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# 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

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VOL. V.

CONTAINING

POLYPODIEÆ—ACROSTICHEÆ.

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# SPECIES FILICUM.

## SUBORD. IX.—POLYPODIEÆ. Gen. I. POLYPODIUM, continued from Vol. IV.

All the following species of the Genus have the veins more or less anastomosing, and may be called DICTYOPTERIDÆ. They may be divided into the following Sections or Subgenera, which by many are considered distinct genera:—

- |   |  |
|---|--|
| § 3. Goniopteris, Sp. 224–249.<br>§ 4. Cyrtomiphlebium, Sp. 250.<br>§ 5. Phlebodium, Sp. 251–253.<br>§ 6. Goniophlebium, Sp. 254–282.<br>§ 7. Craspedaria, Sp. 283–290.<br>§ 8. Campyloneurum, Sp. 291–297. | § 9. Nipholobus, Sp. 298–320.<br>§ 10. Phymatodes (including Lecanopteris, BL), Sp. 321–389.<br>§ 11. Drynaria, Sp. 390–398.<br>§ 12. Dipteris, Sp. 399–401.<br>§ 13. Dictyopteris, Sp. 402–409. |
|---|--|

§ 3. GONIOPTERIS.—Costules or primary veins pinnate, secondary ones or veinlets having one (the lower one) or more pairs angularly connivent, and from those united ones producing an excurrent veinlet which is either free or it unites with the angles above, thus forming as it were a more or less distinct pseudocostule, which often reaches to a sinus. Goniopteris, Pr., and others.—This corresponds with § Eunephrodium among Nephrodium. The species are mostly tropical, with generally pinnated fronds. In some cases this group is not easily distinguished from Meniscium. Sp. 224–249.

\* Fronds simple, entire or sinuato-lobate, or only and rarely pinnate at the base. Sp. 224–226.

224. P. (Goniopteris) *crispatum*, Hook. (viz Linn. ?); caudex moderately stout oblique clothed with ferruginous scales, stipites tufted filiform 1–4 inches long hispid with long spreading fulvous hairs, fronds 5 inches to a foot long linear-lanceolate subsucculent pendulous obtusely acuminate more or less deeply lobato-pinnatifid with rounded or rarely obtusely trigonal lobes ciliated with fulvous hairs, costa flexuose, primary veins also flexuose one to each lobe pinnately twice or thrice branched, veinlets connivent or free, sori dorsal on the veinlets small oval sunk in cavities of the frond about 6 to each lobe in 2 series remote from the margin.—*Ctænopteris* (Glyphotenium) *crispatum*, J. Sm. in *Seem. Bot.*

of the Herald, p. 227. f. 48. *Goniopteris*, Moore (but scarcely *Pol. crispatum*, Linn., founded on the *Asplenium alterum*, *propendens*, et *crispum*, Plum. Fil. t. 102. f. 2. B).

Hab. Isle de Cacagnal, Southern Darien and Bay of Choco, Panama. *Seemann*, n. 995.—Mr. J. Smith places this in *Ctænopteris*, which should have free veins, but he deems it worthy of constituting a new genus (*Glyphotænium*). Its venation corresponds very nearly with that of § *Pleocnemia* of *Nephrodium* (see p. 61 of our Vol. IV.), but the habit of the plant is very different.

225. P. (*Goniopteris*) *simplicifolium*, Hook.; caudex stout creeping, stipites tufted at the apex of the caudex 2–4 inches long hairy subpaleaceous below, fronds a span to a foot long subcoriaceous-membranaceous lanceolate acuminate the margins entire or subsinuate at the base lobate or pinnate, connivent veinlets numerous giving a reticulated appearance, sori small at the point of union of the veinlets at length confluent and meniscioid.—*Nephrodium simplicifolium*, J. Sm. *Aspidium* (*Nephrodium*), Hook. Ic. Plant. t. 919 (or Cent. of Ferns, t. 19). *Abacopteris simplicifolia*, Fée, Gen. Fil. p. 310.

Hab. Samar, Philippine Islands, *Cuming*, n. 315. Fiji Islands, n. 736, *Seemann*.—Misled by the views of others, I was induced, in Ic. Plant., to refer this to *Nephrodium*, acknowledging however that I failed to discover any involucre, and noticing the resemblance of its fructification to that of *Meniscium*. I have since received other specimens from the Fiji Islands which quite conform to those of *Cuming*. *Mettenius* refers *Cuming's* plant to *Nephrodium lineatum*, Pr.

226. P. (*Goniopteris*) *canescens*, Bl.; “fronds pinnated below, from the middle to the apex pinnatifid pubescent on the upper canescenti-villous on the lower surface, pinnæ sessile ovate obtuse slightly (nearly halfway down to the rachis) pinnatifid, segments subfalcato-ovate obtuse entire the margins reflexed, stipes glabrous above pubescent beneath.”—*Bl. En. Fil. Jav.* p. 133. *Gymnogramme*, Bl. Fil. Jav. p. 93. t. 40. *Nephrodium Blumei*, J. Sm., and *Aspidium Blumei*, var. *subpinnata*, *Metten. Aspid.*, according to the references to *Blume*, but surely different, for that has the venation of *Pleocnemia* (see p. 62, n. 3 of our Vol. IV.).

Hab. Java, *Blume*.—I am unacquainted with this species. It is represented as having a creeping caudex, copious slender stipites a span and more long, fronds of the same length, venation of *Goniopteris*, sori on the middle of the veinlets subrotund or oblong; the figure however shows the sori (really always involucre) to be those of a *Polypodium* rather than of *Gymnogramme*.

\*\* *Fronds pinnate.* Sp. 227–249.

227. P. (*Goniopteris*) *crenatum*, Sw.; caudex a stout horizontal rhizome, stipes 1–2 feet long stramineous glossy often pubescent, fronds membranaceous 1–1½ foot long more

or less pubescenti-hirsute especially on the rachis and costæ and veins beneath pinnated, pinnae 9-11 distant terminal one similar to the rest long-petioled 6-8 inches long  $1\frac{1}{2}$ -2 inches wide lower ones subpetiolate upper lateral ones sessile all of them broad-oblong rather suddenly and shortly acuminate the margin subentire or crenato-lobate, veinlets very numerous most of the pairs connivent the produced veinlet generally free uppermost ones free only in the short lobes, sori dorsal on the middle of all the united veinlets thus forming 2 series between each pair of costules or primary veins.—*Sw. Syn. Fil. p. 37. Willd. Sp. Pl. v. p. 189. Goniopteris, Pr., Hook. Gen. Fil. t. 38. Phegopteris, Metten. Phegopt. p. 25. Polyp. meniscioides, P. faucium, and P. imbricatum, Liebm. Fil. Mex.—Plum. Fil. p. 93. t. 111.—Var.  $\beta$ , Gheisbegtii; twice the ordinary size villosa-tomentose. Pol. Gheisbegtii, Linden, Cat. p. 18, a cultivated form, as is P. crenatum, Hook. Fil. Exot. t. 84.*

Hab. Tropical America; frequent in the West India Islands and on the continent, Mexico, *Liebm. Linden, n. 1499. Central America, Cuming, n. 1156. Ecuador, Guayaquil, Spruce* (no number).—Liebmann's specimens are quite glabrous, and form a striking contrast with the var. *Gheisbegtii*.

228. *P. (Goniopteris) tetragonum*, Sw.; caudex "erect," stipes angular subtetragonal when dry, 1-2 feet long, frond firm-membranaceous ovate- or oblong-acuminate scarcely narrowed at the base 1-3 feet long more or less pilosulous especially on the costæ and veins pinnatifid at the apex or terminated by a more or less petioled pinna resembling the lateral ones pauci- or multijugate, pinnae rather distant petioled 4-8 or even 10 inches long  $\frac{1}{2}$  an inch to  $1\frac{1}{2}$  inch broad oblong lanceolate gradually acuminate upper ones more or less obtuse and quite truncate at the base the inferior ones attenuated there by the dwarfing of the lobes all of them more or less deeply pinnatifid often about halfway down to the rachis, the segments ovate obtuse or acute entire, veinlets 10-15 pairs of which 2 or 3 of the lowest ones are connivent all bearing sori in a line between the costule and the margin, capsules echinate or glabrous.—*Sw. Syn. Fil. p. 77. Willd. Sp. Pl. v. p. 203.—a, angustifolia; pinnae narrow-lanceolate. P. tetragonum, Schk. Fil. p. 22. t. 18. Goniopteris, Pr. Phegopteris, Metten. Phegopt. p. 22. Polyp. subtetragonum, Link. P. Caripense, Sieb.— $\beta$ , latifolium; pinnae longer broad-lanceolate. Pol. megalodus, Schk. Fil. p. 24. t. 19 b;*

*Klf. En. Fil. p. 109.* Phegopteris, *Metten. Phegopt. p. 24.* Polyp. affine, *Lowe, Fil. 2. t. 50,* and to this *Mettenius* refers as his *Phegopt. obliterata, Metten. Phegopt. p. 46.*

Hab. Tropical America, most abundant in the West Indies and on the mainland from Brazil and Guiana to the Pacific, and in Central America.\*—Swartz says most justly of *P. megalodus*, Schk., "hujus (*P. tetrag.*) non nisi varietas:" both forms are well represented by Schkuhr himself. Willdenow takes no notice of *P. megalodus*, and does not refer to Schkuhr's figure of *P. tetragonum*, and he places it in his section "frondibus bipinnatifidis." His remark, "species admodum varians," is correct, more so than what follows, "sed facile stipite tetragono laevi agnoscenda." Its chief distinguishing characters are perhaps the attenuated base of the lower pinnae and the terminal petiolated one; but the latter is by no means to be depended upon, for the petiole is not always present, and the apex becomes gradually or suddenly pinnatifid. Some specimens, too, very much resemble forms of *Nephrodium molle*; in which, however, independent of the presence of involucre, there is seldom more than one pair of veinlets united.

229. *P. (Goniopteris) fraxinifolium*, Jacq., Kaulf.; caudex "ascending," stipes 1-2 feet long glabrous, fronds 1-2 feet long ovato-lanceolate glabrous subcoriaceo-membranaceous dark-green now and then gemmiferous pinnated with a terminal pinna generally longer than the rest, pinnae subpetiolate all of them 3-6 inches long from a subcuneated base lanceolate finely acuminate, the margins entire or subcrenato-sinuate, lowest pair of veinlets patent connivent at a very acute angle whence the veinlet is continuous towards the margin the rest of the veinlets also directed towards the margin free or here and there connivent within the margin, sori dorsal on the veins copious forming about 4 series between the costa and the margin on each side, of which those of the costal series are generally the largest.—*Jacq. Ic. Rar. t. 639. Sw. Syn. Fil. p. 38. Willd. Sp. Pl. v. p. 195. Goniopteris, Pr. P. proliferum, Kaulf. En. Fil. p. 107. Phegopteris, Metten. Phegopt. p. 24. Pol. viviparum, Raddi, Fil. Bras. p. 22. t. 32 (very good). Goniopteris, Brack. Pol. diversifolium, Sw. Vetensk. Acad. Hand. 1817. p. 60.*

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\* As this is a species often misunderstood and very common, I may here refer to some specimens in my herbarium which have been circulated with numbers:—Var. *a.* Amazon, *Spruce, n. 1107.* New Granada, *Linden, n. 1011, Holton, n. 44.* Guiana, *Schomburgk, n. 135.* Ecuador, *Spruce, n. 5258.* Peru, *Matheus, n. 1845.* Panama, *Fendler, n. 403, Cuming, n. 1301* (very large and passing into var. *β*). Martinique, *Sieber, Fl. Mart. n. 332, "P. concinnum," Sieber, Otto, n. 119.* Cuba, *C. Wright, n. 817, and n. 1109, "Aspid. tetragonum," Metten. fide Eaton, (Nephrod., p. 103 of our last vol.), but it surely is our Pol. tetrag., large specimen.*—Var. *β.* Venezuela, *Fendler, n. 200.* New Granada, *Linden, n. 261 and 1011.* Cuba, *C. Wright, n. 1010* (pinnules 10 inches long, 1½ inch broad). Ecuador, *Spruce, n. 5719.*

Hab. Caracas, *Willd.*; Brazil, about Rio, very abundant; island of St. Sebastian, S. lat. 24°, *Mr. Fox*.—A most distinct and well-marked species.

230. *P.* (Goniopteris) *Sandwicense*, Hook.; “subarborescent, caudex 1½ foot long erect,” stipes 1½–2 feet long “paleaceous at the base” fulvo-villous above and on the rachis, fronds 2–3 feet long a foot and more wide coriaceous-membranaceous glabrous or pilosulous on the veins beneath broad ovato-lanceolate moderately acuminate pinnate, pinnae numerous subdistant sessile or short-petioled 5–8 inches long 1–1½ inch wide from a broad often sharply auricled base elongato-oblong acuminate more or less falcate very coarsely lobato-serrate the serratures acute or obtuse, terminal pinna rather longer petioled, veinlets erecto-patent subdistant often alternate 7–9 pairs all united (except in the teeth of the margin), sori small subrotund or oblong generally on the middle of the veinlet but forming 2 very irregular series.—*Stegnogramme*, *Brack. Fil. U. S. Expl. Exped. p. 26. t. 4. f. 2.*

Hab. Sandwich Islands, near the crater of Kilauea, *Brackenridge, Dr. Hillebrand, n. 48.*—The copious sori on my specimens are rarely elongated, certainly not at all approaching to the quite linear fructifications of *Stegnogramme aspidioides*, Bl., with which Brackenridge compares it, in which moreover the upper pinnae of the fronds are gradually confluent into a deeply pinnatifid apex (see our figure of that plant, Ic. Plant. t. 950, or Cent. of Ferns, t. 50). Its nearest affinity is *P. pennigerum*, Forst.

231. *P.* (Goniopteris) *unitum*, Hook.; caudex?, stipes “1–1½ foot long stramineous glabrous,” fronds 2½–3 feet long 8–12 inches wide broad-oblongo-lanceolate membranaceous dark-green often gemmiferous pinnate, terminal pinna large lanceolate lateral ones horizontal 4–6 inches long rather distant often exactly opposite from a broad truncated subauricled sessile base oblong gradually and finely acuminate, the margin lobato-pinnatifid, lobes rounded entire or subdenticulate, veinlets about 5–6 distant pairs of which the 3 or 4 lowest are connivent and bear the small sori close to the base where they are subconfluent and then oblong, they form 2–3 costular series distant from the margin.—*Gymnogramme*, *Kze. in Linnæa*, xviii. p. 115. *Phegopteris*, *Metten. Phegopt. p. 22.* *Goniopteris patens*, *Fée, Gen. Fil. p. 252.* *G. sylvatica*, *Pappe and Rawson, Eu. Fil. Cap. p. 39.*

Hab. Natal, *Guenzius*.—A distinct and very remarkable species.

232. *P.* (Goniopteris) *reptans*, Sw.; caudex short small erect often very paleaceous, stipes tufted stramineous slender and as well as the rachis glabrous, fronds firm-membra-

naceous 5 inches to a foot long 1-3 inches wide subhirsute linear-lanceolate or broad-lanceolate erect or flexuose and decumbent creeping and rooting at various points and proliferous pinnate, pinnæ distant from  $\frac{1}{2}$  an inch to 2 inches long from a broad subpetiolated base oblong obtuse lobato-pinnatifid, the superior base auriculiform rarely the lower one, lobes rounded entire, veins opaque flexuose lowest pair of veinlets uniting at a great distance from the costule and forming a large acute areole the rest generally free, sori small scattered, a minute fimbriated scale is considered by Mettenius to be an indusium.—*a*, *radicans*; frond slender creeping and rooting, pinnæ entire free to the apex yet often ternate or deeply pinnatifid. *P. reptans*, *Sw. Syn. Fil. p. 36. Willd. Sp. Pl. v. p. 186. Goniopteris, Pr. P. Sloanei, Desv. (not Kze.). Aspid. reptans, var. 3, radicans, Metten. Aspid. p. 99. Sloane, Jam. t. 29 and 30.—β*, *asplenioides*; frond larger erect, pinnæ large, the apex pinnatifid. *P. asplenioides*, *Sw. Syn. Fil. p. 36. Willd. Sp. Pl. v. p. 188. Goniopteris, Pr. Woodsia pubescens, Spreng. in Nov. Act. Acad. Leop. x. p. 233. t. 16. f. 5-7 (very good).*

Hab. West Indies, both forms especially abundant in Jamaica and Cuba. Guatemala, *Salwyn. Venezuela, Fendler, n. 201*, pinnæ very broad. Brazil (*Mettenius*).—Swartz and others quote the figure of Sloane's *Jam. t. 43, f. 2*, as the authority for the *Polyp. asplenioides*. This is a stout coarse-looking Fern, a foot and more long and 6 inches broad, which appears to me to have more affinity with some forms of *P. tetragonum*. Such imperfect figures scarcely deserve a reference.

233. *P. (Goniopteris) asterothrix*, Hook.; “caudex an oblique rhizome,” stipes a span long and as well as the rachis patently villous, frond a foot long firm membranaceous more or less villous especially on the costa and veins beneath (hairs sometimes forked) oblongo-lanceolate pinnatifid at the apex, pinnæ distant especially the lower ones  $1\frac{1}{2}$ -2 inches long  $\frac{1}{2}$ - $\frac{3}{4}$  of an inch broad oblong obtuse sessile lobato-pinnatifid, lobes oval rounded entire, the bases united by a callous line, sinuses acute, veinlets 4-5 pairs pellucid straight the lowest pair connivent the next pair meeting at the callous line, sori in 2 lines between the costule or primary vein and the margin.—*Goniopteris, Fée, Gen. p. 253. Phegopteris, Metten. Phegopt. p. 21.*

Hab. Cuba, *Linden, n. 1878 (n. 1917, according to Fée)*.—Resembling a large form of *P. reptans*, but the whole plant is larger, the stipes and rachis stouter, very hairy, and the venation is very different. I fail to see the stellated hairs

which gave rise to the specific name, but some of the hairs are forked. The costæ beneath have long spreading hairs.

234. *P. (Goniopteris) costatum*, Hook.; caudex?, stipes?, frond 3 feet long a foot and more wide ovato-oblong acuminate coriaceous dark-brown when dry with a rufous tinge especially on the stout rachis and costa beneath subglabrous pinnated to the very acuminate apex, pinnæ patent sessile opposite below, the rest alternate 8–10 inches long from a broad base an inch and more wide oblong gradually acuminate deeply pinnatifid, segments very numerous oblong or linear-oblong obtuse obscurely serrated at the apex, veinlets approximate numerous 20–25 pairs deeply impressed on the upper side very elevated beneath 2–4 of the lowest pairs connivent, sori copious forming 2 compact lines between the costule and the margins subconfluent.—*Goniopteris costata*, *Brack. Fil. U. S. Expl. Exp. p. 28*.

Hab. Society Islands, in damp hollows, alt. 1000 feet, *Bidwill, Brackenridge*. Fiji Islands, *Brackenridge*.—A noble and very handsome species. I have seen no authentic specimen of it, but I cannot doubt our specimens from Mr. Bidwill being identical with the *Goniopteris costata*, Brack.

235. *P. (Goniopteris) longissimum*, Hook.; “subarborescent, fronds large pinnate, pinnæ sessile horizontal subalternate approximate coriaceous long-linear attenuate pinnatifid, segments oblong-linear subfalcato-acute setose on the margin and veins, sori small approximate.”—*Goniopteris*, *Brack. Fil. U. S. Expl. Exp. p. 29. t. 5*.

Hab. High mountains of Tahiti, rare, *Brackenridge*.—“Trunk stout, erect, 2–3 feet high, crowned with large spreading pinnate fronds 3–4 feet broad.” I am indebted to Mr. Brackenridge for 3 pinnæ of this Fern. They are 1½ foot long and 1½ inch broad, but destitute of sori. I fear it is too near the *P. costatum* from the same island; the texture, venation, and the colour (rufescent) correspond.

236. *P. (Goniopteris) pennigerum*, Forst.; caudex very stout erect almost a span long (2–3 feet, *Brack.*) coarse with roots and remains of stipites paleaceous at the crown, stipites tufted scaly at the base 4–6 inches to 1½ foot long, fronds 1–3 feet long firm-membranaceous broad-oblong lanceolate acuminate pinnated pinnatifid at the apex, pinnæ often opposite patent 4–6 inches and more long ½ an inch to nearly an inch wide and more, distant below sessile from a broad truncated rarely auriculate base oblong rather obtusely acuminate pinnatifid about halfway down to the rachis with ovate entire obtuse lobes, veinlets 6–8 pairs quite straight 2 lowest pairs connivent the upper of the two at the sinus, sori one

on the middle of each veinlet.—*Forst. Prodr. p. 82. Schk. Fil. p. 17. t. 22. Goniopteris, J. Sm. Hook. fil. Fl. N. Zeal. ii. p. 40. Aspid., Sw. Syn. Fil. p. 250 (not Bl.). Nephrodium, Desv.*

Hab. Abundant in N. Zealand, Northern and Middle Island, as far south as Akaroa.—This, in general structure and venation, may be considered to represent, in sect. *Goniopteris* of *Polypodium*, *Nephrodium molle* among the *Eumephrodia*, but it is quite glabrous, and instead of having a wide geographical range it is, we believe, wholly confined to N. Zealand.

237. *P. (Goniopteris) pallidivenium*, Hook.; caudex stout very long creeping underground tortuous black branched and rooting, stipes moderately stout 1–1½ foot long and as well as the rachis stramineous-brown glabrous, fronds 1½ foot long coriaceous-chartaceous glabrous and subglossy oblong-ovate acuminate pinnate, pinnæ 4–5 inches long  $\frac{1}{2}$ – $\frac{3}{4}$  inch wide spreading sessile from a truncated (sometimes a little contracted) base oblong or oblong-lanceolate acuminate serrated at the apex the rest pinnatifid  $\frac{3}{4}$  of the way to the rachis with rather numerous oblong subfalcate entire or obscurely serrated, segments  $\frac{1}{4}$  of an inch long, veinlets numerous 15–20 pairs paler than the frond a little prominent on both sides (most so beneath) the two lowest pairs connivent, sori copious near the middle of the veins subconfluent in 2 lines on each side the costule.

Hab. River Bagroo, west tropical Africa, *G. Mann, n. 909.*—This is remarkable for the long, underground, black, stout, creeping caudex, a span long yet broken off at both ends, and the almost pergamentaceous fronds, and the pale-coloured close-placed veins. The general form of the pinnæ however is scarcely different from that of *Nephrod. molle*, and should involucre be detected, which I have failed to find, it must be removed to the neighbourhood of that species.

238. *P. (Goniopteris) oppositifolium*, Hook.; caudex?, stipes from a span to 2½ feet long yellowish-brown glabrous pubescent epaleaceous, fronds from 1–5 feet long firm coriaceous-membranaceous blackish when dry glabrous ovate or oblong-ovate finely acuminate somewhat attenuated at the base (from the dwarfed pinnæ) pinnate with a rather deeply pinnatifid large and petioled pinna at the extremity, lateral pinnæ very numerous on the larger specimens in rather distant exactly opposite spreading sessile pairs, 2 or 3 of the shorter and uppermost pairs only subalternate 4–9 inches long  $\frac{1}{2}$  to nearly 1 inch wide, from a truncated broad base sometimes auricled above and below oblong but gradually and at the apex very finely acuminate almost cordate very



coarsely and sharply sublobato-serrate, veinlets elevated 6-8 pairs of which 4-5 are connivent, sori very small suboval on the middle of all the veinlets in 2 series between each pair of costules, rachis pubescent.

Hab. Peak of Island of St. Thomas, W. trop. Africa, alt. 5000 feet, *G. Mann.*—A perfectly new and well-marked species. The pinnae are not only opposite on all the specimens, but, owing to the broad truncated base being applied close to the rachis, they have the appearance of being perfoliate.

239. *P. (Goniopteris) Brackenridgii*, Hook.; “stipes black angular paleaceous at the base, fronds pinnate, pinnae alternate subpetiolate pinnatifid coriaceous glabrous glossy above, segments oblong obtuse setose at the margin, rachis furrowed, sori biserial hairy placed near the margin.”—*Goniopteris glandulifera*, *Brack. Fil. U. S. Expl. Exped. p. 29 (not Polyp. glandulif., Liebm.)*.

The author places this between his *Goniopt. costata* and his *G. longissima*, but does not mention in any way its affinities. The stipes is said to be 2 feet long, with 2 rows of glands, abortive pinnules, and the frond 4 feet. Unknown to me.

240. *P. (Goniopteris) urophyllum*, Wall.; caudex?, stipes 2 and more feet long sometimes very stout testaceous brown paleaceous at the base with rather large dark-brown subulate scales, fronds ample firm but not thick coriaceous rarely membranaceous, glabrous or pilosulous above and more or less densely pubescent and sometimes subscabrous or minutely glandulose beneath 2-3 and more feet long subovate pinnated, pinnae distant petioled below 8 inches to 1½ foot long ½-2½ inches wide from a more or less obtusely and unequally cuneated base elliptical-oblong finely caudato-acuminate quite entire or subsinuated more or less grossly obtusely or rarely acutely serrated upwards, terminal pinna most so often larger than the rest and long-petioled, veinlets numerous 15-20 pairs all connivent save the few in the teeth or serratures soriferous in the middle, the sori consequently forming 2 series each between the costules and the spurious costule, or orbicular or 2-lobed sori are borne at the point of junction of the 2 veinlets and are then uniserial.—*Wall. Cat. n. 299 (excl. n. 3)*. *Goniopteris*, *Pr. Phegopteris*, *Metten. Phegopt. Pol. asperum, Pr. Reliq. Haenk. p. 24. t. 3. f. 4*. *Goniopteris, Pr. Meniscium cuspidatum, Bl. Fil. Jar. p. 102. t. 45. (excellent, but sori too long and narrow)*. *Phegopteris, Metten. Phegopt. p. 25*. *Nephrodium glandulosum, J. Sm. in Hook. Bot. Journ. iii. p. 411 (according to the reference to Cu-*

*ming*, n. 16, not of Blume). *Aspidium repandum*, Bl. *Fil. Jav.* p. 144 in *Herb. nostr.* (not Willd.)— $\beta$ , uniseriale; sori uniseriale. *P. granulosum*, Benth. *Fl. Hongkong.* p. 499 (according to the specific character and the locality of Col. Urquhart), not of Presl. *Nephrod. glandulosum*, J. Sm. in *Seem. Bot. Herald*, p. 428?

Hab. Assam and Penang, Wallich. Assam and Sikkim, Griffith, Hooker *fil.* and Thomson (often with quite entire pinnules and deeply tinged with red). Philippine Islands, Cuming, n. 178? Nos. 314 and 361 are referred by Mr. J. Smith, and I think correctly, to *Meniscium cuspidatum*, Bl., and I believe they are the *M. Cumingii* of Fée, Gen. p. 222. They are comparatively small specimens, with nearly entire pinnae turning almost black when dry, the veins sunk, not sensibly elevated; they vary from a simple or undivided frond (with sori), in others with 1-3 and 5 or more pinnae. I have nearly the same form from Moulmein, Parish, n. 135, but destitute of sori. Moulmein and Rangoon, Thomas Lobb, Parish (who sends the membranaceous pinnule of a young frond with evidently a minute cordiform scale or involucre before there is any appearance of capsules). China: Chusan, Hance; Java, Blume, Thos. Lobb, De Vriese and Teijsmann, n. 326, Millett (sori generally biseriate, rarely united and meniscioid). Penang, Sir W. Norris, Hance (pinnae lanceolate). Luzon, Cuming, n. 16 (with indistinct traces of a hairy involucre). Ceylon, Gardner, n. 1137 (more membranaceous and narrower pinnae, fronds mostly deeply tinged with red). Fiji Islands (more serrated and somewhat approaching *P. multilineatum*, Wall.), and island of Aneiteum, N. Hebrides, Macgillivray, n. 877, and Milne, n. 355 (very large, rachis and costae cinnamon-red, pinnae 18 inches long and  $2\frac{1}{2}$  broad. Labuan, Motley, n. 331. Hongkong, Urquhart.—Ever since 1822 this Fern has been known and circulated by the generous Wallich under the appropriate name of *Pol. urophyllum*. My valued correspondent Mr. Parish has lately convinced me that a minute indusium is seen upon the undeveloped sorus, which may require this (and possibly the same may be found in an equally early stage upon other species of *Goniopteris*), and thus necessitate its transfer to *Eunephrodium*. Blume refers the species to *Meniscium*, and his figure would almost justify him; but all my Java specimens indicate (with rare exceptions) a distinct biserial arrangement of rounded sori, and Blume himself says, “sori sublongi aut ovals aut saepe subrotundi, solitarii in ramis singulis brevissimis venarum lateralium.” Mettenius places it in his *Goniopteris* group of *Phegopteris*, and remarks, as distinctive of its species, “soros binos distinctos arcibus macularum procreant;” whereas, “in *Meniscio* sporangia sorum continuum, arcus macularum omnino occupantem efformant.” It is quite certain that, as far as the East Indian meniscioid *Polypodia* are concerned, the origin of the apparently solitary sorus is often at the point of union of the two veinlets, extending as it were laterally down the veinlets; and I am far from certain that position of sori on the veinlets is even of specific value, as in a following species, *P. multilineatum*. Whether the two genera (or subgenera) should be kept asunder is very much a matter of opinion.

The var.  $\beta$  has every appearance of a small specimen, with few pinnae, of *P. urophyllum*, and Mr. Bentham not unnaturally concluded it to be such, for he has referred to that as a synonym; but the sori are here invariably uniseriale! and so subrotund as not to give the idea of these being two confluent sori of a *Polypodium*. It is very unlike the figure of *P. glandulosum*, Pr., whatever that may be. The *Nephrod. grandulosum* of J. Sm., above quoted, is founded on two plants of Cuming: one, *Aspid. glandulosum* of Bl. (see p. 76 of Vol. IV. of this work), Cuming's n. 298; the other, Cuming's n. 16, *P. urophyllum*, Wall. and of us.

241. *P. (Goniopteris) barbatum*, Hook.; “stipes paleaceous

with blackish setæ, frond subcoriaceous glossy 3 feet long ovate, beneath on the costa and margin setulose with white hairs pinnated, pinnæ numerous approximate patent 1 foot long 10 lines wide sessile linear gradually attenuated pinnatifidly inciso-serrate the prolonged apex entire, lobes triangular-ovate acute united by a scariose winged margin produced into a tooth in the sinus, secondary veins (costules) standing out at an angle of  $4^{\circ}$  from the costa, tertiary veins (veinlets) 10-12 pairs lowest or inferior ones anastomosing superior connivent separated by a scariose wing, sori appressed to the costules, inferior ones oblong superior rotundate" (*Metten.*).—*Goniopteris*, *Fée*, *Gen. Fil.* p. 252. *Phegopteris*, *Metten.* *Phegopt.* p. 224. *Goniopt. aspera*, *J. Sm. not Pr.* (*Metten.*)

Hab. Luzon, *Cuning*, n. 172.—By some accident my original specimens of this Fern are mislaid. Unfortunately Mr. Smith gives no specific character, and *Fée* and *Mettenius* make no allusion to its affinity.

242. P. (*Phegopteris*) *Borneense*, *Hook.*; caudex?, stipes 5 inches long slender glabrous, frond firm-membranaceous 7 inches long ovate-oblong acuminate glabrous pinnate, pinnæ  $1\frac{1}{2}$  to  $1\frac{3}{4}$  inch long  $\frac{3}{4}$ -1 inch wide broad-oblong suddenly acute slightly falcate quite sessile truncated at the base and distinctly auricled above subserrated upwards, terminal pinna twice as large as the lateral ones petioled and suddenly caudato-acuminate coarsely serrated in the lower half, costules slender subflexuose, veinlets rather distant horizontal 6-8 pairs nearly all connivent and subhorizontal more or less produced, sori small rather irregular but near the middle of each veinlet forming 2 subequidistant series.

Hab. Borneo, Labuan, *Thos. Lobb.*—A very peculiar and distinct species, quite unlike anything which I am acquainted with; the united produced veinlets are often quite absent, and the nearly horizontal direction of the veinlets themselves causes the areoles to be of a square form, with or without a central uniting veinlet.

243. P. (*Goniopteris*) *multineatum*, *Wall.*; caudex?, stipes 2 feet and probably much more long stout glabrous as well as the rachis, frond probably 3-4 feet long firm-coriaceous pale yellowish-green glabrous pinnated, pinnæ approximate numerous 8-15 inches long 1-2 inches wide from a truncated sessile base elongate moderately acuminate, the margin everywhere strongly and sharply serrated, costa and costules and even veinlets elevated on both sides especially beneath, veinlets 16-20 pairs close placed nearly the whole of them connivent and soriferous in the middle and biserial.—*Wall. in Herb. nostr.*

Hab. Indian continent : Sylhet, *Wallich* ; Sikkim, Assam, Parasnath, Pundua, *Hook. fil. and Thomson* ; Boutan, *Booth* ; Gowhatti, *Simons* ; Kumaon, *Griffith*.—A very fine and large species, with some affinity to *P. lineatum* but more to *P. urophyllum*, especially in the position of the sori ; but the shape of the pinnae is very different and all are coarsely serrated. It seems to be a large-growing species with very numerous parallel veins, and the texture is peculiarly rigid.

244. *P. (Goniopteris) lineatum*, Colebr. ; caudex ? , stipes  $1\frac{1}{2}$  foot and more long rather stout scaleless glossy and as well as the rachis strongly tinged with red (rarely stramineous), fronds 1–2–3 feet long broad-oblong or -lanceolate coriaceous-submembranaceous pinnated glabrous, pinnae numerous rather distant patent sessile 5–8 inches long  $\frac{1}{2}$  an inch or little more broad (on sterile fronds sometimes exceeding an inch) from an obliquely cuneato-truncate sessile base (lower ones rather more attenuated and subpetiolate) lanceolate or elongato-oblong finely acuminate at the apex the margin coarsely and sharply submucronato-serrated, serratures pointing a little forward uniform, costae prominent beneath of the same colour as the rachis and stipes generally reddish, veinlets about 6–8 pairs of which all are connivent except 2–3 short pairs in the teeth of the serratures, sori in 2 series on the middle of the veinlets.—*Colebr. in Herb. Wall., and Wall. Cat. n.* 300. *P. costatum*, *Wall. Herb.* (not *Goniopteris costata* of *Brack.*)

Hab. Mountains, northern India, Nepal and Kumaon, *Wallich, Strachey and Winterbottom*, alt. 3500 feet, *n.* 15. Simla, *Col. Bates.* Nimhlow, Silhet, and Mishmee, *Griffith.* Ceylon, *Mrs. Genl. Walker.*—This is the *P. lineatum*, *Colebr.*, but the *P. costatum* of *Wall. Herb.* (not *Goniopteris costata*, *Brack.*) Its nearest affinity is with *P. rubidum*, *J. Sm.*

245. *P. (Goniopteris) rubidum*, *Hook.* ; caudex ? a span and more long and as well as the rachis cinnamon-red glabrous, frond 1–1 $\frac{1}{2}$  foot or more long subcoriaceous-membranaceous subovate dark-brown or blackish with a reddish tint (probably succulent when recent) pinnated, pinnae all shortly petioled 5–8 inches long by  $\frac{3}{4}$ –1 inch wide from a cuneate base oblong-lanceolate finely acuminate entire obscurely serrated terminal one the largest long-petioled, costa almost black except in var.  $\beta$ , veins or costules scarcely elevated beneath, veinlets about 10 pairs nearly all connivent but the united and produced portion is short not reaching to the next pair above, sori always at the base of the veinlets thus forming 2 distant series.—*Goniopteris*, *J. Sm., in Hook. Bot. Journ.* iii. p. 395 (*name only*).—Var.  $\beta$ , pinnae thicker

broader towards the base, the margin subundulato-lobate, costa very prominent cinnamon-red.

Hab. Luzon, *Cuming*, n. 415. Java, *De Vriese and Teijsmann*, n. 41.—Mr. Cuming's specimens very much resemble those of some of his which I have brought under *P. urophyllum*, but the pinnae are longer and narrower and the sori are clearly at the base of the veinlets and close to the costules; they have the same position in the Java specimens.

246. *P.* (Goniopteris) *Pauangianum*, Hook.; caudex?, stipes (portion of) and rachis moderately stout quite glabrous cinnamon-red, fronds ample membranaceous dark-green glabrous pinnated, pinnae (8–10 pairs only of the base of the frond) 6–9–10 inches long 1–1½ inch broad from a cuneate subattenuated subpetioled base elongato-oblong lanceolate finely acuminate coarsely and sharply submucronately and subduplicato-serrated, serratures moderately patent uniform, veinlets 8–9 pairs very frequently alternate (not opposite as is usual in *Goniopteris*, consequently the 5–6 pairs which are connivent or united are so by means of the spurious veins formed by the prolongation of the united pairs and this is slender and more or less flexuose, sori at the base of each veinlet forming 2 closely placed series only separated by the primary vein or costule.—*Pol. urophyllum*, *Wall.*, var. *angusta*? “*Pol. lineatum*,” *Wall. Cat.* n. 299. 3.

Hab. Penang, *Wallich*.—I have only the lower portion of two specimens a foot or more long of this Fern, each with 10 very uniform pairs of pinnae as described above. It cannot be the *P. urophyllum* of Wallich, for that has never sharp serratures; the texture alone would distinguish it also from that and from *P. lineatum*, with which the serratures agree; and there are more striking characters in the alternate veinlets and in the basal insertion of the sori, so that the two series are unusually wide apart.

247. *P.* (Goniopteris) *proliferum*, Pr.; caudex thickish subrepand, stipites clustered erect varying in length, fronds glabrous or pilosulous 1–2 feet and more long subcoriaceous glabrous pinnated and at the apices and the axils of the pinnae repeatedly proliferous and widely extended, pinnae 3–6 inches long sessile oblong-lanceolate acuminate sometimes auricled at the base entire or in age coarsely crenato-serrate, veinlets 4 to 5 pairs or 8–10 in the longer pinnae connivent and forming a continued spurious vein or costule, sori oval rather than subrotund in the middle of the veinlet sometimes near the point of junction and then confluent and meniscioid.—*Roxb. in Wall. Cat.* n. 312 (not *Kaulf.*). *Meniscium*, *Sw. Syn. Fil.* p. 19 and 207, *Hook. 2d Cent. of Ferns*, t. 15, *Willd. Sp. Pl.* v. p. 135. *Goniopteris*, Pr. *P. luxurians*, Kze. *Phegopteris*, *Metten.*

*Phegopt. p.* 25. *Ampelopteris elegans*, Kze. in *Bot. Zeit.* vi. p. 114, and *A. firma*, Kze. in *Linnæa*, xxiv. p. 133.

Hab. India, König; apparently universal in hilly regions, Wallich, Griffith, Hook. fil. and Thomson, etc. Luzon, Cuming, n. 168. Java, Zollinger. S. China, Sampson (from Mr. Hance). S. Africa, Robinson.—A very variable species, remarkable for its prolific tendency and apparently climbing habit. The sori are not sufficiently elongated either for *Gymnogramme* or for *Meniscium*.

248. P. (*Goniopteris*) *arthrothrix*, Hook.; caudex?, plant villous with soft spreading glossy brown sericeous distinctly jointed hairs more copious beneath and longest on the costæ, stipes (upper portion only) as well as the rachis densely fusco-villous with patent hairs, fronds 1 foot and probably more long 5-6 inches broad firm membranaceous dark brown when dry ovate-oblong acuminate pinnatifid at the apex, pinnæ rather distant subpetiolate 3-4 inches long  $\frac{1}{2}$ - $\frac{3}{4}$  inch wide from a broad truncated rarely auricled base oblong obtusely acuminate upwardly obtuse (not acuminate) the margin quite entire on the lower ones crenate or lobato-crenate, veins distant flexuose sunk, veinlets 3-4 pairs distant one or two lower pairs united so as to form large areoles the rest free or rarely united but from the united lowest pair a produced veinlet extends to the margin forming an imperfect spurious vein or costule, sori on the middle of the veinlet or at the junction of a veinlet smallish subrotund and apparently sometimes more or less elongated.

Hab. Madagascar, Bojer, Lyall.—This is too remarkable a plant to leave unnoticed, and which I have received from two different collectors, although I could wish for more, and more perfect, specimens to describe from. If a *Goniopteris*, it is very aberrant in its venation: the costules or primary veins are not distinct and parallel, and the sori are placed very irregularly, here and there two seem to be confluent.

249. P. (*Goniopteris*) *pæcilophlebium*, Hook.; caudex?, stipes a span and more long slender glabrous as is the whole plant, fronds 10-12 inches long and as much broad very firm membranaceous subdeltoid pinnate, pinnæ about 7, lateral ones in distant pairs subalternate subpetiolate, terminal one generally the largest long petiolate 6-9 inches long  $1\frac{1}{2}$ -2 inches broad broad-lanceolate acuminate, margin a little thickened serrated nearly entire at the base and at the very apex, primary veins or costules rather distant, veinlets erecto-patent 6-7 pairs, lowest pair elongated always free and parallel with the costules the rest united or free, the united apices sending out a short free veinlet and forming a continu-

ous vein or spurious costule, sori small solitary near the middle of the veinlets.

Hab. Dunk Island, N.E. coast of Australia, *Macgillivray, Voy. of the Rattlesnake*.—A very distinct peculiar species. but as the sori are in a measure obliterated I cannot be sure of its being exinvolucrate. Habit of some of the *Cyrtomium* group, but the venation more that of *Goniopteris*, only the basal veinlets (and sometimes the next pair) are always free.

§ 4. CYRTOMIPHLEBIUM.—*Habit and venation of Cyrtomium.* Sp. 250.

250. *P.* (*Cyrtomiphlebium*) *dubium*, Hook.; caudex short thick erect crowned with a dense mass of imbricated subulato-lanceolate jet-black glossy scales  $\frac{1}{2}$ – $\frac{3}{4}$  inch long brownish at the margin, stipites tufted 1–2 feet and more long firm stout stramineous the base clothed with the scales just described the rest as well as the rachis paleaceous with thin membranaceous ferruginous lacerated subovate scales, fronds 1–2 and 3 feet long firm subcoriaceous glabrous pinnated scarcely pinnatifid at the apex, pinnæ 3–5–6 inches long  $\frac{3}{4}$ – $1\frac{1}{2}$  inch wide from a broad cuneate base truncated and auricled above ovato-lanceolate subsalcate serrated or bipinnate in the lower half and then elongated 6–9 inches long uppermost ones pinnatifid and strongly lobed at the margin, pinnules 1– $1\frac{1}{2}$  inch long rhomboid acute sharply serrated towards the point, veins or veinlets all diverging from the costa erecto-patent forked and anastomosing into very elongated areoles rarely except towards the apex and at the margin free, sori irregular varying in size subrotund or oval dorsal on the free or anastomosing veinlets.—*Phegopteris*, *Karst. Fl. Columb.* v. 1. p. 109. t. 84.—Var. *a*, fronds pinnate.—Var. *β*, fronds bipinnate.

Hab. *a*, Péru, *ex Herb. Ruiz and Pavon.* Ecuador, *Jameson.* Mount Tunguragua, *Spruce, n.* 5264 and 5265 (sori very large oval). *β*, Andes of Ecuador, *Spruce, n.* 5263. Bogotá, *Karsten*.—In the course of my investigation of the Polypodiaceous Ferns I am frequently startled with the appearance of species which have little or nothing to distinguish them from others in the Aspidiaceous group save that the sori are destitute of involucre. Such is the case with the one now under consideration; yet so great is its resemblance to the East Indian *Aspid.* (*Cyrtomium*) *caducum*, Wall., that Moore, in his *Ind. Fil.*, refers these South American Ferns of Spruce to the *A. caducum*. Besides, however, the exinvolucrate sori (and if others had overlooked them in the dried state, Mr. Spruce, who has sent the specimens as true "*Polypodium*," could not have done so in the living state), there is a different form in the rhomboid pinnules, and there is a difference in the venation, on which Mr. Moore will lay more stress than I have the credit of doing. In *P. dubium*, in the pinnated form, the veins anastomose more than in *Aspid. caducum* (where sometimes the pinnæ are all free-veined), the free veinlets which do appear are never within an areole, nor do these ever bear a terminal sorus, and in the pinnules of the bipinnate fronds the venation equally anastomoses. Time and experience may teach us the true value to be placed both on the venation and the involucre.

§ 5. PHLEBODIUM, Br.—Veins reticulated, with free included veinlets in the areoles. Free veinlet excurrent, directed towards the margin. Sori on the converging apices of 2 or more included veinlets, the costal areoles sterile.—Chrysopteris, Link. Sp. 251–253.

251. P. (Phlebodium) *aureum*, Linn.; caudex creeping moderately stout clothed with bright tawny slender subulate soft scales, stipes 2 feet and more long stout at first pruinose at length glossy stramineous or brown, fronds a span to 2–5 feet long subcoriaceous-membranaceous often more or less glaucous subovate or oblong deeply nearly to the rachis pinnatifid, segments 3–35 and more spreading 4 inches to a foot long  $\frac{1}{2}$  an inch to  $1\frac{1}{2}$  inch wide oblong or linear-oblong or lanceolate blunt or acuminate entire lowest pair or 2 pairs often separate from the rest, terminal one generally elongated, veinlets forming narrow costular areoles which have no included veinlets and several longer and broader areoles in one or two series with 2–3 parallel included veinlets of which the lower series bear a large sorus at their united apices and sometimes a second series between the costæ and the margin, sori (sometimes oval) in one or two series parallel with the margin, the veinlets variously reticulated—Var. *a*, sori uniserial, *Link. Sp. Pl. p. 1546, Schk. Fil. p. 13. t. 12 (venation very incorrect), Sw. Syn. Fil. p. 32, Willd. Sp. Pl. v. p. 169, Metten. Polypod. p. 100.* Pleopeltis, Pr. Phlebodium, Br., Moore. Chrysopteris, Lk. Pol. areolatum, H. B. K. in *Willd. Sp. Pl. v. p. 172?*, *Metten. Fil. Hort. Lips. p. 35 (and this is Chrysopt. sporadocarpum, Lk., not Willd., according to Metten.)*. Phlebotium, J. Sm. Polyp. pulvinatum, J. Sm. Polyp. sporadocarpum, *Willd. Sp. Pl. v. p. 171, Metten. Fil. Hort. Lips. p. 36. t. 25. f. 12.* Phlebot., Moore, *Ind. Fil. t. 58. f. 1.* Polypod. pulvinatum, *Lowe, Fil. ii. t. 56 (with syns.)*. Polyp. araneosum, *Mart. et Gal. Fil. Mex. p. 33. t. 3. f. 2 (venation execrable)*. An Pol. glaucinum et P. fulvum, *Mart. and Gal. t. 5. f. 1. and t. 6?*—*Plum. Fil. t. 76.*—Var. *β*, sori biserial. P. dictyocallis, *Lowe, Fil. 2. t. 36 (specimen derived from Mr. Moore)*. Chrysopteris, *Fée*. Phlebot. J. Sm. Phleb. multiseriale, *Moore, Gard. Chron. 1855.*

Hab. Var. *a*, very common in the West Indian Islands: Cuba, *C. Wright, n. 803 (P. areolatum, Eat.)*. Tropical America: Ecuador, *Spruce, n. 5240*; Venezuela, *Fendler, n. 241 (P. areolatum, Eat.)*; Brazil, *Gardner, n. 116*; Mexico, *Mart. and Gal. n. 6413 and 6460, Hartweg, n. 1860, Linden, n. 192*; Galapagos, *Capt. Wood*. U. States: East Florida, *Buckley (segments more acuminate)*.—Var. *β*, St. Vincent, *L. Guilding*; Martinique, *Belanger*; British Guiana, *Appun, n. 175, Schomburgk, n. 356*; Surinam, *Hostmann, n. 945.*—This common species varies



much in size and in the more or less glaucous colour of the foliage. *P. sporadocarpium*, *P. arcolatum*, and *P. pulvinatum* are chiefly known as garden species, and all that I have seen under those names I should have no hesitation in referring to *P. aureum*. My native specimens with a double series of sori (and those not invariably so) exactly correspond with the figure of Lowe, derived from Mr. Moore.

252. *P.* (*Phlebodium*) *decumanum*, Willd.; caudex creeping clothed with aureo-fulvous long flexuose linear-subulate fimbriated scales, stipes thick as a goose-quill 2 and more feet long brown glossy, frond ample firm subcoriaceo-membranaceous 1-3 and more feet long subovate deeply nearly to the stout rachis pinnatifid, segments 5-20 or more distant large a span-1½ foot long 1½-3 inches wide oblong or broad-lanceolate acuminate crenato-sinuate rather than serrated, terminal segment large elongated, primary veins or costules evident regular straight distant between which are two series of parallel areoles extending nearly to the margin each with 3 included veinlets connivent and soriferous at the apex rarely are there a few narrow costular areoles (so common in *P. aureum*) free from veinlets, the marginal venation is irregularly reticulated, sori very copious small forming 8-10 somewhat irregular longitudinal series and numerous very regular geminate transverse ones.—*Willd. Sp. Pl. v. p. 170. Metten. Polypod. p. 100. t. 2. f. 10.* *Phlebodium*, *J. Sm. Pleopeltis, Pr., Tent. Pterid. p. 193. t. 7. f. 36 (very imperfect in the primary venation).* *Chrysopteris, Fée.*

Hab. Brazil, "*Hoffmannsegg*," *Gardner, n. 1221*; Pará, *Spruce, n. 912, n. 15\**. Tarapota, Eastern Peru, *Spruce, n. 4104*. Cayenne, *Le Prieur, Sagot, n. 718*. N. Granada, *Schlim, n. 753, Holton, n. 40*.—A noble species, with very beautiful peculiar venation and very copious multiseriate sori.

253. *P.* (*Phlebodium*) *nigripes*, Hook.; caudex stout creeping but tortuous densely clothed with rigid black subulate scales fringed with rusty-coloured woolly hairs, stipes 8-10 inches long partially paleaceous with similar but smaller scales black as well as the rachis and lower part of the costae beneath, fronds a few inches to 9-10 inches long 5-6 inches broad naked and dark-green above paler and subfurfuraceous-squamulose beneath, when young deeply pinnatifid throughout, when mature remotely pinnate below, terminal lobe lanceolate elongated, segments (or pinnæ) oblong-lanceolate acuminate coarsely serrated at the apex decurrent at the base, lowest pair subpetiolate, veins anastomosing and forming two or three series of areoles (besides the usual costal

ones of *Phlebodium*, of which the first series is large and soriferous, each areole including two veins with the globose sorus at their apex), the other areoles irregular, sori rather large distant intermediate between the costæ and the margin.

Hab. Tovar, Venezuela, *Fendler*, n. 247.—I cannot refer this to any described species; and probably Mr. Eaton could not do so either, nor satisfy himself that it was new, and thus probably he was induced to omit it in his 'Fil. Wrightianæ et Fendlerianæ.' The habit and venation are those of a small state of *Pol. aureum*, yet I cannot think it can be safely referred to that species. The stipes is black, and the scales of the caudex are very peculiar.

§ 6. GONIOPHLEBIUM.—*Sori terminal on solitary veinlets within the costal series of areoles, sometimes on those of one or more additional series.* Goniophlebium, *Bl. Marginaria*, Pr., and *Synammia*, Pr., in part.—Sp. 254-282.

\* *Fronds simple.* Sp. 1.

254. P. (Goniophlebium) *glaucophyllum*, Kze.; caudex long creeping or scandent thick as a goose-quill pruinose and scaly with small peltate black scales with a brown margin, stipites distant 2 inches to a span long testaceous glossy, fronds firm subcoriaceo-membranaceous 4-8-10 inches long 1-2 inches wide broad-lanceolate finely acuminate entire, primary veins costuliform parallel opposite, lowest veinlet free axillary and soriferous, the rest connivent in opposite pairs and excurrent into a free veinlet soriferous at the apex thus forming a series of 7-10 areoles, sori consequently uniserial between every pair of costules and multiserial longitudinally.—Var. *a*; fronds glauco-pruinose beneath, sori small. P. *glaucophyllum*, Kze. in *Schk. Fil. p. 227. t. 93 (excellent)*.—Var. *β*; fronds scarcely glaucous, sori small.—Var. *γ*; fronds not glaucous, sori large.

Hab. Tropical America: New Granada, *Moritz*, n. 305, *Otto*, n. 570, *Purdie*, *Burschit*; Andes of Ecuador, *Spruce*, n. 5431; Guadeloupe, *L'Hermisier*.—Var. *β*. Abeokuta, tropical West Africa, *Dr. Irving*, n. 41.—Var. *γ*. Cayenne, *Sagot*. New Granada, *Hartweg*, n. 1502. Andes of Ecuador, Valley of Lloa, *Jameson*, n. 399; Foot of Tunguragua and of Chimborazo, *Spruce*, n. 5245. New Granada, *Schlim*, n. 125.—A well-marked species, yet presenting three varieties as I conceive them to be.

\*\* *Fronds pinnatifid.* Sp. 255-268.

255. P. (Goniophlebium) *Californicum*, Klfs.; caudex creeping paleaceous, stipes 3 inches to a span long testaceous, fronds 3-9 inches long  $\frac{1}{2}$ -4-5 inches broad oblong or ovate or even broad-ovate acuminate subpellucid deeply nearly to the base pinnatifid, segments oblong or sublinear-oblong mostly serrated acute or obtuse, terminal one rather

short acuminate pinnatifid at the base, lowest pair subdecurrent, veins free or anastomosing into a costal series of large areoles, the veinlets free, sori subovate.—*Kaulf. En. Fil. p. 102. Hook. and Arn. Bot. Beech. Voy. pp. 161 and 405, not Metten. Polyp. p. 72 (who gives Juan Fernandez as the locality). Marginaria, Pr. Polyp. intermedium, Hook. and Arn. Bot. Beech. Voy. p. 405. Hook. Fl. Bor. Am. ii. p. 258. Brack. Fil. U. S. Expl. Exp. p. 9 (excl. syn. P. Scouleri).*

Hab. California, *Chamisso, Sinclair, Beechey, Barclay, Coulter, Lieut. Whipple, Brackenridge, Major Eaton, U.S.A.*—Kaulfuss says, “*P. vulgari* simile, difert autem quam maxime, venulis sub margini lacinie anastomosantibus sorumque ovatum includentibus.” My *P. interdim*, which partakes of the two in its venation weakens the characters of *Goniophlebium* (alias *Marginaria*) as a genus.

256. *P. (Goniophlebium) Scouleri*, Hook. and Grev.; caudex creeping scaly, stipes 3–4 or more inches long reddish brown, fronds 6 inches to nearly a foot long 3–6 inches wide thick-coriaceous broad-ovate deeply nearly to the rachis pinnatifid, segments elliptical-oblong very obtuse entire or obscurely serrated, terminal segment the longest, veins anastomosing so as to form a single series of large acute areoles extending nearly to the margin, sori very large prominent subglobose, capsules very long stipitate.—*Hook. and Grev. Ic. Fil. t. 56. P. pachyphyllum, Herb. Eaton.*

Hab. Straits of Juan de Fuca, N.W. America, *Scouler, Barclay, Seemann.* “Port Orford,” *Herb. D. C. Eaton.*—A most distinct and very little-known species. My specimens vary with from 5–9 segments, but a sketch of a specimen from Mr. Eaton, which I cannot doubt is identical with this, is very much larger (10 inches long by 6 wide). Kunze (in *Sill. Journal*, vi. 1848, p. 82) says *P. Scouleri*, H. and Gr. is incorrectly united with the very distinct *P. Californicum*, Klfs., in ‘*Hook. Fl. Bor. Am.*’; and Brackenridge says, “we find the *P. Scouleri* referred to *P. Californicum*, Klfs.,” but these authors surely cannot have seen the *Fl. Bor. Americana*, where, I regret to say, by inadvertence, the plant is omitted.

257. *P. (Goniophlebium) pubescens*, Hook. and Grev.; caudex creeping tortuous ferrugineo-paleaceous, stipes 4 inches to a span long, fronds firm-membranaceous subglanduloso-pubescent 6–15 inches long 2–4 inches wide from a rather broad base ovato-oblong acuminate pinnatifid nearly to the rachis pinnated below, segments and pinnae horizontal often opposite elongato-oblong acute or obtusely acuminate entire or the lower ones and pinnae especially more or less deeply but irregularly pinnatifid, veins anastomosing so as to form a single costal series of large areoles, sori rather small.—*Hook. and Grev. Ic. Fil. t. 182.*

Hab. Cerro del Morro, San Luis, South America, *Gillies*. Andes of Peru, *M'Leon* (segments more entire).—Admirably figured by Dr. Greville, l. c. It has too much the habit of *P. vulgare*, but is larger, and the venation quite that of *Goniophlebium*.

258. *P.* (*Goniophlebium*) *Catharinæ*, Fisch. and Langsd.; caudex creeping clothed with ferruginous subulate scales, stipes 2–3 inches long slender stramineous, fronds coriaceous-membranaceous glabrous 5–8–9 inches long 2–2½–4 inches wide ovate acuminate deeply nearly to the rachis pinnatifid, the acuminate apex nearly entire, segments horizontal approximate 1½–2 inches long ¼ inch wide from a rather broad scarcely decurrent base oblong obtuse entire or subsinuate, the sinuses acute or rarely obtuse, lowest pair generally deflexed, veins forming one or two series of costal areoles of which the first series is soriferous, sori subglobose nearer the costa than the margin.—*Fisch. and Langsd. Fil. p. 9. t. 9. Willd. Sp. Pl. v. p. 172. Metten. Polyp. p. 73. Marginaria, Pr. Goniophleb., J. Sm. Polyp. glaucum, Raddi, Fil. Bras. p. 20. t. 29. f. 1.*

Hab. Brazil, *Langsdorff, Raddi, Boog, Gardner, n. 70.*—I possess specimens quite according with the two figures above quoted, but I cannot consider it a well-marked species. I shall have occasion to refer to other supposed species that are too closely allied to this.

259. *P.* (*Goniophlebium*) *Mathewsii*, Metten.; caudex?, stipes 4 and more inches long subvillous, frond oblong-lanceolate acuminate subcoriaceous 12–14 inches long 3–4 inches wide deeply almost to the rachis pinnatifid clothed on both sides especially beneath and at the margins with rufous hairs some slender and subsetaceous others wider soft flexuose and articulated, segments numerous but rather distant from a broad base linear-ensiform subfalcate, veins forming a single large series of costal areoles, veinlets short free, sori numerous much concealed by the copious rufous hairs.—*Metten. Polyp. p. 74. Goniophlebium Villeminianum, Fée, 7me Mém. Fouq. Nouv. p. 63. t. 27. f. 3 (very good).*

Hab. Chacapoyas, Peru, *Mathews, n. 1811 and 3281.* Ecuador, near Pasto, and forests of the eastern Andes, *Jameson, Spruce.* “New Granada, alt. 3400–3700 mètres, *Schlim,*” *Fée.*—This Fern had been long preserved in my herbarium as a new species, and has lately been well described by Mettenius, and well figured by M. Fée, l. c.

260. *P.* (*Goniophlebium*) *loriceum*, L.; caudex creeping deciduously scaly tortuous at length naked and glaucous, stipes pale-brown a span to a foot and more long, fronds 1–2

fect long 4-6 inches wide broad- or ovato-lanceolate acuminate with an entire or subpinnatifid apex firm-membranaceous deeply nearly to the rachis pinnatifid, segments approximate horizontal from a broad base (the upper base singularly produced or upcurrent especially of the lower half of the frond) oblong gradually acuminate subfalcate entire or subsinuate, lowest pair often deflexed, veins forming one or two series of large costal areoles of which one or both series are soriferous, veinlets free.—*Linn. Sp. Pl. p. 1546. Sw. Syn. Fil. p. 35. Willd. Sp. Pl. v. p. 176. Metten. Polyp. p. 76. Marginaria, Pr. Goniophleb., Fée. Polyp. plesiosorum, Kze. P. gonatodes, Kze. und Metten. Fil. Hort. Lips. p. 32. t. 24. f. 11 and 12. P. confluens, Liebm. P. Falcaria, Kze. in Linnæa, xviii. p. 316. P. ketum, Raddi. P. latipes, Fisch. und Langsd. p. 10. t. 10. P. colpodes, Kze. P. vacillans, Lk. P. punctulatum, Hook. Ic. Pl. t. 69.—Plum. Fil. t. 78.*

Hab. Tropical America, frequent: West Indies, *Plumier, etc.*; Cuba, *C. Wright, n. 827*; Mexico, *Jurgensen, n. 893, Galeotti, n. 6559 and 6550, Liebm. n. 2534*; Guatemala, *Skinner*; Brazil, *Gardner, n. 121 and 5918, Spruce, n. 2534*; Panama, *Seemann (P. pectinatum, J. Sm.)*; Venezuela, *Fendler, n. 242 (P. latipes, Eat.), 243 and 353, Linden, n. 531*; Ecuador, *Spruce, n. 5275 and 5269, Jameson, n. 471*; Pern, *Poeppig* (rachis and costae beneath hairy, *P. dasypleuron, Kze., Metten. Polyp. p. 76*); Tarapota, *Spruce, n. 4650 and 4653*.—The *P. loriceum, L.*, is founded upon *Plumier's* figure above quoted. It is remarkable for having the superior base of many of the lower pairs of segments *surecurrent*, instead of having, as is usual, the inferior base *decurrent*, a character well figured and even described by *Plumier*. Unfortunately the character is not constant, and I possess almost all intermediate grades, till the mark disappears altogether, hence many supposed species have been constituted of it. I am disposed to think I have underrated rather than overrated the number of these pseudo-species, and most of my references are to authentic specimens. My specimens of *P. vacillans*,\* *Lk.*, exhibit numerous segments which are *surecurrent* at the superior base. *P. appendiculatum* of *Linden*, figured in *Hook. Fil. Exot. t. 87*, is so in a less degree, and the red veins can hardly be considered a sound specific character. Again, some of my smaller specimens seem almost to pass into *P. Catharinae*, especially a small form of *P. plesiosorum* and *P. deltoideum, Liebm.* in *Herb. nostr.*

261. *P. (Goniophlebium) lasiopus, Kl.*; "caudex creeping clothed with blackish-brown ovato-lanceolate acuminate rigid appressed scales, stipes 1 inch long, frond membranaceous on each side (as well as the petiole) viscidly puberulous lanceolate acuminate deeply pinnatifid, segments contiguous 10 lines long 2 lines wide oblong and slightly attenuated rather obtuse entire, lowest pair free remote slightly abbreviated

\* This, together with *P. harpedes, Lk.*, which *Mettenius* makes synonymous with *P. latipes*, *Mr. J. Smith* is disposed to refer to *P. attenuatum, H. B. K. and Willd.* (see p. 24).

deflexed, distinct areoles of *Marginaria* (Pr.), short free veinlets between them and the margin, veins sometimes free, sori equidistant between the costa and the margin." *Metten.*—*Kl. in Linnæa*, xx. p. 393. *Metten. Polyp.* p. 73.

Hab. Columbia, *Moritz*, n. 256 (*Kl.*). Venezuela, *Fendler*, n. 244 (*Polyp. lasiopus*, *Kl., Eat. in Herb. nostr.*)—It is to be regretted that neither of the authors who have given a specific character of this obscure plant makes any allusion to its affinities. I have no authentic specimens, unless those of Fendler, named by Eaton, may be considered such; and here there are two forms, one pubescent and with an opaque frond, the other with a pellucid frond and clearly a free black venation. The affinity is close with some of the small abnormal forms of *P. loriceum* and its allies.

What is *P. rhodopleuron*, *Kze. in Linnæa*, xviii. p. 315, and of *Metten.* l. c., p. 74?, of Mexico; said to be *P. Californicum* of Schlecht. in *Linnæa*, v. p. 606, not *Klfs.*?

262. *P. (Goniophlebium) translucens*, *Kze.*; caudex stout (thick as one's little finger) creeping fusco-paleaceous, stipes testaceous brown 4 inches long, fronds firm-membranaceous translucent pale-green 8-10 inches long 6-9 inches broad glabrous deltoid acuminate deeply nearly to the rachis pinnatifid, segments 7-17 lanceolate horizontal decurrent at the base, lower ones sometimes free, terminal one elongated, all of them coarsely and unequally serrato-dentate obtusely acuminate, veins black (when the frond is held up to the light) anastomosing and forming a costal series of large soriferous areoles, veinlets free, sori rather small distant.—*Kze. in Annal. Pteridogr.* p. 16. *Goniophlebium*, *Fée.* *P. intermedium*, *Coll. Pl. Chil.* p. 51. t. 74 (*according to the reference of Mettenius, not of Hook. and Grev.*). *P. Californicum*, *Metten. Polyp.* p. 71 (*not Kaulf.*).

Hab. Juan Fernandez, *Bartero*, *Cuming*, n. 1333, *Douglas*.—A very peculiar species, well defined by Kunze. It appears to be peculiar to the island of Juan Fernandez, and all my specimens, from three different collectors, are very uniform. The segments are large, some of them nearly 5 inches long, and crosodentate.

263. *P. (Goniophlebium) trilobum*, *Cav.*; caudex long creeping stout branched squarrose with copious ferruginous scales, stipes testaceous 4-6 inches long, fronds 4-10 inches long as much wide subcoriaceous broad-ovate in circumscription deeply nearly to the rachis pinnatifid (or rather remotely pinnate with the rachis winged), segments or pinnæ obliquely patent 3-9, terminal one (often tripartite) very much elongated and sometimes also the lowest pair often 6 inches long from  $\frac{1}{4}$ - $\frac{3}{4}$  of an inch wide linear-lanceolate or ensiform more or less acuminate, lowest pair sometimes bipartite, veins

usually anastomosing so as to form elongated soriferous areoles, veinlets free and not unfrequently the veins also, sori oval or very much elongated large oblique.—“*Cav. Præl.* 1804. p. 604.” *Willd. Sp. Pl.* v. p. 164. *Metten. Polyp.* p. 72. *Synammia*, *Pr. Gay. Hook. Gen. Fil. t.* 110. *A. Mecosorus*, *Kl.* *Goniophlebium*, *Moore.* *P. glaucescens*, *Bory, in Dup. Voy. Bot.* p. 260.

Hab. South California, Concepcion to Valdivia, Chiloe, etc. (*Cavanilles*), *Poeppig*, *King*, *Germain*, *Harvey*, *Philippi*, *Lechler*, n. 509, *Bridges*, n. 810 (on Apple-trees, Valdivia).—A handsome species, with a very bad name, somewhat allied to *P. translucens*, *Kze.*, but different in the nearly entire margins and the obliquely patent segments, but above all in the singularly elongated sori.

264. *P. (Goniophlebium) ensiforme*, *Thunb.*; caudex stout creeping with short branches densely clothed with subulate fimbriated scales, stipes stout 5–6 inches long red-brown, fronds a span to a foot and more long 4–5 inches broad firm-coriaceous oblongo-ovate deeply pinnatifid with from 3–13 remote erecto-patent segments 3–5 rarely 6 inches long  $\frac{1}{4}$ – $\frac{1}{2}$  an inch wide elongate linear-oblong obtuse very decurrent at the base, terminal one the longest, veins forming a single series of large oblong areoles soriferous in the upper segments, veinlets free, sori somewhat sunk sometimes very large and prominent subglobose, principal costæ very elevated beneath.—*Thunb. Fl. Cap.* p. 135. *Sw. Syn. Fil.* p. 31. *Willd. Sp. Pl.* p. 165. *Kze. in Schk. Fil. Suppl.* i. p. 117. t. 54 (*excl. f. a.*). *Metten. Polyp.* p. 73. *Marginaria*, *Pr. Pape et Raws. En. Fil. Cap.* p. 39. *Goniophlebium*, *Fée, Gen. Fil. t.* 21. *B. 2.* *Phlebodium*, *J. Sm.*

Hab. South Africa: Cape of Good Hope to Natal.

265. *P. (Goniophlebium) patens*, *J. Sm.*; caudex rather thick creeping clothed with copious ferruginous very slender long subulate crisped scales, stipes 2–4 inches long stramineous glossy, fronds subcoriaceous-membranaceous 6–10 inches long 4–9 inches wide subdeltoid lower half pinnated upper half deeply nearly to the rachis pinnatifid, segments and pinnæ 3–6 inches long  $\frac{1}{3}$ – $\frac{1}{2}$  an inch wide, terminal segment much elongated, all very patent linear-oblong gradually acuminate opposite or alternate singularly decurrent at the base, the margin very obscurely serrate, veins forming a single series of large soriferous areoles, marginal veinlets short free clavate, sori orbicular intermediate between the costa and margin.—*J. Sm. in Seem. Bot. of the 'Herald,'* p. 230.

Hab. On trees, Panama, *Seemann*, n. 25.—Habit of *P. trilobum* of Chili, and *P. ensiforme* of the Cape, but quite different from both.

266. *P. (Goniophlebium) attenuatum*, H. B. K.; caudex stout short creeping paleaceous, stipes rather stout a span and more long reddish-brown, frond coriaceous-membranaceous 10 inches to 2 feet long 8–10–12 inches broad subdeltoid-ovate acuminate deeply to the rachis pinnatifid leaving only a very narrow wing at the broad sinuses, segments very distant elongato-lanceolate acuminate or obtuse entire 4–6 inches long  $\frac{1}{2}$  an inch to nearly an inch wide usually attenuated at the base and slightly decurrent, terminal one similar to the rest sometimes bi-trifid, veins forming three or four series of areoles of which the costal ones and frequently the next series are soriferous, sori subrotund.—*H. B. K. in Willd. Sp. Pl. v. p. 191. Kze. in Linnæa, xxi. p. 219. P. dissimile, Schk. Fil. p. 14. t. 14. P. xiphophoron, Kze. Herb. in Metten. Polyp. p. 73. Goniophlebium elatum?, Fée.*

Hab. Tropical America: Caripe, *Humboldt*; Venezuela, *Fendler*, n. 490; Guiana, abundant, *Parker, Richard Schomburgk*, n. 1669, *Robt. S.*, n. 460, *Le Prieur*; Brazil, *Spruce*, n. 736; Orinoco, *Spruce*, n. 3575; Central America, *Cuming*, n. 1265; Ecuador, *Jameson*, n. 565, *Seemann*, n. 980.—I think a well-marked species, well figured by Schkuhr, but which Mettenius seems to confound with *P. (Eupolypod.) sororium*, which has free venation and oblong sori.

267. *P. (Goniophlebium) amœnum*, Wall.; caudex creeping densely paleaceous with ferruginous subulate scales, stipes a span to a foot or more long stramineous or brown, fronds 1 to nearly 2 feet long 6–10 inches wide glabrous or subpubescent ovate terminating in a lanceolate acuminate subentire segment, deeply pinnatifid to within 2–3 lines of the costa, segments horizontal more or less approximate 3–6–8 inches long  $\frac{1}{4}$ – $\frac{1}{3}$  an inch wide subfalcate from a broad base ensiform gradually acuminate entire or coarsely dentato-serrate, lowest pair deflexed, veins forming one costal series of moderately sized soriferous areoles and sometimes two (the second not soriferous), marginal veinlets free, soriferous veinlet always arising from the vein at a distance from the costa, sori subglobose sunk (papillose on the upper side).—*Wall. Cat. n. 290. Metten. Polyp. p. 80. Marginaria, Pr. Goniophlebium, J. Sm.*

Hab. Nepal, *Dr. Wallich*, and Khasya (*Griffith*), and northern and north-western India, Bootan, Kumaon (alt. 6000–8000–10,000 feet), etc., *Hooker and Thomson, Lady Dalhousie, Edgeworth, Col. Bates, and others. Mussoorie, Dr. Bacon.*—This may assuredly be considered the representative in India of the *P.*



*loriceum* of the New World, at least of that aberrant form of *loriceum* which exhibits least of the produced superior base of the segments; not that this structure is wanting in several of my specimens of *amœnum*. The caudex, however, seems to lose its paleaceous clothing and become smooth and glaucous. The fertile veinlet is never so near the costa, and in *loriceum* there is never more than one series of sori in them, and sometimes the stipes and rachis beneath are a little paleaceous; characters which, if the plant was found in the same country, would scarcely be considered of importance.

268. P. (*Goniophlebium*) *lachuopus*, Wall.; caudex long creeping thick as a writing-pen densely clothed with long black setaceous bristles, stipes 2-4 inches long stramineous-brown, fronds membranaceous 6-8 inches to 1½ foot long 1½-3½ inches wide oblong terminating in an acuminate nearly entire apex deeply near to the rachis pectinato-pinnatifid, segments linear or linear-oblong acute or obtuse obscurely dentato-serrate, lowest pair sometimes deflexed, veins forming a costal soriferous series of large areoles (partially free), marginal veinlets short free clavate, soriferous veinlet arising from the side of the vein distant from the costule, sori orbicular rarely oval, nearer the costa than the margin, rachis beneath often subpaleaceous with orbicular spinulosdentate scales terminated by a long seta.—*Wall. Cat. n.* 310. *Hook. Ic. Pl. t.* 952 (or *Century of Ferns, t.* 52). *Metten. Polyp. p.* 75. P. Fieldingianum, *Kze. Herb. Metten. Polyp. p.* 75.

Hab. Nepal and Kamaon, *Wallich*. Khasya, alt. 4000-6000 feet, and Sikkim, 9000-11,000 feet, *Hooker fl. and Thomson*. Simla, *Edgeworth, Griffith*. Kamaon, alt. 7000 feet, *Strachey and Winterbottom*.—A pretty, neat species, remarkable for the copious, black, setaceous clothing to the stipes, and the pectinated fronds.

\*\*\* *Fronde pinnate (American)*. Sp. 269-277.

269. P. (*Goniophlebium*) *dissimile*, Linn.; caudex stout creeping densely clothed with long reticulated subulate and firmly attenuated blackish scales, stipes 4-6 inches long rather slender stramineous, fronds 1-2 feet and more long 4-8 inches wide firm-membranaceous pubescenti-hirsute and subviscid on both sides broad or elongato-oblong pinnate coadunately pinnatifid at the apex, pinnae horizontal very commonly opposite 2-4 inches long ½ to nearly ¾ inch wide subfalcate from a truncated sessile base (the opposite pairs so close at the base as to appear perfoliate) oblong more or less obtusely or sharply acuminate entire, lowest pair deflexed, veins united into two or three costal series of areoles of which the lowest alone or two or all three are soriferous, marginal veinlets free, sori rather small subrotund.—*Linn.*

*Sp. Pl.* v. p. 1549. *Sw. Syn. Fil.* p. 38. *Willd. Sp. Pl.* v. p. 1549 (not of Schk.). *Lowe, Brit. and Ex. Ferns*, ii. p. 35. *Goniophlebium*, *J. Sm.* Polyp. chnoodes, *Spreng. Syst. Veget.* iv. p. 53. *Metten. Polyp.* p. 77. *Marginaria*, *Pr. Goniophleb.*, *Fée.*

Hab. Tropical South America: West Indies, frequent, *Schwanecke, L. Guilding, March, Wilson, L'Herminier, Dr. Inray, C. Wright*, n. 1019; Trinidad, on Cocoa-trees, *Lockhart*; Venezuela, *Fendler*, n. 238.—A most distinct species, remarkable for its frequently opposite and perfectly horizontal pinnæ, looking as if they were perfoliate. The dense mass of scales of the caudex are peculiar, glossy and reticulated, as in the leaves of *Sphagnum*.

270. *P.* (*Goniophlebium*) *fraxinifolium*,\* *Jacq.*; caudex creeping or scandent much thicker than a swan's quill, when young clothed with subulate black imbricated scales of which the bases alone are persistent centrally attached with a brown membranaceous margin or wing giving the appearance of a snake's skin, stipites often stout varying much in length 1–2 feet long testaceous, fronds oblongo-ovate 10 inches to 2–3 feet and more long 6–18 inches wide subcoriaceo-membranaceous pinnated throughout, terminal pinna petiolate and often larger than the rest, lateral pinnæ varying in number 4–10 inches long and from  $\frac{3}{4}$ –2 inches wide sessile from an obliquely cuneate sessile base elliptical or oblongo-lanceolate finely acuminate entire or sinuato-serrate, primary veins straight and parallel costuliform, opposite veinlets uniting so as to form six to eight areoles each of them including a short usually soriferous veinlet, the sori (which are rather small) are often disposed in six to eight longitudinal series and as many obliquely transverse series as there are costuliform veins with great regularity, marginal veinlets short free.—*Jacq. Ic. Rar. t.* 639 (*small specimen*). *Sw. Syn. Fil.* p. 38. *Willd. Sp. Pl.* v. p. 195. *Metten. Polyp.* p. 79. *P. distans*, *Raddi, Fil. Bras.* p. 21. *t.* 31. *Goniophlebium*, *J. Sm.* Polyp. rhizocaulon, *Willd. Sp. Pl.* v. p. 196. *P. Richardi* and *P. cymatodes*, *Kze.* *P. triseriale*, *Sw.* *P. articulatum*, *Desv. and Kze. (in Herb. nostr.)*

Hab. Tropical America, frequent: from the Atlantic to the Pacific, *Schlim*, n. 121, 656, *Linden*, n. 174, 524, and 530; Venezuela, *Fendler*, n. 235, 236, 237, *Moritz* (" *P. rhizocaulon*, *Willd.*"); Ecuador, *Jameson, Spruce*, n. 5730 (pinnæ

\* It is requested that at p. 4 of this vol., sp. 229, line 17, the name "*fraxinifolium*, *Jacq.*, *Kaulf.*" be erased, and that of *diversifolium*, *Sw.*, not *Willd.*, be substituted; the synonyms of *Jacq. Ic.*, *Sw. Syn.*, and *Willd. Sp.* also be erased; and that, instead of "*Goniopteris*, *Pr.*" at line 5 from the bottom, *Goniopteris fraxinifolia*, *Pr.*, be substituted.

10 inches long, 2 inches wide; "Frondes magnitudine et substantia valde variant, nunc rigide coriaceae nunc fere membranaceae"; Peru, *Matheus*, n. 1839, 1832, 1834, *Pöppig* (*P. articulatum*, Desv., Kze.), *Spruce*, n. 3964, 4064; Brazil, *Raddi*, *Gardner*, n. 131.—Although an extremely variable plant in size and texture, this is a species easily recognized, and is remarkable for the numerous sori, often covering the whole back of the pinnae except at the margin, and these arranged with great regularity in one direction parallel with the costa (longitudinal), in the other, with the primary veins or costules (obliquely transverse). *P. adnatum* is a very near ally.

271. *P.* (*Goniophlebium*) *adnatum*, Hook.; caudex?, stipites 9–10 inches and more long glossy-brown as well as the rachis, fronds  $1\frac{1}{2}$ – $2\frac{1}{2}$  feet and more long 10 inches and more wide ovate acuminate pinnated membranaceous dark blackish-green very opaque on the surface minutely downy, pinnae 13–17 patent 6–8 inches long  $1-1\frac{1}{2}$  inch wide remote subelliptico-lanceolate suddenly subcuspidato-acuminate obscurely serrated moderately attenuated towards the base and there sensibly decurrent, uppermost pairs opposite and more decurrent, terminal pinna resembling the rest but long-petiolate and very decurrent at its base, primary veins subcostuliform approximate straight in direction but flexuose and scarcely thicker than the veinlets, the opposite veinlets uniting and forming areoles each having a free included veinlet terminated by a solitary sorus, sori rather small forming a single series between each pair of primary veins.—*Kze. in Kl. Linnaea*, xx. p. 395. *Metten. Polyp.* p. 78.

Hab. British Guiana, *Schomburgk*, n. 504, *Appun*. New Granada, *Schlim*, n. 320, *Moritz*, n. 359. Ecuador, *Jameson*. Guatemala, *Skinner*.—Some of my specimens of this so closely resemble the ordinary forms of *P.* (*Campyloneurum*) *decurrens*, *Raddi*, that, without carefully examining the venation, I had placed it in the same cover with that species; but it is evidently the *P. adnatum* of Kunze and Klotzsch, and may possibly be only a variety of the preceding, with the upper pinnae more or less adnate and decurrent.

272. *P.* (*Goniophlebium*) *menisciifolium*, Langsd. and Fisch.; caudex creeping, stipites 1–2 feet or more long, fronds ample firm-membranaceous glabrous dark olive-green  $1\frac{1}{2}$ –2 feet long oblongo-ovate pinnated throughout, pinnae patent sessile from an obliquely and very obtusely cuneated base (of which the superior margin is more or less rounded) 6–7 inches to a foot long  $\frac{3}{4}$ – $1\frac{3}{4}$  inches wide oblong or oblongo-lanceolate acuminate entire or subsinuate, upper ones more or less broadly so and opposite, terminal one large, primary veins straight costuliform, opposite veinlets forming six to eight areoles each with a free veinlet of which three to five from the costa are soriferous thus forming as many soral

series, sori globose sunk forming pustules on the upper side with frequently a cretaceous dot in the centre.—*Langsd. and Fisch. Fil. p. 11. t. 12 (very good)*. *Willd. Sp. Pl. v. p. 189*. *Metten. Polyp. p. 78*. *Marginaria, Pr. Goniophlebium, J. Sm. Polyp. albo-punctatum, Raddi, Fil. Bras. p. 21. t. 30. Kze.*

Hab. Brazil, *Langsdorff, Raddi*. S. Gabriel, on the Amazon, rocks in the falls, *Spruce, n. 2269* ("exhales a strong odour of *Anthoxanthum in drying*"). Panama, on the trunk of an Oil-Palm, *Sutton Hayes*. Trinidad, *C. S. Parker*.—I have never received this Fern from any authentic source, and must plead guilty to my having till recently referred my specimens from Parker, Spruce, and Hayes, to *P. neriifolium*, itself a very variable plant. This I find to have much more membranaceous, greener fronds; larger pinnæ, rarely attenuated at the base; smaller sori, arranged in three to five or more series. Perhaps the white cretaceous dots are more distinct in the recent plant than in the dried, or Raddi's name is rather deceptive. Both these species, as well as *P. fraxinifolium* and *P. adnatum*, have peculiarly straight, costuliform, primary veins, and veinlets uniting at an angle so as to form several series of areoles, of which those near the margin are rarely soriferous. *P. menisciifolium* has the longest and narrowest pinnæ of the three, the veins and veinlets are more elevated and conspicuous, and the sori form more prominent warts or tubercles on the upper side.

273. *P. (Goniophlebium) neriifolium, Sw.*; caudex stout creeping knotted paleaceous with large brown broad-lanceolate acuminate scales paler and jagged at the margin, stipites 4 inches to a span or a foot long reddish testaceous, frond ovate a span to 2 feet and more long 8–10 inches wide coriaceous generally very rigid brownish-green when dry glabrous opaque but glossy on the surface distinctly veined pinnate to the very apex, pinnæ 4–8–12 inches long  $\frac{1}{2}$ –1 and rarely  $1\frac{1}{2}$  inch wide sessile from a more or less tapering and unequally cuneated base oblong or linear-lanceolate gradually and moderately acuminate narrow callosomarginate entire or subsinuate, primary veins straight costuliform prominent on both sides, the veinlets forming six to eight series of uniform areoles with a free veinlet included, one to four of the costal ones soriferous, sori large subglobose impressed forming distinct pustules on the upper side.—*P. neriifolium, Sw. Syn. Fil. p. 37. Schk. Fil. p. 14. t. 15 (very characteristic, but the sori too small)*. *Willd. Sp. Pl. v. p. 194. Raddi, Fil. Bras. p. 22. t. 31 bis (very good)*. *Metten. Polyp. p. 78. Hook. Gen. Fil. t. 70 B (venation and sori very faithful)*.

Hab. Tropical America, Atlantic to the Pacific: Brazil, most abundant, *Gardner, n. 26 and 1219, Wallich, n. 307*; Peru, *Mathevs, n. 3287*; Ecuador, *Seemann* (some pinnæ  $1\frac{3}{4}$  inch broad); Caraccas, *Linden, n. 527, Moritz, n. 352*; Venezuela, *Fendler, n. 240, 804*; West Indies, *L'Herminier, Lockhart, n. 41, Dr. Inray, n. 70, M'Fadyen*.—*P. Preslianum, Lk.*, is probably not different from this, and under that Mettenius (*Fil. Hort. Lips. p. 33*) enumerates *P. poly-stichum, P. distans, P. juglandifolium, P. pustulatum, P. longifolium*, and *P.*

*pycnosorum* of gardens! I have alluded to its relationship with *P. menisciifolium*, but I believe they are truly distinct.

274. *P.* (Goniophlebium) *Guatemalense*, Hook.; caudex?, stipites a span to a foot long stramineous as well as the rachis, fronds 2-3 feet long a foot or more broad firm-membranaceous glabrous pinnated, pinnae rather distant 6-8 inches long  $1-1\frac{1}{4}$  wide sessile alternate elliptico-oblong more or less acuminate entire or very obscurely serrated obtusely rotundato-cuneate at the base, uppermost ones more or less adnate and even decurrent, ultimate pinna petiolate or sometimes coadunate at the base with the one next below it, veins forming a single fertile series of large costal areoles in which the free soriferous veinlet arises from the point of junction of the primary vein and the costa, more rarely an elongated sterile areole is formed between the fertile one and the costa and parallel with it (as shown in the figure of Mr. Moore, *Ind. Fil. t. 58. f. 4*), there are besides copious small areoles without order between the soriferous ones and the margin with or without an included free veinlet, but all sterile, sori consequently in one series a little distance from the rachis.—*Phlebodium inaequale*, Moore, *Ind. Fil. l. c.* *Polyp. inaequale*, Lowe, *Brit. and Exot. Ferns*, ii. t. 28 (not of Link). *Goniophlebium*, J. Sm.

Hab. Guatemala, Skinner.—I am not aware that any description of this fine and very distinct Fern exists. It appears to be scarcely known except in gardens. I am so fortunate as to possess a native specimen from Guatemala, to which Mr. Moore has attached his name of *Phlebodium inaequale*, and of which his figure (l. c.) of a fragment represents one form of the venation.

275. *P.* (Goniophlebium) *Chacapoyense*, Hook.; caudex creeping paleaceous with brown ovato-lanceolate very glossy scales, stipites approximate 4-7-8 inches long reddish-stramineous glossy, fronds 6-10 inches long  $1\frac{1}{2}$ -2 inches wide firm subcoriaceous-membranaceous (young fronds pubescently tomentose) dark-green above pale beneath oblong acuminate pinnate, pinnae numerous sessile erecto-patent  $1\frac{1}{2}$ - $2\frac{1}{2}$  inches long  $\frac{1}{4}$  of an inch wide (terminal one 3 inches long) linear-oblong very obtuse entire, veins very conspicuous on the pale under side very pellucid forming a single costal series of soriferous areoles, the rest of the veinlets are marginal and free, sori (young) orbicular intermediate between the costa and the margin. (TAB. CCLXXXI.)

Hab. Sesuja, Chacapoyas, Peru, Mathews, u. 3278.—This, as may be seen by our figure, is very unlike any Fern with which we are acquainted, especially any *Polypodium* of the *Goniophlebium* section.

276. *P.* (*Goniophlebium*) *Surrucuchense*, Hook.; caudex stout creeping paleaceous with large lanceolate glossy reticulated long acuminate scales, stipites 4–5 inches to a foot long brown-stramineous, fronds firm-coriaceous bright-green paler beneath glabrous 6 inches to 2 feet and more long 4 inches to a foot and more wide broad-ovate long-caudato-acuminate pinnate to the very apex (terminal pinna much elongated and long-petioled), pinnæ distant 7–8 to 27, lateral ones sessile 3–6 inches and more long  $\frac{1}{4}$ – $\frac{3}{4}$  of an inch broad from a cuneate sessile base linear-oblong much and finely acuminate entire or subsinuate, venation always pellucid, veins forming a single costal series of fertile areoles, the rest of the veinlets free, sori very orbiculari-globose ranged close to the costa.—*Hook. Ic. Pl. t. 69 (ann. 1837), small specimen.* *P. andinum*, *Karst. Fl. Columb. p. 171. t. 85, very good (ann. 1861).*

Hab. Tropical America: Ecuador, Surrucuchu, *Jameson*; Tunguragua, on trees, *Spruce, n. 5241*, and Baños, *n. 5238*; Bogota, *Karsten*; Venezuela, *Fendler, n. 413*; Jamaica, *Mr. Wiles*; Dominica, *Dr. Imray, n. 112*.—My first knowledge of this handsome species, of a bright-green colour, with pellucid veins and large ferruginous sori, was derived from a small specimen sent by Professor Jameson; since that I have received it from other regions of tropical America, yet I can find no description to accord with it till very recently, 1861, when a fine figure appears, among many other long-described but supposed new species of Ferns, under the name of *P. andinum*, *Karst.*

277. *P.* (*Goniophlebium*) *plectolepis*, Hook.; “caudex creeping clothed with ferruginous lanceolate ciliated scales, stipites 15 inches long glabrescent glossy brown, fronds coriaceous 4 feet long 1 foot wide elongato-lanceolate pinnate, pinnæ alternate patulous subopposite below horizontal distant 6–7 inches long decreasing towards the base  $\frac{1}{2}$ – $1\frac{1}{3}$  of an inch wide linear-lanceolate acute sessile obliquely and broadly cuneate at the base, the margin rotundato-crenate, costa prominent on both sides, veins obscure five- or six-furcate, veinlets forming a series of elongato-pentagonal areoles, sori near the costa rather large ferruginous uniseriate, rachis costa and pinnæ on both sides finely pubescent, down easily deciduous, rachis bisulcate in front rounded at the back.” *Liebmann. Goniophlebium, Moore, in Herb. Hook. Polyp. insignis, Liebmann. Fil. Mex. p. 41 (not Bl.).*

Hab. Totutla, Mexico, *Liebmann*.—My specimens from Liebmann well accord with his description. In habit it perhaps comes nearest to our *P. Surrucuchense*, but it attains a much larger size, has less coriaceous pinnæ, strongly serrated and less acuminate, the venation is different, and the veins very opaque, and it wants the long, terminal, distinct petioled pinnæ of that species.

\*\*\*\* *Fronde pinnate (Indian)*. Sp. 278-282.

278. P. (*Goniophlebium*) *verrucosum*, Wall.; caudex long stout creeping very paleaceous, stipites  $1\frac{1}{2}$  foot and more long, fronds 2-3 feet long oblongo-acuminate firm-membranaceous drooping, pinnæ numerous but distant 6-9 inches long  $1-1\frac{1}{2}$  inch broad oblong costate articulate upon the rachis suddenly and shortly cuspidato-acuminate entire or serrated chiefly towards the apex nearly sessile, the base obliquely cuneate, primary veins slender but straight and parallel costuliform forming with the anastomosing veins four or five series of areoles each with a free included veinlet but of which the lowest series only is soriferous, sori in a single series next the costa sunk in a deep cavity having a corresponding pustule on the upper side, capsules long stipitate mixed with paraphyses.—*Wall. Cat. n. 296. Metten. Polyp. p. 81. Hook. Gard. Ferns, t. 41. Marginaria, Hook. Gen. Fil. t. 10 B. Goniophlebium, J. Sm.—β; pubescenti-vil- lous (young).*

Hab. Penang and Singapore, *Wallich. Amboyna, n. 51, and Ceram and Java, n. 52 and 73, De Vriese and Teijsmann. Luzon, Cuming, n. 227. β. Luzon, n. 291.*—A distinct and very handsome species, with rich-brown sori parallel with and near the costa, the costa sunk in a deep cavity or bag, forming a prominent corresponding pustule or sack on the opposite side of the pinna.

279. P. (*Goniophlebium*) *granlidens*, Kze.; “caudex creeping densely clothed with ovate acuminato-setose rufo-fucous scales, stipites stramineous sparsely (at the insertion of the pinnæ more densely) paleaceous at length glabrous glossy reddish, frond 2-6 feet long membranaceous firm opaque-green glabrous elongato-lanceolate pinnate, pinnæ 4-7 lines long shortly petiolulate from an unequally cuneated entire base lanceolate or linear-lanceolate acuminate coarsely serrated, areoles of *Goniophlebium* three- to five-seriate, the lowest anterior branch fertile, sori terminal impressed rather large in one series near the costa, sporangia mixed with clavate paraphyses.” *Metten.—Kze. Bot. Zeit. iv. p. 423, and in Linnæa, xxiii. p. 318. Metten. Fil. Hort. Lips. p. 33. t. 23. f. 1, 2. P. colpothrix, Kze. in Linnæa, xxiii. p. 316 (fide Metten.)*.

Hab. Java, *Zollinger, De Vriese, n. 51* (less coarsely and less unequally serrated, but in other respects similar).—I have seen no authentic example of this Fern. If De Vriese's specimens be the same, I should consider it as a more coarsely serrated form of *P. verrucosum*, as *P. serratifolium*, Brack., is of *P. subauriculatum*.

280. *P. (Goniophlebium) cuspidatum*, Don?; "caudex creeping paleaceo-crinite," stipites 8-10 inches or more long fuscous glossy, frond 2-3 feet long 1 foot wide oblongo-ovate glabrous firm-membranaceous pinnate, pinnæ shortly petiolate and articulated upon the rachis very patent opposite or alternate 6-8 inches long  $\frac{1}{2}$ - $\frac{3}{4}$  inch wide from a gradually attenuated narrow-cuneate base elongato-lanceolate finely and long-acuminate serrated entire at the base and at the point, veins forming two or three series of areoles including a free veinlet, the costal series only soriferous, sori much nearer the costa than the margin more or less sunk and forming more or less distinct pustules on the back.—*Don, Fl. Nep. p. 6?* *Bl. Fil. Jav. p. 175. f. 82 (very good)*. *Metten. Polyp. p. 81*. *Goniophlebium, Pr.*

Hab. Nepal (*Don*). Java, *Blume, Thos. Lobb, De Vriese and Teijsmann, n. 51*.—This is best distinguished from *P. subauriculatum* by its very finely acuminate pinnules, which gradually taper into the short articulated petiole. If it is the *P. cuspidatum* of Nepal, I have never seen it from that region, nor from the Indian continent.

281. *P. (Goniophlebium) argutum*, Wall.; caudex thick as a writing-quill squarrose with subulate blackish or brown glossy scales, stipites 3-4 inches to a span long testaceous-brown glossy, fronds firm-membranaceous glabrous 1-2 feet long 8-10 inches broad pinnate, pinnæ distant subhorizontally patent 4-6 inches long  $\frac{1}{2}$ - $\frac{3}{4}$  inch wide from a broader but obtusely and oblique cuneated or subtruncated base (rarely rotundato-auricled) elongato-oblong acuminate rather obtusely serrated, lower ones often opposite, the rest alternate, superior ones more or less adnate and decurrent, terminal one similar to the rest, veins forming a costal series of large oblong soriferous areoles, marginal veins and those towards the apex of the pinnæ all free, sori orbicular superficial (not sunk) intermediate between the costa and the margin.—*Wall. Cat. n. 308*. *Goniophlebium, J. Sm. (no descr.)*

Hab. Northern India, chiefly in the Himalaya: Nepal and Kamaon, *Wallich, Madden, Strachey and Winterbottom* (alt. 7000-8000 feet), *Lady Dalhousie*; Sikkim (alt. 8000 feet) and Khasya, *Hooker fil. and Thomson, Simons, n. 252*; Gowhatty Plains, *Thomson*.—This appears to be a good species, chiefly confined to the great Himalayan range, from west to east. One of my specimens from Khasya has large rounded auricles at the inferior base of the pinnæ, occasionally at the superior base also.

282. *P. (Goniophlebium) subauriculatum*, Bl.; caudex creeping stoloniferous densely clothed with narrow acuminate-setaceous scales subpruinete, stipites a span to a foot and



more long sparingly paleaceous rufous-brown, fronds firm subcoriaceous-membranaceous glabrous 2-6 feet long a foot and more wide pinnated, pinnæ horizontal numerous yet remote 3-4 to 8-10 inches long  $\frac{1}{4}$  to nearly  $\frac{1}{2}$  an inch wide shortly petioled and jointed on the rachis from a somewhat cordate or truncated and occasionally auricled base linear-lanceolate finely and gradually acuminate serrated, veins forming a double costular series of areoles including a free venule of which the lower series is soriferous, marginal veinlets free, sori in a single series nearer the costa than the margin forming slightly elevated pustules on the superior side.—*Bl. Fil. Jav. p. 177. t. 83 (very good). Metten. Fil. Hort. Lips. p. 33. P. Reinwardtii, Kze. (fide Metten.). Goniophlebium, De Vriese. G. Pleopeltis, Fée.*—Var.  $\beta$ , *serratifolia*; pinnæ very coarsely serrated. *Goniophlebium serratifolium, Brack. Fil. U. S. Expl. Exped. p. 35. Polyp. pallens, Bl. Fil. Jav. t. 84. f. 1. J. Sm. Metten. Polypod. p. 81.*

Hab. Java, *Blume, Zollinger, Millett, Thos. Lobb, n. 263, De Vriese and Teijsmann, n. 48, 53, and 68. Sumatra, De Vriese, n. 56. Luzon, Cuming, n. 244. Khasya, Simons, n. 282.*— $\beta$ . Fiji Islands, *Brackenridge, Milne, Seemann. Luzon, Cuming, n. 203. Java, De Vriese.*—This is a much larger Fern than the preceding, *P. argutum*, with much longer and narrower and more linear pinnæ, never sensibly widened towards the base, and rarely found on the Indian continent. *P. pallens*, Bl., appears to be a small pubescent state of this species.

§ 7. CRASPEDARIA.—*Venation, in some respects, of the previous section, Goniophlebium, in a subgenus of which J. Smith and Moore place it; but the veins are often difficult to be seen, and certainly variable in different species, and the habit is very different from that group. It is best recognized by the small size, simple, usually dimorphous, and more or less hairy or paleaceous fronds, and very long, creeping, scaly caudices.*—*Gen. Craspedaria, Link, Fée. Marginaria, in part, Presl. Sp. 283-290.*

283. *P. (Craspedaria) piloselloides, Linn.*; caudex very long creeping or scandent filiform branched setaceous rufopaleaceous, stipites  $\frac{1}{4}$ - $1\frac{1}{2}$  inch long slender, fronds sparse subcoriaceous clothed more or less on both sides with rufous subulato-setaceous appressed at length deciduous scales; *sterile* ones  $\frac{1}{2}$ -3 inches long  $\frac{1}{2}$ - $\frac{3}{4}$  inch wide ovate and acute or lanceolate and acuminate; *fertile* ones 1-3 inches long linear-lanceolate, veins copiously anastomosing forming large oblong oblique costal areoles including a free veinlet soriferous at the apex few areoles near the margin, sori densely squamulose.—*Linn. Sp. Pl. p. 1542. Sw. Syn. Fil. p. 25. Willd. Sp. Pl. v. p. 144. Metten. Polypod. p. 93. Hook. Gard. Ferns, t. 18. Marginaria, Pr. Tent. Pterid. p. 187. t. 7. f. 24*

and 24 (venation very good). *Goniophlebium*, *J. Sm.* *Craspedaria*, *Fée.*—*Plum. Fil. t.* 118.—Var.  $\beta$ , *moniliformis*; fronds narrow linear moniliform from the copious sori projecting beyond the margins. *Polyp. Cayennense*, *Desv. Journ. Bot.* vi. p. 257, *Metten. Polypod.* p. 93. *P. ciliatum?*, *Willd.*—Var.  $\gamma$ , *auriseta*; fronds especially the fertile ones villous with long aureo-ferruginous dense hair-like scales. *P. aurisetum*, *Raddi, Fil. Bras. p.* 12. *t.* 23. *f.* 1, *Metten. Polyp.* p. 94. *P. Marginaria*, *Pr.* *Craspedaria*, *Fée.* *Crasp. Gestasiana*, *Fée, 6me Mém. Foug. Nouv. p.* 15. *t.* 4. *f.* 2. *Polypod. piloselloides*, *Raddi, Syn. Fil. p.* 46. *P. tectum*, *Kaulf.*

Hab. Tropical America, frequent, from the Atlantic to the Pacific, and in the West Indian islands.—I think I am correct in referring the three forms to one species.

284. *P.* (*Craspedaria*) *lycopodioides*, *Linn.*; caudex long creeping or scandent clothed with ferruginous (at length bleached) subulato-lanceolate densely imbricated scales, stipes  $\frac{1}{4}$ –1 inch long, fronds scattered firm coriaceous-submembranaceous (sometimes sparsely scaly beneath near the costa) petioled of two kinds; *sterile* ones 2–4 inches long  $\frac{1}{2}$ –nearly 1 inch broad elliptical-oblong cuneate at the base obtuse; *fertile* ones 4–6 inches long  $\frac{1}{4}$ – $\frac{1}{2}$  an inch wide linear-lanceolate obtusely acuminate subsinuate at the margin, sori copious in two series on each side the costa but rather nearer to the margin than to the costa, venation anastomosing so as to form oblong areoles at and parallel with the costa sometimes including short free veinlets and a second series of large oblique areoles near the middle including anastomosing veinlets (most copious on the sterile fronds) together with the sorus which is dorsal or rarely terminal or compital, the rest of the areoles variable in size and shape and generally including free veinlets.—*Linn. Sp. Pl. p.* 1542. *Sw. Syn. Fil. p.* 25. *Metten. Polyp. p.* 97. *Pleopeltis*, *Pr. Tent. Pterid. p.* 193. *t.* 7. *f.* 3 and 4 (*good as to venation*). *Phlebodium*, *J. Sm.* *Drynaria*, *Fée.* *Pol. vacciniifolium*, *Raddi, Fil. Bras. p.* 13. *t.* 23. *f.* 2. *Pleopeltis Corcovadense*, *Pr. Fil. t.* 119.—Var.  $\beta$ , *latifolia*; sterile fronds shorter broader suborbicular often quite sessile. *Polyp. lagopodioides?*, *Desv. Journ. Bot.* vi. p. 259. *f.* 40. *P. Owariense?*, *Desv. Journ. Bot. p.* 258.—Var.  $\gamma$ , *salicifolia*; fronds linear-lanceolate sterile and fertile nearly uniform. *Polypod. salicifolium*, *Willd. Sp. Pl. v. p.* 149, and *Herb. Willd. n.* 19603. *Kl. in Linnæa*, xx. p. 493, sub *Pol.*

lycopodioid. *Metten. Polypod. p. 96.* *P. Surinamense, Jacq. Coll. iii. p. 285. t. 21. f. 4.* *Pleopeltis, Pr. Polypod. squamulosum, Kaulf. Eu. Fil. p. 89.*

Hab. Tropical America: West Indies, Jamaica, Dominica, Brazil, *Gardner, n. 195, Raddi, n. 24*; South Brazil, *Mr. Fox, n. 103*; Peru, *Mathews, n. 128, 1029* (in this costal areoles are rarely found and the sori are near the costa). Natal, *Sanderson.* Tropical Africa: Grand Bassa, *Vogel, n. 78*; banks of the Num, *G. Mann*; Mauritius, *Boutou.*—*B.* Tropical Africa; Brasse, *Barter, in Baikie's Niger Exp. n. 9 and 1815*; Fernando Po, *Barter, n. 1448, 1736, G. Mann.* It is probably the same form which constitutes the *P. lagopodioides* from Bourbon and the *P. Ovariense* of Desvaux.—*γ.* Tropical America, frequent: Brazil, *Gardner, n. 5921, Raddi, n. 23, in Herb. nostr.*; Guiana, *Schomburgk, n. 302, Sagot, n. 714*; Ecuador, *Jameson, n. 738, Spruce, n. 5733*; New Granada, *Moritz, n. 303*; Cuba, *Wright, n. 1023.*—Of this species, I apprehend the normal state is dimorphous; but Dr. Klotzsch has ascertained that the *P. salicifolium, Willd.*, is not specifically different from *P. lycopodioides.* The venation is not easily described, nor do I find it to be by any means constant in what I consider to be one and the same species. Included veinlets, that are free in some cases, in others are lengthened out and unite with the opposite side of the areoles; this often happens in the costular areole; sometimes the free veinlet has two divaricating branches, or sometimes reflexed or even revolute branches. Accurate figures alone can make such venation intelligible to the student of Feras.

285. *P. (Craspedaria) vacciniifolium, Fisch. and Langsd.;* caudex long creeping or scandent branched clothed with dense subulato-setaceous fibrillose scales, fronds distant subcoriaceous short stipitate of two kinds; *sterile* short  $\frac{1}{2}$  an inch to 2 inches long  $\frac{1}{4}$ — $\frac{1}{2}$  an inch wide suborbicular or elliptical very obtuse; *fertile* elongated 2—4 inches long  $\frac{1}{4}$  inch broad linear obtuse, veins anastomosing forming large oblong (suborbicular) oblique costal areoles including a free veinlet bearing a sorus at the apex, marginal areoles few and exappendiculate intermediate between the costa and the margin slightly impressed.—*Fisch. and Langsd. Fil. p. 8. t. 7 (very good).* *Willd. Sp. Pl. (not Raddi).* *Metten. Fil. Hort. Lips. p. 31, Polypod. p. 94.* *Marginaria, Pr. Goniophlebium, J. Sm. Craspedaria, Link.*

Hab. Tropical America: Brazil, frequent, *Gardner, n. 5666*; Venezuela, *Fendler, n. 248*; Jamaica, *Bancroft.*

286. *P. (Craspedaria) serpens, Sw.;* caudex long creeping or scandent subfiliform paleaceous with subulate ferruginous scales, stipites  $\frac{1}{2}$ —1 inch long, fronds subdimorphous both kinds varying much in size but the *fertile* one generally smaller than the *sterile* membranaceous subpellucid 2—4 inches long lanceolate or linear-lanceolate or broad-lanceolate and then often sinuato-pinnatifid acuminate attenuated at the base, venation evident reticulated and forming oblique

oblong areoles of which the costal ones (except in the narrowest forms) are sterile, a second series of longer ones includes a solitary free soriferous veinlet, no other free veinlets except at the margin, sori forming a single series halfway between the costa and the margin.—*Sw. Syn. Fil. p. 26. Willd. Sp. Pl. v. p. 148. Metten. Polyp. p. 95. t. 2. f. 5 (venation only, but the areoles are not like those in our specimens). Pleopeltis, Pr. Phlebodium, J. Sm.—Plum. Fil. t. 121 and 2?*

Hab. Martinique, *Plumier*. Cuba, *Pæppig*, in *Herb. nostr.*, *Linden*, n. 1883, *Otto*, n. 48, *C. Wright*, n. 799.—All my specimens from Cuba (and I have never seen it from any other place), though varying in the size of the fronds, are pretty uniform in general character and in venation.

287. *P. (Craspedaria) geminatum*, *Schrad.*; caudex scandent hard and woody subdichotomously divided paleaceous with membranaceous rusty scales and bearing short branches which have geminate fronds, stipes scarcely any, fronds scarcely dimorphous (the larger and smaller ones bear sori) coriaceous opaque 3–6 inches long lanceolate acute or obtuse entire or slightly sinuated, veins sunk and indistinct, the costular veins meet and form large primary areoles which extend more than halfway to the margin and include the sori which are compital on the veins of the secondary areoles (hence a *Phymatodes*), sori rather distant forming a series halfway between the costa and the margin much sunk and forming pustules on the opposite side.—“*Schrad. Gott. g. Anz. 1824, 867.*” *Metten. Polyp. p. 97. t. 2. ff. 14, 15. P. stigmaticum, Kze., non Pr. P. iteophyllum, Link. Drynaria, J. Sm.*

Hab. Brazil, *Martius*, in *Herb. nostr.*, *Booy*.—I have drawn up my character of this species from a specimen of Dr. Von Martius (who is mentioned as an authority by Mettenius) and another exactly corresponding with it from Mr. Boog. If it be of the *Craspedaria* group it has the largest fronds of any, for they almost vie with those of *P. persicariæfolium*.

288. *P. (Craspedaria) stigmaticum*, *Pr.*; caudex very long creeping slender the younger shoots paleaceous with subulate long and finely pointed ferruginous scales, stipites scarcely any, fronds always solitary and not arising from short branches remote firm membranaceous scarcely dimorphous glabrous 4–5 inches long exactly lanceolate acuminate moderately tapering at the base the margin quite entire, venation manifest slightly prominent and very conspicuous when seen between the eye and the light quite resembling that of *P. geminatum* (and of a *Phymatodes*) the costular venation being more evident, sori compital forming a single

series between the costa and the margin.—*Pr. Reliq. Haenk. p. 20. t. 3. f. 2. Metten. Polyp. p. 97. P. venosum, Lowe, Ferns, p. 1. t. 35. "Phlebodium," Moore and Houlston.*

Hab. Central America, *Cuming, n. 1169.*—Presl and Lowe's figures well represent this plant and its conspicuous venation. In that particular, and in the general shape of the frond, this and the preceding species have a great similarity, but not in other particulars.

289. *P. (Craspedaria?) nummularium, Metten.*; caudex slender long creeping branched setose with imbricated subulate scales, fronds sparse subcarnosio-coriaceous glabrous dimorphous; *sterile* stipitate  $\frac{1}{3}$ — $\frac{2}{3}$  of an inch long orbicular-ovate very obtuse crenated at distant intervals with very narrow clefts or sinuses the surface cellular with raised crystalline dots obscurely costate, costa channelled above, stipes  $\frac{1}{4}$  of an inch long, veins sunk very obscure anastomosing "with areoles of *Doodia*" (*Metten.*); *fertile* fronds 3 inches long very narrow-linear subsinuated on extremely slender stipites nearly as long as the fronds, costa slender prominent beneath, "veins anastomosing and forming unequal elongated areoles in 2–3 series" (*Metten.*), sori in my specimen in two series close to the costa.—*Metten. Polyp. p. 105. Marginaria, Pr. Goniophlebium, Moore. Crypsinus, Pr. Epim. Craspedaria, Fée, 6me Mém. Foug. Nouv. p. 16. t. 5. f. 3. Drynaria neglecta, J. Sm., in Hook. Bot. Journ. iii. p. 397 (not of Blume?). Polyp. pyrolæfolium, Goldm.*

Hab. Luzon, *Cuming, n. 121.*—A very graceful and peculiar species, but of which the true nature of the venation is obscure; and hence, doubtless, the differences in the figures of *Fée* and *Mettenius*. The crenatures of the frond are remarkable, exhibiting fissures in the margin, with very broad teeth between them. The surface also exhibits a great number of very minute crystalline points. The species appears to have been found only by *Cuming*.

290. *P. (Craspedaria?) neglectum, Bl.*; "fronds minute coriaceous margined remotely crenulate single-nerved (costate) veinless glabrous; *sterile* ones obovato-rotundate; *fertile* ones spathulate longer stipitate, sori solitary, caudex creeping paleaceo-setaceous."—*Bl. En. Fil. Jav. p. 121, Fil. Jav. p. 133. t. 54. f. 1. Microterus, Pr. Epim. Bot. p. 124. Pleopeltis, Moore. Craspedaria calva, Fée, Gen. Fil. p. 261.*

Hab. Java, *Blume. Luzon, Meyen.*—The caudex and sterile fronds (1–1½ inch high) of this plant very much resemble those of *Pol. nummularium*, but the fertile fronds are shorter and broader. *Presl*, in his last work on Ferns, considered it worthy of constituting a new genus. There are other supposed species of this (*Craspedaria*) group, under *Craspedaria, Marginaria, Pleopeltis*, etc., but they are imperfectly described, and I can offer little or no satisfactory opinion about them.

§ 8. CAMPYLONEURON.—*Primary veins or costules pinnate, parallel, connected by curved or angled transverse veins, forming areoles that include 2 or more free soriferous veinlets; sometimes a central veinlet is prolonged and unites with the transverse vein above. Fronds simple, often large, in one instance pinnate.*—*Gen. Campyloneurum, Pr. and others. Cyrtophlebium, Br. J. Sm. Sp. 291–297.*

291. P. (Campyloneuron) *Phyllitidis*, Linn.; caudex short stout creeping very much underground partially paleaceous at length glabrous, stipites aggregated short, generally in mature specimens stout but variable often none, fronds 1–2–3 feet long 1–3 inches and more wide coriaceous rigid glabrous generally glossy on both sides often with cretaceous dots above opaque or submembranaceous elongato-lanceolate or lato- or subobovato-lanceolate gradually or suddenly acuminate rarely obtuse much attenuated and decurrent at the base often down to the caudex, the margin entire or subsinuous slightly thickened at the very edge, areoles 6–12–14 (varying with the breadth of the frond) divided transversely into two by a veinlet each one bearing a sorus.—*Var. a, Linnæana*; fronds elongato-lanceolate 1–3 inches wide. *Plum. Fil. t. 130 and 131. P. Phyllitidis, Linn. Sp. Pl. p. 1543. Sw. Syn. Fil. p. 28. Willd. Sp. Pl. v. p. 157. Campyloneuron, Pr. Cyrtophlebium, J. Sm. Campyloneurum Sieberianum and undulatum, Pr. C. Moritzianum, Fée. Polyp. repens, Metten. Fil. Hort. Lips. p. 34. t. 24. f. 1, 2 (figure and description excellent). Polypod. brevifolium, Link and Mettenius. P. costatum, Kze. in Linnæa, ix. p. 38. Metten. Polyp. p. 84 (veins sunk, obscure). Campyloneurum macrosorum, Fée.—*Var. β, lata*; fronds longer broader upwards 3–4 and more inches wide. *Campyloneurum latum, Moore, Ind. Fil. p. 25, note. C. nitidum, J. Sm. Cat. of Cult. Ferns (fide Moore).**

*Hab.* Tropical America, chiefly, I believe, confined to the Atlantic side and the Caribbean seas; from Porto Alegre, in South Brazil, to Jamaica, in the north, particularly abundant in the West Indian islands.—*Var. β* inhabits the same regions: for example, New Grenada, *Holton, n. 34, Fendler, n. 227 and 392* (“*P. Phyllitidis, Eat.*”), *Schlim, n. 274. Brazil, Gardner, n. 5291. British Guiana, Appun, n. 135. Guadeloupe, L’Herminier. Central America, Cuming, n. 1206, Seemann, n. 2 (C. Phyllitidis, J. Sm.); Jamaica, Purdie; Cuba, Linden, n. 1900, “C. Phyllitidis.” St. Vincent, L. Guilding (very large). Nicaragua, C. Wright, Herb. U. S. N. Pacif. Erupt. Exp. (“*C. repens, Eat.*”). Acatamas, Hindes. Ecuador, foot of Chimborazo, alt. 3000 feet, *Spruce, n. 5249.*—A striking and handsome Fern, but which has given rise to great confusion in consequence of the exaggerated figures of Plumier. His representations of *P. Phyllitidis* (t. 130 and 131), the original authority for that species, are tolerably satisfactory; but his figure of *P. repens*, for which species he is also authority, is so exaggerated and so clumsy that not a few botanists have confounded the two, and Mettenius, as may*

be seen by his figure and description, has given *P. repens*\* (see his *Fil. Hort. Lips.* t. 24. f. 1, 2) for *P. Phyllitidis*, but ignored the figure of Plumier, while he refers to Plum. t. 130, for *P. Phyllitidis*; and the *P. repens* of most authors is his *P. caespitosum*, Lk. With regard to Mr. Moore's *Campylon. latum*, I possess numerous specimens so named by the author; but I do not see that his very long specific character justifies its separation from *P. Phyllitidis*. "It is larger in every way," he says, "than any of the forms referred to *C. Phyllitidis*, though near to this plant, as figured by Plumier; and as it cannot be satisfactorily referred to any of the published species, it is here placed under a name which indicates one of its chief peculiarities."—I possess a var. of *P. Phyllitidis*, from Jamaica (Purdie), which is several times dichotomously branched, even from near the base. A less remarkable form is given by Plum. t. 131.

292. *P. (Campyloneuron) repens*, Linn.; caudex slender rarely much thicker than a crow's quill branched tortuous often much entangled on the ground and on trunks of trees, the young portions paleaceous with subulate deciduous scales, stipites remote usually elongated and slender but varying from 1–4 or 5 inches long stramineous, fronds a span to nearly 2 feet long  $\frac{3}{4}$ – $2\frac{1}{2}$  inches wide firm-membranaceous or subcoriaceo-membranaceous opaque (not glossy) oblongo-lanceolate more or less acuminate and more or less attenuated and decurrent at the base sometimes near to the caudex, primary veins or costules straight remote, areoles 5–8 or 10 each undivided and each bearing (except the costal areole which has only one) 2 remote soriferous veinlets rarely more, sori small biserial between the costular veins.—*Plum. Fil. t. 134 (exaggerated in size)*. *Sw. Syn. Fil. p. 29, and Willd. Sp. Plant. v. p. 156 (according to their references to Plumier)*. *Campyloneuron repens*, *Pr. Hook. Gen. Fil. t. 71 A. Cyrtophlebium, J. Sm. C. caespitosum, Lk., Fée, J. Sm. Metten. Fil. Hort. Lips. p. 34. t. 24. f. 4, 5 (very good)*. *Polyp. chrysopodon, Kl. P. oligophlebium, Kze. P. nitidum, Kfs. En. Fil. p. 92, Kze., Fée. Metten. Polyp. p. 83. Campyl. polyanthum, Pr., and C. crispum, Fée.*

Hab. Tropical South America; from the Atlantic to the Pacific, and throughout the West Indies.—This indeed varies much in size, but I have never seen such a coarse specimen as Plumier represents. Mettenius's figure of *P. caespitosum* well exhibits a medium-sized specimen. Some with smaller and narrower fronds than usual, very much resemble *P. (Campyloneuron) fasciale*, but the venation is very different. My specimens of "*P. fasciale, Eat.*," from Fendler, *Plantæ Venezuel. n. 229* and *n. 230*, and of Richard Schomburgk, from British Guiana, are *P. repens*. Again, Spruce's specimens from Tarapota, Eastern Peru, *n. 3912, 4646, and 4647*, and from Chimborazo, though resembling *P. fasciale*,

\* It is just possible that as his figure represents one of the larger forms of *P. Phyllitidis*, he may have had Mr. Moore's *Campyl. latum* in view. If so, Mr. Moore does not acknowledge it.

are truly *P. repens*. I do not see how *P. nitidum*, Kf. (by no means a glossy plant) is any way distinct from *P. repens*.

293. *P.* (Campyloneuron) *angustifolium*, Sw.; "caudex creeping aboveground paleaceous with ovato-acuminate black-brown scales at length glabrous, fronds 1-1½ foot long 3-6 lines wide coriaceous glabrous linear-lanceolate attenuated at the base and decurrent at the insertion of the stipes, at the apex gradually and long-acuminated the margin entire and revolute (most so when dry), primary veins immersed directed at an acute angle from the costa forming areoles which are bi-triseriate, sori bi-triseriate in the direction of the costa biseriate between the costules" (*Metten. under P. tæniosum*).—*P. angustifolium*, Sw. *Syn. Fil. p. 27. Willd. Sp. Pl. v. p. 153. Raddi, Fil. Bras. p. 14. t. 24. f. 2. Marginaria, Pr. Cyrtophlebium, J. Sm. Goniophlebium, Brack. Campyloneuron, J. Sm. Moore, Ind. Fil. (where see a copious list of synonyms). Polyp. tæniosum, H. B. K. in Willd. Sp. Pl. v. p. 155. Metten. Fil. Hort. Lips. p. 34. t. 24. f. 6. a, b, and Metten. Polypod. "p. 82, in part, t. 1. f. 52 and 54" (*Moore*), excluding var.  $\gamma$ . *P. ensifolium*, Willd. *Goniophlebium, Brack. P. leucorhizon, Kl. in Linnæa, xx. p. 400, and in Hb. nostr. P. dimorphum, Lk. P. solutum, Kl. Kze. in Schk. Fil. Suppl. p. 42. t. 117. f. 2. Goniophlebium, Fée. P. amphostemon, Kze.**

Hab. Tropical America, localities almost universal. I may select a few from my herbarium chiefly for the authorities, and in some instances for the names. West Indies: Jamaica, *Purdie, Hartweg, n. 1492, M'Fadyen, Wilson, n. 543, Pæppig* (*P. angustif., Kze.*); Cuba, *C. Wright, n. 747, 801* ("P. vexatum, *Eat.*," who quotes *Campyl.* *Cubense, Fée*, as the same, n. 800, "P. tæniosum"), *Linden, n. 1912, 1913; Brazil, Tweedie, Fox* (Rio Grande), *Sellow, Gardner, n. 136, 5290, "C. amphostemon," Moore. New Grenada, Schlim, n. 725, 647, and 648, Otto, n. 635* ("P. tæniosum, Willd."), *Funck, n. 205 and 555. Guiana, Richard Schomburgk, n. 136 b. "P. leucorhizon, Kf."* (an inch wide, copious sori irregularly scattered), *Moritz, n. 120 b. "P. amphostemon, Kze., and n. 310. "P. solutum, Kf.," Moritz, n. 337. "P. tenuifolium, H. B. K., Kze."* Guatemala, *Skinner. Mexico, Galeotti, n. 6408, 6283, Liebmann* ("P. angustif."). Peru, *Mathews, n. 698, ex Herb. Ruiz and Pav., Lechler, n. 2034, "P. tæniosum, H."* Ecuador, *Jameson, n. 233 and 732, a foot long, scarcely a line wide, Spruce, alt. 6-7000 feet, n. 5246. Antisana, Hartweg, n. 1493.*—The above references are to specimens varying in length and breadth of the fronds, in texture, and I fear, too, not a little in the nature of the venation, the large costal areoles being sometimes the only ones with a few free marginal veinlets, at other times there are 2-3 imperfectly arranged series with 1-2 soriferous included veinlets; hence the sori are sometimes in a single series, quite as in *Goniophlebium*, at other times they are copious and scattered. Some of the broader-fronded and more membranaceous states, myself and others are hardly able to distinguish from *P. fasciale*.—See the copious observations of *Fée*, on this and several of its allied (supposed) species, in



his valuable *Mém. sur les Fong. Nouv.* p. 128. I wish I could say they have tended to clear up the great difficulty of the synonymy.

294. *P.* (Campyloneuron) *lucidum*, *Beyr. Hb.*; caudex creeping thick much-branched, young branches partially scaly the rest naked, stipites aggregated 1–2 inches long, fronds 6 inches to a foot long  $\frac{1}{2}$ – $\frac{3}{4}$  of an inch wide oblongo- or linear-lanceolate glabrous moderately thick carnosocoriaceous (very fragile when living) singularly glossy as if varnished when dry moderately tapering at the base, the margin scarcely thickened, strongly costate chiefly fertile in the upper half, veins immersed primary veins not costuliform, primary large areoles costular a secondary but very irregular series of smaller ones not extending to the margin constitute the rest, these are subquadrangular with here and there a small triangular one, no free marginal veinlets, every areole has its free included soriferous veinlet, the costal one has generally a forked veinlet with the sori at the junction of the branches.—*Campyloneurum lucidum*, “*Moore, in Sim, Cat. of Ferns, 1858.*” *C. rigidum*, *J. Sm. Cult. Ferns, p. 13.* *Polypod. nitidum*, *Hook. (not Kaulfs.) Fil. Exot. t. 12 (excluding all the synonyms).* *P. tæniosum*,  $\gamma$ , *Metten. Polyp. p. 82.*

Hab. Brazil (*Beyrich*), *Sellow* (“*Campyl. nitidum, Kl.*” in *Herb. nostr.*), *Lady Calcott, M. Rae, Swainson.*—If there were no other character, the singularly vernicose surface of the dried specimen would always distinguish this species.

295. *P.* (Campyloneuron) *fasciale*, *Willd.*; caudex creeping more or less paleaceous at length naked, stipites often aggregated varying from almost none to 4–6 inches in length stramineous, fronds firm-membranaceous or subcoriaceous opaque glabrous 3–4 inches to 1–1 $\frac{1}{2}$  foot long  $\frac{1}{2}$ –1 $\frac{3}{4}$  inch wide elongato- or spatulato-lanceolate acuminate gradually tapering from above the middle downwards so as often to form a long and decurrent wing on the stipes, venation usually indistinct, primary veins distant anastomosing so as to form a series of large costal areoles including a free veinlet and one or two rarely more irregular and more or less arched series between the costal one and the margin including 1–3 soriferous veinlets, sori usually small and mostly irregularly scattered over the back of the frond.—*Willd. Sp. Pl. v. p. 156.* *Metten. Polyp. p. 82.* *Campyloneuron, Pr. Polyp. lapathifolium, Sw. Syn. Fil. p. 28.* *Willd. Sp. Pl. v. p. 160.* *Raddi, Fil. Bras. p. 15. t. 24. f. 3.* *P. lanciforme, Pr., and Campanoleuron lanciforme, Pr., Tent. Pterid. p. 19. t. 7. f. 15 (venation*

more perfectly campyloneuroid than usual). *C. Fendleri*, Moore, *Ind. Fil.* p. 224 (in note). *Polyp. lævigatum*, Cav., Sw. *Campyloneuron minus*, Fée, *Mém. Foug. Nouv.* t. 24. f. 3 (very good). *C. Cubense*, Fée, l. c. t. 3. f. 2 (small). *Acrostichum?* *Breutelianum*, Kze. in *Schk. Fil. Suppl.* p. 3. t. 102 (as to the sterile fronds).

Hab. Tropical America, frequent. Brazil, *Raddi*; Banks of the Marañon, *Spruce*, n. 3912. New Granada, *Moritz*, n. 134 ("P. chrysophyllum, Klf."), *Schlim.* n. 310. Venezuela, *Birschell*, *Fendler*, n. 228 (*Camp. Fendleri*, Moore) and 228 β, n. 409 and 226 (very large). Guatemala, *Sinclair*. Cuba, *C. Wright*, n. 1020; Jamaica, *March*, n. 41. Ecuador, *Spruce*, n. 3247 and 5738. *Jameson*.—A variable species in the breadth and length and general shape of the fronds, and with a venation which certainly departs from that of true *Campyloneuron* and partakes of that of *Goniophlebium*.

296. *P. (Campyloneuron) sphenodes*, Kze.; caudex long-creeping slender almost filiform squarrose with deciduous paleaceous scales, stipites distant slender stramineous 3–6 inches long, frond coriaceous-submembranaceous glabrous very minutely pellucido-punctate 3–8 inches long 1 to nearly 3 inches broad elliptico-oval or subovate long and finely suddenly cuspidato-acuminate the margins thickened callous the cuneate base entire or repand, primary veins costuliform approximate straight slightly elevated beneath, areoles 6–8-seriate rather longer than they are broad including two sori-ferous venules, sori small in two series between the costular veins (Tab. CCLXXXII).—*Kze. and Kl. in Linnæa*, xx. p. 402. *Metten. Polyp.* p. 84. *Campyloneuron*, Fée.

Hab. New Granada, Merida, *Moritz*, n. 304. Ecuador, descent of Molleturo, alt. 7000 feet, *Jameson*.

(*Fronde pinnate.*)

297. *P. (Campyloneuron) decurrens*, *Raddi*; caudex creeping stout in native specimens and clothed with dirty-brown at length deciduous scales, stipites 1–1½ to 2–3 feet long brown or substramineous, fronds subaggregate simple (when young) and small (a span to a foot or more and fertile) subsessile or 6 inches long and ternate or 2 to 3 feet long and pinnate firm subcoriaceous-membranaceous glabrous subnitent dark-green when dry, pinnæ distant 6–12–14 inches long ½ to 4 inches broad oblongo-lanceolate sometimes subfalcate finely attenuated and subcuneate at the base especially the upper ones, terminal one resembling the rest petiolate but the petiole winged, primary veins costuliform straight very distinct elevated on the under side, areoles 6–12 each including two free veinlets rarely

more which are soriferous, sori always terminal small forming two series between the costular veins.—*Raddi, Fil. Bras. p. 23. t. 33. Metten. Fil. Hook. Lips. p. 34, Polyp. p. 34. Campyloneuron, Pr. Cyrtophlebium, J. Sm.—β, Fendleri*; large brighter-green, pinnæ 1 foot long, costæ and veins stramineous. *P. Fendleri, Eat. Pl. Wright. et Fendl. p. 199, and P. decurrens, p. 199 (not Campyloneuron Fendleri of Moore). Campyloneuron magnificum, Moore, Ind. Fil. p. 224, in note.*

Hab. Brazil, *Raddi, Douglas, n. 7, Milne, Gardner, n. 1004, 5292, 5665.—β. Venezuela, Fendl. n. 231 and n. 410. Tarapota, Eastern Peru, Spruce.—The Venezuela plants of Fendler are one and same variety; both much larger than ordinary: frond of a lively-green colour.*

§ 9. NIPHOBOLUS.—*Venation internal, indistinct, and when seen very variable in different species, so much so, that those who retain Niphobolus\* as a genus are obliged to have recourse to the artificial character of the under side of the fronds being clothed with more or less dense stellated hairs or tomentum. Fronds always simple, subdimorphous, arising from a long creeping caudex. Gen. Niphobolus, Kfs. Hook. Gen. Fil. t. 83. Niphopsis, J. Sm. Sp. 298-320.*

298. *P. (Niphobolus) angustatum, Sw.*; caudex long creeping branched paleaceous with falcate subulato-setaceous scales, stipites remote  $1\frac{1}{2}$ –4 inches long, fronds 5 inches to a span or more long  $\frac{3}{4}$ –2 inches wide tapering below into a petiole glabrous above hoary and subferruginous with dense stellated pubescence coriaceous-carnose; *sterile* fronds usually the smallest and broadest and with shorter petioles broad or oblongolanceolate; *fertile* ones longer and generally narrower in proportion, venation sunk obscure, costular areoles with free or branched and more or less connected veinlets, sori very large subglobose oval partially sunk in the frond very convex forming a single series on each side between the costa and margin sometimes longitudinally confluent.—*Sw. Syn. Fil. p.*

\* *Niphobolus* was established as a genus by Kaulfuss, “Sori nudi, annulares vel rosacei, conferti vel sparsi ad apicem frondis, pilis stellatis obducti,”—and although his successors have almost invariably retained the genus, they have done little, if anything, towards giving more stable characters. Genus *heteroclitum*, writes M. Fée, “pilis *Neuroplatyceratis* (*Platyceris*, auct.); venulis *Pleopeltidis* et *Gymnopteridis*, sporotheciis uniserialibus ut in *Polypodiis*, *Pleopeltidibus*, etc., multiserialibus ut in *Pleuridiis*, indistinctis et confluentibus ut in *Acrosticheis*, etc. Presl alone, among the advocates for the great importance of venation, has been steady to that principle, and has formed eight genera out of *Niphobolus*! an arrangement in which he has been followed by no one; neither by those, as observed by Moore, ‘who reject as worthless all distinctions, the most marked and obvious differences of vascular structure,’ nor by those who in general patronize the multiplication of genera on slight grounds.” Moore gives in *Ind. Fil.* representations of two (out of many quite different forms of venation) for *Niphobolus*, but acknowledges that, bereft of its hairs, it would simply be a net-veined *Polypodium*.

27 and 224. *Willd. Sp. Pl.* p. 124. *Schk. Fil.* p. 187. t. 80. *Niphobolus*, *Spr. Hook. Gard. Ferns*, t. 20. *Niphopsis*, *J. Sm.* *Pleopeltis*, *Pr.*, and *P. macrosora*, *Pr.* *Polyp. sphærocephalum*, *Wall. Cat. n.* 272. *Metten. Polyp.* p. 122. *Niphobolus*, *Hook. and Grev. Ic. Fil.* t. 94. *N. macrocarpus*, *Hook. and Arn. Bot. of Beech. Voy.* p. 74. t. 18.

Hab. India: Tranquebar, *Roettler*; Assam, *Jenkins*; Singapore, *Wallich*; Malacca, *Griffith*, *Cuming*, n. 372; Penang, *Lorraine*; Borneo, *Wallace*, *Thos. Lobb.* Pitcairne's and Coral Islands and Tahiti, *Cuming*, n. 1394, *Mathews*, n. 13, *Lay and Collie*, *Barclay*. North-east Australia, Brisbane river.—A well-marked species.

299. *P. (Niphobolus) tricuspe*, *Sw.*; caudex stout creeping paleaceous with lanceolato-subulate scales, stipites aggregated rather stout 6–8 inches long, fronds  $1\frac{1}{2}$ –3 inches long  $1\frac{1}{2}$ –4 inches broad at the base very thick carnosu-coriaceous densely stellato-tomentose on both sides at length subglabrous above triangular-cordate or hastato-3-lobed, middle lobe obtusely acuminate entire lateral ones with a deflexed lobe at the base, sori sunk in the tomentum in four parallel series between the costules.—*Sw. Syn. Fil.* p. 30. *Willd. Sp. Pl.* v. p. 63. *Acrostichum hastatum*, *Thunb. Fl. Jap.* p. 331. t. 34. *Niphobolus hastatus*, *Kze. in Bot. Zeit.* vi. p. 565 (not *Polyp. hastatum*, *Thunb. and Metten.*). *Polycampium hastatum*, *Pr. Epimel. Bot.* p. 197.

Hab. Japan: Fusi and Falcon, *Thunberg*; Kanagawa, *Oldham*; Hakodadi (*Hance*); south part of Corea, *Dr. Clarke*. Port Hamilton, an island on the coast of Corea, alt. 700 feet, *Wilford*.

300. *P. (Niphobolus) acrostichooides*, *Sw.*; caudex creeping branched younger portions squarrose with rather large bright ferruginous lanceolato-subulate scales, stipites 1–3 inches long, frond hard-coriaceous 1–3 feet and more long  $\frac{1}{2}$ –1 inch wide glabrous above beneath whitish or tawny stellato-tomentose (tomentum very deciduous) elongato-lanceolate or linear obtuse; sterile fronds generally the broadest, “areoles with 6–7 free veinlets,” sori rather small prominent very compact generally occupying the upper part of the frond arranged in 6–8 oblique very close series between the costules.—*Sw. Syn. Fil.* p. 29 and 225. *An Forst. Prodr.* 434? *Metten. Polyp.* p. 128. *Br. Prodr.* p. 146. *Cyclophorus*, *Pr.* *Niphobolus puberulus*, *Bl. Fil. Jav.* p. 57. t. 23 (excellent). *Cyclophorus glaber*, *Desv.* (not *P. Samarense*, *Metten. Polyp.* p. 123). *Gyrosorium*, *Pr.* *Polyp. furfuraceum*, *Wall. Cat. n.* 278.

Hab. Java (*Swartz*), *Blume, De Friese*, n. 491, *Zollinger*, n. 228. Isle Samar, *Cuming*, n. 323 (*P. Samarensis*, *Metten.*). Molucca Islands and New Hebrides, *Barclay, Mihe*. North-east coast of New Holland, *Brown, All. Cunningham*. Moulmein, *Griffith*. Ceylon, *Gardner*. Penang, *Wallich*.—This is perhaps the longest and narrowest, in proportion to its length, of any of the group; some of my specimens are 3 feet long. What is the *P. Samarensis* of Mettenius? p. 123, for which he quotes *Cuming*, n. 323, which, in my herbarium, is a state of *N. acrostichoides*. N. 333 is *Cuming's Dilemma Samareuse*, *J. Sm.* (See *Polyp. teuulore*, n. 329 in § *Phymatodes*.)

301. *P. (Niphobolus) floccigerum*, *Metten.*; “caudex creeping clothed with scales which are appressed at the base patent at the apex narrow-lanceolate acuminato-setose entire glabrous ferruginous or at the point of attachment brown paler at the margin, stipites 6 lines to 1 inch long floccigerous-tomentose with stellated hairs, fronds coriaceous or carnosocoriaceous wrinkled when dry at first thickly clothed on both sides with stellated hairs (in radios divaricato-flexuosos stuppeos productis) at length glabrous above glossy beneath laxly tomentose 2 inches to 1½ foot long 2½–5 lines wide linear gradually attenuated at the base obtuse, veins in the moistened frond translucent, areoles including two free veinlets, sori at the costa 2–4-seriate slightly impressed not protuberant at the back at length confluent” (*Metten. Polyp. p. 129*).—Under this species Mettenius brings var. *α, latifolium*; fronds 5 lines wide 1¼ foot long. *Niphobolus flocciger*, *Bl. Fil. Jav. p. 61. t. 26*. *Cyclophorus, Pr., and N. varius, J. Sm., ex parte*; and var. *β, loriforme*; fronds 2–2½ lines wide 2 inches to 1 foot long. *N. flocciger, β (not β of Blume?)*. *N. loriformis, Kze. Bot. Zeit. vi. p. 120, and Antrophyum niphoboloides, Kze. Bot. Zeit. vi. p. 209*.

Hab. *α*. Java, *Blume*. “Luzon, *Cuming*, n. 88, in part.”—Var. *β*. Java, “*Zollinger*, n. 2022, 2022 a, 2023, 3177.”—Some of my specimens of *P. acrostichoides* sufficiently accord with *Blume's* figure.

302. *P. (Niphobolus) Africanum*, *Metten.*; caudex creeping densely ferrugineo-paleaceous with rather large ovate acuminate fringed scales, stipites remote ½ an inch to 2 inches long, fronds coriaceous 4 inches to a foot long ½–1½ inch wide lanceolate bluntly acuminate nearly glabrous when mature densely white and stellato-tomentose beneath the base gradually attenuated into the short stipes; *sterile* ones small subspathulate; *fertile* ones often suddenly acuminate and soriferous at that portion, sori numerous small partially sunk in the tomentum irregularly but closely arranged (transverse costular areoles with included anastomosing veins

and free veinlets).—*Metten. Polyp. p. 131.* Niphobolus, *Kze. in Linnæa*, x. p. 501, and in *Schk. Fil. Suppl. p. 67. t. 33.* *Pappe and Raws. En. Fil. S. Afr. p. 41.* Gynosorum, *Pr.*

Hab. South Africa: Natal, *Drège*; British Cafraria, *D'Urban*; Ambas Bay, Cameroons, *G. Mann.*—This species appears to be as peculiar to the warm parts of South Africa as *P. Americanum* is to the tropical regions of the New World.

303. *P. (Niphobolus) rupestre*, *Br.*; caudex rather slender creeping branched tortuose paleaceous with narrow acuminate scales, stipites remote  $\frac{1}{2}$  an inch to 3–4 inches long jointed upon a short scaly branch of the caudex, fronds dimorphous carnosu-coriaceous above partially clothed with stellated hairs or tomentum beneath densely so and sometimes quite white or cinnamon-colour with them; *sterile* fronds 1–2–3 inches long  $\frac{1}{2}$ –1 inch wide obovate elliptical spathulate or even orbicular; *fertile* ones 4–6 inches long  $\frac{1}{2}$ – $\frac{3}{4}$  of an inch wide linear-oblong or -lanceolate obtuse gradually tapering into the petiole, venation quite immersed very irregular as represented by Mettenius and subcampylo-neuroid, sori large and in my specimen very irregular, partially sunk yet very convex and prominent often confluent frequently confined to the superior half of the frond.—*Br. Prodr. p. 136.* *Metten. Fil. Hort. Lips. p. 33. t. 24. f. 9, 10 (venation), Polyp. p. 125.* Niphobolus, *Hook. and Grev. Ic. Fil. t. 93.* *Hook. Fil. Fl. Nov. Zeal. p. 44.* *N. serpens, Endl. Fl. Norf., Pr. Polyp. Forst. P. stellatum, Rich. P. elæagnifolium, Bory, in Duperry Voy. Bot. p. 259. t. 31. f. 1.* Niphob. bicolor, *Kaulfs. En. Fil. p. 128.* *Hook. and Grev. Ic. Fil. t. 44 (wanting the sterile fronds).*

Hab. Australia, as far north as Moreton Bay, New Zealand, as far south as Banks's Peninsula, and the intervening adjacent islands of the South Pacific, Fiji and Kermadec Islands, etc., *Mitue and others.* Society Islands, *Bidwill.*—This is a species, though of extended, yet limited distribution. It does not appear in West Australia, nor in any part of India; and is best distinguished from *P. adnascens* by the large and irregularly-disposed sori.

304. *P. (Niphobolus) confluens*, *Br.*; caudex long slender filiform creeping much-branched paleaceous with subulate finely acuminate scales like slender hairs, stipites 1–4–5 lines long from a paleaceous base squamulose, fronds dimorphous carnosu-coriaceous (probably very thick and fleshy when recent) above glabrous or sparsely stellato-pubescent beneath farinaceous and almost silvery with minute scales mixed with copious stellated hairs; *sterile* fronds  $\frac{1}{4}$ – $\frac{1}{2}$  an inch long orbicular spathulate; *fertile* ones the largest of them

scarcely exceeding an inch in length and 1-2 lines in breadth linear obtuse, in both the margin are incurved so as to render the back convex, venation sunk and wholly concealed, sori few large near the margin orbicular or oval confluent confined to the upper half or extending the whole length much sunk yet prominent.—*Br. Prodr. Fl. Nov. Holl. p.* 146.

Hab. Australia; "Port Jackson," *Brown*; Brisbane river, *Allan Cunningham*, in *Herb. nostr.*, n. 66; and Burnett river, *N. Austral. Expl. Exp.*, lat. 26° S.; and New England, *Mueller*.—The *Polypodium confluens* of *Brown's* 'Prodromus,' placed by him next to his *P. rupestre*, has never, that I know of, been noticed by any other author, although the vicinity of Port Jackson is the acknowledged locality. I have, however, in my herbarium, good specimens of a species gathered by *Allan Cunningham*, which he has confidently marked "*P. confluens*, Br., from rocks and decayed timber in woods, Brisbane river." Identically the same has been sent me by the excellent *Mueller*, from localities in North Australia. If it be the true plant, it has dimorphous fronds, and is the smallest and prettiest of the group; and it is further remarkable for the copious, silvery, appressed, farinaceous scales, abundantly mixed with the stellated hairs. I have been sometimes disposed to think *P. carnosus*, Bl. Ic. Fil. t. 19 (which I have doubtfully referred to a state of *P. adnascens*) may be a more luxuriant state of this.

305. *P. (Niphobolus) adnascens*, Sw.; caudex creeping paleaceous with lanceolato-setaceous scales, stipites distant 1-2 inches long, fronds dimorphous carnosu-coriaceous dark-green above but hoary with sparse stellated pubescence beneath and paler and even white with more copious compact hairs; *sterile* fronds 2-4 inches long spatulate or elliptical-lanceolate obtuse; *fertile* ones 6-8 inches long linear or oblong obtuse or acute both kinds tapering below into the stipes, costa subcarinate, costules sunk obscure their areoles including free-veinlets, sori deep sunk in the tomentum and in the substance of the frond on each side the costa arranged 5-6 in obliquely transverse series, capsules long-stalked mixed with long-stalked stellated scales.—*Sw. Syn. Fil. p.* 25 and 228. *t. 2. f. 2. Willd. Sp. Pl. v. p.* 145. *Niphobolus, Kfss. En. Fil. p.* 124. *Wall. Cat. n.* 268. *Hook. Gard. Ferus, t.* 19. *Cyclophorus, Desv. Polyp. pertusum, Roxb. Hook. Ex. Fl. t.* 162. *Wall. Cat. n.* 267. *Metten. Polyp. p.* 125. *Niphobolus, Spr., Pr. Niphob. elongatus, Bl. Fil. Jav. p.* 52. *t.* 20. *N. varius, Kfss. En. Fil. p.* 125. *Polyp. verrucosum, Wall. Cat. n.* 267. *P. caudatum, Metten. Polyp. p.* 126. *Niphob. Kfss. En. Fil. p.* 127. *Bl. Fil. Jav. p.* 56. *t.* 22. *Polypod. vittarioides, Wall. Cat. p.* 270. *Cyclophorus, Pr. Niphob. Chamissoanus, Pr. (fide Metten.)*

Hab. India: Madras Peninsula, *Wight, Heyne, etc.*; Nepal, Assam, Khasya, Himalaya, Sikkim, *Wallich, Cat. n.* 263, and all travellers; Moulmeine, *Parish*

(fronds almost glabrous), *n.* 203; Malay Archipelago and Islands, *De Vriese* (Java), *n.* 316, 495; Amboyna (*Webb*), *Griffith*, *Wallich*, *Cuming*, *n.* 135, 240, 67, 88, and 93; Ceylon, *Gardner*, *n.* 1153. China, Fiji Islands, etc. West tropical Africa; Cameroons, *G. Mann*.—A very universally distributed Fern, especially over the continent of India and adjacent islands, well distinguished by numerous sori, deeply sunk in a cavity of the frond, and arranged in transversely oblique series between the costa and the margin.

306. *P.* (*Niphobolus*) *spissum*, Bory; "caudex creeping clothed with ferruginous ovato-lanceolate acuminate scales their base appressed recurved at the apex, fronds coriaceous glabrous above, beneath clothed with stellated at length rufescent scales; *sterile* ones 1–4 inches long oblong or linear-lanceolate obtuse or acute, secondary veins submanifest, areoles with three free veinlets immersed the petiole 2–8 lines long; *fertile* ones 4 inches long from a long attenuated base linear rather obtuse soriferous upwards the petiole 4 lines long, sori immersed impressed protuberant at the back on each side the costa 3–4-seriate at first annular." (*Metten.*)—*Bory*, in *Willd. Sp. Pl.* v. p. 146. *Metten. Polyp.* p. 125. *Niphobolus*, *En. Fil.* p. 126. *Cyclophorus*, *Desv.*

Hah. "Bourbon, *Boivin*."—Perhaps allied to *P. adnascens*.

307. *P.* (*Niphobolus*) *porosum*, Wall.; caudex creeping subulato-paleaceous with ferruginous scales, stipites aggregated short scarcely any or 3–5 inches long and then winged or margined to the base, fronds carnosu-coriaceous 6 inches to a foot and more long  $\frac{1}{2}$  an inch to 1–1 $\frac{1}{2}$  wide lanceolate or linear-lanceolate or even linear often finely acuminate the margin quite entire or spuriously and very unequally pinnatifid with remote long and narrow segments, from near the middle gradually attenuated downwards to the caudex at first wholly tomentose with deep ferruginous stellated hairs at length glabrous on the upper side and depresso-punctate the dots corresponding with the sori, venation quite sunk and obsolete, sori very copious and at first quite sunk among the tomentum appearing in the form of small tubercles, at length a circular opening appears but the sori scarcely rise above the surface of the tomentum arranged indeed in series but it is impossible to say how far these series are confined within certain areoles.—*Wall. Cat.* n. 266. *Metten. Polyp.* p. 128. *Niphobolus* and *Cyclophorus*, *Pr.* *Polypod. sticticum*, *Metten. Polyp.* p. 128. *Niphobolus*, *Kze. in Linnæa*, xxiv. p. 257. *N. Schmidianus*, *Kze. Bot. Zeit.* vi. p. 121. *Cyclophorus*, *Pr.*, and *Niphob. fissus*, *Bl. Fil. Jav.* p. 58. t. 24.



Polypod. Mysurense, *Heyue, Wall. Cat. n. 269.* P. lanatum, *Wall. mst. in Herb. nostr.*

Hab. Nepal, *Wallich.* Kumaon and North-west Himalaya, *Strachey and Winterbottom* (alt. 3000 feet), *J. Thomson.* Nilgherries, most abundant, *Schmid, McLeor, Wight, Heyue, Sir F. Adam, Beddome, Hohenacker, n. 907* (Niphobolus sticticus, *Kze.*) Assam and Khasya, *Hooker fil. and Thomson*, alt. 5000-6000 feet. Boutan, *Griffith.* Ceylon, *Gardner, n. 1226*, alt. 2300 feet.—Like not a few others of the *Niphobolus* group, this is a species, and I believe a very distinct one, more easily recognized by the eye than defined by words. It is remarkable for the bright, deep, ferruginous colour of the whole tomentum, and for the fronds not unfrequently having angles and even long-acuminate lobes at the margin, while the base tapers down so gradually as to form a wing to the short stipules. *N. sticticus* of *Kze.* in *Hohenacker*, is identical with this; and, possibly, *Niphob. fissus* of *Blume* is not really different.

308. P. (Niphobolus) *Lingua*, *Sw.*; caudex very long creeping rather slender flexuose paleaceous with ferruginous subulate scales, stipites 3-6 inches and more long remote always arising from a short very paleaceous branch of the caudex, upper scales longest and spreading, fronds 4-8 inches long lanceolate or ovate or oblong obtuse or acuminate densely and very compactly stellato- and sometimes subsquamuloso-tomentose at length glabrous above, sori subelevated copious in 4-6 close series between the primary or costular veins and from 9-20 between the secondary veins.—*Sw. Syn. Fil. p. 29.* *Willd. Sp. Pl. v. p. 162.* *Langsd. et Fisch. Fil. i. p. 7. f. 5.* *Metten. Polyp. p. 130.* *Acrostichum, Th. Fl. Jap. p. 330. t. 33.* *Schk. Fil. p. 1. t. 1.* *Niphobolus, Spr., Kze. Schk. Fil. Suppl. p. 144. t. 63.*

Hab. Japan, *Thunberg*; Nagasaki and as far north as Tsus-Sima. Apparently usually common in China, from various sources: Hongkong, *Champion, etc.*; Formosa, *Wilford, Swinhoe*; Loo Choo, *C. Wright.* Malay Islands and Peninsula, often very large, *Parish, n. 180.* Continent of India, extending to Boutan and Eastern Himalaya, *Hooker fil. and Thomson* (alt. to 5000 feet), *Gardner* (Ceylon), *Griffith, Cuming, n. 127* (Luzon), *Wallace* (Borneo).—Very variable in size and outline, but an easily-recognized species.

309. P. (Niphobolus) *detergibile*, *J. Sm.?* vix *Don?*; caudex rather stout densely fibroso-radicant paleaceous especially about the base of the stipites with finely subulate ferruginous scales, stipites 4-6-8 inches long aggregated clothed as is the whole plant with a dense compact mass of whitish or ferruginous stellated tomentum which not unfrequently peels off in dense cottony masses from the upper side of the frond leaving that part quite naked and glabrous, fronds from 4-16 inches long  $\frac{3}{4}$ -1 $\frac{1}{2}$  inch broad carnosu-coriaceous younger ones often ovato-acuminate mature ones lanceolate finely

acuminate subsinuate moderately attenuate decurrent not unfrequently broader and subhastate at the base then suddenly cuneate, sometimes wrinkled above by the impressions of the sori from the other side and obscurely nigropunctate, below the stellated tomentum is long retained, venation immersed but evidently that of *Campyloneurum*, costules indistinct, intervening areoles 14-16, each with free included soriferous veins, sori scarcely sunk small and but slightly elevated above the tomentum very copious arranged with great regularity.—*P. vestitum*, *Wall. mst. in Herb. Hook.*

Hab. Chiefly North Bengal and along the lower ranges of the Himalaya, from very low altitudes of Silhet and Assam to 3500 feet (in Kumaon), from Simla (*Madden, Edgeworth*) in the west to Boutan (*Griffith*) in the east, *Wallich* (Nepal), *Strachey and Winterbottom, Hooker fil. and Thomson*.—Specimens of this Fern were sent to me from Nepal as early as 1818 by Dr. Wallich, and had I only those to rely upon I might have been disposed to refer them, though with great hesitation, to some described species; but I have since received a copious suite from other collectors, which, though variable in size and shape, are referable to one and the same species. It seems peculiar to northern Bengal. In my specific character, I have pointed out its main distinctive marks, and future observations must determine their permanency or otherwise.

310. *P. (Niphobolus) costatum*, Wall.; caudex creeping rufo-paleaceous with slender subulate scales, stipites subaggregate 1 inch to a span long angled, fronds a span to  $1\frac{1}{2}$ -2 feet and more long 1-2-3 inches and more broad firm (but not apparently carnos-) coriaceous even submembranaceous, in age glabrous above, beneath densely stellato-tomentose and subfurfuraceous (tomentum forming a close coat) lanceolate or suboblanceolate acuminate gradually tapering below and decurrent upon the stipes, primary veins or costules distinct elevated on the under side, sori immersed very minute and numerous arranged in compact closely placed lines or series between the costules and in equally-compact series transversely with them.—*Wall. Cat. p. 265. Metten. Polyp. p. 131. t. 3. f. 14 (venation)*. *Niphobolus*, *Pr. Apalophlebia*, *Pr. Epim. p. 138. Niphob. venosus*, *Bl. Fil. Jav. p. 63. t. 28 (very good, but small fronds)*. *Apalophlebia*, *Pr. Epim. p. 139.*

Hab. Nepal, Kumaon, and all along the Himalayan range, from Kumaon to Sikkim, Khasya, and Assam, *Wallich*, n. 265, *Griffith*, *Strachey and Winterbottom*, *Simons, Hooker and Thomson* (alt. 2000 feet). Moulmeine, *Parish*, n. 17. New Guinea, *Hindes*. Java, *Blume, Zollinger*.—This, I think, has the smallest and most copious sori of any of the *Niphobolus* section; but, numerous as they are, they will be seen to be arranged in regular but closely compacted series.

311. *P. (Niphobolus) albicans*, Metten.; "caudex thickish creeping densely paleaceous with largish scales which have a blackish coriaceous base and are prolonged into a spreading membranaceous pale-ferruginous at length deciduous apex, stipites 1-4 inches long, fronds coriaceous at length glabrous above, beneath densely piloso-stellate adpressedly pannose at length reddish 1-2 feet long 1 inch (-2 inches according to Blume's figure) wide linear-lanceolate acuminate long attenuated at the base, secondary veins on the removal of the downy covering submanifest immersed, sori occupying the the upper half of the frond 6-7-seriate on each side the costa annular slightly impressed not protuberant at the back." *Metten. Polyp. p.* 127. *Niphobolus*, *Bl. Fil. Jav. p.* 60. *t.* 25. *Cyclophorus*, *Pr. N. glaber*, *Klfs. and Bl. Fil. Jav. p.* 62. *t.* 27 (*frond narrower*).

Hab. Java, "*Blume, Thos. Lobb, Goring.*"—I have seen no authentic specimens of this *Niphobolus*, but those from Lobb perfectly agree with the two forms of Mettenius. Blume refers to it, as synonyms, *Polyp. stignosum*, Sw. and Willd., of which Mettenius takes no notice; and the latter unites with it, I scarcely know how justly, as a mere variety, the *N. glaber*, Klfs. (in part) and of *Bl. Fil. Jav. p.* 32. *t.* 27, *N. Blumeanus* of Kze. *Bot. Zeit.*, and *P. acrostichoides*, Willd. *Sp. Pl. v. p.* 156, excl. syn. The name "*albicans*" is very deceptive; the whole under side of the frond is rich cinnamon. Deciduous white down is seen on the costa.

312. *P. (Niphobolus) Gardneri*, Metten.; caudex somewhat creeping the younger portions densely ferrugineo-paleaceous, stipites approximate arising from a scaly branch of the caudex 2-4 inches long, fronds about a foot long carnosocoriaceous lanceolate obtusely acuminate gradually attenuated upon the stipes densely clothed with a very compact firm subfurfuraceous mass of whitish or ferruginous stellated tomentum, costa and primary veins or costules slightly elevated beneath, venation of *Campyloneurum*, secondary transverse veins more obscure, veinlets generally free and soriferous, sori superficial (not sunk) in about four series parallel with the costules and 10-12 transverse series between the costa and the margin.—Var. *a*, *subferrugineu*. *Metten. Polypod. p.* 129. *Niphobolus Gardneri*, *Kze. J. Sm. Cat. Cult. Feras, p.* 12. *Hook. Fil. Exot. t.* 68. *N. acrostichoides*, *J. Sm. Cat. Kew Gard. Feras, p.* 2. *N. costatus*, *J. Sm. Cat. Kew Feras, p.* 6? (*not Polyp. acrostichoides*, Forst.).—Var. *β*, *canescenti-alba*.

Hab. *a. Gardner*, *n.* 53 (*Mettenius*) and in *Herb. nostr., sine no., Mrs. General Walker*. *Khasya, Griffith.*—*β. Mishmee and Boutan, Griffith.*

313. P. (Niphobolus) *splendens*, Hook.; caudex? stipes almost none, fronds  $1\frac{1}{2}$ –3 feet long 3 inches wide oblongo-lanceolate suddenly and subcuspidately acuminate long-attenuated below to the nearly sessile base above sparsely stellately albo-tomentose mixed with cobwebby hairs, beneath clothed with similar tomentum and hairs or fine scales of a rich-brown colour, costa stout prominent below, costules very evident but scarcely elevated, sori small numerous crowded irregularly neither extending in my fertile specimen to the apex nor to the margin.—Niphobolus, *J. Sm. in Hook. Journ. Bot.* iii. p. 596 (name only). *Apalophlebia*, *Pr. Epim.* p. 138.

Hab. Isle of Samar, Philippine, *Cuming*, n. 331.—This is unnoticed by Mettenius, but is really a fine and remarkable species, from the size and from the nature and colouring of the tomentum. It is perhaps most allied to *P. costatum*, but, I think, very different. Presl was ignorant of the fructification.

314. P. (Niphobolus) *Penangianum*, Hook.; caudex?, stipes scarcely any, fronds submembranaceous  $1\frac{1}{2}$  foot and more long  $2\frac{3}{4}$  inch wide oblanceolate finely acuminate the base much and gradually attenuated sessile the margin irregularly sinuated glabrous above (at least in maturity) beneath thinly clothed with fuscous stellated hairs, venation internal but manifest when viewed between the eye and the light, costules not elevated, areoles 16–18 between the costa and the margin quite those of *Campyloneurum* including 4 free soriferous veinlets, sori prominent (not sunk) forming a broad mass in the disk of the upper half of the frond arranged with great regularity in four longitudinal series parallel with the costules and within each areole are transverse lines each of four sori, capsules mixed with long-stipitate peltate stellated scales. *Hook. Ic. Pl. t.* 203. *Gen. Fil. t.* 83. *Polycarpium*, *Pr.*

Hab. Penang, *Lady Dathouse*. Moulmeine?, *Parish* (small and imperfect).—Remarkable for the comparatively membranaceous fronds, the thin sparse coating of brown stellated pubescence of the under side, and the beautifully symmetrical arrangement of the sori in the disk of the superior half of the frond, not extending to the margins.

315. P. (Niphobolus) *subfurfuraceum*, Hook.; caudex short branched creeping the younger branches paleaceous with ferruginous subulate scales, stipites subaggregated 4–5 inches long, fronds 24–30 inches long 4–5 inches wide broad-lanceolate or oblanceolate sharply acuminate below gradually and much attenuated upon the stipes glabrous above minutely stellato-tomentose beneath, the tomentum thin firm and close so as to appear subfurfuraceous or com-

pactly pinnose of a whitish colour, costa stout, costules evident but not elevated, venation indistinct quite that of true *Campyloneuron*, the areoles from 15–20 in a series between the costa and the margin each with numerous included free soriferous veinlets, sori rather small most copious all over the back of the frond elevated subglobose (not in the least sunk) forming as many arched series between the costules as there are areoles.

Hab. Mishmee and Boutan, *Griffiths*.—This fine species vies with, if it does not exceed, in size, our *P. Boothii*, and the venation and arrangement of the sori are similar, but it is a very different species: the frond is much more sharply acuminate and much more attenuated at the base; the tomentum, if it may here be so called, is more pinnose or furfuraceous, forming a rather glaucous stratum; and the sori are all attached to the surface, and thus, though small, very prominent.

316. *P. (Niphobolus) Boothii*, Hook.; caudex?, stipes 16 inches long and stout in proportion tawny-brown paleaceous with imbricating ferruginous lanceolate scales only at the very base, frond carnosio-coriaceous 16–24 inches long 3–4 inches wide elliptico-lanceolate obtusely acuminate moderately attenuated glabrous and punctated above with minute blackish dots (probably corresponding with the receptacles of the sori) beneath covered with a dense velvety mass of ferruginous stellated tomentum, primary costular veins evident but not prominent united by transverse arched veins as in *Campyloneuron* 10–12 series between the costules each including several free soriferous veinlets, sori small partially sunk in the tomentum forming transverse lines between the costules and as many as there are areoles.

Hab. Boutan, Eastern Himalaya, *Griffiths, Booth*.—This is a noble species, as far as I know, peculiar to the locality just specified. The down, covering the whole under side, forms a rich velvety mass of a bright ferruginous colour, studded with the neatly-arranged series of sori.

317. *P. (Niphobolus) linearifolium*, Hook.; caudex long creeping paleaceous with densely imbricated subulato-setaceous shining scales, fronds scattered but approximate erect carnosio-coriaceous sessile 3–4 inches long 1–1½ line wide linear obtuse scarcely attenuated at the base the margins recurved laxly tomentose with scattered stellated appressed hairs at length glabrous above, veins forming two irregular series of oblong large areoles parallel with the costa (no evident costules), sori oval distant terminal on a short included veinlet forming a single series on each side between the costa and the margin. *Hook. 2d Cent. of Ferns, t. 58.*

Hab. Island of Tsus-Sima, Gulf of Corea, growing on rock, *Wilford*.—A very remarkable plant, quite unlike any other Fern of this group known to me; well represented in the work above quoted.

318. *P. (Niphobolus) nummulariaefolium*, Metten.; caudex very long filiform copiously rooting paleaceous with appressed setaceous ferruginous scales, fronds dimorphous carnosocoriaceous subglabrous above beneath densely clothed with ochraceous or subferruginous stellated tomentum; *sterile* fronds (on petioles 1–3 lines long)  $\frac{1}{2}$  to 1 inch long orbicular or elliptical or subcordate; *fertile* ones (on stipites 1–1 $\frac{1}{2}$  inch long) 1 $\frac{1}{2}$ –2 inches long  $\frac{1}{4}$  of an inch wide linear or linear-oblong obtuse, “areoles immersed in 3–4 series including one free veinlet,” *Metten.*, sori scarcely sunk apparently covering the whole back of the frond without order. *Metten. Polyp. p. 123. t. 3. f. 9, 10 (venation)*. *Niphobolus, J. Sm. Fée, Gen. Fil. p. 262. t. 9. A. f. 3.* *Acrostichum, Sw. Syn. Fil. p. 191, 419. Tab. ii. 1. Willd. Sp. Pl. v. p. 100. Bl. Fil. Jav. p. 33. t. 11. f. 1, 2.* *Galeoglossa, Pr., and G. rotundifolia, Pr.*

Hab. Java, *Thunberg, Blume*. Luzon, *Cuming, n. 246*. Assam, *Khasya* (alt. 2000 feet), *Mishmee, Griffith, Hooker fil. and Thomson*.—A distinct and well-marked species.

319. *P. (Niphobolus) obovatum*, Metten.; “caudex creeping clothed with lanceolato-subulate scarcely ciliated reddish subpatent scales, fronds glabrous above below densely adspersed with stellated hairs; *sterile* fronds 6 lines long obovato-oblong attenuated into a stipes 2 lines long; *fertile* fronds 8 lines long spatulato-oblong obtuse with 6 lines long, veins immersed?, sori not impressed.”—*Metten. Polyp. p. 124.* *Niphobolus, Kze.* *Acrostichum, Bl. Fil. Jav. p. 35. t. 11. f. 3.* *Galeoglossa, Pr.*

Hab. Java, *Blume, Zollinger*.—This species is unknown to me, but some of my specimens of *P. nummulariaefolium* seem undistinguishable from it; the stipites vary much in length.

320. *P. (Niphobolus) Americanum*, Hook.; caudex thick but evidently creeping, stipites aggregated 1–3–4 inches long, fronds 1 $\frac{1}{2}$ –2 feet and more long  $\frac{1}{2}$ – $\frac{3}{4}$  of an inch wide hardcoriaceous linear-elongate acuminate long-tapering below on the stipes glabrous and glossy above densely stellato-tomentose and tawny and subfurfuraceous beneath, costa stout prominent beneath, venation?, costules obliquely patent as indicated by the fructifications of which a single series of rather large oval sori occupy the space between the costules.

Hab. Ecuador, about the suburbs of Cuenca, on walls and hedgebanks in great abundance, *Jameson*. Near Baños, "locis saxosis apricis; frons valde coriacea," *Spruce*, n. 5248.—I cannot tell what may be the exact nature of the venation of this Fern, of which I have received only two broken specimens from Professor Jameson, and three or four very perfect fronds from Mr. Spruce. It has all the appearance and the copious stellated tomentum, with the sori sunk or immersed, of *Niphobolus*; if of this group, it is remarkable as inhabiting the New World.

§ 10. PHYMATODES.—*Sori round or oblong, terminal on free veinlets, or dorsal, or frequently on the point of union of the anastomosing veinlets. Venation copiously anastomosing, costules, when present, pinnated, the rest of the venation very irregular, often forming large areoles including numerous lesser ones, and those generally including simple or branched ultimate free veinlets, or not unfrequently the whole network forms areoles nearly uniform in size with included free veinlets.*—Caudex creeping. Stipites for the most part jointed near the base. Fronds often ample and coriaceous, simple or pinnatifid or pinnate, rarely subdimorphous. Gen. *Phymatodes*, *Pr.* *Microgramme*, *Pr.* *Pleopeltis*, *Moore.* *Drynaria* and *Micrororus*, *Fée.* Sp. 321-398.

\* *Fronds simple.* Sp. 321-355.

321. *P.* (Phymatodes) *persicariæfolium*, Schrad.; caudex very long creeping or scandent branched clothed with imbricated subulate scales, fronds distant generally arising from a short paleaceous branch or bud sessile firm-membranaceous 5-8 inches long  $\frac{3}{4}$ -2 inches wide broad-elliptico-lanceolate acute or acuminate attenuated below into a very short stipes entire, veins somewhat irregularly anastomosing forming a series of oblong costal areoles then a series of large areoles including a network of anastomosing veinlets in the centre of which are the large or obliquely oblong or linear sori on the apices of two or more free veinlets, costal and marginal areoles also have frequently free included veinlets.—*Schrad. Goett. g. Anz.* 1824, p. 867. *Metten. Fil. Hort. Lips.* p. 37. t. 25. f. 20, *Polypod.*, p. 98. *Microgramme, Pr., Hook. Gen. Fil. t. 72. A.* *Drynaria, Fée.* *Mecosorus, Kl.* *Pleopeltis, Moore.* *Polypodium lycopodioides, Meyer, Schk. Fil.* p. 187. t. 8. c. *Selliguea Sellowiana, Kl. in Herb. Reg. Berol.*

Hab. Tropical America: Brazil, Guatemala, *Skinner*; Guiana, *Schomburgk*, n. 301, *Sagot*, n. 1016; Orinoco, *Spruce*, n. 3218; Trinidad, Ecuador, Guayaquil (on the trunks of *Theobroma Cacao*). *Spruce*, n. 5735 (pale bright-green; fronds 11 inches long, 2 inches wide; "all the Ferns growing on Cacao-trees are notable for their pale-green colour").—I am aware this is generally considered a very distinct Fern, yet it is very variable in the anastomosing of the veins and in the form of the sori, and I have sometimes a difficulty in distinguishing it from some forms of *P. lycopodioides*.

322. *P.* (Phymatodes) *percussum*, Cav.; caudex very long creeping paleaceous with lanceolate scales, stipites 2-3 inches long distant, fronds 4-5 inches to a foot long  $\frac{3}{4}$ -1 $\frac{1}{2}$  inch

wide firm thin-coriaceous sparsely and minutely scaly beneath lanceolate cuspidato-acuminate gradually attenuated below costate, veins copiously anastomosing, areoles with or without free veinlets, sori large compital partially sunk in a cavity prominent at the back oval or subrotund arranged within a network of compound areoles intermediate between the costa and margin, in an early stage covered with scales, capsules mixed with copious abortive filaments.—*Cav. Sw. Syn. Fil. p. 26. Willd. Sp. Pl. v. p. 57. Langsd. and Fisch. Ic. Fil. p. 8. t. 6. Metten. Polyp. p. 90. Hook. Fil. Exot. p. 90. Raddi, Fil. Braz. p. 14. t. 24. f. 1. Pleopeltis, Hook. and Grev. Ic. Fil. t. 67. Phlebodium, J. Sm. Drynaria, Fée. Polypod. cuspidatum, Pr. Reliq. Hænk. p. 20. t. 1. f. 3, and P. stigmaticum, Pr. l. c. p. 20. t. 3. f. 2. P. avenium, Desv.*

Hab. Tropical America, frequent: Peru, Ecuador, Galapagos, Brazil, New Granada, Guiana, etc.

323. P. (Phymatodes) *lepidotum*, Willd.; caudex long-creeping paleaceous with lanceolate acuminate denticulated ferruginous scales, stipites remote 1–2–4 inches long, fronds coriaceous-carnose 3–9 inches long  $\frac{1}{4}$ – $\frac{3}{4}$  of an inch wide lanceolate more or less acuminate long and gradually attenuated at the base on both sides especially beneath often sinuato-dentate or even pinnatifid almost furfuraceous with copious orbicular ovate small appressed peltate scales dark in the centre pale in the circumference and denticulate, veins immersed very indistinct (“*maculæ Phlebotii*,” Metten.), sori generally very large and often exceedingly prominent pulvinate globose or oval occupying the upper half of the frond.—*Willd. in Schlecht. Adumbr. p. 17. t. 8. Metten. Polyp. p. 88. P. macrocarpum, Willd. Sp. Pl. v. p. 147. Pleopeltis, Klfs. Polyp. lanceolatum, Sw. Syn. Fil. p. 26. Willd. Sp. Pl. v. p. 153 (excl. syn. Linn., Plum., and Petiv.). Pleopeltis, Klfs. Polyp. marginale, Willd. Sp. Pl. v. p. 149. Pleopeltis and P. linearis, Klfs. P. ensifolia, Hook. Ex. Fl. t. 62. Grammitis revoluta, Willd. Sp. Pl. v. p. 139. Pleopeltis Kaulfussiana, Pr. Polypod. leucosporum, Kl. in Linnæa, xx. p. 404. Metten. Polyp. p. 89.*

Hab. Bourbon, *Bory, in Herb. nostr.* South Africa, *Mundt and Maire, Drège and Zeyher, etc.* Mosamballa Hill, Zambesi Mission, alt. 3000–3500 feet, *Kirk.* Madagascar, *Lyall.* St. Helena, *Hooker fil.* (on Diana’s Peak), *Seemann.* Tristan d’Acunha, *Carmichael.* Sierra Leone, *Barter.* Cameroon Mountains, alt. 9000 feet, *Nilghui, G. Thomson, in Herb. Hook., and the Rev. Mr. Johnson,* the only locality known in India. South America: Jamaica, *Swartz, March, Wil-*



son; New Granada, *Moritz*, n. 31, 6, 82, 306 (*P. leucosporum*, *Kl.*), *Feudler*, n. 249, *Purdie*; Guiana, *Rich. Schomburgk*, n. 1188; Surinam (*Miquel*); Brazil, *Gardner*, n. 193; Ecuador, *Jameson*, *Spruce*, n. 5213 and 5214 (deeply and irregularly pinnatifid, some segments  $1\frac{1}{2}$  inch long); Peru, Tarapota, *Spruce*; Juan Fernandez, *Bertero*; Mexico, frequent. Central America, *Cuming*, n. 1286. Sandwich Islands, *Nuttall*.—Schlechtendal has great merit in elaborating the synonymy of this plant, and has selected a very appropriate name. It is well distinguished among the simple-fronded species of this group by its small, copious, appressed scales, which are seldom wholly deciduous. It is more or less fleshy and liable to produce elongated segments at the margin, constituting an abnormally pinnatifid frond.

324. *P. (Phymatodes) loriforme*, Wall.; caudex creeping blackish paleaceous with rather small dirty-brown ovato-lanceolate scales, stipites subaggregated a few lines to 1–2 inches long, fronds extremely variable in size and texture from 3–4 inches to  $1\frac{1}{2}$  foot and from  $\frac{1}{4}$  of an inch to nearly 2 inches wide lanceolate or linear-lanceolate coriaceous and opaque or coriaceous-membranaceous or quite membranaceous bluntly or sharply acuminate, much and gradually attenuated at the sometimes quite sessile base, the margin entire or subsinuate, venation reticulated with included free veinlets but there are primary veins which form large costal areoles including the lesser ones and the compital sori, sori often much sunk (with protuberances at the back) forming a single series nearer the costa than the margin varying much in size, when young partially covered with very compact peltate scales which are soon deciduous, then the sori become very large and pulvinate.—*Wall. Cat. n. 271. Metten. Polyp. p. 92. t. 1. f. 49, 50. Hook. Gard. Ferns, t. 14. P. leiopteris, Kze. in Linnaea, xxiii. p. 319. Metten. Fil. Hort. Lips. p. 36. t. 25. f. 37–39 (excellent for a medium-sized specimen). Pleopeltis nuda, Hook. Ex. Fl. p. 63, and Gen. Fil. f. 18 (not Polyp. nudum, Metten.). Lepisorus, J. Sm. Drynaria, Fée, Gen. Fil. p. 270. Polyp. nudiusculus, Kze. in Linnaea, xxiv. p. 253. P. sesquipedale, Wall. Cat. p. 275. Metten. Polyp. p. 91. P. excavatum, Willd. Sp. Pl. v. p. 158. Lepisorus, J. Sm. Polyp. gladiatum, Wall. Cat. n. 279. P. phlebodes, Kze., Metten. Polyp. p. 92. P. atro-punctatum, Hook. and Arn. Bot. Beech. Voy. p. 103. P. lineare, Th. Jap. p. 335, Ic. t. 19. Pleopeltis elongata, Klfs. Drynaria, Brack. Polyp. Guentzii, Metten. Polyp. p. 91.*

Hab. India, common in all the hilly and mountain regions (as recorded in "Gard. Ferns" under t. 14) from 5000–10,000 feet of alt. Ceylon, Sumatra, China, Japan, Pacific Ocean, Bourbon, and Mauritius. Abyssinia, *Schimper* (*P. phlebodes*, *Kze.*). South Africa: Kaffraria, *Cato*, 1860, large, nearly 2 inches broad (*Pleopeltis* con-

cinna, *Pappe and Rawson, in Herb. nostr.*); Natal, *Gueintzius*; Fernando Po, alt. 3000 feet, St. Thomas, alt. 5000 feet, *G. Mann.*—This most variable and widely diffused species was first well distinguished by us in *Exot. Fl.* f. 63, under the name of *Pleopeltis nuda*, so called on account of its similarity in size and shape with the *Pl. ensifolia*, *Carm.*, in the same work, t. 62 (our preceding species, *P. lepidotum*), but it is destitute of the furfuraceous scales which so readily distinguish that. I fear all the above synonyms can only be considered as referring to forms of one and the same species. The largest size, with the most membranaceous fronds, are the *P. sesquipedale*, *Wall.*; but between them and our *Pleop. nuda*, l. c., there are all intermediate grades.

325. *P.* (Phymatodes) *attenuatum*, *Br.*; caudex long creeping palcaceous with subulate scales, fronds scattered but approximate a span to  $1\frac{1}{2}$  foot long  $\frac{1}{2}$  an inch wide firm-coriaceous glossy linear-loriform scarcely acuminate acute the base attenuated into a short stipes, costa stout prominent beneath, veins subuniformly reticulated with no free included veinlets, sori copious large elliptical very prominent in a single series between the costa and the veins.—*Br. Prodr. Nov. Holl. p.* 146 (*not of Hook. Ic. Pl. t.* 409, *nor Gen. Fil. t.* 71, *nor of All. Cunningham nor of Richard, which are Dictymia lanceolata, J. Sm., and Polyp. Cunninghamsi of this work, from New Zealand*). *Hook. Gard. Ferns, t.* 30. *Dictyopteris, Pr., Moore. Polyp. Brownianum, Spr. fide Pr. P. Brownii, "Wickstr." Metten. Polyp. p.* 85, *but evidently, from the references, including our Polyp. Cunninghamsi.*

*Hab.* New Holland: Port Jackson, *Brown, Sieber, Fraser, and others*; Hastings river, *Dr. Beckler*; Victoria, *F. Mueller*. Fiji Islands, *Milne, Seemann, n.* 723 ("Phymatodes stenophylla").—Much confusion has arisen on the identification of this plant from too brief a character of the learned author of it, so that it has been confounded with a somewhat allied but very different species, the *P. Cunninghamsi* of New Zealand. It is to be hoped that our figures and more ample characters of the respective kinds will remove all future difficulty on that point.

326. *P.* (Phymatodes) *Cunninghamsi*, *Hook.*; caudex short small scaly but apparently sending out runners which again produce other such bulb-like scaly caudices, stipites short tufted, fronds 5–10 inches long lanceolate acuminate glabrous long and narrowly attenuated at the base subcarnosio-coriaceous opaque costate, veins uniformly reticulated with elongated large hexagonal areoles longest at the costa, sori rather distant in two series broad oval or subrotund prominent compital, capsules on long pedicels very numerous and mixed with jointed hairs.—*Hook., under P. attenuatum, t.* 30 *of Gard. Ferns. Polypod. attenuatum, Rich, Fl. N. Zeal. p.* 62. *Hook. Ic. Pl. t.* 409 (*not of Br.*), *excl. the syns. and the locality of*

*N. Holland.* Dictyopteris, *Hook. Gen. Fil. t. 71. B. Bruck. U. S. Expl. Exped. p. 57.* Dictyopteris lanceolata (not Polyp. lanceolatum, *L.*), *J. Sm.* Dictyua lanceolata, *J. Sm., and Hook. fil. Fl. Nov. Zeal. f. 2. p. 43.*

Hab. New Zealand, frequent: Northern and Middle Isles, as far south as Akaroa, *Raoul.* Isle of Mallicolla, New Hebrides, *C. Moore, n. 51.*—This is very different from the preceding, though long confounded with it.

327. *P. (Phymatodes) Schraderi*, Metten.; caudex creeping paleaceous with blackish subulate scales, stipites aggregated short scarcely more than  $\frac{1}{2}$  an inch long, fronds glabrous  $2\frac{1}{2}$ –4–5 inches long  $\frac{1}{2}$  an inch or little more wide lanceolate obtusely acuminate tapering gradually into the stipes blackish when dry entire, veins immersed obscure reticulated somewhat uniformly, areoles here and there including free veinlets, sori impressed very large globose or suboval prominent approximate few in two series one on each side of and very near the costa occupying the upper portion of the frond.—*Metten. Polyp. p. 98. t. 2. f. 11.* *P. elongatum*, *Schrad. Adumbr. p. 10. t. 7, not of others (excellent).* Phymatodes, *Pappe and Rawson, En. Fil. Cap. p. 41.*

Hab. Cape of Good Hope, *Mundt and Maire (Schlecht.), Drège.* Natal, *M'Ken, n. 171.*—Either this is a rare species or I have been peculiarly unfortunate in having received specimens only from M'Ken and Drège. These certainly well accord with Schlechtendal's figure; but what the nature of the frond allows me to see of the venation does not correspond with that represented by Mettenius, where the areoles are less elongated (longitudinally) and the free included veinlets more frequent.

328. *P. (Phymatodes) subecostatum*, Hook.; caudex long creeping partially paleaceous with black subulate scales and densely woolly (as well as the copious roots) with dark-brown tomentum, fronds sparse sessile 4–7 inches long  $\frac{1}{2}$  an inch wide pale-green carnosio-coriaceous very opaque linear-ensiform acuminate entire glabrous moderately tapering at the base, costa internal very indistinct, costules none, venation immersed and scarcely visible but the veins (I think) anastomosing so as to form uniform elongated areoles parallel with the costa without any free included veinlets, sori moderately large subglobose forming a single series close to the margin chiefly occupying the upper half of the frond.—*Tab. CCLXXXIII. A.*

Hab. Borneo, trees, Sarawak, on mountains, alt. 1000 feet, *Thos. Lobb.*—This has much the aspect of our *P. Cunninghami* of New Zealand, and even the venation, as far as the nature of the fronds will allow it to be seen; but these

fronds are quite sessile, the costa as well as the veins are very indistinct, and the sori are smaller, more copious, and quite marginal.

329. P. (Phymatodes) *tenuilore*, Kze. in Metten.; caudex long slender creeping or scandent partially scaly, stipites scarcely any, fronds approximate membranaceous opaque 10 inches to 1½ foot long  $\frac{1}{4}$  to  $\frac{1}{2}$  an inch wide linear-lanceolate acuminate scarcely thickened at the margin, venation usually manifest, costules none, the slender veins anastomose and form about three very irregular series of oblong areoles often including free veinlets the outer one constituting a marginal vein, sori small and usually scattered without any order compital or dorsal subglobose of few lax capsules or more or less confluent and elongated sometimes forming a continued linear sorus within the margin.—*Metten. Polyp. p. 86. t. 1. f. 28 (venation)*. *Drynaria, J. Sm. in Hook. Journ. Bot. iii. p. 397 (name only)*. *Pleopeltis, Moore*. *Diblemma Samarensis, J. Sm. l. c. p. 399*. *Hook. Gen. Fil. t. 100. B. Fée, Gen. Fil. p. 86 (Moore)*. *Fée, Vittar. p. 25*. *Tænitis, Metten. Fil. Hort. Lips. p. 37*.

Hab. Luzon and Isle of Samar, *Cuming, n. 287 and 332*.—I quite agree with M. Fée, “que le spécimen n. 287 (of Mr. Cuming) semble être la même plante que le n. 332.” The form of the frond, the venation, and the very irregular nature of the fructification are the same. It is an aberrant *Polypodium*, and bordering upon some of the *Antrophya*.

330. P. (Phymatodes) *longifolium*, Metten.; caudex horizontal creeping thick squamose, stipites approximate 2–3 inches long, fronds 1–2–3 feet long  $\frac{3}{4}$ –1¼ inch wide thick carnosocoriaceous glabrous linear-lanceolate obtusely acuminate gradually long-attenuated below on the stipes entire the margins subrevolute, venation internal very indistinct, costules veniform united by transverse veins into rather large areoles then into irregular lesser ones which include free veinlets, sori compital oblong forming a line or series near the margin rather close-placed sunk into the substance of the frond and forming a corresponding elevated line on the upper surface, capsules mixed with long-stipitate scales.—*Metten. Polyp. p. 87*. *Grammitis longifolia, Bl. En. Fil. Jaw. p. 119, and Pleopeltis in Add., and Gr. decurrens and Pleopeltis decurrens, Bl. ll. cc.* *Polyp. contiguum, Wall. n. 285?* *Hook. Ic. Pl. x. t. 987 (or Cent. of Ferns, t. 87), Fil. Exot. t. 20*. *Phymatodes and Drynaria revoluta, J. Sm.* *Paragramma, Moore*.

Hab. Malay Islands and Peninsula: Java, *Blume*; Luzon, *Cuming, n. 247*;

Singapore, *Low*; Mergui, *Griffith*.—I fear there is some mistake in specimens of this plant marked n. "285" in Wallich's Cat. The same number is given to Wallich's *Polyp. coronans*, a native of "Kumaon." This is only found, I believe, in Malaya.

331. *P.* (Phymatodes) *soridens*, Hook.; caudex creeping crinite with aureo-nitent slender subulate scales, stipites 1–3 inches long, fronds 4–12 inches long not exceeding  $\frac{1}{2}$  an inch wide coriaceous glabrous narrow-lanceolate gradually long and finely acuminate much and gradually attenuated below thickened at the margin entire except at the upper and fertile portion which has the margin distantly sinuato-dentate each tooth bearing a sorus, venation sometimes very distinct, costules quite veniform anastomosing so as to form moderately-sized but very irregular areoles rarely including a free veinlet, sori rather small orbicular compital sunk in a deep cavity which forms a corresponding small but very elevated sack or pouch on the upper side and always within the tooth at the margin.—TAB. CCLXXXIII. B.

Hab. Borneo, *Wallace*. Sarawak, on trees, *Thos. Lobb*.—A most distinct and very pretty species, not easily confounded with any other. The scales of the caudex are setaceo-villose, of a golden-tawny colour, and the fronds are remarkable for the projecting, rounded, remote teeth, each one deeply impressed with a sorus. Mr. Wallace's specimens are very opaque, and the venation not traceable; those of Mr. Lobb exhibit very distinct veins.

332. *P.* (Phymatodes) *sinuosum*, Wall.; caudex much branched long-creeping or scandent on trees sparingly radiculose  $\frac{1}{2}$  an inch to 2 inches thick almost woody when dry probably car-nose when recent studded as it were with large conical processes upon which the stipites are or have been articulated and which appear to increase much in size after the fronds have fallen, the whole densely covered (as it were tessellated) with nearly orbicular appressed whitish peltate scales with a dark spot in the centre, stipites 1–2 inches long glabrous and scaleless, fronds subdimorphous subcoriaceo-membranaceous glabrous; *sterile* ones 3–6–7 inches long  $\frac{3}{4}$ –1 inch broad subelliptical oblong obtuse entire; *fertile* ones longer sometimes a foot—16 inches long  $\frac{1}{2}$ – $\frac{3}{4}$  of an inch wide linear-elongato-oblong obtuse the margins more or less sinuated the base in both attenuato-de-current, venation copious anastomosing forming large very irregular areoles filled with lesser ones (formed by more slender veins) and these include branched or simple veinlets which occasionally again anastomose, sori remote large oblong immersed in a cavity which forms pustules on the upper side

arranged in a single series nearer the margin than the costa.—*Wall. Cat. n. 2231.*

Hab. Straits of Malacca. *Finlayson, Griffith.* Amboyna, *ex Herb. Webb, De Friese and Teijsmann, n. 321.* Isle of Jobi, *Barclay.* New Hebrides, *C. Moore.* Mergui, *Parish.\** Java, *Zollinger, n. 806.*—In general form the fronds have some affinity with those of *Polypodium stenophyllum*, with much larger sori and much less deeply sunk; but the thick, woody, scandent caudex is very remarkable, like some mammillate *Euphorbia*, having conical spine-like processes, from which the fronds originate. There is, however, an example of the same kind of caudex figured and described by Blume (*Fil. Jav. t. 94*), of which more will be said under our *Polyp. lomarioides*, Kze. n. 366.

333. P. (Phymatodes) *Griffithianum*, Hook.; caudex long creeping paleaceous with long subulate ferruginous scales, stipites very remote 3–6 inches long, fronds chartaceo-coriaceous glabrous 6–8 inches long  $1\frac{1}{2}$ –2 inches broad oblongo- or ovato-lanceolate entire or obsoletely crenate acuminate cuneate at the base sometimes glaucous beneath, the margin thickened, costules very distinct straight prominent beneath, the rest of venation less distinct more or less anastomosing with copious free veinlets in the areoles, sori very large globose compital forming a single series on each side of and close to the costa.—*Hook. Ic. Pl. t. 951 (or Cent. of Ferns, t. 51).*

Hab. India: on trees, Boutan and Mishmee, *Griffith, Booth*; Khasya, *Griffith, Mrs. Mack, Hooker fil. and Thomson* (the glaucous state of the plant).—Very unlike any other Indian species, yet in habit resembling the *P. glaucophyllum*, Kze. in *Schlk. Fil. i. t. 93*, from South America; but that belongs to the *Goniophlebium* section.

334. P. (Phymatodes) *crassifolium*, L.; caudex short creeping soft-paleaceous with ovate acuminate scales, stipites 2 inches to a span long subdistant or aggregated, fronds 1–3 feet long 1–5 inches wide coriaceous elongato-lanceolate obtuse or suddenly or gradually acuminate much attenuated and decurrent at the base and forming a wing upon the petiole, costules very distinct, venation also distinct in thin specimens, veins forming primary large transverse areoles which are again traversed by veinlets at right angles with the veins and the areoles of these include free veinlets, sori large forming a single series between each pair of costules.—*Lin. Sp. Pl. p. 1543. Sw. Syn. Fil. p. 27. Willd. Sp. Pl. v. p. 161.*

\* While correcting the press for this sheet, I receive from Mr. Parish further specimens of this plant, with the remark that it is "the most curious thing I know in the way of a Fern-caudex. It grows at Mergui in large patches. The caudex or rhizome is much branched, and the branches interlacing and overlapping each other often completely encircle the small branches (about the size of one's arm) of the tree on which it invariably grows."

*Metten. Polyp. p.* 109. *P. macrophyllum*, *Sieb.* Phymatodes, *Pr. Drynaria, J. Sm.* Pleuridium, *Fée.* Polypod. porrectum, *Willd.* *P. coriaceum*, *Raddi, Fil. Bras. p.* 16. *t.* 25. *P. acrosorum* and *P. anocarpum*, *Kze.* *P. Vittaria*, *Metten. Fil. Lechl. i. p.* 8.—*Plum. Fil. t.* 123.

Hab. Tropical America, most abundant, from Brazil to the West Indies and Mexico, and Ecuador and Peru.—A most common American species, and, as may be expected, liable to considerable variation in the length and breadth of the frond, and in the greater or less number of sori in each series. The species is otherwise an unmistakable one. Some of the specimens vie with the noble *Asplenion Nidus* in size and beauty; others, especially from Peru, are so narrow as to justify the specific name of *Vittaria*.

335. *P.* (Phymatodes) *crassinervium*, *Bl.*; caudex very stout creeping tortuous with many short branches which are setose with long-subulate falcate scales, stipites remote setaceous-squamose 4–6 inches long stout, fronds 1–1½ foot long 2–4 inches broad glabrous very firm and hard thick-coriaceous oblong or subovato-lanceolate acuminate cuneato-attenuate at the base the margin callose and thickened obscurely remotely suberentate, costa very broad flat and prominent, costules very stout and prominent, veins sunk and quite obscure, sori almost universal arranged in a single series between the costules and sunk in cavities which form pustules on the upper side.—*Bl. Fil. Jav. p.* 145. *t.* 61. *Metten. Polyp. p.* 109.

Hab. Java, *Blume, Zollinger, De Vriese and Teijsmann, n.* 3, *Thos. Lobb.*—A peculiar species, the analogue of the South American *P. crassifolium*, *L.*, but far more coriaceous in texture, and remarkable for the great regularity of the fructifications; the under side is quite tessellated, if I may so say, by the cavities of fructifications, while the upper side is tessellated with the embossments.

336. *P.* (Phymatodes) *triquetrum*, *Bl.*; caudex stout long creeping or scandent clothed with appressed closely imbricated large silky pale-tawny ovate very obtuse scales, stipites remote 4–6–8 inches long, fronds subdimorphous very thick firm coriaceous entire scarcely incrassated at the margin 6–9 inches long; *sterile* ones 3–4 inches broad ovate or ovato-lanceolate acuminate obtuse or cuneate at the base; *fertile* ones generally longer and narrower oblongo-lanceolate acuminate cuneato-attenuate at the base, costules very distant prominent beneath, venation obscure but resembling that of *P. saratile*, sori large biseriate between the costules 6–8 in each series.—*Bl. Fil. Jav. p.* 141. *t.* 59. *Metten. Polyp. p.* 116. *t.* 3. *f.* 33, 34 (*venation*).

Hab. Java, *Blume, Zollinger, Thos. Lobb, De Vriese and Teijsmann, n.* 2.—

Allied to *P. saxatile*, especially in the nature of the paleaceous scales and in the thickness and breadth of the fronds. From the costa above, on one specimen, is a proliferous frond, probably the effect of some injury. Some states and forms of *Grammitis (Selligaea) caudiformis*, Bl., are scarcely distinguishable from this.

337. *P.* (Phymatodes) *saxatile*, Metten.; caudex creeping paleaceous with subulate ferruginous scales, stipites distant 2-4-5 inches long, fronds coriaceous ovato-lanceolate or lanceolate thickened at the margin of 2 kinds; *sterile* ones 2-4 inches long obtuse; *fertile* ones 6-8 inches varying much in form from ovato-lanceolate to narrow-lanceolate more or less acuminate and more or less cuneate or attenuate at the base, costules very distinct rather distant prominent beneath, veins very indistinct sunk primary ones transverse flexuose forming large areoles occupied with smaller areoles which include free veinlets, sori rather small inserted on the transverse veins in two series between each pair of costules.—*Metten. Polyp. p.* 116. *P. rupestre*, Bl. *Fil. Jav. p.* 142. *t.* 55. *f.* 2, and *t.* 60. *f.* 1-3 (not *P. rupestre*, Br.). *Drynaria*, *J. Sm.* *Pleuridium*, *Fée.*

Hab. Java, *Blume, Spanoghe.* Luzon, *Cuning.*—A variable species, as may be seen by Blume's figures, and possibly not distinct from *P. triquetrum*.

338. *P.* (Phymatodes) *ovatum*, Wall.; caudex creeping apparently underground slightly paleaceous, stipites distant 3-8 inches long sparsely paleaceous below, fronds firm-membranaceous glabrous 5-10-11 inches long 2-3 inches wide ovate or ovato-lanceolate acuminate entire the broad base rather suddenly attenuated so as to form a decurrent wing on the upper part of the stipes, costules very evident slightly prominent straight or flexuose connected by transverse veins on which the sori are inserted, the areoles are filled with reticulated veins with or without free included veinlets, the sori are very large and prominent when mature chiefly confined to the centre of the frond distant from the margin scarcely arranged in series, occasionally two are confluent.—*Wall. in Hook. and Grex. Ic. Fil. t.* 41.

Hab. East Indies, *Wallich, in Hook. Herb.* (without special locality). Khasya and Boutan, *Griffith.* Sikkim-Himalaya, *Hooker fil. and Thomson.*—Since the publication of Dr. Greville's fine figure in the *Ic. Filicum*, I possess further specimens of this species, all according with the characters there exhibited. One of my specimens, which I take to be this species, said to be from "Mai valley, Nepal," has more than half the sori so confluent as to appear quite grammitioid.

339. *P.* (Phymatodes) *zosteræforme*, Wall.; caudex short fragile black creeping apparently underground or rather un-



derwater scaleless, stipites very slender weak and filiform  $\frac{1}{2}$ –1 inch long aggregated, fronds 4–6 inches long less than  $\frac{1}{4}$  of an inch wide carnosomenembranaceous black when dry, linear-vittarioid scarcely acuminate subacute entire gradually long-attenuated below into the thread-like stipes, costa prominent beneath and scaly with blackish appressed somewhat fleshy small ovate scales, venation very distinct when seen between the eye and the light, costules none, veins anastomosing so as to form 2–3 series of large parallel but very irregular areoles with no free veinlets, sori in a single but irregular series between the costa and the margin, capsules lax.—*Wall. Cat. n. 280. Metten. Polyp. p. 86 (venation).*

Hab. Mount Chappedung, mouth of the river Tenasserim (not "Nepal," as in Mettenius).—A very remarkable-looking plant, with the appearance and texture and habit of an aquatic; the stipites seem to be too weak to support the weight of the fronds, thin and light as these are. The venation is well represented by Mettenius. In a dried state this Fern has much the aspect of short specimens of *Zostera marina*.

340. P. (Phymatodes) *rhynchophyllum*, Hook.; caudex creeping slender paleaceous subsquarrose with subulate ferruginous scales, stipites scattered slender 1–2 inches long of the *sterile* frond, 2–4 of the *fertile* one, fronds firm chartaceo-membranaceous glossy slightly thickened remotely crenate; *sterile* ones 1–2 inches long elliptical or subovate obtuse; *fertile* ones 3–6 inches long lanceolate from near the base gradually and long-acuminate, below cuneato-attenuated, venation distinct slightly prominent, the costules are connected by transverse veins forming areoles which enclose free veinlets which latter sometimes unite with opposite veins, the sori are mostly confined to the narrow acuminate apex and when mature are very large in a single series on each side the costa.—*Hook. Ic. Plant. 955 (or t. 55 of Cent. of Ferns).*

Hab. Assam, *Mrs. Mack, Griffith. Khasya, Hooker fil. and Thomson*, alt. 4000 feet.—A very pretty and very distinct species, with prominent costa, and distinct costules, and long stipites.

341. P. (Phymatodes) *stenophyllum*, Bl.; caudex creeping paleaceous with glossy subulate pale imbricated ferruginous scales, stipites 1–2 inches long distant, fronds firm-coriaceous very rigid glabrous polished 4–9 inches long  $\frac{1}{4}$ – $\frac{1}{2}$  an inch wide linear-oblong obtuse the margin thickened and subreflexed broadly crenato-sinuate rarely narrowing upwards but much and gradually attenuated below on the stipes, costa pro-

minent beneath, costules none, veins anastomosing so as to form oblong hexagonal oblique areoles with rarely a free included veinlet, sori rather distant oval arranged in a series close to the margin deeply sunk into the substance of the frond forming elevated pustules on the upper side one to each crenature, the margin of the cavity elevated.—*Bl. Fil. Jav. p. 135. t. 55. f. 1. Metten. Polyp. p. 99. t. 1. f. 31–34 (venation). Drynaria, J. Sm. Fée, 6me Mém. p. 18. t. 8. f. 3.*

Hab. Java, *Blume, Luzon, Cuming, n. 122. Malacca, Sir William Norris. Mount Ophir, Thos. Lobb.*—A very remarkable species, the texture almost horny, the sori are near the margin and quite sunk in a cavity.

342. *P. (Phymatodes) accedens*, Bl.; caudex very long slender filiform scarcely paleaceous attached to the bark of trees by copious woolly radicles, stipites scattered 2–5 lines long, fronds subcoriaceous-membranaceous opaque glabrous entire; *sterile* ones 1–1½ inch long oblong ovate obtuse; *fertile* ones 2–3½ inches long from a broad cuneate base rather suddenly long- but obtusely-acuminated, venation obscure no distinct costules, areoles copious irregular including free veinlets, sori large for the size of the plant on the acuminated portion in a single series on each side the costa.—*Bl. En. Fil. Jav. p. 121. Metten. Polyp. p. 92. P. cuspidiflorum, Reinw. in Herb. nostr. Drynaria, J. Sm. Cuspidaria, Fée. Drynaria acuminata, Brack. Fil. U. S. Expl. Exped. p. 42.*

Hab. Java, *Blume, De Vriese, in Herb. nostr. Luzon, Cuming, n. 109. Fiji Islands, Seemann, n. 27. Samoan and Navigators' Islands and Tahiti, Brackenridge.*—In habit allied to *P. rhynchophyllum*, but with much smaller, more opaque, very indistinctly veined, and nearly sessile fronds.

343. *P. (Phymatodes) rostratum*, Hook.; caudex very long filiform creeping branched setaceous with very slender subulate scales, stipites remote 1–2 inches long, fronds scarcely dimorphous from 2–4½ inches long ½ an inch to an inch wide coriaceous-membranaceous opaque glabrous lanceolate or elliptical or ovato-lanceolate rather suddenly subrostrato-acuminate; *sterile* ones often the shortest and most obtuse, venation internal obscure, veins copiously reticulated, areoles mostly oblong angular obliquely directed from the costa (no costules) each including one simple or branched veinlet, sori very large in a single series on each side and near to the costa occupying the upper half of the frond or nearly the whole length.—*Hook. Ic. Plant. t. 953 (or Cent. of Ficus, t. 53).*

Hab. Eastern Himalaya, Khasya, Mishmee and Bontan, *Griffith, Hooker fl. and Thomson*.—Habit of *P. rhynechophyllum* and *P. accedens*, but very different in the form of the frond and in the nature of the venation.

344. *P.* (Phymatodes) *irioides*, Lam.; “caudex creeping clothed with brown-black ovate obtuse scales, fronds 1–3 feet long coriaceous-carnose very glabrous sessile or shortly stipitate elongato-lanceolate towards the base gradually attenuated and decurrent as far as the very base of the stipes entire the margin revolute acuminate or obtuse at the apex undivided or irregularly dichotomous fertile in the upper portion, costa manifest, venation that of *Drynaria* immersed (visible in the dried state), areoles with numerous incurved appendices, free veinlets incrassated at the apex, costal areoles sterile the rest 4–6-seriate fertile bearing numerous sori (14–20) irregularly scattered, sori semi-immersed minute inserted on a manifest receptacle on the back of the veinlets or on the angle of the lesser areoles.” *Metten.*—*Willd. Sp. Pl.* v. p. 160. *Bl. Fil. Jav.* p. 16. t. 7. *Hook. and Grev. Ic. Fil.* t. 125. *Metten. Fil. Hort. Lips.* p. 38. t. 20. f. 10 (f. 7 in *Metten. Polypod.*). Phymatodes, *Pr.* *Drynaria*, *J. Sm.* *P.* sessile, *Kaulf.* *Microsorium*, *Lk.*, *Fée.* *M. irregulare*, *Lk. Fée. Gen.* t. 20. B. f. 3. Phymatodes polycarpa, *Pr. Tent.* p. 198. t. 8. f. 19. *Aspidium microcarpum*, *Bl. En. Fil. Jav.* p. 142. *Polyp. glabrum*, *Roxb. in Wall. Cat. n.* 281. *P. polycephalum*, *Wall. Cat. n.* 273.

Hab. India: Malay Islands and Archipelago, Malacca, tropical Bengal, Assam, Silhet, Bontan, Madras Peninsula, Nilghiri, etc. China: Macao, Chusan. Australia: Moreton Bay, *All. Cunningham, Mueller.* South Pacific, *Bidwill, Sir F. Grey.* Fiji Islands, *Seemann* (*Drynaria musafolia*, *J. Sm. in Flor. Viet.*), *Harvey.* New Caledonia, *C. Moore.* Pitcairn's Island, *Mathews.* Isle of Pines, *Milne.* Africa: Mauritius and Bourbon, Madagascar, *Lyall*; Zambesi, *Dr. Kirk*; Fernando Po, *Barter*; and Liberia, *Vogel*: west coast, south of the tropics, *Currer.* South Africa, Natal, *Sanderson.*—See observations under the next species, *P. musafolium*.

345. *P.* (Phymatodes) *musafolium*, Bl.; “caudex creeping clothed with ovate acuminate scales, fronds 1–3 feet long membranaceous-coriaceous deep-green smooth above and at the apex of the free veinlets bearing a calcareous scale sessile or shortly stipitate oblong-spathulate or elongato-lanceolate shortly acuminate or obtuse soriferous in the upper portion, areoles of *Drynaria*, the veins manifestly elevated cærulescent (manifestæ exculptæ cærulescentes), costal areoles sterile the rest 4–7-seriate fertile bearing 6–15 sori minute irregularly scattered of 8–12 capsules which are superficial placed on the back of the veinlets which form secondary areoles, or

subterminal on the back of the free veinlets." *Metten.*—*Bl. Fil. Jav. p. 171. t. 79. Metten. Fil. Hort. Lips. p. 38. t. 20. f. 7 (venation), Polyp. p. 118.*

Hab. Java, *Blume, Zollinger.* Amboyna (*ex Herb. Webb, in Herb. nostr., 16-18 inches long, quite sessile, spatulate, obtuse, cordate, and broad-eared at the base.*)—Except garden specimens, my herbarium only possesses this plant from Amboyna, and even this is marked "*P. irioides?*" by Mr. Moore, I am not therefore in a position, with such imperfect materials, to say if the species be truly distinct from the well-known, wide-spread, and very variable *P. irioides*. The texture of the frond is thinner, the venation coarser and more prominent, and the areoles larger. Neither the figures nor description of *P. irioides* and *P. musafolium* of Blume (and he is the author of the latter species) seem to justify the view of their being distinct.

346. *P. (Phymadictyon) myriocarpum, Metten.;* caudex creeping, stipes none save the winged portion of the rachis, frond firm-membranaceous 2-3 feet long 2-4 inches wide very elongato-lanceolate acuminate long and gradually tapering to the very base so as in that sense to be called sessile, entire and not thickened at the margin, costa very prominent beneath, venation manifest slightly prominent beneath, costules distinct distant slender straight stopping short at  $\frac{1}{2}$  or  $\frac{3}{4}$  of the way from the costa and there forming a series of very large costal primary areoles, a second series of stout veins forms smaller but still very conspicuous areoles and the space between the second series and the margin is filled up with an irregular network of lesser areoles with copious included free veinlets, sori most abundant minute scattered over the veinlets.—*P. myriocarpum, Metten. Polypod. p. 105. t. 1. f. 3 (venation), not Hook. Phymatodes, Pr. Drynaria longissima, J. Sm. Microsorium, Fée, Gen. Fil. t. 20. B. f. 2.*

Hab. Luzon, *Cuming, n. 66.* Borneo, Sarawak, on limestone, *Thos. Lobb.*—This belongs to the same (*Microsorous-*) group of *Polypodium* as *P. irioides*, and the form is quite of that variety, which has fronds tapering below and long-decurrent wings upon the stipes; but if there is any reliance to be placed on the venation, it cannot but be distinct. This is well represented in Mettenius's figure, l. c. My specimen from Borneo is twice as broad as those from Luzon, and the primary costal areole  $1\frac{1}{2}$  inch long and  $\frac{2}{3}$  of an inch broad. One frond from Cuming is irregularly pinnatifid with segments, some of which are 7 inches long and  $\frac{1}{4}$  of an inch wide, but I look upon it as a *lusus naturee*.

347. *P. (Phymatodes) Schomburgkii, Kze.;* caudex long creeping or scandent branched  $\frac{1}{2}$  an inch to an inch or more in thickness densely clothed with long soft silky lanceolate whitish finely acuminate scales with a brown line down the middle, stipites remote 2-3 inches long, fronds subcoriaceo-membranaceous 1-1 $\frac{1}{2}$  foot long 1 $\frac{1}{2}$ -3 inches wide elliptical

oblong or broad oblongo-lanceolate rather suddenly and subcaudately acuminate gradually attenuated below, the margin thickened entire, costules none, venation sufficiently evident, primary veins forming large transverse soriferous areoles next the costa, these and the rest of the frond are occupied up with smaller elongated simple or compound areoles with or without free veinlets, sori very large subrotund or transversely oblong arranged in a single series nearer the costa than to the margin.—*Kze. in Schk. Fil. Suppl. p. 88. t. 42. Metten. Polyp. p. 98.* Phymatodes, *J. Sm.* *Drynaria, Fée.*

Hab. British Guiana, *Schomburgk, n. 992.* Brazil: Para, on trees, *n. 582,* Rio Negro, *n. 1511,* and S. Gabriel, *n. 2329, Spruce.*—A fine and very peculiar species, with a caudex resembling a hare's foot and often thicker, with no trace of costules, and but a single series of very large sori.

348. P. (Phymatodes) *fusco-punctatum*, Hook. ; caudex long creeping or scandent branched slender partially paleaceous with ovate acuminate scales, stipites apart but approximate scarcely more than  $\frac{1}{2}$  an inch long compressed, fronds firm-membranaceous subchartaceous 6–9 inches long 1–1 $\frac{1}{4}$  inch broad lanceolate finely acuminate gradually attenuated at the base glabrous entire copiously sprinkled on both sides with dark-brown (not pellucid) dots, venation very conspicuous elevated on both sides, no costules, veins very uniformly reticulated forming a series of costular oblong areoles the rest are hexangular ones as long as broad with very rarely a free included simple veinlet, sori large generally compital arranged in a single uniform series between the costa and the margin.—TAB. CCLXXXV. A.

Hab. Ecuador, ascent of Chimborazo, alt. 3000 feet, *Spruce.*—The figure of the venation here given will explain that better than any description can do.

349. P. (Phymatodes) *normale*, Don ; caudex very long creeping or scandent often as thick as a writing-pen the young portions clothed with black subulato-setaceous squarrose scales in age perfectly smooth, stipites very numerous on the caudex more or less approximate 1–2 inches long and as well as the costa reddish stramineous, fronds firm-membranaceous glabrous varying extremely in size 1–2 feet or more long  $\frac{3}{4}$  of an inch to 2 inches wide lanceolate or elongato-lanceolate or loriform generally long and finely acuminate gradually attenuated and decurrent at the base entire subfalcate or flexuose, venation slightly prominent especially beneath, costules none, veins forming rather large but very

irregular areoles with free included veinlets, sori mostly compital rather large arranged in a single regular series nearer the costa than to the margin or in a wavy line partially scattered or very copious and irregularly dispersed over the whole under-surface of the frond.—*Metten. Polyp. p. 86. t. 1. f. 41-43.*—Var. *α, normalis*; frond 1-1½ foot long ½ an inch to 1 inch wide. Polypod. normale, *Don, Prodr. Nep. p. 1. Phymatodes, Pr. Drynaria, J. Sm.*—Var. *β, latifrons*; fronds 1-1½ foot long 1-2 inches wide, sori regularly uniserial.—Var. *γ, sparsisora*; fronds 2-3 feet long ½-1 inch wide, sori irregularly scattered and copious. *P. longifrons, Wall. Cat. n. 274. Hook. and Grev. Ic. Fil. t. 65. Drynaria, Fée.*

Hab. Var. *α* and *γ*. Nepal, and throughout northern Bengal, Khasya, and Assam, alt. 4000-6000 feet, *Wallich, Griffith, Hooker fil. and Thomson.*—Var. *β*. Malacca, *Griffith. Moulmeine, Parish, n. 65, 176* (alt. 4000 feet), *Thos. Lobb. China, Hance, Alexander. Formosa, Swinhoe.*—I cannot doubt but Mettenius is correct in uniting the *P. longifrons*, Wall., with the *P. normale* of Don, notwithstanding the different arrangement of the sori; my numerous intermediate specimens quite justify such a union, and my var. *γ* exhibits intermediate states between those two.

350. *P. (Phymatodes) membranaceum*, Don; caudex creeping stout the younger portion paleaceous with blackish-green ovate acuminate scales, stipites distant or subaggregated 1-5 inches long if longer winged above with the decurrent base of the frond, fronds 6 inches to 2-3 feet long by less than an inch to 6 inches broad! thin-membranaceous and translucent or firm-membranaceous and opaque lanceolate or oblongo-lanceolate or oblanceolate acuminate the base long attenuated and much and gradually decurrent upon the stipes glabrous, the margin entire or more or less deeply sinuato-lobate or pinnatifid and even fimbriated throughout the whole length with long narrow unequal segments, venation very distinct, costules horizontal or nearly so slender usually remote connected by transverse veins which form the primary areoles and these are filled up with irregular network of which the areoles are very unequal and include copious free veinlets, sori compital rather small usually in two series between the costules more or less numerous according to the width of the frond rarely reduced to one sorus near the costa where a single series parallel with the costa is formed, not unfrequently there are 3-4-5 series (not very regular) between the costa in one instance a single series only appears between the costules and those of a very large size and abnormal in form

often oval or oblong and lying parallel with the costules.—*Don, Prodr. Fl. Nep. p. 2. Metten. Polypod. p. 118. P. grandifolium, Wall. Cat. n. 282 (a very large form). P. heterocarpum, Bl. Fil. Jav. p. 167. t. 75 (P. Zollingerianum, Kze. and Metten.).*

Hab. Apparently common all over India proper: Bengal, Khasya, Assam, Boutan, and westward to Kumaon (alt. 6500 feet), Madras and Bombay Presidencies. Ceylon, abundant, *Gardner, n. 1145. Java, Blume, Millett* (firmer texture and more opaque).—It is utterly impossible to attempt to characterize in few words such a truly polymorphous plant as this, in the size and shape and texture, in the form and disposition of the sori, etc. Much of these variations may be considered abnormal, a freak of nature, especially in the deeply pinnatifid fronds and in the case where only a single series of large, pulvinate, misshapen sori appears between the costules. By far the greater number of our specimens have the fronds more thin and membranaceous than, perhaps, any known Fern, sometimes almost as thin and pellucid and as bright a green as *Uva Lactuca. P. heterocarpum*, Bl., well accords with some of our specimens with the firmer and less membranaceous fronds, but the stipes is unusually long, and the name is far from applicable.

351. *P. (Phymatodes) superficiale*, Bl.; caudex very long creeping or scandent branched tortuose sparingly paleaceous with subscariose short lanceolate scales, stipites more or less distant 2–6 inches long often curved upwards, fronds 6–12 inches long 1–2 inches broad straight or subfalcate firm-membranaceous generally very opaque lanceolate or oblongo-lanceolate entire glabrous finely acuminate, below gradually attenuated and decurrent upon the stipes, no distinct costules, primary veins obliquely patent flexuose slender united by transverse veins so as to form about four rows of large subquadrate areoles, these are again divided into irregular lesser ones which include free simple or branched veinlets, sori small arranged in two irregular series between the primary veins.—*Bl. Fil. Jav. p. 136. t. 56. f. 1 (excellent). P. hymenodes, Wall. Cat. n. 283 (not of Kze., according to Metten, Fil. Hort. Lips. p. 37. t. 25. f. 40–41. Fée, Polyp. p. 115).*

Hab. Java, *Blume, De Friese and Teijsmann, n. 27. Chappadong Mountain, Tenasserim, Wallich, Griffith. Khasya, Boutan, Griffith, Hooker fil. and Thomson*, alt. 3000–6000 feet. Hongkong and Tsus-Sima, coast of Corea, *Wilford*.—Var.  $\beta$ , *brevifolia*; fronds very opaque subcoriaceous shorter and broader in proportion, sori larger but few and sparse, possibly distinct. Java, *De Friese*, and Malay Islands, *Thos. Lobb*.—This is well figured by Blume, and is certainly the *P. hymenodes*, Wall., but not of Kze. and Mettenius, according to the latter; yet his figure is sufficiently satisfactory for our plant.

352. *P. (Phymatodes) oodes*, Kze.; caudex creeping filiform setaceo-paleaceous with fulvous hairs rather than scales, stipites wide apart 3–3½ inches long slender filiform glabrous

glossy, fronds subchartaceous firm and probably rather fleshy when recent,  $1\frac{1}{2}$ - $2\frac{1}{2}$  inches long  $1$ - $1\frac{1}{4}$  inch wide exactly ovate obtuse obtusely cuneate at the base entire glabrous opaque rather obscurely costate, costules internal subreniform united by transverse veins forming a few large areoles and those filled with an irregular network of smaller areoles enclosing one or more free veinlets, sori compital small the superior ones form a single series on each side the costa the rest are few on my specimens and irregularly arranged.—*Kze. in Bot. Zeit.* iv. p. 421. *Metten. Polyp.* p. 115. t. 3. ff. 27, 28. *Drynaria, Fée, Gen. Fil.* p. 270, 6me *Mém. Foug. Nouv.* p. 19. t. 7. f. 4.

Hab. Luzon, *Cuming*, n. 58.—So distinct a species that it needs no comment. It appears to be very rare.

353. P. (Phymatodes) *Zippelii*, Bl.; caudex creeping paleaceous with black scales, stipites distant or approximate short 1-2 inches long but winged with the decurrent base of the frond, frond 10-12 inches long  $1$ - $1\frac{1}{2}$  inch broad elongato-lanceolate firm-membranaceous acuminate long-attenuated below and gradually decurrent to the base of the stipes entire glabrous, venation evident, costules distant obliquely patent slender connected by transverse veins including a network of smaller irregular areoles which have occasionally a free simple included veinlet, sori small compital subbiseriate between the costules but in general numerous and very irregular.—*Bl. Fil. Jav.* p. 172. t. 80. *Metten. Polyp.* p. 115. P. oxyphyllum, *Kze. in Bot. Zeit.* vi. p. 116 (*fide Metten.*). *Drynaria subfalcata*, *J. Sm.*, and *D. undulata* (names only); the latter *Mettenius* refers to P. membranaceum, *Don.*

Hab. Java, *Blume, Zollinger.* Luzon, *Cuming*, n. 113 (*Dryn. subfalcata*, *J. Sm.*, n. 250, *D. undulata*, *J. Sm.*), *Thos. Lobb.*—Well represented by *Blume*, l. c. All my specimens are very uniform.

354. P. (Phymatodes) *ensatum*, Thunb.; caudex long-creeping flexuose paleaceous with lanceolate dirty-brown scales, stipites remote a span to a foot long dark-brown often scaly below, fronds dark blackish-green 6-7 inches (and fertile) to a foot and a half long  $1\frac{1}{4}$ -3 inches wide broad-lanceolate acuminate long-attenuate and gradually decurrent below, entire or subsinuous at the margin glabrous, venation very evident, costules distinct horizontally patent united irregularly by flexuose transverse veins into large sub-



quadrate primary areoles which are filled up with a less irregular network of which the areoles enclose frequent free and branched veinlets, sori also very irregular as to size and arrangement compital, sometimes between the costules is only one large orbicular sorus collectively arranged in a single series parallel with and near to the costa sometimes there are two or three between the costules at other times there is a single or a double series of few sori between the costules and these extremely irregular in shape often oblong and linear (grammitoid) and placed transversely with regard to the costa.—*Thunb. in Linn. Trans.* ii. p. 341. *Kze. in Bot. Zeit.* vi. p. 494. *Sw. Syn. Fil.* p. 29. *Willd. Sp. Pl.* v. 158. *Metten. Polyp.* p. 116. *P. Phyllitidis*, *Thunb. Fl. Jap.* p. 335.

Hab. Japan, *Thunberg*, *Zollinger*, *Oldham*, *C. Wright*. Tsus Sima, coast of Corea, *Wilford*.—A noble species, but nearly allied to *P. hemionitideum*, Wall.

355. *P. (Phymatodes) hemionitideum*, Wall.; caudex creeping apparently underground scarcely paleaceous, stipites more or less remote 2 inches to a span and more long winged upwards reddish-brown, fronds 8 inches to 1½ foot long 2-3 inches wide membranaceous subchartaceous subtranslucent oblong or broad-lanceolate acuminate, below rather suddenly very long attenuate and gradually decurrent sometimes almost to the base of the stipes, entire glabrous, venation very evident and prominent, costules slender horizontal or nearly so united by transverse veins so as to form about five series of large subquadrate areoles and these including small ones with or without free veinlets, sori compital rather large forming one series between the costules and these very irregular in shape and size rarely subglobose usually oblong or even (by confluence) linear lying transversely with regard to the costa parallel with the costules.—*Wall. Cat.* p. 284. *Metten. Polyp.* p. 112. *Drynaria*, *J. Sm.* *Selliguea*, *Pr. Tent. Pterid.* p. 216. *t. 9. f. 17.* *Colysis*, *Pr. Epim.* p. 147.

Hab. India: Nepal, *Wallich*; Assam and Khasya, *Griffith*, *Simons*, *Hooker fil. and Thomson* (alt. 4000-6000 feet). Nilghiri, *M'Ivor*, n. 40.—A most distinct species, uniting the *Phymatodes* group of *Polypodium* with the *Selliguea* group of *Gymnogramme*.

\*\* *Fronds simple, lobate or hastate.* Sp. 356-359.

356. *P. (Phymatodes) Labrusca*, Hook.; caudex stout thick erect or ascending densely clothed with long subulato-setaceous dark-brown scales, stipites aggregated nearly terminal on the caudex 4-8 inches long, fronds 3-4 inches long

2½–3 inches wide cordate or acute entire or sinuato-lobate with a deep sinus at the base forming two rounded lobes, costules evident distant united by transverse veins into areoles which are filled by a network of lesser irregular areoles enclosing free veinlets, sori small copious scattered without order over the surface of the frond. (TAB. CCLXXXV. B.)

Hab. Borneo, on limestone rock, Sarawak, *Thos. Lobb*.—A most distinct well-marked species, with fronds quite resembling the leaves of *Vitis Labrusca*.

357. P. (Phymatodes) *hastatum*, Th.; caudex stout creeping densely mottled above with subulate ferruginous flaccid scales, stipites more or less approximate 1½–6 inches long glabrous glossy, fronds coriaceous-membranaceous glabrous 2–6–7 inches long ½ an inch to 1½ inch wide from a broad truncate or cordate base simple and oblong acuminate with a black thickened entire or sinuated margin or hastately trilobed or 3-partite with three spreading equal lanceolate lobes, costules very distinct horizontal, veins forming a fine irregular network over the rest of the frond, the small areoles including free veinlets, sori moderately large compital rather distant forming a single series (alternating with the costules) between the costa and the margin.—*Thunb. Fl. Jap.* iii. p. 335, *lc. Fl. Jap.* p. 10. *Kze. in Schk. Fil.* p. 198. t. 83. *Metten. Polyp.* p. 106. t. 1. f. 18 (venation).

Hab. Japan, *Thunberg*, probably chiefly in the southern islands. Kin Sin and Simoda, *C. Wright*. Kino Ohosima, *Oldham*. Nagasaki, *Babington*, *Oldham*. Formosa, *Wilford*, n. 519, *Swinhoe*.

358. P. (Phymatodes) *Spectrum*, Klfs.; caudex very long creeping or scandent the younger portions covered with close-pressed imbricating deciduous subulate black scales, stipites distant or approximate 2–5 inches long, fronds firm chartaceous-membranaceous 4–8 inches long (but often broader than long) reniformly or cordately triangular (rarely hastate) the lobes large acuminate the base produced into two broad lobes on each side the stipes and there forming a deep sinus, the lobes so large as not unfrequently to overlap each other at their base, costules evident but slender veniform united by transverse veins forming large areoles filled up with lesser ones which include copious free branched veinlets, the branches divaricated short bearing the sori at the apex or on the back, sori small copious irregularly scattered.—*Kaulfs. En. Fil.* p. 94. *Hook. and Arn. Bot. Beech. Voy.* p. 103. *Drynaria*, *J. Sm.*

*Brack. Fil. U. S. Expl. Exped. p. 46.* Phymatodes, *Pr. Polyp. Thouinianum, Gaud. in Freyc. Voy. Bot. p. 348. t. 5. f. 1 (excellent).*

Hab. Sandwich Islands, *Chamisso, Beechey, Gaudichaud, Brackenridge, Hillebrand.* Sumatra, *Terschmacker, n. 33.*—Variable in shape, but an ordinary form is that of a skate or that of a bat with outspread wings, for the side-lobes often quite overpower the central one. I do not find that Mettenius has noticed this under his "*Polypodium*" at all.

359. P. (Phymatodes) *tridactylon*, Wall.; caudex creeping branched (our specimens always clogged with earth) the young apices only paleaceous with blackish lanceolato-subulate scales, stipites more or less apart 1–3–4 inches or 1 foot long winged upwards and as well as the back of the costa towards the base furfuraceo-squamose, fronds 2–3–9 inches long  $\frac{3}{4}$ –1 $\frac{1}{2}$  and 2 inches wide firm membranaceous very dark dirty-green when dry often intensely black lanceolate acuminate and quite entire sometimes subhastato-trilobate or tripartite or 5-fido-pinnatifid, below long-tapering into a gradually decurrent wing upon the petiole glabrous, the margin entire, segments 4–10 inches long linear- or broad-lanceolate acuminate terminal one the largest, venation very conspicuous, costules prominent beneath rather wide apart extending about two-thirds of the way to the margin there uniting and forming large costal areoles within which the sori have their origin, a second series of smaller areoles is formed nearer the margin and these and the rest of the frond are filled up with a network of smaller irregular areoles including free veinlets, sori small not very numerous compital upon the secondary veins of the primary areole.—*Wall. Cat. n. 315. Hook. and Grev. Ic. Fil. t. 209. Metten. Polyp. p. 104. t. 1. f. 39, 40 (venation).* Phymatodes, *Pr. Drynaria, Fée. Drynaria dubia, J. Sm. in Hook. Journ. of Bot. iii. p. 397 (name only).* Polypodium pteropus, *Bl. Fil. Jav. p. 168. t. 76 (very good, but larger than our specimens).* *Metten. Polyp. p. 104. t. 1. n. 36 and 37.*

Hab. India: Nepal and Sylhet. Malay Islands: Isle of Samar, *Cuming, n. 324*; Java, *Blume, De Vriese and Teijsmann, n. 45*; Mergui, *Griffith.* Moulmeine, *Parish, n. 64.* Chittagong, Assam, Khasya, *Hooker fil. and Thomson.* Madras Peninsula, *Wight, n. 59, 62, and 3160.* Nilghiri, *Beddome, n. 98* ("an aquatic," and all the specimens have the appearance of being so).—A very polymorphous species, it must be allowed, as will be seen by the respective figures quoted; but all agree in the very large and distinct primary costal areoles, well represented by Dr. Greville, by Blume, Presl, and Mettenius. Our largest specimens, and sometimes the smaller and entire-fronded, have the sori very commonly

confluent into transverse oblong or linear sori, quite grammitoid. Occasionally the sori form a solitary series on each side the costa (in the simple-fronded forms), and then they are rather large.

\*\*\* *Fronde pinnatifid.* Sp. 360-383.

360. P. (Phymatodes) *angustum*, Metten.; caudex creeping nearly as thick as a duck's quill paleaceous with brown narrow crisped scales, stipites remote or aggregated 2-5 inches long and as well as the costa often ebony-black and the whole under side more especially of the plant sparsely clothed with small ovate peltate appressed ciliated scales, fronds coriaceous flabelliform in outline deeply but irregularly digitato-pinnatifid almost to the rachis with linear acuminate entire segments 3-5 inches long, the base broad and decurrent, the margin thickened most so on the under side, costæ very distinct but the venation is internal and very obscure, sori oval rather large partially sunk in the thick frond approximate forming a single series parallel with the costa and occupying the upper half of the segments mixed with peltate stipitate scales.—*Metten. Polyp. p.* 90. *Pleopeltis*, *H. B. K. Nov. Gen. Am. i. p.* 9. *t.* 1. *Willd. Sp. Pl. v. p.* 211. *Phlebodium*, *J. Sm.* *Polypod. peltidifolium*, *Raddi, Fil. Bras. p.* 16. *t.* 21. *Hook. Ex. Fl. t.* 61. *Pleopeltis Raddiana*, *Gaudich.* *Drynaria torulosa*, *Fée, 6me Mém. Foug. Nouv. p.* 17. *t.* 5. *f.* 4. *D. stenoloma*, *Fée, l. c. p.* 8. *t.* 4. *f.* 1. *Pol. sectifrons*, *Metten. Polyp. p.* 99.

Hab. Mexico, *Humboldt, Galeotti.* Guatemala, *Skinner, n.* 638, 6368, and 6532 (*Drynaria torulosa*, *Fée*). Brazil, abundant.—This is the Fern upon which Humboldt's genus of *Pleopeltis* was founded. It is a well-marked species in the digitate or subdigitate or even subpalmate form of the frond, the lower segments being generally equal in length with the rest and erecto-patent. The locality seems rather limited. It appears to avoid the hotter and moister parts of the tropics.

361. P. (Phymatodes) *leucosporum*, Kl.; caudex long creeping clothed with narrow appressed scales, stipites stout distant 4 inches to a span and more long decidedly paleaceous, fronds very coriaceous 3 inches to a span long lanceolate an inch to 2-3 inches broad in the broadest part furfuraceo-squamose on both sides deeply pinnatifid in the lower half, the upper half much narrower sinuato-pinnatifid entire or obtuse, segments horizontal inferior ones often 1½ inch long but very unequal oblong obtuse entire or slightly sinuate, upper and much shorter ones subtriangular-semi-

ovate, costa prominent on both sides, veins quite sunk and obscure, sori copious very large prominent subrotund or sub-oval forming a series on each side the costule of the segments (often extending to the main costa) or in the upper portion of the frond on each side the main costule to the apex.—*KL. in Linnaea*, xx. p. 404. *Metten. Polyp.* p. 89. *Eat. Fil. Wright. et Fendl.* p. 47.

Hab. Columbia, *Moritz, Burschel*. Venezuela, *Fendler*, n. 251.—A very fine species, very variable in size and in the length of the segments; one of my specimens is forked at the apex of the terminal segments.

362. P. (Phymatodes) *oxylobum*, Wall.; caudex creeping stout paleaceous with dense subulato-falcate ferruginous scales, stipites 2-5 inches long, fronds coriaceous or coriaceo-membranaceous 6-12 inches and more long deltoideo-ovate acuminate deeply pinnatifid to within  $\frac{1}{2}$  an inch of the rachis with 5-11 segments which are 3-6 inches long  $\frac{1}{2}$ -1 inch wide very patent from a broad base oblongo-lanceolate very finely acuminate entire thickened at the margin, the lowest ones cuneato-decurrent, terminal segment often the longest and most narrowly acuminate, venation conspicuous, costules often prominent beneath distant united by transverse veins forming 3-4 series of primary areoles which are filled up by lesser ones including free veinlets, sori large not sunk arranged in a single series nearer the costa than the margin.—*Wall. Cat.* n. 294. *Metten. Polyp.* p. 106. Phymatodes, *Pr.*

Hab. Kumaon, alt. 7000 feet, *Wallich, Strachey and Winterbottom*; thence east to Khasya, alt. 4000-5000 feet, *Griffith, Hooker fil. and Thomson*. Nilgherries, *Beddome*, n. 99 (margins of the segments sinuato-sublobate).—The slightly attenuated and embeated base of the frond, the thickened margin scarcely at all serrated, and the sharply acuminate segments, are characteristic of this species.

363. P. (Phymatodes) *incurvatum*, Bl.; caudex creeping paleaceous, stipites scattered a span to a foot long of the *sterile* frond, 2 feet of the *fertile* glossy-brown, fronds firm-coriaceous glossy dimorphous; *sterile* ones 6-10 inches long 8 inches to 1 foot wide hastato-tripartite rarely pinnatifid with 4-6 lateral lobes, lobes ovato-acuminate entire horizontal terminal one very large all thickened at the margin, costules distinct but immersed, venation internal and very indistinct; *fertile* fronds very long stipitate 10 inches to a foot long nearly as much wide very broad ovate deeply pinnatifid nearly to the rachis, below subpinnate, segments 5-15 4-8 inches long

very remote linear and acuminate decurrent at the base, sori large copious oval sunk into a very deep cavity which forms a circular elevated truncated tubercle on the opposite side, occupying the space between the costa and the margin in a single series.—*Bl. Fil. Jav. p. 151. t. 65. Metten. Polyp. p. 106. t. 1. f. 30 (venation).*

Hab. Java, *Blume, De Vriese and Teijsmann, n. 8, Thos. Lobb, n. 218.* Mount Ophir, Straits of Malacca, *Griffith.*—A very handsome and very peculiar species.

364. *P. (Phymatodes) insigne, Bl.*; caudex short creeping paleaceous with deciduous ferruginous scales, stipes 1–2 inches or more long (according to the length of the decurrent wing of the frond), fronds subtriangular-ovate membranaceous glabrous 4–6 inches long (independent of the decurrent wing) and as much broad subdeltoid deeply pinnatifid with 5–9 lanceolate spreading acuminate segments, the base of the frond subcuneate and decurrently attenuated so that the stipes is winged for the greater part or even the whole of its length, venation distinct, costules slender veniform united by transverse veins forming 2–4 series of primary areoles which are filled by a very delicate network forming lesser areoles including free divaricating veinlets, sori very small generally two on each transverse veinlet but appearing to be irregularly scattered.—*Bl. Fil. Jav. p. 166. t. 74 (very good). Metten. Polyp. p. 117. P. diffundens, Kze. in Bot. Zeit. iv. p. 422. Drynaria decurrens, Brack. Fil. U. S. Expl. Exped. p. 48. D. palmata, J. Sm. (as relates to Cuming's n. 52; not Polyp. palmatum, Bl.).*

Hab. Java, *Blume. Luzon, Cuming, n. 52, Brackenridge.*—A very distinct species. Small specimens resemble some states of *P. tridactylon*, Wall., to which, indeed, Mettenius refers Cuming's n. 52.

365. *P. (Phymatodes) bifrons, Hook.*; caudex very long-creeping branched and often tortuous naked or only very sparingly clothed with small ovate obtuse blunt peltate scales, fronds scattered dimorphous; *sterile* ones sessile 3–4 inches long 1 inch at most wide membranaceous glabrous lanceolate attenuated at the base pinnatifid halfway down to the costa with oblong or ovato-oblong obtuse segments, venation evident, costules slender veniform running up into the segments, veins anastomosing forming costal parallel oblong areoles with forked free veins and rather large suborbicular ones occasionally including a free veinlet; *fertile* fronds 4–6 inches long

on short petioles 2-4 lines wide linear acuminate attenuated below sinuato-lobate at the margin each lobe scrobiculate, veins forming two irregular series of oblong large areoles, sori very large oblong pulvinate occupying the space between the margin and the costules.—*Hook. Fil. Exot. t. 52.*

Hab. "Ecuador, on a tree by the river-side, near Archidona (124 m. N.E. of Quito); the plants were partially immersed in water, and to the root or caudex were attached hollow succulent tubers, in which the ants had taken refuge," *Jameson, n. 789.*—I know nothing like this very distinct and remarkable Fern, which has only been detected in the locality above mentioned. All my specimens are quite uniform.

366. *P. (Phymatodes) lomarioides*, Kze.; caudex creeping constituting a stout probably when recent spongy mass 2-3 inches and more thick bullate with large swellings on the surface and conical processes on which the stipites are jointed, the whole tessellated as it were and silvery-grey with a coating of small peltate scales which have a dark spot in the centre, stipites subaggregate 2-4 inches long, fronds dimorphous coriaceous deeply pinnatifid; sterile fronds 6-14 inches long broad-oblong deeply but not to the rachis pinnatifid, segments 5-17 pairs 2 rarely 3 inches long  $\frac{3}{4}$ -1 inch wide oblong very obtuse often dilated upwards and truncate, venation distinct, costules veniform uniting not far from the margin so as to form a large primary areole (which in the contracted fertile frond includes the sorus), the rest of the venation forms irregular copious oblong areoles which include copious free and divaricating close-placed veinlets; fertile fronds 1-1 $\frac{1}{2}$  foot long oblong 4-5 inches wide pinnatifid nearly to the rachis (below almost pinnated) with 20-30 or more broad linear obtuse or truncated segments, sori large quite sunk in a cavity represented by tubercles on the other side oval forming a single series between the costule and margin.—*Kze. in Metten. Polyp. p. 102.* *Drynaria, J. Sm. (name only).*—*Abnormal form, Lecanopteris carnosae, Bl. Eu. Fil. Jav. p. 120, and Fil. Jav. t. 94. A., and t. 94 B. (L. pumila), no descriptions.*

Hab. Luzon, *Cuming, n. 242.* Borneo, *Barber.* Abnormal form; Java, *Blume.*—Notwithstanding the striking difference between the fronds of this remarkable plant and those of *P. sinuosum*, Wall. (our n. 332), I am disposed to think, from the nature of the caudex and the venation, that these two may prove not specifically different. On mentioning to Mr. J. Smith my views regarding the unity of these two very distinct-looking Ferns, he not only was disposed to agree with me, but suggested that another Fern, viz. *Lecanopteris carnosae*, Bl., universally looked upon as a distinct genus, was equally an abnormal form of our present *Polypodium*;

and he is perfectly correct. The caudex (perhaps in itself abnormal, but the same in all three) and the fertile segments are abnormal, inasmuch as there is a suppression of the substance of the frond between the sori; the consequence is that these segments form marginal lobes, which in a dry state are turned back on the upper side of the frond (as the fructifications of *Nephroma resupinata* among the Lichens). The venation is the same in all three; and if we can believe that *Lecanopt. carnosa* is a state of *P. sinuosum*, Wall., there will be no difficulty in referring Blume's *Lecan. pumila* (Bl. Fil. Jav. t. 94, B, nowhere, I believe, described) to the *L. carnosa*.

367. *P. (Phymatodes) pustulatum*, Forst.; caudex very long scandent branched squarrose with long subulate copious brown glossy scales, stipites rather slender numerous 3-4-5 inches long, fronds a span to 1½ foot long, 1-6 inches wide membranaceous flaccid narrow- or broad-lanceolate undivided and very narrow or deeply and nearly to the rachis pinnatifid acuminate, segments wide apart (often an inch or more) 2-3 inches long rarely ½ an inch wide from a broad decurrent base gradually tapering into an obtusely acuminate point, venation very manifest lax variable, costules or rather primary veins forming one or two series of rather large oblong areoles (margin broad in the sterile specimens) parallel with the costa including free veinlets with very divaricating branches, sori compital on an imperfectly continued marginal veinlet rather distant and consequently forming a marginal series suboval sunk into a rather shallow cavity which forms a tubercle on the upper side.—*Forst. Prodr. p. 81. Sw. Syn. Fil. p. 31. Willd. Sp. Pl. v. p. 168. Schk. Fil. p. 11. t. 10. Metten. Polyp. p. 101. Phymatodes, Pr. Hook. fil. Fl. Nov. Zeal. ii. p. 42. Drynaria, J. Sm. Polyp. membranifolium, Br. Prodr. Nov. Holl. p. 147 (fide All. Cunningham in Herb. nostr.). P. scandens, Forst. and Willd. (fide Metten.)*

Hab. New Zealand, *Forster and others.* Northern Island and as far south as Akaroa. Tropical Australia, *Banks, Brown*; Brisbane river, *All. Cunningham*; Hastings river, "in dark forests, climbing to the height of 100 feet," *Dr. Beckler.* Norfolk Island, *Dr. Vaughan Thompson.*—The whole plant is described as fragrant, and used in New Zealand to scent oil and food.

368. *P. (Phymatodes) longissimum*, Bl.; caudex creeping fleshy partially paleaceous with rather large ovate appressed brownish scales, stipites 1-1½ foot or more long, fronds subcoriaceous 1½-4 feet and more long 6-10 inches wide narrow-oblong scarcely acuminate deeply pinnatifid nearly if not quite to the rachis generally leaving only a narrow wing, segments very numerous 22-40 and probably many more



4-6-8 or 10 inches long rarely exceeding  $\frac{1}{2}$  an inch wide, from a broad decurrent base elongato-oblong acute or obtusely acuminate, the margin slightly thickened, venation evident often slightly prominent and distinct (except the veinlets) on the under side, costules or rather primary veins horizontal flexuose forming a series of large costal soriferous areoles and a second lesser series, secondary veins forming a network of small areoles including free veinlets, sori large copious sub-oval sunk into a hemispherical cavity (forming a pustule or pouch on the upper side, the mouth with a distinct elevated rim) arranged in a single series on nearly the whole length of every segment and close to the costa.—*Bl. Fil. Jar. p. 159. t. 48. Metten. Fil. Hort. Lips. p. 37. t. 25. f. 18 (venation excellent), Polyp. p. 102 (in part only, and excl. Drynaria longissima, J. Sm.). Drynaria rubida, J. Sm. (name only).*

Hab. Java, *Blume, Millett. Celebes, De Vriese and Teijsmann. Luzon, n. 241, Cuming. Moulmeine, Parish, n. 49. Sylhet, Wallich, Cat. n. 289 2. Assam, Simons. Nilgherries, Beddome, n. 102.*—*Mettenius* seems to unite this with the *P. nigrescens* of *Blume*; but surely no two plants can be more distinct. *Blume* calls this, "*Filix magnifica, 4-pedalis vel sapius orgyalis et ultra:*"—the texture, form, etc., are quite different in the two. The cavities for the reception of the sori do not form the perfect sac or pouch which we see in *P. nigrescens*; but, in an old state, when the sori have fallen away, there is a perfectly hemispherical cavity with a raised edge, as complete as if it were turned by an instrument and as smooth within as a tea-cup.

369. *P. (Phymatodes) nigrescens*, *Bl.*; caudex stout creeping partially clothed with ovate appressed at length deciduous scales, stipites 1-1 $\frac{1}{2}$  foot long, fronds membranous (sub-carnose when recent) blackish-green when dry 2-3 feet long oblong acuminate cuneato-decurrent at the base deeply pinnatifid with obtuse sinuses, segments 3-23 10-12 inches long 1-2 inches broad (terminal one the largest) oblongo-lanceolate very finely acuminate entire, venation very distinct, primary veins rather than costules forming large angled costal areoles soriferous in the centre, the secondary veins form a copious network of small areoles which include close-placed free veinlets, sori large sunk into a deep cavity or pouch which is very prominent on the upper side arranged in a single series much nearer the costa than the margin.—*Bl. Fil. Jar. p. 101. t. 70. Hook. Fil. Exot. t. 22. P. excavatum, Roxb. in Griff. Crypt. Pl. Calc. Journ. Nat. Hist. 1844, p. 485. P. alternifolium, Wall. Cat. n. 289, an Willd.? P. longissimum, Metten. Polyp. p. 102 (in part, not of Bl., nor Drynaria longissima,*

*J. Sm.*). *Phymatodes saccata*, *J. Sm.* *Polypodium indicum glabrum*, *Rumph. Amb. vi. t. 35. f. 2.*

Hab. India: Malayan Islands, most abundant, *Elume, etc.*; Ceylon, *Gardner, n. 1144*; Sylhet and Assam, *Wallich, Simons*. Pacific Islands, *Brackenridge (in Herb. nostr., without name), Milne*; Samoa, *Powell, n. 14*.—A fine species, very constant to its characters, and well figured in the *Fil. Ex.* above quoted.

370. *P. (Phymatodes) Billardieri*, *Br.*; caudex long-creeping thick as a writing-pen in the younger portion paleaceous with appressed rather long ovate acuminate dark-brown celluloso-reticulated scales pale at the margins, stipites 4–6–8 inches long, fronds very polymorphous coriaceous glabrous from 3–18 inches long and from 1 inch (when undivided) to 10 inches broad lanceolate and entire acute or obtuse or more or less pinnatifid with 25 more or less acuminate and more or less cuneato-attenuate segments variable in number and size 3–15–25 3–6 inches long from  $\frac{1}{4}$ – $1\frac{1}{2}$  wide short oblong and acute or linear and more or less acuminate, the margin thickened and entire, venation often manifest, costules sometimes prominent forming large costal soriferous areoles including lesser irregular ones which have free divaricating veinlets, sori copious large orbicular sunk in a cavity forming a depressed tubercle or pustule on the upper side compital arranged in a single series between the costa and the margin.—*Br. Prodr. Nov. Holl. p. 147. Metten. Polyp. p. 101. Phymatodes, Pr. Hook. fil. Nov. Zeal. ii. p. 42, Fl. Tasman. ii. p. 150, Fl. Antarct. i. p. 111. Drynaria, J. Sm. Chrysopteris, Lk. Polyp. scandens, Labill. Fl. Nov. Holl. ii. p. 91. t. 240, not Forst. P. diversifolium, Willd., and P. lepidopodium, Lk.*

Hab. Van Diemen's Land, *Labillardière, Brown, and others, Sieber, n. 12*; abundant on Mount Wellington, and to the summit, *Fraser, J. D. Hooker. Australia, Bynoe*; Blue Mountains, *All. Cunningham, Fraser, n. 286. Norfolk Island, M'William, Dr. Vaughan, Thomson, J. Simmons*. Pacific Islands, Lord Howe's Island, Raoul, and Isle of Pines, *Milne and Macgillivray*. New Zealand, throughout the islands. Lord Auckland's Islands, *J. D. Hooker, Brackenridge*.—A species very different from *P. pustulatum*, though not unfrequently confounded with it; in general form and habit and polymorphous character more resembling *P. phymatodes*, but different in venation and in the paleaceous scales of the caudex.

371. *P. (Phymatodes) phymatodes*, *Linn.*; caudex long-creeping more or less clothed with dark-brown deciduous subulato-setaceous scales or bristles, in age the caudex is covered with a chalky-white coat, stipites 2–3 inches to 1 foot and more long, fronds very polymorphous carnosocoriaceous

from a few inches to 2-3 feet long often simple (undivided) and lanceolate and then rarely exceeding 10 inches long, or trifold or tripartite or more or less deeply pinnatifid and then appearing to attain the largest size and a diameter of 10-12 inches deltoideo-ovate, the segments as many as 17-23 3-8 inches long 1-1½ wide lanceolate oblong or linear acute or obtuse, the margin thickened entire, venation internal generally obscure sometimes when the frond is translucent the veins are apparent but veniform soon diverging and anastomosing and forming a series of large costular areoles with other lesser but unequally-sized ones, secondary veins numerous united into smaller areoles but varying in size and form and including numerous free divaricating veinlets more or less impressed and forming pustules at the back, sori often very large oval or globose compital either forming a single or double series between the costa and the margin or irregularly scattered over the frond.—*Linu. Mant. p. 360. Sw. Syn. Fil. p. 30. Willd. Sp. Pl. v. p. 167. Schk. Fil. p. 10. t. 8 d, and t. 17. Jacq. Ic. Pl. Rar. p. 637. Metten. Fil. Hort. Lips. p. 36. t. 25. ff. 10-16 (venation), Polyp. p. 103. Drynaria, Fée. Chrysopteris peltideum, longipes, and terminalis, Lk. (fide Metten.) Polyp. ensiforme, Kze. in Schk. Fil. t. 54. f. a (not the other figures). P. alternifolium, Lk. P. grossum, Langsd. and Fisch. p. 9. t. 8. Willd. Sp. Pl. v. p. 168. Drynaria vulgaris, J. Sm. Phymatodes, Pr.*

Hab. Tropical countries of the Old World, the continent of India alone excepted, almost universal, and equally variable in all localities. Malay Islands: Java, Singapore, Borneo, Amboyna, etc. New Guinea, with some of the sori nearly ½ an inch long! (*Hinds*). Malacca, *Griffith* ("fragrance of *Anthocanthum* when drying"), Mauritius, *Telfair, Wallich, Cat. n. 331.* Ceylon, *Mrs. General Walker, Gardner, n. 1143, 1297.* China: Hongkong, *Dr. Dill*; Formosa, *C. Wilford* (specimen quite simple, 14 inches long, 1-1½ inch wide, exactly lanceolate, finely acuminate, and much attenuated at the base); Loo-choo Islands, *C. Wright.* Pacific Islands, most abundant apparently in all, within or verging upon, the tropics: Fiji; Samoa (*n. 48, Powell*), etc. Africa: Natal to the Zambesi on the east coast, Madagascar, Mozambique, etc., *Drège, Sutherland, Livingstone, Kirk, Miller, etc.*; Western tropical Africa, equally plentiful, *Vogel, Barter, Mann, etc.*—The entire absence of this, otherwise widely dispersed plant on the great Indian continent is very remarkable.

372. *P. (Phymatodes) maximum*, Hook.; caudex "a stout creeping rootstock," stipes stout short about 2 inches long below the decurrent base of the frond ½ an inch thick semiterete, fronds 3-5 feet long coriaceous-submembranaceous 3 inches wide (independent of the long narrow segments) lanceolate obtusely acuminate long attenuated and decurrent

at the base opaque smooth irregularly sinuato-pinnatifid, here and there narrow segments 5 inches long are produced at uncertain distances, rachis very stout semiterete at the back, venation sunk but visible, costules subveniform slightly elevated very distant 1 inch apart, lateral veins unite these and anastomose so as to form several large angled irregular areoles, these include a network of lesser areoles which contain free veinlets, sori rather large partially sunk and embossed at the back irregularly scattered (sometimes confluent) dorsal or compital.—*Drynaria*, *Brack. Fil. U. S. Expl. Exp. p. 51. t. 7.*

Hab. Society Islands: Tahiti, in mountain forests, *Brackenridge, Barclay. Bootan?*, *Griffith* (2–2½ feet long, quite simple and entire).—Brackenridge's description and figure leave nothing to be desired. It is a very remarkable-looking Fern; yet I have specimens from Bootan (*Griffith*) and from Tahiti which I hesitate whether to refer to this or to large simple-fronded forms of *P. phymatodes*. Possibly these may be the normal state of *P. maximum*, and the latter, with its very irregular and unequal segments, a sport of nature.

373. *P. (Phymatodes) affine*, Bl.; caudex creeping, stipites 1–1½ foot long stramineous-brown, fronds 2–3 feet and more long ovate or ovato-oblong acuminate firm-membranaceous deeply pinnatifid with broad obtuse sinuses, segments 4 inches to a foot long (terminal one elongated) from a broad decurrent base (especially the lowest segments) lanceolate or elongato-oblong sunk and gradually acuminate entire, costules veniform forming primary rather large areoles which include the sori and are divided into lesser ones which have copious included free generally branched and divaricated veinlets, sori rather small compital upon the secondary veins forming 2–3 irregular series between the costa and the margin.—*Bl. Fil. Jav. p. 166. t. 69. Metten. Polyp. p. 114. t. 3. f. 22 (venation). Drynaria, J. Sm.*

Hab. Java, *Blume. Luzon, Cuming, n. 97. Ceram, De Vriese and Teijsmann, n. 319.*—A very fine and apparently a rare species.

374. *P. (Phymatodes) commutatum*, Bl.; “fronds tall deeply pinnatifid subdecurrent at the base membranaceous glabrous, segments elongato-lanceolate acuminate entire or subrepand, terminal ones gradually shorter, fertile ones nigropunctate above, sori scattered stipes subtetragonous glabrous.” *Bl. Fil. Jav. p. 165. t. 73.*

Hab. Java, *Blume.* “We at first united this with *P. affine*, from which, however, it differs considerably in the segments being more patent and subrepand,

the sori more numerous, irregularly dispersed," *Bl.* It is unknown to me, as it also appears to be to Mettenius.

375. *P.* (Phymatodes) *dilatatum*, Wall.; caudex creeping (short?) paleaceous with ovate reticulated scales, stipites  $1\frac{1}{2}$  foot and more long but strongly winged for its whole length by the decurrent base of the frond (not articulated on the caudex), fronds ample  $1\frac{1}{2}$ -2 and 3 feet long a foot and more wide membranaceous light-green glabrous oblongo-ovate pinnatifid to within  $\frac{1}{2}$ -1 inch of the rachis (less towards the base), segments 5-6 or 8 inches long (shorter towards the apex)  $\frac{3}{4}$ -1 rarely 2 inches wide oblongo-lanceolate acuminate entire suddenly decurrent, costules veniform forming large primary areoles which extend two-thirds of the way to the margin and include the sori, these and the rest of the segments are occupied by lesser irregular areoles including many free veinlets their branches moderately divaricating, sori numerous very small often oval or more or less elongated compital on the secondary veins and veinlets.—*Wall. Cat. n. 295.* *Drynaria acuminata?*, *Brack. Fil. U. S. Expl. Exp. p. 47.*

Hab. Nepal, *Wallich.* Khasya, *Simons, Griffith, Hooker fl. and Thomson*, alt. 4000-6000 feet. Malacca, *Griffith.* Malayan Peninsula, *Sir Wm. Norris.* Moulmeine, ascent of Mooleit, on rocks, alt. 4000 feet, *Parish.* Samoa, Navigators' Islands, *Powell, n. 55, Brackeuridge?*—This species, a most distinct one, has been largely distributed by Dr. Wallich forty years ago; but has not, as far as I can discover, been noticed by any one, unless it be the *Drynaria acuminata*, *Brack.*, who does not, however, notice the most remarkably winged stipes. There is no joint at the junction of the latter with the caudex, and the breadth of the united wings on the stipes is very considerable, and, no doubt, suggested the Wallichian name of *dilatatum*.

376. *P.* (Phymatodes) *alatum*, Hook.; caudex elongated creeping rather stout and woody destitute of scales in my specimen, stipites 2-3 feet long pale stramineous as well as the rachis, fronds  $1\frac{1}{2}$ -2 feet long 10-12 inches wide broad-oblong membranaceous glabrous deeply pinnatifid with obtuse sinuses subpinnate below, segments patent 6-8 inches long  $1-1\frac{1}{4}$  inch wide (in my specimen opposite or very nearly so) from a somewhat contracted but decurrent base lanceolate obtuse or acuminate sinuato-dentate, venation manifest, costules slightly prominent slender extending to the margin united by rather irregular flexuose transverse veins (all pellucid in my specimens) into 3-4 series of soriferous areoles, these are again occupied by irregular smaller areoles including free veinlets, sori small appearing at first sight irregularly

scattered but each primary areole has two sori and collectively they form about four series parallel with the costa and margin and two parallel with the costules.—*Drynaria*, *Brack. Fil. U. S. Expl. Exp. p. 48. t. 6 (excellent)*.

Hab. Fiji Islands, *Brackenridge, Seemann, n. 731*.—Allied to *P. affine*, Bl., and *P. dilatatum*, but very different from both.

377. *P. (Phymatodes) draconopterum*, Hook.; caudex (the only one I possess and of a young plant) thicker than a swan's quill horizontal scaly towards the apex and there bearing an erect stipes very stout in mature plants thick as the little finger 2-3 and more feet long deeply sulcated (when dry) scaly below with rather lanceolate firm scales decurrently winged above, frond ample  $1\frac{1}{2}$  to 3 and more feet long and perhaps as much broad firm-membranaceous dark-green somewhat glossy deeply (or below remotely pinnated with the pinnæ united by a wing) lobes or segments often very large a foot long (particularly the terminal one) 4-5 inches and more wide broad-oblong the lowest pair unequal-sided or when mature unequally bipartite all rather suddenly and finely acuminate entire, costules  $\frac{1}{2}$  an inch or more apart united by distant curved transverse veins, these again are connected by transverse veinlets and their areoles are reticulated with lesser subquadrangular small appendiculated areoles, the ultimate veins branched free, sori very copious small scattered orbicular dorsal or terminal or compital rarely confluent.—*Aspidium, Eat. in Fil. Wright. et Fendl. p. 211*. *Dryomenis Purdiei, J. Sm. in Seemann, Bot. of the Herald, p. 229 (name only)*. *Pleopeltis, Moore*.

Hab. New Granada, *Purdie, 1845*. Turbo, Gulf of Uraba, *H. Schott*. Tarapota, Eastern Peru, *Spruce, n. 4065*, and Ecuador, Chimborazo, alt. 3000 feet.—Although so very fine a species and collected nearly twenty years ago, it met with no describer till an excellent description was given by Mr. D. C. Eaton, in the work above quoted, from Mr. Schott's specimens. It was, indeed, briefly noticed by Mr. J. Smith as a discovery of Mr. Purdie, who refers it to Fée's genus *Dryomenis*; but neither the shape nor arrangement of the sori tally with the character of the Genus. Mr. Eaton had only imperfect sori, and not unnaturally placed the plant in *Euspidium*.

378. *P. (Phymatodes) meniscicarpon*, Hook.; caudex rather stout erect, stipes terminal clustered a span to 1 foot long, frond about as long as the caudex coriaceous-membranaceous cordate or oblongo-cordate pinnated, pinnæ 3-9 4-6 inches long 1-3 inches wide subopposite lowest pair petiole unequally bipartite the rest broad oblongo-lanceolate

finely acuminate occasionally sublobate, terminal pinna long-petioled mostly tripartite subsinuato-lobate, costules very distinct united by curved transverse veins, their areoles netted with veinlets and the areoles again including free and divaricating branched veinlets, sori copious compital oblong placed in a series one on each side of and close to the costules.—*Aspidium*, *Bl. En. Fil.* p. 142. *Drynaria*, *J. Sm. in Hook. Journ. Bot.* iii. p. 421 (name only). *Metten. Aspid.* p. 131. *Dryomenis*, *Moore*. *Dryomenis Phymatodes*, *Fée, Gen. Fil.* p. 225. t. 18. A.

Hab. Java, *Blume, Zollinger*. Luzon, *Cuming*, n. 31 (this is quoted for *Microrosorium trifidum*, by *Fée, Gen.* p. 269, and n. 4). Island of Samoa, Solomon's Group, *Milne*.—A species with the sori of *Meniscium* and the habit of *Euaspidium* or *Phymatodes*.

379. P. (Phymatodes) *laciniatum*, *Bl.*; "caudex creeping clothed with lanceolate ciliated reddish scales," stipites a span and more long, fronds coriaceous-membranaceous a foot and more long broad cordato-ovate glabrous deeply pinnatifid with obtuse sinuses, segments 15–21 4–8 inches long  $\frac{1}{2}$ – $\frac{3}{4}$  of an inch wide subopposite patent or horizontal oblongo-elongato-lanceolate finely almost setoso-acuminate terminal one more or less elongated, lowest pair deflexed forming a deep sinus at the bases their edges thickened entire or subsinuato-dentate, venation manifest, costules nearly horizontal distinct flexuose extending to the margin united by a network of irregular rather small areoles which include free veinlets, sori rather small sunk forming corresponding pustules on the upper side compital arranged in a single series rather nearer the costa than the margin.—*Bl. Fil. Jav.* p. 149. t. 63. *Metten. Polyp.* p. 107. *Phymatodes, Pr.*

Hab. Java, *Zollinger, De Vriese and Teijsmann*.—Well represented by *Blume*.

380. P. (Phymatodes) *malacodon*, *Hook.*; caudex creeping paleaceous with firm subulate dark-brown scales paler at the edges, stipites 2–4 inches long slender stramineous or reddish, fronds 6–8 rarely 12 inches long subcoriaceous-membranaceous glabrous cordate acuminate deeply pinnatifid with narrow sinuses, segments 5 rarely 7 3–4 inches long  $\frac{1}{2}$ –1 inch wide from a rather contracted base broad-lanceolate subflexuose sharply acuminate patent, terminal one more elongated lowest pair falcate and curved upwards having a deep sinus between the two bases all of them sharply serrated, the teeth or serratures terminated by a rather long soft deciduous

point, venation manifest, costules distinct enclosing a large primary soriferous areole, the veins form an irregular network their areoles with free included veinlets, sori very large when mature superficial (not sunk) compital forming a single series nearer the costa than the margin.—Var. *majus*; 12–14 inches long, segments 7 6–9 inches long erecto-patent.

Hab. North-west Himalaya, alt. 10,500 feet, *Thomson*. Kumaon, 4000–10,000 feet, *Strachey and Winterbottom*. Simla, *Col. Bates*. Sikkim, alt. 12,000–13,000 feet, *J. D. Hooker*.—Var.  $\beta$ . Nepal, *Wallich* (“Polyp. an propinquum var.?” *Wall.*).—A most distinct species, with the segments fringed with soft appendages to the serratures, which seem to fall off in the maturer state of the frond.

381. P. (Phymatodes) *ebenipes*, Hook.; caudex stout creeping elongated and knotted with short frondiferous branches everywhere densely imbricated with intensely-black polished ovato-lanceolate subcoriaceous concave scales fusco-pubescent at the margin, stipites stramineous 6 inches to a span long, fronds a span to  $1\frac{1}{2}$  foot long broad-ovate or deltoid cordate at the base acuminate (by the long terminal segment) coriaceo-membranaceous subrufescent when dry minutely and compactly pellucido-punctate deeply pinnatifid with acute or obtuse sinuses, segments 4–5 inches long  $\frac{3}{4}$ –1 inch wide very patent from a broad base oblong-lanceolate sharply acuminate closely serrated lowest pair generally opposite and drawn in as it were at the very base so as to form a more or less deep sinus at the summit of the stipes, venation very manifest, costules distinct parallel moderately distant extending to the margin, these are united by transverse veins forming about 3–4 series of areoles including free or connected veinlets of which the second only are soriferous, sori very large orbicular in a single series very near the costa.—*P. melanopus*, *Br. in Wall. Cat. n. 293, in part (v. Cat. n. 293 at p. 83, not P. melanopus, Hook. and Grev.)*.

Hab. Nepal, *Wallich, Thomson* (alt. 10–000 feet). North-west Himalaya, alt. 8000–9000 feet, *Strachey and Winterbottom, Edgeworth* (Kamalori). Sikkim, *Hooker fil. and Thomson*, alt. 8000 feet.—A most distinct species, as may be learned by the above characters, and as yet, I believe, quite undescribed.

382. P. (Phymatodes) *glaucum*, Kze.; caudex creeping densely crinite with very narrow glossy spreading subulato-setaceous scales, stipites remote a span and more long, fronds glauco-pruinose (especially beneath) punctate with white dots above coriaceous firm 8–14 inches long 6–7 inches wide cuneato-decurrent at the base deeply pinnatifid, segments sub-



opposite 11-19 suberecto-patent 1-3 inches long  $\frac{1}{2}$  an inch wide from a broad decurrent base elongato-oblong gradually but sharply acuminate, the margin slightly thickened especially on the under side, terminal segment elongated, venation immersed very indistinct, no evident costules (according to Mettenius's figure the veins form two or three series of rather large areoles of which the second series from the costa is fertile, each has one or more free veinlets), sori rather small in a single series (chiefly in the superior half of the frond) nearer the costa than the margin.—*Kze. in Metten. p. 102. t. 2. f. 12, 13.* *Drynaria, J. Sm. (name only). Brack. Fil. U. S. Eepl. Exp. p. 54.*

Hab. Luzon, *Cuming, n. 124, Brackenridge*.—Many of the pinnatifid species of the *Phymatodes* group need a clear view of the venation to distinguish some of the most essential of the specific characters. This, which I believe is a sufficiently good species, has the fronds very glaucous beneath, and a caudex coarsely erinite with spreading, subulate, dark-brown, glossy setæ.

383. *P. (Phymatodes) palmatum*, Bl.; caudex creeping ferruginous with copious large glossy lanceolate long acuminate scales, stipites a span to a foot and more long slender, fronds 6-8 inches long subcoriaceo-membranaceous glabrous broad-ovate acuminate cuneate attenuated at the base deeply pinnatifid or not unfrequently decurrently pinnate or truly pinnate with the always sessile or more or less decurrent pinnæ or segments 3-8-9 5-6 inches long alternate with very obtuse sinuses terminal one the largest; sterile ones 1-2 inches wide broad-lanceolate; fertile ones generally longer, all of them contracted near the base very finely and subcordately acuminate entire, venation manifest, costules evident veniform extending nearly to the margin united by transverse slender veins forming the primary areoles, secondary ones irregular enclosing free veinlets, sori compital in a single series nearer the costa than the margin.—*Bl. Fil. Jav. p. 150. t. 64 (not Pr.). Metten. Polyp. p. 107. t. 1. f. 24 (venation).* *Drynaria, J. Sm. Polyp. Lindleyanum, Wall. Cat. n. 304. Phymatodes Meyeniana, Pr. (fide Metten.)*—Var.  $\beta$ . fronds pinnate. *P. angustatum*, *Bl. Fil. Jav. p. 148. t. 62 (not Sw.)*.

Hab. Java, *Blume. Island of Ternate, Blume and Teijsmann. Luzon, Cuming, n. 126, Brackenridge. Singapore, Penang, Walker, G. Porter*.—This is another Fern of the *Phymatodes*-section well figured by Blume, at least as far as the fertile plant is concerned. Our sterile specimens have much broader segments, and are more contracted at the base. In both, the apices are remarkably finely acuminate, so as to be caudato-cuspidate. The *P. angustatum*, Bl., I consider a very

pinnated state of *P. palmatum*, and certainly that of Mettenius, who gives "Singapore, *Walker*," for the authority, whence I received my pinnated specimens, but which were accompanied by fronds of the ordinary form. *P. Lindleyanum*, Wall., is identical with this.

\*\*\*\* *Fronds pinnated.* Sp. 384-390.

384. *P.* (Phymatodes) *capitellatum*, Wall.; caudex very stout creeping clothed with ovate or lanceolate rather large ferruginous acuminate appressed scales, stipites 1 foot and more long brown glossy as well as the rachis, fronds  $1\frac{1}{2}$ -2 feet and more long coriaceous-submembranaceous, pinnae 15-21 in remote pairs sessile except the terminal one (which is long petiolate) 5-6 inches long 1-2 inches broad from a rounded base oblong-lanceolate finely acuminate entire or slightly sinuato-lobate at the incrasated margin, venation in general manifest, costules very evident straight extending to the margin, these are connected by transverse veins with 3-4 series of areoles again divided into lesser areoles including free divaricating veinlets, sori large compital superficial (not sunk) arranged in a single series nearer the costa than the margin.—*Wall. Cat. n.* 306. *Metten. Polyp. p.* 109. Phymatodes, *Pr.* *Drynaria, J. Sm.* *Polyp. juglandifolium, Dou.*

Hab. Himalaya, Nepal, Kumaon (7000 feet), and Srinuggur, *Wallich*; Simla, *Lady Dalhousie, Col. Bates*; Khasya, *Griffith, Simons, Hooker fil. and Thomson* (alt. 4000 feet); Sikkim, *Hooker fil. and Thomson* (7000-10,000 feet); Boutan, *Griffith*.—In the venation, in the opposite pinnae articulated upon the rachis, this has considerable affinity with *P. Himalayense*, but the single series of large sori, the slender thickened opaque margin (not broad and diaphanous) and broad scales of the caudex would seem to keep it abundantly distinct. Nevertheless I fear we have much to learn on the subject of *variation* in every part of Fern structure. Among my numerous specimens of these two I find a state with alternate pinnae. *P. Himalayense* has not always broad diaphanous margins; *P. capitellatum* varies with two series of sori between the costa and the margin, and the scales of the rachis vary much in width even on the same caudex. It is more than likely that the two will constitute one species. One form of this in my herbarium has the pinnae all very deeply lacinated; but this is evidently a *lusus naturæ*.

385. *P.* (Phymatodes) *tenuicauda*, Hook.; caudex stout creeping clothed with rather large lanceolate acuminate ferruginous scales, stipites a span to a foot long, fronds 1-1 $\frac{1}{2}$  foot long coriaceous-membranaceous ovato-oblong pinnated, pinnae subopposite and alternate distant articulated upon the rachis all more or less petiolate 6-8 inches long  $\frac{1}{2}$ -1 inch wide elongato-lanceolate obliquely cuneate at the base tapering above into a long and very finely almost setaceously acuminate apex entire and very slightly thickened at the margin,

costules manifest straight extending to the margin, venation very obscure but apparently as in the preceding species, sori large copious forming invariably a single series rather nearer the costa than the margin.

Hab. Khasya and Assam, *Mrs. Mack, Griffith*.—The almost invariably alternate and petioled and narrow-lanceolate pinnae, cuneato-attenuate at the base, and drawn out at the apex into a singularly elongated and narrow point, would suggest that this species was very distinct from *P. capitellatum*, and these characters are very constant in all my specimens, and they seem to be both common in Assam and Khasya, yet the differences are rather of comparison than of structure. If this and the preceding and following are really distinct as species, they are very closely allied to each other.

386. *P.* (Phymatodes) *Himalayense*, Hook.; caudex creeping clothed with bright ferruginous hair-like scales, stipites a span to 1 foot and more long, fronds 1-1½ foot long thin-membranaceous and sometimes pubescent or even subtomentose glabrous subcoriaceous in age pinnated, pinnae almost invariably opposite sessile in distant pairs 5-8-9 inches long by 1½-2 inches broad from an obtuse base elliptical-oblong finely and long-cordately acuminate entire but with a very distinct membranous margin, costules manifest connected by transverse veins forming areoles of which one or all are soriferous, these areoles are filled up with a network of lesser areoles which have free included veinlets, sori often large 1-2 in the primary areoles hence they are 1-2-serial between each pair of costules and 3-4-serial in a direction parallel with the costa.—*P. venustum*, *Wall. Cat. n. 305, not of Desv.*

Hab. Nepal, *Wallich*; Boutan, *Griffith, Booth* (alt. 7500 feet); Sikkim, *Hooker fil. and Thomson*; Khasya, *Simons*.—This Fern has almost invariably opposite pairs of pinnae, sometimes quite membranaceous and pubescent in age, glabrous and subcoriaceous, the sori vary, 1-2 biseriate between the costules, sometimes there is only one series parallel with the costa, sometimes 3-4: in general the fewer the sori the larger they are.

387. *P.* (Phymatodes) *leiorhizon*, Wall.; caudex very thick creeping paleaceous with ovate appressed deciduous peltate scales, stipites 1½ and more feet long stout, fronds ample subcoriaceous-membranaceous glabrous 2-3 feet long oblong or oblong-ovate pinnated, pinnae 10-12-30 erecto-patent 8-12 inches and more long oblongo-lanceolate much and very finely acuminate cuneate and slightly petioled superior ones sessile and subdecurrent terminal one very long the margins entire, venation manifest uniform, costules scarcely distinct from the veins but they do anastomose so as to form large costal soriferous areoles and a less imperfect series near the

margin, the rest of the frond is occupied by a network of small areoles including free veinlets, sori large in a single series nearer the costa than the margin moderately sunk so as to form slightly elevated corresponding pustules on the back of the frond.—*Wall. Cat. n. 303. Metten. Fil. Hort. Lips. p. 37. t. 24. f. 17 (venation), Polyp. p. 104. Hook. Fil. Exot. t. 24. Phymatodes, Pr. Drynaria, J. Sm.*

Hab. India: mountain districts of Kumaon, Nepal, Sikkim, Boutan, Khasya, etc., *Wallich, Griffith, Hooker fil. and Thomson, Winterbottom, Mrs. Mack, Booth, etc.*

388. *P. (Phymatodes) albo-squamatum*, Bl.; caudex long stout creeping densely setose with very subulate brown scales (often 1 inch long) falcate ciliated from a broad base suddenly attenuated into a very long hair-like point, stipites 8–12 inches long glossy, fronds (rarely simple a span long and soriferous) 1–1½ foot long oblongo-ovate subcoriaceo-membranaceous pinnate, pinnæ remote 7–15 rather long-petiolate 6–10 inches long (terminal one the longest and longer-petioled) ½–¾ inch broad elongato-lanceolate very finely and long acuminate entire at the margin more or less dotted on the upper surface with small white cretaceous orbicular scales much more copiously at the margin, venation obscure, costules rarely visible and veniform forming large costal soriferous areoles including smaller oblong areoles with free and divaricating veins, other free veinlets at the margin, sori compital scarcely sunk in a regular series between the costa and the slightly cartilaginous margin.—*Bl. Fil. Jav. p. 137. t. 57. Metten. Polyp. p. 108. t. 1. f. 29 (venation). Hook. Gard. Ferns, x. t. 47. Pleopeltis, Pr. (not Drynaria albido-squamata, J. Sm.) Polypod. varians, Bl. Fl. Jav. p. 138. t. 58. Metten. Polyp. p. 108. t. 1. ff. 20–24.*

Hab. Java, *Blume, Thos. Lobb. Luzon, Cuming, n. 202, 236, and 418. Borneo, Wallace; Sarawak, Thos. Lobb, n. 180 (fronds simple).*—Since I published this species in the "Garden Ferns," i. e., I have had the opportunity of examining fuller suites of specimens. I am satisfied that the *P. varians*, Bl., should be united with it. There is no appreciable difference between them. The primary veins sometimes more resemble costules than at other times. The curious caudical scales are the same in both.

389. *P. (Phymatodes) sparsiflorum*, Hook.; caudex large creeping knotted, stipites stout sparingly paleaceous with dark-brown lineari-subulate scales 20 inches long stout but apparently shrunk and angled in drying reddish-brown at the rachis, frond firm subcoriaceo-membranaceous dark blackish-

green when dry paler beneath oblongo-lanceolate distantly pinnated glabrous, pinnae 15–17 often  $1\frac{1}{2}$  inch apart, 7–8 inches long  $1\frac{1}{2}$ –2 inches wide from a narrow contracted cuneate and sessile base oblongo-lanceolate obtusely acuminate entire or subsinuate costate terminal one petiolate larger than the rest, costules none, veins manifest forming a uniform network of rather large oblong hexagonal areoles which have an oblique direction towards the margin always destitute of free veinlets, sori small subrotund of few capsules not copious but irregularly scattered sometimes dorsal on the veins and sometimes compital.

Hab. Tropical Western Africa: Sierra del Crystal, *G. Mann, n. 1634*.—A most distinct species, which I cannot liken to any other. There are no costules, the veins anastomose so as to form a very uniform network of oblong areoles quite like those of a *Selliguea* or *Hemionitis*, with not a single free veinlet, and the sori are small, irregularly scattered.

§ 11. DRYNARIA.—*Venation as in Phymatodes, chiefly differing in a peculiar habit more easily recognized than described. The fronds are often large, pinnatifid or rarely pinnate, generally dimorphous, with the sterile frond sessile, very distinct from the fertile one, shorter, broad, more or less lobed or pinnatifid, not inaptly compared to Oak-leaves, with strong prominent venation, or, more rarely, when the fronds are uniform, the lower half partakes of the character of the sterile frond and the upper portion of the fertile fronds of the dimorphous species. Of the fertile portions the segments or pinnae are, when dry, readily deciduous from the rachis.*—*Gen. Drynaria, Bory, in Ann. Se. Nat. ser. i. 5. t. 12–14. Aglaomorpha, Schott, Gen. Fil. t. 19, Hook. Gen. Fil. t. 91. Dryostachyum, J. Sm. in Hook. Gen. Fil. t. 95.*

\* *Fronds uniform.* Sp. 390–392.

390. P. (*Drynaria*) *Heracleum*, Kze.; caudex stout creeping densely clothed with very long slender silky subulate bright tawny scales, fronds uniform 3–6–7 feet long oblongo-lyrate elongated coriaceous acuminate the base often 6–8 inches wide sessile cordate and broadly sinuato-lobate, the rest regularly and deeply pinnatifid with segments 1– $1\frac{1}{2}$  foot long 3–4 inches broad oblong acuminate glabrous, costae stout, venation very manifest elevated especially beneath, costules conspicuous extending to the margin wide apart but connected by transverse veins forming 7–8 areoles filled up with a network of quadrangular areoles enclosing free veinlets, sori small very copious in two transverse series within each primary areole often compital somewhat impressed and forming slightly elevated pustules on the upper surface.—*Kze. in Bot. Zeit. vi. p. 117. Metten. Polyp. p. 117. t. 3. f. 52 (venation). Hook. Gard. Ferns, t. 1. P. morbillosum?, Metten.*

*Polyp. p.* 117 (according to his reference to *J. Sm.*). *Pr. Reliq. Hænk. i. p.* 22. *t.* 3. *f.* 22. *Drynaria, J. Sm.*

Hab. Java, *Zollinger, De Friese, and Teijsmann, n.* 84, *Thos. Lobb.* Luzon?, *Haenke.* Isle Samar, *Cuming, n.* 330. Solomon's Group, Pacific Islands, *Milne?*—I fear the *P. morbillosum*, *Pr. l. c.*, must be considered a dubious plant. It was described from very imperfect specimens, and, as far as the figures are concerned, with two sori in each primary areole and two series of sori between the costules and parallel with them, I do not see why it should not represent the common *P. quercifolium*. Certainly, if Mettenius's reference to *J. Smith* is to be depended upon for true *P. morbillosum*, then our plant and *morbillosum* are identical. I am doubtful about my Solomon's Islands plant, of which I have no entire fronds, but of which the very small sori are not in regular series but irregularly scattered.

391. *P. (Drynaria) Meyenianum, Schott*; caudex very stout creeping densely clothed with ferruginous crisped soft silky glossy subulato-setaceous ciliated scales, fronds ample sessile coriaceous 2½–3 feet long from a very cordate broadly-lobed base 4–12 inches wide subpellucid strongly and coarsely reticulated then a little contracted oblong deeply pinnatifid with sterile segments 3–6 inches long ½–1½ inch wide oblong obtuse or acute terminating in a singularly contracted pinnatifid fertile apex often a foot long with narrow linear segments moniliformi-lobate, the lobes monosorous, sori immersed, of the intermediate and sterile segments the venation is very manifest and prominent beneath these (as in other *Drynariæ*) are united by transverse veins and the areoles are occupied by a close network forming smaller areoles and including free veinlets, the venation is much altered in the contracted terminal segments.—*Aglaomorpha, Schott, Gen. Fil. t.* 19. *Hook. Gen. Fil. t.* 91. *Metten. Kze. in Schk. Fil. Suppl. i. p.* 191. *t.* 81. *Moore.* *Drynaria Proustiana, Gaudich. Voy. Bonite, Bot. t.* 3. *Polypod. flabelliferum, Goldm.* *Psygmium elegans, Pr.*

Hab. Luzon, on Mount Baldu, *Cuming, n.* 49, *Gaudichaud.*—Singular as is the first aspect of this noble Fern, its great fronds terminated as it were by long narrow beaded spikes of fructification, I can only look upon it as a *Drynaria* and closely allied to *D. coronans*, with its terminal pinnae alone fertile, the sori costal, and the substance of the rest of the segments suppressed, as in *Lecanopteris*, *Bl.*, (see our observations at p. 79 of this volume); in proof of this view an otherwise sterile segment is seen on one of my specimens, having a contracted base and then and there only bearing three costal sori.

392. *P. (Drynaria) coronans, Wall.*; caudex thick creeping branched and interwoven villosopaleaceous with aureo-nitent scales, fronds large uniform when growing arranged in a circle firm coriaceo-membranaceous but rather thin and

translucent 2 and probably many more feet long from a broad sessile cordate lobato-pinnatifid base (then suddenly contracted) lanceolate deeply almost to the rachis pinnatifid, segments 8-12 inches long  $\frac{3}{4}$  to 1 inch and more wide oblongo-lanceolate acuminate, lower ones gradually shorter entire incrassated at the margin, venation very manifest, costules parallel extending to the margin, these are connected by transverse veins forming 5-6 soriferous areoles and then again generally two or three others which include free veinlets, sori oval often confluent longitudinally, solitary in the primary areoles forming an excentric series always nearer one costule than the opposite one.—*Wall. Cat. n. 288. Metten. Polyp. p. 121. t. 40, 41 (venation). Hook. Fil. Exot. t. 91. Phymatodes, Pr. Drynaria, J. Sm.*—Var.  $\beta$ , sori of the series confluent. Polyp. contiguum, *Wall. in Herb. Hook. (not Cat. n. 285.)*

Hab. Nepal, *Wallich*; Kumaon, *Blinkworth*; Assam, *Jenkins*; lower hills of Sikkim and Khasya, 1500 feet, *Hooker fil. and Thomson*; Mishmee, *Griffith*; Moulmeine, *Parish*. Hongkong, *Wilford*.

\*\* *Frons dimorphous.* Sp. 393-398.

393. P. (*Drynaria*) *Fortunei*, Kze. in *Metten.*; caudex creeping short clothed with brown subulate ciliated scales, fronds coriaceous-membranaceous dimorphous; *sterile* ones sessile reddish-brown 2-3 inches long cordato-ovate acute, the margin lobato-pinnatifid with obtuse lobes at the base very acute ones at the apex; *fertile* ones shortly stipitate green 1-1 $\frac{1}{2}$  foot long 4-6 inches wide ovato-oblong acute deeply pinnatifid with patent oblong acute, segments 3-4 inches long  $\frac{1}{2}$ -1 inch wide, below the frond is suddenly contracted and long and the stipes is decurrently winged with short lobes nearly to its base, venation manifest, costules approximate extending nearly to the margin united by transverse veins forming 4-5 soriferous areoles filled with a network of lesser areoles which include free veinlets, sori large copious forming a single series in the middle between the costules.—*Kze. in Metten. Polyp. p. 121.*

Hab. China, *Fortune, A. 78*; Foochow, and covering the walls of the old fort at Lung-Lau, *Alexander*, and at Amoy, *Hance, n. 1409*; Province of Szechuan, W. China, *Col. Sarel*.—A very distinct species, peculiar as far as yet known to China.

394. P. (*Drynaria*) *splendens*, *Hook.*; caudex creeping clothed with appressed imbricated subulate scales, stipites

scarcely any, fronds  $1\frac{1}{2}$ –2–3 feet and more long 10–15 inches broad firm-coriaceous glossy beneath dimorphous; *sterile* ones deeply pinnatifid to the very extremity, segments 5–9–10 inches long  $1\frac{1}{2}$ –2 inches broad oblong sharply acuminate entire, terminal one rather large ovate, basal ones suddenly contracted into a lobed wing decurrent on the stipes, venation as in *P. Meyenianum*; *fertile* fronds the same as the sterile but pinnated above with narrow contracted linear subsinuate costules forming a series of large subquadrate primary areoles each of which is soriferous, the sori large orbicular or subquadrate and filling up the entire areole.—*Dryostachyum splendens*, *J. Sm. in Hook. Journ. Bot.* iii. p. 399, and iv. p. 64. *Hook. Gen. Fil. t.* 95.—Var.  $\beta$ , *pilosum*; smaller upper portion of the frond subpubescent. *Dryostachyum pilosum*, *J. Sm. in Hook. Journ. Bot.* iii. p. 399. *Kze. in Schk. Fil. Suppl.* i. p. 139. *t.* 61.

Hab. Luzon,  $\alpha$ , n. 90, and  $\beta$ , n. 89, *Cuming*.—This again, as indeed Mr. J. Smith has himself intimated, is quite a *Drynaria*, with the upper portion of the fertile frond contracted into narrow segments, primary veins forming large areoles and bearing equally large sori, some of which are orbicular, others almost exactly square, and the latter the largest, sometimes measuring a quarter of an inch across.

395. *P. (Drynaria) quercifolium*, L.; caudex creeping short stout densely clothed with red-brown satiny lanceolato-subulate soft scales, fronds coriaceous or subcoriaceous of two kinds; *sterile* ones varying in size from 3–12 inches and more long and 7–8 inches wide generally dark-brown glossy cordato-ovate variously lobato-pinnatifid often halfway down to the costa; *fertile* ones 2–3 feet long long-petiolate broad-ovate deeply nearly to the rachis pinnatifid, segments 5–9 inches long  $1$ – $1\frac{1}{2}$  inch wide oblong acuminate entire, venation manifest, costules distinct rather distant united by transverse veins forming 4–6 primary soriferous areoles filled up with a network of small quadrangular areoles with or without free veins, sori compital small numerous two in each primary areole consequently in two series between and parallel with the costules.—*Lin. Sp. Pl.* p. 1547. *Sw. Syn. Fil.* p. 32. *Schk. Fil.* p. 13. *t.* 13, and *t.* 8. *b.* (*P. sylvaticum*). *Willd. Sp. Pl.* v. p. 170? *Metten. Polyp.* p. 122. *Phymatodes*, *Pr. Drynaria*, *J. Sm. Polyp. Linnæi, Bory, Ann. Sc. Nat. ser.* i. v. p. 464. *t.* 12. *P. sparsisorum*, *Desv. P. Schkuhrii*, *Bory, l. c.*

Hab. Tropical India, perhaps universal on the continent north to the Himalaya (alt. 1000 feet). Ceylon, China, *Alexander*. Moulmeine, *Parish*, n. 65.



Malacca, *Griffith*. Pegu, *McClelland*. Malay Islands, abundant, Java, *Blume*, *De Vriese and Teijsmann*, n. 211, 304, 310. Luzon, *Cuning*, n. 25, 273, 414. Singapore and Tropical Eastern Australia, *Brown*, *All. Cunningham*, *McGillivray* (Trinity Bay). Albany Island, *F. Mueller*.—From the Pacific Island I only possess one specimen, from Angau, of the Fiji group, said to be frequent on the high grounds (*Milne*, n. 212); but Brackenridge does not record it in the "Voyage of the U. S. Expl. Exped.," anywhere but in the Philippine Islands. It is best distinguished from the other dimorphous *Drynariæ* by the two rows or series of sori between each pair of costules and parallel with them.

396. *P. (Drynaria) propinquum*, Wall.; caudex long very stout creeping densely clothed with lanceolato-subulate delicate membranaceous fringed ferruginous scales, fronds coriaco-membranaceous dimorphous; *sterile* 4–6 inches and more long firm and hard scarioso-membranaceous brown sessile cordato-ovate deeply pinnatifid with narrow oblong acute rarely obtuse segments; *fertile* ones long-stipitate 1–2 feet long oblong-ovate deeply almost to the rachis pinnatifid, segments 4 inches to a span or more long linear-oblong acute or acuminate subentire lowest ones distant and subdecurent, venation manifest slight elevated (so as to give a sculptured character to the surface when dry), costules subveniform flexuose connected by transverse veins forming 4–5 areoles of which the costal one only is soriferous, ultimate small areoles subquadrangular often with free included veinlets, sori forming only a single series close to the costa.—*Wall. in Herb.* 1823. *Cat.* n. 293. *Metten. Polyp.* p. 120. *Phymatodes*, *Pr.* *Drynaria*, *J. Sm.* *P. Willdenowii*, *Bl. Fil. Jav.* p. 156. t. 66? *Hook. Gard. Ferns*, t. 35 (*not of Bory*).

Hab. India: Nepal, Simla, and apparently common in the whole Himalaya range from N.W. India to Sikkim, Khasya, Assam (alt. 5–7000 feet), *Wallich*, *Edgeworth*, *Griffith*, *Hooker fl.* and *Thomson*, *Strachey* and *Winterbottom*. Java, "*Blume*, *Zollinger*" (not "*Mauritius*," as incorrectly given in 'Garden Ferns'). Tropical Africa, Prince's Island, *Barter*; Fernando Po, *G. Mann*.—The single series of sori of this plant on each side of the costules of the segments, and *Blume's* figure of *P. Willdenowii*, l. c., had, I fear, led both of us into the error of considering the Java plant identical with *P. Willdenowii*. Such is not the case; if either, *Blume's Willdenowii* is the *propinquum* of *Wallich* (well figured under the former name in "Garden Ferns"); but *Blume's* figure is a very indifferent one, and I have never seen any true *P. propinquum* but from the above localities.

397. *P. (Drynaria) Willdenowii*, *Bory*; caudex very stout creeping densely clothed with ferruginous glossy subulate ciliated scales, fronds submembranaceous-coriaceous dimorphous; *sterile* ones cordato-ovate subacute 4–6 inches long cut into short broad rounded lobes at the margin; *fertile* ones 1½–2 feet long nearly sessile ovato-oblong deeply al-

most to the rachis pinnatifid suddenly contracted at the base which forms a broad flexuose wing to the stipes, segments 3–6 inches long  $\frac{1}{2}$  an inch (if soriferous) to  $\frac{3}{4}$  inch broad if destitute of sori, narrow-oblong obtuse or obtusely acuminate entire or obscurely serrated, venation manifest, costules veniform, in the sterile segments united by transverse veins forming 4–5 areoles again traversed by other veins forming irregular areoles with included free veinlets, the soriferous and narrower segments have a large central primary soriferous areole (the rest as in the sterile segments) so that here the sori form a series exactly intermediate between the costa and the margin.—*Bory, in Ann. Sc. Nat. ser. i. v. 5, Atl. t. 13 (very good as to general structure and arrangement of the sori). Metten. Polyp. p. 120. t. 3. f. 48 and 49, venation (certainly excl. Bl. Fil. Jav. p. 156. t. 66).*

Hab. Mauritius and Bourbon, *Bory, Wallich, Carmichael*.—I have never seen this really well-marked species from any locality save the islands above mentioned; but Bory suspects, and with reason, that it may very likely be found in Madagascar. It has, as already observed, been confounded with *P. propinquum*, Wall., or rather *P. propinquum* with it.

398. *P. (Drynaria) diversifolium*, Br.; caudex stout elongated creeping clothed with ferruginous long-pointed scales, fronds coriaceous-membranaceous of two kinds arranged in a coronal tuft; *sterile* ones a span or more long sessile oblongo-ovate acuminate cordate at the base tawny-brown lobato-pinnatifid, segments obtuse the upper ones narrower and subacuminate; *fertile* ones 2–4 feet long long-stipitate pinnate, pinnæ distant a span to a foot long linear-lanceolate acuminate subpetiolate articulated upon the rachis with a depression or obscure gland at the inferior base crenato-serrate at the margin, costules veniform connected by an irregular network forming however a long primary costal soriferous areole, the lesser areoles rarely including free veinlets, sori sensibly sunk in the frond with corresponding pustules on the opposite surface arranged in a single series on each side of and near to the costa.—*Br. Prodr. p. 147. Hook. Gard. Ferns, t. 5. Metten. Polyp. p. 121. Drynaria, J. Sm. Polyp. Gaudichaudi, Bory, in Ann. Sc. Nat. ser. i. v. 5. p. 471. t. 13. Bl. Fil. Jav. p. 158. t. 67. Metten. Polyp. p. 120. t. 3. f. 46 and 47 (venation). P. quercifolium, Willd. (fide Metten.) P. glaucistipes, Wall. Cat. n. 297. Drynaria pinnata, Fée, Gen. Fil. p. 272.*

Hab. Tropical Australia, *Brown, F. Mueller, All. Cunningham*; Blue Moun-

tains, *Miss Atkinson*. Malay Peninsula and Islands, *Blume, Wallich, Sir W. Norris, Cuming*, n. 248 and 263, *De Vriese and Teijsmann*, n. 17, 63. Tropical Pacific Islands, *Milne, Harvey, Brackenridge*. Norfolk Island, *All. Cunningham*.—The most distinct of all the *Drynaria*-group, the fertile fronds being strictly pinnated.

§ 12. DIPTERIS.—*Fronds binate, generally ample, each portion repeatedly dichotomously flabelliform; costæ prominent, dichotomous, two branches running parallel in the long broad segments (one in P. Lobbianum). Venation prominent, very copiously and compoundly anastomosing with areoles often four-sided. Sori small, compital, very copious, often arranged in series. Species mostly tropical Indian or Pacific.*—*Gen. Dipteris, Reinw., Moore.* Sp. 399-401.

399. *P. (Dipteris) Wallichii*, Br.; caudex creeping clothed with appressed copious black hard subulato-setaceous scales wrinkled at the back, stipites 1-2 and more feet long smooth and polished, fronds coriaceous 1-2½ feet long and much wider than long dark-green above pale-yellowish ferruginous beneath, flabelliform bipartite into two nearly equal broad-cuneate portions which are palmately and dichotomously divided, ultimate segments 6-8-10 inches long 1½-2 inches wide oblong acuminate, costæ from the summit of the stipes dichotomously branched through the disk of the frond, a single pair runs through each terminal segment connivent at the apices, venation manifest prominent beneath, all the costæ are united by transverse flexuose costules, these by a longitudinal flexuose vein through the middle into two nearly equal series of costular areoles then again into lesser ones all subquadrangular, sori small superficial copious scattered in the areoles but generally in series more or less perfect and accompanied by a resinous or gummy substance.—*Br. in Hook. and Grev. Ic. Fil. t. 168-9. Wall. Cat. n. 287. Mctten. Polypod. p. 119. Drynaria, J. Sm. Dipteris, Moore, Ind. Fil. p. 341. Polyp. macrocheiros, Wall. Herb.*

Hab. India: Pundoa mountains, *Wallich*; Assam, Khasya, Boutan, *Griffith, Hooker fil. and Thomson, Thos. Lobb*.—A remarkable and noble species, named after the most distinguished and liberal of Indian botanists.

400. *P. (Dipteris) Horsfieldii*, Br.; caudex creeping rather stout clothed with rigid black appressed subulate scales wrinkled at the back, stipites 1-2 feet and more long, fronds coriaceous 1-2-3 feet long and much wider than long flabelliform dark-green above very glaucous beneath bipartite the two portions palmately and dichotomously divided (as in the preceding species) but the ultimate segments are more acu-

minated and very strongly serrated, costæ costules and venation also nearly as in the preceding species but the sori are more numerous lax and irregular yet generally forming transverse lines or series following the direction of the transverse veins, the capsules never held together by particles of gum-resin.—*Br. in Wall. Cat. n. 286. Horsf. Fl. Jav. i. t. 1. Drynaria, J. Sm., Brack. Fil. U. S. Expl. Exped. p. 46. Polyp. conjugatum, Kfs. "Wesen der Farrnkr. p. 104, 106." Kze. Annal. Pteridogr. p. 16. t. 10. Metten. Polypod. p. 119. Dipteris, Reinw. Fée, Gen. Fil. p. 274 (excl. syn. Hook. and Grev.). Polypod. Dipteris, Bl. Fil. Jav. p. 174. t. 81.*

Hab. Malay and Pacific Islands: Penang, *Wallich, Norris*; Java, *Blume, Zollinger, De Vriese and Teijsmann, n. 31, Thos. Lobb*; Luzon, *Cuming, n. 155*; Singapore, *G. Thomson*; Borneo, *Thos. Lobb, Barber, Lowe, Wallace*; Pacific islands, Fiji, *Brackenridge, Milne, Seemann, n. 734* (stipes stout, 5 feet long), *Harvey*; Ovalau, *Milne, Brackenridge* (alt. 2000 feet); Aneiteum, *Milne and McGillivray, C. Moore*.—There is great similarity in very many points between this and the preceding species; but the differences above mentioned are very constant, add to which *P. Wallichii* is quite peculiar (as far as we yet know) to the continent of India, as *P. Horsfieldii* is to the Malayan and Pacific islands. Young fronds of this bear a great resemblance to the foliage of *Jeffersonia diphylla* of N. America.

401. *P. (Dipteris) Lobbianum, Hook.*; caudex? (probably creeping), stipites 1 foot and more long, fronds coriaceous 8–10–12 inches long flabelliform glabrous 3–4 times digitately dichotomous dark-brownish green above pale and tawny beneath, segments 4–8 inches long scarcely  $\frac{1}{2}$  an inch wide linear-sublanceolate finely acuminate costate entire, venation manifest, the costules form a costal series of large soriferous areoles, the rest of the veins unite constituting lesser areoles and include free veinlets, sori 1–2 in each primary areole (sometimes confluent) in a single series very near the costa.—*Hook. in Kew Gard. Misc. v. p. 300. t. 11. Metten. Polyp. p. 104. Dipteris, Moore.*

Hab. Malacca, Mount Ophir and Sarawak, Borneo, *Thos. Lobb*.—A very rare and elegant species, and though so extremely different, yet naturally allied to *P. Wallichii* and *P. Horsfieldii*.

§ 13. DICTYOPTERIS.—*A not very satisfactory section, especially as defined by Presl, who makes it to include the simple-fronded Polypod. attenuatum, Br. (§ Phymatodes, nobis), and a more natural group with subdecompound frond, and with the habit of Sagenia or Euaspidium among Aspidiæ, but to which is attributed as essential the having areoles destitute of free included veinlets, which is by no means a constant character.—Gen. Dictyopteris, Pr. Tent. Pterid. t. 8. f. 7. Sp. 402–409.*

402. *P. (Dictyopteris) Barberi, Hook.*; caudex rather stout

suberect or ascending copiously rooting partially paleaceous with dark-brown subulate scales, stipites 6–12 inches long fasciculate, fronds when young 4–6 inches long simple palmately 5-lobed with the lobes acute, lowest pair of lobes deflexed or (when mature) 1–1½ foot long subcoriaceous minutely pellucido-punctulate olive-brown when dry approaching to glaucous broad ovate ternate or pinnate, pinnæ distant petiolate especially the lower ones 5–6 inches long, lateral intermediate ones from a broad unequally cuneate base oblongo-acuminate entire or sinuato-sublobate, lowest ones always the largest and always unequally bipartite, the inferior segment deflexed sometimes as large as the upper ones and the latter are sometimes pinnatifid, terminal pinnæ very large long petioled acuminate deeply pinnatifid the lowest segments very long, venation manifest, the costules send out veins which are united or confluent into variously-formed areoles including numerous free straight veinlets, sori copious dorsal or terminal on a vein or veinlet.

Hab. Malay islands: Pulo-Penang, *Wallich* (marked "*P. confluens*, Wall.;" Tavoy, *n.* 379, *Wallich* (marked *Aspidium variolosum*, Wall.); Borneo, *Barber*, *n.* 276; Indian Archipelago.—These, from the several localities just mentioned, are unquestionably one and the same species, and were they involucrate I should be content to refer them to some of the forms of Dr. Wallich's *Aspid. variolosum*; but such is not the case: and I can hardly think they could pass into *P. irregulare*, though that is its nearest affinity among the "*nudisori*." To the late Mr. Barber, after whom I have named this species, if it be really such, I am indebted for a very rich collection of Bornean plants.

403. *P.* (*Dictyopteris*) *irregulare*, Pr.; caudex stout ascending, stipites tufted 4 inches to 1½ foot in length black setaceo-paleaceous at the base, fronds subcoriaceous-membranaceous minutely pellucido-punctulate glabrous often subglaucous beneath, pinnate with very numerous pinnæ from 6 inches to a foot long 1–3 inches wide more or less petiolate broad-oblong acuminate the lowest pair half-ovate unequally bipartite, lowest segments deflexed and sometimes free and 5–6 inches long all of them more or less deeply lobed often to within one-third of the costa, the lobes oblong acute or acuminate entire or sinuato-lobate, terminal pinna petiolate pinnatifid, costule one to each lobe, the veins anastomose copiously forming elongated areoles which are longest near the costæ and costules, areoles frequently including a free veinlet, sori dorsal or compital or even terminal on the free veins copious but rarely approaching the costa.—*Pr. Reliq. Hænk.* i. p. 25. t. 4. f. 3. *Bl. Fil. Jav.* p. 164. t. 72 (*very good*).

Dictyopteris, *Pr. Tent. Pterid.* p. 194. t. 8. f. 7. Moore. Polyp. difforine, *Bl. Fil. Jav.* 135. Aspidium, *Bl. En. Fil. Jav.* p. 160. Dictyopteris, Moore, *Ind. Fil.* p. 90. Phegopteris, *Metten. Fil. Hort. Lips.* p. 84. t. 85. f. 29. Pheg. macrodonta, *Metten. Phegopt.* p. 31. Dictyopteris, *Pr. Tent. Pterid.* p. 194. Fée, *Gen. Fil.* p. 267. t. 31 A. f. 2. Polyp. confluens, *Wall. Cat.* n. 325. Polyp. eximium, *Kze. in Bot. Zeit.* iv. p. 424.

Hab. Abundant in the Malay islands: Borneo, *De Vriese*, n. 67, *Thos. Lobb, Motley*; Luzon, *Cuming*, n. 114 (not n. 9); Malacca, *Wallich*, n. 325, and n. 379 (marked *Aspid. variolosum*), *Griffith* (6-7 feet long); Moulmein, *Parish*, n. 119; Fiji islands, *Harvey, Seemann*, n. 746.—The present and following species are among *Polypodia* what *Sagenia* and *Euaspidium* are among *Aspidia*, and no dependence can be placed on the presence or absence of free veinlets.

404. *P. (Dictyopteris) petrophyum*, Bl.; "fronds bipinnatifid (rather pinnate the pinnæ pinnatifid) membranaceous subglabrous, pinnæ sessile a foot long oblongo-lanceolate acuminate pinnatifid, segments subfalcato-oblong obtuse entire, those of the lowest pinnæ elongated rather acute coarsely crenate" (not so represented), "stipes and rachis channelled above and subpubescent." *Bl. Fil. Jav.* p. 103. t. 71. *Metten. Aspid.* p. 32. Dictyopteris, Moore, *Ind. Fil.* p. 318. Aspidium saxicola, *Bl. En. Fil. Jav.* p. 160.

Hab. Java, *Blume*.—I have seen no authentic perfect specimen of this; but probably it will prove to be one of the many varieties of *P. irregulare*. Blume himself says of this, "A *P. irregulari* satis superque distinguitur laciniis magis elongatis sororumque dispositione." Mettenius places it in a section, "Maculæ appendiculatæ," and *P. irregulare* in one "Maculæ inappendiculatæ."

405. *P. (Dictyopteris) megalocarpum*, Hook.; caudex?, stipes (upper portion only) and rachis dark ebeneous brown pubescent, frond ample 2 feet and probably more long 1 foot and more wide coriaceous-membranaceous opaque paler and glabrous beneath above villosulous with minute scattered pale paleaceous hairs pinnated pinnatifid at the apex, pinnæ subopposite 4-9 inches long 1½-3 inches wide subfalcate from a broad truncated sessile base broad-oblong shortly acuminate and all uniformly deeply pinnatifid to about three-fourths of the way to the costa, segments oblong obtuse quite entire sinuous obtuse, veinlets reticulated with rather small areoles (no free included veinlets), costular areoles the largest, most of the veinlets in the segments free, sori universal on all the pinnæ very large compital regularly arranged one or at most two series on the disk parallel with

the costa and a double series on every segment occupying nearly the whole space between the costule and the margin.

Hab. Java, *Thos. Lobb*.—A most distinct species of this *Sagenioid* group of *Polypodium*, with unusually large sori and arranged with great regularity.

406. *P.* (*Dictyopteris*) *Brongniartii*, Bory; caudex “subarboreous,” stipes?, frond “3-5 feet long at least” broad oblongo-ovate acuminate firm-membranaceous glabrous pinnate bipinnate below, deeply pinnatifid at the apex, primary pinnæ short petioled 6-14 inches long  $\frac{3}{4}$ -3 $\frac{1}{2}$  inches wide from a broad base oblong much acuminate distant, upper ones more lanceolate and lobato-pinnatifid the rest deeply almost to the rachis pinnatifid, segments 1 $\frac{1}{2}$ -2 inches long  $\frac{3}{4}$ -1 $\frac{1}{2}$  inch wide from a broad base gradually acuminate entire or crenato-lobate, lowest pair (or more?) pinnate with distant pinnæ 2-3 inches long lanceolate, veins or costules straight, veinlets nearly equally reticulated having here and there free included veinlets, costular areoles included always elongated, sori quite marginal.—*Bory, in Du Perry, Voy. p. 263. t. 34. P. pteroides, Pr. Reliq. Hænk. p. 25. t. 5. f. 4 (not Kl.). Dictyopteris, J. Sm. Fée, Gen. Fil. p. 267. t. 21. A. f. 1.*

Hab. Indian Archipelago: Sorzogon, *Hænke*; Waigiou, *D'Urville*; Luzon, *Cuming, n. 171*.—More compound than *P. irregulare*, with more elongated segments, and remarkable for the constantly marginal sori.

407. *P.* (*Dictyopteris*) *Cumingianum*, Hook.; caudex?, stipes?, frond 2 feet and probably more long broad ovate acuminate more or less firmly membranaceous glabrous bipinnate below, pinnate above the middle, pinnatifid at the apex, pinnæ short petiolate distant primary simple ones 6-8 inches long 1-2 inches and more broad oblong-acuminate deeply sometimes nearly to the costa pinnatifid, segments  $\frac{1}{2}$ -1 $\frac{1}{2}$  inch long oblong acuminate subfalcate entire or lobed at the margin (lowest ones sometimes free), lowest primary pinnated pinnæ nearly a foot long from a very broad base triangulari-oblong, pinnules 3-4-5 inches long  $\frac{1}{2}$ - $\frac{3}{4}$  inch wide lanceolate acuminate lobato-pinnatifid, veinlets mostly reticulated with large angular areoles (no free included veinlets as far as I can find) costal ones the largest generally free at the apex of the segments, sori dorsal or usually compital irregularly scattered chiefly on the segments, the disk (parallel with the costæ) without sori.—*Dictyopteris Cumingiana, Pr. Obs. in Epimel. Bot. p. 61 (without character). Dictyopteris macrodonta, J. Sm. in Hook. Journ. Bot. iii. p. 306 (as regards*

*Cuming's n. 9*). *Sagenia varia*, *Brack. Fil. U. S. Expl. Exped.* p. 183?, *vix Presl*.

Hab. Luzon, *Cuming, n. 9*. Samoan Islands, *Milne, n. 530, Brackenridge?* Fiji Islands, *Cairns?* (segments of the pinnæ deep, the margins lobed).—This is, I think, quite distinct from *P. irregulare*, with which Mr. Smith seems to have confounded it.

408. P. (Dictyopteris) *Cameroonianum*, Hook.; caudex?, stipites stout 4 feet long dark-brown rather glossy, fronds ample probably 3–4 feet and more long and  $2\frac{1}{2}$ –3 feet wide (judging by the spread of the lowest pair of pinnæ) firm-membranaceous dark blackish-green, pinnate below (or subbipinnate but the pinnules united by a wing) deeply pinnatifid above, primary pinnæ very large distant lowest pair 17 inches long 9–10 inches wide petiolate upper ones sessile all of them like the upper portion of the frond deeply pinnatifid with rather remote segments from 2–4 inches long  $\frac{1}{2}$ – $1\frac{1}{2}$  inch broad spreading finely and gradually acuminate all more or less lobato-pinnatifid (except at the acuminate apices), lobes subtriangular ovate entire, venation manifest, costæ and costules pale-green the latter distinct corresponding to the marginal lobes, the intermediate veins form an irregular network of rather large areoles (costal ones always present) with or without a free included veinlet, sori rather small at first appearing irregularly scattered but they do form a distant double series one on each side the costa and (though less perfectly) 3–4 other series parallel with the costa.

Hab. Cameroon Mountains, W. trop. Africa, alt. 3000 feet, *G. Mann, n. 1362*.—Could I find the trace of an involucre on this Fern I should have been disposed to refer it to some of the forms of *Sagenia* or *Euaspidium* among *Aspidiæ*. Among the *Nudisori*, however, its place is clearly with the *Dictyopteris* section of *Polypodium*, with no described species of which does it accord.

409. P. (Dictyopteris) *tenerifrons*, Hook.; caudex small creeping underground scaleless with very few radicles, stipites few remote slender glossy stramineous, the base very tomentose with a few sparse scales partly subterraneous attached to the caudex by a small point, fronds thin membranaceous pale-green glabrous subpuberulous on the veins 6–9 inches long quite as broad as long cordato-deltoid subternate or pinnated with 3–9 subfalcate pinnæ, lateral ones nearly opposite petiolate lowest pair half-ovate acuminate 4–6 inches long lobato-pinnatifid those of the superior margin with broad ovate nearly equal subdenticulate blunt lobes, the inferior ones much elongated and acuminate the basal ones again lobato-



pinnatifid, intermediate pinnæ ovato-lanceolate pinnatifid, terminal pinna long petiolate broad-ovate acuminate deeply pinnatifid especially at the base, veinlets uniformly reticulated, areoles with no included free veinlets, costular areoles large, sori rather irregularly scattered dorsal or compital.

Hab. Moulmeine, among limestone rocks, *Rev. C. S. P. Parish*, n. 92. Gaboon River, W. trop. Africa, Luzon, *Gustav Mann*.—This delicate and very membranaceous Fern was brought under my notice by my valued correspondent Mr. Parish, as resembling small specimens of *Aspidium coadunatum* (*A. cicutarium*, nob.); yet it is very different in its caudex, in the texture of the frond, in the venation, and in the entire absence of involucre in all our many specimens. Our African plant from the Gaboon is identical with the Indian one. My *Polyp. (Dictyopteris) membranaceum*, published in Blakiston's 'Five Months on the Yang-tsze,' proves on further investigation to be an Aspidioid Fern, of which I here give the character in a footnote.\*

### SUBORD. X.—GRAMMITIDÆ.

*Sori* more or less oblong or linear, *destitute of Involucre*.—Grammitaceæ, *Pr.* (including *Tænitidæ*, *Pr.*), distinguished by the generally very elongated narrow naked sori, simple or branched or variously anastomosing, arising from the veins or extending to the parenchyme.—The genera here adopted are, *Jamesonia*, *Nothochlæna*, *Monogramme*, *Gymnogramme* (including *Grammitis*), *Brainea*, *Meniscium*, *Antrophyum*, *Vitaria*, *Tænitis*, *Drymoglossum*, *Hemionitis*. Gen. 1–11.

#### 1. JAMESONIA, *Hook. and Grev.*

(HOOK. AND GREV. IN IC. FIL. TAB. 178. HOOK. GEN. FIL. TAB. XIII. *Kunze*, in part. *Pteris*, *Cav.*, *Sw.*, *Willd.* *Cheilanthes*, *Desv.* *Allosorus*, *Pr.* *Gymnogramme*, *Kl.*)

*Sori* oblong arising from the disk of the pinnæ, on the fla-

\* At p. 46 of this volume, after *Aspidium (Euaspidium) calcareum*, n. 57, should be inserted:—

57 bis. *Aspidium (Euaspidium) membranaceum*, *Hook.*; caudex short rather stout or ascending or subrepand crowned at the apex with a conical mass of black linear-subulate glossy scales, stipites subfasciated a span long slender palaceous only at the base with the same scales as are upon the caudex, frond about as long as the stipes membranaceous dark blackish-green puberulous especially beneath deltoideo- or cordato-ovate acuminate bipinnate in the middle, subbipinnatifid at the apex, at the base tripinnate, primary pinnæ 5–7-petiolate inferior ones 4 inches long semiovate the lower half being the broadest subfalcate, their secondary pinnæ sessile lanceolate deeply pinnatifid, the segments oblong entire or crenate, intermediate primary ones ovato-lanceolate deeply pinnatifid with segments like those just described, the lowest segments sometimes five, the large

bellate veins distant from the margin at length confluent, mixed with a dense mass of aureo-nitent or ferruginous long fine woolly hairs; similar hairs in a young state clothe the whole of the young fronds and the still undeveloped apex of the older ones. *Involucre* none, but the margins of the pinnæ are singularly reflexed and more or less membranous at the edge which thus becomes involucriform, nearly plane in age.—Fern of Peru, the Andes, Ecuador, and New Granada, growing, according to Jameson, in marshy places among Sphagnum, and at elevations of from 8–14,000 feet. Caudex creeping, tortuous, very much branched, black, with black wiry roots. Stipites black, flexuose, glabrous, short or elongated. Fronds linear, simply pinnate, varying exceedingly in length from 6 inches to 2 feet. Pinnæ very crowded.

Fée and Mettenius dwell much on the "indefinite evolution" of the frond. It certainly does appear of slow growth, for in the majority of specimens we find the apex scorpioid (unexpanded) and densely clothed with silky wool which gradually falls off in age. Moore observes truly that it is a well-marked genus respecting the majority of the species referred to it. I am compelled, however, to remove from it the compound-fronded species, *J. hispidula*, Kze., which is *Gymnogramme Caracasana*, Kl., *J. paleacea*, Kze., which is *Polypodium (Phegopteris) pycnolepis*, and *J. bipinnata*, Fée, which is *Gymnogramme elongata*, Hook. and Grev. *J. adnata*, Kze., is properly referred to *Polypod. (Phegopteris) moniliforme*, Cav., and I fear the other supposed species of authors must merge into the original *J. imbricata*, Hook. and Grev.

1. *J. imbricata*, Hook. and Grev.—*a*, *gracilis*; slender, frond narrow linear, stipes usually short filiform. Hook. Ic. Fil. 178 (*J. pulchella* on the plate and in the text, but corrected in the Addendum).—*Pteris imbricata*, Cav. (*vide Sw.*) Sw. Syn. Fil. p. 102. Willd. Sp. Pl. v. p. 364. Cheilanthes, Desv. Allosorus, Pr. Pt. orbiculata, Lam. Jamesonia scalaris, Kze. in Bot. Zeit. 1844. p. 738, and in Schk. Fil. i. p. 167. t. 71. f. 1.—Var.  $\beta$ , *canescens*; very densely and most beautifully sericeo-lanose, the hair often of a rich purple-yellow colour concealing the pinnæ. *J. canescens*, Kze. in Schk. Fil. Suppl. ii. p. 81. t. 133. f. 2. *Gymnogramme*, Kl. *J. rotundifolia*, Fée, 7me Mém. Foug. Nouv. p. 41. t. 10. f. 3. *J. nivea*, *J. robusta*, and *J. Bogotensis*, Krst. Fl. Columbiae, ii.

pinnatifid apex is petiolate, veinlets uniform, reticulated areoles with no free veinlets, costal areoles the largest, sori with a small peltate (?) involucre (very sparse on my only two specimens) compital small.—*Polypodium (Dietyopteris) membranaceum*, Hook. in Blakiston, 'Five Months on the Yang-tsze,' App. p. 365.

Hab. Philippine Islands, Cuming (numbered inaccurately). Province of Szechuan, W. China, Col. Sarel.—The scales of the caudex and base of the stipes are peculiar, and the fronds are different from any other of the Aspidioid group.

*p.* 29. *t.* 115.—Var.  $\gamma$ , *cinnamomea*; stipites 3–6 inches long thick as a pigeon's quill, frond broader, pinnæ very concave subsecund glossy. *J. cinnamomea*, *Kze. in Schk. Fil. f.* 1. *p.* 169. *t.* 71. *f.* 2 (*very good*). *Hook. Ic. Pl. t.* 713.—Var.  $\delta$ , *verticalis*; stipites stout thick as a pigeon's quill 12–15 inches long, fronds short in proportion 6–10 inches long, pinnæ large vertical horizontally patent broad ovate from the greater recurvature of the margin at the sides scarcely villous (probably from age). *J. verticalis*, *Kze. in Schk. Fil. Suppl. p.* 194. *t.* 82. *f.* 1.

Hab.  $\alpha$ , Andes of Ecuador, *Jameson*, frequent, *n.* 25, 327, 768 (alt. 14,000 feet). N. Granada, *Schlim*, *n.* 479 and 364, *Moritz*, *n.* 338 (*J. scalaris*, *Kze., Kl.*), *Linden*, *n.* 519 (common form, together with specimens with all the leaves vertical; one of them has the frond 22 inches long with distant patent leaves) and 525. Peru, *Mathews*, *n.* 979, *Lechter*, *n.* 2153, 2036, and 2032 ("*J. scalaris*," very slender and small), *Purdie*. The above present the ordinary form of the plant as represented in the figures quoted.—Var.  $\beta$ , *canescens*; Ecuador, *Jameson*, *n.* 60, *Spruce*. New Granada, *Moritz*, *n.* 339, *Schlim*, 850 (one specimen forked near the base), 844, 363 ("*J. rotundifolia*," evidently old specimens of this variety partially bald), *Holton*, *n.* 25. Many of the specimens of this variety are exquisitely beautiful, from the rich clothing of silky hairs quite concealing the pinnæ, and some are so erect and cylindrical and hairy as to resemble in miniature some of the *Cactuses* of the group of *Cereus senilis*.—Var.  $\gamma$ , *cinnamomea*. This has only been found by *Jameson*, volcano of Pasto, 14,000 feet, *n.* 12, and by *Hartweg*, *n.* 1516. I can only consider it a gigantic form of *J. imbricata*.—Var.  $\delta$ , *verticalis*. This has only been found by *Hartweg*, Andes of Popayan, Peru, *n.* 1848 and 1504.

## 2. NOTHOCHLÆNA, Br.

(HOOK. GEN. FIL. TAB. LXXVI. *Cincinalis*, *Desv.*  
*Cheilanthes* and *Gymnogramme*, *Metten., in part.*)

*Sori* marginal, oblong or sublinear, or, if short and subrotund, situated at the apex of the simple or forked veins and confluent into a continuous or interrupted marginal line or sorus. No distinct *involucre*, but the edge of the frond is sometimes a little reflexed and subindusoid.—*Usually small, more or less compound Ferns, often hairy or woolly or ceruceous beneath, with habit and sori of Cheilanthes, so that the limits of the two genera are not easily defined. Some species border too closely on Gymnogramme.*

\* *Fronds pinnate.* Sp. 1–6.

1. *N. sinuata*, *Klfs.*; caudex creeping and clothed with subulate ferruginous scales and bearing bulbiform knobs as large as hazel-nuts similarly paleaceous and from which the

new fronds seem to emerge, stipites clustered red-brown 2-4 inches long at first (as well as the stout rachis) clothed with ferruginous wool mixed with a few membranaceous scales, fronds a span to 2 feet long  $\frac{3}{4}$  of an inch to  $2\frac{1}{2}$  inches broad coriaceous elongato-oblong pinnated, pinnæ numerous petiolate  $\frac{1}{2}$  an inch to more than 1 inch long ovate lobato-pinnatifid naked and generally bright-green above, beneath clothed with ferruginous or whitish paleaceous scales, the margin a little inflexed, sorus forming a broad continuous band at the margin and following the course of the sinuses.—*Kaulf. En. Fil. p. 135. Kze. in Schk. Fil. p. 95. t. 45 (excellent). Acrostichum, Sw. Syn. Fil. p. 14. Willd. Sp. Pl. v. p. 120. Gymnogramme, Pr. Nothochl. lævis, Mart. and Gal. Fil. Mex. p. 46.*—Var.  $\beta$ , *integerrima*; pinnæ smaller, entire or nearly so.—Var.  $\gamma$ , *bipinnata*; frond bipinnate, pinnules ovate lobed sessile. *N. sinuata, Brack. Fil. U. S. Expl. Exp. p. 21.*

Hab. Mexico, from east to west, apparently abundant, *Andrieux, n. 33, Martens and Galeotti, n. 6350, Schaffner, Liebmann, Linden, n. 1544, Jurgensen, n. 677. Sierra Madre, N.W. Mexico, Seemann, n. 1935. Western Texas and El Paso, C. Wright, n. 614 and 815. Caracas, Linden, n. 511. Ecuador, valley of the Andes, alt. 7000 feet, Jameson, n. 6. Tucuman, on earthen walls, Tweedie.*—Var.  $\beta$ , Mexico, *Liebmann, in Herb. nostr., Dr. J. Gregg*; Sierra Madre, N.W. Mexico, *Seemann, n. 1928.*—Var.  $\gamma$ , Baños, Andes of Peru, *Brackenridge, in Herb. nostr.*—Our var.  $\beta$  is a very remarkable and elegant form, with pinnæ in shape much resembling those of *Asplenium Trichomanes*. The upper sides of the pinnæ are hoary with greyish down.

2. *N. ferruginea, Hook.*; caudex creeping sending down long fibrous roots and having on the upper side bulbiform scaly buds which are frondiferous, stipites clustered 2-4 inches long rigid tomentose at length naked and black, fronds 6-8 or 10 inches long erect firm-coriaceous lanceolate pinnate, pinnæ horizontal sessile  $\frac{1}{2}$  an inch or a little more long oblong obtuse dentato-pinnatifid villous above densely ferrugineo- or albo-pilose, segments or teeth 6-8 on each side short uniform, the margins more or less revolute and subinvolute, sori very black. *Hook. 2d Cent. of Ferns, t. 52. Cheilanthes, Willd. in Kaulf. En. Fil. p. 209. Metten. Cheilanthes, p. 23. Nothochlæna rufa, Pr. Rel. Henk. i. p. 19. Liebm. Fil. Mex. p. 62. N. tomentosa, Desv. Journ. Bot. iii. p. 92. N. trichomanoides, Mart. and Gal. Fil. Mex. p. 45 (not Br.).*

Hab. S. America ("Vahl, Herb."): Peru, *Mathews*; Ecuador, *Jameson, n. 67, 47, and 7, Spruce, n. 5325, Poeppig*; Columbia, *Moritz, n. 250*; Santa Martha, *Purdie, Linden, n. 514*; Guatemala and Mexico, *Galeotti, n. 3465, alt. 3-5000*

feet; New Mexico, *Eaton*. Jamaica, St. Andrew's parish and elsewhere, frequent, alt. 3-4000 feet, *Wilson, Hartweg, n. 1516, March, and others*.—This has been confounded with the rufous variety of *N. trichomanoides*, from which it is very distinct.

3. *N. affinis*, Hook.; "caudex creeping clothed with blackish lanceolato-subulate ciliated scales, stipites 1-2 inches long brown upwards setose with slender scales and sprinkled with a cereaceous substance, fronds subcoriaceous, above laxly beneath thickly covered with a white powdery substance 3 inches long elongato-lanceolate pinnated, pinnæ alternate laxly placed obliquely patent shortly petiolate 3-4 lines long ovato-oblong obtuse pinnatipartite, the lowest ones abbreviated, segments 3-4 on each side coadunate ovate or oblong obtuse entire, sori of few capsules black forming an intramarginal line sunk in the cereaceous mass." *Metten*.—*Cheilanthes*, *Metten. Cheil. p. 20*. *Nothochlæna pulveracea*, *Kl. Linnaea, xx. p. 417, excl. syn.*

Hab. "Mexico" (*Aschenborn*).—Unknown to me.

4. *N. trichomanoides*, Br.; caudex short stout creeping often studded with bulbiform processes and all clothed with subulate black glossy appressed scales, stipites 2-4 inches long rather stout purple-black and as well as the rachis more or less villous and pubescent, fronds 6-12 inches long  $\frac{1}{2}$ -1 inch or  $1\frac{1}{4}$  inch broad coriaceous pinnated dark-green above and glabrous beneath pure white with cereaceous powder and clothed with deciduous stellated tomentum, pinnæ numerous horizontal sessile or nearly so, from a broad cordate or truncated base ovato-oblong obtuse subentire or lobato-sinuate the largest lobes at the base constitute obtuse rounded auricles, sori forming a narrow continuous border just within the edge.—*Br. Prodr. p. 145 (in obs.)*. *Klfs. En. Fil. p. 133*. *Pteris*, *Linn. Sp. Pl. p. 1532*. *Sw. Syn. Fil. p. 102*. *Schk. Fil. p. 91. t. 99*. *Cincinalis*, *Desv. Cheilanthes, Metten. Cheil. p. 18*.—*Plum. Fil. t. 75*.

Hab. Jamaica, common, and for a long time supposed to be peculiar to that island. Cuba, *C. Wright, n. 776 and 1048*.—The under side of this Fern appears in Herbaria under two very different colours, pure white and rusty colour; the first is due to a pulverulent cereaceous substance attached to the cuticle; the latter to ferruginous down mixed with soft slender scales which, being deciduous, the white powder is brought into view.

5. *N. hypoleuca*, Kze.; caudex creeping clothed with dark-brown glossy palcaceous subulate piliferous scales often also

bearing small frondiferous bulbs, stipites tufted slender ebeneous purple pubescent as well as the rachis eventually glabrous and glossy, fronds 2–5 inches in length oblong subcoriaceous downy above when young in maturity glabrous green, beneath densely albo- or ferrugineo-tomentose pinnated, the apex pinnatifid, pinnæ  $\frac{1}{2}$ – $\frac{3}{4}$  of an inch long ovato-oblong deeply more than halfway to the costa pinnatifid, segments oblong obtuse, sori forming a continuous line along the margin and sinuses.—Kze. in *Linnaea*, ix. p. 54, and in *Schk. Fil. Suppl.* p. 114. t. 53. f. 1. Gay, *Fl. Chil.* vi. p. 459. Cheilanthes, *Metten. Cheil.* p. 22.

Hab. Chili, *Pæppig, and all travellers, Cuming*, n. 200; Sierra de Portezuela, southern extremity of the Cordova range, and Tucuman, on earthen walls, *Tweedie*.—A peculiar and well-marked species.

6. *N. Rawsoni*, Pappe; caudex long creeping paleaceous with membranaceous rigid subulate scales black in the centre, stipites approximate at length naked and ebeneous, fronds a span long linear carnosio-coriaceous pinnated, pinnæ alternate rather distant 4–5 lines long sessile cordato-ovate obtuse lobato-pinnatifid naked above and green beneath very thickly albo- or ferrugineo-pannose with matted hairs, the margins subincrassated very patent, lobes 5–9 rounded obtuse, sori marginal continuous, capsules black.—*Pappe, in Pappe and Rawson's Synops. Fil. Afr. Austr.* p. 42. *Hook. 2d Cent. of Ferns*, t. 77.

Hab. S. Africa: hills between Spelhlakel and Komaggas, Namaqua-Land, *Rev. H. Whitehead*, 1856.—Allied to *N. ferruginea*, *N. sinuata*, and *N. trichomanoides*, of tropical America, but unquestionably distinct. The caudex is always destitute of bulbs and the pinnæ are very different in shape. I am indebted to Rawson Wm. Rawson, Esq., C.B., Colonial Secretary at the Cape, and to Rear-Admiral Sir Frederick Grey, K.C.B., for fine specimens.

\*\* *Bipinnate, or more or less decomposed.* Sp. 7–27.

7. *N. candida*, Hook.; caudex creeping or ascending paleaceous with black glossy subulate scales ferruginous at the margin, stipites clustered 2–5 inches long ebony-black, fronds 1–3 $\frac{1}{2}$  inches long  $\frac{1}{2}$ –2 $\frac{1}{2}$  inches wide subdeltoideo-ovate acuminate bi-tripinnate naked above beneath densely albo-pulverulent, primary pinnæ opposite horizontally patent lowest pair more distant than the rest unequally deltoideo-ovate, the inferior secondary pinnæ of the under side elongate and again pinnated the rest pinnate or deeply pinnatifid, pinnules and segments 2–3 lines long oblong obtuse, the margin en-

tire slightly reflexed, sori formed of black capsules immersed in the pulverulent substance and forming a single series or line close to the margin.—*Hook. Sp. Fil. supra*, ii. p. 116 (*name*). *Cheilanthes*, *Mart. and Gal. Fil. Mex.* p. 73. t. 20. f. 1. *b* (*only, and that very bad*). *Metten. Cheil.* p. 20. Ch. monosticha, *Metten. l. c.* *Ceropteris*, *Fée, 7me Mém.* p. 44. t. 22. f. 2 (*excellent*). *N. argentea*, *Lowe, Ferns*, i. t. 55. *N. cretacea*, *Liebm. Fil. Mex.* p. 64 (*and in Herb. nostr., small form*).—*Var. lutea*. *Pteris lutea*, *Car. Dem.* p. 267? *Sw.? Willd.?*—*Var. aurea*. *Pteris aurantiacea*, *Car. Dem.* p. 266? *Sw.? and Willd.?*—*Var. 5-fido-palmata*; fronds less compound ternate, primary lateral divisions unequally bifid deeply pinnatifid as well as the terminal division, segments lanceolate crenate or entire. Probably a distinct species.

Hab. Mexico, *Galeotti*, n. 6412, *Liebmann, Schaffner*; New Mexico, *C. Wright*, n. 820; Galapagos, *Scouler, Cuning*, n. 110.—*Var. lutea*. Peru: Huanaeo (powder beneath pale-yellow), *Mathevs*, n. 981. Chilian Andes, *Gillies*.—*Var. aurea*. Peru, *Ruiz and Pavon*; hot valleys of Eueador, *Seemann*, n. 946.—*Var. 5-fido-palmata*. California, *Dr. J. M. Bigelow*, in *Whipple's Expl.*; New Mexico, *C. Wright*.—I think I am correct in uniting those specimens which have the differently-coloured pulverulent substance beneath; and indeed there are various gradations between the purest white and bright gold-colour. I am most doubtful about the 5-fido-palmate form, for my specimens, though very perfect, yet curl up in drying so much that it is difficult to detect the exact composition of the frond.

8. *N. nivea*, *Desv.*; “caudex ascending, stipites ebeneous-brown glossy, fronds 6–10 inches long subcoriaceous glabrous above, pilose (not in any of my numerous specimens) beneath and there clothed with a white cereaceous pulverulent mass ovate tripinnate below, primary divisions (or pinnæ) opposite distant, secondary ones pinnate or tripartite, tertiary pinnæ short petiolate, lateral ones from a narrowed base cordate, terminal ones from a cuneate base elliptical oblong obtuse entire, secondary veins several times forked soriferous at their apices, sori confluent exhibiting a continuous intramarginal line, the margin (of the pinnules) produced beyond the apices of the veins very narrow scarcely thinner than the rest (*vix attenuatus*).” *Metten.*—*Desv. Journ. Bot.* iii. p. 93. *Kze. in Schk. Fil. Suppl.* p. 43. t. 22. f. 1. *Metten. Fil. Hort. Lips.* p. 46. *Pteris*, *Lam. Cincinalis*, *Desv. Fée, Gen.* p. 160. *Acrostichum*, *Desv. A. albidulum*, *Car. Sw. Sya. Fil.* p. 205. t. 1. f. 2. *Willd. Sp. Pl.* v. p. 125. *Nothochlæna*, *Sturro, Fil. Chil.* p. 16. *Gymnogramme nivea*, *Metten. Cheil.* p. 7 (*in note*). *N. incana*, *Pr. Reliq. Henk.* i. p. 19. t. 1. f. 2.—

Var. *flava*; powdery substance beneath bright yellow. Vix *Gymnogramme flavens*, *Klfs. and Hook. Fil. Exot. t. 47?* An *Acrostichum tereticaule*, *Desv. Journ. Bot. i. p. 274?*

Hab. Tropical America: Peru, *Pæppig, Mathews, n. 755, M·Lean, Lechler, n. 1830*; Ecuador, Huano, *Spruce, n. 5632*; Loxa, Ecuador, *Seemann*. Fée gives Mexico as a locality, *Schaffner*; and Sturm gives Juan Fernandez, on the authority of Bertero, but Bertero's plant is *N. Chilensis*.—What I have here called var. *flava* I cannot distinguish from *N. nivea*, except in colour. I was at first disposed to consider it a small form of *Gymnogramme flavens*, but this, in its sori, is as true a *Nothochlæna* as *N. nivea*. Mettenius, on the genus *Cheilanthes*, refers all of this group of *Nothochlæna* to *Gymnogramme*.

9. *N. tenera*, Gill.; caudex "erect," stipites tufted slender 2–3 inches long capillary and ebeneous-black as well as the rachis and petioles, fronds very membranaceous glabrous glaucous 3–4 inches long 1–2 broad deltoideo-ovate subtripinnate, primary pinnæ (except the superior ones) petiolate distant upon the rachis, secondary ones and the terminal ones generally ternate, pinnules 2–3 lines long elliptical entire sessile, the margin plane or scarcely revolute, costules beaded as it were with little elevations on the under side, sori of rather few sparse black capsules forming a line within the margin.—*Gillies, in Hook. Bot. Mag. t. 3055. Kze. in Schk. Fil. Suppl. p. 44. t. 22. f. 2. Metten. Fil. Hort. Lips. p. 46. Cincinalis, Desv., Fée.*

Hab. Mendoza, eastern foot of the Chilian Andes, and baths of Villavicencia, *Dr. Gillies*. Bolivia, and on earth-walls about Tucuman, *Tweedie*.—The entire absence of the powdery substance on the under side of the fronds, after a long period of cultivation and increase from spores, led to the retention of this as a species distinct from *N. nivea*; but some of my mature specimens from Tweedie, exhibiting clearly traces of the powder, go far towards inducing me to believe that it may not be specifically distinct from that.

10. *N. Chilensis*, Hook.; caudex thick erect crowned with copious subulate ferruginous scales, stipites tufted 2–4 inches long rather stout deep-purple and as well as the rachis ebeneous glossy, fronds 2–3 inches long 1½–2 inches wide subcoriaceous glabrous naked above beneath white-farinose (not very densely so) tripinnate almost to the apex, primary pinnæ (about 7–9)  $\frac{3}{4}$  to nearly 1 inch long very patent deltoideo-ovate, opposite lower ones rather distant on petioles 2 lines long, upper ones sessile approximate, secondary pinnæ sessile oblong ovate horizontal 5–7 opposite approximate, lower ones pinnated upper ones pinnatifid terminal one generally 3-lobed, segments or pinnules oval-oblong about 2 lines long entire or 2-lobed their margins slightly reflexed all soriferous



throughout the entire plant, sori rather prominent forming a brown line all round just within the margin (not sunk in the powdery substance). (TAB. CCLXXXVI. A.)—*Cincinnatiensis*, Fée, in Gay, *Fl. Chil.* p. 497. *Nothochlæna nivea*, Bertero, *mss.*, and Moore (certainly not of Desvaux).

Hab. Juan Fernandez, on rocks in hot situations near El Pangal, Bertero, n. 1549.—No one familiar with *N. nivea*, on seeing this plant, can possibly confound the two. It is indeed a very remarkable species, in ramification between the lax character of *N. nivea*, with its long hair-like petioles, and the less divided and more compact form of *N. candida*; quite distinct from both.

11. *N. dealbata*, Kze.; caudex short thick erect densely paleaceous at the apex with ferruginous subulate scales, stipites 2-4 inches long in my specimens, cæspitose slender dark-purple glossy as well as the capillary rachises, fronds 2-4 inches long deltoideo-ovate tri-quadri-pinnate pure white beneath with a powdery substance deciduous in age, primary pinnæ distant and as well as the secondary ones long petiolate, the petioles (or branches) capillary patent not deflexed or divaricated, pinnules often ternate or quinate oval or obovate scarcely 2 lines long sometimes lobed or subpinnatifid, the margin reflexed, sori brown of few capsules submarginal and linear.—Kze. in *Sillim. Journ.* 1848. p. 82. *Cheilanthes*, *Pl. Amer. Sept.* ii. p. 671 (not Dou). *Nutt. Fl. of N. Am.* ii. p. 253. *Gymnogramme*, *Nutt. in Herb. nostr.* *Nothoch. pulchella*, Kze. in *Mohl. and Schlecht. Bot. Zeit.* i. 1843. p. 633.

Hab. North America: banks of the Missouri, Pursh, Nuttall (in *Herb. nostr.*).—I know of no other locality for this species than that just given, but I am puzzled to find how it is to be satisfactorily distinguished from *N. nivea*.

12. *N. Fendleri*, Kze.; caudex 1-2 inches long as thick as a man's finger ascending densely scaly at the summit with copious ferruginous subulate scales, stipites tufted 1-2 inches long purple-black as are the very zigzag slender capillary rachises, fronds subcoriaceous 2 scarcely 3 inches long broad-deltoid obtuse dark glaucous-green above, beneath pure white and powdery 3-4-pinnate with dichotomous and singularly divaricating fragile capillary black branches (or secondary and tertiary rachises), pinnules scarcely 2 lines long all petiolate except the terminal ones which are frequently ternate and sessile obovate or oval once or twice lobed or entire, the margin a little revolute but scarcely covering the sori, which consist of few dark-brown capsules forming a

subcontinuous line distant from the slightly crenated edge. *Kze. in Schk. Fil. Suppl. p. 87. t. 136 (excellent).*

Hab. New Mexico, *Fendler, n. 1017, a.*—Kunze has well represented this pretty plant, which has no inconsiderable affinity with *N. dealbata*, but the zig-zag rachis and singularly divaricated branches and branchlets with much of the intricate habit of *Cheilanthes dichotoma*, readily distinguish it. The pinnules are not much unlike in general shape those of our alpine Meadow-rue, *Thalictrum alpinum*.

13. *N. fragilis*, Hook. ; caudex ?, stipites 2–4 inches long slender filiform glabrous dark-purple as well as the rachises both of which are fragile, fronds 1–2 inches long membranaceous villous on both sides and at the margin with rather long spreading white hairs deltoideo-bipinnate tripinnate below, primary pinnæ subopposite lowest pair petiolate unequally triangular, their secondary pinnæ subsessile oblong-ovate  $\frac{3}{4}$  of an inch or more long again pinnated, pinnules as well as the superior secondary pinnæ oblong 3–4 lines long deeply pinnatifid with narrow linear inciso-dentate segments which bear short naked interrupted sori of few capsules near the slightly recurved margins. (TAB. CCLXXXVII. A.)

Hab. Fitzmaurice river, N. Australia, rare, *F. Mueller.*—This is a very peculiar species, small and delicate, fragile in the stipes and rachises, with much-divided villose fronds and very sparse short sori scarcely corresponding with any *Polypodium*, and yet the sori are not sufficiently contiguous or confluent to warrant its being decidedly a *Nothochlæna*, neither is there an involucre so developed as to justify its being placed in *Cheilanthes*. Its affinity seems to be with *N. hirsuta*, Desv.

14. *N. distans*, Br. ; caudex scarcely creeping but rather forming a short stout suberect ascending rhizome ferrugineo-paleaceous, stipites tufted 1–3 inches long dark-brown subbeneous and as well as the rachises ferrugineo-paleaceous with lanceolato-subulate erect scales, fronds 3–8–9 inches long scarcely an inch broad subcoriaceous rigid long ferruginously hirsute above, beneath paleaceous with lanceolate long hair-pointed scales especially on the costæ and costules linear-oblong (nearly equal in width for the whole length) obtuse bipinnate, primary pinnæ petiolate  $\frac{1}{2}$ –1 inch long opposite or nearly so erecto-patent deltoideo-ovate those of the lower half of the frond distant all pinnatifid at the apex, pinnules few 2–3 pairs ovato-oblong obtuse lowest ones pinnatifid at the base, the margins recurved and (before maturity) subinvolucriform, sori continuous along the margin.—*Br. Prodr. Fl. Nov. Holl. p. 146. Labill. Sert. Austr.*

*Caled. p. 5. t. 8. Kze. Pl. Preiss. ii. p. 110. Hook. fil. Fl. Nov. Zeal. ii. p. 47. Hook. Ic. Pl. t. 980 (or Cent. of Ferns, t. 80). Cheilanthes, Metten. Cheil. p. 25 (excl. var. profusa?).*

Hab. Australia; probably general throughout the country; Port Jackson, *Brown and others*; Logan River, Bathurst county, *Fraser*; Port Stephens, *King*; Western Australia, *Drummond*; subtropical N. Holland, *J. Stuart, Mitchell*; N. Australia, *Mueller*. New Caledonia, *Labillardière*. Isle of Pines, *Milne*. New Zealand, northern island, *Colenso, J. D. Hooker*.—A species remarkable for its narrow linear-oblong fronds, hairy above, paleaceous beneath, and the uniform ramification.

15. *N. (?) nudiuscula*, Desv.; “fronds pinnated pubescent on both sides, pinnæ pinnatifid, pinnules linear entire lowest ones subincised, involucre extremely narrow (angustissimis).” *Desv. Mém. Soc. Linn. vi. p. 221.*—*Pteris, Br. Prodr. Fl. Nov. Holl. p. 155. Pellæa?*, *Hook. Sp. Fil. supra, v. 2. p. 161.*

Hab. Tropical N. Holland, *Brown*.—Of this little-known plant I possess a solitary named specimen from the late Captain Carmichael, which had been given him by Mr. Brown; but unfortunately it does not entirely tally with the published character: so that I thought it better in an early volume of this publication to place it in the *Pteris*-group, under *Pellæa*, and mention its near affinity with our *Nothochlæna pilosa* (*N. hirsuta*, Desv.). More copious and more varied forms of this latter I have since received, which rather tend to confirm my view of its proximity to the latter species: nevertheless, this *N. hirsuta* I have never seen from any part of Australia, common as it is in other countries. Brown's character accords sufficiently well with the superior portions of the specimen from Carmichael, but the lower portion is clearly tripinnate.

16. *N. glabra*, Brack.; “caudex?, stipes slender 6-10 inches long glabrous glossy dark-brown with a furrow in front, fronds glabrous on both sides 3-6 inches long triangular-ovate bipinnate or even tripinnate, primary and secondary divisions ovato-oblong and obtuse the ultimate divisions or segments 2-3 lines long and 2 lines broad oblong irregularly cut into obtuse lobes or crenatures, capsules in an advanced state projecting beyond the margin of the segments.” *Brack. Fil. U. S. Expl. Exp. p. 21.*

Hab. Fiji islands, *Brackenridge*.—My solitary specimen, for which I am indebted to the author, has no fructification upon it, and its general aspect is very much like that of some forms of *Cheilanthes tenuifolia*.

17. *N. semiglabra*, Kze.; “frond subcoriaceous opaque one-coloured elliptical or oblong obtusely acuminate nearly glabrous above beneath on the costæ and veins pale linear-paleaceous pinnato-pinnatifid or bipinnate, pinnæ remote short-petiolate patent obliquely ovato-oblong obtuse the ultimate ones confluent, pinnules or segments from a cuneate

or excised decurrent base ovate obtuse thinner at the margin which is subreflexed and subrepand, sori broad continuous blackish-brown, stipes short and as well as the primary rachis on both sides and together with the secondary rachis winged purplish beneath rufo-paleaceous, caudex short horizontal fusco-paleaceous." *Kze. in Schk. Fil. Suppl.* ii. p. 59. t. 124. f. 2.—" *Cheilanthes Moluccana*, *Bl. En. Fil. Jav.* p. 136? *Ch. Javanica*, *Kze. Obs. in Fil. Zolling. in Bot. Zeit.* vi. p. 211." *Ch. hispidula*, *Metten. Cheil.* p. 26. t. 3. f. 12, and *Kze. Bot. Zeit.* vi. p. 212. *Mettenius* also quotes *Ch. tenuifolia*, *Kze. Fil. Zoll.* n. 237, and *J. Sm. Fil. Cum.* n. 62.

Hab. Java, *Junghuhn, Zollinger.*—If this be the n. 62 of Cuming, from Luzon, as Mettenius considers it to be, I fear it is merely a trifling var. of *Cheilanthes tenuifolia*: and the figures are not at variance with that well-known plant.

18. *N. hirsuta*, Desv.; caudex short creeping horizontal or ascending clothed with close-placed imbricated subulate ferruginous scales, stipes 2–6 inches long glabrous or hirsute or below paleaceo-hirsute, fronds firm-membranaceous 4–6–8 inches long  $1\frac{1}{2}$ – $2\frac{1}{2}$  inches broad oblong or ovate more or less copiously and variously hirsute often glandular with tawny hairs tripinnate, lowest pair generally distant from the next pair and always tripinnate, the rest pinnate with pinnatifid segments, the segments and pinnules varying much in size from 2–4 lines long and in shape oblong or oval entire or subspathulate often again lobato-pinnatifid at their base, the margin more or less revolute sometimes almost cheilanthoid.—*Desv. Journ. Bot.* iii. p. 93. *Kaulfs. En. Fil.* p. 138. *Brack. Fil. U. S. Expl. Exp.* p. 20. *Cincinalis*, *Desv. Cheilanthes*, *Metten. Cheil.* p. 25. *Pteris*, *Poir. Sw. Syn. Fil.* p. 104. *Willd. Sp. Pl.* v. p. 390. *N. pilosa*, *Hook. and Arn. Bot. of Beech. Voy.* p. 74. *Brack. Fil. U. S. Expl. Exp.* p. 20. *N. sulcata*, *Meyen. in Link, Hort. Berol.* ii. p. 367. *Kze. in Schk. Fil.* i. p. 6. t. 3.

Hab. East Indies, *Sonnerat.* Pacific: Coral Islands, *Beechey*; Society Islands, *Cuming*, n. 1402, *Mathews*, n. 23; and, also, Fiji Island, Ovalau, *Brackenridge.* China, *Vachell*; Whampoa, *Hance*, n. 148 (some of the specimens exactly resembling Kunze's figure of *N. sulcata*, l. c.): Hongkong, *Wilford, Dr. Dill, C. Wright* (" *N. sulcata* ").—Like *Cheilanthes tenuifolia*, which this resembles in much of its form and ramification, the present *Nothochlæna* is very variable. Without having seen any authentic specimens of *N. hirsuta*, I am ready to concede that this may be that species. Be that as it may, I fear that the *N. sulcata* is merely a broad pinnuled form of it, and even that *N. densa* may be a less compound state, and that *N. semiglabra* may not be specifically distinct.

19. *N. Eckloniana*, Kze.; caudex creeping often oblique

stout branched adpressedly paleaceous with ferruginous subulate scales, stipites clustered flexuose ebeneous black 4–6 inches long at first densely villosa-tomentose as well as the rachis, fronds 4–6 inches (1 foot long in cultivation) 1–2–3 inches wide subcarnosio-coriaceous oblong obtuse canescently pilose above at length glabrous-green beneath densely albido- or ferrugineo-tomentose, the tomentum mixed with membranaceous lanceolate appressed and imbricated scales of the same colour generally produced on the rachis and costæ below subtripinnate, primary pinnæ subopposite ovate petiole lowest pairs distant and unequally triangular (the lowest inferior secondary pinna being elongated), secondary ones oblong obtuse deeply pinnatifid or again pinnate, segments or ultimate pinnules ovate or suborbicular entire or the fertile ones slightly crenulate and reflexed, sori forming a continuous line within the margin.—*Kze. in Linnæa*, x. p. 501. *Metten. Fil. Hort. Lips.* p. 45. *Pappe and Rawson, Syn. Fil. Cap.* p. 42. *Cheilanthes, Metten. Cheil.* p. 22. *Nothochlæna Marantæ, Kze. in Linnæa*, vi. p. 184.

Hab. S. Africa: mountain of Uitenhage, Kaffraria, Orange River and Griqualand, *Ecklon and Zeyher*, and various travellers, on mountain ranges, alt. 3000 feet; Macalisberg, *Burke*.—A handsome species, at first mistaken for *N. Marantæ*, but it is more compound and with the lowest pair of primary pinnæ obliquely triangular, having the outer lowest secondary pinnæ longer than the rest. Wherever the pinnules are entire in this species it can hardly be distinguished from *N. Marantæ*.

20. *N. Aschenhorniana*, *Kze.*; caudex “short cæspitose clothed with very rigid appressed lanceolate acute scales lacerated and glanduloso-ciliate at the margins” (*Liebm.*), stipes  $2\frac{1}{2}$ –5 inches long and as well as the rachis at first together with the whole under side of the frond densely clothed with lanceolate acuminate ciliated flexuose scales mixed with glandular pubescence of the same colour, fronds 8 inches–1 foot long 2– $2\frac{1}{2}$  inches broad subcoriaceous oblong shortly acuminate bipinnate above slightly villous, primary pinnæ subopposite horizontally patent sessile from a broad base oblong gradually but bluntly acuminate, pinnules 2–3 lines long oblong obtuse more or less deeply pinnatifid with rounded entire segments, capsules black forming a marginal sorus buried among the tomentum and scales. (TAB. CCLXXXVII. B.)—*Kze. in Linnæa*, xx. p. 417. *Cheilanthes, Metten. Cheil.* p. 21. *Nothochlæna bipinnata, Liebm. Fil. Mex.* p. 62. *N. Galeottii, Fée, Gen. Fil.* p. 159.

Hab. Mountains of Mexico, 5–8000 feet, "*Aschenhorn*," *Coulter*, n. 1679, *Liebmann*, *Galeotti*, n. 6565.—Very remarkable in the peculiar paleaceous scales mixed with bright ferruginous tomentum and minute reddish apparently resinous dots, with which the whole stipes, rachis, and under side of the frond are invested.

21. *N. Pohliana*, Kze. Herb.; caudex creeping paleaceous with close-pressed subulate scales, stipites 2–4 inches long ebony-black as well as the rachises (which are also pubescent-villous), fronds  $3\frac{1}{2}$ –4 inches long firm-membranaceous above villous with long silky tawny hairs especially at the margin, beneath more densely clothed with the same tawny hairs mixed with branched and stellated ones but scarcely tomentose, from a broad base ( $1\frac{1}{2}$ –2 inches wide) pyramidal-oblong gradually but bluntly acuminate bipinnate, lower primary pinnæ opposite all sessile oblong obtuse from nearly 1 inch long at the base with 7–9 pinnules gradually shortening to the apex where the pinnæ are small and only lobato-pinnatifid, pinnules scarcely more than 2 lines long ovate obtuse sessile entire sublobato-pinnatifid, the margins slightly recurved but not concealing the sori which form a continuous brown line just within the margin. (TAB. CCLXXXVI. B.)—*Cheilanthes*, *Metten. Cheil.* p. 23.

Hab. Brazil, *Pohl*. Serra de Natividade, *Gardner*, n. 3551, *Pohl*.—A most distinct and very peculiar species.

22. *N. inæqualis*, Kze.; caudex short horizontal often forming knots or bulbils from which the stipites originate and which are also densely clothed with long narrow rufous subulate soft scales, stipites clustered 3–5 inches long stout intense ebeneous-black as well as the rachis, fronds coriaceous 3–5 inches long  $1\frac{1}{2}$ –2 inches wide subtriangular-ovate acuminate subsericeo-pilose above densely rusty-tomentose beneath bipinnate below pinnate upwards, pinnatifid at the apex, lowest primary pinnæ obliquely triangular their lowest inferior secondary pinnæ being the longest and deeply pinnatifid the rest of the primary ones are oblongo-lanceolate horizontally patent deeply pinnatifid rarely again pinnate, pinnules or segments oblongo-ovate obtuse entire, the margin scarcely reflexed, sori near the margin concealed by the dense mass of brown tomentum.—*Kze. in Schk. Fil. Suppl.* i. p. 146, t. 64. f. 1. *Cheilanthes*, *Metten. Cheil.* p. 24.

Hab. Macalisberg, S. Africa, *Burke*.—Well distinguished from *N. Eckloniana* and *N. Marantæ* by the stouter habit and the dense brown tomentum, not scaly, under side of the frond.

23. *N. lanuginosa*, Desv.; caudex short thick ascending clothed at the apex with ferruginous subulate scales, whole plant densely clothed with soft white or more generally ferruginous wool less dense on the upper side and there not concealing the green of the pinnules, stipites caespitose short stout 1-2 inches long dark-purple when the tomentum is removed, fronds submembranaceous 5-9 inches long 1-1½ inch broad elongato-lanceolate bi-tripinnate, primary pinnæ ¾ of an inch long oblong, secondary ones rotundate and if again divided they are ternate with close-placed orbicular pinnules, the margins of the fertile pinnules narrowly reflexed and minutely crenated, sori forming a broad band just within the margin.—*Desv. Encycl. Suppl.* iv. p. 110. *Kaulf. Enum.* p. 139. *Webb, Fl. Can.* p. 455. *N. vellea*, *Desv. Br. Prodr.* p. 146. *Acrostichum*, *Ait. Hort. Kew. ed. 2.* iii. p. 457. *A. lanuginosum*, *Desf. Fl. Atl.* ii. p. 400. t. 256. *Schk. Fil.* t. 1. *Sibth. Fl. Græc.* t. 965. *N. Plukenetii*, *Fée, Gen. Fil.* *N. lasiopteris*, *Mueller in Herb. nostr.*

Hab. Spain and all the warm regions of the Mediterranean, Greece, etc. *N. Africa*, Madeira, Teneriffe, Cape de Verd islands (*Herb. Par.*). Tropical Australia, *Brown*. Upper Victoria river, *Dr. F. Mueller*, and also near Lake Torrens.—This is another remarkable instance of a Spanish and Mediterranean Fern being likewise a native of Australia. The other is the *Gymnogramme rutifolia*.

24. *N. densa*, J. Sm. (name only); caudex creeping and bearing small scaly bulbs or tubers, stipites clustered 2-3 inches long ebony-purple pilose as well as the rachis, fronds pilose most and ferruginously so beneath subcoriaceous 4-5 inches long 1½ inch wide broad lanceolate obtuse bipinnate tripinnate at the base, primary pinnæ scarcely 1 inch long subopposite sessile triangular-ovate, secondary pinnæ 3-4 lines long oblong as are the ultimate pinnules of the lowest pair of pinnæ very obtuse entire at the margin, sori very broad extending from the margin nearly to the costule.—*Kze. in Schk. Fil.* p. 149. t. 64. f. 2. *Cheilanthes*, *Fée. Metten. Cheil.* p. 24.

Hab. Isle of Corregidor, Philippines, *Cuming*, n. 282.—*Mettenius* says of this, "Lamina minus divisa, segmentis primariis pinnatipartitis, infra densius hirsutovillosis, petiolo hirsuto fortasse non satis ab specie *N. hirsuta* diversa." It may be so, and I think he is likely to be correct.

25. *N. mollis*, *Kze.*; caudex creeping bearing tubers producing fronds both of which are densely clothed with black subulate scales ferruginous at the margins, stipites clustered

2-3 inches long stout and as well as the rachis and all the rest of the plant especially on the under side pannose with dense stellated ash-coloured or ferruginous tomentum, fronds coriaceous 5-11 inches long scarcely 1-1½ inch broad lanceolate attenuated at the base bi-subtripinnate, primary pinnæ (greenish above) erecto-patent shortly petiolate  $\frac{3}{4}$ -1 inch long narrow oblong, secondary ones scarcely 2 lines long sessile oblong lobato-pinnatifid or again pinnated with 3-4 very minute orbicular pinnules, the margins subreflexed and bearing the sori of few capsules just within it.—*Kze. in Linnæa*, ix. p. 54, and in *Schk. Fil. Suppl.* i. p. 115. t. 53. f. 2. *Gay, Fl. Chil.* vi. p. 496. *Cheilanthes, Pr. Metten. Cheil.* p. 29. *Nothochlæna Doradilla, Colla, Pl. Chil. Rar.* p. 46. t. 73.

Hab. Chili, Valparaiso, Coquimbo, *Pœppig, Cuming*, n. 80, *Ph. Germain, Bertero, Harvey*.—A distinct and well-marked species, somewhat approaching *N. lanuginosa* in structure and ramification. When dry, the primary pinnæ become involute.

26. *N. Marantæ*, Br.; caudex a stout horizontal rhizome, densely paleaceous with soft silky ferruginous finely pointed subulate scales, stipites generally stout purplish-black 3-6 inches long aggregated setosely and densely hirsute as well as the rachis, fronds 4-5-10 inches long 2-2½ inches wide oblongo-lanceolate carnosocoriaceous glabrous above, beneath densely clothed with ferruginous oblongo-lanceolate imbricated scales bipinnate, primary pinnæ petiolate or sessile from a broadish obtuse base oblongo-acuminate, pinnules not numerous approximate sessile 2-3 lines long very obtuse entire, upper ones confluent at the base (as are the terminal primary pinnæ) the edge scarcely reflexed, sori forming a broad border extending some way from the margin towards the costule much concealed by the paleaceous covering.—*Br. Prodr. Nov. Holl.* p. 146. *Desv. Webb. Fl. Canar.* iii. p. 455. *N. subcordata, Desv. Acrostichum Marantæ, Linn. Sp. Pl.* p. 1527. *Schk. Fil. t.* 4. *Sw. Syn. Fil.* p. 14. *Willd. Sp. Pl.* v. p. 122. *Sibth. Fl. Gr. t.* 964. *Ceterach, De Cand. Gymnogramme, Metten. A. Canariense, Willd. Sp. Pl.* v. p. 121.

Hab. S. of Europe, throughout the Mediterranean region. N. Africa and adjacent islands of Madeira, Canaries, Azores, Cape de Verdes. Abyssinia, *Schimper*, n. 742 and 995. N.W. India, *Edgeworth*; Kumaon, *Strachey and Winterbottom*; Kumalari, *J. Carter, Esq.*: above Simla, *Col. Bates*; eastward to Sikkim and Bhotan, *Griffith, Hooker fil. and Thomson*, alt. 14,000-15,000 feet.—The uniformly entire margin to the pinnules distinguishes this from the Cape *N. Ecklo-*



*niana*. But one of my European specimens of *N. Marantæ* has pinnatifid pinnales, which is a very near approach to *N. Eckloniana*.

27. *N. pumilio*, Br.; "fronds pinnate glabrous, pinnæ 3-7 oval subentire, the margin a little recurved." *Br. Prodr. Nov. Holl. p.* 146.

Hab. "Tropical New Holland, *Sir Jos. Banks*."—" *Cheilanthes Pteridique affinis*," *Br.*—Unknown to me and I believe to other authors.

### 3. MONOGRAMME, *Schk.*

(HOOK. GEN. FIL. TAB. LXXXIV. A. AND B. Pleurogramme, *Pr.* *Diclidopteris*, *Brack.* *Vaginularia*, *Fée.* *Cochlidium*, *Klfs.*)

*Sori* linear, much elongated, destitute of involucre, single or geminate or forked, fronds sunk in a groove or cleft, thence subinvolucrate, or superficial.—Fronds *linear, simple or rarely forked, costate, with or without simple veins.*

§ EUMONOGRAMME.—*Fronds simple or forked, veinless.*—*Monogramme, Schk., Moore.* Sp. 1-7.

1. *M.* (Eumonogramme) *dureacarpa*, Hook.; caudex slender filiform creeping sparsely hispid with minute subulate scales, fronds subflaccid numerous 8-12 lines long simple filiformi-spathulate scarcely half a line wide in the broadest portion submucronate at the oblique apex costate veinless, sorus sunk in a deep linear cleft at one margin below the apex extending to the costa which is there soriferous (and very much resembles the fructification of a *Dareæ*). (TAB. CCLXXXVIII. A.)

Hab. Labuan, Borneo, on the trunks of trees, *Barber*.—Well marked by the peculiar receptacle of the fructification formed of a deep cleft near the apex of the frond, extending quite to the costa, the other half forming as it were a wing or earina to this short sheath-like receptacle, hence closely resembling in appearance those *Dareæ* (in *Asplenium*) whose involucre has the same texture and colour as the frond.

2. *M.* (Eumonogramme) *furcata*, Desv.; caudex short scarcely creeping densely fibrous, fronds tufted linear firm subcoriaceous  $\frac{3}{4}$ -1½ inch long simple or forked above the middle obtuse strongly costate veinless, the soriferous apices spathulate and concave, sori linear-oblong arising from the costa not in any stage concealed by a duplicature of the fronds.—*Desv. Journ. Bot.* i. p. 23. *Pr.* *Hook. Gen. Fil. t.* 84. *A. and B.* (excluding the upper right-hand figure without a number, which belongs to *Monogramme graminifolia*). *Coch-*

lidium graminoides, *Klfs. En. Fil. p. 86. Schott, Gen. Fil. cum ic. (excellent)*. Pleurogramme, *Fée, Gen. Fil. p. 101. Grammitis, Sw. Syn. Fil. p. 22. t. 1. f. 5 (excellent)*. Asplenium, *Sw. Fl. Ind. Occ. p. 1608. Willd. Sp. Pl. v. p. 141. Acrostichum, Sw. Prodr. Fl. Ind. Occ. p. 128.*

Hab. Jamaica (*Swartz and others*), Brazil (*Langsdorff, fide Fée*). St. Helena, *Menzies, in Herb. nostr.* (possibly an error in the locality).—It is remarkable that *Fée* places this in *Pleurogramme*, which he distinguishes by the presence of veins.

3. M. (Eumonogramme) *linearis*, *Klf.*; caudex filiform elongated branched and densely tufted paleaceous with subulate falcate dark-brown scales, fronds copious subflaccid, lineari-filiform 1-2 inches long simple slightly thickened in the middle indistinctly costate veinless dilated towards the apex and there for about 2-3 lines in length conduplicate soriferous in the axis, the sides forming a spurious involucre, sorus linear occupying the whole length of the duplication.—*Klfs. En. Fil. p. 196. Fée, Gen. Fil. p. 98. t. 9. f. C. Vittar. p. 33. Schott, Gen. Fil. cum ic. (excellent)*. M. graminea, *Schk. Fil. p. 82. Desv. Journ. Bot. i. pp. 1. 22. t. 2. f. 3 (very bad)*.

Hab. Mauritius, Bourbon, and S. Africa, Cape of Good Hope, *Miller*.

4. M. (Eumonogramme) *rostrata*, *Hook.*; caudex thick as a crow's quill ascending subpaleaceous very fibrous-rooting, fronds copious tufted firm subcoriaceous 4-6 inches long less than a line wide linear acuminate long-tapering downwards into a slender terete stipes  $\frac{1}{2}$ - $\frac{3}{4}$  of an inch long, costate veinless; *sterile* ones uniform in width; *fertile* ones swollen in the upper half terete long-rostrate at the apex (and there sterile) at length opening with a longitudinal fissure (the lips never patent) enclosing a linear sorus of the same length as the fissure formed of very numerous capsules arising from the costa. (TAB. CCLXXXVIII. B.)

Hab. Island on the Lake Omotepec, Nicaragua, *C. Wright, in Ringgold and Rodgers' U. S. N. Pacif. Expl. Exp.*—This very distinct little Fern I owe to the kindness of Mr. Eaton, who remarks, "I can assign no name to this unless it is an overgrown form of *Pleurogramme immersa*, *Fée*;" but the absence of veins, setting aside other characters, would alone keep it apart from that: nor can I find any of the *Monogramme*-group at all approaching it. The general form (on a transverse section) of the soriferous receptacle is not unlike that of *M. trichoides*, but all else is very different.

5. M. (Eumonogramme) *subfulcata*, *Hook.*; caudex slender filiform interlaced and densely fusco-tomentose, fronds

very much crowded caespitose 1-1½ inch long ½ a line wide in the broadest part linear-spathulate simple more or less falcate firm subcoriaceo-membranaceous bright green costate veinless soriferous only in the spathulate apex there opening with a longitudinal cleft about ½ an inch long on one side the eccentric costa in the same manner as is described under *M. Junghuhnii*, the linear sorus occupying the sinus or axis of the deep cleft. (TAB. CCLXXXIX. A.)

Hab. Island of Malecolle, New Hebrides, *C. Moore*.—Nearly allied to *M. Junghuhnii*, but very distinct in its much smaller size, firmer texture, curved fronds broader upwards and the short sori always at the apex. The free valve (if I may so call it) which opens from the costa is of a paler colour than the frond, and involucriform.

6. *M.* (Eumonogramme) *trichoidea*, *J. Sm.*; caudex very slender, filiform creeping hispid with very small subsetiform scales, fronds 3-4 inches long densely tufted extremely slender capillary scarcely thicker than human hair (subquadrangular when dry) flexuose flaccid costate (?) veinless; *sterile* ones equally narrow throughout; *fertile* ones with 1-3 swollen distant sheath-like soriferous receptacles 2-3 lines long opening longitudinally and forming a deep semicircular cavity or groove occupied by the sorus which thus appears to be attached to the costa.—*J. Sm. in Hook. Bot. Journ.* iii. p. 394 (*name only*). *Vaginularia*, *Fée, Gen. Fil.* p. 97. t. 9. B.

Hab. Luzon, *Cuming*, n. 160.—An extremely curious little Fern, but which, I think, *J. Smith* has correctly referred to *Monogramme*. I am not aware that it has been gathered by any one except *Mr. Cuming*.

7. *M.* (Eumonogramme) *Junghuhnii*, *Hook.*; caudex slender creeping tomentose much interlaced and tufted paleaceous on the upper side with lanceolato-subulate glossy iridescent sphagnose scales, fronds dense close-placed and forming caespitose masses flaccid 2-3 inches to a foot long ¼ to scarcely ½ a line wide linear-filiform for the whole length simple costate; when *fertile* opening at the costa with a longitudinal cleft (on the left-hand side) thus forming a narrow longitudinal false involucre bearing the sorus in the sinus or axis leaving an elevated ridge formed by the costa and somewhat resembling a second false involucre, sori narrow linear more or less elongated sometimes extending nearly the whole length of the frond. (TAB. CCLXXXIX. B.)—*Vaginularia*, *Metten. Fil. Hort. Lips.* p. 25. t. 27. ff. 25-28 (showing, at fig. 28, a double pseudo-involucre). *Pleurogramme* (?) *paradoxa*, *Fée, Vittar.* p. 38. t. 4. f. 1 (pseudo-involucre double, "spo-

ranges attachés au mesoneure"). *Diclidopteris angustissima*, *Brack. Fil. U. S. Expl. Exped. p. 135* (the figures represent, 1, a double pseudo-involucre, one on each side the costa opening next the costa and a vein on each side parallel with the costa occupying the sinus or axis of the pseudo-involucre, these veins each of them soriferous; and, 2, a section with a single sorus with a unilateral involucre one lateral vein wanting, but this shows no central costa). *Monogramme linearis*, *Junghuhn, in Herb. Kunze et Zollinger, n. 1890 (fide Metten.)*.

Hab. Isle of Ovalau, N. Pacific, "*Martens (an Mertens?)*, *Herb. de St. Pétersb.*" (*Fée*). Samoan and Fiji Islands, *Brackenridge, Powell, Milne*. Sandwich Islands, *Dr. T. L. Andrews, in Herb. nostr. (from Eaton)*. Society Islands, *Bidwill*. Java, *Thos. Lobb, Junghuhn, Zollinger (Luzon, Cuming)*. Ceylon, *Gardner, n. 1281*.—This curious slender Fern is not wanting of illustration. Unknown to each other, three different and very careful Pteridologists have described and figured it under three different genera and with very dissimilar characters. Two only have figured transverse sections of the soriferous portion. Of these three the figures of Brackenridge best accord with our own observations: only we have not been able to detect the *double line* of sori in our specimens. Living specimens are needed for ascertaining the structure in such very minute Ferns, which do not revive after being dried, as Mosses and *Hepaticæ* do: nor are we sure that the same species may not offer different modifications of sori.

§§ PLEUROGRAMME.—*Fronde simple or forked, with lateral simple veins*.—Pleurogramme, *Pr., Fée, Hook. Gen. Fil. t. LXXII. A. Sp. 8-10*.

8. M. (Pleurogramme) *graminifolia*, *Hook.*; caudex scarcely creeping but short rather thick erect or ascending paleaceous at the summit with rather large imbricated obtuse linear ferruginous scales densely fibrous-rooted below, fronds numerous tufted subsessile 2-6-8 inches long  $1\frac{1}{2}$ -2 lines wide firm-coriaceous straight or falcate in the upper half simple or rarely forked linear attenuated at both extremities costate, veins simple oblique not extending to the margin, sori linear continuous costal or from the sides of the costa occupying the upper half of the frond which is more or less conduplicate (so that a transverse section nearly resembles the letter V) in age patent or only concave.—*Tænitis, Hook. Exot. Fl. t. 77*. Pleurogramme, *Fée, Vittar. p. 37*. Pleurogramme linearis, *Pr. Hook. Gen. Fil. t. 72. A., t. 75. A., and t. 84 (upper right-hand figure, without number, carelessly introduced upon the plate of Monogramme furcata)*. *Blechnum seminudum, Willd. Phytogr. p. 13. t. 8. f. 2. (a very good representation)*. *Grammitis, Willd. Sp. Pl. v. p. 140, and hence Pleurogramme pumila, Pr. and Fée*. *Tænitis pumila, Ktfs., Micropteris, Desv. may perhaps be referred here*.

Hab. West Indies, frequent, and probably tropical America generally. Guiana, *Le Prieur*. Brazil, *Gardner*, n. 105 and 5286. Guinea (*Willdenow*; but may not this be an error for Guiana?).—Our figures in *Gen. Fil.* very fairly represent the ordinary state; but it is very variable in the plane or concave or conduplicate soriferous portion of the frond.

9. M. (Pleurogramme) *immersa*, Hook.; “fronds linear curved rather obtuse thick (spissis), veins pinnated simple not extending to the margin terminated by a black point, sori very long continuous costal occupying the middle portion and more of the frond, capsules originating on the costa ‘cuticulam aperientibus et fissuram continuam longitudinalem determinantibus,’ the margins representing a pale-coloured involucre, annulus with 10–11 joints, spores subrotund with pressure subtrigonus.” (*Fée*).—Pleurogramme, *Fée*, *Vittar*. p. 37. t. 4. f. 5. Monogramme linearifolia, *Desv. Journ. Bot.* i. p. 22. t. 2. f. 2.

Hab. French Guiana, *Le Prieur*, n. 126. Venezuela, *Fendler*, n. 353? Cuba?, *C. Wright*.—I have no authentic specimens of this plant. Those from *Fendler* and *Wright* (I don't find either of them noticed in *Eaton's Fil. Wright. and Fendl.*) sufficiently accord with the figures of the natural size above quoted, but scarcely so with *Fée's* magnified representation; and they are too much like our preceding species. Indeed I suspect *Fée's* specimens from *Le Prieur* (the authority for the species recorded by *Fée*) are the same as those of *Le Prieur* in my herbarium, and which I have referred to *M. graminifolia*.

10. M. (Pleurogramme) *myrtillifolia*, *Fée*; “caudex surculiform creeping clothed with lanceolate entire scales, fronds obovate thick entire glabrous attenuated into a short petiole, veins pinnated indistinct forked slender not extending to the margin, costa internal, sori abbreviated subapicular and in a depressed portion of the frond, sporangia ovate, annulus 10–12-articulate, spores thick rotund.” *Fée*, *Gen. Fil.* p. 101. t. 10. C. *Vittar*, p. 58.

Hab. Mexico? (*Fée*).—Quite unknown to me. Fronds 7–8 lines long, exactly spatulate.

#### 4. GYMNOGRAMME, *Desv.*

HOOK. GEN. FIL. TAB. XXXVII. (including *Grammitis*, *Sw.*) HOOK. GEN. FIL. TAB. LXXII. B. FF. 3–7 (excl. ff. 1–3, which are *Polypodium furcatum*). *Stegnogramme*, *Bl.* HOOK. GEN. FIL. TAB. CXX. B. *Hecistopteris*, *J. Sm.* *Pterozonium*, *Trismeria*, *Coniogramme*, *Pleurosorus*, *Fée*. *Leptogramme*, *J. Sm.* *Loxogramme*, *Pr.* *Syngramme*, *J. Sm.* *Selliguea*, *Bory.* HOOK. GEN. FIL. TAB. LXXIV. A.

Anogramme, *Fée*. Eriosorus, *Fée* (*in part*). Dictyogramme, *Pr.* Jamesonia, *Fée and others* (*in part*).

*Sori* oblong or linear, generally linear and very much elongated, copious, simple or forked or variously anastomosing arising from the veins or from the cellular portion of the frond. — Ferns of very varied forms and habit, with veins simple or forked or anastomosing.

The individuals often present so many intermediate passages that it appears more simple for practical purposes to include all the following under one genus rather than break it up into numerous genera, regarding the value of which no two systematic authors are agreed. Respecting those two on which the opinions of botanists are the most united, *Grammitis* ("capsulæ venis frondis furcatis insidentes") and *Gymnogramme* ("sori oblongi vel sublineares, recti costæ paralleli, v. obliqui venulis insidentes"), the characters present no valid distinctions whatever. Presl indeed places them in two separate sections: so different are the views of different botanists on these subgenera. Moore places them in one and the same section, and distinguishes *Gymnogramme* by "sori linear forked distinct," and *Grammitis* by "sori linear oblong simple." I prefer the name *Gymnogramme* (to *Grammitis*) as more characteristic, and that which already includes the greatest number of species. It has been already shown that several *Polypodia*, as now considered, have been formerly ranked under *Grammitis*. There is a gradual passage between rounded and oblong sori.

§ 1. EUGYMNogramme.—*Veins free.* Sp. 1–42.

\* *Fronds simple.* Sp. 1–3.

1. G. (Eugymnogramme) *reniformis*, Mart.; caudex short thick subtuberous paleaceous above with subulate ferruginous scales, stipites tufted 3–6 inches long ebeneous, fronds  $1\frac{1}{2}$  inch long rather more broad coriaceous reniformi-rotundate subcrenate, veins approximate flabellately dichotomous, sori simple linear parallel confluent forming a broad belt or zone some distance from the margin on the disk of the frond.—*Mart. Ic. Pl. Crypt. Braz. p.* 88. *t.* 26. *Hook. 2d Cent. of Ferns, t.* 9. *Pterozonium, Fée, Gen. Fil. p.* 178. *t.* 16. *A. Moore.*

Hab. Dense woods, Brazil, Mount Cupati, near the river Japura, *Martius*. Near Tarrapota, eastern Peru, on Mount Guayrapurima, *Spruce*, 1856, very rare.—If every different form of *Gymnogramme* is to constitute a genus, of course there will be as many genera as species.

2. G. (Eugymnogramme) *pumila*, Spr.; caudex filiform creeping, fronds densely tufted  $1\frac{1}{2}$ –2 inches long sparingly setaceous-paleaceous at the base, sessile membranaceous narrow flabelliformi-cuneate much attenuated below palmately and irregularly inciso-dichotomous at the apex, veins flabellato-dichotomous disappearing below the apex, sori linear elongated not unfrequently (as are the veins) forked at length

more or less confluent.—“*Spreng. Tent. Suppl. ad Syst. Veg. p. 31.*” *Kze. Analecta Pterid. p. 11. t. 8. f. 1.* *Hook. 2d Cent. of Ferns, t. 8.* *Moore. Hecistopteris pumila, J. Sm. in Lond. Journ. Bot. i. 193.* *Fée, Gen. Fil. p. 179. t. 16. B.*

Hab. Tropical America, in moist woods: Guiana, *Weigelt, Le Prieur*; Pará, Brazil, *Spruce, n. 5758.* Isle of Coyba, Veraguas, *Seemann.* Trinidad, *Lockhart.* Jamaica, *March.*

3. G. (Eugymnogramme) *marginata*, Metten.; “caudex creeping abbreviated and as well as the base of the stipites hairy with fusco-ferruginous setæ, stipes 1 inch long as well as the rachis plane above semiterete purplish glossy, fronds 8–16 inches long  $\frac{3}{4}$ –1 $\frac{1}{4}$  inch broad lanceolate long attenuate acuminate slightly attenuated and obtuse at the apex undivided, the margin callose-brown undulato-sinuate two-thirds of the superior part soriferous, veins manifest densely or laxly arranged generally repetito-furcate somewhat as in *Neuropteris* (sub *Neuropteridis*), the branches attaining the callose margin free at the apex all soriferous, sori linear continuous rarely interrupted extending from the margin to the lowest forking of the veins, pedicels of the capsules accompanied by articulated paraphysiform bodies (excrecentiis paraphysiformibus) twice or thrice equalling or exceeding the capsules, at length brown.” *Metten. in Annal. Sc. Nat. 4th ser. v. 15. p. 59.*

Hab. New Caledonia, *Vieillard.*—Quite unknown to me.

\*\* *Fronds pedate, pinnate or bi-tripinnate, destitute of pulverulent substance beneath.* Sp. 4–42.

4. G. (Eugymnogramme) *Schomburgkiana*, Kze.; caudex short creeping, stipites numerous tufted purple-black glossy 3–4 inches to a span long flexuose fragile, fronds firm subcoriaceous-membranaceous sparsely hairy above, more villous and sometimes setose with long hairs beneath, 2 $\frac{1}{2}$ –4–5 inches long  $\frac{3}{4}$  of an inch broad from a rather broad subtruncated base oblong gradually acuminate but obtuse bipinnate below pinnato-pinnatifid above, primary pinnæ ovato-oblong obovato-cuneate sessile 2–3-lobed with the lobes entire or bifid, lobes of the superior pinnæ rounded or obovate obtusely sinuato-dentate, veins more or less forked, sori short oblong, capsules lax.—*Kze. and Kl. in Linnæa, xx. p. 408.* *Hook. Ic. Pl. t. 992 (or Cent. of Ferns, t. 92).* *Anogramme, Fée.*

Hab. British Guiana, *Richard Schomburgk.*—This is somewhat intermediate between *G. Ottonis* and the Peruvian *G. mohriiformis*, Metten.

5. *G.* (Eugymnogramme) *Ottonis*, Kl.; "caudex subrepent setoso-paleaceous, stipites 5-7 inches long castaneous, fronds 5-8 inches long scarcely an inch wide linear acuminate subcoriaceous on both sides sparingly articulato-pilose, primary pinnæ rather distant subsecund when dry  $\frac{1}{2}$ -1 inch long 2-4 lines wide, pinnules  $\frac{1}{2}$ -1 $\frac{1}{2}$  line broad suborbiculato-flabellate shortly petioled, the margin remotely inciso-crenate, sori on the forked veins, partial rachises subpilose." *Kl. in Linnæa*, xx. p. 408.

Hab. Venezuela, mountain regions in arid places, *C. Otto*, n. 630.—I possess only one incomplete authentic specimen of this pretty Fern, which is perhaps too nearly allied to *G. Schomburgkiana*, chiefly distinguished by the narrower more elongated more rigid and more glabrous fronds and more entire pinnules.

6. *G.* (Eugymnogramme) *mohriæformis*, Metten.; caudex creeping, stipites purplish-black tufted numerous 3-4 inches long glossy slender flexuose near the base hispid with reddish and here and there glandular hairs, fronds 2 $\frac{1}{2}$  inches long from a broad truncated base 1 inch wide subpyramidal oblong obtuse firm-membranaceous and as well as the blackish rachis, hispid with reddish hairs subbipinnate pinnate below, inferior primary pinnæ opposite all horizontal, pinnules or segments or lobes 1-2 $\frac{1}{2}$  lines long cuneato-subrotund inciso-crenate, veins twice or thrice forked, sori oblong small on the veins of the disk of the segments.—*Kze. in Metten. Fil. Lechl.* p. 9.

Hab. St. Gavan, Peru, *Lechler*. Mettenius also quotes "*Mathews, Peruvian Plants*, n. 23," which I do not find in my herbarium.—This is of the same group as *G. Ottonis* and *G. Schomburgkiana*, but it has a much stouter caudex, the frond is very different in shape and less decidedly bipinnate. It is well named *G. mohriæformis*. Mettenius well observes that *Mathews*, n. 1814 (our *G. Mathewsii*), from Peru, corresponds with this; but my very perfect specimens seem quite different both in habit and character.

7. *G.* (Eugymnogramme) *Mathewsii*, Hook.; caudex (on a young specimen) subrepent, stipites tufted (of my perfect specimen) 5 inches long stout thick as a crow's quill purple-black ebeneous and as well as the stout rachis glanduloso-villose with ferruginous crisped spreading hairs, fronds subcoriaceous 14 inches long (the apex not fully developed and very hairy) glanduloso-villose on both sides paler beneath broad-lanceolate bipinnate, primary pinnæ in nearly opposite patent (or below reflexed) distant pairs (especially the lowest ones) 2 $\frac{1}{2}$  inches long in the middle sessile from a broad base 1 inch wide gradually tapering to an obtuse apex hence sub-



pyramidal, pinnæ sessile adnate oval-oblong lobato-pinnatifid and subdentate, veins forked, sori oblong and forked. (TAB. CCXC.)

Hab. Peru, *Mathews*, n. 1814.—As I have already observed, this appears to me very distinct from *G. mohriiformis*, of which my authentic specimens are very perfect. This is a much larger and stouter and truly bipinnate species, with very distant primary pinnæ, each one of which well represents an entire frond of *G. mohriiformis* in size and form. Here the frond itself is attenuated from below the middle.

8. *G.* (Eugymnogramme) *microphylla*, Hook.; caudices very slender filiform subrepent and intertwined so as to form a collection of tufted wiry fibres, stipites copious slender filiform very fragile dark-purple ebencous glossy 2-4 inches long, fronds membranaceous subdiaphanous  $1\frac{1}{2}$ - $2\frac{1}{2}$  inches long glabrous triangulari-ovate 3-pinnate (or pinnate and 2-3-pinnatifid), lowest primary pinnæ half-ovate the rest oblong, ultimate pinnules (or segments) oval-lanceolate entire acute decurrent upon the rachises which thus become winged, veins dichotomous one in each pinnule or segment oblong not forked, veinlets terminating below the apex.—*Hook. Ic. Pl. t.* 1916 (or *Cent. of Ferns*, t. 16).

Hab. On trees, Surureen and Saahola, Khasya, *Griffith*.—A graceful little Fern, of which the delicate wiry caudices only seem to be perennial, for they form very dense tufts full of the bases of former years' stipites. In other respects somewhat allied to *G. leptophylla*.

9. *G.* (Eugymnogramme) *flexuosa*, Desv.; caudex creeping firmly rooting with coarse wiry fibres, stipites a span to  $1\frac{1}{2}$  foot long purplish-black glossy flexuose, fronds firm-membranaceous 3-4 feet long having all the rachises singularly geniculato-flexuose or zigzag with a somewhat oblong but not easily-defined outline 3-4-pinnate sparingly pilose, primary pinnæ 4-5 inches long more or less refracted, pinnules dichotomo-flabelliform, segments more or less elongated linear or oblong obtuse entire or forked or emarginate, their base decurrent forming a wing to the ultimate rachises, veins forked following the course of the divisions of the segments, sori elongato-oblong often forked as the veins.—*Desv. in Journ. Linn. Soc.* vi. p. 215. *Grammitis flexuosa*, *H. B. K. Nov. Gen. Am.\** i. p. 4 (*fol. ed.*), *description very incomplete.* *Gymnogramme retrofracta*, *Grev. and Hook. in Bot. Misc.* iii.

\* It is remarkable that Desvaux and Humboldt and Kunth refer to a description of this plant in the *Pl. Équinox.* ii. p. 167. t. 158, where it is certain no such thing is to be found.

p. 385. t. 112 (where for *Cryptogramme* read *Gymnogramme*).  
*G. refracta*, Kze. and Kl. in *Linnaea*, v. 20. p. 410.

Hab. Tropical America: Venezuela, *Humboldt and Bonpland, Purdie*; Sierra Nevada, alt. 7000 feet, *Schlim*, n. 367, 845, *Linden*, n. 520, *Moritz*, n. 359, *Fendler*, n. 300; Nicaragua, *C. Wright*; Ecuador, woods near Cuenca, alt. 8-10,000 feet, growing on the ground; Peru, *Mathews*, n. 1112 and 1820, *Seemann*, n. 961, *Lechler*, n. 2247.—An extremely well marked and interesting species, better known by the name *G. retrofracta* than by the much older one of *flexuosa*, in consequence of the incomplete description of the latter, without any allusion to its affinities.

10. *G. (Eugymnogramme) ferruginea*, Kze.; caudex short erect or ascending ferrugineo-lanose, stipites tufted 6 inches to 1 foot long and (as well as the rachis and the entire frond beneath) densely ferrugineo-lanose ebony-black on the removal of the wool, fronds coriaceous glabrous above except on the costæ 12-14 inches long 3-4 inches wide oblong acuminate pinnate, pinnæ spreading approximate 2-4½ inches long  $\frac{1}{2}$ - $\frac{3}{4}$  inch wide from a broad sessile base oblong gradually acuminate but obtuse at the apex pinnatifid nearly to the rachis almost quite so in some of the lowest pinnæ where that portion of the frond is bipinnate, segments horizontal broad or narrow-oblong obtuse or acute entire or dentato-crenate, veins erecto-patent generally once or twice forked bearing the rather lax narrow lines of sori which are simple or forked on the veins.—*Kze. in Linnaea*, ix. p. 34. *Eriosorus Ruizianus*, *Fée, Gen. Fil.* p. 152. t. 13. f. 2.—Var.  $\beta$ , *lanata*; subbipinnate less woolly beneath, segments or pinnules broader subsinuato-pinnatifid, sori chiefly confined to the branches of the veins. *Gymnogramme lanata*, *Kl. in Braun, Ind. Sem. Hort. Berol.* 1854. p. 17. *Metten. Fil. Hort. Lips.* p. 12.

Hab. Hot dry banks, Peru, *Pöppig, in Herb. nostr., Mathews*, n. 1847; Veragua, *Seemann*, n. 1125. Var.  $\beta$ , Veragua (*Klotzsch*).—Kunze well defines this as "Filix speciosissima." In one of my specimens the caudex and base of the stipites are very sericeo-lanose.

11. *G. (Eugymnogramme) aureo-nitens*, Hook.; caudex ?, stipites ?, fronds 12-16 inches and more long coriaceous, the rachis stout flexuose scandent elongato-oblong bipinnate everywhere densely sericeo-tomentose aureo-fulvous beneath, primary pinnæ very distant between 2-3 inches apart alternate 4-6 inches and more long (including the stout petiole often an inch long) deltoideo-oblong gradually but very bluntly acuminate, pinnules horizontal approximate deltoideo-oblong very obtuse  $\frac{3}{4}$ -1½ inch long sessile pinnatifid deeply so at their base,

uppermost pinnules short confluent rounded, veins pinnated in the pinnules and lobes, veinlets simple or forked, sori elongated simple or forked concealed by the dense sericeous covering, rachises and petioles intensely ebeneous-black when the silky clothing is removed.—*Hook. Ic. Pl. ix. t. 820.* Eriisorus scandens, *Fée, Gen. Fil. p. 132. t. 13. f. 1.*

Hab. Peru, *Ruiz (Fée)*; Veto, *Wm. Lobb*; Ecuador, Pichincha, *Jameson* (old and entirely denuded of its ferruginous silky covering).—A most remarkable species, yet evidently allied to *G. ferruginea*; but that is not scandent and is never truly bipinnated as this, and has very differently shaped and sessile pinnae.

12. *G. (Eugymnogramme) cordata*, Schlecht.; caudex a small erect subglobose rhizome paleaceous above, stipites tufted 1–2 inches long and as well as the rachis decidedly scaly intensely ebony-black, fronds 3–4 inches to a span long erect or flexuose subcoriaceous bright green above and naked or nearly so beneath densely clothed with ovato-acuminate subciliato-dentate reticulated imbricated ferruginous scales, pinnae  $\frac{1}{2}$ – $1\frac{3}{4}$  inch long oblong more or less cordate at the base and more or less deeply lobato-pinnatifid not unfrequently again pinnated rarely subauriculate, veins forked clavate at the apex, sori oblong.—*Schlecht. Adumbr. p. 16.* *Hook. and Grev. Ic. Fil. t. 156.* Grammitis, *Sw. Syn. Fil. p. 23 and 217.* *Willd. Sp. Pl. v. p. 142.* *Hook. 2d Cent. of Ferns, t. 7 (subbipinnate, var.).* Acrostichum cordatum, *Th. Fl. Cap. p. 732.* Ceterach Capensis, *Kze. Analect. Pterid. p. 13. t. 8.* *Fée, Gen. Fil. t. 30. f. 3 and 4.* Gymnogr. Namaquensis, *Pappe and Rawson, Gen. Fil. Cap. p. 43.* Ceterach crenata, *Kaulf.*

Hab. S. Africa: throughout the Cape Colony, plentiful, and eastward to Uitenhage; mountains, Maalisberg, *Ecklon and Burke.* St. Helena, alt. 2400 feet, *Dr. Alexander, R.N., Lieut. Haughton* (chiefly the bipinnate state).—A variable species certainly, yet easily recognized.

13. *G. (Eugymnogramme) pedata*, Klfs.; caudex creeping paleaceous at the apex with lanceolate scales rooting with long descending tomentose pinnated fibres, stipites distant 2 inches to 1 foot long red-brown glabrous, fronds 2–4 inches long firm subcoriaceo-membranaceous villous above pubescent-tomentose beneath cordate quinato-pedate, primary divisions deeply pinnatifid with subtriangular or oblong segments, veins pinnated and several times dichotomous, veinlets copious soriferous near the margin, sori forming a broad subconfluent band nearer the margin than the costa.—*Kaulf. En. Fil. p. 69.* *Metten. Fil. Hort. Lips. p. 42.* Hemionitis,

*Sw. Syn. Fil. p. 20. t. 209. t. i. f. 3. Willd. Sp. Pl. v. p. 129.*  
Neurogramme, *Lk.*

Hab. Mexico, *Audrieux, Liebmann*; Sierra Madre, West Mexico, *Scemann, n.* 1987; Guatemala, *Skinner*.—A specimen I possess from Dr. Meissner, gathered by Dr. Müller at Orizaba, resembles this in every respect except that the venation anastomoses, there being exactly the same differences as between *Pellaea geraniifolia* and *Pteris (Litobrochia) pedata* among the *Pterideæ*, and between *Gymnogramme Javanica*, Blume, and *G. (Dictyogramme) Japonica* among *Grammitideæ*, to which latter section (*Dictyogramme*) I therefore refer the Orizaba plant.

14. *G. (Eugymnogramme) decipiens*, Metten.; caudex creeping underground, stipites approximate terete 6–10 inches long subhispid at the base purplish-black as well as the rachis, fronds firm-membranaceous 6–8 inches long 2–2½ inches broad oblong acuminate pinnated rarely subbipinnate below, pinnae 1–1½ inch long suberecto-patent subtrapezoideo-oblong obtuse obliquely cuneate and petiolate at the base subauriculate and truncated at the superior base inciso-pinnatifid, lobes acute entire or bifid, costa excentric veniform, veins forked, sori linear-oblong one or two on each lobe, capsules mixed with hairs. (TAB. CCXCI.)—*Metten. in Ann. Sc. Nat. ser. 4. xv. p. 60.*

Hab. Aneiteum, New Hebrides, *C. Moore, Milne, and M'Gillivray*, in woods, abundant. New Ireland, *Viellard*.—A very remarkable *Gymnogramme*, unlike any other species known to me, but, according to Mettenius, allied to his *G. marginata* (with simple fronds, see Sp. n. 3) “in the glabrous fronds and the numerous paraphyses mixed with the capsules.”

15. *G. (Eugymnogramme) asplenioides*, Klfs.; caudex very stout in old plants erect or ascending clothed with the remains of former years' stipites, stipites terminal tufted 1–2 inches to a span or more long sparsely paleaceous hirsutopubescent as is more or less the whole plant, fronds 3 inches to 1 foot long 1–4 inches broad lanceolate acuminate attenuate at the base pinnate deeply pinnatifid at the extremity except at the apex which is entire, pinnae 1–2 inches long patent sessile from a nearly truncated broad base subauricled above and below linear-oblong acuminate entire at the base, the rest coarsely serrato-pinnatifid, veins pinnated, veinlets soriferous near their apices, sori short oblong of few lax capsules.—*G. asplenioides, Sw. in Stockh. Handl. 1817. p. 56. t. 3. f. 4.* Grammitis, *Pr. Leptogramme, J. Sm. Phegopteris, Metten. Fil. Hort. Lips. p. 82.* *Gymnogramme aspidioides, Kaulf. (not Hook.) En. Fil. p. 81.* *Ceterach, Willd. Sp. Pl. v. p. 137.* *Raddi, Fil. Braz. t. 31. f. 1.* *Leptogramme,*

*Kl. Phegopteris, Metten. Fil. Hort. Lips. p. 82. t. 17. ff. 1-4. Metten. Phegopt. p. 16.*

Hab. S. America: Brazil, frequent, New Granada, *Otto, n. 526, Moritz, n. 35, Birschil*; Venezuela, *Fendler, n. 176, 306, 360*; Veraguas, *Seemann, n. 1555*; Tarapota, eastern Peru, *Spruce, n. 3964*.—There can be no question but that *G. asplenioides* and *G. aspidioides* are one and the same species, and very uniform in structure.

16. *G. (Eugymnogramme) laserpitiifolia, Kze.*; caudex creeping paleaceous with black subulate scales, stipites dark-purple glossy deciduously pilose a span and more long, fronds 6-10 inches or a foot or more long 4-8 inches wide firm-membranaceous broad-ovate or subtriangular-ovate acuminate tripinnate more or less villous on both sides and often on the rachis, primary pinnæ often very distant, the lowest pair having the lowest inferior secondary pinnæ longer than the rest, pinnules 3-4 lines long broad cuneato-flabelliform and flabellato-pinnatifid, the segments short obtuse entire or emarginate, secondary and ultimate rachises winged, veins dichotomous, sori oblong often forked following the course of the veins yellowish.—*Kze. in Bot. Zeit. iii. p. 285. G. pilosa, Kl. G. glandulosa, Karst. Fl. Columb. i. p. 196. t. 97.*

Hab. Columbia, Tovar, *Moritz, n. 95, Cruger, Birschill, Fendler, n. 301 and 359* (very villous with long soft spreading bracts, and pinnules larger and less divided than usual); Caraccas, *Linden, n. 73* (this is a foot long, yet wants the upper portion and the base of the frond, and the primary pinnæ are wide apart, giving the appearance of a climbing plant).—A very handsome species, which Kunze compares with *G. leptophylla* and his *G. papaveracea*, but the perennial caudex, stout ebeneous stipes, and the size and hairiness of the fronds amply distinguish it.

17. *G. (Eugymnogramme) hispidula, Kl.*; caudex creeping the apex paleaceous with black setaceous scales, stipites 6 inches long flexuose black-purple but not glossy sparingly paleaceous-setose, fronds subcoriaceous hispido-setose (as well as the dark purple rachis) 4-5 inches long scarcely an inch wide oblongo-lanceolate not contracted at the base bipinnate pinnated at the extremity, primary pinnæ  $\frac{1}{2}$ - $\frac{3}{4}$  of an inch long, pinnules 7-9 on a secondary rachis rotundato-flabellate tapering at the base sessile entire except the lowest and the terminal one which are 2-3-lobed the upper side convex the margins much recurved, upper pinnæ oblong entire or 2-3-lobed, veins flabellate, sori oblong subconfluent chiefly occupying the veins in the disk of the pinnules.—*Kl. in Linnaea, xx. p. 407. Jamesonia, Kze. in Bot. Zeit. ii. p. 739, and in Schk. Fil. Suppl. i. p. 196. t. 82. f. 2.*

Hab. Columbia, Merida, *Moritz*, n. 96.—This has even more the aspect of *Jamesonia* than the *G. elongata*, which Fée also refers to that genus, but it is a true *Gymnogramme*.

18. *G. (Eugymnogramme) incisa*, Mart. and Lind.; caudex creeping paleaceous with blackish subulate scales, stipites 5–6 inches long ebeneous-black glossy as well as the rachis which is copiously hispid, fronds 4–6 inches long 1–2½ inches wide firm membranaceous scarcely coriaceous sparingly pilose on both sides oblongo-lanceolate pinnated, pinnæ approximate subopposite sessile horizontally patent from a slightly broader base oblong obtuse rather deeply pinnatifid, segments subobovate or broad cuneate very obtuse entire or subincised at the apex, lowest ones a little larger and subauriculiform, ultimate pinnæ very small and confluent entire or emarginate, veins forked, sori short of few capsules short-oblong.—*Mart. and Lind. Kze. in Schk. Fil. Suppl. ii. p. 78. t. 132.*

Hab. Maraginta, New Granada, alt. 8000 feet, *Linden*, n. 1044, in *Herb. nostr.*

19. *G. (Eugymnogramme) myriophylla*, Sw.; caudex?, whole plant piloso-glandulose, stipites a span and more long and as well as the rachis bright red-brown glossy, fronds 1–1½ foot long 2–6 inches wide oblongo-lanceolate acuminate bi-subtripinnate, primary pinnæ patent petiolate 2–3 inches long oblongo-lanceolate, secondary ones ½ an inch long 1½–2 lines wide sessile oblong obtuse deeply pinnatifid (scarcely again pinnate), segments very small pinnatifid with 5–9 deep teeth or segments which are entire or the lower ones bifid, veins forked corresponding with the divisions of the pinnules, sori copious oblong.—*Sw. in Kongl. Vet. Acad. Handl. 1817. G. spectabilis, Kl. in Herb. Hook.*

Hab. Brazil, *Freyreis (Sw.)*, *Sellow (from Klotzsch)*, *Gardner*, n. 102 and 5922.—This is a species of peculiar aspect. I have seen no authentic specimen of Swartz's *G. myriophyllum* from Brazil; but my specimens from Sellow and Gardner I have reason to believe are the same plant.

20. *G. (Eugymnogramme) flabellata*, Hook.; caudex? (probably as in *G. cheilanthoides* and *elongata*), stipites 3–4 inches long purple-ebeneous glossy, fronds firm-membranaceous finely hirsute (as well as the dark-purple and especially the young apices of the frond) 1½–2 inches wide elongate oblongo-lanceolate acuminate attenuated at the base throughout bipinnate, primary pinnæ 1–2 inches long erecto-patent petioled oblongo-acuminate, secondary pinnæ (or pinnules) 3–4 lines long cordato-flabelliform decurrent upon a

winged petiole 5-7-lobed, lobes cuneate forked or entire ultimate divisions obtuse, veins flabellato-dichotomous, sori linear-oblong occupying the forked veins of the pinnules yellowish.—*Hook. in Journ. of Bot.* 1834. i. p. 61. t. 120. *G. Ruiziana*, *Kl. in Linnea*, xx. p. 410?

Hab. Ecuador, Surrucuecho, near Cuenca, alt. 9000 feet, on the ground amongst herbage, *Jameson*.—A most elegant plant, and to all appearance very distinct from *G. elongata*, as may be seen from the respective figures, and our specimens of the two are exceedingly constant in their characters, presenting no intermediate form; yet it is possible, as we suspect it to be with *G. rufa* and *G. tomentosa*, the simply-pinnated *elongata* may, under certain circumstances, become compoundly pinnated. *G. flabellata*, however, I have never seen except from *Dr. Jameson*. Under his *G. Ruiziana*, Klotzsch quotes this with a mark of doubt; but instead of having the "pinnæ primariæ refractæ," they are here erecto-patent.

21. *G.* (Eugymnogramme) *elongata*, *Hook.*; caudex creeping, the apex setaceo-paleaceous the rest densely radicate with long slightly-branched wiry rigid fibres, stipites numerous but not closely aggregated 3-4 inches long slender fragile black-ebeneous glossy, fronds subcoriaceo-membranaceous 6-14 inches long  $\frac{1}{2}$  an inch wide linear-clongate sericeo-hirsute (as well as the dark-purple rachis and especially the undeveloped apex) pinnated, pinnæ copious distinctly petiolate cordato-ovate very obtuse with reflexed margins deeply pinnatifid with 5-7 short broad obtuse lobes, the lowest pair broad cuneate obtusely bi-trifid the rest rounded entire, veins simple or forked, sori oblong close to the costule or primary vein.—*Hook. in Journ. of Bot.* 1834. i. p. 61. t. 119. *G. cheilanthoides*, *Metten. in Fil. Lechler.* p. 10 (*not Grammitis cheil.*, *Sw. and Hook. and Grev.*) *Jamesonia*, *Fée*, *Gen. Fil.* p. 101.

Hab. Ecuador, at Surrucuecho, near Cuenca, alt. 9000 feet, *Jameson*; Loxa, *Seemann*, n. 957. Peru, Andinarea, *Matheus*, n. 1091; near Agapata, *Lechler*, *Pl. Peruv.* n. 2036.—This is surely distinct from our *G. cheilanthoides*, from Mauritius and Tristan d'Acunha, though Mettenius seems to consider it the same. It has some claim to be ranked with *Jamesonia*, where *Fée* has placed it, and it has the apices of the fronds as in that genus (and in some other genera) apparently in a continuous state of development.

22. *G.* (Eugymnogramme) *cheilanthoides*. Klfs.; caudex creeping underground copiously rooting with numerous wiry fibres, stipites distant slender flexuose 4-5 inches long purple-ebeneous, fronds firm-membranaceous 9-10 inches long  $\frac{3}{4}$  of an inch wide glanduloso-pilose (as well as the dark-purple rachis) elongato-lanceolate acuminate (the young apices very villous) pinnate, pinnæ horizontal sessile but not adnate, from a broad base ovate deeply almost to the rachis

pinnatifid, below bipinnatifid, primary segments 8-9, the inferior segments broad cuneate 3-4-fid intermediate ones bifid the superior ones and all the ultimate segments oblong rounded obtuse entire, veins forked ultimate ones in the segments soriferous, sori oblong simple (not forked).—*Kaulf. En. Fil. p. 71. Hook. and Grev. Ic. Fil. t. 24. Grammitis, Sw. Syn. Fil. pp. 23, 219, and 419. Willd. Sp. Pl. v. p. 143. Carm. in Pl. of Trist. d'Acunha, in Linn. Trans. xii. p. 510. Gymnogramme filipendulæfolia, Desv. Asplenium, P. Thouars, Fl. Trist. d'Acugna, p. 34. t. 4.*

Hab. Mauritius, *Swartz.* Tristan d'Acunha, *Pet. Thouars, Carmichael.*

23. *G. (Eugymnogramme) leptophylla, Desv.;* root a small annual tufted mass of fibres, stipites tufted slender filiform 2-4-5 inches long, fronds small delicate membranaceous subdimorphous 2-4 inches long ovate or oblong; *sterile* ones shorter than the fertile all bi-tripinnate, pinnules 3-4 lines long (*sterile* ones generally the largest) obovato-cuneate decurrent bi-trifid or lobed, lobules obtuse, secondary rachises winged, veins dichotomous, sori simple oblong on the ultimate segments of the pinnules often subconfluent.—*Desv. Journ. Bot. i. p. 26. Kaulf. Hook. and Grev. Ic. Fil. t. 25. Hook. and Arn. Brit. Fl. ed. 8. p. 580. Hook. Brit. Ferns, t. 1. Grammitis, Sw. Syn. Fil. p. 23. t. 1. f. 6. Willd. Sp. Pl. v. p. 143. Polypodium, Linn. Hemionitis, Lagasca. Anogramme, Link, Fée. Asplenium, Cav. Acrostichum, Decand. Osmunda, Lam.*

Hab. Frequent throughout the south of Europe, Azores, basin of the Mediterranean. Its northern limit seems to be Jersey, the only locality in the British Isles. In India it is found at Mussoorie and in the Nilgherries; in Abyssinia, *Schimper*; in the Gulf of Persia, *Kotschy*. In South America: Cuba, *C. Wright*; Andes of Ecuador, *Spruce, n. 5290*; Mexico, *Galeotti, n. 6249*. South Africa. Australia: Victoria, *Robinson, Mueller*; in Tasmania and in New Zealand.

24. *G. (Eugymnogramme) chærophylla, Desv.;* root scarcely to be called a caudex a small descending tuft of fibres as in *G. leptophylla* and equally annual, stipites tufted 3-4 inches to a span long slender stramineous glossy, fronds membranaceous glabrous 2-6 inches long ovate or subdeltoid yellow-green subtripartite bi-tripinnate, primary pinnæ (especially the lowest pair) long-petiolate remote, pinnules 2-3 lines long ovate or ovato-lanceolate inciso-pinnatifid, the segments linear entire or bifid; *sterile* pinnules broader and more cuneate, ultimate rachises winged, veins taking the



course of the segments hence dichotomous and clothed with the equally-forked sori.—*Desv. Berl. Mag.* v. p. 307. *Hook. and Grev. Ic. Fil. t.* 45. *Metten. Fil. Hort. Lips.* p. 40. *Hemionitis, Poir.* *Anagramme, Lk.*

Hab. South America: Paraguay (*Desvaux*); Buenos Ayres, *Tweedie*; Brazil, *Gardner, n.* 14; Jamaica, *March, n.* 29, and others; Cuba, *C. Wright, n.* 860; Guatemala, *Skinner*.—This and *G. leptophylla*, and, I suspect, *G. Ascensionis*, are peculiar among Ferns in having small fibrous annual roots; from both the latter the present species is distinguished by its larger more compound and finely cut fronds, with dichotomously branched sori.

25. *G.* (Eugymnogramme) *Ascensionis*, Hook.; caudex none, root small tufted fibrous annual (?), stipites tufted very slender filiform 2–4 inches high, fronds 2–3 inches long triangulari-ovate membranaceous glabrous bipinnate, pinnules ovate or subobovate cuneate at the base so as to form broad wings on the rachis deeply pinnatifid, segments oblong very obtuse entire or bifid, veins dichotomous, sori oblong simple on the ultimate branches of the veins of each segment.—*Grammitis, Hook. Ic. Pl. t.* 967 (or *Cent. of Ferns, t.* 67).

Hab. Rocks and banks on the Green Mountain, Ascension Island, alt. 1200 to 1800 feet, *J. D. Hooker, Dr. Currer*.—Less delicate in texture than either of the two preceding species, with differently-shaped pinnæ and segments.

26. *G.* (Eugymnogramme) *rutefolia*, Hook. and Grev.; caudex very short rather thick ascending, stipites herbaceous glanduloso-villose densely tufted about an inch long, fronds 3 inches to a span long linear-oblong obtuse subcoriaceo-membranaceous clothed with hairs on all sides which are more or less glandulose at their tips, pinnated, pinnæ alternate rather distant  $\frac{1}{2}$ – $\frac{3}{4}$  of an inch long trapezoid-ovate obovate or flabellate obliquely cuneate at the base and tapering into a short petiole variously lobed or sometimes deeply pinnatifid with narrow cuneate segments, veins flabellato-dichotomous copious, sori oblong or linear rarely forked. *Hook. and Grev. Ic. Fil. t.* 90 (*small specimen*). *Hook. fil. Fl. Nov. Zeal.* ii. p. 45. *Lehm. Pl. Preiss.* ii. p. 110. *Hook. Fil. Exot. t.* 5. *Grammitis, Br. Prodr.* p. 146. *Pleurosorus, Fée.* Ceterach, *Metten.* *Gymnogr. subglandulosa, Hook. and Grev. Ic. Fil. t.* 9 (*less villous*). *Pleurosorus cuneatus, Fée.*—Var. *Hispanica*; fronds more herbaceous, hairs slender eglandulose. *Hook. Ic. Pl. t.* 935. *Hemionitis Pozoi, Lagasca.* *Grammitis Hispanica, Cosson.* Ceterach, *Metten. Fil. Hort. Lips.* p. 80. *Gymnogramme rosea, Herb. Paris in Herb. J. Smith.*

Hab. Tasmania, *Brown*; very general in Australia, from the south and west

and east coasts to the tropics. New Zealand, east coast, *Colenso*. Bourbon, from *Herb. Par. in Herb. J. Sm.*—Var. *Hispanica*; Province of Biscay, *Lagasca*, and Sierra Nevada, *Bourgeau, Boissier, and Reuter*.—The European plant is no way specifically distinct from the Australian one.

27. *G.* (*Eugymnogramme*) *papaverifolia*, Kze.; caudex a small knob-like rhizome erect paleaceous above with imbricated linear-lanceolate brown glossy scales, stipites 1–2½ inches long pubescently glanduloso-hirsute (as is the whole plant) densely tufted, fronds 2–4 inches long 1–1½ inch wide near the middle, broad oblong-lanceolate obtuse bipinnate (or perhaps more correctly pinnate with the pinnæ pinnatifid), pinnæ rather distant alternate subsessile subobliquely ovate, pinnules spreading 2–3 lines long obovato-cuneate decurrent and forming wings on the rachis entire and mono-disorous or the lower ones lobed or dentate, their lobes monosorous, sori oval oblong prominent, when geminate confluent, capsules rather compact.—*Kze. Anal. Pterid. p. 12. t. 8. f. 2* (*the fronds too broad at the base, and hence too triangular*). *Pleurosorus, Fée, Gay, Fl. Chil. vi. p. 498.* Ceterach, *Metten*.—Var.  $\beta$ , fronds pinnate, pinnæ subentire or variously lobed scarcely ever bipinnate. *Pleurosorus immersus, Fée, Gen. Fil. p. 179. t. 16. C. (no description or character). Gay, Fl. Chil. p. 498.* *Gymnogramme Chilensis, Brack. Fil. U. S. Expl. Exped. p. 22.* “*Asplenium ciliatum, Pr., Bertero, mss.*” (*Kze.*), a name, I believe, nowhere otherwise known.

Hab. Chili: “*Quillota, Bertero, n. 65 and 817*” (*Kze.*); *Leona mountains, San Jago, Gay*; *Cordillera, Cuming, n. 198.*—Var.  $\beta$ , Chili, “*Bertero,*” *Bridges, n. 553*; *Santiago, Germain*; *Valparaíso, Harvey, Brackenridge*.—The normal state of this small Fern might easily be mistaken for the *Asplenium Magellanicum* of South Chili, but for the presence of the glandular pubescence and the absence of involucre to the sori. *Kunze's* figure is apt to mislead, for it represents the frond very broad at the base, which I have never seen to be the case; and I am all but satisfied that the supposed species itself will have to be united with *G. rutafolia*, and thus furnish an American locality. *Mr. Harvey's* specimens and *Mr. Bridges'* afford intermediate specimens between *F. papaverifolia* and those of *M. Germain*, which latter can hardly be distinguished from Australian ones: and again I find, among *Sir Thos. Mitchell's* specimens, some fronds from the interior of tropical Australia, which it would be hard to separate from *G. papaverifolia*.

28. *G.* (*Eugymnogramme*) *Totta*, *Schlecht.*; caudex stout horizontal or ascending sparsely paleaceous, stipites subterminal a span and more long subcæspitose scaly at the base, fronds 12–16 inches long 5–10 inches broad dark or blackish-green firm-membranaceous more or less hairy on both sides and on the rachises, pinnate deeply pinnatifid towards the apex broad ovato-lanceolate acuminate, pinnæ patent 3½–5

inches long  $\frac{1}{2}$ — $\frac{3}{4}$  of an inch wide sessile or nearly so from a scarcely contracted base oblong-acuminate pinnatifid rather more than halfway down to the rachis, segments ovate obtuse entire, veins all simple lowest opposite pair meeting at the sinus but not uniting, sori linear extending from the costule to near the margin.—*Schlecht. Adumbr. Pl. p. 15. t. 6. Grammitis, Pr. Hook. Gen. t. 72. B. Leptogramme. J. Sm. Polypodium, Willd. Sp. Pl. v. p. 201. Gymnogramme Lowei, Hook. and Grev. Ic. Fil. t. 89. G. aspidioides, Bl. G. mollissima, Fisch. Kze. in Linnaea, xxiii. p. 310. Polypod. Africanum, Desv. Phegopteris Totta, Metten. Phegopt. p. 18.*

Hab. South Africa: Cape Colony, Madeira, *Lowe and others*; St. Michael's, Azores, *J. C. Hunt. Esq.*; Abyssinia, *Schimper*. Tropical Africa: Fernando Po, on the Peak, alt. 1500 feet, *n. 358*, and on the Cameroons, 7000 feet, *n. 1375, G. Mann*. India: N.W. Provinces, *Edgeworth, Griffith*; Kumaon, 4-800 feet, *Thomson*; Simla, Neilgherries, Assam, Ceylon, *Mrs. General Walker*. Java, *Blume*. Japan, Simoda, *C. Wright*; Port Hamilton and Tsussima, off the coast of Corea, *Wilford*; Kinko Okosima, *Oldham, n. 107*.

29. *G. (Eugymnogramme) gracilis*, Hew. ; caudex "erect," stipites short stramineous brown glossy, fronds  $2\frac{1}{2}$  to 5 feet long 10-14 inches broad glabrous firm subcoriaceous-membranaceous broad oblong-lanceolate (in one instance very long-attenuated below by many dwarfed opposite deltoid pinnæ) pinnated, pinnæ 6-8 inches long patent 1-1 $\frac{1}{2}$  inch wide broad oblongo-lanceolate acuminate sessile pinnatifid nearly down to the costa, segments patent linear oblong often an inch long entire straight or subfalcate, veins rather distant very straight all soriferous, sori linear short close to the margin. (TAB. CCXCII.)—*Heward, Jam. Ferns. in Mag. of Nat. Hist. N. Ser. 1838. Leptogramme (and L. attenuata), J. Sm. Phegopteris, Metten. Phegopt. p. 17. Grammitis Hewardii, Moore.*

Hab. Jamaica, *Heward, Wilson, n. 127, March, n. 268, 362* (fronds 3-5 feet long), *Purdie* (Westmoreland County). "Venezuela, *Moritz, n. 35*," in *Herb. Hook.*, and marked "*Leptogramme aspidioides, Kl.*;" and *Klotzsch* quotes the same number in *Linnaea*, p. 20, for that species, but the two are totally unlike.—This is a very peculiar and most distinct species of *Gymnogramme*, yet a good deal resembling *Fée's G. microcarpa* (8me Mém. Foug. Nouv. t. 20. f. 5, referred by Mettenius to *Phegopteris decussata*), but there the sori are figured and described as close to the costule, here they are confined to the margins; but if, as there is too much reason to fear, the sori of *Gymnogramme* pass into those of *Polypodium*, then *P. decussatum* and possibly *P. rude* are the same specifically.

30. *G. (Eugymnogramme) polypodioides*, Spreng. ; caudex "creeping," stipites 4 inches to a span long, fronds membranaceous subhirsutulous 8-12 inches long 5-8 inches wide

broadly subdeltoideo-ovate suddenly acuminate pinnated, pinnae 5-9 pairs frequently opposite 4-5 inches long spreading from a narrow contracted cuneated base (especially the lower ones) lanceolate acuminate sessile pinnatifid about halfway down to the costa, the apex entire, segments ovate slightly falcate entire, terminal pinna the largest and broadest petiolate deeply pinnatifid with oblong falcate segments, veins simple, sori simple linear oblong rather nearer the costule than the margin.—*Spreng. Syst. Veg.* iv. p. 40. *Phegopteris*, *Metten. Fil. Hort. Lips.* p. 82, *Phegopt.* p. 19. *Ceterach*, *Raddi, Fil. Bras.* p. 10. t. 22 (*very good*). *Grammitis*, *Pr.* *Leptogramme*, *J. Sm.* *Gymnogramme Raddiana*, *Lk.* *G. villosa*, *Lk.*? (*very villous*).

Hab. Brazil, about Rio, *Raddi (in Herb. nostr.)*, *Gardner*, n. 119, *Milne and Macgillivray*, *Mrs. Maria Graham*.—Well distinguished by the abrupt narrow cuneated base of the lower pairs of pinnae and the large terminal one. The distinguishing characters are well represented by *Raddi*.

31. *G. (Eugymnogramme) Linkiana*, *Kze.*; “caudex erect, fronds 1½-2 feet long membranaceous, on both sides as well as on the petiole pubescent lanceolate pinnated, pinnae numerous inferior ones remote ½ an inch long intermediate ones 2-4 inches long sessile from a truncato-rotundate base elongato-oblong acuminate pinnatifid the apex produced serrulate, segments oblong subfalcate rotundo-truncate or acute at the apex, veins undivided all soriferous, sori rotundate or the lowest ones at length linear intermediate between the costule and the margin, capsule generally glabrous rarely pilose loosely packed.” *Metten.*—*Kze. in Linnæa*, xviii. p. 310, and xxiii. p. 310. *Leptogramme*, *J. Sm.*, *Kl.* *Grammitis*, *Pr.* *Gymnogr. polypodioides*, *Lk.*

Hab. Caraccas, “*Pohl.*” Brazil, *Sellow (Herb. Reg. Berol. in Herb. nostr.)*. Tarapota, E. Peru, *Spruce*, n. 4017, 4084, and Andes of Ecuador, n. 5285. Mexico, *Liebmann, Jürgensen*, n. 888 and 964.—This is very variable in the length of the sori, round or oblong or sublinear, otherwise it has a close affinity with *G. rupestris*, as both have with *G. Totta* of the Old World. Indeed Mr. Heward, no incompetent judge, in his notes on Jamaica Ferns, gives the *G. Loweii*, *Hook.* and *Grev.* (*G. Totta*), as an inhabitant of Jamaica, meaning probably either *G. rupestris* or *G. Linkiana* of German authors.

32. *G. (Eugymnogramme) rupestris*, *Kze.*; “caudex erect, fronds 1-2 feet long membranaceous pubescent beneath at length glabrous lanceolate pinnated, pinnae numerous sessile lowest ones abbreviated ¼-½ an inch long intermediate ones 2-3 inches long from a truncated base oblong acuminate

pinnatifid, the apex produced entire, segments semioblong at the apex obliquely rotundato-obtuse or subtruncated entire, veins undivided all soriferous, sori oblong or linear extending nearly to the margin, capsules loosely aggregated mixed with a few rigid setæ." *Kze. in Linnæa*, xxiii. p. 310. *Leptogramme*, *Kl. in Linnæa*, xx. p. 41. *Phegopteris*, *Metten. Hort. Fil. Lips.* p. 82, *Phegopt.* p. 17.

Hab. Tropical America: Columbia, *Moritz*, n. 241 (from Mettenius); Venezuela, *Fendler*, n. 150, n. 307.—Var. *major*; twice or thrice larger (a distinct species?), Andes of Ecuador, *Spruce*, n. 5285. *A.*, and 5286, *Jameson* (veins often forked; Caracas, *Linden*, n. 540, very large, pinnæ 14 inches long  $1\frac{1}{2}$  inch broad, veins sometimes forked; Bogotá).—I fear too nearly allied to *G. Linkiana*.

33. *G.* (*Eugymnogramme*) *pilosa*, Mart. and Gal.; caudex "creeping," stipites 3–4 inches long slender stramineous scaly at the base villous as is the whole frond with longish white hairs, fronds thin membranaceous 6–8 inches long  $1\frac{1}{2}$ –2 inches wide oblong-acuminate pinnated below the upper half or more, deeply pinnatifid, pinnæ (or segments) sessile lower ones rather distant the rest very approximate 1– $1\frac{1}{2}$  inch long 5–8 lines wide bluntly acuminate dentato-crenate upper ones (or segments) nearly entire, the apex of the frond subserrate, veins pinnated, veinlets lax distant undivided or forked, sori oblong very unequal in size and irregularly disposed.—*Mart. and Gal. Fil. Mex.* p. 27. t. 4. f. 1. *Liebm.* *Phegopteris*, *Metten. Phegopt.* p. 18.

Hab. Mexico, Peak of Orizaba, alt. 10,000 feet, *Martens and Galeotti*, n. 6267, *Linden*, alt. 10,000 feet, n. 47.—My specimens from Galeotti, which are fairly represented by him, have the appearance of immature fronds, as indeed Mettenius states them to be.

34. *G.* (*Eugymnogramme*) *aurita*, Hook.; caudex creeping elongated paleaceous, stipites a span to a foot long dark castaneous glossy, fronds  $1\frac{1}{2}$ –2 feet long firm membranaceous ovato-oblong acuminate pinnate rarely subbipinnate, pinnæ mostly opposite in distant pairs approximate (confluent at the apex) 4–8 and more inches long  $\frac{1}{2}$ –1 inch wide from a broad sessile base ( $1\frac{1}{2}$ –2 inches wide) oblong gradually acuminate deeply pinnatifid, lobes broader at the base oblongo-acuminate crenato-serrate the lowest pair twice longer and larger especially the inferior one and subpinnatifid, veins simple or forked all soriferous, sori oblong simple rather nearer the margin than the costule.—*Hook. Ic. Pl. t.* 974, or 74 of *Cent. of Ferns*, and 989 (or t. 89 of *Cent. of Ferns*). Var. *bipinnata*; pinnæ

more elongated forked and both branches soriferous. Grammitis, *Moore*. Phegopteris, *J. Sm. Metten. Phegopt. p. 15.*

Hab. India: Khasya, Mumbree, and Nuncklow, *Griffith*; Lachen, *Hooker fl. and Thomson*, alt. 6000 feet.—A rather large and well-marked species.

35. *G. (Eugymnogramme) subsimilis*, Hook.; caudex?, “whole plant 3–4 feet high,” stipes 1 foot and more long testaceous brown very glossy, frond in my specimen  $2\frac{1}{2}$  feet long  $1\frac{1}{2}$  foot wide firm membranaceous glabrous subdeltoid acuminate bipinnate below subtripinnate pinnate above the middle, pinnatifid at the apex, pinnæ all petiolate the lowest pinnule or segment always the largest primary lowest pinna 10 inches long their lowest basal secondary pinna 5 inches long subpinnate at the base, pinnules 2–3 inches long  $\frac{1}{2}$ – $\frac{3}{4}$  of an inch wide often adnate and subdecurent at the base lobato-pinnatifid obtuse or acute, above the middle they are confluent, intermediate pinnæ deeply pinnatifid, the segments resembling the pinnules but rather crenate than lobate at the margin, veins rather distant rarely simple mostly forked once or more rarely twice soriferous near the middle of the superior veinlet distant from the margin, sori small oblong. (TAB. CCXCIII.)

Hab. Fernando Po, n. 125, *G. Mann.*—This is an ally of *G. obtusata*, but the venation and the position of the sori are very different.

36. *G. (Eugymnogramme) decurrenti-alata*, Hook.; caudex?, stipes  $1\frac{1}{2}$  foot long rather stout, frond sparsely paleaceous with a few rather large ferruginous lanceolate scales, frond  $1\frac{1}{2}$  foot long 1 foot wide at the base dark-green membranaceous subsucculent deltoideo-ovate acuminate bipinnate below, pinnate in the middle, pinnatifid at the apex, pinnæ all petiolate subopposite oblong acuminate, inferior basal segments or pinnules the largest, lower primary pinnæ with the pinnules an inch long 5 lines wide subopposite distant remote adnate and decurrent so that they are connected by a winged rachis, oblong very obtuse lobato-pinnate most so on the inferior margin and the lowest lobe always the largest forming a blunt rounded auricle, intermediate pinnæ deeply pinnatifid with segments resembling the pinnules, veins pinnate subfasciculate, a fascicle to each lobe soriferous chiefly at the base of the veinlets, the sori oblong and then forked rarely a sorus produced on the veinlets nearer the margin. (TAB. CCXCIV.)

Hab. Japan, moist banks, Okosima, *Oldham*, 1861.—A very distinct species, but, like the compound species of *Diplazia*, not easily described in words. Its nearest affinity is with *G. obtusata*, but here all the pinnules are connected by a membranous wing on the rachis.

37. *G.* (*Eugymnogramme*) *obtusata*, Bl.; caudex ?, stipites  $1\frac{1}{2}$  and more feet long, fronds 2 feet and more long nearly a foot wide at base subdeltoideo-ovate acute membranaceous pubescent on the rachises and costæ bipinnate below, pinnate in the middle, pinnatifid at the apex, lower primary pinnæ petiolate 6 inches long 3 inches wide oblongo-ovate, their pinnules  $1-1\frac{1}{2}$  inch long less than  $\frac{1}{2}$  an inch wide oblong sessile and adnate and slightly decurrent at the base obtuse or acute lobato-pinnatifid, the lobes retuse or emarginate, intermediate primary pinnæ deeply pinnatifid sinuato-serrate, veins fasciculato-pinnate a fascicle to each lobe of the pinnules or large segments soriferous only at the base of the lower branches, sori oblong forked.—*Bl. Fil. Jav. p. 97. t. 43 (excellent)*. *Phegopteris opaca*, *Metten. Phegopt. p. 15*. *Hemionitis*, *Don, and Gymnogramme, Spr. (fide Metten.) Gymnogr. arborescens, De Vriese, in Herb. nostr.*

Hab. Nepal, *Wallich*. Khasya, *Griffith*. Java, *Blume, De Vriese*.

38. *G.* (*Eugymnogramme*) *vestita*, Hook.; caudex creeping shaggy with long sericeous fulvous soft hairs, stipites aggregated 3–6 inches long sericeo-lanate, fronds 6 inches to a foot long  $1-1\frac{1}{3}$  inch broad (everywhere) including the rachis, copiously strigose with appressed sericeous aureo-nitent hairs most glossy and more copious beneath subcoriaceo-membranaceous pinnated to the very apex, pinnæ  $\frac{1}{2}$  to nearly 1 inch long petiolate cordato-ovate or oblongo-ovate obtuse entire, veins numerous oblique simple clothed with narrow lines of the forked sori.—*Hook. Ic. Pl. ii. t. 115*. *Grammitis?*, *Wall. Cat. n. 12*.

Hab. N.W. Himalaya, alt. 7–8000 feet, *Wallich* (mont. altiss., Kamaon), *n. 12, Griffith, Col. Bates, Madden, Lady Dalhousie, Thomson, Strachey and Winterbottom, Edgeworth*.—A most lovely species, quite confined to N.W. Himalaya, with fronds in shape much resembling luxuriant leaves of *Polemonium caeruleum* or some Oriental *Astragalus*, and richly covered with glossy golden long silky hairs, most brilliant on the under side.

39. *G.* (*Eugymnogramme*) *Muelleri*, Hook.; caudex creeping underground, stipes 1–2 inches long, fronds 7 and probably more inches long  $1\frac{1}{2}$  inch wide carnosocoriaceous pinnated, pinnæ alternate rather distant  $\frac{1}{2}-\frac{3}{4}$  of an inch long patent sessile ovate obtuse cordate at the base entire clothed

on the upper side with dense whitish lanceolate dentato-ciliated scales emarginate at the base and subpeltate, and on the under side with ferruginous scales of the same nature, the surface of the pinnæ bright-green when the scales are removed, veins immersed close compact simple or forked clothed with the narrow elongated sori for nearly their whole length and which are (like the veins) simple or forked, rachis ebeneous-black paleaceous with imbricated linear lanceolate sub-ferruginous appressed scales, longer and less toothed at the margin than those of the pinnæ. (TAB. CCXCV.)

Hab. Fort Cooper, North-east Australia, *Edward Bowman, Esq.* Received in 1862 from *Dr. Mueller*.—It would be idle to speak of the great acquirements and the unbounded liberality of the prince of Australian botanists, *Dr. Mueller*, F.R.S. of London, and Government botanist at Melbourne, who must ever rank with the noble-hearted *Dr. Wallich* amongst botanists. To *Dr. Mueller* I owe the only specimens of this very remarkable Fern that have yet been detected. They are sufficient to show a considerable affinity with a plant of a widely different and alpine country in the northern hemisphere, viz. *G. vestita*: in the latter, as described under the preceding species, the clothing of the pinnæ on both sides consists of the most delicate and finest of soft silky hairs; this has the pinnæ and the rachis equally clothed with lanceolate membranaceous closely reticulated fringed scales.

40. *G. (Eugymnogramme) tomentosa*, *Desv.*; caudex short erect, stipites 4–12 inches long tufted purple-ebeneous as well as the rachis and both (when young especially) villous with patent fulvous hairs, fronds also villosio-subtomentose 6–12 inches long submembranaceous acuminate or (in the more compound specimens) ovate pinnate with the pinnæ 1–2 inches long petiolate, lower ones and often the terminal ones cordato-ovate with 1–2 deep lobes at the base, upper ones narrower and entire generally bipinnate and even subtripinnate, lower primary pinnæ 4–6 inches long their pinnæ as in those just described, terminal ones often hastate or even pinnatifid, veins very close compact bi-trifurcate with the narrow linear sori covering the whole back of the frond.—*Desv. Berl. Mag. v. p. 304. Sw. Svensk. Handl. 1813. p. 36. t. 4. f. 2 (very good). Hemionitis, Raddi, Fil. Bras. p. 8. t. 19. Asplenium, Lam. Neurogramme, Lk. Ceterach lobatum, Pr. (fide Raddi).*

Hab. Brazil, about Rio, *all collectors, Gardner, n. 14 and 4077. Peru, M'Lean, Mathews, n. 1815.*—Notwithstanding the close affinity of the simply-pinnated forms of this Fern with the *G. rufa*, leading to the belief that they may both be forms of one species, I have among my numerous specimens no certain *G. rufa* from Brazil anywhere south of the Amazon, where *G. tomentosa* is so abundant, while all my specimens of *G. rufa* are from north Brazil.



41. G. (Eugymnogramme) *rufa*, Desv.; caudex short erect or ascending, stipites 1-6 rarely 12 inches long tufted dark ebeneous-purple and as well as the rachis of the same colour ferrugineo-patenti-pilose, fronds subcoriaceo-membranaceous 6-18 inches long 2-4½ inches wide pilose with appressed ferruginous hairs pinnated, pinnæ 1-2 inches long subopposite petiolate horizontal, from an obtuse base oblongo-ovate obtuse or acuminate entire, veins parallel close two to three times dichotomous extending to the margin and covered for their whole length with the narrow lines of sori.—*Desv. in Berl. Mag.* v. p. 304. *Hemionitis*, *Sw. Syn. Fil.* v. p. 20 and 210. *Schk. Fil.* p. 8. t. 17 and 21. *Willd. Sp. Pl.* v. p. 130. *Neurogramme*, *Lk.* *Acrostichum*, *Linn. Sp. Pl.* p. 1525. *Sloane, Jam.* i. p. 87. t. 45. f. 1.

Hab. Tropical America: Jamaica, *Sloane, Wilson*, n. 524, *Hartweg*, n. 1579. Cuba, *Linden*, n. 2023; N. Granada, *Linden*, n. 509, *Holton*, n. 22; Venezuela, *Fendler*, n. 302 (lowest pair of pinnæ with an acute lobe at the base, as if disposed to be compound); Panama, *Cuming*, n. 1200, *Seemann*, n. 375; Guatemala, *Skinner*; Brazil, rocky shores of the Amazon, *Santarem, Spruce*, n. 401, and *Tarapota*, Eastern Peru, n. 3992.—The simply-pinnated ramification of this chiefly distinguishes it from *G. tomentosum*, Desv., and its close affinity with that plant is alluded to by Willdenow.

42. G. (Eugymnogramme) *Javanica*, Bl.; caudex an ascending rhizome scarcely creeping, stipites varying extremely in length and thickness from the size of a crow's to that of a swan's quill and from 1-4 feet long, frond ample equally variable in size 1-4 feet long ovato-lanceolate (simple when young) pinnate generally with the basal pinnæ geminate or ternate to bi-tri- and almost 4-pinnate the extremity always pinnate, pinnules or ultimate pinnæ extremely variable in size and shape from 3 inches to 12-16 inches and more long ½ an inch to 3 inches wide lanceolate or oblong or elliptical-cuneate and acute or obtuse, the margins entire or more or less serrated finely acuminate gradually or often suddenly caudate or cuspidate, veins very close parallel simple or once or twice dichotomous, sori copious narrow-linear following the course of the veins from the costa and branching with them but never extending to the margin.—*Bl. Fil. Jav.* p. 95. t. 41. *Coniogramme*. *Fée.* G. *serrulata*, *Bl. Fil. Jav.* p. 95. t. 42 (*less compound and larger pinnæ*). *Grammitis procer*, *Wall. Cat.* n. 3. G. *affinis*, *Wall. Cat.* n. 11. G. *caudata*, *Wall. Cat.* n. 4. *Gymnogramme pilosa*, *Brack. Fil. U. S. Expl. Exp.* p. 22. t. 4 (*slightly pubescent beneath*). *Diplazium falcatum* and *D. fraxineum*, *Don*, according to *Moore*.

Hab. Malay Islands: Java, *Blume, De Vriese and Teijsmann*, n. 50, 281, and 282 (pinnæ very broad, probably the var. *macrophylla*. Bl.), *Millett*; Luzon, *Cuming*, n. 86; Sumatra, *Herb. nostr.*; Moulmeine, *Parish*. India: all over Himalayan India, from east to west, at an elevation of 7-8000 feet, *Wallich, Griffith, Edgeworth, Strachey and Winterbottom, Bates*; Khasya and Assam, *Griffith, Hook. fil. and Thomson*; Ceylon, *Mrs. Gen. Walker, Gardner*, n. 1225. Tropical W. Africa: Fernando Po, on the Peak, alt. 10,000 feet, n. 664; Island of St. Thomas, 4-5000 feet, Cameroon Mountains, 4-7000 feet, n. 1365, *G. Mann*. Japan: Simoda, *C. Wright*; Hakodadi, *Wilford*, n. 1023. Sandwich Islands, *Brackenridge, Hillebrand*.—Difficult as this fine but variable species may be to define in words, there is no possibility of confounding it with any other, save *G. (Dictyogramme) Japonica*, from which however the different venation will at once distinguish it, anastomosing in the latter, always free in *G. Javanica*.

§ 2. CEROPTERIS.—*Veins free, simple or forked; fronds clothed beneath with a white or yellow pulverulent substance.*—*Gen. Ceropteris, Link and Fée. Trismeria, Fée.*

43. *G. (Ceropteris) flavens*, Klfs.; caudex very short erect ferrugineo-paleaceous, stipites tufted 8-10 inches long slender ebeneous-purple glossy fragile, rachis and its branches quite capillary, fronds coriaceous-membranaceous 3-6-8 inches long triangular-ovate dark-green and naked above bright and copiously yellow-puverulent beneath tripinnate, primary and secondary pinnæ long-petioled broad-ovate, pinnules 2-4 lines long articulated upon the rachis and upon the petiolule elliptico-rotundate entire easily deciduous, veins twice forked bearing linear sori upon the branches each of few and lax capsules more or less confluent.—*Klfs. En. Fil. p. 77. Hook. Fil. Exot. t. 47. Kze. Acrostichum, Sw. Syn. Fil. pp. 16 and 204. Willd. Sp. Pl. v. p. 125. Cincinalis (?) flavens, Fée, Gen. Fil. p. 161. t. 30. B. Desv.? J. Sm. Nothochlæna, Moore, Ind. Fil. p. 9.*

Hab. Tropical S. America, *Nee*; Ecuador, Andes of Quindiu, alt. 4000 feet, *Humboldt and Bonpland*; Loxa, *Seemann*.—This elegant and well-marked Fern has been placed in *Acrostichum*, *Cincinalis*, and *Nothochlæna*; but surely *Kaulfuss* and *Kunze* are correct in referring it to *Gymnogramme*. See some remarks under our *Nothochlæna nivea*, at p. 112 of this volume.

44. *G. (Ceropteris) triangularis*, Klfs.; caudex very short rather thick paleaceous ascending, stipites copious tufted ebeneous-purple very glossy a span to 1 foot long, fronds 3-4 inches long subcoriaceous pedately triangular or subpentangular in outline dark-green above yellow or deep-orange farinaceous or rarely white beneath pinnate, pinnæ sessile generally opposite 3-4 pairs of the ultimate ones confluent into a pinnatifid apex, lowest pair half-triangular (the lowest inferior pinnæ the longest) and again subpinnate, pinnæ and segments oblong obtuse more or less obtusely lobato-pinnatifid, sori oblong

soon confluent and covering the whole back of the pinnæ and lobes save the margins.—*Klfs. Eu. Fil. p. 75. Hook. and Grev. Ic. Fil. t. 153, and Fil. Exot. t. 153.*

Hab. California, especially about San Francisco, *Chamisso, Sinclair, Coulter, Brackenridge, Hartweg, n. 2041, Bridges, n. 296*, as far south as the 35th parallel of lat., *Dr. J. M. Bigelow*; Oregon territory, Mount Hood, *Douglas, Nuttall*. Hot valleys of Ecuador, *Seemann, n. 946*.—A very distinct and well-marked species, occupying a great extent of country on the Pacific coast from Ecuador in South America to Oregon, which seems to be its limit in North America. It is remarkably uniform in its form and ramification.

45. *G. (Ceropteris) sulphurea*, Desv.; caudex very short erect, stipites tufted purple-black when young pulverulent 4 inches to a span long, fronds membranaceous bright green and glabrous white- or sulphur-pulverulent beneath ovate or ovato-lanceolate bi- tri- or at the base subquadripinnate, pinnæ and inferior pinnules ovato-lanceolate the rest lanceolate the ultimate ones deeply pinnatifid, the segments oblong or cuneate 5-6-toothed (in some cases deeply cut into very narrow linear almost capillary segments), veins dichotomous. sori linear subconfluent, the capsules few and lax.—*Aerostichum, Sw. Syn. Fil. p. 15. Schk. Fil. p. 4. Willd. Sp. Pl. v. p. 123. Linden, Cat. G. pulchella (a white var.), Moore, in Gard. Chron. for Sept. 1856. p. 597 (with a woodcut). Hook. Fil. Exot. t. 74.*

Hab. West Indies: Jamaica, abundant. Cuba, *C. Wright, n. 975*, large form. Venezuela, *Linden. Tovar, Fendler, n. 357*, At Antilly Gap, Jamaica, alt. 2500 feet, St. David's; same locality as *Aspidium (Polystichum) tridens*. Mr. Wilson finds a pretty variety 3-4 inches to a span long scarcely 2 inches wide, very compact, white or sulphur-coloured beneath.—Myself as well as others have considered the *G. pulchella* of our gardens a distinct plant from the *G. sulphurea*, but my copious specimens from the West Indies and Venezuela satisfy me that they are one, varying a good deal in composition and in the breadth of the ultimate divisions of the pinnules; in specimens from Venezuela as finely cut as in many *Trichomanes*.

46. *G. (Ceropteris) conspersa*, Kze.; caudex very small erect possibly annual, stipites very slender filiform flexuose 3-4 inches to a span long purple-ebeneous, fronds 3-4 inches to 1 foot high very thin membranaceous subtriangulari-ovate acuminate glabrous above, sparsely white-farinaceous beneath, (sometimes of firmer texture and yellow-farinaceous) tri- or rarely below quadripinnate, ultimate pinnules  $1\frac{1}{2}$  line to  $\frac{1}{4}$  of an inch long trapezoid cuneate sessile subdichotomously or digitately pinnatifid, ultimate segments cuneate or linear entire obtuse, veins forked soriferous, sori linear more or less elongated and more or less confluent.—*Kze. in Linnaea, xviii. p. 116, and in Schk. Fil. Suppl. i. p. 225. t. 00*

Hab. My first specimens of this delicate Fern were received from Bourbon and Madagascar, marked as *G. rosea*, Desv., and *G. farinosa*, Bojer, mss., from the Paris Herbarium, *Bory*, and from *Bojer*. I have since received it from South Africa, *Pappe*, and from *Gueinzius*, and it is unquestionably the *P. conspersa*, Kze.—Its nearest affinity is with *G. sulphurea*, from which indeed some states are not very distinct, and like it is variable in character as to size and shape of the pinnules and in the farinaceous substance beneath being white and then generally laxly dispersed; the brighter the yellow, the more copious the covering. Some very membranaceous specimens have pinnules so large and so membranaceous and so deeply cut as to resemble some forms of *Adiantum Capillus-Veneris*.

47. *G. (Ceropteris) calomelanos*, Klfs.; caudex short stout suberect, stipites tufted 1–2 feet long ebeneous-purple or black (as is the rachis), fronds 1–2 or 3 feet long oblong acuminate coriaceous clothed beneath with a white yellow or orange pulverulent substance bi-subtripinnate, primary pinnæ lanceolate 6–10 inches long, secondary ones 1–1½ inch long oblongo-lanceolate cuneate at the base and subdecurent more or less acute or acuminate inciso-serrate pinnatifid or at their base again pinnate their apices sometimes sharply serrated, lowest superior basal pinnules often subauriculate, veins erecto-patent dichotomous, sori linear or forked reddish-brown occupying the forked veins.—*Klfs. En. Fil. p. 76. Hook. Gen. Fil. t. 76. Hook. Gard. Ferns. t. 50. G. chrysophylla, Klfs.?* *Acrostichum, Linn. Sp. Pl. p. 1529. Sw. Syn. Fil. p. 15. Schk. Fil. p. 4. t. 5. Willd. Sp. Pl. v. p. 123. Hort. Berol. t. 41. Fisch. and Langsd. Fil. t. 3 (very good). Ceropteris, Link, Fée. C. distans, Fée.*

Hab. All over tropical America and the West Indian islands, most abundant. Tropical Western African islands, Prince's Island, and Fernando Po, *Barter, Gustav Mann*.—I have, in 'Garden Ferns,' l. c., shown that no dependence can be placed on the colour of the pulverulent substance of this species; it varies from pure white to sulphur-yellow and bright orange; indeed I have seen and represented the two latter colours each quite distinct on one and the same pinnule. The pinnules are very variable also in shape and in being more or less acuminate.

48. *G. (Ceropteris) tartarea*, Desv.; "caudex ascending, fronds 1–2 feet long subcoriaceous glabrous above beneath white with a powdery ceraceous substance ovate acuminate bipinnate, primary pinnæ linear-oblong obtuse or the lowest ones ovato-lanceolate obtuse, secondary ones confluent with a very narrow wing oblong rotundato-obtuse at the apex, the margin serrulate, lowest ones pinnatifid, the segments oblong obtuse." *Metten.*—*Desv. Berl. Mag. v. p. 305. Klfs. En. Fil. p. 75. Metten. Fil. Hort. Lips. p. 41. Ceropteris, Link, Fil. Hort. Berol. p. 142. Acrostichum, Sw. Syn. Fil. p. 15. Gymnogramme dealbata, Link. Hemionitis, Willd. Sp. Pl. v.*

p. 131. *Hort. Berol. t. 40.*—Var. *pallidipes*; stipites and rachis pale-brown. *Gymnogramme Peruviana*, *Desv. Kze. in Schk. Fil. Suppl. i. p. 65. t. 32. Metten. Fil. Hort. Lips. p. 41. Ceropteris, Lk. Allosorus farinosus, Kze. in Schk. Fil. Suppl. ii. p. 5. t. 103. Gymnogramme ornithopteris, Kl. in Linnæa, xx. p. 413. Gymn. Guianensis, Kl. in Linnæa, xx. p. 413.*

Hab. Tropical America and Mexico. Samoa, S. Pacific, *Brackenridge, Powell.*—Spite of the many authors who maintain this as a species distinct from *G. calomelanos*, I confess myself to be quite puzzled to invent a good distinguishing character, and am content if others can do so. As may be expected, too, the pulverulent substance of the under side of the frond is liable to vary in colour from pure white to sulphur and deep yellow or orange. *G. chrysophylla*, Kfs., may thus be as likely to belong to *G. tartarea* as to *G. calomelanos*. Much stress has been laid by Klotzsch and others on the pale stipites and rachises of some states of this, and hence the *G. Peruviana*, etc., have been formed; but I possess specimens with quite intermediate characters, and with an almost intermediate form of pinna between the most elongated and acuminate pinnules of *G. calomelanos* to the usually obovate and very blunt one at the extremity of *G. tartarea*. *G. Martinii*, Bory and Kze. in *Linnæa*, xxiii. p. 255, and *Metten. Hort. Fil. Lips.*, I possess both from Guadeloupe and Jamaica, but can only look upon it as a state of this of a rich golden-yellow beneath.

49. *G. (Ceropteris) trifoliata*, *Desv.*; caudex very short suberect, stipites stout tufted (and as well as the rachis) bright purple-castaneous glossy at the base and squarrose with broad subulato-castaneous scales, fronds 2–3 and more feet long oblongo-lanceolate elongated pinnate, pinnæ numerous lower ones petiolate 3–4 inches long subternate upper ones sessile simple and as well as the pinnules linear-lanceolate serrulate (naked and then generally *barren* or) when *fertile* clothed with a yellow or whitish powder beneath, veins manifest copious dichotomously divided approximate clothed with narrow lines of sori which follow the direction of the veins and are at length confluent.—*Desv. Journ. Bot. i. p. 25. Hook. Gard. Ferns, t. 4. Acrostichum, Linn. Sp. Pl. p. 1527. Sw. Syn. Fil. p. 13. Schk. Fil. p. 3. t. 3. and t. 22. Willd. Sp. Pl. v. p. 119. Hemionitis, H. B. K. Nov. Gen. Am. i. p. 4. Trismeria argentea, aurea, and microphylla, Fée, Gen. Fil. p. 165. Phyllitis ramosa trifida, Sloane, Jam. i. t. 45. f. 2. Lingua cervina triphylla, Plum. Fil. p. 123. t. 144.*

Hab. Jamaica and other of the West Indian islands, and in tropical S. America from Brazil and Ecuador, Guatemala.—The powdery substance clothing the under side of the fertile fronds varies from white to full sulphur-colour.

§ 3. STEGNOGRAMME.—*Veins pinnated from the costule, connivent, the lower ones at least, in opposite pairs (as in Eunephrodium among Aspidiæ).—Gen. Stegnogramme, Bl. Hook. Gen. Fil. t. CXX. B. (from Presl.)*

50. G. (Stegnogramme) *aspidioides*, Hook. (not Klfs.); caudex ascending more or less paleaceous-subrepent, whole plant on both sides especially on the veins hairy (except the caudex) sometimes densely villous, stipites terminal on the caudex tufted a span to a foot long at length glabrous glossy, fronds 1–1½ foot long 5–6 inches wide ovato-lanceolate acuminate pinnated pinnatifid at the apex firm-membranaceous, pinnæ opposite or alternate sessile subtruncate and more or less adnate at the base 3–4 inches long rarely an inch wide oblongo-lanceolate lobato-pinnatifid, superior ones confluent, veins 5–6 pairs from each costule simple 3 lower ones united to those opposite and forming an excurrent spurious vein reaching to the sinus, those in the lobes free all soriferous, sori linear-oblong occupying nearly the whole length of the veins.—*Hook. Gen. Fil. t. 120. B., and Ic. Pl. x. t. 950 (or Cent. of Ferns, t. 50). G. Stegnogramme, Bl. Fil. Jav. p. 98. t. 44. Stegnogramme aspidioides, Bl. En. Fil. Jav. p. 172. Presl, Tent. p. 210. t. 9. f. 5 (not Gymnogr. aspid., Bl. En. Fil. Jav. p. 112, which is G. Totta). Phegopteris Stegnogramme, Metten. Fil. Hort. Lips. p. 84. Phegopt. p. 26.*

Hab. Banks of rivers, Java, alt. 3–4000 feet, *Blume, Thos. Lobb, De Vriese and Teijsmann, n. 612. Eastern Bengal, Khasya, alt. 6000 feet, Griffith, Hooker fil. and Thomson. Ceylon, Gardner, n. 1292.*—The Java specimens are generally the largest and most copiously villous. *Stegnogramme Sandvicensis*, Brack., is *Poly-podium* (Goniopteris) *Sandvicense* of this work.

§ 4. DICTYOGRAMME.—*Veins uniting so as to form costular irregular areoles, ultimate veinlets near the margin, free.—Gen. Dictyogramme, Fée.*

51. G. (Dictyogramme) *ambigua*, Hook.; caudex?, stipes?, fronds 1½ foot and more long 6–12 inches wide sparsely pilose on both sides with long brown jointed hairs membranaceous ovate or ovato-lanceolate acuminate pinnated pinnatifid at the extremity, pinnæ sessile or nearly so distant in subopposite pairs 4–6 inches long ½ an inch (in some of the fertile pinnæ to 1–1½ inch long) in the sterile ones oblongo-lanceolate pinnatifid rather more than halfway down to the costa, segments oblong subfalcate obtuse entire, veins anastomosing so far as to form a series of costal areoles and 2 or 3 costular ones nearly all the rest free simple or forked soriferous, sori oblong subpulvinate simple on the simple veins forked on the forked veins rarely suborbicular.—*Digrammaria ambigua*,

*Pr. Tent. Pterid. p. 117. t. 4. f. 12.* Heterogonium aspidioides, *Pr. Epim. Bot. p. 143.* Stenosemia aurita, *J. Sm. Hook. Gen. Fil. t. 94. f. 1-1 (excl. ff. 5-9, which belong to Polypodium (Phegopteris) Philippinum).*

Hab. Luzon, *Cuming, n. 151* (this number is referred to by *J. Sm.* as *Lastrea spectabilis*, in *Hook. Bot. Journ. iii. p. 399*), and *Samar, n. 321* (*Stenosemia aurita*, *J. Sm. l. c. p. 395*).—This is a remarkable plant, and is subdimorphous, that is, the fertile fronds or pinnae are more contracted than the sterile ones. It corresponds in its venation with *Pleocnemia* in the *Aspidium* group. As in some other *Grammitideæ*, the sori vary from oblong to subglobose.

52. *G. (Dictyogramme) Japonica*, *Desv.*; caudex creeping, stipites a span to a foot long stramineous-brown very glossy, fronds  $1\frac{1}{2}$ –2 feet and more long 1 foot wide broad-ovate acuminate membranaceous pinnated subbipinnate below, pinnae all petiolate subopposite 6–10 inches long 1–2 inches broad from an obliquely cuneated base oblong subfalcate finely acuminate entire or serrated, veins copious approximate erectopatent anastomosing so as to form rather large costal areoles, others forked partially anastomosing into narrow elongated areoles the rest free towards the margin, sori copious often on all the veins and uninterrupted (so as to have the sori of *Hemionitis* next the costa, and of *Gymnogramme* towards the margin).—*Desv. Journ. Bot. iii. p. 26.* *Kze. in Schk. Fil. Suppl. ii. p. 39. t. 116.* *Dictyogramme, Pr. Epim. Bot. 263* (altered by the author in my manuscript copy to “*Notogramme*”). *Hemionitis, Th. Fl. Jap. p. 333.* *Sw. Syn. Fil. p. 21.* *Willd. Sp. Pl. v. p. 120.*

Hab. Japan, *Thunberg. Goring; Yokahama, Oldham, n. 110.* Island of Formosa, *Swinhoe* (pinnae very broad).—This bears the same relation to *G. Japonica* that our *G. podophylla* does to *G. pedata*. The only difference is in the venation, and it is not a little remarkable that *G. Japonica* is also found to be a native of Japan, viz. of Simoda and Hakodadi.

53. *G. (Dictyogramme) pinnata*, *Hook.*; caudex creeping at the apex clothed with black setaceous hairs, stipites subaggregated a span and more long glossy brown as well as the rachis, fronds coriaceous a span to a foot and more long nearly as much wide suboval glabrous subnitent pinnate, pinnae 5–17 petiolate 5–10 inches long  $\frac{1}{2}$ –1 inch and more wide lanceolate or linear-lanceolate costate, veins uniformly anastomosing so as to form copious narrow-oblong oblique areoles, veins soriferous, sori narrow linear and considerably elongated subanastomosing (as are the veins) or short oblong and very irregularly scattered.—*Syngramme pinnata, J. Sm. in Hook. Lond. Journ. Bot. iv. (1845) p. 168. t. 7, s. C.* *Dictyo-*

gramme, *Moore*. *Hemionitis elongata*, *Brack. Fil. U. S. Expl. Exp. p. 66. t. 8.*

Hab. Island of Jobie, Indian Archipelago, *Barclay*. Fiji islands, *Brackenridge*, *Milne*, *Harvey*, *Seemann*, n. 715, *Cairns*. Ovalau, *Milne*.—The state with the short scattered oblong sori seems to be much the most common in Fiji and Ovalau, and the pinnae of such have the broadest sori; the form, however, seems to arise from disease.

54. G. (Dictyogramme) *podophylla*, Hook.; caudex?, stipites 5–6 inches long purple-brown glossy, fronds  $2\frac{1}{2}$ –4 inches long nearly as much wide firm-subcoriaceous villous above pubescenti-tomentose beneath cordate and quinato-pedate primary divisions deeply pinnatifid with obtuse or acuminate segments, veins anastomosing apparently free near the margin and those soriferous, sori linear soon confluent. (TAB. CCXCVI.)

Hab. Mexico, between Vera Cruz and Orizaba, *F. Müller*, n. 719 (communicated by Dr. Meisner). Rio Grande, New Mexico, from the U. S. Mexican Boundary Survey, *C. Wright*, n. 819.—In my specimens from Dr. F. Müller, it is quite clear that the veins anastomose; in other respects the species does not differ specifically from the *G. pedata*, Klfs. (our n. 13). I am a little doubtful of Mr. Wright's specimens. The fronds there are too opaque to enable me to distinguish the true structure of the venation, yet I suspect the two are identical.

§ 5. SYNGRAMME.—*Primary veins parallel, forming very elongated transverse areoles, veinlets anastomosing only near the margin.*—*Gen.* Syngramme, *J. Sm.* Callogramme, *Fée*.

55. G. (Syngramme) *quinata*, Hook.; caudex?, stipites a span and more long stramineous-brown glossy, fronds firm subcoriaceo-membranaceous quinato-pedate or in other words ternate with the terminal or intermediate pinna 6–14 inches long  $1\frac{1}{4}$ –3 inches broad, lateral ones 6–11 inches long entire with the lowest pair decurrent at the base or bipartite with the lower segment subdeflexed half the size of the one which bears it, all oblongo-lanceolate shortly and suddenly acuminate entire, veins subhorizontally patent approximate simple or rarely forked anastomosing at the margin so as to form a single series of areoles within the margin, sori simple or forked linear occupying more or less of the anastomosing veinlets. (TAB. CCXCVII.)

Hab. Island of Vanecolla, or Pitt's Island, S. Pacific, *C. Moore*, n. 12. Salomon's Islands, S. Pacific, *Milne*, n. 579. Borneo, Sarawak, *Thos. Lobb*.—A very handsome and peculiar species.

56. G.? (Syngramme?) *subtrifoliata*, Hook.; caudex?, stipites (imperfect ones) 4 inches long brown glossy margined



the whole length on each side with a narrow wing from the decurrent bases of the lowest pinnae, fronds (*sterile*) firm membranaceous nearly 1 foot long trifoliolate, leaflets or pinnae 6–10 inches long  $\frac{3}{4}$  to 1 inch wide petiolate alternate articulated on the rachis and deciduous, terminal pinna the largest and broadest lanceolate finely acuminate subsinuato-crenate gradually attenuate at the base into a narrow wing on the petioles and stipes, all of them thickened by a line at the very margin, veins approximate numerous subhorizontal patent simple or forked extending to and united with the thickened margin, costa pale greenish-brown beneath, sori? (TAB. CCXCVIII.)

Hab. Trees on mountains, Naviti Levu, Fiji Islands, *Milne*, n. 108, not found in fructification.—I give this plant a place and a name here, though it may have little or nothing to do with this group of Ferns. The pinnae are clearly jointed on the slender and always winged rachis, and there is evidently a marginal (not intramarginal vein which unites all the transverse veins.

57. *G.* (Syngramme) *obtusifolia*, Hook.; caudex creeping underground copiously and long radicans, stipites aggregated very slender flexuose 2–3 inches long stramineous glossy, fronds simple coriaceous glossy 6–9 inches long  $\frac{1}{4}$ – $\frac{1}{2}$  an inch wide (*fertile* ones generally the longest and narrowest) linear-spathulate flexuose very obtuse at the apex (singularly so and broad in the sterile fronds) quite entire, the margin scarioso, the costa pale stramineous beneath, veins prominent and very conspicuous on the upperside not at all so nor even manifest beneath, subhorizontally patent numerous simple or forked extending to and uniting with an intramarginal vein close to the callous edge, not a few of these veins anastomose but by no means commonly so, sori oblong rather than linear simple or rarely forked most numerous near the margin. (TAB. CCXCIX.)

Hab. Java, *De Vriese and Teijsmann*, n. 206.—The slender and very flexuose stipes and the long attenuated flexuose base of the frond and very obtuse apices give this Fern a peculiar aspect. It is very different from the two preceding species and perhaps in general habit and texture more allied to *G. vittiformis*; but the stipites are very different, and there is here clearly no *marginal* anastomosing of the veins.

58. *G.* (Syngramme) *Lobbiana*, Hook.; caudex creeping partly clothed with short black hairs, stipites subaggregated  $1\frac{1}{4}$ –2 inches long ebony-black very glossy as is the costa beneath, fronds simple firm-coriaceous opaque 7–10 inches long glabrous  $\frac{1}{2}$ – $\frac{3}{4}$  of an inch wide narrow lanceolate or broader below the middle much and gradually acuminate entire, veins numerous erecto-patent simple or forked free to within

a short distance from the margin where they unite by a series of angular arches which constitute a zigzag line, sori most beautifully and regularly arranged simple or forked clothing the whole length of the veins but not extending to the connecting marginal arches. (TAB. CCC.)

Hab. Borneo, *Thos. Lobb*.—A very pretty species, which I can nowhere find described.

59. *G. (Syngramme) borneensis*, Hook.; caudex creeping the apex clothed with short black velvety hairs, stipites very short scarcely 3 lines long pale-brown aggregated, fronds simple coriaceous glabrous; *sterile* ones 4–7 inches long  $\frac{3}{4}$  of an inch wide spatulato-lanceolate shortly acuminate; *fertile* ones 6–8 inches long scarcely  $\frac{1}{4}$  of an inch broad narrow linear-lanceolate longer but more bluntly acuminate, all of them gradually attenuated at the base nearly to the caudex very minutely pellucido-punctulate, the margin narrowly scarious serrulate towards the apex, the costa pale stramineous beneath, veins copious subhorizontally patent simple or forked united by a distinct longitudinal vein a little within the margin, sori copious linear simple or forked extending the whole length of the veins or more copious towards the margin. (TAB. CCCI.)

Hab. On trees, Sarawak, Borneo, alt. 2500 feet, *Thos. Lobb*.—Evidently allied to *G. lobbiana*, but very distinct in texture, venation, and in the attenuated base of the almost sessile fronds.

60. *G. (Syngramme) vittæformis*, Hook.; caudex creeping partially clothed with setaceous black scales, stipites approximate subcæspitose 1–1½ foot long subflexuose purple-black, fronds simple coriaceo-membranaceous 7–12 inches long  $\frac{3}{4}$ –2½ inches broad (in the *sterile* ones) shortly and obtusely acuminate moderately attenuated at the base in the *fertile* fronds long and narrow attenuated and decurrent on the stipes, the margin subsinuato-dentate, veins copious very patent simple or forked anastomosing into 2–3 series of areoles only at the margin, sori narrow-linear occupying the whole length of straight veins and extending partially to the anastomosing ones.—*Syngramme*, *J. Sm. in Hook. Lond. Journ. Bot.* iv. (1845) p. 168. *t. 7, 8. f. A. Pr. Epim. Bot.* p. 144. *Callipteris*, *J. Sm. in Hook. Journ. Bot.* iv. p. 409. *Oxygonium*, *J. Sm.*

Hab. Island of Samoa, *Cuming*, n. 329.—Well figured by Mr. J. Smith, l. c. I have seen no specimens save from the above locality.

61. *G. (Syngramme) alismæfolia*, Hook.; caudex creeping,

stipites a span to a foot and more long blackish-purple, fronds subcoriaceous-membranaceous simple 5–8 inches long  $2\frac{1}{2}$  inches wide near the base, from a rounded base ovate or ovato-lanceolate finely acuminate, veins numerous approximate simple or forked anastomosing only at the margin into 1–2 rarely more series of oblong hexagonal areoles, sori narrow-linear on all the straight veins but scarcely extending to the anastomosing ones.—Syngramme, *J. Sm. in Hook. Lond. Journ. Bot.* 1845. p. 168. t. 7, s. B. *Pr. Epim. Bot.* p. 144. Diplazium, *Pr. Rel. Hænk. i.* p. 49. t. 8. f. 3 (sori inaccurate). Oxygonium, *Pr. Tent. Pterid.* p. 118. t. 4. f. 11 (venation only). Callogramme Cæciliæ, *Fée, 7me Mém. Foug. Nouv.* p. 41. t. 8. f. 1.

Hab. Luzon, *Hænk.* Singapore, *Wallich, in Herb. nostr., Thos. Lobb.*

62. G. (Syngramme) *Wallichii*, Hook.; caudex creeping underground, stipites subfasciculate a span to  $1\frac{1}{2}$  foot long black-purple, fronds subcoriaceous-membranaceous simple 6–10 inches long  $1\frac{1}{2}$ –2 inches wide in the middle broad-lanceolate or subelliptico-acuminate entire narrow cuneato-attenuate at the base, veins numerous approximate simple or forked anastomosing only at the margin into 1–2 rarely more series of oblong hexagonal areoles, sori narrow-linear on all the straight veins but scarcely extending to the anastomosing ones. (TAB. CCCII.)

Hab. Singapore, *Wallich.* Borneo, Sarawak and Labuan, *Wallace, Thos. Lobb, Motley.*—This is readily distinguished from *G. alismifolia* by its longer and truly lanceolate fronds with a tapering narrow embeate base, and all my specimens are very uniform in this respect.

§ 6. SELLIGUEA.—Primary veins often pinnated from a central costa, the rest (or all) uniformly but often irregularly anastomosing, with or without free veins. Fronds mostly simple and entire, rarely pinnatifid.—This is among *Grammitidæ*, in regard to venation, what *Phymatodes* is among *Polypodiæ*.—*Gen. Selliguela, Bory.* *Grammitis, Auct.* *Loxogramme, Pr., in part.* *Hook. Gen. Fil. t. 73. B.* *Colysis, Pr.*

63. G. (*Selliguela*) *involuta*, Don; caudex long creeping paleaceous at the apex with broad lanceolate scales, stipites subaggregated stout but compressed and winged, fronds carnosocoriaceous a span to  $1-1\frac{1}{2}$  foot long  $\frac{3}{4}$ –3 inches wide simple lanceolate acuminate much attenuated at the base and narrowly decurrent on the stipes, costa broad compressed pale-coloured, venation immersed obscure, primary veins oblique subcostuliform very slender connected by a network of secondary veins forming subuniform areoles with larger

costal ones sometimes including free veinlets, sori linear elongated erecto-patent but varying a good deal in direction not quite extending to the costa or to the margin.—Grammitis, *Don, Prodr. p. 14. Hook. and Grev. Ic. Fil. t. 53. Bl. Eu. Fil. Jav. p. 117.* Antrophyum, *Bl. Fil. Jav. p. 87.* Loxogramme, *Pr. Selliguela, Kze. in Linnæa, xxiv. p. 252.* Polypodium, *Metten. Fil. Hort. Lips. p. 37. t. 25, 26, 27 (venation and sori). Polyp. p. 113.* Grammitis cuspidata, *Zenk. Pl. Ind. i. t. 2.* Gr. scolopendrina, *Bory, in Voy. Coq. p. 256. t. 30. f. 1.* Gr. flavescens, *Wall. Cat. n. 6.* Antrophyum, *Bl. Fil. Jav. t. 37. f. 1 (not Grammitis coriacea, Klfs. in Sieb. Syn. 67, a Mauritius Fern, which is considered by Kunze to be Gr. lanceolata, Sw.).* Antr. avenium, *Bl. Fil. Jav. p. 86. t. 37. f. 2.* Polypodium *Metten. Polyp. p. 114. t. 3, 20, 21.* Loxogramme Blumei, *Pr. Selliguela, Kze.* Polypodium, *Metten. Polyp. p. 114. t. 3, ff. 27, 28 (venation and sori).* Grammitis acuminata, *Wall. Cat. n. 7.* Gr. macrophylla, *Wall. Cat. n. 10 (not Blume).* Selliguela Wallichiana, *Hook. Ic. Pl. t. 204.*

Hab. One of the most common of Indian Ferns in mountain districts, at an elevation of 4000–6000 feet, from Kumaon in the west to Sikkim and Boutan and Khasya in the east; Neilgherries, etc. Moulmeine and Borneo, *Thos. Lobb. Java, Blume and others*, frequent. Penang and probably all the Malay islands, Luzon, *Cuming, n. 12.* Ceylon, Horton Plains, alt. 8000 feet, *Gardner, n. 1227.* Salomon Islands, S. Pacific, *Milne, n. 565* (very fine specimens).—With so common an Indian tropical Fern as this, some variation may be anticipated in relative length and breadth of the frond, but few species of Ferns are more easily recognized. Bory gives this as a native of New Zealand, and hence perhaps Dr. Hooker, in his Flora N. Zeal, has supposed it to be the *Grammitis australis*, Br.

64. G. (Selliguela) *lanceolata*, Sw.; caudex long creeping densely rooting paleaceous, stipites often aggregated very short 3–4 lines long compressed marginato-alate, fronds 6–12 inches long  $\frac{1}{2}$ – $\frac{3}{4}$  of an inch wide simple carnosu-coriaceous lanceolate sharply acuminate, below attenuated and long decurrent nearly as far as the caudex costate, costa sunk, veins anastomosing and forming a series of oblong hexangular areoles parallel with the costa rarely including free veinlets, sori large linear oblong pulvinate obliquely parallel with the costa.—Grammitis, *Sw. Syn. Fil. p. 22 and 213. t. 1. f. 4. Willd. Sp. Pl. v. p. 139. Hook. and Grev. Ic. Fil. t. 43.* Antrophyum, *Bl. Fil. Jav. p. 84. t. 36.* Loxogramme, *Pr. Hook. Gen. Fil. t. 73. B.* Selliguela, *Fée.* Polypodium, *Metten. Polyp. p. 12. t. 3. f. 25.*

Hab. Bourbon and Mauritius. Ceylon, *Thwaites, C. P. n. 3146.* S. Africa, *L. Meade, D'Urban* (very bright green when dry: some specimens bifid and lacinated at the apex). Tropical W. Africa, Sierra Leone, *Brass, Barter*; Fernando

Po, alt. 3000 feet, *Gustav Mann*, n. 373, and Cameroon Mountains, common, alt. 4-7000 feet, n. 1381 (some specimens  $1\frac{1}{4}$  inch broad). Java, *Blume*, *Thos. Lobb*. India: Khasya and Moosmee, *Griffith*, alt. 3-4000 feet, *Hooker fil. and Thomson*; Neilgherries, *Wallich* (Gr. *Wightiana*, *Wall.*) China: Bonin, *Beechey*, *C. Wright*. Japan: Nagasaki, *Oldham*; Tsus-Sima, *Wilford*.

65. G. (*Selliguea*) *elongata*, Sw.; caudex creeping rufo-tomentose as well as the copious radicles, stipites distant 3-4 lines long, fronds 3-8 inches long  $\frac{1}{4}$ - $\frac{1}{2}$  an inch wide coriaceous opaque simple sparsely and deciduously scaly (with very minute rounded peltate ciliato-dentate scales) linear-lanceolate acuminate much and gradually attenuated below, costa often black on the under side, veins submanifest on the thinner fronds anastomosing so as to form elongated areoles nearly parallel with the costa the lower ones often including a long free veinlet, sori oblong a little sunk pulvinate numerous intermediate between and parallel with the costa and the margin, capsules when young mixed with minute peltate scales.—*Sw. Syn. Fil. p. 22. Willd. Sp. Pl. v. p. 140. Synnammia, Pr. Mecosorus, Kl. Phlebodium, J. Sm. Polypodium, Metten. Polyp. p. 88. Drynaria, Fée, and D. Pricurii, Fée, Gen. Fil. p. 271, and Gme Mém. Foug. Nouv. p. 17. t. 6. Grammitis lanceolata, Schk. Fil. p. 9. t. 7 (sori too long). Gr. squamulosa, Splitg.*

Hab. Tropical America, frequent. Throughout the W. India Islands, Cuba, *Wright*, n. 796. Venezuela, *Birschill*. Brazil, *Raddi, Gardner*, n. 192, and others. Surinam, *Splitgerber*. Western Andes of Quito, *Spruce*, n. 5664.—Generally a small but well-marked species.

66. G. (*Selliguea*) *Salvinii*, Hook.; caudex long creeping paleaceous and rooting with densely tomentose fibres, fronds distant carnosomembranaceous simple 6-10 inches long glabrous obtusely acuminate gradually attenuated to the perfectly sessile base obscurely costate, veins forming series of oblong hexagonal areoles with no included free veinlets, sori linear or short oblong pulvinate slightly oblique but nearly parallel with the costa.—*Grammitis, Hook. 2d Cent. of Ferns, t. 71. Selliguea Mexicana, Fée, 7me Mém. Foug. Nouv. t. 10. f. 4?*

Hab. Guatemala, Vera Paz, alt. 3500-5000 feet, *Osbert Salvin, Esq., Jurgensen*, n. 248?—A very distinct-looking plant of its section, with quite sessile fronds and with a very obscure costa. The latter is represented by a broad whitish line rather than by any perceptible thickening to constitute a midrib. My specimens are very perfect, and I have seen none but those gathered by Mr. Salvin. I cannot satisfy myself without authentic specimens if it be the same as *Fée's Selliguea Mexicana*, thus characterized, "fronds lanceolate thick coriaceous soft attenuated at both extremities when dry yellowish, the margin undulate, stipes very short winged, sori linear obtuse straight remote, capsules subrotund, pedicels broad

short, annulus 14-16-articulate, stoma narrow, spores ovoid." The figure represents the frond much more attenuated at each extremity, and with much smaller sori. If it should eventually prove the same, the name of *Mexicana* must have the right of priority.

67. G. (Selliguea) *caudiformis*, Hook.; caudex creeping paleaceous with lanceolato-subulate ferruginous scales, stipites remote plano-triquetrous a span or more long, fronds dimorphous firm-coriaceous; *sterile* ones 5-7 inches long ovato-oblong acuminate acute at the base; *fertile* ones 6-9 inches long elongated lanceolate more or less acuminate, venation obscure, primary veins costuliform very patent but united by transverse veins including lesser areoles and then having free veinlets, sori uniseriate between the costules subrotund (and polypodioid) or confluent into linear elongate (and grammitidoid) sometimes as long as the costules.—Var. *α*, sori elongated and continuous. Grammitis (Selliguea) *caudiformis*, *Hook. Bot. Mag. t. 5328*.—Var. *β*, sori interrupted and more or less polypodioid. *Polypodium caudiforme*, *Bl. Fil. Jav. p. 146. t. 54. f. 2. Metten. Polyp. p. 110*. *Selliguea plantaginea*, *Brack. Fil. U. S. Expl. Exp. p. 58*.

Hab. Java, *Blume, De Vriese and Teijsmann*, alt. 10,000 feet. Tahiti, *Erack-enridge*. Isle of Aneiteum, *Milne*. Fiji Islands, *Seemann*.—The fronds of this Fern have a great resemblance to those of our *Polypodium* (Phymatodes) *triquetrum*, and are sometimes in like manner proliferous: but the fertile ones are narrower and more or less acuminate. The sori are remarkable for being sometimes polypodioid and sometimes grammatidoid, so that it is difficult to say to which group it should belong.

68. G. (Selliguea) *Févi*, Hook.; caudex creeping paleaceous with subulato-setaceous scales which are dilated at the base, stipites distant 2-4 or 6 inches long (of the *fertile* fronds), fronds more or less firm-coriaceous glabrous; *sterile* ones 2-4-5 inches long ovate acuminate with an obtusely cuneate base rarely and only when young oblongo-ovate and obtuse; *fertile* ones 4-6 inches long lanceolate acuminate (rarely oblong and obtuse) subdecurently attenuated at the base, venation obscure, primary veins costuliform distant subhorizontally patent united by transverse veins forming large areoles which are again occupied by lesser areoles with or without free included veinlets, sori central alternating with and parallel with the costules sunk, when young small and suborbicular, in maturity nearly as long as the costules linear-oblong pulvinate rarely subinterrupted.—*Selliguea*, *Bory, in Dict. Class. d'Hist. Nat. vi. p. 344, cum Ic. Bl. Fil. Jav. p. 123. t. 51. Pr. Epim. Bot. p. 145. Polypodium, Metten. Polyp. p. 110*.

*Polypodium Vulcanicum*, *Bl. l. c. p. 144. t. 56. f. 2* (fronds obtuse). *Metten. Polyp. p. 111.* *Grammitis*, *Bl. En. Fil. Jav. p. 118.* *Grammitis diversifolia*, *Wall. Cat. n. 8, and in Herb. nostr.*

Hab. Penang and Singapore, *Wallich, Sir Wm. Norris.* Java, *Blume.* Borneo, *Thos. Lobb.*—This has much narrower sterile fronds than *G. heterocarpa* (our n. 72), and, I believe, is very distinct. I may here mention a species of *Selliguea* of Brackenridge with which I am unacquainted; *S. aliena*, “caudex creeping, stipites elongated marginate, fronds entire glabrous membranaceous lanceolate caudato-acuminate attenuate at the base repand at the margin, sori oblique continuous scarcely extended to the margin.”—*Brack. Fil. U. S. Expl. Exped. p. 58.* Hab. Luzon. “Closely related to *Ceterach paniculata*” (*pedunculata?*), “Hook. and Grev., and to *Grammitis membranacea*, Bl.”

69. *G. (Selliguea) macrophylla*, Bl.; caudex “creeping paleaceous, stipites 3 to 8 inches in the fertile plant,” fronds membranaceous 12–16 inches long 3–3½ inches broad oblongo-lanceolate or oblongo-subspathulate shortly acuminate at the base gradually and rather long-attenuated upon the stipes entire or subsinuate at the margin subopaque, venation manifest, primary veins costuliform subhorizontally patent, a slenderer intermediate soriferous vein runs parallel with them, and all are connected by transverse veins thus forming nearly four-sided subuniform areoles often including free veinlets, sori alternating with the parallel veins equally long entire or interrupted.—*Grammitis, Bl. En. Fil. Jav. p. 119.* *Selliguea, Bl. Fil. Jav. p. 127. t. 53 (very faithful).* *Colysis, Pr. Polypodium, Metten. Fil. Hort. Lips. p. 37. t. 25. f. 22, 23 (venation excellent).* *Metten. Polyp. p. 111.*

Hab. Java, *Blume.* Isle of Bohol, Philippine Islands, *Cuming, n. 351.* Borneo, forests at Sarawak, *Thos. Lobb* (more sharply acuminate and the fertile frond more ovate).—The finest species perhaps of the group.

70. *G. (Selliguea) membranacea*, Bl.; caudex creeping branched the young branches paleaceous with subulate black scales, stipites remote 2–6 inches long, fronds 6–12 inches long ½–1½ inch wide lanceolate acuminate firm-membranaceous glabrous almost black when dry, the base long attenuated and narrow decurrent on the stipes, primary veins slender subcostuliform united by secondary ones forming hexagonal subuniform areoles, sori patent linear extending from near the costa to near the margin.—*Grammitis, Bl. En. Fil. Jav. p. 118.* *Selliguea, Bl. Fil. Jav. p. 123. t. 52. f. 2.* *J. Sm. Colysis, Pr. Epim. p. 147.* *Selliguea marginata, Meyen. in Pr. Tent. Pterid. p. 216.* *Colysis, Pr. Epim.*

Hab. Java, *Blume.* Luzon and Samar, *Cuming, n. 325 and 334.*—Presl makes two species out of *Cuming's* specimen, but, I think, without sufficient reason.

71. G. (*Selliguea*) *Wrightii*, Hook.; caudex creeping paleaceous with blackish subulate often falcate small scales, stipites scarcely any or in other words 8–12 inches long but winged almost to the caudex by the gradually decurrent base of the frond, in general the longer are of the fertile fronds, fronds 6–8 inches long before coming to the rather sudden contraction which forms the wings to the stipes almost black when dry glabrous membranaceous opaque exactly lanceolate obtusely acuminate entire remarkably decurrent on the stipes, primary veins costuliform subhorizontally patent between which are two parallel series of rather large oblong-square areoles with or without free veinlets, sori linear rarely interrupted yellowish alternating with the costular veins. (TAB. CCCIII.)

Hab. Loochoo Islands, *C. Wright* (“*Selliguea pedunculata*, Pr.”) West coast of Formosa, *Wilford*, *Swinhoe*.—This is quite different from the *Selliguea pedunculata* of Pr., to which Mr. C. Wright refers it, and a very remarkable species, extremely uniform in the specimens I possess from three different collectors. From the dark opaque hue of the fronds and scales of the caudex, it has the appearance of an aquatic.

72. G. (*Selliguea*) *heterocarpa*, Bl.; caudex creeping densely clothed with appressed subulate-setaceous scales, stipites distant 6–8–10 inches long stramineous longest of the fertile frond, fronds subcoriaceo-membranaceous and glossy entire more or less acuminate from 10–12 inches long usually all more or less lanceolate or oblongo-lanceolate attenuated and decurrent at the base entire, costules very distinct horizontal connected by transverse veins forming large areoles filled up with a net work of smaller ones with free included veinlets, sori alternating with the costules broad oblong sunk (forming an oblong boss on the upper side) extending neither to the costa nor to the margin.—*Grammitis*, *Bl. En. Fil. Jav. p.* 118. *Selliguea*, *Bl. Fil. Jav. p.* 125. *t.* 52. *f.* 1. *Pr.* *Polypodium*, *Metten. Fil. Hort. Lips. p.* 37. *t.* 25. *ff.* 24 and 25 (*venation very faithful*).

Hab. High mountains of Java, *Blume*, *Zollinger*, *Millett*, *Thos. Lobb. De Friese and Teijsmann*.—This is well figured by Blume, and appears to be peculiar to Java.

73. G. (*Selliguea*) *Hamiltoniana*, Wall.; caudex creeping partially paleaceous with subulate black scales, stipites distant 2–4 inches long, the sterile fronds a foot and more long and more slender in the fertile, fronds dimorphous subcoriaceo-membranaceous subopaque glabrous sinuato-dentate ovate or ovato-lanceolate acuminate at the base long-attenu-



ated and decurrent upon the stipes; *sterile* ones 5–18 inches long; *fertile* 3– rarely exceeding 5 inches long, primary veins costuliform flexuose horizontally patent distant united by transverse veins forming large square areoles including several lesser ones which generally include free veinlets, sori copious oblong continuous alternating with the costular veins equally long with them at length confluent.—*Wall. Cat. n. 9.* Selligiea Hamiltoni, *Pr. Tent. Pterid. p. 216. t. 9. f. 16,* and S. Hookeri, *Pr. l. c.* Ceterach pedunculata, *Hook. and Grev. Ic. Fil. t. 5.* Selligiea, *Pr. Epim. Bot. p. 146.*

Hab. Silhet, *F. de Silea.* Khasya and Mishmee, *Griffith.*

74. G. (Selligiea) *decurrens*, Hook.; caudex creeping paleaceous, stipites distant 1 foot and more long stramineous-brown, fronds 1–1½ foot and more long 8–10 inches broad firm-membranaceous broad ovate deeply pinnatifid or pinnated with the rachis more or less winged, segments spreading 6–8 inches long ½ an inch or less to 1½ inch wide linear-lanceolate or broad oblongo-lanceolate finely acuminate subopposite and very distant generally contracted near the base then dilated above, and so extending above and decurrent below as to form a narrow or broad wing between the segments, veins sometimes slightly costuliform but usually they constitute rather large unequally-sized hexagonal areoles including free clubbed veinlets, sori linear obliquely patent varying much in length and in breadth commencing near the costa but never extending to the margin.—*Grammitis decurrens, Wall. Cat. n. 5. Hook. and Grev. Ic. Fil. t. 6.* Selligiea, *Pr. Hemionitis pothifolia, Don, Prodr. Nep. p. 13.* Selligiea, *J. Sm. Colysis, Pr. Epim. Bot. p. 148.* Polypodium, *Metten. Polyp. p. 103.*

Hab. Nepal, *Wallich*, and all along the Himalaya range from N.W. Bengal, eastward to Sikkim, Boutan, Khasya, *Griffith, Hooker fil. and Thomson* (alt. 6000 feet, *Edgeworth*); Moulmeine, *Parish, n. 294*; Luzou, *Cuming, n. 53.* China: Loochoo, *Beechey, C. Wright*; Hongkong, abundant; Formosa, *Swinhoe.* Japan: Nagasaki, *Oldham*, who also finds a very abnormal state with fronds irregularly lacinated.

## 5. BRAINEA, *Hook.*

*Sori* linear, simple or branched, usually on the veins which form the costal areoles and on the bases of the free transverse ones, often more extended and confluent. *Veins* united so as to form one series of large oblong costal areoles, the rest

free simple or forked.—Caudex *erect, arborescent*. Fronds *pinnated*. *Bowringia*, *Hook. olim, not Benth. and Champ.*

An Indian Fern with an arborescent trunk, with the venation of *Woodwardia* and grammitidoid sori, which however often become confluent and more or less acrostichoid.

1. *B. insignis*, *Hook. Kew Gard. Misc. ix. p. 354*; *Moore, Ind. Fil.*; *Benth. Fl. Hongk. p. 460.*—*Bowringia*, *Hook. Kew Gard. Misc. v. p. 23. t. 2.* *Hook. Fil. Exot. t. 38.*

Hab. Hongkong, *Sir J. Bowring, J. C. Braine, Esq., Dr. Harland, and others.* Eastern Bengal, Khasya, alt. 4000 feet, *Hooker fil. and Thoyson.*—This remarkable fern has a tree-like stem or caudex as thick as a man's arm, clothed with shaggy, dark-brown or ferruginous, long subulato-lanceolate scales. Stipites stout, short, scarcely a span long. Fronds not unlike those of a *Lomaria*, firm-coriaceous, bright-green, pinnated or occasionally below partially bipinnated. Pinnæ very numerous, close-placed, horizontal, 5-6 inches long, 4 lines broad, from a cordate base, linear-oblong, gradually and finely acuminate, minutely serrated. The sori are remarkable, confined to the costal arches or also running up, the simple veins halfway or more towards the margin, often becoming confluent. At present the only localities known are those above given.

## 6. MENISCIUM, *Schreb.*

(*HOOK. GEN. TAB. XL.*)

*Sori* oblong or linear or sometimes orbicular and geminate, arising from the transverse connivent veinlets. *Involucre* 0. *Veins* or *costules* pinnated from the costa; *veinlets* numerous, the opposite ones uniting in an arc or angle and sending out from that angle a free or continuous veinlet.—Fronds *simple or pinnated*. *Too nearly allied to some species of Goniopteris among Polypodiæ.*

1. *M. simplex*, *Hook.*; caudex long creeping paleaceous, stipites distant stramineous 3-5 inches long of the *sterile*, a span to a foot long of the *fertile* fronds, pubescent, fronds simple subdimorphous firm-membranaceous subcoriaceous; *sterile* ones 6-8 inches long and 1½-2 inches broad; *fertile* ones always much smaller; both are simple oblongo-ovate acuminate sinuato-dentate cordate and hastate at the base with a blunt apex, costa and venation pilose, transverse veins connecting the costules 8-10 the prolonged intermediate vein continuous in the *sterile* frond, generally short and free in the *fertile* one, sori globose or oblong sometimes continued up the free veinlet.—*Hook. Lond. Journ. Bot. i. p. 194. t. 11, Kew Gard. Misc. ix. p. 834, Fil. Exot. t. 83. Benth. Fl. Hongk. p. 457.*

Hab. China: Hongkong, *Hindes and others*; Chusan, *Alexander*. N.W. coast of Formosa, *Wilford*.—Allied as this species certainly is to *M. triphyllum*, our species, n. 3. and numerous as are my specimens of both, I find each very constant to its character, exhibiting no intermediate forms.

2. *M. giganteum*, Metten.; caudex?, stipes (in my only specimen) a foot long dark-brown slightly pubescent upwards, frond simple firm-membranaceous dark-green paler beneath 21 inches long 4 inches wide at the middle elongato-oblong acuminate cuneato-subattenuated at the base obtusely sinuato-dentate at the margin, costa stout downy, costules subhorizontal patent slightly curved upwards slender 3 lines asunder soriferous, transverse veins very numerous (as many as 37) between the costa and margin slightly curved, the whole length occupied by a linear continuous sorus, free veinlets from the two united veins short never extending to those above in my specimen.—*Metten. in Fil. Lechl. p. 19.*

Hab. Shady moist woods, St. Govan, Peru, *Lechler*.—Extremely different, as Mettenius observes, from the only other known undivided Meniscium, *M. simplex*, and a very fine and remarkable species.

3. *M. triphyllum*, Sw.; caudex long creeping subulato-paleaceous, stipites pale-brown glabrous 4-5 inches long of the *sterile*, a foot and more long of the *fertile* ones, fronds coriaceous-membranaceous 3-5-foliolate subdimorphous, pinnae 3-5 inches long  $\frac{1}{2}$  an inch to 1 inch wide smaller and narrower in the *fertile* frond, terminal pinna always the largest and long-petiolate, all of them oblong acuminate obtuse or cuneate or subhastate at the base, the margin repando-dentate or nearly entire, venation subpubescent beneath, soriferous veins 4-7-8 arched, the sori (apparently at least) solitary extending the whole length of the transverse veinlet between the costules.—*Sw. Syn. Fil. pp. 19 and 206. Spreng. Analect. iii. p. 84. t. 3. f. 20 (sterile). Willd. Sp. Pl. v. p. 133. Hook. and Grev. Ic. Fil. t. 120. Kze. in Schk. Fil. Suppl. p. 112. t. 52 (excl. syn. and figure of M. simplex, Hook.). M. erosum, Wall. Cat. n. 62. M. cuspidatum, J. Sm. in Hook. Bot. Journ. iii. p. 395 (Cuming's n. 178). M. Cumingii, Fée, Gen. Fil. p. 222.*

Hab. East Indies, China (*Swartz*). Sylhet, *Wallich*; Chittagong and Cachar, *Hooker fil. and Thomson*; Mishmee and Malacca, *Griffith*. Luzon, *Cuming*, n. 178, and Leyte, n. 299. Java, *Blume*. Singapore, *Thos. Lobb*. Ceylon, *Dr. Emerson, Mrs. General Walker, Gardner*, n. 1293. Whampoa, China, *C. Wright*, *Hance*, n. 1511.—I cannot agree with Kunze in including *M. simplex* as a mere simple form of this species, nor in excluding "the figure and description and locality of Ceylon;" indeed my Ceylon specimens being better than any I had at that time in my herbarium, my figures and most of the descriptions were (as there stated)

made from them; so that if they are wrong I have not figured or described the species at all.

4. *M. salicifolium*, Wall.; very glabrous, caudex?, stipites a foot or more long and as well as the rachis stramineous-brown very glossy, fronds 1-1½ foot long subovate subcoriaceous-membranaceous pinnated, pinnæ rather distant spreading 6-7 inches long 4-5 lines broad near the middle, linear-lanceolate very long and finely acuminate and very much and gradually and finely attenuated into the stipes, the margins quite entire, soriferous veins 4-7 the prolonged veinlet short, sori oblong formed of two confluent rounded ones.—*Wall. Cat. n. 63. Hook. Ic. Pl. x. t. 990 (or Cent. of Ferns, t. 90).*

Hab. Penang, *Wallich, Sir Wm. Norris, Singapore, Hance, n. 990, Thos. Lobb.*

5. *M. angustifolium*, Willd.; caudex short underground erect or ascending, stipites subaggregated a span to 1-2 feet long subpubescent at length glabrous (not glossy) subpaleaceous at the base, rachis and costæ beneath always downy, fronds firm-membranaceous dark-green 8-10 inches to 1½ foot long 4-10 inches wide pinnated, pinnæ 4-6 inches long ¼-¾ of an inch wide alternate subpetiolate from a cuneate and moderately attenuated base linear-lanceolate finely acuminate quite entire at the margin those of the *fertile* fronds always the narrowest, soriferous veinlets 6-8 between the costules, medial prolonged veinlet continuous, sori oblong of two confluent ones, capsules soon deciduous.—*Willd. Sp. Pl. v. p. 133.*

Hab. S. America, Caraccas, "*Bredemeyer*;" Venezuela, *Funcke, n. 445. Panama, Fendler, n. 423, Seemann, n. 377. Tarapota, Eastern Peru, Spruce, n. 3978. W. Indies: Jamaica, Purdie, Wilson, n. 510; Cuba, n. 781.*—This is very distinct in its much smaller size, subdimorphous fronds, narrow and quite entire pinnæ, from any South American species, and has a much closer affinity with the East Indian *M. salicifolium*.

6. *M. pauciflorum*, Hook.; caudex a thick erect or ascending rhizome with copious wiry roots, stipites tufted 4 inches to a foot long stramineous-brown and as well as the rachis glossy, fronds very firm membranaceous dark-green 8-18 inches long 3-6 inches wide lanceolate acuminate pinnate to the apex where it is often proliferous, pinnæ numerous patent 1¼-3½ inches long 2-3 lines wide near the middle linear-lanceolate finely acuminate and finely attenuated with a slender thickened pale margin very sharply coarsely and regularly subspinulose serrated chiefly near the middle,

costa rather slender prominent beneath, veins indistinct above slightly prominent and manifest beneath, each pair sends out opposite branches which unite and form a costal areole this united pair is prolonged to the margin and sometimes a second areole is formed and thus there is a solitary or there are two transverse veins which are soriferous, sori linear parallel with the costa rarely interrupted and probably formed by the union of two oblong confluent ones.

Hab. Sierra de Crystal, tropical W. Africa, *G. Mann*, n. 1672.—This is quite a new, and in many respects a very peculiar species, yet I think it can hardly be separated from the genus *Meniscium*. The transverse sori form one or two series between the costa and the margin and parallel with them.

7. *M. serratum*, Cav.; caudex ascending, stipites from the thickness of a duck's to that of a swan's quill 1–3½ feet long brown glabrous, fronds 1½–3½ feet long coriaceous-chartaceous dark-brown green when dry pinnated, pinnae 5 inches to 1 foot long ½ an inch to 2 inches wide from a generally broad and obliquely cuneated mostly sessile base oblong gradually acuminate, the margin strongly and sharply serrated, soriferous veins numerous but varying in proportion to the breadth of the pinna forming an acute angle or a slightly curved line the produced veinlet short and interrupted or continuous through to the margin, sori short and rounded or elongated and composed of two confluent ones very copious and of a bright snuff colour.—“*Cav. Praelect.* 1803. p. 548?” *Sw. Syn. Fil.* p. 19. *M. palustre*, *Raddi, Fil. Bras.* p. 9. t. 20 (very accurate). *Metten. Fil. Hort. Lips.* p. 84. *M. dentatum*, “*Pr. Delic. Prag.* i. p. 162. n. 6.”

Hab. Tropical America, Brazil, *Gardner*, n. 15, 1905 (*M. rostratum*, *Fée, Gen. Fil.* p. 224, t. 18, f. 3), *Spruce*, n. 36\*. Guiana, *Schomburgk*, n. 459, *Richard Schomburgk*, n. 1674, *Appun*, n. 171, *Sagot*, n. 720. N. Granada, *Holton*, n. 30. Panama, *Sutton Hayes*, n. 32. Mexico, *Jurgensen*, n. 917 (*M. Jurgensenii*, *Fée, Gen. Fil.* p. 225).—*Raddi's* figure and description are perhaps the best authority for this species, if indeed it be a species, of which I am very doubtful. I possess not a few specimens on which I cannot decide whether they should be referred to this or to *M. reticulatum*.

8. *M. reticulatum*, Sw.; caudex stout erect or ascending, stipites 1–3 feet long, fronds 1½–4 feet long (*Spruce*) rarely subpubescent coriaceous-membranaceous pinnated, pinnae 5–6–12 inches long and from ¾ of an inch to 3–4 inches wide; fertile ones sometimes contracted oblongo-lanceolate acuminate the base obliquely obtuse or cuneately attenuated lowest ones often petiolate, the margin generally entire or

repando-dentate or obtusely crenate (not sharply serrated), costules horizontal very distinct, transverse scriferous veins numerous but varying according to the breadth of the pinnæ prolonged into veinlets short or more generally continuous to the margin, sori short and subrotund and apparently solitary or geminate and more or less confluent into an oblong sorus or linear and extending in a more or less curved line nearly from one costule to the adjacent one.—*Sw. Syn. Fil. p. 19. Willd. Sp. Pl. v. p. 134. Schk. Fil. p. 5. t. 5. Polypodium, Linn. Sp. Pl. p. 1549. Plum. Fil. p. 92. t. 110 (incorrect as to sori). M. sorbifolium, Willd. Sp. Pl. v. p. 134. Fisch. and Langsd. Fil. p. 6. t. 3. Asplenium, Jacq. Coll. ii. p. 106. t. 3. f. 2. M. falcatum, Liebm. Fil. Mex. p. 31.*

Hab. Tropical America, Martinique, Plumier, and West Indian Islands, generally; Cuba, *C. Wright, n. 782, etc.* Mexico, *Liebmann (M. falcatum, Liebm., and M. sorbifolium, W. var.)*. Venezuela, *Fendler, n. 232, and Panama, Fendler, n. 404.* Peru, *Puppig (from Kze.), Lechler, n. 1785. Tarapota, Spruce, n. 4645, and others.* Ecuador, alt. 3000 feet, *Spruce, n. 5739, Jameson, Seemann, Wood, etc.* Brazil, *Langsdorff, Moricand, n. 477, Gardner, n. 103 and 1904, Spruce, n. 32\*\**, 2141, 1243, *Sellow ("M. longifolium, Kl. = sorbifolium, L. and F.")*. Surinam, *n. 1828 (M. Kaplerianum, Fée, Gen. p. 223, Hostmann, Kapler)*. French Guiana, *Le Prieur, n. 1396 (probably M. Guyanense, Fée, Gen. Fil. p. 224)*.—A very variable species, it must be acknowledged, and further observations may yet prove that the *Meniscium cuspidatum*, of Bl. Fil. Jav. p. 102, t. 45, is in reality neither generally nor specifically distinct from this; yet, on the other hand, I have materials for showing that that plant is one and the same as *Polypodium* (§ *Goniophlebium*) *urophyllum*, Wall.! See our remarks on that species, at p. 10 of this volume.

9. *M. macrophyllum*, Kze.; "frond elliptical or oblong membranaceous glabrous pinnated, pinnæ few alternate cuneato-decurrent at the unequal base upon the short petioles which are dilated upwards acuminate, the margin sinuate and slightly repand; sterile ones elongato-lanceolate very large; fertile ones much smaller at both extremities much attenuated, sori dense at length diffuse, costa and veins glabrous, rachis and long stipes of both fronds tetragonous."—*Kze. in Schk. Fil. Suppl. p. 93. t. 44. "Kze. in Comment. ad Martii Herb. Fl. Braz. n. 362."*

Hab. Brazil, Bahia, *Blanchet, near St. Sebastian, Martius, Cayenne, Le Prieur*.—I possess no exactly authentic specimen of this plant, but I have from Blanchet, a Brazilian *Meniscium*, without name, which entirely corresponds with Kunze's figure and description; but I cannot feel satisfied that it is specifically distinct from *M. reticulatum*.

N.B. Our *Meniscium Thwaitesii*, briefly noticed in 'Filices Exoticae,' under *M. simplex*, t. 83, appears to have involucrate sori, and will probably have to be referred to *Aspleniceæ*. It requires further investigation.

7. ANTROPHYUM, *Klfs.*

(HOOK. GEN. FIL. TAB. CIX. A. *Hemionitis*, *Auct.* *Acrostichum*, *Auct.* *Polytænium*, *Desv.* HOOK. GEN. FIL. TAB. CVII. *Scoliosorus*, *Moore.*)

*Sori* very long, linear, continuous, reticulated (but often imperfectly), occupying for the most part the lateral veins which form the areoles, hence their general course is perpendicular, superficial, or very frequently sunk in a channel or groove. *Veins* copiously and uniformly anastomosing into elongated hexagonal areoles with no free included veins.—*Caudex* short, creeping, often densely tomentose. *Fronds* simple, entire, flaccid, costate or ecostate.

Chiefly distinguished from *Hemionitis* by habit and by the latter having the veins everywhere soriferous. *Aetium* of Splitgerber, which most authors combine with *Acrostichum*, Fée considers an anomalous *Antrophyum*. To me it seems rather an anomalous *Hemionitis*, in which genus Presl places it. Fée has elaborated, with considerable care, the present genus *Antrophyum*, and published many good figures, and as I have not had the advantage of seeing many authentic specimens of himself and others, I have felt it right in the main to follow his arrangement and to preserve his species.

A. *Sori sunk in a manifest groove.*—Sp. 1–11.

1. *A. callaeifolium*, Bl.; “fronds coriaceous glabrous entire wrinkled when dry, terminating in a long acuminate point, the margin entire yellowish diaphanous, the base ending in a short plane flat stipes, costa none or only conspicuous towards the stipes, areoles hexagonal moderately large, sori linear sub-continuous distinct immersed.” Fée.—*Bl. Fil. Jav. p. 83. t. 35.* Fée, *Antroph. p. 42.* *A. reticulatum*,  $\gamma$ , *Moore.*

*Hab.* Java, *Blume*, *Zollinger*, 6 inches to 2 feet long.—Unknown to me. *Blume* likens it to *A. reticulatum*, differing in the thickness and breadth of the frond, in the narrowed pellucid margin, the straight sori not reticulately connected. *Moore* refers it to that species, and some of my specimens of *reticulatum* quite accord with it.

2. *A. Cumingii*, Fée; “stipes complanate twisted black with a black line passing through it, fronds falcato-lanceolate sword-shaped ecostate wrinkled above, areoles very long narrow, sori straight subreticulated much sunk, the margins scariose resembling a spurious indusium.” Fée, *Antroph. t. 4. f. 7.*—*Moore, Ind. Fil. excl. syn. Brack. A. latifolium*, “*Reinw.*” *J. Sm.* (no character or description).

*Hab.* Luzon, *Cuming*, n. 416.—Our original specimens from *Cuming* measure from 1–1½ foot long, 1 inch wide, and they have a distinct, broad, black, but not elevated costa, extending upwards from the very short stipes. I have specimens

from Java (*De Vriese*) in every respect the same, but wanting the dark-coloured costa. It is, I fear, a dubious species.

3. *A. semicostatum*, Bl.; fronds soft coriaceous 8–18 inches long including the very short stipes less than an inch long, 2–4 inches wide spatulate acuminate long-attenuated and gradually and decurrently tapering below, veins very conspicuous, areoles exceedingly elongated often 2–3 inches long, costa broad compressed occupying only the lower part of the frond, sori sunk yet rising above the cuticle very much elongated and parallel rarely branched or anastomosing chiefly following the course of the longitudinal veins.—*Bl. Fil. Jav. p. 77. t. 33. Fée, Antroph. p. 42. Hemionitis, Pr. A. D'Urvillæi, Bory. A. reticulatum, Wall. Cat. n. 40, in Herb. Hook. A. alatum, Brack. Fil. U. S. Expl. Exped. p. 64.*

Hab. Malay islands, *Blume, Wallich* (Penang), *Wallace and Thos. Lobb* (Borneo), *Cuming, n. 19* (Luzon). Ceylon, *Gardner, n. 1307. Khasya, Griffith.* Pacific islands, abundant, Society Islands and Solomon's group, Fiji, Aneiteum (*C. Moore*), and Navigators' Islands (*Brackenridge*).

4. *A. Lessoni*, Bory; “stipes very short subtetragonous thickened at the base, fronds ovoideo-oblong attenuated at each extremity ecostate entire or here and there sinuate coriaceous, sori linear or catenæform rarely reticulated narrow immersed.” *Fée*.—*Bory, in Voy. de la Coquille, p. 254. t. 28. f. 2. Fée, Antroph. p. 45. A. plantagineum, Bl. Fil. Jav. p. 74. t. 30 (excl. the syns.) A. plantagineum, δ, Moore, Ind.*

Hab. Islands of Waigion, Amboyna and Borabora, *Lesson and D'Urville*. Java, *Blume*. Society Islands, *Bidwill, Barclay*. Fiji islands, *Milne, Seemann, n. 77.* Coral Islands, *Beechey* (*A. plantagineum, var., Hook. and Arn.*).—The true plant of Bory, the *A. plantagineum*, of Bl. (not Klfs.), has ovate or oval fronds, more or less acute or acuminate, 3–4 inches long, but some of our specimens take a much more elongated form.

5. *A. elongatum*, *Fée*; “fronds elongato-lanceolate much-acuminated ecostate stipitate submembranaceous pellucid deep-green above, stipites plane, veins very slender, areoles long narrow, sori linear simple flexuose some subcontinuous others short and interrupted brown immersed?” *Fée, Antroph. p. 43. Moore. A. parvulum, β, elongatum, Bl. Fil. Jav. p. 78.*

Hab. Java, *Blume*.—A very dubious species even according to *Fée's* remarks, of which *Blume's* figure (*A. parvulum, α*) represents fronds six inches long including the short stipes: but the same author says his var. *β* attains a length of 1½ foot, and then it must much resemble *A. Cumingii*.—I possess an *Antrophyum* quite agreeing with *Blume's* figure of var. *α*, except that our plant is a foot long (from Aneiteum, *Milne*), but it has a more or less conspicuous midrib.



6. *A. reticulatum*, Klfs.; "fronds lanceolate subfalcate acuminate, the margin flexuose ending at the base in a long flexuose stipes, sori reticulated or subreticulated extended over the whole inferior surface immersed." *Fée*.—*Klfs. En. Fil. p. 198. Fée, Antroph. p. 44. Bl. Fil. Jav. p. 81. Hemionitis, Forst. Prodr. p. 79. Sw. Syn. Fil. pp. 20 and 208. Schk. Fil. vi. t. 6. Willd. Sp. Pl. p. 128. A. falcatum, Bl. Fil. Jav. p. 76. t. 32 (and Moore brings hither *A. callæfolium*, *Bl. Fil. Jav. p. 83. t. 35, our n. 1*).*

Hab. *Fée* gives Society and Caroline Islands, Java and the Philippines, and observes that the species is rare in herbaria. Blume recognizes four varieties, distinguished by the fronds being acuminate or obtuse, spatulate or lanceolate, simple or divided at the summit, so that it is difficult to say what should be included under this species. My specimens, which I consider genuine, are from 10–18 inches long, and 1–1½ inch wide, and are from Java (*Miquel, De Vriese and Teijsmann, n. 341, 283, Blume ("A. falcatum" and "A. reticulatum").* Penang and Mishmee, *Griffith. Assam, Griffith and Wallich. Ceylon, Gardner, n. 1229*; one large specimen is bipartite and the apices have 2–3 large teeth or segments, from Newera Ellia, alt. 5–6000 feet, *n. 1228 and 1305*. Then I have other smaller forms, with the fronds in general shape and size, between *A. Lessoni* and this, which I hesitatingly refer to *A. plantagineum*.

7. *A. nanum*, *Fée*; "fronds elongato-spathulate very obtuse attenuated at the base wrinkled above, cuticle on the upper side (in the Philippine Island specimens) with scattered very minute dots, the margin entire, sori deeply immersed obtuse linear thickish." *Fée, Antroph. p. 44.*—*Moore, Ind. A. obtusum, Bl. Fil. p. 80. t. 94. f. 4 (excl. syn.). Bory. J. Sm.*

Hab. Java, *Blume, in Herb. nostr.* Philippine Islands, "*Cuning, n. 81.*"—A very small species, the spatulate fronds not measuring more than 2 inches in length; in my specimen not more than 1 inch. I should doubt if it has attained its full size.

8. *A. coriaceum*, *Wall.*; "fronds lanceolate acute sessile ecostate plicato-rugose and pale-fulvous when dry thick supple acuminate at the apex furrowed beneath plaited above, the base terminating in a plane stipes, sori situated in the plicatures of the frond forming straight lines remotely confluent." *Fée.*—*A. coriaceum, Wall. Cat. n. 43. Moore, Ind. Hemionitis, Don. Antroph. plicatum, Fée, Antroph. p. 44. t. 5. f. 1. Solenopteris lanceolata, Wall. in Cat. sub n. 43, and in Herb. nostr.*

Hab. Nepal, on the trunks of trees, *Wallich*; Khasya and Mergui, *Griffith.*—Grows in dense tufts; fronds very uniform, 6–7 inches long, 6–8 lines wide, thick and fleshy, no doubt, when fresh, wrinkled longitudinally when dry, sori much elongated and parallel. This has a very distinct appearance from any other of

the genus. Fée's specimens are from Griffith, and there is no doubt of the species being identical with the *coriaceum*, Wall. and Don.

9. *A. plantagineum*, Klfs.; "fronds lanceolato-stipitate acute or acuminate, costa disappearing in the lamina only evident at the base, sori anastomosing occupying the whole frond narrow and immersed, not quite extending to the margin, the furrow superficial." Fée.—*Klfs. En. Fil. p. 197. Bory, Voy. de la Coquille Bot. p. 254. t. 28. f. 1, not Bl.* "Hemionitis, Cav." *Antroph. angustatum*, *Brack. Fil. U. S. Expl. Exp. p. 63?* (frond a foot long linear-lanceolate very membranaceous).

Hab. "Philippine and Marianne Islands, *Lesson and Gaudichaud.*" Society Islands, *Bidwill* (stipites slender, 6-8 inches long, fronds 8 inches long, 1-1½ inch wide, elliptical-lanceolate). Tahiti, *Nuttall and Brackenridge* ("A. angustatum," *Brack.*).—Other smaller forms, but with broader fronds and tapering much and decurrently on the stipes, I am doubtful whether to refer to *A. Lessoni* or *A. reticulatum* or to this species. They are from Ceylon, *Gardner*, n. 1173 (named *plantagineum* by Moore in my Herb.), and n. 1308. India: Mambree, *Wallich* (this also is called *plantagineum* by Moore; and Borneo, *Thos. Lobb, Barber*; Moulmeine, *Thos. Lobb*). Moore indeed unites the *A. Lessoni*, *A. plantagineum*, and the still more different-looking *A. angustatum*. If this be correct, and I am far from thinking it is not, there are I fear many others of the genus which will not bear the test of specific distinction.

10. *A. parvulum*, Bl.; "fronds shortly stipitate lanceolate acuminate at both extremities submembranaceous ecostate, sori nearly straight exposed (nudi)." *Bl. Fil. Jav. p. 78. t. 34. f. 3 excl. β. elongatum* (not *A. pumilum*, Klfs.). Fée, *Antroph. p. 45, in part (excl. syn. Hemionitis immersa, Bory, and the locality of Bourbon).*

Hab. Java, *Blume, in Herb. nostr.* Penang, *Thomas Lobb*. Tahiti, *Barclay*. Khasya, alt. 4000 feet, *Hooker fil. and Thomson.*—My specimens, from the author, about 6 inches long, exactly accord with Blume's figure; those from Khasya are less than half the size. Moore expresses an opinion that the specimens are a very young state of *A. reticulatum*, and this I think very possible; but it has nothing to do with the *A. pumilum* of Kaulfuss. See our next species.—Solitary specimens I further possess, of what I take to be *A. parvulum*, from Penang and Tahiti, one marked by Mr. Moore as "*A. Grevillei*, Balfour?" which is *Polytenium Grevillei*, Moore, Ind. Fil.; but I know not if a description or character is anywhere published.

(*Bourbon and Mauritius.*—Sp. 11.)

11. *A. pumilum*, Klfs.; fronds 2-3½ inches long ½ an inch or a little more wide lanceolate suboblique coriaceous opaque longitudinally wrinkled on the upper surface when dry obtuse or subacute attenuated into a short stipes at the base less than 1 inch long, costa none, sori linear reticulately branched deeply immersed.—*Klfs. En. Fil. p. 197. Hook.*

and Grev.  *Ic. Fil. t. 46. A. Hookerianum, Fée, Antroph. p. 46. Moore. Hemionitis, Pr. Tent. Pterid. p. 221. H. immersa, Bory, in Willd. Sp. Pl. v. p. 127 (and in my Herb.). Pr.*

Hab. Bourbon, *Bory, in Herb. nostr. Mauritius, Carmichael, Bojer, and others*, evidently common there.—My numerous specimens are very uniform in size and shape, and are well represented by Dr. Greville's beautiful figures in *Ic. Fil. 1* cannot but wonder therefore that Fée should consider it a new species and confer my name upon it; and still more, that Moore should assent to this, for he had the opportunity of seeing on the same sheet Bory's *Hemionitis immersa* in my herbarium, and this is the original authority for the species. The excellent Kaulfuss, no doubt, altered the specific name, which is inconsistent with its now generic name.\* It is singular that one of the best marked species of this difficult genus, as far as I yet know, should be so misunderstood. M. Fée, as already remarked, has confounded the Bourbon plant with the *P. parvulum* of Blume.

B. *Sori superficial.*—Sp. 12–24.

12. *A. subsessile*, Kze.; frond sessile membranaceo-coriaceous 6–14 inches long  $\frac{1}{2}$ – $1\frac{1}{4}$  inch wide spathulato-lanceolate obtusely acuminate or rarely quite obtuse, from above the middle gradually attenuated downwards and decurrent to the very base, costate to the apex, costa slender prominent beneath, areoles large oblongo-hexagonal having an obliquely patent direction, sori subsuperficial linear obliquely patent elongated often forked but rarely reticulated.—*Kze. Anal. Pterid. p. 29. t. 19. f. 1 (excellent). Fée, Antroph. p. 47. Moore. A. Cayennense, Kze. in Linnaea, ix. p. 78 (excl. syn.). A. discoideum, Kze. Bot. Zeit. vi. p. 702 (Fée). Hemionitis Brasiliana, Desv. Antrophyum spathulatum, Fée, Antroph. p. 46. t. 4. f. 6.*

Hab. Peru, *Pæppig*; Tarapota, Eastern Peru, *n. 4610* (fronds obtuse). Ecuador, Andes of Quito, *Jameson, n. 704. New Granada, Moritz, n. 81. Fendler, n. 305, Schlim, n. 851, Linden, n. 71, Purdie, n. 13, Jurgensen. Cuba, C. Wright, n. 775.*—A well-marked species, extremely unlike any of those of the Old World, most allied to the following, *A. Cayennense*.

13. *A. Cayennense*, Klfs.; stipites 1–3 inches long rather slender, fronds coriaceous-membranaceous 6–10 inches long  $1-1\frac{1}{2}$  inch broad oblongo-lanceolate shortly acuminate rarely obtuse gradually tapering at the base into the stipes, costate to the apex, costa slender prominent beneath, areoles large oblongo-hexagonal erecto-patent, sori subsuperficial linear obliquely patent elongated often forked but rarely reticulated.

\* From *αντρον*, a cavern or cavity, and *φύω*, I grow, because the sori are produced in cavities or clefts of the cuticle; not, as Loudon has it, "because the plant is found in shady caverns."

—*Klfs. En. Fil. p. 199, in note. Kze. Analect. Pterid. p. 30. t. 19. f. 2 (very good). Hemionitis, Desv. Pr. H. reticulata, Raddi.*

Hab. French Guiana, *Richard, Le Prieur, Sagot, n. 1119; Guiana, Hostmann, n. 1057, Schomburgk, n. 472, Appun. Brazil, Raddi. Para, Spruce, n. 31. Amazon; San Gabriel, n. 2369 and 3027, Spruce* (fronds much acuminate, the former, n. 2369, remarkable for the "steel-blue tint when fresh." Antr. chalybæum. *Spruce's ms.*).—Allied to *A. subsessile*, but truly distinct; both have a percurrent costa, and both have sori subsuperficial, scarcely at all immersed.

14. *A. Boryanum*, Klfs.; stipes 4–6 inches long broad-compressed, fronds 4–6 inches long 2–2½ wide oblong or broad-oblong lanceolate acute or sublobato-incised coriaceo-membranaceous cuneate at the base and more or less attenuated into the stipes, venation slightly prominent beneath, areoles copious oblong hexagonal, sori superficial on the veins not sunk readily deciduous.—*Klfs. En. Fil. p. 199 (not Bl.). Hook. and Grev. Ic. Fil. t. 74. Fée, Antroph. p. 49. Bory, Voy. de la Coquille, Crypt. p. 255. t. 29. f. 1. Hemionitis, Willd. Sp. Pl. v. p. 128. H. reticulata, Bory, Voy. i. p. 214.*

Hab. Mauritius and Bourbon, *Bory and Bojer, in Herb. nostr., Carmichael, Sieber, Fl. Mixta, n. 317. Island of Johanna, east coast of tropical Africa, Dr. Kirk, Zambesi Exped.*—If we take the samples figured for this species, as given by Hooker and Greville, and Bory (l. c.), the species may be considered a well-defined one. Carmichael's specimens are much smaller and narrower, and have a very long attenuated base to the fronds. Bory's own specimen in my herbarium is 17 inches long, 3 inches broad in the middle, and is yet broken off before coming to the absolute base, and it has perhaps as much claim to be referred to *A. giganteum* as to the present species. Our specimen from Johanna Island is quite that of the ordinary form.

15. *A. latifolium*, Bl.; stipites 3–4–6 inches long compressed 2 lines wide, fronds subcarnoso-coriaceous 3–7 inches long 3–4–5 inches wide ovato-subrhomboidal or obovate suddenly and sharply acuminate and sometimes subincisobovate below the acumen, the base cuneate and rather suddenly attenuated into the stipes, costa none, venation manifest, areoles very large oblongo-hexagonal subflabellately directed most elongated in the disk, sori chiefly occupying the disk very subsuperficial elongated simple or branched rarely reticulated.—*Bl. Fil. Jav. p. 75, in note. Kze. Bot. Zeit. vi. p. 209. Fée, Antroph. p. 48. Moore. A. Boryanum, Bl. Fil. Jav. p. 75. t. 31 (excellent, excl. syns.), not of Hook. and Grev. Hemionitis, Bl. En. Fil. Jav. p. 111 (excl. syn.). H. Blumiana, Pr. Tent. Pterid. p. 221.*

Hab. Java, *Blume, Thos. Lobb.* Mountains, north of Assam, *Simons* (communicated by *Dr. Thomson*).—Our Java specimens exactly correspond with *Blume's* excellent figure, and are of a singularly pale-green colour, especially beneath: those from Assam are more variable, some of the fronds quite pyriform, and all of a dark-brown colour, like that of our African *A. Mannianum*, from which however, in other and more important particulars, it widely differs.

16. *A. Mannianum*, Hook.; stipites 6–9 inches long compressed slender not thicker than a crow's quill black, fronds ample 5–10 inches long and often nearly as much wide firm-membranaceous subpellucid brown-olivaceous when dry rhomboid-rotundate suddenly and often caudato-acuminate coarsely sinuato-serrate at the superior margin and not unfrequently lacinate ecostate rather suddenly attenuate into the stipes, venation very conspicuous elevated subflabellate, areoles large numerous oblongo-hexagonal, sori superficial linear-elongate more or less interrupted.—*Hook. 2d Cent. of Ferns, t. 73.*

Hab. West tropical Africa; trunks of trees on the Peak of Fernando Po, alt. 3000 feet, *n. 364*, Cameroon Mountains, alt. 3–4000 feet, *n. 1364*, and Bagroo river, *G. Mann.*—Unquestionably the finest species of the genus, distinguished by the great breadth of the frond in proportion to its length, its submembranaceous translucent texture, the coarsely irregularly serrated margin, and the slender stipes. Under a lens the frond is seen to be very minutely pellucido-punctate.

17. *A. latipes*, Kze.; “fronds coriaceous elongato-lanceolate acuminate yellowish when dry ecostate, stipes very broad compressed having a broad central rib (mesoneuro lato peragrato), the margins waved thin, sori loosely reticulated in a cleft of the lamina thick brown snuff-colour, rhizome surculose, the scales very long narrow acuminate.” *Fée.*—*Kze. in Fée, Antroph. p. 48. t. 5. f. 2.*

Hab. Java, *Zollinger.*—“A perfectly distinct species.” The figure represents fronds 12–14 inches long,  $\frac{3}{4}$ –1 inch broad in the widest part above the middle, tapering much at both extremities, with few but very large areoles,  $2\frac{1}{2}$  and more inches long, and 3 lines wide. It is unknown to me. Notwithstanding the expression of the “sori in rima laminarum siti,” *Fée* places it in a section “*sporothecis superficialibus.*”

18. *A. obtusum*, Klfs.; “fronds spathulato-oblong sessile or terminating below in a flat stipes very obtuse at the margin which is cartilaginous circumscribing the thick opaque lamina, areoles narrow hexagonal, costa none, veins sculpturate rugose on the under side and whitish.” *Fée.*—*Klfs. En. Fil. p. 199 (not Blume).* *Bory, in Voy. de la Coquille, p. 256. t. 29. f. 2.* *Fée, Antroph. p. 50.* *Hemionitis, Bory, in Willd. Sp. Pl. v. p. 127. Pr.*

Hab. Mauritius and Bourbon, *Bory, Carmichael*. Madagascar, "*Pervillé*."—My specimen, from Carmichael, quite according with Bory's figure, may very well be a narrow form of *A. Boryanum*, Klfs. The stipes is 6 inches long, the frond 10 by 2 inches wide.

19. *A. giganteum*, Bory; "fronds sessile lanceolate ecostate membranaceo-cartilagineous acute at the base gradually but broadly diminishing in width (basi lato-decrescentibus), the margin undulate sometimes sublobate very large, veins narrow long lightly sculpturate thickened on the inferior side of the frond and longer and more rugose, sori subreticulated." *Fée*.—*Bory, Voy. Belang. Cr. p. 36. Fée, Antroph. p. 49. t. 5. f. 3.*

Hab. Mauritius and Bourbon, *Bory, Sieber, Syn. Fil. n. 64, in Herb. nostr.*—Bory describes this species as differing from all others by its great size, attaining a length of 18 inches. Neither he nor *Fée* give any really definite characters for it. My own specimen from Sieber, n. 64, referred to by *Fée*, is 20 inches long, 4 inches broad in the widest part, and clearly has a stipes, thick and paleaceous with membranaceous, lanceolate, and subulate setæ; but I am far from thinking it may not be a form of *A. Boryanum*, itself a very variable species.

20. *A.?* (sect. *Digramma*, *Kze.*) *niphoboloides*, *Kze.*; "frond 2-3 inches long about 2 lines wide coriaceous rigid linear-lanceolate obtuse attenuated below into a short stipes revolute at the margin above laxly reticulated elevato-venose, sorus at each side of the costa linear deeply impressed at length effuse and as well as the costa clothed with canescent stellated hairs, caudex filiform very long creeping rufescent at length albido-paleaceous sparingly radiculose."—*Kze. in Bot. Zeit. vi. p. 209. Tænitis, Moore.*

Hab. "Java, *Zollinger, n. 2223.*—Plant of doubtful genus; differing from *Tænitis* in the immersed sori covered with stellated hairs; from *Vittaria* in the sori being close to the costa, as well as in the presence of stellated pubescence; from *Niphobolus*, with which it agrees in habit, in the linear sori; lastly, from *Antrophyum* in the solitary sorns on each side the costa, and not reticulately arranged on the veins." *Moore* refers it to *Tænitis*.

21. *A. ensiforme*, *Hook.*; fronds quite sessile subcarnosomembranaceous flaccid subtranslucent a span to a foot long 6-8 lines wide subfalcate ensiform obtusely or sharply acuminate very broadly but obscurely costate tapering gradually in the lower half towards the sessile base where it is 3 lines wide, venation quite internal, areoles large the costal ones elongated the rest oblong erecto-patent in direction, sori also erecto-patent sunk in very shallow lines simple or forked often short-oblong and interrupted, most copious towards the margin, in age prominent and dark-brown.—*Hook.*

in *Benth. Pl. Hartw. p. 73* (1839). *Hook. Ic. Pl. t. 394* (1841) *venation omitted*. *Scoliosorus, Moore*. *Antrophyum Galeottii, Fée, Antroph. p. 51. t. 5. f. 4.* (1852). *Hook. 2d Cent. of Ferns, t. 70*. *A. falcatum, Mart. and Gal. Fil. Mer. p. 49. t. 12* (not *Blume*).

Hab. Mexico, *Galeotti, Hartweg, n. 522* (alt. 10,000 feet). Guatemala, *Skinner*, and on mountains of Vera Paz, alt. 3500-5000 feet, *Salvin*.—It is upon this plant that Mr. Moore's genus *Scoliosorus* was founded, and I fear, relying on my incomplete figure in the 'Icones Plantarum,' considered the frond to be destitute of veins. It is the most completely sessile of all the *Antrophyta*, and in my finest specimens a broad white band runs up half the length of the frond.

22. *A. subfalcatum*, Brack.; fronds scarcely stipitate not more than  $\frac{1}{2}$ –1 inch long 3–4 lines wide subcoriaceous-membranaceous scarcely costate a slender costa only seen in the lower half linear-lanceolate acuminate, from near the middle tapering gradually into the short stipes, areoles in about 3 parallel series large and much elongated hexagonal, sori irregular linear-elongate in 2–3 parallel series more or less interrupted or branched rarely reticulated moderately sunk yet scarcely rising above the surface of the lamina.—*Brack. Fil. U. S. Expl. Exp. p. 65* (1854). *A. Brookei, Hook. 2d Cent. of Ferns, t. 79* (1861). *A. Cumingii, Moore, Ind. Fil. p. 83*.

Hab. Borneo, *Thos. Lobb*. Fiji Islands, *Brackenridge* (in *Herb. nostr.*), *Milne*. *Brackenridge* justly alludes to the close similarity in appearance of this and *A. lineatum*. The nature of the sori is very different, and it would be a *Scoliosorus* of Moore.

23. *A. lineatum*, Klfs.; fronds coriaceous-membranaceous sessile 6–12–14 inches long  $\frac{1}{4}$ – $\frac{1}{2}$  an inch wide linear-lanceolate finely acuminate subfalcate, from near the middle gradually attenuated downwards and decurrent to the base costate for the whole length, costa slender prominent beneath, areoles very much elongated parallel with the costa and margin, sori 4–6–rarely 8, 2–3 or 4 on each side the costa between it and the margin lodged in a deep furrow continuous (as in *Vittaria*) or here and there the continuity is slightly interrupted never branched nor forked.—*Klfs. En. Fil. p. 199*. *Fée, Antroph. p. 47*. *Hemionitis, Sw. Prodr. p. 129*. *Loxogramme, Pr. Polytænium lanceolatum, Desv. Prodr. in Journ. Bot. i. p. 218*. *Hook. Gen. Fil. t. 107* (costa omitted and receptacle of the capsules too prominent). *Moore. Vittaria lanceolata, Sw. Fl. Ind. Occ. iii. p. 1603*. *Syn. Fil. p. 109*. *Willd. Sp. Pl. p. 407*. *Schk. Fil. t. 101*.

Hab. Tropical America. Jamaica, *Swartz, Menzies, Purdie*. Cuba, *C. Wright*,

n. 974, 977. Brazil, *Gardner*, n. 145. New Granada, *Moritz*, n. 140, *Linden*, n. 194, *Fendler*, n. 304. Guatemala, Vera Paz, *Salvin*. Andes of Quito, *Jameson*, n. 426. —Fée justly observes that “one might consider this a *Vittaria*, with numerous sori.”

24. *A. lanceolatum*, Klfs.; fronds sessile or nearly so firm-membranaceous subpellucid a span to 14–16 inches long  $\frac{1}{4}$ – $\frac{1}{2}$  an inch wide linear-lanceolate acuminate tapering downward gradually from about the middle nearly to the very base of the compressed and winged stipes distinctly costate throughout, costa slender slightly prominent beneath, areoles about four series between the costa and the margin parallel with them, those nearest the costa and towards the base are the most elongated, sori narrow of few readily deciduous capsules but superficial or nearly so more or less reticulated and following the course of the veins.—*Klfs. En. Fil. p. 198 (not Bl.)*. *Fée, Antroph. p. 50*. *Moore, Ind. Fil. Hemionitis, Linn. Sp. Pl. p. 1535 (excl. syn. of Sw. Syn. Fil. p. 20)*. *Schk. Fil. p. 6. t. 6 and 18*. *Willd. Sp. Pl. v. p. 127*. *Antrophyum Féei, Schaffn. in Fée, 7me Mém. Fil. Nouv. p. 42. t. 22. f. 1*.

Hab. West Indies, *Swartz, Menzies, L. Guilding, C. Wright, n. 776 (according to Eaton, but my specimens seem to be a young state of A. lineatum)*, *Purdie, Linden, n. 1397*. New Granada, *Moritz, n. 140*. Mexico, *Schaffner* (smaller and more lanceolate, *A. Féei, Schaffn.*). Guatemala, Vera Paz, *Salvin* (same form as the preceding).—This has very much the aspect of *A. lineatum*, but the fructification is quite different; here scarcely sunk at all, and in no long-continued straight lines.

### 8. VITTARIA, Sm.

(HOOK. GEN. FIL. TAB. LXVIII. B. *Tæniopsis, J. Sm.* *Moore. Tæniopteris*, HOOK. GEN. FIL. TAB. LXVI. B. *Haplopteris, Pr.*, HOOK. GEN. FIL. TAB. CXX. D. (*copied from Presl*).

*Sori* very long, linear, continuous, simple, lying in a groove at the very margin of the frond or near the margin and parallel with it on the under side, and then generally more superficial. *Involucre* none, unless the lips of the soriferous furrow can be considered such.—*Fronds simple, linear, often very much elongated and drooping, subcoriaceous, distinctly or scarcely costate. Veins simple, pinnated, often obscure, sometimes combined at the apex.*

It is often very difficult, especially in the dried state, to see if the sori are strictly marginal or intramarginal on the under side, and I cannot but think that Fée has wisely united *Tæniopsis, J. Sm.*, with *Vittaria*; and my *Tæniopteris* is undoubtedly identical with *Tæniopsis*. Here again, as in *Antrophyum*, I have



taken Fée as my guide; but I wish I could satisfy myself that his characters taken from the spores and those from the "sporangiasters" (abortive capsules) were of the same importance that he considers them to be. His species, too, are here adopted, although authentically unknown to me; and this I think only a proper compliment to pay to one who has studied the subject so deeply.

§ 1. *Sori superficial (supracuticulares)*.—TÆNIOPSIS, *J. Sm.* 1-18.

A. *Spores reniform.* 1-12

a. *Fronds costate.* 1-8.

\* *Sporangiasters cyathiform or cupuliform.* 1-9.

1. *V. Amboinensis*, Fée; "fronds smooth submembranaceous falcate acuminate tapering below into a petiole, costa slender disappearing below the apex, veins curved equal approximate, sori closely marginal, cuticle of the margin resembling a false involucre, caudex flexuose contorted scaly, scales cancellate rigidly toothed at the margin." *Fée, Vittar. p. 44. t. 1. f. 1.*

Hab. Amboyna, *Labillardière*. Martaban, *Parish*.—Fronds 4-5 inches long, 3-4 lines wide, exactly lanceolate. My specimens from Martaban quite accord with the figures and description of Fée, except that the veins are very obscure. M. Fée observes that it well deserves the name of *ensiformis*, which Willdenow had given it in his herbarium.

2. *V. loricea*, Fée; "fronds pendulous flexile thick opaque linear tapering below into a long striated stipes, costa nearly plane not extending to the apex, veins manifest on the frond rather remote, sori marginal continuous with a broad sulcus, spurious involucre thick, caudex creeping unequal, scales cancellate cinereous glossy lanceolate dentate at the apex very long entire." *Fée, Vittar. t. 1. f. 2.*—"V. planipes, *Kze.*" *Melten.*

Hab. Java, "*Zollinger, n. 1001.*"—"One of the longest species of the genus (2 feet long, 5 lines wide), easily recognized by the breadth of the soriferous groove (canal) which receives the sori." I possess specimens from Griffith, from Eastern Bengal, which sufficiently accord with the figure and description of this *Vittaria*; but the veins are here also very obscure and quite undistinguishable externally.

3? *V. Forbesii*, Fée, *Vittar. p. 15.*—Tæniopteris, *Hook. Gen. Fil. t. 76 B. (analysis and name only).*

Hab. Mozambique, *Forbes*.—See remarks on the following species, *V. Zeylanica*.

4. *V. Zeylanica*, Fée; "fronds lanceolato-linear acute membranaceous and pellucid gradually attenuated at the base flexile pendulous, costa coloured robust prominent on the under side, canaliculate on the upper side nearly plane towards the apex, veins equal brown forming a very acute angle with the costa, sori continuous in a broad sulcus." *Fée, Vittar. p. 45. t. 1. f. 3.*—Haplopteris scolopendrina, *Pr. Tent. Pterid. p. 141. t. 5. f. 21.* Tæniopteris Forbesii, *Gen. Fil. t. 76 B.* Pteris scolopendrina, *Bory, in Willd. Sp. Pl. v. p. 141. Sw. Syn. Fil. p. 94. Bory, Voy. ii. p. 32-4.*

Hab. Bourbon, *Bory*. Mozambique, *Forbes*. Ceylon, *Mrs. Genl. Walker*, n. 210.—Fronde 2 feet long, 9 lines wide. Caudex creeping, paleaceous with subulate scales. I possess specimens from the same source as M. Fée's (Ceylon), bearing the same number, 210. M. Fée compares it with my *Teniopteris*, and justly, for I have now long been aware that *that* genus, published when *Vittaria* was scarcely known (except as having the sori in a 2-lipped groove formed in the very margin of the frond), is one and the same with *Tenioopsis* of J. Sm., which includes those *Vittariæ* which have the sorus on the under surface at a greater or less distance from the margin. Believing it then to have the characters of a genus, I gave it also a specific name; but my original specimens having gone astray, I willingly abandon the name of species as well as of the genus. *Haplopteris scolopendrina*, now considered by J. Smith to be a *Tenioopsis*, and being a Bourbon species, is identical with my plant from Mozambique.

5. *V. Gardneriana*, Fée; "fronds lanceolato-linear falcate often curved attenuated at both extremities translucent especially the sterile ones plane at the margin, veins sculpturate above not extending to the margin, sori broad superficial gibbose fusco-tabacine neither continued to the apex nor to the base, caudex creeping." Fée, *Vittar. t. 3. f. 1.*—*Metten. in Fil. Wright. et Fendl. p. 197.*

Hab. "Organ Mountains, Brazil, *Gardner*, n. 147 (*Herb. nostr.*). Columbia, *Moritz*, n. 1426." Venezuela, *Fendler*, n. 260. Panama, *Sutton Hayes*. Ecuador, *Jameson*, n. 749, *Spruce*, n. 4670 and 5710. Jamaica, *MFadyen*.—Rarely exceeding a foot in length; about  $\frac{1}{2}$  an inch in the broadest part. A species, if it be such, apparently with no valid characters.

6. *V. Ruiziana*, Fée; "fronds narrow-linear soft fasciculate plane opaque acute attenuated below into a flattened stipes, costa evident at the base of the frond broad reddish at length subevanescent, sori interrupted brown snuff-colour when young concealed within the margins of the frond, the sulcus superficial, fertile veins slender, caudex surculiform clothed with cancellate lanceolate acute scales." Fée, *Vittar. p. 16. t. 3. f. 3.*

Hab. "Peru, *Ruiz*."—"Fronde, including the stipes, 25 centim. long, by 2-3 millim. broad. This species is perfectly distinct. It has some affinity with *V. stipitata*; the microscopic details are the same. It is recognized especially by the flattened stipes and by the superficial situation of the sori."

7. *V. flexuosa*, Fée (not Wallich); "fronds linear flexuose, margins revolute tapering into a striated flattish stipes, costa subcrisiform, sori near the margin broad brownish snuff-colour, capsules globose, annulus broad 18-20-articulate, articulations broad more remote, spores reniform thick smooth depressed when dry, sporangiasters cyathiform and campaniform sulphur-coloured dilated at the mouth, pedicels undulate branched, caudex creeping, the scales very narrow-lan-

ceolate long acuminate serrated at the margin." *Fée, Vittar.* p. 16.—"*Wall. Cat.* n. 144. *V. flexuosa*, *Wall.*" (but n. 144 in *Wall. Cat.* in "*V. elongata*," not *flexuosa*, and Dr. Hooker and Mr. J. Smith have considered a large suite of the same collected by Hooker fil. and Thomson to be the true *elongata*, Sw.; but M. Fée maintains that the sori are "supracuticulaires," while they are "endophylles," sunk in the substance, not necessarily in the very margin in *V. elongata*, and hence *Euvittaria*. Whatever this *Vittaria* may be, it is not authentically known to me.)

8. *V. stipitata*, Kze.; "fronds broad-linear flexile rather obtuse yellowish tapering below into a brown glossy fragile long attenuated stipes, costa at the thickened base of the frond (only) manifest evanescent above, sori extramarginal the cleft 2-lipped (sporotheccis hiantibus), caudex thick (rhizomate denso) clothed with lanceolate brown scales." *Fée.*—*Kze. Analect. Pteridogr.* p. 28. t. 18. f. 1 (excluding the adjacent analysis). *Fée, Vittar.* t. 3. f. 8 (analysis only).

Hab. Peru, *Poeppig, in Herb. nostr.* Tarapota, *Spruce, n.* 4773. Columbia, *Moritz, n.* 113, *Purdie, Schlim, n.* 623 and 634, *Feudler, n.* 269 and 259  $\beta$ , *Holtou, n.* 60. Brazil (*Fée*). Pitcairn's Island, *Mathews, Cuming, n.* 1380.—Often 2 feet long, 3-4 lines wide, very fragile when dry. Kunze has represented the venation as anastomosing with long narrow areoles, which is not the case in *Poeppig's* original specimens; but, in reality, his analysis placed by and for *V. stipitata* belongs to Kunze's *V. costata* of the same plate, which is *Tenitis angustifolia*.

$\beta$ . Frond with the costa pinnate.\* 9-12.

9. *V. tenera*, Fée; "fronds thin narrow linear flattish sulcate flexile acute young ones very obtuse, veins reticulated slender translucent tapering below into the stipes, costa slender, sori marginal, sulcus very narrow extending from the base to the apex of the frond, fronds fasciculate, scales large cancellate toothed at the margin, younger ones obtuse pellucid, veins per conniventiam anastomosing." *Fée, Vittar.* p. 17. t. 2. f. 1.

Hab. Natal, South Africa, *Gueinzins.*—Length 1 foot, width 1-1½ line, as represented on the plate. Whatever this may be, and I have no means of knowing, it is doubtless included in the *V. lineata* in *Pappe and Rawson's Syn. Fil. Cap.* p. 38, in *Gueinzins's* locality for that species. None of these exceed 5 inches in length and 1 line in breadth. M. Fée, indeed, tells us that the *V. tenera* "n'est pas sans analogie avec le *V. lineata*, mais elle est plus étroite, plus flexible, plane

\* This character of M. Fée ("*frondibus mesoneuro dentatis*") is placed in opposition to that at  $\alpha$  in our preceding page ("*frondibus mesoneuro donatis*"), but it appears to me, from the figures given by the author (ll. cc.), that the costa or mesoneuro is alike pinnated in both.

et transparente ; en outre, les sporangiastres sont claviformes, tandis qu'ils ont l'aspect de rubans tortillés dans le *V. lineata*."

\*\* *Sporangiasters cuculliform*.

10. *V. sarmentosa*, Fée ; "fronds graminiform narrow-linear plane striated opaque rather strict fasciculate narrower at the base, sori continuous very narrow striæform remote from the margin, caudex surculiform clothed with narrow acuminate dentate scales." Fée, *Vittar.* p. 19. "*V. graminifolia*, *Klfs. En. Fil.* p. 192."

Hab. "Trees, Cape of Good Hope, *Mundt and Maire*. Natal, *Gueinzins* — " Cette espèce diffère du *V. tenera*, par des sporangiastres rubanés et non cyathiformes. C'est par l'aspect que prennent ces mêmes corps qu'on peut établir quelques-uns des caractères qui le séparent du *V. lineata*."

\*\*\* *Sporangiasters intestinaeform*. 11, 12.

11. *V. lineata*, Sw. ; "fronds fasciculate rugoso-striate narrow-linear, the margins reflexed and thus canaliculate at length nearly flat and striated, sori continuous near the margins frequently concealed by the convolute margins of the frond, caudex bearing fasciculated fronds, scales lanceolate long acuminate toothed at the margin." Fée.—*Sw. Syn. Fil.* p. 109. *Willd. Sp. Pl.* v. p. 404. *Schk. Fil.* p. 93. t. 101. b. Fée, *Vittar.* p. 17. *Tæniopsis*, *J. Sm.* *Pteris*, *Linn.* *V. Schkurii*, *Raddi.* *V. angustifrons*, *Mich. (not Bory).* *V. filiformis*, *Cav. Sw. Willd.*—Var.  $\beta$ , *graminifolia*, Fée, l. c. p. 18. *Tæniopsis graminifolia*, *J. Sm. in Hook. Bot. Journ.* iv. p. 67. *Vittaria sarmentosa*, *Ruiz, Henk.*

Hab. "Trunks of trees, Brazil, South Carolina, Florida (*Captain Le Conte*), French Guiana, Jamaica, Antilles, and various tropical regions of America.  $\beta$ . Peru, Brazil, and probably in various countries of tropical America."—"Le *V. lineata* est l'espèce la plus anciennement connue, et celle sur laquelle il existe le plus de vague et d'incertitude dans les descriptions.\* Nous la croyons exclusivement américaine." Such are the unsatisfactory conclusions at which the most laborious of modern pteridologists has arrived respecting a *Vittoria* which was supposed to have had its specific prototype in almost all the warm parts of the globe, and I fear many other *Vittariae* are not more satisfactorily defined. I must here enumerate *numbered* specimens, most of which myself and others have been in the habit of considering *V. lineata* :—Brazil, *Gardner*, n. 72, 146, 1327, *Sellow* (" *V. squamosa*, Kl., which M. Fée is disposed to refer to *V. scabrifolia*), *Spruce*, n. 4 ; Guiana, *R. Schomburgk*, n. 354, *Appun*, n. 162 ; Columbia, *Cunning*, n. 1202, *Schlim*, n. 396, 852, *Feudler*, n. 258, *Moritz*, n. 141b ; Nicaragua, *C. Wright* ; Ecuador, *Jameson*, n. 357 ; Cuba, *Otto*, n. 302, *C. Wright*, n.

\* " Nous regardons comme étant le *V. lineata* toute espèce qui naît en touffe sur une souche peu disposée à progresser, ayant des lames convolutées en leurs bords par la désiccation, et prenant alors une apparence canaliculée, des sporothèces marginaux repliés en dedans et des sporangiastres rubanés. Aucune (autre) espèce ne réunit ces caractères." Fée.

855; Jamaica, *Wilson*, n. 514; Mexico, *Liebmann* (*V. granifolia*); South Africa, *Sanderson* (Natal), *Drege*; Caledon, *Sir Fred. Gray*, *Pappe and Rawson*; Tropical Africa, Fernando Po, alt. 1000 feet, *G. Mun*; Quorra, *Barber*, n. 1825; south of the Line, *Curror*; East Indies, Himalaya, 3000-8000 feet, *Hook. fil. and Thomson*, *Strachey and Winterbottom*, *Griffith*; Borneo, *Barber*, *Wallace*; Singapore, *Thos. Lobb*, *G. Thomson*. This is the only species admitted into the 'Cape Flora' by *Pappe and Rawson*, and probably correctly so.

12. *V. angustifolia*, Bl.; "fronds ecostate very long rigid attenuate convolute when dry scarcely narrower at the contorted base rigid fragile narrow coriaceous opaque and striated, sori marginal brown, caudex slender creeping with distant fronds, scales criniform long acuminate brown, veins thick." *Fée*.—*Bl. En. Fil. Jav.* p. 199. *Fée, Vittar.* p. 18. t. 1. f. 4. *J. Sm.*

Hab. Java, *Blume*. Malacca, *Cuming*, n. 381.—1-1½ foot long, 1½ line broad. "Elle a quelques rapports avec le *V. lineata*; les marges sont également convolutées, mais la présence d'un rhizome chargé d'écaillés à bords entiers, la rigidité du port et les courbes que forment la base des frondes, ne permettent pas les confondre." *Fée*. With this I am unacquainted, and I do not appear to possess specimens above referred to from Mr. *Cuming*.

B. Spores Irigonous or triedrous. 13-17.

\* *Sporangiasters cyathiform.* 13, 14.

13. *V. isoetifolia*, Bory; "fronds fasciculate very long narrow rigid coriaceous opaque striated canaliculate ecostate, the margins a little incurved scarcely narrower at the base, sori continuous marginal and endophyllous especially in the superior part of the frond, caudex surculiform creeping branched clothed with thick fulvous tomentum, the scales lanceolate acuminate toothed at the margin." *Fée*.—*Bory, Itin.* ii. p. 325. *Sw. Syn. Fil.* p. 109. *Willd. Sp. Pl.* v. p. 405. *Fée, Vittar.* p. 19. t. 2. f. 3.—Var.  $\beta$ , *angustifrons*?, Bory (*Fée*).

Hab. Mauritius and Bourbon, *Bory (Fée)*.—Often 3 feet and more long, scarcely more than a line in width. "Differs from all the species with narrow fronds in the sori being situate quite at the edge of the frond, so as to appear endophyllous." I regret never to have received a *Vittaria* from Mauritius or Bourbon which I could refer to the figure of *Fée*.

14. *V. Guineensis*, Desv.; "fronds lanceolate long acuminate costate revolute at the margin stipitate, stipites subrotund very black glossy, sori near the margin snuff-colour, caudex creeping thick as a crow's quill, scales lanceolate dentate." *Fée, Vittar.* p. 19.—"*V. plantaginea*, *Spreng.*, not *Bory*."

Hab. Oware, tropical West Africa, *Beauvois*.—"Length 5-60 centim., breadth 7-9 centim."

\*\* *Sporangiasters mastoid, claviform.* 15, 16.

15. "*V. stricta*, Carm. Herb.; fronds linear coriaceous opaque thick rigid striated, costa broad, margins revolute obtuse at the apex the base stipitiform, sori rather remote from the reflexed margin deeply immersed, caudex creeping scaly, scales cinereous lanceolate very long-acuminate the margin entire." *Fée*.—*Carm. in Linn. Trans.* xii. p. 513. *V. revoluta*, *Fée, Vittar.* p. 19. *Pteris vittarioides*, *Thouars, Fl. Trist. d'Acunha*, p. 31. t. 1.

Hab. Tristan d'Acunha, *Du Petit Thouars, Carmichael, in Herb. nostr.*—My specimens are 1 foot to 16 inches long,  $1\frac{1}{2}$  scarcely 2 lines wide. Petit Thouars' specimens appear to have been very small. *Fée* compares them to the pods of *Vanilla*.

16. *V. filifolia*, *Fée*; "fronds linear acute tapering below into a long filiform fructiferous stipes, sori extramarginal when young covered with a plicature of the margin, sulcus broad occupying a third part of the lamina running from the base to the apex, caudex thick the scales brown lanceolate denticulate flexuose at the margin." *Fée, Vittar.* p. 20. t. 3. f. 6.—*Tenitis linearis*, *Mart. and Gal. Fil. Mex.* p. 144 (*Fée*).

Hab. Columbia *Linden (in Herb. nostr.)*, *Jurgensen*. Mexico, *Galeotti*, n. 6337. Guadeloupe, etc.—10–12–14 inches long, little more than a line wide. I fear this may be found in not a few herbaria under the name of *lineata*; but M. *Fée* tells us it differs from that and *isoetifolia* and *tenera* by the trigonous or cordiform spores.

\*\*\* *Sporangiasters cuculliform.* 17.

17. *V. scabrida*, *Kl.*; fronds linear more or less obtuse and more or less elongated, veins spathulate, sori flexuose continuous, sulcus deep (sulco cavo), the margins subindusiform, scales lanceolate toothed at the margin." *Fée*.—*Kl. in Fée, Vittar.* p. 20.

Hab. Brazil, *Sellow*. Mexico, *Schiede*.—The fronds of my specimens from Dr. Klotzsch are 2 inches long, 1 line wide in the broadest part, tapering gradually downwards so as to be subspathulate.

C. *Spores rounded (sporangia none).* 18, 18\*.

18. *V. falcata*, *Kze.*; "fronds rigid thick acute, costa continuous, caudex erect fibrillose, sori endophyllous, the margin of the sulcus gaping." *Fée, Vittar.* p. 20. t. 4. f. 1.

Hab. Java (*Fée*). Mount Ophir, Malacca, *Griith*, in *Herb. nostr.*—"Filius pusilla, habitu *Tenitidis linearis*. Les frondes sont épaisses et portées par un caudex dressé. On ne peut le confondre avec nulle autre." The fronds of our plants are 3–5 inches long,  $1\frac{1}{2}$  line wide. The caudices are certainly erect.

18\*. *V. minor*, Fée; "fronds linear ecostate obtuse tapering at the base into a short stipes, sori apicular broad exactly marginal in a deep sulcus, sporangiasters none." *Fée, Vittar. p. 23. t. 4. f. 2.*—Var.  $\beta$ , *minima*, Hook.; fronds 1 inch long less than  $\frac{1}{2}$  a line wide.

Hab. Philippine Islands, *Cuming, n. 381 (in part,  $\frac{1}{2}$  a line wide, Fée).* Borneo, Sarawak, on mountains, alt. 2500 feet, *Thos. Lobb, in Herb. nostr.*—Var.  $\beta$ . Moulmeine, *Parish.*—My specimens from Borneo are  $1\frac{1}{2}$ –3 inches long, scarcely more than a line wide; the caudex is erect as in *V. falcata*, and it is probably too near that species.

§ 2. *Sori endophyllous.*—EVVITTARIA. 19–21.

a. *Fronds ecostate.* 19, 20.

19. *V. zosteræfolia*, Bory; "fronds vittate broad linear-falcate at the apex dilated tapering below into a long stipes flexuose membranaceous subdiaphanous brown when dry, costa extending from the base to the apex, sori concealed in the mesophyl of the frond, caudex creeping densely paleaceous with very long subulato-setaceous erect iridescent scales black lanceolate cancellate, the margin flexuose." *Fée.*—*Bory, Itin. i. p. 238, and ii. p. 324. Willd. Sp. Pl. v. p. 406. Bl. En. Fil. Jav. p. 200. Fée, Vittar. p. 20. t. 2. f. 2. Metten. Fil. Nor. Caledon. in Ann. Sc. Nat. Ath ser. xv. p. 59.*

Hab. Bourbon, *Bory.* Mauritius, *Sieber, Syn. Fil. n. 63, and Bojer (sub non. V. isoetifolia).* Johanna Island, *Speke.* Owhyhee, *Menzies, in Herb. nostr.* New Caledonia, *Veillard, n. 1577, in Herb. nostr. (from Mettenius).* Fernando Po, east tropical Africa, *G. Mann, n. 124 and 1356, alt. 4000 feet.* Sierra Leone, *Barter.*—This is a true *Vittaria*; the sorus is in the cleft of the margin, yet the two sides or valves of the cleft are unequal in breadth, shortest on the under side, so that the sorus is brought more into view by looking at the under rather than the upper side, and also in consequence of a recurvature of the margin in the dried state.

20. *V. bisulcata*, Kze.; "fronds narrow linear thick opaque narrower at the base, costa conspicuous as far as the middle of the frond blackish when dry, caudex creeping flexuose, sori endophyllous the lips of the cleft contracted, the margins preserving the aspect and consistence of the frond." *Fée.*—*Kze. in Fée, Gen. Fil. t. 8. B. f. 2. Vittar. p. 21.*

Hab. Java, "*Zollinger, n. 867.*"—"Fronds 11–16 centim. long, 2 millim. broad. Cette plante ne peut être confondu avec nulle autre, étant la seule qui, dans cette section, ait, avec le *V. zosteræfolia*, un mésoncure (costa) apparent." With this I am unacquainted.

$\beta$ . *Fronds ecostate.* 21–21.

21. *V. Owariensis*, Fée; "fronds fasciculate convolute linear long ecostate thick opaque greyish when dry fragile.

sori marginal rather wide deeply seated brown, caudex surculiform, scales lanceolate acute the margins subentire." *Fée, Vittar. p. 21. t. 3. f. 2.*

Hab. Oware, tropical West Africa, *Palisot de Beauvois*.—This also is unknown to me, and even the learned author desires to see better specimens to confirm the sufficiency of the characters. It is certain, however, that the fragment figured of the frond does not show it to be destitute of costa.

22. *V. rigida*, Klfs.; "fronds fasciculate rigid coriaceous opaque ecostate subensiform striato-rugose above, smooth beneath, acute at the apex terminating below in the stipes reddish-brown when dry, sori endophyllous superior lip of the cleft subpatent (sublevato) in form and aspect resembling an involucre, sulcus deep, caudex creeping the scales lanceolate narrow-acuminate." *Fée*.—*Klfs. En. Fil. p. 193. Bl. En. Fil. Jav. p. 199. Fée, Vittar. p. 22. V. plantaginea, Hook. et Grev. Ic. Fil. t. 187* ("fragmenta et diagnosis optima," *Fée*), *an Bory, Sw., et Fée?*—Var.  $\beta$ , *elongata*; "fronds elongated, longer, flexuose, pendulous, scarcely ensiform." *Fée, Vittar. p. 22. t. 3. f. 5. V. elongata, Sw. Syn. Fil. p. 199 and 302. Willd. Sp. Pl. v. p. 406*, "a little longer and narrower than the typical plant."—Var.  $\gamma$ , *ensiformis*; "fronds short, thick, acute, opaque, ensiform falcate." *Fée, Vittar, p. 22. Sw. Syn. Fil. p. 109. Nov. Act. Soc. Nat. Berol. p. 134. t. 7. f. 1. Willd. Sp. Pl. v. p. 406. Schk. Fil. t. 101. b (reduced). Bl. Fil. Jav. p. 198* (*by error named ensifolia*). "Size of the fronds half the length of the type and narrower."—Var.  $\delta$ , *intermedia*, Bl.; "fronds erect subfalcate linear attenuated rigid slightly costate revolute at the margins, sori marginal, caudex creeping paleaceo-crimite." *Fée, Vittar. p. 22. V. intermedia, Bl. En. Fil. Jav. p. 199.*

Hab. Sandwich Islands, *Chamisso*.—Var.  $\beta$ . "East Indies, Marianne Islands, Java, etc., *Wallich, n. 1432 (V. rigida), n. 144 (V. elongata)*."—Var.  $\gamma$ . "Java, *Blume*."—I do not understand the limits of this species and *V. zosterifolia*. Although the latter ought to be ecostate, the former *costate*, I find the costa to be more or less evident in specimens which I should otherwise consider identical. Specimens from the following localities stand in my herbarium as *V. rigida*, Klfs. (including *V. plantaginea*, Hook. and Grev. (an Willd. et Fée?), *V. elongata*, Sw., *V. ensiformis*, and, I presume, *V. intermedia*, Bl. (not Brack.);—Society Islands, *Menzies, Beechey, Brackenridge, etc.*; Sandwich Islands, *Hillebrand*; Samoa, *Powell*; Fiji, *Seemann, n. 719, 720, Milne, Brackenridge* ("*V. plantaginea*"); New Hebrides, *Mibe*; New Caledonia, *Vieillard*; tropical east coast of Australia, *All. Cunningham, C. Moore*; Norfolk Island, *C. J. Simmons*; Mauritius, *Bojer, Gardier*; Bourbon, *Bory*; East India, Singapore, *Wallich, n. 142/2, Thos. Lobb*; Kumaon, *Strachey and Winterbottom*; Boutan, *Nuttall*; Assam and Khasya, *Simons, Hooker fil. and Thomson*.



23. *V. plantaginea*, Bory; "fronds linear-lanceolate ensiform acuminate subtranslucent soft and subpapyraceous pale vinous colour when dry tapering below into a depressed plane base, sori subendophyllous brown-snuff colour, sulcus dilated, caudex as thick as a pigeon's quill, the scales narrow cancellate long setaceous at the apex lanceolate subentire at the margin." *Fée*.—*Bory, Itin.* ii. p. 325. *Sw. Syn. Fil.* p. 110. *Willd. Sp. Pl.* v. p. 406; not *Hook. and Grev. (Fée)*. *Fée, Vittar.* p. 22. t. 3. f. 7 (*fragments only, but surely a costa is represented, at letter B. a, at variance with Fée's remark, "privée absolument de mésoncure"*).

Hab. "Bourbon and Mauritius, *Bory*; also in the Marianne Islands."—"Total length of the frond 20–25 centim., 4–6 millim. wide. Near *V. zosterifolia*, but smaller, and in drying it becomes of a decided straw-colour. Other differences exist in the form of the fronds and their consistence; the scales, too, are not exactly similar. Its affinity with *V. rigida* is more easily shown, which latter is rigid-coriaceous, opaque, and brown when dry; the scales differ in form, and the position of the sori is not quite identical." And thus on account of these slight differences, Dr. Greville's and my figure *V. plantaginea*, in *l.c. Fil.* (so much praised by M. *Fée*), though done from an authentic specimen derived from M. *Bory*, is pronounced not to be *Bory's* plant, and is united to *V. rigida*! To this union I offer no objection; so far from it, we declared that we did not see how the species could be satisfactorily distinguished from *V. elongata*, *Sw.*, and *V. ensiformis*, now justly considered the same as *rigida*.

24. *V. anodontolepis*, *Fée*; "fronds elongated narrow depressed and scarcely narrower at the base, sori marginal subendophyllous rather broad brown-snuff colour continuous, caudex creeping, scales cinereous lanceolate very long acuminate entire at the margin." *Fée, Vittar.* p. 23. t. 4. f. 3. *V. isoetifolia*, *Willd. Herb. Berol. (Fée)*.

Hab. Graham, Marianne Islands, *Chamisso*.—The figure represents the fronds unusually slender, the longest 15 inches long and 1 line wide, the shortest 4–5 inches long, but broader upwards (probably sterile), so as to be there 2 lines broad. "Distinct from *V. isoetifolia* in habit, in the scales, and in the form of the sporangiasters, which are cyathiform and not claviform."

(M. *Fée* gives the following additional species in his 7me *Mém. Foug. Nouv.* p. 26. t. 20. f. 1, but I do not know its proper place in the above enumeration:—"*V. remota*, *Fée*; fronds linear-lanceolate attenuated at the base and the apex slightly curved acuminate fascicled, petioles plane flexuose rufescent, costa continuous broad at the base and brown, margins with a few thick teeth, sori superficial brown distant from the margin, capsules oval, annulus with 20–22 articulations, spores large reniform, sporangiasters scyphuliform." *Fée*. Hab. New Granada, *Schlim*, n. 611.—"Resembles *Pteropsis angustifolia*, *Desv.*, but the veins are those of *Vittaria*.")

## 9. T. ENITIS, *Sw.*

(*Hook. GEN. FIL. TAB. LXVII. B. Pteropsis, Pr.*  
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HOOK. GEN. FIL. TAB. LXVII. A. Dieranoglossum, *J. Sm.*  
Paltonium, *Pr.* Neurodium, *Fée.* Drymoglossum (in part),  
*J. Sm.* *Moore.*)

*Sori* linear, very much elongated, continuous, rarely interrupted, more or less sunk in a groove or sulcus and more or less distant from the margin. *Involucre* none. *Veins* variously anastomosing, areoles with or without free veinlets.—*Fronds mostly uniform, simple or pinnated or subdichotomously pinnatifid, usually costate.*

A small yet sufficiently natural group, but botanists are not agreed as to the propriety of keeping it entire.

\* *Fronds simple.* 1-4.

1. *T. obtusa*, Hook.; caudex creeping ferrugineo-hirsute, stipites 2-3 inches long glossy hirsute at the base, fronds 1½-2 inches long firm coriaceous glossy oblongo-ovate simple obtusely cuneate at the base submucronate rarely obscurely lobed or incised, costa indistinct, the margin incrassated, veins internal rather sparingly anastomosing, areoles large oblique, sori forming a continuous rarely interrupted line all round at a little distance from the margin except at the base.—*Hook. Ic. Pl. t. 994 (or 94 of Cent. of Ferns).*

*Hab.* On sandstone rocks, Sarawak, Borneo, alt. 2000 feet, *Thos. Lobb.*—A beautiful and very peculiar species, of which I have only seen specimens from the above locality. Some of the young fronds vary much in form, orbicular and not larger than a silver penny, or larger, subrhomboid or oval.

2. *T. lanceolata*, Br.; caudex stout creeping clothed with appressed ferruginous subulate scales, stipites articulated on the caudex approximate 2-4 inches long, fronds a span to a foot long simple firm coriaceous glabrous 1-1½ inch wide lanceolate often suddenly and long acuminate (especially when soriferous) much attenuated below towards the stipes opaque strongly costate, veins copiously anastomosing and forming hexagonal areoles with simple or forked and much divaricated free included veinlets clubbed at the apex, sori linear prominent close to the margin chiefly occupying the contracted upper portion of the frond close to the margin.—*Br. Prodr. p. 154 (in obs.). Kfs. En. Fil. p. 130. Metten. Fil. Hort. Lips. p. 27. Kze. Pteropsis, Desv. in Ann. Soc. Linn. Pt. vi. p. 218. Pr. Hook. Fil. Exot. t. 45. Paltonium, Pr. Epim. Bot. Neurodium, Fée, Gen. Fil. p. 93. t. 8. c. Drymoglossum, J. Sm. Moore—Plum. Fil. t. 132.*

*Hab.* West Indian Islands, frequent; Martinique, Jamaica, Guadeloupe, Cuba

(*C. Wright*, n. 979), etc., Belize, *Skinner*.—A peculiar and rigid plant, with much of the general aspect of *Hymenolepis*. Various have been the views of its generic position, as may be seen by the above synonyms.

3. *T. angustifolia*, Br.; caudex creeping densely tomentose paleaceous at the base of the stipes, stipites short compressed, fronds pendulous simple 12–18 inches long 4 lines to  $\frac{1}{2}$  an inch broad linear-lanceolate acuminate attenuated below into the short stipes costate entire at the margin, sori very near the margin continuous or interrupted, veins copiously anastomosing, areoles hexangular much elongated parallel with the costa and margin, with no free included veinlets.—*Br. Prodr. Nov. Holl.* p. 154 (*in obs.*). *Pteropsis*, *Desv. Fée*, *Vittar.* p. 24. *Pteris*, *Sw. Syn. Fil.* p. 95. *Willd. Sp. Pl.* v. p. 357. *Vittaria costata*, *Kze. Analect. Pterid.* p. 29. *t.* 18. *f.* 2, and letters a and b of *f.* 1.

Hab. Tropical America: West Indian Islands, abundant, Jamaica, Cuba (*C. Wright*, n. 978); Columbia, *Cuning*, n. 1286, *Purdie*; Guiana, *Schomburgk, Le Prieur, Hostmann*; Brazil, Pará, *Spruce*, n. 10; Galapagos, *Wood*.—Quite the habit of *Vittaria* (§ *Tænopsis*), and scarcely to be distinguished but by the anastomosing venation.

4. *T. Blumei*, Hook.; “caudex creeping clothed above with setaceous scales, stipites scarcely any, fronds caespitose  $1\frac{1}{2}$ –9 inches long  $\frac{1}{3}$ – $\frac{3}{4}$  of an inch wide simple entire linear-lanceolate sometimes falcate entire or waved coriaceous ecostate laxly reticulate glabrous, sori marginal subcontinuous rarely interrupted linear villous slightly immersed.” *Bl.*—*Pteropsis*, *Fée*, *Gen. Fil.* p. 87, and *Fée*, *Vittar.* p. 25. *Tænitis marginalis*, *Moore*, *Ind. Fil.* *Antrophyum*, *Bl. Fil. Jar.* p. 80. *t.* 31. *f.* 1 and 2.

Hab. On trees, Java, *Blume*.—I am ignorant of this species. *Fée* refers it to *Pteropsis*, and *Moore* to *Tænitis*. The former alludes to its affinity with *T. angustifolia*, of which it resembles very small specimens, but it is ecostate.

\*\* *Fronds pinnate or pinnatifid.* 5–6.

5. *T. blechnoides*, Sw.; caudex creeping nearly as thick as a writing-pen setose, stipites approximate 8–12 inches long thickened and setose at the base, fronds 10 inches to 1 foot and more long (rarely when young, yet soriferous, simple) coriaceous-submembranaceous generally dimorphous pinnated, pinnæ a span or more long entire at the margins; *sterile* fronds with 5–7 broad-lanceolate suddenly acuminate pinnæ; *fertile* pinnæ more numerous 15–16 linear-lanceolate gradually attenuated at the base, lower ones sessile, sori continuous or interrupted, veins copiously anastomosing, areoles

oblique oblong veinless.—*Sw. Syn. Fil.* pp. 24 and 220. *Willd. Sp. Pl.* v. p. 135. *Bl. Fil. Jav.* p. 70. *t.* 28. *f.* 2, and *t.* 29. *Fée, Vittar.* p. 26. *Tænitis pteroides*, *Schk. Fil.* p. 21. *t.* 6. *Spreng. Analect.* iii. p. 374. *t.* 10. *f.* 106. *Pteris blechnoides*, *Willd. Phytogr.* p. 13. *t.* 9. *f.* 3.—*Var. interrupta*; much smaller, sori often interrupted. *T. interrupta*, *Wall. Cat. n.* 142. *Hook. and Grev. Ic. Fil.* *t.* 62.

Hab. Malay Peninsula and Archipelago, abundant: Penang, *Wallich*, *n.* 142; Luzon, *Cuming*, *n.* 277; Borneo, *Barber*; Mergui and Tavoy, *Parish*, *n.* 81.—*Var. interrupta*. Singapore, *Wallich*.—Very variable in the number, length, and breadth of the pinnae.

6. *T. furcata*, *Willd.*; caudex subrepent densely tomentoso-radiculose, fronds caespitose sessile 4–15 inches long firm membranaceous (rarely simple and linear-lanceolate) cuneato-obovate in circumscription dotted beneath with copious but not crowded peltate brown scales superior half or more subdichotomously pinnatifid with 3–9 or more linear finely acuminate segments 3–8 inches long from 3 lines to  $\frac{1}{2}$  an inch in their greatest diameter entire long-decurrent at the base so as scarcely to leave any stipes, costate, costae prominent beneath, veins erecto-patent obscure in the larger specimens simple or forked here and there anastomosing, in the smaller and narrower ones more or less but never copiously anastomosing generally forming solitary large oblong areoles with no free veinlets, sori chiefly upon the (sometimes contracted) segments marginal linear continuous or more or less interrupted.—*Willd. Sp. Pl.* v. p. 136. *Hook. and Grev. Ic. Fil.* *t.* 7 (*venation omitted*). *Pteropsis*, *Desv. Pr. Cuspidaria*, *Fée, Gen. Fil.* p. 88. *t.* 8. *A. f.* 2. *Vittar. l. c.* p. 25. *Pteris*, *Linn. Sp. Pl.* p. 1531. *Sw. Syn. Fil.* p. 95. *Dicranoglossum*, *J. Sm.* *Tænitis*, *Desv. Kl. Tæniopsis*, *Moore*. *Cuspidaria semipinnatifida*, *Fée, Gen. Fil.* p. 88. *t.* 8. *A. f.* 2.—*Plum. Fil.* p. 122. *t.* 14 (*exaggerated*).—*Var. polypodioides*; sori interrupted, and so regular and at such short distances as to resemble those of *Polypodium*.

Hab. Tropical America: West Indies, frequent; Cuba, *C. Wright*, *n.* 980; Trinidad, *Purdie*, *n.* 20; Guiana, abundant, *Rich. Schomburgk*, *n.* 243 (*Tæn. Desvauxii*, *Kl.*), and others; Panama, Venezuela, *Fendler*, *n.* 423; Ocaña, *Schlim*, *n.* 655, *Purdie*; Brazil, *Spruce*, *n.* 2370.—*Var. polypodioides*. Ecuador, near Guayaquil, *Jameson*, *Spruce*, *n.* 6576, on *Theobroma Cacao*.—Dr. Greville and myself little imagined that in our *Tænitis furcata* given our in *Ic. Fil.* we were publishing a new species, as *Fée* and *Moore* now consider it to be; the latter, indeed, refers it to another genus, but I think if these authors had the opportunity of consulting extensive suites of specimens, they would find all intermediate grades of venation, free and anastomosing, undoubtedly on the same individual specimen.

The *Pteris tricuspidata*, L. (*Cuspidata tricuspis*, Fée, *Pteropsis*, Pr., *Teniopsis*, Moore), founded on an extravagant figure of Plum. Fil. t. 140, is probably some *Vittaria* with a trifid apex, and is only known from that figure.

#### 10. DRYMOGLOSSUM, Pr.

(HOOK. GEN. FIL. TAB. LXXVIII. A. Nothochlæna?, Wall., an *Tænitis*? Lemmaphyllum, Pr. Schizolepton, Moore.)

*Sori* linear, elongated, continuous, rarely interrupted, situated between the costa and the margin and parallel with them, often near the margin, scarcely immersed. *Veins* copiously anastomosing, often obscure, the areoles usually including free veinlets.—*Caudex* creeping, filiform. *Fronds* simple, stipitate, small, dimorphous; the fertile ones narrow, sublinear; the sterile ones shorter but broad.

Nearly allied to *Tænitis*, but habit different; the fronds are dimorphous.

1. *D. carnosum*, Hook.; caudex long filiform wiry clothed with peltate toothed scales, stipites 2 lines to 1 inch long (in the fertile frond) distant slender, fronds simple of two kinds; sterile ones from  $\frac{1}{2}$  an inch (and then generally orbicular or subcordate) to 2 and even 3 inches long and then elliptical or obovate or spathulate or even lanceolate and acuminate thick and fleshy coriaceous when dry faintly costate on the under side, veins anastomosing, the areoles including free generally simple veinlets; fertile fronds 1–2–2 $\frac{1}{2}$  inches long linear-spathulate obtuse, sori linear continuous forming a line intermediate between the costa and the margin soon confluent and representing one broad band nearly as broad as the frond, when young covered by numerous peltate pedicellated scales.—Var. *major*; fronds 1–2 inches long, sterile ones elliptical or obovato-spathulate rarely lanceolate. *D. carnosum*, Hook. Gen. Fil. t. 78. A. Fée, Vittar, p. 29. Nothochlæna? (*Tænitis*?) *carnosa*, Wall. Cat. n. 131. Lemmaphyllum, Pr. Epim. Bot. p. 158. *Tænitis*, Metten.—Var. *minor*; fronds much sunk smaller, sterile ones suborbicular (often sessile) or subcordate rarely obovato-spathulate. *D. subcordatum*, Fée, Gen. Fil. p. 94. t. 9. A. f. 1. Lemmaphyllum microphyllum, Pr. Epim. Bot. p. 263. *Pteris piloselloides*, Thunb. Fl. Jap. p. 331. Banks, Ic. Kæmpf. t. 31.

Hab. Var. *major*. Nepal, Wallich, n. 138. Sikkim, Hooker fil. and Thomson, Griffith. Loochoo Islands and Kekeah Island, Japan (smaller than the samples from British India), C. Wright. Japan, Miss Nelson (intermediate between *major* and *minor*).—Var. *minor*. North China and Japan, abundant, Thunberg, Oldham, Bobington, Wilford (Hongkong), C. Wright. Port Hamilton, Wilford. Formosa, Swinhoe (the small var., but the sterile fronds obovato-spa-

thulate, stipites of both fronds elongated and very slender).—My copious suites of specimens exhibit such a variety of forms and size, that, different as the extremes may be, there is ample evidence, to my mind, of their being but one species.

Of the species of *Drymoglossum* in Moore's Index Fil., I would observe that *D. abbreviatum*, with its uniform fronds, *D. Cunninghamsi*, Moore, *D. ellipticum*, Moore, are too imperfectly known to enable me to form any opinion about them; *D. acrostichoides*, Moore (*Vittaria*, Hook. and Grev.), is assuredly, as Mr. Moore has since acknowledged, an imperfectly soriferous state of *Acrostichum conforme*, and *D. lanceolatum* is a *Tænitis* of this work.

2. *D. piloselloides*, Pr.; caudex long filiform wiry clothed with appressed peltate lacinated scales, stipites 2–10 lines long (in the *fertile* frond) distinct jointed and deciduous near the base, fronds simple of two kinds; *sterile* ones  $\frac{1}{2}$  an inch to 2 inches long orbicular subcordate obovate or elliptical thick and fleshy coriaceous when dry, entire indistinctly costate, veins anastomosing, the areoles including free simple or branched and divaricating veinlets; *fertile* fronds  $1\frac{1}{2}$ –3 inches long linear-oblong obtuse tapering at the base, sori linear continuous just within the margin at first narrow eventually spreading so as to cover the whole back of the frond leaving a furrow between, capsules mixed with peltate pedicellated scales.—Pr. *Tent. Pterid.* p. 227. t. 10. ff. 5, 6. *Fée, Vittar.* p. 28. *Hook. Gard. Ferns*, t. 46. *Pteropsis*, Desv. *Tænitis*, Br. *Metten. Fil. Hort. Lips.* p. 28. t. 13. f. 6–8. *D. ellipticum*, Moore? *Pteris*, Willd.? *D. rotundifolium*, Pr. *Fée*. *D. spathulatum*, Pr. *Fée*. *Lemmaphyllum*, Pr. *Pteropsis nummularia*, Desv. *Nothochlæna*, Klfs. *En. Fil.* p. 133. *Wall. Cat. n.* 139. *Bl. Fil. Jav.* p. 67. *Pteris*, Linn. *Sp. Pl.* p. 1530. *Banks, Ic. Kämpf.* t. 31. *Sw. Syn. Fil.* pp. 94 and 286. t. 2. f. 2. *Schk. Fil.* p. 83. t. 87. *Willd. Sp. Pl. v.* p. 355 (not of Thunb.). *Acrostichum heterophyllum*, Linn. *Sp. Pl.* p. 1523. *Piper nummularium*, Lam. *Ill. i.* p. 82 (according to authors). *Rheed. Hort. Malab.* xii. p. 57. t. 29. *Linn. Amœn. Acad. i.* t. 12. f. 2.

Hab. Tropical East India, most abundant on the mossy trunks of trees: Malay Islands, Malacca, and the continent of British India westward to Nilghiri (*Beddome*), Singapore, Tenasserim, and Silhet, *Wallich*, n. 239; Chittagong, *Hooker fil. and Thomson*; Ceylon, *Gardner*, n. 1156.—Well distinguished, variable as may be the form and size of the sterile fronds, by the linear-oblong, not spatulate, fertile fronds, and the marginal sori.

3. *D. rigidum*, Hook.; caudex long-creeping thick as a crow's quill paleaceous with subulate ferruginous scales, stipites distant scarcely 1 inch long in the *sterile* frond 4 inches in the *fertile*, fronds dimorphous; *sterile* ones of the same

length as their stipites very coriaceous thick rigid glossy obovate cuneato-attenuate at the base entire the margin slightly recurved and thickened, costa and venation internal very obscure, veins anastomosing forming oblique oblong areoles not extending to the margin with no free included veinlets; *fertile* fronds 4-5 inches long  $1\frac{1}{2}$  line wide thick coriaceous subsemiterete, sori sunk in a deep furrow on each side the thickened but obscure costa.—*Hook. Ic. Pl. t. 996 (or Cent. of Ferns, t. 96)*. Schizolepton, *Moore, Ind. Fil. p. 344*.

*Hab.* Borneo, near Sarawak, *Thos. Lobb*.—A most remarkable and very rare Fern with quite the habit of *Drymoglossum*, but with very coriaceous rather than fleshy fronds, no free veinlets in the areoles, and with sori sunk in a groove. Surely those who sanction *Tavitis lanceolata* being placed in *Drymoglossum* may well allow this to remain there.

## 11. HEMIONITIS, *Linn.*

(*HOOK. GEN. FIL. TAB. LXXIV. B.* Dictyocline, *Moore*. Anetium, *Splitg.* Acrostichum, *Linn., in part.* Antrophyum, *in part, Fée*.)

*Sori* linear, elongated, mostly superficial, uniformly anastomosing always on the veins and sometimes sparsely scattered in the areoles (*Anetium, Splitg.*). *Veins* copiously anastomosing and soriferous.—Fronds *simple, palmato-pinnatifid or pinnate*.

§ 1. *Sori confined to the veins.* HEMIONITIS.—Sp. 1-4.

1. *H. lanceolata*, *Hook.*; caudex stout as a man's thumb in one of my specimens, ascending scarcely repent, its apex paleaceous with subulate small scales, stipites subfasciculate 8-10 inches long bright castaneous very glossy stout, fronds firm-coriaceous submembranaceous opaque 6-10 inches long  $1\frac{1}{4}$ - $2\frac{1}{4}$  inches wide below the middle, simple broad-lanceolate acuminate narrowly marginate obtuse or cuneato-attenuate at the base, costate, costa very prominent beneath, venation uniform, costules none, areoles oblong obliquely patent hexagonal smaller towards the margin, sori copious anastomosing like the veins.—*Hook. 2d Cent. of Ferns, t. 55*.

*Hab.* Fiji Islands, *Milne, Seemann, n. 716*.—A very handsome species which has some resemblance to a simple-fronded form of *Grammitis (Dictyogramme) pinnata (Hemionitis elongata, Brackenridge)*, which indeed bears simple fronds when young, but such are always linear-lanceolate, destitute of sori, and small in comparison to these fronds, which abound in fructification; and the venation is quite different in the two.

2. *H. cordata*, Roxb. ; caudex a short stout erect rhizome, stipites tufted ebony-black polished clothed with long patent fulvous deciduous hairs, those of the *sterile* fronds 2-4 inches of the *fertile* ones 8-13 inches long, fronds subcoriaceous very fulvo-villous when young and subpermanently so beneath dimorphous; *sterile* ones 2-3 inches long 1-2 inches wide cordate obtuse or subacute with a deep sinus; *fertile* ones generally larger and broader at the base hastate or sharply trilobo-hastate both with a costa ebony-black beneath and two subobsolete lateral costæ within the lobes, venation uniform forming oblong hexagonal areoles, sori copious and equally anastomosing with the veins covering the whole under side of the frond.—*Roxb. in Wall. Cat. n. 44. Griff. Crypt. Pl. of Roxb. p. 500 (H. cordifolia). Hook. and Grev. Ic. Pl. t. 64. H. sagittata, Fée, Gen. Fil. p. 172. t. 14. D.*

Hab. India: rich wet soil about Calcutta, *Roxburgh, Wallich*; frequent in the Neilgherries, *Wight, n. 51, G. Thomson, Hohenacker, n. 1253*; Cochin, *Johnstone*; Ceylon, *Gardner, n. 28 and 1309*; Moulmeine, *Parish, n. 142*; Luzon, *Thos. Lobb*.—The under sides of the fronds, even when destitute of fructification, are tinged with cinnamon colour.

3. *palmata*, L. ; caudex a short thick erect rhizome, whole plant copiously pubescent with fulvous soft hairs, stipites tufted purple-ebony very glossy those of the *sterile* frond 2-4 inches long of the *fertile* ones 6-10 inches, fronds subcoriaceous-membranaceous 2-4 inches long and as much broad; *sterile* ones generally a little smaller cordato-trilobate, lateral divisions unequally bilobed the lobes obtuse coarsely crenate; *fertile* ones palmato-5-partite, lobes broad-lanceolate acuminate crenato-lobulate, costæ 1 to each primary lobe glossy black purple beneath, venation uniform, areoles oblong hexagonal, sori clothing the whole veins forming a network over them.—*Linn. Sp. Pl. p. 1535. Sw. Syn. Fil. p. 20. Willd. Sp. Pl. v. p. 129. Hook. Exot. Fl. t. 53. Schott, Gen. Fil. t. 9.*

Hab. Tropical America: West Indies; Jamaica, Cuba, *C. Wright, n. 774*; Dominica, Trinidad, Martinique, *Sieber, n. 347, etc.*; New Granada, *Fendler, n. 303*; Mexico, Guatemala; Tarapota, Eastern Peru, *Spruce, n. 3993.*

4. *H. Griffithii*, Hook. fil. and Thoms. ; caudex ?, stipites 8-12 inches long villous paleaceous at the base with subulate scales, fronds coriaceous-membranaceous, villous especially on the venation 8-10-14 inches long 6-8 inches broad cordato-ovate acuminate pinnatifid or oblong or broad-ovate and pinnated, pinnæ about nine 6 inches long by 1-1½ inch



wide petiolate oblong subfalcate acuminate entire rotundato-cuneate at the base, terminal pinna large long-petiolate acuminately pinnatifid, its lowest pair of segments much the longest, the basal pair of pinnæ the largest broad oblong falcate and acuminate more or less lobed the rest gradually smaller upwards, the apex acuminate entire, pinnæ and larger segments costate with the costæ pinnated the rest of the venation reticulated, costal areoles the largest.—Var. *a*, *pinnata*. II. *Griffithii*, *Hook. fil. and Thomson, in Herb. Hook.* *Dictyocline*, *Moore*, “*Gard. Chron.* 1855. p. 854.” *Ind. Fil.* p. 59.—Var. *β*, *pinnatifida*. II. *Wilfordii*, *Hook. Fil. Exot.* t. 93.

Hab. Khasya, *Hooker fil. and Thomson.* *β*. Same locality, and Formosa, *C. Wilford.*

§ 2. *Sori partially scattered over the surface of the fronds as well as arising from the veins.—ANETIUM.*

5. II. (*Anetium*) *citrifolia*, *Hook.*; stipes from  $\frac{1}{2}$  an inch (in small specimens) to 9 inches long compressed flaccid, fronds 3 inches to nearly 2 feet long and from 1–4 inches wide oval or oblong rarely subspathulate acute or acuminate more or less attenuated at the base and more or less strongly costate or semicostate membranaceous pale-green flaccid, areoles with an erecto-patent direction oblong hexagonal, sori linear and copious on the veins superficial, and capsules are also sparsely yet very generally scattered over the areoles.—*Linn. Sp. Pl.* p. 1513. *Sw. Syn. Fil.* p. 9. *Willd. Sp. Pl.* v. p. 108. *Acrostichum*, *Linn.* *Anetium*, *Splitg.* *Anthrophyum*, *Fée.* *A. pendulum*, *Le Prieur, Fée, l. c. Acrost.* p. 97. *Pr. Epim. Bot.* p. 175. *Moore, Ind. Fil.* *Hemionitis parasitica*, *Linn. Sp. Pl.* 1535. *Hemionitis spathulata*, *Pr.* *Anthrophyum Sprucei*,\* *Moore, Ind. Fil.* pp. 72, 73 (*name only*). *Plum. Fil.* p. 101. t. 116.

Hab. Common throughout the West Indies and tropical America, frequently growing pendulous from Palm stems: Amazon, *Spruce, n.* 2368, and Para, *n.* 52 (3 feet long, including the petiole, and costate almost to the apex).—The species is most variable in point in the length of the stipes, and in the length and distinctness of the costa, but in all other respects very uniform in characters. Mr. Spruce remarks, “when recent the fronds are rather fleshy, and the midrib being winged at the back, they appear to have a triolate stipes.”

\* Mr. Moore has entered this under *Anetium* as a distinct species, and has taken the name (not without acknowledgment) from my private herbarium, but without careful examination or any description.

## SUBORD. XI.—ACROSTICHEÆ.

*Sori* destitute of involucre, superficial, and apparently clothing the whole under side (rarely both sides) of the frond or segments with a uniform stratum of capsules, sometimes forming local patches (in *Platycterium*), on the parenchyme as well as the veins. *Veins* simple or forked or variously branched, connivent or copiously anastomosing, with or without included free veinlets in the areoles.—Ferns *abounding in tropical regions and of exceedingly varied size and forms, the caudex creeping or erect or short and tufted. Fronds simple or variously compound, frequently dimorphous, the fertile fronds or pinnæ generally more contracted, very different in shape in some instances, especially in* § *Rhipidopteris and in the genus Platycterium.*

Many have been the attempts to divide the species into a number of distinct genera, but, as will be seen by the synonyms I have quoted, not in a manner to give general satisfaction. Indeed, the passages from one to another group or genus are too apparent to escape notice, and I have thought it better, with the single exception of *Platycterium*, to consider the groups rather of sectional than of generic value.

1. *Acrostichum, L.*

*Sori* a uniform mass, clothing the whole under side of the fronds or pinnæ (rarely both sides), costa generally excepted. *Veins* simple or variously compound or anastomosing.

*The following are the names of the Sections or Subgenera (Genera of other authors) here adopted:—*

I. *Veins free.*

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| 1. Elaphoglossum (HOOK. GEN. FIL. TAB. CV. A). Aconiopteris (HOOK. GEN. FIL. TAB. LXXIX. A). | 3. Polybotrya (HOOK. GEN. FIL. TAB. LXXVIII. B).           |
| 2. Lomariopsis.  | 4. Stenochlæna (HOOK. GEN. FIL. TAB. CV. B). Lomaribotrya. |
|  | 5. Rhipidopteris.  |
|  | 6. Egenolfia.  |

II. *Veins free or united only near the margin.*

7. Olfersia (HOOK. GEN. FIL. TAB. LXXIX. A).

III. *Veins variously anastomosing.*

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|---|---|
| 8. Soromanes.   | A. Neurocallis, Hymenodium).                    |
| 9. Stenosemia.  |   |
| 10. Heteroneuron (Pœcilopteris, <i>Eschweiler</i> , HOOK. GEN. FIL. TAB. LXXXI. A. Campium, HOOK. GEN. FIL. TAB. LXXXI. A). | 12. Gynnopteris (HOOK. GEN. FIL. TAB. LXXXV.).  |
| 11. Chrysidium (Acrostichum, <i>Pr.</i> HOOK. GEN. FIL. TAB. LXXXI.   | 13. Leptochilus.                                |
|   | 14. Hymenolepis.                                |
|   | 15. Photinopteris (HOOK. GEN. FIL. TAB. XCII.). |

§ 1. ELAPHOGLOSSUM.—Fronds simple, entire, rarely pinnatifid. Veins simple or forked, free.—Gen. Elaphoglossum, Schott. Olfersia, Pr.

The following are M. Fée's divisions of this subgenus in his valuable 'Histoire des Acrostichées,' which are here adopted; the characters, however, must not be received in too strict a sense:—

I. OLIGOLEPIDE.E, Fée.—Fronds mostly destitute of scales. 1-58.

A. Fronds oval or oval-lanceolate. 1-44.

\* Fronds coriaceous. 1-32.

\*\* Fronds soft and flaccid. 33-44.

B. Fronds linear. 45-58.

II. POLYLEPIDE.E, Fée.—Fronds more or less scaly or setoso-squamose. 59-94.

A. Fronds oval or oval-lanceolate. 59-60.

B. Fronds linear or linear-lanceolate. 61-94.

I. OLIGOLEPIDE.E, Fée.—Fronds mostly destitute of scales. 1-58.

A. Fronds oval or oval-lanceolate. 1-44.

\* Fronds coriaceous. 1-32.

1. A. (Elaphoglossum) *decoratum*, Kze.; "caudex thick paleaceous with linear very narrow and very long crisped scales," stipites 3-8 inches long thick as a crow's quill striated bright reddish-brown densely squarrose for the whole length with ovato-cordate very obtuse ferruginous scales  $\frac{1}{4}$  of an inch long, at the base only are numerous very long narrow-linear crisped ones near the caudex, fronds very coriaceous 12-15 inches long 3-4 inches wide broad-oblong acute at the base shortly and sharply acuminate at the apex, fringed for its whole length at the thickened edge with apparently a double series of scales similar to those of the stipes but smaller and more orbicular.—Kze. in *Linnaea*, ix. p. 25. *Analect. Pterid.* p. 9. t. 6. Fée, *Acrost.* p. 27. t. 22. f. 4. Olfersia, Pr. Elaphoglossum, Moore.

Hab. Peru, in dense forests, Pampayaco, Pappig. Guadeloupe, L'Herminier, in *Herb. nostr.* British Guiana, Schomburgk, n. 1647 (Moore).—A most beautiful and remarkable species, perhaps the finest of the section; extremely rare in collections. The veins are slightly elevated on the under side and unite with the thickened margin, not unfrequently partially anastomosing, so that some systematists might refer it to *Hymenodium*.

2. A. (Elaphoglossum) *Wrightii*, Metten.; caudex very long creeping and scandent on the trunks of trees thick as a duck's quill squarrose with rather large oblong acuminate bright ferruginous scales, stipites remote 1-1 $\frac{1}{2}$  inch long striated reddish-brown squarrose with similar scales, fronds coriaceous 7-12 inches long 1-1 $\frac{1}{2}$  inch wide broad-oblong-lanceolate suddenly and subcuspidato-acuminate subspathulate

attenuated from above the middle and decurrent upon the caudex, the margin white callous subsinuuous and crisped, veins manifest when the frond is seen between the eye and the light; *fertile* frond smaller, the white margin reflexed, capsules yellow-brown, costa broad partially paleaceous below.—*Metten. in Eat. Fil. Wright. et Fendl. p. 194.* Elaphoglossum, *Moore.*

Hab. Cuba, *C. Wright, n. 965.*—This appears to me a very good species, with scales on the stipes not unlike those of *A. decoratum*, and with similar ones to those on the long scandent caudex, a white, suberenate, and waved margin, patent on the *sterile* frond, but closely reflexed and not crenate on the *fertile* fronds; giving the appearance of a pteroid involuere.

3. *A. (Elaphoglossum) andicola*, Fée; “sterile fronds thick cartilaginous ovato-lanceolate very glabrous margined acute at the apex decurrent at the base, costa thick, veins converging spreading at an angle of  $85^{\circ}$ ; *fertile* ones lanceolate acute at both extremities glabrous margined, costa stout, capsules pale fulvous,—*planta sicca aurata.*”—*Fée, Acrost. p. 28. t. 2.* *A. pachyphyllum*, *Eat. in Fil. Wright. et Fendl. p. 7 (omitting syn. of Hymenodium Kunzeanum, Fée).*

Hab. Venezuela, alt. 4000–14,500 feet, *Linden, n. 549 (Fée).* Mexico (*Fée*). To these *Moore* adds, Venezuela, *Fendler, n. 293 and 296* (but which is *Elaphogl. pachyphyllum*, according to *Eaton*, in *Fil. Wright. et Fendl.*, and to which *Eaton* refers *Hymenodium Kunzeanum*, *Fée, Acrost. p. 90, t. 58*).—I have no authentic specimen of this plant of *Fée*, unless *Fendler's* can be considered so, and as *Moore* considers it to be; but I confess I should have little hesitation in referring *Fée's* figure and *Fendler's* specimens to *A. latifolium*. The sori are fulvous, it is true, in the n. 296 of the latter, but dark-brown in 293. Trifling variations are brought forward too much, failing others, as specific distinctions. *Moore* remarks, “*Elaphoglossum latifol. affine.*”

4. *A. (Elaphoglossum) callæfolium*, *Bl.*; “fronds oblong-lanceolate elongated acute at each end coriaceous long decurrent glabrous undulate, *fertile* ones of the same form rather obtuse shorter longer stipitate, stipites at the base and the caudex paleaceous, veins extending to the margin, costa thick prominent beneath canaliculate above, caudex woody creeping thicker than a goose-quill, scales lanceolate entire.” *Fée.—Bl. Fil. Jav. p. 22. t. 4 (not Link).* *Olfersia, Pr.* Elaphoglossum, *Moore.*

Hab. Java, Mount Gede, 8000–9000 feet above the level of the sea, *Blume.*—*M. Fée*, whose character, as I have given above, seems to have been taken from an original specimen of *Blume*, is at great pains to distinguish it from his South American *A. alismæfolium*.—“Elle a des frondes aiguës, mais non-acuminées des pétioles (stipites) plus courts et plus déliés, une lame marginée et un mésonneur coloré, infiniment plus robuste,” etc. I, on my part, who possess authentic and

good specimens from Blume and De Vriese, do not see how it is in any way to be distinguished specifically from the *A. latifolium*. Our figure of the latter in Fil. Exot. t. 42. from a living South American specimen, really seems identical with Blume's East Indian *A. callefolium*.

5. *A. (Elaphoglossum) alismæfolium*, Fée; "fronds ovato-lanceolate membranaceous subcoriaceous ovate acuminate acute at the base and decurrent, the margin in drying revolute, stipites long unisulcate paleaceous nigrescent at the base, veins turgescient at the apex; sterile ones ovato-lanceolate, costa compressed; fertile lanceolate long-stipitate narrower reddish-brown beneath, caudex creeping thick as a child's finger, its scales linear, the margin scarcely toothed fulvous very long crisped when dry."—Fée, *Acrost.* p. 28. t. 3. Elaphoglossum, Moore.

Hab. Tropical America: Guadeloupe, *L'Herminier*, n. 7; Cuba, *Linden*, n. 2158; New Granada, *Purdie*, *Funck*, n. 654; to which Moore adds Cuba, *C. Wright*, n. 791, 966, 970; Jamaica, Portorico, etc., most of them apparently from my herbarium, and all of which I should have been disposed to refer to *A. latifolium*.—Fée observes, "Cette espèce varie par ses frondes ovoïdes, terminées en une pointe mousse ou aigné, le stipes s'allonge plus ou moins," etc.; and there is nothing essentially at variance with the *A. latifolium*. I may remark that Mr. Moore refers my specimen of *A. Sartorii*, Liebm., from Mexico, to *A. alismæfolium*. It is, I suspect, an elongated form of that plant, and is the same as *A. Tovarense*, Metten. in *Eat. Fil. Wright. et Fendl.*, and a Peruvian plant of Mathews, n. 388, which I bring under *A. latifolium*.

6. *A. (Elaphoglossum) Sieberi*, Hook. and Grev.; caudex a short thick horizontal rhizome copiously rooting below generally forming knots or lumps from which the fronds arise and these are densely crinite with long narrow-linear subulate erect almost black hair-like scales, stipites 2 inches to a span long scurfy with small black imperfect scales, fronds firm-coriaceous 2–15 inches in length and from 1–3 inches wide elliptic or oblong or oblongo-lanceolate, the margin a little thickened and recurved obtuse or bluntly acuminate moderately attenuated and decurrent at the base strongly costate, costa prominent beneath; fertile fronds generally smaller and narrow entirely soriferous except on the rather broad costa.—Hook. and Grev.  *Ic. Fil. t. 237. Fée, Acrost. p. 29. Olfersia, Pr. Elaphoglossum, Moore. Acrostichum latifolium, Sieb. Syn. Fil. n. 26 (an Sw.?). A. ellipticum, Fée, Acrost. p. 30. t. 4. f. 2. Elaphoglossum, Moore.*

Hab. Mauritius and Bourbon, *Commerson*, *Bory*, *Sieber*, n. 25. *Bojer*, *Carmichael*, etc. Fernando Po, *G. Mann*, alt. 2000 feet, n. 370.—I have said all I can in favour of this being distinct from *A. latifolium*; the character rests chiefly on

the very dark colour and almost setaceous character of the scales of the caudex. In the absence of caudex on my Fernando Po specimens, they are as likely to be *A. latifolium* as *A. Sieberi*.

7. *A. (Elaphoglossum) macropodium*, Fée; “sterile fronds lanceolate coriaceous robust, the margin incrassated subrevolute beneath copiously but minutely dotted with white (not in my specimens), costa prominent; fertile fronds nearly uniform in size lanceolate elongate acuminate, stipes robust (scarcely in my specimens) longer, costa prominent beneath striated canaliculate above, veins spreading at an angle of  $85^{\circ}$ – $88^{\circ}$ , caudex thick as a child’s finger short scaly, scales tawny ovato-lanceolate laxly imbricated.” — Fée, *Acrost.* p. 30. t. 6. f. 2. *Elaphoglossum*, Moore. *A. coriaceum*, Wall. *Cat.* n. 14?, according to Moore.

Hab. Bourbon, Fée, and (if Wallich’s plant be the same) Mauritius, Wallich. — I possess no authentic specimen of Fée’s plant, of which he further remarks that it varies in the length and breadth of the fronds and of the stipes, and that it differs from *A. Sieberi*, Hook. and Grev., and his *A. ellipticum*, both from the same islands, by the large and tawny scales, and by the form of the rhizome. I confess that my specimens do not well accord with Fée’s plant, judging from his figure and description, for though they very much differ in the colour and nature of the caudical scales from *A. Sieberi*, they want the white dots of *A. macropodium*, and may possibly be forms of *latifolium* or of *conforme*.

8. *A. (Elaphoglossum) conforme*, Sw.; caudex creeping varying in length and thickness paleaceous with lanceolate ferruginous or dark-brown even or crisped scales, stipites from 2 inches to a span or a foot long stramineous partially and deciduously scaly discoloured blackish at the base evidently swollen and subarticulated at the junction of the caudex, fronds coriaceous 3–4 inches to 1 foot long  $\frac{1}{2}$ – $1\frac{1}{2}$  inch in width elliptical or oblongo-lanceolate obtuse or acute more or less attenuated at the base not unfrequently minutely glanduloso-punctate especially beneath; fertile frond sometimes equal in size to the sterile and nearly of the same shape or smaller often on a longer stipes soriferous all over the surface except on the costa, veins indistinct.—Sw. *Syn. Fil.* pp. 10 and 192. t. 1. f. 1 (a common Cape form). Willd. *Sp. Pl.* v. p. 107. *Bl. Fil. Jav.* p. 23. t. 5 (excellent). Fée, *Acrost.* p. 30. *Elaphoglossum*, Moore. *Olfersia*, Pr. *Acrost. æmulum*, *Bl. Fil. Jav.* p. 100. *A. latifolium*, Sw. in *Schrad. Journ.* *A. oblongum*, Desv. *A. laurifolium*, P. Thouars, *Fl. Trist. d’Acunha*, p. 31. Fée, *Acrost.* p. 37. t. 7. f. 1. *A. Gayanum*, Fée, *Acrost.* p. 37. t. 16. f. 2. *A. aphle-*

bium,\* *Kl. in Linnaea*, xx. p. 419. *A. angustatum*, *Schrad. Schlecht. Adumbr.* p. 14. t. 5. *Olfersia*, *Pr.* *Elaphoglossum æmulum*, *Brack. Fil. U. S. Expl. Exp.* p. 71. *Acrost. glandulosum*, *Hook. and Grev. Ic. Fil. t. 3.* *A. Cumingii*, *Fée, Acrost.* p. 31. *A. obtusifolium*, *J. Sm. (name only).* *Vitaria acrostichoides*, *Hook. and Grev. Ic. Fil. t. 186* (*abnormal form with the sori confined to two parallel lines distant from the costa*). *Acrost. marginatum*, *Wall. Cat. n. 17.* *Fée, Acrost.* p. 31. *Olfersia*, *Pr.* *A. angulatum*, *Bl. Fil. Jav. p. 25. t. 6.* *Fée, Acrost.* p. 52. *Olfersia*, *Pr.* *Elaphoglossum*, *Moore.* *A. Gorgoneum*, *Bl. Fil. Jav. p. 28. t. 8.* *Fée, Acrost.* p. 38.

Hab. Cape of Good Hope, abundant. Tropical Africa: Prince's Island and Brass, *Barter*, n. 1816; Mauritius, *Carmichael*; St. Helena, *J. D. Hooker, Haughton*; Tristan d'Acunha, *P. Thouars, Carmichael, Milne*. Java, Ceylon, *Blume, in Herb. Hook.*, under the incorrect name of "viscosum," *Gardner*, n. 1165. East Indies: Nepal, *Wallich*; Khasya, *Hooker fil. and Thomson*; Nilghiri, *Beddome*, n. 106; Luzon, *Cuming*, n. 193; Sandwich Islands, *Brackenridge, Hillebrand*. Tropical America: Venezuela, *Fendler*, n. 277, 278, 295.  $\beta$  (some of the fronds narrow-oblong, bright green); Ecuador, *Spruce*, n. 5661, *Jameson* (scales of the caudex almost black and appressed, even, in other respects the same as the African plant); Andes of Peru, *Macleay*; Chili, *C. Gay*; Panama, *S. Hayes*, n. 151; North-west Mexico, Sierra Madre, *Seemann* (quite the African form and glanduloso-punctate).—*Fée* limits the geographical position of this Fern to the Cape Colony. I do not distinguish from that my specimens from other countries here recorded, not even those of South America; and *Blume's* figure from the Java plant cannot, I think, be called in question, nor *Cuming's* n. 193, from Luzon. That it is a variable species cannot be denied, and some of the Cape specimens I am really unable to distinguish from *A. latifolium*; nor can I agree with *M. Fée* when he says, "On le reconnaîtra facilement à ses frondes épaisses, jaunâtres, inférieurement terminées en pointe, à son pétiole court et ailé, à sa marge plus ou moins érispée et à son rhizome rampant, couvert d'écailles brunâtres lâchement imbriquées."—marks most of which are as common to several other supposed species as to this. This perhaps may be considered a type into which might safely merge, besides all those given in the synonyms, not a few of the following species.

9. *A. (Elaphoglossum) Feejeense*, *Hook.*; "caudex a short thick creeping paleaceous rhizome, stipites 3–5 inches long semiterete paleaceous at the base, fertile ones longer 10–12 inches long, fronds coriaceous submarginate lepidote on both sides; sterile ones a span long 1 inch broad oblongo-lanceolate obtuse narrowly angustate much attenuated at the base; fertile ones small oblong obtuse slightly attenuated at the

\* *A. glabratum*, *Metten. Fil. Nov. Caled.* p. 1. should perhaps rank near this, of which the author says, "proximum *A. aphlebio*, *Kze.* a quo forma foliorum, præsertim fertileium recedit. Hab. New Caledonia, *Viellard.*"

base, veins immersed parallel forked." *Brack.*—*Elaphoglossum*, *Brack. Fil. U. S. Expl. Exp. p. 72.*

Hab. Fiji Islands, *Brackenridge, Milne.*—"This differs from *A. æmulum* in the obtuse fronds and in the presence of numerous small peltate scales on both surfaces." Such lepidote fronds are not uncommon in *A. conforme*. I possess no authentic specimen of this *Acrostichum*, but I think I have the true plant from Milne; if so, its chief distinguishing feature from *A. conforme* is the narrowly attenuated base of the frond; but even this is variable.

10. *A. (Elaphoglossum) æmulum*, Klfs.; "caudex creeping paleaceo-squamose, stipites glabrous semiterete furrowed above, fronds stipitate coriaceous oblong-lanceolate margined attenuated at the base; *fertile* ones long stipitate." *Brack.*—*Klfs. En. Fil. p. 63. Fée, Acrost. p. 62 (sp. dubia).* *Elaphoglossum*, *Brack. Fil. U. S. Expl. Exp. p. 71.* *Olfersia, Pr.*

Hab. Sandwich Islands, *Kaulfuss*, attaining an alt. of 8000 feet, *Brackenridge, Hillebrand, n. 55 and 57?*—Of this I possess no named specimen save from Dr. Hillebrand. I can well conceive, however, that it is the true plant, and I fear can hardly be distinguished from *A. conforme*. In my specimen (*n. 55*) the caudex is short, thick, creeping, paleaceous with rather large scales; sterile frond 5 inches long,  $\frac{1}{2}$  an inch wide, linear-oblong, obtuse, attenuated at the base, coriaceous on a stipes 2 inches long, black, and jointed near the base; *fertile* fronds 3-5 inches long, on longer stipites. Dr. Hillebrand's *n. 57* has the fronds all uniform, more attenuated, with stipites not an inch long, and one of the fronds partially sterile, the extremity soriferous.

11. *A. (Elaphoglossum) scapellum*, Mart.; "sterile fronds coriaceous glaucous ovate narrowly decurrent at the base edged by a thickened discoloured margin, stipes and costa sparsely scaly, veins slender excurved; *fertile* fronds linear longer stipitate repand, caudex thick scaly, scales lanceolate-linear long attenuated crisped at the apex." *Fée.*—*A. scapellum (not scapellum, as in Fée), Mart. Fil. Bras. p. 86. Fée, Acrost. p. 52. t. 10.*—*An A. consobrinum, Kze. in Fée, Acrost. p. 32?*

Hab. Brazil: Rio Negro, *Martius*; Goyaz, *Gardner, n. 4047.*—Very much like *A. latifolium*. *Fée's* figure is quite correct, and evidently taken from *Gardner's* specimens; indeed, *Gardner's* locality is the only one expressly recorded by him and Moore. The thickened margin of the frond is dwelt upon by *Fée*, but on which *Martius* himself says nothing. My specimens show this thickened margin more decidedly on some fronds than others. I fear it must be considered a very dubious species, and the *A. consobrinum*, *Kze.*, no less so.

12. *A. (Elaphoglossum) Schomburgkii*, *Fée*; "sterile fronds ovato-lanceolate membranaceous (my specimens are singularly coriaceous probably very carnose when recent) acute at the apex long-cuneate at the base subundulate at the margin,



costa slender ('arcta,' my specimens have the costa singularly stout and very prominent beneath) slightly channelled above, veins parallel slender approximate spreading at an angle of  $85^{\circ}$ , stipes triangular firm; *fertile* fronds smaller lanceolate acute (in Herb. Deless. terminated by a short obtuse mucro), caudex thick scaly, scales linear-lanceolate amber-colour (*succineis*), the margin scarcely sinuated." *Fée, Acrost. p. 32. t. 8. Griseb. in Herb. nostr.*—*Elaphoglossum, Moore, Ind. Fil. p. 14. A. latifolium, "Kze. in Herb. Delessert (not Sw. nor Sieber)." Elaphoglossum, Moore, Ind. Fil. p. 358 (excl. Acrost. (Hymenodium) pachyphyllum, Kl. in Linnæa, xx. p. 428, and in Herb. nostr.).—Var. ellipticum. A. luridum, Fée, Acrost. p. 33. t. 19.*

Hab. British Guiana, *Schomburgk, n. 450. New Granada, Merida, Moritz, n. 321* ("A. pachyphyllum," from *Kl.*). Ecuador, near Pasto.—*Var. ellipticum. Province of Arima, Purdie. French Guiana, Le Prieur.*—I fear this fine plant is not clearly understood or well defined. It was first detected by Schomburgk in 1837 and circulated as his n. 450, and named and described by Fée, l. c., p. 32, in 1844; but, strangely enough, at p. 29, the same plant of Schomburgk (n. 450) is brought forward as the *Acrostichum brevipes*, Kze., and is said to be *A. latifolium*, J. Sm., and *A. callifolium*, Lk. (not Bl.); and M. Fée seems altogether to ignore an *A. latifolium*. I have purposely omitted here the *A. brevipes*, Kze.; for I cannot tell what is intended by it; and in regard to *A. Schomburgkii*, my original specimen is quite at variance with the "fronds membranaceous" of Fée, as it is with the character "costa slender." My Schomburgkian specimen has the sterile frond more than 2 feet long, 3 inches wide, singularly thick and coriaceous, broad-lanceolate, much acuminate, the costa very stout, very prominent at the back, and together with the stipes (a foot long) as thick as a goose-quill. Specimens identical with this are from Merida, in my herbarium, as "*A. (Hymenodium) pachyphyllum, Kl. (not Kze.)*. Again, I have from Purdie an allied plant, I believe a variety, which Dr. Grisebach has named on my specimen and in his Fl. of the British W. Ind. vol. ii. ined., *A. Schomburgkii*; but it has some considerable points of difference from the other samples I have alluded to and is unquestionably identical with the figure of *A. luridum*, Fée, *Acrost. p. 35. t. 19*, where the same number of Schomburgk, viz. n. 450, is given for this plant also. This has scarcely any stipes, but a frond from 8–12 inches long,  $2\frac{1}{2}$ –3 inches wide, elliptical, spatulate, thin, coriaceous, obtuse, gradually decurrent almost to the base of the winged stipes, a somewhat cartilaginous margin, ciliato-squamulose at the edge, and a slender and flattened costa. May they not all be forms of *A. latifolium*?

13. *A. (Elaphoglossum) impressum, Fée*; "fronds lanceolate coriaceous opaque acute unequally cuneate at the base; *sterile* ones coriaceous revolute at the margin, veins spreading at a right angle approximate rimæform on the upper side, beneath immersed, costa deeply grooved on the upper side; *fertile* ones scarcely altered wider at the base slightly decurrent, the margin entire incrassated, veins superficial

above blackish, costa squamulose, scales lacerated." *Fée, Acrost. p. 33. t. 5.*

Hab. Martinique (*Fée*).—Unknown to me. The figure given by *Fée* very much resembles rather narrow forms of *A. latifolium*.

14. *A. (Elaphoglossum) scandens*, Bory; "sterile fronds remote ovato-lanceolate coriaceous glaucescent margined subrepand and plane at the edge, costa thick, veins approximate, stipes squamose nodose and blackish at the base; fertile fronds lanceolate acute attenuated at the base with a longer stipes, caudex scandent angular thick as a swan's quill clothed with fulvo-ferruginous scales." *Fée*.—Bory, in *Fée, Acrost. p. 33.* *Elaphoglossum, Moore. A. Schlimense?*, *Fée, Sme Mém. Foug. Nouv. p. 68.*

Hab. Caracas, *Linden, n. 74 (1842).* New Granada, *Schlim, n. 622?* alt. 7000 feet. Guadeloupe, *Fée.* Ecuador, *Spruce?*—My specimens of this Fern from Linden are destitute of fertile fronds, and I am not certain that those I have from Guiana, Schomburgk and Le Prieur, are identical; they present some differences to characters given by *Fée*. The "pétioles noduleux et noirâtres à la base" are common to many *Acrosticha* allied to *A. conforme*. All my specimens appear to have the caudex more or less scandent, frondiferous towards the apex. My specimens also from Schlim I refer here doubtfully; the number is quoted by *Fée, l. c.*, but the character is very brief and unsatisfactory, "sterile and fertile fronds of the same form, with close-placed veins, lanceolate-acute at the summit and at the base; margin entire and cartilaginous; stipites short, whitish (mine are 6-9 inches long, bright-tawny) scaly; caudex erect, scaly, bearing close-placed fronds." Probably all may be considered forms of *A. latifolium*.

15. *A. (Elaphoglossum) latifolium*, Sw.; caudex thick creeping towards the apex especially densely clothed with subcrisped thin membranaceous scales, fronds mostly terminal on the caudex; sterile ones including the stipes 1 or 2 and even 3 feet long and from 1-3 inches wide broad-lanceolate shortly and obtusely acuminate subcoriaceous very opaque glossy paler beneath attenuated at the base upon a stipes varying in length from 2-6-8 inches which is often scaly below and jointed a little above the caudex, costa generally stout and prominent on the under side, veins simple or forked close parallel rarely here and there anastomosing nearly horizontal; fertile fronds generally smaller and narrower than the sterile, sori universal except on the costa.—*Sw. Fl. Ind. iii. p. 1589 (not Sw. in Schrad. Journ., which is A. conforme, from the Cape).* *Syn. Fil. p. 9.* *Willd. Sp. Pl. v. p. 105.* *Hook. Fil. Exot. t. 42.* *A. longifolium, Jacq. Coll. p. 105.* *Elaphoglossum, J. Sm. Moore. Acrost. Lingua, Raddi, Fil. Bras. p. 5. t. 15. f. 4 (small, but characteristic).*

*Fée, Acrost. p. 33.* *Olfersia, Pr.—Plum. Fil. t. 135.*—Var. *elongata*; sterile fronds  $\frac{1}{2}$  a foot to 2 feet long by 2–2 $\frac{1}{2}$  inches wide; fertile fronds long and narrow in proportion. *A. Sartorii, Liebm. Fil. Mex. p. 19.* *A. Tovarense, Metten. in Eat. Fil. Wright. et Fendl. p. 194 (name only).*

Hab. Tropical America and West Indies. I shall here refer to a few of the native specimens that have been widely distributed with numbers. Cuba, *C. Wright, n. 790 and 791.* Dominica, *Inray, n. 82.* Guadeloupe, *L'Hernimier, n. 10.* Jamaica, *Wilson, n. 746.* New Granada, Venezuela, *Fendler, n. 285, 287, 279* (small, very coriaceous and almost sessile), 293, 296, 290 (small and much acuminate). *Elaph. attenuatum, Metten. ms. in Eat. Fil. Wright. et Fendl. p. 194), n. 291.* *E. sporadolepis, Kze. and Metten. ms. in Fil. Wright. et Fendl. Santa Martha (2 $\frac{1}{2}$  feet long and 4 $\frac{1}{2}$  inches broad), Purdie, n. 294.* Ocaña, *Schlim, n. 832.* Brazil, *Raddi, Gardner, n. 96, 97, 5926.* Mexico, *Liebm., Galeotti, n. 6342.* Ecuador, *Jameson.* Peru, Tarapota, *Spruce, n. 4723, 4734.*—Var. *elongata.* Mexico, *Liebm.* (*A. Sartorii, Liebm.*). Cusapi, *Mathews.* Venezuela, *Fendler, n. 292 (A. Tovarense, Metten. ms.).*—I have here confined myself to the generally acknowledged *A. latifolium* of the New World; but it may easily be gathered from what I have said in my 'Filices Exoticæ,' and in the present volume, that I am greatly tempted to unite with this or with *A. conforme* many supposed species of other authors. The notion is still too prevalent that species of Ferns are very local, and the imagination will then raise up characters not warranted by nature.

16. *A. (Elaphoglossum) decurrens, Fée* (an *Desv.?*); caudex creeping ferrugineo-paleaceous, stipites subterminal aggregated 1–4 inches long sparsely paleaceous, fronds (sterile only 2–2 $\frac{1}{2}$  inches long and 1 inch broad and then elliptical-spathulate) or 15 inches long 3 $\frac{1}{2}$  inches broad firm-coriaceous very opaque dark-brown (probably carnosose when recent) spatulato-oblong long-attenuated and decurrent upon the stipes smooth above beneath finely granulated with minute elevated points giving the appearance of young fructification bordered by a pale-tawny distinct subpellucid scariose margin fringed with close-placed lanceolate ciliated rufo-ferrugineous patent scales, venation quite obsolete from the thickness of the substance.—*Desv. Journ. Bot. 1813. p. 273?* *Fée, Acrost. p. 34 (a, junior, ornatum).* *Elaphoglossum, Moore. E. obtusifolium, J. Sm. (name only), an of Willd., Bl. Fil. Jav. p. 32. t. 10?, Brackenridge, etc.*

Hab. Luzon, *Cuming, n. 144* (sterile specimens only).—This is a very remarkable *Acrostichum*, and perhaps different from what authors have described as *A. decurrens* and *A. obtusifolium*; for none of them notices the beautiful fringe of copious scales which borders the frond, nor the granulated appearance of the under side. It is true *Fée* makes two varieties: one, *a, junior, ornatum*, *Cuming's* plant; and *β, senior, nudum*, *Blume's* plant. But my smallest fronds and my very largest one (which has every appearance of being well advanced) are alike fringed.

17. *A.* (Elaphoglossum) *obtusifolium*, Brack., an Bl.?; “caudex stout short creeping paleaceous, stipites semiterete paleaceous at the base, fronds coriaceous glabrous submarginate obscurely lepidote obovato-oblong obtuse attenuated at the base; *fertile* ones narrower, and stipes longer, veins immersed parallel and forked.”—Elaphoglossum, *Brack. Fil. U. S. Expl. Exp. p. 72.* Acrostichum, *Willd. Bl. Fl. Jav. p. 31 (no figure).* *A. decurrens*, *Bl. Fil. Jav. p. 32. t. 10 (not of other authors?)*. *A. decurrens (var. β, senior; nudum)*, *Fée, Acrost. p. 34 (excl. var. α, junior; ornatum)*.

Hab. Java. *Blume.* Fiji Islands, Ovalau, *Brackenridge, Milne.*—Great confusion prevails respecting the *Acrost. obtusifolium* and *A. decurrens* of authors; what I have in this work called *A. decurrens* is certainly the *A. decurrens*, “*α, junior, ornatum.*” of *Fée*. But that appears to me quite different from the *A. decurrens* of *Bl. Fil. Java*, l. c., of which the figure is an admirable representation of *Brackenridge's A. obtusifolium*. Our specimens are in a perfect state and quite glabrous, coriaceous; stipites 2–3 inches long, those of the *fertile* fronds 6 inches; *sterile* fronds 2½–6 inches long, 1½–2 inches wide, oval or obovate, very obtuse; *fertile* fronds 2 inches long, ½–¾ of an inch wide.—Still I am not inclined to think that these may be a broad-fronded form of *A. conforme*.

18. *A.* (Elaphoglossum) *flaccidum*, *Fée*; caudex stout thick as one's finger ascending or suberect (probably more or less scandent) scaly frondiferous at the apex, stipites scarcely any of the *sterile* frond, 3 inches to a span long in the *fertile* jointed near the base; *sterile* fronds 10–12 inches long firm-membranaceous ½–1¼ inch broad sparsely punctato-squamulose beneath lanceolate or narrow-lanceolate sharply acuminate long-tapering almost to the caudex below subpellucid costate, costa somewhat slender, veins conspicuous subhorizontal rather close-placed; *fertile* fronds generally exceeding the *sterile* ones on account of the greater length of the stipes and narrower.—*Fée, Acrost. p. 35. t. 7 (very accurate).* Elaphoglossum, *Moore.* *E. simplex*, *J. Sm.*—*Var. β, Lechlerianum*; caudex decidedly scandent. *A. Lechlerianum, Metten. Fil. Lechler. p. 3.* *A. oxyphyllum, Brougn. in Herb. nostr.*

Hab. Guiana, *Schomburgk, n. 448, Sagot, n. 927, Appun.* New Granada, *Purdie.* Corrientes, *Seemann, n. 1000.* Brazil, San Gabriel, *Spruce, n. 2187.*—*Var. β, Peru, Lechler, in Herb. nostr.*—I fear there is no valid distinction between the *A. Lechlerianum* of *Mettenius* and *A. flaccidum*.

19. *A.* (Elaphoglossum) *alatum*, *Fée*; “*sterile* fronds lanceolato-ovate the margin repand the apex acute the base long-decurrent cuneate, stipes winged grooved with a narrow

furrow; *fertile* fronds elongato-ovate obtuse sterile at the cuneated base, the margin cartilagineo-dentate, stipes slender longer (than the sterile), caudex thick paleaceous, scales broad fulvous very long attenuated, their margins fibrillose."—*Fée, Acrost. p. 35. t. 5. f. 2 (not Gaud.)\**. Elaphoglossum, *Moore*. *E. latifolium*, *J. Sm. in Loud. Journ. of Bot. i. p. 197 (according to Moore)*.

Hab. Guiana, *Le Prieur, Schomburgk, n. 419*. Brazil, *Spruce, n. 2245 and 2869 (fertile fronds longer and narrower)*. Cuba, *C. Wright, n. 969 ("A. alismæfolium, Eat.")*.—Schomburgk's specimens are the authority for this, and the name is derived from the more or less winged character of the upper portion of the stipes, arising from the decurrent base of the frond. A trifling circumstance, I fear; and I am content, with J. Smith, to refer this species to small forms of *A. latifolium*, or, with Eaton, to *A. alismæfolium*, or even to *A. conforme*.

20. *A. (Elaphoglossum) calophyllum*, Kze.; "sterile fronds linear-oblong attenuated at both extremities marginate parallel-venose, the base of the veins elevated pale beneath glabrous above; *fertile* ones long-stipitate oblong-narrow, the stipes sparsely paleaceous channelled above, caudex creeping paleaceous." *Fée*.—*Kze. in Linnea, ix. p. 27. Fée, Acrost. p. 36*. Elaphoglossum, *Moore*.

Hab. Peru, *Pæppig*.—I have no acknowledged specimen of this.

21. *A. (Elaphoglossum) simplex*, Sw.; caudex rather stout creeping ferrugineo-paleaceous, fronds coriaceous very opaque blackish-brown when dry, venation quite internal obsolete lanceolate long decurrent at the base acuminate; *sterile* ones 6–12 inches long, with stipites 1–4 inches long; *fertile* generally smaller or shorter stipites and more obtuse, costa reddish.—*Sw. Syn. Fil. p. 10. Willd. Sp. Pl. v. p. 100. Fée, Acrost. p. 86. Hook. Gen. Fil. t. 105. A. Olfersia, Pr. Elaphoglossum, Schott. Moore. Olfersia nigrescens, Kl. in Herb. Reg. Berol. et in Herb. nostr.*

Hab. Jamaica, St. Vincent, *Swartz, Pardie, Wilson, Guilding*. Brazil.—I possess no authentic specimens of this Fern, and as there is no perfect figure of it, some doubt will remain as to its determination. All I can say in favour of the specimens I have in view being the plant, is that Dr. Grisebach has so named it, and it will bear the name in his forthcoming volume of the 'Flora of the West Indies.' It is of a dark chocolate-brown when dry, but, except in the more acuminate leaves, it is very closely allied to *A. conforme*.

22. *A. (Elaphoglossum) Funckii*, Fée; "sterile fronds

\* The *A. alatum*, Gaud. (*A. sessile*, Fée, name only), is a wretched figure, without fructification and without description, given in the Voy. de la Bonite, t. 135, by Gaudichaud, from the Sandwich Islands.

chartaceo-coriaceous discoloured obovato-elliptical obtuse at the apex acute at the base, the margin entire decurrent upon the short stipes which is black at the base, veins scarcely conspicuous standing at an angle of  $80^{\circ}$ ; *fertile* ones lanceolate rounded at the base brown beneath, stipites nigrescent, caudex creeping."—*Fée, Acrost. p. 36. t. 6. f. 1.*

Hab. Cumana, *Funck, n. 642.* Venezuela, *Fendler, n. 429, Moore* (I do not find this in Eat. Fil. Wright. et Fendler.).—"Cette espèce est parfaitement distincte; cependant nous eussions voulu la décrire d'après plusieurs spécimens. Peut-être la discolorité des frondes est-elle due à des causes accidentales?" The figure might well pass for a small specimen of *A. latifolium* or a large one of *A. conforme*.

23. *A. (Elaphoglossum) Lepervanchii*, Bory; "fronds coriaceous rigid glabrous terminating in a short rigid acumen attenuated or decurrent at the base or elliptical or oblongo-lanceolate, with the margin semirevolute; *fertile* ones equal in size or scarcely longer and narrower, veins on the upper surface impressed atrofuscos, caudex paleaceous thick as a goose-quill uneven clothed as well as the stipites with broad caducous scales." *Fée.—Bory, in Fée, Acrost. p. 37. t. 9. f. 1.*

Hab. Bourbon, *Bory*.—"Cette espèce a de grands rapports avec l'*A. glandulosum* de Hooker: mais il n'y a point de glandes." Our *A. glandulosum* is an acknowledged form of *A. conforme*, which varies with or without the minute glandular scales. Is this otherwise different from that ubiquitous species?

24. *A. (Elaphoglossum) didynamum*, Fée; "fronds cæspitose rigid glabrous; *sterile* ones lanceolate acute at both ends coriaceous fulvous when dry, the margin subrevolute, stipes short nodose (near the base?); *fertile* fronds lanceolato-linear acuminate rubricose above decurrent at the base, the margin plane repand almost twice longer than the sterile, caudex thick in the upper portion bearing the persistent bases of the old stipites."—*Fée, Acrost. p. 37. t. 16. f. 2.*

Hab. Bourbon.—"Cette plante a du rapport avec l'*A. Lepervanchii*."—I fear I shall weary my readers with the constant references to *A. conforme* for close affinities of so many of M. Fée's supposed new species, at least as far as can be judged from the author's figures and remarks.

*A. gorgoneum*, placed next to this species by Fée (*Acrost. p. 38*), is not the plant of Kaulfuss, from the Sandwich Islands, which belongs to the *Olfersia* group, but is the *gorgoneum* of Blume, which again is *A. conforme*.

25. *A. (Elaphoglossum) notatum*, Fée; "sterile fronds lanceolato-oblong acute at each end stipitate beneath dotted with narrow acute scales pale-red at the base; *fertile* ones

lanceolate abruptly acuminate obliquely cuneate at the base long-stipitate, veins not extending to the margin turgid at the apices resinose terminated with a black dot."—*Fée, Acrost. p. 38. t. 10. f. 1.*

Hab. Bolivia, *D'Orbigny*.—"Sterile frond nearly 6 inches long and 1 inch wide; its stipes  $3\frac{1}{2}$  inches long; fertile frond 4 inches long, 1 wide, apiculated with a sharp mucro; stipes 7 inches long. Caudex unknown."

26. A. (*Elaphoglossum*) *stipitatum*, Bory; "fronds lanceolate rather obtuse attenuated at the base very long stipitate, veins minute placed at an angle of  $45^\circ$  scaly on the upper side; fertile (sterile?) ones with white scariose scales; fertile ones with ferruginous scales, stipites flexuose, scales sharply dentate, caudex creeping flexuose scaly, the scales rufous long-acuminate." *Fée*.—*Bory, in Fée, Acrost. p. 38. t. 4. f. 3.*

Hab. "Bourbon, *Bory*."—"La discolorité des squames des lames stériles et fertiles est un fait curieux: les poils qui se trouvent sur l'épispore constituent aussi un fait singulier." The figure represents a long, creeping, paleaceous caudex, thicker than a crow's quill; stipites of the sterile fronds 5-7 inches long, of the fertile fronds 9 inches long; fronds uniform, 4-5 inches long,  $\frac{1}{2}$  an inch wide.

27. A. (*Elaphoglossum*) *petiolosum*, Desv.; caudex horizontal or subascending densely clothed with purple-black glossy subulate scales, stipites aggregated slender subulato-squamulose 4-5 to 6-7 inches long of the sterile fronds; sterile fronds 2-3 inches long  $\frac{1}{2}$ - $\frac{3}{4}$  inch wide oblong coriaceous opaque suddenly terminated by a narrow-linear acumen at the apex  $\frac{1}{2}$  an inch and more long obtuse at the base a little repand and setoso-suberrulate at the margin; fertile fronds smaller  $1\frac{1}{2}$ -2 inches long broader with a short acumen, veins a little curved parallelo-furcate.—*Desv. Journ. Bot. 1813. p. 271. Fée, Acrost. p. 38. t. 14. f. 1. Olfersia, Pr. Acrost. caudatum, Hook. Ic. Plant. t. 215. Elaphoglossum, Moore. Fée, Acrost. p. 39.*

Hab. "Peru, *J. de Jussieu*." Pilzhun, Ecuador, *Jameson*.—A well-marked species, with a very long, linear apiculus to the fronds, and almost jet-black, glossy scales to the caudex.

28. A. (*Elaphoglossum*) *Tambillense*, Hook.; caudex as thick as a man's finger copiously radiculose erect or ascending very paleaceous with rich-brown glossy subulate somewhat crisped scales, stipites aggregated slender stramineous quite glabrous 2-3 inches long (shorter in the fertile ones) spreading and subflexuose; sterile fronds  $2\frac{1}{2}$ -3 inches long

1-1 $\frac{1}{4}$  wide below the middle coriaceous-membranaceous from a truncated or very obtuse base ovato-oblong gradually and sharply acuminate scarcely thickened at the margin, costa slender, veins very slightly prominent beneath; *fertile* fronds much smaller scarcely 1 $\frac{1}{2}$  inch long oblongo-acuminate with under side wholly soriferous.—*Hook. Ic. Pl. t.* 856.

Hab. Ecuador, sides of ravines, Tambillo, near Quito, *Jameson*.—Somewhat allied to Desvaux's *A. petiolosum*, but very distinct.

29. A. (*Elaphoglossum*) *minutum*, Pohl; "small, fronds entire decurrent; sterile ones lanceolate helveolous acute at both ends membranaceous, stipes and costa scaly; *fertile* ones half-shorter rather obtuse at the apex, caudex repent clothed with ovate acute fulvous scales." *Fée*.—*Pohl, in Fée, Acrost. p.* 39. *t.* 10. *f.* 3.

Hab. "Brazil, *Pohl*."—*Fée* has seen only one specimen of this little plant, which well represents an *Acrostichum* I have from Venezuela, n. 968 of Fendler; but it does not accord with *Fée*'s characters of the colour of the frond or its membranaceous texture. This latter plant is referred by Moore to *A. affine* (*A. unitum*, *Fée*).

30. A. (*Elaphoglossum*) *acrocarpon*, Mart.; caudex 1-2 feet long thick as a swan's quill recumbent terete, at the apex only ascending clothed with subulato-setaceous dark-brown spreading scales, stipites alternate upon the caudex numerous terete subulato-setaceous-squamose 2-3 inches long of the sterile frond; *sterile* fronds firm-coriaceous 3-4 inches long 4-5 lines wide linear-oblong obtuse dark-green slightly attenuated below, the margin recurved, above dotted with minute whitish fringed ovate scales beneath naked except the prominent costa which has hair-like scales; *fertile* fronds on very long stipites and rising much above the sterile ones with which they accord in shape and size but they are plane not recurved at the margin and beneath wholly soriferous, veins evident on the under side patent.—*Mart. Crypt. Bras. p.* 85. *t.* 23. *Fée, Acrost. p.* 39. *Olfersia, Pr. Elaphoglossum, Moore*.

Hab. Brazil, Minas Geraes, *Martius*. New Granada, *Purdie*. Ecuador, on Mount Mulmul, alt. 8000-9000 feet, *Spruce, n.* 5229.—It is a pleasure to come to such a fine and distinctly marked species as the present, after wading through such a host of dubious ones.

31. A. (*Elaphoglossum*) *dimorphum*, Hook. and Grev.; caudex horizontal or subsending creeping scaly at the apex



thickish, stipites copious approximate and even crowded 4 inches to a span long subrobust paleaceous throughout; *sterile* fronds 3–4 inches long oblongo-lanceolate costate obtuse coriaceous-membranaceous lobato-pinnatifid at the margin, younger ones punctato-squamulose, veins obliquely patent, costæ beneath deciduously squamulose; *fertile* ones small subentire or sinuato-lobate.—*Hook. and Grev. Ic. Fil. t. 145. Fée, Hist. des Acrost. p. 40. Hook. 2d Cent. of Ferns, t. 90. Olfersia, Pr. Elaphoglossum, Moore. Microstaphyla furcata, Fée, 7me Mém. Foug. Nouv. p. 145. t. 13. f. 1. C (not Pr.).*

Hab. St. Helena, on rocks and walls: on the summit of Diana's Peak, *Shuter, J. D. Hooker, Capt. Haughton*.—A remarkable species, peculiar to the summit of the little island of St. Helena. Fertile fronds very rare; for a long time I possessed but one specimen in that state at the time the figure was made for the *Ic. Fil. l. c.*, but that arising from the same caudex as the sterile fronds. Happily I have very recently received from Captain Haughton a series of beautiful specimens fully confirming the great accuracy of that plate, and consequently not justifying the remark of M. Fée, that our figure “pèche par l'exactitude, la fronde fertile figurée n'appartenant pas vraisemblablement aux frondes stériles.” Ample specimens, too, from the same source, of the following species, *A. bifurcatum*, also confirm our views of the distinctness of the two species in opposition to those of M. Fée.—See our observations on these two very interesting species in our ‘Second Century of Ferns.’

32. A. (Elaphoglossum) *bifurcatum*, Sw.; caudex horizontal or ascending creeping imperfectly scaly at the apex the rest quite glabrous and scaleless, stipites densely crowded very slender stramineo-fuscous 3–6 inches long; *sterile* fronds 2–4 inches long oblongo-lanceolate with the rachis winged, pinnæ (or rather segments) linear distant simple but generally once or twice forked costate or one-veined; *fertile* fronds smaller oblongo-linear obtuse, pinnæ (or segments) short cuneate or subquadrate, upper ones coadunate, the apices bi-quadrifid or bi-trifurcate, veins bi-trifurcate.—*Sw. Syn. Fil. p. 42. Schk. Fil. t. 3. Willd. Sp. Pl. v. p. 111. Hook. 2d Cent. of Ferns, t. 91. Osmunda, Jacq. Coll. t. 20. f. 2. Olfersia, Pr. Polybotrya, Moore. Gymnogramme, Kze. in Linnaea, x. p. 496. Microstaphyla furcata, Pr. Epimel. Bot. p. 161. Fée, 7me Mém. Foug. Nouv. p. 45. t. 13. f. 1 and 1. B. Darea furcans, Bory, Voy. Coquille, Bot. p. 269. t. 35. f. 2 (sterile). Agramme paradoxa, Fée, Gen. Fil. p. 64.—Filicula cornuta Insulæ Sanctæ Helenæ, *Pluken.**

Hab. St. Helena, abundant, on wet rocks and mossy banks, to an alt. of 1000 feet (*J. D. H.*). First recorded by *Plukenet*, 160 years ago, as “*Filicula cornuta*

Insulæ Sanctæ Helenæ;" since collected by *Sir G. Staunton, Menzies, Shuter, Cuming, n. 420 and 421, Nuttall, Lady Dalhousie, Dr. Lyall, Seemann, J. D. Hooker, Haughton, etc.*—A very curious and certainly very peculiar form for an *Acrostichum*; yet from its close natural affinity with *A. dimorphum*, I should be unwilling to separate it from that genus (as Presl has done), nor can I see any good to be derived from so doing. We have abnormal species in plenty and must expect abnormal genera.

\*\* *Fronde more or less soft or subflaccid.* 33, 44.

33. A. (Elaphoglossum) *Boryanum*, Fée; caudex large creeping knotty the upper part densely ferrugineo-paleaceous with large ovato-lanceolate scales, stipites aggregated 3–5 inches to a foot long (and in one of our sterile specimens nearly 2½ feet long) copiously furfuraceo-squarrose with spreading brownish sublanceolate scales but varying in size and shape and more or less deciduous; *sterile* fronds firm-membranaceous subpellucid 8–10 inches to 12–15 inches long 2½ (in one instance) to 5 inches broad oblong acuminate or often notched and proliferous at the apex broadly cuneate at the base minutely ciliato-serrate and often fringed with scales when young, dotted more or less on both sides with minute fringed scales, costa piloso-squamulose; *fertile* fronds smaller and narrower 6–8 inches long 1 inch wide.—*Fée, Acrost. p. 40.* Elaphoglossum, *Moore.*

Hab. Tropical America: Guadeloupe, *L'Herminier, in Herb. nostr.*; Martinique (*Fée*); Dominica, Couliabon Mountains, *Dr. Inray*; Trinidad, *Cruger*; Ecuador, on trees foot of Chimborazo, alt. 3000 feet, *Spruce*.—One specimen including stipes, from Mr. Spruce, measures 3½ feet long, and some very young fronds which we possess are caudato-acuminate at the apex and fringed with scales at the minutely serrated margin.

34. A. (Elaphoglossum) *hybridum*, Bory; caudex stout creeping knotty, where the stipites arise densely clothed with silky slender glossy narrow-subulate dark purple-brown or almost black scales, stipites aggregated 4–6–7 inches long generally slender flexuose stramineous or tawny paleaceo-villous with rather sparse long subulate horizontally patent brown scales 2–3 lines long; *sterile* fronds submembranaceous rarely subcoriaceous usually subpellucid 5–10 inches long 1½–2 inches broad oblong-lanceolate acuminate obtuse rarely attenuated at the base, the margin and partially the costa beneath especially near the base fringed with long soft subulate brown hairs, costa nearly plane on both sides, veins manifest subhorizontally patent; *fertile* frond smaller 3–5 inches long rarely 1 inch wide oblong obtuse with a stipes

frequently of the same length as the sterile.—*a*, *submembranaceum*; fronds submembranaceous subpellucid, stipites slender. *A. hybridum*, *Bory, Voy. iii. p. 95. Sw. Syn. Fil. p. 11. Willd. Sp. Pl. v. p. 107. Hook. and Grev. Ic. Fil. t. 21 (excellent, taken from Sieber's specimen, n. 27). Fée, Acrost. p. 40. t. 9. f. 4 (very faithful, but a small plant). Elaphoglossum, Moore. Olfersia, Pr. A. villosum, Sieb. Syn. Fil. n. 27 (non Sw.). Acrost. ciliare, P. Thouars, Fl. Trist. d'Acunha, p. 32. Carmich. in Fl. Trist. d'Acun. in Linn. Trans. xii. p. 510.—*β*, *subcoriaceum*; fronds thicker and more opaque, stipites stouter.—*γ*, *minus*; fronds ovato-oblong more acuminate. *A. hybridum*, *β*, *Vulcani, Leperv. in Fée, Acrost. p. 44. t. 9. f. 3.**

Hab. *a*. Bourbon and Mauritius, *Bory, Carmichael, Bojer, Boutan, etc. Tristan d'Acunha, P. Thouars, Carmichael.* Peak of Fernando Po, alt. 4000–5000 feet, *G. Mann.*—*β*. Mauritius, *Bojer.*—*γ*. Lofty volcanic mountains of Bourbon, *Lepervanche.* Volcanic mountains of the Cameroons, alt. 8000 feet, *G. Mann.*—*M. Fée* retains the South American *A. erinaceum* as distinct from the African *A. hybridum*, and he quotes Sieber's *Syn. Fil. n. 27* and *Bojer* as authority for this species; yet he refers our figure of *A. hybridum* (*Ic. Fil. t. 2*), which is admirably copied from these very specimens, to his *A. erinaceum.* See our next species, *A. scolopendrifolium.*

35. *A. (Elaphoglossum) scolopendrifolium, Raddi*; caudex short stout thicker than a man's thumb subrepent or ascending densely clothed with long ferruginous or dark-brown soft linear-lanceolate crisped scales, stipites 4–6–8 inches long (about the same length in the *fertile* as the *sterile* frond) stramineous densely crinite with long spreading soft horizontally patent dark rufo-ferruginous subulato-setaceous scales, similar scales are also abundant all along the margins of the frond upon the costa on both sides (often there deciduous) and in one case covering the upper and under side of the sterile fronds so copiously and perfectly as to give an erinaceous aspect to the plant and then of a rich ferruginous colour; *sterile* fronds firm-membranaceous somewhat satiny subpellucid 5–15 inches long 1½–3 inches wide oblongo-lanceolate acuminate rarely tapering moderately in the lower half (not decurrent) sometimes cordate at the base, the margin a little thickened, costa plane, veins very manifest close-placed; *fertile* fronds smaller and narrower 3–8 inches long ½ an inch to more than 1 inch wide obtuse the whole under side soriferous except on the costa.—*Raddi, Fil. Bras. p. 4. t. 16 (excl. Syn. Bory). Fée, Acrost. p. 42. Olfersia, Pr. Elaphoglossum, Moore. A. erinaceum, Fée,*

*Acrost.* p. 41 (*excl. syn. Hook. and Grev.*). Elaphoglossum, *Moore, Ind. Fil.* p. 356 (*excl. syn. Hook. and Grev.*).

Hab. Tropical America : Brazil, *Raddi, Douglas* ; Surinam, *Hostmann, n. 1082* ; Veraguas, *Seemann, n. 1581* ; Guatemala, *Skinner* ; New Granada, *Linden, n. 1495* ; Venezuela, *Fendler, n. 264* (*caudex 2 inches thick, including the dense paleaceous clothing ; young plants with the stipes and wider side of the costa black-crinite with the copious scales, while the rest of the frond, of a bright-green, is quite naked ; the veins not unfrequently anastomosing*) ; Andes of Peru, *M'Lean, Mathews* ; Ecuador, forests on the west side of Pichincha, *Jameson* (splendidly erinaceous).—On the identity of this fine but variable Fern with the African *A. hybridum*, it behoves us all to speak with caution. There is nothing improbable nor unusual in the same species inhabiting such widely remote localities ; and considering the great difference of soil and climate,—the one inhabiting lofty volcanic mountains of Africa, the other the moist forests of tropical America,—it is possible that much of the difference may be due to local circumstances.

36. A. (Elaphoglossum) *Hystrix*, Kze. ; “frond linear-oblong attenuated at the base acuminate at the apex marginate glabrous at the margin densely curvato-paleaceous, costa stout canaliculate above sparingly more densely beneath horrid with black rigid deflexed scales (sterile only).”—*Kze. in Linnæa*, ix. p. 26. *Fée, Acrost.* p. 45. Elaphoglossum, *Moore*.

Hab. Peru, Pampayaco, *Pæppig*.—“Stipites  $2\frac{1}{2}$  inches long, reddish, lineari-paleaceous at the brown base, above, as well as the costa, clothed with lanceolato-subulate black scales ; fronds 15–20 inches long, above deep, beneath pale green, parallelo-patenti-villose ; scales of the margin of the frond minute, brown, from a subovate base, subulate, curved.” *Kze.*—Surely this cannot be far removed from some of the forms of *A. scolopendrifolium* ? I possess no authentic specimen of the plant.

37. A. (Elaphoglossum) *undulatum*, Willd. ; “caudex creeping with the scales lanceolato-subulate brown,” stipites 5 inches long (equal in the sterile and fertile plant) densely paleaceo-villose with subulate ferruginous horizontal scales not more than 1 line long ; *sterile* frond membranaceous subpellucid 10 inches long 2 inches wide oblongo-lanceolate obtusely cuneate at the base gradually narrowing upwards but in my specimen notched at the apex and proliferous on the costa, the margin entire ciliated with setaceous soft hairs or scales and the same are scattered over the surface of the frond and more copiously on the slightly prominent and reddish costa beneath, veins manifest singularly wide (not less than 2 lines apart) often once- or twice-forked ; *fertile* frond 3 inches long 8 lines wide oblongo-cuneate at the base bluntly acuminate, the margin and costa decidedly ciliated.—*Willd., Sp. Pl.* v. p. 105. *Kaulf. En. Fil.* p. 61. *Fée, Acrost.* p. 42. *Olfersia, Pr.* Elaphoglossum, *Moore*. *Acrost.* po-

dotrichum, *Desv. (Fée)*. “*A. aureum*, *Sieb. Fil. Mart. n. 346*, and in *Herb. nostr.*”—Fée quotes *Plum. Fil. t. 126* as “*bona*.” I should not have recognized it as representing my specimens.

Hab. Martinique, *Plumier?*, *Sieber*. Fée gives Mauritius, *Commerson*.—My only specimens are a single sterile and fertile frond from Sieber, Martinique; and these seem to partake in some degree of the nature both of *A. hybridum* and of *A. scolopendrifolium*, and it is said to inhabit both Mauritius and the West Indies. In size and texture it best accords with the former; in the erinite scales on the surface of the frond it is most allied to the latter: but these scales are shorter than in either of the others, and on the stipes much more copious and persistent than in *A. hybridum*. The very remotely placed veins, too, are quite remarkable. In *A. scolopendrifolium* they are two or three times closer than here.

38. *A. (Elaphoglossum) apodum*, Klfs.; caudex thick knotty densely ferrugineo-palaceous with very long narrow-linear subulate soft crisped scales, stipites costæ beneath the margins especially and sometimes the under side of the sterile fronds ferrugineo-villose with soft setaceous hairs which are often deciduous; *sterile* fronds firm-membranaceous rarely subcoriaceous 1–1½ foot long 1¼–2½ inches wide in the broadest part above the middle oblongo-spathulate acuminate a little thickened at the margin below gradually tapering into a short stipes 1–2 inches rarely more long, veins united at the summit with the thickened margin; *fertile* fronds much smaller glabrous 4–8 inches long (never attaining to the height of the *sterile* fronds) tapering into a stipes 2–6 inches long.—*Klfs. En. Fil. p. 59. Hook. and Grev. Ic. Fil. t. 99. Fée, Acrost. p. 42. Elaphoglossum, Schott. Moore. Olfersia, Pr. Acrost. platyneuron, Fée, p. 45. t. 4. f. 1.*

Hab. West Indian Islands: Montserrat (*Ryan*); St. Vincent, *L. Guilding*; Jamaica, *M'Fadyen, Wilson, Purdie*; Cuba, *Linden, n. 2056, C. Wright, n. 967*. Venezuela, *Fendler, n. 430*. Brazil, Para, *Spruce, n. 9, 16, San Gabriel, n. 2186* (very fine specimens).—The Brazilian specimens are peculiarly fine. Fée is disposed to refer the *A. melanostictum*, Bl. (*Fil. Jav. t. 7*), to this; but that is quite glabrous, and the *sterile* fronds are alone known. The venation, too, if correctly described, is different. The *A. platyneuron* of Fée seems in no way whatever distinct from this.

39. *A. (Elaphoglossum) stenopteris*, Kl.; caudex stout short scaly, stipites terminal cæspitose very short scarcely ½ an inch long subsquarrose with patent ovate acuminate scales which become narrow and subulate on the back of the base of the costa, fronds as well as the stipites nearly uniform in the *sterile* fronds firm-membranaceous 1–1½ foot long 6–9 lines wide in the middle linear-ensiform acumi-

nate tapering downwards and long decurrent on the stipes, entire or slightly repando-crenate scarcely margined glabrous, costa very stout pale reddish-stramineous, veins rather distant all terminating within the margin with clavate apices and on the upper side of the frond an intramarginal line of blackish dots indicates the free apices of the veins; *fertile* fronds a little shorter and narrower and upon a rather longer stipes (2 inches long), sori in my specimen confined to the upper half of the frond having at the base of the frond a slight contraction, the other half or more resembling the sterile frond.—*Kl. in Linnæa*, xx. p. 420. *Eat. in Fil. Wright. and Fendl.* p. 421. Elaphoglossum, *Moore*.

Hab. Columbia, *Moritz*, n. 234. Venezuela, *Fendler*, n. 282.—Perhaps the nearest affinity of this is with our following species, *A. nigrescens*, in habit and form of the sterile fronds, and in the venation; but the colour and texture of the two are very different,—here green and membranaceous,—and the sterile fronds and stipites are quite unlike.

40. A. (Elaphoglossum) *nigrescens*, Hook.; caudex erect or ascending (apparently not at all creeping) destitute of scales, fronds close tufted terminal; *sterile* ones coriaceo-membranaceous black-brown firm yet subtranslucent 5–9 inches long 4–7 lines wide in the widest part above the middle quite glabrous linear-subspathulato-lanceolate obtusely acuminate gradually tapering below into a very short winged stipes, the margin quite entire plane not thickened, veins distant thickened and clavate at the apex never extending to the margin; *fertile* fronds 2–3 inches long 3 lines wide linear obtuse shortly tapering at the base into a slender angular stipes 8–12 inches long intensely black as well as the costa.

Hab. Roraima, British Guiana, *Schomburgk*.—This, too, has all the appearance of an aquatic Fern, and is quite distinct from *A. apodum* and *A. palustre*. The venation is very evident and very peculiar, as is the great length of the stipites of the fertile frond and the small size of the latter, but which together are twice as long as the stipites and frond united.

41. A. (Elaphoglossum) *palustre*, Hook.; caudex long creeping densely rooting with black branching fibres paleaceous towards the extremity with lanceolato-subulate long dark-brown often falcate scales, stipites and back of the costa in like manner paleaceous with smaller scales; *sterile* fronds blackish-green firm-membranaceous glabrous 1 foot long 1–1 $\frac{3}{4}$  inch wide in the broadest part above the middle spathulato-lanceolate acuminate tapering gradually below and

terminating more or less suddenly upon the short stipes 1–2 inches long, the margin slightly thickened and undulato-erentate, costa prominent beneath, veins approximate united to the thickened margin; *fertile* fronds always longer than the sterile ones 1–1½ foot and more long 4 lines wide at the utmost linear tapering into a stipes 2–3 inches long often sterile below, contracted upwards and there widening and soriferous beneath.

Hab. Banks of the Onitoha, *Niger Exp.*, Barter, n. 1452, and Sierra Leone, Barter. In swamps, Ambus Bay, tropical West Africa, *G. Mann*, n. 785.—Quite different from *A. apodum* in the caudex, fertile fronds, and in the entire absence of villosity throughout the whole fronds. It has quite the appearance of a swamp-loving plant. *Sterile* fronds have great resemblance to the figure of *A. melanostictum* of Blume (of which the fructification is unknown); but that, though it has been referred by Fée to the American *A. apodum*, is a coriaceous species and is probably identical with our next species, *A. Norrisii*.

42. A. (Elaphoglossum) *Norrisii*, Hook.; caudex subrepent (possibly subscandent) clothed with rather large oblong entire ferruginous scales, fronds sessile or nearly so hard-coriaceous glabrous opaque dark-brown when dry; *sterile* ones 10–18 inches long  $\frac{3}{4}$  to rather more than 1 inch broad above the middle lanceolate obtusely acuminate gradually attenuated downwards from the broadest part and decurrent upon the broad stipes nearly or quite to the caudex, near the base on the under side minutely furfuraceous or subglandulose and on the same part of the frond may generally be seen extremely minute pale dots as if glands had fallen away, the margin entire not thickened but slightly reflexed, costa strong broad and elevated towards the base, veins patent very obscure and only seen on the under side in the younger specimens; *fertile* fronds 6–10 inches long 4–6 lines wide linear very obtuse tapering down upon the stipes as in the sterile fronds.—*A. melanostictum*, *Bl. Fil. Jav. p. 26. t. 7?*

Hab. Penang, *Sir Wm. Norris*. Java?, *Blume*.—I should certainly have referred this well-marked species to Blume's *A. melanostictum* (of which the sterile fronds are known), were it not that Fée says he has seen an authentic specimen of Blume's plant in the Paris Herbarium, that the black dots which gave rise to the name are a parasitic fungus; and he unites the plant with the South American *A. apodum*, from which its "coriaceous" (Bl.) texture would, I should have thought, alone distinguish it. It is true that Blume's artist has represented the veins too distinct for our plant, but Blume himself says "venæ supra vix conspicuæ, subtus paululo distinctiores."

43. A. (Elaphoglossum) *micradenium*, Fée; caudex very long creeping paleaceous with rufous-brown subulate scales, stipes nearly uniform 3–6 inches long distant stramineous

flexuose slightly paleaceous; *fertile* fronds papyraceo-membranaceous dark-green younger ones vernicose oblong acuminate 3–6 inches long 1–1½ inch wide subcaudato-acuminate entire minutely punctato-glandulose, the base narrowly attenuated slightly thickened at the margin, costa slender very distinct uniting with the margin; *fertile* fronds much smaller 1–2 inches long narrow-oblong obtuse.—A. micradenium, *Fée, Acrost. p. 43. t. 8. f. 1 (sterile fronds only)*. Elaphoglossum, *Moore*. E. nitidum, *Brack. Fil. U. S. Expl. Exp. p. 70. t. 9*.

Hab. Sandwich Islands, *Gaudichaud, Brackenridge, Hillebrand*. Sumatra, *Teschemacher* (sterile).—A very well marked species, remarkable for the papyraceous texture of the fronds, especially of the younger ones, which are, moreover, vernicose.

44. A. (Elaphoglossum) *stigmatolepis*, *Fée*; “sterile fronds membranaceous papyraceous lanceolate acuminate acute at the base, the margin entire slightly revolute, costa depressed clothed with lateral scattered ovate scales subglabrous on both sides marked with reddish dots (scars of fallen scales), veins slender not attaining the margin turgid pellucid and punctiform at the apex; *fertile* ones lanceolate narrower long-cuncate at the base, stipites equal in both depressed canaliculato-striated sulcate at the base blackish with scales, caudex creeping bearing branched tomentose fibrous roots.”—*Fée, Acrost. p. 62. t. 24. f. 2. Kze. in Linnæa, xxiv. p. 248*. Elaphoglossum, *Moore*.

Hab. Neilgherries (*Fée*), to which *Kunze* adds Java.—*Fée* represents the stipites 5–7 inches long, the fronds 6 inches long, 8–10 lines wide. Unknown to me.

B. *Fronds linear.* 45–58.

45. A. (Elaphoglossum) *Herminieri*, *Bory*; caudex very stout short subrepent clothed with a very dense fulvous mass of long linear silky scales, stipites very short almost none tufted; *sterile* fronds coriaceous glabrous 1½–3 feet long 1–1½ inch wide linear-ensiform long-acuminate and below very long-attenuated so as to form a winged stipes, costa broad and as well as the short stipes complanate; *fertile* fronds very short but broader in proportion 3–4 inches long 1–1½ inch wide elliptical subacute, their stipes only a few lines long.—*Bory, in Fée, Acrost. p. 43. t. 11*.

Hab. Tropical America: Guadeloupe, *L'Herminier*: Cuba, *C. Wright, n. 971*; Guiana, *Le Prieur, Appun*; Brazil, *Blanchet (Fée)*.—A very noble species, but the fertile fronds look like dwarfs amidst the noble tufts of sword-shaped sterile ones.



46. A. (Elaphoglossum) *dissimile*, Kze.; “sterile frond oblongo-linear, towards the base very long-attenuate, acuminate at the apex above and at the margin very minutely albosquamulose, the scales ciliate, glabrous beneath, stipes short sparingly paleaceous; *fertile* frond sublinear above densely scaly, scales ciliated, stipes elongated marginate squamoso-paleaceous.”—Kze. in *Linnaea*, ix. p. 28. *Fée*, *Acrost.* p. 44. Elaphoglossum, *Moore*. Olfersia, *Pr.*

Hab. Cassapi, Peru. *Pappig*, in *Herb. nostr.*, from *Kunze*.—Sterile fronds 14–15 inches long,  $1\frac{1}{2}$  inch wide; *fertile* ones 9 inches long, 7–8 lines wide. *Kunze* says, “insigniter species, quod *supra* squamulosa et *subtus* glabra.” *Fée* remarks, “elle n’a pas de caractères bien tranchés.” My original specimen from *Kunze*, perhaps through age, has no trace of small scales, and placed side by side of an equally authentic specimen of *A. alismaefolia*, not the shadow of a difference can be seen.

47. A. (Elaphoglossum) *affine*, Mart. and Gal.; “fronds elongato-linear acuminate at both extremities, the margin entire narrowly revolute long decurrent coriaceous opaque quite glabrous (probably from the scales being deciduous), stipites elongated depressed smooth; *fertile* ones conform brownish above, caudex thick as a sparrow’s quill creeping clothed with lanceolate scales. *Fée*.—*Mart. and Gal. Fil. Mex.* p. 24. t. 3. f. 1. *Metten. Fil. Lechl.* p. 3. *Liebm. Fil. Mex.* p. 13. Elaphoglossum, *Moore*. *Acrost. unitum*, *Bory*, in *Fée*, *Acrost.* p. 44.

Hab. Mexico, *Galeotti*, alt. 5000 feet, n. 6548, *Liebmann*, alt. 10,000 feet. Peru, *Lechler*, n. 1744. Ecuador, *Jameson*. Cuba, *C. Wright*, n. 968. Santa Martha, *Purdie*.—*Moore* has given other localities, which I am not able to verify. My specimens from the stations above quoted are probably one and the same plant, of which *Galeotti*’s is perhaps the type. But I agree with *Fée* in the remark, “que cette espèce n’a pas de caractères bien tranchés.” They are all small, rarely exceeding a span in length, including the stipes; and there is, to my mind, a great affinity with some dwarf forms of *A. conforme*.

48. A. (Elaphoglossum) *falcatum*, *Fée*; “fronds linear acuminate falcate rigid opaque attenuated at the base beneath having sparse ovato-lanceolate scales especially near the costa, glabrous above; *fertile* fronds acute at both extremities scarcely falcate longer than the stipites depressed canaliculate, costa slightly channelled, caudex creeping thick as a goose-quill clothed with ovate scales.”—*Fée*, *Acrost.* p. 44. t. 21. f. 1.

Hab. Bourbon, *Leperranche and Richard*.—“Cette espèce, bien distincte, a le port de l’*A. salicifolium*.” The figure represents the sterile stipites 3–1 inches long, their fronds 8–9 inches long,  $\frac{3}{4}$ –1 inch wide, very acuminate; *fertile* frond 9 inches long, oblongo-lanceolate, obtuse; scales of the caudex ovate, very obtuse.

49. A. (Elaphoglossum) *Martinicense*, Desv.; “fronds rigid coriaceous opaque linear long-attenuated below decurrent very glabrous smooth, veins lying at an angle of  $45^{\circ}$ , margins revolute; *fertile* fronds scarcely broader than the sterile, stipes longer, margins plane repand, costa broad canaliculate, younger ones with the margins plicate, caudex creeping thick as a child’s finger, scales lanceolate margined with long articulated or sometimes strangulated hairs.” *Fée*.—*Desv. in Fée, Acrost. p. 45. t. 16. f. 3. Griseb. Fl. Br. W. Ind. ii. ined. Elaphoglossum, Moore. Acrost. glabellum, Kl. in Linnæa, xx. p. 421. Elaphoglossum, J. Sm.*

Hab. Tropical America: Souffriere, Guadeloupe, *Parker*, “one specimen passing into *A. simplex*?” Cuba, *C. Wright, n. 789*; Jamaica, *M. Fadyen*; Guiana, *Schomburgk, n. 447, Appun, n. 138*; Brazil, Baña de Rio Negro, *Spruce, n. 1426*.—Many other localities are given by *Moore*, but which I have not the means of identifying. *Fée*’s figures of *A. Martinicense*, t. 16, f. 3, well represent our plant from Cuba; they are taller and more graceful than our Mexican and Guadeloupe ones. In our plants the fronds are 6–8 inches long, quite narrow, spear-shaped, sharply acuminate, and narrowly attenuated below, everywhere glabrous and scaleless; stipites 2–3–6 inches long.

50. A. (Elaphoglossum) *leptophyllum*, *Fée*; “fronds linear rather obtuse attenuated at the base, petioles helveolous, scales ovate acuminate dentate; sterile ones thicker, costa narrowly canaliculate; *fertile* ones larger longer stipitate, caudex creeping thick as a goose-quill clothed with soft fulvous scales.”—*Fée, Acrost. p. 45. t. 17. f. 1. Elaphoglossum, Moore.*

Hab. Brazil, *Blanchet*. “Venezuela, *Fendler, n. 276, 277*” (*Moore*).—“Elle diffère de l’*A. Martinicense* par des pétioles libres de tout parenchyme et palécés à la base, par des lames terminées en pointe émoussée, par la nature des squames de rhizome,” etc. Some of my specimens under *A. affine* much resemble *M. Fée*’s figures, as do *Fendler*’s *Acrost.* from Venezuela, n. 276 and 277.

51. A. (Elaphoglossum) *Calaguala*, *Kl.*; caudex thick clothed with small black glossy straight (not flexuose) subulate imbricated scales, stipites crowded at the extremity of the branches reddish-brown as well as the rather stout bright reddish costa and both (at the base especially) rough with small blackish rather rigid scales, stipites of the *sterile* fronds 1 inch long, of the *fertile* ones 4 inches; fronds coriaceous reddish-brown, *sterile* ones 3–4 inches long  $\frac{1}{4}$  of an inch wide linear very obtuse and very long and narrowly attenuated upon the stipes lepidote above being sparsely dotted with very minute whitish closely pressed irregularly orbicular scales which are more numerous and patent at the margin beneath indistinctly

glandular and subviscid, *fertile* fronds much overtopping the sterile fronds from the longer stipites 3–4 inches long narrower than they and more finely attenuated upon the stipes, veins indistinct but slightly prominent beneath.—*Kl. in Linnaea*, xx. p. 421. *Elaphoglossum*, Moore.

Hab. Merida, Columbia, *Mo. itz* (in *Herb. nostr.*, from Klotzsch). Peru, Ruiz, *Herb. n.* 54 (fide Moore).—I have drawn up my character of this from one of Moritz's original specimens. Though the author, Dr. Klotzsch, assigns no reason for calling this plant "*Cataguala*," it is presumed he does so from a conviction of its being the *Cataguala Mediana* of the Peruvian pharmacy, described under that head and with the botanical name of *Acrostichum Huasseno* by Ruiz, and published in Lambert's work on Chinchona, p. 128 (*Elaphoglossum Ruizianum*, Moore, Ind. Fil. p. 353, name only). I possess from Dr. Jameson, Quitinian Andes, n. 44, a nearly allied, if it be not really a distinct species, with a very long, stout, apparently scandent caudex, paleaceous or rather densely crinite with long, narrow, dark-brown, lax and very falcate, glossy scales, quite different from those of *A. Cataguala*, and which extend somewhat up the stipites, gradually upwards becoming smaller, slenderer, and paler-coloured, and mixed with some broad peliote ones; the fronds are longer than those of *Cataguala*, and the younger ones are scurfily lepidote on the upper side, towards the margin are small broad-subulate scales; beneath, the fronds are very minutely glanduloso-punctate; stipites of the *fertile* fronds a span long. Neither are my specimens sufficient, nor is Ruiz's description sufficiently minute to settle the point of identity. Pritzel, indeed, refers to published figures of Ruiz's plant, viz. Bert. Amen. It. 2, and Opusc. Soc. Bon. t. 8; but I have no access to them.

52. A. (*Elaphoglossum*) *Aubertii*, Desv.; caudex horizontal densely rooting paleaceous, stipites of the *sterile* fronds stramineous short tufted crinite with long copious fulvous patent subulate scales, the fronds firm-membranaceous 1–1½ foot long ½–¾ inch broad near the middle linear-lanceolate finely acuminate moderately attenuated at the base and there obtuse (not decurrent) subrepand, costa very pale sparsely paleaceous, veins conspicuous erecto-patent simple or forked disappearing within the margin; *fertile* fronds 2–3 inches long ½–¾ of an inch wide elliptical-oblong obtuse or acute on stipites 7–8 inches long.—*Desv. Journ. Bot.* 1813. p. 272. *Fée, Acrost.* p. 45. t. 18. f. 1. *Elaphoglossum*, Moore. *Acrost. Klotzschii*, Moritz, in *Eat. Fil. Wright. et Fendl.* p. 194.

Hab. Tropical Africa: Bourbon, "*Bernier*," etc.; Zambesi, on the vegetable mould among the dense jungle of Mount Dzomba, alt. 6500 feet, *Dr. Kirk*, in *Livingstone's Exp.* (sterile). East tropical Africa: Fernando Po, alt. 7000 feet on the Peak, *G. Mann*, n. 662. Tropical America: Venezuela, *Fendler*, n. 265, 281, *Funck and Schlim*, n. 968.—I agree with Moore in referring here the Fendlerian *A. Klotzschii* of South America, but I can almost perceive a passage between this and *A. lineare*, Fée,—not very well figured in his '*Histoire des Acrostichées*.'

53. A. (Elaphoglossum) *viscosum*, Sw.; caudex creeping or ascending thick generally clothed at the apex with dark-brown or black more or less subulate scales, stipites clustered mostly elongated but varying much in length 3-4-6-10 inches long longest in the *fertile* fronds smooth or more or less dotted with blackish furfuraceous scales which often extend to the under side of the costa; *sterile* fronds 5 inches to a foot long  $\frac{1}{4}$ - $\frac{3}{4}$  or rarely 1 inch wide firm-membranaceous or subcoriaceous often dotted (more so on the under side) with minute stellated deciduous scales sometimes viscid linear-ensiform acuminate much attenuated at the base scarcely thickened at the edge, costa very distinct slender, veins clubbed at the apex and extending quite to the margin; *fertile* fronds 4 inches to a span long much narrower and more linear than the sterile ones and on stipites twice or thrice the length of the sterile ones.—Sw. *Syn. Fil. pp. 10 and 193*. Willd. *Sp. Pl. v. p. 193*. Hook. and Grev.  *Ic. Fil. t. 64*. Wall. *Cat. p. 15*. Bl. *Fil. Jav. Fée, Acrost. p. 45*. Olfersia, *Pr. Elaphoglossum, Schott. Moore. Acrost. petiolatum, Sw. Fl. Ind. Occ. iii. p. 1888*. A. *salicifolium, Kaulf. A. Blumeanum, Fée, Acrost. p. 62*. Elaphoglossum, *J. Sm. (name only)*. A. *Breutelianum, Kze. in Schk. Fil. Suppl. ii. p. 3. t. 103 (fert. frond, fide Fée, Moore)*. A. *neriifolium, Wall. Cat. n. 16*.

Hab. Tropical America, abundant: West Indies, perhaps in all the islands, Jamaica, etc.; Cuba, *C. Wright, n. 789 (1859)*; Guadeloupe, *L'Herminier, n. 6*, with stipites of sterile and fertile fronds more than a foot long; New Granada; very characteristic specimens from Venezuela, *Fendler, n. 272 (but very small), 273, 274, 275, 295,—280* has the sterile fronds 12-14 inches long, 2 inches broad, and quite vernicose, and is the *A. xanthoneuron*, Kze. and Metten. in *Eat. Fil. Wright. et Fendl. p. 194 (name only)*; Brazil, *Gardner, n. 99, Fox, n. 246*; St. Gabriel, *Spruce, n. 2308 (sterile fronds finely and pungently acuminated)*; Mexico, *Coulter, n. 1695 and 1696, Schaffner, 2*; Peru, *Mathews, n. 3278, Hartweg, n. 1793*; Ecuador, *Jameson, n. 18, Spruce, n. 5288*, "stipites insigniter viscosi." Tropical India: Java, *Blume, Millett; Luzon, Cuming. n. 194*; Nepal, *Wallich, n. 16 ("A. neriifolium, Wall.")*; Khasya, *Hooker fl. and Thomson. alt. 4000 feet*; Nilghiri, *Beddome, n. 4, 5*. Mauritius and Bourbon, *Sieb. Syn. Fil. n. 28, Bory, Bouton, etc.* Ceylon?, *Gardner (without a number, very obtuse at the apex of the fronds, and almost intermediate between A. conforme and viscosum; young sterile fronds vernicose)*. Tropical Africa: Fernando Po, alt. 2000 feet, *G. Mann, n. 270, in part, (quite characteristic)*; Johanna Island, east tropical Africa, *Dr. Kirk*.—A widely distributed species, and, as may be expected, subject to much variation, sometimes showing a close affinity with narrow and elongated forms of *A. conforme*, sometimes with *A. Martineuse*, and their allies. The figure of Dr. Greville in  *Ic. Fil.* is certainly very characteristic.

54. A. (Elaphoglossum) *Preslianum*, Fée; caudex long thicker than a swan's quill apparently scandent naked or

clothed with dark-brown subulate scales, stipites from the ascending apex of the caudex reddish-tawny partially paleaceous with subulate scales, varying in length from a span to  $1\frac{1}{2}$  foot long subequal in the *sterile* and *fertile* fronds; fronds coriaceous 12–18 inches long  $\frac{3}{4}$ –1 inch broad elongato- or linear-oblong sublanceolate obtuse acute or acuminate opaque cuneate or more or less attenuate at the base deciduously subsquamuloso-ciliate at the margin, costa strong prominent beneath, veins extending to the margin; *fertile* fronds 6–8 inches long 6–8 lines wide, in other respects similar to the sterile.—*Fée, Acrost. p. 47. t. 24. f. 1* (smaller and more acuminate than my specimens in general). *Metten. Fil. Lechl. p. 4.* *A. ciliatum, Pr. Reliq. Henk. p. 15.* *Kze. in Linnaea, ix. p. 28.* *Olfersia, Pr. Elaphoglossum, Moore.*

Hab. Peru, *Preppig.* Tarapota, *Spruce, n. 4735, Lechler, n. 2686.* Ecuador, *Spruce, n. 5230* (fronds quite according both in sterile and fertile fronds with *A. viscosum*, but caudex long and scandent), Caraccas, *n. 31* (*ex Herb. Miquel*). Merida, *Moritz, n. 316.*—My specimens are very variable in the length and breadth and more or less acuminate or very obtuse fronds; some resemble gigantic forms of *A. viscosum*, but they are more coriaceous, and all have the very elongated and scandent caudex.

55. *A.* (*Elaphoglossum*) *pachydermum*, *Fée*; “fronds linear firm-coriaceous thick; *sterile* ones acute at each extremity very narrowly decurrent at the base revolute at the margins having piliform scales on both sides, costa channelled above plane beneath quadrangular, the apex of the frond acute, stipites robust blackish at the base without joint or scales; *fertile* ones smaller, caudex thick clothed with lanceolate lacerated pale fulvous scales.”—*Fée, Acrost. p. 47.* *Kze. in Linnaea, xxii. p. 575.* *Elaphoglossum, Moore.*

Hab. Brazil.—Probably a very dubious species.

56. *A.* (*Elaphoglossum*) *lineare*, *Fée*; caudex short creeping densely clothed above with ferruginous ovate acuminate scales, stipites copiously tufted slender stramineous erinite with rather long subulato-setaceous spreading rufous scales, *sterile* ones 1–2 inches rarely more long, *fertile* ones 4–6–8 inches long scaleless upwards; *sterile* fronds membranaceous 8–12 inches long 4–5 lines wide linear much acuminate, at the base very long and gradually attenuated and decurrent upon the short stipes entire scarcely subrepando-crenate, costa slender sparsely subulato-squamose at the base, veins terminating in clavate apices within the margin; *fertile* fronds generally very small 1–2–3 inches long oblong

shortly acuminate narrower attenuate at the base, on much longer stipites than the sterile ones yet the summit of the fronds never attains to the height of the sterile.—*Fée, Acrost. t. 15. f. 2* (*fronds too obtuse, which is rather an abnormal state*). *Elaphoglossum, Moore. A. tenellum, Desv.?*

Hab. Brazil, *Gardner, n. 98* (the authority for the species) and *n. 5927*. Bourbon, *Richard, n. 274* (unquestionably the same species).—I can almost fancy this to be a small and delicate form of our *Aubertii*, *n. 52*, and both inhabiting Bourbon and South America, still the extreme forms appear, at first sight, very dissimilar.

57. *A. (Elaphoglossum) rubiginosum, Fée*; caudex horizontal creeping stout clothed with dense black subulate imbricated scales, stipites aggregated towards the apex of the caudex 3–4 inches long in the *sterile*, a span or a foot and more in the *fertile* ones reddish-brown furfuraceous with small close-placed subpeltate fimbriated scales dark-coloured in the centre mixed with short subulate black ones; *fertile* fronds coriaceous 4–5 inches or less to 8–12 inches long  $\frac{1}{4}$ – $\frac{3}{4}$  of an inch wide near or above the middle, elongato-lanceolate acuminate tapering at the base and generally much so, opaque entire lepidote or scurfy on the upper side with scattered close-pressed dirty-white minute deciduous scales generally long stellato-pilose at the margin beneath almost pubescent-tomentose with more copious similar scales mixed with stellate hairs both of a tawny colour; *fertile* fronds generally much exceeding the sterile ones on account of the great length of the stipes but they are shorter and narrower, otherwise similar.—*Fée, Acrost. p. 47. t. 5. f. 1* (*very good*), and *t. 13. f. 1* (*smaller*). *A. Schiedeii, Kze. Analect. Pterid. p. 10. A. nivosum, Kze. in Bot. Zeit. Elaphoglossum tectum and Schiedeii, Moore. Acrost. brachyneuron, Fée, l. c. p. 49. t. 22. f. 1* (*as far as figure and much of the description is concerned, but the fronds are not pellucid, yet the reference is to "Gardner, n. 5928," which is our plant*).

Hab. Tropical America: Columbia, fine specimens, Santa Martha; Ocaña, *Schlim*; Peru, *Mathews, n. 1794*; Pasco, *Cruckshanks* (fronds short, stipites very slender); Jamaica, *Purdie, Wilson*, alt. 4000 feet, *n. 742*; Dominica, *Dr. Inray*; Guatemala, *Skinner*; Mexico, *Liebmann* ("*A. Schiedeii*,"—and this is correctly quoted under *A. rubiginosum* by *Fée* and under *A. Schiedeii* by *Moore*); Brazil, *Gardner, n. 5928* (*Acr. brachyneuron, Fée*, as to figure and reference and much of the description).—The *A. tectum* of *Humboldt* is ascertained by *Fée* to be the *A. lepidotum*, *Willd.*, though that is a species by no means satisfactorily known; but *Fée* has accurately defined and figured the present species, which has claim to rank with the section "*Polylepideæ*."

58. *A. (Elaphoglossum) Féei, Bory*; small, caudex long

creeping filiform clothed with acuminate ferruginous scales, stipites remote sparsely paleaceous; *sterile* fronds 1-3 inches long  $\frac{1}{4}$  of an inch wide oblongo-lanceolate obtuse bluntly subrenato-lobate sparsely scaly on the surface attenuated below into a stipes equal in length or shorter, costa slender, veins few remote erecto-patent forked below the middle, their clubbed apices not extending to the margin; *fertile* fronds less than half the size of the fertile ones elliptico-oblong entire 3-4 times shorter than the stipes.—*Bory, in Fée, Acrost. p. 48. t. 18. f. 2. Hook. Ic. Pl. t. 992 (or Cent. of Ferns, t. 92). Elaphoglossum, Moore. Acrost. trajiaefolium, L'Hermin. ms. in Herb. Hook. Elaphoglossum, Moore.*

Hab. Tropical America: Guadeloupe, *L'Herminier, n. 76, in Herb. nostr.*; on Mount Couliabon, Dominica, *Dr. Murray, n. 236*; Ecuador, Quito, *Jameson*; Chimborazo, alt. 300 feet, *Spruce, n. 5682*.—A small but very distinct species; and, as Fée observes, with the habit of *Polypodium serpens* of Swartz.

II. POLYLEPIDÆ, Fée.—*Fronde more or less scaly or setoso-squamose.*  
Sp. 59-94.

A. *Fronde ovate or oval-lanceolate.* 59, 60.

59. A. (Elaphoglossum) *Lindenii*, Bory; caudex stout thicker than a man's finger horizontal or ascending clothed at the apex with small black shining subulate scales and a dense cluster of slender brown flexuose and often spreading stipites 4-6 inches or a span long (nearly uniform in the fertile and sterile fronds) setoso-paleaceous with dark-brown subulate deciduous spreading scales; *sterile* fronds firm subcoriaceo-membranaceous subtranslucent 1-4 inches long  $\frac{1}{2}$ -1 $\frac{1}{2}$  inch wide elliptical or oval or subovate obtuse or bluntly acuminate shortly and obtusely cuneate at the base sparsely on the surface and fringed at the margin with rather long subulate hair-like deciduous scales, costa very slender, veins evident erecto-patent distant simple or forked, the apices clubbed and terminating within the margin; *fertile* fronds similar to the sterile ones but much smaller rarely 1 inch long.—*Bory, in Fée, Acrost. p. 48. Elaphoglossum, Moore. Acrost. blepharodes, Fée, Acrost. p. 48. t. 24. f. 3? A. crinitum, Mart. and Gal. Fil. Mex. p. 25? (not Sw.). Elaphoglossum, Moore? Liebm. Fil. Mex. p. 16, in Herb. nostr.*

Hab. Ceylon (according to *Moore*). Mexico, *Linden*, alt. 9700 feet, *n. 52, Liebm., in Herb. nostr.*, alt. 9000-10,000 feet. Caracas, *Fueck, n. 556*. Venezuela, *Otto*, alt. 7500 feet. Ecuador, Cotopaxi, alt. 13,000 feet, and caves

on the eastern Cordillera, *Jameson*. Brazil, *Gardner*, n. 5925 (fronds oblongo-lanceolate, almost passing into *A. villosum*).—Some of my specimens of this species quite resemble the figures of the *sterile* fronds (all known) of the *A. blepharodes*, *Fée*; while others, especially the Brazilian specimens from *Gardner*, border closely upon *A. villosum*.

60. A. (Elaphoglossum) *heteromorphum*, Kl.; caudex very long creeping filiform paleaceous with linear-subulate flaccid brown scales, stipites scattered distant slender 2–4 inches long 5–6 inches of the *fertile* ones flexuose squarrose with patent brown subulate scales; *sterile* fronds  $1\frac{1}{2}$ –2 inches long  $\frac{3}{4}$ –1 inch broad membranaceous brownish-green subtranslucent elliptico-oblong obtuse or short obtusely acuminate rounded or truncated at the base hispid on the surface (both sides) and on the entire margin with rather firm-membranaceous subulate brown scales generally permanent, costa slender, veins patent very manifest dark-coloured slightly elevated on both sides rather distant simple or forked not extending to the margin clubbed at the apex; *fertile* fronds much smaller oval subacute at both extremities.—*Kl. in Linnæa*, xx. p. 424. Elaphoglossum, *Moore*.

Hab. Columbia, *Hartweg*, n. 1525, *Moritz*, n. 319 (*A. squarrosum*). Ecuador, western side of Pichicha.—This differs from *A. Lindenii* strikingly in the long filiform caudex, in the oblong, membranaceous fronds, with exceedingly conspicuous veins, more copiously scaly, especially on the costa and generally on both sides of the frond.

B. *Fronds linear or linear-lanceolate.* 61–94.

61. A. (Elaphoglossum) *squarrosum*, Kl.; caudex suberect or rather ascending 2 inches long thick as a sparrow's quill but densely clothed for its whole length with long slender glossy subulate deep chestnut-brown scales, stipites remote slender  $\frac{1}{2}$ –1 inch or little more long of the *barren* 2 inches of the *fertile* fronds hispid with spreading brown ferruginous hair-like scales, the same hair-like scales are scattered sparsely over the fronds and at the margins; *fertile* fronds  $1\frac{1}{2}$ –2 inches long 4–5 lines wide membranaceous pale yellow-green exactly lanceolate rather obtusely acuminate slightly attenuated at the base, costa slender, veins manifest simple rarely forked suberecto-patent clubbed at the apex and terminating within the margin.—*Kl. in Linnæa*, xx. p. 424. Elaphoglossum, *Moore*.

Hab. Columbia, *Moritz*, n. 319.—*Klotzsch* places this next to his *A. heteromorphum*, and says, “a precedente differt, frondibus sterilibus magnis angustioribus, nec ad basin aggregatim paleaceis.” The fronds, indeed, exactly resemble sparsely pilose specimens of very dwarf *A. villosum*, but the caudex is more



elongated, and its scales excessively dense and uniform all over and of a bright blackish-chestnut colour.

62. A. (*Elaphoglossum*) *strictum*, Raddi; "fronds simple herbaceous, sterile ones linear-lanceolate attenuated at each extremity shortly petiolated, fertile ones narrower linear rather obtuse long-petiolate margined on each side squamoso-vil-  
lous, scales lanceolate ciliated different on the petiole and the costa, caudex creeping scaly." *Fée*.—*Raddi, Fil. Brus. p. 3. t. 15. f. 3. Acrost. p. 49. Mart. Crypt. Brus. p. 84. t. 22.* *Elaphoglossum, Moore.*

Hab. Brazil, *Raddi, Martins*.—Imperfect as the above character may be, it is perhaps the best that has yet appeared. The real plant seems very little known, and the figures do not well illustrate this dubious species.

63. A. (*Elaphoglossum*) *villosum*, Sw.; caudex stout sub-  
repent or ascending often enlarged and forming a knot at the summit which is paleaceous with ferruginous or dark-  
brown narrow scales, stipites generally copious and tufted from 2-4-5 inches long villous with long slender subulate  
ferruginous hairs rather than scales, fronds membranaceous pellucid varying in length and breadth 3-8-9 inches long and  
from  $\frac{3}{4}$ -1 $\frac{1}{2}$  inch in diameter broad oblongo-lanceolate or rather subspathulate and obtuse more frequently suddenly acumi-  
nated cuncate at the base villous on both sides and at the margin with aureo-ferruginous long subulato-setaceous but  
soft silky hairs, costa slender, veins distinct moderately patent distant simple or forked clavate at the apex and  
terminating within the margin where a blackish spot appears on the back of the frond, fertile frond much smaller acute  
or obtuse upon a longer stipes yet never equalling the length of the sterile frond.—*Sw. Syn. Fil. p. 10. Willd. Sp. Pl. v. p. 103. Hook. and Grev. Ic. Fil. t. 95 (excl. syn. Plum.). Olfersia, Pr. Elaphoglossum, Moore. A. Moritzianum, Kl. in Linnæu, xx. p. 423. Elaphoglossum, Moore. A. setosum, Liebm. Fil. Mex, p. 17.—Var.  $\beta$ . *Pæppigianum*: fronds linear-lanceolate, fertile ones linear. A. *villosum, Kze. in Linnæu, ix. p. 32.**

Hab. Tropical America: Jamaica, *Swartz, Bancroft, Menzies, Purdie*; Do-  
minica, *Dr. Imray*; Cuba, *C. Wright, n. 1040* (fronds ordinary size, but spathulate and obtuse); Venezuela, *Fendler, n. 362* (fertile frond small, ovate),  
and *n. 266* (common form); Ecuador, Andes of Quito, alt. 8000 feet, *Jameson*;  
Mexico, *Liebmann*.—Var.  $\beta$ , *Pæppigianum*. Peru, *Pæppig*. Tropical Africa,  
Sierra Leone, *Barter* (stipites very densely villosopaleaceous).—A variable

species, yet appearing very distinct in the form so well represented by Dr. Greville in Ic. Fil.

64. A. (Elaphoglossum) *procurrens*, Metten.; caudex very long filiform creeping thick as a sparrow's quill slightly branched paleaceous with glossy bright aureo-ferruginous subulate spreading scales, stipites remote 1-3 inches long very slender winged above with the decurrent frond scarcely longer in the *sterile* plant, villous with spreading ferruginous narrow subulate hairs and the same are scattered rather copiously over the fronds on both sides and margins; *sterile* fronds membranaceous bright pale-green 1-3 (-6, Metten.) inches long ovate or oblong spatulate obtuse entire much attenuated and decurrent at the base, costa very slender, veins conspicuous rather distant patent clubbed at the apex and terminating close to but just within the margin.—*Metten. in Eat. Fil. Wright. et Fendl. p. 195.* Elaphoglossum, *Moore.*

Hab. Cuba, *Fendler, n. 793.*—This very pretty *Acrostichum* is peculiar in its very long creeping caudex, clothed with bright, subulate, spreading scales. The fronds of some of the smaller specimens are almost identical with those of *A. piloselloides*, while the larger ones quite resemble those of the *A. Moritzianum*, of Eat. in Fil. Wright. et Fendl. p. 194.—Cuba, *C. Wright, n. 1040* (a form, I fear, of *A. villosum*).—not of Eat. l. c. Fendl. n. 266, which is the ordinary form of *villosum*; and Mettenius seems to take a similar view of the species.

65. A. (Elaphoglossum) *Plumieri*, Fée; caudex short thick horizontal or ascending forming a knot at the summit clothed with a few ferruginous narrow scales, stipites densely tufted slender 2-4 inches long villous with copious long slender patent ferruginous hairs; *sterile* fronds thin membranaceous pellucid 5-6-8 inches long  $\frac{1}{2}$ - $\frac{3}{4}$  of an inch wide narrow-lanceolate obtusely acuminate much attenuated below, the margin sublobato-sinuate fringed with soft spreading ferruginous subulate hairs which are also scattered over both surfaces rather copiously, costa slender, veins conspicuous rather thick erecto-patent very distant simple or forked clavate at the apex and terminating within the margin; *fertile* though often on a rather longer stipes yet is much smaller 1-2 inches long oblong obtuse very aureo-villous on the back.—*Fée, Acrost. p. 50.* Elaphoglossum, *Moore.*—*Plum. Fil. p. 110. t. 107.*

Hab. St. Domingo, *Plumier, L'Herminier, in Herb. nostr.*—M. Fée blames Dr. Swartz and the authors of the 'Icones Filicum' for quoting Plumier's figure now cited under *A. villosum*, though we did not do so without adding the remark, "vix bona quoad marginem et hirsutiem." M. Fée was so fortunate as to receive,

from the same island which yielded Plumier's plant (St. Domingo), a plant which more closely resembles his, and which I have also received from M. L'Herminier; and I am willing to adopt it as a species, though I am far from certain it may not prove a state of *villosum*. It has a more membranaceous sterile frond, and the margin is more or less repando-lobate; the veins are more distant, fewer, and thicker. These are the differences; but Kunze's *A. villosum*, from Peppig, has narrower fronds than this, which Fée acknowledges to be that species. Moore says *A. Plumieri* inhabits Jamaica and Brazil, and he refers to it Lowe's miserable figure, 'Ferns,' vii. t. 54, of *A. villosum*; but I think the venation and margin of the frond prove that to be true *villosum*.

66. *A. (Elaphoglossum) Webbiai*, Fée; "fronds membranaceous caespitose lanceolate obtuse shortly mucronate acute at the base canaliculate on the stipes paleaceous, the margin subdentate, costa rufous, veins prominent villous lying at an angle of  $55^\circ$  turgid at the apex not extending to the margin, hairs simple when magnified subcoarsely toothed (*vis grosse dentatis*), caudex repent scaly, scales rufous erect filiform entire at the margin."—Fée, *Acrost.* p. 51. t. 24. f. 4.

Hab. "Panama, Chili, *Cuming*, n. 151."—This is a sterile plant, exhibiting no tangible distinguishing character. My Fern from Chili, *Cuming*, n. 151, is an *Adiantum*. In another place, under *Acrost. pilosum* (*Acrost.* p. 63), the author says there is among all the species known to him only one (*A. Webbiai*) which has true hair, but assuredly his figure, l. c., f. 5a and f. 5b, represents true scales copiously reticulated.

67. *A. (Elaphoglossum) piloselloides*, Pr.: small, caudex short thick suberect or declined more radiculose than paleaceous, stipes crowded caespitose short 1-2 rarely (of the *fertile*) fronds 4-5 inches long patently setoso-paleaceous; *sterile* fronds from  $\frac{1}{2}$ -3-4 inches long obovate spatulate or oblong rarely linear obtuse tapering more or less into the stipes subcoriaceous-carnose clothed on both sides and fringed at the margin with narrow subulate scales of rich tawny or blackish-purple colour reticulated and toothed or spinuloso-serrate at the margin, costa obscure prominent beneath, veins generally obscure thickened or clubbed at the apex and stopping short of the margin; *fertile* frond much smaller than the rest and generally upon a much longer stipes which latter exceeds in length the sterile fronds  $\frac{1}{2}$ -1 inch long oval ovate oblong or suborbicular, sori often not quite extending to the margin.—Pr. *Reliq. Haenk.* p. 14. t. 11. Fée, *Acrost.* p. 51. t. 14. f. 6. Hook. *Fil. Exot.* t. 39 (a large cult. specimen). Olfersia, Pr. *Elaphoglossum*, Moore. *A. pumilum*, Mart. and Gal. p. 23. t. 2. f. 2. *A. Jamesoni*, Hook. and Gr. *lc. Fil.* t. 80. Fée, *Acrost.* p. 52.—Var.  $\beta$ , *obtusatum*; fronds broader.

*Hook. Fil. Exot. sub t. 29.* A. obtusatum, *Carm. in Fl. Trist. d'Acun. Lim. Trans. xii. p. 510.* *Hook. and Grev. Ic. Fil. t. 22.* A. ciliare, *P. Thouars, Fl. Trist. d'Acun. p. 32.* A. Jamesoni,  $\beta$ , obtusatum, *Fée, l. c. p. 52.*—Var.  $\gamma$ , *horridulum*; sterile fronds longer lanceolate. *Hook. Fil. Exot. l. c.* A. horridulum, *Klfs. in Fée, Acrost. p. 52. t. 14. f. 4.* Elaphoglossum, *J. Sm. Acrost. spathulinum, Raddi, Fl. Bras. p. 3. t. 15. f. 2.* A. Raddianum, *Hook. and Grev. Ic. Fil. t. 4.*—Var.  $\delta$ , *spathulatum*; fertile frond retuse at the apex. *Hook. Fil. Exot. l. c.* A. spathulatum, *Bory, Voy. i. p. 263. t. 20. f. 1. Sw. Syn. Fil. p. 10. Willd. Sp. Pl. p. 106. Fée, Acrost. p. 51. Olfersia, Pr.*

Hab. Tropical America, from Mexico and the West Indies, and on the mainland of continental South America from the Atlantic to the Pacific. Bourbon, Madagascar, Natal (Ingoma, rare on rocks, *W. T. Gerrard*), Tristan d'Acunha, and Ceylon.—In my 'Filices Exoticae' I took great pains to settle the synonymy of this pretty but variable species (whose general aspect is much like that of a Sundew, *Drosera*), and I have no reason to alter the views I there expressed. But it is impossible to define the individuals of any of the groups, which pass so insensibly from one form to another.

68. A. (Elaphoglossum) *ovatum*, Hook.; caudex long filiform very much branched, the branches divaricating clothed with ferruginous lanceolato-subulate crisped and laciniato-fimbriated scales, stipes distant very slender  $\frac{1}{2}$  to rarely 1 inch long except of the *sterile* ones which are often 2 inches long fimbriato-squamulose; *sterile* fronds subcarnosocoriaceous opaque  $\frac{1}{2}$  to rarely 1 inch long ovate or rarely oval-oblong on both sides fusco-ferrugineo-paleaceous with soft laciniato-fimbriated scales; *fertile* fronds generally larger of the same form and overtopping the sterile ones by the greater length of the stipes. *Hook. and Grev. Ic. Fil. t. 140. Fée, Acrost. p. 52. t. 14. f. 7.* Elaphoglossum, *Moore. Acrost. rhabdolepis, Fée, Gen. Fil. p. 42. t. 1. f. 3.* Elaphoglossum, *Moore. Acrost. ramosissimum, Fée, Acrost. p. 53. t. 22. f. 3.* Elaphoglossum, *Moore. Acrost. crispatum, Fée, Gme Mém. Foug. Nouv. p. 2. t. 1. f. 2.*

Hab. Ecuador, Cayambe, alt. 14,000 feet, and Cordillera of Pillaro, alt. 15,000 feet, *Jameson, n. 89 and 95.* Ad flumen Magdalenam "*Acrost. reptans?*, Cav." (*Brongniart, ex Herb. Par.*). Ocaña, alt. 10,000–11,000 feet, *Schlim, n. 1814.* Columbia, *Hartweg, n. 1488 (Moore)*, Brazil, summit of the Organ Mountains, n. 5923. Mexico (*Moore*).—A beautiful and well-marked species.

69. A. (Elaphoglossum) *squamipes*, Hook.; caudex thick as a sparrow's quill very much elongated and much branched with divaricating branches which are clothed with copious

broad-ovate or lanceolate concave lax ferruginous entire scales large for the size of the plant, stipites distant slender stramineous clothed with similar scales with the caudex but smaller and more spreading 1 inch long of the *sterile* fronds, 2-3 inches long in the *fertile*; *sterile* fronds  $\frac{1}{2}$ -1-1 $\frac{1}{4}$  inch long ovate or oblong-ovate obtuse carnosio-subcoriaceous obtuse subcuneate at the base sparingly clothed with soft subulate flexuose hair-like scales on both sides, veins manifest; *fertile* fronds scarcely differing from the sterile ones which however they overtop on account of the much longer stipites. *Hook. Ic. Pl. t. 197. Fée, Acrost. p. 53. t. 22. f. 2. Elaphoglossum, Moore.*

Hab. Chacapoyas, Peru, *Mathews.* New Granada, *Purdie.*—Evidently an ally of *A. ovatum*, but with larger fronds and very different and much larger and quite entire paleaceous scales. M. Fée criticizes my "*médiocre* figure" of this well-marked *Acrostichum*, which, however, is extremely faithful, but imperfectly printed.

70. A. (Elaphoglossum) *cardiophyllum*, Hook.; caudex long-creeping thicker than a crow's quill much (but not very copiously) patently branched clothed with rather large imbricated oblongo-lanceolate concave scales, stipites 1-2 inches long near 3 inches of the *fertile* frond laxly paleaceous with smaller and more subulate dark-brown scales; *sterile* fronds coriaceous glaucous or whitish-green 12-14 lines long and broad-cordate or 4-5 lines long and deltoid or subrhomboid-ovate with black short subulate deciduous small scales on the surface, costa prominent beneath, veins scarcely manifest horizontally patent; *fertile* fronds in size and shape resembling the sterile ones. *Hook. Ic. Pl. t. 715. Elaphoglossum, Moore.* A. cochlearifolium, *Fée, 6me Mém. Fouy. Nouv. p. 2. t. 1. f. 3 (sterile fronds only).* Elaphoglossum, *Moore.*

Hab. Quitinian Andes, *Jamson, n. 212 and 395, alt. 14,000 feet.*—A well and easily defined species, faithfully represented in our Ic. Plant., and, as far as the sterile fronds are concerned, by M. Fée also.

71. A. (Elaphoglossum) *Lloense*, Hook.; caudex very long creeping thick as a sparrow's quill rarely branched rooting the younger portions paleaceous with lanceolate acuminate ferruginous suberisped scales, stipites remote pale stramineous slender 2-5 inches long 5-8 of the *fertile* frond subsquarrose with similar but smaller more or less deciduous scales; *sterile* fronds firm-membranaceous in the older ones subcoriaceous pale-green 2-4 inches long deciduously scaly

with scattered small subulate blackish-brown scales especially beneath (not at the margin),  $\frac{3}{4}$ –1 inch broad lanceolate or subovato-lanceolate more or less gradually acuminate cuneate at the base entire with a thickened marginal line having a slender pellucid external edge, costa very distinct, veins slightly prominent patent simple or forked extending to and united with the marginal thickened line; *fertile* fronds much smaller  $\frac{3}{4}$ –2½ inches long narrow oblong-lanceolate on stipites much exceeding the whole sterile fronds in height. *Hook. Ic. Pl. t. 657* (a small narrow-fronded specimen). *Fée, Gen. Fil. p. 43.* *Kl. in Linnæa, xx. p. 425.* (*Olfersia repens, Kl. in Herb. nostr.*)

Hab. Valley of Lloa, Ecuador, and temperate forests of the Andes, *Jameson*. Peru, *Mathews*. Venezuela, *Fendler*, n. 286. Columbia, *Moritz*, n. 286 (very fine specimens, with the broadest fronds).—A very distinct and well-marked species, but of which specimens with the smallest and narrowest fronds in the *Ic. Plantarum* are only given. The nature of the venation would almost justify its being placed in § *Acouopteris*.

72. A. (Elaphoglossum) *Hartwegii*, *Fée*; “fronds lanceolate obtuse thick opaque attenuated at the base long-stipitate scaly beneath naked above, scales densely imbricated thick oval scariose at the margin rufous in the centre entire; *fertile* ones shorter and more obtuse but with longer stipites, stipites in both scaly, scales ovate laxly imbricate patulous at the base, caudex repent somewhat branched thick as a crow’s quill clothed with fuscous scales.” *Fée, Acrost. p. 53. t. 9. f. 2.* *Elaphoglossum, Moore.*

Hab. Columbia, *Hartweg*, n. 1480, 1486? *Moore* gives other localities, and Mexico, *Galeotti*, n. 6265 (bearing the name of *A. muscosum*).—Our specimens from *Hartweg* (n. 1486) have a long, creeping, black, tortuous caudex, as thick as a goose-quill, with glossy, dark brown, subulate scales; *sterile* fronds 2 inches long and rather linear than lanceolate, on stipites 4 inches long; *fertile* fronds 1½ inch long, on stipites 6 inches long. Our specimens n. 1480 are a good deal larger, and the fertile fronds more than 4 inches long, still I cannot look upon these two as specifically different.

73. A. (Elaphoglossum) *Mathewsii*, *Fée*; “fronds uniform thick opaque lanceolato-linear obtuse acute at the base; *sterile* ones smaller, whole plant ferrugineo-squamose, all the scales scariose toothed at the margin, those on the frond adpressedly imbricated, those of the stipites long subpatulous, those of the scandent flexuose caudex (thick as a crow’s quill) laxly imbricated glossy of an intensely brown colour acute serrated at the margin.” *Fée, Acrost. p. 54. t. 2. f. 2.* *Elaphoglossum, Moore.*

Hab. Pern, on trees, *Mathews*, n. 611, "in crevices of rocks," *Macleau*. Pilzhan and Audes of Ecuador, *Jameson*. New Granada, *Purdie*.—"This species is very remarkable; it ranks next to *A. Hartwegii*, from which it differs by the ciliated scales, fronds uniform and linear, by the nature of the scales, the dimensions, consistence," etc. (*Fée*.) Having original specimens of both, I confess that neither in size, consistence, form, and certainly not in place of growth, do I find any valid difference between the two. I fear the scales are as liable to vary in the margin or outline as are the fronds.

74. A. (*Elaphoglossum*) *muscosum*, Sw.; caudex thick as a goose or a swan's quill paleaceous with rather short glossy black-brown ciliated imbricated subulate or ovato-subulate scales, stipites 5–8 inches in length, generally more of the *fertile* fronds, subsquarrose with pale ferruginous ovate lax deciduous tawny finely ciliated scales mixed with lesser ones which are paler-coloured whiter and appressed; *sterile* fronds firm-coriaceous varying greatly in size generally 6–8–13 inches long and from  $\frac{1}{2}$  an inch to nearly 1 inch wide oblongo-lanceolate bluntly acuminate obtuse or subattenuated at the base clothed on the upper side with copious closely pressed subovate small whitish or rarely tawny deciduous scales mixed with others especially on the costa much larger more lax with a deep-brown stain in the centre (these are apparently the first to be deciduous), beneath much more densely paleaceous with generally pale ferruginous scales all rather lax though still closely imbricated more permanent and equally of two kinds; *fertile* fronds 4–6 inches long 3–6 inches wide linear or linear-oblong obtuse at both extremities all beneath soriferous except on the costa which is concealed by imbricated narrow-lanceolate ciliated scales.—*Sw. Fl. Ind. Occ. p.* 1591. *Syn. Fil. p.* 10. *Willd. Sp. Pl. v. p.* 101. *Fée, Acrost. p.* 54. *Elaphoglossum*, *J. Sm. Moore*. *Olfersia*, *Pr.*—Var.  $\beta$ , *latifolium*; caudex much thicker and knobbed about the caudices clothed with very long narrow-linear subulate bright-chestnut scales or blackish, sterile fronds broader and subelliptical. *A. plumosum*, *Metten. Fil. Lechl. p.* 4.

Hab. Jamaica, *Swartz*, *Baneroft*, *Wilson*, n. 743 (Blue Mountain Peak, *Alexander Prior*), etc. St. Domingo, *Schomburgk*. Quitinian Andes, *Jameson*, n. 231. Andes of Peru, *Macleau*.—Var.  $\beta$ , *latifolium*. Jamaica, *M'Fadyen*, *Baneroft*. Andes of Peru, *Macleau*, *Lechler*.—*Fée* remarks, "L'*A. muscosum*, de Swartz, n'a été vu que par cet auteur; Willdenow ne l'avait étudié que stérile; tous les auteurs qui ont adopté cette espèce n'ont pas été à même de voir le spécimen autographe." Very many of the more modern species are in the same predicament. Unfortunately there is not even a figure to have recourse to in the present case. I have derived my characters mainly from a plant commonly received from botanists of Jamaica, which is probably the true plant. It seems pe-

cular to elevated regions. My var.  $\beta$ , if I am correct in referring it here, is remarkable for the great length of the caudical scales, sometimes resembling long, soft, rich brown hairs, for the breadth and subelliptical form of the sterile fronds, and the brighter colour of the scales.

In Karsten's *Fil. Columb.*, that author's distinctions are so finely drawn between his *A. Lindigii*, t. 3, *A. Engelii*, *A. rupestre*, and *A. deorsum*, t. 59, and *A. caulolepis* and *A. truncicola*, Karst., and even his *A. lepidotum*, Willd., that, beautiful as the figures are and laboured as are the descriptions, I must decline any attempt to refer them to acknowledged species.

75. A. (*Elaphoglossum*) *plumosum*, Fée; caudex stout as thick as a man's little finger or towards the extremity as a man's thumb densely fibroso-radical and sparingly paleaceous with broad-lanceolate rather long membranaceous ferruginous ciliated scales, stipites 2–3 inches at the summit of the *sterile* 8–10–12 inches in the *fertile*, shaggy with pale-tawny large ovate plumosely ciliated lanceolate scales mixed with smaller ovate appressed ones, soft and equally and most beautifully *plumoso-ciliate* (as are all the scales); *sterile* fronds subcarnosio-membranaceous 8–12 inches long 1–1½ inch wide lanceolate obtusely acuminate long attenuated and decurrent at the base often injured and proliferous at the apex paleaceous on both sides most copiously beneath and at the margins (partially deciduous above) with rather small linear-ovate ciliated scales, a few longer and more linear ones are attached to the costa; *fertile* fronds overtopping the sterile ones from the great length of the stipes 5–6 inches long about 5 lines wide linear obtuse; the paleaceous indument varies in colour from pale-tawny to bright-ferruginous.—Fée, *Acrost.* p. 54. t. 2. f. 1. *Elaphoglossum*, Moore. A. Wagneri, Kze.?

Hab. Guiana, *Schomburgk.* n. 446, *Appun*, n. 190. Amazon, Barra, *Spruce*, n. 1770, and San Gabriel, on small trees, rarely on the ground, *Spruce*, n. 2397.—Certainly one of the most beautiful and distinct of the genus.

76. A. (*Elaphoglossum*) *perelegans*, Fée; “*sterile* fronds elongato-oblong lanceolate membranaceous subpapyraceous acute at the apex attenuated at the base punctated beneath on both sides sparingly squamose, the margin flexuose, scales aureous lacerated at the superior margin, stipites canaliculate clothed with patulous scales scarcely so long as the frond, costa helveolous scaly above with a narrow groove, veins arcuate approximate; *fertile* fronds longer linear narrower, at the apex and at the base acute clothed above with lacerated scales, caudex thick sending out very long rooting fibres.” Fée, *Acrost.* p. 55. t. 23. *Elaphoglossum*, Moore. A.



muscosum, *Kze. in Linnaea*, ix. p. 29 (not *Sw.*). “*Plum. Fil. p. 120. t. 139 ?*” (*Fée*).

Hab. Martinique and St. Domingo, *Plumier*. Brazil, *Vauthier*. Peru, *Pampayaco, Poeppig*. Couliabon Mountains, *Dominica, Murray, n. 101*.—I have no authoritative specimen of this species; but I possess two sterile fronds from *Dominica* which seem to accord sufficiently with *Fée*'s description. It appears to me a doubtful species, yet Mr. Moore has brought forward a number of synonyms which he refers to it. My sterile fronds are 8–11 inches long,  $1\frac{1}{4}$ – $1\frac{1}{2}$  inch in diameter, quite, but not thin, membranaceous.

77. A. (Elaphoglossum) *Gardneri*, *Fée*; caudex short sub-repent or quite erect towards the thickened apex and there ferrugineo-paleaceous with broad ovato-lanceolate soft ciliated scales, stipites  $1\frac{1}{2}$ –2 inches long 4–6 inches of the sterile fronds, squarrose with lax patent ovate piloso-ciliated and sublaciniate scales mixed with smaller and more appressed ones; sterile fronds 4 to nearly 6 inches long  $\frac{3}{4}$ –1 inch broad very firm coriaceous-submembranaceous elliptico-oblong very obtuse at both extremities or rarely subacute at the base, above subglabrous nearly destitute of scales beneath sparsely yet conspicuously stellato-squamulose with very minute rufous scales a little larger and more copious on the costa, veins manifest elevated; fertile fronds 4–5 inches long overtopping the sterile ones 4–5 lines wide linear-oblong obtuse.—*Fée, Acrost. p. 55. t. 15. f. 3 (small specimen)*. Elaphoglossum, *Moore*. E. intermedium, *Brack. Fil. U. S. Expl. Exp. p. 69*.

Hab. Stems and branches of trees, Organ Mountains, Brazil, *Gardner, n. 93*; same locality, *Brackenridge*.—*Brackenridge*'s plant is from the same locality as *Gardner*'s, and, I can hardly doubt, is the same plant. It is true he does not speak of the upper side of the frond as denuded of scales, but I suspect that in a younger state our plant would be scaly above. The under side is rather dotted with minute scales than paleaceous or chaffy.

78. A. (Elaphoglossum) *Orbignyana*, *Fée*; “fronds oblongo-linear; sterile ones acute at each extremity clothed above with appressed papyraceous silvery scales beneath densely squamose with fulvous laeclerated laxly imbricated uniformly coloured scales, stipites long canaliculate scaly; fertile ones narrower the margin undulated densely clothed with lacerated scales having a central rufous dot.”—*Fée, Acrost. p. 56. t. 13. f. 2*. Elaphoglossum, *Moore*.

Hab. Mexico, *D'Orbigny*.—The figure represents a large Fern, densely squamose; sterile with a stipite 16 inches long, frond nearly  $1\frac{1}{2}$  foot long,  $1\frac{3}{4}$  inch wide; fertile stipite 8 inches long, frond 15 inches long,  $1\frac{1}{4}$  inch wide. “Easily recognized by its scales, those on the upper side of the sterile fronds close-pressed, excessively thin, as if were papyraceous, and silvery, those on the under side are imbricated, oval-lanceolate, *décliquetées*, a little deeper in colour towards the

centre; those of the costa and margin are longer, more loosely imbricated, and reddish in the centre." It would require copious specimens to ascertain if many of these marks are not variable.

79. A. (Elaphoglossum) *heterolepis*. Fée; caudex stout black more or less clothed with close-pressed black rigid subulate scales, stipites 3–5 inches long, of the *fertile* fronds 15 inches, clothed with small ciliato-laciniated appressed whitish ovato-subulate scales with or without a reddish dot in the centre mixed with much longer linear-subulate falcate more or less ciliated ones with a black line in the centre, upwards on the stipites the dark line is much paler; *sterile* fronds 9–15 and even 20 inches long 1–1½ inch wide oblongo-lanceolate more or less obtuse or obtusely acuminate attenuated below coriaceous clothed on both sides but most densely on the under side with similar scales to those of the stipites but the narrow elongated ones are chiefly confined to the costa beneath and are straight spreading horizontally with a pale reddish line down the centre, the ciliated margin of all the scales varies in degree; *fertile* fronds 6–8 inches long ½–¾ of an inch wide elongate- or linear-oblong similarly scaly on the upper side and nearly as much so on the lower side in the younger state of the fructification, but the scales are obliterated as the fructification advances except the costal ones which are very copious and conspicuous.—Fée, *Acrost. p.* 36. *t.* 15. *f.* 1. *Sieb. Fl. Miata, n.* 281 (Fée).

Hab. Bourbon, *Bory*.—I possess fine specimens of this plant well figured by Fée, under the names of *A. tomentosum* and of *A. obductum*, from the Paris herbarium, and of *A. macrolepis*, of Bojer, ms.; and hence I believe Mr. Moore has transferred those synonyms to *A. obductum*. Kfss., retaining, however, the *A. heterolepis* of Fée, to which our plants certainly belong.—See our remarks on *A. obductum* (n. 86).

80. A. (Elaphoglossum) *Langsdorffii*, Hook. and Grev.; caudex creeping stout black densely clothed with long brownish-black long ciliated glossy subulate scales, stipites 4–6 inches long of the *fertile* fronds 8–10 inches long copiously paleaceous with ovate or ovato-lanceolate finely ciliated lax scales varying in size of an aureo-ferruginous colour; *sterile* fronds coriaceous 8–10 inches to a foot and more long ¾–1½ inch wide lanceolate more or less elongated clothed on both sides more densely and more permanently beneath with the same kind of scales as to form and colour as the stipites the largest being attached to the costa all of them have a deeper tawny spot in the disk, upper surface often in age quite denuded;

*fertile* fronds 5-8-10 inches long  $\frac{1}{2}$ - $\frac{3}{4}$  of an inch wide linear-oblong.—*Hook. and Grev. t. 164. Mart. Crypt. Bras. p. 83. t. 21 (small specimens). Fée, Acrost. p. 57. Elaphoglossum, Moore. Olfersia, Pr.*

Hab. Brazil, *Langsdorff, Martius, Sellow, Gardner, n. 94 and 5929.*—Fée observes, "cette grande et belle espèce est fort distincte; elle est abondamment couverte des squames blanchâtres:" whereas the scales of our specimens are aureo-ferruginous, and in his own specific character he says, "squamis ferrugineis." This colour is one of the distinguishing marks between this species and *A. heterolepis*, and, as I suspect is the case in that species, the scales are in age very deciduous.

81. A. (*Elaphoglossum*) *laminarioides*, Bory; "sterile fronds vittate (elongato-linear) acuminate, acumen very long and narrow flexuose partially clothed (subtectis) with lacerated acuminate rufo-ferruginous scales on both sides especially at the costa, stipites ferruginous; *fertile* fronds linear acute, the margin" (probably in drying?) "revolute, beneath clothed with appressed irregularly rounded scales ciliated at the margin, caudex creeping." *Fée.*—*Bory, in Fée, Acrost. p. 57. Elaphoglossum, Moore.*

Hab. French Guiana, *Leprieur.*—Fée's figure represents an *Acrostichum*, of which the *sterile* plant has a stipes 8-9 inches long, fronds  $1\frac{1}{2}$ -2 feet long 1-1 $\frac{1}{2}$  inch wide obtusely or long and finely acuminate; *fertile* with a stipes only 3 inches long, with a frond 7 inches long by  $\frac{1}{2}$  an inch wide. The species exhibits no very striking characters.

82. A. (*Elaphoglossum*) *cuspidatum*, Willd.; "sterile fronds linear-lanceolate elongate terminating abruptly in a narrow acumen sometimes gradually acuminate attenuated at the base squamose beneath, scales fulvous lanceolate more copious on the rufescent costa, above the scales are appressed albescent translucent ciliated channelled, the margins repand, veins parallel standing out nearly at a right angle; *fertile* fronds linear densely squamose, scales rounded ciliated, stipites in both elongated sulcate squamose, caudex repent thick, the scales rufous lanceolate subentire ending in a long cuspidate point." *Fée.*—*Willd. Sp. Pl. v. p. 106. Kze. in Linnæa, ix. p. 29. Fée, Acrost. p. 57. t. 14. f. 2. Elaphoglossum, Moore. Olfersia, Pr.*

Hab. Caracæas (*Willdenow*). Peru, *Poeppig. Tarapota, Spruce, n. 1638. Venezuela, Fendler, n. 271. Ocaña, Schlim, n. 621. Ecuador, Baños, Spruce, n. 5232.* (Fée quotes Brazil, *Gardner, n. 5929*, but that is clearly *A. Langsdorffii*)—This is probably, like too many of the *Elaphoglossum* group, a very variable plant. Fée's figure represents a narrow form of it with unusually cuspidate points of the sterile fronds, and their under side as quite shaggy with palea-

ceous scales; whereas my specimens have the scales (of a cinnamon-colour rather than ferruginous) singularly appressed and compact, looking as if their ciliated margins had been worn away more or less, and as if what remained, though quite covering the surface, were glued, as it were, to it. These close compact scales have sometimes a black spot upon them, and sometimes they are mixed with little black scales. This is the case with my authentic specimens from Kunze. My most perfect specimens are from Fendler and from Spruce. In these the caudex is stout, black, creeping, clothed with copious, intensely black, falcate, narrow, subulate, glossy scales; stipites, *sterile* and *fertile*, nearly equal, very decidedly scaly; *sterile* fronds nearly 2 feet long, 3 inches wide, destitute of scales above; *fertile* fronds 1 foot long, 1½ inch wide.

83. A. (*Elaphoglossum*) *curvans*, Kze.; “*sterile* frond linear-oblong cuspidate, the margin subrepand coriaceous subglabrous above, rather glossy pale-coloured beneath, densely ferrugineo-squamose, scales ciliated, costa and long stipes clothed with scales having a pellucid border; *fertile* fronds linear above densely nigrescenti-squamose curved at both extremities, caudex creeping densely nigro-paleaceous.”—Kze. in *Linnaea*, ix. p. 30. *Fée*, *Acrost.* p. 58. *Elaphoglossum*, *Moore*.

Hab. Peru, *Pappig*.—Stipes of the *sterile* frond 6–8 inches long, *fertile* one 7–10 inches; *sterile* frond 10–12 inches long, 10–14 lines wide; *fertile* frond 6–7 inches long, 4–6 lines wide. The curvation of the frond is remarkable and constant.” My solitary specimen from Kunze is peculiarly straight in its frond, and it is in too imperfect a state to allow me to form any judgment upon it. Kunze compares it to *A. squamatum*, Sw., but says it differs in the cuspidate and, above, subscaless frond, and in size.

84. A. (*Elaphoglossum*) *elongatum*, Kze.; “*sterile* frond linear-oblong cuspidato-acuminate at the apex, coriaceous densely patenti-venose above sparingly and minutely squamose margined, with the margin scaly beneath pubescent with very minute lacerated squamules; *fertile* frond conform narrowed above more densely albo-squamose, the margin nearly free from scales, costa sulcate channelled beneath, stipites of each frond very long and together with the costa of the sterile plant canaliculate densely squamuloso-pilose, scales larger scattered blackish.”—Kze. in *Linnaea*, ix. p. 31. *Fée*, *Acrost.* p. 58. *Elaphoglossum*, *Moore*.

Hab. Peru, *Pappig*.—“Sterile frond 1 foot long, 14 lines wide; *fertile* frond shorter, 5 lines broad.” *Fée* compares the species with *A. dissimile*, but says the spores differ.

85. A. (*Elaphoglossum*) *Bellermannianum*, Kl.; caudex short thick horizontal or ascending ferrugineo-paleaceous, stipites aggregated 2–5 inches long, of the *fertile* fronds 6–9 inches long, squamose with two kinds of scales some small

appressed and whitish the others large ferruginous and more or less spreading both are ovate and more or less ciliated and marked with a dark spot at the base; *sterile* fronds 3 to nearly 6 inches long 1-1 $\frac{1}{4}$  inch wide thin coriaceous elliptical-oblong obtuse subobliquely cuneate at the base very slightly thickened and entire at the margin dotted with minute scales whitish on the upper side beneath pale fuscous subovate finely ciliated appressed rather unequal in size much larger on the prominent costa beneath and marked with a dark almost black spot in the disk, veins slightly prominent beneath subhorizontally patent; *fertile* fronds 2-4 $\frac{1}{2}$  inches long 5-7 lines wide oblong obtuse a little attenuated at the base.—*Kl. in Linnæa*, xx. p. 426. *Kze. in Schk. Fil. Suppl.* p. 37. t. 116. Elaphoglossum, *Moore*.

Hab. Columbia, *Moritz*, n. 259. Venezuela, *Fendler*, n. 270.—My specific character is drawn up from a fine specimen of Fendler.

86. A. (Elaphoglossum) *obductum*, *Klfs.*; caudex short thick knotted or much incrassated about the stipites and clothed with copious subulate bristle-like intensely black glossy scales, the superior ones towards the apex with white margins, stipites 3-4 inches long 6-10 inches of the *fertile* fronds clothed in an early stage with white firm scales of two kinds, small and appressed ovato-acuminate with a black spot in the disk, others larger subulate with a black line in centre, fronds rather thin-coriaceous; *sterile* ones 10-12-14 inches long about 1-1 $\frac{1}{4}$  inch wide oblongo-lanceolate generally or acuminate attenuated at the base scaleless or only clouded as it were with whitish patches which appear to be the remains of close-pressed whitish very indistinct scales, beneath subfurfuraceous with closely-pressed tawny minute squamules close-placed and presenting no distinct form nor any fringed or ciliated margin, these are also (though more persistent than the upper squamules) in time deciduous; *fertile* fronds smaller and narrower but not otherwise different, sometimes on the costa beneath exhibiting white linear scales with an intensely black line in the centre.—*Klfs. in Sieb. Syn. Fil.* n. 25, in *Herb. nostr.* *Fée, Acrost.* p. 59. *Olfersia, Pr.*

Hab. Mauritius and Bourbon, *Bory, Sieber, Bojer, Bouton, Gardner*.—This has much in common with the *A. heterolepis*, and I have sometimes doubted if this may not be an old state of the former; the scales, if such they may be called, have nothing of the perfectness of that species: but in all my specimens the fronds are here thinner and more acuminate.

87. *A.* (Elaphoglossum) *adenolepis*, Kze.; “frond oblong-linear attenuated at the apex obtuse thick-coriaceous above remotely beneath (as well as the long canaliculate stipes and the rachis grooved above) densely lepidote, scales minute in the middle glanduloso-brunneous silvery at the margin.” *Kze.*—(Fertile fronds unknown, and I fear the plant itself very imperfectly so.)—*Kze. in Linnæa*, ix. p. 27. *Fée, Acrost.* p. 59.

Hab. Peru, *Poeppig*.—“Frond 1-2 feet long, 2 inches broad.” “Espèce fort distincte.” *Fée*.

88. *A.* (Elaphoglossum) *lepidotum*, Willd.; caudex short thick creeping or ascending knotted clothed with black very glossy subulate falcate scales, stipites 2-3 inches, of the fertile fronds more than 5 inches long, scurfy with scales of two forms smaller ovate pale-brown and larger sublanceolate and falcate generally with a black line down the middle both more or less ciliated; sterile fronds coriaceous 2- (rarely 6) inches long 3 lines to  $\frac{1}{2}$  an inch wide linear-oblong obtuse or subacute obtusely cuneate at the base above clothed with white (apparently blanched) papyraceous sometimes bright tawny appressed lanceolate ciliated scales very copious at the margin, beneath equally scaly with aureo-fulvous scales of the same character frequently with a dark or black spot on the disk especially on those of the costa; fertile fronds scarcely differing in size and shape from the sterile, equally scaly above and copiously so on the costa beneath.—*Willd. Sp. Pl.* v. p. 102. *Fée, Acrost.* p. 58. *Elaphoglossum, Moore. Olfersia, Pr. A. Dombeyanum, Fée, Acrost.* p. 59. t. 17. f. 2 (very good).

Hab. Peru, *Dombey, Fée*. Ecuador, Pichincha, *Jameson*, n. 232. On Mount Aznay, alt. 13,000 feet. Columbia, *Moritz*, n. 323 (“*A. polylepis*, Kze. Herb.”). “Venezuela (*Linden*), Truxillo et Merida, 1300-4800 (!) mètres.” *Fée* (under *A. Dombeyanum*).—My specimen from Linden is marked “Caraccas (1842), n. 550;” but n. 550 is quoted by *Fée* as *A. rubiginosum*, and by *Moore* as *A. Schiedei*, Kze. It is, however, the very counterpart of *Fée*’s figures of his *A. Dombeyanum*, t. 17, f. 2. It would not be easy to say exactly what is *Willdenow*’s *A. lepidotum*. It is probably the same as ours, and I think *Moore* has done rightly in referring *Fée*’s *A. Dombeyanum* to *A. lepidotum*. Indeed, the author notices this resemblance, but gives as one of the essential differences that *A. Dombeyanum* has only 11 articulations to the annulus of the capsules, *A. lepidotum* has 12-14. It is remarkable, too, that *Fée* gives *Dombey* as the authority for the discovery of *A. lepidotum* in Peru, but does not mention his name under *A. Dombeyanum*. The present species appears to be eminently Andine, and might almost be looked upon as a dwarfed form of *A. Langsdorffii*.

89. *A.* (Elaphoglossum) *auricomum*, Kze.; “sterile fronds

oblongo-linear acuminate membranaceous lax, the margin repand, veins thick standing at an angle of  $80^{\circ}$ – $85^{\circ}$ , scales aureous remote stellately fringed above adhering to the frond, at the base very long attenuated upon the stipes, stipes hirsute with narrow lacerated patulous scales; fertile fronds narrower acute at both extremities squamose, scales as in the sterile, caudex creeping scaly." *Fée*.—*Kze. in Linnæa*, ix. p. 28. *Fée, Acrost.* p. 59. *Elaphoglossum*, *Moore*. *Olfersia*, *Pr.*

Hab. Peru, *Poeppig*. St. Gabriel, Amazon, *Spruce*, n. 2185. Mexico (*Fée*).—I possess only a barren specimen of this from Kunze, but I cannot doubt that my very fine plant from Spruce is identical with this, though somewhat more coriaceous. The scales are deeply fringed, constituting rather stellated hairs than scales, particularly abundant on the under side, near the base of the frond, and of a fine aureo-fulvous colour. On the stipes, however, the fine stellated hairs are mixed with narrow, fringed, lacerated scales, and a few of such appear on the upper side of the frond; stipites of the *sterile* fronds 2–4 inches long, of the *fertile* fronds twice that length; *sterile* fronds 12–15 inches long,  $1\frac{1}{4}$ – $1\frac{1}{2}$  inch wide, much attenuated at the base; *fertile* frond 10 inches long, 5 lines wide, obtuse, attenuated at the base,

90. A. (*Elaphoglossum*) *erythrolepis*, *Fée*; "fronds linear acute at each extremity; *sterile* ones with the margins plicate above clothed with rubricose ovato-ciliated scales sometimes palmate at the base obtuse beneath more copious laxly imbricated and paler as on the stipites, caudex creeping thick as a pigeon's quill, the scales blackish-brown rigid thick scarcely ciliated."—*Fée, Acrost.* p. 60.

Hab. "Peru, *Dombey*."—"C'est une bonne espèce, qui demande à être complétée." I fear too much stress is apt to be laid on the form of the scales, and that too many species are formed on very imperfect materials in this very variable group.

91. A. (*Elaphoglossum*) *squamosum*, Sw.; caudex short thick horizontal or ascending, the portion nearest the stipes clothed with subulate glossy subulate castaneous scales, stipites 2–4 inches, of the *fertile* fronds 4–6 inches long clothed with bright ferruginous (sometimes intensely black) linear-lanceolate scales, small compact ones being mixed with larger and spreading ones all long and most beautifully plumoso-ciliated, scales of the same two kinds cover the whole of the fronds (save the soriferous lamina) very copious at the margins and they are sometimes pale-tawny on the upper side or on both sides aureo-nitent, the larger or longer scales generally about the costa often there mixed with ebony-black ones, fronds coriaceous-membranaceous, *sterile* ones 5–8–9 inches long  $\frac{3}{4}$ –1

inch broad oblong or oblongo-lanceolate moderately but bluntly acuminate cuneate or often attenuated at the base, *fertile* ones 4-8-10 inches long  $\frac{1}{2}$  an inch broad linear-oblong copiously plumoso-squamose on the upper side obtuse at both extremities.—*Sw. in Schrad. Journ.* 1800. ii. p. 11. *Syn. Fil.* p. 10. *Schk. Fil.* p. 184. t. 1. b (*execrable*). Elaphoglossum, *J. Sm. Moore.* Olfersia paleacea et vestita, *Pr. A. hirtum, Sw. Syn. Fil.* p. 194 and 419. *Willd. Sp. Pl.* v. p. 104. *Fée, Acrost.* p. 61. A. vestitum (paleaceum on the plate), *Hook. and Grev. Ic. Fil.* t. 235. A. rufescens, *Liebm. Fil. Mex.* p. 18. A. splendens, *Bory, in Willd. Sp. Pl.* v. p. 104. *Fée, Acrost.* p. 60. t. 21. f. 2. Elaphoglossum, *Brack. Moore.* Acrost. Meridense, *Kl. in Linnæa,* xx. p. 427.

Hab. Jamaica, frequent. Venezuela (*A. Meridense*), *Fendler, n.* 269 (the smaller specimen doubtful). Parí, *Spruce, n.* 16. Ecuador, Valley of Lloa, *Jameson, Spruce.* Mexico, *Liebmann.* Bourbon, on trees, *Bory, in Herb. nostr.* Interior of Madagascar, *Bojer.* Sandwich Islands, frequent. Ceylon, *Mrs. Genl. Walker.* Sumatra, *Teschemacher.* India: Kumaon, *Wallich;* Nilghiri, *Beddome, n.* 17. Madeira, Azores, abundant. West tropical Africa: Sugarloaf Mountain (fronds long and narrow, very tapering below), *Barter, in Baikie's Niger Exp.;* Cameroon Mountains, alt. 6000 feet, *G. Mann, n.* 1378 (some of the larger scales on the costa and on the stipes 4-5 lines long).—The chief characteristics of this most beautiful species may be summed up in few words. The linear-lanceolate scales copiously and most beautifully pectinato-plumose, but it must be confessed that with a very little variation in the scales it would be very difficult to distinguish this from *A. plumosum*,

92. A. (Elaphoglossum) *vestitum*, Schlecht.; “fronds linear-lanceolate long attenuate at the base acuminate at the apex acute, on both sides clothed with lanuginous rufo-ferruginous caducous tomentum; *fertile* ones narrower of about the same length as the sterile on longer stipes, caudex abbreviated repent densely clothed with dilated ciliated purpureo-fuscous scales.” *Fée.—Schlecht. in Linnæa,* v. p. 605 (*not Lowe, in Hook. and Grev. Ic. Fil.*). Elaphoglossum, *Schott. Moore.* Olfersia, *Pr. Acrost. fulvum, Mart. and Gal. Fil. Mex.* p. 24. t. 3. f. 2.

Hab. Mexico, *Schiede and Deppe, Galeotti, “n.* 6459.” Jamaica, *Grisebach, in Herb. nostr.*—Schlechtendal speaks of this Fern as “bi-tripedalis, stipitibus semipedalibus; frondibus sterilibus ad summum sesquipollicem, fertilibus quatuor lineas latis.” Galeotti’s figure of *A. fulvum* gives no idea of such dimensions. *Fée*, in his remarks, modifies the term “tomento lanuginoso vestitum” by the expression, “les écailles sont roussâtres,” etc.; and he further adds, “elle a d’assez grandes rapports avec *A. splendens*.” My Jamaica specimen might, indeed, pass for a starved state of the latter plant, but the species appears to be a very unsatisfactory one.



93. A. (*Elaphoglossum*) *succisefolium*, P. Th.; caudex creeping thicker than a swan's quill tortuose densely clothed with imbricated black subulate glossy scales, stipites aggregated 2-3-4 inches long, 5-6 of the fertile fronds, very paleaceous with copious small furfuraceous scales and erecto-patent larger lanceolate acuminate ones black with a pale pubescenti-ciliated margin, fronds coriaceous; *sterile* ones  $3\frac{1}{2}$ -4 inches long 1-1 $\frac{1}{2}$  inch wide elliptical-oblong or sublinguiform very obtuse at the apex and base, clothed pretty uniformly on both sides with fulvo-ferruginous scales of two kinds smaller and furfuraceous ones and much larger lanceolato-acuminate ones, downy at the margin and more or less dentato-ciliated towards the base, very copious on the costa; *fertile* fronds about the same length but much narrower and equally obtuse and equally paleaceous on the upper side and on the costa beneath.—*P. Th. Fl. Trist. d'Acunha*, p. 31. *Carm. in Linn. Trans.* xii. p. 510. *Hook. and Grev. Ic. Fil. t. 2. Fée, Acrost.* p. 61.

Hab. Isle of Tristan d'Acunha, *P. Thouars*, *Carmichael*, *Macgillivray*, and *Milac*.—Du Petit Thouars gives Mauritius, and Bory gives Bourbon, as the localities for this species.

94. A. (*Elaphoglossum*) *pilosum*, H. B.; “*sterile* fronds flexuose acute at each extremity griseous on long weak stipites, on both sides paleaceous, scales reddish stellate lacerated to the naked eye looking like hairs (whence the name), *fertile* ones linear-lanceolate acute attenuated at the base scaly, stipites as long as the frond, caudex thick unequal scaly, the scales fulvous lanceolate lacerated.” *Fée*.—*Humb. et Bonpl. in Willd. Sp. Pl.* v. p. 103. *Fée, Acrost.* p. 63. *Elaphoglossum*, *Moore*. *Olfersia*, *Pr.* *Moore* refers to this, and probably correctly, the *A. cochleatum*, *Bory*, in *Fée, Acrost.* p. 63. t. 16. f. 1.

Hab. New Andalusia, alt. 6600 feet, *Humboldt and Bonpland*. Mexico, *Andrieux*, n. 31 (in *Herb. nostr.*). Columbia (*A. cochleatum*), *Moritz*, n. 30 (*Moore*).—My specimen of *A. pilosum* from Andrieux and *Fée*'s figure of *A. cochleatum*, *Bory*, quite resemble each other, and have all the appearance of old withered specimens, twisted and distorted by drought. In both the scales of the caudex are broad and ferruginous and very copious.

§ 2. LOMARIOPSIS.—*Fronds pinnated. Veins simple or forked, free*.—*Gen. Lomariopsis, Fée. Acrostichum, L. Stenoehlaena, in part, J. Sm.*

95. A. (*Lomariopsis*) *sorbifolium*, Linn.; caudex long thick scandent often angled by the decurrent bases of the stipites clothed with large lanceolato-subulate ciliated generally pale

fuscous scales, stipites varying in length 3-4 inches to a foot long more sparingly paleaceous, fronds subcoriaceous 1-1½-2 feet long lanceolate or oblong pinnated, pinnæ articulated 6-7-20-30; *sterile* pinnæ from 4-7 inches long and from ¾-2 inches wide lanceolate or oblong acuminate sometimes broader upwards or sometimes caudato-apiculate subpetiolate entire or more or less serrated or dentate at the margin, rachis winged towards the apex and even for its whole length in the young specimens, veins manifest more or less elevated; *fertile* pinnæ smaller and narrower but not otherwise different.—*Linn. Sp. Pl. p. 1526. Willd. Sp. Pl. v. p. 115. Lomariopsis, Fée, Acrost. p. 69. Onoclea, Sw. Syn. Fil. p. 112. Olfersia, Pr. Lomaria longifolia and sorbifolia, Klfs. Stenochlæna longifolia, J. Sm. Brack. Fil. U. S. Expl. Exp. p. 75. Plum. Fil. t. 117. Acrost. lomarioides, Bory, in Belang. Voy. p. 21. t. 2 (pinnules obtuse). Olfersia, Pr. Lomariopsis Boryana, Fée, Acrost. p. 68. Lomaria integrifolia, Klfs. in Sieb. Syn. Fil. n. 23. Lomariopsis cuspidata, Fée, Acrost. p. 68. t. 27. L. variabilis, Fée, Acrost. p. 70. t. 31 and 32 (abnormal form). Lomaria, Willd. Olfersia, Pr. Lomaria fraxinea, Willd. Lomariopsis ludens (abnormal form), Fée, Acrost. p. 70. t. 30. L. recurvata, Fée, Acrost. p. 68. t. 28. L. leptocarpa, Fée, Acrost. p. 69. t. 29 (pinnæ much elongated, and fertile ones very long and narrow). Stenochlæna oleandrifolia, Brack. Fil. U. S. Expl. Exp. p. 75. Lomariopsis Cochinchinensis, Fée, Acrost. p. 66. t. 26. Lomariopsis Smithii, Fée, Acrost. p. 74. t. 33. f. 2 (fertile), t. 53 (sterile frond). L. Wrightii, Metten. in Fil. Wright. et Fendl. Acrost. Yapurense, Mart. Ic. Pl. Crypt. Bras. p. 36. t. 24 (a larger form, excellent). Hook. Gard. Ferns, t. 57. Acrostichum phlebodes, Kze. in Linnæa, ix. p. 33. Lomariopsis, Fée, Acrost. p. 66. L. Prieuriana, Fée, Acrost. p. 66. t. 25. f. 1. L. erythrodes? and L. elongata, Fée, Acrost. p. 67.*

Hab. Tropical America, frequent: West Indian Islands, Cuba, *C. Wright, n. 787 (Lomariopsis Wrightii, Eat.)*; Columbia, Guiana, Peru, etc. Tropical Africa: River Nun and Prince's Island, Fernando Po, *Barter, Gustav Mann*.—I expressed my doubts as to the distinction between *A. sorbifolium* and *A. Yapurense* in my volume of 'Garden Ferns.' A further investigation has satisfied me that there are no valid differences between them: and I have every reason to believe that the following localities from the Old World are correct: Philippine Islands, *Cuming, n. 132 (Lomariop. leptocarpa, Fée)*; and the same form, Fiji Islands, *Seemann, n. 711, and Brackewidge*. Samoa, *Powell (Stenochl. oleandrifolia, Brack.)*. Luzon, *Cuming (Lomariop. Smithii, Fée, Stenochl. elongata, J. Sm.) and Brack-*

*euridge*; the latter also gives Samoa. Singapore (*L. tudeus*, Fée), Cochinchina (*L. Cochinchinensis*, Fée), Bourbon, Mauritius, Madagascar, etc.—Besides the variations common to Ferns in general, this plant is extremely apt to take abnormal forms, which have given rise to a *Lomariopsis tudeus*, *L. variabilis*, where the elongated caudex bears fronds a span and more long, or simple or pinnatifid at the base, or wholly pinnatifid, or pinnae with the small pinnules pinnatifid. But the most remarkable abnormal state apparently belonging to this species (for my specimen was received without name and bearing no separate ticket) has the caudex terete, straight, thick as a goose-quill, beset with sharp, very pungent spines, and bearing small, sessile, ovate fronds, 3 inches long, very compound, closely tripinnate, the ultimate pinnules little more than  $\frac{1}{2}$  a line long and cuneate; this is considered to be the *Lomaria aculeata*, Bl., and is certainly the *Lomariopsis spinescens*, Fée, *Acrost.* p. 71. t. 33. f. 1, which that author keeps distinct from *L. Smithii*. But he adds the portion of a caudex of *L. Smithii*, which is spinous and bears a normal frond and an abnormal one, which is only bipinnate, so that I strongly suspect both belong to one and the same plant. J. Smith seems to refer these to *Stenochlæna scandens* (see that plant at p. 219). My specimen of *L. Smithii* is a very perfect or normal one, quite like the South American *L. sorbifolia*, except that the veins are more distant. Indeed, Mr. J. Smith considered it to be identical with the *Lomaria longifolia* of Kaulfuss, which is generally united by authors with *sorbifolia*.

*Stenochlæna variabilis*, of Brack, *Fil. V. S. Expl. Exp.* p. 78. t. 11, from the Ovalau and the Fiji Islands, is, as I stated under *Lomaria filiformis* (supra, vol. iii. p. 33), an abnormal state of that plant. What is *Lomariopsis Nova-Caledoniae*, Metten, *Fil. Nov. Caled.* p. 4, of which he says, "paleis rhizomatis cum *L. Smithii*, Fée, congruit, a qua vero directione obliqua nervorum recedit; *L. leptocarpa*, Fée (*Stenochlæna variabilis*, Brack.), nervatura congruente proxima, paleis subcoriaceis pallide rufescentibus oblongo-lanceolatis, pinnis fertilibus contractis linearibus, utriusque ad costam receptaculum elevatum more *Polybotryæ* gerentibus, diversa est"?

96. A. (*Lomariopsis*) *burifolium*, Kze.; caudex flexuose scandent clothed with narrow-lanceolate acuminate scales, fronds (6 inches long on short stipites) pinnated, pinnae 10–14 pairs ( $\frac{1}{2}$  an inch long); sterile ones oval or obovate sessile slightly oblique at the base terminal one larger acuminate; fertile pinnae linear or linear-spathulate sessile remote.—*Kze. in Schk. Fil.* p. 171. t. 72. *Lomariopsis*, Fée, *Acrost.* p. 69.

Hab. Madagascar, *Goudot*, *Meller, in Herb. nostr.*—It is more than possible that this may be a dwarfed or starved form of *L. sorbifolium*; indeed, my specimens, sterile ones it is true, from Dr. Meller are accompanied by others which show a passage to the ordinary form of *sorbifolium*.

97. A. (*Lomariopsis*) *polyphyllum*, Hook.; caudex long scandent tortuose very paleaceous, stipites 2–4 inches in length and as well as the rachis (which is winged upwards) paleaceous with subulate brown spreading scales, fronds firm-membranaceous subpellucid dark-green  $1\frac{1}{2}$  foot long 3–4 inches wide at most, narrow-lanceolate much attenuated, below, pinnate, pinnae numerous not less than 10 pairs;

*sterile* fronds with close compact pinnæ 1-2 inches long less than  $\frac{1}{2}$  an inch wide from a broad always sessile base oblong-acuminate subdentate, lowest ones very small close-placed orbicular; *fertile* fronds rather smaller, the pinnules 1-1 $\frac{1}{2}$  inch long linear petiolate truncate or subhastate at the base.

Hab. West tropical Africa: Cameroon Mountains, alt. 4000 feet, *G. Mann.*—This is, at first sight, more unlike the ordinary form of *A. sorbifolium* than any of its varieties; yet I will not venture to pronounce upon this as *decidedly* distinct. The pinnæ are very numerous, close-placed in the sterile frond, more distant (on account of their narrowness) in the *fertile* frond, and in the latter truncate or even subhastate at the petiolated base.

§ 3. POLYBOTRYA.—*Fronds dimorphous, generally ample and very compound. The fertile pinnules much contracted and sometimes soriferous on both surfaces. Veins simple or forked.*—Gen. Polybotrya, *H. B. K.*

98. A. (Polybotrya) *caudatum*, Hook. (not *Acr. caud.*, Hook. Ic. Pl. t. 215); caudex stout scandent 15-20 feet long often 1 inch broad, stipites elongated as thick as the finger at the base and there paleaceous with subulate brown falcate scales an inch long, fronds from near the summit of the caudex ample subcoriaceous several feet long; *sterile* ones tripinnate, primary pinnæ 1 $\frac{1}{2}$  foot long distant long-petioled often 1 foot broad, secondary ones 4-6 inches long petiolulate deeply pinnatifid or pinnate with ovate or falcate entire or serrated lobes, ultimate pinnules 1 $\frac{1}{2}$ -2 inches long; *fertile* fronds ample bipinnate, pinnules petiolate 2-4 or more inches long 1 $\frac{1}{4}$  line wide linear more or less irregularly pinnatifid with short oblong segments, terminal portion caudate all over soriferous or with a ridge on the back which is sometimes sterile.—Polybotrya, *Kze. in Linnæa*, ix. p. 23. *Fée, Acrost.* p. 72. t. 34 (*very good*). Psomiocarpa, *Pr.*—Var.  $\beta$ ; rachis, costæ, and veins ferruginously stellato-pubescent and villous. *P. pubens*, *Mart. Fil. Bras.* p. 87. t. 25. *Kze. in Linnæa*, ix. p. 23.

Hab. Peru, *Pœppig, Spruce*, n. 4634, 3880. Ecuador, Tumaco, *Hindes, Seemann*. New Granada, Arima, *Purdie*, n. 12. Panama, *Sutton Hayes*.—Var.  $\beta$ . Peru, *Pœppig, in Herb. nostr.* Amazon, *Martius*. Guiana, *Schomburgk, Le Prieur*. Brazil, *Spruce*, n. 2116.—The ample panicle of very long caudate pinnules are mainly characteristic of this species. The *P. pubens* of Kunze and Martius appears to me to be a hairy var. of the same; the fertile frond is identical. In both the disk of the upper side is more or less free of capsules.

99. A. (Polybotrya) *nutans*, Hook.; “caudex very long scandent and radiant, stipes moderately large paleaceous, frond triangular-oblong subglabrous; *sterile* frond bipinnate,

pinnæ and pinnules confluent at the apex, pinnæ lanceolate, acuminate, pinnules rhombéo-ovate subfalcate shortly acuminate at the base above truncato-subauriculate below cuneate veined serrated; *fertile* frond subquadripinnate tripinnatifid or bipinnate at the apex, pinnæ acuminate, tertiary ones filiform obtuse, rachises subpaleaceous hairy." *Kze.*—Polybotrya, *Kze. in Linnea*, ix. p. 24. *Fée, Acrost.* p. 72. Psomiocarpa, *Pr. Epimel.*

Hab. "Pampayaco, Peru," *Poeppig.*—"Differs from *P. caudata* in the fertile frond being more compound, the sterile ones more simple; from *P. osmundacea* (ex descrip. et Ic.) in the rachises being pilose, and in the fertile pinnules being elongated." I fear there is too great a desire to multiply needlessly the species of the *Polybotrya* group of *Acrostichum*.

100. A. (Polybotrya) *acuminatum*, Hook.; "caudex erect scandent densely paleaceous, stipes sparsely paleaceous, fronds coriaceous glabrous; *sterile* ones 1-2 feet long oblong-ovate acuminate bipinnate, inferior secondary pinnæ petiolate, superior ones sessile and decurrent from a cuneate entire unequal base or on the lower side cuneate with the superior side truncate and produced ovate subfalcate acuminate pinnatifidly incised or grossly crenate; *fertile* fronds 1 foot long deltoid-ovate tripinnate, tertiary segments petiolate oblong entire or lobulate at the base." *Metten.*—Polybotrya *acuminata*, *Link. Sp. Fil.* p. 148. *Fée, Acrost.* p. 73. *Metten. Fil. Hort. Lips.* p. 23. t. 2. f. 1-6. Psomiocarpa, *Pr. Epim.* p. 161. *Aspidium, Raddi, Fil. Bras.* p. 34. t. 39 (*sterile frond only*).

Hab. Brazil, *Raddi (in Herb. nostr., but sterile), Langsdorff.*—It has long been a puzzle what the *Aspidium scandens*, figured and described by Raddi from sterile specimens, could be. My authentic ones from Raddi quite agree with the figure and description of Mettenius of the present plant, and the two are alike natives of Brazil. Moore had, indeed, been disposed to refer Raddi's plant to *Polybotrya osmundacea*; but as far as the frond and caudex and stipes are concerned, they much more resemble Link's and Mettenius's plant.

101. A. (Polybotrya) *incisum*, Hook.; "fronds pubescent subtripinnate, pinnæ bipinnate oblong, pinnules bipinnate at the base bipinnatifid above, segments incised, the segments obtuse, rachis thick paleaceous; *fertile* ones tripinnate branched, ultimate divisions linear obtuse acuminate at the apex, capsules large ovoid clothing the under side of the laminae." *Fée.*—Polybotrya, *Link. Sp. Fil.* p. 148. *Fée, Acrost.* p. 73. t. 35. *Metten. Fil. Hort. Lips.* p. 23.

Hab. Brazil (*Vautier*).—"In this plant there is a great disposition to have parts of a frond sterile, the rest fertile."

102. A. (Polybotrya) *cylindricum*, Hook. ; sterile fronds subtripinnate, segments truncato-rotundate crenulate ciliate ; fertile ones tripinnate, pinnules cylindrical.—Polybotrya, *Klfs. En. Fil. p. 56. Fée, Acrost. p. 74. t. 36. P. speciosa, Schott, Gen. Fil. p. 2. cum Ic.*

Hab. Brazil, *Martius, Schott, Chamisso, etc., Garduer, n. 91. Jamaica, Wiles.*—I cannot distinguish between this and the following.

103. A. (Polybotrya) *osmundaceum*, Hook. ; “sterile frond subbipinnate, pinnæ ovato-lanceolate acuminate alternate pedicellate glabrous, upper ones pinnatifid, segments oblong oblique at the apex obtuse serrato-crenate, upper ones confluent, inferior pinnæ pinnate at the base 3 inches long 1 inch wide, pinnules oblong acute crenate 1 inch long, rachis and costules glabrous naked ; fertile frond tripinnate, primary pinnæ 3 inches long and as well as the secondary ones alternate, lower ones 1 inch long, pinnules terete 1–3 lines long on every side clothed with capsules resembling cylindrical and globose spikelets.” Polybotrya, *H. B. K. Nov. Gen. Am. 1. p. 23. t. 2. Willd. Sp. Pl. v. p. 99. Klfs. En. p. 56. Hook. Gen. Fil. t. 88. B. Fée, Acrost. p. 74.*

Hab. New Granada, *Humboldt and Bonpland. Ecuador, Spruce, n. 5685. Brazil, Garduer, n. 91 and 92, Moricand. Jamaica, A. Prior, Purdie. Cuba, C. Wright, n. 786.*—I fear the composition of the fertile fronds and the relative length and breadth of the ultimate pinnæ are too variable to afford really stable characters for this and the three or four preceding species. This is, however, the one on which the genus *Polybotrya* was established.

104. A. (Polybotrya) *Lechlerianum*, Hook. ; caudex thick elongated scandent paleaceous with ovate very acuminate brown scales, stipites pale-brown glossy a span long 2–3 lines wide scaly below ; sterile frond 3 feet and more long submembranaceous firm villous broad-ovate acuminate tripinnate, primary pinnæ sessile a span to a foot long distant ovate acuminate, secondary ones approximate numerous, pinnules  $\frac{1}{3}$  of an inch long very numerous ovato-oblong deeply pinnatifid, the segments oblong very acute slightly falcate each with a single vein clavate at its apex and not reaching to the apex of the segment ; fertile frond ramified as the sterile one, the pinnules short 2–4 lines long linear very obtuse lobato-pinnatifid soriferous beneath chiefly near the margin.—Polybotrya, *Metten. in Lechl. Pl. Peruv. n. 2156, and Fil. Lechl. Chil. et Peru. p. 4. t. 1. f. 1–5. Hook. 2d Cent. of Ferns. t. 97.*

Hab. Shady places, St. Gavau, Peru, *Lechler, n. 2156. Near Tarapota, Eastern*

Peru, *Spruce*, n. 4744 (fine specimens, but sterile only). Ecuador, *Jameson* (fertile frond only).—A very peculiar and elegant species, with very small, deeply-cut sterile pinnules.

105. A. (Polybotrya) *canaliculatum*, Hook.; caudex very long (15 feet) scandent densely clothed with long subulate brown scales spinulose towards the apex, stipes and rachis stramineous paleaceous with long subulate scales above with broader and shorter ones, “fronds coriaceous glabrous  $2\frac{1}{2}$  feet long; *sterile* ones bi-tri-subquadripinnate, lower secondary pinnæ petiolate ovato-oblong acute subpinnatifid from the middle to the lower base cuneate, superior truncate and produced unequally oblong obtuse pinnate at the base or inciso-pinnatifid, upper ones decurrent; *fertile* fronds quadripinnate, ultimate pinnules petiolate subglobose or obovate.” *Metten.*—Polybotrya, *Kl. in Linnaea*, xx. p. 429. *Eat. in Fil. Wright. et Fendl.* p. 196. *Metten. Fil. Hort. Lips.* p. 24.

Hab. Venezuela, *Moritz*, n. 278, *Karsten*, *Fendler*, n. 262.—This is a very elegant plant, the fronds much smaller than any of the preceding species, bright green when dry, paler beneath, and with the ultimate fertile pinnules small, petioled, globose.

106. A. (Polybotrya) *articulatum*, Hook.; caudex?, stipes?, rachis thick as a goose-quill dark purple-brown slightly hairy and subpaleaceous with soft subulate scales (reddish-brown in the *fertile* frond), fronds ample probably several feet long and certainly  $2\frac{1}{2}$  feet broad (in the fertile frond) firm-membranaceous dark-brown when dry bipinnate; *sterile* fronds, primary pinnæ articulated upon the rachis 8–10 inches long pinnated to the very apex, pinnæ petiolate and articulated on their rachis nearly uniform  $\frac{3}{4}$  of an inch long obliquely ovate obtuse, the superior base produced truncated and strongly auricled sharply serrated, inferior base excised; *fertile* fronds much narrower, the pinnules small petioled articulated 2–4 lines long linear auricled at the superior base and sometimes at the inferior also the under side soriferous.—Polybotrya, *J. Sm. in Hook. Bot. Journ.* iii. p. 401 (*name only*). *Fée, Acrost.* p. 74. t. 37 (*excellent*).

Hab. Leyte, Philippine Islands, *Cuming*, n. 296.—An extremely well marked species, only found, we believe, by Mr. Cuming.

107. A. (Polybotrya) *Wilkesianum*, Hook.; caudex long scandent angular and almost winged as thick as a swan's quill several twining round each other radicant almost quite

destitute of scales except on the nascent fronds which exhibit an appearance of scurfy scales, stipites articulated upon the caudex a span to a foot and more long stramineous and as well as the rachis terete glabrous and glossy; *sterile* fronds firm-membranaceous darkish-green  $1\frac{1}{2}$ -2 feet and more long oblong-ovate bipinnate, primary pinnæ articulated rather remote 4-6-8 inches long pinnated at the apex, pinnules numerous but rather distant articulated  $\frac{1}{2}$ -1 inch long scarcely petioled ovate and acute or acuminate or lanceolate, superior base often truncated a little produced but not auricled, inferior base more or less excised coarsely but sharply serrated, the rachises with a narrow green wing on each side (on one of my specimens the upper portion of the frond is simply pinnated for the length of 8 or more inches, the pinnæ, 11 in number, are rather petiolate of a firm texture 3 inches long by  $\frac{3}{4}$  of an inch wide oblongo-lanceolate acuminate cuneate at the base strongly costate, costa testaceous), veins copious close-placed forked, terminal pinna equal in size to the rest; *fertile* frond similar to the sterile but the pinnules all contracted narrow-linear soriferous on the under side.—Polybotrya, *Brack. Fil. U. S. Expl. Exp. p. 80. t. 10 (excellent)*. *P. articulata*, *J. Sm. in Seem. Fl. Vit. n. 713*.

Hab. Society Islands, *Bidwill, Brackenridge*. Fiji Islands, *Seemann, n. 713* (the leaves more lanceolate, more obtusely serrated, only found sterile). New Caledonia, *Vieillard* (but Mettenius unites it with *A. articulata*).—This is a very interesting plant and very distinct, but unquestionably allied to *P. articulata*, *J. Sm.* The two kinds of primary pinnæ, the one simple the other wholly pinnated, on the same frond, render it doubtful which should be considered the normal state of the plant; in the former case (simple pinnæ), we have a perfect *Lomariopsis* of Fée. Something of the kind takes place in *L. ludens* (of which sterile plants only are known), but there there are two kinds of sterile fronds from the same caudex; and, again, in the *L. variabilis* of Fée is an abnormal state with the lower portions of the fronds pinnated below, the rest of the frond simple; or we have an *Egenholfia* of Schott (§ of *Polybotrya*, Fée), but wanting the remarkable spiculæ in the sinuses of the lobes or serratures. Such anomalies should make us cautious in forming genera on feeble grounds.

108. A. (*Polybotrya*) *apiifolium*, Hook.; caudex subtubiform rooting below; *sterile* fronds, stipites tufted 2-4 inches long and as well as the rachises ferrugineo-tomentose mixed with a few small subulate blackish scales, fronds membranaceous 4-5 inches long with a few soft subulate hairs on the surface and the margin subtriangular ovate bipinnate below, towards the apex pinnato-pinnatifid, pinnatifid at the apex, ultimate pinnules or segments  $\frac{1}{2}$  an inch long obovate obtuse decurrent at the coarsely dentato-serrate or entire margin;



*fertile* fronds, stipites 6–8 inches long slender subulato-squamose towards the base, fronds 2–4 inches long tripinnate ovate, pinnules or segments much contracted linear, ultimate ones short nodulose sessile remote, sori copious near the margin appearing to be universal on both sides.—*Polybotrya*, *J. Sm. in Hook. Journ. Bot.* iii. p. 401 (*name only*). *Kze. in Schk. Fil. Suppl.* p. 142. t. 62. *Fée, Acrost.* p. 72.

Hab. Luzon, *Cuming, n. 26, Thos. Lobb.*—An elegant small species having a caudex representing a small roundish rhizome, and fronds with the general aspect of an *Anemia*, rather than of a *Polybotrya*.

109. A. (*Polybotrya*?) *nanum*, Hook.; “small glabrous, fronds cæspitose; *sterile* ones pinnatifidly lobate subdentate, terminal lobe large, stipes short, costa narrowly channelled beneath; *fertile* ones pinnated, pinnæ few, lateral ones ovate, terminal one linear, root fibrous, fibres very long.”—*Polybotrya*, *Fée, Acrost.* p. 75. t. 38. f. 1.

Hab. “New Zealand, *Hugel.*”—*Fée*’s figure represents a small New Zealand Fern only 1 inch long (stipes included), which calls to mind an unusually small and starved specimen of *Lomaria nigra* (vol. iii. p. 35, of this work, and Hook. *lc.* Pl. t. 960). Indeed, I feel confident that this view is correct, and that no form of *Polybotrya* has been found in New Zealand.

§ 4. STENOCHLÆNA.—*Fronds ample, dimorphous, pinnate or bipinnate. Veins free, extending to, and united with, the thickened margin.*—*Gen.* Stenochlæna, *J. Sm.* *Lomariobotrys*, *Fée.* (*A mere subsection, if that, of Lomariopsis.*)

110. A. (*Stenochlæna*) *scandens*, *J. Sm.*; caudex very long scandent thicker than a swan’s quill furrowed scaleless but rooting with short tufted radiating fibres from the angles, stipites 4–5 inches long stout, fronds distant 1–2–3 feet and more long ovato-lanceolate firm-coriaceous glossy pinnated; *sterile* pinnæ 3–9 inches long 1–1½ inch broad lanceolate acuminate rarely subfalcate and obliquely cuneate at the base petioled, the petiole articulated upon the rachis, the margin thickened entire or more frequently spinuloso-serrate, veins very close elevated extending to and united with the thickened margin; *fertile* fronds 6 inches sometimes 1 foot long 1½–2 lines wide petioled linear acuminate; sometimes the lower half of the frond is sterile and the upper half fertile.—*Stenochlæna scandens*, *J. Sm. in Hook. Journ. Bot.* iv. p. 149. *Hook. Gen. Fil.* t. 105. *B. Fée, Gen. Fil.* p. 77. *Moore. Onoclea, Sw. Syn. Fil.* pp. 112 and 309. *Lomaria*, *Willd. Sp. Pl.* p. 293. *L. limonifolia*, *Wall. Cat. n. 30.* *Stenochl. Blumeana*, *Pr. Epim. Bot.* p. 163. *S. fraxinifolia*,

*Pr. Epim. Bot.* p. 164. Filix fronde pinnata, etc., *Linn. Zeyl.* n. 425. *Burm. Zeyl.* p. 100. t. 46. *Rumph. Amb.* vi. p. 71. t. 31.—*Abnormal forms*: *Scolopendrium D'Urvillei*, *Bory*, in *Duperrey, Voy. Coq. Bot.* p. 273. t. 37. f. 1 (*very bad*). *Kze. in Schk. Fil. Suppl.* p. 9. t. 5. *Davallia achillæifolia*, *Wall. Cat.* n. 248. *Hook. Sp. Fil.* i. p. 195. t. 56. D.

Hab. East India, Java, Ceylon, Malabar, Cochin, Madras Peninsula, Bengal, Assam, Sikkim, Silhet, Chittagong, *Parish*, n. 146, *Griffith*, *Hooker fil. and Thomson*, Singapore, *Wallich*, *Schomburgk*, *Sir W. Norris*. China, *Beechey*. Siam, *Schomburgk*. Luzon, *Cuming*, n. 133, 229, and Isle of Negros, n. 347. Fiji Islands, *Brackenridge*, *Seemann*.—This fine *Acrostichum* is liable to produce the same peculiar abnormal forms described under *A. sorbifolium*, thus showing a strong generic identity.

111. A. (*Stenochlæna*) *Meyerianum*, *Hook.*; caudex very long stout partially and imperfectly scaly scandent rooting parasitically on trees, stipites distant a foot or more long stout firm and glossy, fronds dimorphous large 2–3 feet long; *sterile* ones pinnated firm pergamentaceous (rather than coriaceous) glossy, pinnæ from a span to a foot and more long  $\frac{3}{4}$ – $1\frac{1}{2}$  inch wide oblong-lanceolate often very finely acuminate obliquely cuneate at the base, base of the petiole confluent (not articulated) bearing a gland, the margin thickened spinuloso-serrate, veins very close compound extending to and uniting with the thickened margin; *fertile* fronds ample *bipinnate* with a gland at the axil of the primary pinnæ, pinnules very numerous 2–3 inches long narrow-linear sessile or nearly so entirely soriferous beneath except at the narrow but scarcely involucriform margin.—*Hook. Gard. Ferns*, t. 16. *Stenochlæna*, *Pr. Epim. Bot.* *Lomaria*, *Kze.* *Lomariobotrys*, *Fée*, *Gen. Fil.* p. 45. *Lomaria secunda*, *Wall. Cat.* n. 34. *L. longifolia*, *Wall. Cat.* n. 61. *L. tenuifolia*, “*Desv.*” and *Boj. Hort. Maurit.* p. 407, and *L. grandis*?, p. 407.

Hab. South Africa, Natal, *Drège*, *Guienzius*. Mauritius, *Wallich*. East coast of tropical Africa, *Bojer*. Madagascar, *Meller*. Isle of Nissobé, *Boivin*.—Well distinguished by its ample *bipinnate* fertile fronds, with most copious pendent pinnules.

112. A. (*Stenochlæna*) *laurifolium*, *Hook.*; caudex?, stipes?, fronds firm thin-coriaceous subnitent  $1\frac{1}{2}$ –2 feet and probably more long pinnate; *sterile* pinnæ approximate subpetiolate not jointed on the rachis and not glandular on the petiole 6–8 inches long  $1\frac{1}{2}$ – $1\frac{3}{4}$  inch wide oblong acuminate truncated and broad at the base or very obtusely and obliquely

cuneate thickened at the margin and there serrato-spinose, the spinules appressed, veins prominent compact extending to the thickened margin; *fertile* pinnæ numerous but more apart 10–12 inches long  $\frac{1}{4}$ – $\frac{1}{2}$  an inch wide broad-linear acuminate.—*Stenochlæna*, *Pr. Epim. Bot. p.* 164. *S. scandens*,  $\beta$ , *J. Sm. in Hook. Journ. Bot.* iii. *p.* 401.

Hab. Luzon, *Cuming, n.* 226. Solomon's Group, Pacific Islands, *Mibe, n.* 518.—I cannot but agree with Presl in considering this a species quite distinct from *Stenochl. scandens*, to which Smith refers it; for besides the broader pinnæ, especially of the fertile fronds, the short petioles are confluent with the rachis, there is no trace of an articulation there, and no trace of glands.

§ 5. EGENOLFIA.—*Fronds dimorphous, pinnated, Pinnæ articulated on the rachis. Veins free, bi-trifurcate, the superior veinlet terminating in a seta in the sinus of the teeth or lobes of the margin.*—*Gen. Egenolfia, Schott.*

113. A. (*Egenolfia*) *appendiculatum*, Willd.; caudex creeping, stipites 4–6 inches to a foot long in the fertile frond, more or less scaly as is the rachis; *sterile* fronds subcoriaceous-membranaceous a span to  $1\frac{1}{2}$  foot long oblong acuminate pinnate, pinnæ 1– $2\frac{1}{2}$  inches long 4–6 lines wide oblong obtuse crenato- or lobato-pinnatifid truncato-auriculate at the base above, rachis winged, veins fascicled 2–3 times forked, superior veinlet terminating in a marginal seta between the lobes or crenatures; *fertile* frond more or less contracted, pinnæ much smaller 4 lines to  $1\frac{1}{2}$  inch long oblong very obtuse cordate at the base, rarely subauriculate, entire or sublobato-pinnatifid, or very slender and moniliformly pinnate.—*Willd. Sp. Pl. v. p.* 114. *Hook. Exot. Fl. ii. t.* 108. *Gymnogramme, Klfs. Acrost. Hamiltonianum, Wall. Cat. n.* 29. *Egenolfia, Schott. Gen. Fil. cum Ic. Polybotrya marginata, Bl. Fil. Jav. p.* 18. *t.* 3. *P. intermedia, J. Sm. in Hook. Journ. Bot.* iii. *p.* 401. *Fée, Acrost. p.* 76. *t.* 40. *f.* 1 (*young sterile pinnæ scarcely crenate, setæ very prominent*). *Acrost., Bory, in Belang. Voy. Bot. p.* 23. *t.* 3. *A. viviparum, Wall. Cat. n.* 28 (*variat pinnis fertilibus omnibus vel quibusdam tantum moniliformibus, Wall.*). *Hook. Exot. Fil. t.* 107 (*fertile pinnæ moniliform*). *Polybotrya nodiflora, Bory, in Belang. Voy. Bot. p.* 17. *Fée, Acrost. p.* 77. *t.* 38. *f.* 2. *P. rhizophylla, Pr. Acrost. setosum, Wall. Cat. n.* 30. *Polyb. serrulata, J. Sm. in Hook. Journ. Bot.* iii. *p.* 401? (*Luzon, Cuming, n.* 269, of which I appear to have no specimen). *P. neglecta, Fée, Acrost. p.* 76. *t.* 39. *f.* 2 (*a common form of P. appendiculata, and mixed with P. serrulata, J. Sm.*). *La-caussadea montana, appendiculata, and rhizophylla, Gaudich,*

*Voy. de la Bonite, Bot. t. 118, 119, and 110 (no descr.).*—Var. *costulata*; larger, sterile pinnæ deeply pinnatifid  $\frac{1}{2}$ – $\frac{3}{4}$  of the way to the rachis, costulate with simple patent veins sometimes bipinnate at the base.

Hab. Continental India, in the hilly countries almost universal: Bengal, Madras, Peninsula of India, Himalaya, etc. Moulmeine, *Parish, n. 69* (fertile pinnæ entire and moniliform mixed, and with sterile pinnæ entire and lobato-pinnatifid). Ceylon, *Gardner*. Malay Peninsula and Islands.—Var. *costulata*. Khasya, *Griffith, Hooker fl. and Thomson (sterile fronds 6 inches long and  $1\frac{1}{4}$  inch broad, fertile fronds entire or lobed and moniliform)*. Moulmeine, *Parish, n. 60* (one specimen 2 feet long; the lowest pair of pinnæ 7 inches long, half-deltoid, bipinnate at the base; pinnules  $1\frac{1}{2}$ – $3\frac{1}{2}$  inches long, deeply pinnatifid like the primary pinnæ; fertile pinnæ also with the lower pair in like manner pinnated as in the sterile fronds).—I feel confident, from an examination of almost innumerable specimens from all parts of India, that the eight species included in M. Fée's section *Egenolfia* of *Polybotrya* are mere forms of one and the same. A still more remarkable form than any of those, I have added to the number as var. *costulata*; especially that state, found by Mr. Parish, distinguished not only by the deeply pinnatifid pinnæ, but by the lowest pair, both in the sterile and fertile fronds, being again pinnate. The Khasya specimens, however, exhibit quite intermediate forms.

§ 6. RHIPIDOPTERIS.—*Fronds small, singularly dimorphous, subflabellately lobed or deeply dichotomous with narrow segments; less deeply divided in the fertile ones. Veins (or costæ) free, flabellately or radiately divided.*—*Gen.* Rhipidopteris, *Schott.* Peltapteris, *Link.*

114. A. (Rhipidopteris) *peltatum*, Sw.; caudex very long-creeping slender scaly, stipites 1–2 rarely 3 inches long paleaceous; sterile fronds 1– $1\frac{1}{2}$  inch long flabelliform repeatedly dichotomously divided, the segments erecto-patent narrow-linear  $\frac{1}{3}$  of a line wide evidently costate, bifid or entire at the always obtuse apex; fertile fronds about 4 lines long subpeltate orbicular-reniform often emarginate or bilobed, the whole under side soriferous except the subpellucid crenated margin.—*Sw. Syn. Fil. p. 11. Schk. Fil. t. 12. Willd. Sp. Pl. v. p. 110. Rhipidopteris, Fée, Gen. Fil. Acrost. p. 78 (excl. the syn. of Acrost. fœniculaceum, Hook. and Grev.). Peltapteris, Link. Olfersia, Pr. Osmunda, Sw. Prodr. Plum. Fil. t. 50. f. A.*

Hab. Tropical South America, abundant, and West Indian Islands, Mexico, Columbia, Guiana, Brazil, Peru, and Ecuador.—A beautiful and most easily recognized species. Some of the fertile fronds have the sori very much confined to the veins.

115. A. (Rhipidopteris) *flabellatum*, H. B. K.; caudex long-creeping filiform sparsely paleaceous, stipites 1–3 inches long scarcely scaly; sterile fronds  $\frac{1}{2}$  an inch long cuneate

and undivided or flabellate or reniform rarely bipartite or tripartite with the segments cuneate bi-trifid, the upper margin dentato-crenate, veins dichotomous; *fertile* fronds small rarely more than 3 lines long orbicular or subreniform rarely obscurely 3-lobed, the whole under side soriferous except the narrow waved thin subdiaphanous margin.—*Humb. and Bonpl. Nov. Gen. Am. i. p. 27. t. 662. Willd. Sp. Pl. v. p. 110. Hook. Ic. Pl. t. 96.* Rhipidopteris, *Fée, Acrost. p. 78.* R. sphænophylla, *Fée, Acrost. p. 79.* Acrostichum, *Kze. Analect. Pterid. p. 11. t. 7.* A. flabellatum,  $\beta$ , sphænophyllum, *Kze. in Linnaea, ix. p. 32.* Acrostichum tripartitum, *Hook. and Grev. Ic. Fil. t. 118 (I fear only a more deeply divided form of fertile fronds of this species).* Rhipidopteris, *Fée, Acrost. p. 79.*

Hab. Tropical South America, but never, as far as I know, extending to the West Indian Islands. Peru, *Poeppig, Mathews, n. 1801, Spruce, n. 4635.* Ecuador, *Jameson, n. 1719* (and the form *tripartita*), *n. 5227* ("facies *Peperomie* ejusdam"). New Granada, *Moritz, n. 313, Purdie, Fendler, n. 263.*—Mr. Spruce likens this pretty Fern to some *Peperomia*. In a dried state in the herbarium the first sight reminds one of some *Marsilea*. The sterile fronds are variable, and of the *tripartite* form there is a disposition in the lobes to become dichotomous.

116. A. (Rhipidopteris) *feniculaceum*, Hook.; caudex long-creeping filiform paleaceous, stipites slender paleaceous  $1\frac{1}{2}$ –3 inches long; *sterile* fronds 1 inch long broad flabelliform in circumscription copiously and repeatedly divaricato-dichotomous, segments very numerous linear-setaceous scarcely thicker than a line drawn with a pen, ultimate segments always dichotomous and the apices always acute ecostate or in other words reduced to the costa; *fertile* fronds from  $\frac{1}{3}$ – $\frac{1}{2}$  an inch long reniform bilobed, under side all soriferous except the rather broad irregularly but sharply toothed diaphanous margin.—*Hook. and Grev. Ic. Fil. t. 119.*

Hab. Ecuador: forest of Esmeraldas, alt. 2500 feet, on trunks of trees, *Jameson*: foot of Chimborazo, alt. 3000 feet, on stones, *Spruce, n. 5226.*—M. Fée considers this identical with *A. pellatum*; but no one who has seen the plant or Dr. Greville's excellent figure in the 'Icones Filicum' is likely to do so. The ramification of the most finely cut frond is quite different, *divaricately* dichotomous, and the segments as slender as the finest thread, exhibiting no trace of costa, which is so conspicuous in the preceding species; or in other words, the segments are reduced to costæ. It is, I believe, very rare, only as yet found in Ecuador and in the vicinity of Chimborazo; firstly, more than thirty years ago, by Professor Jameson, and recently, viz. in 1860, by Mr. Spruce. The sterile fronds resemble some dichotomous capillaceous seaweed.

§ 7. OLFERSIA. — *Fronde dimorphous, simple or pinnate. Veins simple or forked, connivent within the margin, so as to form there a longitudinal, straight, or zigzag vein, sometimes producing short excurrent veinlets.*—*Gen.* Olfersia, *Raddi.* *Aconiopteris, Pr.*—(Not a very natural group, but easily recognized by the venation.)

\* *Fronde ample, pinnate or bipinnate.*—*Euolfersia.*

117. A. (*Olfersia*) *cervinum*, Sw.; caudex short thick creeping densely clothed with long narrow brown subulate membranaceous scales, stipites approximate a span or more long stout scaly at the base, fronds coriaceous-membranaceous 3–5 feet long; *sterile* ones pinnated (when young quite simple) on long slender stipites, pinnæ numerous 4–5–9–10 inches long 1–2 inches and more wide ovate or lanceolate acuminate, the lateral ones very unequal-sided at the base, the inferior base excised, the margin entire or a little serrated at the apex, veins numerous compact prominent usually forked or fascicled extending to and uniting with an intramarginal vein; *fertile* fronds often equal in length to the sterile ones simple and linear or bipinnatifid or bipinnate, primary pinnæ as long as the sterile ones linear-lanceolate acuminate, pinnules  $\frac{1}{2}$ – $\frac{3}{4}$  of an inch long obtuse terete or slightly compressed covered (apparently) all over to the very apex with capsules.—*Sw. Syn. Fil. pp.* 14 and 200. *Willd. Sp. Pl. v. p.* 120. *Olfersia, Kze. Bot. Zeit.* 1842. i. p. 312. *Hook. and Grev. Ic. Fil. t.* 81. *Hook. Fil. Exot. t.* 43. *Polybotrya, Klfs.* *Osmunda, Linn. Sp. Pl. p.* 1521. *Dorcapteris, Pr.*—*Var. β*; fertile fronds pinnate. *Olfersia Corcovadensis, Raddi, Fil. Bras. p. 7. t.* 14. *Pr. Polybotrya, Spreng. P. Raddiana, Klfs.* *Acrostichum linearifolium, Pr.—Plum. Fil. t.* 154.

*Hab.* Tropical America, frequent.—Some of C. Wright's specimens from Cuba present a remarkable form with sterile pinnæ deeply pectinato-pinnatifid, some of the segments having sori at their apices. Another plant from New Granada has the upper half of the sterile pinnæ suddenly contracted and caudate, and partially soriferous.

\*\* *Fronde simple.*—*Aconiopteris.*

118. A. (*Olfersia*) *gorgoneum*, Klfs.; caudex a thick woody knotted subdecumbent rhizome paleaceous at the summit, stipites aggregated from the apex of the rootstock 3–5 inches long twice as long of the fertile fronds, a little paleaceous at the base, fronds coriaceous or subcoriaceous, *sterile* 6–12–14 inches long  $2\frac{1}{2}$ –3 inches wide above the middle obovato-spathulate rather suddenly acuminate long attenuated at

the base and decurrent entire at the margin, veins subhorizontal slender evident on the under side, simple or forked rarely here and there anastomosing all of them connivent at the extremity and there forming an intramarginal vein; *fertile* fronds much narrower 1-1½ foot long 1-1½ inch wide near the middle, lanceolate very much attenuated at the base and long decurrent soriferous except at the edge beyond the intramarginal vein.—*Klfs. En. Fil. p. 63 (not Bl.). Brack. Fil. U. S. Expl. Exp. p. 74. Olfersia, Pr. Aconiopteris obtusa, Fée, Acrost. p. 80. t. 40. f. 2 (small specimens).*

Hab. Sandwich Islands, *Chamisso, Douglas, n. 43, Brackenridge, Hillebrand, n. 54. Society Islands, Bidwill (fertile only, 2 inches broad, more membranaceous, and less decurrent at the base).*

What is the *A. Vieillardii*, Metten. Fil. Nov. Caled. p. 1, of which he says, "Inter species, nervis arcu intramarginali præditis, generi *Aconiopteridi*, Pr. (Fée), adscriptas, cum nulla nisi *Aconiopt. obtusa*, Fée, Acrost. p. 80. t. 40. f. 2, comparandum; in hac autem arcus nervorum manifestus et margini approximatus, non immersus et remotus a margine attenuato"?

119. A. (*Olfersia*) *longifolium*, Jacq. ? ; caudex elongated thick as a man's thumb apparently attached to the trunks of trees rough below with the persistent bases of old stipites paleaceous upwards and bearing the new stipites which are 4-5 inches long stramineous (as well as the costa) twice as long as the fertile fronds, fronds thin membranaceous; *sterile* ones 2-2½ feet long 2½ inches broad near the middle, lanceolate sharply acuminate long and gradually decurrenti-attenuate at the base, veins nearly horizontal slender simple or forked all connected at the extremity with a nearly straight marginal vein; *fertile* fronds smaller and much narrower soriferous (except on the costa) to the very margin.—*A. longifolium, Jacq. Coll. ii. p. 105? Sw. Syn. Fil. p. 9? Willd. Sp. Pl. v. p. 105? Eut. in Fil. Wright. et Fendl. p. 195. Aconiopteris, Fée. Acrost. p. 80. t. 41. Olfersia, Pr. Moore.*

Hab. West India Islands. Venezuela, *Fendler, n. 283, 284. Merida, Moritz, n. 324, in part.*—M. Fée has shown how impossible it is clearly to ascertain what is the true *Acrost. longifolium*, Jacq., and consequently of Swartz and Willdenow. The present species is well defined by the evident marginal vein, to which the transverse veins are united by their apices, hence an *Aconiopteris* of Presl.

120. A. (*Olfersia*) *subdiaphanum*, Hook. and Grev. ; caudex thick ascending or suberect and very paleaceous as well as the stipites and back of the costa with ferruginous squarrose ovato-lanceolate scales, stipites terminal tufted 2-6 inches long, those of the *fertile* fronds twice as long flexuose,

fronds firm carnosio-coriaceous subdiaphanous; *fertile* ones 3-6-8 inches long  $\frac{3}{4}$ -2 inches wide oblongo-lanceolate obtuse moderately attenuated at the base above partially squamulose minutely punctulato-glandulose beneath, veins subhorizontal singularly prominent beneath, connivent at a sharp angle a little within the margin so as to form a zigzag submarginal vein often prolonged by a single veinlet from their union to the very margin; *fertile* fronds smaller and narrower.—*Hook. and Grev. Ic. Fil. t. 105.* Aconiopteris, *Pr. Tent. Pterid. p. 236. t. 10. f. 17.* *Fée, Acrost. p. 79.* *Olfersia, Moore.*

Hab. St. Helena, on trunks of trees, summit of Diana's Peak, *Walker, Dallas, J. D. Hooker, Nuttall, etc.*—This very distinct species of *Acrostichum* was supposed to have been detected in the Madras Peninsula, but it is now ascertained that specimens received from that country were gathered at St. Helena.

121. A. (*Olfersia*) *Richardi*, Bory; “*sterile* fronds linear acute at each extremity sometimes rather obtuse coriaceous beneath clothed with small caducous scales; *fertile* fronds linear very narrow stipitate longer and scaly in both canaliculate, caudex creeping as thick as a goose-quill.”—Aconiopteris, *Fée, Acrost. p. 80.*

Hab. Bourbon, *Bory.*—“Cetle espèce manque des caractères tranchés, mais la soudure des nervilles près de la marge la faisant entrer dans le sous-genre *Aconiopteris*, il sera facile de la reconnaître.” *Fée.*

§ 8. SOROMANES.—*Fronds ample, dimorphous, pinnated, pinnatifid at the apex; fertile ones more compound. Veins slender, forked, and connivent at an acute angle, so as to form oblique, elongated areoles, destitute of free veinlets.—Gen. Soromanes, Fée. (Venation of Cycloidium among Aspidieæ, and, like that, not unfrequently free.)*

122. A. (*Soromanes*) *Cænopteris*, Kze. Herb.; caudex long stout partially densely radican with coarse wiry fibres very paleaceous with large subulate soft ferruginous denticulated scales, stipites 1-1½ foot long paleaceous below, fronds dimorphous subcoriaceous; *sterile* ones 1½-2 feet and more long ovato-lanceolate pinnate pinnatifid at the apex 5-7 inches long ovato-lanceolate or lanceolate acuminate obtusely and obliquely subcuneate at the base, lower ones subpetiolate often serrated towards the apex; *fertile* fronds narrower bipinnately tripinnate, pinnules ½ an inch long oblong sessile very obtuse, rachises winged.—*Polybotrya serrata, Bory, in Herb. Galeotti (Fée).* *Soromanes serratifolium, Fée, Acrost. p. 82, very good (S. dentatum on the plate, not Acrost. serratifol., Mert. in Klfs. En.). S. integrifolium, Fée, l. c. t. 42, fertile*



frond only, the sterile one is that of *Aspidium* (*Cyclodium*) *meniscioides*, Willd.). *Polybotrya serratifolia*, Kl. *Eat. in Fil. Wright. et Fendl.*—Var. *salicifolium*; leaves narrow-lanceolate subentire, veins nearly all free.

Hab. Mexico, Galeotti, in *Herb.* (Fée; not elsewhere recorded, that I know of, as a native of that country). Venezuela, Funck, n. 186, Fendler, n. 261 (accompanied by a sterile specimen with deeply pinnatifid pinnae; below, the fronds are almost bipinnate, passing, as it were, into a fertile frond), Moritz, n. 277 (“*Polybot. Ceanopteris*, Kze.?” pinnae coarsely serrato-dentate, ultimate veinlets often connivent at their apices, so as to form an intramarginal vein, as in *Offerisia*).—Var.  $\beta$ . Serra de Araripe, Brazil, Gardner.—M. Fée has been singularly unfortunate in the names he applied to this solitary species of his genus *Soromanes*, and in the fact, which he candidly acknowledges, of the sterile frond (*Acrost.* t. 42) being taken from a specimen of quite another Fern, but having similar venation.

§ 9. STENOSEMIA.—Fronds triangular, dimorphous, ternate or ternate-pinnate. Veins anastomosing so as to form large costal and costular areoles without free veinlets, the rest of the veins mostly free. The fertile fronds very much contracted, 3-pinnate; the segments linear.—Gen. *Stenosemia*, J. Sm.

123. A. (*Stenosemia*) *auritum*, Sw.; caudex short stout woody erect at the summit palaceous with dark-brown rather rigid linear subulate scales which are continued some way up the stipes, stipites tufted 5–12 inches long nearly twice as long of the fertile frond; sterile fronds firm-membranaceous 9–12 inches long nearly as much wide deltoid ternate often bulbiferous in the axils, terminal primary divisions broad-ovate-deltoid acuminate pinnatifid cuneate at the base or the lower half pinnate with the pinnae pinnatifid, lowest or lateral primary divisions half-ovate long acuminate pinnatifid, lowest inferior segments much the longest and lobate-pinnatifid, veins anastomosing into large costal and costular areoles, the rest mostly free; fertile fronds of the same form (deltoid) very much contracted bi-tripinnatifid, the segments all linear.—Sw. *Syn. Fil.* pp. 13 and 198. Willd. *Sp. Pl.* v. p. 112. Hook. *Gard. Ferns*, t. 81. *Stenosemia aurita*, Pr. *Tent. Pterid.* p. 237. t. 10. f. 24 (not J. Sm., or only in part). Fée, *Acrost.* p. 82. *Polybotrya*, Bl. *Fil. Jav.* p. 15. t. 1. Rumph. *Ambouy.* vi. p. 78. t. 35. f. 1.

Hab. Java, Blume, Thos. Lobb, Zollinger, n. 427. Isle of Samar, Cuming, n. 341 (a more compound form).—Well figured by Blume and in Hook. *Exot. Ferns*.

124. A. (*Stenosemia*) *cicutaria*, Hook.; “fronds long stipitate ternate fulvo-villous on the veins beneath, segments linear acuminate entire, superior ones obtuse, lateral inferior

ones elongato-lanceolate pinnatifid, stipes paleaceous." *Fée*.—*Stenosemia*, *Pr. Tent. Pterid. p.* 237. *Fée, Acrost. p.* 83. *Polybotrya*, *Bl. Fil. Jav. p.* 17. *t.* 11.

Hab. Java, *Blume*.—This is only known in a sterile state, but the general habit has considerable resemblance to that of *St. aurita*. The segments are much narrower and the costæ are more conspicuous.

§ 10. HETERONEURON.—*Fronde generally ample, dimorphous, pinnate, often viviparous. "Veins pinnate, from a central costa arcuately, angularly, or irregularly anastomosing, areoles sometimes producing exterior free or irregularly anastomosing veinlets."*—*Gen. Heteroneuron, Fée. Campium and Pæcilopteris, Eschw. and Pr., in part. Pæcilopteris, Moore. Cyrtogonium, J. Sm. Bolbitis, Schott. Jenkinsia, Hook. Gen. Fil. Tab. LXXV. B (sori abnormal).*

For this section I prefer *Fée's* name of *Heteroneuron* as indicative of the varied nature of the veining, and as sufficiently shown in the only two kinds represented by *Moore* (*Ind. Fil. pl. 7*) under *Pæcilopteris*. The species he includes best correspond with my views of the group, but the characters are most unsatisfactory.

125. A. (Heteroneuron) *punctulatum*, Linn.; caudex less thick than a goose-quill creeping, stipites a span to a foot long  $1\frac{1}{2}$  of the fertile frond, fronds membranaceous pinnated, pinnæ 3–11–12, 2–3 of the uppermost ones coadunate at the base; *sterile* pinnæ 4–9 inches long  $1-1\frac{1}{2}$  inch wide ovate or oblong acuminate often broader upwards more or less attenuate and subpetiolate at the base entire at the margin or serrate only at the apex, superior ones decurrent at the base, lowest ones sometimes unequally bipartite, venation manifest, costules present but obscure, veins subequally anastomosing and forming angled areoles of which the largest and most oblong are next the costa and costules, rarely including a short solitary free veinlet; *fertile* pinnæ much smaller and oblong, superior ones very obtuse.—*Linn. Suppl. p.* 441. *Sw. Syn. Fil. p.* 13. *Willd. Sp. Pl. v. p.* 118. *Pæcilopteris, Pr. Cyrtogonium, J. Sm. Heteroneuron, Fée, Acrost. p.* 92. *t.* 54 (*very good*). *Acrost. auriculatum, Lam. A. Finlaysonianum, Wall. Cat. n.* 2162.

Hab. Bourbon and Mauritius, *Commerson and others, Sieber, Syn. Fil. n.* 24. East tropical Africa: Johanna Islands, *Dr. Kirk*. West tropical Africa: Fernando Po and Prince's Island, *Barter, Mann*; and on the mainland south of the equator, *Curror*.—*Linnaeus*, and *Swartz* and *Willdenow*, following him, describe the upper surface of the frond as *punctated* (whence the specific name). *Fée* says the fertile fronds alone are punctated beneath. I find no punctuations on my numerous specimens in one or the other case.

126. A. (Heteroneuron) *flagelliferum*, Wall.; caudex creeping paleaceous thick as a goose-quill, stipites a span to a foot and more long (longer of the fertile frond) scaly at the base.

fronds firm-membranaceous a span to 1-2 feet long pinnate, pinnae commonly 3-5 rarely more; *sterile* pinnae 3-5 inches long  $1\frac{1}{2}$ -2 inches wide subelliptical or oblongo-lanceolate, lateral ones rather suddenly acuminate entire or sinuato-crenate subcuneate at the base and petiolate, terminal one similar to these but larger and more petiolate or more generally very much elongate and caudate a foot or  $1\frac{1}{2}$ -2 feet long! rooting and proliferous at the apex, venation manifest, costules rather wide apart, veins anastomosing always forming a series of oblong large areoles close to the costa and costules, nearly uniform in size and shape, the rest of the areoles very irregular and with or without free included simple veinlets; *fertile* pinnae much smaller 2-3 inches long oblong obtuse; occasionally the cauda of the terminal *sterile* pinnae becomes fertile and the lateral *sterile* pinnae partially soriferous, the capsules in that case chiefly confined to the costules and near to the margin.—*Wall. Cat. n. 25. Hook. and Grex. Ic. Fil. t. 23. Bl. Fil. Jav. p. 104. t. 13. Cyrtogonium, J. Sm. A. heteroclitum, Pr. Pœcilopteris, Pr. Heteroneuron, Fée, Acrost. p. 92. Acrostichum diversifolium, Bl. Fil. Jav. p. 36. t. 12? (sterile frond simple!). Cyrtogonium, J. Sm. Heteroneuron, Fée, Acrost. p. 91 (excl. syn. Gymnopteris trilobata, J. Sm.). Pœcilopteris, Pr. Rheede, Hort. Malab. xii. t. 11.*

Hab. East Indies: Malabar, *Rheede*; Nepal and thence through the eastern provinces generally, *Wallich, Griffith*; Chittagong, etc., *Hooker fil. and Thomson*; Moulmeine, *Parish, n. 20. Java, Blume, in Herb. nostr., Zollinger, n. 884. Luzon, Cuming, n. 5 and 32.*—A very polymorphous species, it must be confessed, well represented by Blume and in the *Ic. Fil.* by Dr. Greville; but it is to be regretted that neither represents the peculiarity of the venation. The species is remarkable for the generally small number and large size of the pinnae.

127. A. (Heteroneuron) *Quoyanum*, Gaud.; caudex (creeping?), stipites about a span long, more of the *sterile* frond, pubescent and as well as the rachis partially subulato-squamose; *sterile* fronds 8-10 inches long firm-membranaceous pinnate, pinnae petiolate 3-4 inches long  $1-1\frac{1}{2}$  inch wide pubescenti-hirsute on the costae and costules beneath, from a truncated base broad-lanceolate deeply beyond the middle pinnatifid, lowest pair dilated at the inferior margin (semi-ovate and more deeply pinnatifid), the apex of the frond on the ultimate pinna also deeply pinnatifid at the base, segments oblong-ovate subfalcate entire or sinuato-dentate rarely (the longest of them) subpinnatifid, and the sinuses and

margin more or less spinuloso-setiferous, venation manifest, costules remote, veins anastomosing and forming two series of costal areoles and one rarely two series of costular ones, no included free veinlets, veinlets next the margin free; *fertile* fronds oblong, pinnæ very much contracted oblongo-lanceolate pinnatifid.—*Gaud. Voy. de l'Uranie*, p. 307. t. 3. Heteroneuron, *Fée, Acrost.* p. 96. Pœcilopteris, *Moore. Pr.* *Cyrtogonium laciniatum*, *J. Sm. (name only)*. Heteroneuron *argutum*, *Fée, Acrost.* p. 96. t. 25. f. 2 (*apparently a young and very imperfect state of this species*).

Hab. Moluccas, *Gaudichaud*. Island of Leyte, *Cuming*, n. 294, 237, and 261 (very young and imperfect).—Allied to *A. repandum*, Bl., but, I think, very distinct. *Heteron. argutum* of *Fée*, if not a very young state of this plant, is too imperfectly known to justify its being made a species.

128. A. (Heteroneuron) *repandum*, Bl.; caudex creeping, stipites a span to a foot and more long generally longer of the *sterile* fronds, fronds 1–2 feet long; *sterile* ones firm-membranaceous ovato-oblong acuminate pinnate, pinnæ 4–6 inches long  $\frac{1}{2}$ –1 inch broad more or less petiolate lanceolate or oblongo-lanceolate pinnatifid generally halfway down to the costa with ovato-rotundate subfalcate lobes having rather broad sinuses serrated at the margin and generally bearing one or more rarely two spinulose subulate setæ in the sinuses similar to what are seen in those of *Egenolfia*, terminal pinna the longest more deeply pinnatifid with longer segments and often prolonged, caudato-attenuate to the length of a foot and proliferous towards the apex, venation manifest, costules remote connected near the base by a transverse arched vein forming a series of elongated costal areoles, other veins form two or three smaller and more square-shaped costular areoles, the rest being free, free included veinlets none; *fertile* fronds oblong, the pinnæ much smaller and contracted coarsely crenato-pinnatifid.—*Bl. Fil. Jav.* p. 39. t. 14 and 15 (*and A. proliferum*, *En. Fil. Jav.* p. 104). *Cyrtogonium*, *J. Sm.* Pœcilopteris, *Pr. Moore.* Heteroneuron, *Fée, Acrost.* p. 96. t. 58 (*sterile pinnæ scarcely pinnatifid*). *Cyrtogonium sinuosum*, *J. Sm. (name only)*. Heteroneuron, *Fée, Acrost.* p. 95. t. 55. f. 2. Pœcilopteris *sinuosa* and *cuspidata*, *Moore.* *Acrost. loncophorum*, *Kze. in Schk. Fil. Suppl.* p. 5. t. 2 (*very good, but venation inaccurate*). Heteroneuron, *Fée, Acrost.* p. 94. Pœcilopteris, *Moore.* *Cyrtogonium palustre*, *Brack. Fil. U. S. Expl. Exp.* p. 86. t. 12 (*very good, particularly the venation*).

Hab. Java, *Blume, in Herb. nostr.* Luzon, *Cuming, n. 152, 104, and 105.* Isle of Bonin (*Imp. Acad. Pterop. n. 54*). China: Foochowfoo, *Alexander: Hongkong, Urquhart* (pinnae firmer, more coriaceous, setae of the sinuses deciduous). Formosa, *Wilford, n. 478* (sterile pinnae sinuato-lobate, areoles occasionally including a free veinlet). Society Islands, *Cuming, n. 1416.* Anéiteum, *Milne*.—The pinnatifid sterile pinnae and the presence of soft subulate setae in the sinuses of the segments are chiefly the characteristics of this plant, which in other respects has great affinity with some of the forms of *A. virens*.

129. *A. (Heteroneuron) virens*, Wall.; caudex creeping paleaceous, stipites a foot or more long  $1\frac{1}{2}$  of the fertile fronds scaly at the base, fronds subcoriaceous-membranaceous often bright pale-green when dry, pinnated; sterile frond a span to  $1\frac{1}{2}$  foot and more long ovato-oblong, pinnae very variable in size and shape from 3–8–9 inches long oblongo-lanceolate acuminate lobato-pinnatifid or coarsely serrated at the margin, terminal one not unfrequently prolonged and caudato-acuminate or sometimes an elongated apex of the frond has numerous much contracted suborbicular pinnae coadunate at the very extremity generally proliferous and rooting, venation manifest but very variable, costules nearly horizontal connected by transverse curved but angled veins forming one or two large arched areoles from which are emitted solitary or two to three free veins, or two combine and form an interior areole with or without a free included veinlet, towards the margin the veins form a more uniform reticulation; fertile fronds with the pinnae much contracted very variable in length 2–6 inches long linear or linear-oblong entire or subsinuato-pinnatifid obtuse.—*Wall. Cat. n. 1033. Hook. and Grev. Ic. Fil. t. 221* (excellent, especially for what may perhaps be considered the normal and most compound state of the venation). *Campium, Pr. Cyrtogonium, J. Sm. Bolbitis, Schott. Pæcilopteris, Moore. Heteroneuron, Fée. Acrost. subcrenatum (a small state), Hook. and Grev. Ic. Fil. t. 110. A. proliferum (larger and proliferous), Hook. Ic. Plant. t. 681 and 682. Campium, Pr. Pæcilopteris Hookeriana, Moore. Heteroneuron, Fée, Acrost. p. 95. t. 55. Polybotrya, Bory, in Belung. Voy. Bot. p. 18. Hook. 2d Cent. of Feras, t. 88. A. terminans, Wall. Cat. n. 2168. Bolbitis, Schott. A. contaminans, Wall. Cat. n. 22. Pæcilopteris, Moore.*—Var.? *crispatum*; pinnae narrow-lanceolate especially the fertile ones, sinuate or sublobato-pinnatifid, veins generally forming only one costal series of large areoles, the rest free rarely again anastomosing. *A. Crispatum, Wall. Cat. n. 204. Pæcilopteris, Moore. Campium, Pr. Cyrtogonium, J. Sm.*

Hab. India, probably throughout the hilly parts: Nilghiri, *Beddome*; Kumaon to Sikkim and Boutan, Khasya, etc., *Wallich*, *Griffith*, *Hooker fil. and Thomson*; Ceylon, *Gardner*, n. 1161, Moulmeine, n. 63, *Mr. O'Riley* (*Parish*, n. 63, sterile pinnæ 8 inches, fertile 9 inches long, narrow-linear, sinuato-pinnatifid).—The broad form which I had published as *A. proliferum* has generally the opposite veins of the costules meeting at an angle or forming two angles, bearing one or two included free veinlets, and seems to be found in the hotter parts of India: Ceylon, *Gardner*, n. 1313 (with *sterile* pinnæ almost coriaceous, 7–8 inches long, more than 2 inches wide, very opaque; *fertile* pinnæ also in proportion large and broad, the united veins forming a very acute angle and bearing a solitary free veinlet throughout; probably a distinct species); Nilghiri, *Beddome*, n. 9 (fertile pinnæ 5–6 inches long, almost filiform); Bombay, etc. Tropical Africa: Fernando Po and Sierra Leone, *Barter*, *Rendall*.—I suspect most of the above forms must be considered varieties rather than species, as myself and others had considered them, for I find all kinds of intermediate states in the shape and size of the pinnules, and assuredly great diversity in the venation.

130. A. (Heteroneuron) *costatum*, Wall.; caudex creeping subulato-paleaceous, stipites 1–1½ and more feet long striated and often here and there rusty-furfuraceous, fronds 1–1½ or more feet long coriaceous or subcoriaceous-membranaceous very pale-green pinnated, pinnæ petiolate, of the *sterile* frond 7–10 inches long 1–2 inches broad oblong acuminate obtusely and obliquely cuneate at the base entire sinuato-crenate at the margin, costules horizontal, and costa prominent beneath, primary veins arched and forming three or four or more series (according to the breadth of the pinnæ) of very irregular but subtransverse large areoles, within which are lesser deltoid areoles including two or more clavate free veinlets, free veinlets also at the margin; pinnæ of the *fertile* fronds generally smaller 2–3–6 inches long more coriaceous but nearly of the same form wholly or partially coriferous, the margin sometimes reflexed, costules very distinct and prominent beneath, venation less compound.—Var. *α*, *rubicundum*; pinnæ very large subcoriaceous often finely acuminate 8–12 inches long frequently deeply tinged with purple-red wholly soriferous beneath, *fertile* ones 6–9 inches long ½ an inch wide. A. *costatum*, *Wall. Cat. n. 26*. *Cyrtogonium*, *J. Sm.* *Pœcilopteris*, *Moore*. *Campium*, *Pr.*—Var. *β*, *deltigerum*; small, sori partial generally marginal and interrupted, spots or masses forming transverse lines between the costules frequently having a deltoid form. *Meniscium deltigerum*, *Wall. Cat. n. 59*.—Var. *γ*, *undulatum*; resembling var. *β*, but the sori frequently only marginal, forming a broad band, but often extending a little way down between the costules towards the costa, the disk of the pinnule naked. *Nothochlæna undu-*

lata, *Wall. Cat. n. 140.* *Jenkinsia*, *Hook. Gen. Fil. t. 75.* *Moore.* *Campium*, *Pr. Cyrtogonium*, *J. Sm. Lomariopsis*, *Metten.* *Heteroneuron sculpturatum*, *Fée, Acrost. p. 95. t. 56, judging from the figure (sori universal on the pinnae).*

Hab. India.—Var. *a.* Nepal and Sylhet, *Wallich.* Assam, Khasya, Kumaon, and Chittagong, *Griffith, Hooker fil. and Thomson.*—Var. *β.* Nepal, *Wallich.* Boutan, *Griffith.* Sikkim, *Thomson.*—Var. *γ.* Martaban, *Wallich.* Khasya, *Griffith.* Moulmeine, *Parish, Thos. Lobb.* Sikkim, *Hooker fil. and Thomson.*—Different as are the extremes of the three species I have here united into one, I think it is correct to do so. The terminal pinna is not unfrequently proliferous. The species belongs to the same group as *A. virens*, and partakes of the same normal venation.

131. A. (Heteroneuron) *rivulare*, *Hook.*; “caudex creeping thick as a goose-quill paleaceous, stipites angular paleaceous 4–5 inches long, that of the *fertile* frond 12–14 inches; *sterile* fronds membranaceous 8–10 inches long glabrous oblong acuminate pinnated towards the apex sinuato-pinnatifid, pinnæ entire oblongo-lanceolate or ovate subfalcate proliferous; *fertile* fronds small 4 inches long, sporangia pale straw-colour.”—*Cyrtogonium*, *Brack. Fil. U. S. Expl. Exp. p. 85. t. 11.* *Neurocallis*, *Moore.*

Hab. Ovalau, Fiji Islands, *Brackenridge.*—I am unacquainted with this. The venation is represented as uniformly reticulated, with no included free veinlets, and hence I presume Mr. Moore refers it to *Neurocallis.*

132. A. (Heteroneuron) *serratifolium*, *Mert.*; caudex creeping paleaceous, stipites 1–1½ foot long pale stramineous scaly below; *sterile* fronds 1–1½ foot or more long membranaceous uniformly pinnated, terminal pinna long-petiolate, the rest shortly so, 3–5 inches long oblong or oblongo-lanceolate more or less acuminate sinuato-subcrenate, the base cuneate or obliquely obtuse, petioles and rachis scurfy rather than paleaceous, venation manifest, costules rather obscure, veins anastomosing forming large subtriangular areoles next the costa, the rest of the areoles very irregular gradually smaller towards the margin, terminal veinlets usually free; *fertile* fronds with pinnæ contracted 1½–2½ inches long 3–6 lines wide oblong obtuse, the margin narrowly reflexed.—*Mert. in Klfs. En. Fil. p. 66.* *Bolbitis*, *Schott, cum Ic. Pæcilopteris, Pr. Moore. Hook. Gen. Fil. t. 81. B (renation very good).* *Heteroneuron*, *Fée, Acrost. p. 94. t. 55. f. 3 (fertile pinna only, nat. size, with the sori confined to the veins).* *Acrost. fraxinifolium, Pr. (not Willd.).*

Hab. South America: Brazil, frequent, *Mertens, Raddi, Gardner, n. 217;*

Peru, *Mathews*, n. 1107 and 1796, *Spruce* (Tarapota, Eastern Peru), n. 4123; Venezuela, *Fendler*, n. 311.—Certainly very nearly allied to *A. Raddianum*, but the pinnæ are generally larger, and the caudex, though creeping, does not appear to be scandent. The apex of the pinnæ is not unfrequently prolific.

133. A. (Heteroneuron) *Raddianum*, Kze.; caudex elongated scandent partially sparingly subulato-paleaceous, stipites 4-6 inches long generally longer of the *fertile* frond, fronds membranaceous 10-18 inches or more long pinnated, pinnæ rather distant; *sterile* ones 3-6-7 inches long  $\frac{1}{2}$ - $\frac{3}{4}$  of an inch wide petiolate lanceolate finely acuminate serrated especially towards the apex sometimes sublobato-serrate, venation manifest, costules subveniform, veins anastomosing and forming very large subtriangular costal areoles, the rest smaller and more uniform, ultimate veinlets at a little distance from the margin short free clavate; *fertile* fronds much smaller, the pinnæ contracted linear-oblong.—Acrostichum, *Kze. in Herb. Imp. Vindob. (not Hook. and Grev.)*. *A. scandens*, *Raddi, Fil. Bras. p. 6. t. 18, excl. syn. (not Linn.)*. *Neurocallis*, *Moore*. *Heteroneuron Raddianum*, *Fée, Acrost. p. 94*. *Pœcilopteris*, *Moore*.

Hab. Brazil, *Raddi, Gardner*, n. 100, *Milne*. Pará, *Spruce*, n. 15.—This has not the very uniform reticulation of the veins which constitutes *Neurocallis*, to which genus, or section, *Moore* refers it.

134. A. (Heteroneuron) *Heudelotii*, Bory; caudex thicker than a swan's quill black creeping and rooting under water, stipites reddish-brown or black 3-4 inches to a span and more long, fronds subcoriaceous-membranaceous 10-14 inches long broad-oblongo-lanceolate pinnated, pinnatifid at the apex; *sterile* pinnæ 3-6-7 inches long 5 lines to  $\frac{3}{4}$  of an inch broad linear-lanceolate acuminate acute or obtuse obliquely cuneate at the base, intermediate ones decurrent, lowest ones distant and subpetiolate, the margin entire or bluntly serrate or even serrato-pinnatifid, venation manifest, costules united by a few transverse arched veins forming large costal areoles, the rest are more or less anastomosing (very irregularly) with occasional free included veinlets.—Var. *major*; 14 inches long, fronds very dark dull-green, stipites and rachis reddish-brown, pinnæ much acuminate. *Gymnopteris Heudelotii*, *Bory, in Fée, Acrost. p. 84. t. 45*. *Anapausia*, *Moore*.—Var. *minor*; smaller, fronds less than a foot long, pinnæ obtuse, whole plant intensely black.

Hab. Tropical.—Var. *major*. Senegambia, *Heudelot*, "in aquis vivis."—Var. *minor*. Sierra Leone, aquatic, *Barter*. East tropical Africa: Mangauja coun-



try, alt. 3000 feet, growing in the rocky river-bed, *Dr. Kirk, Livingstone's Exp.*—Our specimens from Barter and Kirk are specifically identical with those we have received from Heudelot; but they are smaller and blacker, apparently more succulent, probably having been more submerged, for the plant is quite an aquatic. I may mention a third (but sterile) form of this from Barter, gathered "on sunk rocks under water in ravines near Free Town, S. Leone;" the caudex is long and almost filiform, the stipites and rachis not thicker than sewing-thread, the pinnae narrow and pinnatifid, the areoles few and large, with very few free veinlets.

135. A. (Heteroneuron) *Preslianum*, Hook.; "caudex stout creeping paleaceous with narrow attenuated lanceolate scales, fronds pinnated glabrous, pinnae remote subopposite shortly petiolate, rachis winged; *sterile* ones acute attenuate at each extremity rarely obtuse beneath dotted with numerous very minute points, superior pinnae often trilobed, inferior ones often two-lobed, superior lobe short very obtuse; *fertile* fronds longer stipitate, pinnae all very obtuse acute at the apex, terminal one longer."—Heteroneuron, *Fée, Acrost.* p. 92. t. 39. f. 1. Pæcilopteris, *Moore*. Acrostichum punctulatum, *Pr. (not Sw.)*. Campium, *Pr.*

*Hab.* Philippine Islands (*Prest*). Asia, *Hugel (Fée)*. Concan, *Law*.—My specimens from Mr. Law are all sterile, but they correspond so well with Fée's figure and description that I cannot doubt their identity. The stipites are approximate and tufted, 6 inches long; the fronds about the same length, dark, opaque-green, subcoriaceous-membranaceous; pinnae  $2\frac{1}{2}$ –3 inches long, 4–5 lines wide, narrow-lanceolate, bluntly acuminate, entire, tapering below into a rather long, winged petiole, and decurrent on the rachis, which is also thus winged, uppermost ones more or less confluent at the apex, so that the extremity is pinnatifid; venation obscure; costules evident, these are connected by rarely more than two pairs of opposite veinlets, which meet at an acute angle and are prolonged into a single free veinlet, included in the areoles. The aspect and affinity of the plant are certainly with *A. Heudelotii*.

136. A. (Heteroneuron) *salicinum*, Hook.; caudex creeping, stipites 4 inches to a span long stramineous (as are the rachis and costae), fronds firm-membranaceous dark-green 3–4 inches to a foot long ovate-oblong pinnated to the very apex, pinnae of the *sterile* frond 2–3–10,  $1\frac{1}{2}$ –4 inches long rarely exceeding  $\frac{1}{2}$  an inch broad lanceolate sometimes long and finely acuminate or obtuse entire or subserrate cuneato-attenuate long-petiolate, terminal pinna similar to the rest longer petiolate, costules obscure with few transverse connecting arched veins, these form about two series of large areoles next the costa irregularly anastomosing towards the margin, free included veins rare; *fertile* fronds rather smaller more obtuse and in one instance rather coarsely serrated.

*Hab.* Niger Exped., Sierra Leone, *Barter*. Fernando Po, *G. Mann*, n. 1339.—This very distinct pinnated species has the appearance of having grown in wet

places. A sterile frond with alternate, long, narrow-lanceolate, long-petiolate pinnae, with their pale-coloured costae, has very much the appearance of *Salix amygdalina* or some allied species of Osier. Quite different from *A. Heudelotii*, besides other characters, in the entirely pinnated frond, the terminal pinna long-petioled.

§ 11. CHRYSODIUM.—Fronds simple or pinnated, more or less dimorphous. Veins uniformly reticulated so as to form elongated hexagonal areoles, destitute of free veinlets.—Gen. Chrysodium, Fée, in part. Acrostichum, Linn. Neurocallis, Fée. Cheilelepton, Fée. Chorizopteris, Fée. Hymenodium, Fée. Dictyoglossum, J. Sm.

137. *A. (Chrysodium) aureum*, Linn.; caudex short thick erect slightly paleaceous at the summit emitting a mass of fleshy fasciculated vermicular fibres, stipites tufted a span to 2 feet and more long often as stout as a man's finger, fronds for the most part very coriaceous and hard when dry when young submembranaceous sometimes only a span long and simple (yet fertile) oblong or ternate or 2–6 feet and more long oblong and pinnate, pinnæ usually petiolate 3–4 inches to 1½ foot long ½–3 inches wide, upper ones somewhat contracted and fertile varying extremely in shape generally more or less oblong or linguiform obliquely cuneated at the base, the apex obtuse or even retuse or emarginate sometimes apiculate or acuminate, the margin slightly thickened and subrevolute, veins closely and uniformly anastomosing with small oblong areoles which have an obliquely patent direction from the costa.—Linn. Sp. Pl. p. 1525. Sw. Syn. Fil. p. 13. Willd. Sp. Pl. v. p. 116. Schk. Fil. t. 1. Moore. Chrysodium vulgare, Fée, Acrost. p. 27. Acrost. fraxinifolium, Br. Chrysod., Fée, l. c. p. 101. t. 62. *A. speciosum* and *A. inaequale*, Willd. *A. marginatum*, Schk. *A. danæefolium*, Langsd. and Fisch. Ic. Fil. p. 5. t. 1. *A. obliquum*, Bl. Fil. Jav. p. 30. t. 9. Chrysod. hirsutum, Fée. Acrost. formosum and *A. Wightianum*, Pr. Chrysod. Cayennense, Fée, Acrost. p. 100. t. 69. *C. D'Urvillei*, Fée, l. c. p. 100. t. 60. *C. sculpturatum*, Fée, l. c. p. 100. t. 61. Acrost. juglandifolium, Klf's. *A. rigens*, Pr.

Hab. Tropical and subtropical countries throughout the world. America, from the southern extremity of the United States to South Brazil, and from the Atlantic to the Pacific: Galapagos, C. Wood. India: Malay Islands and Peninsula, Borneo, Thos. Lobb. China and its islands (Formosa, etc.). Bengal, Wallich. Ceylon, Mauritius, Bourbon, and Madagascar. Zambesi, east tropical Africa, Kirk. South Natal, Macalisberg (Sanderson). West tropical Africa, mainland and islands, Vogel, G. Mann, Barter. Australia: tropical, Brown (differing in no essential particular from that of other countries); Brisbane, Fraser, and salt-water creeks towards M'Adam's Range, Mueller; Port Essington, Armstrong; Percy Island, Macgillivray. Pacific Islands, Fiji and Society and Samoan Islands, Brackenridge,

*Mibe, Harvey.* Aneiteum (some pinnae  $1\frac{1}{2}$  foot long and 3 inches broad), *Milov.*—Variable as the outline of the pinnae may be in size and form, there are unmistakable characters about this species; and if any of the above synonyms merits to be considered as distinct, it would be only just to add still more to the imaginary list of species.

138. A. (*Chrysodium*) *reticulatum*, Kfzs.; caudex very thick short woody knotted or almost tuberous, about the stipites densely clothed with long lanceolato-subulate ferruginous silky fimbriated scales, stipites 2–4 inches long, a span to a foot of the fertile, fronds simple; *sterile* ones very hard-coriaceous 6–9 inches long  $1-1\frac{1}{2}$  inch broad lanceolate obtuse glabrous margined slightly attenuated at the base, costa very thick elevated at the back, veins internal obscure close-placed transversely dichotomous and frequently anastomosing so as to form elongated and narrow areoles coming to a very acute angle at each end; *fertile* fronds longer than the sterile 7–12 inches long otherwise resembling the sterile ones.—*Kfzs. En. Fil. p. 64.* Elaphoglossum?, *Gaudich. Voy. de la Bonite, t. 79. f. 1–4.* Hymenodium, *Moore. H. crassifolium, Fée, Acrost. p. 94, t. 53. f. 1.*

Hab. Sandwich Islands, *Chamisso, Gaudichaud, Brackenridge, Hillebrand, Nuttall.*

139. A. (*Chrysodium*) *crinitum*. Linn.; caudex short thick forming a woody knotted irregular creeping rhizome densely clothed with long slender silky brown scales, stipites a span to a foot and more long, of the sterile fronds  $1\frac{1}{2}$  foot long, clothed with long spreading deflexed subulate dark-purple scales, fronds simple; *sterile* ones 6–8–16 inches in length and from 3–6 inches wide elliptical carnosio-subcoriaceous hispid with long spreading dark-purple hair-like scales dilated and ventricose at the very base, costa stout, veins everywhere anastomosing into uniform elongated hexagonal areoles; *fertile* fronds much smaller covered all over except on the costa with a mass of dark-brown capsules.—*Linn. Sp. Pl. p. 1523. Sw. Syn. Fil. p. 11. Willd. Sp. Pl. v. p. 108. Hook. and Gr. Ic. Fil. t. 1. Hook. Fil. Exot. t. 6. Olfersia and Anetium, Pr. Hymenodium, Fée, Acrost. J. Sm. Moore. Chrysodium, Metten. Dictyoglossum, J. Sm. Plum. Fil. p. 109. t. 125.*

Hab. West Indian Islands, frequent. Mexico, *Galeotti*.—A noble and very remarkable species, very much confined to the islands of tropical America.

140. A. (*Chrysodium*) *pachyphyllum*, Kze.; “caudex thick

clothed with very long and very narrow scales twisted at the extremity," stipites thicker than a writing-pen 10 inches and more long, fronds simple very thick carnososo-coriaceous; *sterile* ones 2 feet and more long 6 inches wide glabrous broad-lanceolate acuminate cuneate at the base margined entire, costa channelled above elevated beneath, veins very numerous internal indistinct close-placed transverse at their base anastomosing into a series of short oblique costal areoles, the rest dichotomously divided but here and there anastomosing into very long narrow acute-angled areoles directed towards the margin; *fertile* frond in my specimen 9 inches long by  $2\frac{1}{2}$  broad acuminate.—*Kze. in Linnaea*, ix. p. 26. *Olfersia*, *Pr.* Hymenodium *Kunzeanum*, *Fée, Acrost.* p. 90. t. 58. *H. pachyphyllum*, *Moore*.

Hab. Near Pampayaco, Peru, *Pæppig, in Herb. nostr.*—This is undoubtedly the largest, or at least the longest, of all the simple-fronded Acrostichoid Ferns, and appears to be very rare. I have heard of no other locality than that above given.

141. A. (*Chrysodium*) *Blumeanum*, Hook. (not of *Fée*); caudex long-scandent squarrose with lanceolate reticulated dirty-brown scales, stipites a span and more long thicker than a goose-quill and as well as the rachis pale-brown deciduously setoso-squamulose as is much of the frond beneath in a young state, fronds 2-3 feet long ovate acuminate pinnated, pinnæ numerous; *sterile* ones membranaceous subpetiolate, petiole short articulated on the rachis alternate 6 inches long 1 inch wide from a truncated slightly oblique base oblong coarsely serrated below the acuminate point, veins oblong forming oblong hexagonal areoles having a horizontally patent direction gradually smaller towards the margin; *fertile* pinnæ 6-8 inches long scarcely  $1\frac{1}{2}$  line wide sessile opposite or very nearly so linear acute, sori clothing the whole back of the pinnæ save the costa.—*Cheilolepton*, *Fée, Acrost.* p. 89. t. 51 (*very accurate*). *Leptochilus lomarioides*, *Bl. Fil. Jav.* p. 206. *Neurocallis*, *Moore*. *Lomagranne pteroides*, *J. Sm. in Hook. Journ. Bot.* iii. p. 402 (*name only*), and iv. p. 152 (*the sori partially confined to the margin of the pinnæ*). *Hook. Gen. Fil.* t. 97. *Moore, Ind. Fil.* t. 30. *Fée, Vittar.* p. 27. *Brack. Fil. U. S. Expl. Exp.* p. 83.

Hab. Java, *Blume*. Luzon, *Cuming*, n. 223 and 228. Samoa, Navigators' Islands, abundant, but local, in damp shady places, running over rocks and up high trees, *Brackenridge, Rev. T. Powell*, n. 26.—My specimens of this from Cuming have the most perfect conformity with the figure and description of *Fée's*

plant from Java; those from Samoa (Powell) besides being smaller, have some of the sterile pinnæ more serrated, and the fertile pinnæ much broader and tapering at the apex: but in both cases the sori cover the whole pinnæ between the costa and the margin. My specimens show satisfactorily to me that *Lomagramme pteroides* of J. Smith is an abnormal state of this plant with the sori partially confined to the margin, as is the case also in *A. præstantissimum* (n. 144).

142. A. (Chrysodium) *Requienianum*, Gaud.; caudex?, "stipites a span to a foot long; sterile fronds ternate rarely pinnate, pinnæ 5-7 inches long lanceolate acute, terminal one petiolate, veins reticulated (as in *A. Blumeanum*); fertile fronds pinnate, pinnæ 4-8 inches long subopposite linear acuminate petioled at the base."—*Gaudich. in Voy. de Freyc. p. 304. t. 4. Presl. Neurocallis, Fée, Acrost. p. 90.*

Hab. Moluccas. Rawak. *Gaudichaud*.—This appears to be only known in the Paris Herbarium, and from the description and figure above quoted I do not see why it may not be a young and imperfect state of *A. Blumeanum*.

143. A. (Chrysodium) *polyphyllum*, Hook.; caudex scandent and radicant thick as a duck's quill, stipites distant a span to a foot long obsoletely squamulose jointed, on the caudex scarcely thicker than a crow's quill; sterile fronds ample probably 2-3 feet long membranaceous pinnate or bipinnate, primary pinnæ 6-8 inches to a foot long, pinnules (all articulate) 1-1 $\frac{3}{4}$  inch long rather distant petiolate oblong or oval-oblong strongly serrated acute, rachises winged, veins anastomosing, the largest areoles next the costules; fertile fronds bipinnate, smaller pinnules much contracted scarcely more than  $\frac{1}{2}$  an inch long linear wholly soriferous concealing the costa, the margins revolute.—*Lomagramme polyphylla, Brack. Fil. U. S. Expl. Exp. p. 83. t. 12. f. 3 (portion of the sterile frond only).*

Hab. Pacific Islands, *Alexander*. Fiji Islands, *Brackenridge, Harvey*. Ancientum, *Macgillivray*. Isle of Vanicolla, *C. Moore*.

144. A. (Chrysodium) *præstantissimum*, Bory; caudex short apparently erect, stipites 1-1 $\frac{1}{2}$  foot or more long thick as a goose or even a swan's quill cæspitose, fronds subcoriaceo-membranaceous 2-3 feet long pinnated, pinnæ 12-26 not jointed on the rachis; sterile ones 5-10 inches long 1-1 $\frac{1}{2}$ -2 inches wide oblong more or less suddenly acuminate sessile obliquely cuneate at the base entire, veins uniformly anastomosing with shortly oblong hexagonal areoles having a transverse direction; fertile pinnæ as long as the sterile ones but much contracted linear acuminate sessile, sori covering the

whole pinnae, or frequently forming a broad marginal line on the upper portion of the half-changed pinna, or rarely forming a narrow marginal line more or less covered by the reflected margin giving a pteroid character.—*Hook. Gard. Ferns, t. 28.* *Neurocallis præstantissima, Fée, Acrost. p. 89. t. 52.*

Hab. West Indies, apparently very local: Gadeloupe, *L'Herminier, in Herb. nostr.* Dominica, *Dr. Inray*.—One of the finest of the many fine West Indian Ferns.

145. A. (*Chrysodium*) *aureo-nitens*, Hook.; caudex a short erect tufted-rooted rhizome very paleaceous at the apex, whole plant except the upper side of the fronds densely clothed with a mass of aureo-nitent imbricated lanceolate subulate glossy toothed scales, fronds of two kinds coriaceous-carnose: *sterile* ones simple 3–4–5 inches long obovato-spathulate entire tapering below into a short stipes; *fertile* frond pinnate stipitate, stipites 3–4 inches long, pinnae few 6–9 scarcely an inch long the largest of them linear-oblong obtuse, the sori concealed by the copious scales.—*Acrostichum (Neurocallis) aureo-nitens, Hook. Ic. Pl. t. 933.*

Hab. Galapagos, *Cuming, n. 109, Capt. Wood, Dr. Andersson*.—A most remarkable Acrostichoid Fern, quite unique of its kind, and peculiar, as it appears, to the Galapagos Islands.

§ 12. GYMNOPTERIS.—*Fronds dimorphous, simple, lobed or pinnatifid or pinnate. Veins pinnate from the costa, the rest compoundly anastomosing, more or less hexagonal, including simple or branched and divaricating free veinlets.*—*Gen. Gymnopteris, Fée. Anapausia, Pr. Moore.*—(This corresponds in venation and a good deal in habit with *Phymatodes* among *Polypodiæ*.)

146. A. (*Gymnopteris*) *Gaboonense*, Hook.; caudex creeping sparingly paleaceous with dirty-brown small subulate scales, stipites numerous approximate 6–7 inches long sparingly paleaceous at the base, of the fertile fronds twice or thrice as long, fronds simple; *sterile* ones firm-membranaceous 12–14 inches long 3–3½ inches broad ovato-lanceolate acuminate and proliferous at the apex moderately attenuated at the base entire or sinuate at the margin dark blackish-green, costa prominent beneath, venation very distinct, costules horizontal wide apart connected by many transverse curved veins forming a series of long narrow costal areoles free from veins or slightly veinleted, the rest forming several wide arched areoles filled with a network of irregular areoles with or without an included veinlet, veining near the margin free; *fertile* frond 4–6 inches long 1–1½ inch wide lanceolate subentire or sinuato-pinnatifid.

Hab. Gaboon River, west tropical Africa, lat. 1° N., *Gustav Mann*.—This has some affinity in form and venation with our next species, *A. pandurifolium*, but the form and structure at the base are extremely different; the ultimate areoles are by no means so numerous, nor the free included veins, nor are the latter branched.

147. A. (Gymnopteris) *pandurifolium*, Hook.; caudex creeping thick as a goose-quill copiously scaly and rooting, stipites approximate paleaceo-squamose about a foot long,  $1\frac{1}{2}$  of the *sterile*; *sterile* fronds membranaceous a foot long  $3-3\frac{1}{2}$  inches wide simple and panduriform having two round sinuose lobes at the base, or ovato- or oblongo-lanceolate acuminate with two small subrotund pinnae at the base, costules remote flexuose united by transverse nearly straight veins forming subquadrangular rather large areoles smaller towards the margin including sometimes smaller areoles or free and divaricating branched veinlets; *fertile* fronds very much smaller lanceolato-panduriform or ternate with the terminal pinna lanceolate, the two lateral ones or auricles rounded and petiolate.—*Gymnopteris pandurifolia*, *Hook. 2d Cent. of Ferns*, t. 87.

Hab. Mount Guayrapurima, near Tarapota, Eastern Peru, *Spruce*, n. 4711, and (the ternate-fronded form) Chimborazo, alt. 3000 feet, n. 5684.—Since I published the simple-fronded form of this, I have received from Mr. Spruce a state, as I believe, of the same species, with two basal lobes separate and forming two distinct lateral pinnae or auricles. If more decidedly pinnated, it might pass into *Acrost. nicotianaeifolium*.

148. A. (Gymnopteris) *bicuspe*, Hook.; caudex creeping and as well as the base of the stipes densely clothed with aureo-fulvous silky hairs, stipites  $1-1\frac{1}{2}$  foot (of the sterile frond) long channelled on the anterior side, dilated upwards, fronds coriaceous simple pale-green; *sterile* ones  $6-8$  inches long  $3-3\frac{1}{2}$  inches broad ovate-acuminate quite entire and tricostrate, or suborbiculate and deeply (to the middle) bicuspidate  $6$  inches broad and as much long  $6-8$ -costate with the acuminate segments divaricating, entire at the margin, venation conspicuous, primary veins anastomosing and forming large subquadrangular areoles enclosing a network of smaller areoles with copious free branched and divaricating included veinlets; *fertile* frond always entire  $6-9$  inches long  $6-8$  lines wide lanceolate acuminate tricostrate, the margin thickened, sori fulvous covering the surface except on the costae and margin.—*Polypodium*, *Bl. Fil. Jav.* p. 125. *Anapausia*, *Moore*. *Cheiropleuria*, *Pr. Eat.* *Acrostichum tri-*

nerve, *Hask. Kze. Gymnopteris Vespertilio, Hook. Lond. Journ. Bot. v. p. 193. t. 7 and 8. Acrostich., Metten. Anapausia, Moore. Cheiropleuria, Pr.*—Var.  $\beta$ , *integrifolia, Eat.* in *Herb. Hook.*; fronds of both kinds ovate acuminate entire.

Hab. Java, on trees, *Blume, Thos. Lobb, Zollinger.* Loochoo Islands, mostly with quite entire fronds, *C. Wright.*—A most remarkable and very handsome Fern, probably only known in a barren state to Blume, its first discoverer, or he could not have referred it to *Polypodium*; and hence I overlooked his plant when I described it as *Gymnopteris Vespertilio*,—a very applicable name for the normal state of the sterile frond, but which has been found quite entire in the Loochoo Islands, and that far more common than the bicuspidate state.

149. A. (*Gymnopteris*) *tricuspe, Hook.*; caudex creeping clothed with subulato-setaceous ferruginous scales, stipites 1 foot long,  $1\frac{1}{2}$  of the fertile frond; *sterile* frond subcoriaceous-membranaceous subtriangular-cordate 8–10 inches long 10–12 inches wide at the base including the spread of the lateral lobes, deeply trilobate, lateral lobes 5 inches or more long  $1\frac{1}{2}$  inch wide horizontally patent, intermediate one 6 inches and more long 2 inches wide, all of them oblongo-lanceolate acuminate entire unicostate, venation manifest, costules distant indistinct connected by transverse irregular curved veins forming large areoles enclosing lesser ones which have copious free branched and divaricating veinlets; *fertile* fronds much elongated but contracted tripartite nearly to the base, segments scarcely  $\frac{1}{2}$  an inch wide linear strap-shaped acuminate, lateral ones 9–10 inches long erecto-subpatent, intermediate one a foot and more long, sori universal except on the costa. (TAB. CCCIV.)

Hab. Hot valleys of Sikkim-Himalaya, *Mrs. Atkinson.*—This very fine and new species, with not a little of the habit and venation of *A. bicuspe*, differs remarkably in being trilobed or tripartite, and it has always a solitary central costa to each lobe. One of my specimens has the three segments only partially contracted and fertile.

150. A. (*Gymnopteris*) *alienum, Sw.*; caudex stout creeping paleaceous, stipites 1– $1\frac{1}{2}$  foot long sparsely scaly at the base; *fertile* ones the longest, fronds varying much in size 6 inches to  $1\frac{1}{2}$ –2 feet in length bright-green membranaceous; *sterile* ones when young subsimple or only pinnatifid below, when fully developed more deeply divided at length pinnated pinnatifid above, pinnæ numerous 5–6–8 inches long 1–2 inches broad subpetiolate lanceolate finely acuminate lobato-pinnatifid serrated towards the apex, lowest pair dilated at the lower margin and more deeply pinnatifid, lobes subserrated, ter-



minal one coadunate at the base forming the pinnatifid apex and more entire at the margins of the segments, venation manifest, costules distinct, veins anastomosing forming rather large unequal angular areoles including free often forked and divaricating veinlets; *fertile* fronds much smaller pinnate below, pinnatifid at the apex, pinnæ and segments 2-3 inches long 4-5 lines wide oblong obtuse entire or more or less lobed.—*Sw. Fl. Ind. Occ. p.* 1595. *Syn. Fil. p.* 13. *Willd. Sp. Pl. v. p.* 120. *Gymnopteris, Pr. Hook. Gen. Fil. t.* 85. *Fée, Acrost. p.* 84. *Anapausia, Moore. Chrysodium, Metten. Acrost. brunneum, Willd. (Kze. in Herb. nostr.). A. caudatum, Cav. and Willd., is by some authors referred here. Acrost. cladorhizans, Spr. A. Portoricense, Spr. A. hastatum, Liebm. Fil. Mex. p.* 20 (and in *Herb. nostr.*). *A. umbrosum, Liebm. l. c. p.* 22 (and in *Herb. nostr.*). *Plum. Fil. p.* 10. *t.* 10.

Hab. Tropical America. West Indies: Jamaica, *Swartz*, and probably in most of the islands; Cuba, *Linden, n.* 1755, *C. Wright. n.* 783; Porto Rico, *Schwannecke*. New Granada, *Purdie, Fendler, n.* 336. Mexico, *Liebold, Gabenti, n.* 6572. Guatemala, *Skinner*.—Our plate in the 'Genera Filicum' well represents the sterile and fertile fronds and the venation of this plant, and Plumier's figure is much less exaggerated than is usual in his representations of Ferns. The species is, however, as *Fée* remarks, "extrêmement variable dans ses formes et dans ses dimensions;" and some of the smaller states scarcely differ from those of *A. semipinnatifidum*, except in the presence of copious free veinlets.

151. *A. (Gymnopteris) semipinnatifidum, Hook.*; caudex creeping thick as a goose or a swan's quill subsetaceous-paleaceous, stipites a span to a foot long,  $1\frac{1}{2}$  foot of the fertile frond, fronds firm or subcoriaceous-membranaceous very dark green 10-15 inches long; *sterile* ones subdeltoid pinnatifid or in the perfect state pinnated below with 1-2 or rarely 3 pairs of sessile or subpetioled pinnæ, near the middle with 1-2 pairs of very decurrent pinnæ, the rest upwards are eoadunate so that the apex of the frond is more or less deeply pinnatifid, pinnæ 4-9 inches long  $\frac{3}{4}$ - $1\frac{1}{2}$  inch wide lanceolate more or less attenuated at the base acuminate entire or lobato-pinnatifid at the margins, lowest pair dilated at the lower margin and there more deeply pinnatifid with the lowest lobe sometimes very much elongated, lowest segments of the upper portion also much elongated, the apex itself lobato-pinnatifid, venation manifest, costules subhorizontal distant, the veins variously anastomosing but forming elongated costal and costular areoles, the areoles destitute of free included branched veinlets or very rarely here and there with

a solitary simple free one; *fertile* frond much smaller oblong but with pinnæ and segments of the same character though more obtuse and more entire at the margin.—Gymnopteris, *Fée, Acrost. p. 84. t. 44* (rather a small specimen with nearly entire pinnæ). *Hook. Ic. Plant. t. 971 and 972.* Anapausia, *Moore.*

Hab. Tropical America: French Guiana, *Le Prieur* (my specimen from Le Prieur has the margins nearly entire and quite like Fée's figure, but is larger); Brazil, Amazon, *St. Gabriel, Spruce, n. 2121* (scarcely at all pinnated); Pará, *Spruce, n. 577*; Jamaica, alt. 3000 feet, *Purdie* ("G. aliena, β, Purdieana," Griseb. in *Fl. W. Ind. ined.*); Trinidad, *Cruger, n. 221.*—Some of the smaller, yet fully developed specimens of this plant closely resemble certain states of *A. alienum*, but the venation, especially the general absence of the free included veins, will at once distinguish it.

152. A. (Gymnopteris) *Harlandii*, *Hook.*; caudex stout short creeping woody setaceo-paleaceous, stipites 1 foot to 2 feet long of the sterile frond, stout close-clustered paleaceous below with setaceous scales; *sterile* fronds 1–1½–2 feet long coriaceous glossy rarely simple three-partite or pinnate with five large pinnæ of which the lateral ones are 6–8 inches long, lowest pair free the rest coadunate and very decurrent, terminal one a foot long, all oval-lanceolate long-acuminate entire, venation very manifest, costules distant connected by transverse curved flexuose veins including a network forming irregular smaller areoles which enclose free divaricating veinlets; *fertile* fronds smaller very much contracted, pinnæ 3–4 inches long  $\frac{1}{2}$ – $\frac{3}{4}$  of an inch wide oblongo-lanceolate acuminate but having the same structure as the sterile.—Gymnopteris decurrens, *Hook. Fl. Hongkong. in Kew Gard. Misc. ix. p. 359.* *Hook. Fil. Exot. t. 94* (not of *Hook. Gard. Ferns, t. 6.*) *Acrostichum, Benth. Fl. Hongkong. p. 445* (not *Acrost. decurrens, Desv.*; nor *Leptochilus decurrens, Bl.*).

Hab. Hongkong, *Dr. Harland*, top of Mount Gough, etc., *Wilford.*—This appears, though variable in form, a very distinct species, and as yet detected only in the island of Hongkong.

153. A. (Gymnopteris) *fluviale*, *Hook.*; caudex long creeping branched, stipites stout a foot and more long, 2 feet of the fertile frond; *sterile* fronds 1½–2 feet long firm-membranaceous simple broad-lanceolate and entire, or larger and hastato-trilobate, with lateral segments 6–7 inches long 2½ inches broad ovato-oblong acuminate horizontal, middle lobe 16 inches long 4 inches wide broad-lanceolate or larger still and pinnatifid with about 5–9 large segments, inferior la-

teral ones and the terminal one as in the second form just described, costæ rather stout, costules indistinct, veins everywhere distinct regularly anastomosing into rather large uniform hexagonal areoles rather smaller towards the margin quite destitute of any free included veinlets; *fertile* fronds similar to the sterile ones hastate or pinnatifid but much smaller.

Hab. Fernando Po, on the banks of a river, *Gustav Mana*, n. 412. Niger Exped., *Barter*. West tropical Africa, *Curror*.—In one of my specimens of this plant, which has the appearance of being palustral or growing in wet places, the costules are sufficiently apparent, but are veniform, and the frond is regularly reticulated as in *Neurocallis præstantissima*. The venation is quite intermediate between § *Gymnopteris* and § *Neurocallis*.

154. A. (*Gymnopteris*) *nicotianæfolium*, Sw.; caudex long stout creeping paleaceous, stipites  $1\frac{1}{2}$ –2 feet long scaly at the base, fronds submembranaceous 1–2 feet or more long pinnated with 3–7–10 petiolated pinnæ, terminal one the largest and longer petioled; *sterile* pinnæ 4–8 inches long elliptical-ovate rather suddenly acuminate subdentato-sinuate at the margin, costules manifest united by curved veins forming arched areoles which are filled up by anastomosing rather small nearly square areoles including free branched often divaricated veinlets; *fertile* fronds much smaller than the sterile, pinnæ oblongo-lanceolate.—*Sw. Syn. Fil.* pp. 13 and 199. *Willd. Sp. Pl.* v. p. 118. *Hook. Gard. Ferns*, t. 26. *Gymnopteris*, *Pr. Fée, Acrost.* p. 86. t. 46. *Anapausia*, *Pr. Moore*. *Chrysodium*, *Metten*. *Acrost. acuminatum*, *Willd. l. c.* p. 111. *Gymnopt.*, *Pr. Fée, Acrost.* p. 85. *Anapausia*, *Moore*.—*Plum. Fil.* p. 100. t. 115.

Hab. Tropical America, especially the West Indian Islands, Brazil, and British Guiana.—The species varies in the shape of the sterile pinnæ, especially of the terminal one, sometimes almost rhomboid, and in the size of the ultimate areoles, and in the more or less copious free veinlets. Hence Willdenow and Fée have constituted two species.

155. A. (*Gymnopteris*) *subrepandum*, Hook.; caudex creeping stout, stipites a span to a foot or more long paleaceous with coarse black subulate deciduous scales, fronds  $1-1\frac{1}{2}$  foot long coriaceous-membranaceous almost brown when dry paler beneath simple or pinnated (terminal pinna petiolate and larger), pinnæ 3–13 6–19 inches long 1–2 inches wide oblongo-lanceolate acuminate sessile obliquely cuneate at the base quite entire or (in Cuming's pinnated specimen) repando-sublobate at the margin, costules distinct

united by arched and angled transverse veins and these again connected by longitudinal ones (*i. e.* parallel with the costular) thus forming costular areoles again reticulated or including free veinlets; *fertile* pinnæ much smaller more petiolate with a pale-coloured margin.—*Gymnopteris*, *J. Sm. in Hook. Bot. Journ.* iii. p. 403. *G. subsimplex*, *Fée, Acrost.* p. 83. t. 40?

Hab. Luzon, *Cuming*, n. 225. Malay Peninsula, *Sir Wm. Norris*.—My specimen from Mr. Cuming is quite a pinnated one; those of Sir W. Norris have pinnated and subsimple fronds; but *Fée's* figure seems rather to represent the sterile frond of a terminal pinna than an entire simple frond.

§ 13. LEPTOCHILUS.—*Only differs from the preceding section* (§ *Gymnopteris*) *in the very narrow-linear or almost filiform fertile fronds or their pinnæ.*—*Gen.* *Leptochilus*, *Klfs.* *Fée.* *Gymnopteris*, *Bernh. in part.* *Moore.*

156. A. (*Leptochilus*) *axillare*, *Cav.*; caudex very long scandent flexuose here and there branched; *sterile* fronds rather distant (with very short stipites almost none or 1–2 inches long and stramineous) membranaceous 5–6 inches to 1 foot and more long  $\frac{1}{2}$ – $1\frac{1}{2}$  inch wide lanceolate more or less acuminate strongly costate entire gradually tapering below and long-decurrent sometimes to the base of the stipes and even auricled there; *fertile* fronds (with stipites 3–4 inches long a little scaly at the base) 6 inches to a foot long 1–3 lines wide linear tapering at both extremities flexuose.—*Cav. Prælect.* 1801. n. 582. *Sw. Syn. Fil.* p. 11. *Willd. Sp. Pl.* v. p. 509. *Gymnopteris*, *Pr. Tent. Pterid.* p. 244. t. 11. f. 4, 5. *Leptochilus*, *Klfs. En. Fil.* p. 147. t. 1. f. 10. *Fée, Acrost.* p. 86. *Lomaria* (?) *serpens*, *Wall. Cat.* n. 32.

Hab. Philippine Islands (*Cavanilles*). Luzon, *Cuming*, n. 30. *Thos. Lobb. Java, Blume.* Borneo, *Motley.* Moulmeine, *Parish*, n. 68 (creeping to a great height up trees). Sylhet, *Wallich*, n. 32 ("supra arb. alte radicans"). Assam, *Griffith, Hooker fil. and Thomson, Simons.* Boutan, *Booth.* Cochin, *Johnstone.* Nilghiri, *M'Ivor.* Ceylon, *Gardner.*—A species remarkable for its very long, flexuose, scandent caudex, adhering to the trunks of trees by fibrous radicles.

157. A. (*Leptochilus*) *lanceolatum*, *Hook.* (not *Linn.*); caudex creeping copiously rooting, stipites 4 inches to a span and even more long of the fertile fronds testaceous; *sterile* fronds firm-membranaceous 6 inches to a span long 1–2 inches wide lanceolate acuminate much attenuato-decurrent at the base entire, costules indistinct, areoles with free veins; *fertile* ones coriaceous a span to 1 foot long 2–6 lines broad.—*Leptochilus*, *Fée, Acrost.* p. 87. t. 47. f. 1.—*Var. β, nor-*

*male*; sterile fronds small sessile. *Gymnopteris normalis*, J. Sm. in Hook. Journ. Bot. iii. p. 403.

Hab. Hab. East Indies, Hugel. Indian Peninsula, Perottet, M'Ivor, alt. 5000 feet, Col. Bates, Dr. Wight, n. 45 and 58, Law. Moulmeine, Parish, n. 186. Ceylon, Mrs. Gent. Walker, n. 1163, Gardner, n. 1303, 1316, and 1317.—Var.  $\beta$ . Ceylon, along with the ordinary form. Isle of Samar, Cuming, n. 326.—Very variable in the size of the fronds and in the length of the stipes; best distinguished from *G. avillaris* by the very different caudex.

158. A. (*Leptochilus*) *minus*, Metten.; small, caudex creeping thick as a sparrow's quill scaly at the apex, stipites remote slender 1–3 or in those of the fertile frond 4 inches long; *sterile* fronds membranaceous  $1\frac{1}{2}$ –2 inches long oblong or broad-lanceolate costate tapering into a stipes  $2\frac{1}{2}$  inches long, costules indistinct, areoles with a free included clavate veinlet smaller towards the margin; *fertile* fronds 2 inches long linear obtuse.—Metten. Fil. Hort. Lips. p. 20. *Leptochilus*, Fée, Acrost. p. 87. t. 47. f. 2, according to his figure (excl. syn. J. Sm.). *Gymnopteris*, Hook. 2d Cent. of Ferns, t. 78.

Hab. Khasya, near Churra, alt. 2000–3000 feet, Hooker fil. and Thomson. Isle of Samar, Philippines, Cuming, n. 326 (in Herb. Fée, but that number in our herb. is *Gymnopt. normalis*, J. Sm., our *A. lanceolatum*,  $\beta$ ).—Cuming's n. 326 would appear to include two species. The present is the *Leptochilus minor* of Fée, but is not the *G. normalis*, J. Sm., which bears the same number of Cuming. The present is the smallest species of the genus.

159. A. (*Leptochilus*) *variabile*, Hook.; caudex long creeping flexuose scarcely paleaceous, fronds distant; *sterile* one membranaceous 6 inches to a foot and 14 inches long (including the decurrent base)  $1$ – $2\frac{1}{2}$  inches wide broadly ovato-lanceolate costate acuminate below rather suddenly attenuated and very long decurrent upon the scaleless stipes sometimes almost to the base, the margin subrepand or laciniato-pinnatifid with long acuminate unequal segments, costules very distinct subhorizontally patent, primary areoles large transversely oblong, secondary ones subquadrangular including free divaricating veinlets; *fertile* fronds narrow-linear (pinnated in var.  $\beta$ ) often 6–10 inches long 2–3 lines wide on very long scaleless stipites often a foot long, sori continuous often spreading over the margin.—*Gymnopteris decurrens*, Hook. Gard. Ferns, t. 6 (not of Fil. Érot.). Acrost. (*Gymnopteris*), Thw. En. Pl. Ceyl. p. 381. excl. syn. *Leptochilus*, Bl. Fil. Jav. p. 206. Fée, Acrost. p. 88. t. 48. f. 2. *Acrostichum rivulare*, Wall. Cat. n. 2165.—Var.  $\beta$ . *laciniatum*; *sterile* fronds deeply laciniato-pinnatifid; *fertile* fronds pinnated with very long unequal filiform pinnæ. Thw. En. l. c.

Hab. Java, *Blume*. Penang, *Wallich*. Ceylon, common, *Mrs. Genl. Walker, Gardner*, n. 1157, 1317, 1318 (*var. β*). Assam, *Simons*. Khasya, *Hooker fil. and Thomson*, alt. 2000–3000 feet.—Allied to *A. lanceolatum*; but that is smaller and more rigid, sterile fronds scarcely costulate. It varies much in the relative length and breadth of the fronds and in paler or darker colour. In *var. β* the sterile fronds are deeply laciniato-pinnatifid, and the fertile ones are pinnated with several very long, almost filiform pinnæ. "It grows in peculiar localities, rarely intermixed with the normal state" (*Thwaites*).

160. A. (*Leptochilus*) *Linnæanum*, Hook.; caudex creeping scaly fibrous beneath, stipites scattered approximate 2–6 inches long sparsely paleaceous below with subulate black scales, fronds subdimorphous; *sterile* ones 4–8 inches long  $\frac{1}{2}$  an inch wide submembranaceous elongato-lanceolate subopaque often long acuminate rooting and proliferous at the apex entire at the margin costate, costules indistinct, veins anastomosing, areoles subhexagonal rarely with free included veinlets.—*Hook. 2d Cent. of Ferns*, t. 26. *Leptochilus*, *Fée, Acrost.* p. 87. t. 47. f. 2 (*excl. probably all the syns.*). *Dendroglossa*, *Fée, Gen. Fil.* p. 81.

Hab. Malay Islands: Java, "*Zollinger*, n. 1441;" Borneo, *Motley*, n. 427.—Well figured by *Fée*; but he surely errs in quoting *Acrostichum lanceolatum*, *Linn. Amœn. Acad.* i. p. 268, where it is said, "fructificationes sunt puncta confertissima, versus apicem frondis," and reference is made to Hort. Malab. xii. t. 27. Swartz showed long ago that the Linnæan plant is the *Polypod. acrostichoides* of Forst., now considered to be a *Niphobolus*.

161. A. (*Leptochilus*) *taccefolium*, Hook.; caudex stout short creeping paleaceous with long dark-brown glossy linear-subulate scales, stipites short and almost none or a span to a foot long of the fertile fronds, in both near the base crinite and almost squarrose with long narrower spreading flexuose scales; *sterile* fronds membranaceous dirty-brown when dry 6–11 inches long  $1\frac{1}{2}$ – $2\frac{1}{2}$  inches wide and simple broad-lanceolate shortly acuminate costate subsinuate moderately attenuated below scarcely decurrent but terminating rather suddenly and with a decidedly waved margin, or larger and deeply three-lobed, or larger still  $1\frac{1}{2}$  foot long and nearly as much wide and deeply pinnatifid with 7–9 oblong distant more or less acuminated confluent segments 4–6–8 inches long entire or sinuate or even pinnated in the lower half, the pinnæ large deeply bipartite and petioled, venation conspicuous, costules evident nearly horizontal very flexuose united by transverse arched veins forming primary large areoles, secondary areoles subquadrangular copious including free divaricating veinlets; *fertile* frond 6–12 inches or more long  $1\frac{1}{2}$  line wide narrow-linear and simple or deeply pinnatifid or

pinnate in the same way as the sterile frond.—*Gymnopteris taccæfolia*, *J. Sm. in Hook. Journ. Bot.* iii. p. 403 (*name only*). *the most fully developed form of the species, pinnated below.* *Leptochilus*, *Fée, Acrost.* p. 89. t. 50. *Polybotrya*, *Metten. Fil. Hort. Lips.* p. 24.—Var.  $\beta$ , *pinnatifida*; frond large pinnatifid. *L. subquinquefidus*, *Fée, Acrost.* p. 88. t. 49.—Var.  $\gamma$ , *trilobata*; frond three-lobed. *Gymnopteris trilobata*, *J. Sm. l. c.* p. 403 (*name only, including also the following var.*). *Polybotrya*, *Metten. Fil. Hort. Lips.* p. 25.—Var.  $\delta$ , *simplicifolia*; fronds undivided. *Leptocarpus hilocarpus*, *Fée, Acrost.* p. 87. t. 48. f. 1.

Hab. Isle of Mindoro, *Cuming, n. 357*.—Var.  $\beta$ , *pinnatifida*. Luzon, *Cuming, n. 3*.—Var.  $\gamma$ , *trilobata*. Luzon, *Cuming, n. 3, in part (J. Sm.)*, *Thos. Lobb*.—Var.  $\delta$ , *simplicifolia*. Manila, *Gaudichaud (Fée)*. Luzon, *Cuming, n. 5*.—I am unacquainted with the *A. (Leptochilus) varians* of Mettenius, *Fil. Nov. Caled. p. 2*. “*Rhizoma elongatum scandens, folia disticha distantia subcoriacea glaberrima, e basi cuneata late ovata pinnatipartita,*” etc., to the affinities of which the author makes no allusion.

162. A. (*Leptochilus*) *quercifolium*, *Retz*; caudex creeping sparsely paleaceous, stipites 2–3 inches to a span of the fertile frond in length, below paleaceous with spreading subcrinite scales and more or less ferrugineo-tomentose, fronds ternate; sterile ones shortly stipitate membranaceous ciliated 3–4 inches long 1½–2 inches wide cordato-oblong very obtuse, lateral pinnæ cordato-trilobed, terminal one very large ovate all pinnatifid with obtuse irregular lobes costate, costules evident hairy beneath corresponding with the lobes, veins irregularly anastomosing, the arcoles with free including veinlets; fertile fronds small 1–2 inches long long-stipitate, two lateral pinnæ short, all petiolate.—*Retz. Sw. Syn. Fl.* p. 12. *Schk. Fil. ii. t. 8.* *Willd. Sp. Pl. v. p. 112.* *Gymnopteris, Bernh. in Schrad. Journ. Bot.* 1806. i. p. 20. *Pr. Tent. Pterid.* p. 244. *Hook. Ic. Pl. x. p. 905, and Fil. Exot. t. 80.* *Leptochilus, Fée, Acrost.* p. 88. *Dendroglossa, Fée, Gen. Fil. p. 80. t. 7. f. 2.* *Ophioglossum Zeylanicum, Houtt. Linn. Pl. Syst. xiii. p. 47. t. 94. f. 1.*

Hab. Ceylon, *Burmans, Mrs. Genl. Walker, Gardner, n. 1170 and 1319.* Madras Peninsula, *Rottler, Wight, n. 46.* China and CochinChina (*Fée*).—A well-marked species, amply illustrated, and one that cannot be confounded with any other.

163. A. (*Leptochilus?*) *pteroides*, *Br.*; “fronds bipinnate glabrous, pinnules linear, with margins reflexed.”—*Br. Prodr. Nov. Holl. p. 144.*

Hab. Tropical New Holland, *Brown, in Herb. nostr. (ex Herb. Carmichael)*.—I place this here with great hesitation. At first sight it has much the general aspect of a fertile frond of some bipinnated *Leptochilus*. My solitary specimen is 13 inches long, destitute of caudex; stipes slender, terete, slightly flexuose, and, as well as the rachis, *ebeneous-black*; fronds 6 inches long, ovato-lanceolate, bipinnate; primary pinnae alternate, upper ones sessile, about 1 inch long, lower ones rather long-petioled (petioles black), nearly 2 inches long, pinnate with 3-4 pinnules, all of them linear,  $\frac{1}{2}$ - $\frac{3}{4}$  of a line wide, narrow-linear, plane or even a little grooved at the back, with no appearance of costa there, beneath canaliculate, the margin moderately recurved and somewhat involucriform, the whole under side clothed with capsules, save the slender black costa. We trust Australian botanists, and especially the explorers of tropical Australia, will rediscover this remarkable plant and enable us to say something definite respecting its affinities.

§ 14. HYMENOLEPIS.—*Fronde simple, uniform. Sorus produced on a contracted apex of the frond.—Gen. Hymenolepis, Klfs.*

164. A. (*Hymenolepis*) *spicatum*, Linn.; caudex creeping paleaceous and tubercled with the persistent bases of the old fronds, fronds approximate a span to a foot long  $\frac{1}{2}$ -1 inch and more broad coriaceous-carnose opaque elongate or narrow-lanceolate costate gradually tapering below into a short thick stipes articulated upon the caudex contracted at the extremity into a linear receptacle varying much in length and soriferous, the margins in an early state revolute and pseudo-involucrate, capsules mixed with peltate scales, veins copiously anastomosing, costules very indistinct veniform, the rest of the veins forming uniform areoles enclosing free veinlets.—Var. *a*, *macrostachys*; fronds narrow, soriferous receptacles much elongated. *Linn. Suppl. p. 444. Cav. Prælect. 1801. n. 569. Sm. Ic. Ined. t. 49. Hymenolepis spicata, Pr. Epimel. Bot. p. 159. Hook. Fil. Exot. t. 78. Onoclea, Sw. Syn. Fil. pp. 110 and 303. Schizæa, Sm. Act. Taur. v. p. 53. Lomaria, Willd. Sp. Pl. v. p. 289. Gymnopteris, Pr. Tent. Pterid. p. 244. t. 11. f. 7. Hymenolepis ophioglossoides, Klfs. En. Fil. p. 146. t. 1. f. 9. Kze. in Schk. Fil. Suppl. p. 99. t. 47. f. 1. H. revoluta, Bl. Fil. Jav. p. 201. Kze. in Schk. Fil. Suppl. p. 101. t. 47. f. 2. H. validinervis, Kze.—Var. *β*, *brachystachys*; fronds broader, receptacle short very obtuse. *Hook. Gard. Ferns. t. 3.**

Hab. East Indies, especially the islands: Archipelago and Pacific Islands, Ceylon, Bourbon, Mauritius, Assam and Khasya, China and Sikkim, Philippine Islands, Java, Penang, Society and Fiji Islands, and Solomon's Group. Brisbane River, North-east Australia (*Hill, Mueller*). Madagascar, *Dr. Meller*. New Caledonia, *Fiellard*.—Var. *β* is chiefly a garden variety, due perhaps to luxuriance.

165. A. (*Hymenolepis*) *platyrhynchos*, Hook.; caudex as-



ending, fronds tufted 12–16 inches long 1 inch wide suborbato-lanceolate coriaceous-membranaceous costate attenuated at the base into a very short petiole, soriferous appendage broad-oblong 1–2½ inches long ½ an inch wide, the disk only covered with capsules leaving a broad spreading margin.—*Kze. in Schk. Fil. Suppl. p. 101 (no figure)*. *Hook. Ic. Plant. t. 999*. Gymnopteris, *J. Sm. in Hook. Journ. Bot. iii. p. 403 (name only)*. Macroplethus, *Pr. Epimel. Bot. p. 142*.

Hab. Luzon, *Cuning, n. 196*.—A very rare and remarkably distinct species.

§ 15. PHOTINOPTERIS.—*Fronde ample, uniforme, fertile à l'extrémité, et dont la portion pinnée est étroite-linéaire ou presque filiforme; la portion stérile très-dure-coriacée, pinnée avec la pinnule articulée sur une large base de la pétiole; ou simple mais profondément pinnatifide, et quand elle se détache facilement de la rachis. Venation comme dans § Gymnopteris et § Leptochilus*.—(This section corresponds with § *Drynaria*, among *Polypodiæ*, and our second species especially, with *Pol. Meyenianum*, Schott, and *P. splendens*, Hook.) *Gen. Photinopteris, J. Sm.*

166. A. (Photinopteris) *rigidum*, Wall., Hook.; caudex repent or scandent paleaceous with elongated brown subulate fringed scales mixed with hair-like ones in age albo-glaucous, stipites short nearly as thick as a writing-pen, fronds 1½–2–3 feet long broad-lanceolate very hard-coriaceous glossy pinnate; sterile pinnæ long-petiolate distant 3–6 inches and more long broad-ovate acuminate, the apex generally caudate and curved upwards, venation manifest elevated on both sides, costules subflexuose united by transverse veins into four angled areoles which are again divided into lesser areoles including branched free clavate veinlets, petioles articulated on the rachis and dilated into a large orbicular scutiform base; sometimes these sterile pinnæ occupy the whole frond, more frequently the rachis is suddenly elongated at the apex and bears 1–12–13 distant very contracted narrow-linear and fertile pinnæ from 5–12 inches long soriferous except on the costa and on the slightly revolute margin.—*Wall. Cat. n. 27 (1822)*. *Lomaria speciosa, Bl. Fil. Jav. p. 202*. *Photinopteris simplex, J. Sm. P. Horsfieldii, J. Sm. (no description or character)*. *Hook. Gen. Fil. t. 92*. *Pr. Moore. Brack. Fée, Acrost. p. 102. t. 63*.

Hab. Singapore, *Wallich, Cuning, n. 363, De Vriese (in Herb. nostr.)*. Java *Blume, Horsfield*. Mindora and Isle of Bohol, *Cuning, n. 352*. Labuan, *Thos. Lobb*. Luzon, *Brackenridge, Cuning, n. 61*. Isle of Panay, *Cuning, n. 362*.—This magnificent Fern is described by Dr. Wallich as parasitic on the trunks of trees, and Brackenridge remarks that the very peculiar aspect which the sterile portion of this plant presents is not unlike some scandent species of the genus *Ficus*.

167. A. (Photinopteris) *drynarioides*, Hook. ; caudex ?, stipites very short thick clothed at the base with long slender linear fringed tawny silky sessile scales, fronds 2-4 or more feet long 8-12 inches broad coriaceous glabrous glossy broad-lanceolate; *sterile* fronds acuminate uniformly and deeply pinnatifid sinuato-lobate at the narrowed base, the whole when dry easily becomes detached from the rachis where the texture is pellucido-membranaceous, segments approximate 5-8 inches long 1 inch and more broad near the middle oblong acuminate subfalcate, lower ones much shorter and broader very obtuse, costa deeply furrowed above very prominent and semiterete beneath, venation as in the preceding species; the *fertile* fronds have a remarkable prolongation of the rachis which is pinnated into numerous distant sessile linear-elongated pinnæ 6-8-12-14 inches long dilated at the very base, wholly soriferous beneath.

Hab. Malayan Peninsula, *Sir Wm. Norris*. Salomon's Islands, South Pacific, *Milne*.—Though it cannot be said that the segments are jointed upon the costa or rachis, as the pinnæ are in the preceding species, yet the whole of the frondose portion separates (at least when dry) most readily from the costa; so deciduous, indeed, that it seems hardly possible to preserve the fronds entire.

## 2. PLATYCERIUM, Desv.

(HOOK. GEN. FIL. TAB. LXX. B. Acrostichum, *Sw*. Neuroplatyceros, *Pluken*. *Fée*. Alcornium, *Gaudich*.)

*Sori* occupying a portion only of the under side of the disk of the fertile fronds and forming large, often reniform patches, frequently at the sinuses of the primary lobes. *Fronds* ample, dimorphous, epiphytal, subdistichous, coriaceous, increasing, as it were, by new annual fronds superimposed upon the old, withered and dead ones; one on each side; from between these two fertile, subalcorniform, fertile fronds arise.—*Venation varied, copious, prominent; costa numerous, subflabellate; the rest of the veins forming large oblong areoles, usually with free, included, simple or forked veinlets.*

1. *P. alcornie*, Desv.; *sterile* fronds spreading sessile subreniform convex downy when young sinuato-lobate at the margin eventually brown and persistent, primary veins dichotomously radiating, secondary uniformly reticulated forming

hexangular areoles with rarely free included veinlets; *fertile* fronds clustered erect narrow elongato-cuneate whitish and downy beneath 1-3 times dichotomous, segments oblong acuminate, ultimate ones chiefly soriferous, primary veins dichotomous parallel elevated, here and there anastomosing into very elongated areoles which are occupied by lesser ones.—*Desv. Journ. Bot.* vi. p. 213. *Acrostichum*, *Sw. Syn. Fil.* p. 12 (*in part*). *Willd. Sp. Pl.* v. p. 111. *Br. Prodr. Nov. Holl.* p. 145. *Gawl. Bot. Reg. t.* 262 and 263. *Neuroplatyceros alcornis*, *Fée, Acrost.* p. 120. *Alcornium vulgare*, *Gaudich.* *Platycerium angustatum*, *Desv. Turpin, in Dict. Hist. Nat. cum Ic. (very good).*

Hab. Considered to be abundant in tropical regions of the world, but I fear other species have been mistaken for it. Blume records it in Java, but I have never seen specimens from thence nor from any part of India proper. It abounds in Australia: New South Wales, *Brown, Sieber, Hooker fil., and others*; Hastings River, *Dr. Beckler*, "Tenterfield," lat. 29° S.; Lord Howe's Island, *Mibe and Macgillivray*. Madagascar, *Boivin*. Johanna Island, *Speke, Dr. Kirk (Zambesi Exp.)*, *Hutton* (these specimens from Africa have much larger, almost flabelliform fertile fronds, more compoundly dichotomous, and the areoles of the veins larger). South America!: Tarapota, Eastern Peru, *Spruce, n.* 4729 (fronds larger, segments of the fertile ones much elongated).—This, the first species known to our gardens, is best distinguished by the numerous *erect* fertile fronds. Its geographical distribution is imperfectly known; possibly those who speak of it as inhabiting Norfolk Island, King George's Sound, Timor, and Ombai, are correct.

2. *P. Æthiopicum*, *Hook.*; fronds ample when young canescent all over with stellated sessile and pedicellated hairs; *sterile* ones bifarious suborbicular imbricated variously lobed and sinuated subcoriaceous-membranaceous; *fertile* fronds pendent carnosocoriaceous canescent beneath, shortly petiolate broad-cuneate bifurcate, segments all divaricating, ultimate ones sharply acuminate, sorus dark-brown nearly of the shape of the letter V and usually situated beneath the sinus of the ultimate fork, venation as in *A. alcornis* but the primary veins are more apart.—*Hook. Gard. Ferns, t.* 9. *Neuroplatyceros Æthiopicus*, *Pluk. Almagest.* p. 151. t. 429. f. 2 (*young and very imperfect fertile frond*). *Fée, Acrost.* p. 103. t. 61 (*sterile fronds erect instead of pendent*). *Acrostichum alcornis*, *Sw. Syn. Fil.* p. 12 (*in part*). *Schk. Fil.* i. t. 2 (*copied from Plukenet*). *A. stemaria*, *Beauv. Fl. d'Oware, i.* p. 2. t. 2 (*sterile fronds represented erect*). *Platycerium stemaria*, *Desv. Journ. Bot.* vi. p. 213.

Hab. "Æthiopia" (*Plukenet*); tropical Africa, East and West, mainland and islands, frequent on trees.—Extremely variable in the size both of the sterile and fertile fronds, and in the size and form of the masses of fructification.

3. *P. grande*, J. Sm.; fronds ample bifarious eventually glabrous; *sterile* ones imbricated suborbicular below convex and irregularly sinuato-lobate elongated dilated upwards, deeply and much laciniated or subdichotomously pinnatifid with patent and subinflexed segments; *fertile* ones geminate very large broadly cuneate bipartite suddenly narrowed at the base, the disk soriferous and not produced beyond the sinus, each partition or primary segment of the frond elongated several times dichotomously divided, segments very long loriform, ultimate ones obtuse, venation as in the preceding species but with broader areoles and the free branched included veinlets more frequent, soriferous mass solitary on each frond often very large transversely reniformi-ovoid dark-brown.—*J. Sm. in Hook. Journ. Bot.* iii. p. 402. *Pr. Hook. Fil. Exot.* t. 86. *Acrostichum grande*, *All. Cunn. in Herb. nostr.* *P. biforme*, *Hook. Gen. Fil.* t. 80. *B. (not Bl.)*. *Neuroplatyceros grandis*, *Fée, Acrost.* p. 103.

Hab. Singapore, *Wallich*, 1823. Luzon, *Cuning*, n. 56. North-east Australia, *All. Cunningham* (1829), *Fraser*.—It is only of late years that we have received such specimens of the several species of this magnificent genus, and that the species have been so successfully cultivated in our Ferneries, as to enable us to identify them. I am now satisfied that Dr. Wallich was the first to detect, but not to name, the present one, whose fronds have been found to be 5–6 feet long. The soriferous mass on one of our specimens measures 6 inches in length and 10 in breadth; it is solitary on each of the fronds and formed in the primary sinus of the frond.

4. *P. Wallichii*, *Hook.*; fronds ample bifarious at length glabrous; *sterile* ones imbricated below irregularly sinuato-lobate above elongated dilated deeply and much dichotomously pinnatifid, segments patenti-inflexed; *fertile* fronds geminate very broadly flabellato-cuneate twice-dichotomous suddenly narrowed at the base, each primary division or segment bears a sorus on the disk (hence there are two sori on each frond) which is semicircular and very much produced in the sinus itself, the terminal segments beyond the soriferous disk are several times dichotomous and pendent, venation as in *P. grande*.—*Hook. in Gard. Chron. for Oct.* 1858. p. 765, and in *Fil. Exot.* t. 97. *Acrostichum alci-corne*, *Wall. Cat.* n. 19 (*not Linn.*).

Hab. Malay Peninsula, on trees: banks of the Irawaddy and of the river Martaban, *Wallich*, 1826 and 7, *Griffith*; Moulmeine, *Parish*.—In many respects allied to *P. biforme*, where, however, the soriferous disk is an unchanged portion of the frond, as to its appearance on the upper side; in *P. Wallichii* its presence is indicated in an altered appearance of the upper side of the frond, and it is protruded, if I may use the expression, so as to be scutiform (forming a semicircle

or half-shield, an approach to the more distinct shield of *P. grande*), and this is convex and rises or inclines upwards at the margin, giving a very peculiar character to the fertile fronds. Our specimens all bear two or more rarely three sori on each of the fronds.

5. *P. biforme*, Bl.; fronds ample bifarious at length glabrous; *sterile* ones imbricated very thick and corky towards the base subrotund but very varied in circumscription lobed and sinuated at the margin coarsely reticulato-venose; *fertile* fronds (geminate?) rather long-stipitate of great size 5-6 and more feet long! from a subcuneate base repeatedly dichotomous, the segments loriform flaccid and pendent, fertile segments quite different from the rest forming a large reniform stipitate shield-like receptacle 6-8 inches or more in diameter wholly soriferous beneath except at the margin.—*Bl. Fil. Jav.* p. 14. t. 18. *Pr. J. Sm. Hook. in Gard. Chron. for 1858.* p. 761. *Neuroplatyceros*, *Fée, Acrost.* p. 104. *Acrostichum*, *Sw. Syn. Fil.* p. 112. *Willd. Sp. Pl. v.* p. 111. *A. fuciforme*, *Wall. Cat. n.* 20. *Platycerium coronarium*, *Desv.*

Hab. Malay Islands: Java, *Blume*; Singapore, *Wallich*, n. 20; Borneo, *Barber*, *Motley*. Philippine Islands, *Cuning*, n. 156. Malay Peninsula, *Norris*. Mergui, *Griffith*—At once recognized by the segment which bears the sorus being changed into a large, reniform, shield-like receptacle, quite different from the rest of the fertile frond; hence Swartz's name of *biforme*. Wallich's name of *fuciforme* would be more appropriate, for some of the young segments of the fertile fronds much resemble *Fucus nodosus*.

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## APPENDIX.

Omitted under CYATHACEÆ, and which should have been placed after  
*Alsophila*, at p. 56 of Vol. I.

### GEN. 4. MATONIA, Br.

(HOOK. GEN. FIL. TAB. XLIII.)

*Sori* dorsal, solitary at the inferior base of a segment of the frond, surrounded by a cluster of obscure anastomosing veins, each of six capsules surrounding the base of a receptacle, which is prolonged and attached at the summit to a hemispherical, firm-membranaceous, umbrella-shaped *involucre*, indistinctly six-lobed, inflexed at the margin, and there de-

ciduous with the receptacle.—Caudex “*creeping.*” Stipites *elongated*. Fronds *very firm and hard-coriaceous, ample, fan-shaped, 1-1½ foot wide, bipartite, each portion subscorpoideo-pinnate*. Pinnæ *all secund, elongate, long-lanceolate, terminal ones gradually smaller, glabrous, often glaucous beneath, deeply pectinato-pinnatifid nearly to the stout costa, linear, bluntly acuminate, the margin reflexed*. Costule *strong*. Veins *copious, very close-placed, elevated beneath, oblique, dichotomous and free*.

1. *M. pectinata*, Br. in Wall. Pl. Asiat. Rar. i. t. 16.

Hab. Malacca, summit of Mount Ophir, *Farquhar, Walker, n. 21, Sir Wm. Norris, Griffith, Cuning, n. 383*.—Of late years I have received copious specimens of this magnificent and rare Fern, and am satisfied that the genus belongs to the Cyatheaceous group.

It is with no ordinary feeling of satisfaction that the Author has brought to a conclusion the five volumes constituting the 'Species Filicum' (accompanied by 304 plates, representing 522 species), 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 had access. This title is further explained in the preface to the first volume as including—

1. Such species as the author has had the opportunity of examining himself;

2. Those which have been universally received, and which his own observations have tended to prove are justly to be regarded as distinct by references to satisfactory figures; and

3. A considerable number, of which he has neither seen figures nor specimens, but which are given upon the authority of botanists of name and character, though often imperfectly characterized.

It is just twenty years since the author commenced this laborious undertaking,\* and during its progress his chief regret has been that he has, especially in the earlier volumes, introduced so many species merely on the ground of the name and celebrity of the author, going as far back as Swartz (1806) and Willdenow (1810), and which still remain in the category of *species non ritè cognitæ*. Of late years the number of bad or dubious species has increased to a most alarming degree, consequently increasing the difficulty of the tyro in determining the good species; so that we require to be more guarded than ever in the selection of what ought to be maintained and what discarded. The excellent Dr. Grisebach has prefaced his account of the genus *Hymenophyllum*, in his 'Flora of the British West Indian Islands,' with the remark, "I omit several West Indian species of *Hymenophyllum* and a few of *Trichomanes*, named by Dr. Van den Bosch upon the same

\* The Work was issued in parts, and the *first volume* in four parts was completed and issued January 1, 1846.

*materials as I had before me*, and published lately after his death (in the *Nederl. Kruidk. Arch.*, 1863), because, judging from the descriptions, they are not well founded."

It is indeed well known that there is a tendency among botanists of the present day to increase the number of species (and genera too) on insufficient characters; an error often indeed arising from incomplete specimens, and want of suites of specimens, which would show the modifications to which they are liable.

On the limits of the *genera* of Ferns, it is needless for me to remark here. Every author is entitled to entertain his own views upon the subject. I have endeavoured to maintain such as may best preserve the natural grouping of the species, and be attended with the least difficulty to the working student.

It was the intention of the Author, as announced in a note at p. 1 of Vol. I., to have included the *Osmundaceæ* and *Ophioglossaceæ* (generally arranged among the PSEUDO-FILICES, *Willd.*), or *anomalous Ferns*; not numerous indeed; but the fifth volume is sufficiently bulky without them; and the Author is preparing, if his life and health be spared to him to accomplish, a volume, to be entitled "SYNOPSIS FILICUM," with *brief* characters of the sections, genera, and species of Ferns (omitting all really dubious ones), with general habitats, and references, in every instance, for synonyms, more full localities and general information, figures, etc., to the pages of the present Work; to which will be added all needful corrections and alterations, also the additional species (not a few) which have come into the author's possession during the twenty years this present Work has been in progress; and, lastly, including the *Schizæaceæ*, *Osmundaceæ*, *Marattiaceæ*, and *Ophioglossaceæ*; thus constituting a needful supplementary volume to the 'Species Filicum,' and in itself constituting a handbook, especially useful to travelling pteridologists, who would find it impracticable to carry about with them so voluminous a Work as the present.

*Royal Gardens, Kew,*  
Jan. 1, 1864.



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## INDEX

OF THE

## TRIBES, SUBORDERS,\* AND GENERA

OF THE FERNS CONTAINED IN THE FIVE VOLUMES  
OF THIS WORK.

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\* It is requested that at p. 1 of vol. i., SUBORDER I., and at p. 14, SUBORDER II., may be corrected with a pen to TRIBE I. and TRIBE II.; that at p. 14 TRIBE I., and at p. 56, TRIBE II., be corrected to SUBORDER I. and SUBORDER II.; that at p. 57, SUBTRIBE I., and at p. 58, SUBTRIBE II., and at p. 64, SUBTRIBE III., be corrected to SECT. I., II., and III.; and, lastly, at p. 202, TRIBE IV. be corrected to SUBORDER IV. Thus only will the four *Suborders* in that volume correspond in value to the divisions (or *Suborders*) in the four succeeding volumes.—*W. J. H.*

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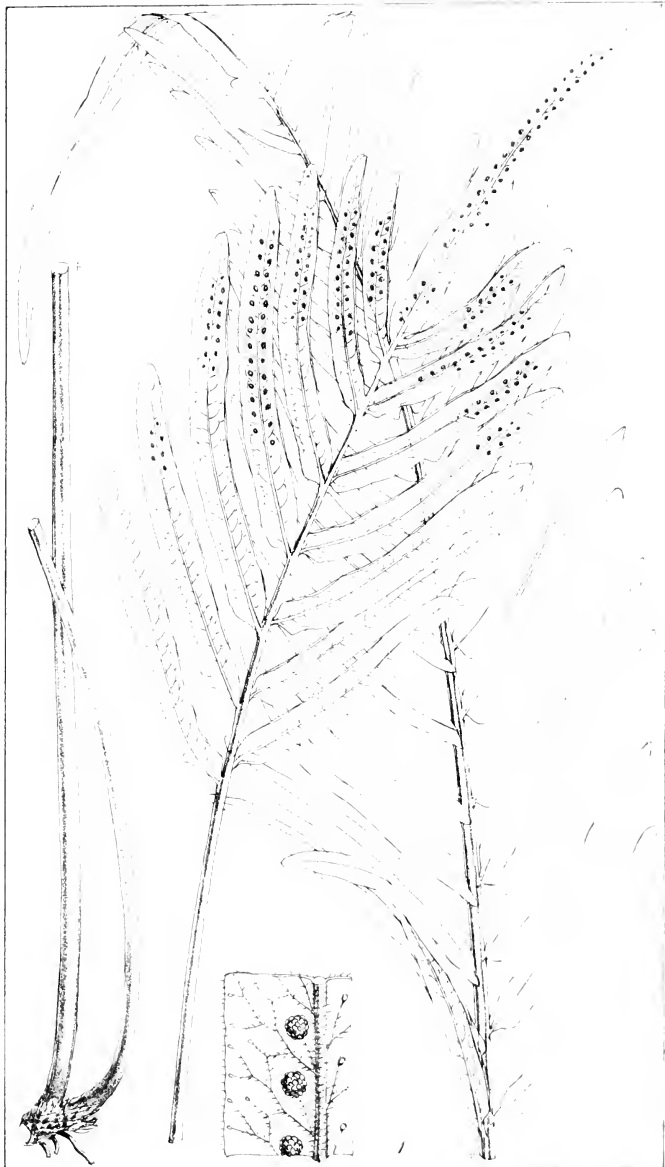
END OF INDEX TO THE WHOLE FIVE VOLUMES.



TAB. CCLXXXI.

POLYPODIUM (GONIOPHLEBIUM) CHACAPOYENSE, *Hook.*—p. 29.

Portion of a paleaceous caudex, stipites, and sterile and fertile fronds; *nat. size.* Fig. 1. Portion of a fertile frond, showing the venation and sori; *magnified.*





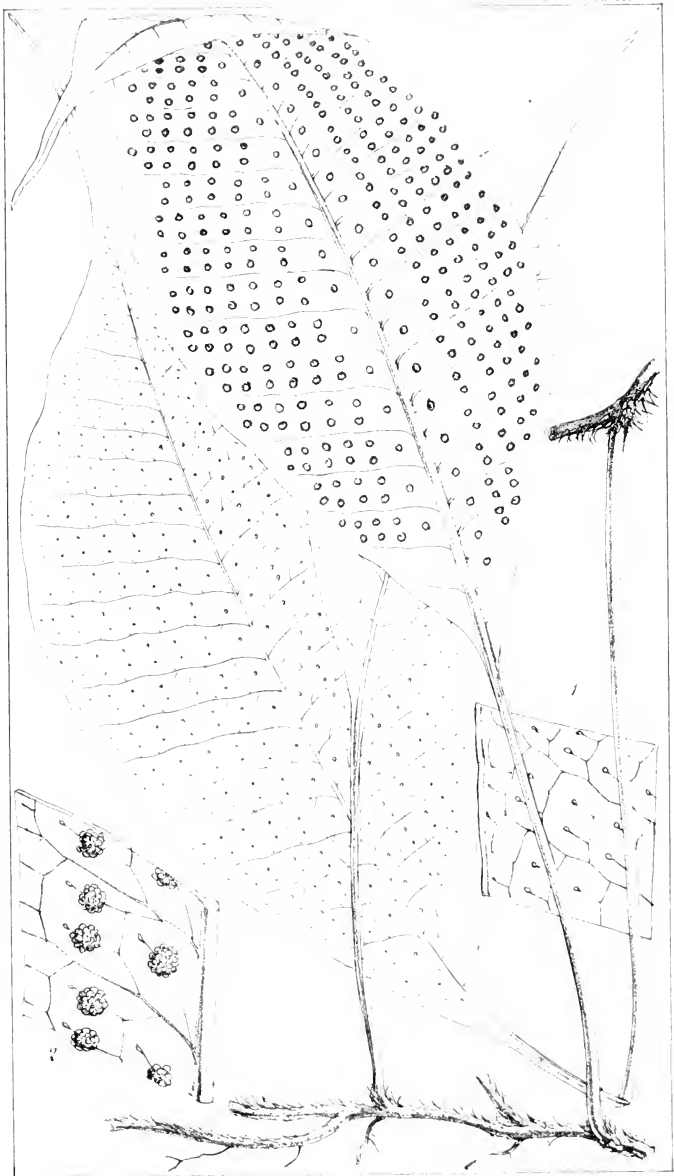




TAB. CCLXXXII.

POLYPODIUM (CAMPYLONEURON) SPHENODES, *Kze.*—p. 42.

Caudex and sterile and fertile fronds; *nat. size.* Fig. 1. Portion of a sterile frond, showing the venation; and Fig. 2. Portion of a fertile frond, with its venation and sori; *magnified.*



Fitch, del. et lith

S. angustifolia





TAB. CCXXXIII.

A. *ASPIDIUM (POLYSTICHUM) MELANOCHLAMYS*, *Féc.*—p. 35.

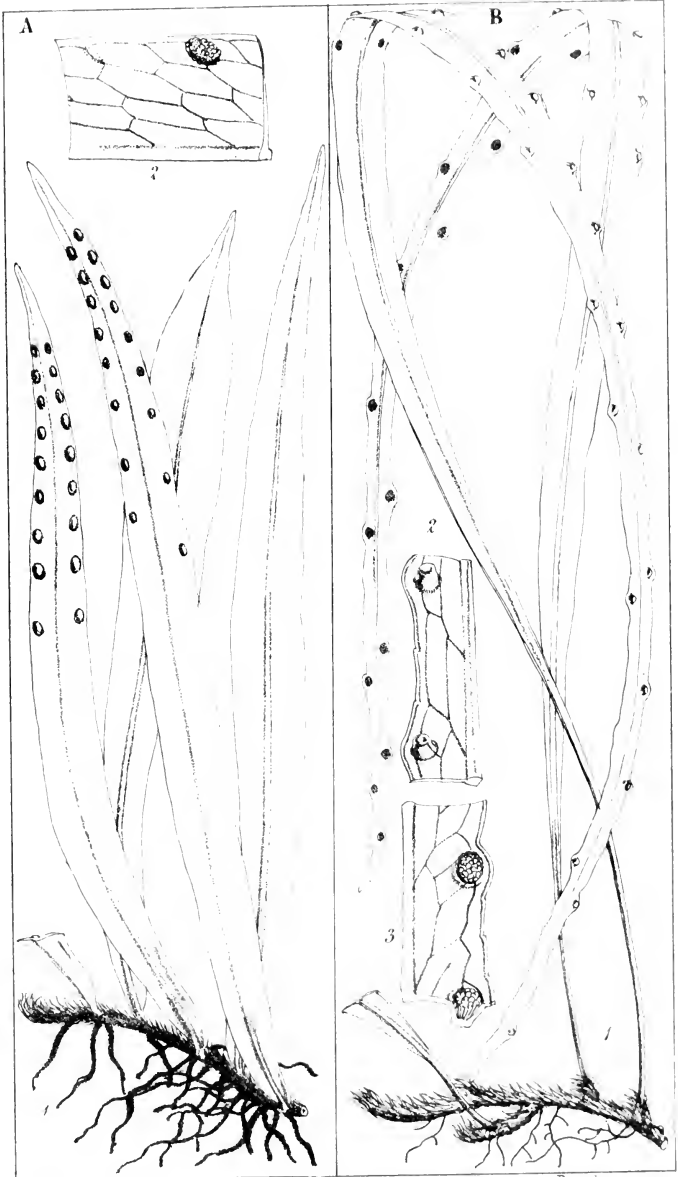
Fig. 1. Portion of a caudex, base of a stipes, and portion of a fertile frond: *nat. size.* Fig. 2. Fertile pinnule. Fig. 3. Two segments of a fertile pinnule. Fig. 4. Involucre; *more or less magnified.*

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.*



Fitch, del., et lith.

Pamphn, m.p.







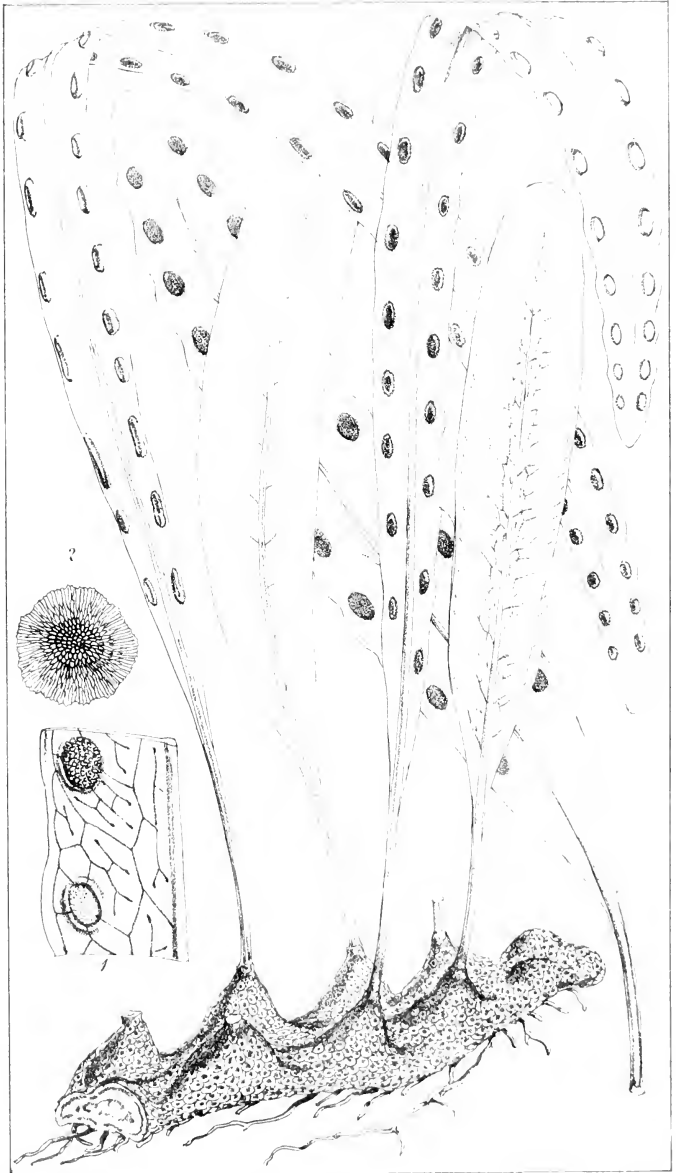
TAB. CCLXXXIV.

(By mistake, CCLXXIV. on the *Plate.*)

POLYPODIUM (PHYMATODES) SINUOSUM, *Wall.*—p. 61.\*

Caudex and sterile and fertile fronds; *nat. size.* Fig. 1. Portion of a fertile frond, showing venation and two sori; *magnified.* Fig. 2. Scale from the caudex; *magnified.*

\* At the end of the first line at p. 62, add “(TAB. CCLXXXIV.).”







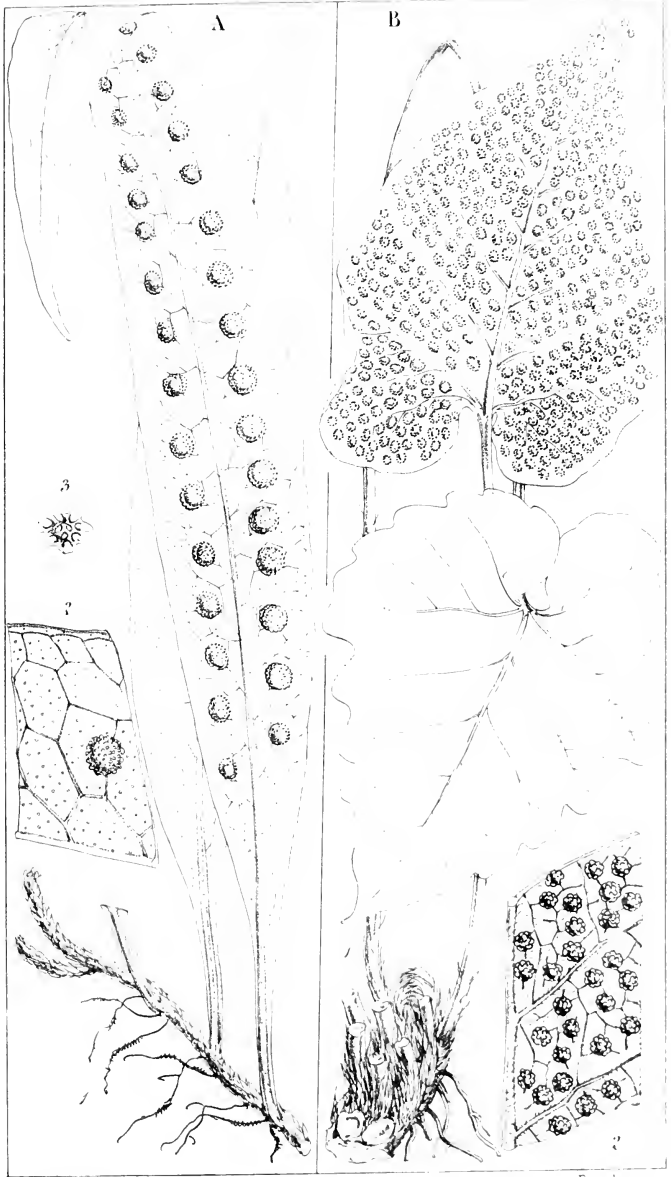
TAB. CCLXXXV.

A. POLYPODIUM (PHYMATODES) FUSCO-PUNCTATUM, *Hook.*—p. 69.

Fig. 1. Caudex and fertile fronds; *nat. size.* Fig. 2. Portion of a fertile frond, showing the venation and a sorus; *magnified.* Fig. 3. Appearance of one of the dots on the frond; *much magnified.*

B. POLYPODIUM (PHYMATODES) LABRUSCA, *Hook.*—p. 73.

Fig. 1. Portion of a caudex and fertile and sterile fronds; *nat. size.* Fig. 2. Portion of a fertile frond, showing the venation and sori; *magnified.*









Tab. CCLXXXVI.

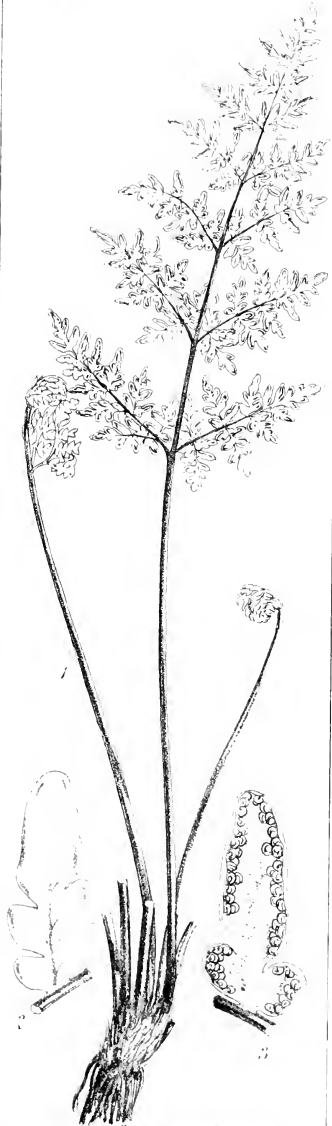
A. NOTHOCHLENA CHILENSIS, *Hook*—p. 112.

Fig. 1. Fertile fronds; *nat. size*. Fig. 2. Upper, and Fig. 3. Under side of fertile pinnæ; *magnified*.

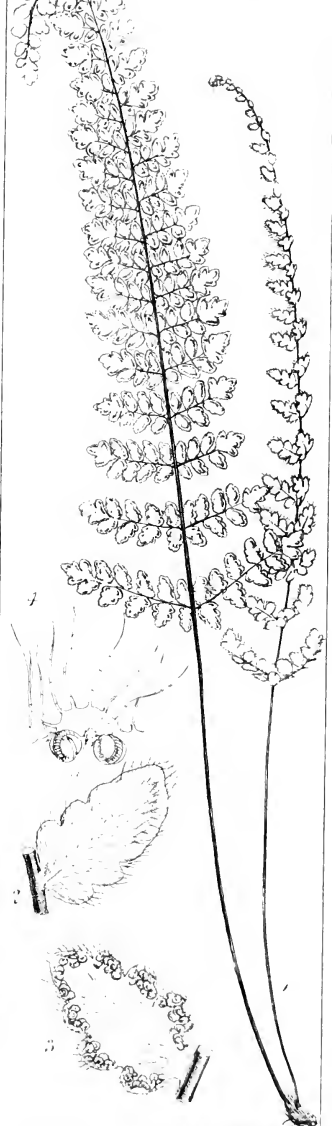
B. NOTHOCHLENA POHLIANA, *Kze.*—p. 118.

Fig. 1. Fronds; *nat. size*. Fig. 2. Upper, and Fig. 3, under side of fertile pinnæ; *magnified*. Fig. 4. Portion of a fertile pinna, showing the hairs on the margin; *more magnified*.

A



B







TAB. CCLXXXVII.

A. NOTHOCHLÆNA FRAGILIS, *Hook.*—p. 114.

Fig. 1. Fronds; *nat. size.* Fig. 2. Pinna; *magnified.* Fig. 3.  
Pinnule; *magnified.*

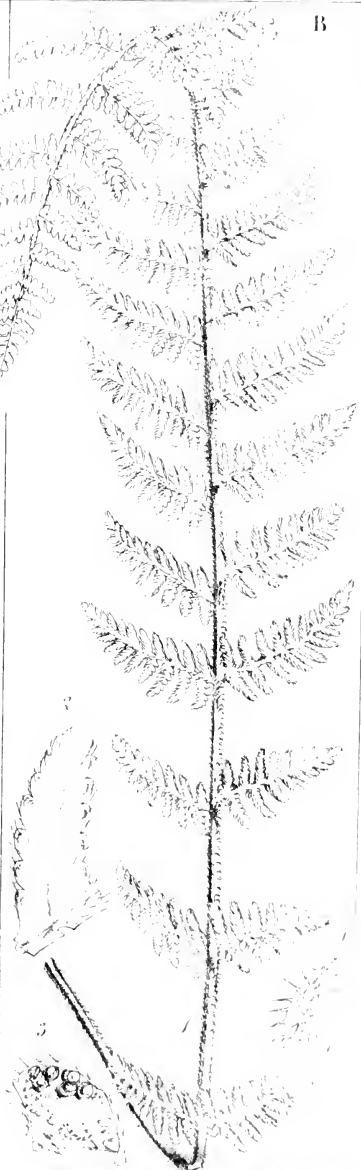
B. NOTHOCHLÆNA ASCHENHORNIANA, *Kze.*—p. 117.

Fig. 1. Fertile frond; *nat. size.* Fig. 2. Upper side of a pinnule; *magnified.* Fig. 3. Portion of a fertile pinnule, seen from beneath: *more magnified.*

A



B









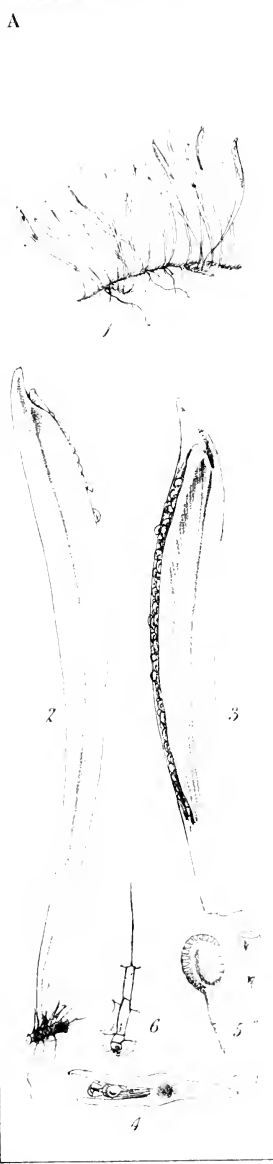
Tab. CCLXXXVIII.

A. MONOGRAMME (EUMONOGRAMME) DAREÆCARPA, *Hook.*—p. 121.

Fig. 1. Caudex and fronds; *nat. size.* Fig. 2. Anterior, and Fig. 3, posterior side of a fertile frond; *magnified.* Fig. 4. Transverse section of a frond, showing the sorus; *magnified.* Fig. 5. Capsule and abortive ditto; *much magnified.* Fig. 6. Scale from the caudex; *much magnified.*

B. MONOGRAMME (EUMONOGRAMME) ROSTRATA, *Hook.*—p. 122.

Fig. 1. Portion of a caudex, with fertile fronds; *nat. size.* Fig. 2 and 3. Front and back view of a fertile frond; *magnified.* Fig. 4. Transverse section of a fertile frond; *magnified.*







TAB. CCLXXXIX.

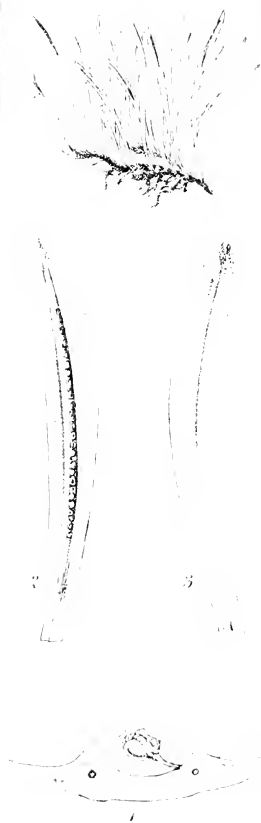
A. MONOGRAMME (EUMONOGRAMME) SUBFALCATA, *Hook.*—p. 122.

Fig. 1. Caudex and fertile fronds; *nat. size.* Fig. 2 and 3. Back and front view of a portion of a fertile frond; *magnified.* Fig. 4. Transverse section of the fertile portion of a frond; *more magnified.*

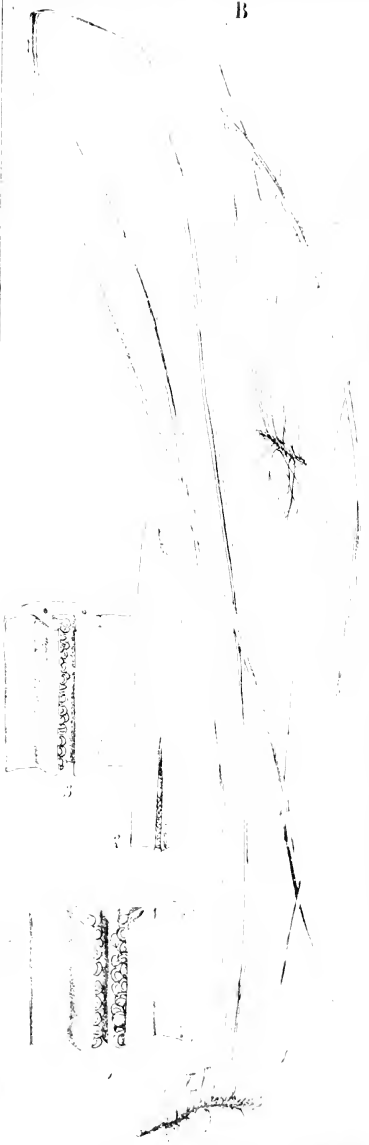
B. MONOGRAMME (EUMONOGRAMME) JUNGHUHNII, *Hook.*—p. 123.

Fig. 1. Portions of the caudex, with fronds; *nat. size.* Fig. 2. Portion of a fertile part, including the upper portion of a sorus; *magnified.* Fig. 3. Portion of a solitary sorus; and Fig. 4, portion of a double sorus; *more magnified.*

A



B





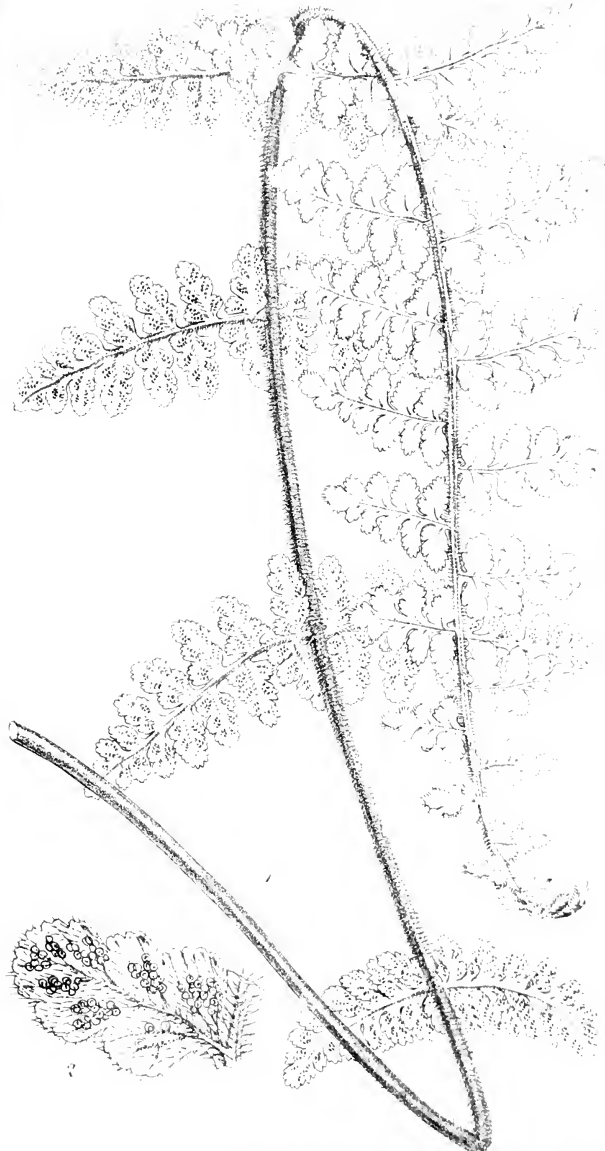




TAB. CCXC.

GYMNOGRAMME (EUGYMNOGRAMME) MATHEWSEI, *Hook.* — p.  
128.

Fig. 1. Fertile frond; *nat. size.* Fig. 2. Fertile pinnule; *magnified.*



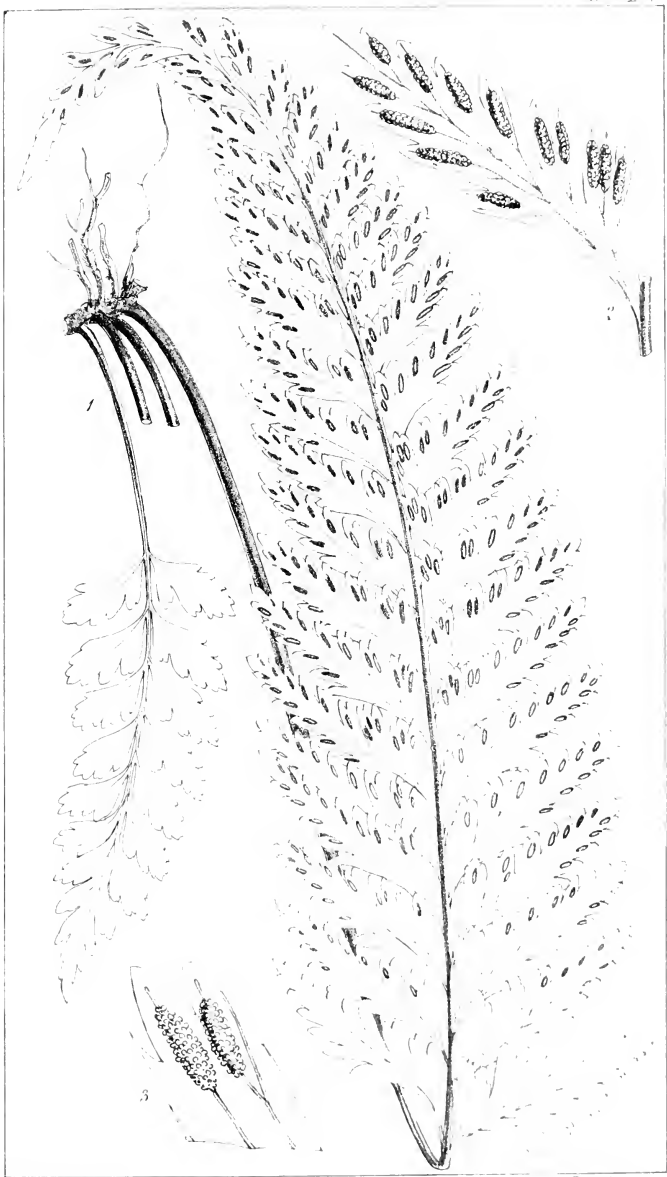




TAB. CCXCI.

GYMNOGRAMME (EUGYMNOGRAMME) DECIPIENS, *Metten.*—p. 132.

Fig. 1. Portion of a caudex, with sterile and fertile fronds; *nat. size.* Fig. 2. Fertile pinna; *magnified.* Fig. 3. Sori and veins; *more magnified.*





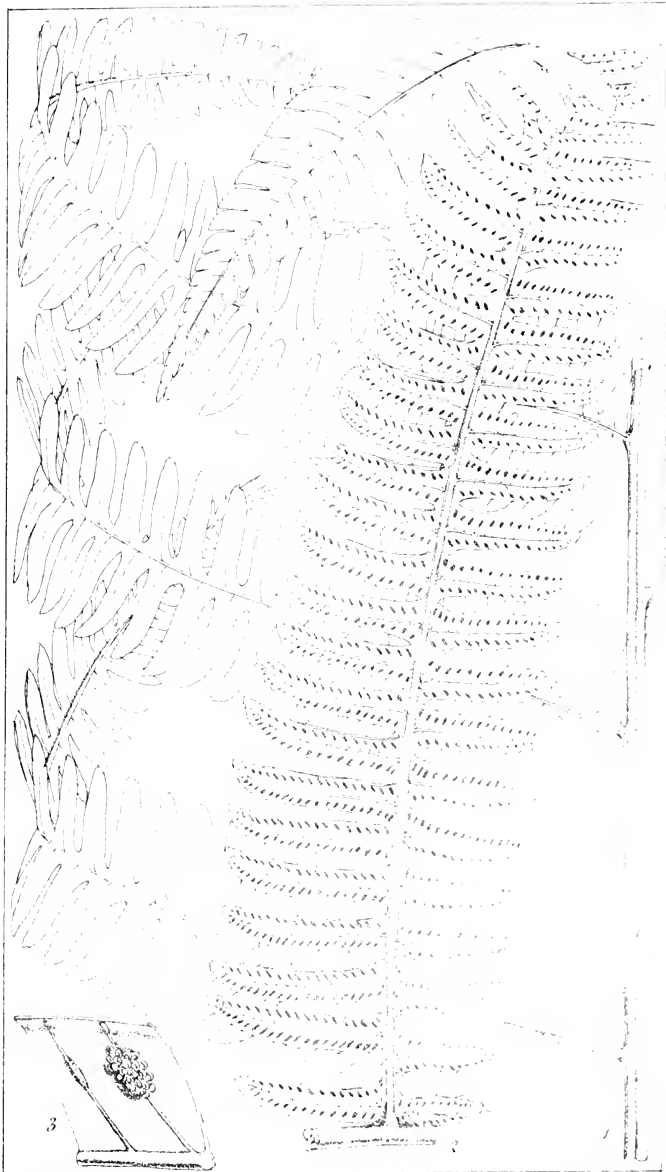




TAB. CCXCII.

GAMNOGRAMME (EUGYMNOCRAMME) GRACILIS, *Hew.*—p. 139.

Fig. 1. Portion of a sterile frond; and Fig. 2. Pinna of a fertile frond; *nat. size.* Fig. 3. Portion of a fertile segment, showing venation and sori; *magnified.*



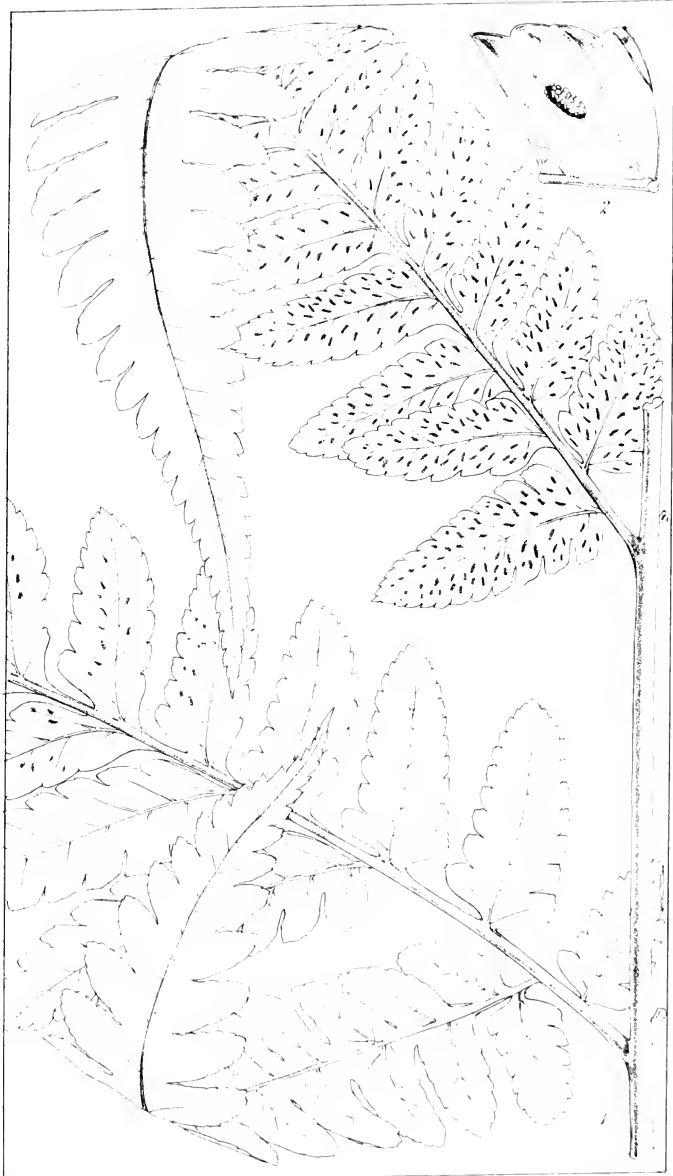




Tab. CCXCIII.

GYMNOGRAMME (EUGYMNOGRAMME) SUBSIMILIS, *Hook.*—p. 142.

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. Portion of a fertile pinnule, with sorus; *magnified.*









TAB. CCXCIV

GYMNOG: AMNE (EUGYMNOGRAMME) DECURRENTI-ALATA, *Hook.*

—p. 142.

Fig. 1. Lower primary pinna of a fertile frond; and Fig. 2, apex of a frond; *nat. size.* Fig. 3. Portion of a pinnule, with sori; *magnified.*



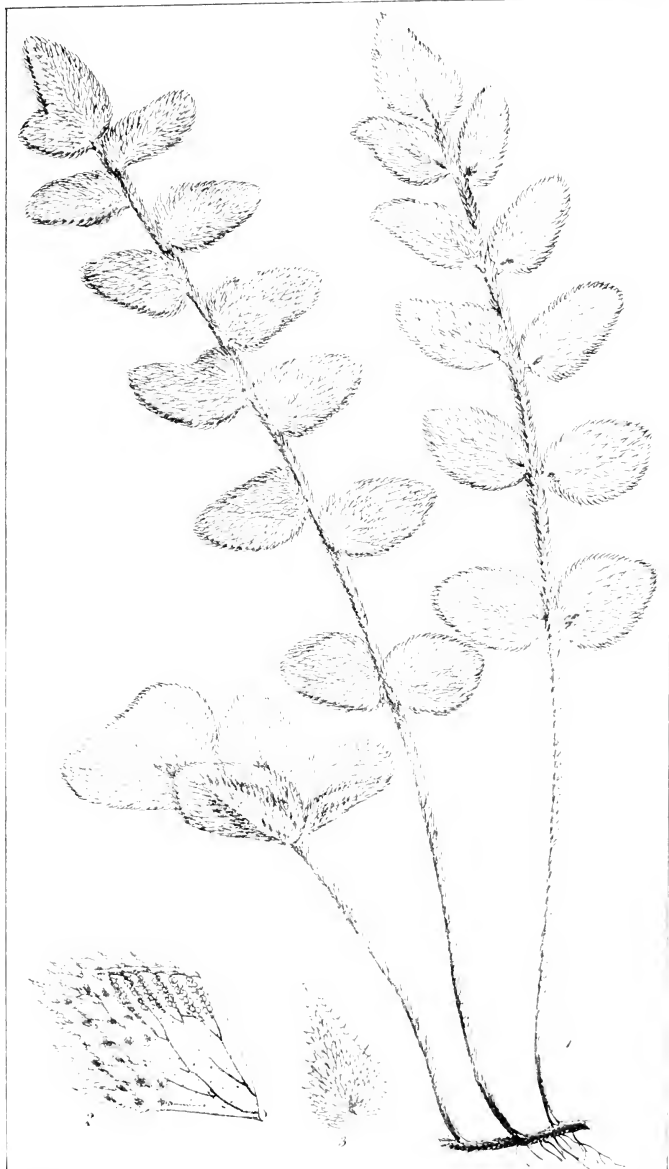




TAB. CCXCV.

GYMNOGRAMME (EUGYMNOGRAMME) MUELLERI, *Hook.*—p. 143.

- Fig. 1. Portion of a caudex and fertile fronds; *nat. size.* Fig. 2. Portion of a fertile pinna, with the scales partially removed, showing the veins and sori; *magnified.* Fig. 3. Scale of the frond; *more magnified.*





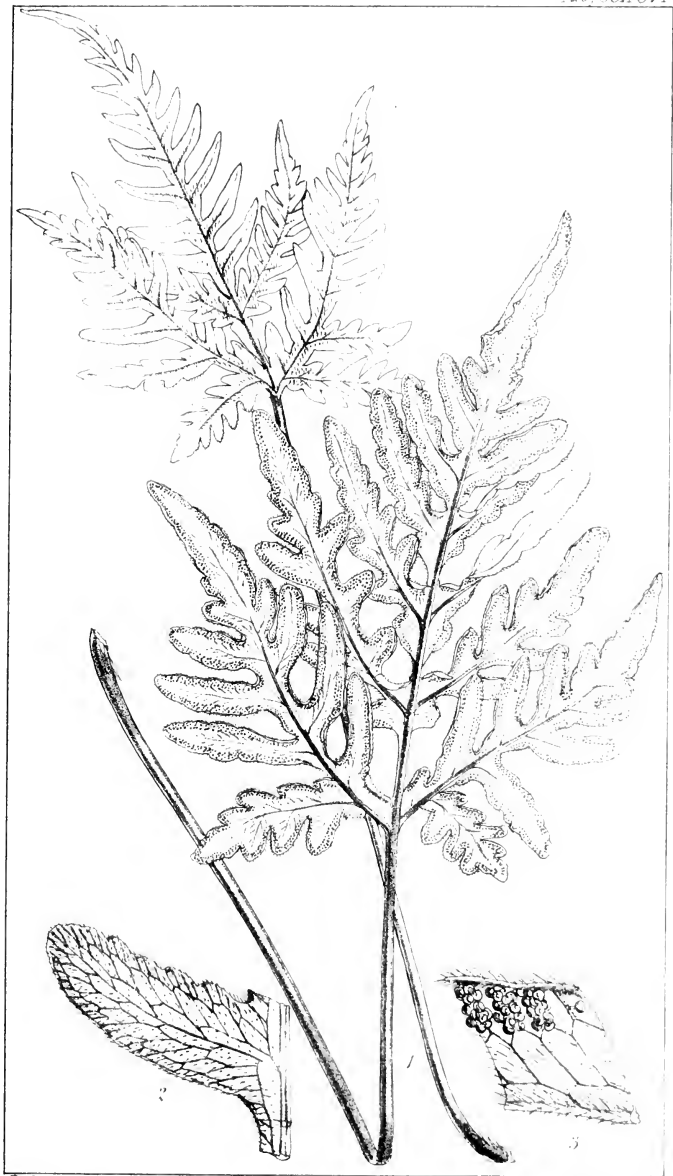




TAB. CCXCVI.

GYMNOGRAMME (DICTYOGRAMME) PODOPHYLLA, *Hook.*—p. 152.

Fig. 1. Sterile and fertile fronds ; *nat. size.* Fig. 2. Upper side of a segment, showing the venation ; *magnified.* Fig. 3. Portion of a fertile segment, showing venation and sori ; *more magnified.*



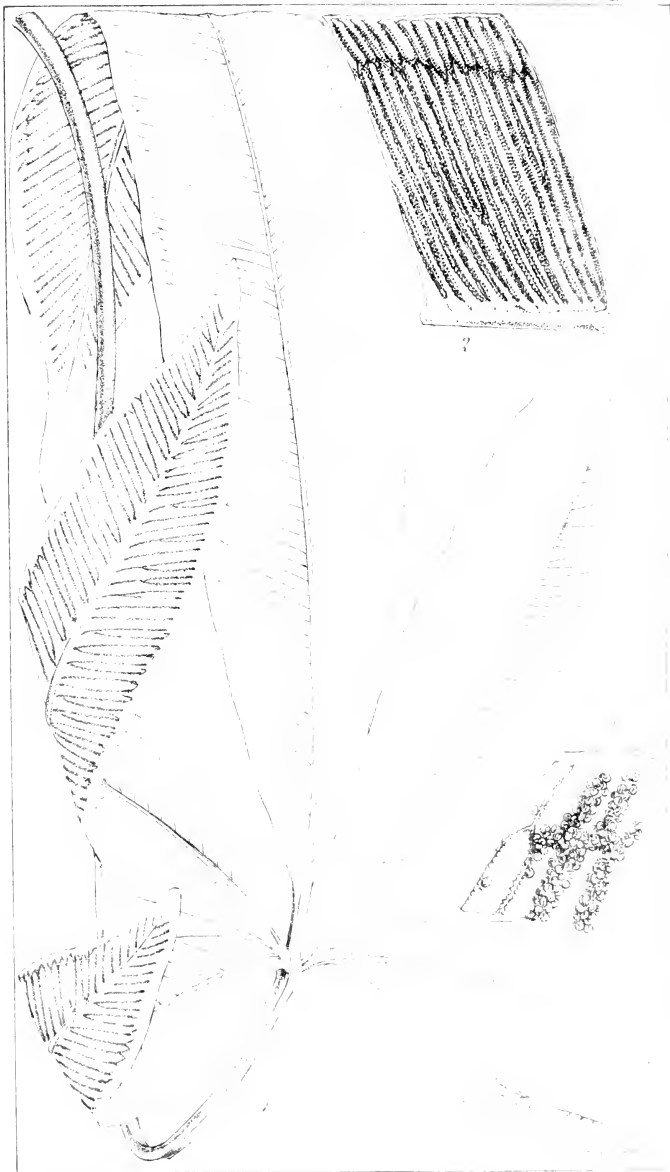




TAB. CCXCVII.

GYMNOGRAMME (SYNGRAMME) QUINATA, *Hook.*—p. 152.

Fig. 1. Fertile frond ; *nat. size.* Fig. 2. Portion of a pinna, with sori ; *magnified.* Fig. 3. Fertile portion of a pinna, from near the margin ; *more magnified.*









Tab. CCXCVIII.

GYMNOGRAMME? (SYNGRAMME?) SUBTRIFOLIATA, *Hook.*—p. 152.

Fig. 1. Sterile frond; *nat. size.* Fig. 2. Portion of a sterile pinna, showing the venation; *magnified.*



3

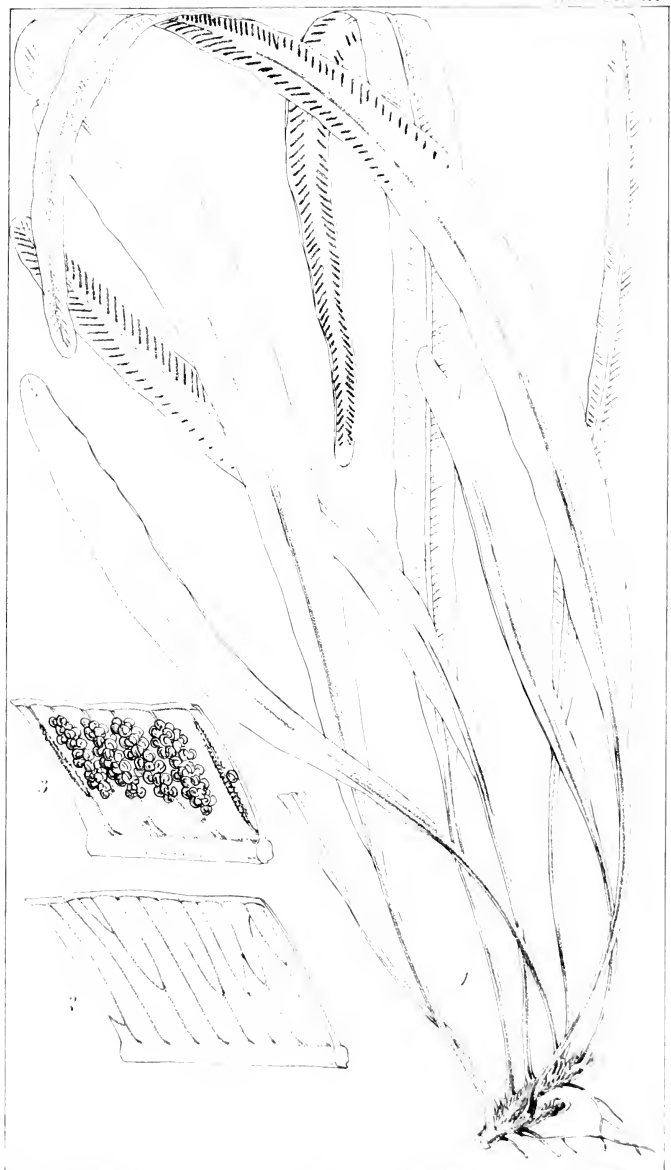




TAB. CCXCIX.

GYMNOGRAMME (SYNGRAMME) OBTUSIFOLIA, *Hook.*—p. 153.

Fig. 1. Portion of a caudex, with sterile and fertile fronds ; *nat. size.* Fig. 2. Portion of a sterile frond, showing the venation ; *magnified.* Fig. 3. Portion of a fertile frond, with sori ; *magnified.*



*Phragmites communis*

PLATE 1



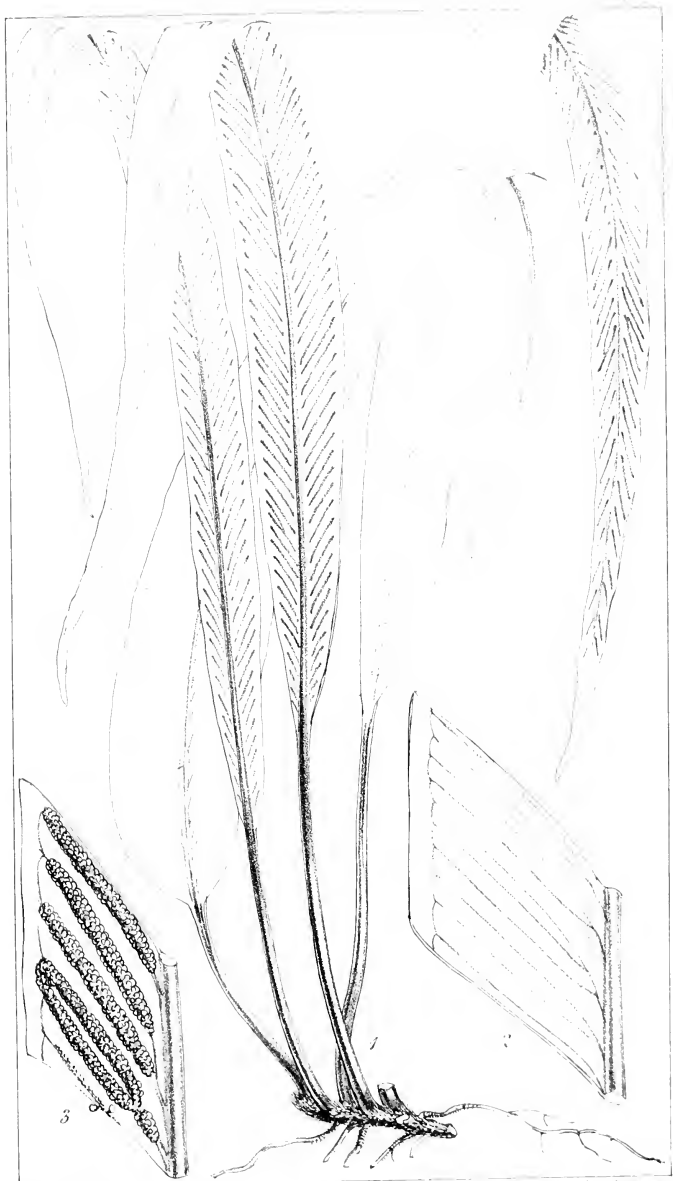




TAB. CCC.

GYMNOGRAMME (SYNGRAMME) LOBBIANA, *Hook.*—p. 153.

Fig. 1. Portion of a caudex, with sterile and fertile fronds ; *nat. size.* Fig. 2. Portion of a sterile frond, showing the venation ; *magnified.* Fig. 3. Portion of a fertile frond, with sori ; *magnified.*



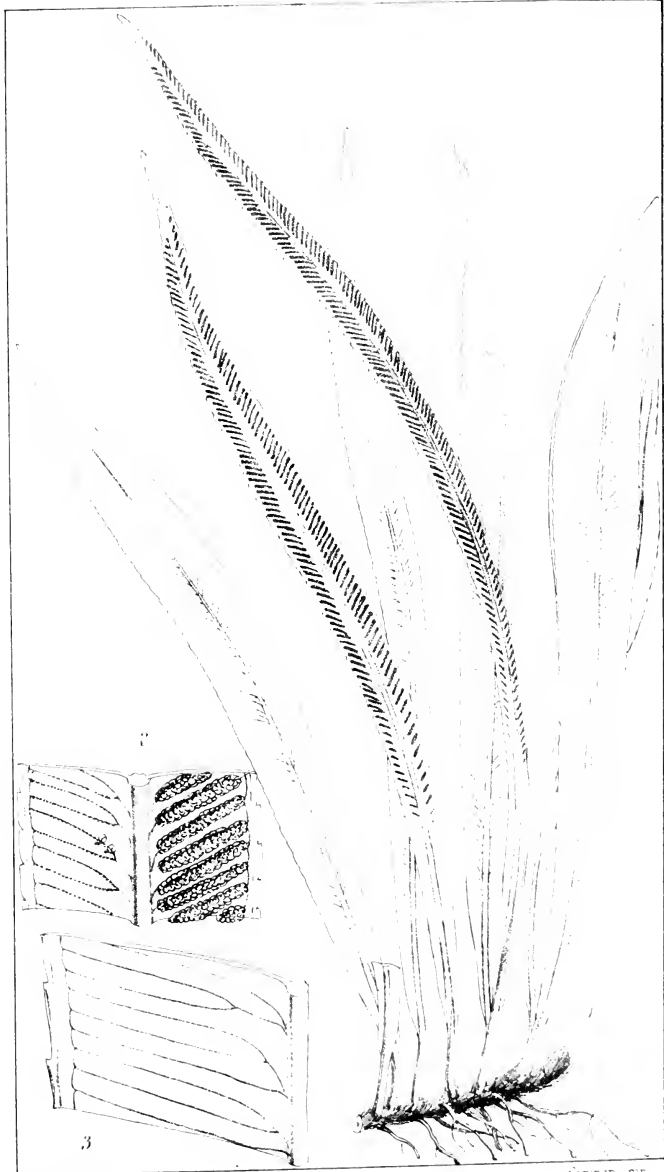




Tab. CCCI.

GYMNOGRAMME (SYNGRAMME) BORNEENSIS, *Hook.*—p. 154.

Fig. 1. Caudex and sterile and fertile fronds; *nat. size.* Fig. 2. Portion of a fertile frond, with sori; and Fig. 3. Portion of a fertile frond, showing the venation; *magnified.*



3



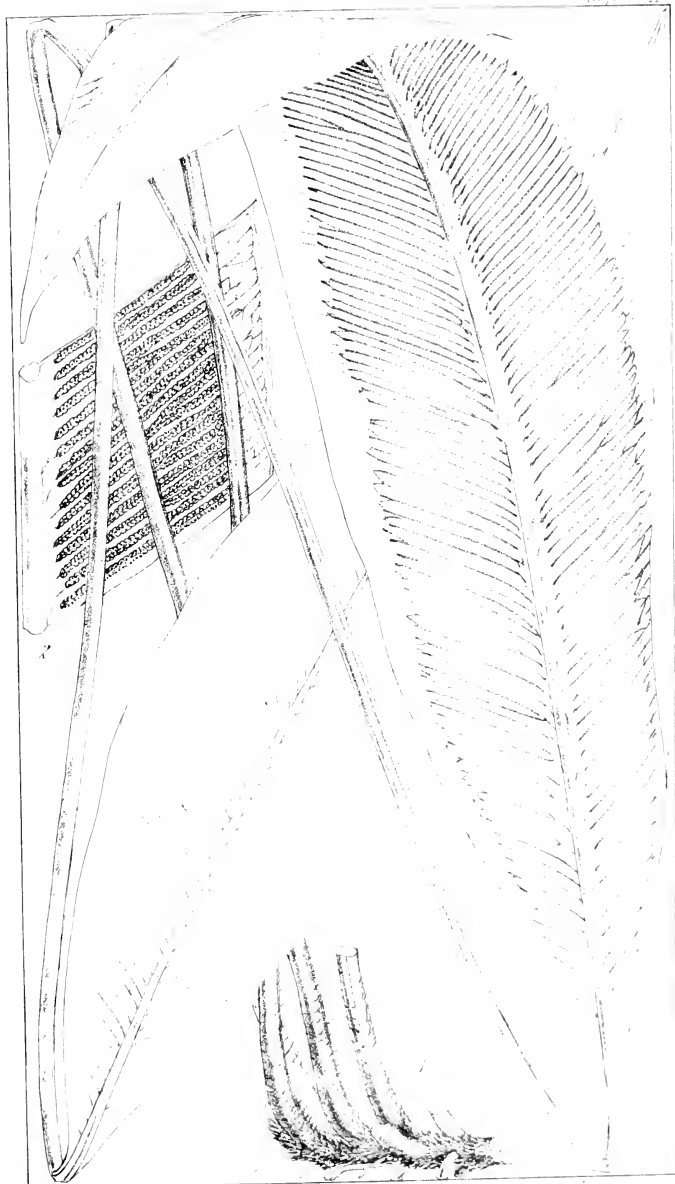




TAB. CCCII.

GYMNOGRAMME (SYNGRAMME) WALLICHII, *Hook.*—p. 155.

Fig. 1. Portion of a caudex, with sterile and fertile fronds; *nat. size.* Fig. 2. Portion of a fertile frond, with sori, showing the venation; *magnified.*



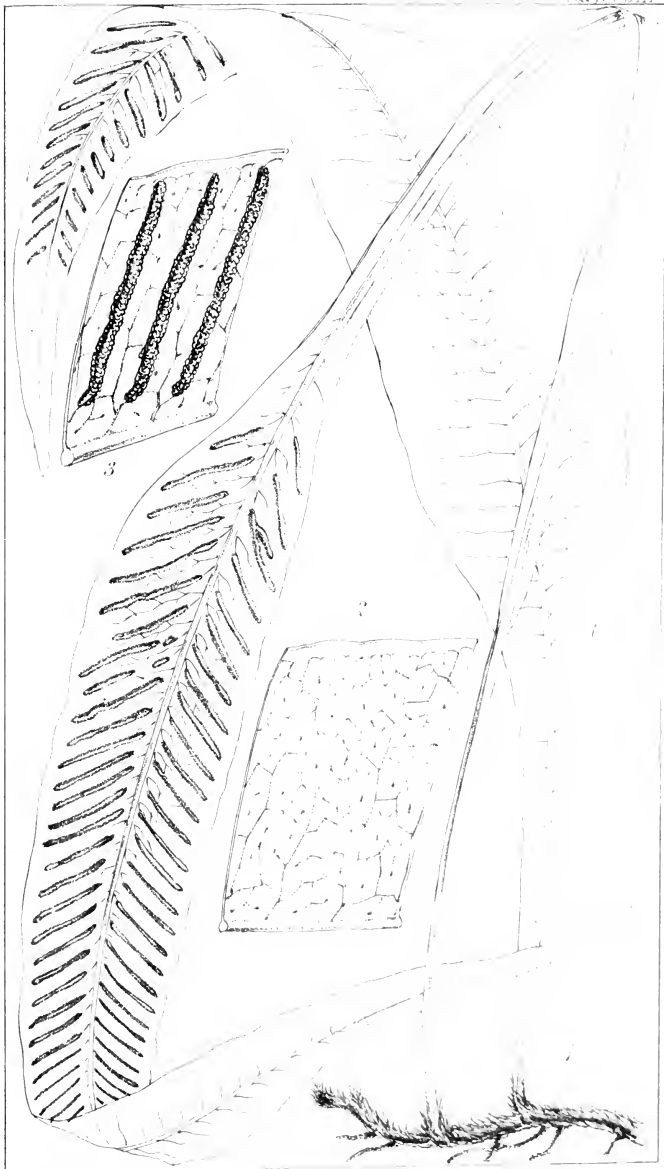




Tab. CCCIII.

GYMNOGRAMME (SELLIGUEA) WRIGHTII, *Hook.*—p. 160.

Fig. 1. Caudex and fertile fronds; *nat. size.* Fig. 2. Portion of a sterile frond, showing the venation; *magnified.* Fig. 3. Portion of a fertile frond, showing its venation and sori; *magnified.*









TAB. CCCIV.

ACROSTICHUM (GYMNOPTERIS) TRICUSPE, *Hook.*—p. 272.

- Fig. 1. Portion of a caudex, with sterile frond ; *nat. size.* Fig. 2. Fertile frond ; *nat. size.* Fig. 3. Portion of a sterile frond, showing the venation ; and Fig. 4, portion of a fertile frond, with sorus, some of which is removed to show the venation ; *magnified.*

