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GARDEN FERNS;

OR,

COLOURED FIGURES AND DESCRIPTIONS,

WITH THE

NEEDFUL ANALYSES OF THE FRUCTIFICATION AND VENATION,

OF A SELECTION OF

Exotic Ferns adapted for Cultivation

IN THE

GARDEN, HOTHOUSE, AND CONSERVATORY.

BY

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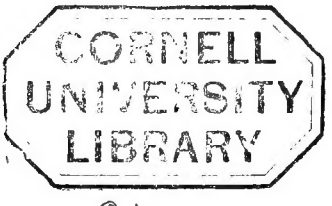
THE DRAWINGS BY WALTER FITCH, F.L.S.

LONDON:

LOVELL REEVE & CO., 5, HENRIETTA STREET, COVENT GARDEN.

1862.



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LINCOLN'S INN FIELDS.

CONTENTS.

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Plate 1.

POLYPODIUM (§ Drynaria) Heracleum, *Kze.*

Hogweed-leaved Polypody.

Polypodium (Drynaria) *Heracleum;* caudex stout, repent, densely clothed with very long, slender, silky, subulate, exceedingly acuminated, bright tawny scales; fronds three to four and more feet long, oblong-lyrate, elongated, coriaceous, acuminate, the base sessile, broad, subcordiform, and subpellucid, and moderately sinuato-lobate; above this, in the contracted portion, becoming regularly pinnatifid, widening upwards, where the segments are a foot or a foot and a half long, three to four inches broad, oblong acuminate, everywhere glabrous; midrib of the segments stout, primary lateral veins pinnated, secondary ones transverse, nearly equidistant, curved, forming oblong areoles filled up with anastomosing veins, which have subquadrangular areoles and free veinlets; all the veins prominent beneath; sori very copious, in two rows within each primary transverse areole and almost always terminating a short free veinlet, rarely seen upon the union of two or more veinlets.

Polypodium Heracleum. *Kze. in Bot. Zeit. v.* 6. *p.* 117. *Metten. Polypod. p.* 117. *t.* 3. *f.* 52 (*a small section of a segment, showing the venation and sori only*).

Polypodium morbillosum. *Hort.* (*fide Metten.*) *not Presl.*

Drynaria morbillosa. *J. Sm. Journ. of Bot. v.* 3. *p.* 398, *and Cat. of Cult. Ferns, p.* 14 (*excluding the synonyms of Presl*).

Hab. Malay Islands, Java, *Zollinger, n.* 977 (*Metten.*), *Wm. Lobb.* Isle Samar, Philippines, *Cuming, n.* 330.

We spoke of this plant in our volume of 'Exotic Ferns,' under tab. xci., *Polypodium* (Drynaria) *coronans*, Wall., the near ally of that almost equally magnificent species, as the *P. morbillosum* of Presl, the name by which we received the living plant from the Dutch gardens; but a slight comparison of the venation and position of the sori here and in the figure of *P. morbillosum* as given by Presl in his 'Reliquiæ Hænkeanæ' will satisfy any one that the two are far from being identical. Both, according to Mettenius, are in cultivation in the German gardens, but the true *morbillosum* is quite unknown to us.

Like the *P. coronans*, the ample fronds form a splendid crown to the thick creeping caudex, which latter is densely clothed with rich golden-tawny, long, subulate, membranaceous scales; that of *P. coronans* has scales of the same colour indeed, but broader, strongly reticulated, and quite villous. Though the general form

be the same in the two, here the number of segments is fewer, and they are very much larger and wider. But the more striking difference is in the venation and sori. Here, where the areoles are seen to have a double row of several sori, the corresponding areoles in *coronans* have only one sorus in each.

Fig. 1. Portion of a tuft of fronds on an exceedingly reduced scale. 2. Small fertile segment,—*nat. size.* 3. Portion of a segment, showing the venation and sori,—*magnified.*

W. Fitch, del et lith.

Vincent Brooks, Imp

Plate 2.

TRICHOMANES (§ Hymenostachys) elegans.

Elegant Bristle-Fern.

Trichomanes (Hymenostachys) *elegans;* caudex very short, indistinct, erect, with copious, long, wiry, descending roots; stipites tufted; sterile fronds numerous, broad-lanceolate, deeply pinnatifid, oblong-obtuse, serrated, acuminate or frequently terminating in a very prolonged rachis, proliferous at its apex; fertile fronds one to three, broad-linear, margined on both sides with the very numerous, coadunate, cylindrical, obtusely bidentate involucres; receptacle elongated, filiform, much exserted; veins anastomosing.

Trichomanes elegans. *Rudge, Pl. Guian. p.* 24. *t.* 35 (*excl. the fertile frond of* T. spicatum). *Hook. Gen. Fil. t.* 108 (*not Exot. Fl.*). *Hook. Gen. et Sp. Fil. v.* 1. *p.* 114.

Hymenostachys diversifrons. *Bory in Dict. Class. d'Hist. Nat. v.* 8. *p.* 462, *cum Ic.*

Hymenostachys elegans *and* osmundioides. *Presl, Hymenoph. p.* 11.

Feea Boryi. *Van den Bosch, Syn. Hymenophyll. p.* 7.

Hab. Tropical America, terrestrial; in shady woods, French Guiana, *Poiteau, Leprieur.* British Guiana, *Schomburgk, n.* 1030. Valley of the Amazon, *Spruce, n.* 2182, 2944. Isthmus of Panama, *Cuming, n.* 1127; *Seemann, n.* 648; *Fendler, n.* 388. Trinidad, *Purdie, Cruger.* Jamaica, *Purdie.*

Presl speaks of this as "planta in herbariis rarissima;" but its place of growth in damp shady woods, together with its lurid colour, have probably caused it to be overlooked. In form and texture it is very attractive; and though we do not agree with Presl in regard to its rarity in tropical America, no Fern is probably more rare and so little known as this in cultivation, and it only requires to be seen to be appreciated. It is but of late years that any of the *Hymenophyllaceæ* have been seen in cultivation; but owing to the success that has attended the attempts with our native species of *Hymenophyllum* and *Trichomanes*, the far more beautiful tropical species have recently been imported, and the stoves of Kew, and still more, we believe, of Mr. Backhouse of York, already exhibit many lovely species from the West Indies. We are indebted to Dr. Cruger, the Government Botanist, Trinidad, for plants of the *Trichomanes* here figured. This and all its congeners succeed best under a bell-glass or in small Wardian cases, even within a damp tropical fernery.

Except in size, the present species is very constant to the cha-

racters above given: we possess specimens scarcely five inches long, including the root, and all intermediate grades to eighteen or twenty inches. The caudex is generally small and indistinct, perpendicular, clothed with numerous thick wiry roots. The largest of our sterile fronds is two and a quarter inches broad, divided almost to the base into spreading segments finely serrated at the margins; often the midrib is prolonged for some inches into a tail-like point, proliferous at the extremity. The fertile fronds are always much longer than the sterile one, narrower, linear and entire, the whole margin formed of the closely compacted and coadunate involucres, from which the columella or receptacle (its base clothed with capsules) is much exserted. It is the general prolongation or exsertion of these bristle-shaped receptacles that has suggested the English specific name.

Fig. 1. Sterile and fertile fronds (from the same root),—*nat. size.* 2. Fertile frond,—*nat. size.* 3. Portion of a segment of the sterile frond. 4. Section of a fertile frond. 5. Involucre laid open, showing the capsules surrounding the columella. 6. Capsule:—*all magnified.*

W Fitch del et lith

Vincent Brooks imp.

Plate 3.

HYMENOLEPIS SPICATA, *Pr.*; var. *brachystachys.*

Serpent's Tongue Hypolepis; short-spiked *var.*

HYMENOLEPIS *spicata*; caudex creeping, scaly, tuberculate; fronds approximate, shortly petiolate, articulated upon a bulb-like tubercle, lanceolate, coriaceo-carnose, contracted at the apex into a linear appendage, varying much in length, and soriferous; veins copiously anastomosing, areoles with free veinlets.

Var. *macrostachys*; fronds narrow, and spike much elongated.

HYMENOLEPIS spicata. *Presl, Epimel. Bot. p.* 159. *J. Sm. Kew Ferns, p.* 1; *Cult. Ferns, p.* 7. *Hook. Exot. Ferns, t.* 88.

HYMENOLEPIS ophioglossoides. *Kaulf. Enum. Fil. p.* 146. *t.* 1. *f.* 9 (*figure bad*). *Blume, Enum. Fil. Jav. p.* 200. *Kze. in Schk. Fil. Suppl. p.* 99. *t.* 47. *f.* 1.

HYMENOLEPIS revoluta. *Bl. En. Fil. Jav. p.* 201. *Kze. in Schk. Fil. Suppl. p.* 101. *t.* 47. *f.* 2. *Presl, Epimel. Bot. p.* 160.

HYALOLEPIS ophioglossoides *and* revoluta. *Kze. in Linnæa, v.* 23. *pt.* 2. *p.* 258. *Metten. Fil. Hort. Lips. p.* 28.

ACROSTICHUM spicatum. *Linn. Suppl. p.* 444. *Cav. Præl.* 1801. *n.* 569. *Sm. Ic. ined. t.* 49.

ONOCLEA spicata. *Sw. Syn. Fil. p.* 110 *and* 303.

SCHIZÆA spicata. *Sm. Act. Taur. v.* 5. *p.* 53.

LOMARIA spicata. *Willd. Sp. Pl.* 5. *p.* 289.

GYMNOPTERIS spicata. *Presl, Tent. Pterid. p.* 244. *t.* 11. *f.* 7.

Var. *brachystachys*; fronds broader, spike short, very obtuse (TAB. NOSTR. 3).

HAB. India, especially the islands of the Eastern Archipelago, and the Pacific Islands, Ceylon, Bourbon, Mauritius, Assam and Khasya, Churra and Sikkim, Philippine Islands, Java, Penang, Society and Fiji Islands, and Solomon's Group; Brisbane, North Australia.

(See 'Exotic Ferns,' t. lxxxviii., for more particular localities of the species.)

The ordinary form of this plant is well represented and fully described in the 'Exotic Ferns' above quoted, and from garden specimens which differ in no respect from native ones. Another form, that here given, is also cultivated at Kew from plants received from the Leipzig Garden, under the name of *H. ophioglossoides*, but from what locality is not stated. The numerous fronds are very uniform in their great breadth, and in the singularly short and broad spike; so different at first sight from the ordinary state of the plant, that persons familiar with the Fern

tribe have supposed it to be distinct. The numerous specimens in my herbarium do contain specimens with fronds as large as those here figured, and some with the spikes so short, as to satisfy me that, though this may be a form produced by cultivation, it is only a variety of *H. spicata;* and these specimens further serve to convince me that only two distinct species of the genus are yet known, viz. *H. spicata* and *H. platyrhynchos* (figured in our Ic. Plant. p. 142).

With regard to the place of this genus in the system, the young fructifications on the living plants have almost satisfied me that Willdenow was not far wrong when he referred it to *Lomaria*, or Presl, in his 'Tentamen Pteridologiæ' (the best and soundest of all his Fern publications), who placed it in his genus *Gymnopteris* (see *Gymnopteris quercifolia*, 'Exotic Ferns,' tab. lxxxi.). I think it is impossible to look at figs. 2 and 3 of the present Plate, without recognizing a true indusium or involucre, exactly as in *Lomaria*, and a very broad one too. It is true that in age the involucres become patent, forced back by the copious capsules, and then the fertile portion has quite an acrostochoid appearance. Indeed, if the whole frond of our plant (instead of the apex only) became fertile, we should have (save in the venation) a *Lomaria* very much resembling the entire-fronded forms of *Lomaria Patersoni* (see 'Exotic Ferns,' t. xlix.).

PLATE 3. Sterile and fertile fronds of *Hymenolepis spicata*, var. *brachystachys*. Fig. 1. Portion of the sterile frond, showing the venation,—*magnified*. 2. Fertile portion, young, the sorus still concealed by the involucre,—*natural size*. 3. Portion of a spike, with the involucre bursting open and showing the numerous capsules, mixed with the copious peltate scales,—*magnified*. 4. Capsule; and 5. Peltate scales,—*more highly magnified*.

W Fitch, del et lith.

Vincent Brooks, Imp

Plate 4.

GYMNOGRAMME TRIFOLIATA, *Desv.*

Ternate-leaved Gymnogramme.

GYMNOGRAMME *trifoliata;* tall, erect, rigid; caudex shortly creeping; stipes stout (and the rachis), bright castaneous, glossy, at the base squarrose, with sparse broad-subulate scales; fronds oblong-lanceolate, elongate, pinnate; pinnæ numerous, lower ones petiolate, ternate, upper ones sessile, simple, and, as well as the pinnules, linear-lanceolate, serrulate, naked, or clothed with a yellow or whitish powder beneath; veins oblique, approximate, clothed with the narrow lines of sori, which are at length confluent.

GYMNOGRAMME trifoliata. *Desv. Journ. Bot. v.* 1. *p.* 25, *and in Mém. Soc. Linn. v.* 6. *p.* 214.

ACROSTICHUM trifoliatum. *Linn. Sp. Pl. p.* 1527. *Willd. Sp. Pl. v.* 5. *p.* 119. *Sw. Syn. Fil. p.* 13. *Schk. Fil. p.* 3. *t.* 3. *et* 22.

HEMIONITIS trifoliata. *H. B. K. Nov. Gen. Am. v.* 1. *p.* 4.

TRISMERIA argentea, T. aurea, *and* T. microphylla? (*sterile*). *Fée, Gen. Fil. p.* 165.

PHYLLITIS ramosa trifida. *Sloan, Jam. v.* 1. *t.* 45. *f.* 2.

LINGUA cervina triphylla, etc. *Plum. p.* 123. *f.* 144.

HAB. Abundant in Jamaica, and probably in the West Indian Islands generally; Cuba, *C. Wright.* Brazil, *Sellow.* New Grenada, *Schlim, Fendler, Moritz.* Guatemala, *Skinner.* Peru, *Cuming;* Lima, *Seemann;* Areca, *Lechler;* Tarapota, *Spruce.*

A very noble, erect, and peculiar-looking tropical American Fern, of which many of our native specimens are from three to four feet high, with the stout stipes and the very straight rachis of a rich glossy chestnut colour, the former clothed with brown squarrose scales at the base; most of the pinnæ are ternate, that is to say, each short petiole bears three pinnules; towards the summit of the frond a few of the pinnæ bear two pinnules, but the uppermost ones are all undivided, and, as M. Fée justly observes, resemble the leaves of *Salix viminalis.* The fructification is mostly confined to the pinnæ on the upper half of the frond, where it appears covering the copious forked veins, and so abundant and close-placed as eventually to become confluent, clothing all the back of the frond, then resembling an *Acrostichum,* as it has often been called. These fructifications are accompanied by a pulverulent substance, sometimes yellow, but often white, which is considered to be a waxy secretion from the frond,

but which in all my numerous specimens never appears on the sterile plant, or on the lower and sterile pinnæ.

We cannot agree with M. Fée in the propriety of constituting a new genus of this *Gymnogramme* ("*Trismeria*") still less in making two, or rather three, species dependent on the colour of the powdery secretion, which, as in other genera of Ferns with a similar secretion (see *Cheilanthus argentea* at tab. xcv., and observations thereupon, of 'Exotic Ferns'), varies from almost a pure white to full yellow.

Fig. 1. Very much diminished plant of *Gymnogramme trifoliata*. 2 and 3. Base and apex of a frond,—*nat. size*. 4. Portion of a fertile pinna,—*magnified*.

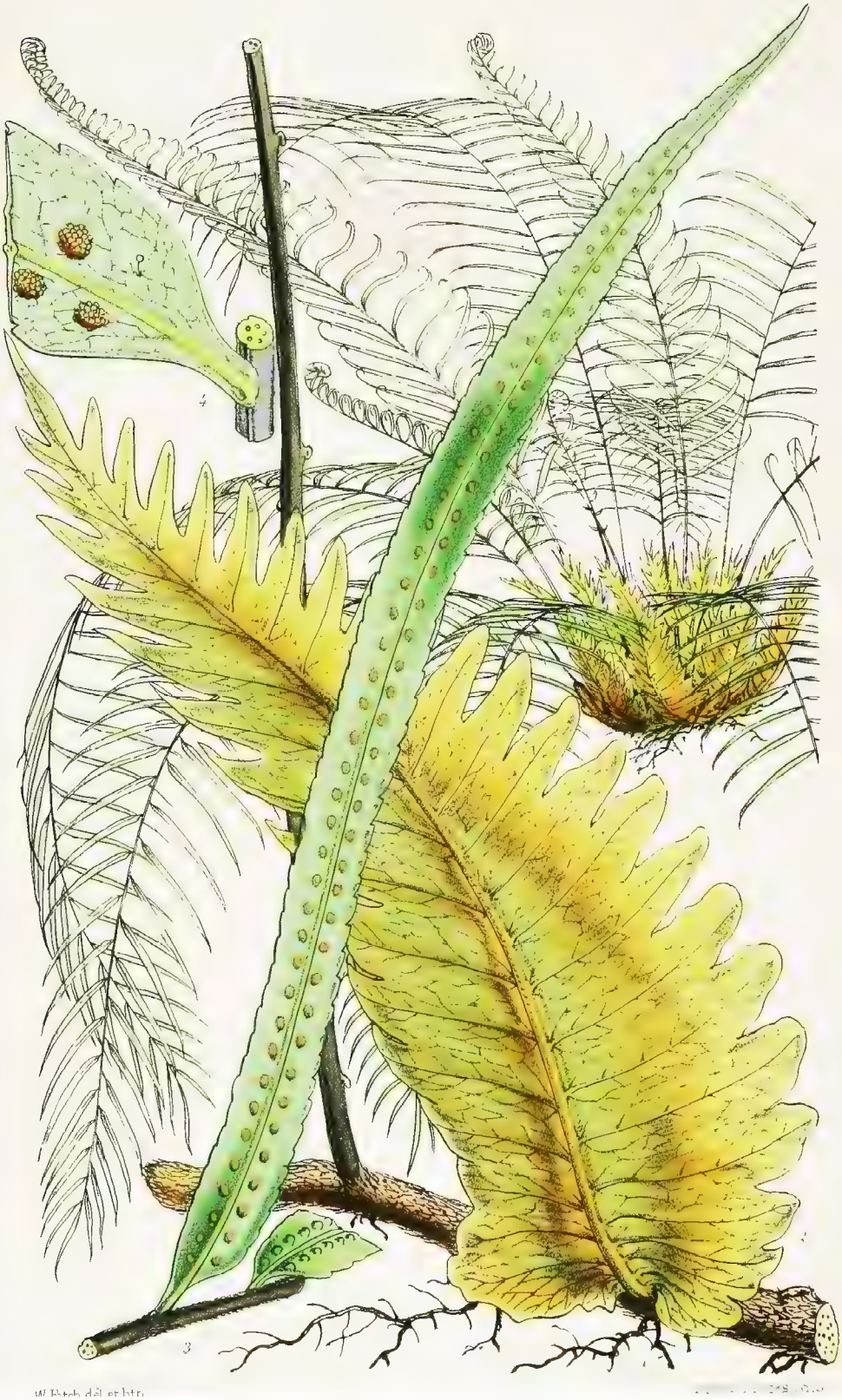
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Plate 5.

POLYPODIUM (§ Drynaria) DIVERSIFOLIUM, *Br.*

Diverse-leaved Polypody.

Polypodium (Drynaria) *diversifolium;* caudex stout, elongated, clothed with ferruginous, long-pointed scales; fronds of two kinds collected together in a sort of coronal tuft; *sterile* ones a span or more long, sessile, oblong-ovate, acuminate, caudate at the base, subpellucid, costate, tawny, lobato-pinnatifid; segments obtuse, ovate, the upper ones lanceolate; *fertile* ones long-stipitate, two to four feet long, lanceolate, pinnate; pinnæ distant, a span to a foot long, linear-lanceolate, acuminate, subpetiolate, coriaceous, green, articulated upon the rachis, with a depression or obscure gland often at the inferior base, crenate; sori sunk in the frond in two rows, one on each side the costa; primary veins in the *sterile fronds* pinnated, secondary ones strongly reticulated with angular, oblong areoles, having no free veinlets; *fertile fronds*, primary veins indistinctly pinnate, the rest irregularly anastomosing, with here and there free veinlets in the areoles.

Polypodium diversifolium. *Br. Prodr. p.* 147.

Polypodium Gaudichaudii. *Bory, Ann. Sc. Nat. ser.* 1. *v.* 5. *p.* 471. *t.* 13. *Bl. Fil. Jav. p.* 158. *t.* 67. *Metten. Polypod. p.* 120. *t.* 3. *f.* 46 *and* 47 (*venation only*).

Polypodium quercifolium. *Willd. Sp. Pl. p.* 170, *not Linn.* (*fide Meltenius*).

Drynaria diversifolia. *J. Sm. Journ. of Bot. v.* 3. *p.* 398; *Cat. of Cult. Ferns, p.* 14.

Drynaria pinnata. *Fée, Gen. p.* 272.

Polypodium glaucistipes. *Wall. Cat. n.* 297.

Hab. Tropical Australia, *R. Brown, F. Mueller.* Pacific Islands, Isle of Rawak, *Gaudichaud.* Isle of Pines, Aneiteum, and Fiji Islands, *Milne, Harvey.* Malay Archipelago, Philippine Islands, *Cuming, n.* 248 *and* 263. Penang, *Wallich.* Java, *Blume, Zollinger.* Malay Peninsula, *Sir Wm. Norris.*

M. Bory de St. Vincent, when he formed his genus *Drynaria*, characterized it as having the fronds of two kinds (biform, not uniform), that is, having the sterile fronds short, broad, sessile, somewhat resembling a dried oak-leaf (whence the name, from δρυς, *an oak*), whilst the fertile fronds are totally different, long-petioled and deeply pinnatifid or pinnated. Mr. J. Smith and Mr. Moore adopt the genus, retaining the above character, but including in it the *Polypodium Heracleum*, Kze. (*Drynaria morbillosa*, J. Sm. and Moore), figured in our last number, Plate 1, and *Polypodium coronans*, Wall. These have perfectly uniform fronds, or, in other words, each frond seems to combine the two; the base in texture and general form resembles the sterile fronds

of true *Drynaria*, the rest upwards gradually becoming fertile. I see no objection to such a union in the group, but it is hard to say how these latter differ from *Phymatodes*. The young undeveloped fertile frond, indeed, as seen in our reduced figure of the *Polyp. Heracleum* (Platè 1), bears a very close resemblance to the fully-developed sterile frond of the present plant; but it gradually changes its character, and is terminated by the fertile portion.

P. diversifolium is remarkable among the true *Drynariæ* in having the fertile fronds pinnated, not pinnatifid. Brown was the first to detect this species in tropical Australia, where Malayan Ferns may be looked for. The present is one among the most beautiful of Ferns in the tropical fern-house of Kew, and is a species that seems peculiar to the Malayan Archipelago and the islands between it and north-eastern tropical Australia, which appears to be its western limit.

Fig. 1 represents a very reduced figure of a tuft, or crown, of sterile and fertile fronds of *Polypodium diversifolium*, Br. 2. Caudex, with a small barren frond, and a stipes of a fertile frond. 3. Fertile pinna :—*natural size.* 4. Base of a fertile pinna, with sori, showing the venation,—*magnified.*

W Fitch, del et lith

Vincent Brooks, Imp

Plate 6.

GYMNOPTERIS DECURRENS, *Hook.* (*not of Fil. Exot.*)

Decurrent Gymnopteris.

GYMNOPTERIS *decurrens;* caudex long, creeping, flexuose, scarcely paleaceous; fronds distant, *sterile ones* broadly ovato-lanceolate, costate, membranaceous, undivided, acuminate, below rather suddenly attenuated and long, decurrent upon the stipes sometimes almost to the base; primary veins pinnate, secondary ones arcuato-transverse, and forming large subquadrangular areoles, which are filled by anastomosing veinlets, whose angular areoles have free, clavate veinlets; stipes short, epaleaceous; *sterile fronds* narrow-linear, elongated, upon very long stipites, undivided, quite scaleless; sori continuous, uniform on each side the costa, and extending partially to the upper side.

LEPTOCHILUS decurrens. *Bl. Enum. Fil. Jav. p.* 206. *Fée, Acrost. p.* 88. *t.* 48. *f.* 2.

ACROSTICHUM rivulare. *Wall. Cat. n.* 2165.

HAB. Java, *Blume.* Penang, *Wallich.* Ceylon, common, *Mrs. Gen. Walker, Gardner, n.* 1157. "Nibari," *Dr. Buch. Hamilton, in Wall.* Assam, *Simons.* Khasya, 2–3000 feet of elevation, *Hooker fil. and Thomson.*

That this is the *Leptochilus decurrens* of Blume, as far as can be decided by Fée's figure, there can be no doubt. We can now record it a native of Penang, as well as of Java and of Ceylon, and of Khasya and Assam, on the continent of India, Bengal Presidency. It has a very close resemblance to the *Lept. lanceolatus* of Fée, inhabiting similar regions in tropical India, but that has narrower sterile fronds and less pronounced primary pinnated veins. All the species of *Leptochilus* known to me are very variable, and I have reason to think that Ceylon specimens which have accompanied some of this *Gymnopt. decurrens,* may be a state of the same plant. Blume compares this species with *Leptochilus axillaris* of Kaulfuss; but that is remarkable for its very long scandent caudex, and is the *Lomaria serpens,* Wall. Cat. n. 32.

Leptochilus of Kaulfuss, as it appears to me, should be united to *Gymnopteris,* and ranked in the acrostichoid Ferns; but in transferring our present species there, I am obliged to sacrifice the name *Gymnopteris decurrens* (figured and described in the 'Filices Exoticæ,' t. 94), and I would suggest that that be called *Gymnopteris Harlandi,* after its discoverer in Hongkong.

FEBRUARY 1ST, 1861.

Our present species is cultivated in the fern-stove at Kew.

PLATE 6. Sterile and fertile fronds of *Gymnopteris decurrens*,—*natural size*. Fig. 1. Portion of the sterile frond, showing the venation. 2. Section from the fertile frond, showing the sori:—*magnified*.

W Fitch, del et lith

Vincent Brooks, Imp

Plate 7.

DAVALLIA (§ Humata) pedata, *Sm.*

Pedate Davallia.

Davallia (Humata) *pedata;* caudex long, creeping, paleaceous; fronds stipitate, very firm and coriaceous, small (three to five inches long), subovate, somewhat five-angled, tripartito-pinnatifid; segments free, oblong, strongly serrate or subpinnatifid, lowest pair free from the rest, and at the inferior base (which is broader than the superior) bipinnatifid; involucres small, semi-orbicular, subterminal and marginal between the serratures, terminating a thickened vein; stipes scaly below.

Davallia pedata. *Sm. Act. Taur. v.* 5. *p.* 414. *Sw. Syn. Fil. pp.* 131 *and* 341 (*excl. Syn. Cav.?*). *Willd. Sp. Pl. v.* 5. *p.* 466. *Wall. Cat. n.* 250. *Hook. Sp. Fil. v.* 1. *p.* 154. *t.* 45 *A. Nees and Bl. Pl. Jav. in Act. Nat. Cur. v.* 11. *t.* 13. *f.* 1.

Davallia subimbricata. *Bl. En. Fil. Jav. p.* 231.

Humata pedata. *J. Sm.*

Pachypleuria pedata. *Fée, Gen. Fil. p.* 322.

Adiantum repens. *Linn. Suppl. p.* 446.

Hab. Malay Archipelago, frequent, Java, *Blume and others.* Singapore and Sylhet, *Wallich.* Ceylon, abundant. Mauritius and Bourbon.

Of the beautiful genus *Davallia* (so named by Sir J. E. Smith, in compliment to a very amiable Swiss botanist, M. Edmund Davall), one hundred and twelve species are enumerated in our 'Genera et Species Filicum,' many of them very ill-defined by authors, it is true, and doubtfully distinct. The present is an elegant and easily recognized member of the genus, and derives its specific name from the word *pedatus*, botanically used to imply a leaf or frond which is "tripartite, and has the lateral divisions again divided in the fore (or anterior) part," thus rendering their two sides very unequal. The fronds vary more in size than in form or râmification: we have seen specimens scarcely more than an inch in length, while some attain to nearly six inches. In cultivation it requires the heat of the stove, and is best kept in a broad pan, so that its long branching caudex may have room to extend over the surface, and attach itself by its fibrous radicles. Cultivated in the warm stove at Kew.

Plate 7 represents a plant of *Davallia pedata*, Sm., with sterile and fertile fronds,—*natural size.* Fig. 1. Fertile segment,—*magnified.* 2. Sori, one with the involucre removed to show the capsules,—*more magnified.*

February 1st, 1861.

W Fitch, del et lith.

Vincent Brooks, Imp

Plate 8.

TRICHOMANES PINNATUM, *Hedw.*

Pinnated Bristle-Fern.

TRICHOMANES *pinnatum;* caudex erect or ascending, with copious wiry roots; fronds long-stipitate, tufted, tall, a span to 1½ foot, ligulato-lanceolate and simple, or ovato- or deltoideo-lanceolate and pinnated with 4–20 oblong- or linear-lanceolate, membranaceous, costate, subentire or strongly serrated pinnæ, from 3–6 inches long, upper ones more or less confluent, terminal one the longest, or it is replaced by an extension of the rachis (for 3 to 8–10 inches) which is then rooting and proliferous; veins strong, pinnated, simple or forked, close-placed, united to a thickened margin; between these are transverse, spurious veinlets (often obsolete or none), free or connecting the adjacent veins; sori very copious, marginal; involucres subpetiolate, cylindrical, a little dilated and shortly 2-lipped above; columella very long.

TRICHOMANES pinnatum. *Hedw. Fil. Gen. et Sp. cum ic. t.* 4. *f.* 1. *Sw. Syn. Fil. p.* 142. *Kze. in Bot. Zeit. v.* 5. *p.* 352. *Linnæa, v.* 21. *J. G. Sturm, in Mart. Fl. Bras. fasc.* 23. *p.* 247; *and in Enum. Plant. Vasc. Crypt. Chil. p.* 39.—Neurophyllum pinnatum, *Presl, Hymenoph. p.* 19. *t.* 4.—Neuromanes Hedwigii, *Van den Bosch, Syn. Hymenophyll. p.* 8.

TRICHOMANES floribundum. *H. B. K. in Willd. Sp. Pl. v.* 5. *p.* 505. *Nov. Gen. Am.* 1. *p.* 25. *Hook. and Grev. Ic. Fil. t.* 9. *Hook. Sp. Fil. v.* 1. *p.* 129.

TRICHOMANES pennatum. *Kaulf. Enum. p.* 261. *Hook. Sp. Fil. v.* 1. *p.* 129. *J. G. Sturm in Mart. Fl. Bras. fasc.* 23. *p.* 248.—Trichomanes spectabile, *Bl. Fil. Luschnath. Bahiens. n.* 33, *and Kze. in Linnæa, v.* 14. *p.* 287 (*fide J. G. Sturm*).—Neurophyllum pennatum, *Presl, Hymenophyll. p.* 19.—Neuromanes Kaulfussii, *Van den Bosch, Enum. Hymenoph. p.* 8.

TRICHOMANES Schomburgkianum. *J. G. Sturm, in Mart. Bl. Bras. fasc.* 21. *p.* 249 (*according to the references to Schomburgk's specimens in my herbarium*).

NEUROMANES immersum. *Van den Bosch, Enum. Hymenophyll. p.* 9?

(*Frond simple.*)

TRICHOMANES Vittaria. *De Cand. in Poir. Encycl. Méth. v.* 8. *p.* 65. *Hook. in Lond. Journ. Bot. v.* 1. *p.* 137. *t.* 5. *J. Sm. in Lond. J. B. p.* 200.—Trichomanes floribundum, β Vittaria, *Splitgerb. En. Fl. Surinam, p.* 52. *Hook. Sp. Fil. v.* 1. *p.* 129.—Neurophyllum Vittaria, *Pr. Hymenoph. p.* 19.—Neuromanes Vittaria, *Van den Bosch, Enum. Hymenoph. p.* 9.

(*Spurious transverse veins wanting.*)

NEUROPHYLLUM abruptum. *Fée,* 1 *Mém.* 14. *t.* 1. *f.* 5 (*small portion of a pinna and name only*).—Neuromanes abruptum. *Van den Bosch, Enum. Hymenoph. p.* 10.—Trichomanes Hostmannianum, *Kze. Bot. Zeit. v.* 5. *p.* 352. *Schk. Fil. Suppl. t.* 110. *J. G. Sturm* (*excellent*).—Neurophyllum Hostmannianum, *Kl. in Linnæa, v.* 18. *p.* 532, *in Mart. Bl. Bras. fasc.* 21. *p.* 250.—Odontomanes Hostmannianum, *Presl, Epimel. Bot. p.* 21.

HAB. Tropical and West Indian Islands; from Mexico (Oaxaca) in the north, to the tropic of Capricorn, south, on both sides the vast continent of America, apparently most abundant under the Equator. Cultivated in the Royal Gardens of Kew.

FEBRUARY 1ST, 1861.

It would be filling our pages unprofitably if I were to give a list of the special localities of this very beautiful tropical American Fern, the most beautiful of a very beautiful genus; they are very numerous. But it does behove me to explain why I have brought together so many synonyms, and no less than three genera, of some of our most able Fern-botanists, of what I cannot but consider, after the most careful investigation, not only to be a true *Trichomanes*, but all relating to one and the same species. I ought to make an exception perhaps in the case of the *Neuromanes immersum* of Dr. Van den Bosch, which I have not seen. I have referred it here doubtfully. It is said by the learned author, "a reliquis" (meaning the species or forms of *Neuromanes*) "differt statura minore, consistentia frondis et structura, soris immersis." The chief character here appears to be the *immersed* sori. I have samples of the common form with involucres partially immersed, while others are almost stipitate on the apex of an excurrent nerve; and a slight modification of cellular structure is common to this as to many other species of Ferns, without affecting specific character.

As regards the genus, Hedwig, the first describer and figurer of this species (hence I erred in adopting Humboldt's and Willdenow's appropriate name of *floribundum* rather than of *pinnatum*), and all authors who have figured this Fern, have represented the secundary transverse veinlets sometimes short and free, and sometimes elongated and uniting with the opposite primary vein. This character Presl considered of so much importance as to require the separation of the plants as a genus, and he named it *Neurophyllum*. Dr. Van den Bosch adopts the genus, but properly changes the name to *Neuromanes*, there being already a *Neurophyllum* amongst *Umbelliferæ*, and he constitutes two divisions or groups,—1, *venæ venulis spuriis transversalibus reticulatim conjunctæ;* and 2, "*venulis transversalibus nullis.*" This latter section includes the *Neurophyllum abruptum*, Fée (*Tr. Hostmannianum*, Kze.); a plant with every character of *Tr. pinnatum*, save the absence of these spurious transverse veinlets; but thus, in reality, removing it from Presl's *Neurophyllum* itself. With great consistency to his principles, Presl constitutes of this another genus, "*Odontomanes*," in his 'Epimeliæ Botanicæ.' My own numerous specimens have satisfied me that the presence of these spurious veinlets, though very general, is by no means to be depended upon; all intermediate stages may be seen, from very copious and evident transverse veinlets, to their entire absence, as Hostmann's Surinam plant, n. 75, New Granada ones from Schlim, n. 228, Purdie's from Santa Martha, French Guiana, from Delessert, and specimens from the Bana River, Valley of the Amazons, Spruce, etc., all of which are more or less destitute of these veinlets.

In regard to *Tr. Vitturia* of De Cand. and others, having no intermediate specimens at the time I published my figure and description of that plant, I expressed myself inclined to adopt De Candolle's view of its distinctness. But in my 'Species Filicum' I united them, and, to my great satisfaction, I have since received perfect specimens of the simple and the pinnated form arising from one and the same root! gathered by Mr. Spruce in the forest near Pará, which I hope will settle the question of *their* identity. *Tr. pennatum*, retained by most authors, is considered by J. G. Sturm to be identical with *Tr. floribundum* of Hook. and Grev. Ic. Fil. t. 9, and I am well satisfied with that plant being the true *pinnatum* of Hedwig. Of *Tr. Schomburgkianum* I possess the very specimens referred to by Sturm (*Schomburgk's* n. 299 and 1155); they exhibit no distinguishing characters whatever.

The species is doubtless variable. Our largest specimen is two and a half feet long, the terminal pinna is a foot long; the costa there runs out six inches (and more) and then bears a solitary pinna. An excurrent rachis instead of a terminal pinna is very common, and sometimes it throws out only roots, at other times young plants; in one case these young plants have no venules, while the parent frond has them sufficiently conspicuous.

PLATE 8. Caudex of *Trichomanes pinnatum*, Hedw., bearing two kinds of fronds, undivided and pinnated,—*nat. size.* Fig. 1. Portion of a pinna, with sori and spurious veins,—*magnified.* 2, 3. Involucres, one laid open to show the attachment of the sorus to the columella,—*more magnified.*

W Fitch, del et lith

Plate 9.

PLATYCERIUM Æthiopicum, *Hook.*

Æthiopian Stag's-Horn Fern.

Platycerium *Æthiopicum;* fronds ample, when young canescent all over with stellated, sessile and pedicellate hairs; *sterile* ones bifarious, suborbicular, imbricated, variously lobed and sinuated, subcoriaceo-membranaceous; *fertile* ones drooping, carnoso-coriaceous, canescent, beneath shortly petiolated, broad-cuneate in circumscription, bifurcate; segments all divergent, ultimate ones sharply acuminated; sorus dark brown, nearly of the shape of the letter V, situated beneath the sinus of the ultimate fork.

Neuroplatyceros Æthiopicus. *Pluk. Almagest. p.* 151. *t.* 429. *f.* 2 (*young and very imperfect fertile frond*). *Fée, Hist. des Acrost. p.* 103. *t.* 64 (*sterile fronds erect, instead of pendent*).

Acrostichum stemaria. *Palisot de Beauv. Fl. d'Oware et du Benin, v.* 1. *p.* 2. *t.* 2. (*very much reduced figure, and with sterile frond erect*).

Platycerium Stemmaria. *Desv. in Act. Soc. Linn. de Paris, v.* 6. *p.* 213.

Acrostichum alcicorne. *Sw. Syn. Fil. p.* 12, *in part* (*not Br.*). *Schk. Fil. v.* 1. *t.* 2 (*copied from Plukenet*).

Hab. Tropical Western Africa, "Æthiopia" (*Plukenet*), Oware, on old Mangrove-trees only, *Palisot de Beauvois.* Guinea Coast, *Afzelius, Leprieur.* Senegambia, *Heudelot, n.* 764 (*Herb. Nostr.*). Sierra Leone, *Vogel, Captain Babington, Dr. Kirk,* etc. Niger, probably abundant, *Vogel, Barter* (at Idda, on rocks). Fernando Po, Prince's Island, Nun river, *Gustav Mann, Vogel, Barter.* Tropical Africa, south of the Line, *Dr. Curror.*

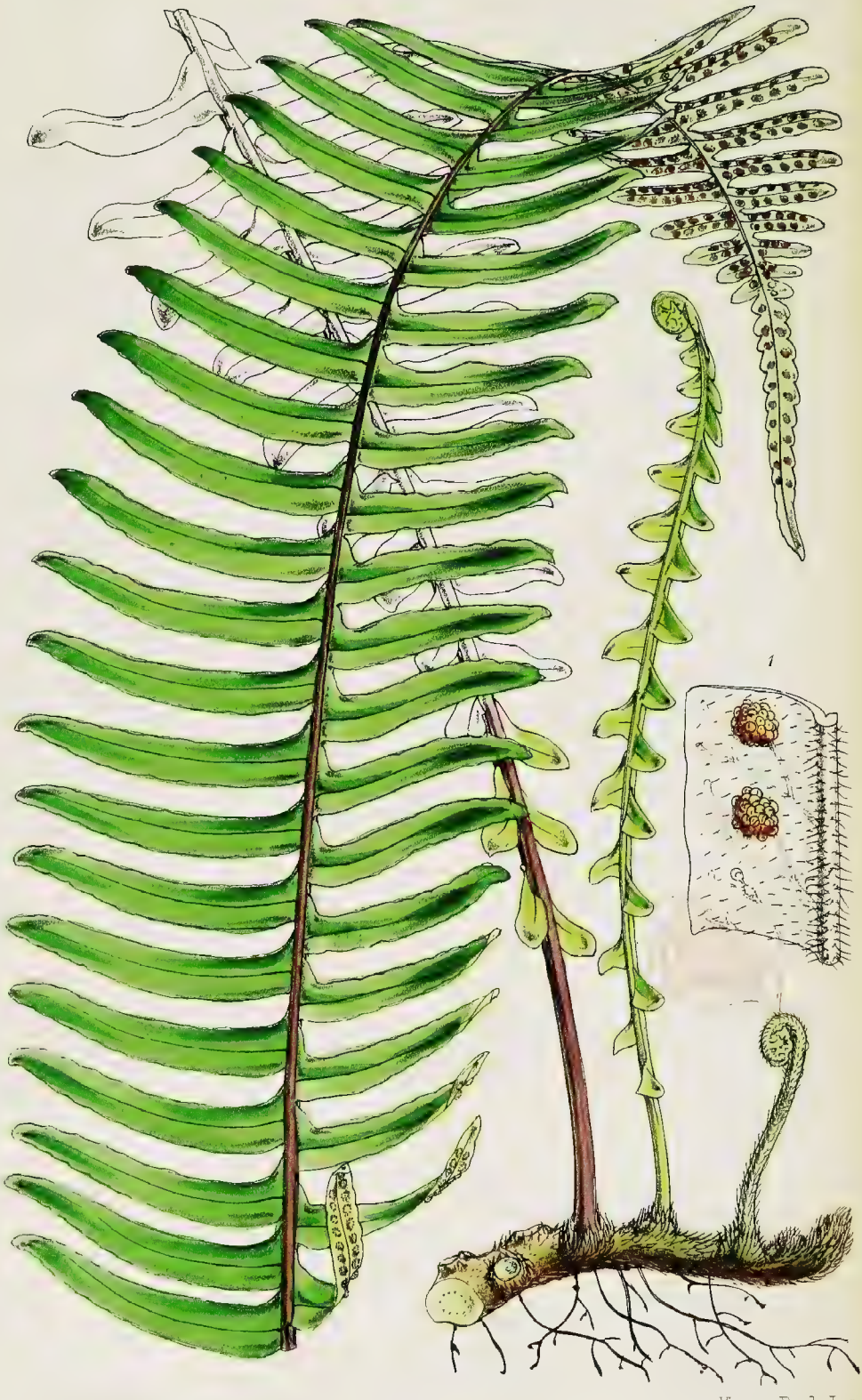
Although an extremely distinct species of *Platycerium*, this is a very variable one in its different stages of growth, which will easily account for the different representations given by different authors. Plukenet, the first author who brought this plant into notice, had only a small, half-developed fertile frond in view, too young to bear fructification, or even to have taken its perfect form. Palisot de Beauvois and Fée have erred in figuring the fertile fronds erect, as in *Platycerium alcicorne*, Br., and I should have erred in the same way, probably, had it not been my good fortune to have a fine living plant before me, where they are as pendent as in *Pl. grande, biforme*, and *Wallichii*. We have indeed long cultivated the species in our fern-stove, but never had it fructify in perfection, till it was exposed to great dampness, and heat and the influence of steam. We regret that we are confined to an octavo plate in its representation, and it is only a portion of

an apex of one of the bifurcations which can be introduced of the *natural size*. In shape both the sterile and fertile fronds vary extremely, the former from the diameter of the palm of the hand, to two and a half and three feet in length; and the latter from six inches, with perfect sori, to three feet; in the broadest segment, from one to six inches, and in one case a foot, and the spread of the fructification extending to that diameter. Our finest specimens are from Prince's Island, where Barter and Mann record its unusual size compared with the specimens from the mainland. It often grows on the Sandbox-tree.

Unwilling as I am to change an old established specific name, I cannot but give the preference to that of Plukenet, which M. Fée has adopted. M. Palisot de Beauvois writes the specific name "*stemaria*," probably intended as *stemmaria* (from *stemma*, a crown), but he does not give this as his own, but as that of Commerson, MSS., attached to a drawing of some plant of the kind, which that distinguished naturalist found in Madagascar, whence I possess specimens of the true *Pl. alcicorne*, collected by Boivin, and which is no doubt the *stemaria* of Commerson.

No instance is yet recorded of the present species being found, save on the western tropical coast of Africa. It does not enter the Cape possessions, nor does it appear among the Ferns of Dr. Kirk, from Dr. Livingstone's Zambesi Expedition. Dr. Kirk indeed sent home specimens from Sierra Leone, collected on his route to eastern tropical Africa. Its nearest affinity is doubtless with *A. alcicorne*, as we have already observed, and like that is prolific from the root; but its much broader and (in proportion) shorter and drooping *fertile* fronds, their sharper segments, and when fully developed, much larger *sterile* fronds, will readily distinguish it. It propagates itself by offsets from the base of the frond.

Fig. 1. Greatly reduced plant, with sterile and fertile fronds of *Platycerium Æthiopicum*. 2. Apex of a fertile frond, with sorus,—*natural size*. 3. Small portion of a fertile frond, from which part of the sorus is removed, showing the venation there,—*magnified*.



Vincent Brooks Imp

Plate 10.

POLYPODIUM (Eupolypodium) pectinatum, *L.*

Pectinated Polypody.

Polypodium (Eupolypodium) *pectinatum;* caudex moderately stout, elongated, horizontal, scaly, tuberculated above with the bases of the former year's fronds and which are also scaly; stipites scattered, approximate, 1–5 inches long, terete, blackish-brown, especially hairy on one side; fronds decurved, a foot to 1½ foot long, 2–4 inches broad, lanceolate or ensiform, acuminate, more or less attenuated at the base, pinnatifid nearly to the rachis, firm-membranaceous, blackish-green when dry, villosulous; segments very numerous, horizontally patent, from a broad base which is singularly dilated upwards, gradually but obtusely acuminated, entire or subsinuate, strongly costate, veins rather remote, internal not readily conspicuous, once or twice forked, sometimes anastomosing so as to form large costular areoles, the lowest veinlets on the superior side soriferous; sori globose, sulphur-coloured, forming a continuous series on each side between the margin and the costa; rachis and costa hairy, especially beneath.

Polypodium pectinatum. *Linn. Sp. Pl. p.* 1545. *Sw. Syn. Fil. p.* 32. *Willd. Sp. Pl. v.* 5. *p.* 180. *Metten. Polyp. p.* 59. *Griseb. Fl. Carib. p.* 135 (*excl. syn. Schk.?*). *J. Sm. Cat. Cult. Ferns, p.* 1, *and in Seem. Bot. of H.M.S. Herald* (*quoting as a synonym, Schkuhr's t.* 17, P. Schkuhrii, *Raddi, which in his Cult. Ferns he retains as a distinct species*).

Goniophlebium pectinatum. *J. Sm. in Hook. Lond. Journ. of Bot. v.* 4. *p.* 57. *Id. in Seem. Bot. of the Herald, p.* 230.

Polypodium Lonchitidis folio. *Petiv. Fil. t.* 7. *f.* 14.

Polypodium nigrum tenerius sectum. *Plum. Fil. p.* 64. *f.* 80.

Hab. West Indian Island and tropical America, probably abundant in numerous localities. Jamaica, Martinique, Dominica, St. Vincent, Guadeloupe, Cuba, etc., sent found by most travellers: *Plumier, Swartz, Bancroft, M'Fadyen, Chs. Wright* (*n.* 1017), *Duchassaing.* Guatemala, *Skinner.* Peru; Tarapota, *Spruce, n.* 4145 *and* 4146 (segments linear, very obtuse, sinuses very narrow and acute). Brazil (S. Catharine's), *Mr. Fox, n.* 231, *Gardner, n.* 126, *Milne, M'Gillivray, J. D. Hooker* (chiefly about Rio). Pará, *Spruce, n.* 1; and São Gabriel, summit of the Serra do Gama, Amazon, *n.* 2220. New Granada, frequent. Bogotá, *Holton, n.* 36. Venezuela, *Fendler, n.* 220, 221. Caracas, *Linden, n.* 185, 129, *Moritz, n.* 255; (P. Otites, *L. fide Metten.*, but the veins are free). Ocaña, *Schlim, n.* 156, 369, 633, *and* 636. Columbia (Pacific side), *Cuming, n.* 121 *and* 1210.

This *Polypodium* belongs to a group of the genus whose species are very ill-defined, and which I suspect vary considerably, a circumstance which leads to their being needlessly multiplied; but it would require more time and space than can here be

given to unravel the confusion. It is a Linnæan and Swartzian plant, and the figure of Plumier, with which ours sufficiently accords, has been our guide. No good and more recent figure has been given of it, that I am aware; for the *P. pectinatum*, of Schkuhr, Fil. t. 17. f. 2, is by most botanists now considered a distinct species, having the base of the frond broad and truncated, not attenuated, and decurrent, as it were, on the stipes. Unfortunately I have various intermediate states, which would appear to unite them. Certainly, too, my herbarium possesses other specimens, which I cannot distinguish from this, amongst them a plant of Sieber, "Flora Mixta, n. 334," which has the veins anastomosing, so as to form large costular areoles, each including the soriferous venule. This *Polypodium* of Sieber, Mettenius refers to *P. Otites*, but in his character of that he does not notice the union of the veins: an authentic specimen from the latter of his *P. Otites* (Moritz, n. 555) has entirely free veins. Grisebach remarks under this Fern, "Species contra eos, qui ex nervatura genera Filicum artificialia derivarunt, grave argumentum dat, nam extant formæ ubi venæ juxta marginem pinnarum hinc inde ansas formant, aliæ verum pinnæ dichotomiam liberam ostendunt." Hence, too, Mr. J. Smith has been led to refer this plant at one time to his *Goniophlebium*, at another to *Eupolypodium*. *P. lomariæforme*, Kze., from an authentic specimen in my herbarium, is probably our plant with the venation anastomosing. *P. Paridiseæ*, Fisch. and Langsd., *P. Struthionis*, L., *P. Plumula*, Willd, *P. Schkuhrii*, Rad., and even *P. curvatum*, and perhaps some others, require a careful study and comparison, before they can really and with confidence be pronounced distinct.

PLATE 10. *Polypodium* (Eupolypodium) *pectinatum*, L.,—*natural size*. Fig. 1. Portion of a fertile segment, with sori,—*magnified*.

W.Fitch del. et lith.

Plate 11.

TRICHOMANES Leprieurii, *Kze.*

Leprieur's Bristle-Fern.

Trichomanes *Leprieurii;* tufted, tall, ample, erect; fronds broadly ovate, pinnate; pinnæ distant, bi-tripinnatifid, the ultimate segments linear, sometimes exceedingly narrow, acute, simple or bifid; main rachis very broad, compressed, marginato-ancipitate; involucres supra-axillary, free, cylindrical, tapering below, the mouth entire, much spreading (not two-lipped); stipes compressed, marginato-ancipitate below the frond, subterete or tetragonal towards the base.

Trichomanes Leprieurii. *Kze. Anal. Pteridogr. p.* 48. *Van den Bosch, Synops. Hymenophyl. p.* 31.

Trichomanes anceps. *Hook. Sp. Fil. v.* 1. *p.* 135. *t.* 40 *C. Van den Bosch, Synops. Hymenophyl. p.* 31 (*who excludes my var.* β).

Trichomanes elegans. *Rich. in Act. Paris* (*according to Delessert in Herb. Nostr., not Rudge*).

Trichomanes rigidum. *Kl. in Herb. Reg. Berol. and in Herb. Nostr.*

Trichomanes villosulum? *Wall. Cat. n. p.* 163 (*a very bad specimen, slightly hairy on one side*).

Trichomanes achilleæfolium. *J. Sm. En. Fil. Philip.* (*name only, not Willd.*).

Var. β; subpiloso-squamose, segments and divisions everywhere very narrow, linear-filiform, ultimate segments subsetaceous. *Hook. Sp. Fil. l. c. t.* 40 *C. f.* 3.

Hab. Guiana, *Richard.* Brazil, *Sellow, Leprieur.* West Indies; Dominica, *Dr. Imray, n.* 60, 61; Trinidad, *Cruger.* Isle of Gorgona, Pacific side of America, *Seemann.* Singapore, *Wallich, Cuming, n.* 368. East Indies, *Wallich, n.* 163, cultivated at Kew.—β. Philippine Islands, *Cuming, n.* 162 *and* 171.

A most lovely species of a lovely genus; our largest specimen, from French Guiana, is more than a foot and a half long, and nearly as broad at the base. Van den Bosch is of opinion that under my *T. anceps* I have included other species. The opinion of so acute an observer is worthy of every respect, and he may be quite right. He has at any rate shown me that I have in my 'Species Filicum' entirely omitted Kunze's earlier name of *Tr. Leprieurii;* his plant is identical with my South American ones, and I gladly preserve that name. I have, indeed, during the time that has elapsed since the publication of the first volume of 'Species Filicum,' received many specimens from different localities, which I should be disposed to refer here; but the *Hymenophyllaceæ* are in better hands than mine at this

time. Our cultivated plants were received from Dr. Cruger, of Trinidad.

PLATE 11. Fertile plant of *Trichomanes Leprieurii*,—*natural size.* 2. Segment and portion of a rachis, with sori,—*magnified.*

Vincent Brooks imp.

Plate 12.

ADIANTUM (§ Euadiantum) polyphyllum, *Willd.*

Many-leaved Adiantum.

Adiantum (Euadiantum) *polyphyllum;* stipes stout, one to two feet long, black-ebeneous, glossy, hairy below; fronds two to three feet long, tripinnate, bright-green, firm-membranaceous, glossy; pinnæ all petiolate, oblong-lanceolate, shortly acuminate; pinnules petiolulate, numerous, approximate, an inch and more long, horizontal, elliptical-oblong, almost forming a parallelogram, very obtuse, inferior margin and superior base truncate, superior margin arcuate, lobed and serrated, lobes soriferous; veins copious, approximate, flabellato-dichotomous; involucres reniformi-rotundate, large, convex, thick and hard, especially in the disk, rachises everywhere black-ebeneous and glossy.

Adiantum polyphyllum. *Willd. Sp. Pl. v.* 5. *p.* 154. *H.B.K. Nov. Gen. Am. v.* 1. *p.* 21 (*not Kze.*). *Presl, Reliq. Hænk. v.* 1. *p.* 62. *Kl. in Linnæa, v.* 18. *p.* 554. *Hook. Sp. Fil. v.* 2. *p.* 49. *Moore, Ind. Fil. p.* 34. *Metten. Fil. Hort. Lips. p.* 48.

Adiantum cardiochlæna. *Kze. in Linnæa, v.* 17. *p.* 569, *and in Bot. Zeit. v.* 3. *p.* 281. *Hook. Sp. Fil. v.* 2. *p.* 51. *t.* 83 *A. Feé, Gen. Fil. p.* 114. *t.* 11 *B. f.* 2.

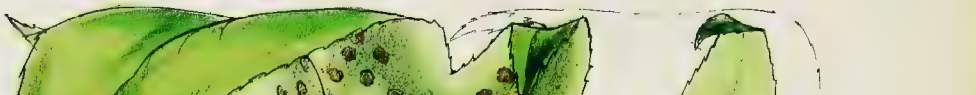
Adiantum patens. *Kze. in Linnæa, v.* 23. *p.* 216 (*fide Metten.*).

Hab. Caracas, *Bredemeyer* (*Willd.*), *Moritz, n.* 59, *Funck, n.* 438, *Linden, n.* 125. Tovar, *Fendler, n.* 80, *Birschel.* Trinidad, *Aldridge, in Herb. J. Smith, Cruger.*

At the time the species of *Adiantum* were described in my 'Species Filicum,' I had no means of knowing what was the *A. polyphyllum* of Willdenow; and of *A. cardiochlæna* I had authentic specimens, so that I preferred then publishing the present plant under that name, which however proves identical with the former. It is a very fine species, and worthy of a place in every tropical fernery; the stout intensely ebeneous-black stipites and rachises are well contrasted with the bright-green fronds, and the upper margin of the pinnules is fringed with a regular line of dark-brown kidney-shaped involucres. The species appears to be peculiar to Venezuela, the Caracas, and the adjacent island of Trinidad.

Plate 12. Fig. 1. Very reduced outline figure of *Adiantum polyphyllum.* 2. Portion of a frond,—*natural size.* 4. Portion of a pinna, with two sori, one forced back to show the capsules:—*magnified.*

March 1st, 1861.



W. Fitch, del et lith.

Vincent Brooks, Imp.

Plate 13.

ASPIDIUM (Cyrtomium) caryotideum, *Wall.*

Caryota-leaved Shield-Fern.

Aspidium (Cyrtomium) *caryotideum;* caudex short, thick, erect, densely paleaceous, with large, erect scales, as are the bases of the erect, robust, cæspitose stipites, which are ten to twelve inches long; fronds half a foot to two feet long, oblong, subcoriaceo-carnose, of a palish yellow, opaque, yellowish-green, pinnated; pinnæ three to four, or even six inches long, ovate, much acuminated (sometimes repando-lobate), falcate, sharply serrated, superior base much broader than the inferior, undivided, or more generally with a long, sharp, acuminated appendage or ear, the lowest pair and terminal pinna often with one on each side; veins anastomosing, primary ones pinnate, flexuose, costal areoles with a solitary, free, soriferous veinlet, superior ones with two to three clavate veinlets; sori very copious; involucre orbicular, peltate, entire or laciniated at the margin, rachis and rather short petioles setoso-paleaceous.

Aspidium caryotideum. *Wall. Cat. n.* 376. *Hook. and Grev. Ic. Fil. t.* 69. *Kze. in Linnæa, v.* 24. *p.* 278. *Metten. Aspid. p.* 32.

Cyrtomium caryotideum. *Pr. Tent. Pterid. p.* 86.

Aspidium anomophyllum. *Zenk. Pl. Nilgh. t.* 1 (*identical with our plant*). *Metten. Aspid. p.* 34.

Cyrtomium falcatum. *Raws. and Pappe, Syn. Fil. Afr. Austr. p.* 15 (*not* Aspid. falcatum, *Thunb.*).

Hab. India, chiefly in mountain regions: Nepal, *Wallich;* Kumaon, *Griffith, Strachey and Winterbottom* (at Dwali, elev. 8200 feet), *T. Thomson;* Bootan, *Griffith, Booth;* Sikkim-Himalaya, *Hook. fil. and Thomson;* above Simla, *Colonel Bates;* Nilghiri, *Dr. Wight, n.* 108, *Sir F. Adam, Zenker, Hohenacker in Pl. Nilgh. n.* 912 *and* 913, named *Aspid. anomophyllum*, Zenk., var. *macropteron* (912), and var. *micropterum*, Kze. (*n.* 913), *M'Ivor.* South Africa: Natal, *Major Garden;* forests of British Caffraria, *Captain Espinasse*, 1856 (*Rawson and Pappe*).—Cultivated in the Fernery at Kew.

We have figured the better-known, because longer cultivated in England, and hardy and closely allied *Aspidium falcatum*, Th., at Tab. xcii. of our 'Filices Exoticæ.' To see the two in a living state, the differences are very striking, chiefly, however, arising from the deep vivid-green of *falcatum*, so glossy on the upper surface as to appear varnished there, whereas *caryotideum* has pale-green foliage, dull on the surface, not in the slightest degree polished. In the dried state the colour and surface present no difference to the eye. In this condition the chief distinctions are to be found in the entire edge (never serrated) of *falcatum*, to-

gether with the absence of those long sharp ears, almost universal on the inferior pinnæ, and the distinct, sharp, even spinulose serratures of the margin, rarely confined to the acuminated apex. The two are, I have no doubt, quite distinct, but the pinnæ are wonderfully variable, not only on different plants, but on one and the same individual. I possess young and sterile specimens, of which the frond is confined to a single pinna, with three acuminated lobes, like the leaf of some exotic species of Maple. Some fronds have pinnæ not two inches long, others six inches long and four broad. The auricles are of all sizes, from a small sharp lobe to a segment two to three inches long, bearing a slight resemblance to the leaves of *Caryota urens*. In some the pinna is disposed to be pinnatifid at the margin, with short, unequal segments; this may be considered an abnormal state, for in that case the serratures are there more or less obsolete, or confined to the apex.

I have clearly ascertained that the South African plant is the present species; not *Aspidium falcatum*, as it was supposed to be.

PLATE 13. Fig. 1. Caudex, young frond and stipes, and lower pair of pinnæ of a perfect frond of *Aspidium* (Cyrtomium) *caryotideum*, Wall.; and 2. the rest of the fertile frond:—*natural size*. 3. Portion of a fertile frond, showing the venation and sori. 4. An involucre, with margin more fimbriated than usual:—*magnified*.

W Fitch, del et lith.

Vincent Brooks, Imp

Plate 14.

POLYPODIUM (Phymatodes) loriforme, *Wall.*

Strap-shaped Polypody.

Polypodium (Phymatodes) *loriforme;* caudex moderately stout, creeping, branched, clothed with imbricated, appressed, grey-brown scales; fronds distant, a span to a foot or more long, subcoriaceous, lorato-lanceolate, acute or acuminate, rarely obtuse, strongly costate, entire, tapering gradually below into a short stipes, setoso-squamose at its very base; veins anastomosing, and forming rather large hexagonal areoles, with free clavate veinlets; sori usually large, in a regular series between the costa and the margin, globose or suboblong, superficial or scarcely sunk, concealed when young by copious peltate scales.

Polypodium loriforme. *Wall. Cat. n.* 271. *Metten. Polypod. p.* 92. *t.* 1. *f.* 49, 50 (*fragments only*).

Phymatodes loriforme. *Presl, Tent. Pterid. p.* 196.

Drynaria loriformis. *J. Sm. Hook. Journ. of Bot. v.* 4. *t.* 61.

Pleopeltis loriformis. *Pr.*

Pleopeltis nuda. *Hook. Exot. Fl. t.* 63 (*not of Gen. Fil. t.* 18, *which is an allied species,* Polypod. (*Phymatodes*) excavatum, *Willd.*).

Polypodium Wightianum. *Wall. Cat. n.* 2222.

Polypodium gladiatum. *Wall. Cat. n.* 279.

Hab. East Indies: apparently common in all the hilly and mountain regions, from 5–10,000 feet in elevation, in Himalaya (*Hooker and Thomson*); abundant in the Nilghiries. Ceylon, frequent, *Gardner and others.* Sumatra, *Tuschemacher.* China: Foochowfoo, *Alexander;* Amoy, *Hance, n.* 1410; Hongkong, *Dr. Harland.* Japan, *Miss Nelson.* Pacific Ocean: Oahu, *Douglas, n.* 56, *Seemann, Barclay, Macrae, Nuttall, Beechey, Dr. Diell.*— Cultivated at Kew.

A species which has evidently a wide geographical range, but not extending, as far as we yet know, to Africa, unless indeed the *Polypodium excavatum,* Willd., *Polyp. sesquipedale,* Wall. and Mettenius, should prove identical, which seems very possible (for we find here the sori more or less sunk, and the venation is not very different), and never occurring in America.

I believe the first published description was under our name of *Pleopeltis nuda* above quoted, a genus of Humboldt which is hardly tenable. I should have probably retained the specific name here, but that there is a *Polypodium nudum* of Mettenius.

Plate 14. *Polypodium* (Phymatodes) *loriforme,* Wall.,—*natural size.* Fig. 1. Portion of a fertile frond, showing the venation and sori,—*magnified.* 2. Capsule. 3. Peltate scale from the sorus:—*more magnified.*

April 1st, 1861.

W Fitch, del et lith

Vincent Brooks, Imp

Plate 15.

BLECHNUM (Salpichlæna) volubile, *Klfs.*

Scandent Blechnum.

Blechnum (Salpichlæna) *volubile;* caudex thick, creeping, bearing sparse, rigid scales; stipites very long, and, with the rachises, extending many feet in length, climbing over trees to a great height; fronds bipinnate; pinnæ with three to seventeen petiolated pinnules, which are six to twelve inches long, lanceolate or linear-oblong lanceolate, serrated more or less only at the points, coriaceous, glossy, obtuse and unequal at the base; veins copious, simple or forked, united at their apices by the thickened margin; sori linear, continuous, close-pressed to the costa; involucre rigid-membranaceous, black, at first involutely cylindrical, membranaceous, at length patent and flat, breaking up into pieces of various lengths, and separating and falling away from the pinnules.

Blechnum volubile. *Kaulf. Enum. p.* 159 (*excl. the locality*). *Hook. Gen. Fil. t.* 93; *Sp. Fil. v.* 3. *p.* 62. *Kze. Annal. Pterid. p.* 20. *t.* 13. *Metten. Fil. Hort. Lips. p.* 63.

Salpichlæna volubilis. *J. Sm. in Hook. Journ. of Bot. v.* 4. *p.* 168. *Pr. Epimel. Bot. p.* 122. *Fée, Gen. Fil. p.* 79.

Blechnum scandens. *Bory in Duperrey Voy. p.* 272. *t.* 36.

Salpichlæna scandens. *Presl, Epim. Bot. p.* 122.

Hab. Tropical America, apparently frequent: Brazil, *Sellow, Blanchet, Gardner, n* 185, 5306, etc.; Guiana, *Leprieur* (sterile pinnules two inches broad), *Schomburgk, Kappler;* Peru, *Lechler, n.* 2542; Tarapota, eastern Peru, *R. Spruce* (without number, pinnules small, strongly serrated at the apex, sori very narrow); Columbia, *Purdie* (pinnules fifteen to sixteen inches long), *Moritz, Funck, n.* 776, *Fendler, n.* 17 (leaves almost elliptical, very abruptly acuminate). West Indies: Dominica, *Dr. Imray, n.* 53 (sterile pinnules 2½ inches broad); Guadeloupe, *L'Herminier;* Trinidad, *Cruger;* Jamaica, *Purdie.*—Cultivated in the stove at Kew.

This is, on several accounts, a very remarkable Fern; and not the least peculiarity is its very close general resemblance to our *Lomaria volubilis* ('Species Filicum,' v. 3. t. cl.) from the Amazon. The latter however has thin, almost membranaceous pinnules, spinuloso-serrate at the apex, and somewhat cuneate and nearly equal at the base, dull and opaque on the surface, and the fertile pinnules are narrow-linear, much longer than the sterile ones, and with decided fructification of a *Lomaria;* marginal involucres, etc. Both climb over trees to a height of twenty and thirty feet, like a *Lygodium.* Our present plant has the fructification of a *Blechnum,* even in its earliest stage; the involucres originate near the costa: these unroll, and at length lie quite flat

upon the pinnule, and are sometimes so broad on the narrower pinnules, that they occupy a considerable portion, almost one-half, of the breadth of the pagina. At length they break transversely into pieces of unequal lengths, separating entirely from their attachment, and carry away with them the crowded capsules, of which the receptacle is at the inner base. Mr. Purdie has recorded his observation, that "when the sori and involucres have separated and fallen away so completely that no trace of them is left, those pinnules now increase gradually in size, and remain broad sterile ones. Hence it is that the fructified pinnules are always the youngest, and at the extremity of the plant, and in tall plants difficult to be procured." Some of these sterile pinnæ are among the largest of the pinnules of Ferns I have seen. Whatever claim botanists may think this Fern to possess to the rank of a genus, I cannot accede to M. Fée's views of referring to the same, as he has done, *Blechnum orientale*, Bl., and *Finlaysonianum*, Wall., and even *Lomaria Patersoni*. If a genus at all, it must be limited to one species, from which the *Bl. scandens* of Bory (*Salpichlæna scandens*, Presl) is by no means different.

PLATE 15. Fig. 1. Small portion of a plant of *Blechnum* (Salpichlæna) *volubile*, Klfs. 2. Fertile pinnule:—*natural size*. 3. Portion of sterile pinna, showing the venation,—*magnified*. 4. Small portion of a fertile pinna, with portions of sori. 5. Involucre, from the base of which the capsules have fallen:—*more highly magnified*.

N Fitch, del et lith.

Vincent Brooks, Imp

Plate 16.

ACROSTICHUM (Euacrostichum) Meyerianum, *Hook.*

Meyer's Acrostichum.

Acrostichum (Euacrostichum) *Meyerianum;* caudex very long, stout, partially scaly, scandent on trees, here and there rooting parasitically; stipites distant, a foot and more long, stout, firm and glossy; fronds dimorphous, very large, two to three feet long, *sterile* ones pinnated; pinnæ from a span to a foot long, petiolate, firm, pergamentaceous, glossy, oblong-lanceolate, acuminate, sharply cartilagineo-serrate, the base obliquely cuneated, penni-veined; veins slender, very copious and compact, simple or forked near the base, uniting at their apices with the cartilaginous margin; petioles two to three lines long, not articulated upon the rachis, bearing a gland above; *fertile* fronds as large as the sterile, bipinnate, with a gland at the axil of the primary pinnæ; pinnules very numerous, two to three inches long, narrow-linear, sessile or nearly so, soriferous beneath, except at the narrow, but scarcely involucriform margin.

Lomaria Meyeriana. *Kze. in Linnæa, v.* 10. *p.* 509.

Stenochlæna Meyeriana. *Presl, Epimel. Bot. p.* 166. *J. Sm. Cat. Cult. Ferns, p.* 42.

Lomariobotrys Meyeriana. *Fée, Gen. Fil. p.* 45.

Lomaria secunda. *Wall. Cat. n.* 34. *p.* 2; *and Cat. p.* 61 (Lomaria longifolia, *Wall.*)

Lomaria tenuifolia. "*Desv.*" *Bojer, Hort. Maurit. p.* 407 (*name only*); *an* Stenochlæna tenuifolia, *Moore?*

Lomaria grandis. *Bojer, Hort. Maurit. p.* 407 (*name only*).

Hab. South Africa; trunks of trees: between Omtendo and Omsamculo, climbing over the trees, *Drège in Herb. Nostr.* Natal, *Guienzius, Plant, Herb. Natal. n.* 91. Mauritius, *Wallich in Herb. Nostr.* East coast of tropical Africa, Isle of Galega, where it climbs to the top of the loftiest Cocoa-nut trees, *Bojer in Herb. Nostr.* (Lomaria grandis, *Boj.*), and Madagascar; Nissolée, *Brown.*—Cultivated at Kew, in the warm stove.

Stenochlæna was first constituted a genus by Mr. J. Smith "on account of its peculiar habit;" meaning thereby, I presume, its scandent habit; and seven species are included in it, with not much uniformity of habit or character, of which, however, *S. scandens* appears to be the type, and with its general aspect our plant sufficiently accords: but then the author acknowledges that, setting habit aside, it becomes difficult to detect a good technical character to distinguish it from *Elaphoglossum*, Schott, and *Polybotrya*, Humb. Presl, finding the pinnæ of this species

not articulated upon the stem, and the fertile frond to be bipinnate, formed a section of this under the name "*Caffraria*," and M. Fée afterwards raised it to the rank of a genus, *Lomariobotrys*. It is doubtful whether it should be referred to the *Lomaria*- or to the *Acrostichum*-group; but seeing that the under surface of the pinnæ is so clothed with capsules as to leave scarcely any margin which can be called involucre, I prefer placing it in the latter genus, where it ranks near *Acrost. sorbifolium, L.;* a species which Mr. J. Smith at first referred to *Stenochlæna*, but subsequently to *Lomariopsis* of Fée; in other words, to those true *Acrosticha* which have *pinnated* fronds. To strengthen the character of *Stenochlæna*, Moore lays stress* upon the presence of "*costal areoles*" to the pinnæ, which Mr. J. Smith does not speak of in that light; and on the "marginal gland near the base at the upper edge of the pinnæ," distinct enough, but of which Mr. Smith takes no notice. Now these so-called areoles, very seldom seen *at all*, and rarely indeed so distinct as we have represented them in our Fig. 4, appear to be constituted by a narrow thickened edge to the costa, which Mr. J. Smith describes as "an *obscure* transverse *vein*, *continuous* with, and *close to*, the costa," from which the veins originate: these occasionally separate a little from the costa; but this would seem to be rather an abnormal feature, and quite unsuited to form a generic mark of distinction.

This noble Fern is not by any means confined to the Cape colony, but extends to eastern tropical Africa, Madagascar and its islands, and to Mauritius; and probably the *Lomaria decomposita*, of Desvaux, as well as the synonyms we have above introduced, all belong to this species; the *Lomaria grandis*, from the island of Galega, certainly does.

PLATE 16. Fig. 1. Greatly reduced figure of *Acrostichum* (Euacrostichum) *Meyerianum*, with fertile and sterile fronds. 2. Portion of caudex and base only of a sterile frond. 3. Single pinna (showing the gland):—*natural size*. 4. Portion of a sterile pinna, showing the venation, and the thickened edge of the costa slightly separating from the costa. 5. Portion of a rachis and a primary pinna from the fertile frond:—*natural size*. 6. Small portion of a fertile pinnule, with the sori removed from one side of the costa,—*magnified*.

* "A genus admirably marked by the costal areole and the marginal gland."—*Moore*.

W Fitch del et lith

Vincent Brooks, Imp.

Plate 17.

DIDYMOCHLÆNA LUNULATA, *Desv.*

Blunt-leaved Didymochlæna.

Didymochlæna *lunulata.*

Didymochlæna lunulata. *Desv. Mém. Soc. Linn. v.* 6. *p.* 282.

Adiantum lunulatum. "*Houtt. N. H.* 2. *v.* 14. *t.* 100. *f.* 1."

Didymochlæna sinuosa. *Desv. Mém. Soc. Linn. v.* 6. *p.* 28. *Kaulf. En. Fil. p.* 184. *Mart. Ic. Pl. Crypt. Bras. p.* 95. *t.* 28 *and* 29. *f.* 1. *Hook. Gen. Fil. t.* 8.

Didymochlæna squamata. *Desv. Journ. Bot. Appl. v.* 1. *p.* 5. *t.* 2. *f.* 4.

Aspidium truncatulum. *Sw. Syn. Fil. p.* 52, 252. *Willd. Sp. Pl. p.* 256.

Didymochlæna truncatula. *J. Sm. Gen. of Ferns, p.* 84.

Monochlæna sinuosa. *Gaudich. in Freyc. Voy. Bot. p.* 340. *t.* 12. *f.* 3.

Tegularia adiantifolia. *Reinw. Syll. Pl. Ratisb. v.* 2. *p.* 3.

Diplazium pulcherrimum. *Raddi, Fil. Bras. p.* 42. *t.* 59.

Aspidium squamatum. *Willd. Sp. Pl. v.* 5. *p.* 250.

Aspidium cultratum. *Presl, Delic. Prag. v.* 1. *p.* 174.

Didymochlæna dimidiata. *Kze. in Linnæa, v.* 18. *p.* 122. *Schk. Fil. Suppl. p.* 200. *t.* 84. *Pappe and Rawson, Syn. Fil. Afr. Austr. p.* 15.

Lonchitis ramosa, cauliculis seu costis squamosis. *Plum. Fil. p.* 43. *t.* 56.

Hab. Tropical America: Brazil, in mountain woods, frequent, *Raddi, Martius, Sellow, Gardner, and others;* New Grenada, *Purdie, Fendler, Linden, Schlim* (elevation, 7000 feet in Ocaña); Andes of Ecuador and Peru, *Mathews, Spruce, Jameson, Lechler.* West Indian Islands: St. Domingo, *Plumier;* east side of Cuba, *C. Wright.* East Indies: Java, *Thunberg, Blume, Thos. Lobb;* Luzon, *Cuming.* South Africa: Natal, *Gueinzius, Dr. Pappe, Dr. Alexander Prior.* Madagascar, *Goudot.* Fernando Po, elevation of 4000 feet on the mountains, "Peak," *Gustav Mann.* Island of Ovolau, Fiji group, on the *Milne, Brackenridge.*—Cultivated in the fern-stoves of Kew.

This splendid plant, in the stoves of the Royal Gardens, has not, with fertile fronds four feet in length, formed a stem or erect caudex more than six and a half inches high, and four inches in diameter. In Ecuador, Mr. Spruce speaks of it as "a tufted Fern, two to five feet high." Mr. Gustav Mann describes the caudex in Fernando Po as "stout and erect;" but in Brazil it would appear to be truly a *Tree*-Fern, of which the caudex is twelve to eighteen feet high; at least, as represented on the same plate with *Alsophila armata*, its trunk is equal in height with it, which is described to be of that size. From the summit of the caudex springs a noble tuft of stipitate fronds, four to

five feet long (stipites very paleaceous), bipinnate, primary pinnæ a span to a foot long (their rachis hispido-squamose), oblong-lanceolate, gradually acuminate, dark bright-green above, paler beneath. Pinnules close, compact, three-quarters to one inch long, coriaceo-membranaceous, elliptical, irregularly rhomboid, on short petioles articulated on the rachis, superior base truncated, the apex obliquely truncate, obtuse, rarely acute, subsinuato-serrate; costa veniform, dividing the pinnule into two very unequal halves; veinlets once or twice forked, clavate at the apex, a superior veinlet bearing the elliptical sorus. Involucre elliptical, attached by its centre to a large receptacle, and having a deep, narrow, grooved line at the sinus, not extending to the apex, giving an oblong horse-shoe-like shape to the involucre, which, however, is free all round at the margin, and this reflexed in age. The sori are mostly confined to the superior sides of the pinnæ, rarely seen on the lower and smaller half.

The habit of this Fern is quite peculiar, and so is its fructification. The involucre is incorrectly described by the author of the genus as "*geminate*" (hence its name). It is as much a single or solitary involucre as any among the group of Ferns, originating at the apex of a veinlet, of an oval or elliptical form, with a small sinus at the base, and its point of attachment, for a considerable length and breadth, the centre of which is indicated by a depressed line or furrow, which seems almost to divide it into two halves, thus giving the appearance of a narrow hippocrepiform (horse-shoe-shaped) involucre. This large point of attachment causes the involucre to be persistent. Yet the general form and structure is not far removed from that of *Nephrodium*, and especially to that *Nephrodium* which has been called *Mesochlæna*. See our figure and description of *Nephrodium* (Mesochlæna, *Br.*) *Javanicum* in our 'Filices Exoticæ,' t. 72.

It is quite certain that all the specimens discovered in America, Asia, Africa, and the Pacific islands, belong to one and the same species, nor do I find any strongly marked varieties. The pinnules indeed vary on different parts of one and the same plant, as is the case with many species of *Adiantum*, with which the form of the pinnules has no small resemblance.

PLATE 17. Fig. 1. Very much reduced figure of *Didymochlæna lunulata*, Desv. 2. Fertile pinnæ,—*nat. size.* 3. Fertile pinnule. 4. Young sorus. 5. Old sorus:—*more or less magnified.*

W. Fitch del et lith

Vincent Brooks, Imp

Plate 18.

POLYPODIUM (Craspedaria) piloselloides, *L.*

Small tongue-shaped Polypody.

Polypodium (Craspedaria) *piloselloides;* caudex long-creeping, filiform, scarcely thicker than a sparrow's quill, setaceo-paleaceous; fronds scattered, distant, of two kinds, stipitate, coriaceo-carnose, costate, obtuse, minutely subulato-paleaceous; stipes one to one and a half inch long, setaceo-paleaceous; *sterile* fronds two to two and a half inches long, oblong or ovato-oblong; *fertile ones* lanceolate, two and a half to three inches long; veins anastomosing, with large, oblique, hexagonal, oblong areoles next the costa, with a free vein soriferous at the apex, marginal areoles smaller; sori large, in two rows, one on each side nearer the costa than the margin, large, prominent; capsules long, stipitate, mixed with long, hastate, stipitate scales, longer than the capsules.

Polypodium piloselloides. *Linn. Sp. Pl. p.* 1542. *Sw. Syn. Fil. p.* 25. *Willd. Sp. Pl. v.* 5. *p.* 144. *Metten. Polypod. p.* 93.

Marginaria piloselloides. *Presl, Tent. Pteridogr. p.* 187. *Hook. Gen. Fil. t.* 51.

Goniophlebium piloselloides. *J. Sm. in Hook. Journ. Bot. v.* 4. *p.* 56.

Craspedaria piloselloides. *Fée, Gen. Fil. p.* 264.

Craspedaria veronicæfolia. *Fée, Gen. p.* 264 (*fide Mettenius*).

Lingua cervina minima repens et hirsuta. *Plum. Fil. p.* 103. *t.* 118.

Hab. Tropical America, frequent on the trunks of trees, among mosses, etc., and on dry rocks in mountain districts frequent. West Indian Islands generally. Andes of Quito, Ecuador, *Jameson.* Portorico, *Schwanecke.* Venezuela, *Fendler.*—Cultivated in the tropical fernery of Kew.

This belongs to a small group of *Polypodium*, which has been distinguished as a genus by Link, under the name of *Craspedaria*, chiefly by its habit and dimorphous fronds; but he included some species of *Niphobolus*. M. Fée adopts the genus, excluding the *Niphoboli*, mainly however on account of the different venation. The present species is extremely common in perhaps all the West Indian Islands; less abundant, it would appear, on the continent of South America. The exact limits of the species are not accurately defined. It borders very closely on the one hand to the *Polyp. aurisetum*, Raddi, Fil. Brasil., p. 12. t. 23. f. 1 (which indeed is the *P. piloselloides* of that author's Synopsis, p. 46); and on the other to the *P. Cayennense*, Desv. (Pol. ciliatum, *Willd.*, Craspedaria, *Link*), from which it chiefly differs in the very narrow fertile fronds; so narrow that the

sori lap over the margin of the frond and give to it a moniliform character.

It is remarkable that no good recent representation has been anywhere given of this common plant, but Plumier's is more accurate than the greater number of his fern-figures.

PLATE 18. Caudex and sterile and fertile fronds of *Polypodium* (Craspedaria) *piloselloides*, L.,—*natural size*. Fig. 1. Apex of a sterile frond, showing the venation. 2. Portion of a fertile frond, showing the position of the sori, and more distinctly the frondal scales and the venation. 3. Capsule. 4. Stipitate scale from among the capsules of the sori:—*all more or less magnified.*

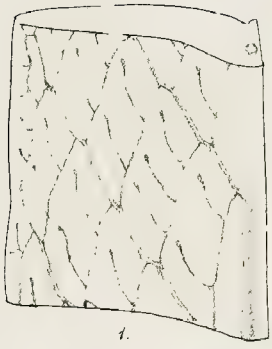


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Plate 19.

NIPHOBOLUS ADNASCENS, *Klf.*

Close-growing Niphobolus.

Niphobolus *adnascens;* caudex elongate, creeping, branched, as thick as a blackbird's quill, paleaceous with lanceolate-setaceous scales, rooting below; fronds of two forms, scattered, distant, coriaceo-carnose, dark-green above, but hoary with a scattered stellated pubescence, beneath paler with more copious and stellated pubscence, very obtuse, or acute, bluntly carinate beneath, above subcanaliculate at the costa; stipes one to two inches long; *sterile fronds* two to four inches long, spathulate or broad-lanceolate; *fertile ones* six to eight inches long, linear or oblong in both, tapering below into the stipes; primary veins oblique, connected by transversely slightly arcuated ones, forming areoles in which are two to three free veinlets, clavate at their apex; sori copious, compact, rather small, situated between the costa and the margin, sunk in cavities of the fleshy frond, and arranged in transversely oblique series of a cinnamon-brown colour, suborbicular, but a little irregular in shape.

Polypodium adnascens. *Sw. Syn. Fil. p.* 25 *and* 222. *t.* 2. *f.* 2.

Niphobolus adnascens. *Klfs. En. Fil. p.* 124. *Wall. Cat. n.* 268. *J. Sm. Cat. Gard. Ferns, p.* 12.

Cyclophorus adnascens. *Desv. in Berl. Mag. v.* 5. *p.* 300; *Journ. Bot. v.* 1. *p.* 20.

Polypodium pertusum. *Roxb. in Hook. Exot. Fl. t.* 162. *Metten. Fil. Hort. Lips. p.* 33.

Niphobolus pertusus. *Spr. Syst. Veget. v.* 4. *p.* 44. *Pr. Tent. Pterid. p.* 201. *Epimel. Bot. p.* 127, *excl. syn.*

Craspedaria pertusa. *Link, Hort. Berol. p.* 118.

Niphobolus carnosus. *Bl. Fil. Jav. Ic. p.* 50. *t.* 19. *Pr. Epim. p.* 126.

Polypodium carnosum. *Metten. Polypod. p.* 124.

Niphobolus elongatus. *Bl. Fl. Jav. Ic. p.* 52. *t.* 20. *Pr. Epim. p.* 126.

Niphobolus varius. *J. Sm. Hook. Journ. of Bot. v.* 3. *p.* 396.

Polypodium carnosum, *var.* elongatum. *Metten. Polypod. p.* 124.

Polypodium verrucosum. *Wall. Cat. n.* 267.

Polypodium caudatum. *Metten. Polypod. p.* 126.

Niphobolus caudatus. *Kaulf. En. p.* 127. *Bl. Fil. Jav. Ic. p.* 56. *t.* 22. *Pr. Epim. p.* 127.

Pleopeltis Commersoniana. *Willd.; and* Niphobolus Chamissoanus, *Pr. Tent. Pterid. p.* 127 (*fide Metten.*).

Polypodium vittarioides. *Wall. Cat. p.* 270.

Cyclophorus vittarioides. *Pr. Epim. Bot. p.* 129. *Metten. Polypod. p.* 126.

Niphobolus vittarioides. *Pr. Tent. Pterid. p.* 202.

Hab. India: Madras Peninsula, *Wight, Heyne;* Concan, *Law;* Eastern Bengal, Nepal, Assam, Khasya, *Wallich, Griffith, Hooker fil. and Thomson;* Himalaya, Kumaon (*Strachey and Winterbottom*); Silhet, Nepal, Sikkim, *Wallich, Griffith, Hooker fil. and Thomson, Booth.* Malay Archipelago and

Islands, *Griffith, Wallich, Lady Dalhousie, Cuming, n.* 240 *and* 93. Ceylon, *Gardner, n.* 1153. China, *Vachell, Fortune*, 169. Fiji Islands, *Milne.*— Cultivated in the stove of the Royal Gardens of Kew.

A very universally distributed Fern over the continent of India, and adjacent islands, the Malay islands, etc., and well distinguished by the numerous small sori, deeply sunk in a cavity of the frond, and arranged in transversely oblique series between the costa and the margin. Its long creeping scaly caudices grow close to the bark of trees, among mosses, etc., and cling to the substances on which they grow by copious fibrous radicles, whence Swartz's original specific name of *adnascens.*

PLATE 19. Plants of *Niphobolus adnescens*, Kaulf., with sterile and fertile fronds,—*natural size.* Fig. 1. Portion of a sterile frond, showing the venation. 2. Portion of a fertile frond, showing the arrangement of the sori and the stellated tomentum :—*magnified.* 3. Sorus cut through vertically, showing the cavity in which the capsules are sunk,—*more magnified.*

Vincent Brooks Imp

Plate 20.

NIPHOBOLUS angustatus, *Spr.*

Large-fruited Niphobolus.

Niphobolus *angustatus;* caudex long, creeping, branched, radicant, about the thickness of a duck's quill, clothed with closely imbricating, falcate, subulato-setaceous scales, especially in the younger portions; fronds scattered, distant, thick, coriaceo-carnose, from five inches to a span or more long, tapering below into a stout petiole, glabrous above, hoary with dense stellated pubescence beneath, costate, acute or apiculate; *sterile fronds* usually the smallest and broadest, and with shorter petioles, broad- or oblong-lanceolate, *fertile ones* longer and generally narrower in proportion; primary veins patent, slender, distant, parallel, these are connected by slightly curved transverse ones, forming areoles which include several, free or united, and slightly branched, ultimate veinlets; sori large, subglobose or oval, partially sunk in the frond, and forming on each side the costa a chain or single series between the costa and margin, sometimes longitudinally confluent.

Niphobolus angustatus. *Spr. Sp. Pl. v.* 4. *p.* 44.

Polypodium angustatum. *Sw. Syn. Fil. p.* 27 *and* 224. *Willd. Sp. Pl. p.* 154. *Schk. Fil. p.* 187. *t.* 8 *c.*

Niphopsis angustatus. *J. Sm. Cat. Cult. Ferns, p.* 6

Niphobolus sphærocephalus. *Hook. and Grev. Ic. Fil. t.* 94.

Polypodium sphærocephalum. *Wall. Cat. n.* 272.

Pleopeltis angustatus. *Pr. Tent. Pterid. p.* 193; *Epimel. Bot. p.* 126.

Niphobolus macrocarpus. *Hook. and Arn. Bot. Beech. Voy. p.* 74. *t.* 18.

Pleopeltis macrosora. *Pr. Epim. Bot. p.* 126.

Hab. East Indies: "Tranquebar, *Roettler*" (*Swartz*); Assam, *Jenkins;* Sincapore *Wallich, Schomburgk;* Malacca, *Griffith, Cuming, n.* 372; Penang, *Dr. Lorraine;* Borneo, *Wallace;* Labuan, *Thomas Lobb.* Pacific Islands: Pitcairne's Island, *Cuming, n.* 1394, *Mathews, n.* 13; Coral Islands, *Lay and Collie;* Tahiti, *Barclay.* North-east Australia: Brisbane River, *F. Mueller.*—Cultivated in the fern-stoves of Kew.

The size of the fronds, and the very large sori, oval or subglobose, arranged in a single series, on each side of the costa, if taken in conjunction with the venation, when that can be seen, distinguish this fine species of *Niphobolus.* The genus, which we have hesitated whether to abandon or to retain, has been generally received, and the peculiar stellated tomentum on the fronds

may perhaps justify its preservation. The venation, although in general very obscure, is very different in different species of the genus, as is the arrangement of the sori.

PLATE 20. Sterile and fertile fronds of *Niphobolus angustatus*, Spr.,—*natural size*. Fig. 1. Portion of a sterile frond, showing the venation. 2. Portion of a *fertile* frond, showing sori and the stellated tomentum :—*magnified*.


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Plate 21.

CYATHEA (Notocarpia) sinuata, *Hook. and Grev.*

Sinuated Cyathea.

Cyathea (Notocarpia) *sinuata;* small (for a *Tree*-Fern); caudex erect, slender, one inch broad, two to four feet high, black, clothed below with descending aerial fibrous roots, above with the ebeneous-black bases of the old stipites; fronds forming a terminal crown of numerous, erecto-patent, more or less decurved, membranaceous, bright-green, simple (undivided) fronds, two to three feet long, one to one a half inch broad, elongato-lanceolate, moderately acuminate, sinuated at the margin, sublobate towards the base, rather shortly stipitate (stipes three to four inches long, very scaly); costa strong, prominent beneath; veins horizontal, in pinnated fascicles; sori inserted near the base of the lateral veins or veinlets; involucres globose, at length breaking away in the upper half and leaving a hemispherical cup with numerous pear-shaped capsules, which are seated on a globose, large, elevated receptacle.

Cyathea sinuata. *Hook. and Grev. Ic. Fil. t.* 106. *Hook. Sp. Fil. v.* 1. *p.* 15.

Hab. In woods, in mountains of Ceylon, *Dr. Emerson*, *Mrs. General Walker*, *G. A. K. Thwaites, Esq.* (Singhe Rajah Forest, n. 3052), *Gardner*.

It has often been remarked by lovers of British Botany, that the researches, and consequently the discoveries, were never so numerous as during the publication of Sir James Edward Smith's 'Flora Britannica,' and his and Sowerby's 'English Botany;' and we trust that what those works did towards promoting our knowledge of the plants of Great Britain, the 'Species Filicum,' and the present work, will do by increasing our acquaintance with the Ferns of the whole world. We have, indeed, to a great extent, already experienced this to be the case. These works have afforded the means of studying the genera and species, and have encouraged students and collectors abroad, and they are sure that their contributions of new and rare species will be turned to account for the good of the public, and that they will be duly described and recorded. We are certain that our friend Mr. Thwaites will have pleasure in knowing that two of the rarest and most beautiful Ferns of Ceylon, which he has taken infinite pains in sending far into the mountain woods of Ceylon to procure and send to us in a living state, have at length reached us in safety and in the most beautiful condition; and that, in less than a fortnight after their arrival, they are drawn and engraved for the

present work: these are the *Cyathea sinuata* here represented, and the more singular, but much less local *Hymenostachys Zeylanica* of Dr. Wallich.

The *Cyathea* is not only peculiar to Ceylon, but is very rare, and we only know of its being gathered by our friends above mentioned. It is, moreover, the only species of the extensive genus which has simple or undivided fronds; and it is perhaps among the smallest, and certainly the most elegant of the tribe. It has quite an arborescent character, but bears about the same proportion to the gigantic species of the same genus, that the pigmy-deer of Ceylon does to the red-deer of our country. The two Ceylonese Ferns now mentioned were packed in a very long, narrow, vertical glazed case, made for the purpose, and committed to the care of Dr. Thomas Thomson, as far as Malta, then to that of Mr. Bury. The two plants reached us in the most perfect state of health and of fructification. The *Hymenostachys*, being of the *Ophioglossum* family, we are less sanguine of cultivating with success than we are the *Cyathea:* we shall soon present a figure of that to our subscribers.

PLATE 21. Fig. 1. Much reduced figure of *Cyathea* (*Notocarpia*) *sinuata*, Hook. and Grev. 2. Single fertile frond,—*natural size.* 3. Portion of a frond, with sori, showing the venation and the position of the sori on the veins,—*magnified.* 4, 5, 6. Sori and involucres in different stages of maturity,—*more magnified.*

W Fitch, del et lith

Vincent Brooks, Imp

Plate 22.

PTERIS (Litobrochia) palmata, *Willd.*

Palmated Pteris.

Pteris (Litobrochia) *palmata;* caudex ascending; stipites tufted, ebony-black, setoso-squamose below; fronds very polymorphous, cordate; young and sterile ones obtusely three- to five-lobed; fertile ones thick and fleshy when recent, coriaceous when dry, often gemmiparous at the base beneath, palmately three- to five-lobed; lobes variously and deeply divided or pinnatifid, frequently so as to leave a broad disk to the frond; the segments more or less acuminated and more or less broad, lowest pair of primary lobes generally with long segments near the base, pointing downwards, sometimes again pinnatifid; sinuses rounded; costa and costules ebeneous at the back of the frond; sori continuous, narrow; veins anastomosing, sunk in the substance of the frond and very obscure.

Pteris palmata. *Willd. Sp. Pl. v.* 5. *p.* 357. *Kze. in Linnæa, v.* 23. *p.* 322.

Litobrochia pedata. *Presl, Tent. Pterid. p.* 149, *including* "P. pedata, L., *and* P. palmata, *Willd.*"

Doryopteris palmata. *J. Sm. in Hook. Journ. of Bot. v.* 4. *p.* 163. *Klotzsch, in Linnæa, v.* 20. *p.* 342.

α. lata; disk of the frond and the segments broad. (Plate 22.)

β. angustiloba; disk and segments narrow, elongated.

Pteris varians. *Raddi, Fil. Brasil. p.* 44. *t.* 64.

Pteris platyloma. *Kze. in Linnæa, v.* 23. *p.* 322 (*fide Mettenius*).

Pteris collina. *Raddi, l. c. p.* 44. *t.* 64. *f.* 1, 2.

Pteris pedata. *Sieb. Fl. Martin. n.* 368 (*in Herb. nostr.*). *Eaton, Fil. Fendl. and Wright, p.* 204 (*according to Fendler's Venezuela specimens, n.* 91; *and Mettenius also, according to Eaton, refers this to* P. palmata).

Doryopteris euchlora. *Klotzsch in Linnæa, v.* 20. *p.* 342 (*and in Herb. nostr.*).

Hab. South America: Caraccas, *Bredemeyer;* Galipan, *Moritz;* Ocaña, elev. 7000 feet, n. 194 and 598, *Schlim;* Columbia, *Otto;* Bogotá, *Holton, Hartweg;* Venezuela, *Fendler, n.* 91; Santa Martha, *Purdie;* Peru, Province of Chacapoyas, *Mathews;* Galapagos, *Maclean, Captain Wood, Cuming, n.* 107; Martinique, *Sieber;* British Guiana, *Rich. Schomburgk;* Brazil, Rio, *Raddi, Burchell, Macgilivray, Milne, Gardner, n.* 37 (a gigantic specimen) and *n.* 5930; Pernambuco, *M. de Mornay;* Rio Grande, *Mr. Fox.* Island of Trinidad, South Atlantic Ocean; some of the specimens more than usually divided, but not otherwise different. East Indies: Dindighul, *Dr. Wallich, n.* 874, *Wall. Cat.* "from Herb. Wight, where it is said to be *Pteris Mysorensis,* Heyne," if there be no mistake respecting this locality, which seems hardly possible, being accompanied by a ticket with the number in Dr. Wallich's handwriting. Cultivated at Kew.

Opinions are divided as to the propriety of keeping the *Pteris palmata* of Willdenow distinct from the Linnean *P. pedata,* and

it is not without hesitation that I now change my views, so strongly expressed in favour of the union of the two in my 'Species Plantarum.' It is true that both are very polymorphous plants, yet I think no one can compare our figure here given with the very accurate one of *P. pedata* at t. xxxiv. of the 'Exotic Ferns,' which is very characteristic, without looking upon them as distinct. It is true it is an extreme form here represented, having a broader disk and broader segments than is usual, but I have numerous intermediate forms, to the deepest and narrowest lobed varieties referred to, and figured by the authors above quoted. The chief characteristics of *P. pedata* are the more membranaceous, the more deeply-divided segments, with acute sinuses, and the middle (or terminal) primary lobe narrowed into an acute wedge-shaped base. Keeping these points in view, I have not, with perfect specimens before me, found it difficult to separate the two species. The broad- and narrow-lobed forms are not unfrequently seen to arise both from the same root. The present is a much more widely dispersed Fern than *P. pedata*. The gemmiparous bud, so common on this species, especially when cultivated, has never been noticed on the *pedata*.

PLATE 22. Upper and under sides of fertile fronds of *Pteris* (*Litobrochia*) *palmata*, Willd.,—*natural size*. Fig. 1. Portion of the stipes. 2. Portion of a fertile frond, showing the venation and the sorus. 2. Involucre, forced back to show the receptacle:—*all more or less magnified*.

Cornell University Herbaria

W. Fitch, del et lith.

Vincent Brooks, Imp

Plate 23.

PTERIS (Litobrochia?) leptophylla, *Sw.*

Slender-leaved Pteris.

Pteris (Litobrochia) *leptophylla;* caudex small, subtuberiform; stipites tufted, slender, stramineous, a span to a foot long, scaleless; fronds 4–5 inches to a span long, pale green, thin, membranaceous, pellucid, deltoid-acuminate, subdentate, bipinnate, tripinnate below; pinnules linear, acuminate, broader in the sterile plant, and deeply and long-setosely serrate, at the apex only so in the fertile plant, all the pinnæ and pinnules more or less decurrent on the winged rachises; veins free and forked in the narrow pinnules, in the broader ones with only a single and often interrupted series of areoles next the costa (as in *Campteria*).

Pteris leptophylla. *Sw. in Act. Holm.* 1817, *p.* 70. *Ag. Pterid. p.* 57. *Presl, Tent. Pterid. p.* 145. *Hook. Sp. Fil. v.* 2. *p.* 216.

Pteris spinulosa. *Raddi, Syn. Fil. Bras. n.* 115. *Fil. Bras. p.* 47. *t.* 70 *and* 70 *bis.*

Cheilanthes spinulosa. *Link.*

Litobrochia leptophylla. *Fée, Gen. Fil. p.* 135. *J. Sm. Cat. Cult. Ferns, p.* 37. *Moore and Houlston, in Gard. Mag. of Bot. v.* 3. *p.* 126.

Hab. Brazil, abundant about Rio, gathered by various travellers and collectors. South Brazil, *Sellow.* Cultivated at Kew.

A delicate and graceful Fern, peculiar, as far as we at present know, to Brazil. It is one of the many species which throws a great doubt on my mind, of the propriety of multiplying the genera of Ferns on the grounds of venation only. We have here a Fern which the followers of Linnæus and Swartz, and we may add Brown, would have no difficulty in recognizing as a *Pteris:* but unfortunately in its venation it partakes of two, if not three, modern genera; much of it has the free venation of true *Pteris* (*Eupteris*), more perhaps of *Campteria;* rarely do the areoles form more than a costal series (constituting *Campteria*), so as to satisfactorily associate with *Litobrochia:* nevertheless, Presl places this plant in true *Pteris* (notwithstanding that he is the author of *Campteria*), while Moore, as well as others, who maintains the genus *Campteria* "as a useful group between *Pteris* and *Litobrochia,*" refers it to the latter genus *par préférence.* This observation is made in no carping spirit, but to show that by this minute multiplication of genera upon no solid foundations, while it perplexes the tyro and increases the difficulty of the

study, in no way promotes a natural arrangement. The plant now under consideration, with the venation of *Campteria*, is own brother in habit and structure to *Pteris* (*Litobrochia*) *Brasiliensis*, Raddi, and ought always to rank next to it: Fée and J. Smith have gone so far as to abandon *Campteria*. There is indeed a true *Pteris* (Eupteris) *gracilis* of Fée (see our Sp. Fil. v. 2. p. 172. t. 128 A.) also from Brazil, so closely resembling this that I doubt if it is even specifically distinct.

PLATE 23. Fertile plant of *Pteris* (*Litobrochia ?*) *leptophylla*, Sw.,—*natural size*. Fig. 1. Fertile pinnule,—*magnified*. 2. Portion of a sorus,—*more magnified*. 3. Sterile pinna,—*natural size*. 4. Portion of a pinnule, showing the venation of *Campteria*,—*magnified*.

W.Fitch del et lith

Plate 24.

HYPODERRIS Brownii, *J. Sm.*

Brown's Hypoderris.

Gen. Char. *Sori* dorsal, subglobose, arranged in lines or series within the areoles formed by the secondary veins upon the confluent angles of reticulated *veinlets*. *Involucre* inferior, cup-shaped, very thin and membranaceous, the margin fimbriated and spreading.—Fern of *Trinidad, confined to one species*. Caudex *creeping, very paleaceous with subulate scales, and similar scales clothe the stipites and the costa beneath.*—Fronds *stipitate, membranaceous, subcordato-hastate, acuminate, costate, pinnatedly veined;* primary and secondary veins *alternate, nearly parallel, flexuose;* veinlets *copiously anastomosing, so that the whole surface is reticulated with angular areoles, some of which have a free clavate* veinlet (*appendiculated*).

Hypoderris *Brownii.*

Hypoderris Brownii. *J. Sm. in Hook. Gen. Fil. t.* 1. *Hook. Ic. Plant. t.* 675 *and* 576; *Sp. Fil. v.* 1. *p.* 57. *J. Sm. Cult. Ferns, p.* 51.

Hab. West Indies: St. Anne's Valley, Trinidad, *Lockhart;* growing on moist rocks in deep shady ravines; since communicated, probably from the same locality, by *Dr. Cruger*. Cultivated at Kew.

A Fern of great rarity, and remarkable in structure, inasmuch as, with the fructification evidently allied to *Woodsia*, it has the habit and venation of that group of *Polypodium*, to which *Phymatodes* and *Drynaria* belong, and of *Aspidium*, Presl, among the *Aspidium*-group. Its only native country yet known is the island of Trinidad, and the only locality there yet recorded, is that above given.

In the present case, as the genus is a very remarkable one, we have given the generic character. There being but one species, no specific character is necessary, for there is no other known Fern with which it can offer any specific comparison.

Plate 24. Figs. 1 and 2. Fertile fronds of *Hypoderris Browniana*, J. Sm., *natural size*. 3. Portion of a fertile frond, with sori, showing the venation,—*magnified*. 4. Sorus and involucre,—*more magnified*.

June 1st, 1861.


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Plate 25.

CYATHEA MEDULLARIS, *Sw.*

Edible Cyathea.

Cyathea *medullaris;* arboreous; caudex erect, stout, twelve to fourteen feet high, eight inches to a foot and more in diameter, dark-brown, almost black, below clothed with a dense mass of aerial descending radicles, above with the remains of former years' stipites, crowned with a magnificent tuft of erecto-patent fronds, equal in length to the caudex (of which the stipites occupy two to three feet, are very stout, of a deep purplish-black, with a delicate glaucous bloom, strongly muricated, as is the rachis), broad ovate-lanceolate, coriaceous, three feet in diameter in the widest part, tripinnate, full-green, paler beneath; primary pinnæ from a broad petiolated base, oblong-lanceolate; secondary ones lanceolate acuminate; pinnules linear-oblong, subfalcate, obtuse, toothed or lobato-pinnatifid; sori at the forking of the veins in two rows, nearer the margin than the costule, which has ciliated, paleaceous scales beneath; involucres globose, firm-membranaceous, bursting irregularly at the top, leaving a ragged cup with an elevated receptacle. (The fronds when quite young are covered with a very thick and dense mass of long, soft, woolly, paleaceous hairs, which fall away as the frond gets perfectly developed.)

Cyathea medullaris. *Sw. Syn. Fil. p.* 140 *and* 366. *Schk. Fil. p.* 128. *t.* 133 (*good*). *Willd. Sp. Pl. v.* 5. *p.* 494. *Hook. Sp. Fil. v.* 1. *p.* 27. *A. Cunn. Prodr. Fl. Nov. Zel. in Hook. Comp. Bot. Mag. v.* 2. *p.* 368. *A. Rich. Fl. N. Zeal. p.* 77. *Hook. fil. Fl. New Zeal. v.* 2. *p.* 7. *Bracken. Fil. Bot. United States Expl. Exp. p.* 281.

Polypodium medullare. *Forst. Prodr. p.* 82. *Pl. Esc. p.* 84.

Sphæropteris medullaris. *Bernh. in Schrad. Journ. Bot.* 1800, *v.* 1. *p.* 22. *t.* 1. *f.* 1.

Cyathea affinis. *Sw. Syn. Fil. p.* 141 (*not of Schkuhr*).

Polypodium affine. *Forst. Prodr. p.* 83.

Cyathea extensa. *Sw. Syn. Fil. p.* 139 *and* 364. *Schk. Fil. p.* 127. *t.* 132 *a–c* (*good, as representing the barren state and ciliated scales of the rachis beneath*).

Alsophila extensa. *Hook. and Arn. in Bot. of Beechey's Voy. p.* 76.

Cyathea Mertensiana. *Bongard, MS. in Herb. Imp. Acad. Petersb. and in Herb. Nostr.*

Hab. New Zealand; Northern and Middle Islands, as far south as Akaroa, *Forster, Raoul, Hooker fil. etc.;* Norfolk Island, *Forster* (*Endlicher*). Pacific Islands, *Forster;* Otaheite, *Duperrey;* Pitcairn's Island, *Cuming, n.* 1793, *Mathews, n.* 7; New Guinea, *Barclay;* Bonin, *Dr. Mertens;* Coral Islands, *Beechey;* island of Aneiteum, *Raoul;* and Kermadee Islands, *Milne and Macgillivray;* "caudex arborescent, one foot in diameter."

Grand and striking as are the Tree-Ferns in general, the pre-

sent species is the one which has perhaps attained the greatest size in a state of cultivation. Our principal plant was presented to the Royal Gardens by his Royal Highness the Prince Consort; in eight years it has doubled its size, and at this time (1860), with its tub (much too small for it), it stands twenty feet from the ground to the summit of its noble crown of leaves. But this is small, compared to the size of one of which we possess a drawing, by favour of Dr. Sinclair, from a native specimen growing within reach of the spray of a cascade in New Zealand, which is, we believe, estimated at eighty feet. Dr. Hooker mentions the stems or caudices measuring from six to eight feet in circumference, and with fronds eighteen feet long. Mr. Brackenridge describes the trunk fifteen to thirty feet long. No doubt, it varies much according to locality. The young undeveloped stipites and fronds are densely clothed with very long, crisped, glossy, silky, paleaceous, dark-brown fibres, forming a felt all over, which gradually falls off as the fronds are perfected: then the rich purple-black of the muricated stipes, with a glaucous coating or bloom, like that of a plum, is apparent. The pinnules vary in being more or less toothed or pinnatifid, sometimes nearly entire, the margins often reflexed. The sterile pinnules are broader than the fertile ones. This is one of several New Zealand Ferns, of which the pith-like core or centre, in a glutinous semifluid state, and presenting a medullary substance (whence the specific name), used to be extensively eaten by the Aborigines; but now the more civilized condition of the Natives has taught them to prefer more substantial and nourishing food.

PLATE 25. Fig. 1. Fertile plant of *Cyathea medullaris*, Sw.,—*a much reduced figure*. 2. Portion of a secondary pinna of ditto,—*natural size*. 3. Pinnule, with sori,—*magnified*. 4, 5, 6. Sori in different states of maturity,—*more magnified*.

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W Fitch del et lith

Plate 26.

Acrostichum (Gymnopteris) nicotianæfolium, *Sw.*

Tobacco-leaved Acrostichum.

Acrostichum *nicotianæfolium;* caudex long, stout, creeping; stipites stout, distant, one and a half to two feet long, scaly below; fronds dimorphous, one to two feet long, submembranaceous, pinnated with three to seven or ten petiolated pinnæ, terminal one the largest; *sterile* frond, pinnæ four to eight inches long, elliptical-ovate, rather suddenly acuminated, sinuato-dentate at the margin, penniveined; primary veins subarcuate, connected by transverse subarcuate lesser veins, their areoles with anastomosing ultimate veinlets, which are appendiculated; *fertile* fronds smaller than the sterile; pinnæ oblong-lanceolate, subacuminate.

Acrostichum nicotianæfolium. *Sw. Syn. Fil. p.* 13. *t.* 199. *Willd. Sp. Pl. v.* 5. *p.* 118.

Gymnopteris nicotianæfolia. *Pr. Tent. Pterid. p.* 244.

Acrostichum acuminatum. *Willd. Sp. Pl. p.* 116.

Gymnopteris acuminata. *Pr. Tent. Pterid. p.* 244.

Gymnopteris latifolia. *Pr. l. c.?* (*Fée*).

Lingua cervina scandens citriifoliis major. *Plum. Fil. p.* 100. *t.* 115.

Hab. Tropical America. West Indies: Martinique, *Plumier;* Jamaica, *Swartz, Wilson, Purdie;* Cuba, *C. Wright, n.* 788, *Linden,* 2117. British Guiana, *Schomburgk.* Near Pará, Brazil, *Spruce, n.* 28. Cultivated at Kew.

A very fine bold-growing species, frequent in marshy ground, according to the testimony of Plumier and of Spruce. The pinnæ vary in size, both of the sterile and fertile fronds (the latter are always the smaller of the two), and they vary in their relative length and breadth: hence two species have been constituted, which are hardly worth recording even as varieties. It is an exceedingly well marked species. M. Fée has lauded the figure of Plumier as characteristic of his *Gymnopteris acuminata;* his own figure, *G. nicotianæfolia,* can in no way be distinguished from Plumier's plant, which is the original authority for our *Acrostichum nicotianæfolium.* It is remarkable that Swartz should have overlooked Plumier's figure, and placed it among his "species incertæ."

Plate 26. Fig. 1, 2, 3. Portion of a caudex and stipes, and upper portion of a sterile and of a fertile frond,—*natural size.* 4. Portion of a fertile pinna, with the fructification partially removed to show the venation,—*magnified.*

July 1st, 1861.

Linnean

Plate 27.

TRICHOMANES crispum, *L.*

Crisped Bristle-Fern.

Trichomanes *crispum;* caudex elongated, creeping, branched, black-setose at the apex; stipites scattered, or often aggregated at the apex of a caudex or branch, one to four or five inches long, subtriquetrous, black-brown with spreading hairs; fronds three or four inches to a foot and more long, membranaceous, compactly cellular with minute areoles, more or less villous with simple or branched hairs (as is the rachis), oblong-lanceolate, acuminate, sometimes a little contracted at the base, deeply pinnatifid in the upper portion, below pinnated, often decurrently so; segments and pinnæ more or less compact, horizontal, oblong, obtuse, or sublanceolate, costate, sinuato-dentate, subcrispate; veins rather distant, one- to three-forked; involucres infundibuliform, sunk in the substance of the frond, the mouth sometimes a little exserted, at other times situated in the sinus formed by two projecting teeth, mostly at the apex of the segments; columella often very long and much exserted.

Trichomanes crispum. *Linn. Sp. Pl. p.* 1560. *Sw. Fl. Ind. Occ. v.* 3. *p.* 1731. *Willd. Sp. Pl. v.* 5. *p.* 504. *Hedw. Fil. cum ic. Hook. and Grev. Ic. Fil. t.* 12. *Van den Bosch, Syn. Hymenoph. p.* 18. *J. W. Sturm, in Mart. Fl. Bras. Hymenoph. p.* 251.

Trichomanes pilosum. *Raddi, Fil. Bras. t.* 79. *f.* 1. *Epimel. Bot. p.* 15. *J. E. Sturm, in Mart. Ic. Pl. Crypt. Bras. p.* 105. *t.* 68. *Mart. Fl. Hymenoph. p.* 252. *Van den Bosch, Hymenoph. p.* 19 (T. laxum, *Kl. in Linnæa, v.* 18. *p.* 536, *according to Kunze*).

Trichomanes fastigiata. *Seib. Syn. Fil. n.* 144. *Pr. Hymenoph. p.* 115; *Epimel. Bot. p.* 14. *Van den Bosch, Syn. Hymenoph. p.* 18.

Trichomanes accedens. *Pr. Epimel. Bot. p.* 14. *Van den Bosch, l. c. p.* 18. *J. E. Sturm, in Mart. Fl. Bras. Hymenoph. p.* 253; *in Schk. Fil. Suppl. p.* 158. *t.* 68; *and in Pl. Crypt. Pœpp. v.* 9. *p.* 104. *J. E. Sturm, in Mart. Fil. Bras. Hymenoph. p.* 255. *Van den Bosch, Syn. Hymenoph. p.* 19.

Trichomanes Sellowianum. *Presl, Hymenoph. p.* 15 *and* 37; *Epimel. Bot. p.* 15 *and* 37 (*and* Trichom. maximum *of Pohl, and Kze. in Linnæa, v.* 21. *p.* 240, *according to J. E. Sturm*). *J. E. Sturm, in Mart. Fl. Bras. Hymenoph. p.* 253. *Van den Bosch, Syn. Hymenoph. p.* 20.

Trichomanes cristatum. *Klfs. Enum. Fil. p.* 265. *Pr. Hymenoph. p.* 15; *Epimel. Bot. p.* 14 (Tr. pellucens, *Kl. in Linnæa, v.* 18. *p.* 530, *quoad Plant. Hostm. n.* 600, *fide J. E. Sturm*). *J. E. Sturm, in Mart. Fl. Bras. Hymenoph. p.* 254 (Trichomanes laxum, *Kl. in Linnæa, v.* 18. *p.* 530, *according to J. E. Sturm*). *Van den Bosch, Syn. Hymenoph. p.* 19.

Trichomanes Hænkeanum. *Pr. Hymenoph. p.* 15 *and* 36. *t.* 3 *A; Epimel. Bot. v.* 1. *p.* 69 (T. crispum, *Pr. Reliq. Hænk. v.* 1. *p.* 69, *fide Pr.*). *J. E. Sturm, in Mart. Hymenoph. p.* 255. *Van den Bosch, Syn. Hymenoph. p.* 19.

Trichomanes Mertensii. *Pr. Hymenoph. p.* 15 *and* 36. *Epimel. Bot. p.* 15.

J. E. Sturm, in Mart. Fl. Bras. Hymenoph. p. 257. *Van den Bosch, Syn. Hymenoph. p.* 19.

Trichomanes eriophorum. *Pr.* (*sub Ragatelo*) *Epimel. Bot. p.* 18. *t.* 9. *J. E. Sturm, in Mart. Fl. Bras. Hymenoph. p.* 257. *Van den Bosch, Syn. Hymenoph. p.* 20.

Trichomanes Plumula. *Pr. Hymenoph. p.* 15 *and* 36 (*Van den Bosch refers to this under his* T. pilosum, *Mart. Ic. Pl. Crypt. Bras. t.* 68, *right-hand figure*).

Trichomanes plumosum. *Kunze, in Linnæa, v.* 9. *p.* 104.

Polypodium crispum, calyciferum. *Plum. Fil. p.* 67. *t.* 86.

Hab. Tropical America. West Indies: Martinique, *Plumier*, *Sieber*, *n.* 144 (T. fastigiatum, *Sieber*); Jamaica, *Swartz*, *Purdie*, *March;* Guadeloupe, *C. Parker;* St. Vincent, *Guilding;* Cuba, *C. Wright*, *n.* 900. Columbia, *Schlim*, *n.* 601 and 654, *Purdie*, *Seemann*, *Fendler* (Venezula), *n.* 26, sterile, pinnules elliptical-oblong, scarcely crisped; and *n.* 389, two feet long, stipites and rachises very slender, fronds very membranaceous and delicate, much attenuated at the base, *Birschell*, *Funck*, *n.* 650: Brazil, *Sellow*, *Gardner*, *n.* 207 (both quoted as *T. Sellowianum*, Kze.); Tarapota, *Spruce* (Tr. plumosum, *Kze.*), and Pará, *n.* 2, and *n.* 209 (this is *T. crispum*, according to Presl, Epimel. p. 14, and *T. pilosum*, J. E. Sturm, in Mart., and *n.* 1908, which is *T. cristatum*, Kaulf., according to Presl, and *T. pellucens*, *n.* 208, of *Gardner*), (T. pilosum, *Raddi*, according to J. E. Sturm); Barra, on the Amazon, densely clothed with ferruginous hairs, and *n.* 1212, nearly free from hairs. British Guiana, *Schomburgk*, *n.* 442 (this is also T. cristatum, *Klfs.*, according to Presl, n. 277, "Trichomanes crispum, *L.*, β rufum, is T. Martensii, *Pr. Hymenoph. p.* 15, and T. pilosum, *Mart. Ic. Crypt. Bras. p.* 105. *t.* 68); *C. S. Parker;* Essequibo, *Appinn.* 181. French Guiana, *Le Prieur* (T. plumosum, *Kze.*, *DC.*); Surinam, *Hostmann*, *n.* 599 (T. Plumula, *Pr.*). Peru, *Lechler*, *n.* 2548 (T. crispum, *L. Metten.*, T. pellucens, *Van den Bosch*), *Pœppig* ("T. pellucens, *Kze. Fil. v.* 1. *p.* 158. *t.* 68," and other specimens of Pœppig, marked, by Kunze, T. plumosum, *Kze.*, and *Pr. Hymenoph. t.* 2 *A*). Tropical Africa, Brass River, and Prince's Island, *Barter*, *in Baikie's Niger Expedition*, *n.* 1817 and 1818; banks of the Nun River, *Gustav Mann*. Cultivated at Kew.

A most beautiful species, long supposed to be peculiar to tropical America; but recently detected in tropical Western Africa. I know few species of the difficult and variable genus *Trichomanes* which is more readily recognized than this; and I cannot but express my surprise that Dr. Greville's excellent figure of it, in the 'Icones Filicum,' should be so misunderstood, as to induce Presl first, and others following him, to divide it from *T. crispum*, and constitute a species, under the name of *T. accedens*, distinct from *T. crispum* of Linnæus and of Plumier (the original authority). It is not to be wondered at, that those who separate species upon such slight grounds, should go further, and give rise to the above catalogue of synonyms, which, for the greater part at least, possessing as I do authentic specimens, I can only regard as one and the same species, un-

worthy of notice even as well-marked varieties. I think, could the able botanists whose names stand in the above list of synonyms, inspect the numerous suites of specimens which it is my privilege to possess, they would come to very different conclusions respecting the limits of species.

I am not, it is true, acquainted with *Tr. Hænkeanum* of Presl; but as that author's description is not at variance with *T. crispum*, and as he first considered it to be identical with that Fern, we are perhaps not far wrong in bringing it here. *T. eriophorum* is surely, both from the figure and description, a more hairy state of *T. crispum*, and seems to have been so considered by its discover, Sir Robert Schomburgk, whose specimens of British Guiana, distributed under n. 442, have been considered, by a very able closet-botanist, to include three distinct species?

PLATE 27. Fig. 1 and 2. Fertile plants of *Trichomanes crispum*,—*natural size*. 3. Fertile pinna,—*magnified*. 4. Sorus,—*more highly magnified*.

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Plate 28.

HELMINTHOSTACHYS Zeylanica, *Hook.*

Ceylon Helminthostachys.

Gen. Char. Helminthostachys, *Kaulf.* *Capsules* subglobose, clustered, opening downwards by a longitudinal fissure into two nearly equal valves: *clusters* pedicellate, crested, collected into an elongate, pedunculated, caudiform, subdistichous terminal *spike.* *Spores* pellucid, small, globose.—Native of India. Caudex *a thickened, fleshy, creeping* rhizome, *throwing down fleshy* fibres; stipes *simple, elongated, herbaceous;* frond *ternato-verticillate, binate, ternate, or subquinate, or pinnate;* pinnæ *lanceolate, subserrate, lateral ones decurrently winged and coadunate, terminal one generally free.*

Helminthostachys *Zeylanica.*

Helminthostachys Zeylanica. *Hook. Gen. Fil. t.* 47. *Presl, Suppl. Tent. Pterid. p.* 59. *Hook 2nd Cent. of Ferns, t.* 95.

Helminthostachys dulcis. *Kaulf. En. Fil. p.* 28. *t.* 1. *f.* 1. (*spike only*). *Bl. En. Fil. Jav. p.* 258. *Wall. Cat. n.* 54. *Hook. and Grev. En. Fil. Bot. Miscell. v.* 3. *p.* 220.

Botrychium Zeylanicum. *Sw. Syn. Fil. p.* 172. *Willd. Sp. Pl. v.* 5. *p.* 65.

Osmunda Zeylanica. *Linn. Sp. Pl.* 1519.

Ophioglossum laciniatum. *Rumph. Herb. Amboyn. v.* 6. *p.* 153. *t.* 68. *f. B.*

Helminthostachys integrifolia. *Presl, Suppl. Tent. Pterid. p.* 50.

Botryopteris Mexicana. *Presl, Reliq. Hænk. v.* 1. *p.* 76. *t.* 12. *f.* 1.

Helminthostachys crenata. *Presl, Suppl. Tent. Pterid. p.* 60.

Hab. Malay Archipelago and Amboyna, *Rumphius;* Luzon, *Cuming, n.* 39; Tavoy and Bengal, *Wallich;* Mergui, *Griffith;* Java, *Blume, Thomas Lobb;* Borneo, *Thomas Lobb;* Ceylon (*Linnæus*), *Gardner, Thwaites;* Cochin, *Mrs. General Walker, Johnstone;* New Caledonia, *La Billardière;* Guahan, Marianne Islands, *Hænke.* Cultivated at Kew.

In this case again, where the genus is limited to a solitary species, we give the generic character, which includes that of the species. This is a Fern, or, as sometimes called, a Pseudo-Fern, allied to our well-known *Ophioglossum vulgatum,* but as it has a compound spike and compound fronds, it is properly considered a distinct and a new genus by Kaulfuss. It is peculiar to eastern and southern India, and the Malay Archipelago and Islands, and has been successfully introduced to Kew by the kindness of our

excellent friend Mr. Thwaites. It grows, as that gentleman informs us, in watery places, such as produce the *Ceratopteris thalictroides*, Brong., and we shall find it probably as difficult to cultivate, for a series of years, as we do the *Ophioglossum*, *Botrychium*, etc., which, it is possible, judging from the fleshiness of their roots, may be all in some sense parasitic.

It must be a great love of species-making that induced the late Dr. Presl to describe the three specimens distributed in the collections of Mr. Cuming from Luzon, as three distinct species! One of these he afterwards acknowledged to be the same as his *Botryopsis Mexicana* of 'Reliquiæ Hænkeanæ;' and on finding that it was not really a Mexican plant, and not distinct as a genus from *Helminthostachys*, he had called it *H. crenata*.

PLATE 28. Fertile plant of *Helminthostachys Zeylanica*, Kaulf.,—*natural size*. Fig. 1. Portion of a frond, to show the venation. 2. Portion of a spike, with clusters of capsules. 3. Single cluster of do.,—*all magnified*.

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Plate 29.

BOTRYCHIUM Virginianum, *Sw.*

Hemlock-leaved Moonwort.

Botrychium *Virginianum;** stipes three inches to a foot and a half long; *sterile frond* shorter than the stipes, deltoid, subternate, tripinnate (lower primary pinnæ often so distant from the pair next above as to appear like two lateral fronds); ultimate pinnæ varying much in size, oblong-lanceolate, deeply pinnatifid; the segments lanceolate, irregularly more or less serrated or incised; *fertile frond* long-pedunculate, arising from the base of the compressed rachis, or from various distances above the base; raceme compound, subtripinnate; ultimate segments short, capsuliferous.

Americanum; peduncle of the fertile frond from near the base of the sterile one.

Botrychium Virginianum. *Sw. in Schrad. Journ.* 1800. *Syn. Fil. p.* 171. *Schk. Fil. p.* 157. *t.* 156. *Sm. in Rees' Cycl. Suppl. Ledeb. Fl. Ross. v.* 5. *p.* 506. *Svensk Bot. t.* 665.

Osmunda Virginiana. *Linn. Sp. Pl. p.* 1579.

Botrychium Virginicum. *Willd. Sp. Pl. v.* 5. *p.* 64. *Hook. and Grev. En. Fil. Bot. Misc. v.* 3. *p.* 233. *Presl, Tent. Suppl. p.* 46. *Fries, Sum. Veg. p.* 83. *A. Gray, Man. Bot. United States Illustr. p.* 602. *Schlecht. in Linnæa, v.* 5. *p.* 621.

Botrypus Virginicus. *Mich. Fl. Bor. Am. v.* 2. *p.* 274.

Botrychium gracile (*small var.*). *Pursh, Fl. Am. Sept. p.* 656.

Botrychium brachystachys. *Kze. in Linnæa, v.* 18. *p.* 305.

Botrychium cicutarium. *Sw. Syn. Fil. p.* 171. *Willd. Sp. Pl. v.* 5. *p.* 65. *Hook and Grev. En. Fil. in Bot. Misc. v.* 3. *p.* 223. *Presl, Tent. Suppl. p.* 46.

Osmunda cicutaria. *Lam. Enc. Bot. v.* 4. *p.* 650.

Osmunda Asphodeli radice. *Plum. Fil. p.* 136. *t.* 159.

Indicum; peduncle of the fertile frond from near the middle of the sterile frond.

Botrychium languinosum. *Wall. Cat. p.* 48. *Hook. and Grev. Ic. Fil. t.* 79 (*small, and the peduncle inserted at the base of the sterile frond*). *Presl, Tent. Suppl.* 46. *Kze. in Linnæa, p.* 246.

Hab. North America: Canada (*Sir J. E. Smith*), and throughout the United States, to the extreme south, Texas, etc., Mexico, *Dr. Coulter, n.* 1716, *W. Bates* (sterile frond much resmbling that of *B. daucifolium*, Wall., and Hook. and Grev., but the peduncle inserted as in the American form). South America, *Funck and Schlim, n.* 971; New Granada, *Purdie;* Ecuador, *Hartweg, n.* 1484; Quito, *Jameson;* St. Domingo, *Plumier*, Scandinavia (*Herb. Nostr.*), and said to be found in "Russia, Austria, and Styria."—*Indicum;* Sheopore and Nepal, *Wallich;* and throughout Northern India and the Neilgherries, *Wight, n.* 31, *Hooker fil. and Thomson, Major Madden* (Simla, 5–8000 feet elev.). Khasya, *Griffith.* Ceylon, *Gardner, n.* 1181. Tsus-Sima, in the Gulf of Korea, *Wilford, n.* 848. Japan?, *Thunberg.*

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* The original Linnæan name is *Virginianum*, not *Virginicum*, as generally written.

August 1st, 1861.

The present species of *Botrychium* was long supposed to be peculiar to North America, from Canada (according to Willdenow and Smith, though I have never myself seen Canadian specimens) to Carolina: but unquestionably the same plant appears, generally in a larger form, in Mexico, and in the northern parts of South America and Ecuador. It inhabits also Northern Europe, but, from the few specimens I have seen from thence, in a very reduced form. The *Botrychium lanuginosum* of Wallich, from India, is remarkable in almost every instance in having its fertile peduncle arising, not from the base of the sterile frond, but from near the middle of its rachis. But my first authentic specimens received from Dr. Wallich, still preserved in my herbarium, and figured in the 'Icones Filicum' (tab. 79), have the peduncle exactly as in the American plant, and is noways different from it. There are, indeed, other allied species, and described ones (*B. daucifolium*, Wall., *B. matricarioides*, Willd., *B. australe*, Br., *B. ternatum*, Sw., *B. lunarioides*, Sw., etc.), in which the peduncle originates from the stipes considerably below the sterile frond, and even from near the base of the stipes. But indeed all the species of the genus require a careful revision, and the notion, still too prevalent, must be abandoned, that Ferns of widely separated localities are specifically different: and then the seventeen species enumerated by Presl, in his 'Supplementum Tentaminis Pteridographiæ,' will require to be reduced.

The present Fern is undoubtedly very variable in the size of the frond, and in being more or less compound. Our figure well represents the usual size and normal state of the plant.

PLATE 29. Fertile plant of *Botrychium Virginianum*, Sw.,—*natural size*. Fig. 1. Ultimate pinnule of a sterile frond. 2. Portion of a fertile raceme. 3. Capsule :— *all more or less magnified.*

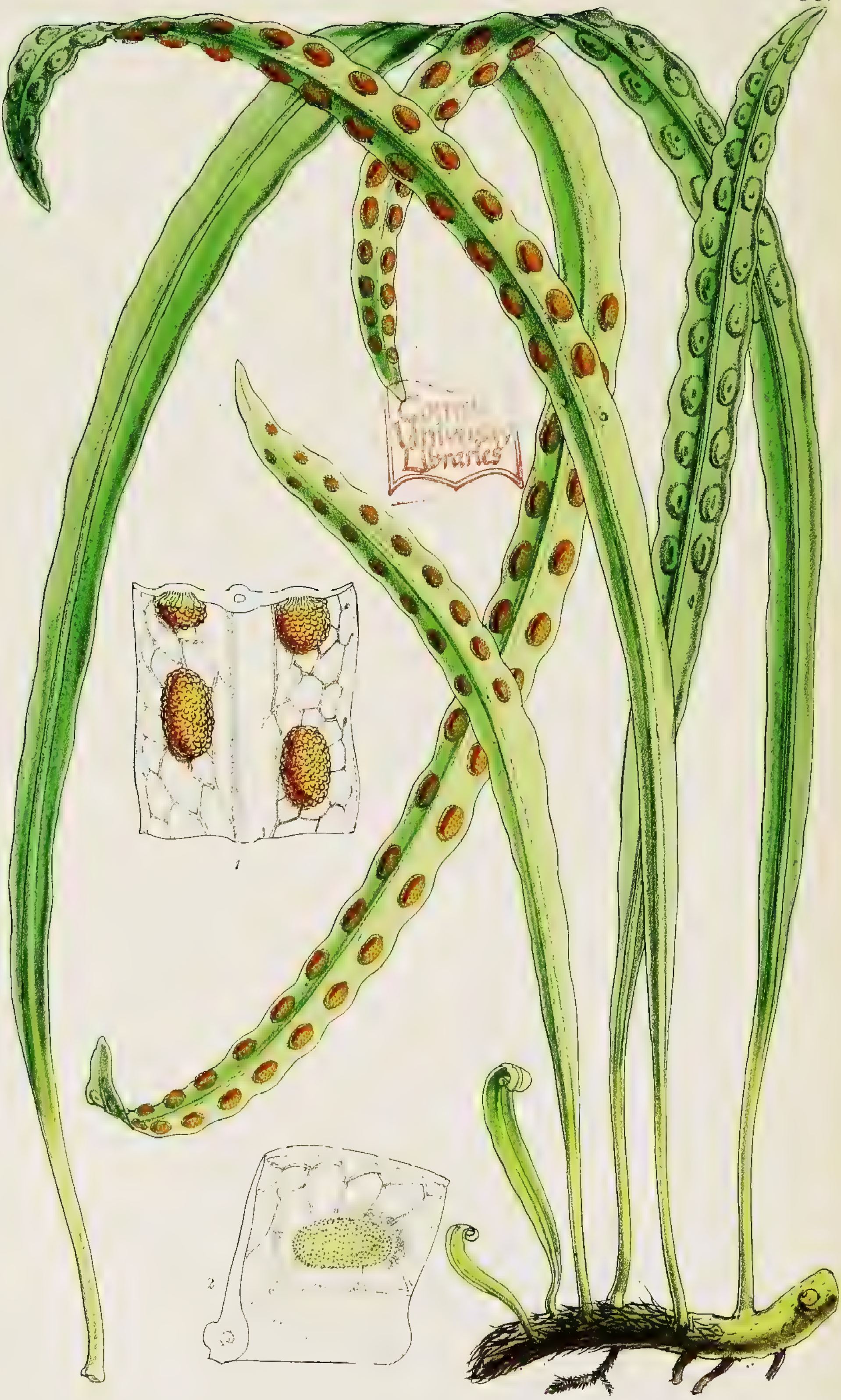

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Plate 30.

POLYPODIUM (Phymatodes) attenuatum, *Br.*

Attenuated Polypody.

Polypodium (Phymatodes) *attenuatum;* caudex long, creeping, subulato-squamose towards the apex; fronds scattered, a span to a foot and a half long, firm-coriaceous, glossy, linear-loriform, scarcely acuminated, acute, the base attenuated into a short stipes, destitute of scales, articulated on the caudex; costa very stout, prominent beneath; veins subuniformly reticulated, forming long narrow areoles next the costa with no free veins; sori copious, large, elliptical, prominent, in single series between the costa and the margin, and originating both from the surface of the areoles and of the veins.

Polypodium attenuatum. *Br. Prodr. Nov. Holl. p.* 146 (*not Hook. Ic. Plant. t.* 409, *nor Gen. Fil. t.* 71 *B, nor of All. Cunn., nor of Richard, which are* Dictymia lanceolata, *J. Sm. of New Zealand*). *Sieb. Syn. Fil. n.* 93, *and Fl. Mixt. n.* 237.

Dictyopteris attenuata. *Pr. Tent. Pterid. p.* 194. *Moore.*

Dictymia attenuata. *J. Sm., in Comp. Bot. Mag. v.* 72, *p.* 16.

Polypodium Brownianum. *Spr.* (*fide Presl*) *and* Drynaria Browniana, *Fée.*

Polypodium Brownii. "*Wickstr.*" *Metten. Polypod. p.* 85, *but evidently, judging from references, including J. Smith's* Dictymia lanceolata.

Hab. New Holland: Port Jackson, *Brown, Sieber, n.* 93, *Clowes, Fraser;* Hastings River, *Dr. Beckler;* Cunningham's Gap, Victoria, *F. Mueller.* Island of Viti-Levu, Fiji group, *Milne, Captain Denham's Voyage of the 'Herald.'* Cultivated at Kew.

A very distinct and well-marked species, though I was led formerly to publish another plant, the *Dictymia lanceolata*, J. Sm., under that name, from having so received what I believed to be authentic specimens, from Allan Cunningham, and from the too brief character given by Mr. Brown. Allan Cunningham does not appear to have found the true *P. attenuatum*, in Australia, to which country, however, it is not peculiar, for I have received specimens from the Fiji Islands. On the other hand, *Dictymia lanceolata*, J. Sm. in Hook. Fil. Fl. N. Zeal. v. 2. p. 43 (which may be called *Polypodium* (Phymatodes) *Cunninghami*, by those who do not sanction *Dictymia* of J. Sm., or *Dictyopteris*, Pr.), is not confined to New Zealand. I possess specimens from the island of Mallecolla, one of the New Hebrides, gathered by Mr. C. Moore, of Sydney (n. 50). It is remarkable that Dr. Mettenius, in his work on "*Polypodium*," takes no notice of this latter plant, except as he confounds it with the *P. attenuatum*, Br. (his *P. Brownii*), for he describes the fronds as sometimes "spathulato-

lanceolate," which is characteristic of Cunningham's plant. He quotes my figure in Ic. Pl. t. 409, and in Gen. Fil., but he makes no allusion to its being a New Zealand species. I trust our present figure will clear up all difficulties respecting Mr. Brown's plant.

PLATE 30. Fertile specimens of *Polypodium* (Phymatodes) *attenuatum*, Br.,—*natural size*. Fig. 1. Portion of a fertile frond, *magnified*, showing the venation: another smaller portion, *more magnified*, showing the receptacle of the sorus.

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Plate 31.

LOXSOMA Cunninghami, *Br. MSS.*

Mr. Cunningham's Loxsoma.

Gen. Char. *Loxsoma,* Br. *Sori* marginal, in the sinus of the teeth of the fronds, pointing downwards, terminating a vein. *Involucres* suburceolate, coriaceous, of the texture of the frond, the mouth truncated, entire. *Receptacle* columnar, elongated, much exserted beyond the involucre, and covered, for its whole length, with clavate, shortly stipitate *capsules,* mixed with jointed hairs and furnished with a broad, oblique, incomplete *ring,* opening on one (the out-)side vertically. *Spores* triangular, with a depressed, triangular mark.—*An elegant* Fern, *peculiar to New Zealand.* Caudex *long, creeping, scaly.* Stipites *elongated, scattered.* Fronds *coriaceous, decompound, glaucous beneath, the* segments *lanceolate, dentato-pinnatifid,* veins *simple or forked;* sori *on the extremity of a vein.*

Loxsoma *Cunninghami.*

Loxsoma Cunninghami. *Br. MSS. A. Cunningham, in Bot. of N. Zeal. in Hook. Comp. to Bot. Mag. v.* 2. *p.* 366. *t.* 31, 32. *Hook. Gen. Fil. t.* 15. *Sp. Fil. v.* 1. *p.* 86. *Hook. Fl. N. Zeal. v.* 2. *p.* 18.

Davallia dealbata. *A. Cunn. MSS.*

Trichomanes cœnopteroides. *Harv. MSS.*

Hab. New Zealand; Northern Island, in several localities, *All. Cunningham, Colenso, Sinclair, J. D. Hooker, Harvey, etc.* Cultivated at Kew; living specimens having been received from Dr. Sinclair.

This very remarkable and rare genus (only hitherto detected in the Northern Island of New Zealand), was first discovered and described by Mr. Allan Cunningham. It may be looked on as a Fern with the habit of a *Davallia* and the fructification of *Trichomanes.* We are satisfied to place it in *Dicksonieæ,* along with *Davallia, Hymenophyllum,* etc. Presl seems to have taken no notice of it. Dr. Van den Bosch, who is deeply versed in *Hymenophyllaceæ,* in his most recent work 'Eerste Bijdrage tot de Kennis der *Hymenophyllaceæ,*' constitutes an Order "*Bryopterides,*" which has three suborders,—(1) *Hymenophyllaceæ,* (2) *Diplophyllaceæ,* (3) *Loxsomaceæ;* the latter formed of the single genus *Loxsoma.* We have lately had the good fortune to re-

ceive from Dr. Sinclair living plants at the Royal Gardens of Kew, and are but too happy to offer a figure in the present work.

PLATE 31. Plant, with sterile and fertile fronds, of *Loxsoma Cunninghami*, Br., —*natural size*. Fig. 1. Sorus and involucre. 2. Sorus with the involucre laid open. 3. Capsule and jointed filaments from the sorus. 4. Front view of a capsule:—*all more or less magnified*.

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Plate 32.

WOODSIA (Hymenocystis) polystichoides, *Eat.*

Polystichum-like Woodsia.

Var. β. Veitchii.

Woodsia (Hymenocystis) *polystichoides;* densely cæspitose, a span rarely to a foot high; caudex scarcely any; stipites short, pale-castaneous, glossy, scaly; fronds subcoriacco-membranaceous, opaque, lanceolate, pinnate; pinnæ patent, numerous, approximate, sessile, six to seven lines long, lanceolate, obtuse, cuneato-truncate at the base, auriculate above, more or less villose, or sparsely subulato-paleaceous, the margins entire or sinuato-pinnatifid; costa indistinct; veins immersed, simple or forked, free, soriferous at the apex within the margin; involucre of four to five long-ciliated, imbricated, membranaceous scales, inserted beneath the sorus, at first orbicular, enclosing several capsules, rachis testaceous, glossy, partially and deciduously scaly.

α. nudiuscula; fronds subglabrous; pinnæ nearly entire at the margin.

Woodsia (Hymenocystis) polystichoides. *Eaton, Ferns of Wright's Herb. of Ringgold and Rodgers, U. S. Expl. Exped. in Proc. of Acad. of Arts and Sc.* 1859, *p.* 110. *Hook. in Second Cent. of Ferns, t.* 2.

β. Veitchii; fronds very villous on both sides; pinnæ nearly entire at the margin. (Plate 32. Fig. 1, 2, 4, 5, 6, 7.)

Woodsia Veitchii. *Hance, MS. in Herb. nostr.*

γ. sinuata; pinnæ broader, more obtuse, lobato-pinnatifid. (Plate 32. Fig. 3.)

Hab. Japan. Var. *α.* Hakodadi, *Ringgold and Rogers, Wilford, n.* 1021. Var. *β.* Hakodadi, *Veitch.* Var. *γ.* Hakodadi and Manchouria, *Wilford, n.* 1093. Ta-lien-kwan, Yellow Sea, *Birnie.*

We had scarcely figured the normal state of this plant, derived from specimens sent to me by Mr. Eaton, in our 'Second Century of Ferns,' above quoted, than we received further specimens from our collector, Mr. Wilford; and, more recently, a very villous variety which Mr. Veitch had presented to our botanical friend Mr. Hance, at Whimpoa, taken from a case of living plants that were dispatched to Messrs. Veitch's nursery at Chelsea; so that we may now consider the plant as introduced to our collections, and thus entitled to a place in a work of "Garden Ferns." A portion of these here figured were sent to us by Mr. Hance as a new species of *Woodsia*, which in his MSS.

he had called *Woodsia Veitchii*. As this name cannot be adopted for the species, we gladly employ it for the variety of this very beautiful and interesting species of the genus *Woodsia*.

PLATE 32. Fig. 1. *Woodsia polystichoides*, var. β *Veitchii*, Hook.,—*natural size*. 2. Portion with fertile pinnæ. 4. Portion of a pinna. 5, 6. Sori. 7. Portion of a scale of the involucre:—*magnified*. 3. Pinna of var. γ,—*natural size*.

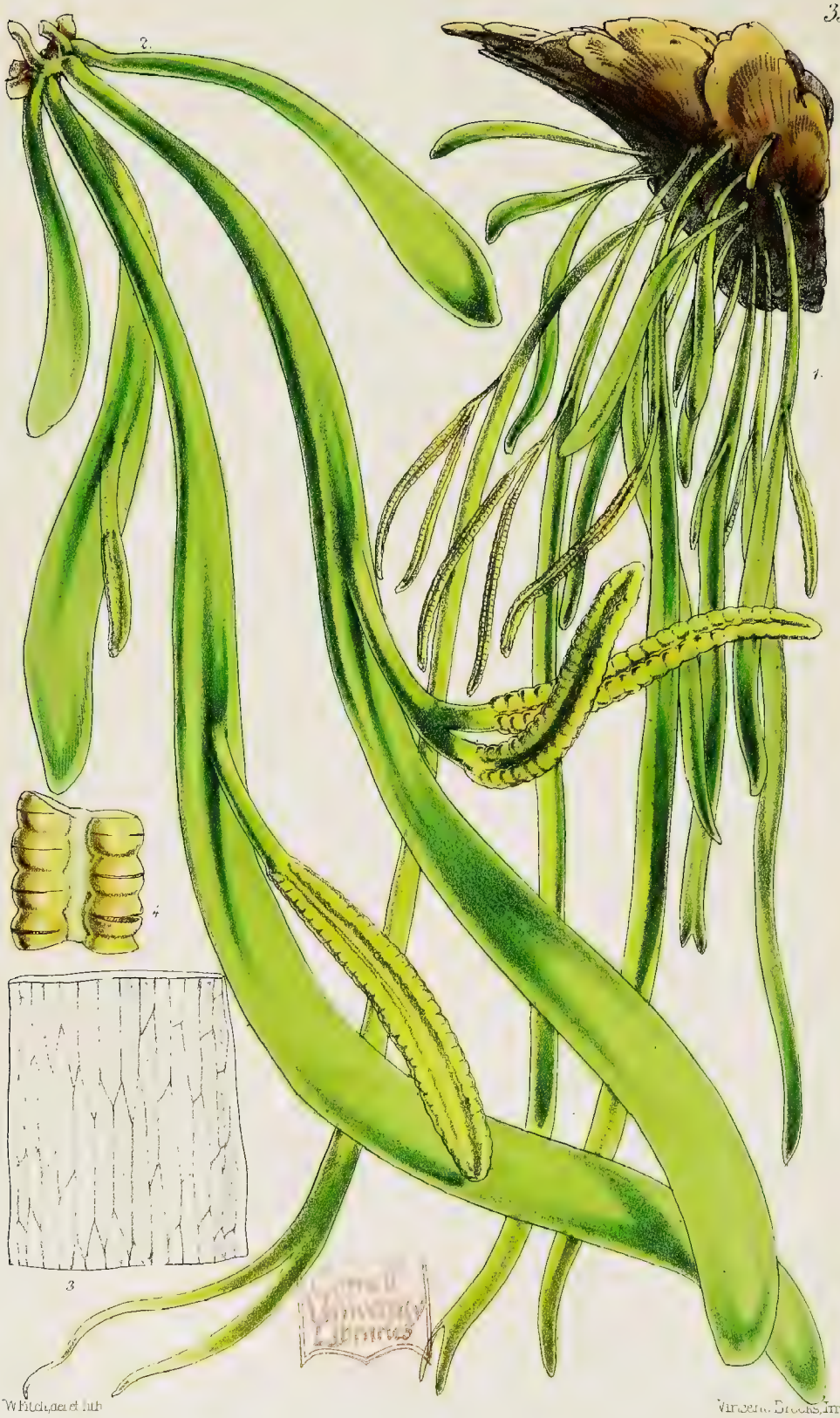

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Plate 33.

OPHIOGLOSSUM (§ Ophioderma) pendulum, *L.*

Great Pendulous Adder's-tongue.

Ophioglossum (§ Ophioderma) *pendulum;* epiphytal; root consisting of stout, coarse, fleshy fibres; fronds carnoso-membranaceous, one to four or five feet long, one to two or rarely three inches in diameter, ribbon-shaped, attenuated at the base, simple and subspathulate or once or twice dichotomous, ecostate, the segments very long, linear, subacute; veins internal, anastomosing, with long narrow subhexangular areoles; peduncles solitary, one to three inches long, simple or forked; spikes one or two, linear, three or four inches to a span long, pendulous.

Ophioglossum pendulum. *Linn. Sp. Plant. p.* 1518. *Sw. Syn. Fil. p.* 170. *Willd. Sp. Pl. v.* 5. *p.* 60. *Hook. and Grev. Ic. Fil. t.* 19. *Grev. and Hook. En. Fil. in Hook. Bot. Misc. v.* 3. *p.* 219. *Bl. En. Fil. Jav. p.* 260 (§ Ophioderma).

Ophioderma pendulum. *Presl, Suppl. Tent. Pterid. p.* 55.

Hab. Chiefly in tropical regions of the Old World; the islands of the Indian and Pacific Oceans; found by all botanists and collectors. Mauritius, Ceylon, East Australia, Brisbane River, *All. Cunningham,* and five miles from Port Jackson, *C. Moore* (*in Herb. Nostr.*). Cultivated in Kew Gardens from living plants sent from Sydney by *Sir Daniel Cooper,* growing among decaying fronds of *Acrostichum* (Platycerium) *grande.*

Our living plants of this interesting species of Adder's-tongue were sent to us, with other rare Ferns, from Australia by our obliging friend Sir Daniel Cooper. His remarks on this plant, in his letter, are very interesting: "The *Ophioglossum pendulum* is a beautiful species. If you can manage to insert a piece into the under part of *Acrostichum grande,* when that Fern has become well established, it will hang from it like a large green beard, and appear to great advantage. I tried to bring a magnificent specimen of the *Acrostichum,* from which *O. pendulum* hung down like a mass of beautiful green ribbons, six and seven feet long, two feet wide, and eight or nine inches thick, and with seedpods six inches long attached to the various leaves; the *Acrostichum* however died, and the leaves (or fronds) of *O. pendulum* withered away; but new ones are pushing through the surface of the dead *Acrostichum.*" To the present plant it is however impossible to do justice on a Plate of this small size, and all we can do is to represent at our fig. 1 a specimen on a very reduced scale, and at fig. 2 a *young* fertile plant, which

generally has the fronds simple and subspathulate. Some of our largest spikes of capsules, independent of the peduncle, are nearly a foot long.

Of true *Ophioglossum*—that is, of the group to which our European *O. vulgatum* and *O. Lusitanicum* belong—Presl enumerates twenty-five species. Almost innumerable specimens in our herbarium, from various parts of the world, induce Dr. Hooker and myself to believe that all are forms of one and the same species. In our present plant, and in the still more remarkable *Ophioglossum palmatum*, L., of South America (well distinguished by the stipitate palmated frond, and the aggregated spikes arising from the stipes), the specific distinctions are clear enough; but then Endlicher, adopting Blume's sectional name, makes of it a genus, *Ophioderma*, in which he is followed by Presl, and the latter again makes a new genus of *O. palmatum* (*Cheiroglossa*). Presl gives Quito, in South America, as a locality for *O. pendulum*; but I am confident the Quitonian plant is the *O. palmatum*, whence I have numerous specimens. But although the former is exclusively a native of the Old World, I have proof in my herbarium that *O. palmatum* is not exclusively confined to the New, for I possess specimens from M. Bouton and from the Paris Herbarium, gathered in the island of Bourbon, where however it is stated to be very rare.

PLATE 33. Fig. 1. Tuft of *Ophioglossum pendulum*, L.,—*on a very reduced scale.* 2. Young fertile plant,—*natural size.* 3. Portion of a frond, to show the venation. 4. Section from a spike of capsules:—*magnified.*

Plate 34.

SCHIZÆA ELEGANS; *α.* LATIFOLIA.

Beautiful Schizæa; broad-leaved var.

Schizæa *elegans;* caudex moderately stout, creeping, slightly setose; stipites numerous, approximate, ten inches to two feet long; fronds eight to ten inches long, broad-cuneate and undivided or broad-flabelliform, coriaceous, membranaceous, glossy, more or less dichotomously divided; primary divisions attenuated into a compressed one-nerved (or costate) petiole, ultimate divisions or segments three to four or more inches long, oblong-cuneate, from three-quarters of an inch to an inch or more broad, their somewhat truncate apices cut into several, subulate, long, costate segments, each terminated by a compound falcate spike of fructification, or the whole frond is cut into narrow-linear costate segments bearing one or few spikes; spikelets at first secund, afterwards spreading; capsules mixed with long jointed hairs, much exceeding them in length; the venation consists of nearly parallel dichotomous veins in the broad segments, a single central vein or rib in the narrow ones.

α. latifolia; segments broad, with copious dichotomous veins. (Plate 34.)

Schizæa elegans. *Sw. Syn. Fil. p.* 151. *Willd. Sp. Pl. v.* 5. *p.* 88. *Splitgerb. En. Fil. Surinam.* 1840, *p.* 433.

Schizæa cristata. *Willd. Sp. Pl. v.* 5. *p.* 88 (*Forster's plant from the Society Islands, which is intermediate between α and β*).

Lophidium elegans. *Presl, Suppl. Tent. Pterid. p.* 77.

Acrostichum elegans. *Vahl, Symb. v.* 2. *p.* 104. *t.* 50.

β. dichotoma; fronds repeatedly flabellately dichotomous, with narrow costate segments.

Schizæa dichotoma. *Sw. Syn. Fil. p.* 150. *Willd. Sp. Pl. v.* 5. *p.* 85. *Hook. and Grev. Ic. Fil. t.* 17. *Presl, Suppl. Tent. Pterid. p.* 75. *Brown, Prodr. Fl. Nov. Holl. p.* 162 (*fronds sometimes slightly muricated*).

Ripidium dichotomum. *Bernh. in Schrad. Journ.* 1800, *v.* 2. *p.* 127. *t.* 2. *f.* 3.

Acrostichum dichotomum. *Linn. Sp. Pl. p.* 1524. *Forst. Prodr. n.* 415.

Hab. *α. latifolia.* Trinidad, *Van Rohr, Lockhart, Crüger;* Jamaica and other West Indian Islands. Tropical America, especially Guiana, Brazil, Columbia, Mexico; generally in mountain regions. Pacific Islands: Society, Coral, Fiji Islands, New Hebrides, and Queen Charlotte's group, *Forster, Beechey, Mathews, C. Moore, Milne,* etc., and evidently, by innumerable gradations, passing into the *S. dichotoma,* Sw., and Hook. and Grev. Ic. Fil. t. 17.—*β. dichotoma,* Malay Islands, China, Mauritius, Bourbon, Madagascar, and the Pacific Islands, where it grows in company with *α. latifolia,* exhibiting various intermediate forms, the broad segments of the latter splitting not only at the apex but in the disk into narrow ones. Australia (common); New Zealand. Rare in South America. Caracas, *Birschel;* Venezuela, *Fendler,* 485; Cuba, *C. Wright, n.* 926. There is no good authority for either form of this being found on the *continent* of India.—Cultivated at Kew, where plants were received from Dr. Crüger, of Trinidad.

The genus *Schizæa* of Swartz and Smith has been by Presl separated into three genera:—1. *Actinostachys,* Wallich, three

species; *Schizæa* itself, nine species; and *Lophidium*, to which he refers, five species, viz. *S. spectabilis*, Mart., *S. pacificans*, Mart., *S. Flabellum*, Mart. (*Lophidium latifolium*, ? Rich.), our present *S. elegans*, Sw. (Acrostichum, *Vahl*), to which Dr. J. G. Sturm has added, in the Fl. Brasiliensis of Von Martius, *S. attenuata*, Beyr. MS., and *S. Fluminensis*, Miers. That our *S. elegans* is the true plant of Vahl, there can, I think, be no question. Vahl's figure is very accurate, and our garden specimen here figured is derived from Trinidad. It will be worth considering how far the other species of *Lophidium* deserve to be distinguished from this. *S. spectabilis*, Mart., figured in Mart. Fl. Brasil. t. 15 (not "14") is only known from one *sterile* frond; that frond is flabellato-reniform and quite simple, that is, not broken into dichotomous segments. *S. pacificans*, Mart. Ic. Pl. Crypt. Bras. p. 116. t. 56. f. 1, is fertile, and otherwise exactly corresponds with *S. spectabilis*, but it is bipartite, and one of the two lobes is again divided, while the other exhibits a disposition to become so, and the frond would thus be twice dichotomous. *S. Flabellum* is cuneato-flabellate and bipartite, really in no essential particular differing from the two preceding, and is not an uncommon form in Guiana. *S. attenuata*, J. G. Sturm, is unfortunately not figured, but the description and the remark, "Unicum tantum hujus speciei vidi specimen, quod tamen a *S. elegante* diversum existimo," lead me to the conclusion that it has no good characters to distinguish it. And lastly, we come to the *S. Fluminensis* of Miers, in Sturm, l. c. t. 15 (not "14"): "Species inter omnes *Schizæas* floræ nostræ gracillima et cum alia non confundenda." The figure exhibits a starveling plant of what may be a very undeveloped condition of *S. elegans*, and of which I ought to possess good specimens from Mr. Spruce, who is the only authority *mentioned* for its discovery.

Thus much for the genus or group of *Lophidium*. I have quoted the Pacific Islands as affording the plant now under consideration. Some of my Aneiteum specimens are decidedly this plant, gathered by M'Gillivray and Milne and C. Moore, and each set exhibits samples in all gradations, gradually merging into *S. dichotoma*. I possess, indeed, true *dichotoma*, which is rare in the New World, from Caracas (*Birschel*) and from *C. Wright*, gathered in Cuba (n. 926), but neither from the New World have I seen this to pass into *S. elegans*, nor from India and Australia, as among my Pacific Island specimens. The size of the spikes of capsules varies exceedingly on different specimens.

PLATE 34. Fertile plant of *Schizæa elegans*, Sw.,—*natural size*. Fig. 1. Compound spike of fructification, seen from the back. 2. Single spikelet, seen from the front. 3. Capsule. 4. One of the hairs from the rachis:—*all more or less magnified*.

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Plate 35.

POLYPODIUM (§ Drynaria) Willdenowii, *Bory*.

Willdenow's Polypody.

Polypodium (§ Drynaria) *Willdenowii;* caudex long, very stout, repent, densely clothed with lanceolato-subulate, delicate, membranaceous scales, fringed with long, silky, golden hairs; fronds of two kinds, forming a coronal tuft; *sterile* ones four to six inches and more long, sessile, ovate, firm, strongly costate, scarioso-membranaceous, subcoriaceous, more or less deeply pinnatifid, cordate at the base, strongly and prominently veined; *fertile fronds* long-stipitate (stipes and rachis beneath dark-purple), one and a half to two feet long, herbaceous, oblong-ovate, deeply almost to the rachis pinnatifid; segments a span or more long, linear-oblong, entire or serrated only at the moderately acute apex, lowest ones distant and decurrent; veins in the sterile fronds having the primary ones very distinct and pinnate, secondary and tertiary ones with no free veinlets; in the fertile fronds the primary veins are indistinctly pinnate, the rest anastomosing, with here and there free veinlets in the areoles; sori prominent, tawny, in two rows, situated close to the costa.

Polypodium Willdenowii. *Bory, in Annal. des Sc. Nat. ser.* 1. *v.* 5. *p.* 468. *Atlas, t.* 13. *Bl. Fl. Jav. t.* 66. *Metten. Polypod. p.* 120. *t.* 3. *f.* 48, 49 (*venation only*).

Polypodium propinquum. *Wall. in Herb.* 1823. *Cat. n.* 293. *Presl, Tent. Pteridogr. p.* 198.

Drynaria propinqua. *J. Sm. in Hook. Journ. Bot. v.* 4. *p.* 61. *Cat. Cult. Ferns, p.* 13.

Polypodium dimorphum. *Zoll.* (*fide Metten.*).

Hab. East Indies: Mauritius, *Bory, Wallich, Bouton;* Nepal, Simla, and apparently common in Eastern Bengal, Khasya, Assam to Bootan and Sikkim, and along the Himalaya range, at elevations of 5–6000 feet to North-west India, *Wallich, Griffith, Edgworth, Hook. fil. and Thomson, Strachey and Winterbottom* (elev. 7000 feet). Java, *Blume, Zollinger.*—Cultivated in the stoves at Kew.

We have here another species of that fine group of *Polypodium* to which the name of *Drynaria* has been given, having two distinct fronds; the sterile almost resembling a withered oak-leaf, of which we have offered an example at our Plate 5 of this work, *Polypodium* (§ Drynaria) *diversifolium*. Dr. Wallich named the present species *P. propinquum* in his Herbarium and in his 'Catalogue,' probably from its affinity with *P. quercifolium*, L. From that species it is at once distinguished by having

only two lines of sori, contiguous to and parallel with the costa. From *P. diversifolium*, which has similarly arranged sori, it is as readily recognized by its pinnatifid, not pinnated, fertile fronds.

Bory de St. Vincent's excellent memoir on his genus, or rather, as he calls it subgenus, of *Polypodium*, "*Drynaria*," in the first series of the 'Annales des Sciences Naturelles,' has been two much overlooked by Pteridologists, especially of this country, perhaps from the work being little known and difficult of access.

PLATE 35. Fig. 1. Tuft of fertile fronds of *Polypodium* (Drynaria) *Willdenowii*, on a very reduced scale. 2. Portion of a caudex, with stipes and sterile frond,—*natural size.* 3. Segment of a frond, with sori,—*natural size.* 4. Sori and venation. 5. Scale from the caudix,—*magnified.*

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W. Fitch, del. et lith.

Vincent Brooks, imp.

Plate 36.

ANEMIA (§ Euanemia) Mandioccana, *Rad.*

Mandiocca Anemia.

Anemia (§ Euanemia) *Mandioccana;* caudex a short erect or oblique rhizome, from which arises a cluster of stipites four to six inches long, clothed with spreading fulvous hairs; fronds a span to a foot long, oblong or ovato-oblong, herbaceo-membranaceous, dark-green, pilosulous, acuminate, multijugate, pinnated, pinnatifid only at the very apex, bearing the pair of fertile panicles at its base; pinnules one to three inches long, spreading, oblong, obtuse or subacuminate, crenato-serrate, superior base truncated and approximate with the rachis, inferior margin excised, ecostate; veins flabellate, very close, dichotomous; fertile panicles oblong, acuminate, on stipites about as long as themselves.

Anemia Mandioccana. *Raddi, Syn. Fil. p.* 23. *Fil. Brasil. t.* 9. *f.* 1. *Presl, Suppl. Tent. Pteridogr. p.* 90 (*not Hook. Gen. Fil. t.* 90, *which is* A. Breuteliana, *Pr.*). *J. G. Sturm in Mart. Fl. Bras. p.* 198.

Anemia abscissa. *Schrad. Goett. Gel. Anz. v.* 184. *p.* 864.

Anemia collina. *Kaulf. En. Fil. p.* 52? *Moore, Ind. Fil. p.* 64.

Var. *radicans;* rachis prolonged at the apex and rooting.

Anemia radicans. *Raddi, Syn. Fil. p.* 22. *Fil. Bras. p.* 70. *t.* 10. *Presl, Suppl. Tent. Pteridogr. p.* 85.

Hab. Brazil; abundant in the Mandiocca district, near Rio Janeiro (whence the author's specific name), *Raddi, Sellow, Gardner, Martius, Tweedie*, etc. etc. Cultivated at Kew.

Like too many other genera of Ferns, the present one, *Anemia*, requires a careful revision, and, if possible, an attentive study of the species in their native localities; and probably the thirty-eight species of true *Anemia*, and the seven of the group *Anemidictyum* (genus of J. Sm.), and assuredly the forty-eight Brazilian species described by J. G. Sturm, will have to be considerably reduced. It is certain that our plant here figured is the true *A. Mandioccana* of Raddi, for I possess authentic specimens from the author; and probably Moore is correct in referring Raddi's *A. radicans* to the same species, notwithstanding that all our specimens of the latter have narrower fronds, and are radicant or proliferous at the apex. It is true these two plants have no distinct costa to the pinnules, and hence are distinguishable from *A. Langsdorffiana*, Pr., and from my *Anemia Mandioccana* (not of Pr.), from Trinidad (now referred to *A. Breuteliana*, Pr.); yet there is what may be called a slender costal vein, excentric it is true,

from which the close-placed dichotomous veins radiate or diverge.

All the species of this genus are exceedingly beautiful, as may be seen by our figures of *A. collina*, *A. villosa*, and *A. fulva*, in our 'Filices Exoticæ,' t. 20 and 65, and eminently deserving of cultivation in our fern-stoves.

PLATE 36. Sterile and fertile fronds of the *Anemia* (§ Euanemia) *Mandioccana*, Raddi,—*natural size*. Fig. 1. Segment of a fertile panicle,—*magnified*. 2. Single capsule,—*more highly magnified*.

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Plate 37.

TRICHOMANES Javanicum, *Bl.*

Javanese Bristle-Fern.

Trichomanes *Javanicum;* caudex short, erect, at length woody, sending down numerous, long, very wiry roots, and from above a fascicle of numerous, erect, rigid, almost black, deciduously setose stipites, one to four inches or more long; fronds oblong, acuminate, four inches to a span and more high, rigid-membranaceous, black-green, pinnated; pinnæ numerous, half an inch to nearly an inch long, oblong-rhomboidal, obtuse, obliquely cuneate and subpetiolate at the base, superior base more or less truncated, the margins serrated, or more or less deeply pinnatifid, especially at the superior margin, and in the superior and most fructiferous pinnæ; often the inferior serratures terminate in a long bristle ("*var.* B. serraturis setaceis," *Bl.*, in other words, a segment is formed by a vein destitute of parenchyme); involucres marginal, subinfundibuliform, scarcely winged, the mouth spreading; columella often four to six times as long as the involucre, clavate at the extremity, very fragile; venation strong and forked.

Trichomanes Javanicum. *Bl. En. Fil. Jav. p.* 224. *Hook. and Grev. Ic. Fil. t.* 224 (*a young specimen, with the upper pinnæ less divided and less fructiferous than the older state of the plant*). *Hook. Sp. Fil. v.* 1. *p.* 130. *Brack. Fil. U. St. Exp. Exped. p.* 261. *Van den Bosch, Hymenoph. p.* 7.

Trichomanes rigidum. *Wall. Cat. n.* 161 (*not Swartz*).

Trichomanes setigerum. *Wall. Cat. n.* 158.

Trichomanes filamentosum. *Wall. Cat. n.* 1668.

Trichomanes alatum. *Bory in Duperrey's Voy. p.* 282. *t.* 38. *f.* 2 (*not Swartz*).

Trichomanes rhomboideum. *J. Sm. En. Fil. Philipp. in Hook. Bot. Journ. v.* 3. *p.* 417 (*name only*).

Trichomanes curvatum. *J. Sm. En. Fil. Philipp. in Hook. Bot. Journ. v.* 3. *l.c.*

Trichomanes asplenioides. *Pr. Hymen. p.* 37 (*according to his reference to Cuming, n.* 184). *Kze. in Schkh. Fil. Suppl. p.* 218. *t.* 89.

Trichomanes fuscum? *Bl. En. Fil. Jav. p.* 225 (*Van den Bosch refers this to a group of* Cephalomanes "*with scandent rhizomes and scattered fronds;*" *if that be correct, it is probably quite a distinct species, and more allied to* Tr. auriculatum (Tr. dissectum, *J. Sm.*), *which has a* "*scandent radicant caudex,*" *not however noticed by Blume in his* Tr. fuscum: *and the species is acknowledged to be unknown to Van den Bosch*).

Trichomanes oblongifolium. *Pr. Epimel. Bot. p.* 19. *t.* 10 (*the name changed at p.* 258 *to* Tr. Javanicum, *Bl.*)

Trichomanes Zollingeri? *Van den Bosch, Hymenoph. p.* 8.

Trichomanes Boryanum. *Kze. in Schkh. Fil. Suppl. p.* 237. *t.* 97.

Trichomanes atrovirens. *Van den Bosch, Hymenoph. p.* 9.

Cephalomanes Javanicum. *Pr. Epimel. Bot. p.* 258 (*in addend. et corrig.*). *Van den Bosch, Synopsis Hymenoph. p.* 10.

Cephalomanes rhomboideum. *Van den Bosch, Synopsis Hymenoph. p.* 10.

Cephalomanes atrovirens. *Pr. Hymenoph. n.* 18. *t.* 5.

October 1st, 1861.

Cephalomanes Boryanum. *Van den Bosch, Synopsis Hymenoph. p.* 11.

Cephalomanes Singaporianum. *Van den Bosch, Synopsis Hymenoph. p.* 11.

Cephalomanes Madagascariense? *Van den Bosch, Synopsis Hymenoph. p.* 11.

Hab. Malay Peninsula and tropical islands in the West Pacific, probably universally; abundant in Java (*Blume* and *others*) and the Philippine Islands. Singapore, *Wallich, n.* 161, Chappidong, *n.* 158, and *n.* 1668 (without locality, in my Herb.; not that number of *Wall. Cat.*); Penang, *Lady Dalhousie, Sir W. Norris;* S. Comarines, *Cuming, n.* 184, and Luzon, *n.* 169; Malacca and Mergui, *Griffith, Parish, n.* 83; Chittagong, *Hooker fil. and Thomson;* Labuan and Sarawak, *Wallace, Lobb, Motley, Barber;* Fiji and Samoan Islands, New Hebrides, etc., *Harvey, Brackenridge, Seemann, C. Moore, Milne, Macgillivray;* Madagascar? *Boivin.*—Cultivated in the Fern-stoves of Kew, from plants received from Mr. Sim, of Foot's Cray.

I quite agree with Brackenridge in his observation under this plant, namely, that "it is an extremely well-marked species, of peculiar habit, and of frequent occurrence" (in the tropical Pacific islands). Indeed, making a moderate allowance for what must be ceded to Ferns in general for certain degrees of variation, easily comprehended by the aid of a large series of specimens, I hardly know one species of Fern, certainly none among the genus *Trichomanes*, so easily recognized as the present. But the above synonyms exhibit a great difference of opinion among other botanists, and those botanists who have made Ferns their special study, and whose opinions are consequently deserving of respect and consideration. The only ones of which I can reasonably express any doubt are the *Trichomanes Zollingeri* and *Cephalomanes Madagascariense* of Van den Bosch, for I have never seen authentic samples; but, the former Kunze does not consider distinct from *Tr. Javanicum;* and of the latter its author says, "habitu et statura convenit cum *Tr. Zollingeri*, et *curvato*, sororum forma cum *C. rhomboideo*." The country, indeed, Madagascar, is very remote from all the localities yet recorded for *Tr. Javanicum*. Much stress is laid by Van den Bosch on the nature of the cellules, and the base of the pinnæ is described as cordate. It is therefore possibly a distinct species.*

Presl has created some confusion by his fondness for genus-making, in constituting of Mr. Cuming's specimens, n. 169, from Luzon, a new genus, under the name of *Cephalomanes*, and has described and figured a large globose head to the columella, such

* While in the act of sending this to the press, I receive the number of the 'Nederlandsch Kruidkundig Archief,' 1861, which contains a Supplement to the *Synopsis Hymenophyllacearum*, by Dr. Van den Bosch, with two additional species of *Cephalomanes*, viz. *C. Australicum*, var. α, β, from the Isle of Pines, *Cuming*, n. 8 (but Cuming was never there); and *C. Wilkesii*, Brackenridge's plant from the Fiji Islands. My numerous specimens from Fiji are unquestionably *Tr. Javanicum*, Bl.

as I have never seen in any of my numerous specimens, as *C. atrovirens*, "unica ut usque nota species," retaining *Trichomanes Javanicum* in its old genus. Six years later he published a *Cephalomanes oblongifolium* in Epimel. Botanicæ, p. 19. t. 10, equally from Cuming's specimens, n. 169; yet in the Appendix to the same work, he refers it to *Trichomanes Javanicum*.

PLATE 37. Tuft of fronds of *Trichomanes Javanicum*, Bl.,—*natural size*. Fig. 1. Fertile pinna,—*magnified*. 2. Sorus,—*more magnified*.

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Vincent Brooks, Imp

Plate 38.

ASPLENIUM (§ Euasplenium) alternans, *Wall.*

Alternate-lobed Splcenwort.

Asplenium (§ Euasplenium) *alternans*, Wall.; caudex short, copiously rooting, paleaceous with scales, as are often the very short stipes and base of the costa beneath; fronds cæspitose, about a span long, chartaceous, very opaque, pale rusty-green beneath, glabrous, lanceolate, scarcely acuminate, attenuated below, deeply and regularly pinnatifid throughout, lobes ovate- or triangular-oblong, with broad sinuses, obtuse, quite entire but subsinuated; veins subflabellato-dichotomous, all free; sori copious on all the lobes, in two rows, linear, erecto-patent, involucres entire.

Asplenium alternans. *Wall. Cat. n.* 221. *Hook. Sp. Fil. v.* 3. *p.* 92.

Asplenium Dalhousiæ. *Hook. Ic. Pl. t.* 105. *Metten. Asplen. p.* 147.

Hab. East India, *Dr. Wallich*, who remarks, "Patria dubia, Nepalia? an Rio Janeiro?" It is, however, I believe, in India, confined to North-west Himalaya, and is found at elevations of not less than 6000 feet, in stony woods: *Lady Dalhousie, Strachey and Winterbottom* (Kamoun), *Edgworth, Col. Bates* (Simla), *Dr. Thos. Thomson* and (Chumbra Hills), *Jacquemont, n.* 59, 60, 61, and 62 (*Herb. Nostr. from Herb. Paris*), *Dr. Fleming, Hugel, Hoffmeister.* Abyssinia, *Schimper, n.* 288 (*Herb. Nostr. from Herb. Paris*).—Cultivated at Kew, where it was received from Mr. Sim's extensive Fern Nursery, Foot's Cray, Kent.

This is a rare Fern; one of very few species of true *Asplenium*, which have regularly pinnatifid fronds, and it is remarkable for its great general resemblance to *Asplenium* (§ Hemidictyum) *Ceterach* of Linnæus, and of us in Sp. Fil. v. 3. p. 273, and in Brit. Ferns, pl. 36: so great indeed, that but for the entire absence of the tawny scales which so densely clothe the under side of the last-mentioned species, it might, at first sight, easily pass for that plant. Here, however, on a close investigation, it will be found that the veins are all free and never anastomosing, and the involucres are sufficiently conspicuous. Except in North-western India and Abyssinia it appears to be unknown: in those countries it is found in dry, stony woods, such as our own *Ceterach* often affects.

Plate 38. Tuft of *Asplenium* (§ Euasplenium) *alternans*, Wall.,—*natural size.* Fig. 1. Fertile segment,—*magnified.* Fig. 2. Portion of the same, showing the sori,—*more magnified.*

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Vincent Brooks, Imp

Plate 39.

CHEILANTHES multifida, *Sw.*

Many-branched Cheilanthes.

Cheilanthes *multifida;* caudex short, thick, slightly creeping, clothed with black subulate scales; roots tufted, fibrous; stipites sparse, four to six inches long, plane and margined above on the anterior side, below a little scaly at the base, and as well as the rachises stout, rigid, deep ebony-black, glossy; fronds glabrous, four inches to a span or foot and more long, deltoid-ovate, acute, when young often glanduloso-punctate beneath, tri-, below quadri-partite, coriaceous; primary pinnæ supposite, broad-ovate, subdeltoid, petiolate; pinnules or segments oblong, pinnatifid; lobes subrotund, convex, each bearing two to four, subrotund, flattish, appressed, pale-brown, submembranaceous, distinct involucres.

Cheilanthes multifida. *Sw. Syn. Fil. pp.* 129, 134. *Willd. Sp. Pl. v.* 5. *p.* 459. *Bl. Enum. Fil. p.* 137. *Schlecht. Adumbr. p.* 40. *f.* 29. *Pr. Tent. Pterid. Metten. Fil. Hort. Lips. p.* 52. *Cheilanth. p.* 89. *t.* 3. *f.* 20, 21. *Hook. Sp. Fil. v.* 2. *p.* 90. *t.* 100 *B.* *Pappe and Raws. Syn. Fil. Afr. Austr. p.* 33.

Cheilanthes Capensis. *Eckl. in Un. It. n.* 168 (*Herb. Nostr.*).

Allosorus multifidus. *Bernh.*

Adiantum multifidum *and* Lonchitis Caffrorum. *Sw. in Schrad. Journ.*

Hab. South Africa, *Ecklon and Zeyher, Villette, etc.;* Macalisberg, *Sanderson;* Albany, *Harvey.* East-tropical Africa, Moramballa Hill (elev. 2500 feet), on the Zambesi, *Dr. Kirk, in Dr. Livingstone's Zambesi Exped.* (very large). St. Helena, *Bennett in Herb. Nostr., Roxburgh in Herb. Banks.* Lofty mountains, *Blume in Herb. Nostr.*—Cultivated in the temperate Fern-house of Kew.

If the sterile pinnæ and pinnules be alone inspected of this species, its affinity with the Indian *Cheilanthes Mysurensis* is considerable; but the very different outline of the much more compound fronds of the latter will serve to distinguish them. Blume's specimens from Java and those from St. Helena are identical with our numerous ones from South Africa. The Zambesi plant gathered by Dr. Kirk has fronds measuring fourteen and sixteen inches long, but it is not otherwise different from that of the extremity. It is indeed remarkable how many of the Cape species extend to East-*tropical* Africa.

Plate 39. Fertile plant of *Cheilanthes multifida*, Sw.,—*natural size.* Fig. 1. Pinnule, with sori,—*magnified.* 2. Small portion of the same, with sori,—*more magnified.*

October 1st, 1861.

W. Fitch, del. et lith.

Vincent Brooks Imp.

Plate 40.

LOMARIA L'Herminieri, *Bory*.

L'Herminier's Lomaria.

Lomaria *L'Herminieri;* caudex short, moderately thick, ascending, paleaceous with ovate, brown, deciduous scales, sending down copious wiry roots from below, and bearing tufted brownish stipites at the apex, which are three or four inches to a span long; fronds of two kinds, coriaceous, oblong-ovate; sterile ones a foot and more long, four inches broad, very deeply nearly to the rachis pinnatifid, the sinuses very acute; segments oblong, subfalcate, obtuse, entire, often opposite, one to three pairs of the basal ones forming so many semicircular, decurrent, dwarf lobes; veins oblique, forked, veinlets clavate at the apex; *fertile* fronds smaller, pinnated, with distant, linear, generally alternate pinnæ.

Lomaria L'Herminieri. *Bory in Litt.* 1838, *according to Schkuhr, Fil. Suppl. p.* 173. *t.* 73. *Hook. Sp. Fil. v.* 3. *p.* 9.

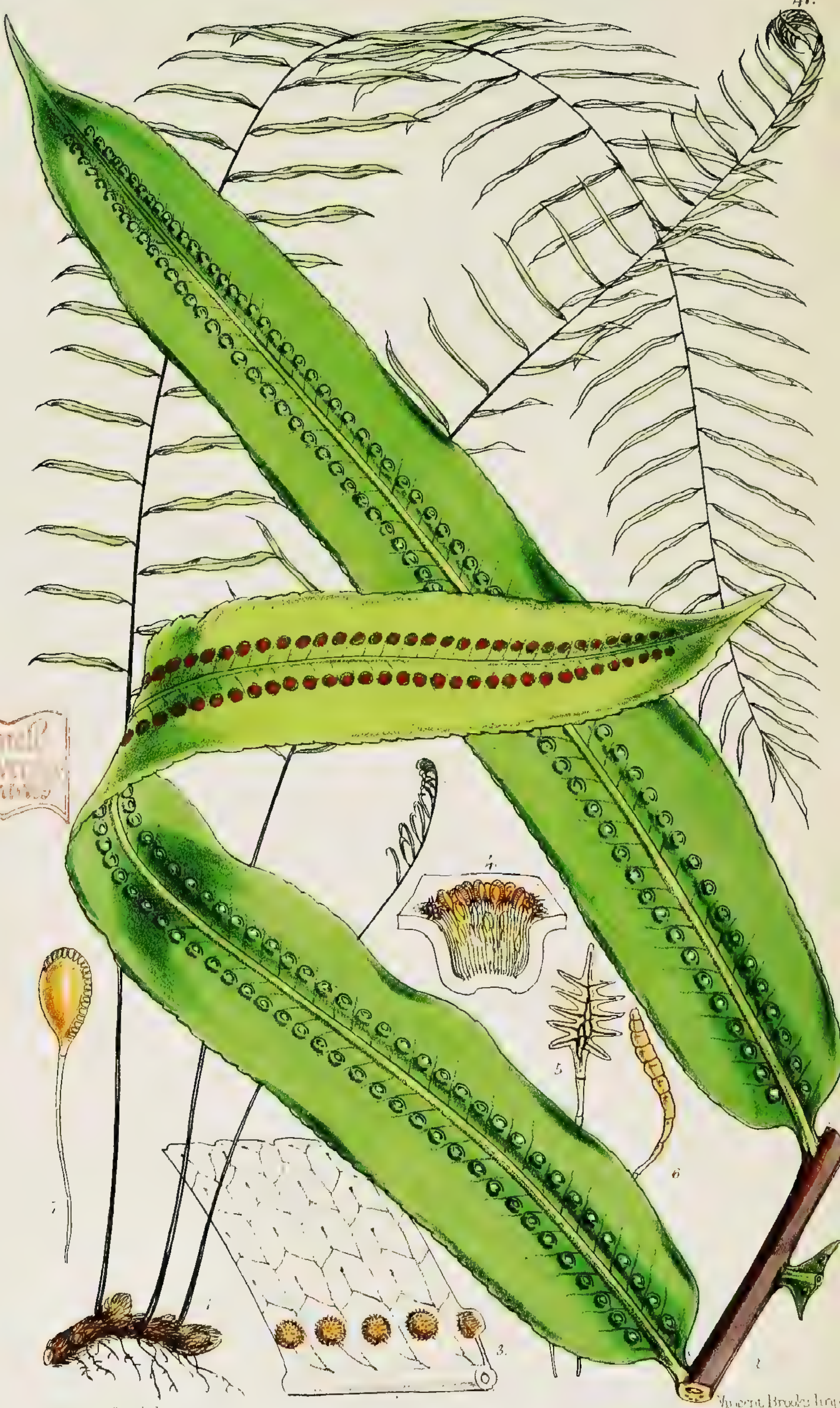
Blechnum L'Herminieri. *Metten. Fil. Hort. Lips. p.* 64. *t.* 4. *f.* 13, 14 (*fructification only*).

Hab. Tropical America; first detected in Guadeloupe by *L'Herminier, n.* 99 *ter, and n.* 2? Caracas, *Linden, n.* 193. Tovar, *Moritz, n.* 383. Santa Martha, *Purdie.*—Cultivated in the stoves at Kew.

Kunze's figure well represents the specimens of our plant from the above-mentioned localities. It belongs to a group of *Lomaria* having the sterile fronds deeply pinnatifid, of which twenty-three kinds are enumerated in our third volume of 'Species Filicum,' but of many of which we have had occasion to express our doubts about the soundness of the species. The character of the present one is made to depend mainly on the sudden contraction of the basal segments of the sterile frond, so as to exhibit a stipes winged as it were with lobes in its upper half; but as Kunze acknowledges these lobes to be sometimes reduced to one, the species then is not easily distinguished from *L. lanceolata,* Spr.; and that again very nearly approaches some forms of *L. attenuata,* Willd. The latter, however, and *L. pteropus,* Kze., have a stout, creeping, horizontal caudex, by which they are best recognized.

Plate 40. Sterile and fertile fronds of *Lomaria L'Herminieri,* Bory,—*natural size.* Fig. 1. Portion of a sterile segment, showing the venation. 2. Portion of a fertile pinna,—*magnified.*

October 1st, 1861.



W Fitch, del et lith

Vincent Brooks Imp.

Cornell University Library

Plate 41.

POLYPODIUM (§ Goniophlebium) verrucosum, *Wall.*

Wart-leaved Polypodium.

Polypodium (§ Goniophlebium) *verrucosum;* caudex long, stout, creeping, very scaly, stipites one and a half foot or more long, distant, terete; fronds two to three feet long, oblong, acuminate, firm-membranaceous, pinnate; pinnæ numerous, but distant, six to nine inches long, an inch to an inch and a half broad, oblong, costate, articulated upon the rachis, suddenly and shortly acuminated, entire, or serrated chiefly at the apex, nearly sessile, the base obliquely and obtusely cuneate; sori copious, in two compact lines nearer the costa than the margin, sunk in a very deep cavity or sac, which cavities form prominent warts or tubercles on the upper side of the pinnæ; primary veins horizontally patent, nearly straight, approximate: these are united by veins which form the letter V inverted (Λ); areoles terminating in a free clavate veinlet, lowest areole next the costa the largest, and bearing a free soriferous veinlet, arising from the inferior angle.

Polypodium verrucosum. *Wall. Cat. n.* 296. *Metten. Polypod. p.* 81.

Marginaria verrucosa. *Hook. Gen. Fil. t.* 10 *B.*

Goniophlebium verrucosum. *J. Sm. Cat. of Cult. Ferns, p.* 4.

Hab. Penang and Singapore, *Wallich,* 1829. Island of Amboyna, *De Vriese and Teijsmann,* 1859–60, *n.* 54. I also introduce with some doubt *n.* 51, 52, and 73 of *De Vriese and Teijsmann,* from Ceram and Java; and *Cuming, n.* 227, from Luzon.—Imported into Europe by — Rucker, Esq., and cultivated at Kew.

For a long time I had seen no specimens I could decidedly refer to this species of *Polypodium,* save those of Dr. Wallich, and, very recently, from Dr. de Vriese and J. E. Teijsmann, from Amboina. Mr. Cuming's n. 291, from the Philippine Islands, I suspect is a young state of this plant; the specimens are very conspicuously pubescenti-villous: some of the fronds so young that they are strap-shaped, a foot and more long, and quite undivided. With some degree of doubt I bring to this Cuming's n. 227 (Luzon), De Vriese and Teijsmann, n. 51 and 52, from Java, and 73, from Ceram; the warts are much less prominent. These warts, when perfect, have a depressed disk at the apex, looking like an operculum; and in some very old specimens, when the sori have fallen away, there is a circular opening left on the pinna.

It is a very handsome, and I believe little-known species, with fructifications nearly if not quite as remarkable as those of the

otherwise very different *Polypodium* (Drynaria) *nigrescens* of Blume, figured by us in the ' Exotic Ferns,' t. 22.

PLATE 41. Fig. 1. Fertile plant of *Polypodium* (Goniophlebium) *verrucosum*, Wall.,—*on a very reduced scale.* 2. Fertile pinna, seen from above and beneath, —*natural size.* 3. Portion of a pinna, with sori. 4. Vertical section of the cavity or receptacle of the sorus. 5 and 6. Abortive capsules, found among the perfect ones. 7. Single capsule :—*more or less magnified.*

W Fitch, del et lith.

Vincent Brooks, Imp.

Plate 42.

SCHIZÆA RUPESTRIS, *Br.*

Rock Schizæa.

SCHIZÆA *rupestris;* caudex slender, subfiliform, repent; fronds loosely or compactly tufted, undivided, three to five inches long, linear, plane, costate, entire, scarcely denticulate; *sterile* ones obtuse, *fertile* ones tapering upwards, filiformly attenuated at the base into a slender stipes; fructiferous spike pinnate, of from six to eight or ten pairs of pinnæ, which are spreading or secund, linear, laciniate at the margin; capsules compact, in two rows.

SCHIZÆA rupestris. *Brown, Prodr. Fl. Nov. Holl. p.* 162. *Hook. and Grev. Ic. Fil. t.* 48. *Pr. Tent. Pterid. Suppl. p.* 74.

HAB. Australia: New South Wales; about Port Jackson, *Brown;* above Glenmore Distillery, Port Jackson, *C. Moore;* under damp rocks in the Blue Mountains, *Fraser, Allan Cunningham*; Swan River, *Drummond, n.* 225.—Cultivated at Kew from plants imported by Mr. Sim, of Foot's Cray.

In our ninth number, at Plate 34, we gave a figure of the beautiful *Schizæa elegans.** Our present species of this interesting genus, if not equal to that in beauty of form, is far more rare: being hitherto only known as an inhabitant of Australia; but since it is now detected at New South Wales, on the east coast, and at Swan River on the west, it is probable that it will be found occupying a good part of the South Australian continent. We wish we had the opportunity of studying other species of Australia and of the southern hemisphere, from living plants. The characters hitherto given of them are far from satisfactory.

PLATE 42. Sterile and fertile fronds of *Schizæa rupestris*, Br.,—*nat. size.* Fig. 1. Apex of a sterile frond,—*magnified.* 2. Portion of the same, showing the venation,—*more magnified.* 3. Compound fructifying spike. 4. Single spike with capsules. 5. Capsule with spores:—*all more or less magnified.*

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* Since the publication of the remarks on that species, I find myself in possession of original specimens of *S. fluminensis* of Mr. Miers, and Mr. Spruce of the same supposed species, and am more than ever satisfied that they are merely starvelings of *S. elegans:* the foliaceous portion of the fronds being reduced to the smallest size, in some quite obsolete.

NOVEMBER 1ST, 1861.

Fernd. University Lond.

W.Fitch, del. et lith.

Vincent Brooks, Imp.

Plate 43.

WOODSIA (§ Perrinia) obtusa, *Hook.*

Obtuse Woodsia.

Woodsia (§ Perrinia) *obtusa;* frond broad-lanceolate, glabrous, or minutely glanduloso-pilose, bipinnate; pinnæ remote, subopposite, slightly petiolate, deltoideo-ovate, obtusely attenuated, deeply pinnatifid, the lower ones again pinnate; segments or pinnules oval-oblong, dentate or inciso-lobate; sori solitary on each tooth or lobule near the sinus; involucres glabrous, very thin and fragile, soon breaking down into spreading laciniated lobes; stipes and base of rachis partially chaffy.

Woodsia obtusa. *Hook. Gen. et Sp. Fil. v.* 1. *p.* 63. *Asa Gray, Man. of Bot. Illustr. p.* 595. *t.* 12, 4, *and* 5.

Physematium obtusum. *Hook. Fl. Bor. Am. v.* 2. *p.* 259.

Aspidium obtusum. *Willd. Sp. Pl. v.* 5. *p.* 254. *Schk. Fil. t.* 43 (*figure bad*). *Pursh, Fl. Am. v.* 2. *p.* 262.

Polypodium obtusum. *Sw. Syn. Fil. pp.* 39 *and* 420. *Schk. Fil. p.* 18. *t.* 21.

Woodsia Perriniana. *Hook. and Grev. Ic. Fil. v.* 1. *t.* 68.

Physematium Perrinianum. *Kze. Anal. Pterid. p.* 43.

Alsophila Perrinina. *Spreng.*

Hab. United States of America; Pennsylvania to Virginia, rocky banks and cliffs, *Pursh, Torrey, Asa Gray,* etc.; and south as far as New Mexico, gathered by *Mr. C. Wright,* in 1851–2, n. 2119 and 2120. We have splendid specimens from Kentucky, *Dr. Short* (18 inches high, including the stipes). West side of the Rocky Mountains, *Douglas, Drummond,* near the sources of the Columbia. We have recently received fine specimens, gathered by *Dr. Lyall,* of the Oregon Boundary Commission, in British North-west America, north lat. 49°, *n.* 140. California, *Douglas.*—This has been for many years in cultivation in the temperate fern-house at Kew.

Our herbarium contains copious specimens of *Woodsia,* from the Andes of South America, some of which seem nearly allied to the North American *W. obtusa:* but they require careful study and comparison before the specific distinctions can be identified. The genus itself, as we have considered it, has three forms of involucre, of which we have ventured to constitute so many groups or subgenera:—1. *Physematium,* with the involucre at first globose, and probably entire, afterwards bursting at the top, with an irregular contracted opening, and persistent (this is the genus *Physematium,* Klfs., and *Hymenocystis,* C. A. Meyer). 2. *Perrinia,* involucre subhemispherical, from an early stage opening at the top, and soon breaking down into spreading, irregular,

jagged, deciduous lobes or segments, to which section our present plant belongs; and 3. *Woodsia* (*vera*), Br., involucres minute, covered and concealed by the capsules, the long hairs of the margin only projecting beyond the sorus. To this belong our two British species, *W. hyperborea* and *Ilvensis*. But so difficult is the exact structure of this minute and very fragile organ to be seen, that some able modern botanists still place the species in question in *Polypodium*.

PLATE 43. Fertile plants of *Woodsia* (Perrinia) *obtusa*, Hook.,—*nat. size.* Fig. 1 and 2. Pinnules, with sori,—*magnified.* 3. Involucres, spread, most of the capsules removed, showing the receptacle,—*more magnified.*

W Fitch, del et lith

Vincent Brooks, Imp

Plate 44.

XIPHOPTERIS serrulata, *Klfs.*

Serrated Xiphopteris.

Xiphopteris *serrulata;* caudex a slender, scaly, more or less ascending and rooting rhizome; fronds small, subhispid, tufted, on short stipites, two to four or six inches long, more or less curved or flexuose, linear, attenuated below, deeply pinnatifid, the segments subovate or dentiform; *fertile* ones bearing the sori on the changed, caudate, and generally more or less entire, usually falcate extremity, the very apex sometimes sterile and pinnatifido-serrate; veins solitary in each lobe, soriferous in the fertile portion, sori soon confluent.

Xiphopteris serrulata. *Klfs. En. Fil. p.* 85. *Fée, Gen. Fil. t.* 10 *B.*

Grammitis serrulata. *Sw. Syn. Fil. p.* 22. *Willd. Sp. Pl. v.* 5. *p.* 141. *Schk. Fil. p.* 9. *t.* 7. *Hook. Exot. Fil. t.* 78. *Raddi, Fil. Bras. p.* 11. *t.* 22. *f.* 2. *Bojer, Hort. Maurit. p.* 415. *Pr. Tent. Pterid. p.* 208.

Polypodium serrulatum. *Mett. Fil. Hort. Lips. p.* 30; *Polyp. p.* 32.

Asplenium serrulatum. *Sw. Fil. Ind. Occ. p.* 1607.

Micropteris. *Desv. in Mem. Soc. Linn. v.* 6. *p.* 216.

Xiphopteris myosuroides. *Klfs. En. Fil. p.* 85.

Grammitis myosuroides. *Sw. Syn. Fil. p.* 22. *Schk. Fil. p.* 9. *t.* 7. *Presl, Tent. Pterid. p.* 208 (*not of Raddi, Fil. Bras, p.* 12. *t.* 22. *f.* 3).

Polypodium myosuroides. *Sw. Fl. Ind. Occ. p.* 1644. *Metten. Polypod. p.* 33.

Hab. From Mexico, south through tropical America and the West Indian Islands, *all travellers.* Mauritius, on the trunks of trees, *Bouton, in Herb. Nostr.; Bojer* also records it as a native of Bourbon and Madagascar, which is quite likely. Sandwich Islands, *Menzies, in Herb. Nostr.* Juan Fernandez, *Captain Wood.* West tropical Africa, Sugarloaf Mountain, *Barter, in Baikie's Niger Expedition.*.

There is a peculiarity in *Xiphopteris*, besides the altered form of the portion of the frond which bears the fructification, that induces me to retain the genus; but in regard to the species, it seems to me that the two forms *serrulata* and *myosuroides* gradually pass into each other, and are often seen on the same frond. Others may think my *X. Jamesoni* ('Second Century of Ferns,' t. 14) not more worthy of specific distinction. I have stated my views on the subject, and the habit of the plant indicates something peculiar. In respect of *Xiphopteris setosa*, Kaulf. En. Fil. App. p. 274 (Grammitis, *Pr.*, Polypod. *Metten.*, Grammitis myosuroides, *Raddi*, not of others), I should be dis-

posed, with Presl, to retain it in *Grammitis*. The sterile and fertlie portions of the fronds are quite uniform, and the principal characteristics of *Xiphopteris* are wanting: sori are produced on all the segments alike.

PLATE 44. Fertile plant of *Xiphopteris serrulata*, Kaulf.,—*natural size*. Fig. 1. Portion of a fertile frond,—*magnified*. 2. Fertile, and 3. sterile portions of a frond; 4. Capsule:—*more magnified*.

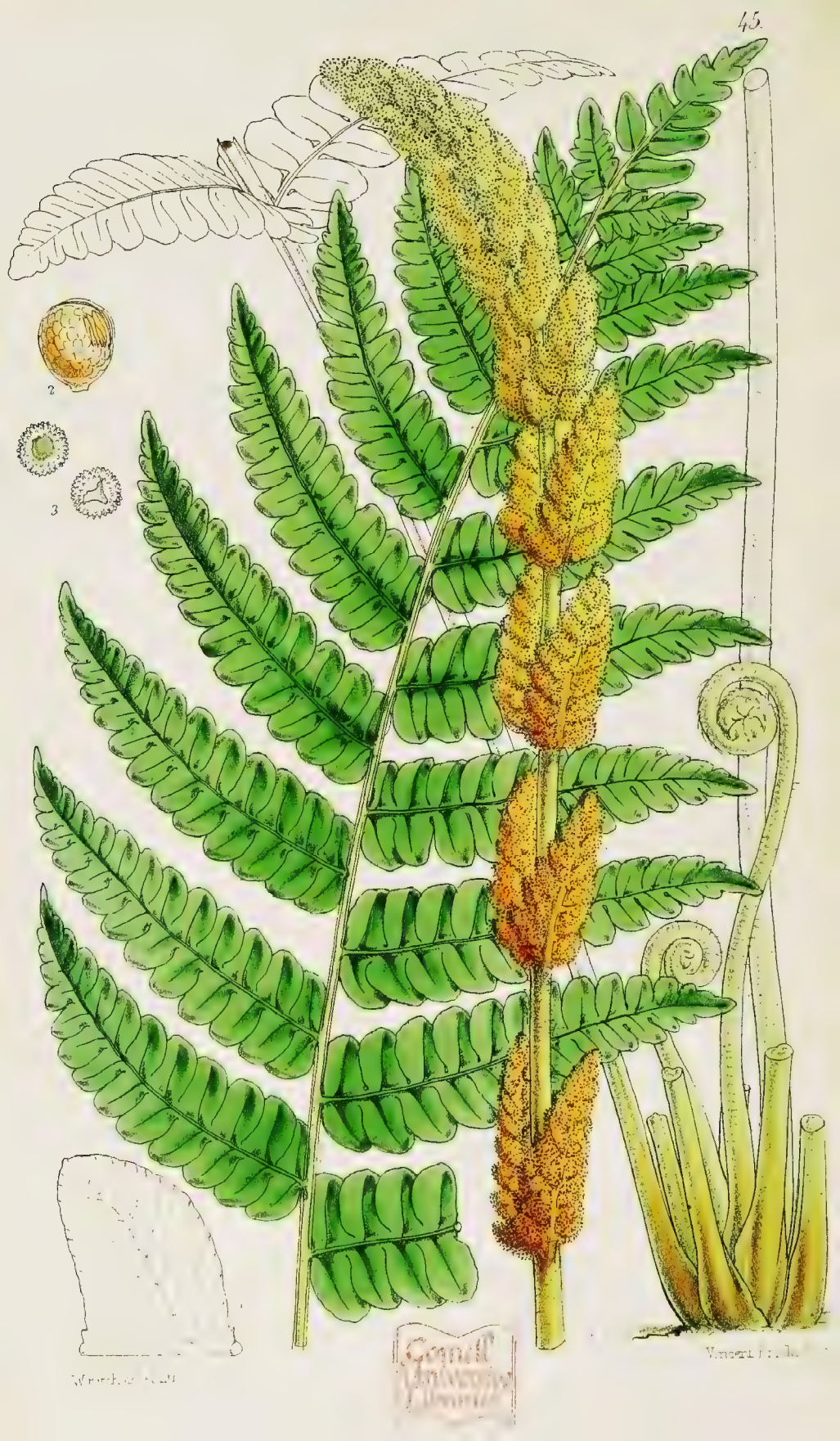
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Plate 45.

OSMUNDA CINNAMOMEA, *Linn.*

Cinnamon-coloured Osmunda.

Osmunda *cinnamomea;* young plants clothed with copious, lax, ferruginous wool; stipites clustered, a foot and more long; fronds a foot to eighteen inches long, firm, coriaceo-membranaceous, dimorphous; *sterile* ones oblong-lanceolate, pinnate; pinnæ sessile, oblong, acuminate, deeply nearly to the rachis, pinnatifid; segments broad-ovate, acute or obtuse, subfalcate, entire, costulate; veins once forked; rachis slightly winged above; *fertile* ones crowded (except sometimes at the base, when there are a few sterile pinnæ), bipinnate; pinnules oblong, densely capsuliferous on all sides.

Osmunda cinnamomea. *Linn. Sp. Pl. p.* 1522. *Mich. Fl. Bor. Am. v.* 2. *p.* 273. *Willd. Sp. Pl. v.* 5. *p.* 98. *Schk. Fil. p.* 148. *t.* 46. *Pursh, Fl. Am. p.* 657. *Grev. and Hook. Enum. Fil. in Bot. Misc. v.* 3. *p.* 231. *A. Gray, Man. Bot. Illustr. p.* 601. *Hook. Fl. Bor. Am. v.* 2. *p.* 265. *Chapm. Fl. S. U. St. p.* 598. *Liebm. Fil. Mex. p.* 142. *J. G. Sturm, in Mart. Fl. Bras. fasc.* 23. *p.* 163.

Osmunda Claytoniana, var. *Conrad in Journ. Acad. Sc. Phil.* 1829, *p.* 39.

Osmunda alata. *Hook. in Edinb. Phil. Journ. v.* 6. *p.* 332.

Osmunda imbricata. *Kze. Schk. Fil. Suppl. v.* 2. *t.* 112.

Filix florida major Virginiana per totam caulis longitudinem florescens. *Moris. Hist. v.* 3. *p.* 593. *sect.* 14. *t.* 4. *f.* 3.

Var. *achilleæfolia;* sterile fronds narrow, pinnate; pinnæ ovate, acuminate, laciniato-bipinnatifid.

Hab. Throughout the United States, from New Orleans in the south, and throughout Canada, as far north as Montreal, Quebec, Newfoundland; not, that I am aware of, extending to the Hudson's Bay Territories and the Rocky Mountains, nor on the Pacific side of North America. Huatusco, Mexico, *Liebm. in Herb. Nostr.;* Guatemala, *Friedrichsthal;* New Granada, *Purdie;* marshy places, Organ Mountains, Brazil, *Gardner, n.* 5957; North China, Manchuria, *Wilford, n.* 1119; Amur River, *Maximowicz;* Hakodadi, Japan, *C. Wright.* Var. *β.* Quebec, *Gordon.*—Cultivated in the Royal Gardens, Kew.

For a long time this very handsome species of *Osmunda* was considered peculiar to the United States and Canada, where it undoubtedly has its maximum. It is now found to extend itself, probably following the course of the mountains southward to Mexico, Guatemala, New Granada, and Brazil, retaining its ordinary character, that is, the dimorphous fronds, in the fertile ones wholly fertile (or, comparatively rarely, two or three of the lowest pair of pinnæ sterile); in this respect bearing the same

relationship that Dr. Wallich's *O. speciosa* bears to *O. regalis.* But the *O. speciosa* having been since found with the upper portion of the sterile fronds fertile, it is now properly referred to *O. regalis.* Now, there is also another well-known North American *Osmunda* (though, as now ascertained, also by no means peculiar to North America), *O. Claytoniana,* L., which, as far as I can see, in no way differs from our *O. cinnamomea,* save that the middle pinnæ of the frond are fertile, those below and above sterile; and yet no one has intimated the probability of the two being varieties of each other. Mr. Conrad, *l.c.*, gives a description and a figure of what he considers *O. Claytoniana,* which has the apex only fertile. To which of the two now mentioned can this be referred? Certainly it approaches nearer to the *O. cinnamomea* than to the *O. Claytoniana,* L. (O. interrupta, *Mich.*). It is referred by Dr. Asa Gray, I think properly, to it, as var. *frondosa.* But Dr. Gray goes on to say, "rarely such fronds are found fertile in *the middle;* otherwise sterile." How do such in any way differ from *O. Claytoniana,* L. (interrupta, *Mich.*)? I do not offer a decisive opinion on the subject until I shall have the opportunity of figuring and describing the *O. Claytoniana.*

PLATE 45. Portions of an entire plant, with sterile and fertile fronds, of an entire plant of *Osmunda cinnamomea,* Linn.,—*natural size.* Fig. 1. Lobe of a pinna, showing the venation. 2. A capsule. 3. Spores:—*all more or less magnified.*

W Firth del et lith

Vincent Brooks, Imp

Plate 46.

DRYMOGLOSSUM piloselloides, *Pr.*

Pilosella-leaved Drymoglossum.

Drymoglossum *piloselloides;* caudex long, filiform, creeping, wiry, clothed with closely pressed, small, ovate, laciniated, peltate scales and rooting here and there with short villous fibres; stipites two to ten lines long (in the fertile frond), distant, jointed and deciduous near the base, which is scaly; fronds of two kinds; *sterile* ones from half an inch to two inches long, orbicular, subcordate, obovate or elliptical, thick and fleshy, coriaceous when dry, undivided, entire at the margins, glabrous, indistinctly costate; veins anastomosing, the areoles including free, simple, or branched and divaricating veinlets; *fertile* fronds linear-oblong, obtuse, tapering at the base; sori in a line just within the margin, at first narrow, eventually spreading so as to cover the whole back, with a furrow down the middle; capsules mixed with stellated, paleaceous, peltate, and pedicellate hairs.

Didymoglossum piloselloides. *Pr. Tent. Pterid. p.* 227. *J. Sm. in Hook. Journ. Bot. v.* 4. *p.* 66. *Pr. Epimel. Bot. p.* 156. *Fée, Mém. Vittar. p.* 30.

Pteropsis piloselloides (*et* Pt. nummularia). *Desv. Mém. Soc. Linn. Paris, v.* 6. *p.* 218.

Pteris piloselloides. *Linn. Sp. Pl. p.* 1530. *Banks, Ic. Kæmpf. t.* 31. *Sw. Syn. Fil. p.* 94 *and* 286. *t.* 2. *f.* 2. *Schk. Fil. p.* 83. *t.* 87. *Willd. Sp. Pl. v.* 5. *p.* 355 (*not of Thunb. Jap.*).

Nothochlæna piloselloides. *Kaulf. Enum. p.* 133. *Wall. Cat. n.* 139. *Bl. Fil. Jav. p.* 67.

Acrostichum heterophyllum. *Linn. Sp. Pl. p.* 1523.

Piper nummularium. *Lam. Ill. v.* 1. *p.* 82 (*according to authors*). *Rheed. Hort. Malab. v.* 12. *p.* 57. *t.* 29.

Hab. Tropical India, most abundant, flourishing on the mossy trunks of trees, and amongst other decaying vegetable matter: Malay Islands, Malacca, and the continent of British India westward to Nilghiri (*Mr. Beddome*); Sincapore, Tenasserim, and Silhet, *Wallich, n.* 139; Chittagong, *Hook. fil. and Thomson;* Ceylon, *Gardner, n.* 1156.—Cultivated in the Royal Gardens of Kew.

A well-marked species, of a peculiar, and, if the dimorphal fronds be considered, general habit, and texture, an easily recognized genus. M. Fée adopts three species, and adds a fourth rather doubtfully; and a fifth he has published in his 'Iconographie,' with monomorphous fronds, in opposition to one of his most important definitions. *Drymoglossum*, "a *Tænitide* longe distat frondibus dissimilaribus." Still more is it contrary to nature to unite the West Indian *Tænitis lanceolata*, Kaulf.,

(Pteropsis, *Desv.*) with *Drymoglossum*, while my *Drymoglossum rigidum* (Ic. Plant. v. 10. t. 996) is united by Mr. Moore to *Lindsæa* (Schizoloma) *cordata*, Gaud., and placed in *Schizolepton*, Fée; a genus, Mr. Moore says, "differing from *Drymoglossum* in the absence of free included veinlets."

The *Pteris piloselloides* of Thunberg's 'Flora Japonica,' I omit here, because all the specimens in my herbarium (and they are not a few), from China and Japan, belong to a very different species, *D. carnosum*, Hook. (Nothochlæna carnosa, *Wall. Cat. n.* 138), a native of *North* India, and most abundant in Japan; a plant apparently of more temperate latitudes. The "*D. subcordatum*, Fée," of Eaton, in Herb. of the U. S. N. Pacif. Expl. Exp., is, I fear, only a var. of *carnosum;* but I am not sure whether it is the same as that of the original describer, as I have seen no authentic specimen; but I suspect it is, as Fée's specimens are from China (*Gaudichaud*), and his description is not materially at variance. All the known species are from Eastern India. The resemblance of the smaller orbicular fronds of this or of some allied species to a Pepper (*Piper* or *Peperomia*), is supposed so far to have deceived Lamarck, that he has described it as a Pepper, *Piper nummularium*, Lam.! If the statement be correct, the genus inhabits Mauritius, though I do not find that locality recorded.

PLATE 46. Fertile plants of *Drymoglossum piloselloides*, Pr.,—*natural size.* Fig. 1. Portion of a sterile frond, showing the venation. 2. Portion of a fertile frond. 3. Smaller portion of the same, showing the receptacle of the sorus. 4. Capsule. 5. Stellated, pedicellate, paleaceous hair, mixed with the capsules in the sorus:—*all more or less magnified.*

W Fitch, del et lith.

Plate 47.

POLYPODIUM (Phymatodes) albo-squamatum, *Bl.*

White-dotted Polypody.

Polypodium (Phymatodes) *albo-squamatum;* caudex long, stout, creeping, clothed with long, subulate, falcate, finely attenuated brown scales; stipites a span to a foot high, terete, purplish-brown, polished; fronds a foot to a foot and a half long, broad, membranaceous, pinnated; pinnæ five to seven, all petioled, especially the terminal one, six inches to a span long, long-lanceolate, finely acuminate, entire at the margin, costate, veins irregularly anastomosing, so as to form large angular areoles, free only and forked at the margins; these areoles include free veinlets, simple or forked, the forks often divaricating, their apices clavate; on the superior surface corresponding with those clavate apices, are white, cretaceous scales or dots (whence the specific name); sori in two lines or series on the pinna, halfway between the costa and the margin, approximate, generally extending nearly the whole length of the pinna, always compital (placed on the junction of the reticulated veins).

Polypodium albo-squamatum. *Bl. En. Fil. Jav. p.* 132. *Fl. Jav. p.* 137. *t.* 57. *Metten. Polypod. p.* 108. *t.* 1. *f.* 29 (*fragment, with venation*).

Pleopeltis albo-squamatum. *Pr. Tent. Pterid. p.* 193 (*not* Drynaria albido-squamata. *J. Sm. in Hook. Journ. Bot. p.* 397, *which is* Polypodium varians, *Bl.*).

Hab. Java, *Blume;* Borneo, *Wallace.*—Cultivated in the Royal Gardens of Kew.

A handsome, graceful, and well-marked species, yet nearly allied to the *P. varians* of Blume, which Mr. J. Smith mistook for it in naming Mr. Cuming's n. 286, in the 'Journal of Botany.' The venation quite accords with the section "*Drynaria*" of *Polypodium*, here forming rather large areoles, but having free veinlets towards the margin: where the free veinlets terminate (and their apices are always clavate), we find on the upper side of the pinnæ white dots, arising probably from an exudation, which deposits a calcareous orbicular scale or crust. Such white secretions are not uncommon on many tropical Ferns: to a less extent they are seen on *Polypodium plebejum*, described at our Plate 48 (next Plate); but they are there too few and inconspicuous to be represented in the figure.

Plate 47. Fertile plant of *Polypodium* (Phymatodes) *albo-squamatum*, Bl.,—*natural size.* Fig. 1. Portion of the upper side of a pinna, showing the venation and the cretaceous dots, at the margin and on the disk. 2. Under side of ditto, with a sorus, and the receptacle of a second, showing the compital attachment. 3. Scale from the caudex:—*all magnified.*

December 1st, 1861.

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W Fitch, del et lith.

Vincent Brooks, Imp

Plate 48.

POLYPODIUM (§ Eupolypodium) plebejum, *Schlecht.*

Plebeian Polypody.

Polypodium (§ Eupolypodium) *plebejum*, Schlecht.; caudex moderately stout, elongated, creeping, densely covered with small, lanceolate, fringed and crisped brown scales, frequently with a black costa in the centre; stipites purplish-brown, distant, three to four and six inches long, margined with an obscure wing on each side, more distinct upwards, firm, coriaceo-membranaceous, six inches to a span and more long, in outline oblong, scarcely acuminated, with a truncated base, deeply, almost to the very rachis pinnatifid (or pinnated with a decurrent wing); the segments horizontally patent, linear-oblong, often narrower above the base, so as to be subspathulate, more or less acute or obtuse, subcrenato-serrate, naked above, here and there having a few cretaceous dots near the margin, beneath and on the rachis and costæ more or less clothed with scattered, small, ovate, acuminated, appressed, and subpeltate scales; veins immersed, indistinct, once or twice forked, free, the lowest superior veinlet bearing the globose or suboval sorus; the sori forming two rows, halfway between the costa and the margin.

Polypodium plebejum. *Schlecht. in Linnæa, v.* 5. *p.* 607. *Kze. in Linnæa, v.* 18. *p.* 319. *Liebm. Fil. Mex. p.* 46.

Polypodium leucostictum. *Kl. in Linnæa, v.* 20. *p.* 380.

Polypodium Karwinskianum. *Metten. Polyp. p.* 66. *Eat. Fil. Wright et Fendl. p.* 198.

Marginaria Karwinskiana. *Pr. Tent. Pterid. p.* 188 (*name only*).

Hab. Mexico, on mountains, three to eleven thousand feet, *Harris; Galeotti, n.* 6277; *Liebmann.* Vera Paz, Guatemala, *Salvyn.* New Granada, *Moritz, n.* 336; *Hartweg, n.* 1499; *Fendler, n.* 252. Andes of Quito, *Jameson, n.* 14 *and* 54; *Spruce, n.* 5239 (*large*). Trees on the Organ Mountains, *Gardner, n.* 5920.—Cultivated at Kew.

Dr. Mettenius adopts the name of *Karwinskianum* for this species, because of its priority over *P. plebejum;* but it was a name without any note or remark by which the plant could be recognized. Schlechtendal gave it a name from its general resemblance to our common Polypods, "e viliore grege *P. vulgaris,*" with which it has no small affinity; but the curious subpeltate scales, close-pressed to the under side of the frond, together with the general form, bring it nearer to the well-known *P. incanum* and its allies, a group in which the venation sometimes represents that of *Marginaria,* sometimes that of *P. vul-*

gare; hence Presl appears to have placed it in *Marginaria,* while others refer it to *Eupolypodium.*

PLATE 48. Fertile plants of *Polypodium* (Eupolypodium) *plebejum*, Schlecht., —*natural size.* Fig. 2. Portion of a segment of the frond, showing the venation, and a sorus,—*magnified.* 3. Scale, from the back of the frond,—*more magnified.*

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W Fitch, del. et lith.

Vincent Brooks, Imp

Plate 49.

SCHIZÆA (§ Actinostachys) digitata, *Sw.*

Fingered Schizæa.

Schizæa (§ Actinostachys) *digitata;* caudex short, creeping; fronds crowded, a span to a foot and a half long, two lines wide, short-stipitate, erect, linear, subcoriaceo-membranaceous, the costa prominent and keeled at the back; receptacles of the capsules (appendages) narrow-linear, 5–10–12, erect, in two secund rows, digitato-pinnate, the margins inflexed, including four close-packed lines of numerous, small, obliquely oblong or subpyriform, obtuse capsules, without hairs, of a rich dark-brown chestnut colour, the upper half striated longitudinally (forming a kind of annulus), the lower half reticulated.

Schizæa digitata. *Sw. Syn. Fil. pp.* 150 *and* 379. *t.* 4. *f.* 1. *Willd. Sp. Pl. v.* 5. *p.* 86. *Blume, En. Fil. Jav. p.* 255.

Actinostachys digitata. *Wall. Cat. n.* 1. *Presl, Suppl. Tent. Pteridogr. p.* 73.

Schizæa marginata. *Wall. in Herb.* 1823.

Acrostichum digitatum. *Linn. Sp. Pl. p.* 1524*; and in Amœnit. Acad. v.* 1. *p.* 157. *f.* 1. *Fl. Zeyl. p.* 379.

Hab. India, Ceylon; *Burmann, Gardner, n.* 1182, *Thwaites.* Tranquebar, *Klein, Rottler.* Singapore, *Wallich.* Philippine Islands, *Cuming, n.* 371. Chittagong, *Hook. fil. and Thomson, n.* 347. Mergui, Malacca, Khasya, *Griffith, Parish;* Labuan, *Thos. Lobb, Motley;* Bonin Islands, *C. Wright;* Java, *Blume, Thos. Lobb.* Feejee Islands, *Seemann, n.* 793. New Caledonia, *C. Moore,* growing on dry, bare, exposed situations. Isle of Pines, *J. Macgillivray* (stony shady places).—Cultivated at Kew; received from Mr. Thwaites, Ceylon.

This very interesting *Schizæa,* quite new to our gardens, may be considered the representative in the East Indies of the *Schizæa pennula,* Sw. (S. trilateralis, *Schk.* and *Hook. et Grev. Ic. Fil. t.* 54), of Western India and South America, and if there were characters worthy of constituting a genus, both would be included. Mr. Brown, in his Prodromus, p. 162, has a note on the *S. digitata;*—"A congeneribus differt appendice digitata, nec pennata, capsulis confertis nec biseriatis, nec extus dehiscentibus: an ideo separanda?" This led the excellent Dr. Wallich to give the present species the appropriate generic name of *Actinostachys.* But Mr. Brown does not appear to have had perfect specimens before him at the time. To me the differences from *Schizæa* are rather sectional than generic. The

spikes of fructification are in reality shortly pinnate in two rows, as in other Schizæas; the capsules, if not in two rows, are in two double rows, one on each side the costa, and I perceive no difference in the dehiscence of the capsules. From the *S.* (§ Actinostachys) *pennula*, it is at once distinguished by its plane, or nearly so, fronds, and especially by the absence of the copious, long, chaffy, ferruginous hairs on the margins and among the capsules on the appendices.

PLATE 49. Fertile plant of *Schizæa* (§ Actinostachys) *digitata*, Sw.,—*natural size*. Fig. 1. Portion of the frond. 2. Portion of a capsuliferous appendage. 3. Section of the same. 4. Capsule. 5. Spores:—*all more or less magnified.*

W.Fitch, del. et lith.

Vincent Brooks, Imp.

Plate 50.

GYMNOGRAMME calomelanos, *Kaulf.*

Black-stalked Powdery Gymnogramme.

Gymnogramme *calomelanos;* caudex short, suberect, stout, densely rooting at the base; stipites tufted, one to two feet long, ebeneous-purple or black, as is the rachis; fronds about the same length as the stipes, oblong, acuminate, subcoriaceous, beneath pulverulent with a white (or yellow) ceraceous substance, bi-tripinnate; primary pinnæ lanceolate, secondary ones oblong-lanceolate, cuneate at the base, and subdecurrent, 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; veinlets dichotomous, erecto-patent; sori oblong, lax, reddish, occupying the forked veins.

Gymnogramme calomelanos. *Kaulf. En. Fil. p.* 76. *Hook. Gen. Fil. t.* 76. *Metten. Fil. Hort. Lips. p.* 41. *J. Sm. Cat. Cult. Ferns, p.* 18.

Acrostichum calomelanos. *Linn. Sp. Pl. p.* 1529. *Schk. Fil. p.* 4. *t.* 5. *Sw. Syn. Fil. p.* 15. *Willd. Sp. Pl. v.* 5. *p.* 123. *Hort. Berol. t.* 41. *Fisch. et Langsd. Fil. t.* 3 (*very good*).

Ceropteris calomelanos. *Link, Hort. Berol. v.* 2. *p.* 53. *Fée, Gen. Fil. p.* 183.

Filix non ramosa major, caule nigro, etc. *Sloan. Jam. v.* 1. *t.* 30. *f.* 2.

Filix albissimo pulvere conspersa. *Plum. Fil. v.* 30. *t.* 40.

β. aureo-flava; frond golden-yellow beneath. *G. chrysophylla,* Kaulf.!?

Hab. Tropical America, abundant. West India Islands, universal; Cuba, *C. Wright, n.* 298 *and* 777, *n.* 1047; var. *elata;* some of the pinnules an inch and a half long, all obtuse. Dominica, *Finlay* (some specimens quite golden-yellow beneath, others white). Central America, Nicaragua, *C. Wright;* Panama, *Fendler;* Galapagos, *Capt. Wood;* New Granada, *Moritz, n.* 113 (large, pinnules one and a half inch and more long, subentire); Bogotá, *Holton, n.* 24; Caraccas, *Linden, n.* 264; British Guiana, *Parker, Sagot, Appun, n.* 170 *and* 133 (large, pinnules narrow, sharply acuminated). Peru, *Mathews;* Ecuador, *Jameson.* Brazil, frequent, Rio Negro, *Spruce, n.* 2969, *etc.* Tropical Africa, Prince's Island, *Barter in Baikie's Second Niger Expedition, n.* 1912. Fernando Po, *Barter, Mann, n.* 137, common forms.—*Var.* golden-yellow beneath, Porto Rico, *Baron de Schach;* Guatemala, *Skinner.* Hot valleys of Ecuador, *Seemann, n.* 948; Guadeloupe, *L'Herminier;* "G. chrysophylla, *Willd.*," and again "G. Martensii, *Bory*" (from the Herb. Mus. Paris); Brazil, *Gardner, n.* 12 (rather sulphur than golden-yellow).—Cultivated in Kew and elsewhere; and in the collection of the Oxford Botanic Garden, occasionally producing pinnæ, of which some of the pinnules are pure white on the under side, while others are rich golden-yellow, as represented in our Plate, fig. 3.

One of the most common Ferns of tropical America, and scarcely known beyond that extensive region; but the more the

botany of tropical Africa is opened up to us, the more we find there of species previously supposed to be exclusively of American or Indian origin. It is one of a group of *Gymnogramme*, distinguished by the presence of pulverulent yet ceraceous substance, sometimes white and sometimes golden-yellow; the first are called by cultivators "*Silver*," the other "*Golden Ferns*." But here, as I have had occasion to observe on some other Ferns with this exudation on the under surface of the fronds (see our figures and description of *Cheilanthes argentea*, Hk. Fil. Exot. t. 95), the colour varies from white to yellow and golden colour, and here giving rise, I suspect, to the formation of new species. Specimens I take to be *G. chrysophylla*, Kaulf., I cannot distinguish but by the colour of this substance; but now that we find the two colours on one and the same plant, and even on one and the same pinna, and well defined, it will, I presume, be found necessary to unite them. But to this subject I hope to return again ere long, for it deserves further consideration.

Our figure represents what may be looked upon as the normal form of the species, but, like many other Ferns of large geographical range, it differs much in size (often four feet high even in cultivation), and with pinnules varying exceedingly in length and breadth, and in the outline of the margin more or less incised or pinnatifid, in texture from membranaceous to coriaceous, and in the plane or reflected edges. Different as the ordinary form of *G. tartarea*, Desv. (Hemionitis dealbata, *Willd.*), may be from this, I find intermediate states which are very puzzling; and I possess not a few specimens proving that the white under side sometimes assumes a rich and uniform golden colour in *G. tartarea*.

PLATE 50. Fig. 1 and 2. Stipes and portion of a fertile frond of *Gymnogramme calomelanos*, Kaulf.,—*natural size*. 3. Pinna, with golden and white pinnules; from the Oxford Botanic Garden, seen from beneath,—*natural size*. 4. Upper side of pinnule, showing the venation. 5. Under side of a fertile pinnule,—*magnified*.

W. Fitch, del. et lith.

Vincent Brooks, Imp.

Plate 51.

DAVALLIA Novæ-Zelandiæ, *Col.*

New Zealand Davallia.

Davallia *Novæ-Zelandiæ;* caudex long, creeping, hairy (not chaffy), as well as the lower part of the stipes and the axils of the primary pinnæ, with soft, copious, jointed, ferruginous hairs; fronds a span to a foot and more long, ovate, acuminate, tripinnate, membranaceous, but rather rigid, divisions all rather distant, finely cut, ultimate pinnules deeply pinnatifid, lanceolate; segments ovato-lanceolate, falcate, cuspidato-acute, entire, or with one or two teeth; sori rather large, upon a lateral tooth, rarely in a sinus; involucres subreniform, at length forced back from the enlargement of the sorus; secondary rachises flexuose.

Davallia Novæ-Zelandiæ. *Colenso, in Tasm. Journ. of Nat. Sc. p.* 52. *Hook. Fil. in Lond. Journ. of Bot. v.* 3. *p.* 418. *Hook. Sp. Fil. v.* 1. *p.* 158. *t.* 51 *B. Hook. Fil. Fl. Nov. Zel. v.* 2. *p.* 19.

Hab. New Zealand, Northern Island, *A. Cunningham in Herb. Heward* (D. hispida, *Hew. MSS.*). Common on the coast and in the interior, *Colenso, n.* 50, *Stephenson, n.* 121.—Cultivated at Kew.

Quite distinct from any other *Davallia*, but allied to the East Indian *D. chærophylla*, Wall., and to *D. affinis*, J. Sm.; also an Indian species. In size most resembling the former. Caudex slender, creeping, hairy, or almost tomentose, with jointed, soft, ferruginous hairs, not at all scaly, sending down numerous, hairy, fibrous roots from beneath. Stipes six to eight inches high, mahogany-brown, glossy; main rachis the same, flexuose and slender. Frond eight inches to a foot long, membranaceous, but very firm; thrice pinnated. Sori large in proportion to the size of the segments, often equal in breadth to the teeth on which they are placed. The colour of the frond is brownish-green, slightly glossy, much paler below. Mr. Heward had given a very appropriate name to this species in his herbarium, which we would gladly have adopted, but that Mr. Colenso's name is published in the 'Tasmanian Journal of Science.'

Plate 51. Caudex, stipites, and fertile frond of *Davallia Novæ-Zelandiæ*, Colenso,—*natural size*. Fig. 1. Pinnule, with sori,—*magnified*. 2. Segment of ditto, with the involucre forced back, showing the receptacle of the sorus,—*magnified*.

January 1st, 1862.

W. Fitch, del. et lith.

Vincent Brooks, Imp.

Plate 52.

LOMARIA Magellanica, *Desv.*

Magellanic Lomaria.

Lomaria *Magellanica*, Desv.; caudex one to two feet high, erect, stout, subarboreous, clothed at the summit and at the base of the stipites with a dense mass of slender, coriaceo-membranaceous, subulate, firm, glossy, falcate scales, one and a half inch long; stipites rather short, stout, four to six inches long, having two rows of distant tubercular scales (abortive pinnæ?); *sterile* fronds one and a half to two feet or more long, oval-oblong, acuminate, very coriaceous, rigid, pinnated with close-placed pinnæ, four to six inches long, half an inch wide, linear-oblong, acuminate, sessile, terminal ones only subconfluent at the base, frequently at the inferior base bearing a very distinct, oblong auricle; *fertile* frond oblong, obtuse; pinnæ close-placed, linear, lower ones often auricled at the inferior base; involucre dark-brown, at first revolute, and concealing the capsules.

Lomaria Magellanica. *Desv. in Mag. Nat. Berl.* 1811, *p.* 330, *in Mém. Soc. Linn. Par. v.* 6. *p.* 289. *Hook. fil. Fl. Antarct. v.* 2. *p.* 393. *Brack. Fil. U. S. Expl. Exp. p.* 126. *Hook. Sp. Fil. v.* 3. *p.* 27.

Lomaria setigera. *Gaud. in Ann. Sc. Nat. v.* 5. *p.* 98.

Lomaria robusta. *Carm. in Trans. Linn. Soc. Lond. v.* 12. *p.* 512.

Lomaria Boryana. *Willd. Sp. Pl. v.* 5. *p.* 292. *Pappe and Raws. En. Fil. Cap. p.* 27.

Onoclea Boryana. *Sw. Syn. Fil. p.* 111.

Lomaria cinnamomea. *Kaulf. En. Fil. p.* 153.

Lomaria Ryani. *Kaulf. En. Fil. p.* 155. *Kze. Anal. Pterid. t.* 12.

Pteris osmundioides. *Bory, Voy. p.* 194. *t.* 3.

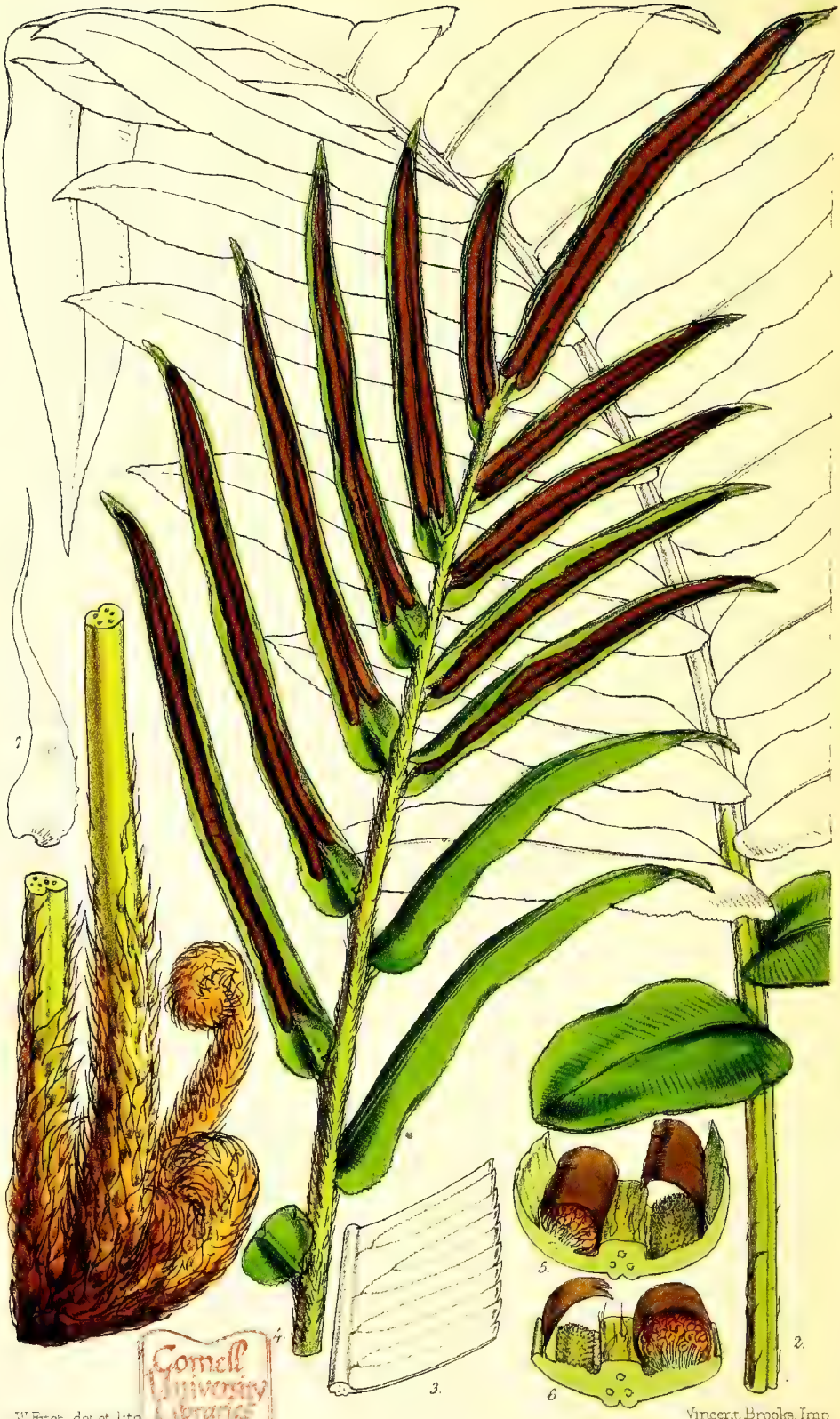
Hab. Straits of Magellan, and Tierra del Fuego, and Falkland Islands, very abundant, *Commerson, Freycinet, Pernetty, Darwin, J. D. Hooker* (Hermite Island); extending on the Pacific side of South America to Chili and Juan Fernandez. Tristan d'Acunha, *Carmichael.* Brazil, *Gardner and others* ("a tree Fern, four feet high"), British Guiana, New Granada, *various collectors;* Peru, *Mathews;* West Indies. South Africa, Mauritius and Bourbon, Madagascar, *Bojer and others.*—Cultivated at Kew, from roots imported by Mr. Standish from South Chili.

This is as yet a rare species in British Ferneries, and, though usually kept in a cool greenhouse, will probably succeed well in the open air, since it is a native of the extreme south of South America, yet growing as far north as the West Indian islands.

January 1st, 1862.

Further remarks on the synonymy and on the geographical range may be seen in the third volume of the 'Species Filicum,' *l. c.*

PLATE 52. Sterile and fertile fronds of *Lomaria Magellanica*, Desv.,—*natural size*. Fig. 1. Portion of a sterile pinna, showing the venation. 2. Section of a fertile pinna. 3. Portion of an involucre, with the receptacle from whence the capsules have been removed. 4. Scale from the base of the stipes:—*all more or less magnified*.



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W. Fitch, del. et lith.

Vincent Brooks, Imp.

Plate 53.

LOMARIA procera, *Spr.*

Tall Lomaria.

Lomaria *procera;* caudex erect or ascending, stout, woody, elongated, clothed at the extremity (as is the base of the stipes) with large, ovato-lanceolate, ferruginous, opaque, chaffy scales; fronds tufted, ample, from a span to four feet high, including the stipites, oblong-ovate, coriaceous, pinnated; pinnæ numerous on the larger specimens, generally horizontally patent; *sterile* ones (often partially *fertile*) oblong or oblong-lanceolate, three inches to a span long, sometimes an inch wide, sharply acuminate, sessile, unequally cordate at the base, subfalcate, the margins finely serrated, terminal pinnæ free, often very long; veins close, compact, simple or forked near the base; *fertile* pinnæ linear, more or less broad, two to six inches long, distant, erecto-patent, cordate at the base, the apex suddenly contracted, sori with very crowded capsules; involucres dark brown, marginal or originating at some distance from the margin, involute and fornicate, at length breaking up into segments and spreading.

Lomaria procera. *Spreng. Syst. Veg. v.* 4. *p.* 65. *A. Cunn. Bot. N. Zeal. in Comp. Bot. Mag. v.* 2. *p.* 263 (*excl. syn. Richard.*). *Hook. Ic. Pl. t.* 127, 128. *Sp. Fil. v.* 3. *p.* 23. *Hook. fil. Fl. Antarct. v.* 1. *p.* 110. *Fl. N. Zeal. v.* 2. *p.* 27. *t.* 75.—Var. *minor. Brack. Fil. U. S. Expl. Exp. p.* 127. *Hombr. et Jacq. Voy. Pôle Sud, Crypt. t.* 2 *E?* (*figure only, no description; scales at the base of the stipites narrower and longer*).

Lomaria latifolia. *Colenso, in Tasm. Journ. Nat. Sc. v.* 2. *p.* 176.

Lomaria Capensis. *Willd. Sp. Pl. v.* 5. *p.* 291. *Rawson and Pappe, En. Fil. Cap. p.* 27.

Blechnum Capense. *Schlecht. Adumbr. Fil. p.* 34. *t.* 18.

Onoclea Capensis. *Sw. Syn. Fil. p.* 111.

Osmunda Capensis. *Linn. Mant.*

Stegania procera *and* S. minor. *Br. Prodr. Fl. Nov. Holl. p.* 153.

Lomaria Chilensis. *Klfs. En. Fil. p.* 154. *Hook. Gen. Fil. t.* 64 *B* (*sterile and fertile pinnæ and analysis*). *C. Gay, Fil. Chil. p.* 23.

Lomaria spectabilis? *Liebm. Fil. Mex. p.* 83. *Rich. Fl. N. Zeal. t.* 247 (*fertile frond only.*)

Lomaria lineata. *Willd. Sp. Pl. v.* 5. *p.* 290 (*venation more distinct*).

Osmunda lineata. *Sw. Syn. Fil. p.* 111.

Blechnum procerum. *Labill. Fl. Nov. Holl. v.* 2. *p.* 87. *t.* 247.

Lomaria striata. *Willd. Sp. Pl. v.* 5. *p.* 291.

Onoclea procera. *Spreng. in Schrad. Journ. v.* 3. *p.* 267.

Osmunda procera. *Forst. Prodr. n.* 414.

Asplenium procerum. *Bernh. Act. Enf.* 1802, *p.* 4. *f.* 1.

FEBRUARY 1st, 1862.

Parablechnum procerum. *Pr. Epim. Bot. p.* 109.

Lomaria Gilliesii. *Hook. et Grev. Ic. Fil. t.* 207.

Orthogramme Gilliesii. *Pr. Epim.*

Hab. A Fern of wide, yet not general geographic distribution; its maximum is in the southern hemisphere, but in the New World it extends as far north as Mexico and the Caribbean Islands. It seems to have been first detected by Forster in New Zealand, and since as far south as Banks' Island (*Dr. Lyall*). It occurs also in Tasmania, in Lord Auckland's and Campbell's Islands, in South Australia, South Africa, in the Malay and the South Pacific Islands; in Jamaica, St. Vincent, Dominica, Guadeloupe, and in various parts of South America, chiefly in mountain districts.—Cultivated at Kew.

Those who desire to see a more full history of this species, can consult the four very closely printed pages on the subject in the 'Species Filicum,' *l. c.* It is a well-marked species, yet presenting not a few variations, enough however to induce different authors to entertain different opinions as to their specific identity.

Plate 53. *Lomaria procera*, Spreng. Fig. 1. Apex of a caudex, with young fronds and the bases of mature stipites. 2. Sterile frond,—*natural size.* 3. Portion of a sterile pinna, showing the venation,—*magnified.* 4. Fertile froud,—*natural size.* 5. Section of a fertile pinna, with the involucres originating some way within the margin. 6. Section of a fertile pinna, with the involucres marginal. 7. Scale from the base of the stipes:—*all magnified.*

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Plate 54.

TODEA HYMENOPHYLLOIDES, *Rich.*

Hymenophyllum-like Todea.

Todea (§ Leptopteris) *hymenophylloides;* stipites tufted, a span to a foot long, and, as well as the rachis, deciduously ferruginous-tomentose, fronds olivaceous, membranaceous, one to two feet long, ovate-oblong, bipinnate; primary pinnæ sessile, oblong, acuminate, often opposite, four to six inches long, secondary ones (or pinnules) crowded, one inch long, ovato-lanceolate, deeply pinnatifid, the segments narrow, simple or forked, acute; veins simple or forked, sori oblong at the base of each vein beneath, consisting of seven to nine large globose bipartite pedicellate reticulated coriaceous capsules.

Todea hymenophylloides. *Rich. and Less. Fil. N. Zeal. in Voy. Astrol. p.* 97. *t.* 16. *Hook. Gen. Fil. t.* 16.

Todea pellucida. *Carm. in Grev. and Hook. En. Fil. in Hook. Bot. Misc. v.* 3. *p.* 232. *Hook. Ic. Pl. Rar. v.* 1. *t.* 8. *A. Cunn. Fl. N. Zeal. in Hook. Comp. to Bot. Mag. p.* 362.

Leptopteris hymenophylloides. *Pr. Suppl. Tent. Pteridogr. p.* 71. *Hook. fil. Fl. N. Zeal. v.* 2. *p.* 48.

Hab. New Zealand, Northern and Middle Islands, and as far south as Banks' Peninsula, *Banks*, *Forster*, and all succeeding voyagers.—Cultivated at Kew.

No figure can do justice to the beauty of this plant, especially of those specimens which exhibit fronds three feet long, with its delicate and finely cut fronds of the texture of *Hymenophyllum* or *Trichomanes*. Different however as is the texture of the frond from that of the much better-known *Todea Africana*, yet the fructifications are the same. Although I was myself formerly disposed to preserve Presl's genus *Leptopteris* for the present species, *Todea Fraseri*, Hook. et Grev. Ic. Fil. t. 101, and the still more beautiful *T. superba* of Colenso ('Century of Ferns,' t. 11), yet on a further comparison I think it best to constitute of them a section or subgenus.

It is to be hoped the *T. superba* will ere long be introduced to our gardens. It grows in dense tufts; some of the fronds, Mr. Colenso says, are "four feet in length, the old ones spreading outwards, while the younger ones, generally rising three at

a time, circinate, and of a light green colour, rise in the most graceful suberect manner from the centre."

PLATE 54. Entire small fertile plant of *Todea hymenophylloides*, Rich.,—*natural size*. Fig. 1. Portion of a pinnule, with a sorus,—*magnified*. 2. Capsule,—*more magnified*.

Plate 55.

PTERIS (§ Litobrochia) podophylla, *Sw.*

Long-stalked Pteris.

Pteris (§ Litobrochia) *podophylla*, Sw.; stipes bright pale-tawny, tall, very stout (thicker than one's finger), more or less muricated near the base, branched, as well as the stout rachis in a bi-trifurcate manner; fronds ample, tri-quadripinnate (several feet long and broad), subcoriaceous, glabrous; ultimate pinnæ or pinnules petiolate, four inches to a foot long, broad, linear-oblong, acuminate, an inch to an inch and a half broad, deeply and regularly pinnatifid; segments approximate dimidiato-oval falcate acute (scarcely acuminate) serrated at the apex, the sinuses rounded; veins copiously anastomosing, forming three or four series, its broad oblong subhexagonal areoles, of which the costal ones are the largest and parallel with costa, sori continuous following the course of the sinuses.

Pteris podophylla. *Sw. Syn. Fil. p.* 100. *Willd. Sp. Pl. v.* 5. *p.* 403. *Ag. Sp. Gen. Pterid. p.* 75. *Hook. Sp. Fil. v.* 2. *p.* 227.

Litobrochia podophylla. *Pr. Tent. Pteridogr. p.* 149.

Litobrochia camptocarpa. *Fée, Gen. Fil. p.* 137.

Lonchitis pedata. *Linn. Sp. Pl. p.* 1536.

Lonchitis erecta tribrachiata, lateralibus bipartitis, medio recto simplici. *Browne, Jam. p.* 89. *t.* 1.

Hab. Tropical America, Jamaica, *P. Browne, Swartz, Tussac, Purdie, Dr. Alexander Wilson;* Venezuela, *Fendler, n.* 98, 99; *Moritz, n.* 47; Caracas, *Linden, n.* 175, 1539, *and n.* 542.—Var. *minor*, Bogotá, *Holton, n.* 50; Ecuador, *Jameson;* Ocaña, altitude 4–5000 feet, *Schlim, n.* 661.—Cultivated in the Gardens at Kew.

This is one of the finest of the many fine species of *Pteris*, § *Litobrochia*. The only figure hitherto published of it is that of Patrick Browne, more than a hundred years ago, and far from a bad one, considering its antiquity. A healthy, but still young, fertile specimen in the Royal Gardens, has enabled us to give a reduced figure of the entire plant, and of two pinnæ of the natural size, but these are far from being among the largest the plant produces. The stipes, not often found in the herbarium, is always of a rich tawny colour, and is smooth, or more or less muricated, especially near the base. For a long time the species was supposed to be a native of Jamaica only.

Plate 55. Fig. 1. Very reduced figure of *Pteris* (Litobrochia) *podophylla*, Sw. 2. Portion of a rachis, with two fertile pinnules,—*natural size*. 3. Portion of a sterile segment, showing the venation,—*magnified*. 4. Portion of a fertile segment, showing the involucre and capsules,—*more magnified*.

February 1st, 1862.


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2

Plate 56.

TRICHOMANES (§ Ptilophyllum) Bancroftii.

Dr. Bancroft's Trichomanes.

Trichomanes (§Ptilophyllum) *Bancroftii*, Hook. and Grev.; caudex often creeping and slender and filiform, hairy rather than scaly; stipites solitary or subcæspitose, alate with a broad decurrent wing; fronds three to four inches long, oblong or ovate, deeply pinnatifid; lobes or segments oblong or subovate, variously lobed and pinnatifid or even sub-bipinnatifid, so that the frond is then tripinnatifid, with linear obtuse segments; veins pinnated, subflexuose, veinlets or branches one to each division or lobe; their veins and the rachises bear scattered clavate soft hairs beneath; involucres sunk in the substance of the frond at the apex of a lobe or segment, infundibuliform, with a spreading entire mouth; receptacles much exserted, very fragile.

Trichomanes Bancroftii. *Hook. and Grev. Ic. Fil. t.* 204. *Hook. Sp. Fil. v.* 1. *p.* 123. *Van den Bosch, Syn. Hymenoph. p.* 16. *Presl, Hymenoph. p.* 16. *Epim. Bot.* 17. *J. G. Sturm in Mart. Fl. Brasil. fasc.* 18. *p.* 259.

Trichomanes coriaceum. *Kze. Fil. Pœpp. in Linnæa, v.* 9. *p.* 105. *Analect. Pteridograph. p.* 46. *t.* 29. *f.* 1.

Ptilophyllum Bancroftii. *Van den Bosch, Gen. Hymenoph. p.* 22.

Hab. Tropical America, but apparently peculiar to the West Indian Islands and the northern and eastern continent, south to Brazil. First detected by *Dr. Bancroft* in Jamaica, since found there by *Wiles* and *Higson*, by *March*, *Wilson*, *Purdie*, etc.; St. Vincent, *L. Guilding;* Guadeloupe, *L'Herminier;* Cuba, *C. Wright*, *n.* 955. Guiana, British, French, and Dutch, *Hostmann*, *Schomburgk*, *Appun*, *Sagot*, *C. S. Parker*, *Le Prieur;* Pará, Brazil, near Collaris (not "Peru," as given by Kunze on the distributed specimens), *Pœppig;* Baña de Rio Negro, *Spruce*, *n.* 871, and St. Gabriel, *n.* 2344: these seem to be the only localities known in Brazil; even Martius does not seem to have met with it.—Cultivated at Kew.

A well-marked species, if general structure be considered, yet variable in composition, from pinnatifid with broad and sinuated lobes, as here represented, or tri-pinnatifid, as given in our principal figure in the 'Icones Filicum.' Kunze's figure, above quoted, is bipinnatifid. In many states of this plant there is a decided creeping caudex, but in many of our own specimens (as the accompanying figure, and in Kunze's), there are only tufted fibrous roots visible.

Attempts have been made by Presl and Van den Bosch, to form many genera of *Hymenophyllum* and *Trichomanes*, the latter undoubtedly the most successfully, yet, I fear, with not very

tangible characters. Our present *Trichomanes* would fall into *Ptilophyllum* of Van den Bosch, of which the character given is, "Frons 1–2-pinnatifida margine denticulata" (hardly in this plant), "pilis hyalinis sessilibus simplicibus (raro furcatis) sparsis obsessa, venula pinnatifida vel furcata, sori terminales." *Hymenophyllaceæ* are by this author now grouped into twenty-four species. We look anxiously for the more complete development of this author's views. His 'Hymenophyllaceæ Javanicæ,' a quarto volume which has just appeared, gives admirable descriptions, and equally admirable figures, of what is known of this beautiful tribe of plants in the Dutch East Indian possessions.

PLATE 56. Tuft of *Trichomanes* (§ Ptilophyllum) *Bancroftii*, Hook. and Grev., fertile,—*natural size*. Fig. 1. Primary segment, with sori,—*magnified*. 2. Involucre and receptacle of capsules,—*more magnified*.

W Fitch, del et lith.

Vincent Brooks, Imp

Plate 57.

ACROSTICHUM (§ Lomariopsis)* Yapurense, *Mart.*

Strong-veined Acrostichum.

Acrostichum (§ Lomariopsis) *Yapurense;* caudex long, stout, scandent ("climbing up young trees," *Spruce*), in general especially the new shoots very scaly; stipites a span to a foot long, more or less scaly, especially below; rachis subsquamose, winged towards the apex; fronds one to two feet long, oblong, ovate, pinnate; pinnæ six or seven to thirty and more; *sterile* ones four to seven inches long, jointed upon the rachis, terminal one generally the longest, one to two inches broad, elliptical-oblong, obliquely subcuneate and sessile at the base, very firm, subcoriaceo-membranaceous often cuspidato-acuminate, the margin entire or obscurely crenato-dentate; veins approximate, very conspicuous, parallel, simple or forked, prominent, especially beneath; *fertile* pinnæ much smaller, oblong-lanceolate, capsuliferous to the very entire margin, the base rounded.

Acrostichum Yapurense. *Mart. Ic. Plant. Crypt. Bras. p.* 86. *t.* 24 (excellent).

Acrostichum phlebodes. *Kze. in Linnæa. v.* 9. *p.* 33.

Lomariopsis phlebodes. *Fée, Acrostich. p.* 66.

Lomariopsis Prieuriana. *Fée, Acrostich. p.* 66. *t.* 25. *f.* 1.

Lomariopsis erythrodes? *and* L. elongata? *Fée, Acrost. p.* 67.

Hab. Tropical America; Brazil; on old trees in the forests of the rivers Japura and Madeira, *Martius;* Pará, *Spruce, n.* 27 and 569; Organ Mountains, *Gardner, n.* 101, *Sellow;* Guiana, *Le Prieur, Hostmann, n.* 188 *and* 179, *Appun, n.* 128, *Sagot, n.* 712; Trinidad, *Purdie, Cruger;* Jamaica, *Wilson;* Peru, *Pœppig;* Tarapota, *Spruce;* Magdalena, N. Granada, *Holton, n.* 21. —Cultivated at Kew, from roots sent by *Dr. Cruger* from Trinidad.

Dr. Martius' name of *Yapurense* (*Japurense* would perhaps be more correct) has the claim of priority over that of the more

* *Lomariopsis* of Fée, which I here preserve as a section of *Acrostichum*, has no character to distinguish it from *Acrostichum* of Fée (*Elaphoglossum* of Schott and other authors), except that the individuals that compose it are pinnated (not simple); and now that the original *Acrostichum* is so much split into genera, the very name has been wellnigh abolished; and it does seem to me strange that Presl and others should fix upon *Acrostichum aureum*, Linn., as the fit representative—a genus of one species, too, as I believe, for this once extensive genus. Moore asserts that it is the "Linnæan type," and quotes 'Linnæus Gen. Fil.' (Plant. ?) p. 785. Now I have consulted Linnæus's works. In the first edition of his 'Syst. Nat.' (1735) his only reference under *Acrostichum*, is "*Muraria.*" In his 'Genera Plantarum,' 1737, n. 785 (and therefore I presume the one referred to by Moore), the *first* synonym is "*Ruta muraria*, Tourn. t. 317," and in his edition of the same work, 1754, it is the only one given: and this is *Asplenium Ruta-muraria*, Linn.!

March 1st, 1862.

appropriate one of Kunze, *phlebodes*, judging from the dates of the respective volumes in which they have appeared: Martius', 1828–34, Kunze, 1835. One of the striking characteristics of the plant is the very conspicuous *prominent veins*, especially beneath: to this may be added the large and handsome fronds, the great size of the pinnules, their almost entire margins, and the broader and lanceolate fertile pinnæ, as the distinguishing features from the *Acrostichum sorbifolium*, Linn. And, if we were to confine our attention to the two as cultivated in the Tropical Fern-house at Kew, there are few Botanists who would not pronounce them very distinct. Unfortunately my herbarium possesses such a suite of specimens of the latter as greatly to invalidate the soundness of the specific differences. In both the pinnæ are jointed upon the rachis; in both the caudex is long, stout, branched, scandent, and fusco-paleaceous: in *A. sorbifolium* the venation is occasionally very prominent, and the pinnæ also vary a good deal in size; while in *A. Yapurense* I have seen the fertile pinnæ almost as narrow and as linear as in *sorbifolium*.

In our present plant, as in *sorbifolium*, there are abnormal forms of the pinnæ; not unfrequently the sterile ones are suddenly contracted into a caudato-cuspidate point, and sometimes they are partially converted into fertile ones (the rest sterile), as figured by Fée, in his *Lomariopsis Prieuriana*. In one of my specimens, from British Guiana, the terminal pinna is alone partially fertile, and there the capsules are confined to the veins.

PLATE 57. Fig. 1. Apex of a caudex, and base of a stipes of *Acrostichum* (Lomariopsis) *Yapurense*, Mart. 2. Portion of a sterile frond, and fig. 3 of a fertile one:—*natural size*. 4. Portion of a sterile pinna, showing the venation. 5. Portion of a fertile pinna, with part of the capsules removed:—*magnified*.

Cornell University Library

W. Fitch del et lith

Plate 58.

ACROSTICHUM (§ Neurocallis) præstantissimum, *Bory.*

Beautiful Neurocallis.

Acrostichum (§ Neurocallis) *præstantissimum;* caudex short, erect; fronds ample, including the stipes (about equal in length to the frond), three to four feet high or more, tufted, ovate, or oblong, pinnated; pinnæ twelve to thirteen to twenty-six, five to ten inches long, two inches broad, subcoriaceo-membranaceous, inarticulate; *sterile* ones oblong, more or less suddenly acuminate, sessile, obliquely cuneate at the base, strongly costate; veins uniformly reticulated; the areoles oblong, hexagonal, transverse; *fertile* as long as the sterile ones, narrow linear oblong, one-third or half an inch wide, finely acuminate, the margin subinvolucrate; areoles of the veins longitudinal; sori covering the whole back of the pinnæ, except the costa, sometimes forming a broad band, only extending half-way to the costa, and at other times confined to a narrow line at the margin, as in *Pteris*, and then closely covered with a narrow pteridoid involucre; stipes and rachis tawny-red, glossy.

Acrostichum præstantissimum. *Bory in Fée.*

Neurocallis præstantissima. *Fée, Acrostich. p.* 89. *t.* 52 (very good).

Hab. West Indies, very local. Guadeloupe, *L'Herminier in Herb. Nostr.;* Dominica, *Dr. Imray, n.* 65, 74 and 62 (1839).—Cultivated in Horticultural Gardens, Kew, from plants sent by Dr. Imray.

Truly this is, as M. Fée (the only person who has written on it) remarks, "la plus belle de toutes les Acrostichées connues: le nom de *A. præstantissimum*, donné par M. Bory, lui convient mieux qu'à toute autre." It is evidently a plant of great rarity, or it would long before have been described by authors. M. Fée speaks of it as being in the herbarium of Mougeot and Bory, from Guadeloupe. It has been distributed with great liberality by the Professors at the Herbarium of the Museum of Paris, and I am indebted to them for a magnificent native specimen; and I have very little doubt that Messrs. Mougeot and Bory derived their specimens from the same source. I have the good fortune to possess equally fine specimens from Dominica, from *Dr. Imray;* and that gentleman has favoured us with a living and now very flourishing plant, from which our figure has been entirely derived. No other country than the above two West Indian Islands, as far as I know, possess this plant.

March 1st, 1862.

M. Fée has observed, "Quelques frondules (pinnæ) ne sont chargées de sporanges que sur les bords, ce qui les fait ressembler à certaines espèces de *Pteropsis*." This is of common occurrence both on our living and native dried specimens; but that is not all, for there is in that state a distinct, narrow, continuous *involucre*, as in *Pteris*, closely covering the sori, represented at our figs. 2 and 3: and, if the more perfect fertile pinnæ be carefully observed, a very contracted involucre may be seen (at our fig. 5), but more distinctly on the back of the pinnæ, where a narrow inflexed margin clearly shows an approach to the genus *Lomaria*.

Few Fern groups are in a more unsettled state than that of which the genus *Acrostichum* is the type; and this is mainly due to the prevalent desire to multiply genera on slight grounds. Fée's genus, *Neurocallis*, was restricted to the present and the very little-known *Acrostichum Requienianum*, from the Moluccas. To these Presl added the *Leptochilus lomarioides*, of Blume; and Moore the *A. aureo-nitens*, Hook., and *Acrostichum scandens* of Raddi, together with two species of his genus *Chorizopteris*, *C. bipinnata* and *C. pinnata*, Moore, in 'Gard. Chron.' 1855, p. 854; but I do not find any such plants described there.

PLATE 58. Fig. 1. Very reduced figure of a plant, with sterile and fertile fronds, of *Acrostichum* (§ Neurocallis) *præstantissimum*, Bory. 2. Pinnæ from a barren frond, but in an abnormal state, with marginal sori and a pteridoid involucre. 3. Portion of the same, *magnified*, showing the involucrate sorus and the venation:—*magnified*. 4. Upper portion of a fertile frond,—*natural size*. 5. Small portion of a fertile pinna, with some of the capsules removed to show the venation,—*magnified*.

W Fitch, del et lith.

Vincent Brooks, Imp

Plate 59.

PTERIS SEMIPINNATA, *Linn.*

Semi-pinnated Pteris.

Pteris (§ Eupteris) *semipinnata;* caudex stout, creeping, villous rather than squamose, as are also the glossy-brown stipites, about a span long; fronds broad-lanceolate, acuminate, a foot or more long, submembranaceous, pellucid, pinnate; inferior pinnæ semi-ovate, distant, subpetiolate; superior margin undivided, inferior deeply subpectinato-pinnatifid; the apex long, caudate; segments oblong or linear, entire (except at the apex and in the sterile fronds, where they are serrated); upper pinnæ linear-oblong, undivided, decurrently confluent at the base; veins distant, forked.

Pteris semipinnata. *Linn. Sp. Pl. p.* 1534. *Sw. Syn. Fil. p.* 97. *Willd. Sp. Pl. p.* 388. *Ag. Pterid. p.* 17. *Hook. Sp. Fil. v.* 2. *p.* 169. *Bentham, Fl. Hong-Kong. p.* 448.

Pteris flabellata. *Schk. Fil. t.* 93, *not Thunb.*

Pteris alata. *Lam.* (*not Gaudich.*)

Pteris dimidiata. *Bl. En. Fil. Jav. p.* 210 (*not Willd.*) *Osb. It. Chin. p.* . *t.* 3. *f.* 1.

β. subæquilatera; smaller, lower pinnæ pectinato-pinnatifid at both margins; segments of the upper side abbreviated, and gradually reduced to the lowest pinnæ, where they are only auricled at the base above. *Hook. Sp. Fil. l.c. p.* 169.

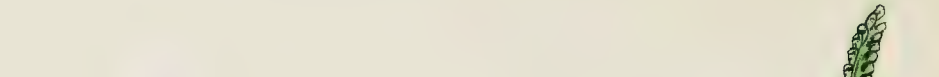
Pteris dispar. *Kze. in Bot. Zeit.* 1848. *p.* 539.

Hab. India, Tranquebar, *Sylhet, Wallich;* Khasya, alt. 3–4000 feet, *Thomson and Hooker;* Ceylon, *Mrs. General Walker;* Assam, *Jenkins, Simons;* Java, *Blume;* Luzon, *Cuming, n.* 258; Borneo, *Barber, Motley;* China, *Osbeck, Vachell, Alexander;* Hong-Kong, *Wilford, C. Wright;* Japan, *Miss Nelson, Babington.*—Var. *β.* Japan, *Miss Nelson, Babington, C. Wright;* Hongkong, *Dr. Lorraine;* Loo-Choo, *C. Wright;* Formosa, *Wilford.*—Cultivated at Kew.

An extremely well-marked species. Our var. *β* the late Professor Kunze considered a distinct species, to which he gave the name of *Pt. dispar*, it is remarkable for the pinnæ being pinnatifid on both sides, sometimes almost equally so; but among my specimens I find all intermediate varieties. It is, however, generally smaller with narrower segments, and these segments more acuminate.

Plate 59. Fertile plant of *Pteris semipinnata*, Linn.,—*natural size.* Fig. 1. Portion of a fertile segment, showing the venation,—*magnified.*

March 1st, 1862.



W Fitch, del et lith.

Vincent Brooks, Imp

Plate 60.

TRICHOMANES spicatum, *Hedw. fil.*

Spike-fruited Bristle-Fern.

Trichomanes (§ Féea) *spicatum;* caudex elongated, subrepent, clothed with long, descending, wiry radicles; stipites tufted; *sterile* ones short, one to three inches long; *fertile* ones three to five inches long; fronds of two kinds, *sterile* ones four to five inches long, broad, lanceolate, membranaceous, deeply pinnatifid nearly to the rachis with close-placed, subhorizontal, oblong, obtuse, sinuated, entire segments; veins twice or thrice dichotomous, free, and, as well as the costa and rachis, glanduloso-villous; *fertile* fronds narrow-linear, formed of a rachis with copious close-placed funnel-shaped shortly pedicellate involucres, arranged in a distichous spike; receptacle variously often much exserted, clothed, bearing copious capsules.

Trichomanes spicatum. *Hedw. fil. in Web. and Mohr, Beitr.* 1. *p.* 116. *Hook. Sp. Fil.* 1. *p.* 115.

Trichomanes elegans. *Pl. Guian. p.* 24. *t.* 35 *(the spike only). Hook. Exot. Fl. t.* 52.

Trichomanes spicisorum. *Desv., in Berl. Mag. v.* 5. *p.* 329.

Trichomanes osmundioides. *Bory, in Poir. Encycl. Bot. v.* 8. *p.* 65.

Féea polypodina. *Bory, in Dict. Sc. Nat.* 6. *p.* 147 *(with a figure). Presl, Hymenoph. p.* 10.

Féea spicata. *Van den Bosch, Synops. Hymenoph. p.* 6.

Hab. Tropical America, in very wet shady places, often found incrusted with epiphytal *Jungermanniæ*, etc.; more frequent in the West India Islands than in the mainland, where it seems to be peculiar to the north of that continent; French Guiana, *Martin;* Bay of Choco, Isthmus of Panama, *Seemann;* Trinidad, *Lockhart, Purdie, Cruger;* Jamaica, *Wilson, March, etc.*—Cultivated in the Fern-stoves at Kew, from plants sent by Dr. Cruger from Trinadad.

A very beautiful species, belonging to a group of the genus *Trichomanes* with dissimilar fronds, and with the sori, in the fertile fronds, arranged in spikes; by many considered a character of sufficient importance to form a genus to which the name *Féea* has been given by Bory, in compliment to the very distinguished pterodologist, M. Fée. Some have even gone further, Bory and Presl in particular, and have separated from this group the *Trichomanes elegans* (see our Plate 2), where the sori, besides being arranged in spikes, are united by a membrane, which is not the case here. It is true the venation is there anastomosing, but that character

did not influence the author of the genus; nor does Dr. Van den Bosch sanction this distinction in his most recent arrangement of *Hymenophyllaceæ*.* The latter author forms a new genus of a Trichomanoid plant, which he places next before Féea, *Maschalosorus*, from French Guiana (Le Prieur), *M. Mougeoti*, unknown to me, but evidently closely allied to our present *Trichomanes*, generally distinguished by the "frons pinnatifida, *sori axillares;*"—in that respect very different from the "frondes heteromorphæ" and "soni spicati" of *Tr. spicatum*. But in our present Plate it will be seen that the fronds are not always of two distinct kinds, but that a sterile frond has sometimes *several of its lower segments transformed into sori;* and on another sample in my herbarium, now before me, together with dimorphal fronds, is one frond of which the upper half is fertile, the rest as in a sterile frond, except that here the segments are interrupted and *partially* converted into sori. Is it not possible that *Maschalosorus* of Van den Bosch may be an abnormal form of our plant, with here and there a sterile segment suppressed and a sorus taking its place, which would then become axillary, being in the sinus of two sterile segments?

PLATE 60. Fertile plant, sterile and fertile fronds,—*natural size*. Fig. 1. Portion of a sterile segment, showing the venation. 2. Portion of a fertile spike, with two sori:—*magnified*.

* It is indeed not a little remarkable that both Presl and Van den Bosch entirely overlook the anastomosing venation in *Trichomanes elegans*, describing it as "free;" and the former author excludes our plant (of *Tr. elegans*, figured in our Gen. Fil. t. 108, and in our present volume, Plate 2) from his synonyms *on account of the union of the veins!* I possess numerous specimens from various parts of Tropical America, and all have the veins distinctly and copiously reticulated, as in our figure last quoted.

Plate 61.

WOODWARDIA areolata, *Moore.*

Netted-veined Woodwardia.

Woodwardia (§ Lorinseria) *areolata*, Moore: caudex creeping, and, as well as the base of the elongated stipes, paleaceous; fronds dimorphous, a span to a foot long; *sterile* ones subtriangular-ovate, membranaceous, deeply pinnatifid (pinnate below); segments sixteen to twenty-five, lanceolate, horizontally patent, acute or obtuse, finely serrated, subsinuato-lobate, lowest ones or pinnæ petiolate; veins everywhere anastomosing; *fertile* fronds ovato-lanceolate in circumscription, coriaceous, pinnate; pinnæ remote, linear; sori approximate, occupying nearly the whole under side of the pinnæ between the costa and margin.

Woodwardia areolata. *Moore, Index Fil. p.* xiv. *Hook. Sp. Fil. v.* 3. *p.* 70.

Acrostichum areolatum. *Linn. Sp. Pl. p.* 1526. *Gron. Virg. p.* 124. *Amœn. Acad. v.* 1. *p.* 274.

Woodwardia angustifolia. *Sm. in Act. Taur. v.* 5. *p.* 411. *Sw. Syn. Fil. p.* 116. *Gray, Man. of Bot. N.U. States, p.* 593. *t.* 10. *f.* 1, 2, 3 (*excellent*). *Metten. Fil. Hort. Bot. Lips. p.* 66. *t.* 6. *f.* 67.

Woodwardia onocleoides. *Willd. Sp. Pl. v.* 5. *p.* 416.

Onoclea nodulosa. *Mich. Fl. Bor. Am. v.* 2. *p.* 272. *Sw. Syn. Fil. p.* 111.

Woodwardia Floridana. *Schk. Fil. p.* 103. *t.* 111.

Lorinseria areolata. *Pr. Epim. Bot. p.* 72. *Fée, Gen. Fil. p.* 207. *t.* 17 *B.*

Hab. Boggy places, and apparently throughout the United States; most common in the south, but extending as far north as Massachusetts, chiefly near the coast. Unknown, or at any rate unnoticed, as yet, on the west side of the Rocky Mountains, or in any part of California or British Columbia.—Cultivated at Kew, in the open border.

Woodwardia is one of the finest of the genera of Ferns, and of which six species are known to us, all, I believe, restricted to the northern hemisphere, but there found in Europe, Asia, Africa, and America. These I have ventured, in my 'Species Filicum,' to divide into three groups, which Presl was disposed to consider so many distinct genera.

Plate 61 represents a caudex and stipes together with a barren and fertile frond,—*natural size*. Fig. 1. Portion of a barren frond, showing the anastomosing venation. 2. Portion of a fertile pinna, seen from above. 3. Portion of a fertile pinna, seen from beneath:—*magnified.*

April 1st, 1862.

W. Fitch del. et lith.

Vincent Brooks, Imp.

Plate 62.

LINDSÆA ensifolia, *Sw.*

Sword-leaved Lindsæa.

Lindsæa (Schizoloma) *ensifolia;* caudex very short, creeping; stipes a span and more long; fronds firm, membranaceous, simple, or more or less pinnated, six to twelve inches long; pinnæ three to eleven or fifteen, all petioled, varying from linear-ensiform to lanceolate or ovato-lanceolate, much acuminated, sterile ones subserrated; veins forked, the branches anastomosing and forming large oblong angled areoles; sorus continuing round the whole margins of the pinnæ.

Lindsæa ensifolia. *Sw. Syn. Fil. p.* 118 *and* 317. *Willd. Sp. Pl. v.* 5. *p.* 420. *Hook. et Grev. Ic. Fil. t.* 3. *Hook. Sp. Fil. v.* 1. *p.* 221.

Schizoloma ensifolium. *J. Sm.*

Lindsæa lanceolata. *Labill. Pl. Nov. Holl. v.* 2. *p.* 98. *t.* 248. *f.* 1. *Brown, Prodr. Nov. Holl. p.* 156.

Lindsæa membranacea. *Kze. in Linnæa, v.* 18. *p.* 121.

Lindsæa pteroides. *Wall. Cat. n.* 2193.

Lindsæa sublobata. *Kze. in Linnæa, v.* 18. *p.* 121.

Schizoloma Billardieri. *Gaud. in Freyc. Voy. Bot. p.* 380. *t.* 17.

Lindsæa attenuata. *Wall. Cat. n.* 2192.

Lindsæa longipinna. *Wall. Cat. n.* 2194.

Lindsæa Griffithiana. *Hook. Sp. Fil. p.* 219. *t.* 68 *B* (*young or simple state of the frond, yet fertile*), *and* L. pentaphylla, *Hook. l. c. t.* 67 *A*).

Hab. Abundant all over the warm parts of continental India and countries and islands in the adjacent seas. In India proper extending from the western to the eastern extremity and through the Malay peninsula to China (from Hongkong, *Wilford*, one specimen has pinnæ ten inches long and an inch and a quarter broad) and the Malayan Islands, Luzon, Java, Borneo, Singapore, etc.; Ceylon, common; Mauritius; Madagascar (*Kaulfuss*); Isle of Nissobi, *Boivin*, extending westward to Natal, *Gueinzius*, and Graham's Town, *Sanderson*, and even to the west coast of Tropical Africa, where it was recently detected in the Nun River, *Gustav Mann;* Australia, *La Billardière, Brown, Allan Cunningham;* probably most abundant in the north, Fitzmaurice River, Albany, Stradbrooke Island, and Moreton Bay, *Hill, Dr. F. Mueller;* Fiji Islands, *Milne, Seemann.* It seems nowhere to be an inhabitant of the New World, and Africa only one locality, above mentioned, has as yet been detected. Cultivated at Kew.

As may be judged from the copious synonyms above given, this pretty *Lindsæa* has a very extensive geographical range, and the plants being liable to very trifling forms are regarded as

species. Three or four forms of frond may often be seen on one plant.

PLATE 62 represents two states of *Lindsæa* (Schizoloma) *ensiformis*, Sw., the more perfect form with several pinnæ, and a triphyllous one,—*natural size.* Fig. 1. Portion of a fertile pinna, with sorus. 3. Sorus:—*more or less magnified.*

W Fitch, del et lith.

Vincent Brooks, Imp

Plate 63.

MARSILEA macropus, *Hook.*

Longstalk-fruited Marsilea, or Nardoo.

Marsilea *macropus;* leaves peltate, quaternate, and, as well as the elongated petioles, sericeo-tomentose; leaflets broad-cuneate, erose at the apex; peduncles subradical, elongated, two inches long; capsules obliquely ovate, densely and obliquely sericeo-strigose, transversely but obliquely more or less distinctly marked with lines, and gibbous at the base on one side; caudex creeping, branched.

Marsilea macropus. *Hook. Ic. Plant. v.* 10. *t.* 909 (*or Cent. of Ferns, t.* 9).

Marsilea quadrifolia, *L., var.* hirsuta, *F. Mueller, in Herb. nostr.*

Hab. Australia, in low inundated grounds: Lachlan River and Liverpool Plains, *All. Cunningham;* Severn River, S. W. Australia, *Wm. Drummond;* Darling River, Darlachy, and Goodwin, *Dr. F. Mueller.* Probably common in the interior of Australia, where it supplies, in its small nut-like capsules, an article of food to the miserable natives under the name of *Nardoo.*—Not yet introduced alive to our European gardens.*

We propose devoting the last two Plates of this Work, now brought to a close with the sixteenth number, to two Ferns of some interest, although neither is as yet known in any gardens.

The subject of our present Plate is a near ally of a well-known South-European plant, the *Marsilea quadrifolia*, Linn. Of the genus we have no species native of Britain, but we possess one which belongs to the same group or family, namely, our well-known *Pillwort* or *Pepperwort* (Pilularia globulifera, *Linn.*), lately figured in our 'British Ferns,' t. 37. The *M. quadrifolia* has long been in cultivation in tanks in our gardens; and *M. macropus* is readily distinguished by its larger size and the remarkably long stalk to the compressed and obliquely-striated, densely villous fruits. The fruits of this singular plant constitute the *Nardoo* of the Aborigines of Australia. There are few that have not read the account of the recent Central Exploring Party under Mr. Burke, formed for traversing Australia from Melbourne to the Gulf of Carpentaria. The great feat has been accomplished, but it has been attended by a loss of life of five out of eleven persons forming the staff. Could they have provided

* Since the above was printed, I am informed by my friend Professor Arnott, that young plants have been raised in a tank in the Glasgow Botanic Garden.

themselves as easily with the *Nardoo*,* and prepared it as readily as the natives do, their lives might have been spared to their country, which owed so much to their exertions.

The specimens I first received of the *Nardoo* fruits, if we may be allowed so to call them, were from Captain Washington, hydrographer to the Admiralty, inscribed as "*Nardoo* seed, taken from the patch on the spot where Burke died, Cowper's Creek, near Camp XXXI., lat. 27° 42′ south, long. 140° 46′ east, collected by E. T. Welch, September 25th, 1861." These, from their large size and shape and long fulvous sericeo-strigose clothing, I had no hesitation in referring to my *Marsilea macropus*, of the same country. In a printed catalogue I have very recently received from Dr. Mueller, of the vegetable products sent by the Victoria Government to the International Exhibition of this year, and find a notice under Class III., p. 118, of "*Nardoo fruit and flour*," sent (but not yet arrived) by the Exploration Committee, with the remark that they are derived from *Marsilea quadrifolia*, L., var. *hirsuta*, of Dr. F. Mueller. In this we have both come to the same conclusion, for that plant is identical with my *M. macropus*. It may still be a question whether it should be looked upon as a species, or distinct from the European *M. quadrifolia*. I am well aware how very liable aquatic plants are to vary.

* In the Narrative of the Expedition, "*Nardoo fields*" are spoken of, meaning probably swampy grounds abounding in the *Nardoo*, and of the occupation of gathering and pounding the *Nardoo*; and in one place it is said, "Two days after leaving the spot where Burke died I found some gunyahs (bark huts), where the natives had deposited a bag of *Nardoo*, sufficient to last me a fortnight." Elsewhere, "We gathered some *Nardoo*, and boiled the seeds, as we were unable to pound them." And again: "On the following day Mr. Wills and I went out to gather *Nardoo*, of which we obtained a supply sufficient for three days, and finding a pounding-stone at the gunyahs, Mr. Wills and I pounded the seed, which was such slow work that we were compelled to use half flour and half *Nardoo*."

PLATE 63. Fertile plant of the *Nardoo*, *Marsilea macropus*, Hook.,—*natural size*. Fig. 1. One of the leaflets. 2. Capsule, with a portion of the footstalk. 3. Vertical section of the capsule. 4. Transverse section of the same. 5. One of two bodies contained in the cells of the capsule, consisting of a pyriform sac, including minute granules, represented at Fig. 6. Fig. 7 and 8. Another and larger sac from the cells, including an oval body, which, when broken, is found to contain very minute spores, represented at Fig. 9:—*all more or less magnified.*

Cornell University

Vincent Brooks, Imp

Plate 64.

TRICHOMANES Malingii, *Hook.*

Mr. Maling's Trichomanes.

Trichomanes *Malingii;* caudex long, slender, filiform; stipites scattered on the caudex, rarely more than an inch long, slender; fronds two to four inches long, oblong-lanceolate, tri-quadripinnate, or rather perhaps pinnatifid, destitute of any wing or foliaceous portion, consisting of rachis alone; the ultimate branches are often forked, and in the fertile fronds almost all the branches are soriferous at the apex, and the whole frond is clothed with a dense stellated pubescence of a ferruginous colour on one side and a pale grey on the other; involucres terminal, subhemispherical, of a thick and firm texture, obscurely two-lipped, and with the lips lobed; column scarcely exserted, thick, fleshy, fusiform.

Hab. *Mr. Maling,** it appears, is the fortunate discoverer of this remarkable Hymenophyllaceous Fern on the ranges of Golden Bar, Middle Island, New Zealand, and *Mr. Brunner*, Surveyor General, Middle Island, on the "mountain-range between Blind Bay and Massacre Bay" (possibly the same locality).

This is one of the most distinct of all the kinds of *Trichomanes* with which I am acquainted; a genus of which the species are in general distinguished by the membranous expansion of the frond, of so delicate and beautiful a nature as of late years greatly to recommend the species for cultivation in our ferneries. In the *Trichomanes* now under consideration, however, all appearance of membrane is absent, and the plant seems reduced to that portion denominated rachis,—in other words, the continuation of the stipes and rachis. Yet it must not be forgotten that we have a structure of nearly the same kind in my *Trichomanes Pluma*, from Borneo, figured in the 'Century of Ferns,' t. 97. But there the whole texture is conspicuously (for so small a plant) cellular. I have no hesitation in placing it in the same genus. Another re-

* In a letter from my valued correspondent W. T. Luke Travers, Esq., dated Christchurch, New Zealand, 6th July, 1861, I received my first specimen of this plant, stating that it was obtained by Mr. C. Maling, who found it on the "ranges of Golden Bay, Middle Island, New Zealand," after whom I at once proposed to name the species. In a subsequent letter from D. Rough, Esq., dated Nelson, New Zealand, 6th November, 1861, to Dr. Hooker, that gentleman sends specimens gathered by Mr. Brunner, Surveyor-General, gathered on "the mountain-range between Blind Bay and Massacre Bay." Possibly the same range is meant in both cases.

April 1st, 1862.

markable feature in this little plant is the dense covering of starry pubescence or tomentum, which gives the appearance of some *Jungermannia* of the *tomentella*-group, and the colour is, in all the specimens I have yet seen, ferruginous or tawny-brown on one side and pale grey on the other—a circumstance I can only account for by supposing it to grow in masses, of which one surface is exposed to a strong light, while the other side is bleached by the absence of light. The involucres are all at the apex of the branches, which seem to be swollen and hollowed out for the reception of the columella and capsules.

PLATE 64. A fertile plant of *Trichomanes Malingii*, Hook.,—*natural size*. Fig. 1. Portion of a fertile primary pinna or segment. 2. Smaller portion. 3. Involucre. 4. The same, with the tomentum removed, in order to show its more exact form. 5. The same, cut through vertically, showing the columella, from which some of the capsules have been removed. 6 and 7. Frond and side view of capsules, with the oblong entire ring of the genus. 8. Capsule, burst. 9. Stellated hair:—*all more or less magnified*.