
<tr>
<td>honestum, Kze.</td>
<td>264</td>
</tr>
<tr>
<td>Hookeri, Brack.</td>
<td>171</td>
</tr>
<tr>
<td>hymenophylloides, Kifs.</td>
<td>228</td>
</tr>
<tr>
<td>inaequale, Lk.</td>
<td>259</td>
</tr>
<tr>
<td>inanum, Sw.</td>
<td>208</td>
</tr>
<tr>
<td>incisum, Sw.</td>
<td>65</td>
</tr>
<tr>
<td>inconspicuum, Bl.</td>
<td>184</td>
</tr>
<tr>
<td>Jamesonoides, Fée</td>
<td>183</td>
</tr>
<tr>
<td>jubeiforme, Kifs.</td>
<td>186</td>
</tr>
<tr>
<td>juglandifolium, H.B.K.</td>
<td>39</td>
</tr>
<tr>
<td>Jungermannioides, Kl.</td>
<td>166</td>
</tr>
<tr>
<td>Karstenianum, Kl.</td>
<td>261</td>
</tr>
<tr>
<td>Karwinskianum, Mett.</td>
<td>213</td>
</tr>
<tr>
<td>Kaulfussii, Pr.</td>
<td>165</td>
</tr>
<tr>
<td>Kegelianum, Kze.</td>
<td>180</td>
</tr>
<tr>
<td>Keraudrienianum, Gaud.</td>
<td>268</td>
</tr>
</tbody>
</table>

* It is requested that at p. 254 this name may be altered to P. Honolulense, there being already (at p. 228) a P. Hillebrandii.
## INDEX.

### POLYPodium.

<table>
<thead>
<tr>
<th>Species</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Khasyanum, Hook.</td>
<td>191</td>
</tr>
<tr>
<td>lacerum, Thunb.</td>
<td>21</td>
</tr>
<tr>
<td>lachnophyllum, J. Sm.</td>
<td>263</td>
</tr>
<tr>
<td>lanigerum, Eaton.</td>
<td>189</td>
</tr>
<tr>
<td>lanosum, Fée</td>
<td>211</td>
</tr>
<tr>
<td>Lasixanthum, Kze.</td>
<td>90</td>
</tr>
<tr>
<td>lasiosorum, Hook.</td>
<td>166</td>
</tr>
<tr>
<td>latebrosum, Wall.</td>
<td>68</td>
</tr>
<tr>
<td>laxifrons, Liebm.</td>
<td>190</td>
</tr>
<tr>
<td>laxum, Pr.</td>
<td>189</td>
</tr>
<tr>
<td>leptiderum, Mart.</td>
<td>98</td>
</tr>
<tr>
<td>lepidopteris, Kze.</td>
<td>211</td>
</tr>
<tr>
<td>leptostomum, Fée</td>
<td>183</td>
</tr>
<tr>
<td>leucosorum, Bojer</td>
<td>198</td>
</tr>
<tr>
<td>leucostachium, Kze.</td>
<td>213</td>
</tr>
<tr>
<td>leucostetum, Fée</td>
<td>188</td>
</tr>
<tr>
<td>Leucosanum, Gaud.</td>
<td>61</td>
</tr>
<tr>
<td>Lindeniaux, Kze.</td>
<td>217</td>
</tr>
<tr>
<td>Lobbianum, Hook.</td>
<td>226</td>
</tr>
<tr>
<td>lomariæforme, Kze.</td>
<td>203</td>
</tr>
<tr>
<td>Louschits, L.</td>
<td>8</td>
</tr>
<tr>
<td>longisetosum, Hook.</td>
<td>225</td>
</tr>
<tr>
<td>macrocarpus, Pr.</td>
<td>215</td>
</tr>
<tr>
<td>macrodon, Hook.</td>
<td>218</td>
</tr>
<tr>
<td>macrophyllum, Hook.</td>
<td>241</td>
</tr>
<tr>
<td>macroscorpus, Fée</td>
<td>216</td>
</tr>
<tr>
<td>Madrense, J. Sm.</td>
<td>214</td>
</tr>
<tr>
<td>Mannianum, Hook.</td>
<td>253</td>
</tr>
<tr>
<td>moratioides, Klfs.</td>
<td>218</td>
</tr>
<tr>
<td>marginellum, Sw.</td>
<td>164</td>
</tr>
<tr>
<td>Martensii, Mett.</td>
<td>207</td>
</tr>
<tr>
<td>melaneaulon, Forst.</td>
<td>53</td>
</tr>
<tr>
<td>melanopus, Grev.</td>
<td>200</td>
</tr>
<tr>
<td>melanostachium, Kze.</td>
<td>182</td>
</tr>
<tr>
<td>microlepis, Fée</td>
<td>209</td>
</tr>
<tr>
<td>millefolium, Bl.</td>
<td>227</td>
</tr>
<tr>
<td>Milnæi, Hook.</td>
<td>254</td>
</tr>
<tr>
<td>minutum, Bl.</td>
<td>188</td>
</tr>
<tr>
<td>manurum, Lk.</td>
<td>204</td>
</tr>
<tr>
<td>molle, H.B.K.</td>
<td>204</td>
</tr>
<tr>
<td>molle, L.</td>
<td>68</td>
</tr>
<tr>
<td>mollæcomum, Nees</td>
<td>181</td>
</tr>
<tr>
<td>mollieculum, Kze.</td>
<td>102</td>
</tr>
<tr>
<td>molluseculum, Wall.</td>
<td>68</td>
</tr>
<tr>
<td>molliflorum, Laytis.</td>
<td>182</td>
</tr>
<tr>
<td>monticola, Kl.</td>
<td>185</td>
</tr>
<tr>
<td>Moritzianum, Lk.</td>
<td>202</td>
</tr>
<tr>
<td>multifidum, Bory</td>
<td>174</td>
</tr>
<tr>
<td>multifidum, Jacq.</td>
<td>265</td>
</tr>
<tr>
<td>murorum, Hook.</td>
<td>216</td>
</tr>
<tr>
<td>myosuroides, Sw.</td>
<td>175</td>
</tr>
<tr>
<td>myriocarpum, Hook.</td>
<td>207</td>
</tr>
<tr>
<td>myriophyllum, Mett.</td>
<td>227</td>
</tr>
<tr>
<td>nanum, Fée</td>
<td>178</td>
</tr>
<tr>
<td>nemorale, Brack.</td>
<td>266</td>
</tr>
<tr>
<td>Noeboreseense, L.</td>
<td>89</td>
</tr>
<tr>
<td>nutans, Bl.</td>
<td>180</td>
</tr>
<tr>
<td>nutans, J. Sm.</td>
<td>180</td>
</tr>
<tr>
<td>obliquatum, Bl.</td>
<td>190</td>
</tr>
<tr>
<td>obscurum, Hook.</td>
<td>237</td>
</tr>
<tr>
<td>obscurum, Mett.</td>
<td>170</td>
</tr>
<tr>
<td>oligocarpum, Spr.</td>
<td>67</td>
</tr>
<tr>
<td>onustum, Hook.</td>
<td>216</td>
</tr>
<tr>
<td>Oreopteris, Sm.</td>
<td>90</td>
</tr>
<tr>
<td>Organense, Mett.</td>
<td>177</td>
</tr>
<tr>
<td>ornatum, Wall.</td>
<td>142</td>
</tr>
<tr>
<td>Otites, L.</td>
<td>204</td>
</tr>
<tr>
<td>palacecum, Andser.</td>
<td>261</td>
</tr>
<tr>
<td>pallidum, Brack.</td>
<td>266</td>
</tr>
<tr>
<td>paludosum, Bl.</td>
<td>244</td>
</tr>
<tr>
<td>papillosum, Bl.</td>
<td>198</td>
</tr>
<tr>
<td>Paradiseae, Langsd.</td>
<td>204</td>
</tr>
<tr>
<td>parasiticum, Mett.</td>
<td>167</td>
</tr>
<tr>
<td>paticium, Kl.</td>
<td>172</td>
</tr>
<tr>
<td>parvulum, Bory</td>
<td>184</td>
</tr>
<tr>
<td>paniciflorum, Hook.</td>
<td>242</td>
</tr>
<tr>
<td>pectinatum, L.</td>
<td>203</td>
</tr>
<tr>
<td>pectinatum, L.</td>
<td>200</td>
</tr>
<tr>
<td>pectinatum, Schk.</td>
<td>204</td>
</tr>
<tr>
<td>pediculariafolium, Pr.</td>
<td>242</td>
</tr>
<tr>
<td>pellucidum, Klfs.</td>
<td>206</td>
</tr>
<tr>
<td>pendulum, Gaudich.</td>
<td>195</td>
</tr>
<tr>
<td>pendulum, Sw.</td>
<td>194</td>
</tr>
<tr>
<td>Peruvianum, Desv.</td>
<td>186</td>
</tr>
<tr>
<td>Phegopteris, Linn.</td>
<td>245</td>
</tr>
<tr>
<td>Phyllitidis, Roxb.</td>
<td>43</td>
</tr>
<tr>
<td>piligerum, Hook.</td>
<td>226</td>
</tr>
<tr>
<td>pilipes, Hook.</td>
<td>230</td>
</tr>
<tr>
<td>pilipes, Kl.</td>
<td>231</td>
</tr>
<tr>
<td>piloisisus, Hook.</td>
<td>168</td>
</tr>
<tr>
<td>pilosisium, Mart. et Gal.</td>
<td>181</td>
</tr>
<tr>
<td>plantagineum, Jacq.</td>
<td>44</td>
</tr>
<tr>
<td>platyphyllum, Hook.</td>
<td>248</td>
</tr>
<tr>
<td>plebejun, Schlecht.</td>
<td>213</td>
</tr>
<tr>
<td>Plumier, Desv.</td>
<td>91</td>
</tr>
<tr>
<td>Plumula, H. B. K.</td>
<td>200</td>
</tr>
<tr>
<td>Poppygianum, Mett.</td>
<td>168</td>
</tr>
<tr>
<td>Poppygii, Kze.</td>
<td>272</td>
</tr>
<tr>
<td>polystrichioides, Kl.</td>
<td>249</td>
</tr>
<tr>
<td>Prionitis, Kze.</td>
<td>239</td>
</tr>
</tbody>
</table>

Vol. IV.
**Polydodium**

<table>
<thead>
<tr>
<th>Name</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>procerum, Brack.</td>
<td>269</td>
</tr>
<tr>
<td>procurrens, Kze.</td>
<td>218</td>
</tr>
<tr>
<td>pseudo-grammitis, Gaud.</td>
<td>165</td>
</tr>
<tr>
<td>pseudo-Lonchitis, Jaeq.</td>
<td>23</td>
</tr>
<tr>
<td>pteroidem, K.</td>
<td>255</td>
</tr>
<tr>
<td>pteropus, Hook.</td>
<td>192</td>
</tr>
<tr>
<td>puberulum, Schlecht.</td>
<td>220</td>
</tr>
<tr>
<td>pubescens, Raddi</td>
<td>90</td>
</tr>
<tr>
<td>pulchrum, Mart. et Gal.</td>
<td>199</td>
</tr>
<tr>
<td>punctatum, Hook.</td>
<td>172</td>
</tr>
<tr>
<td>punctatum, Spruce</td>
<td>262</td>
</tr>
<tr>
<td>pyenolepis, Hook.</td>
<td>247</td>
</tr>
<tr>
<td>Raddii, Desv.</td>
<td>212</td>
</tr>
<tr>
<td>reclinatum, Brack. 190</td>
<td>222</td>
</tr>
<tr>
<td>recurvatum, Klfs.</td>
<td>204</td>
</tr>
<tr>
<td>rigidum, Hook. et Meyer</td>
<td>246</td>
</tr>
<tr>
<td>rigidum, Desv.</td>
<td>120</td>
</tr>
<tr>
<td>rigidum, Hook. et Grev.</td>
<td>26</td>
</tr>
<tr>
<td>Robertianum, Hoffm.</td>
<td>250</td>
</tr>
<tr>
<td>rotundatum Hook.</td>
<td>238</td>
</tr>
<tr>
<td>rude, Kze.</td>
<td>243</td>
</tr>
<tr>
<td>rufescens, Bl.</td>
<td>257</td>
</tr>
<tr>
<td>rugulatum, Fr.</td>
<td>212</td>
</tr>
<tr>
<td>rugulosum, Labill.</td>
<td>272</td>
</tr>
<tr>
<td>sacatum, Fée</td>
<td>187</td>
</tr>
<tr>
<td>sagittatum, Sw.</td>
<td>232</td>
</tr>
<tr>
<td>salicifolium, Hook.</td>
<td>242</td>
</tr>
<tr>
<td>Sancti-Gabrieli, Hook.</td>
<td>233</td>
</tr>
<tr>
<td>sanctum, Sw.</td>
<td>252</td>
</tr>
<tr>
<td>Sandvicense, Hook. et Arn.</td>
<td>267</td>
</tr>
<tr>
<td>sarmentosum, Brack.</td>
<td>195</td>
</tr>
<tr>
<td>scabridum, Wall.</td>
<td>81</td>
</tr>
<tr>
<td>scabrum, Roxb.</td>
<td>77</td>
</tr>
<tr>
<td>Schkuhrii, Raddi</td>
<td>204</td>
</tr>
<tr>
<td>scolopendrioides, Hook.</td>
<td></td>
</tr>
</tbody>
</table>

*At p. 251, it is requested that this name may be altered to P. Bojeri.*
INDEX.

POLYPODIUM

subscabrum, Kl. . . 183
subserratum, Hook. . 202
subspathulatum, Brack. 173
subtile, Kze. . . 187
subtriphylum, Hook. et Arn. . . 52
suspensum, L. . . 196
suspensum, Leech. . 190
suspensum, Sieb. . . 187
sylviacium, Col. . . 249
tamarisefolium, Klfs. . . 228
tanacetifolium, Hoffm. . 127
taxifolium, L. . . 201
tenellum, Forst. . . 217
tenisculum, Thou. . . 91,270
tenisculum, Wall. . . 142
tenuisectum, Bl. . . 227
thelypteroides, Desv. . 95
thysanolepis, A. Braun . 210
Tijuccanum, Raddi . . 239
tomentosum, Thou. . 91,270
Tovarensce, Kl. . . 187
triangularum, L. . . 14
trichodes, Reinw. . . 112
tricholepis, Schrad. . . 212
trichomanoides, Sw. . . 178
trichosorum, Hook. . . 178
tridens, Kze. . . 210
trifoliatum, Linn. . . 45
trifurcatum, L. . . 194
triste, Kze. . . 104
truncicola, Kl. . . 178
Tweedeanum, Hook. . . 215
unidentatum, Hook. . . 267
et Arn. . . 267
varium, Linn. . . 30
vastum, Kze. . . 259
velatum, Schkt. . . 209
venulosum, Bl. . . 223
vestitum, Hook. . . 271
vestitum, Raddi . . . 98
vestitum, Forst. . . 20
villosissimum, Hook. . . 197
villosum, L. . . 135
Virginiaeum, L. . . 205
viscidum, Spr. . . 272
viscoso-viscidum, Th. . . 272
viscosum, Roxb. . . 272
Vogelii, Hook. . . 271
vulgare, L. . . 205

POLYPODIUM

Walkere, Hook. . . 233
xanthothrichum, Kl. . . 190
xiphopteroides, Liebm. . . 183
Zeylanicum, Mett. . . 169
Polystichum abbreviatum, Pr. . . 38
aculeatum, Roth. . . 19
acutifolium, Pr. . . 20,24
aemulum, Pr. . . 31
ampissimum, Pr. . . 145
angulare, Pr. . . 19
anomalum, Thwaites . . . 27
aristatum, Hook. fil. . . 22
biaritum, Eaton . . . 28
coriaceum, var. Hook. fil. . . 23
coriaceum, Schott . . . 33
cornu-cerei, Don . . . 28
eristatum, Roth. . . 121
Cumingianum, Pr. . . 21
cyphochlamys, Fée . . . 14
Debreuillianum, Gaud. . . 77
discretum, J. Sm. . . 20
Drepanum, Pr. . . 219
elegans, Gay . . . 26
falcatum, Fée . . . 9
falcinellum, β, Moore . . . 10
Filix-mas, Roth. . . 116
fragrans, Led. . . 122
frondosum, J. Sm. . . 31
gelidum, Kze. . . 248
Grevilleanum, Pr. . . 160
Hækenanum, Pr. . . 25,247
Haleakalense, Brack. . . 21
Hamiltonii, Moore . . . 28
heterolepis, Fée . . . 21
hispidum, J. Sm. . . 150
horizontal, Pr. . . 24
illicifolium, Fée . . . 14
Lonchitis, Roth. . . 8
melanostictum, Kze. . . 34
mucronatum, J. Sm. . . 14
obtusum, Pr. . . 24
orbiculatum, Desv. . . 21
platyphyllum, Pr. . . 249
polylepharum, Kze. . . 21
Schkuhrii, Pr. . . 150
Selbyianum, Pr. . . 21
semicordatum, Moore . . . 17
Sieberianum, Pr. . . 20
Polystichum
  spinosum, Roth. . .  127
  stimulans, Pr. . .  13
  tetragonum, Fée . .  21
  trapezioides, β, Moore . .  15
  tridens, Moore . .  15
  varium, Pr. . .  30
  venustum, Hombr. . .  22
  vestitum, Hook. . .  31
  viriparum, Fée . .  15, 21
  Wallichianum, Pr. . .  20

Pygnopteris, Siebold, Moore . .  87

Ragiopteris onocleoides, Pr. . .  160

Rumohrea aspidioides, Raddi . .  33

Sagenia alata, Moore . .  47
  calcarca, J. Sm. . .  46
  cienaria, Pr. . .  49
  grande, Moore . .  55
  grandifolia, Moore . .  58
  latifolia, var. β, Moore . .  51
  macrodonta, Fée . .  49
  macrophylla, Moore . .  56
  Mexican, Fée . .  51
  platyphylla, J. Sm. . .  57
  polymorpha, J. Sm. . .  54
  variolata, Moore . .  52

Schoffneria nigripes, Fée . .  4

Sclopendrium
  ambiguum, Raddi . .  3
  Brasiliense, Kze. . .  3
  cordatum, Fée . .  2
  Douglasii, Hook. . .  3
  Durvillai, Bory . .  2
  Hemionitis, Sw. . .  2
  Krebsii, Kze. . .  3
  Lindeni, Hook. . .  2
  Lingua, Palmstr. . .  2
  longifolium, Pr. . .  2
  minus, Fée . .  2
  nigripes, Hook. . .  3
  officinarum, Sw. . .  2
  plantaginum, Schrad. . .  3
  pinnatum, J. Sm. . .  2
  repandum, Pr. . .  3
  rhizophyllum, Hook. . .  4
  sagittatum, De Cand. . .  2
  Sibiricum, Hook. . .  4
  vulgare, Sm. . .  1

Soromanea integrifolia, Fée . .  37

Sphaerostephanus Meso-
  chlaena, J. Sm. . .  67

Stegnogramme Mesocheleaa,
  Fée . . . .  67

Stenosema aurita, J. Sm. . .  237

Struthiopteris Germanica,
  Eaton . .  161

Pennsylvaniae, Willd. 161

Tectaria Calahuala, Cav. . .  33

Sclopendrium
  granthmitidis,
  Spr. . . .  230

Jamesoni, Hook. . .  175

serulata, Klfs. . .  175

setosa, Klfs. . .  175
Tab. CCXI.

Aspidium (Polystichum) Plaschnickianum, Sw.—p. 7.

Tuft of fertile fronds, viviparous at the apex; nat. size. Fig. 1. Portion of the underside of the frond with a sorus, and showing the venation. Fig. 2. Involucere. Fig. 3. Scales from the stipes; magnified.
**Tab. CCXII.**

**Aspidium (Polystichum) Lachenense, Hook.**—p. 8.

Fig. 1. Tuft of fertile fronds; *nat. size*. Fig. 2. Pinna from the same; *magnified*. Fig. 3. Tuft with a larger frond; *nat. size*. Fig. 4. Pinna from the same; Fig. 5. Involucre; Fig. 6 and 7. Scales from the stipes; *all more or less magnified*. 
Tab. CCXIII.

Aspidium (Polystichum) caespitosum, Wall.—p. 13.
Various fronds, fertile and sterile; nat. size. Fig. 1. Portion of a pinnule, with a sorus, and showing the venation. Fig. 2. Involucre. Fig. 3. Scale from the stipes; magnified.
Tab. CCXIV.

Aspidium (Polystichum) stimulans, Kze.—p. 12.
Tuft of fertile fronds; nat. size. Fig. 1. Pinna, with sori.
Fig. 2. Portion of a pinna, with a sorus, and showing the venation. Fig. 3. Scale from the stipes; magnified.
TAB. CCXV.

Aspidium (Polystichum) tridens, Hook.—p. 15.
Tuft of fronds, sterile and fertile; nat. size. Fig. 1. Fertile pinna. Fig. 2. Involucre, seen from above. Fig. 3. Involucre, side view. Fig. 4. Scale from the stipes; magnified.
Tab. CCXVI.

Aspidium (Polystichum) mucronatum, Sw.—p. 9.
Fertile frond; nat. size. Fig. 1. Fertile pinna. Fig. 2. Portion of a pinna, with an involucre, and showing the venation. Fig. 3. Scales from the stipes; magnified.
Aspidium (Polystichum) lepidocaulon, Hook.—p. 10.

Fertile frond; nat. size. Fig. 1. Portion of the rachis, with part of a fertile pinna, with numerous scales. Fig. 2. Portion of a pinna, with old sori, showing the venation. Fig. 3 and 4. Scales from the rachis; magnified.
Tab. CCXVIII.

Aspidium (Polystichum) auriculatum, Sw.—p. 11.

Fig. 1 and 2. Apex and base of a fertile plant; nat. size. Fig. 3. Base of a fertile pinna, with sori. Fig. 4. Portion of a pinna, with an old sorus, and showing the venation. Fig. 5. Scale from the stipes; magnified.
Tab. CCXIX.

Aspidium (Polystichum) munitum, K/fls.—p. 10.

Fig. 1 and 2. Apex and base of a fertile frond; nat. size. Fig. 3. Pinna. Fig. 4. Portion of a pinna, with two sori, and showing the venation. Fig. 5. Involucre; magnified.
Tab. CCXX.

Aspidium (Polystichum) Tsussimense, Hook.—p. 16.
Fertile frond; nat. size. Fig. 1. Fertile pinnule, and showing the venation. Fig. 2. Sorus; magnified.
Tab. CCXXI.

Aspidium (Polystichum) obtusum, Metten.—p. 24.
Fertile frond; nat. size. Fig. 1. Fertile pinna. Fig. 2. Portion of a pinna, with a sorus; magnified.
Tab. CCXXII.

Aspidium (Polystichum) Richardi, Hook.—p. 23.
Fertile frond; nat. size. Fig. 1. Fertile pinnule. Fig. 2. Involucre; magnified.
Tab. CCXXXIII.

Aspidium (Polystichum) Prescottianum, Wall.—p. 22.
Fertile plant; nat. size. Fig. 1. Sterile pinna. Fig. 2. Fertile pinna. Fig. 3. Involucre; magnified.
Tab. CCXXIV.

Aspidium (Polystichum) adscendens, Hew.—p. 32.

Fig. 1. Portion of a caudex and stipes. Fig. 2. Sterile portion of a frond; nat. size. Fig. 3. Two segments; magnified.

Fig. 4. Fertile portions of a frond. Fig. 5. Fertile pinnule.

Fig. 6. Involucre (often quite lastreoid); magnified.
Tab. CCXXV.

*Aspidium (Polystichum) amabile*, Bl.—p. 25.

Fig. 1 and 2. Plant; *nat. size*. Fig. 3. Portion of a fertile pinna. Fig. 4. Involucres; *magnified*. 
Aspidium (Polystichum) varium, Sw.—p. 30.

Fig. 1 and 2. Portion of the scaly caudex, stipes, and portion of a fertile frond; nat. size. Fig. 3. Scales from the caudex. Fig. 4. Scale from the rachis. Fig. 5. Fertile pinnule, seen from beneath. Fig. 6. Involucre (often lastreoid); magnified.
Tab. CCXXVII.

Fertile fronds; nat. size. Fig. 1. Fertile pinnule. Fig. 2, Upper, and Fig. 3, Underside of an involucre; magnified.
Tab. CCXXVIII.

Aspidium (Polystichum) oculatum, Hook.—p. 24.
Fertile frond; nat. size. Fig. 1 and 2. Scales from the stipes.
Fig. 3. Fertile portion of a pinnule. Fig. 4, Front, and
Fig. 5, Side view of an involucre; magnified.
Tab. CCXXIX.

Aspidium (Polystichum) Berteroanum, Colla.—p. 33.

Fig. 1. Portion of a caudex, with a young frond, and Fig. 2, Portion of a fertile frond; nat. size. Fig. 3. Fertile pin-nule; magnified. Fig. 4. Involucre; more magnified.
Tab. CCXXX.

Aspidium (Polystichum) Seemannii, Hook.—p. 34.

Fig. 1 and 2. Fertile portions of a frond; nat. size. Fig. 2. Portion of a fertile pinna, magnified, and showing the venation. Fig. 4 and 5. Involucres; more magnified.
Tab. CCXXXI.

Aspidium (Euaspidium) semibipinnatum, Hook.—p. 59.
Fertile frond; nat. size. Fig. 1. Portion of a fertile pinna; magnified. Fig. 2. Single sorus; magnified.
**Aspidium (Euaaspidium) Lobbii, Hook.**—p. 59.

Fertile frond; *nat. size*. Fig. 1. Portion of a pinna, with sori, and showing the venation; *magnified*. Fig. 2. Smaller portion of the same; *more magnified*. 
Tab. CCXXXIII.

A. Aspidium (Polystichum) melanochlamys, Fée.—p. 35.

Fig. 1. Portion of a caudex, base of a stipes, and portion of a fertile frond; nat. size. Fig. 2. Fertile pinnule. Fig. 3. Two segments of a fertile pinnule. Fig. 4. Involucre; more or less magnified.

B. Aspidium (Polystichum) melanostictum, Kze.—p. 34.

Fig. 1. Portion of a fertile frond; nat. size. Fig. 2. Upper side of a pinnule; magnified. Fig. 3. Under side of a fertile pinnule; magnified. Fig. 4. Involucre; more magnified.

N.B.—It is requested that, at page 34 of this volume, "Tab. CCXXXIII. A." may be corrected to Tab. CCXXXIII. B.; and that, at page 35, "Tab. CCXXXIII. B." be corrected to Tab. CCXXXIII. A.

The former references to Tab. CCXXXIII. to be cancelled, and this leaf substituted.
Tab. CCXXXIV.

Aspidium (Cyrtomium) abbreviatum, Schrad.—p. 37.

Fig. 1, 2, and 3. Portions of a caudex, stipes, and fertile frond; nat. size. Fig. 4. Portion of a fertile pinna, with free venation, and involucre. Fig. 5. Involucre. Fig. 6. Portion of a fertile pinna, with anastomosing venation. Fig. 7. Involucre from the same; magnified.
Tab. CCXXXV.

Aspidium (Cyrtomium) nephrodioides, Hook.—p. 42.
Fig. 1 and 2. Portions of a fertile frond; nat. size. Fig. 3. Portion of a fertile pinna, with some involucres aspidioid. Fig. 4. Sorus with lastreoid involucre; magnified.
Tab. CCXXXVI.

Aspidium (Cyrtomium) Teijsmannianum, Hook.—p. 41. 
Stipes and frond of a fertile plant; nat. size. Fig. 1. Portion of a pinna, showing the venation and sori; magnified. Fig. 2. Smaller portion of a pinna; and Fig. 3. Involucre (showing it to be deeply ciliated); more magnified.
Tab. CCXXXVII.

Aspidium (Polystichum) fœniculaceum, Hook.—p. 36.

Fig. 1. Stipes; and Fig. 2. Small portion of a fertile frond; nat. size. Fig. 3. Pinnule; Fig. 4. Segments of a pinnule; Fig. 5. Smaller segment of a pinnule, with sorus; and Fig. 6. Involucre; all more or less magnified. (The involucres are often more orbicular than here represented.)
Nephrodium (Pleocnemia) Aristatum, Hook.—p. 62.

Fig. 1. Caudex and portion of a stipes; Fig. 2. Fertile frond; and Fig. 3. Pinnae from another frond; nat. size. Fig. 4. Portion of a pinna, showing the venation, with sori; magnified. Fig. 5. Involucre; more magnified.
Tab. CCXXXIX.

Nephrodium (Eunephrodium) Wrightii, Hook.—p. 64.
Portion of a caudex, stipes, and fertile fronds; nat. size. Fig.
1. Fertile segments; magnified. Fig. 2 and 3. Sori; more magnified.
Tab. CCXL.

A. Nephrodium (Eunephrodium) extensum, Bl.—p. 72.
   Fig. 1 and 3. Single pinnae, two varieties, with sori; nat. size.
   Fig. 2. Fertile segments of fig. 1; and Fig. 4. Fertile segments of fig. 5; magnified. Fig. 5. Involucre; more magnified.

B. Nephrodium (Eunephrodium) hirsutum, J. Sm.—p. 70.
   Fig. 1. Single fertile pinna, seen from beneath, and a portion of the rachis; and Fig. 2. Base of a pinna, seen from above, and showing the gland on the rachis; nat. size. Fig. 3. Two fertile segments; magnified. Fig. 4. Involucre; more magnified.
Tab. CCXLI.

A. Nephrodium (Eunephrodium) cyatheoides, Klj.—p. 76.
Fig. 1. Fertile pinna; nat. size. Fig. 2. Portion of a pinna, showing the venation; and Fig. 3. Portion of a pinna, with sori; magnified. Fig. 4. Involucere; more magnified.

B. Nephrodium (Eunephrodium) abruptum, Pr.—p. 77.
Fig. 1. Fertile pinna; nat. size. Fig. 2. Portion of a pinna with sori; magnified. Fig. 3. Sorus; more magnified.
Tab. CCXLII.

A. Nephrodium (Lastrea) Imrayanum, Hook.—p. 86.
   Fig. 1. Fertile pinnae; nat. size. Fig. 2. Portion of a fertile
   pinna (involucres fuller); magnified. Fig. 3. Single sorus;
   more magnified.

B. Nephrodium (Lastrea) macrotis, Hook.—p. 86.
   Fig. 1 and 2. Fertile portions of a frond; nat. size. Fig. 3.
   Portion of a pinna, with sori; magnified. Fig. 4. Involuc-
   cre; more magnified.
Tab. CCXLIII.

Nephrodium (Lastrea) decipiens, Hook.—p. 86.
Fertile frond; nat. size. Fig. 1. Portion of a fertile pinna; magnified. Fig. 2. Portion of the same, more magnified, with a single sorus. Fig. 3. Involucre; magnified.
Nephrodium (Lastrea) crinibulbon, Hook.—p. 92.
Fertile frond; nat. size. Fig. 1. Portion of a fertile frond;
Fig. 2. Involucre; and Fig. 3. Hair-like scale from the stipes; magnified.
Tab. CCXLV.

Nephrodium (Lastrea) Raddianum, Hook.—p. 98.

Fertile frond; nat. size. Fig. 1. Portion of a pinna, with sori; magnified. Fig. 2. Portion of a segment, with sorus; more magnified. Fig. 3. Involucre; and Fig. 4. Scale from the stipes; much magnified.
Tab. CCXLVI.

Nephrodium (Lasteira) aurovestitum, Hook.—p. 101.

Fertile frond; nat. size. Fig. 1. Segment of a pinna, with sori; magnified. Fig. 2. Smaller portion of a segment, with a single sorus (the involucre having fallen); more magnified.
Nephrodium (Lastrea) velatum, Hook.—p. 101.

Fertile frond; nat. size. Fig. 1. Segment of a pinna, with sori; magnified. Fig. 2. Portion of segment, with a sorus; more magnified. Fig. 3. Involucre; and Fig. 4. Scale from the stipes; much magnified.
Tab. CCXLVIII.

Nephrodium (Lastrea) apiciflorum, Hook.—p. 112.
Fertile frond; nat. size. Fig. 1. Segment of a pinna, with sori; magnified. Fig. 2. Portion of the same with a sorus; more magnified. Fig. 3. Involute; and Fig. 4. Scale from the stipes; much magnified.
Tab. CCXLIX.

Nephrodium (Lastrea) hirtipes, Hook.—p. 115.

Fig. 1. Fertile, and Fig. 2. Sterile pinna; slightly magnified.
Fig. 3. Portion of a fertile pinna; more magnified. Fig. 4. Involucre; much magnified.
Nephrodium (Lastrea) microstegium, Hook.—p. 119.
Portions of fertile frond; nat. size. Fig. 1. Pinnule of a fertile frond; magnified. Fig. 2. Segment of a pinnule, with sori (the involucres having fallen); more magnified.
Nephrodium (Lastrea) Brunonianum, Hook.—p. 113.

Fertile frond; nat. size. Fig. 1. Pinna; slightly magnified.

Fig. 2. Fertile segment; more magnified. Fig. 3. Sorus, with a portion of a segment; much magnified.
Tab. CCLII.

Nephrodium (Eunephrodium) refractum, Hook.—p. 162.
Fertile frond; nat. size. Fig. 1. Portion of a fertile pinna; magnified (the involucres concealed by the capsules).
Tab. CCLIII.

Nephrodium (Lastrea) erythrosorum, Eat.—p. 120.
Fertile frond; nat. size. Fig. 1. Fertile pinna; magnified.
Fig. 2. Portion of a pinna, with involucre; more highly magnified.
Tab. CCLIV.

Nephrodium (Lastrea) Falconeri, Hook.—p. 123.

Stipes and portion of a fertile frond; nat. size. Fig. 1. Fertile pinnule; magnified. Fig. 2. Portion of a pinnule, with involucre; more magnified.
Tab. CCLV,

Nephrodium (Lastrea) Napoleonis, Bory.—p. 123.
Fertile frond; nat. size. Fig. 1. Fertile segment; magnified.
Fig. 2. Fertile pinnule; less magnified.
Tab. CCLVI.

Nephrodium (Lastrea) cognatum, Hook.—p. 123.
Portions of the stipes of the fertile frond; nat. size. Fig. 1.
Fertile pinnule; magnified. Fig. 2. Portion of a pinnule, with sorus; more magnified.
Tab. CCLVII.

Nephrodium (Lastrea) Ascensionis, Hook.—p. 124.
Base of stipites, undeveloped frond, and fertile frond; nat. size.
Fig. 1. Pinnule; magnified. Fig. 2. Segment of a pinnule, with sorus; more highly magnified.
Tab. CCLVIII.

Nephrodium (Lastrea) athamanticum, Hook.—p. 125.

Stipes and portions of a fertile frond; nat. size. Fig. 1. Fertile pinna; magnified. Fig. 2. Portion of the same with involucre; magnified.
Tab. CCLIX.

Nephrodium (Lastrea) funestum, Hook.—p. 129.
Stipes, with portion of the caudex, and portions of a fertile frond; nat. size. Fig. 1. Fertile pinnule; magnified.
Fig. 2. Involucre; more magnified.
Tab. CCLX.

Nephrodium (Lastrea) Parishii, Hook.—p. 131.
Fertile frond; nat. size. Fig. 1. Fertile pinnule; magnified.
Fig. 2. Involucre; more magnified.
Tab. CCLXI.

Nephrodium (Lastrea) membranifolium, Pr.—p. 131.
Fertile frond and portion of the caudex; nat. size. Fig. 1.
Fertile segment; magnified. Fig. 2. Involucre; more magnified.
Tab. CCLXII.

Nephrodium (Lastrea) purpurascens, Hook.—p. 132.
Stipes and fertile frond; nat. size. Fig. 1. Fertile pinnule; magnified. Fig. 2. Involucre; more magnified.
Nephrodium (Lastrea) flaccidum, Hook.—p. 133.

Stipes, portion of a caudex, and fertile frond; nat. size. Fig. 1.
Fertile pinnule; nat. size. Fig. 2. Segment of a pinnule, with a sorus; more magnified. Fig. 3. Involucre; still more magnified.
Nephrodium (Lastrea) villosum, Hook.—p. 134.
Portion of a fertile frond; nat. size. Fig. 1. Fertile pinna; magnified. Fig. 2. Involucre; more magnified.
TAB. CCLXV.

Nephrodium (Lastrea) recedens, Hook.—p. 135.
Fertile frond and small portion of a caudex; nat. size. Fig. 1. Fertile pinna; magnified. Fig. 2. Fertile segment of a pinnule, with a sorus (wanting the involucre); more magnified.
Tab. CCLXVI.

Nephrodium (Lastrea) oppositum, Hook.—p. 136.
Lower primary pinna, and the apex of a fertile frond; nat. size.
Fig. 1. Fertile segment; magnified. Fig. 2. Involucre; more magnified.
Tab. CCLXVII.

Nephrodium (Lastrea) Mexicanum, Hook.—p. 138.
Fertile frond, and portion of a caudex; nat. size. Fig. 1.
Fertile pinna; magnified. Fig. 2. Involucre; more magnified.
Tab. CCLXVIII.

*Nephrodium (Lastrea) squamisetum*, Hook.—p. 140.

Portion of a caudex, stipes, and fertile frond; *nat. size.* Fig. 1.

Fertile pinnule; *magnified.* Fig. 2. Fertile segment, with a sorus; *more magnified.*
Tab. CCLXIX.

Nephrodiuim (Lastrea) tenericaule, Hook.—p. 142.

Base of a stipes, and portions of a fertile frond; nat. size.

Fig. 1. Fertile pinnule; magnified. Fig. 2. Portion of a fertile pinna, with a sorus (the involucre obsolete); more magnified.
Tab. CCLXX.

Nephrodium (Lastrea) squamigerum, Hook. et Arn.—p. 144.
Portion of a caudex, and a fertile frond; nat. size. Fig. 1.
Pinnule; magnified. Fig. 2. Involucre; more magnified.
Tab. CCLXXI.

Nephrodium (Lastrea) acutum, Hook.—p. 147.
Base of a stipes, and (Fig. 3) a portion of the frond; nat. size.
Fig. 1. Involucre; much magnified. Fig. 2. Fertile segment of a pinna; less magnified.
Tab. CCLXXII.

A. **Polypodium** (Eupolypodium) **sessilifolium**, Hook.—p. 168.
   Fig. 1. Portion of a fertile frond; magnified. Fig. 2. Fertile fronds; nat. size.

B. **Polypodium** (Eupolypodium) **Zeylanicum**, Metten.—p. 169.
   Fig. 1. Portion of a fertile frond; magnified. Fig. 2. Fertile fronds; nat. size.
Tab. CCLXXIII.

A. Polypodium (Eupolypodium) hirtum, Hook.—p. 170.

Fig. 1. Portion of a frond, upper side; and Fig. 2. Portion of a fertile frond, seen from beneath; magnified. Fig. 3. Fertile fronds; nat. size.

B. Polypodium? (Eupolypodium) binerve, Hook.—p. 175.

Fig. 1. Segment, with a single vein; and Fig. 2. Segment, with two veins; magnified. Fig. 3. Sterile fronds; nat. size.
Tab. CCLXXIV.

A. Polypodium (Eupolypodium) subscabrum, Kl.—p. 183.
   Fig. 1. Portion of a fertile segment of a frond; highly magnified. Fig. 2. Fertile segment; less highly magnified. Fig. 3. Fertile fronds; nat. size.

B. Polypodium (Eupolypodium) parvulum, Bory.—p. 184.
   Fig. 1. Portion of a fertile segment; highly magnified. Fig. 2. Fertile segment; less highly magnified. Fig. 3. Sterile and fertile fronds; nat. size.
Tab. CCLXXV.

A. Polypodium (Eupolypodium) subtile, Kze.—p. 187.
   Fig. 1. Fertile segment of a frond, from which the sori have been removed; and Fig. 2. Fertile segment, with sori; magnified. Fig. 3. Fertile fronds; nat. size.

B. Polypodium (Eupolypodium) pteropus, Hook.—p. 192.
   Fig. 1. Portion of a fertile segment; highly magnified. Fig. 2. Portion of fertile segment; less highly magnified. Fig. 3. Fertile frond; nat. size.
Tab. CCLXXVI.

A. Polypondium (Eupolypondium) glandulosum, Hook.—p. 193.
   Fig. 1. Fertile segment, with sori; and Fig. 2. Sterile segments; magnified. Fig. 3. A tuft of fronds; nat. size.

B. Polypondium (Eupolypondium) Skinneri, Hook.—p. 215.*
   Fig. 2. Portion of a fertile pinna, with sori; highly magnified.
   Fig. 3. Fertile pinna; less highly magnified. Fig. 1 and 4. Scales from the frond; highly magnified. Fig. 5. Caudex and fertile frond; nat. size.

* It is requested that “Tab. CCLXXXVI.” at this page (215) may be corrected to Tab. CCLXXVI.
Tab. CCLXXVII.

A. **Polypodium (Eupolypodium) alternifolium**, *Hook.*—p. 222.
   Fig. 1. Fertile frond; *nat. size.* Fig. 2. Fertile pinna; *magnified.* Fig. 3. Portion of a fertile pinna; *more highly magnified.*

B. **Polypodium (Eupolypodium) athyrioides**, *Hook.*—p. 224.
   Fig. 1. Fertile frond; *nat. size.* Fig. 2. Fertile pinna; *magnified.* Fig. 3. Portion of a pinna, with a sorus, and the apex of sterile vein; *more magnified.*
Tab. CCLXXVIII.

A. Polypodium (Eupolypodium) longisetosum, Hook.—p. 225.
   Fig. 1. Portion of a fertile pinna, with the sorus removed, showing the vein; *highly magnified.* Fig. 2. Fertile pinna; *less highly magnified.* Fig. 3. Fertile frond; *nat. size.*

   Fig. 1. Portion of a fertile pinna, with one sorus removed; *highly magnified.* Fig. 2. Fertile pinna; *less highly magnified.* Fig. 3. Fertile frond; *nat. size.*
Tab. CCLXXIX.

A. Polypondium (Eupolypondium) Hillebrandii, Hook.—p. 228.
   Fig. 1. Ultimate fertile pinnatifid segment (or pinna), with sori; magnified. Fig. 2. Primary compound segment or pinna; slightly magnified. Fig. 3. Frond, and portion of the caudex; nat. size.

B. Polypondium (Eupolypondium) decipiens, Hook.—p. 231.
   Fig. 1. Fertile portion of a pinna; much magnified. Fig. 2. Fertile pinna; less magnified. Fig. 3 and 4. Fertile frond; nat. size.
Tab. CCLXXX.

Polyodium (Phegopteris) pteroideum, Kl.—p. 255.

Fig. 1. Portion of a fertile pinnule; and Fig. 2. Portion of a sterile one (showing the venation); magnified. Fig. 3 and 4. Stipes, and small fertile portion of a large frond; nat. size.