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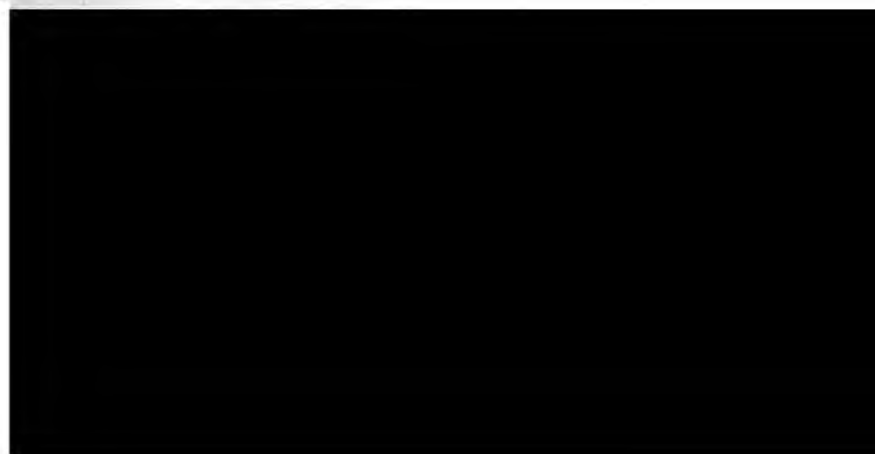
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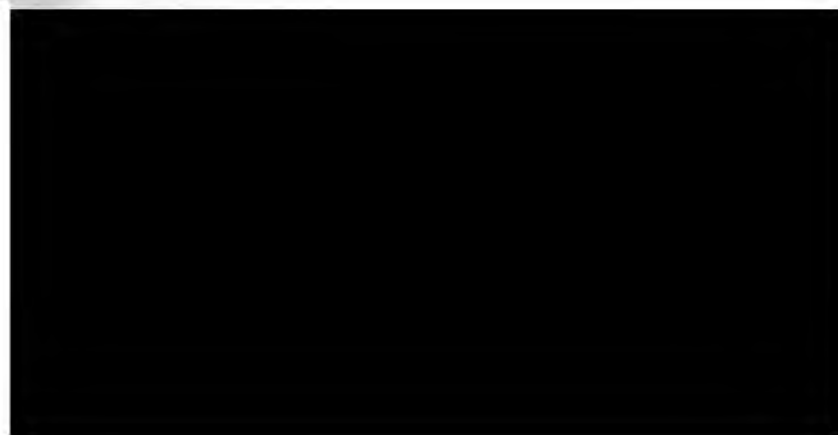
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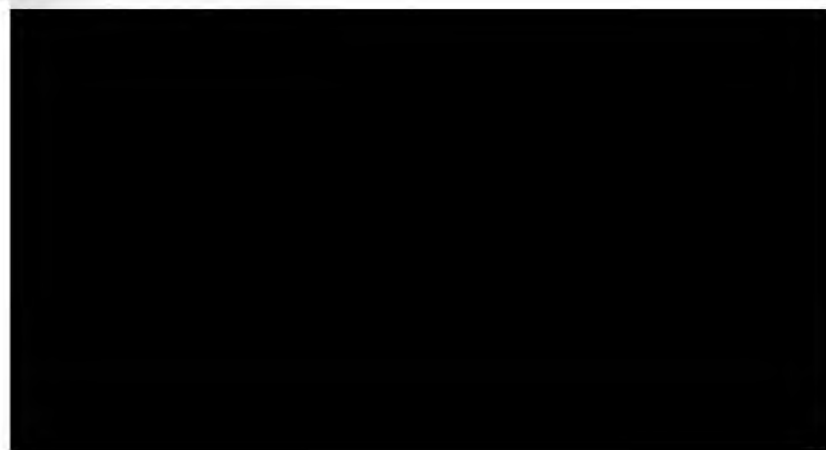
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SPECIES FILICUM.

LONDON :
E. NEWMAN, PRINTER, DEVONSHIRE STREET,
BISHOPSGATE.



SPECIES FILICUM;

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

ACCOMPANIED WITH NUMEROUS FIGURES:

BY

SIR WILLIAM JACKSON HOOKER, K.H., D.C.L.,

F.R.S., V.P.L.S., F.A.S., ETC.

DIRECTOR OF THE ROYAL BOTANIC GARDENS OF KEW.

VOL. I.

CONTAINING

GLEICHENIA — DICTYOXYPHIUM.

PLATES I. — LXX.

LONDON:

WILLIAM PAMPLIN, 45, FRITH STREET, SOHO SQUARE.

M.DCCC.XLVI.



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TO
ROBERT BROWN, ESQ., D.C.L.,
MEMBER OF THE INSTITUTE,
VICE PRESIDENT OF THE LINNÆAN SOCIETY,
&c. &c. &c.

My Dear Sir,

Having enjoyed your friendship from the earliest period of my botanical career, and derived inestimable advantage from our frequent intercourse, as well personal as by letter, I trust I may be permitted to put that friendship, of which I have so much reason to be proud, on record, in the dedication of the present work, which is indebted to your writings and counsel, for much of what merit it may possess. Too happy am I in any opportunity of assuring you that

I am,

With most sincere regard and esteem,

Your faithful and affectionate,

W. J. HOOKER.

Kew, January 1, 1846.

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P R E F A C E .

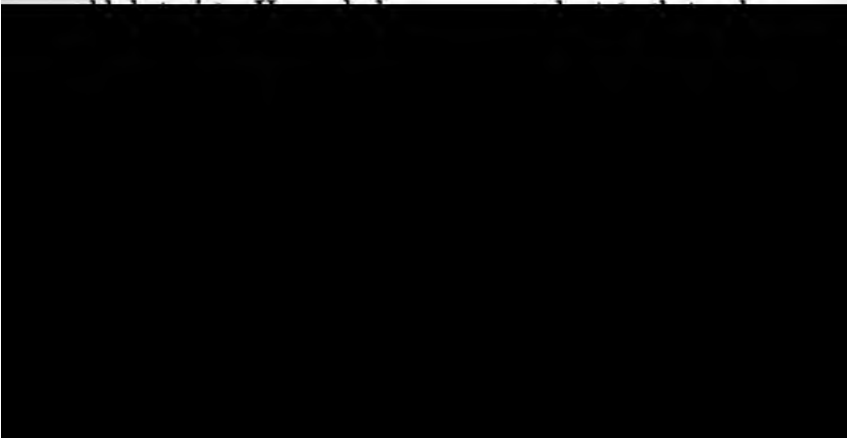
IN submitting to the public a few short prefatory remarks upon the contents of the present volume, it has appeared to the author desirable to put his readers upon their guard at the outset, lest the notice on the wrappers of the several Nos. that the work might be expected "to comprehend all the known species of Ferns," should prove ultimately the cause of disappointment. He begs it therefore to be understood, that his meaning must be taken in the restricted sense of including only

1. Such as he himself has had the opportunity of examining in a perfect state, whether recent or dried.

2. Those which have been universally received, and which his own observations have tended to prove are justly to be regarded, as distinct, judging principally from figures; and

3. A considerable number, of which he has seen neither plates nor specimens, but which rest upon the authority of botanists, of so high a character, that it would be unwarrantable to dissent, without some specific cause, from their opinions.

Even thus, however, the difficulties he has had to encounter have been greater than would be easily imagined by any one who had not actually undertaken a task of the same kind. Nothing, he feels, could justify the conclusions at which he has arrived, respecting the union of many Genera and Species, but the power of examining the almost countless specimens, preserved either in his own peculiarly rich herbarium, or in the many others, as well public as private, to which he has been allowed access. The opportunities, thus afforded, of comparing the same species, in its varied forms, and from different, indeed often from widely severed, localities, have proved of the utmost utility. They have enabled him to arrive at results, to which no other means of investigation could have led. These results, he is aware, are but too likely to startle other students of the same tribe of plants; and indeed he is not ignorant that the so frequent junction of supposed distinct species, in the following pages, has already called forth expressions of surprize from the pens of



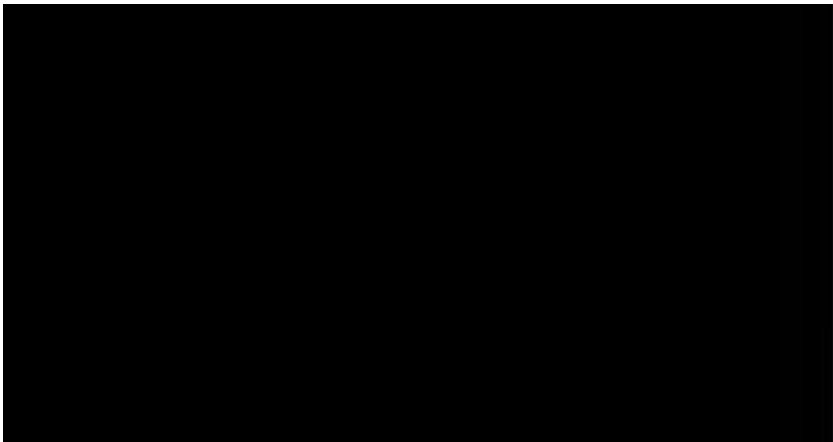
Ferns. This is owing to three causes. 1. The difficulty of accurately defining in words the highly varied forms of these beautiful plants. 2. The often imperfect or incomplete specimens collected, especially of the larger kinds. And 3. A too generally received opinion that the same Fern is not likely to grow in two very remote portions of the globe. In illustration of the last of these remarks, a more striking instance can hardly be adduced than the universally known *Osmunda regalis* of Linnæus, which, retaining its own name as an European species, has been described as *O. spectabilis* in North America, *O. speciosa* in Nepal, and *O. Leschenaultii* in the Neelgherries.

Innumerable examples of a similar kind might be brought forward, and nothing can assist in rectifying these errors but the opportunity of examining a large number of specimens from various habitats. The want of such opportunities has led botanists of high repute not uncommonly to commit mistakes; and the author will take the liberty of adducing one or two instances which have recently come before him; in fact, so recently, that it was only just as the concluding sheets of the present volume were in the press. He would not otherwise have failed to notice some of the errors before.

While engaged on the genus *Cystopteris*, he received the No. of Jacquemont's 'Voyage aux Indes Orientales,

Partie Botanique,' containing the Ferns. On examining it, to see if there were any individuals of the genus in question, he found three; viz., *Cystopteris retusa*, Decne., *C. dimidiata*, Decne., and *C. squamata*, Decne. The first two were, happily, accompanied with figures, from which, no less than from the excellent description, it was quite clear that *C. retusa* was identical with *C. fragilis* (an universally diffused species); while *C. dimidiata* is the *Davallia* (*Leucostegia immersa* of this volume (p. 157). The *C. squamata*, of which there is no delineation, and only a brief distinguishing character, it was not in his power to identify, and it is accordingly here placed among the *Species dubiæ*, in the Addenda. Even its genus must remain doubtful; it may be (and standing next after *C. dimidiata* it probably is) a *Davallia* (*Leucostegia, Presl*), rather than a *Cystopteris*.

The appearance of the 'Hymenophyllacæ' of Dr. Presl in England, exactly at the close of the printing of that



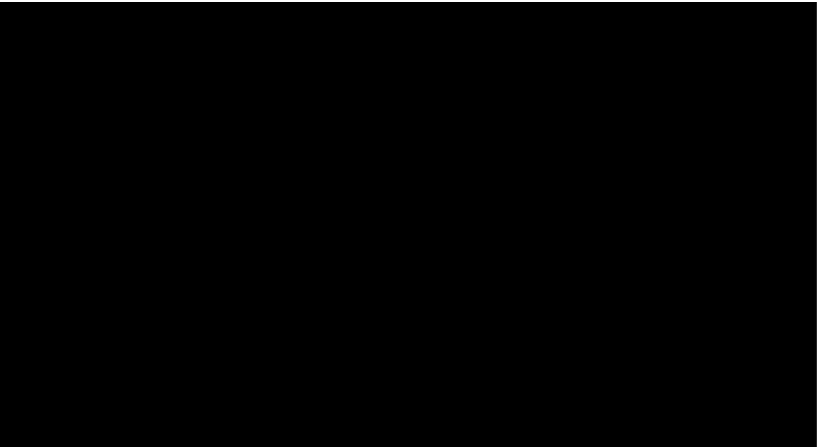
Hymenophyllaceæ (and other Ferns of Equinoctial America', in which six "new species" are described. The first of these might have admitted of some doubt, as to its being really new, from the general nature of the specific character, no less than from its being referred to *Neurophyllum* of Pral; but the mention of Hostmann's Surinam plants removes every difficulty, and identifies the Fern in question with *Trichomanes floribundum* (H. B. K.) noticed at p. 129. Neither is it even a variety, like the remarkable var. β . (*l. c.*), which, in the absence of more materials at the time, had once been deemed distinct (the *T. Vittaria* of De Cand. and Hook. in Lond. Journ. of Bot. i. p. 137, t. 5).

These statements are made from no invidious motive, but simply to show that, without access to a most extensive collection of specimens, from widely different localities, the best botanists, as has already been remarked, must be liable to fall into mistakes of this kind, and therefore to multiply the difficulties of the study, by loading the system with dubious or wholly untenable species. It has become a necessary, but in many respects an ungrateful task, thus to confine the species, so far as practicable, within due bounds; but this is one main object the author has kept before him. His extensive herbarium has, however, necessarily presented many new forms; and these, and other hitherto unfigured ones, he has been anxious, wherever it could be done, to illustrate by faithful representations, executed on

as small and economical a scale as is compatible with accuracy. The delineations will often be useful to the student where words are not sufficiently intelligible.

It has been the aim of this publication, to give all the references to good figures that could be admitted, consistently with its limited nature; always preferring those which are the fullest and most accurate. Many that exist in the books of the older authors, as Sloane, Plukenet and even Plumier, are often purposely omitted (though quoted by other writers) as only tending to mislead. The fructification and venation were, at the time they wrote, too little regarded; and every botanist is now aware that, in a multitude of instances, some species of one genus resemble others of different genera, in almost every particular save this, the most important one.

There remains, what is no less the pleasure of the author than his duty, to acknowledge the much assistance derived




highly distinguished naturalist which led, in the first instance, to the publication of the 'Icones Filicum' by the present author, in conjunction with Dr. Greville. Without the same rich materials for working upon, this Synopsis would never have been undertaken. It is not, however, for specimens alone that obligations are in this instance to be acknowledged. The same most kind friend still further communicated a copy of all his own and Dr. Roxburgh's valuable MSS. on the subject of Indian Ferns; which proved of eminent service, taken, as they were, in many cases, from entire fronds of the plants, which cannot be preserved in the herbarium. More than ordinary collections have also been received from the Royal Herbarium of Berlin, from the late Mr. Griffith, Mr. Gardner, Dr. Wight, Mrs. Genl. Walker, Rev. Mr. Colenso, Professor Wm. Jameson, H. Cadogan Rothery, Esq, &c. &c. &c.

The author's plates and descriptions of the 'Genera of Ferns,'* (genera constituted by the most distinguished Pteridologists), have been some time before the public. He there declined pledging himself to the adoption of these, or any particular portion of these, genera; on the ground that "a more accurate examination of the several species of each genus would probably enable

* 'Genera Filicum;' or Illustrations of the Genera of Ferns, chiefly from the coloured drawings of the late Francis Bauer, Esq.

him to form a more exact judgment on this head than was then in his power." Increased study has, he must confess, strengthened his conviction that those Botanists, who have showed themselves peculiarly addicted to multiplying genera, have not always taken Nature for their guide, nor succeeded in eliciting a simple and tangible arrangement. Yet have their close and accurate investigations thrown a new light upon the study of Ferns, a light which cannot fail to aid the researches of future writers, and which ought, therefore, to be gratefully acknowledged. In these remarks, Dr. Presl and Mr. John Smith are particularly alluded to. Dr. Presl was the first, at least in point of publication, to carry out the vast extension of the Genera, and his is the completest Catalogue that has yet appeared. In the following pages, a middle course has been pursued, between the highly multiplied genera of these two authors, and the too meagre enumerations of Willdenow, Sprengel, Link, Kunze, and others.



They are sufficient to show, that, had he given his master-mind to the complete development of the subject, little would have remained to his successor, but to tread closely in his steps.

and the other side of the coin, the fact that the majority of the respondents are not in favour of the proposed changes, it is not clear how the company should proceed. The fact that the majority of the respondents are not in favour of the proposed changes, it is not clear how the company should proceed. The fact that the majority of the respondents are not in favour of the proposed changes, it is not clear how the company should proceed.

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SPECIES FILICUM.

ORD. I.—FILICES.*

Capsules (Sporangia) sessile or pedicellate, free, rarely connate, one-celled, bursting variously, and various in texture, frequently surrounded by a more or less complete elastic ring, generally collected in definite clusters (*sori*), arising from veins on the under side of the leafy portion or frond, or at the margin, more rarely collected into spikes or racemes distinct from the frond, naked, or furnished with a peculiar membranaceous scale (*indusium, involucre*) which covers the sori wholly or in part; or, sometimes the margin is dilated into this membranaceous covering, and is interrupted or continuous. *Seeds or sporules* generally very small and numerous, varying in form.—Fronds with *circinate vernation, plane, herbaceous*. Trunk or root-stock *perennial, often creeping, frequently, in the tropics and in the southern hemisphere, arborescent*.

Ferns are found in almost every part of the globe where vascular vegetation exists at all; but they chiefly abound in moist and warm climates. They have a peculiar habit, by which they are more easily to be recognized than described, differing greatly from all other vegetables, generally exhibiting the most graceful forms, and varying in size from the humble *Trichomanes* or *Hymenophyllum* to the noble *Tree-Ferns* of the equatorial Forests.

SUBORD. I.—GLEICHENIACEÆ, Br.

Sori dorsal, naked, subglobose, formed of few, sessile, sometimes immersed *capsules*, which have a transverse or obliquely transverse, complete, elastic ring, bursting vertically (from the apex).—Tropical; or extra-tropical *only in the southern hemisphere, of a harsh and rigid texture, simple or, generally, with copious, dichotomous branches, and gemmæ in the axils, the ultimate branches pinnatifid*. HOOK. GEN. FIL. TAB. 39 AND 41, A. B. C.

* In this Order will be included *Osmundaceæ* and *Ophioglossæ*. The work, indeed, is intended to include species of all the genera figured and described in the author's 'Genera Filicum,' published in one volume, with numerous coloured plates, many of the drawings of which were executed by the late Francis Bauer, Esq.

1. PLATYZOMA. *Br.*

Sori of very few (2—3) sessile *capsules* (mixed with a pulverulent substance, *Br.*), soon deciduous, placed at the apex of the simple veinlets, and concealed by the singularly revolute margins of the pinnæ. — Rootstock *creeping*. Fronds *cæspitose, glabrous, erect, unbranched, linear, pinnatifid*. Pinnæ *oval, sessile, very concave*. HOOK. GEN. FIL. TAB. 41. C.

1. *P. microphyllum*. *Br. Prodr. Nov. Hol. p. 160. Guillem. Ic. Pl. Austr. Rar. t. 13. Presl. tab. 1. f. 4.*

Hab. Tropical New Holland, *Mr. Brown*. Madagascar? *Bojer*.—This genus might perhaps, without violence to nature, be united to the following.

2. GLEICHENIA. *Br.*

Gleichenia, Calymella and Mertensia, Presl. Gleichenia and Mertensia, J. Sm. and most authors. Platyzomatis sp., Desv. Dicranopteris, Bernh. Sticherus, Presl.

Sori of few (2—4) sessile, superficial or immersed, deciduous *capsules*, situated on a lower exterior veinlet. — Tropical or Australasian Ferns, *procumbent, dichotomously branched: the branches simple or pinnate; pinnæ pinnatifid, the segments small, ovate or orbicular, or larger, oblong and linear, plane or concave, the margin sometimes singularly revolute, glabrous or chaffy*. Veins *pinnate, often immersed and obsolete, simple or forked*. HOOK. GEN. FIL. TAB. 41, A. B.; AND TAB. 39.

Subgen. I. EUGLEICHENIA. *Sori at the apex of a veinlet, capsules often sunk. Segments of the ultimate branches ovate or orbicular. Australasian or mountains of Java. Gleichenia and Calymella, Presl.*

1. *G. Speluncæ, Br.*; glabrous, fronds simple or forked and dichotomous pinnate, pinnæ pinnatifid the segments semi-

neath, the adult ones naked, younger ones and rachis densely clothed with ferruginous scales and down.—*Br. Prodr. p. 161. Hook. et Grev. Ic. Fil. t. 58. Calymella, Presl.*

Hab. Tasmania. Abundant on Mount Wellington, and on the western mountains, *Brown, R. Gunn, Esq.*—A small species, readily distinguished by its closely placed orbicular or semiglobose segments, the younger shoots densely clothed with rusty-coloured tomentum mixed with scales.

4. *G. polypodioides*, Sm.; fronds dichotomous, branches pinnate, pinnæ pinnatifid, segments ovate glaucous beneath, capsules 3—4 immersed forming a flat-topped sorus. — *Sm. Act. Taur. v. p. 419, and ix. f. 10. Schk. Fil. t. 149.* — β . fronds more glaucous beneath. *G. glauca, Sw.* (not *Mertensia glauca*, Sw.) *G. gigantea, Kaulf.*

Hab. S. Africa, probably chiefly on the mountains near the Cape Colony: at an elevation of from 1500 to 4500 feet, (*Drège, Eklon and Zeyher*).—The younger fronds, and especially the partial and main rachis, are frequently clothed with rusty down. The sorus is a beautiful object, sunk in a circular depression, which the three or four capsules exactly fill, depressed at the top, and marked from the centre with radiated lines, formed by the close proximity of the capsules and their bursting in the middle, from the centre to the circumference.

5. *G. microphylla*, Br.; fronds dichotomous divaricated, branches pinnate, pinnæ pinnatifid glabrous, segments ovate or subrotund nearly plane, their margins slightly recurved, capsules 3—4 exserted lax, branches and rachis clothed with ferruginous chaffy hairs.—*Br. Prodr. p. 161. G. Speluncæ, Guillem. Ic. Plant. Austr. Rar. t. 12. G. circinata? Sw.*

Hab. Port Jackson, *Brown. Tasmania, Brown, R. Gunn, Esq.*—If I do not mistake this plant, the segments of the leaves are ovate as well as subrotund, and it is distinguished from the following by the simply and slightly recurved margins of the segments, so that the sori are more exposed to view.

6. *G. dicarpa*, Br.; fronds dichotomous divaricated, branches pinnate, pinnæ pinnatifid, segments orbicular very fornicate with a broad recurved margin, capsules 2 within the hollow of the segment, branches nearly glabrous, rachis hairy. (Tab. I. C.)—*Br. Prodr. p. 261. G. microphylla, Sieb. Fl. Mixt. n. 230.*

Hab. Tasmania, *Brown, R. Gunn, Esq.*—This species is easily recognized by the orbicular and almost saccate form of the segments.

7. *G. semivestita*, Labill.; fronds dichotomous divaricated, branches pectinate, pinnæ pinnatifid, segments orbicular ovate slightly concave, branches densely ferrugineo-pubescent, rachis with few stellated hairs, capsules (3—4 exserted, *Labill.*) (Tab. II. A.)—*Labill. Sert. Nov. Caled. p. 8, t. 11.*

Hab. New Caledonia, *Labillardière. Malacca, Cuming.*—In many respects agreeing with some states of *G. microphylla*: and the slight differ-

ences may probably be due to the tropical or subtropical countries where alone this plant has been found.

8. *G. hecistophylla*, A. Cunn. ; fronds dichotomous divaricated, branches pectinate, pinnæ pinnatifid, segments orbicular saccate, branches and rachis densely ferrugineo-pubescent, capsules 2 sunk in the hollow of the segments. (Tab. II. B.) — *A. Cunn. Nov. Zel. in Hook. Comp. to Bot. Mag. v. ii. p. 361.* *G. semivestita*, *J. Sm. (not Labill.)*

Hab. N. Zealand, *R. and A. Cunningham, Colenso.*—This seems to bear the same relation to *G. semivestita*, that *G. dicarpa* does to *G. microphylla*.

9. *G. longissima*, Bl. ; “stipes dichotomous and the rachis flat above, fronds bipinnatifid submembranaceous glaucous beneath and slightly tomentose, pinnæ alternate linear-lanceolate deeply pinnatifid, the segments linear obtuse, capsules 3—4 subglobose sessile.” *Bl. Fil. Jav. p. 250.*

Hab. Moist woods, Java, *Blume.*—This author says its place is between *G. polypodioides* and *G. microphylla* : and he notes two varieties. 1. fronds white beneath with the segments larger. 2. fronds coriaceous ferrugineo-tomentose beneath, the segments smaller, rachis with chaffy scales beneath.

10. *G. vulcanica*, Bl. ; “stipes dichotomous terete at length glabrous, fronds bifurcate bipinnatifid coriaceous glaucous beneath, pinnules narrow-linear, segments orbicular cucullate and reflexed beneath, rachis everywhere densely pubescent.” *Bl. Fil. Jav. p. 251.*

Hab. Lofty burning mountains of Java and Celebes, *Blume.*—With this (as with the preceding) I am unacquainted. Mr. J. Smith refers it to *G. semivestita* in his ‘Enum. Fil. Philipp.’ but Blume notices its great affinity with *G. alpina*, and remarks that the common rachis is not tomentose, but altogether chaffy.

Subgen. II. MERTENSIA, Willd. Sori near the middle or at the

cord so well with the description of Swartz, that I have little hesitation in referring it to the *Mertensia glauca* of that author.

12. *G. gigantea*, Wall.; primary pinnae opposite oblong acuminate, its rachis above with a slightly elevated very obtuse margin, secondary lanceolate acuminate alternate deeply pinnatifid, segments oval oblong very obtuse entire with an elevated crest at the base above forming an interrupted marginal line to the rachis which beneath as well as the costa is woolly scarcely glaucous, capsules 3—5. (Tab. III. A.)—*Wallich Cat. n. 157.*

Hab. Nepal, *Wallich*. Assam, *Mrs. Mack*.—Dr. Wallich has rightly judged this to be a distinct species. It is remarkable for the longitudinal crests at the base of the segments on the upper side. At the setting on of the primary pinnae is a collection of leafy deeply lacinated persistent scales, which I presume included the gemma before its development, and which probably is found in all of the present section.

13. *G. Bancroftii*, Hook.; primary pinnae opposite oblong acuminate, its rachis above with a very acute margin, secondary lanceolate alternate deeply pinnatifid almost pinnated, segments remote decurrent at the lower base linear obtuse entire perfectly glabrous rather glaucous beneath, at the base above slightly crested so as to form an interrupted margin to the rachis, capsules 3—4. (Tab. IV. A.)

Hab. Jamaica, *Swartz, Dr. Bancroft*.—This also seems specifically distinct from *G. glauca*, and is no doubt the fern without fructification which Dr. Swartz detected in Jamaica, and referred doubtfully to that plant. Perhaps the *Filix taxiformis minor* of Plum. Fil. t. 25, may be the same as this, although Swartz has placed it among his dubious *Aspidia*.

14. *G. excelsa*, J. Sm.; primary pinnae opposite oblong acuminate, its rachis above with an acute elevated line, secondary alternate lanceolate acuminate deeply pinnatifid, segments linear-oblong obtuse glabrous slightly glaucous beneath, at the base above with an elevated crest forming a margin on each side the furrowed rachis, capsules 3—5. (Tab. IV. B.)—*J. Sm. Enum. Fil. Philipp. in Hook. Journ. of Bot. iii. p. 420, (without description).*

Hab. Luçon, *Cuming*, (n. 265).—Intermediate, as it were, between *G. Bancroftii* and *G. gigantea*.

Obs. All the species of this group are large ferns, 5—6 feet long, in the case of *G. gigantea*, according to Wallich, and probably in the others also, "forming impenetrable and extensive jungles." The caudex is very long and creeping; the stipes at first forked, the branches of the forks bearing doubly pinnate fronds, the ultimate pinnae pinnatifid. The small portions we see in our herbaria have consequently little resemblance in structure to the following species; but the affinity would be more apparent if we saw entire specimens.

§ II. *Fronds dichotomous (rarely simple) pinnatifid: in other words the leafy portion is not confined to the forked apices, but is decurrent more or less upon the branched portion of the stipes.* (See Tab. VI.—VIII).

15. *G. flabellata*, Br; fronds two or three times dichotomous proliferous flabelliform, branches lanceolate ascending caudate at the point pinnatifid, below pinnate, segments linear acute serrated erecto-patent, capsules 1—4.—*Br. Prodr. p. 161. Labill. Sert. Nov. Caled. p. 9, t. 12.*

Hab. New Holland and Tasmania, *Brown, Gunn, Lawrence.* New Caledonia, *Labillardière.* Northern Island, N. Zealand, *A. Cunningham, Colenso, Dr. Sinclair.* — Fronds more or less harsh and rigid or soft and membranaceous; in the former case the margin of the segments is revolute, giving the latter a narrower appearance.

16. *G. tenera*, Br.; “fronds dichotomous proliferous, branches lanceolate pinnatifid, pinnæ (segments?) linear entire divaricated slightly hairy, rachis scaly, capsules 3—5 exserted sessile.” *Br. Prodr. p. 161.*

Hab. Tasmania, *Brown.* — With this species I am unacquainted. It is probably allied to the preceding.

17. *G. Cunninghami*, Hew. MS.; stipes clothed with large deciduous scales, fronds dichotomous flabellate, branches lanceolate acuminate patent and falcato-recurved pinnatifid almost to the apex, below pinnate, segments rigid coriaceous linear acute quite entire beneath glaucous and clothed with copious deciduous hairs, capsules 2—4. (Tab. VI. B.)—*G. arachnoidea, A. Cunn. MS.*

Hab. Northern Island, N. Zealand, *A. Cunningham, Colenso, Edgerley, Dieffenbach.* — Certainly near *G. flabellata*, but very distinct. It is of an extremely rigid habit, the fronds are of a thick coriaceous texture, the apex of the branches not running out into a tail-like point, but pinnatifid to the extremity, patent and falcato-recurved, very glaucous beneath, the seg-

19. *G. cryptocarpa*, Hook.; glabrous, fronds dichotomous proliferous subflabelliform, branches broadly lanceolate acuminate ascending or subincurved and falcate rigid pinnatifid, segments linear acute patent the margins recurved concealing the sori and almost meeting on the costa, capsules 1—4. (Tab. VI. A.)

Hab. Plains near Los Andes, Province of Valdivia (n. 802) and Chiloe (n. 20), *Bridges*. Falkland Islands, *Lieut. Robinson*.—The affinity of this is with *G. pedalis*, but the habit and the direction of the branches of the frond are different, and the revolution of the margin of the fertile segments is such as to conceal the fructification almost as in *Cryptogramma*. *Bridges* says it is from 1 to 3 feet high.

20. *G. acutifolia*, Hook.; stipes glabrous, fronds about twice dichotomous subflabelliform, branches broadly lanceolate acuminate somewhat falcate pinnatifid, segments linear acute somewhat hairy beneath clothed on the costa and midrib with ferruginous aristate scales, the margin recurved, capsules 2—4. (Tab. VIII. A.)

Hab. Port Antonio and Port Famine, Patagonia, *Capt. King's Voyage*.—This is a small species, scarcely a foot high. In each of my specimens from two localities the frond is only twice dichotomous, the branches or peduncles which bear the forks or pinnæ are short, and leafy chiefly on one side. The colour in the dry state is dingy brown, below ferruginous from the rusty scales on the rachis and costa.

Obs. The six preceding species might almost form a distinct group, having apparently an upright stipes terminated by more or less flabelliform fronds; and they do not seem to possess the straggling character of the remainder of the section.

21. *G. revoluta*, H. B. K.; stipes and rachis especially beneath clothed with ferruginous ciliated chaffy scales, fronds repeatedly dichotomous proliferous rigid coriaceous, branches linear acuminate pinnatifid, segments ovate horizontal obtuse glaucous beneath, the margins revolute, capsules 2—4. (Tab. VII. A.)—*Humb. et Kunth, Nov. Gen. An. v. i. p. 29. Mertensia angusta, Klotzsch, in Herb. nostr.*

Hab. Andes of Quito. Cold and elevated situations at Saraguru of *Parama* and *Pulla*, between 9—10,000 feet above the level of the sea, *Humboldt, Jameson* (n. 40).—Stipes clothed with pale (bleached?) fimbriated scales. Under side of the fronds with ferruginous-brown ciliated scales, which, in the perfect specimens, conceal the fructification, and, almost entirely, the glaucous underside of the frond.

22. *G. simplex*, Hook.; stipes naked, frond simple linear rarely forked at the top acuminate and caudate at the point deeply pinnatifid pinnate at the base, rachis densely clothed beneath with pale ferruginous large fimbriated scales, segments and pinnules obliquely patent linear-oblong broader at the base obtuse entire very glaucous beneath, capsules 2—4.

Hook. Ic. Pl. v. i. t. 92. Mertensia simplex, Desv. MS. in Dict. des Sc. Nat. with a figure.

Hab. Andes of Quito, *Prof. W. Jameson* (n. 83), Cordillera of Peru, *Mathews* (n. 1093).—A simple-fronded fern, in the adult state, is certainly a phenomenon in the genus *Gleichenia*, and I have more than once, especially on finding a specimen proliferous at the apex, with circinate infant branches, been disposed to consider it a state of the preceding species; I can hardly say the infant state, because there is generally fructification in abundance. But on again directing attention to the subject, I am induced to keep them distinct:—for I find that copious specimens of both plants are very constant to their characters: and though I have received, at several different periods, from Professor Jameson, the respective plants, they are uniformly the same; and by my correspondent sending the two with different numbers, he appears not to entertain the shadow of a doubt of their being distinct. Of the present I may observe that I never find the stipes otherwise than free from chaffy scales: the scales on the rachis are of a much paler colour than in the preceding, the frond is broader, the segments longer and narrower, the lower ones often rather remotely separated from one another, when completely developed, caudate.

23. *G. (Mertensia) pubescens*, Willd.; stipes round glabrous or more or less chaffy, fronds repeatedly dichotomous leafy, branches or pinnæ lanceolate acuminate ascending pinnatifid, segments horizontal or nearly so linear obtuse or retuse, beneath clothed with a dense pale ferruginous cobwebby substance in which the sori are immersed, capsules 4—5.—*Mertensia ferruginea, Desv.*—*M. immersa, Kaulf.*—*Hook. et Grev. Ic. Fil. t. 15. M. velata, Kze.*—*M. bifida, Willd.*—*β. glabra*; fronds more or less glabrous beneath. *M. furcata, Sw.*—*Acrostichum furcatum, L.*—*Polypodium, Sw. Fl. Ind. Occ.*—*Plum. Fil. t. 28.*—*γ. pinnæ or branches narrow.*

Hab. Brazil and West Indian islands, frequent. Peru, *Pöppig* and *Herb. nostr.* Guatemala, *Mr. Skinner*, and Rio, *Mr. Gardner*, (larger and bright green in drying).—*β. West Indies, Swartz.* South Brazil, *Sellow, Twee-*

24. *G. Mathewsii*, Hook.; small ($1\frac{1}{2}$ foot) stipes terete or nearly so glabrous, frond twice dichotomous partially leafy below the upper fork and chiefly on one side, branches lanceolate falcate pinnatifid, segments linear obtuse patent but pointing upwards subglaucous beneath and clothed with deciduous cobwebby down, rachis subpaleaceous, capsules 3—4. (TAB. VII. B.)—*M. furcata*, Mart. et Galeot. Fil. Mex. p. 17. — β . *major*; pinnæ larger.

Hab. Peru, *Mathews*. Savannas and marshes, Cordillera of Oaxaca, Mexico, at an elevation of 7500 feet above the level of the sea, *Galeotti*.— β . *Dominica*, *Dr. Imray*.—This may be a young state of *G. pubescens*, but the fructification is perfect. The fronds both in the Mexican and Peruvian specimens are small, including the stipes and the creeping caudex scarcely exceeding $1\frac{1}{2}$ foot high: but I rest the chief distinction on the leafy portion extending so little way down from the apex: or, to make myself perhaps more intelligible, the frond itself is only twice forked, in which respect it differs greatly from the preceding species.

25. *G. (Mertensia) farinosa*, Kaulf.; “frond pinnate, gemmæ abortive, pinnæ (branches) petiolate geminate lanceolate deeply pinnatifid, segments linear obtuse beneath ochraceous-farinose, capsules 4, costa beneath and stipes paleaceous.” *Kunze, Analect. Pterid. p. 6, t. 3.*

Hab. Trinidad, *Sieber*.—This plant is unknown to me except by Kunze's figure and description. I have placed it here from its great affinity with my *G. Mathewsii*. It is, indeed, owing to its proliferous propensity from the axil of the main dichotomy that it becomes, as characterized by Kunze, pinnate: so that the frond exactly corresponds with *M. Mathewsii*: and the only difference seems to be that the latter species has the under side clothed with deciduous cobwebby down, the present with an ochry farinaceous substance.

26. *G. Owhyhensis*, Hook.; upper part of the stipes much compressed and winged with 2 elevated ciliated lateral lines, frond 3 or 4 times dichotomous leafy, branches lanceolate acuminate incurved pinnatifid, rachis clothed principally at the margin with chaffy ciliated ferruginous hairs, segments linear horizontal broad at the base tapering towards the point acute loosely cobwebby on the costa and veins beneath, capsules 2—4.

Hab. Byron's Bay, Owhyhee, *Macrae*.—Allied, especially in the hairy rachis, to the following species, *G. longipinnata*; but the pinnæ, or ultimate branches, are much shorter and the segments on the lower forkings of the branches are as long as in the ultimate ones. It seems to be a large plant, the branches or pinnæ 2 inches to $2\frac{1}{2}$ inches broad, changing to a dark rusty brown colour in drying.

27. *G. longipinnata*, Hook.; upper part of the stipes much compressed hispid at the margins, frond twice dichotomous, branches of the first fork very short with 3—4 pairs of unequal segments, branches or pinnæ of the upper fork 2— $2\frac{1}{2}$ feet

long falcato-incurved lanceolate acuminate deeply pectinato-pinnatifid, rachis clothed with ferruginous chaffy hairs, the segments linear horizontal obtuse or emarginate, the recurved margins and base beneath clothed with ferruginous hairs, sori abundant, capsules 2—3.

Hab. Surinam, *Dr. Hostmann*, n. 238.—My solitary specimen of this is confined to the upper portion of a stipes with a twice-forked frond: the lower fork or dichotomy is not an inch long, but the branches or pinnæ of the upper fork are between 2 and 3 feet long, copiously and beautifully pectinato-pinnatifid, 3 inches in diameter. It has perhaps the longest pinnæ of any known species.

28. *G. flagellaris*, Spreng.; stipes rounded "chaffy" (*Spr.*) at length smooth, fronds repeatedly dichotomous, branches elongato-lanceolate pinnatifid, segments linear-lanceolate obtuse very glaucous beneath and there at the base of the costa clothed with ferruginous wool. — *Mertensia flagellaris*, *Bory. M. muricata*, *Sieber*.

Hab. Mauritius, *Sieber*, *Syn. Fil.* n. 18, et *Fl. Mixt.* n. 277. *Mr. Telfair*, *Bory*, *Bojer*. — A distinct and well marked species, the narrow leafy fronds copiously dichotomous, the lower branches spreading, the under side singularly glaucous. None of my specimens possess fructification, although I have many of them.

29. *G. (Mertensia) lævigata*, Willd.; stipes rounded or nearly so with a marginal wing on each side, frond 3 or 4 times dichotomous leafy, branches spreading, ultimate ones or pinnæ lanceolate acuminate pinnatifid, segments linear obtuse or retuse glabrous or slightly cobwebby at the costa paler but not glaucous beneath, capsules about 4. — *G. Javanica*, *Spr. Sticherus lævigatus*, *Pr.*

Hab. Java (*Willd.*), *Chas. Millett*, *Esq.*—This comes near the preceding but is truly distinct, and has broader pinnæ and narrower segments. There is an evident narrow wing on each side the stipes.

Hab. Lofty mountains of Java, *Blume*.—"Appears to differ from *G. Javanica*, Spr. (*Mertensia levigata*, Willd.) in the shorter and more obtuse segments of the frond, glaucous beneath." May not this be *G. flagellaris*?

32. *G. bifurcata*, Bl.; "stipes dichotomous subpaleaceous plane above, fronds bifurcate or dichotomous deeply pinnatifid even on the dichotomy (of the branches) of the stipes decurrent submembranaceous green beneath, segments linear obtuse or abrupt and emarginate downy on the costa beneath, rachis beneath sparingly paleaceous." *Bl. Fil. Jav. p. 250*.— β . plant everywhere quite glabrous. *G. bifurcata*, *J. Sm. Enum. Pl. Philipp. in Hook. Journ. of Bot. v. iii. p. 420*.

Hab. Java, on the mountain Burangrang, *Blume*.— β . Malacca, *Cuming*, n. 377. S. America, in the Caracas, *Linden*, n. 77.—It is extremely difficult, without authentic specimens or figures, to determine the exact species intended by authors of this genus. Mr. J. Smith may be correct in referring *Cuming's* plant (n. 377) from Malacca, hither: but as my specimens at least have not the slightest trace of down, I have ventured to make a variety of it, and even to consider a *Gleichenia* distributed in *Linden's* collections from Caracas to be the same. It differs from *Cuming's* specimens only in being larger, taken, it would appear, from a more vigorous plant.—Of the original species of *Blume*, that author observes that it differs from his *G. vestita* in the segments of the fronds not being decurrent upon the branches, in their being narrower, longer and of a thinner texture, and in the rachis being sparingly chaffy.

33. *G. hirta*, Bl.; "stipes dichotomous nearly round, branches slightly compressed, fronds dichotomous deeply pinnatifid even on the dichotomy (of the branchlets) half-decurrent coriaceous glaucous beneath, segments linear obtuse serrulate at the apex cobwebby and (sub)-tomentose at the costa beneath, rachis with chaffy hairs, capsules 3—5 subglobose sessile." *Bl. Fil. Jav. p. 250*.

Hab. Woody mountains of the Moluccas, *Blume*.

34. *G. rufinervis*, Mart.; "stipe rounded, frond repeatedly dichotomous glabrous beneath, petioles rounded apterous, segments from a broad base linear, the costa beneath clothed with rusty down, capsules (short pyriform) beneath the tomentum 6—8." *Mart. Crypt. Brazil. p. 111*.

Hab. Minas Geraes, Brazil, *Freireis*, (*Mart.*)—The above is all the account that *Martius* has given of this plant.

§ III. *Stipes simple and bearing simply forked pinnae* (see TAB. V. A.): or *dichotomous, the branches zigzag, bearing alternate branchlets each with simply forked, or only one pair of, pinnae. Segments never decurrent.*

35. *G. (Mertensia) glaucescens*, Willd.; stipes terete, branchlets with a decurrent line below the frond each terminated by a pair of lanceolate pinnatifid pinnae glabrous or nearly so glaucous beneath, segments linear entire obtuse emarginate,

capsules 8—10. — *M. pectinata*, Willd. — *Langsd. et Fisch. Ic. Fil. t. 30.* *M. dichotoma*, Sw. (*non Willd.*) *M. Brasili-ana*, Desv. *M. canescens*, Kaulf. *M. emarginata*, Raddi, *Fil. Brasil, t. 6.* *M. Hermannii*, Hook. et Grev. *Ic. Fil. t. 14* (*excluding the synonyms*). — β . pinnæ beneath clothed with ferruginous cobwebby down.

Hab. Frequent throughout Brazil and in S. America and the West Indies generally. Guatemala, Skinner. Mexico, Galeotti— β . Bahia, (*Herb. nostr.*)—I greatly erred in referring this to the *G. Hermannii* of Mr. Brown (*G. dichotoma*, Willd. and this work), from which it is at once distinguished by the absence of the pair of pinnules at the base of the forkings of the stipes. The character of the species is indeed very peculiar, and I do not know any with which it is likely to be confounded. It is, as other species are, liable to vary in the size of the pinnæ and in their relative length and breadth, and slightly in pubescence. The whole plant is so well marked that the species might with propriety form a section of itself: the following however may be considered a more simple form of the same section.

36. *G. nervosa*, Kaulf.; caudex creeping, stipes terete short simple bearing a frond consisting of one pair of broadly ovate acute pectinato-pinnatifid pinnæ, segments long linear narrow coriaceous acute nearly horizontal glossy and marked with prominent veins above, the margin revolute, glaucous beneath and densely clothed with rusty tomentum among which the capsules 3—4 in a sorus are imbedded. (Tab. V. A.)

Hab. Brazil. St. Catherine's, Chamisso, Sellow, Capt. Beechey.—A most distinct and well marked and beautiful species, and as far as I know only hitherto discovered at St. Catherine's of Brazil.

§ IV. *Stipes repeatedly di- or trichotomous, the ultimate branches bearing simply forked pinnæ: a pair of pinnæ also arise from the base of the di- or trichotomy of the branches (not of the frond). Segments never decurrent.*

Enum. Fil. Philipp. in Hook. Journ. of Bot. iv. p. 420. — β . pinnæ very broad, more or less caudate at the apex. *M. mucronata*, *Reinw. according to J. Sm. l. c.* p. 420. — δ . pinnæ very large, almost a span broad, some of the lower segments large and deeply pinnatifid others lobed or toothed.

Hab. East Indies and Malay Islands, frequent. Nepal, Sylhet, Tenasserim, Singapore, *Wallich*. China, *Beechey &c.* Ceylon, abundant, *Mrs. Col. Walker*. Malabar coast (with rigid fronds), *Dr. Wight*. Philippine Islands (fronds membranaceous), n. 270, *Cuming*, and n. 136 (fronds very rigid and segments broad, *G. rigida*, *J. Sm.*, our var. β .) Assam, with var. γ . *Mrs. Mack*. Pulo Penang, (*Hort. Soc.*) Mauritius, *Bouton*. Java, *Millett*. Anube, an island in the S. Pacific, *Nightingale*. Madagascar, *Dr. Lyall, Forbes, Bojer*. Fernando Po, *Vogel*, (*Niger Expedition*). Brazil, *Martius*; Diamond district, *Gardner*, n. 5337. Bahia, *Salzmann*. S. Brazil, *Tweedie*, n. 1119. Island of Taboga, near Panama (exactly *Martius' M. flexuosa*), *Barclay*. Trinidad, *Mr. Lockhart*.

I am literally overwhelmed with specimens of this plant from almost all the tropical parts of the world, and if the peculiar structure of the fronds be considered and allowance made for the usual variations, so general among ferns, it is an easily recognized species.

38. *G. Klotzschii*, Hook.; stipes rounded, ultimate branches with a pair of pinnæ and a pair also at the base of the dichotomy, pinnæ elongato-lanceolate acuminate pinnatifid, segments linear acute coriaceous glabrous glaucous beneath where the costa is clothed with long ferruginous hairs, lower external segments the smallest quite entire, capsules 4—6. (TAB. V. B.)—*Mertensia revoluta*, *Klotzsch*, *MS. in Herb. Reg. Berol. et in Herb. nostr. (not H.B.K.)*

Hab. Brazil, *Sellow*.—Perhaps this ought rather to be considered a variety of the preceding than retained as a distinct species. My specimen is but imperfect; but it evidently belongs to this section. The pinnæ are about a foot long, rigid, coriaceous. The chief character of the species, if species it may be called, lies in the copious long dark ferruginous hairs which clothe the rachis of the segments beneath.

Dubious Species.

39. *G. teguis*, Presl; "affinis videtur *G. glaucescenti*, *Humb.*" 40. *G. nitida*, Presl; "affinis *G. dichotomæ*." 41. *Mertensia remota*, Kaulf.; "frond dichotomous branched, primary gemma proliferous, pinnæ geminate elongate linear-lanceolate and as well as the branches pinnate, pinnules linear glaucous beneath, sori minute." Hab. Brazil, *Kaulf.* 42. *M. tomentosa*, Sw.; probably the same with *G. pubescens*. 43. *M. fulva*, Desv. 44. *M. elata*, Desv. 45. *M. truncata*, Willd.; "stipes dichotomous naked, fronds pinnate, pinnæ glabrous of the same colour beneath truncate at the apex, decurrent on the stipes through all the dichotomies," *Willd. Act. Holm.* 1804, p. 169, t. 5, f. A. 46. *M. Cuming-*

iana, Presl.—There is a *M. Magellanica* quoted by Desvaux as described by Poiret in Encycl. Bot. Suppl. 3, p. 669; but on referring to that work there is no such species mentioned.

SUBORD. II. — POLYPODIACEÆ, Br.

Sori dorsal, often near, or at, the margin, various in form, sometimes constituting an uniform linear or spreading mass, naked or furnished with an involucre. *Capsules* one-celled, with a longitudinal or oblique elastic articulated generally incomplete *ring*, bursting transversely and irregularly.—*A most extensive suborder, but of which, as it appears to me, all the groups or tribes are so connected together by habit and structure, as to form in themselves one natural division, not affording subdivisions of equal value with Gleicheniaceæ for example. They inhabit almost every part of the world from the tropics to the arctic and antarctic regions where extreme cold prevails, and are exceedingly variable in size and appearance, including as the suborder does, the largest Tree-Ferns, and the smallest herbaceous species.*

TRIBE I. CYATHEÆ, Gaud.

Sori globose, situated upon, or at the forking of, a vein. *Capsules* numerous, sessile or stalked, upon an elevated receptacle, often mixed with hairs, obovate more or less compressed, furnished with a broad, generally oblique, frequently complete elastic *ring*. *Involucre* sometimes covering the whole sorus, having its origin from beneath and bursting irregularly or with a circular opening, frequently cup-shaped, entire or more or less lobed or lacinated, sometimes wholly wanting. — Arborescent Ferns *inhabiting tropical or subtro-*

poundly pinnate. Stipes frequently aculeated. HOOK. GEN. FIL. TAB. 2 AND 23.

Subgen. I. NOTOCARPIA, Presl. *Sori situated upon a vein or veinlet, not at the forking.* Schizocœna, J. Sm. HOOK. GEN. FIL. TAB. 2.

1. *C. sinuata*, Hook. et Grev.; fronds simple lanceolate very much elongated sinuated at the margin.—*Hook. et Grev. Ic. Fil. t. 106.*

Hab. Ceylon, *Dr. Emerson, Mrs. Col. Walker.*—The caudex of this is about an inch in diameter, clothed with the dark brown almost black bases of the stipes of the old fronds, bearing a crown of elegant simple long wavy fronds at the top. These have a stout costa. The veins are pinnated and the veinlets bear the sori near the middle. Involucre globose or slightly depressed, bursting very irregularly at the top, so as to become cup-shaped with a very uneven margin. Receptacle globose. Capsules on long stalks.

2. *C. Brunonis*, Wall.; fronds pinnate, pinnæ oblongo-lanceolate acuminate with a long narrow point sinuato-crenate often serrated at the margin above.—*Wall. Cat. n. 179. Hook. Gen. Fil. t. 2. C. longifolia, Wall. in Herb. 1823.*

Hab. Pulo Penang, *Dr. Wallich, Lady Dalhousie. Malacca, Cuming. n. 378.*—This is a truly beautiful fern, but of which the caudex is unknown to me, nor is it described in Dr. Wallich's MS. volumes of ferns, which I owe to that gentleman's liberality. The stipes is one or two feet long; the frond 2—3 feet, alternately pinnated: pinnæ 6—8 inches long, between membranous and coriaceous, obliquely truncated at the base and shortly petiolate, tapering into a narrow acumen at the point. Sori copious, from the middle of the forked veins or veinlets. Involucre of the same structure as the preceding, but in age more lacerated and lobed. Capsules stalked.

3. *C. Mexicana*, Schlecht.; unarmed, rachis and costa above pubescenti-scabrous, fronds bipinnate, pinnules lanceolate acuminate pinnatifid glabrous, segments oblong slightly falcate rather obtuse serrated, sori confined to the lower half of the segment, situated upon the veins which are almost wholly simple or below the fork when divided very rarely indeed at the forking, involucre exceedingly thin and fragile almost resembling a thin coat of varnish when perfect soon obliterated.—*Schlecht. in Linnæa. v. v, p. 616. Presl. Tent. Pterid. t. 1, f. 8 (very accurate as to the situation of the sori). Martens et Galeot. Fil. Mex. p. 79 (where read n. 6335 instead of 6334). Galeotti Herb. Mex. n. 6335 (not Hook. in Benth. Pl. Hartweg. p. 54, n. 412).*

Hab. River-sides, forests of Xalapa, Mexico, *Schiede et Deppe. Galeotti.*—This remarkable fern seems to have been found only at or near Xalapa. It is remarkable in having the habit of the species of the following sub-genus, but bearing the sori almost always on simple veins, or below the forking in the rare instances of their being divided, sometimes but very

seldom at the forking, and it shows how careful we ought to be in not laying too much stress on the value of the venation and position of the sori, in distinguishing genera of ferns. Galeotti speaks of it as inhabiting, along with *Allophila pruinata*, the borders of brooks in the thick forests of Kalapa and Totutla, at an elevation above the sea of 3500 to 4000 feet.

Doubtful Species of this Section.

4. ? *C. lævigata*, Willd. *Herb.*; "fronds bipinnate, pinnules sessile linear-lanceolate subcordate at the base crenate at the apex, stipes smooth, rachis tomentose, sori subcostal." *Kaulf. Enum. Fil. p. 256.*—*C. Madagascarensis*, *Kaulf. l. c. p. 257* (according to Presl).

Hab. Madagascar, *Petit Thouars.*—"Pinnules an inch long, three lines wide, glabrous; veins bi-trifurcate." Of this and the two following I know nothing from authentic specimens. Presl places them in his section of *NEUROCARPIA*; but the subcostal sori described by Kaulfuss in this and the next species, and especially the remark on the present one, "Sori placed on the division of the veins," would lead to a different conclusion.

5. ? *C. marattioides*, Willd. *Herb.*; "fronds bipinnate (?), pinnules petiolate lanceolate acuminate cordate at the base serrated at the apex, rachis hairy above, sori subcostal subcontiguous." *Kaulf. Enum. Fil. p. 256.*

Hab. Madagascar, *Petit Thouars.*—"Lower pinnules an inch long, upper gradually larger, 2 inches long $\frac{1}{2}$ an inch wide. Veins bi-trifurcate."

C. grandifolia, Willd. and *C. speciosa*, Willd. will be found under *Hemitelia*.

Subgen. II. *EUCYATHEA.* *Sori in the axils of the forks.* HOOK.
GEN. FIL. TAB. 23.

Obs. Perhaps in the whole range of the great family of Ferns there is not a group more difficult of accurate determination than are the species of this section of *Cyathea*. They have arborescent trunks, whose appearance and even external form are only known to travellers who have the opi-

vate collection, and from works where they have been the most carefully described.

* *Species of the West Indies, Mexico and South America.*

6. *C. arborea*, Sm.; unarmed or with few distant short prickles on the main rachis and stipes which are frequently downy, fronds bipinnate, pinnules lanceolate elongate much acuminate deeply pinnatifid glabrous or with the rachis and costa hairy paler beneath, involucre coriaceous cup-shaped in age a little contracted upwards opening with a beautifully even margin. — *α. nigrescens*; rigid, stipes rachis and upper side of the frond almost black when dry, involucre chartaceous nearly black. *Polypodium arboreum*, L.—*Plum. Fil. t. 1 (reduced figure of the entire plant), and t. 2.*—*Disphenia arborea*, Presl.—*C. Guadelupensis*, Spr. (according to Presl). *C. bisulca* (*C. affinis in text*), Schkh. *Fil. t. 132, b, and 132, c, according to Kaulf.* — *β. pallida*; less rigid, stipes rachis and upper side of the frond paler, involucre membranaceous brown. *C. elegans*, Hew. in *Mag. of Nat. Hist.* 1838, p. 466. *Hook. Gen. Fil. t. 23.*

Hab. Jamaica, Hispaniola, Martinique, St. Vincent's, and probably the West-Indian Islands generally. Ilhios, Brazil (*Moricand in Herb. nostr. under the name of C. Sternbergii*).—In consequence of the imperfect figures and descriptions of the early authors, it cannot be clearly ascertained what they meant by their *Polypodium arboreum*. Yet Plumier's representation of the involucre is so characteristic that I think I cannot do wrong in considering our present plant to be the same: and that this is the *Cyathea arborea* of Sir J. E. Smith, I have the authority of a specimen from himself which cannot be mistaken. The essential character, as it appears to me, is to be looked for in the firm texture and beautifully regular margin of the cup-shaped involucre in age, in my var. *β.*, indeed, becoming thinner and consequently somewhat more fragile, yet still different from that of any other species with which I am acquainted, and especially in the depth of the cup and its remaining so perfect and regular in form, after the capsules have fallen away. Occasionally the receptacle has been seen to be bifid, and then this plant becomes *Disphenia* of Presl.

7. *C. Serra*, Willd.; more or less muricated, fronds bipinnate, pinnules lanceolate deeply pinnatifid much acuminate, segments linear-oblong acute serrated falcate glabrous or the costa and rachis slightly hairy, sori generally covering the whole of the segments, involucre very thin and membranaceous at length forming a shallow hemispherical cup entire or more or less torn at the margin. (TAB. IX. A.) *C. Guadelupensis*, Spr. in *Nov. Act. Acad. Nat. Cur.* 1821, p. 233. *Hemitelia Serra*, Desv.

Hab. Caracas, *Bredemeyer* (in Willd.) Jamaica, *Dr. Bancroft*. St. Vincent, *Rev. L. Guilding*. Guadeloupe, *C. S. Parker, Esq.* Serra de Batatho, Brazil, *Gardner*, n. 2990. — I am aware that Sprengel unites the *C. Serra*, and even his own *C. Guadelupensis*, to *C. arborea*. I find, however,

the present plant, which I consider distinct from *arborea*, so entirely to agree with Willdenow's description, that I do not hesitate to figure and describe it as such. The sori are very different from those of *C. arborea*, always pale brown (as indeed the whole plant is, when dry) even in perfection; the upper half of the involucre has rather the appearance of a coat of varnish than of a firm membrane, and this breaks away or disappears with the capsules, and only a very thin and shallow fragile cup remains at the base, as shown in our figure. The stipes and rachis are never dark-coloured, which is frequently the case in *C. arborea*.

8. *C. Imrayana*, Hook.; slightly aculeate, stipes more or less clothed with ferruginous down, general and partial rachis especially beneath hispid with lacinated scales, fronds bipinnate, pinnules lanceolate acuminate serrate pinnatifid, segments oblong or linear subfalcate generally nearly entire, sori covering most of the segments, involucre globose membranaceous fragile bursting very irregularly. (TAB. IX. B.)— β . *subnudata*; main rachis with the scales deciduous.

Hab. Couliaban Mountain, Dominica, *Dr. Imray*. Jamaica, *Dr. Bancroft*. — β . Jamaica, *Wiles, Bancroft*.—This indeed, like the preceding, varies in the length and breadth of the pinnæ and segments: and the scaly covering of the rachis, though remarkable in some specimens, is scarcely visible upon that of others, from its deciduous character, as may be supposed. The involucre is very fragile, and, when burst, extremely irregular, thin and membranaceous, never opening with the thin even margin of *C. arborea*.

9. *C. muricata*, Willd.; "fronds bipinnate, pinnules oblong-lanceolate acuminate pinnatifid, segments oblong obtuse crenate, rachis and arboreous caudex aculeated." *Willd. Sp. Pl. v. iv. p. 497, (not of Sieber)*. *Kaulf. Enum. Fil. p. 259?* "*Plum. Fil. p. 5, t. 4.*"

Hab. Martinique, *Plumier*.—I know nothing of this. Willdenow seems to have taken it up solely from the figure of Plumier, which has no fructification; thus even the genus must be doubtful. Kaulfuss quotes Sieber's *C. muricata* as the plant of Willdenow. This may be; but if so it is

falcate obtuse serrated hairy beneath at the costa and the partial rachis, sori biserial mostly at the base of the segment, receptacle globose" ("at length bipartite," *Presl*). *Spreng. Syst. Veg.* p. 126. *Kaulf. Enum. Fil.* p. 255. *Disphenia aculeata*, *Presl, Tent. Pterid.* p. 55, t. 1, f. 13.

Hab. Hispaniola. Portorico, (*Spreng.*)—It is impossible, without an inspection of Willdenow's herbarium, to determine Sprengel's plant. *Presl's* figure of the leaflets is very like *C. arborea*: but the receptacle and involucre are such as I have never seen (the former deeply bipartite, larger than, and exserted much beyond, the firm and even edge of the involucre) and certainly do not correspond with *Kaulfuss's* remark, which would appear to be made on Willdenow's specimen. He says "it differs from *C. arborea* in the rachis and pinnules being hairy beneath, that the receptacle is globose, and the involucre very thin and caducous."

12. *C. cuspidata*, *Kze.*; "frond bipinnate, pinnules alternate subsessile divergent oblong cuspidate unequal at the base deeply pinnatifid beneath with minute white" (deciduous) "scales, segments linear-falcate the lower fertile portion contracted crenulate at the apex and acute, sori costal, partial rachis furrowed above paleaceo-hirsute" (at length glabrous) "shining beneath, universal rachis rough above shining beneath, stipes hairy at the base." (TAB. XII. A.) *Kze. Syn. Pl. Crypt. Pæpp.* p. 101. *Mart. Ic. Pl. Crypt. Braz.* p. 78.

Hab. Marshy woods of Maynas, Peru, *Pæppig.*—The figure here given is taken from one of *Pæppig's* own specimens. It is assuredly allied to *C. arborea*, as *Kunze* remarks, but especially to some of the varieties with narrow elongated segments; yet the involucre seems different, very thin and membranaceous, bursting irregularly and not forming a cup beneath the sorus. *Martius* compares it to *C. excelsa*, a Mauritius species with a very different habit.

13. *C. divergens*, *Kze.*; "frond bipinnate pendulous, pinnæ alternate petiolate very remote, pinnules alternate much petiolated divergenti-divaricate lanceolate acuminate deeply pinnatifid, the segments oblong falcate acute serrated on the reflexed margin, sori costal numerous contiguous, rachis hairy above scabrous beneath, stipes chaffy above aculeated beneath." (TAB. XI. A.) *Kze. Syn. Pl. Crypt. Pæpp.* p. 100. *Mart. Ic. Pl. Crypt. Braz.* p. 78.

Hab. Mountains of Pampayaco, Peru, *Pæppig.*—*Kunze* makes no remarks on the affinities of this species. *Martius* alludes to its resemblance to *C. arborea*; but to me it appears to be very distinct in the size and form of the segments and in the very petiolated pinnules, as may be seen by our figure taken from an original specimen.

14. *C. equestris*, *Kze.*; "fronds bipinnate, pinnules remote alternate petiolate the lower ones divaricated lanceolate acuminate equal at the base pinnatifid, the segments oblongo-falcate obtuse serrated at the apex, the lower ones fertile, sori

subcostal irregular, costa and partial rachis hairy and rough above glabrous beneath." *Kze. l. c. p. 100.*

Hab. Mountains near Pampayaco, Cerro de Cristobal, Peru, *Peppig.*— This is only taken up by Kunze, who speaks of it as very different from any previously described species.

15. *C. vestita*, Mart.; "frond bipinnate, stipes and rachis shortly and acutely aculeated, partial rachis and nerves with rusty hairs, pinnules pubescenti-villous beneath linear-acuminate deeply pinnatifid, the segments falcato-lanceolate rather acute crenulate with 6—10 sori in each." *Mart. l. c. p. 75, t. 52.*

Hab. Brazil. Woods of the Province of St. Sebastian and St. Paul, *Martius.* Serra dos Piloos, *Pohl.* Serra de Araripe, *Gardner, n. 1907.*— *Martius* compares this with *C. aculeata*, Willd. and Kaulf., but observes that it is different, especially in the more acuminate segments. *Mr. Gardner's* plant above quoted, which agrees with this, has a caudex 20—30 feet high, and an involucre very thin, membranaceous and brittle.

16. *C. hirtula*, Mart.; "frond bipinnate, stipes sharply aculeate and the rachis with brownish hairs and sparingly paleaceous, pinnules on each side slightly pubescenti-hirsute linear acute pinnatifid, the segments ovato-lanceolate rather obtuse subcrenulate or entire, sori in each segment few situated at the base." *Mart. l. c. p. 76, t. 53.*

Hab. Serro do Mar, Province of Bahia, Brazil, *Prince de Neuwied.*— *Martius* notices the affinity of this to his *C. Grevilleana* (*l. c. Pl. Bras. p. 78*) from Jamaica, but the latter "differs in the larger and more sparingly pubescent fronds, in the rachis and nerves not patenti-hirsute but strigillose in the acuminate pinnules, in the lower segments being distinct, and in the more numerous sori."

17. *C. Schanschin*, Mart.; "frond bipinnate, stipes and rachis sharply aculeated, and with the rachis and nerves strigoso-

characters; but we can happily refer to published species and an excellent figure for a proof of the plant here intended. Martius, who says it is called *Schauschin* or *Xanzim* in South Brazil, observes that "it differs from *C. vestita* in its clothing (indumentum), in the stipes and rachis being aculeated, and in the form of the pinnules and segments; and from *C. hirtula* in its larger size, stouter aculei, absence of hairiness and form of the pinnules, which are not acute but much and long-acuminated."—Kunze, however, compares the species with *C. aculeata*, Willd. Herb. and Kaulf., and with *C. arborea*, Sm. The latter, he says, "is recognized by its linear segments, serrated throughout the whole margin and acute, the costa with white chaffy scales at the base and the receptacle bipartite: the former by its narrower and more obtuse pinnae, linear segments with the whole margin serrated, and the aculeated stipes."

18. *C. Gardneri*, Hook.; frond bipinnate, stipes and main rachis nearly glabrous, pinnules gradually and at the apex much acuminated pinnatifid, segments oblong obtuse falcate serrated hairy beneath especially on the costa and nerves, lowest ones adnato-decurrent, sori covering the whole segment, involucre almost globose pale brown opaque with a dark mammillate point at the apex at length bursting with a small aperture at the top. (TAB. X. B.)

Hab. Near Arrial das Mercedes, Brazil; n. 5328, and Morro Velho, n. 5333, Gardner.—This is a rather soft and flaccid species, more easily recognizable by the eye than described in words. The sori are very copious on the segments; the involucre opaque, firm, not readily bursting, but, while entire, tipped with a dark-coloured umbo.

19. *C. Beyrichiana*, Pr.; stipes aculeate, frond bipinnate, rachis and costa more or less downy, pinnules lanceolate acuminate, segments linear-oblong acute subserrate slightly falcate, sori copious, involucre apparently bursting vertically on the upper side large loose membranaceous persistent at length hemispherical. *Presl, Tent. Pterid. p. 55 (name only). Hook. Ic. Pl. v. vii. tab. 623. Alsophila stipulacea, "Beyrich, Herb."*

Hab. Brazil, *Sellow, Beyrich*. Rio Janeiro, *Gardner*, n. 135.—My first knowledge of this plant was derived from a fine specimen sent to me by Dr. Klotzsch from the Royal Berlin herbarium; and it is very remarkable in the large persistent involucre, not bursting at the top all round, but dehiscing as it were vertically from the top outwards, towards the apex, or more correctly, obliquely towards the margin of the segments. The stipes is pale brown, minutely tubercled and also aculeated, at the base clothed with long brown chaffy hairs. The frond is dark green above, much paler beneath, in texture between membranaceous and coriaceous. Mr. Gardner's plant seems to be exactly the same, his specimen is a little more advanced in age, and of a yellower tint; but the structure of the involucre is similar, and may perhaps be considered as more analogous to that of *Hemitelia*, but it is difficult to decide without an examination of young fruit. In the earliest state of the sorus which has come under my observation, the involucre covers it entirely, but the point of attachment appears to be only on the lower half of the sorus next the costa. *C. Walkeræ* from Ceylon has a similar structure in its involucre, (see n. 33).

20. *C. Grevilleana*, Mart. ; “frond bipinnated, rachis and nerves above strigillose, beneath the nerves and nervules minutely chaffy and slightly hairy, pinnules linear-lanceolate acuminate sessile deeply pinnatifid, segments linear or sublanceolate nearly straight acute crenulate, sori in the lower part of the segments 4—10.” *Mart. l. c. p. 78.*

Hab. Jamaica, (*Greville*).—As a Jamaica plant, and communicated, which it is, by Dr. Greville to Martius, I ought to be acquainted with it; but brief specific characters, without figures or full diagnoses, will not suffice for distinguishing the species of *Cyathea* or allied genera, and thus the catalogue of dubious species must be large. Martius does indeed observe of this that it resembles *C. canaliculata* (a Mauritius species very unlike any Jamaica one that I have seen), but that this latter “may be known from it by its (larger) and more acuminate pinnæ, the segments almost entire, the sori crowded on all the segments,”—and that *C. Schanochin* differs in “the stipes, rachis and laminæ beneath being downy with true hairs, in the segments being more curved and more obtuse, in the lower ones of each pinna being coherent, which in *C. Grevilleana* are altogether distinct.”*

Dubious Species of the West Indies, Mexico and South America.

21. *C. Delgadii*, Pohl ; Brazil.

22. *C. Sternbergii*, Pohl ; Brazil. — This and the preceding appear to be noticed and perhaps described in Sternberg’s ‘*Flora Orbis Primig.*’ but, if so, I have no access to the work.

23. *C. Tussacii*, Desv. ; “partial fronds triplicato-pinnate, pinnules adnate linear falcate obtuse entire, sori on each side somewhat solitary at the base of the pinnules, rachis chaffy, caudex arboreous.” *Desv. Soc. Linn. Pur. v. ii. p. 323.* Jamaica, *De Tussac*. “Affinis *C. glauca*, sed discolor nec glauca.” *C. glauca*, it may be remarked, is a Mauritius species, and I have always observed there is little similarity between the *Cyathea* of the eastern and western world. Probably the

26. *C. Sellowiana*, Pr. All that I can find mentioned of this by Presl, is, that it is identical with "*C. aculeata*, Herb. Reg. Berol. Bras. n. 88."—Brazil.

** *Species of South Africa.*

27. *C. Drègei*, Kze.; unarmed, fronds bipinnate coriaceous, pinnules lanceolate acuminate pinnatifid glabrous above paler below, and rufo-tomentose on and near the rachis beneath, segments oblong-ovate subfalcate obtuse nearly entire, sori on the lower half of the segment immersed in rufous wool, involucre fragile forming an hemispherical cup, then breaking away irregularly. (TAB. X. B.) *Kze. in Linnæa*, v. xiii. p. 153, *et in v. x. p. 551.*— β . paler, segments serrated the wool beneath tawny, main rachis woolly. (TAB. XVII. A.)

Hab. S. Africa; rocky valley at the great cataract between Omsamwaho and Omsamcaba, *Drège*. Macalisberg, S. lat. 26°, *Burke*.—This has a caudex only 3—4 feet high, according to *Drège*. It has dark-coloured fronds when dry, paler beneath, a reddish stipes and rachis and very rufous wool, in which the sori are immersed: the rest glabrous. *Drège* has the credit of first discovering a true *Cyathea* in Africa. The same species, and also the following, were detected by Mr. Burke, while collecting for Lord Derby.

28. *C. Burkei*, Hook.; stipes tubercled with small aculei, and at its base and that of the main rachis clothed with glossy brown chaffy scales, frond bipinnatifid membranaceous, pinnules lanceolate obtusely acuminate bipinnatifid scarcely paler beneath, rachis partially woolly, glabrous above, segments oblong-ovate obtuse scarcely falcate entire, the costa hairy at the base, sori few often solitary, involucre globose remaining until much advanced, with an irregular opening at the top. (TAB. XVII. B.)

Hab. Macalisberg, S. Africa, *Burke*.—This has a dark mahogany-colored stipes and main rachis, clothed with short obtuse points or aculei, and with conspicuous glossy chaffy scales at the base of the main rachis and stipes,—membranaceous, dark-coloured fronds scarcely at all paler beneath, and much fewer and less woolly hairs among the sori than the preceding; still, future observations may prove that this is but a state of *C. Drègei*, and that only one species of the genus has yet been discovered in Africa.

*** *Species of Eastern India and Islands, the Pacific Islands and New Zealand.*

29. *C. canaliculata*, Willd. Herb.; unarmed or indistinctly tubercled, fronds bipinnate coriaceous, pinnules (large) broadly lanceolate acuminate deeply pinnatifid frequently again pinnated especially below glabrous (main rachis channelled when dry) articulated on the stipes, segments or ultimate pinnules linear-oblong obtuse more or less serrated, veins copi-

ous frequently twice or even thrice forked, sori occupying most of the segment at some distance from the costa, involucre membranaceous durable but bursting very irregularly. (TAB. XI. B.) *Spr. Syst. Veg. v. iv. p. 126.* *C. Borbonica*, *Poir.* *C. Mascarena*, *Sw. Mag. Nat. Berl.* 1811, n. 328 (according to *Desvauz*).— β . rachis very dark-colored. *C. melanocaula*, *Desv.*— γ . *latifolia*; pinnules a foot long, 3 inches broad, pinnated almost to the summit. (TAB. XIII. A).

Hab. Isles of France and Bourbon (*Poiret*), *Bojer*, *Sieber* (*Syn. Fil. n. 59*, and *Fl. Mixta n. 305*). Madagascar, *Desvauz*.— γ . Mauritius, *Bojer*, *Sieber* (*Fl. Mixta n. 304*).—A very distinct species, of which Prof. *Bojer* says that the caudex is much shorter than in the following (*C. excelsa*), and the frond far broader and thicker. It is the finest of the genus with which I am acquainted; the pinnules being 8—10 inches long and 2½ inches broad in the usual state of the plant; but some are more than a foot long and 4 inches broad, as in our var. γ . Sometimes the stipes and rachis become black, probably the effect of age, and then it is the *C. melanocaula*, *Desv.*

30. *C. excelsa*, *Sw.*; unarmed, fronds bipinnate rather membranaceous but firm, pinnules glabrous lanceolate much acuminate pinnatifid pinnate at the base, segments oblong, obliquely subacute serrated destitute of scales, veins simply forked below the middle, sori near the costa, involucre membranaceous glossy very fragile bursting irregularly often into lobes rarely bifid. (TAB. XII. B.)—*Sw. Syn. Fil. p. 140 and p. 367.* *Pr. Tent. Pterid. tab. 1. f. 15.* *C. arborea*, *Bory*, (*not Sm.*)

Hab. Bourbon, *Bory*, *Carmichael*. Mauritius, *Bojer*.—Stipes and rachis pale. Fronds, when dry, rather dark green, not verging to brown. Nerves very slender, but little prominent, once forked below the middle, and the sori are by no means so near the costa as in the following very distinct species. *Swartz* doubts, however, if this be really distinct from *C. medullaris*.

below naked or furnished with small concave deciduous scales. Pinnules as it were jointed upon the rachis and at the base pinnated, the segments or pinnules being distinct, contracted at the base so that their form is elliptical. The texture is very firm, rigid, coriaceous, when dry inclining to a rich brown colour, paler beneath. The veins are numerous, sunk, forked from the very base, and the sori being wholly confined to the axil of the lower fork are consequently placed close to the costa. Involucres membranous, but firm and opaque, bursting as it would appear rather irregularly on the superior half vertically, so as to be irregularly two-lobed: this large and broad involucre is then reflexed upon the costa, but still covering in a measure the sorus on the lower side in the form of a broad concave hood. As my specimens have all very advanced fruit, I cannot say with certainty that the involucre completely surrounds the sorus in the young state; but the probability is that it does, and that in structure it is analogous to that of *C. Beyrichiana*. I do not look upon it as a dimidiate involucre, or I should place it in *Hemitelia*.

32. *C. spinulosa*, Wall.; stipes and lower part of the rachis much and strongly aculeated, fronds bipinnate flaccid and membranaceous, pinnules sessile lanceolate acuminate pinnatifid, segments oblong acute serrulate glabrous with a few minute scattered deciduous scales sometimes on the costa beneath (especially on the barren frond), sori close to the costa copious, involucres globose membranaceous fragile glossy soon breaking down into a jagged irregular cup. (TAB. XIV. C.) *Wall. in Herb.* 1823. *Cat. n.* 178.

Hab. Nepal, *Wallich*. Madras Peninsula, *Dr. Wight*, n. 149. — This species is nearly allied to *C. excelsa*, but is of a more membranaceous texture, and the stipes and main rachis are closely and strongly muricated.

33. *C. glauca*, Bory; "fronds triplicato-pinnate, pinnules glaucous beneath oblong obtuse entire the lower ones dentate from the base to the middle, sori solitary at the base of the pinnules, rachis tomentose, stem arboreous." *Willd. Sp. Pl. v. v. p.* 493.

Hab. Bourbon, *Bory de St. Vincent*. — This species I have never seen, but it seems to be known to Willdenow and Kaulfuss. The former says that the secondary pinne are 2 inches and more long, and that the glaucous hue of the underside is due to a covering of excessively minute scales, only visible under a microscope. Kaulfuss states that the rachis is paleacetomentose, and that the sori at the base of pinnules are generally 2 rarely 3 together.

34. *C. crenulata*, Bl.; "arboreous unarmed, fronds bipinnate (or tripinnatifid) coriaceous, pinnules lanceolate acuminate deeply pinnatifid chaffy at the costa beneath, segments linear-falcate crenulate at the margins obtuse and entire at the apex, sori (3—8) subconfluent close to the costa, rachis above tawny-tomentose nearly glabrous and rough with minute dots beneath." *Blume, Enum. Pl. Jav. Fil. p.* 244.

Hab. Moist mountain woods, Java, *Blume*. "*Cyathea canaliculata* differs in the segments only being toothed at the apex."

35. *C. Javanica*, Bl.; "arboreous unarmed, fronds bipinnate subcoriaceous, pinnules lanceolate acuminate deeply pinnatifid bullato-squamulose at the base of the costa, segments linear-subfalcate obtuse crenulate or entire plane, sori 2—5 parallel to the costa, secondary rachis paleaceo-tomentose, primary one asperulous with minute bristles." *Bl. l. c. p. 245.*— β . *rigida*: frond more rigid, sori (2—8) regularly arranged. *Bl. l. c.*

Hab. Woods on the mountains of Java, *Blume.*—"From *C. affinis*, Sw. this differs in the substance of the frond, in the plane segments and color of the stipes. It varies with the rachis tomentose or glabrous above."

36. *C. ? Celebica*, Bl.; "fronds tripinnate coriaceous glauco-sericeous beneath, pinnules linear-lanceolate acuminate, secondary pinnules linear-subfalcate rather obtuse crenulate at the apex, truncate and sessile at the base, common rachis furfuraceous sparingly and slightly aculeated." *Bl. l. c. p. 245.*

Hab. Woods of the Islands of Celebes and Ternate, *Blume.*

37. *C. integra*, J. Sm.; unarmed, fronds bi-tripinnate, pinnules broad-lanceolate acuminate pinnatifid rather more than half way to the rachis, segments broadly ovate acute slightly serrated glabrous, sori mostly below the incisions at a considerable distance from the costa, involucre membranaceous at first hemispherical very thin and evanescent at the apex at length breaking into 4 or 5 rather regular spreading lobes. *Hook. Ic. Pl. v. 7. t. 638. J. Sm. En. Fil. Philipp. in Hook. Journ. of Bot. v. iii. p. 419 (name only).*— β . *petiolata*; pinnules mostly petiolated. *Hook. Ic. Pl. v. 7, t. 638, f. 2. C. petiolata, J. Sm. l. c. p. 419.*

Hab. Amboyna (Herb. Hook. from *P. B. Webb, Esq.*) Luçon, *Cuming, n. 120.* β . Isle of Mindora, Philippine Islands, *Cuming, n. 359.*—Mr. J.

fid, sori copious almost as broad as the narrow space between the costa and margin occupying a lobe or tooth which when dry has the margins very revolute, involucre globose membranaceous glossy soon breaking down into 3 or 4 irregular lobes.—*Schkuhr, Fil. f.* 138, (*good*). *Polypodium medullare, Forst.* *Sphæropteris medullaris, Bernh. in Schrad. Journ.* 1800, II, p. 122, t. 1. *C. affinis, Sw. Syn. Fil. p.* 141, (*not of Schkuhr, Fil. t.* 132, b, and 131, d—h). *Polyp. affine, Forst.* *C. extensa, Sw. Schkuhr, Fil. t.* 132, a—c, (*good, as representing the barren state and the ciliated scales*). *Alsophila extensa, Desv.*—*β. integra*; segments nearly entire.—*γ. tri-pinnata*; pinnules again pinnated except at the apex, pinnules quite entire. *C. Mertensiana, Bongard, MS. in Herb. Imp. Acad. Petersb. et in Herb. nostr.* *Alsophila extensa, Hook. et Arn. in Bot. of Beech. Voy. p.* 76.

Hab. New Zealand (where it is called “Mamagu”), probably confined to the northern island, *Forster and others.* Norfolk Island, *Forster in Endlicher.* Pacific Islands, *Forster.* New Guinea, *Barclay.* Otaheite, *Du-perry's Voy.*—*β.* New Zealand, *Colenso.*—*γ.* Bonin, *Dr. Mertens.* Coral islands, *Capt. Beechey.*—This is probably a more extensively diffused species than botanists are generally aware, and by no means confined to New Zealand, where however it forms a common article of food with the natives. ‘*Hæc felicitis species*” says Forster, “in sylvis Novæ Zelandiæ frequens est; et apud incolas *Mamagu* dicitur; hi radicem et caudicis inferioris medullam costam comedunt; hujus enim substantiæ mollis et pulposæ sapor quandam similitudinem cum rapæ sapore habet et quidem hinc præstat ita ut ad medullam *Saguari arboris (sago)* accedat. In medullari substantia hujus *Polypodii succus glutinosus rubescens abundat.*” Like other *Cyathecæ*, the fronds are very variable in the form and margin of the segments. The stipes and rachis are remarkable for the glandular, glossy, raised points, resembling a resinous exudation dried and hardened the instant it had pierced the epidermis. I quite think the *Cyathea affinis* and *C. extensa*, gathered by Forster in the Pacific Isles, may be safely referred to this species, especially if, as I presume, the figures of Schkuhr which I have quoted here, are to be relied on, and more particularly if the fruit may be trusted as belonging to it: but *that*, on account of the bifid receptacle (a character probably by no means confined to one species), Kaulfuss has quoted under *C. arborea*. That fruit has the true cup of *Cyathea*. Mr. Brown, however, refers *C. extensa* to *Alsophila*, in which he is followed by Presl. Bory, in the ‘*Botany of Belanger's Voyage,*’ gives *C. extensa* as an inhabitant of high mountains of Java.

39. *C. dealbata, Sw.*; unarmed, frond bipinnate, rachis everywhere clothed with ferruginous deciduous down, pinnules narrow lanceolate acuminate deeply pinnatifid very glaucous beneath, sometimes again pinnate at the base, segments oblong acute falcate serrated, sori copious situated half way between the costa and margin, involucre globose membranaceous fragile soon breaking down in a very irregular

manner, the base above often remaining a shallow cup. *Rich. Fl. Nov. Zel. p. 77, t. 10.*

Hab. New Zealand. Northern and middle islands, *Forster and others. Poghna* of the natives.—This, so far as I know, is wholly confined to New Zealand, and is a very beautiful fern, rising with a caudex or trunk 10—15 feet high, crowned with a noble tuft of fronds white with glaucous farina beneath. Mr. Edgerley remarks that this fern is also eaten by the natives, and probably in the same way as the *C. medullaris*.

Dubious species of the East Indies.

40. *C. Rumphii*, Desv. *Polypodium arboreum*, *Lour. Fl. Cochin. excl. syn. Linn. Rumph. Amb. v. ii. p. 64, t. 27, Desv.*

2. HEMITELIA, *Br. (excl. H. Capensis).*

Cnemidaria, Pr. Cyathæ sp. of Auth.

Sori solitary, globose, situated below the apex of a lateral vein or veinlet, generally near the margin. *Receptacle* elevated, globose or columnar. *Involucres* small, semicircular, concave, occupying the lower side of the sorus, at first applied to it, and at length reflexed and persistent, rarely forming a shallow cup under the sorus, and then small, indistinct, never at any period covering the whole sorus. *Veins* pinnated, simple or branched, generally forked, all free, or the lowest ones anastomosing.—*Natives of the tropics.* Arborescent. Fronds *large pinnate or decomposed*. Pinnules *mostly larger and broader than in true Cyathæ*. HOOK. GEN. FIL. TAB. 4, (veining imperfect, correctly represented in the accompanying figures).

Obs. If we take the *Hemitelia horrida* of Br. as our guide for the essential character of this genus, we shall have in it and *H. speciosa* and *obtusata*, and *grandifolia*, or even in *petiolata* and *Hostmanni*, not only a sufficiently natural, but well defined genus, characterized by the small dimidiate involu-

ing in words, the description of Kaulfuss, as well as of Willdenow, applies to this, although Presl refers the plants of these respective authors to two different genera: — that of Willdenow (and Humboldt) to true *Cyathea*, and that of Kaulfuss to his *Cnemidaria speciosa*. It is clear to me however from his figure of *Cnemidaria speciosa* that he had in view what I here consider the *Hemitelia obtusa* of Kaulfuss; a species which more nearly approaches the *H. grandifolia*, if indeed it be really distinct.

2. *H. alternans*, Hook.; unarmed or only with extremely minute distant tubercles on the base of the stipes, fronds only (?) pinnate, pinnæ very remote petiolate alternate oblong lanceolate membranaceo-coriaceous acuminate deeply pinnatifid almost to the rachis, at the base again pinnated, segments and pinnules oblong rounded at the apex with rather an acute point nearly entire, veins all free forked near the base rarely simple, sori on the veinlets above the fork (seldom in the axil) copious forming a series half-way between the margin and the costa, involucre a very shallow cup or little pellicular peltate scale covered and concealed by the sorus. *Hook. Ic. Pl. v. 7, t. 622. Polypodium alternans, Wall. Cat. n. 329.*

Hab. Penang, *Dr. Wallich, 1822, Lady Dalhousie.* — This is one of the many Cyatheaceous plants whose genus will probably long be considered doubtful. The habit sufficiently harmonizes with the species of this genus: but the involucre is not dimidiate, but peltate and nearly flat, going all round the base of the sorus, though small and distinct and wholly covered and concealed by the sorus itself. As far as I can judge from my specimens the fronds are only once pinnated, in this respect resembling the first section, with very remote pinnæ, which are nearly a foot long, and, only below, again pinnated, the rest deeply pinnatifid. Veins quite free (never anastomosing).

3. *H. obtusa*, Kaulf.; aculeated, fronds pinnate, pinnæ broad-lanceolate acuminate pinnatifid or lobed half-way down to the rachis, lobes approximate so as to leave a very narrow sinus, broadly oval obtuse subfalcate serrulate, sori at a little distance from the margin and forming a continued line much below the sinus so as to approach the rachis, veins generally once or twice forked the lower ones angularly anastomosing and sending out veinlets which meet or almost meet at the sinus. (TAB. XIV. A.) *Kaulf. En. Fil. p. 252. Presl. Cnemidaria speciosa, Presl, Tent. Pterid. p. 57, t. 1, f. 16, 17, (sori inaccurate). Hemitelia speciosa, Mart. l. c. p. 66 (in obs.), t. 48, f. 2, (not Kaulf.)*

Hab. West-Indian islands, probably generally. Jamaica, *Wiles. Trinidad, Baron de Schack, Lockhart. St. Vincent, Rev. L. Guilding. British Guiana, C. S. Parker, Esq. French Guiana, (Delessert).* — Lower part of the stipes aculeated with short, rather obtuse prickles. Under side of the fronds with deciduous bullate whitish scattered scales upon the costa and nerves.

4. *H. grandifolia*, Spr.; aculeated, fronds pinnated, pinnæ large lanceolate acuminate pinnatifid more than two thirds of the way down from the margin, lobes or segments oval-oblong rather acute not closely approximate but leaving a deep and moderate sinus subfalcate serrulate principally towards the apex, sori at a little distance from the margin and forming a continued line below the sinus reaching almost to the costa, veins once or twice forked the lower ones angularly anastomosing and sending out veinlets which almost meet at the sinus. (TAB. XIV. B.) *Plum. Fil. t. 26.* *Cyathea grandifolia*, Willd. *Presl.* *C. horrida*, Sieb. *Fl. Mixta*, n. 331, and *Fl. Mart.* n. 375, (not Sm.) *Cnemidaria Kohautiana*, Pr.

Hab. Martinique, Plumier. Trinidad, Jamaica, St. Vincent, and probably the West-Indian islands generally. — Allied to the preceding, and the two may possibly pass into each other. If so the name of *grandifolia* should be retained. My specimens however seem tolerably constant. The stipes is aculeated and the underside of the frond has frequently the same deciduous scales as in *H. obtusa*. The fronds are 7—8 feet long, according to the late Rev. L. Guilding.

** *Fronde bipinnate or decompound.*

5. *H. horrida*, Br.; aculeated, fronds bipinnated clothed beneath at first and on the rachis with cobwebby tomentum, pinnules large ovate acuminate deeply pinnatifid almost to the base, segments lanceolate short-acuminate or acute lobato-dentate the lower ones almost again pinnatifid with blunt short lobes, sori following the course of the margin but descending in a double line below the sinuses half way down to the costa, veins pinnated, lower veinlets of the segments often angularly anastomosing. (TAB. XV.) *Cyathea horrida*, Sm. *Presl.* *Polypodium horridum*, L. *Plum. Fil. t. 8.* *Cyathea commutata*, Spr. (excl. the sup. of *Plum. t. 14.*)

6. *H. petiolata*, Hook.; unarmed, fronds triplicato-pinnate, pinnules lanceolate petiolate acuminate lobato-pinnatifid upper ones coadunate serrated (not lobed) terminating in an acuminate point, sori at the very margin continuing close under the sinus in an uninterrupted line, veins pinnated, the lower veinlets angularly anastomosing. (TAB. XVI.) *H. marginalis*, *J. Sm. in Hook. Lond. Journ. of Bot. v. i. p. 622, (name only)*.

Hab. Isthmus of Panama, *Dr. Sinclair*.—A perfectly distinct and well-marked species. Each pinna is a foot and more long, pinnated with remote petiolated pinnules, the upper portion only pinnatifid with simply serrated (not lobed) segments. The sori form a beautiful, beaded border along the margin, constituting a single series, not descending below the sinus, but keeping close to its margin.

7. *H. Hostmanni*, Hook.; stipes and main rachis scaly especially at the base of the former and there aculeated, fronds bipinnated, pinnules oblong very obtuse sessile but cuneate at the base, membranaceous pinnatifid or lobed half-way down to the rachis, upper ones coadunate and decurrent, sori remote half-way between the sinus and the rachis situated on the middle of the lower veinlets all of which are simple and free. *Hook. Ic. Pl. v. vii. t. 646*.

Hab. Dutch Guiana, *Hostmann, n. 64*.—A very distinct and well-marked species, of which I possess an entire frond about 4 feet long, including the stipes, which is a foot and a half, rich mahogany brown, on one side densely clothed with long dark brown glossy scales, on the other mucronated with short aculei. Pinnae remote, a foot long (the largest), sessile, broad lanceolate, pinnated with oblong, very obtuse pinnatifido-lobate pinnules, the lobes rotundato-ovate, obtuse, entire, of a thin and flaccid texture, nerves of each lobe pinnated, only the lowest pair of veinlets (all of which are simple and free) bearing, near the middle, each, a solitary sorus, so that on the pinnules the sori are distant, and form a line very remote from the margin, half way between the sinus and the rachis. The upper pinnules are confluent, at first simply combined by a decurrent wing, then united into a lobed margin and terminating in a blunt entire acumen. The rachis of the pinnae is rough and somewhat scaly, that of the pinnules slightly strigoso-hispid.

8. *H. ? Guianensis*, Hook.; unarmed? rachis and even the costa beneath slightly scaly and hispidly strigose, fronds bi-tri-pinnate, secondary rachis distinctly winged especially upwards between the pinnules, pinnules sessile oblong-lanceolate ending in an obtuse entire acumen pinnatifid rather more than half way down to the rachis membranaceous, segments ovate obtuse entire, veins free forked near the middle, sori few in each segment (2—4) on the axil of the fork rather nearer the margin than the costa, involucre ciliated often forming 2 or 3 irregular lobes chiefly but not entirely on the inferior side of the sorus. *Hook. Ic. Fil. v. vii. t. 648*.

Hab. British Guiana, *C. S. Parker, Esq.*—I do not find this anywhere described, nor am I clear that it should not be placed in *Cyathea*. In habit and form of the pinnules it has the closest affinity with the following; but the involucre is dissimilar.

9. *H. ? Parkeri*, Hook. ; unarmed ? fronds bi-tri-pinnate, main rachis slightly scaly and together with the lesser rachis costa veins (more or less) and margin clothed with numerous spreading hairs, rachis between the pinnules distinctly winged, pinnules sessile oblong-lanceolate bluntly acuminate pinnatifid about half way down subcoriaceo-membranaceous segments ovate obtuse entire, veins all free forked above the middle and bearing the sori (several in each segment) in the axil of the fork and rather nearer the margin than the costa, involucre rather small ciliated dimidiate often bifid in age. *Hook. Ic. Pl. v. vii. t. 643.*

Hab. British Guiana, *C. S. Parker, Esq.*—The winged rachis, very distinct in the upper part between the pinnules, is a striking character in this and the preceding species : but this is easily recognized by its copious hairs and more abundant sori and very different involucre, which I think may be considered entirely that of a *Hemitelia*; though the general habit approaches nearer that of a true *Cyathea* or *Alsophila*.

10. *H. multiflora*, Br. ; “fronds bipinnate, pinnules oblong-lanceolate acuminate pinnatifid, segments oblong obtuse obtusely serrated, rachis winged, caudex arborescent.” *Willd. Cyathea multiflora, Sm. Willd. Sw. Alsophila, J. Sm. Amphicosmia multiflora, Gardn. in Hook. Lond. Journ. of Bot. v. i. p. 441.*

Hab. Jamaica; ex Herb. Banks. (*Smith*).—With this I am unacquainted, and Mr. Brown is the authority for its being referred to *Hemitelia*. Sir Jas. Smith, with whom the species originated, has merely said of it (under *Cyathea*) “Caudice —, fronde bipinnata pinnatifida, laciniis obtusis serratis, rachi alata, floribus sparsis, calyce lacero.” Willdenow, who seems

13. *H. monilifera*, *J. Sm. in Hook. Lond. Journ. of Bot. l. c. p. 662, (name only).*

14. *H. cruciata*, *Desv.*; "pinnæ opposite sessile linear-lanceolate subacuminate patent deeply crenate, with the segments somewhat imbricated incurved (obtusisque apici latere acutiusculis) obscurely toothed, costa and rachis naked, caudex arborescent?" *Desv. in Mém. Soc. Linn. Par. v. ii. p. 521.*

Hab. Tropical America, (*Desvaux*). "Intermediate between *H. grandifolia* and *speciosa*," (an *obtusata*?). The latter remark would lead one to infer that *H. obtusa* or *H. grandifolia* is here intended; but nothing can be learned from the specific character, a part of which, inserted above in a parenthesis, is unintelligible to me.

15. *H. stigmosa*, *Desv.*; "fronds decomposed? partial ones pinnatifid, pinnules subpetiolate rather deeply pinnatifid decurrent, segments oblong obtuse entire stigmatose above (supra stigmatosis) with a solitary sorus at the base, partial rachis margined at the apex ferrugineo-pilose beneath." *Desv. l. c. p. 321.*

Hab. Tropical America, (*Desvaux*).

16. *H. cyathoides*, *Desv.*; "fronds decomposed, partial ones bipinnate, pinnæ petiolate winged at the middle of the rachis acuminately obtuse (acuminatè obtusis), pinnules slightly pinnatifid glabrous, the segments suboblong obtuse repando-subdenticulate, sori on each side at the base of the segments nearly solitary, rachis downy above." *Desv. l. c. p. 321.*

Hab. Guiana, (*Desvaux*). "Segments nearly linear."

17. *H. cordata*, *Desv.*; "pinnules lanceolate acuminate shortly petiolate repando-dentate nearly cordate at the base subauriculate serrated at the apex, sori in an uninterrupted series near the costa, rachis purple-black glossy downy above, caudex arborescent?" *Desv. l. c. p. 321.*

Hab. Madagascar, (*Desvaux*). "Pinnæ a foot and a half long and more. Pinnules nearly 2 inches long, 4—5 lines wide."—This probably belongs to some genus very different from *Hemitelia*.

18. *H. laciniata*, *Spreng.*; "herbaceous unarmed, frond supra-decomposed glabrous flaccid, leaflets oblong-lanceolate obtuse repand, sori small rather remote in two rows." *Spreng. Syst. Veget. v. iv. p. 126.* "*Polypodium laciniatum*, *Forst. Herb.*"

Hab. New Hebrides, *Forster*. — This also has most likely nothing to do with *Hemitelia*.

Omitted after *Hemitelia horrida*, p. 30.

5.* *H. Imrayana*, *Hook.*; unarmed? fronds bipinnate? glabrous, pinnules large broadly oblong-lanceolate acuminate

deeply pinnatifid almost to the base, segments lanceolate acuminate serrated, sori following the course of the margin in a nearly single series, and reaching to the main costa at the sinus, veins pinnated, veinlets 2—3, lower ones often anastomosing. *Hook. Ic. Pl. t.* 669.— β . segments coarsely serrated. *H. serrata*, *J. Sm. in Hook. Lond. Journ. of Bot. v. i. p.* 662, (*name only*).

Hab. Dominica, *Dr. Imray*, 1839. β . Jamaica? *Wiles?* (*Herb. J. Smith*). — At first sight this has a good deal the appearance of the preceding, *H. horrida*; but the pinnæ are much narrower, smaller, 10—12 inches long, apparently always glabrous, the segments serrated, the veins much less copiously pinnated. The *H. serrata*, *J. Sm.* (without character), may, I think, be safely considered a variety of this. (*v. supra p.* 32, n. 12).

3. ALSOPHILA, *Br. Mart.*

Cyathea sp. of authors. *Hemitelia* (1 sp.), *Br. Presl.* *Amphicosmia*, *Gardn.* *Metaxya*, *Presl.* *Gymnosphæra*, *Bl.* *Chnoophora*, *Kaulf.* *Trichopteris*, *Presl.* *Amphidesmium*, *Schott.*

Sori globose, situated upon a vein or in the axil of a fork. *Receptacle* elevated, frequently villous, punctiform in the subgenus *Metaxya*. *Involucre* none, unless a loose lacinated deciduous scale seen in some species and inserted at the lower side of the base can be so called, or a minute indistinct membrane covered by the sorus, or a few hairs radiating from the base. *Veins* pinnated, simple or forked, free. — Arborescent Ferns, *similar in general habit and structure to Cyathea* (*A. pruinosa excepted*). — *HOOK. GEN. FIL. TAB.* 9 and 21. *TAB.* 42. A. (*Hemitelia*, *Br.*) *TAB.* 42. B. (*Metaxya*, *Pr.*) *TAB.* 34. (*Trichopteris*, *Pr.* *Chnoophora*, *Kaulf.*) *TAB.* 100, (*Gymnosphæra*, *Bl.*)

Obs. The plants which I refer to this genus are those *Cyatheaceæ* in which

more long, glossy, firm.—*Metaxya*, Pr. HOOK. GEN. FIL. TAB. 42, B. *Amphidesmium*? Schott. *Alsophila*, § I. *Chnoophora*, in part, Mart. (not *Chnoophora*, Kaulf.)

1. *A. blechnoides*, Hook.; fronds pinnate, pinnæ lanceolate serrated upwards and acuminate into a long narrow point, sori generally on the lower half of the nerves.—*Polypodium blechnoides*, Sw. *Syn. Fil.* p. 73. *P. rostratum*, Willd. (not Lam. and Sw.) *P. Humboldtii*, Poir. *P. Parkeri*, Hook. et Grev. *Ic. Fil.* t. 232. *Aspidium rostratum*, H. B. K. *Alsophila rostrata*, Mart. l. c. t. 39, (excellent).—β. *polycarpa*; sori extending almost to the margin of the pinnæ.

Hab. Woods, Guiana (*Swartz*), Mr. Parker, *Schomburgh*, n. 18 and 313. *Hostmann*, n. 73. Orinoco, *Humboldt*. Province of Para and Rio Negro, Brazil, *Martius*. Guatemala, *Skinner*. Isle of Gorgona, west coast of Panama, *Barclay*. Panama, *Cuming*, n. 1126. Peru, *Poeppig*, in *Herb. nostr.*—β. Dutch Guiana, *Hostmann*, n. 1080.—A very beautiful species, varying in the size and breadth of the pinnæ, which are sometimes a foot and more long, but always terminating in a long, acuminate, narrow point. The var. β. has, besides the line forming the linear series near the base, the rest of the numerous sori extending to near the margin of the pinnæ, and the margin is wavy and jagged; and in this respect is what *Martius* alludes to, when he says “*variat interdum pinnae grosse lobatis et altius dentatis.*”

Subgen. II. TRICHOPTERIS. *Veins parallel, twice or thrice forked, patent. Sori solitary on the veins or in the upper forks, forming a more or less regular or continuous line or series the length of the pinnule. Capsules mixed with copious long persistent hairs.—Tropical America. Fronds bipinnate. Pinnæ moderately large, 4–6 inches long.—Trichopteris, Presl. HOOK. GEN. FIL. TAB. 24.*

2. *A. Tænitis*, Hook.; aculeated, fronds bipinnate, pinnules lanceolate acuminate glabrous more or less serrated or entire between coriaceous and membranaceous, sori in an uninterrupted series intermediate between the costa and margin.—*A. excelsa*, Mart. l. c. p. 63, t. 37. *Polypodium Tænitis*, “*Roth, Nov. Sp.* 394,” (according to *Kaulf.*) *Trichopteris excelsa* and *denticulata*, Pr. *Polypodium Corcovadense*, *Raddi, Fil. Bras.* p. 26, t. 40.

Hab. Brazil, frequent about Rio and Corcovado; St. Sebastian, Minas Geraes and elsewhere, *Menzies*, *Martius*, *Gardner*, n. 5335 and 5336, *Capt. Beechey*, *Raddi*, *Macrae*, *Sellow*.—Varying in the size and breadth of the pinnules and in the serratures: generally the substance is firm, but not thick, sometimes almost membranaceous. Line or series of fructifications continuous, regular. The copious hairs persist long after the capsules have fallen away.

3. *A. elegans*, Mart.; aculeated, fronds bipinnate, pinnules thick and coriaceous (fleshy? when recent) lanceolate acute

mostly entire slightly hairy and scaly beneath, sori in 2 or 3 series forming an unequal broad and more or less interrupted series nearer the costa than the margin.—*Mart. l. c. p. 63, t. 38.* *Trichopteris elegans, Pr.*

Hab. Brazil, *Sellow, in Herb. nostr.* Woods of St. Paul and Minas Geraes, *Martius*.—This is probably a rare, but very distinct, species. My only specimen is from the Royal Herbarium of Berlin, and was gathered by *Sellow*, probably in South Brazil. Besides the much less acuminate pinnules and the thicker texture, the veins are more sunk and less evident than in the preceding; and the sori are more scattered, forming a very interrupted, thick, broad and irregular linear series; in this respect, as it were, connecting this section with the preceding, which indeed *Martius* has done (*Sect. CHNOOPHORA*); and certainly invalidating the characters as distinct genera. The original *Chnoophora* of *Kaulfuss*, however, let it be observed, is a true *Alsophila*, (*A. villosa, Kze.*)

Subgen. III. EUALSOPHILA. *Veins free, simple or forked, rather remote, obliquely patent from the main trunk or costa; branches diverging (not parallel). Sori solitary at the base or about the middle of a vein or in the axil of a fork.—Tropical or sub-tropical, of the old and of the new world; bi-tripinnate; pinnules pinnatifid, segments generally small. Sori few and scattered on the segments, or sometimes forming a line, but frequently not a continuous one (owing to the remote or distinct sori) between the margin and costa.* HOOK. GEN. FIL. TAB. 21, 42 & 100.

§ I. *Sori with a spurious Involucre at the inner base.*

4. *A. Capensis, J. Sm.*; unarmed, fronds triplicate-pinnate, pinnæ lanceolate acuminate pinnatifid almost to the rachis, segments narrow-oblong acute falcate membranaceous serrated, rachis and costa with small bullate deciduous scales, and one lax lacinated one at the inferior base of each sorus persistent? veins all simple or very rarely forked dark-coloured, sori much elevated cylindrical generally solitary at

supposed involucre appears to be of the nature and texture of the bullate scales common on this and other Cyatheaceous plants, not membranaceous or resembling as it were a pellicle, but soft and succulent and vasculose, similar also to what are figured by Mr. Bauer at the base of the young sori of *Alsophila aspera*, HOOK. GEN. FIL. TAB. 21, f. 1, 2. Presl retains the name of *Hemitelia* to the present plant, removing from it the other species which Mr. Brown intended as the types of the genus (*Onemidaria*, Pr.), on account of the lower anastomosing veins and the different form of the involucre: ascribing to the present plant an "indusium inferum, dimidiatum, semi-involucrans, concavum, latere superiore deficiente;" and "sorus in qualibet lacinia solitarius;" which latter is not a constant character. Mr. Gardner considers it desirable to separate our plants both from *Hemitelia*, Br. and *Alsophila*, and, finding the species to inhabit the new, as well as the old world, gives to it the name of *Amphicosmia*. To this he adds the *Cyathea multiflora*, Sm. (*Hemitelia*, Br.) In the same volume of the 'London Journal of Botany' in which Mr. Gardner's paper appears, Mr. J. Smith has given his views of the genus *Alsophila*, which he makes to depend on the "veins (or venules) forked or simple free, sori axillary or medial, involucre semicalyciform or sometimes very small or absent:"—and then he has two sections, the one characterized by the presence of a more or less distinct involucre, and that he subdivides by the simple and forked veins: and thus our *A. Capensis* comes into his first section, with several other species having spurious or very imperfect involucre. In the union of our plant with *Alsophila* I entirely agree, and only differ from Mr. J. Smith in not laying so much stress as he does upon the value of the supposed involucre. The simple or forked veins have the advantage at least of being more apparent: but they are liable to great modifications. Indeed, as regards the fructification, there are so many and such insensible gradations from the most perfect cup of *Cyathea arborea* to the entirely naked sori of true *Alsophila*, and the slight differences in venation are accompanied by so little of natural habit, that the older Pteridologists were not very wrong who looked upon the whole of this group as one genus, *Cyathea*.

So far from the sorus being universally solitary on each segment of this species, I possess specimens with as many as six upon a segment: when that is the case, the one or two lower ones (as may also be observed when solitary) is at the base of a vein; but the others are placed higher up. I have occasionally seen a forked vein, but have never observed the sorus in the axil of it. Receptacles always very long, cylindrical, hairy.—Extended as the remarks are already on the *Alsophila Capensis*, I must not quit the subject without mentioning a remarkable change, as it appears, that many of the pinnæ have undergone on the lower part of the stipes. They may be called abortive pinnæ, and are short, 3—4 inches long, many times multifid, with narrow linear membranaceous hyaline segments with a rigid costa; and at first sight so much resembling some *Trichomanes* or *Hymenophyllum* in a barren state, growing parasitically on the *Alsophila*, that Kaulfuss has described them under the name of *Trichomanes ? cormophyllum*, (*Enum. Fil.* p. 266).—The specific appellation "*riparia*," Willd., selected by Mr. Gardner, is doubtless more appropriate, now that the plant has been found not only at the Cape, but in Java and in Brazil: but this circumstance scarcely warrants the change of an old Linnæan name.

5. *A. latebrosa*, Wall.; stipes and main rachis muricated with short elevated points, fronds bipinnate, pinnæ lanceolate, pinnules narrow-lanceolate acuminate pinnatifid almost to

the rachis, segments narrow-oblong acute falcate subcoriaceous serrated, rachis and costa with small bullate scales, and one generally at the base of the sorus, veins all once forked, sori much elevated cylindrical copious occupying nearly the whole segment. *Polypodium latebrosum*, *Wall. Cat. n. 318* (*Alsophila* in index).

Hab. Penang, *Dr. Wallich*. Assam, *Mrs. Mack*, *Major Jenkins*.—Stipes dark mahogany-brown. Pinnæ slender and graceful. In general habit a good deal allied to *A. Capensis*, and especially in the very prominent and almost cylindrical sori, beneath which, frequently, but not always, a concave scale is attached, showing a still further affinity with the preceding. Here however the frond is more coriaceous, the veins are always forked, the fructifications are more copious. In the present species the receptacle is frequently split or forked.

§ II. *Sori destitute of involucre, or so minute as to be wholly covered by the sorus and with difficulty observed.*

* *Species of the West Indies, Mexico and South America.*

6. *A. Miersii*, Hook.; rachis aculeated with slightly deflexed prickles, fronds (bi?) pinnate, pinnules remote free even to the terminal one narrow-lanceolate much and gradually acuminate the long acumen serrated cuneate at the base the rest pinnatifid half-way to the rachis glabrous, bullate scales none, segments ovate obtuse nearly entire, veins simple and forked, sori on all the segments chiefly occupying the lower portion situated half-way between the costa and the margin, receptacles hairy. *A. acuminata*, *J. Sm. Gen. (name only)*.

Hab. Organ Mountains, *Gardner*, n. 117. Tejuco, *J. Miers, Esq.*—An extremely well-marked Fern, with glabrous, glossy fronds: the pinnules much elongated, 6—8 inches long, gradually acuminate into a finely serrated point, the whole of which is destitute of fructification; this latter is confined to the segments, and is situated on the veins or forks of the veins, the two series of which take the shape of the segments, being placed about equidistant between the costa and the margin. Receptacles slightly ele-

Mountains (n. 114) and Tejuco (n. 5673) *Gardner*. — Quite different from any previously described species of the genus; the pinnules, 2—4 inches long, being very slightly pinnatifid, the segments short and blunt; the sori dispersed over all the pinnatifid portion.

8. *A. Hookeriana*, Klotzsch; stipes and rachis strongly aculeated, fronds everywhere glabrous or pubescent on the partial rachis subcoriaceous, pinnules shortly petiolate lanceolate slightly and obtusely acuminate cuneate at the base, segments short rounded obtuse oblique quite entire, veins simple and forked, sori in 2 series half-way between the costa and margin, bullate scales none, receptacles elevated hairy, rachis of the pinnæ winged between the upper pinnules. *A. Hookeriana*, *Klotzsch in Herb. Reg. Berol.*

Hab. South Brazil, *Sellow*. St. Catherine's, *Lay and Collie*. — This I was at first disposed to make a variety of the preceding, but it is probably different: the stipes is very much aculeated, the fronds are more coriaceous, the pinnules not truncate at the base nor by any means so acuminate at the apex, the veins are more frequently forked, the receptacles more hairy and the capsules less crowded and compressed. A distinct wing appears on the rachis of the pinnæ, between the upper pinnules, in which respect it resembles the following species.

9. *A. armigera*, Kze.; "fronds bipinnate, pinnules nearly sessile falcate lanceolate the upper ones abbreviated incispinnatifid, the segments obtuse or truncated, sori forming a line along the veins of each segment, partial and universal rachis winged above and hairy rough beneath, stipes aculeated above, beneath rigidly paleaceous. *Alsophila*? *armigera*, *Kze. Syn. Plant. Crypt. Poep. p. 98.*

Hab. Ventanilla de Cassapi (Maynas, in *Herb. nostr.*), *Poeppig*. — Allied to *A. procera*, but partially downy, very downy on the main rachis. Pinnules also larger and rather more deeply pinnatifid. On the underside the veins are nearly of the same color as the frond: in that respect approaching *A. aspera*. There are hairs among the sori on the receptacles.

The above four preceding species differ from the rest of this group, in the shallow segments of the pinnules, the deepest of them not being cut half way down to the rachis. The following species however, *A. aspera*, is, as it were, intermediate in that respect.

10. *A. aspera*, Br. ?; stipes and rachis aculeated, main and partial rachis above strigillose slightly scaly beneath and on the costa the rest glabrous shining, fronds bipinnate coriaceous, pinnules shortly petiolate oblong pinnatifid one half or two thirds the way down with an acuminate point, segments oblong-ovate rather acute serrulate, costa and simple or forked veins of the same color and texture as the frond, bearing small bullate scales, sori very deciduous in 2 series intermediate between the costa and margin, receptacles moderately elevated with few hairs. *A. aspera*, *Br. ? Hook. et Greav. Ic.*

Fil. t. 213—215. *Hook. Gen. Fil. tab.* 5—11 an 1—4? *Cyathea aspera*, Willd.?—*Cyathea muricata*, Sieb. *Fl. Mixt. n.* 337, (and *Fl. Martin. n.* 374, according to Kaulf.). *Kaulf. Enum. Fil. p.* 259? non Willd. *Sp. Pl. v. p.* 497. *A. nitens*, *J. Sm. Gen. Fil. (name only)*. — β . more aculeated, aculei longer. (TAB. XIX. B.)

Hab. Martinique, Sieber. Jamaica, Bancroft, Macfadyen, Purdie. — β . St. Vincent's, L. Guilding.—Probably different authors have had different plants in view for their *Cyathea* or *Alsophila aspera* and *Cyathea* or *Alsophila muricata*. I have referred to the published specimens of Sieber for the plant here described. It is probably abundant in the West Indian islands. Mr. Purdie speaks of it as very frequent in Jamaica, and as having a slender stem, 20—30 feet high, but not more than $2\frac{1}{4}$ inches in diameter. I find no involucre whatever to the sori, and it would appear that the capsules do not remain long in a compact form, but are quickly deciduous, leaving a small receptacle, slightly elevated and moderately hairy. Fronds very ample. Pinnæ 2 feet and more long, texture coriaceous, glossy, veins conspicuous, prominent on the underside, and what is not common in the genus, exhibiting a color and texture exactly analogous to that of the surrounding parenchyme; or in other words, as if the same parenchyme covered the veins. Kaulfuss considers Sieber's plant the same with that of Willdenow; but whether it be identical with the original species of Plumier (*Fil. t.* 3), from which Willdenow seems to have derived his character, will probably long remain doubtful. See p. 18 of this volume, where I have thought it right to include the name and character of *Cyathea aspera* and of *C. muricata*, from Willdenow. My specimens from St. Vincent have the stipes and main rachis with much longer aculei, but they are not otherwise at all different; it is that state which is figured at our TAB. XIX. B.

11. *A. armata*, Presl; stipes and main rachis aculeate with short prickles, rachis and fronds beneath clothed with fulvous spreading hairs, fronds bipinnate coriaceous, pinnules linear-lanceolate acuminate, scattered chaffy scales beneath, segments lanceolate subfalcate slightly obtuse crenate, veins forked above the middle, sori copious covering the whole segment.

A. armata, Presl *Pterid. p.* 62. *A. Swartziana*, Mart. *Pl.*

bipinnate, pinnules lanceolate acuminate sessile deeply pinnatifid nearly to the rachis, numerous small bullate scales beneath, segments oblong very obtuse entire everywhere clothed with sori even to the acuminate apices. — β . nearly glabrous above and less hairy beneath. *Cyathea nigrescens*, *Klotzsch in Herb. Reg. Berol.*

Hab. Woods, San Gaetano, Brazil, *Gardner*, n. 5330.— β . South Brazil, *Sellow*.—This species in some respects resembles *A. armata*, but is more universally hairy or almost woolly, and the hairs are less tawny; the segments are broader, and more obtuse and entire.

13. *A. ferox*, *Presl*; more or less pubescenti-hirsute especially on the nerves, rachis and stipes with long sharp aculei, fronds bipinnate, pinnules sessile broadly lanceolate narrow acuminate deeply pinnatifid almost to the rachis, segments linear-oblong falcate serrated, small bullate scales beneath, nerves forked, sori copious but not wholly covering the segments. *A. ferox*, *Presl, Pterid. p.* 62. *Cyathea ferox*, *Pr. Alsophila armata*, *Mart. Pl. Crypt. Bras. p.* 72, t. 48, (*not Presl*). *Polypodium aculeatum*, *Raddi, Fil. Bras. t.* 41. *Chnophora aculeata*, *Kaulf. in Herb. Mart.* — β . costa beneath with more copious bullate scales.— γ . segments broader, costa with numerous scales beneath. *A. Sellowiana*, *Presl.*

Hab. Brazil, probably frequent, *Raddi, Martius, Mr. Boog, Gardner*, n. 27. Bahia, *Saltzman*. British Guiana, frequent, *C. S. Parker, Esq. Surinam, Splitgerber*.— β . Guiana.— γ . S. Brazil, *Sellow*.—This appears to be a very distinct species, of which an excellent figure is given by *Martius*, and another by *Raddi*. It should rank near to *A. armata*, *Presl*; but it is much less hairy, and the segments are generally narrower: yet in these respects the plant seems liable to vary, and my var. γ . has been deemed deserving of specific distinction by our friend *Dr. Klotzsch*. On similar grounds our present species of *Alsophila* might be increased four-fold.

14. *A. leucolepis*, *Mart.*; “frond bipinnato-partite slightly strigilloso-hirsute on the nerves and nervules above beneath with the scales and scalelets large, stipes aculeate, partial rachis unarmed, pinnæ linear-oblong acuminate, pinnules linear acuminate pinnatifid, segments between the rounded sinuses linear-lanceolate subfalcate sinuato-dentate, sori 10—12 on the segments.” *Mart. Pl. Crypt. Bras. p.* 70, t. 46.

Hab. Brazil; Province of Minas Geraes, *Martius*. Near Inficionado, *Gardner*, n. 5329. Woods, Gongosoco, *Gardner*, n. 5331. — From the general appearance of *Mr. Gardner's* specimens, and the presence of the copious white scales beneath, I can have little hesitation in referring them hither; but the segments of the pinnules are broader, and there are none or but very few of those larger scales which form so conspicuous a feature in *Martius' plant*. The whole frond is very opaque (not glossy), and in *Mr. Gardner's n.* 5331, there are still fewer of the large scales, and the veins are frequently simple as well as forked.

15. *A. phalerata*, Mart.; "frond bipinnato-partite strigillose on the veins above slightly downy beneath elsewhere glabrous, stipes aculeolate at the base, pinnæ in their circumference narrow-oblong acuminate, common and partial rachis unarmed strigillose above, pinnules linear acuminate pinnatifid serrated at the apex, segments linear-oblong obtuse somewhat serrated towards the apex those towards the summit crenate on their anterior edge (anticé crenata), the uppermost confluent into crenated pinnæ, sori biseriata in the inferior part of the segments." *Martius, Pl. Crypt. Bras. p. 67, t. 42. Cyathea phalerata, Martius, olim.*— β . costa with a few small scattered scales beneath.

Hab. Brazil: woods in the Province of Bahia, *Martius.*— β . Ilhios, *Moricand.* Demerara and Guadeloupe, *C. S. Parker, Esq.* Dominica, *Dr. Imray, n. 110.*—Our specimens from Moricand, Mr. Parker and Dr. Imray, altogether agree with the figure and description of Martius, except that they have, generally, small scales beneath the pinnules, which appear wanting in the original plant. The veins are often twice forked, the forking commencing below the middle, so that the sori are nearer the costa than the margin. In some of Dr. Imray's specimens the segments are more elongated, narrower, and frequently more serrated.

16. *A. infesta*, Kze.; "frond bipinnate, pinnules unequal at the base pinnatifid acuminate, segments oblong falcate rather obtuse, sori uniseriate approaching the margin, rachis puberulous furrowed and paleaceous, stipes chaffy above aculeate below." *Kze. Syn. Pl. Crypt. Poepp. p. 98.*— β . pinnules narrower and more scaly beneath. *Alsophila fumata, Klotzsch in Herb. Reg. Berol.*

Hab. Maynas, Peru, *Poeppig in Herb. nostr.* British Guiana, *C. S. Parker.* Dominica, *Dr. Imray, n. 119.*— β . South Brazil, *Sellow.*—A comparison of my Guiana plant with an authentic specimen of *A. infesta*, Kze., shows it to be the same. The pinnules are rather broad, membranaceous,

pinna." *Martius, Pl. Crypt. Bras. p. 66, t. 41.* *Cyathea compta, Martius, olim.*

Hab. Brazil; Province of St. Paul, *Martius*. Caraccas, *Linden*. Tabasco, Mexico, *Linden*, n. 1919.—If I am not greatly mistaken, the above two *Alsophilas* of Linden from Caraccas and from Mexico, are identical with *A. compta*, Mart. They exhibit the same form of pinnules, and the veins are alike, except that the forking in our specimens takes place nearer the margin than is represented in Martius' figure.

18. *A. elongata*, Hook.; sharply aculeated, glabrous except on the rachis above, fronds bipinnate, pinnules lanceolate much elongated pinnatifid nearly to the rachis terminating in a long narrow serrated acumen, segments remote linear rather acute rigid much falcated the margins recurved serrated, veins twice or thrice forked from near their base, sori numerous covering the entire segments except at the apex, bullate scales none or deciduous, receptacle very hairy.

Hab. Columbia, probably the low plains, *Hartweg*, n. 1528. — This has the appearance of being a distinct species, at any rate it is considerably dissimilar from any that I am acquainted with. In the crowded fructifications it resembles the *A. armata*: but the pinnules are very different. The single pinna in my herbarium is nearly 3 feet long, rigid, coriaceous, downy or strigillose on the rachis above, the rest quite glabrous, if we except the long hairs among the capsules. The pinnules are 6—8 inches in length, finely acuminate, the segments nearly an inch long, narrow, much falcated, the margins a good deal recurved, the whole underside, except at the apex, crowded with the fulvous sori.

19. *A. Poeppigii*, Hook.; glabrous except the rachis above, pinnae closely pinnated, pinnules elongated sessile oblong-lanceolate much and suddenly acuminate pinnatifid nearly to the costa, segments thick and coriaceous crowded narrow-oblong falcate very obtuse densely clothed with sori to the very apex almost to the extremity of the acuminations, the margins slightly reflexed, bullate scales none, copious hairs among the capsules.—*A. villosa*, *Kze. Syn. Pl. Crypt. Poep. p. 99* (according to an authentic specimen of *Poeppig* in *Herb. nostr.*), excluding the synonyms.

Hab. Peru, 1829, *Poeppig* in *Herb. nostr.* — This plant, although called *A. villosa* by Kunze in the Synopsis of S. American Cryptogamiæ, has nothing to do with the *Cyathea villosa*, H. B. K., which is adduced as a synonym. The species is more nearly allied to, though quite different from, *A. armata*. My solitary specimen does not show whether the stipes is aculeated or not. The rachis is glabrous, except above. Pinnules wholly glabrous above, the segments very close compact and regular, much broader and stouter and blunter than in our *A. elongata*, and not the smallest portion of them is destitute of sori. The long apex is so suddenly acuminate, that the pinnules might be called caudate.

20. *A. villosa*, (*Kze.?*) Presl; stipes unarmed or only beset with small dark elevated points, fronds tripinnate glabrous above clothed beneath (and on both sides in the young state)

with a more or less copious and lax tomentum, pinnæ nearly erect ovate (in circumscription) acuminate, pinnules oblong-lanceolate gradually acuminate more or less pinnatifid coriaceous, the segments oblong obtuse entire or coarsely serrated, veins twice or thrice forked of the same color and texture beneath as the frond, sori in 2 series rather distant on each side the costa, receptacle slightly elevated, hairs among the capsules long woolly. *A. villosa*, *Kze.?** *Cyathea villosa*, *H. B. K. Nov. Gen. Am. v. i. p. 24*, and *v. vii. t. 670*; *Willd. Sp. Pl. v. v. p. 495*. *Chnoophora Humboldtii*, *Kaulf. En. Fil. p. 250*.—*Als. tomentosa*, *Presl*, according to *Klotzsch in Herb. Reg. Berol. A. humilis*, *J. Sm. Gen. Fil.*

Hab. Near Caripe, Santa Cruz and Guardia San Augustin, Missions of Chaynas, Caraccas, *Humboldt and Bonpland*. Caraccas, *Linden*. Brazil, near Moro Velho, n. 5334, and Serra do Frio, n. 5332, *Gardner*. S. Brazil, *Sellow*.—This species is extremely well figured by Humboldt in the work above quoted, and is indeed a very remarkable one, with a habit in many respects considerably different from that of other *Alsophila*. The pinnæ and pinnules do not spread at almost right angles from the rachis, which is common in the present genus, but point upwards. It is more divided, so as to be at least tripinnate. The whole plant, too, especially in a young state, is clothed with lax, deciduous, cobwebby hairs.

21. *A. plagiopteris*, *Mart.*; “fronds bipinnato-partite, stipes aculeate, partial rachis and veins downy above, scales on the veins few and deciduous, pinnæ linear-oblong acuminate, pinnules linear much acuminate and pinatifid, segments between the rather broad sinuses lanceolate falcate toothed at the apex, the fertile ones nearly entire, the sterile serrated, in each pinnule the lowest and shorter segment is obliquely adnate with the rachis, sori upon the entire segments from 8—16.” *Martius, Pl. Crypt. Bras. p. 73, t. 50*.

Hab. Brazil; Province of St. Paul, *Martius*. South Brazil, *Sellow*.—My own specimen of this, from the Royal Berlin Herbarium, quite coin-

arranged in 2 rows." *Mart. Pl. Crypt. Bras. p. 68, t. 43.*
Polypodium Alsophilum, Link. Als. munita, Presl.

Hab. Brazil; Province of St. Paul, St. Sebastian and Bahia, *Martius*.
 —Dr. Martius compares this with *A. armata* (our *A. ferox*), from which it appears to me very distinct. Presl calls this *Als. munita*, Kaulf., but I know not upon what authority; for it is a species I find nowhere described.

23. *A. hirsuta*, Kaulf.; "frond tripinnatifido-partite slightly hairy on both sides especially beneath, and there furnished with little scales, stipes and rachis aculeate beneath, and as well as the partial rachis rough with hairs, pinnæ linear-oblong shortly acuminate deeply pinnatifid, segments broadly lanceolate inciso-semipinnatifid, the ultimate segments obliquely ovate acutely serrate above, sori in each segment 8—16." *A. hirta, Kaulf. En. Fil. p. 249. Martius, Pl. Crypt. Bras. p. 69, t. 44. Cyathea hirsuta, Presl. Polypodium axillare, Raddi, Fil. Bras. p. 27, t. 41.*

Hab. Brazil; Province of St. Sebastian, *Martius*. Rio Janeiro, *Raddi*.
 —Gaudichaud has adduced the *Polypodium axillare*, Raddi, as a synonym to this plant, and probably correctly.

24. *A. rigidula*, Mart.; "frond bipinnato-partite rather firm ovato-rhomboid flocculoso-pubescent especially beneath, stipes clothed at the base with long whitish ciliated scales and as well as the rachis aculeolate nodulose slightly hairy above in the middle, pinnules lanceolate rather obtuse at the base on the lower margin subdecurrent pinnatifid and crenate, the ultimate confluent into a serrated acumen, sori 2—4—6 in each segment." *Martius, Pl. Crypt. Bras. p. 74, t. 51.*

Hab. Woods, Province of St. Paul, Brazil, *Martius*.

25. *A. nigra*, Mart.; "frond bipinnato-partite slightly hairy the hairs spreading, scales none, stipes and rachis aculeate, partial rachis and veins hairy, pinnæ linear-oblong acuminate, pinnules linear acuminate pinnatifid, segments between the rather acute sinuses linear-oblong obtuse crenato-dentate in the superior margin, sori 8—10 covering the whole segments." *Martius, Pl. Crypt. Bras. p. 71, t. 47.*

Hab. Province of Rio Negro, Brazil, *Martius*.

26. *A. monticola*, Mart.; "frond bipinnato-partite, rachis and nerves villous below and above villosa-tomentose, the rest of the plant nearly glabrous above downy beneath, pinnæ and pinnules oblongo-lanceolate acuminate, segments of the posterior pinnæ linear-oblong pinnatifido-serrate, the serratures acute nearly entire, sori 6—10 on the segments, segments of the superior pinnæ toothed with the sori nearly solitary." *Martius, Pl. Crypt. Bras. p. 75.*

Hab. Brazil. Province of Minas Geraes, Villa Rica, Brazil, *Freireis* (in *Martius*).

27. *A. Sprengeliana*, Mart. ; "frond bipinnato-partite, stipes aculeate and as well as the rachis and veins sparingly downy, pinnæ oblongo-lanceolate acuminate, pinnules linear-oblong much cuspidate, segments between the rather acute sinuses obliquely linear-oblong rather obtuse denticulate on the superior margin, the lower posterior segment of each pinnule shorter but not decurrent, sori 8—10 occupying the whole segment." *Martius, Pl. Crypt. Bras. p. 75.* "*Cyathæa armata, Spreng. in Herb. Bertero.*"

Hab. San Domingo and Guadeloupe, *Bertero*.

28. *A. atrovirens*, Presl ; "fronds compound, pinnæ pinnate subpetiolate, pinnules sessile broadly lanceolate coarsely and pinnatifidly dentato-serrate denticulate, sori scattered or arising from an hemispherical receptacle, stipes with short spines (arborescent)." *Polypodium atrovirens, Langsd. et Fischer, Fil. Bras. p. 12, t. 14. Willd. Sp. Pl. v. v. p. 188.*

Hab. St. Catherine's, Brazil, *Langsdorff*.—This is, no doubt, as Presl has rightly judged, an *Alsophila* : and, so far as can be inferred from the figure, nearly allied to *A. procera*, or perhaps *A. Hookeriana*.

29. *A. radens*, Kaulf. ; "fronds bipinnate, pinnules linear-lanceolate pinnatifid, segments oblong obtuse nearly entire, rachis aculeate beneath, costa paleaceous." *Kaulf. En. Fil. p. 248.*

Hab. Brazil, *Chamisso*.—"Pinnæ about 2 feet long ; pinnules 1½—2 inches. Sori minute, globose, inserted upon the receptacle, parallel with the costa of the segments and arising from the middle of the veinlets. Involucres scarcely any."

30. *A. setosa*, Kaulf. ; "fronds tripinnate, secondary pinnæ lanceolate acuminate pinnated at the base glaucous beneath

chis flexuose angled and as well as the stipes aculeate with white chaffy scales above." *Kunze, Syn. Pl. Crypt. Poepp.* p. 97.

Hab. Woods of Pampay, near Peru, *Poeppig*.

32. *A. subaculeata*, Splitg.; "frond bipinnate, pinnæ alternate nearly glabrous, pinnules lanceolate acuminate pinnatifid segments oblong obtuse dentate, rachis and stipes subaculeate." *Splitg. Enum. Fil. Surin*.

Hab. Surinam, *Splitgerber*.—The above brief character is not calculated to throw light on the species here intended, nor can much more be learned from the full description. The author compares it with *Als. nigra*, Mart. (n. 25 of this work).

33. *A. pilosa*, Martius et Galeotti; "fronds ample pilose ovato-lanceolate sub-bipinnate, pinnæ patent lanceolate elongate much acuminate deeply pinnatifid, upper ones gradually smaller, segments linear oblong obtuse toothed at the apex, the margins revolute glabrous above, veins parallel, the rachis and costa hairy beneath, sori globose crowded submarginal pilose, stipes and common rachis hairy." *Martius et Galeotti, Syn. Fil. Mex. p. 78, t. 22*.

Hab. Mexico; Totutla, Colony of Mirador, at an elevation of 4000 feet above the level of the sea, *Galeotti*, n. 6406.—"Frond 4—6 feet. Pinnæ 2—10 inches; the lower ones a foot long, segments half an inch to an inch long."—It is impossible from such a description and from such a figure to offer an opinion on the affinities of this species. The veins are represented as quite simple, parallel and nearly horizontal, and the sori, although stated to be globose, are oblong in the plate.

34. *A. Mexicana*, Mart.; "frond tripinnatifido-partite sparingly hirsute on both sides, stipes and rachis rough with hairs and furnished with deciduous scales varying in size, pinnæ linear-oblong acute, pinnules linear acuminate deeply pinnatifid, ultimate segments obliquely and broadly ovate entire or emarginato-bidentate, sori on each segment near the rachis 2—8." *Mart. Pl. Crypt. Bras. p. 70, t. 45*.

Hab. Mexico, Province of Oaxaca, *Karwinski*.

35. *A. pruinata*, Kaulf.; fronds bipinnate glaucous beneath rigid woolly upon the rachis, pinnules lanceolate (small) deeply pinnatifid, segments ovato-lanceolate very acute sinuato-serrate, veins simple, sorus solitary at the base of each segment, capsules mixed with copious hairs. — *Polypodium pruinatum*, *Sw. Fl. Ind. Occ. v. iii. p. 1682*. *P. glaucum*, *Sw. Prodr. p. 134*. *P. cinereum*, *Cavan.* *P. griseum*, *Schkuhr, Fil. t. 25*. *Cyathea discolor*, *Bory, in Duperrey's Voy. Crypt. p. 281*.

Hab. Jamaica, abundant, *Swartz and others.* Mexico, *Linden*, n. 18,

Galeotti, n. 6334. Chili, frequent: Conception, *Cuming*, n. 153. *Valdivia*, *Bridges*, n. 814, *Mr. Reynolds*. Juan Fernandez, *Bertero*, n. 1553, *Douglas*.—This is said to have a stem from 3—6 or 8 feet high, and which Mr. Douglas compares to a small pine-tree, leafy at the top. The stipes is quite smooth, the underside of the frond singularly glaucous, equally so with the *Cyathea dealbata* of New Zealand; the pinnules are extremely numerous, small, not exceeding 1—1½ inch in length, but the pinnæ are ample. In habit and appearance this is extremely distinct from any other *Alsophila*, and the receptacles are very slightly elevated; so that it must be considered but a doubtful species of the genus.

▲ *Dubious Species of the West Indies, Mexico and South America.*

36. *A. Dombeyi*, Desv.; “fronds glabrous, pinnules sessile elongato-lanceolate acute slightly pinnatifid, segments obtuse nearly entire oblong, sori near the costa, rachis unarmed.” *Desv. Prodr. Fil. in Mém. Soc. Linn. v. ii. p. 320.* Peru.—“Pinnules resembling those of *A. aspera*, but the sori differently placed. Involucre unknown.” *Desv.*

37. *A. Millefolium*, Desv.; “fronds decomposed subquadridio-pinnate, pinnules dilated at the base acuminato-attenuate at the apex, shortly petiolate pinnate, lowest pinnulets petiolate deeply pinnatifid alately adnate, segments elongato-triangular, involucre lacerato-crinite, rachis glabrous unarmed above pulverulently pubescent.” *Desv. l. c. p. 320.*—Hispaniola. Desvaux makes no further remark, except to adduce as a synonym the “*Filix aurea ramosa*, etc., *Plum. Fil. p. 26, t. 33.*”

38. *A. Schiedeana*, Presl; “fronds bipinnate, pinnæ deeply pinnatifid. Arboreous, aculeate, nearly allied to *Polypodium (Alsophila) procerum*, Willd., from which it differs in the aculei, in the pinnules being more deeply pinnatifid, and the segments nearly entire.—Also allied to *Pol. pungens*, Willd. (*Alsophila*, Kaulf.), from which again it differs in the pinnules

40. *A. (Gymnosphæra, J. Sm.) aculeata*, J. Sm., Gen. Fil. name only.—Trinidad.

41. *A. speciosa*, Presl, Pterid. p. 62. Under this name Presl refers to "*Polypodium speciosum*, Meyen, St. i. p. 108."—S. America?

A. strigosa, J. Sm., Gen. Fil. (name only), from British Guiana, "*Schomburgk, n. 304*," the author is disposed to consider the same as *Hemitelia Hostmanni*, supra, p. 31.

A. serrata, J. Sm., Gen. Fil. (name only), from Jamaica, Mr. Smith considers probably a var. of *A. aspera*.

A. Tumacensis, J. Sm., Gen. Fil. (name only), is *A. elongata*, supra, p. 43, n. 18; to which may be added Island of Tumaca, Central America, *Barclay*.

A. lævis, J. Sm., Gen. Fil. (name only), is *Hemitelia Guianensis*, Hook. supra, p. 31, n. 8.

A. tenera, J. Sm., Gen. Fil. (name only).—St. Vincent's, *Caley*. A portion of this, now before me, consisting of a pinna with a part of the main rachis, is unarmed and every where glabrous, except a few rather long scattered hairs on the veins above and closely appressed shorter ones on the rachis above. Pinnules about 3 inches long, broad lanceolate, thin and very membranaceous, deeply pinnatifid almost to the base, shortly acuminate into a narrow serrated point; segments oblong, obtuse, slightly falcate, serrated, lower veins forked, with the sori in the forks. The capsules have mostly fallen away, still there remains a shallow cup-shaped involucre much broken at the margin, but so large and so entirely surrounding the receptacle that I should have no hesitation in referring the plant to *Cyathea*. Its very tender frond may be the consequence of growing in a shady situation.

A. brevis, J. Sm., Gen. Fil. (name only). This Mr. Smith now considers may be a *Polypodium*.

** *Species of the South Sea Islands and Australia.*

42. *A. excelsa*, *Br.*; stipes and main rachis muricated, rachis when young especially beneath clothed with chaffy scales frequently mixed with wool, fronds bipinnate, pinnules oblong-lanceolate acuminate, segments oblong rather acute serrated at length coriaceous with the margins reflexed, lower ones subauriculate at the base free and even slightly petiolated, the lower half or sometimes the whole segments bearing sori, veins often twice or thrice forked, capsules mixed with hairs, involucre nearly obsolete a thin minute irregular mem-

brane beneath the sorus which entirely conceals it. (TAB. XVIII. A.) *A. excelsa*, *Br. Prodr. (note) p. 158. Endlicher, Prodr. Fl. Norf. Isl. p. 16. Backhouse, Austral. Voy. plate at p. 265, (group of trees with A. excelsa).*

Hab. Norfolk Island, *Ferd. Bauer, A. Cunningham, Backhouse.* — Although there may be more lofty species of Tree Ferns in the East Indies, the present one is not undeserving the name of *excelsa*. This appellation has been universally attributed to Mr. Brown, by whom the plant was perhaps first noticed in print, and who referred it to the genus *Alsophila*; yet it appears to me that by the expression “*necnon plures ineditæ ab India utraque et una excelsa Insulæ Norfolkicæ,*” he merely intended a lofty species of Norfolk Island; there being already a *Cyathea excelsa*, and indeed an *Alsophila excelsa* of Martius (our *A. Tenitis*). Lieut. King* says of this noble Fern, “It grows to the height of 80 feet, and the branches (fronds) which resemble the palm-tree, fall off every year, leaving an indentation on the trunk. The middle of the tree, from the root to the apex, consists of a white substance resembling a yam, and when boiled it tastes like a bad turnep: this the hogs feed on greedily. It is found in great plenty all over the island.” Mr. Cunningham measured a trunk which he felled in 1830, which was 57 feet in length without the fronds. Mr. Backhouse measured the stems “40 feet high, crowned with magnificent circular crests of fronds.” Endlicher’s description of this noble Fern is very full and accurate.

43. *A. australis*, Br.; glabrous, stipes aculeated? fronds bipinnate, pinnules (rather small 2—4 inches) linear-lanceolate acuminate deeply pinnatifid paler somewhat glaucous beneath, segments ovate acute entire or slightly serrated, bulate scales none, sori from 1—4 occupying the lower part of the segment, veins simple and forked, capsules mixed with a few hairs. (TAB. XIX. A.) *Br. Prodr. p. 158. Sieb. Syn. Fil. n. 122. Fl. Mixt. n. 241.*

Hab. N. S. Wales. Port Jackson and Tasmania, *R. Brown. Macquarie Harbour, Tasmania, Backhouse.* — Probably a rare species. The only specimens I am so fortunate as to possess, are amongst Sieber’s collections.

somewhat glaucous beneath: the main rachis light brown, the veins dark-colored, simple, except a few at the base of the segment, which are frequently forked and bear the sori.

44. *A. lunulata*, Br.; "fronds bipinnate, pinnæ at the apex serrated setaceous, the segments linear-oblong falcate serrated at the apex, stipes rough." *Polypodium lunulatum*, Forst. *Prodr. Fl. Ins. Austr.* p. 83.

Hab. South-Sea Islands, Forster. — Of this plant I know nothing. Mr. J. Smith, in his *Enum. Fil. Ins. Philipp.*, supposes his *A. caudata*, from Laçon (Cuming, n. 267) may be the same. See Hook. *Journ. of Bot.* v. iii. p. 419.

45. *A. decurrens*, Hook.; unarmed? nearly glabrous, fronds tripinnate, pinnules small (an inch long) sessile pinnatifid membranaceous obtuse with a few bullate scales and hairs beneath, segments ovate acute entire or slightly serrated the lower one adnate with the rachis and decurrent, veins simple or forked, sori one on each segment, receptacle elevated destitute of hairs. *Cyathea extensa?* Hook. in *Nightingale's Voy. App.*

Hab. South-Sea Islands, *Nightingale*. — A very distinct species, which I place in *Alsophila*, on account of the elevated receptacle and the presence of bullate scales. The pinnules are the smallest of any species I am acquainted with, delicate, membranaceous, pinnatifid about half-way down to the rachis, the lowest exterior segment adnate with the rachis, and decurrent along its side.

*** *Species from the East Indies, Malay Islands and Ladrões.*

46. *A.* (*Gymnosphæra*) *glabra*, Bl.; "frond bipinnate, pinnules lanceolate sharply serrated at the apex, the base truncate slightly pinnatifid glabrous, segments rotundate obtuse crenulate." *Gymnosphæra glabra*, Blume, *En. Fil. Jav.* p. 242.

Hab. Lofty mountains of Java, Blume. — The above is the description given of this plant by Blume, which, together with *A. squamulata*, he refers to his genus *Gymnosphæra*, on account of the sori being inserted on the middle of the vein; — a very inconstant character.

47. *A.* ("Gymnosphæra") *squamulata*, Bl.; frond bipinnate, partial rachis slightly squamose, pinnules all petiolate, sterile ones oblong-lanceolate, fertile portions contracted coriaceous glossy as if varnished ending in an acuminate serrulated point pinnatifid scarcely half way down to the rachis, segments ovate obtuse serrate, the margins thickened or very slightly recurved, veins simple, sori frequently confined to the lower part of the pinnules and placed close to the costa of the segments. — Bl. *En. Fil. Jav.* p. 243. *J. Sm. En. Fil. Philipp. in Hook. Journ. of Bot.* v. iii. p. 419. *Hook. Gen. Fil.* t. 100.

Hab. Java, Blume. Malacca, Cuming, n. 396. — A very well marked

species, but the description of Blume is too short to be satisfactory; though I have followed Mr. J. Smith in considering our plant the same. The main rachis is of a rich chestnut brown color; the principal pinnules have a distinct petiole, a line or a line and a half long: the texture is coriaceous, the surface singularly glossy, with the veins having the same appearance as to color and surface as the frond. Fructifications dark brown, sometimes occupying the greater part of the pinnule, which is then contracted, or confined to the lower segments, when they become contracted so that the broadest part is above the middle. A few minute dark brown bulate scales are seen on the costa. Veins simple.

48. *A. contaminans*, Wall.; aculeolate, frond bipinnate coriaceous glaucous beneath, pinnules oblong-lanceolate acuminate deeply pinnatifid, segments oblong falcate the fertile ones narrower rather obtuse crenulate, sori upon forked veins in lines parallel with the costa and covering nearly the whole segment, capsules mixed with hairs. (TAB. XVIII. B.) *A. contaminans*, Wall. *Cat. in Index*. *Polypodium contaminans*, Wall. *in Herb.* 1823, *Cat. n.* 320. *Chnoophora glauca*, Blume, *En. Fil. Jav. p.* 243. *Alsophila glauca*, J. Sm.— β . segments more elongated and acuminate.

Hab. Penang, Dr. Wallich. Java and Molucca, Millett and Blume. Luçon, Cuming, n. 71. South Camarines, Cuming, n. 291.— β . Isle Negros, Philippine Islands, Cuming, n. 345.—A well marked species, with rather rigid coriaceous fronds, becoming very dark colored in drying, but always retaining their glaucous hue beneath. The stipes is muricated with very short sharp points, and the same extend to the main rachis and to that of the pinnæ, in this respect resembling the *A. excelsa*. I retain the name of its first discoverer, Dr. Wallich, by whom it has been extensively distributed. Blume thinks it probable it may be the *Cyathea glauca* of Bory.

49. *A. caudata*, J. Sm.; unarmed, frond bipinnate glabrous, pinnules sessile oblong-lanceolate broadest at the base the apex suddenly contracted into a long narrow serrated tail-like acumen coriaceous-membranaceous paler and slightly glaucous

occupying the greater part of the segments.—*A. Brunonian*, *Wall. Cat. n. 7073*.

Hab. Mountains of Sylhet, *Dr. Wallich*. — Neither in my own rich collection of East-Indian Ferns from *Dr. Wallich*, nor in the still more extensive one which exists in the herbarium of the Linnean Society, derived from the same source, is there any specimen under this name. There is, however, an enormous trunk (caudex) of this Fern, 45 feet long, deposited in the British Museum, by *Dr. Wallich*: and from some withered remains on the summit of its caudex, the above imperfect character is drawn up. It would appear to be very closely allied to the *A. contaminans* above described, but the stipes and rachis do not seem at all muricated. The pinnules also approach very nearly some states of *A. gigantea*.

51. *A. gigantea*, *Wall.*; unarmed, fronds bi-tripinnate, pinnae ovato-lanceolate submembranaceous opaque (not glossy), pinnules oblong-lanceolate subpetiolate acuminate pinnatifid to various depths, the uppermost pinnules united into an acuminate pinnatifid apex, segments ovate more or less broad slightly falcate serrated, upper side of the rachis strigose, costae without scales or with a few minute deciduous ones, veins simple, sori in two rows placed half way between the margin and costa, receptacle elevated without hairs. *Polypodium giganteum*, *Wall. Herb. 1823, Cat. n. 321*. *Gymnosphæra gigantea*, *J. Sm. Gen. Fil.* *Polypodium altissimum*, *Wall. in Herb. 1820*. *Cyathea venulosa*, *Wall. Cat. n. 180*. *Alsophila venulosa*, *Wall. Cat. in Index*. *Polypodium? umbrosum*, *Wall. Cat. n. 336*.

Hab. Sylhet. Nepal. Mountains of Tenasserim, *Wallich*. Ceylon, *Mrs. Walker, n. 1919*. Penang, *Dr. Wallich, Lady Dalhousie*. Java, *Millett*.—Caudex gigantic, 50 feet high (*Wall.*) Fronds simple, but so variable in the form and size of the pinnules in our copious specimens, that it is scarcely possible to define them in words. I find no tubercles or aculei on the stipes or rachis. The pinnules are remote on the lower part of the main rachis, gradually becoming closer upwards, till they unite and terminate in a long, pinnatifid, acuminate point. Pinnules on some specimens 2—4 inches long, half an inch broad: in others 6 inches long and 1 inch broad: segments varying much in length and in the depth of the sinus, all of them slightly falcate, serrated, the veins almost invariably simple; lines of fructification in two rows, occupying nearly the whole length of the segment between the margin and costa. The texture of the frond is rather thin, not approaching to coriaceous; the color very dark in drying.—It is a trunk of this species which forms so conspicuous an object on the stair-case of the apartments of the Linnean Society of London.

52. *A. comosa*, *Wall.*; unarmed, stipes densely clothed with long chaffy pale brown deciduous scales, rachis strigose or almost setose above, fronds bipinnate, pinnae united towards the apex so as to be there pinnatifid, pinnules sessile or nearly so oblong-lanceolate moderately acuminate submembranaceous pinnatifid about two-thirds of the way down, segments

ovate slightly falcate obtuse, veins generally forked, bullate scales none, receptacles small slightly elevated. (TAB. XX. A.) *A. comosa*, *Wall. Cat. n. 319*.— β . pinnules more deeply pinnatifid, segments narrower, veins oftener once or twice forked, scales of the stipes more permanent.

Hab. Singapore, *Wallich. Java, Millett*.— β . Ceylon, *Mrs. Gen. Walker*. In many respects this resembles the preceding, *A. gigantea*; but it is more delicate in texture, paler in color, the veins mostly forked, the receptacles less elevated.—The var. β . may be a distinct species; yet I can discover no tangible differences except the above, to which may be added that the fronds are of a rather firmer and more coriaceous texture.

53. *A. crinita*, *Hook.*; stipes and main flexuose rachis pale colored rough with minute points and muricated with very short black spines, fronds bipinnate coriaceous, rachis everywhere hairy above beneath clothed as well as the costa with ciliated scales some short and minute the majority very long slender appressed resembling coarse shaggy hair, pinnules sessile narrow-lanceolate gradually tapering into a very slender point deeply pinnatifid almost to the rachis, segments narrow ovate oblong rather obtuse falcate the margin (when dry) strongly recurved, paler beneath where the costa and even the veins are often hairy, veins forked, sori occupying nearly the whole length and breadth of the segments and in a measure covered by the crinite scales. *Hook. Ic. Pl. t. 671*.

Hab. Ceylon, *Mrs. General Walker, n. 34 and 41*.—A very remarkable species, not like any other that I am acquainted with. It has the dark minute tuberculations on a pale stipes and main rachis, which I have described on *Cyathea medullaris*. The main rachis too, and the rachis of the pinnæ, although stout, are waved or flexuose: and they are beneath quite shaggy with copious scales; these are of two kinds, at least upon the main rachis, some of them being exceedingly small, but the majority are long, slender, subulate, more or less appressed, gradually smaller on the costæ,

of the pinnules is not different; they are less coriaceous, and the underside is slightly glaucous.

55. A. ? (*Chnoophora tomentosa*, Bl.; "arborescent unarmed, frond bipinnate coriaceous densely clothed beneath with fulvous tomentum, pinnules lanceolate acuminate deeply pinnatifid, the segments linear obtuse nearly straight the margin slightly crenulate and revolute, common rachis tomentose whitish above paleaceous beneath," Bl. *Chnoophora? tomentosa*, Bl. *En. Fil. Jav.* p. 244.

Hab. Woods on the lofty mountains of Gede, Java, Blume.

56. A. (*Chnoophora lurida*, Bl.; "arborescent unarmed, frond bipinnate coriaceous, costæ beneath and the secondary rachis paleaceo-hirsute, pinnules lanceolate acuminate deeply pinnatifid the segments linear subfalcate obtuse crenulate recurved at the margin, common rachis shining above hairy beneath." *Chnoophora lurida*, Bl. *En. Fil. Jav.* p. 244.

Hab. Mountain woods of Java and Celebes, Blume.

57. A. *Hænkei*, Pr.; "fronds triplicato-pinnate, secondary pinnæ sessile linear cuspidate acuminate, pinnules oblong obtuse subfalcate serrulate, stipes and primary and secondary rachis muricated, tertiary paleaceo-hirsute, costæ scaly beneath." Presl, *Reliq. Hænk. v. i.* p. 68. A. Marianna, Gaud. in Freyc. *Voy. Bot.* p. 365. "Cyathea Marianna, Gaud. *M.S. et Gen.* p. 74," (Freyc.)

Hab. Marianne Islands (Guam), Hænke, Gaudichaud. — Of this I know nothing, nor can much be learned from the more full description given by Gaudichaud. Although Presl himself adduces *A. Marianna* as a synonym of *A. Hænkei*, I cannot but feel doubtful on the point. Presl describes his plant with an "Indusium planum lacero-multifidum," and he speaks of it as allied to *Pol. lunulatum*, Forst., and *Cyathea extensa*, Sw. Gaudichaud also quotes, though doubtfully, *Cyathea extensa*, Schkuhr, *Fil.* p. 127, t. 132, not even excluding the figures D, E, and F, where the fructification is truly the cup of a *Cyathea*.

Doubtful Species of the East Indies.

58. A. *Manillensis*, Presl, in Mey. *Herb.* (v. Presl, *Tent. Pterid.* p. 62).

59. A. *Wallichiana*, Presl, *Tent. Pterid.* p. 62. "Polypodium e Silhet Mountains," Pr.

60. A. *glaucescens*, Wall. *Cat. n.* 7074. Mountains of Sylhet, W. Gomez. "Allied to *A. Brunontiana*, Wall. (*supra*, p. 52, n. 50).

61. A. *Grevilleana*, Wall. *Cat. n.* 7075. Mountains of Sylhet, W. Gomez.

62. *A. Telfairiana*, Wall. in Index. *Aspidium Telfairianum*, *Wall. Cat. n. 385*. Mauritius, *Mr. Telfair*. — Of this and the two preceding species I have seen no specimens.

Doubtful Species; country unknown.

63. *A. Wiegeltii*, Roem. Herb. Presl, *Pterid. p. 61*, (name only).

TRIBE II. DICKSONIÆ, *Gaud.*

Sori globose or subcylindrical, situated upon the back (WOODSIEÆ) or at the apex of a vein or veinlet (EUDICKSONIÆ) or at the confluent angle of reticulated veins (HYPODERRIDEÆ). *Involucre* inferior (having its origin from beneath) globose or cylindrical, free, sometimes covering the whole sorus, closed at the top, at length bursting at the summit; more frequently cup-shaped, open at the mouth, the margin entire or 2-lipped, naked or fimbriated or crinite, wholly or in part formed of the substance of the frond, or more membranaceous: sometimes it constitutes a shallow, very indistinct, fringed cup, of which the membranaceous portion is so small as to be concealed by the capsules, never wholly wanting.—*Tufted or creeping Ferns, generally small, rarely arborescent, inhabiting various climates, from the extreme Arctic regions to the Tropics.*

Obs. It has been found, I believe, by all botanists to be far more difficult to divide the several groups of Cryptogamic plants into natural and tangible sections, than the so-called higher orders of Phænogamous plants. They are seen to pass so insensibly, the one into the other, and to be connected by so many different links, that it is next to impossible to define them by words, and in vain to expect that the several individuals who study them should arrive at the same conclusion in regard to their respective limits, artificial though, in a linear series, they must still, in a measure, necessarily be. — The several genera, for example, which I here bring under one

tion, bring together plants very little allied by nature, for no Ferns can be more different, if habit be considered, than *Hypoderris* and *Trichomanes*; yet if the nature of the sori and of the involucre especially is of such primary importance as has generally been allowed, I have no other characters to offer, and none so simple, as the usually *free cup-shaped sometimes bifid involucre* of *Dicksonia*. *Loxsona*, while it is closely allied in the form and structure of the involucre to *Trichomanes* on the one hand, on the other is the connecting link with *Davallia*.

SUBTRIBE I. *Sori on the junction of reticulated veins or veinlets.*

HYPODERRIDEÆ.

1. HYPODERRIS, Br.

Sori dorsal, globose, inserted in lines or series, parallel with the primary veins upon the confluent angles of reticulated veinlets. *Involucre* inferior calyciform thin and membranaceous loosely reticulated, the margin spreading and fimbriated. *Capsules* nearly globose, stipitate, on a small punctiform receptacle. — *Native of Trinidad.* Frond *stipitate, simple, subcordato-hastate, acuminate, costate, pinnately veined, membranaceous*; veins *alternate, nearly parallel, flexuose*; primary veinlets *pinnated, the rest anastomosing, so that almost the whole surface has a reticulated venation.* HOOK. GEN. FIL. TAB. 1.

1. *H. Brownii.* J. Sm. MS. in Hook. Gen. Fil. l. c. Hook. Ic. Pl. t. 675, 676.

Hab. St. Anne's Valley, Trinidad, *Lockhart*.—Caudex creeping. Stipes from a span to a foot high, scaly. Frond longer than the stipes, ovate-lanceolate, acuminate, entire, membranaceous, glabrous, the base with rather a deep sinus, and on each side a short obtuse rounded lobe, or this is occasionally prolonged into two broadly lanceolate, sometimes acuminate, erectopate segments, 2—5 inches long. Costa strong, emitting a branch at the base to each auriculated segment; this costa is again regularly pinnated with strong, parallel veins, which are connected by slender transverse ones, sending off branches which form a nearly hexangular, delicate network over the whole surface. Several of the areolæ, especially near the strong lateral veins from the costa, are occupied by a free veinlet. Sori not very copious and always on the angle of united veinlets arranged in rather remote series on each side of the lateral veins just mentioned; and when more copious also on each side the primary transverse veinlets.

This rare plant was first noticed by Mr. Brown, who says, in Wallich's *Ic. Plant. Asiat. Rar.*, when speaking of *Matonia*, "the beautiful ramification of veins in *Matonia*, is not altogether peculiar to it. Among the genera of *Polypodiaceæ* having an indusium, one remarkable example occurs in a genus yet undescribed (*Hypoderris*), which, with an indusium not materially different from that of *Woodsia*, has exactly the habit of *Aspidium trifoliatum*, while of those genera of *Polypodiaceæ* which are without an indusium, the same kind of vascularity is found in an extensive and very natural section of *Polypodium*, to which *P. Phymatodes* and the greater number of those species, 'sori saccati' belong."—Mr. J. Smith places this genus in "*Aspidiceæ*" between *Matonia* and *Aspidium*, Pr. although its involucre is

widely different from both. To the latter genus, as restricted by Presl and J. Smith, it is undoubtedly allied in its venation, while it is equally so with the *Phymatodes*-group of *Polypodium*. Considering as I do, that the primary divisions of Ferns should be taken as much as possible from the fructification, I have no hesitation in placing *Hypoderris* among the *Dicksonias*, and near to *Woodsia*, with which it bears the same relation that *Aspidium*, Presl, does to *Lastrea* in *Aspidias*; or *Phymatodes*, Presl, to *Polypodium*, under *Polypodiaceæ*.

I am indebted to Mr. Lockhart of Trinidad for fine specimens of this plant.

SUBTRIBE II. *Sorus on the back of a simple vein or veinlet.* WOODSIEÆ, (Peranemaceæ, Pr.)

2. SPHÆROPTERIS, *Wall.* (not *Bernh.*)

Peranema, *Don*, *Presl.*

Sori globose, on the back of a vein or veinlet. *Receptacle* elevated globose. *Involucre* inferior, globose, coriaceous, stalked, at first entire and covering the whole sorus, at length bursting rather irregularly and vertically at the top into 2 valves or lips. *Capsules* numerous, stipitate. — *Native of Northern India.* *Rhizoma large, globose; no distinct caudex.* *Fronds erect, stipitate (stipes and rachis chaffy), tripinnate.* *Veins simply pinnate, veinlets rarely forked, clavate at the apex within the margin, and glandular below the apex on the under side; lower anterior veinlet soriferous.* HOOK. GEN. FIL. TAB. 22.

1. *S. barbata.* *Wall. in Herb.* 1823; *Cat. n.* 183; *Pl. Asiat. Rar. i. p.* 42, *t.* 48. *Peranema cyathoides*, *Don*, *Prodr. Fl. Nep. p.* 12.

Hab. Nepal, Wallich, 1821. — *Fronds* 2—3 feet long, tripinnate; the base of the stipes densely clothed with long brown membranaceous acuminate scales; the main and partial rachis with fewer scattered smaller ones. *Pinnules* oval-oblong sessile, decurrent, so that the partial rachis is winged,

herbaceous, decomposed. Stipes and rachis paleaceo-hirsute. Veins pinnated. Veinlets simple, free, clavate at the apex within the margin: lower anterior veinlet soriferous. HOOK. GEN. FIL. TAB. 99.

1. *D. aspidioides. Bl. En. Fil. Jav. p. 241. Aspidium foliolosum, Wall. Cat. n. 359. Cistopteris gigantea, Pr. Phymatium aspidioides, Kunze, Anal. Pterid. p. 43.*

Hab. Woods on the elevated mountains of Java, *Blume. Sylhet, Wallich. Assam, Mrs. Mack, Mr. Griffith.*—A graceful Fern, 2—4 feet high, with rather a long stipes, clothed below with very large, broad, opaque, brown, membranaceous scales. Similar scales, but smaller and almost rotundate, are seen at the axils of the pinnae of the younger plants. Fronds tripinnate, primary pinnae often nearly opposite: main and partial rachis frequently beset with copious short setose scales, especially beneath, sometimes with long crinite scales which also appear on the veins above: these afterwards disappear, and the rachis is then quite smooth. Pinnules submembranaceous, oblong-cuneate, pinnatifido-lobate, more or less decurrent, so that the rachis of the ultimate pinna is generally winged:—the lobes are deeper at the anterior edge. Veins dark-colored, simply pinnate, the veinlets undivided, not reaching quite to the margin. Involucres exactly globose, attached by a small point, dark mahogany-colored. Presl has strangely placed this in the genus *Cistopteris*, and yet appears to have seen a Wallichian specimen in the Royal Berlin Herbarium. Kunze refers it to the genus *Phymatium*, but the firm texture of the involucre and the whole habit of the plant seem to forbid such an union.

4. ? ARACHNIODES, *Bl.*

“*Sori* roundish, scattered, inserted upon a slightly elevated receptacle. *Involucre* arachnoid, covering the sorus.” *Bl.*

1. *A. aspidioides, Bl. En. Fil. Jav. p. 242.*

Hab. Summit of the mountain Burangrang, Java, *Blume.*—Of this we have but a short and imperfect description given by its discoverer, *Blume*; and its place among Ferns is doubtful to me. It is compared in its fructification to *Trichopteris*, Presl, or *Chnoophora*, Kaulf.; but the habit seems very different. A solitary specimen only appears to have been found, in all respects resembling *Aspidium coriaceum*, Sw., except that the pinnules are acute. “Nevertheless,” Dr. *Blume* observes, “it cannot be associated with the *Aspidia*, the structure of the involucre being so different. It consists of a cobweb-like substance covering each sorus, soon evanescent, and so tender that it can scarcely be said to form a membrane.”

5. WOODSIA, *Br.*

Phymatium, Kaulf. Hymenocystis, C. A. Mey. Polypodii sp. Auct. Alsophilæ sp. Spr.

Sori globose, situated on the back of a vein or veinlet. *Involucre* inferior, soft-membranaceous, either from the first calyciform or pateriform, or more or less globose and sometimes in an early stage completely covering the entire sorus,

at length opening at the top, the margin or mouth irregular, lobed or fimbriated. *Capsules* globose, on short stalks, arising from a small punctiform receptacle.—*Small Ferns, mostly of temperate or even cold climates, caespitose, stipitate, the stipes sometimes jointed and separating at the joint. Fronds membranaceous, tender, pinnately divided. Veins pinnated, simple or forked.* HOOK. GEN. FIL. TAB. 119 and 3.

Obs. The genus was established by Mr. Brown in 1813 upon the *Poly-podium hyperboreum* and *Ilvense* of Linnæus, in which it must be confessed that the minute inferior cup-shaped or rather pateriform involucre is with difficulty seen, though its marginal fringe of hairs be sufficiently evident. To this genus Dr. Greville and myself had no hesitation in referring the *Aloophila Perriniana*, Spr. which has comparatively large involucre, almost covering the sorus, and simply lobed at the margin, the lobes spreading. From this structure the passage is but slight to the more globose involucre, lobed at the contracted mouth, of *Hymenocystis*, C. A. Mey., and this again cannot naturally be separated from *Physematium*, Kanlf., in which the involucre is at first perfectly globose and entire (see Kunze's excellent figure in *Annecta Pteridographia*, t. 27), afterwards it opens at the summit with an irregular mouth. These supposed genera of authors will therefore, with me, as with Mr. J. Smith, form but one:—but they may be conveniently divided into subgenera, as follows:—

Subgen. I. PHYSEMATIUM, *Kauf.* *Involucre at first globose and probably entire, afterwards bursting at the top with an irregular contracted opening and persistent. Hymenocystis, C. A. Mey.* HOOK. GEN. FIL. TAB. 3.

1. *W. mollis*, J. Sm.; fronds lanceolate pinnate, densely clothed especially beneath with soft articulated hairs, pinnæ sessile oblong-ovate obtuse pinnatifid, segments approximate oval subrotund obtuse entire, sori marginal, involucre hairy at first apparently closed (*Kunze*), afterwards opening with a contracted jagged roundish mouth, rachis and stipes chaffy. *Physematium molle, Kunze in Bot. Zeit. i. p. 341; et*

crenato-serrate, sori intermediate between the margin and costa, involucre glabrous at first closed afterwards bursting at the top with an irregular roundish contracted opening, stipes and rachis with few small deciduous hair-like scales. (TAB. XXI. A.)

Hab. Guatemala, *Mr. Skinner*.—Nearly twice the size of the preceding, with all the herbaceous portion glabrous; the segments of the pinnæ more remote, more serrated or crenate. Sori pale brown, membranaceous, remaining long closed or entire at the top, then bursting and persisting with a contracted loose mouth.

3. *W. Peruviana*, Hook.; fronds oblong-lanceolate bipinnate piloso-glandulose, primary pinnæ nearly opposite remote sessile, ovate-acuminate, pinnules opposite or rarely alternate oblong obtuse sessile and decurrent so that the rachis is winged somewhat pinnatifid with shallow bicuspidate lobes, sorus solitary in each lobe subglobose at first entire afterwards bursting at the top with an irregular contracted mouth, stipes and main rachis glabrous. (TAB. XXI. B.)

Hab. Shady places, Huamantanga, Andes of Peru, *Mathews*, n. 602.—A very distinct species, and the tallest of any I am acquainted with, the frond with a portion of the stipes being 14 inches long. This frond is twice pinnate, the pinnules almost all opposite, very patent, rather remote, cut in a pinnatifid manner into a number of small lobes, which are bicuspidate, terminating in two, rarely three, sharp teeth.

4. *W. (Physematum, Kze.) Cumingiana*, Kze.; “frond narrow-lanceolate deeply pinnato-pinnatifid, pinnæ somewhat remote sessile lanceolate subacuminate rather obtuse glabrous above, beneath on the costa veins paleaceo-hirsute, segments oblong rounded glanduloso-dentate decurrent, sori solitary upon the teeth, involucre glabrous, rachis and stipes (of moderate length) subglabrous purple.” *Kunze, Anal. Pterid.* p. 43.

Hab. “Probably in Chili,” *Cuming*, (in *Herb. Kunze*).—“Between *W. Physematum* *incisa* and *Perriniana*, but different from both. Stipes 3 inches, frond $7\frac{1}{2}$ inches long, 2 broad. Lower pinnæ and superior ones smaller. *W. incisa* differs in the narrower pinnæ piloso-glandulose, obtuse, obtusely toothed, in the involucre being at length lacinated, the lacinia reflexed. *P. Perriniana* differs especially in the pinnæ being deltoideo-ovate, minutely glanduloso-pilose, in the involucre being deeply cut, and the stipes and rachis chaffy.”—I place this in the present group rather than the following, though the species is quite unknown to me, because in contrasting the involucre with those of the *W. incisa* and *Perriniana* (belonging to the next group) the author speaks of the deeply cut involucre of the latter, and their spreading segments, as if a contrary character existed in *W. Cumingiana*. It is probably allied to our *W. Peruviana*, and very likely not from Chili: at least I possess no such plant from Cuming gathered either in Chili or in Peru, and I had the choice of his collections immediately on his return from those countries.

5. *W. Caucasica*, J. Sm.; fronds lanceolate glabrous acuminate pinnate the costa and rachis slightly hairy, pinnæ sessile nearly opposite lanceolate but broadest at the base acuminate pinnatifid, segments ovate-oblong oblique obtuse dentate, sori 2 on each segment near the base one on each side the costa near the margin, involucre glabrous large membranaceous loose at first apparently entire with a central depression at length opening with a contracted depressed irregular and somewhat 2-lobed mouth. — *Hymenocystis Caucasica*, *C. A. Mey. Pl. Cauc. et Casp. p. 229*; *Hook. Gen. Fil. t. 3. Phymatium fragile*, *Kunze, Anal. Pteridog. p. 42*. *Dicksonia fragilis*, “*L. C. Trevir. in Berl. Mag. vii. 1816, p. 155, tab. 3, f. 18, 19.*” *Aspidium Caucasianum*, *Fisch. in Herb. nostr.*

Hab. The country adjacent to the Caspian Sea, *F. Blume*. Rocky places in the Caucasus, at an elevation of 1000—6000 feet above the level of the sea, *C. A. Meyer*. — A span or more high, with the frond and the pinnæ more acuminate than in any other *Woodsia*, and somewhat resembling *Cistopteris fragilis*. The involucre are peculiarly large for so small a plant, the two on each segment often meeting together over the costa and the other side overlapping the margin: they seem too large for the sorus, which gives them a somewhat irregular and bullate form, considerably different from other fructifications in the genus.

6. *W. elongata*, Hook.; glanduloso-pilose especially above, fronds oblong elongated pinnated, pinnæ rather distant alternate sessile from a broadish base oblong-obtuse pinnatifid not more than half way down, segments short rounded inciso-dentate each bearing a sorus (rarely more) on the lower anterior veinlet near the sinus, involucre small soon bursting with an irregular opening at the top glanduloso-pilose, stipes and rachis slightly chaffy. (TAB. XXI. C.)

Hab. Northern India. Himala mountains, *Lady Dalhousie*. *Krande, Pakenham Edgeworth, Esq.* — A very distinct and well-marked species

tooth or lobule and near the sinus, involucre glabrous very thin and fragile soon breaking down into spreading lobes, stipes and rachis partially chaffy. *Physematium obtusum*, *Hook. Fl. Bor. Am. v. ii. p. 259*. *Aspidium obtusum*, *Willd. Schkuhr, Fil. t. 43 (figure bad)*. *Pursh, Am. v. ii. p. 262*. *Polypodium obtusum*, *Sw. Schkuhr, Fil. t. 21*. *Woodsia Perriniana*, *Hook. et Grev. Ic. Fil. v. i. t. 68*. *Physematium Perrinianum*, *Kze. Anal. Pterid. p. 43*. *Alsophila Perriniana*, *Spreng.*

Hab. United States of America; Pennsylvania to Virginia, *Pursh*. Kentucky, *Dr. Short, Mr. Peter*. West side of the Rocky Mountains, near the sources of the Columbia, *Douglas, Drummond*.—It is probable, as suggested in the 'Flora Boreali-Americana,' that this Fern is not a native, though it has been so stated, of the West-Indies. It seems to be wholly confined to North America, and I possess unusually fine specimens, 12—14 inches long, from Dr. Short of Kentucky. It is a most distinct and well-defined species: and is assuredly the old *Aspidium obtusum* of American authors.

8. *W. incisa*, Gill. *Hook. & Grev.*; fronds broad-lanceolate minutely glanduloso-pilose pinnated, pinnæ approximate subopposite sessile oblong obtusely attenuated deeply pinnatifid sometimes again pinnate, segments or pinnules oval pinnatifidly lobed and toothed or incised the teeth obtuse, sorus solitary on each lobule near the sinus, involucre glabrous very thin and fragile soon breaking down into spreading lobes. *Hook. et Grev. Ic. Fil. t. 191*. *Physematium incisum*, *Kunze, Anal. Pterid. p. 43*.

Hab. Shady mountain rocks, near Mendoza, and San Luis de Cordova, Argentine Republic, *Dr. Gillies*.—Quite distinct from the preceding and from every other species, and apparently only discovered in the locality above mentioned.

Subgen. III. *WOODSIA vera*. *Involucre minute, pateriform, covered and concealed by the capsules, the long hairs of the margin only projecting beyond the sorus. Stipes with a joint.* *HOOK. GEN. FIL. TAB. 119.*

9. *W. Ilvensis*, Br.; slightly hairy above, stipes rachis costa and nerves below crinite and clothed with copious rufous chaffy scales, frond broad-lanceolate, pinnæ oblong obtuse broader at the base sessile deeply pinnatifid with many oblong obscurely crenated somewhat coriaceous segments.—*Br. in Linn. Trans. v. xi. p. 173*. *Hook. in E. Bot. Suppl. t. 2616*. *Polypodium*, *Sw.* *Acrostichum*, *Linn.* *Nephrodium rufidulum*, *Ph.*

Hab. Rocks; northern part of the northern hemisphere as far as Greenland; and mountainous regions in the temperate countries. Altai mountains, *Bunge*. Rare in Britain; Wales and Yorkshire.

10. *W. hyperborea*, Br.; glabrous or with the stipes rachis

and costa beneath slightly hairy mixed with a very few narrow pale chaffy scales, fronds linear-lanceolate pinnated, pinnæ cordato-ovate membranaceous pinnatifid with few (5—7) broadly obovate entire segments, the lower ones remote.—*Br. in Linn. Trans. v. xi. p. 173. t. 11.* Polypodium, *Soc. Presl. E. Bot. t. 2023.* P. Arvonicum, *Sm.*

Hab. Rocks; Arctic and subarctic countries of the northern hemisphere; very rare in the mountainous parts of the temperate regions; Savoy (*Hooker*): rare also in Britain. On Snowdon, Wales; Ben Lawers and in Clova, Scotland.—Some of the small hairy specimens, with a few chaffy scales, assuredly come very near the preceding; and I have seen individuals that I have found it difficult to pronounce upon: yet I believe they are really distinct. The present is generally the tallest and most tender and membranaceous plant, the fronds much narrower, the lower pinnæ distant and gradually becoming smaller from near the middle; the sori are larger, soon confluent.

11. *W. glabella*, *Br.*; quite glabrous, fronds linear tapering a little below pinnated, with the pinnæ very remote towards the short stipes, all of them deltoid thin and membranaceous very obtuse, cut into a few (3—7) short rounded or subcuneate nearly entire lobes.—*Br. in Richards. App. to Frankl. Journ. p. 39.* *Hook. Fl. Bor. Am. v. ii. p. 259, t. 237.*

Hab. Subarctic America; abundant about Great Bear Lake, *Dr. Richardson*.—This approaches much nearer to the last species than the first: but is more delicate and slender, of a paler colour, quite glabrous, far narrower in the frond and the lower pinnæ coming down much lower on the stipes.

SUBTRIBE III. *Sori on the apex of a vein or veinlet, and frequently projecting more or less beyond the margin.* EUDICKSONIÆ.

6. THYRSOPTERIS, *Kze.*

Panicularia, Colla.

or *thyrsoidal* raceme or panicle, and the sori are stalked. Main rachis stout, woolly (the wool deciduous), with a deep furrow on one side; it and the stipes unarmed. HOOK. GEN. FIL. TAB. 44, A.

1. *T. elegans*, Kze. in *Linnaea*, ix. 506; and in *Schk. Fil. Suppl. p. 3, tab. 1.* "Panicularia Berteri, A. Colla, *Memor. Act. Torin. v. xxxix. p. 33, t. 64.*"

Hab. In moist woody, shady, and mountainous places, Juan Fernandez, Bertero, 1830, (n. 1537).—Of this beautiful Fern, fine specimens were sent me by its lamented discoverer, marked "Cyathea? an potius Aneimia? sp.?" and indeed the nature of the fronds and the thyrsoid character of the fructifications would induce one at first sight to suppose it would naturally rank near the latter genus: but the fructification is totally at variance with that, and may be considered identical with *Cyathea*, so far as the structure of the involucre and capsules and receptacles is concerned; nor am I yet sure that its proper place is not among Cyatheous plants. The terminal sori, however, upon the veins, and the general appearance of the fronds, lead to the conclusion that its natural position is near the true *Dicksonia*. Kunze remarks that "this Fern is said to have a caudex as thick as a walking-stick; whence it has been supposed to be arborescent." Bertero is silent in regard to the trunk, in his notes accompanying my specimens, and Presl does not allude to it. But the latter author says "An huic generi adnumeranda est *Chonta* Molinæ, quæ arbor, trunco atronitente a Chilensis ad baculos prædilectos usitato, foliis multidivisis, divisionibus tenuibus, baccis racemosis quæ hucusque ad Palmas relata fuit."

7. DICKSONIA, L'Hérit.

Balantium, *Kaulf.* Culcita, *Pr.* Leptopleuria, *Pr.* Cystodium, *J. Sm.* Patania, *Pr.* Sitolobium, *Desv.*

Sori situated at the margin of the frond, and always from the apex of a vein. *Involucre*s subglobose or reniform, coriaceous or membranaceous, formed, in part, of a more or less changed *lobule* of the frond and of the *proper involucre* more or less united, generally recurved, 2-valved or entire, frequently (in the subgenus *Patania*) cup-shaped or campanulate. *Receptacle* more or less elevated. *Capsules* sessile or stipitate, with an incomplete ring.—*Tropical Ferns, or inhabiting temperate climates, chiefly in the southern hemisphere, one in N. America; sometimes arborescent.* Fronds generally ample, various in composition, frequently much divided into small, coriaceous or membranaceous pinnules. Veins pinnated, simple or forked.—HOOK. GEN. FIL. TAB. 20. (Balantium, *Kaulf.*; but the original *Dicksonia*, L'Hérit.). TAB. 60, A. (Culcita, *Pr.*). TAB. 60, B. (Leptopleuria, *Pr.*). TAB. 96. (Cystodium, *J. Sm.*). TAB. 61, A. (*Dicksonia*, *Pr.*). TAB. 61, B. (*Patania*, *Pr.*)

Obs. It is not without the most careful consideration that I am induced

to unite the several genera above mentioned; and thus, as it were, to restore the original genus *Dicksonia*, as understood by L'Héritier. It is true, if we look at the majority of species of the *Patania*-group, there is a considerable difference, both in habit and apparently in the structure of the involucre, from the arborescent species of the *Balantium*-group; but, in regard to habit, all intermediate grades may be seen, and the difference of structure in the involucre is more in appearance than in reality. In both cases the involucre may be said to be double: there is a true and an accessory one; the true one, generally membranous, is situated near the margin, below a small lobule of the frond, which latter is recurved, more or less changed in texture, and united with the true one in a *greater or less* degree; in the first case forming the cup-shaped or campanulate, generally entire, involucre of *Patania*; in the latter case the 2-lipped or 2-valved involucre of *Balantium* &c. In some instances, as in our *D. Plumieri*, our *D. dubia* (*Davallia dubia*, Br.), the accessory and the true involucre are scarcely united, and then it is difficult to distinguish the genus from some *Davallia*, especially that group called *Microlepia* by Presl. In short, it may be said that the proper involucre of *Davallia* united with the accessory one of *Cheilanthes*, go to form that of *Dicksonia*.

Subgen. I. BALANTIUM. *Involucre distinctly 2-valved.* *Balantium*, *Kaulf.* *Culcita*, *Pr.* *Leptopleuria*, *Pr.* *Cystodium*, *J. Sm.*

1. *D. arborescens*, L'Hérit.; arborescent, fronds bi-tripinnate coriaceous, pinnæ oblong scarcely attenuated obtuse, pinnules or segments ovate acute serrated decurrent upper ones coadunate, fertile pinnules contracted, stipes rachis and costa beneath clothed with ferruginous glandular wool. (TAB. XXII. A.). *L'Hérit. Sert. Angl. p. 31.* *Wall. Cat. n. 64.* *Dicksonia integra*, *Sw.* *Balantium arborescens*, *Hook. Gen. Fil. l. c.* *B. auricomum*, *Kaulf. Enum. Fil. p. 228, t. 21, f. 12. Presl.*

Hab. Island of St. Helena, *Sir Jos. Banks, Dr. Solander, and various travellers*; only near the highest summit of Diana's Peak, *J. D. Hooker.* — Caudex 9 or 10 feet high, clothed with the bases of the old stalks of the fronds and crowned at the summit with a horizontal tuft of dark rusty green

Prodr. Nov. Holl. p. 157. *Balantium antarcticum*, Presl.
Cibotium Billardiæ, Kaulf.

Hab. Van Diemen's Land, *Labillardière*, Brown. Ravines in the mountainous parts of the island, and close to the sea on the southern shores, Gunn, Backhouse, J. D. Hooker. Summit of the Blue Mountains, New Holland, Allan Cunningham, 1823. — This is truly a noble arborescent Fern, with a trunk or caudex 30—35 feet high. It is well represented in the plate of a "Fern valley, Van Diemen's Land," in Mr. Backhouse's 'Narrative of a Visit to the Australian Colonies.' With a trunk, however, more lofty than that of *D. arborescens*, and fronds probably equally large, the pinnules and segments are very much smaller, not one fourth part of the size, and the apices of the pinnae and pinnules are more acuminate. The sori are small, but equally copious on the segments, which are but little contracted in consequence of their presence. Fine living plants of this Fern exist in the greenhouse of the Royal Gardens of Kew, and in that of His Grace the Duke of Devonshire, at Chatsworth.

3. *D. Sellowiana*, Hook.; arborescent, fronds supradecomposed coriaceous glabrous, general and partial pinnae scarcely acuminate at the apex, the latter oblong-lanceolate, pinnules and segments ovate acute pungent incisoserrate, fertile ones pinnatifid scarcely altered, sori small, general rachis quite smooth. (TAB. XXII. B.). *Balantium Sellowianum*, Pr., (according to specimens from the Royal Berlin Herbarium). *Dicksonia Organica*, Miers, MS. in *J. Sm. Gen. Fil. (name only)*.

Hab. Brazil, Sellow. Organ Mountains, J. Miers, Esq. in *Herb. nostr.*—In general appearance, in the size of the pinnae, pinnules and ultimate segments, and in the size and form of the involucres, this has an exact affinity, except in the pinnae not being so much acuminate, with the preceding, *D. antarctica*: nor can I detect any difference, save the less acuminate pinnae, and the perfectly smooth, not rough, main rachis.

4. *D. Berteroana*, Hook.; arborescent, fronds decomposed (tripinnate at least) coriaceous glabrous, pinnae all acuminate, ultimate pinnae or pinnules crowded oblong acuminate broader and imbricated at the base pinnatifid almost to the rachis, segments oblong-ovate acute somewhat pungent subfalcate serrated the lower ones free (ultimate pinnules) fertile ones narrower more elongated almost all free deeply pinnatifid into 7 or 8 lobes each of which bears a rather large sorus, stipes slightly rough more or less woolly. (TAB. XXIII. A.) *Balantium Berteroanum*, Kunze, *Anal. Pterid. p. 40.* *Davallia*? an sp. n.? an gen. distinct.? *Bertero MS. in Herb. nostr.*

Hab. Thickly wooded places on the elevated mountains of Juan Fernandez, Bertero, n. 1538.—Caudex 6—15 feet high, Bertero.—Here again we have a *Dicksonia* nearly allied to *D. antarctica* and *D. Sellowiana*, yet from a widely different locality to either of them. It is however more distinct from them, than they are from each other. The ultimate pinnae and pinnules and segments are much more crowded, their bases literally imbricating each

other, the fertile fronds are more divided, the ultimate pinnæ (or pinnules) being again pinnated, the fructified segments more contracted, more deeply divided, and the sori are much larger, next in size indeed to those of *D. arborescens*. Our figure will give a better idea of these differences than can be conveyed by words.

5. *D. squarrosa*, Sw.; arborescent, caudex clothed with the bases of the old stalks, stipes (black) and rachis everywhere rough with raised points and frequently hispid with black spreading hairs, fronds coriaceous 3—4-pinnate, ultimate pinnæ oblong moderately acuminate deeply pinnatifid, segments ovate or oblong pungent and mucronately serrated, fertile segments much smaller contracted deeply pinnatifid each lobe bearing a rather small sorus, valves of the involucre both concave nearly equal. *Schkuhr, Fil. p. 124, f. 130, (barren frond only)*. *Trichomanes squarrosum, Forst. Prodr. p. 86.*

Hab. New Zealand. Dusky Bay in the middle island, southern extremity, *Forster*; extending northward probably through the whole of the middle and northern islands, *Allan and Richard Cunningham, Colenso, Sinclair, J. D. Hooker, and various travellers*.—Trunk 6—8 feet high, or perhaps more, crowned with noble tufts of bright green, beautifully graceful fronds, divided more copiously and into much finer segments in the fructified portions. The acutely and pungently serrated segments, the black stipes and rachis, rough with little elevated points mixed with black spreading bristles, readily distinguish this species from the two following.

6. *D. fibrosa*, Colenso; "arborescent, caudex bulky clothed with an excessively thick dry fibrous substance," main and partial rachis smooth (not rough) clothed with dense patent velvety hairs especially beneath, fronds coriaceous bipinnate (fertile tripinnate) primary pinnæ much acuminate, secondary or ultimate ones oblong-lanceolate acute deeply pinnatifid, segments ovate subfalcate pungently acute and sharply

the plant; and in time causes it to appear unusually bulky. Some trees were noticed from 16—19 inches in diameter. The natives cut away this fibrous outside in thick slices, which they use for many purposes in the construction of their dwelling houses, and especially their stores for food. Being easier cut by them than wood, a piece resembling a small plank may readily be obtained. It is also found much more effectual than such timber as they, with their limited means, could cut, for excluding rats and mice, for these animals cannot gnaw the dry fibrous substance so readily as through wood. Its living fronds are few in number, spreading and deciduous; when dead they remain hanging for a long while thickly around the trunk, giving the plant a peculiar bushy appearance. Its foliage, when living, is much softer than that of *D. squarrosa*, which is very harsh and spiny, and much more deeply veined. The natives call this species *Weki-ponga*; a word worth noticing, as showing the acuteness of their observation of natural productions: it being evidently derived from *Weki*, the name given by them to *D. squarrosa*, and *Ponga*, their name for *Cyathea dealbata*; this plant being, according to their ideas, intermediate between those two species; or possessing characters common to both, which undoubtedly it has in general appearance; uniting the softness of the foliage of the one, with the rough caudex and deciduous fronds of the other."

7. *D. lanata*, Colenso; subarborescent, stipes (pale brown) and rachis smooth but clothed with dense shaggy deciduous wool, fronds ovate bi-tripinnate coriaceous, ultimate pinnæ oblong shortly attenuated obtuse deeply pinnatifid, segments ovato-oblong obtuse subfalcate obtusely serrated, the lower ones free (pinnules), fertile segments smaller contracted deeply pinnatifid each lobe bearing a rather small sorus, valves of the involucre both concave nearly equal. (TAB. XXIII. C.). —*D. lanata*, Colenso in *Tasm. Journ. of Nat. Sc.* *D. lævis*, Heward, MS. in *Herb. nostr.*

Hab. New Zealand, northern island, first detected by Mr. Allan Cunningham; J. D. Hooker. Acclivities, cleared woods on the high shores of the east side of Waikare lake, December, 1841, W. Colenso, Esq. — This, so far as I can learn, and as Dr. Hooker's observation goes, does not rise much above the ground, and forms but a short imperfect caudex. It is extremely different from the two preceding species, in the quite smooth stipes and rachis, of a pale brown colour, clothed with copious yellowish deciduous wool, and the very blunt segments and serratures of the segments. Mr. Colenso indeed in his MS. now before me, mentions a variety "*B. hispida*, which is much larger, and grows on the mountain range of Wananake, near the Wangarei lake, E. coast. It attains to 5—6 feet in height, including the stipes, and is nearly quadripinnate; its pinnules too are more distant, segments oblong-linear and pinnatifid, and the hair of the stipes and frond is much more rigid and of a dark brown colour. I am almost inclined to consider it a distinct species, but wait the examination of better specimens than those at present in my possession." — I have received from this persevering and enthusiastic botanist a specimen marked "33, *Dicksonia*, n. sp.?" which I take to be the plant just alluded to. If so, though a rather striking variety, I still think it but a variety. The stipes and rachis are pale brown, slightly rough to the touch, but not sensibly to the eye, quite free from woolly covering, which has no doubt fallen away; but the base of the stipes is clothed with long, silky, dark brown setæ; the

sterile fronds are dark green above, pale beneath; the segments of the pinnae larger; the fructifications are similar, but the involucre are yellow, not reddish-brown as is usually the case.

8. *D. Culcita*, L'Hérit.; caudex creeping, stipes with dense long fulvous silky hair at the base, fronds triangular 4-pinnate subcoriaceous glabrous, pinnules ovato-cuneate incise-serrate or lanceolate and pinnatifid, fertile ones somewhat contracted, sori rather large 1—3 on each lobe or pinnule, involucre reniform on the anterior margin, the valves both concave nearly equal.—*Culcita macrocarpa*, *Pr. Hook. Gen. Fil. t. 60, A.* *Balantium Culcita*, *Kaulf.*

Hab. Madeira and the Azores, *Masson and other travellers*. In the latter island on mountains of 2—3000 feet of elevation, *Guthrie, H. C. Watson*. A well known and beautiful Fern, as far as I know, confined to the islands just mentioned. I can see no reason for separating this from *Dicksonia* (*Balantium, Kaulf.*), as Presl has done under the generic name of *Culcita*, and whose characters rest on the semilunate involucre, with the two valves alike, the transverse, linear and crest-shaped receptacle and large sori: while Mr. J. Smith retains the genus *Culcita* on the ground of the "slightly oblong and coriaceous texture of the frond with the remarkable criniferous rhizoma."

9. *D. conifolia*, Hook.; caudex creeping?, fronds ample lax quadripinnate membranaceous glabrous, ultimate pinnules small lanceolate acuminate distant incise-pinnatifid, the segments short oblong obtusely bi-tridentate, ultimate rachis compressed winged, main rachis woolly especially on one side, fertile pinnules scarcely contracted, sori large reniform terminating a short tooth membranaceous brown, the valves nearly equal of the same texture. (TAB. XXIV. A.)

Hab. Caraccas, *Linden, n. 538*.—The caudex and stipes are unknown to me: they probably resemble *D. Culcita*, with which the involucre exactly agree; but the species is very different. Primary pinnae 1½ foot long, 8—

11. *D. dubia*, Gaud.; caudex creeping?, fronds tripinnate subcoriaceous, pinnæ deeply pinnatifid in the larger ones down to the winged rachis lanceolate inciso-serrate, the lower ones remote and again pinnatifid hairy beneath (at length glabrous), sori globose, upper valve of the involucre formed of a scarcely changed tooth or lobule of the frond reflexed, lower one small convex membranaceous and jagged. (TAB. XXIV. C.)—*Gaudich. in Freyc. Voy. Bot.* p. 367. *Davallia dubia*, *Br. Prodr.* p. 157. *Balantium Brownianum*, *Pr. Pter.* p. 134, t. 5, f. 4. *Dicksonia fallax*, *Kaulf. in Sieb. Syn. Fil.* n. 111, *Fl. Mixt.* n. 247. *Woodsia? dubia*, *Desv.*

Hab. Port Jackson, and Tasmania, *Brown, Sieber, Sinclair, Bynoe, Guss., J. D. Hooker.*—A pale straw-coloured species, with coriaceous rigid apparently ample fronds, generally with rusty hairs beneath. Mr. Brown places this plant in *Davallia*, because he does not consider the small reflexed lobule which partially covers the sori as a portion of the involucre, which may well be considered doubtful, as is that of *D. adiantoides*: but from analogy, and especially from the close affinity of the species with *D. straminea*, I prefer ranging it in *Dicksonia*, as Gaudichaud and Kaulfuss have done. Presl represents a more evident two-valved involucre than I find, and one exactly resembling that of *Dicksonia straminea*, Labill.

12. *D. straminea*, Lab.; caudex creeping?, “fronds triplicato-pinnate, pinnæ acuminate greenish-yellow beneath, pinnules trapeziform-oblong obtusely serrated, stipes and rachis naked semiterete furrowed.” *Labill. Sert. Austr. Caled.* p. 7, t. 10.

Hab. New Caledonia, *Labillardière*. Offach, Ile Waigiou, *D’Urville.*—This has much the habit and general appearance of our *D. dubia* (*Davallia dubia*, Br.), so that, were it not for the glabrous fronds (of rare occurrence in *D. dubia*), and the larger inferior valve of the involucre, I should take the two species to be identical.

13. *D. davallioides*, Br.; caudex creeping?, “fronds supra-decompound membranaceous flaccid somewhat hairy beneath, pinnules oblong incised with few sori, involucre glabrous, exterior valve smaller.” *Br. Prodr.* p. 158. *Sitobium*, *J. Sm.*

Hab. Port Jackson, *Brown.*—“Closely allied to *Davallia dubia*.”

14. *D. Kaulfussiana*, Gaud.; “fronds triplicato-pinnate, primary and secondary pinnæ elongato-acuminate at the apex serrulate, pinnules ovate-oblong rather acute crenulato-dentate cuneate at the base beneath and on the rachis villous, involucre pilose.” *Gaud. in Freyc. Voy.* p. 368. “*Davallia hirta*,” *Kaulf. En. Fil.* p. 223.

Hab. Mowi, in the Sandwich Islands, 12—14000 feet of elevation, *Gaudichaud*. Owhyhee, *Chamisso?*—Gaudichaud says his plant has a great resemblance to the large variety of *Dicksonia davallioides*, Br.; and quotes *Kaulfuss’ Davallia hirta* of Oahu as the same, observing that although the upper valve of the involucre, formed by the inflexed lobule of the frond, is

not very distinct, yet that it is sufficiently so to determine that this plant cannot be confounded with *Davallia*;— whereas Kaulfuss remarks, on his species, that “it possesses the habit of *Dicksonia*, but the fructification of *Davallia*.”

15. *D. abrupta*, Bory; caudex creeping scaly, fronds lanceolate pinnate, pinnæ sessile lanceolate doubly serrated broad and cordate or truncate at the base, upper ones fertile narrower acuminate, involucre along the whole margin upon short broad teeth coriaceous dark brown reniform, outer valve largest and convex, inner nearly plane operculiform.— *Bory, Voy. v. ii. p. 187, t. 30. Sw. Syn. Fil. p. 138. Hook. Gen. Fil. t. 6, B. Leptopleuria, Presl.*

Hab. Bourbon, amongst scoræ and lava, *Bory, Carmichael.*— Pinnæ 3—4 inches long, an inch broad at the base of the lower ones. Veins copious, parallel.

16. *D. sorbifolia*, Sm.; fronds bipinnate, pinnæ subpetiolate acuminate serrated especially towards the apex truncate at the base, fertile ones narrower margined with fructifications, involucre subglobose membranaceous, outer valve cucullate, inner small and nearly plane, rachis and costa hirsute. (TAB. XXV. A.)— *Sm. in Rees' Cycl. v. vii. D. Moluccana, Wall. Cat. n. 2174. Cystodium sorbifolium, J. Sm.—Hook. Gen. Fil. t. 96.*

Hab. Isle of Honimoe, E. Indies, *Mr. C. Smith. Moluccas, Herb. Roxburgh.*— Evidently allied to *D. abrupta*, but more compound, with much smaller pinnæ, distant veins and different involucre.

17. *D. Plumieri*, Hook.; fronds tripinnate ample glabrous, pinnæ subpetiolate broadly lanceolate acuminate deeply pinatifid cuncate at the base, the segments oblong acute or acuminate crenate the teeth everywhere bearing sori, involucre suborbicular deeply 2-valved membranaceous, outer valve

ceolate acuminate deeply and sharply inciso-serrate lower ones often distinct the serratures bearing the fructifications, involucre suborbicular, outer valve at length convex inner smaller both membranaceous and united into a compressed almost complete cup. (TAB. XXV. B.)

Hab. Caraccas, Linden, n. 166.—This is, in many respects, allied to the preceding, but differs in the pinnæ and segments being narrower and more acuminate, and sharply inciso-serrate. Involucres approaching those of the *Patania*-section, but compressed, and standing forward, almost as in *Deparia*.

Doubtful Species of this Section.

19. *D. marginalis*, Sw. ; “fronds pinnate, pinnæ ensiform auricled and incised above, upper ones coadunate, stipes villous.” *Sw. Syn. Fil. p. 138 and 362. Willd. Sp. Pl. v. v. p. 482.* Polypodium marginale, *Thunb. Jap. 337.*—Hab. Japan, *Thunberg.*—This should perhaps be placed next *D. abrupta*.

20. *D. linearis*, Cav. ; “fronds subbipinnate, pinnæ alternate linear, pinnules of the same form crenulate.” *Sw. Syn. Fil. p. 138. Willd. Sp. Pl. v. v. p. 483. Cav. Præl. 1801, n. 683.*—Hab. Marianne and Philippine Islands. — This plant seems to be only known on the authority of Cavanilles.

21. *D. Japonica*, Sw. ; “fronds subbipinnate, pinnules rhombo-ovate obtuse serrated and as well as the stipes pubescent.” *Sw. Syn. Fil. p. 138 and 360. Willd. Sp. Pl. v. v. p. 483.* — Hab. Japan. — Swartz and Willdenow quote under this species *Polypodium cristatum Japonicum*, *Houtt. Linn. Pfl. Syst. p. 208, t. 99, f. 3* ; but Brown gives this as a synonym to his *Davallia flaccida*.

22. *D. strigosa*, Sw. ; “fronds bipinnate, pinnæ ensiform, pinnules rhombo-oblong rather acute incised, segments obovate dentate, stipes and rachis pubescent.” *Sw. Syn. Fil. p. 138. Willd. Sp. Pl. v. v. p. 484. Trichomanes, Thunb. Jap. 339.* — Hab. Japan. — I am not aware that anything more is known of this Fern than what is here given.

(*D. polypodioides*, Sw.—This is probably the *Davallia flaccida*, Br. ; since Forster’s *Polypodium nudum*, *Prodr. n. 446*, is the authority for it, and the *Microlepis polypodioides*, Pr.)

23. *D. Zeylanica*, Sw. ; “fronds supradecomposed, pinnules oblong obtuse sinuato-pinnatifid, the segments obovate gibbous dentate, stipes glabrous.” *Sw. Syn. Fil. p. 138 and 358. Willd. Sp. Pl. p. 489.* — Hab. Ceylon, *Thunberg.* — Swartz compares this with his *D. flaccida* and *D. dissecta*, and it may perhaps be of the *Patania*-section : but his remark on the involucre is at variance with that genus. “In-

dua duplicia sorum amplectentia : *exterius* e denticulo obtuso concavo inflexo in sinu pinnulæ ; *interius* oppositum, e membrana semicirculari integra, plicata, pallida."

24. *D. ? Madagascariensis*, Kze. ; " frond membranaceous tripinnato-pinnatifid hairy on each side at the veins, primary pinnæ ovato-oblong, secondary alternate sessile unequally ovato-oblong falcate acuminate, pinnules unequally oblong deeply pinnatifid, segments shortly oblong obtuse inciso-crenate, sori of the crenatures intramarginal rounded, interior involucre semi-lunate, rachis hairy, secondary margined." *Kze. Anal. Pter. p.* 38.

Hab. Madagascar, whence very incomplete portions have been brought by *M. Goudot*. — Kunze is very doubtful about the genus of this plant. It would appear, from the description of the involucre, to belong to the *Balantium*-group, if a *Dicksonia* at all.

Subgen. II. PATANIA. *Involucres cup-shaped or subcampanulate.*
Patania, *Pr. Dicksonia*,* *Pr. Sitolobium*, *Desv.*

(*Ultimate divisions or pinnæ large, more than an inch long. Sp.* 25—29).

25. *D. Pavoni*, Hook. ; fronds ample bipinnate, pinnæ sessile broadly oblong acuminate pinnatifid about half-way down, upper ones obtuse coadunate, segments or lobes broad short rounded slightly margined nearly entire and pubescenti-ciliate, sori 1—6 in the sinuses chiefly on the upper margin rather small at length shallow cup-shaped membranaceous, rachis somewhat zigzag and as well as the costa downy. (TAB. XXVI. A.)—*Davallia arborescens*, *Willd. Sp. Pl. v. p.* 470. *Plum. Fil. p. 7, t. 6.*

Hab. Hispaniola, *Plumier*. Peru, *Ruiz and Pavon*, in *Herb. nostr.* — I think there can be little doubt of the figure of *Plumier* belonging to this species. If so, the stem is arborescent: "3 feet high and 6 inches in

pinnatifid, segments ovato-oblong obtuse superior base truncate inferior base abscisso-cuneate, the superior margin and apex incised, incisions obtuse emarginate fructiferous, rachis scabrous." *Davallia concinna*, *Presl, Reliq. Hænk. p. 66. Patania, Pr. Tent. Pterid. p. 138.*

Hab. —? (*Presl*).— From the above character I should have been disposed to refer this to our *D. Plumieri*, (n. 17): but the author says of it, "affinis *Davallia arborescenti*, Willd.," which is identical, in my opinion, with our *Dicksonia Pavoni*; and Sprengel, without any doubt, adduces it as a synonym to *Davallia arborescens*.

27. *D. adiantoides*, H. B. K.; fronds ample spreading glabrous 2—3-pinnate, primary divisions acuminate, pinnæ broadly lanceolate acuminate more or less deeply pinnatifid obliquely cuneate at the base and decurrent, the segments broadly ovate very obtuse nearly entire or lobato-dentate bearing sori (1—3) in the sinuses mostly at the upper margins rather small cup-shaped. (TAB. XXVI. B.)—*H. B. K. Nov. Gen. Am. i. p. 24. Willd. Sp. Pl. v. p. 488.* "D. bipinnata," *Cav. Præl. 1801, n. 682. Dicksonia altissima, Sm. in Rees' Cycl. v. xi? Polypodium globuliferum, Lam. Encycl. v. p. 554. Plum. Fil. t. 30.*

Hab. Hispaniola, *Plumier, Thierry. Caraccas, Humboldt, Linden, n. 156.*— This is a noble species, with large pinnæ, somewhat resembling our *D. Pavoni*, but differing in the form of the pinnæ, in the fructifications and in the absence of all hair. Sir J. E. Smith refers to Plumier's figure for his *D. altissima*, but describes his plant as having zigzag hairy ribs and veins, which better accords with *D. Pavoni*.

28. *D. erosa*, Kze.; "frond coriaceous subtripinnate, secondary pinnæ divergent lanceolate acuminate, pinnules unequally ovato-oblong cuneate at the base below and decurrent above subauriculate with the rounded or truncate apex emarginate or crenate, the margin obtusely falcato-dentate, rachis rough below squamoso-canaliculate, stipes chaffy." *Kze. in Pl. Crypt. Poepp. p. 88 (not Patania erosa, Presl, Pterid. nor Hook. Gen. Fil.)*

Hab. Woods at Pampayaco, Peru, frequent, *Poeppig.*—"Fronds very large, 6—9 feet. Our plant differs from *P. ordinata*, Kaulf., an allied species, in the coriaceous frond, in the secondary pinnæ being remote, broader pinnules more rounded at the apex, the rachis beneath asperulous, above squamulose. *Dicks. adiantoides*, H. B. K. and Willd., and Plum. t. 30, may be distinguished by the stipes and the rachis being subpuberulous or glabrous."— From these remarks of Kunze, it seems that this species has the closest affinity with *Dicks. adiantoides*. But the *Patania erosa* of Presl, and, following him, of our Gen. Fil. l. c., is, judging from Presl's figure of a pinnule, a very distinct species, which I here refer to *D. cicutaria*.

29. *D. ordinata*, Kaulf.; "fronds tripinnate, secondary pinnæ lanceolate attenuato-caudate patent, pinnules oblong-lau-

ceolate inciso-dentate truncate at the apex bearing about 6 glabrous sori, segments truncate emarginato-dentate, stipes and rachis glabrous." *Kaulf. En. Fil. p. 226.*

Hab. Porto-rico, *Ventenat.* — "Sufficiently different from the *D. adiantoides* in the form of the pinnæ and of the pinnules."

(*Ultimate divisions or pinnæ small, less than an inch, generally much smaller. Sp. 30—51.*)

30. *D. cicutaria*, Sw.; fronds spreading tripinnate, ultimate pinnæ ovate or ovato-lanceolate cuneate at the base and decurrent upon a winged rachis rather distant obtuse lobed or pinnatifid half way down to the costa, the base above generally auricled, segments varying in length frequently falcate with the lower ones sometimes acute projecting beyond the sorus, sori solitary rather large cup-shaped, rachis costa and veins glabrous or hairy, the latter prominent or level with the surface.—*Sw. Syn. Fil. p. 137. Willd. Sp. Pl. v. p. 487. D. pilosiuscula, Raddi, Fil. Bras. p. 63 (excl. syn.) D. Hookeriana, Kl. in Herb. Reg. Berol. et in Herb. Hook.—β. frond more membranaceous. Sloane, Jam. i. t. 57, f. 1, 2 (excellent). Plumier, t. 31? D. tenera, Mart. Pl. Crypt. Bras. p. 96, t. 66 (excellent). Hook. Gen. Fil. t. 61, A. D. adiantoides, Link (not H. B. K.)—γ. barren segments more cuneate and serrated above. D. dissecta, Sieb. Syn. Fil. n. 198, (not Sw.)—δ. pinnules larger brighter green less deeply lobed. Patania erosa, Pr. Pterid. p. 138, t. 5, f. 12, 13, (not Dicks. erosa, Kze.) Hook. Gen. Fil. t. 61, B.*

Hab. Jamaica, *Sloane, Swartz*, and probably general in the West-India Islands. Brazil, *Raddi, Sellow, Gardner*, n. 5327, and 201, *Macrae*. Cocos Island, N. Pacific, *Menzies, Barclay*. Guayaquil, *Hænke*. Vera Cruz and Jalapa, Mexico, *Linden*.—β. Brazil, *Martius*.—γ. Guatemala, *Skinner*. Quebrada of Panabuanca, Peru, *Mathews*, n. 974.—This is assuredly a very

pinnatifid rotundato-sinuate truncate and crenate at the apex, costæ hairy beneath, segments oblong truncate falcate, partial rachis pubescent." *Kaulf. En. Fil. p. 227.*

Hab. Brazil, (*Sprengel*). "Sori rather large, oblong, transverse, in the sinuses of the segments. Indusia ovate, transversely dehiscing." Whether the appearance of transverse opening of the involucre be occasioned by pressure in drying, or not, I am doubtful. I suspect the species is nearly allied to *D. cicutaria*.

32. *D. dissecta*, Sw.; fronds spreading tripinnate, ultimate pinnæ or pinnules lanceolate cuneate at the base and decurrent upon a slightly winged rachis deeply pinnatifid with long narrow segments the lower ones of which are often inciso-pinnatifid, sori rather small solitary in the sinuses of the segments cup-shaped, rachis and costa slightly hairy.—*Sw. Syn. Fil. p. 136. Willd. Sp. Pl. p. 486. Schkuhr, Fil. t. 130, b. Martens et Galeotti, Fil. Mex. p. 77. Dicks. expansa, Kaulf. in Sieb. Syn. Fil. n. 110.*

Hab. Jamaica, *Swartz, Bancroft, Wiles. Vera Cruz, Mexico, Galeotti.*—What I take for this plant, and from whence I have drawn up my specific character, might, I think, without violence to nature, be considered a variety of *D. cicutaria*, with narrower pinnules and finer segments. Schkuhr's figure is sufficiently accurate.

33. *D. apiifolia*, Sw.; fronds tripinnate, pinnules rhombolanceolate deeply inciso-pinnatifid subpetiolate and decurrent on a slightly winged rachis, the segments narrow-linear acute pointing upwards, sori rather small on short teeth in the sinuses of the segments, rachis and costa quite glabrous. (TAB. XXVI. C.)—*Sw. Syn. Fil. p. 137. Willd. Sp. Pl. p. 487. D. apiifolia, β. dissecta, Desv. et Kze. Pl. Crypt. Poepp. p. 88. D. angustidens, Pr.*

Hab. Jamaica, *Swartz. Maynas, Peru, Poeppig.*—My character of this is taken from Poeppig's specimen, the same as Kunze's plant, and which seems to me to be the same with *D. apiifolia*, Sw.; a name it appears well to deserve. Swartz, however, was unacquainted with the fructification, and of course the genus was doubtful to him. It is remarkable for the inciso-pinnatifid character of the pinnules, their narrow segments and their tapering almost into a footstalk, which however is decurrent and forms a very narrow wing upon the rachis.

34. *D. flaccida*, Sw.; "fronds triplicato-pinnate, primary and secondary pinnæ acuminate, pinnules ovato-oblong acute pinnatifid, segments oblong-cuneate the upper margin unequally and obtusely dentate, the upper fructiferous ones bidentate, stipes and rachis downy." *Willd. — Sw. Syn. Fil. p. 137 and 357. Willd. Sp. Pl. v. p. 489. Schkh. Fil. t. 129. Dennstädtia flaccida, Bernh. in Schrad. Journ. 1801, t. 1, f. 3. Trichomanes flaccidum, Forst. Prodr. n. 472.*

Hab. Pacific Isles, *Forster*.— I have seen no specimens of this from the "Pacific Isles," save Forster's original ones in the Banksian herbarium; and as far as can be judged from them, and indeed from the description and figures above quoted, it may safely be referred to *D. cicutaria*, which we know grows at Cocos Island. Swartz describes a double indusium, which, if correct, would induce us to refer the species to the *Balantium* division: but Bernhardt's figure represents it as an entire cup.

35. *D. Moluccana*, Bl.; "frond tripinnatifid coriaceous somewhat downy beneath, pinnæ opposite oblongo-lanceolate acuminate, pinnules lanceolate rather obtuse deeply pinnatifid, segments dimidiato-ovate obtusely toothed on the upper margin, rachis and scandent stipes aculeate." *Bl. Fil. Jav. p. 239.*

Hab. Mountains of the Moluccas, *Blume*.—"Distinguished from *D. flaccida*, Sw., by the aculeate rachis."

36. *D. scandens*, Bl.; frond tripinnatifid or supradecom-pound membranaceous glabrous, pinnæ opposite oblongo-lanceolate acuminate, pinnules lanceolate rather obtuse deeply pinnatifid, segments dimidiato-ovate obtuse bluntly incisedentate, rachis and scandent stipes aculeate." *Bl. Fil. Jav. p. 240.*

Hab. Lofty mountains of Java. On the volcanic mountain, Gede, Pal-lasarie, &c. *Blume*.—"Differs from the preceding (*D. Moluccana*) in the flaccid frond and in the larger teeth of the segments."

37. *D. Javanica*, Bl.; "frond decomposed coriaceous, at the costa beneath and on the rachis hairy, pinnæ alternate and the pinnules (which are nearly opposite) ovato-oblong very acuminate, secondary subrhombico-lanceolate acute deeply pinnatifid, the segments cuneato-linear rather obtuse unequally and obtusely dentate bearing sori in the sinuses." *Bl. Fil. Jav. p. 240.*

39. *D. rubiginosa*, Kaulf. ; fronds spreading ample tripinnate, pinnæ oblong obtuse hairy especially beneath, the segments oblong dentato-pinnatifid especially on the superior margin membranaceous firm often brown and glossy above, sori very small chiefly on the superior margin in the sinuses of the sharp teeth cup-shaped compressed (from drying?), rachis and costa clothed with rufous down. (TAB. XXVII. A.)—*Kaulf. Enum. Fil. p. 226.*

Hab. Brazil, Rio Janeiro, (*Kaulfuss*); *Gardner*, n. 5672. Tejuca, *Martius*. Bahia, *Blanchet*, n. 2236. Vera Cruz, Mexico, *Linden*, n. 76, and Chiapas, Columbia, *Linden*, n. 1537. Peru, *Mathews*, n. 1096 and 1829. Guatemala, *Skinner*, Jamaica, *Purdie*, *Bancroft*.—Apparently an abundant species in the above-mentioned localities, and, in my opinion, a very distinct one. The pinnæ and segments are remarkably uniform in size and structure, and the sori amongst the smallest of the genus.

40. *D. anthriscifolia*, Kaulf. ; fronds ample spreading tripinnate, pinnæ ovato-oblong pinnatifid nearly to the costa, segments oval-oblong obtuse dentate soriferous in the axils of the teeth, rachis glabrous, costa and veins slightly hairy. (TAB. XXVII. B.)—*Kaulf. En. Fil. p. 227. Kze. in Linnæa*, v. v. p. 45. *Sieber, Syn. Fil. n. 60. Fl. Mixt. n. 314. Cheilanthes, Bory in Willd. Sp. Pl. v. p. 461.*

Hab. Bourbon, *Bory*. Mauritius, *Bojer*, *Sieber*, *Telfair*.—A species with ample spreading fronds much resembling those of *D. rubiginosa*; but more delicate and very slightly hairy.

41. *D. punctiloba*, Hook. ; fronds lanceolate bipinnate membranaceous, pinnæ lanceolate rather obtuse deeply pinnatifid, the segments oblong obtuse toothed or again pinnatifid, sori very small, one in the sinus or upper margin of each segment (rarely more), rachis and costa glanduloso-pilose.—*Nephrodium punctilobum, Mich. Flor. Bor. Am. ii. p. 268. Dicksonia pubescens, Schkh. Fil. t. 13. D. pilosiuscula, Willd. Sp. Pl. v. p. 484 (not Raddi). Hook. Fl. Bor. Am. ii. p. 264.*

Hab. United States and Canada, *Michaux and others*.—Very distinct. General appearance resembling *Asplenium Filix-femina*, L., but of a pale straw colour when dry, the stipes red-brown. This is the only species of *Dicksonia* yet known to inhabit temperate or cold climates, and it extends as far north as Canada.

42. *D. appendiculata*, Wall. ; everywhere especially beneath piloso-glandular, fronds lanceolate tall much attenuated at the base bipinnate, pinnæ narrow oblong almost linear pinnatifid, the segments oblong entire or bi-trifid the base decurrent on the rachis, sori large globose copious upon the shortened teeth of the segments. (TAB. XXVII. C.)—*Wall. Cat. n. 65.*

Hab. Nepal and Kamoun, *Wallich*.—A most distinct species, in gene-

ral form or outline resembling *D. punctiloba*, but different in the divisions of the pinnæ. The lower pinnæ are very short, numerous on the lower part of the rachis or stipes, and there remote. The name is, no doubt, given from the conspicuous sori on the somewhat contracted teeth, resembling globular appendages. Stipes and rachis brown, glossy, stout.

43. *D. deltoidea*, Hook.; frond deltoid-ovate quadripinnate, pinnules oblong-cuneate pinnatifid, the segments linear obtuse few on a winged rachis, sori terminal upon the shorter segments, rachises (the main one zigzag) costæ and frond (in a slight degree) hairy. (TAB. XXVIII. A.)

Hab. Ceylon, *Mrs. Genl. Walker*.—Stipes 6—8 inches long, a little rough, glossy brown. Frond 1 foot long, much divided, the segments narrow. Ultimate rachises winged, and the rachis which bears them slightly winged or compressed.—I have received this very distinct species from no other source but that just mentioned.

44. *D. scabra*, Wall.; fronds ovate acuminate bipinnate, pinnæ ovato-lanceolate acuminate pinnatifid deeply and nearly to the rachis, segments with 3—4 teeth or again pinnatifid, sori terminal upon the teeth cup-shaped, upper portion (formed of the lobule of the frond) firm and subcoriaceous, lower more membranaceous, stipes very long, and as well as the rachis scabrous and more or less clothed with long tawny spreading hairs especially at the base of the stipes, costa slightly hairy. (TAB. XXVIII. B.) *Wall. Cat. n.* 2173.

Hab. Nepaul, *Wallich*. Assam, *Mrs. Mack*. Northern India, *Mr. Edgeworth*.—A very handsome and distinct species, with a long, creeping, hairy caudex. Stipes 1—1½ foot in length, chestnut-coloured. Fronds scarcely a foot long, pale stramineous green, occasionally slightly hairy.

45. *D. cuneata*, Hook.; glabrous, fronds ample spreading 4-pinnate, pinnules broadly rhomboid-ovate from a winged rachis very obtuse the cuneate base tapering into a footstalk

glandulose. (TAB. XXVIII. D.)—*Sitobium flaccidum*, *J. Sm. En. Fil. Philipp. p.* 418, *excl. syn. (name only)*.

Hab. Luzon, Manilla, *Cuming*, n. 108, 145 and 222.—This well-marked plant agrees neither with the description nor figure of *D. flaccida*, to which Mr. J. Smith refers it. It is peculiarly rigid, particularly the fertile specimens; the rachises very stout and straight; the primary pinnæ much attenuated into a caudate point; pinnules rigid, with dark brown prominent veins. Barren segments, or pinnules, broader than the fertile ones, and the primary pinnæ less caudate.

Doubtful Species of this Section.

47. *D. obtusifolia*, Willd.; “frond pinnate, pinnæ pinnatifid, segments ovato-oblong roundish obtuse inciso-dentate.” *Willd. Sp. Pl. v. p.* 483. *Patania obtusifolia*, *Pr. Pterid. p.* 138, t. 5, f. 14.—Hab. Caraccas, *Bredemeyer*.—Willdenow observes, “ab omnibus fronde bipinnatifida laciniis margine rotundatis diversa.”—This, if a distinct species, should perhaps be placed near *D. adiantoides*, and the solitary lobe, figured by Presl, is not unlike some of the lobes of that species.

48. *D. strigosa*, Sw.; “fronds bipinnate, pinnæ ensiform pinnate rhombeo-oblong rather acute incised, segments obovate dentate, stipes and rachis pubescent.” *Sw. Syn. Fil. p.* 128. *Willd. Sp. Pl. v. p.* 484. *Trichomanes strigosum*, *Thunb. Jap. p.* 539.—Hab. Japan, *Thunberg*.

(*D. “glutinosa*, Wall.” (according to *J. Sm.*). *Sitobium glutinosum*, *J. Sm. (name only)*. E. Indies, *Wallich*.—I do not find such a species anywhere noticed by Wallich).

49. *D. Domingensis*, Desv.; “pinnæ petiolate, pinnules lanceolate acute cuneate at the base ultimate ones coadunate, inferior ones subpetiolate subauriculated above pinnatifidoblate, lobes broad acute remotely serrate, fertile ones crenato-serrate, caudex frutescent.” *Desv. Fil. in Mém. Soc. Linn. ii. p.* 317.—Hab. “Hispaniola.”

50. *D. multifida*, Sw.; “fronds triplicato-pinnate, primary and secondary pinnæ acuminate, pinnules lanceolate obtuse pinnatifid, segments bidentate, veins hairy on both sides, stipes and rachis pubescent.” *Sw. Syn. Fil. p.* 137. *Willd. Sp. Pl. v. p.* 489. *Pr. Reliq. Hænk. p.* 68.—Hab. East Indies (*Willd.*)—Willdenow brings under this his “*Cænopteris Japonica*, *Phyt. p.* 14, t. 8, f. 1, *excl. syn.*,” which Mr. Brown refers to his *Davallia flaccida*, as perhaps a variety of it, and, certainly, a species of *Davallia*.

51. *D. millefolium*, Desv.; “pinnules attenuate sub-caudate ultimate ones oblong deeply pinnatifid cuneate at the base auricled above, segments subtridentate obtuse uncinata,

rachis pruinoso-pubescent, that of the pinnules slightly margined." *Desv. l. c. p. 318.*—Hab. E. Indies.

8. CIBOTIUM, *Kaulf.*

Pinonia, Gaudich.

Sori at the very margin and projecting from it, pointing downwards, always from the apex of a vein. *Involucre* subglobose or reniform, coriaceous or horny, 2-valved, generally unequally so, outer valve not formed of the substance of the frond, inner one smaller and operculiform. *Receptacle* a little elevated. *Capsules* stipitate, with a nearly complete ring.—*Tropical or subtropical Ferns of the northern hemisphere, inhabiting the Sandwich Islands, the Philippines, Assam and Mexico, arborescent in C. Chamissoi and C. Schiedeii, (perhaps in others); fronds bipinnate. Veins simple or once or twice forked. HOOK. GEN. FIL. TAB. 25.*

1. *C. glaucum*, H. et A.; fronds bipinnate glabrous very glaucous beneath, pinnæ linear-oblong acuminate into a long narrow serrated point deeply pinnatifid to the rachis often pinnate at their base, segments oblong falcate rather acute crenato-serrate especially at the apex, involucre coriaceous numerous 6—12 on each segment or on each ultimate pinnule rather small tawny, the valves unequal, innermost one narrow and elongated, veins once or twice forked, rachis and costa quite glabrous. (TAB. XXIX. A.)—*Hook. et Arn. in Bot. of Beech. Voy. p. 108, (excl. syn. Kaulf. et Gaudich.) Dicksonia glauca, Sm. in Rees' Cycl. v. vii. Hi-atea Menz. MS. (apud nos).*

Hab. Sandwich Islands, *Mr. Menzies. Lay & Collie* in *Beechey's Voy.*—Discovered so long ago as 1807 by the venerable Menzies, and described

veins simple rarely forked. — *Kunze in Schkh. Suppl. p. 63, t. 31 (cult.)* *Balanþium, Link, Fil. H. Berol. p. 40.* “*Cibotium glaucophyllum, Hort. Berol.*” *Presl.* *Cibotium glaucum, J. Sm. En. Fil. Philipp. (excl. syn.) C. Cumingii, Kze. l. c. p. 64, (name only).* *C. Barometz, J. Sm. Gen. Fil. Aspidium Barometz, Hort. Angl.*

Hab. Philippine Islands, *Cuming, n. 123.* — This is, in many respects, allied to *C. glaucum*, but distinguished by its simpler veins and by the involucre, which besides being of a different form and texture, stand singly, one (very rarely two) on each side at the base of each segment, thus, as Mr. J. Smith remarks, forming a long parallel line on each side the costa and a little remote from it. They are by no means corneous and tawny, but rather coriaceous, approaching to membranaceous and glaucous, broader than long, reniform, the two valves nearly alike in size and form; and the same characters exist on various specimens. Our cultivated ones from the Birmingham Botanic Garden, which are, I believe, identical with the *C. glaucescens*, Kze., are similar to Mr. Cuming’s from Luzon, probably the native country of the garden plant, which has by some, but without sufficient authority, been supposed to be the “*Tartarian Lamb*” of Loureiro.

3. *C. Assamicum*, Hook.; fronds bipinnate, pinnae oblong-lanceolate very much attenuated caudate glaucous beneath deeply pinnatifid almost to the rachis the lower segments remote (but united) all of them linear-oblong very acute subfalcate serrated, involucre subcoriaceous several (4—6) on each segment pale brown the valves unequal inner one narrower, rachis glabrous, costa with arachnoid appressed hairs, veins simple or rarely forked. (TAB. XXIX. B.)

Hab. Assam, *Mrs. Mack.*—Allied to *C. glaucum* and *glaucescens*, differing from the former in the more simple veins and less coriaceous involucre, and from the latter in the different form and texture and unequal valves of the involucre.

4. *C. Chamissoi*, Kaulf.; arborescent, fronds bipinnate, pinnae lanceolate acuminate subcoriaceous not anywhere glaucous glabrous or beneath (especially on the rachis and costa) clothed with more or less copious arachnoid hairs pinnatifid $\frac{2}{3}$ or $\frac{3}{4}$ down to the rachis, the segments ovate obtuse bluntly serrate, involucre generally copious (6—12) rather small very horny glossy tawny the valves unequal, inner one narrower, veins sunk (not prominent) dark-coloured simple or forked. — *Kaulf. Enum. Fil. p. 230, t. 1, f. 14, (April 1824).* *Pinonia splendens, Gaud. in Ann. Sc. Nat. Dec. 1824, and in Freycin. Voy. p. 370, t. 21.*

Hab. Oahu, *Chamisso, Gaudichaud, Barclay, Macrae.* — Truly distinct from all the preceding and from the following species. It is the species on which the genus *Cibotium* was founded by Kaulfuss, and *Pinonia* by Gaudichaud: with the figures and descriptions of both of which it entirely

accords. The hairs, though sometimes copious and cobwebby, are generally deciduous.

5. *C. Menziesii*, Hook. ; fronds bipinnate everywhere glabrous thick and coriaceous, pinnæ (large) oblong acuminate sinuato-pinnatifid, the segments or lobes not reaching half-way to the rachis, rounded very obtuse obscurely crenate or rather entire, the sinuses rather wide bearing the fructifications at their base, involucre several on each side and at the base of the sinus corneous opaque large, inner valve smaller and narrower, rachis and simple or forked veins very prominent and pale. (TAB. XXIX. C.)

Hab. Oahu, *Menzies, Lay and Collie* in *Beechey's Voy.* — This is assuredly a very distinct plant, which had been no doubt confounded with one or other of the described Sandwich Island *Cibotia*. The fronds are the thickest and most coriaceous of all the species, and the pinnæ the largest and broadest, sinuato-pinnatifid, the sori at the base of the sinus running partially up the segments or lobes, and the costa and veins pale and singularly thick and prominent, while the involucre are the largest of the genus and very horny.

6. *C. Schiedei*, Schlecht. et Cham. ; arborescent, fronds bipinnate, pinnules (small) lanceolate finely acuminate pinnatifid $\frac{2}{3}$ of the way down with copious long fulvous hairs especially on the costa, segments ovate acute slightly falcate somewhat glaucous beneath serrated, involucre copious small 8—10 on each segment coriaceous tawny transversely oblong the valves nearly equal convex, inner one a little smaller, rachis subarachnoid with woolly deciduous hairs, veins simple or forked. (TAB. XXX. A.)—*Cham. & Schlecht. in Linnæa*, v. v. p. 616.

Hab. Hacienda de la Laguna, Mexico, *Schiede and Deppe*. Xalapa, *Galeotti*, n. 6458. Guatemala, *G. U. Skinner, Esq.* — Schlechtendal and Chamisso justly observe that this is a more elegant Fern than any of its

within the involucre, stipitate, with an incomplete elastic ring. — Tropical Ferns of the northern hemisphere, the Sandwich Islands and Peru, ample, bipinnate. Fronds subcoriaceous or membranaceous. Veins pinnated, veinlets simple or forked. HOOK. GEN. FIL. TAB. 44, B.

1. *D. prolifera*, Hook.; fronds ample bi?-pinnate membranaceous glabrous, pinnæ opposite elongated oblong acuminate deeply pinnatifid nearly to the costa, the segments distant oblong obtuse nearly entire (when barren), involucre on short projecting teeth small pateriform inserted on both sides the segments and towards the apex, veins all simple. *D. Macraei*, Hook. et Grev. Ic. Fil. t. 154. *Dicksonia*, Kaulf. En. Fil. p. 225.

Hab. Oahu, *Chamisso*, *Lay and Collie* in Beechey's Voyage, arclay. *Owhyhee*, *Macrae*.—Kaulfuss, who first described this handsome plant, observes that its rachis is proliferous, which is not apparent in my specimens.

2. *D. Mathewsii*, Hook.; fronds ample glabrous bipinnate coriaceous-membranaceous, pinnæ alternate or opposite only at the base of the primary divisions oblong from a broad base gradually acuminate deeply pinnatifid to the costa or in the lower ones pinnato-decurrent, segments and ultimate pinnales approximate obliquely broad-ovate very obtuse or abrupt the larger ones lobed and bluntly auricled at the base above irregularly crenate, involucre from the apices of the segments approximate cup-shaped compressed situated on short teeth, veins approximate simple and forked. (TAB. XXX. B.)

Hab. Peru, *Mathews*, n. 1782. — Widely different from the preceding, yet, in my mind, confirming the validity of the genus, which I distinguish by having a cup-shaped or pateriform membranaceous involucre, standing forward beyond the margins of the segments upon little teeth, never directed downward or towards the underside. Its nearest affinity is with *Loxsonia* and *Trichomanes*. The capsules, however, are different from both, of the ordinary structure, but situated on very long stalks.

10. LOXSOMA, Br.

Sori marginal, pointing forward, but partially sunk in the axil of a tooth or lobe, from the apex of a vein. *Involucre* suburceolate, coriaceous, the outer apparently formed of a changed portion 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 complete ring, opening on one (the out-) side vertically. *Sporules* triangular, with a depressed triangular mark.—A beautiful Fern of New Zealand.

Caudex creeping. Fronds stipitate, coriaceous, glabrous, decomposed, glaucous beneath, the segments lanceolate, dentato-pinnatifid, secondary veins or veinlets simple or forked. HOOK. GEN. FIL. TAB. 15.

1. *L. Cunninghamsi*, Br. MS.; *A. Cunn. in Bot. N. Zeal. in Hook. Comp. Bot. Mag. ii. p. 366, t. 31, 32.* *Davallia dealbata*, *A. Cunn. MS.* *Trichomanes cœnopteroides*, *Harv. MS.*

Hab. New Zealand, northern island, abundant, *A. & R. Cunningham, Mr. Colenso, Dr. Sinclair, J. D. Hooker, and all travellers.* — One of the most remarkable of Ferns, especially in the nature of its fructifications, and rigid fronds. Frond about a foot long, tripinnate, very glaucous beneath. Involucres in a measure connate with the margin of the frond, and resembling that of some coriaceous *Davalliæ*, but they form a complete somewhat urceolate cup. The receptacle is a long exserted column as in *Trichomanes*, covered with hairs and stipitate capsules, which have the broad oblique ring of *Cyatheaceæ*, and exhibit little resemblance to those of *Trichomanes*.

11. HYMENOPHYLLUM, *Sm.*

Sori marginal, lateral or terminal, more or less sunk in the frond, or quite exserted, and always terminating a vein or costa. *Involucres* monophyllous, cup-shaped, urceolate, cuneate or orbicular, more or less deeply 2-valved, sometimes to the very base, of the same substance as the frond, or thicker and more compact, reticulated, toothed or entire at the margin. *Receptacle* elongated, frequently columnar, included, rarely exserted. *Capsules* sessile, or nearly so, covering the receptacle wholly or in part, depressed, surrounded by a generally broad, entire, almost transverse ring, bursting vertically on one side. *Sporules* (always?) triangular, with a deep triangular depression. — *Small, sometimes minute, Ferns, inhabiting rocks or trees or terrestrial, in the tropics and tem-*

genus *Lozsoma*, that they possess the important characters of the modification in a Fern of the more ordinary texture: and it seems to me that they rank quite naturally near that genus; and with respect to the frond, the excellent Link justly remarks of these two genera, "Frons harum Filicum interdum a fronde Polypodiacearum nullo modo differt, in genere vero magis tenera est, et ob cellulas majores magis reticulata apparet, ita ut ad habitum Muscorum frondosorum magis accedant."—The genus *Hymenophyllum* is sometimes with difficulty distinguished from *Trichomanes*. The receptacle is not always included in *Hymenophyllum*, nor always exerted in *Trichomanes*. Again, in the latter genus, there is an approach to a two-lipped involucre, and in the former it can sometimes be scarcely called two-valved.

* *Fronds undivided, dichotomous, or once pinnatifid, § glabrous. (Sp. 1—4).*

1. *H. cruentum*, Cav.; fronds broadly lanceolate sinuato-dentate penninerved, involucre at the apices of the teeth orbicular-ovate the cuneate base sunk, the lips free entire, receptacle in age a little protruded, stipes very long slender. (TAB. XXXI. A.)—"Cav. Præl. 1801, n. 684." *Sw. Syn. Fil. p. 145. Willd. Sp. Pl. v. p. 516.*

Hab. Chiloe, on trunks of trees, *Cavanilles, Cuming, n. 5. Woods, Valdivia, Bridges, n. 794.*—Fronds brown when dry in our specimens, not blood-colored.

2. *H. marginatum*, Hook. et Grev.; fronds erect linear-cuneate di-trichotomous, the segments linear obtuse subundulate with a thickened margin, apex emarginate, involucre terminal solitary nearly orbicular, the valves convex free to the base exerted entire with a thickened colored margin. *Hook. et Grev. Ic. Fil. t. 34.*

Hab. Among mosses, Port Jackson, New Holland, *Fraser, Bynoe.*—A small and very distinct species. Fronds 1—1½ inch long, 2—3 lines wide, resembling some frondose *Jungermannia*. Stipes 2—4 lines long, hairy at the base, arising from a slender creeping caudex.

3. *H. asplenoides*, Sw.; fronds pendulous oblong-lanceolate pinnatifid rather more than half-way down, the segments entire or bifid oblong obtuse, involucre terminal on the segments orbicular-ovate entire, the short cuneate base sunk the rest free 2-valved, receptacle always included.—*Sw. Syn. Fil. p. 145. Lam. Illustr. t. 8, f. 1. Willd. Sp. Pl. v. p. 516. Hedw. Fil. cum Ic.*—β. fronds broader, segments subpalmate. *H. palmatum, Klotzsch, in Herb. Reg. Berol. et in Herb. Hook.*

Hab. Trunks of trees, Jamaica, *Swartz, Bancroft.*—β. Brazil, *Sellow.*—Stipes 1—3 inches long: fronds nearly equal in length, sometimes simply

§ *H. asplenoides* has the segments of the fronds occasionally again divided. *H. rarum*, Br., on the other hand, which is sometimes simply pinnatifid, and at other times pinnate and then pinnatifid, will be found among the compound species.

pinnatifid, sometimes almost so much divided as to justify its being placed in the next division.

4. *H. abruptum*, Hook.; small, frond broadly oblong truncated at the apex deeply pinnatifid, the segments spreading linear-oblong entire retuse rarely bifid, involucre terminal orbicular-cuneate almost wholly immersed, the semiorbicular valves short entire, receptacle protruded in age, stipes not winged. (TAB. XXXI. B.)

Hab. Jamaica, *Menzies, Purdie*.—I do not find this anywhere described. Caudex creeping, filiform. Stipes slender, half an inch long. Fronds $1\frac{1}{2}$ inch long by 1 inch or less broad, very delicate, thin and membranaceous, deeply pinnatifid, almost to the rachis; segments mostly entire, the upper ones coming to a nearly level top. Involucre almost wholly sunk, cuneate; the short lips forming a half-circle, receptacles much protruded, especially in age.

** Fronds compound, pinnate, or twice or more pinnatifid, hairy or ciliated, § entire or rarely indistinctly denticulate. (Sp. 5—28).

† Fronds pinnatifidly divided. (Sp. 5—16).

5. *H. hirsutum*, Sw.; pendulous, clothed with tawny stellated hairs, fronds linear-oblong more or less elongated pinnatifid, the primary segments short (simple when young) pinnatifid and subflabellate, the segments linear-oblong obtuse mostly pointing upwards and subunilateral, involucre nearly orbicular hairy, the subcuneate base sunk in the frond.—*Sw. Fl. Ind. Occ.* iii. p. 1746. *Syn. Fil.* p. 146. *Willd. Sp. Pl.* v. p. 517. *Raddi, Fil. Bras.* t. 79, f. 3. *Hedw. Fil. cum Ic. Hook. et Grev. Ic. Fil.* t. 84, (young plants). *H. venustum, Desv.* *Trichomanes hirsutum, Linn. Sp. Pl.* p. 1561.

Hab. Jamaica, *Swartz, Menzies, MacFadyen, Purdie*. Trinidad, *Lockhart, C. S. Parker*. Organ Mountains, *Gardner*, n. 214. Huanuco, *Hænke*.—Stipes generally short, not winged, hairy above. The specimens figured

147. *Hedw. Fil. cum Ic. Willd. Sp. Pl. p. 519. Hook. et Grev. Ic. Fil. t. 35.*

Hab. W. Indies, Swartz, &c. Brazil, Burchell, Sellow, Gardner, n. 213 and 5968. Surinam, Hostmann, n. 1232. Mexico, Ruiz and Pavon, in *Herb. nostr.*—Stipes very variable in length, when short, winged almost to the base. Frond 2—6 inches long, varying in diameter. Involucres broader than the segments, rounded but cordate at the base and generally oblique there, one lobe being larger than the other, a character not distinctly represented in our *Ic. Fil.*, nor even by Hedwig, but which yet appears to me very constant.

7. *H. Plumieri*, Hook. et Grev.; frond broadly lanceolate bipinnatifid, costa and margins with stellated ferruginous hairs, primary divisions ovate acuminate pinnatifid half-way down, the segments oblong forked or trifid, involucres suborbicular cuneate the base sunk, the valves free ciliated, stipes with a broad decurrent wing. *Hook. et Grev. Ic. Fil. t. 123. Filicula digitata, &c., Plumier, Fil. p. 78, t. 50, B.*

Hab. Hispaniola, Plumier. Pichincha, Columbia, Jameson.—A robust handsome plant, with compact broad primary divisions, less deeply cut than most of the bipinnatifid species. Fructifications numerous, terminating many of the segments and forming an interrupted line round the margin. To this rather than to *H. ciliatum* (surely not to *H. hirsutum*, as Willdenow quotes it) I think Plumier's figure should be referred:—though it must be confessed the two species are very nearly allied.

8. *H. trichophyllum*, H. B. K.; “fronds bipinnate ferrugineo-hirsute, secondary pinnæ dichotomo-pinnatifid, the segments linear nearly entire, rachis hairy terete naked, sori terminal, valves of the involucre semiorbicular hairy.” *H. B. K. Nov. Gen. Am. i. p. 22.*

Hab. Mountains of Cumana, Humboldt and Bonpland.—The authors speak of this as a very elegant species, nearly allied to *H. ciliatum*; but they observe “frondes pedales? bipinnatæ (aut plus compositæ?).” It might be inferred from the word “bipinnate,” used by the authors, this plant should be referred to another division; but the term is frequently employed by them to express such species as I consider bipinnatifid, that is, they mean bipinnate with the rachis winged.

9. *H. Boryanum*, Willd.; hairy especially beneath at the margins with branched hairs, frond ovato-oblong scarcely acuminate bi-tripinnatifid, the segments linear obtuse, involucres suborbicular cuneate at the base and there sunk in the frond, the valves ciliated, stipes short winged above. (TAB. XXXI. C.)—*Willd. Sp. Pl. v. p. 518. Wall. Cat. n. 167. Steb. Syn. Fil. n. 139. H. hirsutum, Bory in Willd. (not Sw.)*

Hab. Mauritius and Bourbon, Bory, Bojer, Carmichael, Telfair, Wallich.—Fronds small, seldom more than 3—4 inches long, very hairy beneath, much less so above, the primary segments close with blunt apices. Nearly allied to *H. ciliatum*, but the involucres are very different, never cordate at the base, but cuneate and partially sunk in the frond.

10. *H. hirtellum*, Sw.; small hairy (especially on the costæ and margin) with fulvous branched hairs, frond ovate oblong slightly acuminate thin membranous but elastic tripinnatifid, the segments narrow linear slightly attenuated obtuse closely placed, involucre ovato-orbicular slightly and obliquely cuneate at the base partially sunk in the frond and a little broader than the segments, the valves ciliated, stipes very slightly winged above hairy to the base. (TAB. XXXI. D.)—Sw. *Syn. Fil. p.* 149. *Willd. Sp. Pl. v.* 519.

Hab. Jamaica, Swartz. Wet banks, Fox's pass, St. George's, *Purdie*.—Allied to *H. ciliatum*; but I think quite distinct, in the smaller more compact and generally ovate fronds, the slightly winged and hairy stipes, the differently shaped involucre and the striking elasticity of the frond, in which latter respect it resembles the *H. elasticum* of Mauritius.

11. *H. Chiloense*, Hook.; small tufted, frond lanceolate sub-bipinnatifid with simple hairs or rarely branched at the base on the margin and under surface, glabrous above, segments broad linear obtuse, involucre axillary free ovate toothed obovato-cuneate, valves semiorbicular deeply ciliated at the margin slightly hispid at the base beneath, stipes not winged glabrous. (TAB. XXXII. A.).

Hab. Chiloe, *Cuming*, n. 8 and 12. Valdivia, on trunks of trees in woods, *Bridges*, n. 797. — A small densely tufted species, with rigid costa, broad segments, and the involucre always axillary. The hairs are rigid and appear seated on a minute dark tubercle.

12. *H. Organense*, Hook.; frond tall ample ovato-acuminate tripinnatifid, primary divisions broad-lanceolate acuminate, the segments linear simple or bifid obtuse toothed and as well as the costa obscurely ciliated, involucre at the apices of the frond or of the lower primary divisions copious narrow ovate free 2-valved to the base the valves convex dentate and obscurely ciliated, stipes not winged slightly hairy. (TAB.

lined to the upper portion of the frond: the segments which bear them contracted and in some degree changed, marginal hairs deciduous.

14. *H. Beyrichianum*, Kze.; "fronds curved tripinnatifid decurrent into the stipes hairy beneath glabrous above, primary segments ovato-lanceolate curved, secondary oblong, their segments linear obtuse toothed setoso-ciliate, sori terminal, involucre ovate eroso-dentate." *Kze. in Pl. Crypt. Poepp. p.* 108.

Hab. Trunks of trees, Peru, *Poeppig*. "Also found in Sierra d'Estrella by *Beyrich*.—Allied in habit to *H. elasticum*, differing in the unwinged rachis; and to *H. fumarioides*, which has, however, entire margins to the frond, glabrous and the receptacle retuse."

Dubious Species of this Section.

15. *H. microcarpum*, Desv.; "fronds tripinnatifid dilated at the base elongated at the apex puberulous, pinnæ subimbricated and pinnules decurrent, the latter 2—4-partite, the segments linear obtuse toothed setigerous at the margin, sori glabrous minute, rachis and stipes with a winged margin." *Desv. in Mém. Soc. Linn. iv. p.* 333. *Hispaniola (Desvaux)*. "Stipes 1 inch and more long. Fronds 6 inches; pinnæ 1 inch."

16. *H. capillare*, Desv.; "fronds subtripinnatifid, lower pinnæ remote few, pinnules hairy on both sides subpalmato-pinnatifid, the segments toothed obtuse subcontiguous, rachis sinuose naked capillary and hairy." *Desv. l. c. p.* 333. *Trichomanes hirsutum*, *Du Pet. Thouars, Fl. Tr. d'Acunha, p.* 34, (*excl. syn.*)—*Tristan d'Acunha, Thouars*.—"Near *Trichomanes trichophyllum*," but the lacinia broader, more decurrent at the base, according to *Desvaux*.

†† *Fronds primarily, especially below, pinnately divided. (Sp. 17—28).*

17. *H. elegans*, Spr.; pendulous linear elongated pinnated, pinnæ decurrent ovato-cuneate deeply pinnated with 3—5 somewhat flabellate segments which are linear-oblong obtuse rather distantly ciliated with long slender forked or stellated hairs, costæ glabrous, involucre nearly orbicular cuneate at the base which is sunk in the frond, valves ciliated with long hairs.—*Spreng. Syst. Veg. iv. p.* 133. *H. bifidum, Hook. et Grev. Ic. Fil. t.* 196.

Hab. Brazil, *Sellow*. Surucuco, Columbia, at 5000 feet of elevation, *Jameson*. San Carlos, Peru, *Mathews, n.* 1786.—I possess specimens from the above localities, which retain all their characters.

18. *H. pulchellum*, Schlecht.; fronds pendulous elongated pinnated, pinnæ remote petiolate subrhomboid-ovate acuminate bipinnatifid everywhere clothed with tawny stellated

hairs, segments linear-oblong obtuse, involucre semiobicular cuneate at the base much sunk in the frond and covered with copious long hairs. (TAB. XXXIII. A.) — *Schlecht. in Linnæa*, v. p. 618, (*small and barren*).

Hab. Mexico, *Schiede*, in *Herb. Reg. Berol.* et in *Herb. Hook.* Pillz-hum, Columbia, on trunks of trees, at an elevation of 13,000 feet, *Jameson*. Jamaica, *MacFadyen*.—A very distinct species. Our Jamaica and Columbia specimens are much longer (sometimes a foot long) than the original ones of *Schiede* from Mexico; but these latter are barren and otherwise imperfect, scarcely 4 inches long in the fronds, with the pinnæ approximate and the segments closely placed. The former have the pinnæ distant, longer, especially the sterile ones, more deeply divided, with more spreading segments, and these only bear fructifications.

19. *H. sericeum*, Sw.; everywhere ferrugineo-sericeous, fronds pendulous much elongated narrow oblong truncated at the apex especially the younger ones, pinnæ lanceolate approximate obtuse cuneate at the base (much attenuated in the fertile ones) laciniato-pinnatifid but not deeply so, veins forked close parallel lamellated, involucre small on the apices of the ultimate segments orbicular sunk very hairy.—*Sw. Prodr.* p. 136. *Willd. Sp. Pl.* v. p. 517. *Hedw. Fil. cum Ic.* — *H. tomentosum*, *Kze. Pl. Crypt. Poepp.* p. 107. *H. plumosum*, *Kaulf.*—*Trichomanes pendulum serici villosi*, instar molle, *Plum. Fil.* p. 56, t. 73.

Hab. Martinique, *Plumier*. Jamaica, *Swartz, &c.* Peru, *Poeppig, Matthews*, n. 1090, 206 and 1792. Columbia, *Hartweg*, n. 1506, Jamaica. Guatemala, *Hartweg*, n. 862. Brazil, *Sellow, Gardner*, n. 215, *Burchell*.—Perhaps the most splendid species of the genus, of great length, 1½ foot to 2 feet long, pendent, soft and flexible, 3—4 inches broad, set with closely placed pinnæ for almost the whole length, and these are black and more or less decayed below, but towards the apex bright-colored and perfect and clothed with rusty copious hairs. The ample fronds cover the faces of rocks, according to Mr. Gardner, as with a curtain. The curious lamellæ

21. *H. pyramidatum*, Desv.; "frond pinnate piloso-subtomentose on both sides, pinnæ elongate acute cuneate at the base subadnate repando-dentate obscurely denticulate, rachis winged, stipes terete subglabrous winged above." *Desv. in Mém. Soc. Linn. Par. ii. p. 332.*

Hab. "Warm parts of America," *Desvoux*. "Frond about 1 foot long." — Probably a variety of *H. sericeum*.

22. *H. elasticum*, Bory; fronds ovate acuminate thin and membranaceous but rather rigid and highly elastic bi-tripinnatifid above below pinnate, pinnæ bipinnatifid, the segments narrow-linear obtuse ciliated as well as the costa, involucre very small semiorbicular, the base cuneate and sunk, valves short ciliated, stipes not winged more or less hairy.— *Willd. Sp. Pl. v. p. 520. Sieb. Syn. Fil. n. 78. Hook. et Grev. Ic. Fil. p. 135.*

Hab. Mauritius and Bourbon, *Bory, Bojer, Sieber*. — This species well deserves its specific name; for when dry, at least, the sides become recurved, and it is hardly possible to keep the specimens flat except by pressure. Sori very small and the valves of the involucre peculiarly short.

23. *H. Berteroi*, Hook.; fronds oblong ovate or lanceolate moderately attenuated clothed with tawny silky stellated hairs pinnated below bi-tripinnatifid above, pinnæ and primary divisions approximate ovato-lanceolate obtuse or acuminate more or less deeply pinnatifid, the segments broadly linear obtuse, veins not lamellate, involucre very small suborbicular sunk very hairy, stipes elongated hairy terete not winged. (TAB. XXXIII. C.)

Hab. Mountains of Juan Fernandez, *Bertero, n. 1540. Chiloe, Cuming, n. 11.* — Stipes 3—5 inches long. Fronds 4—6 inches, in general aspect approaching *H. sericeum*, but acuminate, smaller, veins not lamellate, involucre much smaller and shorter. One of my specimens is so deeply divided as to resemble *H. elasticum*, but the lower portion of the frond is clearly pinnated, and the surface, as well as the costæ and margin, covered with copious tawny stellated hairs.

24. *H. obtusum*, Hook. et Arn.; small, fronds cæspitose broadly oblong very obtuse tripinnatifid pinnated below, pinnæ or primary divisions approximate cuneate pinnatifid and subflabelliform, segments narrow linear, margins and costa clothed with long branched hairs appressed to the frond, involucre on the ultimate segments equal in breadth to them nearly orbicular, their base broadly cuneate sunk, the valves much ciliated. (TAB. XXXIII. D.)

Hab. Oahu, *Lay & Collie*, in *Beechey's Voyage*. — Stipes very slender, short, not winged, hairy. Plant small and tufted. Fronds 2 inches long glossy; ultimate segments as it were corymbose, so as to form a blunt and broad extremity. Hairs copious, confined to the costa and margin, many

lying flat over the surface of the frond. Some of the fronds, it may be observed, are wholly pinnatifid, others pinnate below.

25. *H. æruginosum*, Carm.; clothed with branched tawny hairs, fronds oblong or ovato-acuminate tripinnatifid pinnate below, pinnæ or primary divisions ovate acuminate subcuneate, the segments close compact often almost imbricated linear obtuse, involucre smaller than the segments semiorbicular the base cuneate sunk, valves very hairy, stipes not winged. (TAB. XXXIV. A.)—*Carm. in Linn. Tr. xii. p. 573.* *Trichomanes æruginosum*, *Thouars.—Poirot, Encycl. viii. p. 76.*— β . *Franklinianum*; primary divisions and pinnæ more distant and rather more acuminate. *H. Franklinianum*, *Colenso in Tasm. Phil. Journ.*

Hab. On rocks, Tristan d'Acunha, *Thouars, Bory, Carmichael*— β . New Zealand, Dusky Bay, *Menzies*. Pendulous on the trunks of trees, Waikare, northern island, *W. Colenso, Esq. n. 272.*—Stipes hairy, shorter than the frond, which is 4—5 inches long. In the color of the dried specimens there is nothing to justify the specific name. The species resembles small specimens of *H. ciliatum*; but the lower portion of the frond is clearly pinnated, and the involucre are different.

26. *H. lanceolatum*, Hook. et Arn.; fronds lanceolate pinnated, pinnæ ovato-lanceolate bipinnatifid distant, the segments narrow-linear obtuse erecto-patent, the margins hairy, hairs erect simple or branched, rachis winged above, involucre terminal on lateral segments orbicular almost free ciliated with long hairs, stipes not winged hairy. (TAB. XXXIV. B.) *Hook. et Arn. Bot. of Beech. Voy. p. 109.*

Hab. Oahu, Sandwich Islands, *Lay & Collie, Douglas, Diell.*—A rather small, apparently pendent, species, becoming of a dark chestnut brown when dry, with lanceolate fronds 3—4 inches long, erecto-patent, divisions and segments, which are rather distant, fringed with appressed hairs. Involucre scarcely at all sunk, ciliated with long hairs.

Dubious Species of this Section.

28. *H. Arbuscula*, Desv.; "fronds oblong pinnate somewhat hairy, pinnæ decurrent oblong rather obtuse remote pinnatifid, the segments very obtuse ciliated stellate, rachis and stipes hairy marginately winged." *Desv. l. c. p.* 332.—*Hab. Mauritius.*—"Stipes 2 inches long; frond of the same length." *Desv.*

*** *Fronde decomposee, the margins toothed or serrated, not hairy nor ciliated. (Sp. 29—47).*

† *Fronde pinnate especially below. (Sp. 29—36).*

29. *H. Tunbridgense*, Sm.; procumbent densely matted, fronds small rather tender pinnated, pinnæ distichous subvertical pinnatifid, segments linear simple or bifid and as well as the supraaxillary solitary subcompressed involucre spinuloso-serrate the valves semiorbicular, the very short cuneate base sunk, rachis winged above. *Sm. Fl. Brit. p.* 1141. *E. Bot. t.* 162. *Schkuhr, Crypt. t.* 135, *d. Sw. Syn. Fil. p.* 147. *Willd. Sp. Pl. v. p.* 520. *H. minimum*, *Rich. Fl. Nov. Zeal. p.* 91, *t.* 14, *f.* 2. *A. Cunn. Fl. Nov. Zeal. in Comp. to Bot. Mag. ii. p.* 369. *H. revolutum*, *Colenso in Tasm. Phil. Journ.* *H. asperulum*, *Kze. Pl. Crypt. Poepp. p.* 109. *H. Thunbergii*, *Eckl. in Schied. Pl. Exsic. Cap. Un. It. n.* 92. "H. unilaterale? *Willd.*" (*according to a specimen from Martius, it is this species*).— β . frond elongated, pinnæ more distant and more rigid. *H. cupressiforme*, *Lab. Nov. Holl. p.* 102, *t.* 250, *f.* 2. *Willd. Sp. Pl. v. p.* 522. *H. Tunbridgense*, *Br. Prodr.*

Hab. Europe, northern or alpine or subalpine districts. Azores, *Guthrie*. Madeira. Cape of Good Hope. Mauritius, *Carmichael*. Chili, *Beechey &c.* Valdivia, *Bridges n.* 798, *Poeppig, D'Urville*. Brazil, *Martius*.— β . Tasmania, New Zealand, Cape of Good Hope. Organ Mountains, Brazil, *Gardner*, *n.* 212.—Mr. Brown rightly determines the *H. cupressiforme* of Labillardière to be our *H. Tunbridgense*, or but a trifling variety. The species indeed seems to be an inhabitant of various parts of the globe, in the old and new world, in the northern and southern hemisphere. In the Organ-mountain specimens, and in some, but not all, from Tasmania, the involucre are nearly entire, and scarcely distinguishable from those of *H. Wilsoni*. *Poeppig* refers our *H. Tunbridgense* from Chili to his new species, *H. asperulum*, but his *asperulum* quite accords with the European *Tunbridgense*.

30. *H. Wilsoni*, Hook.; fronds rigid pinnate, pinnæ recurved subunilateral wedge-shaped in circumscription pinnatifid, the segments linear undivided or bifid spinuloso-serrate, involucre supraaxillary substipitate solitary ovate inflated entire the rachis generally free to the base. *Hook. in Brit. Flor. Wils. in E. Bot. Suppl. t.* 2686, (*excellent*).

H. unilaterale, Willd. *Sp. Pl.* v. p. 521 (according to description, but not according to a specimen from Martius). *H. Tunbridgensis*, β . Kze. in *Arot. Afr. Austr.* p. 7. *H. peltatum*, Desv. l. c. p. 33. *Trichomanes peltatum*, Poiret, in *Encycl. Bot.* viii. n. 521, an *H. dentatum*, Cav.? — β . valves of the involucre combined below. — γ . segments narrower, involucre smaller.

Hab. Mountains and wet rocks, England, Scotland and Ireland. Cape of Good Hope, Bourbon, &c. — β . Chiloe, Cuming, n. 16. — γ . Chiloe, Cuming, n. 19 and 17. Valdivia, Bridges, n. 798. Tasmania, Gunn. Cape Horn, Hermite Island, J. D. Hooker. — The differences between this and *H. Tunbridgensis* are detailed with great precision by Mr. Wilson in the 'Supplement to English Botany' above quoted: but great though they are in the respective forms of our own country, it often becomes difficult accurately to distinguish the exotic ones: and it is singular that in almost every country where one species is found, the other is found also.

31. *H. Peruvianum*, Hook. et Grev.; fronds oblong-lanceolate pinnate, pinnæ pinnatifid, the segments broadly linear obtuse spinuloso-serrate, the lowermost forked, involucre supra-axillary obovate semivalvate sessile situated at the inner bases of nearly all the pinnæ spinuloso-serrate at the apex, rachis winged above. *Hook. et Grev. Ic. Fil. t.* 208.

Hab. Trunks of trees, Province of Esmeraldas, elevation of 5000 feet, Jameson.

32. *H. pectinatum*, Cav.; fronds linear-lanceolate elongated pinnate, pinnæ curving upwards pinnatifid only on the upper side, hence the segments are all secund, erect, the segments linear obtuse toothed chiefly towards the apex, involucre occupying the apices of all the segments of the superior pinnæ ovate entire at the apex 2-valved to the base broader than the segments, rachis winged above, stipes terete smooth. (TAB. XXXIV. D.) — *Cav. Præl.* 1801, n. 687. *Sw.*

Hab. Andes of Columbia, above Quito, *Prof. W. Jameson*, n. 106. — An elegant, graceful and very distinct species, which deservedly bears the name of an able and most industrious naturalist. Caudex creeping, very slender, rooting, capillary as well as the stipes, which is about 2 inches long. Frond often a span and more long, an inch wide in the broadest part, very delicate, thin and membranaceous; the rachis and costa beneath singularly beset with long, conspicuous, soft, spine-like processes. Whole frond of a greenish colour when dry.

34. *H. Smithii*, Hook.; erect, fronds oblong acuminate narrow at the base pinnate (dark brown), pinnae bipinnatifid lanceolate acuminate, segments linear flaccid spinuloso-dentate rather obtuse, involucre sessile axillary oblong ovate almost lanceolate rather acute entire 2-valved only half-way down, receptacle exerted in age, rachis often crinite winged above very slightly so towards the base, stipes elongated terete glabrous. (TAB. XXXV. B.) — *H. bivalve*, *Sm. En. Fil. Ins. Philipp. in Hook. Lond. Journ. Bot.* ii. p. 418, (not Swartz).

Hab. Philippine Islands, *Cuming*, n. 221 and 264. — This is not the *H. (Trichomanes) bivalve* of Forster in the Banksian herbarium; the involucre and other characters being widely different. From *H. multifidum* it equally differs in form and size, in the more delicate texture and acute involucre. Its nearest ally is perhaps *H. fucoides*, but the involucre are very dissimilar. Stipes 3—4 inches long; fronds 4—6 inches or more. In *Cuming's* n. 264 the segments are rather broader and the involucre larger than in n. 221; but there appears no other mark of distinction.

35. *H. Bridgesii*, Hook.; erect, fronds broadly ovate acuminate bipinnate, pinnules subdeltoid pinnatifid, the segments narrow-linear obtuse rather rigid somewhat crisped when dry spreading dentato-serrate, involucre axillary or supraaxillary sessile copious roundish-obovate entire or obscurely toothed 2-valved about two-thirds of the way down, the valves convex, rachis and very elongated stipes hispid, the rachis only slightly winged towards the apex. (TAB. XXXV. C.)

Hab. Valdivia, on trunks of trees, *Bridges*, n. 795 and 796. Chiloe, *Cuming*, n. 9. — One of the most distinct of all the species, being truly bipinnate with very narrow patent segments and copious fructifications. Stipes long (nearly a span), black, setose, especially above as well as the rachis. Frond 3—5 inches high, broad at the base, almost deltoid. It can scarcely be the *H. dentatum* of Cavanilles: or, if it be, the description is very incorrect.

Dubious Species of this Section.

36. *H. dentatum*, Cav.; “caudex creeping, fronds tripinnate, pinnules alternate capillary, clusters of capsules strobiliform.” “*Cav. Præl.*” 1801, n. 687. *Sw. Syn. Fil.* p. 409. *Willd. Sp. Pl.* v. p. 525.

Hab. San Carlos, Chiloe, *Cavanilles*. — Can this be the same with *H. Bridgesii* above described? or may it not be a var. of *H. Wilsoni*? By the term strobiliform capsules is probably merely meant their dense arrangement on the elongated receptacle common to almost all the species.

†† *Fronds pinnatifidly divided.*

37. *H. multifidum*, Sw.; erect, fronds broadly ovate tripinnatifid, the segments linear narrow rigid obtuse spinuloso-dentate, involucre sessile supraaxillary obovate obtuse scarcely half bivalved, the lips entire or serrated, receptacles more or less exserted in age, rachis scarcely winged very low down, stipes elongated terete not winged. *Sw. Syn. Fil. p. 149 and 378. Schkh. Fil. t. 135, b. Hook. et Grev. Ic. Fil. t. 167.* *Trichomanes multifidum*, Forst. *T. macilentum*, *Herb. Banks.*— β . smaller, the fronds curved downwards.

Hab. New Zealand, in woods on the ground, *Forster, Colenso, J. D. Hooker, Sinclair.*— β . Faces of rocks, New Zealand, *Colenso.*—Stipes 3—4 inches long: fronds 2—3 inches; in β . scarcely an inch long.

38. *H. bivalve*, Sw.; fronds erect broadly ovate tripinnatifid, the segments linear rather rigid spinuloso-dentate obtuse, involucre terminal broadly ovate entire 2-valved to the cuculate base which is sunk in the frond, receptacles always included, the rachis but slightly winged below, stipes terete without wing glabrous. (TAB. XXXV. D.) *Sw. Syn. Fil. p. 146 and 372. Schkh. Fil. t. 135 (sterile). Willd. Sp. Pl. v. p. 523.* *Trichomanes bivalve*, Forst. *Hymenophyllum spathulatum*, *Colenso in Tasm. Phil. Journ. Trichomanes Pacificum*, "*Hedw. Fil. sine Ic.*" (*my copy wants also the description*).

Hab. New Zealand, *Forster, Colenso.*—This is the true *H. bivalve* of Forster, a very little understood plant, though the general character of the frond is well represented in Schkuhr: but his figure is destitute of fructifications, in the situation and form of which the main characters are to be looked for. Its nearest affinity is with *H. multifidum*.

39. *H. dichotomum*, Cav.; erect, fronds ovate or ovato-lanceolate bipinnatifid, the segments broadly linear bi-trifid very

Blume with a doubt, thinking it likely to be different from the Chillean plant (or rather from the plant I take to be the true *dichotomum* of Chiloe); and it seems to me the more dubious because the author does not notice the remarkable spinulose processes which are so conspicuous on the rachis and stipes, and are independent of the ordinary wings.

40. *H. tortuosum*, Herb. Banks.; rigid erect, fronds broadly ovate tripinnatifid, the segments linear narrow more or less undulated and crisped sharply toothed (not plicate), involucre oval and elongated terminal upon the lower segments of the pinnules, their apices ciliato-dentate the valves short contracted at the mouth, rachis and stipes with a crisped tortuous sinuato-spinulose wing. *Hook. et Grev. Ic. Fil. t. 129. H. nigricans, Colla, in Act. Taur. 39, p 32, t. 62, (ex Herb. Banks.)*

Hab. Staten Land (not New Zealand as stated by mistake in the 'Icones Filicum'), *Menzies, Dr. Eight's*. Tierra del Fuego, *Banks, Solander, Darwin, J. D. Hooker*. Valdivia, *Bridges, n. 799*.—Allied to *H. dichotomum*; but the fronds are not plicate at the margin, and they are of a more rigid texture; the involucre also are longer, distinctly ciliato-spinulose. Distinguished also by the absence of the soft spines on the stipes, rachis and costæ: though the remarkably tortuous nature of the wings on the rachis and stipes gives them at first sight a scaly appearance.

41. *H. attenuatum*, Hook.; tall, fronds narrow-ovate attenuated tripinnatifid, the segments linear scarcely rigid plane (not undulated or plicate) ultimate ones elongated ciliato-dentate, involucre terminal on the segments oblong subcylindrical contracted at the mouth with two short ciliato-dentate valves or lips, wings of the rachis and of the long stipes (where they reach to the base) very tortuous and dentato-spinulose. (TAB. XXXVI. B.)

Hab. Summit of the Organ Mountains, *Gardner, n. 5950*. Chiloe, *Cuming, n. 6*.—Evidently allied to *H. tortuosum*, but much larger (fronds 6—7 inches and stipes nearly the same); and in none of my specimens are the fronds either undulate or plicate; the texture is more membranaceous and tender, the whole plant more flaccid and the margins ciliato- rather than spinuloso-dentate.

42. *H. Neesii*, Hook.; erect small, fronds narrow ovate tripinnatifid, the segments linear often forked, the margins deeply undulate and crisped spinuloso-serrate, involucre solitary supraaxillary oblong subcylindrical spinuloso-dentate at the apex the mouth contracted with two short acute valves or lips, rachis and stipes setose especially at the base broadly winged with a crisped undulated serrated membrane. *H. dichotomum, Nees in Nov. Act. Acad. 1823, p. 127, t. 13, f. 4, (sterile), not Cav. Trichomanes Neesii, Blume, Enum. Fil. Jav. p. 226. T. aculeatum, J. Sm. in En. Fil. Philipp.*

Hab. Java, *Blume*. Luzon, *Cuming, n. 146*.—This species, together

with *H. denticulatum*, Sw., Blume, and also Mr. J. Smith, refer to *Trichomanes*, and with some justice, so far as the form of the involucre is concerned, which in them, and indeed in the two preceding species, is almost cylindrical, with 2 very short valves or lips; but the texture is thinner than is common in *Trichomanes*, and the general affinity is rather with *Hymenophyllum*. The present species is small, singularly opaque, as if succulent when recent, and the general appearance not much unlike some small spinous fucoid plant.

43. *H. secundum*, Hook. et Grev.; fronds ovato-lanceolate bipinnatifid, primary divisions somewhat flabellate falcato-recurved, the segments linear secund dichotomous serrated, involucre terminal on short axillary segments oval-oblong somewhat compressed 2-valved half-way down, the valves entire the base sunk, rachis winged its margin entire, stipes terete not winged.—*Hook. et Grev. Ic. Fil. t. 133.*

Hab. Staten Land (not "New Zealand"), *Menzies*. Hermit Island, Cape Horn, *J. D. Hooker*.—A very elegant and remarkable species; primary divisions falcato-recurvate and at the base subpalmate, especially the lower ones; the segments secund and pointing upwards, of a rigid texture, becoming dark brown when dry.

44. *H. cristatum*, Hook. et Grev.; fronds oblong bi-tripinnatifid, the segments rather long linear obtuse sharply serrated with large teeth which exist also on the rachis and veins at the back, involucre supraaxillary large orbicular sessile much broader than the segments the apex and sides sharply spinuloso-ciliate 2-valved to the very base, stipes slightly winged above.—*Hook. et Grev. Ic. Fil. t. 148.*

Hab. On Cayambe, Andes of Quito, on the trunks of trees near the limits of perpetual snow, at 14,000 feet of elevation above the sea, *Jameson*.—Remarkable for its dark brown colour, the long spinulose crests on the back of the rachis, costæ and veins, and the very large orbicular involucre, with beautifully ciliated deep valves. Receptacles globose, large, causing a tumid swelling in the lower half of the valves.

natifid, primary divisions pointing upwards, the segments linear-oblong obtuse serrated, involucre subsessile marginal frequently on both sides the primary divisions oval or obovate dentate serrated compressed 2-valved half-way down, receptacle protruded in age, stipes slightly winged above frequently crinite.—*Sw. Fl. Ind. Occ. p. 1747. Syn. Fil. p. 146. Willd. Sp. Pl. v. p. 523. Trichomanes fucoides, Hedw. Fil. cum Ic.*

Hab. Jamaica, *Swartz, Purdie*. Martinique, *Sieber*. Summit of the Organ Mountains, *Gardner, n. 5951*. Peru, *Poeppig*. Mexico, (*Kunze*). Caraccas, *Linden, n. 57*.—This species is very faithfully represented in Hedwig's Filices.

47. *H. denticulatum*, Sw.; "frond ovate glabrous deeply subtripinnatifid, primary divisions alternate approximate trapezoideo-ovate, secondary divisions cuneiform digitato-pinnatifid, segments linear bifid emarginate sinuato-denticulate, involucre with the mouth 2-lipped, rachis winged above entire, stipes short terete." *Bl.*—*Sw. Syn. Fil. p. 148 & 375. Willd. Sp. Pl. v. p. 524. Trichomanes denticulatum, Blume, En. Fil. Jav. p. 226. Hymenophyllum humile, Nees. et Bl. in Nov. Act. Acad. xi. t. 13, f. 3, (sterile).*

Hab. Trunks of trees, Java, *Thunberg, Blume*.—I have copied Blume's character of this species as more full than that of Swartz, for I am unacquainted with it myself.

**** *Fronde decomposita; margins entire (not hairy nor ciliated).*

† *Fronde pinnatifidly divided.*

48. *H. rarum*, Br.; flaccid pendent, fronds oblong or linear-oblong bipinnatifid, the segments short obtuse erecto-patent broad entire, involucre rhomboid the lower half cuneate sunk the upper forming 2 semicircular entire compressed valves, stipes slender filiform sometimes slightly margined above.—*Br. Prodr. Nov. Holl. p. 159. Hymenophyllum fumaroides, Bory in Willd. Sp. Pl. v. p. 526, (according to Kunze). Kaulf. Syn. Fil. p. 269. Kunze, Acot. Afr. Austr. p. 75. H. australe, Willd. l. c. p. 527? H. semibivalve, Hook. et Grev. t. 83.—β. fronds very short compact imbricated. H. imbricatum, Colenso, in Tasm. Phil. Journ.—γ. more elongated and acuminate, involucre narrower.*

Hab. Tasmania, *Brown, Gunn, J. D. Hooker*. New Zealand, *Menzies, Colenso, n. 412 and 277, J. D. Hooker*. Chiloe, *Cuming, n. 13 and 15*. South Africa, *Drège, Ecklon, Harvey, Forbes, Carmichael, Mund*. Bourbon and Mauritius, *Bory*.—β. Chiloe, *Bridges*. New Zealand, *Colenso*. S. part of Tierra del Fuego, *Darwin, J. D. Hooker*.—γ. Ceylon, *Mrs. Gen. Walker, Dr. Wight, Macrae*.—The normal state of this plant seems to be that figured in the 'Icones Plantarum,' under the name of *H. semibivalve*, and is common in Tasmania, New Zealand and S. Africa: but a shorter and more compact form is also found, which I have indicated as var. β.

With the first, on the authority of Kunze, the Bourbon and Mauritius *H. fumarioides* agrees, for he says it is the same with Cape specimens of Drège. The *H. australe* of Willdenow is probably also identical. In the usual state of the plant, with short primary divisions, the segments are mostly secund, from the upper side, but sometimes there is a different appearance. In one of two specimens of Mr. Cuming's n. 13, the fronds are ovate, tripinnatifid, but it is barren and may perhaps prove distinct. His n. 15 has at first sight a very different appearance, bearing long narrow branches or primary divisions, each resembling the more usual form of the entire plant; it is also more rigid and wiry. It must be confessed that the species is a very variable one.

49. *H. badium*, Hook. et Grev.; fronds broadly oblong lanceolate obtuse bipinnatifid, the segments short oblong spreading entire obtuse, the lower ones of the primary divisions bifid, involucre few solitary on short lateral segments sessile free orbiculari-reniform convex 2-valved to the very base, quite entire, stipes winged in the upper half. *Hook. et Grev. Ic. Fil. t. 76, (not Wall. Cat. n. 172).*

Hab. East Indies, *Dr. Wallich*, probably from Nepal.—All my individuals are of a rich brown colour, the segments short and very broad. The fructifications rare, orbicular, approaching to reniform. Our specimens were received and published in the 'Icones Filicum' before *Dr. Wallich* appears to have drawn out his celebrated 'Catalogue;'—and the species there noted (but with a mark of doubt as this, n. 172) is *H. polyanthos*.

50. *H. caudiculatum*, Mart.; tall erect, fronds lanceolate or ovato-lanceolate acuminate tripinnatifid somewhat glossy, primary divisions lanceolate and as well as the apex of the frond long-caudate especially in the sterile fronds, secondary remote often simple, segments short broadly linear entire spreading obtuse or emarginate, involucre supraaxillary large orbicular free sessile or on very short segments 2-valved to the base compressed entire or slightly erose, rachis prominent from the very broad wings, stipes slender terete broadly winged wings

entire undulato-cripsed especially at the rachis, involucre copious all terminal campanulate free sessile 2-valved to the base, the valves somewhat plaited truncate fimbriato-dentate, stipes winged almost to the very base, the wings much crisped. (TAB. XXXVI. C.)—*J. Sm. Fil. Philipp. l. c. p. 418, name only.*

Hab. Luzon, *Cuming*, n. 218.—Stipes 2—3 inches; frond 4—5 inches. A good deal resembling *H. Javanicum*, but the fructifications are very different.

52. *H. fuciforme*, Sw.; tall rigid (from the stoutness of the stipes and rachis) erect, fronds broadly lanceolate acuminate tripinnatifid somewhat glossy, the segments broadly linear obtuse rounded bifid or sometimes emarginate ultimate ones attenuated, involucre supraaxillary marginal rarely substipitate very small ovate 2-valved to the base free, the valves entire, receptacles in age and even the capsules from the spreading of the valves exerted, rachis with a very broad wing, stipes (pale-colored) stout compressed almost sulcate when dry strongly winged above. (TAB. XXXVI. D.) *Sw. Syn. Fil. p. 148. Willd. Sp. Pl. v. 529. H. fucoides, Cav. Præl. 1801, n. 686 (not Swartz).*

Hab. Chiloe (*Cavanilles*) *Cuming*, n. 7. Shady woods, Valdivia, *Bridges*, n. 793. Trunks of trees in mountain woods, Juan Fernandez, *Bertero*, n. 1841.—This is unquestionably the finest and most striking species of this beautiful genus of Ferns. Specimens from Bertero are more than 2 feet long, the stipes one-third of that length, and, as well as the rachis, peculiarly stout, so as to give a firm rigid character to the entire plant. The leafy or winged portion of the rachis is very broad; the ultimate segments are acuminate; the involucre always lateral and resembling the silicula-form fruit of many *Alge*,—and, what is remarkable, even before the full maturity of the fructification, while the capsules are upon the receptacle, they are exposed to view by the spreading and shrinking of the valves. Its affinity is with *H. dilatatum*.

53. *H. pulcherrimum*, Colenso; rather large erect, fronds ovato-lanceolate tri-quadripinnatifid, the segments rather short somewhat spreading entire linear obtuse bifid, the margins waved, secondary rachis flexuose, involucre sessile axillary or on very short segments small orbicular quite free 2-valved to the very base, the valves convex entire, receptacles included, stipes compressed winged to the base and as well as the rachis of the same color with the frond. (TAB. XXXVII. A.)—*Colenso in Tasm. Phil. Journ.*

Hab. Trunks of trees, Waikare lake, N. Zealand, *Colenso*.—Stipes 3—5 inches; frond 8—10 inches, 4—5 inches broad. In the pale color of the rachis and stipes, in the compressed and strongly winged character of the latter, and in the almost equal size of the entire plant, this has a great affinity with *H. dilatatum*: but the fronds are very different, of a soft and flaccid nature,

subundulated, the segments shorter, more spreading, narrower, not at all palmate. The color is not so green; the involucre are much smaller, never terminal on the longer segments, and not at all sunk.

54. *H. dilatatum*, Sw.; tall erect, fronds ample ovate acuminate or oblong tripinnatifid, primary divisions ovato-lanceolate and as well as the secondary segments broad and subpalmate below, the segments broad-linear elongated subcaudate and drooping entire, involucre terminal on the segments orbicular lower half cuneate sunk in the frond and broader than the segments, the valves slightly convex semi-orbicular very obtuse entire, receptacles clavate included, stipes ancipiti-alate decurrent almost to the base and as well as the rachis green.—*Sw. Syn. Fil. p. 149 and 373. Schkh. Fil. t. 135. Willd. Sp. Pl. v. p. 533. Hook. et Grev. Ic. Fil. t. 60. Trichomanes, Forst. Prodr. n. 467. Blume, Enum. Fil. Jav. p. 221.*

Hab. New Zealand, *Forster and other travellers*. Rocks and trunks of trees, woods of Java, *Blume*. — A very handsome species, well represented in the 'Icones Filicum,' except that in most specimens the bases of the segments are so united as to be broad and subpalmate. Stipes and rachis always of the same pale hue as the frond, which is often a foot or even a foot and a half high.

55. *H. protrusum*, Hook.; fronds pendent oblong-acuminate bi-tripinnatifid flaccid compact, primary divisions ovate acuminate, segments linear obtuse entire, involucre terminal small obovate obtuse the lower half cuneate and sunk, the valves entire, receptacles in age thrice as long as the involucre, stipes terete glabrous slightly winged above. (TAB. XXXVII. B.)

Hab. Realejo, Central America, *Sinclair*. Jamaica; woods above Mount Stewart, *Purdie*. — Stipes 2—3 inches long; fronds about 5 inches, mem-

flaccid, varying much in the direction of the segments, sometimes recurved, sometimes pointing upwards; lower primary divisions very remote.

57. *H. crispatum*, Wall.; erect, fronds ovato-acuminate tripinnatifid, the segments linear obtuse generally plane sometimes waved entire, involucre terminal sometimes on lateral segments copious ovate sessile free entire 2-valved to the very base the valves convex, receptacles wholly included, stipes with broad crisped wings almost to the base, wing of the rachis also crisped.—*Wall. Cat. n. 169. Hook. et Grev. Ic. Fil. t. 77.*— β . *minus*; fronds contracted oblong, fructifications small.— γ . *majus*; fronds broader, fructifications larger. *H. sanguinolentum*, *J. Sm. Enum. Fil. Philipp. l. c. p. 418*, (not Swartz).— δ . *Tasmanicum*; involucre shorter and broader often geminate and generally very erose. *H. flabellatum*, *Br. Prodr. p. 159*, (not Labill.) *H. atrovirens*, *Colenso in Tasm. Phil. Journ.*

Hab. Nepal, *Wallich*. β . Ceylon, *Mrs. Gen. Walker*. γ . Luzon, *Cuming*, n. 220. δ . Tasmania, *Brown, Gunn*. New Zealand, *Colenso*, n. 275, *Logan, J. D. Hooker*.—*H. crispatum*, as figured in the 'Icones Filicum,' I possess from Nepal. The Ceylon specimens are smaller, with narrower and copious fructifications, scarcely half the size of the former. Those I call γ . are larger, with the involucre twice the size of β , still more copious, especially at the apices of the ultimate segments. The specimens from Tasmania appear quite to agree with Mr. Brown's *H. flabellatum* (not Labill.), for the slight differences would scarcely justify their being kept distinct. Among my abundant specimens from that country the fronds are more or less crisped, or sometimes wholly plane. The involucre, always terminal on elongated segments, are nearly orbicular in some instances, in others ovate, entire or erose. Mr. Colenso's beautiful specimens from New Zealand (*H. atrovirens*, Col.) have the segments of the fronds almost entirely plane, the involucre smaller and exactly ovate.

58. *H. flexuosum*, A. Cunn.; fronds erect rather rigid broadly ovate almost deltoid tri-quadripinnatifid, the segments narrow linear entire obtuse undulated, involucre rather broader than the segment terminal free orbicular entire 2-valved to the base, the valves convex, receptacles included, rachis as well as the stipes with a broad crisped wing. *A. Cunn. Nov. Zeal. in Hook. Comp. to Bot. Mag. ii. p. 369.*

Hab. New Zealand, northern island, *All. Cunningham, Colenso*.—This bears the rounded involucre of *H. Javanicum*, but they have the terminal insertion of *H. crispatum*. The fronds are more deeply and copiously divided than in either, more crisped, especially in the rachis and stipes; and the general habit is different; yet it must be confessed that in many respects it appears intermediate between the two just mentioned.

59. *H. undulatum*, Sw.; pendent, fronds ovate or oblong (small) tri-quadripinnatifid, below sometimes pinnate, primary divisions patent, the segments short oblong spreading entire

emarginate everywhere undulated and crisped dense and compact, involucre rare terminal orbicular free compressed 2-valved to the base entire, rachis with the wings undulate and strongly crisped, stipes slender filiform very indistinctly winged.—*Sw. Prodr. Fl. Ind. p. 1751. Syn. Fil. p. 148. Willd. Sp. Pl. v. p. 533. Hedw. Fil. cum Ic.*

Hab. Jamaica, *Swartz, Menzies*. Mountains of Andinamarca, Peru, *Mathews, n. 1086*.—Very distinct. The stipes varies from 1—3 inches. Fronds 3—4 inches long, in every part beautifully and equally undulato-crispate.

60. *H. Javanicum*, Spr.; fronds ovate oblong tripinnatifid, the segments linear obtuse entire and as well as the rachis undulated crisped, involucre copious upon very short lateral segments orbicular convex entire or erose free 2-valved to the very base, stipes with a broad wavy wing extending nearly to the base.—*Spreng. Syst. Veget. iv. p. 132. Blume, Enum. Fil. Jav. p. 222. H. crispum, Nees et Blume in Nov. Act. Nat. Cur. xi. t. 14, f. 1, (not H. B. K.) H. serpens, Wall. Cat. n. 173.*

Hab. Pundowa Mountains, N. India, *De Silva (Wallich)*. Assam, *Major Jenkins*. Java, in mountain woods, and in the Moluccas, *Blume*.—This is well figured by Nees and Blume in the work above quoted, though the fronds are a little broader than in our specimens. The species is very near *H. crispatum*, but the fronds are much more crisped, and the involucre are orbicular, not ovate. In some specimens, however, there is an approach to the ovate form. Stipes 2—4 inches. Fronds 3—4 inches.

61. *H. myriocarpum*, Hook.; pendent flaccid, fronds elongato-lanceolate compact tripinnatifid, primary divisions lanceolate gradually smaller at the apex and base, the segments short linear-oblong obtuse entire or retuse moderately spreading, involucre very numerous on short lateral contracted segments broadly orbicular sessile 2-valved to the very base, the

eres ovate slightly sunk in the frond. — *H. polyanthos*, Sw. *Syn. Fil.* p. 149. *Willd. Sp. Pl. l. c.* p. 531. *Hedw. Fil. cum Ic.* *H. abietinum*, Kze. *Pl. Crypt. Poepp.* p. 109, *vix Hook.* *H. Jalapense*, Cham. et Schlecht. in *Linnæa*, v. p. 619. *H. badium*, Wall. *Cat. n.* 172, *not Hook. et Grev.* *H. ricciæfolium*, Klotzch, in *Herb. Reg. Berol. an Jacq.?* — β . fructifications generally on short lateral segments more or less contracted, involucre broadly ovate or more frequently orbicular free to the base (not sunk). — *H. clavatum*, Sw. *Syn. Fil.* p. 149. *Willd. Sp. Pl. v.* p. 532. *Hedw. Fil. cum Ic.* Kze. in *Syn. Pl. Crypt. Poepp.* p. 109. *H. Jalapense*, Martens et Galeotti, *Syn. Fil. Mex.* p. 81. *H. sanguinolentum*, Sw. *Syn. Fil.* p. 529. *Schkuhr, Fil.* p. 136, t. 135, c. " *Hedw. Fil. cum Ic.*" (not in my copy). *Willd. Sp. Pl. v.* p. 529. *Trichomanes sanguin.* Forst. *Hymenophyllum villosum*, Colenso, in *Tasm. Phil. Journ.* (a subvar. with stipes and rachis very slightly hairy). — γ . fronds larger, fructifications as in var. β . *H. abietinum*, Hook. et Grev. *Ic. Fil. t.* 127.

Hab. α . West Indian islands, apparently general. Peru, Mathews, n. 1798 and 1887, Hartweg, n. 1529, Poeppig. Mexico, Schiede and Deppe. Guiana, Schomburgk, n. 509. Surinam, Dr. Hostmann. Brazil, Sellow, n. 5. Nepal, Wallich. Assam, Major Jenkins, (the specimens small). Philippine Islands, Cuming, n. 384. — β . Jamaica, Swartz, Purdie. St. Vincent, Lansdowne Guilding. Peru, Mathews, n. 207 and 1791, Poeppig. Mexico, Galeotti. Brazil, Burchell. Guiana, C. S. Parker. Juan Fernandez, Douglas. Luzon, Cuming, n. 214. New Zealand, Forster, Colenso, Logan, (in one of Dr. Logan's specimens the involucre has crested lamellæ). — γ . Pichincha, Jameson, n. 65. Chacapoyas, Peru, Mathews. — As far as specimens are concerned I have had an ample supply at my command, in various states, of what I cannot but consider, after the most careful investigation, as belonging to one and the same species. An opinion has already been expressed in the 'Icones Filicum,' that the differences between *H. polyanthos* and *H. clavatum*, Sw., were not permanent: and I am confirmed in that opinion by further examination. The extreme states of this species are indeed easily recognized and easily described; but there are various intermediate grades that baffle all attempts to discriminate them specifically. The fronds are not only variable in general form and circumscription, but also in the direction of the primary divisions, sometimes being curved downwards. As to size, the plant varies from 4—10 or 12 inches in length. Small specimens of β ., when a little crisped, as they sometimes are, approach the *H. undulatum*, Sw.

63. *H. crispum*, H. B. K.; "fronds bipinnatifid glabrous, the linear segments as well as the winged rachis entire undulated and crisped, stipes rounded slightly hairy, involucre terminal the valves subrotund ciliated." *H. B. K. Nov. Gen. Am. i.* p. 60.

Hab. Declivities of Mount Silla de Caraccas, elevation of 6,000 feet, Province of Venezuela, Humboldt.

64. *H. erosum*, Bl.; "frond tripinnatifid ovate glabrous, pinnæ alternate subrhomboid-ovate, pinnules ovate triangular digitato-pinnatifid, ultimate segments linear obtuse emarginate and as well as the winged rachis subundulate, valves of the involucre oblong obtuse erose at the apex, stipes winged." *Bl. Enum. Fil. Jav. p. 221.*

Hab. Trunks of trees in woods, Java and Moluccas, *Blume*.—"Differs from *H. demissum*, Sw., which it much resembles, in the shorter pinnæ and form and colour of the valves of the involucre."

65. *H. dædaleum*, Bl.; "fronds tripinnatifid ovato-oblong glabrous, pinnæ alternate approximate rhomboid-oblong cuneiform-pinnatifid, the segments linear bi-trifid and as well as the rachis winged sinuato-undulate, valves of the involucre rounded erose towards the apex, stipes winged above." *Bl. Enum. Fil. Jav. p. 222.*

Hab. Mossy trunks of trees, Province of Bantam, Java, *Blume*.—"Near *H. dichotomum*, Cav. but distinct in the approximate pinnæ, in the segments not being spinuloso-dentate and other characters. Involucre erose at the apex."

66. *H. imbricatum*, Bl.; "fronds bipinnatifid ovate purplish glabrous, pinnæ alternate approximate rhombeo-oblong pinnatifid, segments and pinnules trapezoid incised above and subimbricate, ultimate segments linear obtuse, valves of the involucre orbicular entire, stipes rounded." *Bl. En. Fil. Jav. p. 220.*

Hab. Mossy places, mountains of Java, *Blume*.—"Differs from *H. sanguinolentum* in the subdimidiate pinnules, which are subbipinnatifid only above and subimbricated."

67. *H. ricciæfolium*, Bory in Willd.; fronds bipinnate, pinnæ secund, lower pinnules pinnatifid upper ones tripartite, segments linear obtuse, sori terminal, involucre obovate.

and yet it is hardly likely that it should not have been rediscovered in Tasmania, through the industry of succeeding botanists.

†† *Fronds pinnately divided.*

69. *H. exsertum*, Wall.; flexile pendent, fronds oblong elongate acuminate pinnated, pinnæ rather distant lanceolate acuminate decurrent especially the upper ones pinnatifid but not deeply, segments short linear-oblong obtuse entire simple or bifid, involucre on the upper side of the pinnæ solitary or 2—3 sessile or terminating short segments ovate 2-valved almost to the base compressed, the valves eroso-serrate or nearly entire, rachis stipes and costa more or less crinite with long scattered rufous hairs. (TAB. XXXVIII. A.)—*Wall. Cat. n. 171.* *H. densum*, *Wall. Cat. n. 170.*

Hab. Nepal, *Wallich.*—A well-marked species. The pinnæ are decurrent, broad and not deeply pinnatifid.

70. *H. capillaceum*, Roxburgh; fronds small elongate pinnated, pinnæ remote narrow-cuneate digitato-pinnatifid, segments few linear oblong a little broader upwards entire simple or bifid, involucre orbicular the base cuneate sunk deeply 2-valved compressed denticulate, rachis filiform slightly winged above glabrous, stipes short. (TAB. XXXVIII. B.)—*H. capillaceum*, *Roxburgh*, in *Beatson's Cat. of St. Helena Plants.* *H. infortunatum*, *Bory*, in *Duperrey Voy. p. 284, t. 38, f. 3.*

Hab. St. Helena, on rocks and Tree-Ferns, Diana's Peak, *Menzies*, *Roxburgh*, *Bennett*, *J. D. Hooker*, *Duperrey.*—A small, slender, graceful plant, 3—5 inches long, with a short, slender stipes and a wavy filiform rachis. A well-marked species in the form of the frond, remote, narrow, cuneato-pinnatifid pinnæ and orbicular and toothed valves of the involucre, which latter circumstance has been entirely overlooked by *Bory* in the figure given in *Duperrey's Voyage.*

71. *H. demissum*, Sw.; tall erect elastic, fronds ovato-acuminate pinnate, rachis winged above, pinnæ bi-tripinnatifid, the segments linear obtuse entire pointing upwards, ultimate ones frequently elongated, involucre on the lateral segments small ovate sessile 2-valved to the base compressed, stipes terete smooth.—*Sw. Syn. Fil. p. 147 and 374.* *Schkr. Fil. t. 135, c.* *Willd. Sp. Pl. v. p. 528.* *Trichomanes demissum*, *Forst. "Hedw. Fil."*

Hab. Pacific Islands, *Forster.* New Zealand, southern island; Dusky Bay, *Menzies.* Northern island; Bay of Islands, *A. Cunningham*, *Colenso*, *J. D. Hooker*, &c. Tasman's Bay, *D'Urville.* Philippine Islands, *Cuming*, n. 212.—This has a stout caudex and a stipes, about as thick as a sparrow's quill, quite terete; the fronds and pinnæ acuminate, sometimes falcato-curved. Involucre small. Frond 8—10 inches long, stipes nearly as long. Closely allied to *H. polyanthos*, but larger; the lower portion of the frond

I find to be always truly pinnated, the segments more attenuated and pointing upwards; rachis never winged, except above: but these are the only differences perceptible. Cuming's specimen precisely accords with the New Zealand ones.

72. *H. scabrum*, A. Rich.; rigid tall erect elastic, fronds ovate acuminate pinnate, pinnæ bi-tripinnatifid acuminate the segments narrow-linear obtuse entire, involucre terminal small ovate orbicular sessile free 2-valved to the base entire or scarcely denticulate terminal on segments which are slightly contracted at their apices, rachis (and frequently the costæ) and stipes above more or less setose, below the stipes is rough.—A. Richard, *Fl. Nov. Zeal. p.* 90, *t.* 14, *f.* 1.

Hab. New Zealand, *D'Urville, A. Cunningham, Colenso, J. D. Hooker.*—Although this be the *H. scabrum* of Richard, the involucre are in our specimens more ovate than shown in his figure, and scarcely denticulate: indeed the species has a very close affinity with *H. demissum*, but it is more rigid, and more or less setose with harsh coarse hairs, which, under a microscope, are curiously and beautifully jointed. When these hairs fall away, as is the case on the stipes, especially on the lower portion, the surface appears scabrous to the eye and to the touch with copious raised points.

73. *H. reniforme*, Hook.; small, fronds ovato-oblong pinnated rigid laxly cellular, pinnæ pinnatifid decurrent, the segments linear emarginate or the lower ones forked entire, the margins recurved when dry, involucre terminal free broader than the segments reniform 2-valved to the base, stipes very short terete smooth hispid with reddish deciduous hairs. (TAB. XXXVIII. C.)

Hab. Peru, *Mathews, n.* 1783.—A most elegant and very distinct species, growing in dense tufts, with a long creeping caudex which is hairy as well as the short stipes: the latter half an inch to an inch long. Fronds 1—2 inches long; texture firm and rigid, but the reticulations are large in proportion to the size of the plant. The margins are much recurved when dry,

75. *H. axillare*, Sw.; pendent flaccid linear-oblong, fronds bipinnate, primary pinnæ often irregular elongate (as if they were branches), secondary short bipinnatifid, the segments short broad linear emarginate, involucre small orbicular generally upon the lower lateral segments the short cuneate base sunk the rest free 2-valved, the valves semiorbicular entire.—*Sw. Syn. Fil. p. 148. Willd. Sp. Pl. v. p. 532. Hook. et Grev. Ic. Fil. t. 124.*

Hab. Jamaica, on trunks of trees in the mountains, *Swartz, Lunan, Higson and Wiles, Bancroft, Purdie*.—A graceful species, flaccid and pendent; the caudex slender, much branched. Stipes short, the primary pinnæ not unfrequently running out into other fronds or as it were branches of the main frond. Extremely distinct.

76. *H. flabellatum*, Lab.; rather flaccid curved downward, fronds ovate or oblong acuminate pinnate slightly glossy on the surface, pinnæ from a broad cuneate base much acuminate pinnatifid the lower segments frequently palmately divided subflabellate all obtuse or emarginate entire, rachis and costæ pale, involucre terminal chiefly on lateral segments nearly orbicular the lower half immersed the upper free 2-valved compressed the valves entire, stipes terete smooth.—*Labill. Fl. Nov. Holl. ii. p. 101, t. 250, f. 1, (not Brown). Willd. Sp. Pl. v. p. 526. H. nitens, Brown, Prodr. p. 159. Hook. et Grev. Ic. Fil. t. 197.*— β . smaller, involucre narrower, fronds ovate erect.

Hab. Trunks of trees, Tasmania, *Labillardière, Brown, Gunn, J. D. Hooker, Laurence*. New Zealand, *Menzies, Colenso, Lesson*.— β . Holes of rocks and roots of trees, New Zealand, *Colenso, J. D. Hooker*.—Doubtless a highly variable plant. *Labillardière's* figure well represents small specimens. Some of our numerous ones are nearly a foot long and much elongated, which is the common form in Tasmania. Smaller ones are often pilose with fine lax and crisped hairs. The most striking character of the plant is the flabellate or subpalmate form of the lower pinnæ. There is also a slight gloss on the surface, not common in the genus, and a pale rachis and costæ. The involucre are narrower in β .

Dubious Species of this Section.

77. *H. floribundum*, H. B. K.; "fronds bipinnate glabrous, secondary pinnæ dichotomously pinnatifid, segments linear entire retuse, rachis and stipes winged, sori terminal, valves of the involucre ovate."—*H. B. K. Nov. Gen. Am. i. p. 27.*—Near Caripe, province of Cumana, *Humboldt*.—"Fronds 3 inches high."

78. *H. ramosissimum*, Hamilt.; "frond ovato-lanceolate tripinnate, pinnæ deeply pinnatifid, segments linear-cuneate generally bifid, sori terminal numerous, involucre entire very short, stipes and rachis terete." *Hamilt. in Don, Prod. Fl.*

Nep. p. 12.—Mountains of Nepal, *Hamilton*.—"Fronds 1—1½ foot high ovato-lanceolate."

79. *H. tenellum*, Don; "frond pinnate, pinnæ alternate pinnatifid, segments linear-oblong obtuse entire emarginate at the base simple or bifid, sori solitary lateral, involucre entire, stipes and rachis winged." *Don. Prodr. Fl. Nep. p. 12.*—Nepal, *Hamilton, Wallich*.—"Fronds very thin, 1—2 inches high; habit of *H. Tunbridgense*, but most distinct in the entire, not serrated, segments, in their emarginate apices, entire involucre, in the stipes being winged and in the sori being placed at the apices of the lateral segments."

80. *H. endiviaefolium*, Desv.; "fronds decurrently tripinnate, pinnæ subdistant, pinnules confluent pinnate, segments linear emarginate obtuse undulate crisped, stipes rounded margined at the apex." *Desv. in Mém. Soc. Linn. ii. p. 334.*—Peru (*Desvaux*). "Fronds 4—10 inches." The author says nothing about the margins of the segments, whether serrate or entire, nor are the involucre noticed.

81. *H. decurrens*, Sw.; "fronds bipinnate, pinnules oblong-ovate cuneate pinnatifido-lobate, the segments linear obtuse, sori terminal." *Sw. Syn. Fil. p. 166. Willd. Sp. Pl. v. p. 530.*—*Adiantum decurrens*, *Jacq. Collect. ii. p. 103, t. 2, f. 12.* Martinique, (*Jacquin*).—This plant is taken up solely on the authority of *Jacquin*, whose figure is extremely unsatisfactory. A specimen in the Banksian herbarium under this name is *H. protrusum* of the present work.

82. *H. emarginatum*, Sw.; "fronds dichotomously subtripinnatifid oblong, pinnæ decurrent, pinnules bipartite, the segments linear emarginate, terminal ones elongated, sori su-

pilose, stipes naked hairy. "Trichomanes nudum, Poir. in *Encycl. Bot.* viii. p. 73. — Guadeloupe, *Badier*. — Poiret compares this with *Hymenophyllum ciliatum*, Sw., and *H. lineare*, of the same author: but I have seen no authentic specimens.

85. *H. Telfairianum*, Wall. Cat. n. 168. — Mauritius, *Telfair*. — Of this likewise I have received no authentic specimens; nor does it appear to exist among the plants of Dr. Wallich preserved in the Banksian or Linnæan herbaria.

12. TRICHOMANES, Sm.

Didymoglossum, Desv. *Feea*, *Bory*. *Hymenostachys*, *Bory*.

Sori marginal, lateral, or terminal, sometimes upon a changed frond and forming a spike, free or united or sunk in the frond, always terminating a vein. *Involucres* monophyllous, tubular, subcylindrical, tapering at the base, more or less spreading at the mouth, sometimes two-lipped, of the same texture as the frond or thicker and more compact, entire, rarely toothed or serrated. *Receptacle* elongated, columnar, or more frequently filiform, much exserted, sometimes to a very great length. *Capsules* sessile or nearly so, clothing the base of the receptacle within the involucre, rarely the upper portion also, depressed, surrounded by an entire, broad, nearly transverse ring, bursting on one side vertically. *Sporules* 3-angular or 3-lobed; in the subgenus *Hymenostachys* oval. — Ferns usually of small size, but varying from 2 inches to 2 feet in length, inhabiting the tropics or temperate climates. *Caudex* generally more or less creeping, filiform or stout, glabrous or tomentose: sometimes apparently wanting. *Fronde* more or less stipitate, sometimes sessile, of a membranaceous rarely subcoriaceous texture, generally loosely reticulated, but occasionally (in *T. reniforme*) very closely and compactly so, the meshes or areolæ mostly placed without order, but sometimes (in *T. membranaceum* and its allies) arranged in lines corresponding with the direction of the venation; generally of a deep green color, darker and brownish or almost black when dry; glabrous or hairy, rarely fringed with scales; simple or pinnated or pinnatifid, and variously divided, with narrow oblong or linear segments, which are incised or usually undivided, entire, seldom toothed or serrate, with a strong costa or vein in the centre: sometimes the veins radiate from the base (as in *T. reniforme* &c.) in a very elegant manner. — HOOK. GEN. FIL. TAB. 31. TAB. 108. (*Hymenostachys*, *Bory*). HOOK. EX. FL. TAB. 52. (*Feea*, *Bory*).

Obs. Closely allied as are the genera *Hymenophyllum* and *Trichomanes*, it is rare that one has a difficulty in recognizing them; and yet it is not easy to point out the characters in few words. In our present genus, *Trichomanes*, the involucre are mostly subcylindrical, narrow-urceolate, the mouth spreading, entire, or cut into two short, usually spreading lips, which, when a little elongated, afford the character of *Didymoglossum* of Desvaux; their texture is firm and subcoriaceous, yet cellular; they are often quite sunk or immersed in the segment of the frond, in two or three instances arranged in distichous spikes. Receptacles filiform and not only exserted, but sometimes very much protruded, so as to be several times longer than the involucre: and, either often varying on the same plant, or, by their great fragility, easily broken away and then apparently short. The fronds are more generally erect, as far as can be judged from the dried specimens, and I am not aware that, except in a very few instances, the margins of the segments are ever toothed or serrated, as is common in *Hymenophyllum*: but the characters now mentioned are not invariably constant. The species are I think more remarkable for beauty of form and delicacy of texture than even those of *Hymenophyllum*.

Subgen. I. HYMENOSTACHYS. *Sterile and fertile fronds dissimilar. Involucre arranged in distichous spikes and connate for their whole length. Sterile fronds with reticulated veins. Hymenostachys, Bory.*

1. *T. elegans*, Rudge; tufted, sterile fronds much shorter than the fertile ones broadly lanceolate pinnatifid the segments nearly horizontal lanceolate subfalcate serrated often caudate and proliferous at the apex, veins reticulated, spike broad-linear acuminate constituting a compact membrane, the margins formed by the connate sunk cylindrical involucre.—*Rudge, Guian. p. 24, t. 35, (excl. the fertile frond of T. spicatum).* *Hook. Gen. Fil. t. 108, (not Exot. Fl.) Hymenostachys diversifrons, Bory in Dict. Class. Hist. Nat. viii. p. 462, cum Ic.*

Hab. Guiana, Martin, Poiteau, Schomburgk, n. 1030. Gorgona and

than the fertile ones broadly lanceolate pinnatifid, the segments nearly horizontal oblong sinuato-crenate, veins pinnated, spike linear with distichous free urceolate stipitate involucre. — *T. elegans*, *Rudge, l. c. (in part, spike only)*. *Hook. Exot. Fl. t. 52.* *T. spicisorum*, *Desv.* *T. osmundioides*, *Bory.* *Flea polypodina*, *Bory in Dict. Sc. Nat. cum Ic.*

Hab. Guiana, *Martin.* St. Vincent, *L. Guilding.* Trinidad, *Lockhart.* Guadeloupe, (*Bory*). Woods of Portland, Jamaica, *Purdie.*—General habit of the preceding, one half or two thirds the size. Rachis pinnated, as it were, with closely-placed but unconnected involucre.

3. *T. nanuin*, *Bory*; “fronds pinnated, pinnules ovate, spikes slender.” *Bory in Dict. Class. Hist. Nat. cum Ic.*

Hab. Guiana, *Poitou.*—This I only know from authentic specimens in Mr. Heward’s collection, one of which he has been kind enough to give me. It is much smaller than the latter, and differs in the sterile fronds being pinnate, especially below, instead of pinnatifid: the involucre are more remote, less patent, and their rachis is sterile and membranaceous at the apex: while the rachis of the barren frond is often lengthened out into a long creeping and proliferous cauda.

Subgen. III. EUTRICHOMANES. *Sterile and fertile fronds similar or nearly so. Involucre never spicate.*

* *Fronds entire, lobed or digitate. (Sp. 4.—19).*

† *Veins radiating from the base or flabellate, dichotomous, rarely and only very partially reticulated. Caudex creeping. (Sp. 4—8).*

4. *T. reniforme*, *Forst.*; fronds coriaceous almost horny when dry reniform entire with a deep sinus below, the base decurrent on a long stipes, involucre copious crowded marginal terminating almost every vein cuneato-cup-shaped, columella exerted clavate clothed to the top with capsules.—*Forst. Prodr. n. 462.* “*Hedw. Fil. cum Ic.*” *Sw. Syn. Fil. p. 141.* *Willd. Sp. Pl. v. p. 499.* *Hook. et Grev. Ic. Fil. t. 31.*

Hab. New Zealand, *Banks and Solander, Forster and all travellers.*—Caudex creeping, very long. Fronds 4—5 inches broad, semi-pellucid, somewhat fleshy when recent. Veins beautifully radiating from the base, rather close, dichotomous, occasionally anastomosing.

5. *T. membranaceum*, *L.*; caudex creeping tomentose, fronds rather small sessile thin membranaceous suborbicular or obovate and cuneate or cordate at the base, margins entire often deeply incised bordered with double peltate scales, involucre copious sunk cylindrical attenuated below, the mouth 2-lipped, veins flabelliform dichotomous crowded distinct, reticulations minute.—*Linn. Sp. Pl. p. 1560.* *Sw. Fl. Ind. p. 1724.* *Syn. Fil. p. 141.* *Willd. Sp. Pl. v. p. 499.* *Hook. Exot. Flora, t. 76.* *Filix Hemionitis, &c., Pluk. Am. t. 285, f. 3.* *Plum. Fil. t. 101, f. A.*

Hab. West Indian Islands, abundant on the trunks of trees, *Swartz and others*. — Fronds varying much in size, from 1—3 inches long, and often as much broad, cordate or cuneate at the base and sometimes much attenuated, the margin entire or erose or cut and jagged, or more or less deeply incised; the barren plants, more especially, fringed with curious, nearly orbicular, membranaceous, peltate scales, lying flat upon the edge in pairs, one on each side and placed back to back. These are situated between the veins, alternate with them, so that they cannot be supposed in any way to be abortive involucre. Besides the usual flabellate veins of this group, there are intermediate very slender ones, parallel with them, between which the reticulations appear also arranged in lines parallel with them. One of the most delicate and elegant of Ferns.

6. *T. punctatum*, Poiret; caudex creeping tomentose, fronds small imbricating sessile simple orbiculari-cordate or obovate and obtuse at the base shortly petiolulate crenato-lobate with marginal stellated hairs, the lobes obtuse, veins compact flabellate dichotomous, involucre few exserted free cylindrical attenuated below the mouth 2-lipped, receptacle a little exserted.—*Poiret, in Encycl. Bot.* viii. p. 64. *Kaulf. Enum. Fil.* p. 201. *Hook. et Grev. Ic. Fil.* t. 236.—β. base of the frond sometimes cuneate. *T. sphenoides*, *Kze. in Pl. Crypt. Poepp.* p. 102, (*excl. syn. of Hooker*).

Hab. Martinique, *Poiret*. Guadeloupe, (*Kaulfuss*). Trinidad, *Lockhart*. Gorgona, Pacific side of Central America, *Barclay*. Guiana, *C. S. Parker*.—β. Peru, *Poeppig*.—*Poeppig's T. sphenoides*, according to his specimen in my herbarium, only differs from *T. punctatum* in the cuneate base of the fronds.

7. *T. reptans*, Sw.; caudex creeping tomentose, fronds small erect simple cuneato-ovate entire inciso-pinnatifid tapering into an elongated slender stipes, margin with a few stellated hairs, veins flabellate compact dichotomous, involucre few exserted cylindrical attenuated below 2-lipped at the mouth, receptacles included. — *Sw. Fl. Ind. Occ.* p. 1727.

sunk in the frond, the mouth dilated concave scarcely 2-lipped, receptacles much exserted, stipes elongated.—*Hook. et Grev. Ic. Fil. t. 155.* *T. undulatum, Wall. Cat. n. 160.*

Hab. Mauritius, *Bojer, Wallich, Néraud.*—At first sight this might almost be mistaken for large specimens of *T. reptans*; but the frond is more flabelliform, tapering into a longer stipes, the involucre are quite sunk or immersed in the fronds and the receptacles are exserted.

†† *Fronde with a central costa or rib, pinnated with simple or dichotomous oblique veins. (Sp. 9—12).*

9. *T. muscoides, Sw.*; caudex creeping tomentose, fronds small erect simple everywhere glabrous oblong or oblongo-lanceolate obtuse cuneate and nearly sessile sinuato-pinnatifid with an intramarginal vein, reticulations in parallel lines minute, involucre cuneate wholly sunk, the mouth spreading scarcely 2-lipped, receptacles slightly exserted.—*Sw. Fl. Ind. Occ. p. 1726. Syn. Fil. p. 141. Willd. Sp. Pl. v. p. 500. Hook. et Grev. Ic. Fil. t. 179, (excl. syn. T. hymenodes, Hedw.)*

Hab. West Indies. Jamaica and Hispaniola, *Swartz, Wiles and Higson.* Dominica, *C. S. Parker.* St. Vincent, *L. Guilding.* Java, *Zollinger,* in *Herb. Heward.*—An elegant and very delicate species, 2—3 inches high. The venation is not flabellate, but approaching to it; there is a central vein or costa whence the lateral veins diverge at very oblique angles, and are rather close, simple or dichotomous. The species is well marked, especially by the intramarginal vein to which the lateral veins from the costa are united. Involucre wholly sunk; the mouth very wide, level with the margin.

10. *T. erosum, Willd.*; “caudex filiform creeping dilated at the apex lacinated and irregularly pinnatifid, principal veins forked secondary simple slender.” *P. de Beauv. Fl. Oware et Benin, ii. p. 79, t. 109, f. 3. Willd. Sp. Pl. p. 501.*

Hab. Oware and Benin, Western Africa, *Beauvois.*—The figure is not a very satisfactory one, but resembles a narrow form of *T. muscoides.*

11. *T. pusillum, Sw.*; caudex creeping tomentose, fronds small erect crowded oblong or cuneate tapering into a short stipes subbipinnatifido-lobate costate with oblique dichotomous subpinnated veins, margins with stellated hairs, involucre cylindrical tapering 2-lipped half sunk in the apex of a lobe, columella slightly exserted.—*Hedw. Fil. cum Ic. Sw. Syn. Fil. p. 142. Willd. Sp. Pl. v. p. 499. Didymoglossum pusillum, Desv.*

Hab. Jamaica, *Swartz.* Trinidad, *Lochhart.*—Allied to *T. muscoides,* especially in the veining and reticulation; but it is smaller, narrower, with a more tapering base, and with involucre which are half exserted.

12. *T. apodum, Hook. et Grev.*; caudex creeping very tomentose, fronds minute sessile cordato-rotundate deeply and

broadly lobed, the lobes obtuse sinuate with stellated hairs in the sinuses, reticulations irregular, veins pinnated remote subdichotomous, involucre rare solitary terminal quite exserted, subcylindrical attenuated below 2-lipped at the mouth, receptacles three or four times as long as the involucre.—*Hook. et Grev. Ic. Fil. t. 117.*

Hab. Barbadoes, *C. S. Parker, Esq.*—A very distinct species, though at first sight resembling *T. punctatum*; but different in texture, the reticulation being of the ordinary kind, and the venation not flabellate as in the species just mentioned.

†† *Fronde with only a solitary central vein or costa in each segment.*
(*Sp. 13—19.*)

13. *T. parvulum*, Poir.; caudex creeping densely matted tomentose, fronds reniform or rotundato-cuneate stipitate inciso-palmate glabrous, segments linear obtuse emarginate or bifid, involucre terminal sunk subturbinate, the mouth spreading obscurely 2-lipped, receptacles slightly exserted. (*Tab. XXXIX. A.*)—*Poir. Encycl. Bot. viii. p. 44.* *Blume, En. Fil. Jav. p. 223.* *T. sibthorpioides, Bory, in Willd. Sp. Pl. v. p. 498.*

Hab. Bourbon, *Bory, Poiret.* Java, *Blume.* Philippine Islands, *Cuming, n. 256.* Moluccas, *Gaudichaud.* New Ireland, *Barclay.* Madagascar, *Du Petit Thouars.*—An elegant little species, resembling some palmated *Jungermannia*, especially our *J. flabellata*, with a comparatively short stipes, but little longer than the frond.

14. *T. proliferum*, Bl.; caudex creeping downy much entangled, stipes elongated bearing fronds which are proliferous from their axils and which are subreniform or cordate deeply divided palmate or almost digitate, the segments linear and often again divided obtuse, involucre subcylindrical quite

sion the same author employs in his character of *T. proliferum*, it is perhaps very nearly allied to that species: and indeed under that (*T. proliferum*) he remarks "a præcedentibus (*T. parvulum* et *T. minutum*) differt laciniis pinatifidiis."

16. *T. bifolium*, Bl.; "frond on a long stipes binato-conjugate rhombeco-ovate tripartite glabrous, segments cuneate truncate subtrifid erose at the apex." *Bl. En. Fil. Jav. p. 224.*

Hab. Mossy trunks of trees, mountains of Java, *Blume*. — "An potius var. *T. proliferi*, nob.?"

17. *T. digitatum*, Sw.; caudex creeping hairy, fronds stipitate linear digitate dichotomous, the segments linear elongated the margins setose, involucre cuneato-cupshaped compressed shortly 2-lipped quite sunk, receptacle elongated. — *Sw. Syn. Fil. p. 370 and 422.* *T. lanceum*, *Bory in Willd. Sp. Pl. v. p. 501.* *Sieb. Syn. Fil. n. 81.* *Hook. et Grev. Ic. Fil. t. 33.*

Hab. Mauritius and Bourbon, *Bory, Sieber, Telfair.* Java, *Blume*. — *Blume* observes that the specimens of Java differ from the Mauritius ones in the broader fronds with more numerous segments, which are again more frequently bifid. Our specimens have the fronds with 2—4 segments, of a dark lurid green color when dry.

Dubious Species of the section "entire, lobed or digitate fronds."

18. *T. flabellatum*, *Bory*; "frond cuneato-flabellate, segments dichotomously furcate." *Bory in Duperrey, Voy. Bot. p. 281.* *T. Flabellula*, *D'Urv. Fl. Isles Malouines in Mém. Soc. Linn., iv. p. 597.*

Hab. Falkland Islands, *D'Urville, Gaudichaud*. — *M. Bory de St. Vincent* observes that "*M. Gaudichaud* detected this in the Falkland Islands as well as *M. D'Urville*, but that he confounded it with his *Hymenophyllum cæspitosum*. We have not seen the fructification, but its resemblance to *T. sibthorpioides*, nob. in *Willd.*, induces us to refer the plant of *M. d'Urville* to this genus. Its stipes is filiform, simple, 5—6 lines high, expanding into a small flabellate frond, wedge-shaped below, divided into two small segments, which again are thrice forked, spreading, the apices acute. It is principally this latter character which distinguishes *T. flabellata* from *T. sibthorpioides*. It grows in dense tufts and becomes black in drying." *Bory*. *D'Urville* himself says of it, "extremitates subradicantes. *T. sibthorpioidi* vicinum."

19. *T. cuspidatum*, *Willd.*; "fronds ovate acuminate obtuse stipitate, base sinuato-subtruncate coarsely crenate and undulate." *Willd. Sp. Pl. v. p. 499.*

Hab. Bourbon, *Flügge*. — "Stipes 4 lines long, compressed, clothed with small paleaceous setæ. Frond an inch long or less, ovate or oblong, cuneate or truncate at the base, attenuated and obtuse at the apex, the margin deeply and obtusely crenate, undulated, membranaceous, nervoso-veined, soriferous towards the apex and at the margin."

** *Fronde pinnatifid*, in *T. Kaulfussii* and *T. brachypus* almost *bipinnatifid*. (*Sp.* 20—28).

20. *T. intramarginale*, Hook. et Grev.; caudex creeping somewhat tomentose, fronds small erect pinnatifid tapering into a short stipes, the segments few linear-oblong obtuse erecto-patent slightly waved opaque with a slender intramarginal vein, the apices retuse, involucre subcylindrical tapering at the base sunk entirely in the apex of the segments, the mouth spreading of 2 short lips, receptacles included (?). — *Hook. et Grev. Ic. Fil. t.* 211.

Hab. Ceylon, (*Dr. Lindley*).—A small plant, 1—1½ inch high. I have received this, and but few specimens, only from *Dr. Lindley*, gathered probably by *Macrae*. The receptacles appear to be included, but they are perhaps broken away.

21. *T. Krausii*, Hook. et Grev.; caudex creeping very tomentose, fronds small oblong sessile or stipitate obtuse at the base or cuneate and attenuated deeply pinnatifid almost to the rachis, the segments linear-oblong obtuse sinuate or sometimes again pinnatifid stellato-pilose in the sinuses, involucre subcylindrical attenuated at the base much sunk in the frond 2-lipped, the lips large semiorbicular exerted generally margined with red. — *Hook. et Grev. Ic. Fil. t.* 149.

Hab. Dominica, *Dr. Kraus*. St. Vincent, *L. Guilding*. Trinidad, *Lockhart*. Guiana, *Leprieur*. Berbice, *Schomburgk*. Porto Rico, *Bertero*. Guadeloupe, (*Herb. Delessert et Heward*). Jamaica, *Purdie*.—An elegant species. Fronds 1—3 inches high: the larger specimens have sometimes the segments again slightly and irregularly pinnatifid.

22. *T. quercifolium*, Hook. et Grev.; caudex creeping tomentose, fronds small obovate or oblong-cuneate tapering into a very short downy stipes deeply pinnatifid, the segments

ly 2-lipped, receptacles filiform much exerted. — *Rich. in Willd. Sp. Pl. v. p. 502. Lam. Illustr. t. 871, f. 1. Hook. et Grev. Ic. Fil. t. 13. T. quercifolium, Desv. in Berl. Mag. v. p. 328, (not Hook. et Grev.) Bory in Dict. Sc. Nat. cum Ic.*

Hab. Guadeloupe and other West Indian Islands, frequent. Peru, *Poeppig*.—From 4—9 inches high, very thin, membranaceous and pellucid.

24. *T. incisum*, Kaulf.; caudex creeping, fronds lanceolate acuminate deeply pinnatifid hairy at the margin and especially on the veins beneath, tapering into a short stipes, involucre in the lobes of the segments urceolate entirely sunk, the mouth spreading obscurely 2-lipped, receptacles filiform much exerted.—*Kaulf. En. Fil. p. 261. Bory in Duperrey's Voy. Bot. p. 282, t. 38, f. 1. T. sinuosi planta junior, Knze.*

Hab. St. Catherine, Brazil, *Macrae, Beechey, Tweedie*. S. Brazil, *Chamisso*. Rio, *Douglas*; at San Gaetano, *Gardner, n. 5326*.—Kaulfuss first described this species, and was at some pains to distinguish it from *T. sinuorum*, to which, it must be confessed, it is too nearly allied. It differs in the more delicate texture, more hairy fronds, which are more attenuated at the apex, with longer, deeper, and more divided segments, always more or less glaucous: and the characters now mentioned are constant in my specimens from several localities.

25. *T. Ankersii*, Parker in Hook. et Grev. Ic. Fil.; caudex exceedingly long creeping more or less tomentose, fronds numerous distant nearly sessile broadly lanceolate subacuminate obtuse at the base deeply pinnatifid, the segments oblong obtuse angulato-dentate the lowermost sometimes auricled at the base or subpinnatifid, involucre subcylindrical pedicellate from the apex of a tooth and solitary at the superior base of each segment or numerous along the margins. — *Hook. et Grev. Ic. Fil. t. 201.*

Hab. Trunks of trees, British Guiana, *C. S. Parker*.—Allied in habit to *T. brachypus*, but very distinct, with the segments undivided. Caudex creeping apparently to a very great length, 2 feet and probably much more, simple or branched. Fronds numerous but distant, 3—4 inches to a span long, membranaceous yet tolerably firm, turning nearly black in drying. Veins pinnated, simple. Receptacles long, much exerted.

26. *T. brachypus*, Kze.; caudex much elongated creeping, fronds numerous nearly sessile flaccid procumbent, ovato-oblong bipinnatifid, the segments all patent, primary divisions oblong, secondary bi-trifid, segments rather acute costa rooting, involucre terminal on the ultimate segments cylindrical attenuated at the base completely exerted and pedicellate, the mouth short spreading scarcely 2-lipped, the receptacles filiform much exerted.—*Kze. Pl. Crypt. Poepp. p. 105. T. radicans, Hook. et Grev. t. 218 (excl. syn.), not Swartz. Moricand in Herb. Bras.*

Hab. Trinidad, *Lockhart*. St. Vincent, *L. Guilding*. Berbice, *Schomburgk*. Brazil, *Moricand*. Peru, *Poeppig*.—Kunze is no doubt quite correct in considering this distinct from *T. radicans*, Sw. (a species long ill understood, by others as well as by us), which is a much more compound species, as will be found on comparison. Its nearest affinity is with *T. Ankersii*, but it differs in the more divided segments of the frond, so divided, indeed, as rather to belong to the section with bipinnatifid fronds; the fructifications, too, are more copious. It is on account of its close affinity with *T. Ankersii* that I have referred the plant to this group.

27. *T. Kaulfussii*, Hook. et Grev.; caudex short stout creeping, fronds approximate subcæspitose stipitate rather tall hairy with stellated hairs broadly almost ovato-lanceolate pinnatifid having a broad wing to the rachis, the segments approximate horizontal lanceolate rather rigid lobato-dentate subpinnatifid, lobes short generally obtuse, involucre copious cylindrical cup-shaped sunk entirely in the segment the mouth a little spreading not lipped, stipes winged above, receptacles filiform much exserted.—*Hook. et Grev. Ic. Fil. App. p. 9. T. lucens, Hook. et Grev. Ic. Fil. t. 10, (excl. syn.)*

Hab. Jamaica, *Menzies, &c.* St. Vincent, *L. Guilding*. British Guiana, *C. S. Parker*. Dominica, *Dr. Imray*. St. Thomas, *Dr. Torrey*.—Frond from a span to a foot and a half high, erect, rigid, dark-colored and somewhat crisped when dry: the segments approximate, patent, nearly horizontal, having a broad wing next the rachis (owing to the sinuses terminating at a regular distance from the rachis). The real *T. lucens*, although this was mistaken for it in the 'Icones Filicum,' is a very different species.

Dubious Species of this Section.

28. *T. trigonum*, Desv.; "frond lanceolate pinnatifid hairy beneath, segments lanceolate acute dentato-serrate, stipes trigonal."—*Desv. Mag. Nat. Berl.* 1811, et in *Mém. Linn. Soc. t. 9, f. 2. Spr. Syst. Veg. iv. p. 128.*

Hab. Guiana, (*Desquair*).—With this I am unacquainted. Kunze in

with two wide spreading lips, stipes distinctly densely rufo-pilose winged above, receptacles much exserted. (TAB. XXXIX. C.)

Hab. St. Vincent, *L. Guilding*. Jamaica, *MacFadyen*. Dominica, *Imray*. — A delicate, very distinct species, 4 inches to a span high; intermediate in general structure between *T. Kaulfussii* and *T. alatum*, more deeply bipinnatifid than the former, less so than the latter, with very different involucre and smaller than either.

30. *T. alatum*, Sw.; tufted tall stipitate slightly hairy with branched tawny hairs, fronds broadly lanceolate acuminate deeply pinnatifid almost to the rachis which has only a narrow wing, segments rather distant spreading linear-lanceolate acuminate deeply pinnatifid thin membranaceous flaccid slightly glossy the ultimate segments lanceolate bifid or dentato-pinnatifid, involucre cuneate quite sunk in the segments, the mouth spreading scarcely 2-lipped, stipes slightly winged above more or less hairy, receptacles much exserted. — *Sw. Fl. Ind. Occ. iii. p. 1732. Syn. Fil. p. 143. Willd. Sp. Pl. v. p. 506, (not Hook. in Fl. Lond.) Hook. et Grev. Ic. Fil. t. 21. Plum. Fil. t. 50, f. D.*

Hab. Hispaniola, *Plumier*. Mountains, Jamaica, *Swartz*. St. Vincent, *L. Guilding*. Trinidad, *Lockhart*; and probably in the West Islands generally. — Readily distinguished from *T. attenuatum*, by its taller fronds, 8—10 inches long, exclusive of the stipes, darker color, more divided, so that the lower part is sometimes tripinnatifid. The figure in the 'Icones Filicum' is very characteristic.

31. *T. Bancroftii*, Hook. et Grev.; caudex short creeping, fronds somewhat tufted rather small ovate sometimes subdeltoid deeply pinnatifid nearly glabrous rigid, the rachis with a broad wing, the segments oblong approximate entire or nearly so, sometimes sinuato-pinnatifid and sometimes deeply pinnatifid, the ultimate segments linear oblong obtuse, involucre entirely sunk in the apices of the ultimate segments cuneato-cylindrical, the mouth spreading but not 2-lipped, stipes with a very broad wing extending almost to the base, receptacles much exserted filiform. — *Hook. et Grev. Ic. Fil. t. 204. T. coriaceum, Kze. En. Pl. Crypt. Poepp. p. 105.*

Hab. Jamaica, *Bancroft, Purdie*. St. Vincent, *L. Guilding*. British Guiana, *Parker, Schomburgk*. Surinam, *Hostmann, n. 26, Wiegelt*. Peru, and Brazil, *Poeppig*. — Very distinct and well marked. Kunze's *T. coriaceum* is by no means different from our plant, which varies in being only pinnatifid or bi-tripinnatifid, always with a very broad wing to the rachis, extending far down towards the base upon the stipes. Varies in size from 1—6 inches.

(Fronds remote, from an elongated creeping caudex. Species 32—42).

32. *T. humile*, Forst.; caudex creeping matted, fronds

small lanceolate bipinnatifid glabrous margined, the segments linear obtuse entire, involucre axillary oblong cylindrical quite free but with a narrow wing on each side, and the mouth with 2 short rounded lips, rachis winged above.—*Forst. Prod. n. 464. Hedw. Fil. cum Ic. Sw. Syn. Fil. p. 143 and 371. Willd. Sp. Pl. v. p. 507. Hook. et Grev. Ic. Fil. t. 35. T. minutulum, Gaud. in Freyc. Voy. p. 377, t. 12, f. 2 ?—β. involucre strongly winged or sunk in the frond.*

Hab. Society Islands, *Forster. Otaheite, Menzies, Mathews, n. 29* (under the name of *T. floribundum*). Pacific Islands, *Beechey, Nightingale. Luzon, Cuming, n. 98. — β. Waimate, Bay of Islands, New Zealand, A. Cunningham, 1838, Dr. Sinclair, J. D. Hooker.*—A distinct species, 2—3 inches high, including the short stipes, with a distinctly thickened margin to the frond, and supraaxillary involucre, sometimes free or slightly winged, sometimes sunk in the frond.

33. *T. pyxidiferum, L.*; fronds rather small oblong-ovate bitripinnatifid sometimes scarcely winged below (and then pinnate) membranaceous pellucid not margined somewhat glossy, the segments linear glabrous entire often emarginate at the apices, involucre solitary axillary wholly sunk subcylindrical attenuated at the base opening above into a broad concave scarcely 2-lipped mouth, receptacles very long filiform much exserted, stipes winged or margined above rarely naked.—*Linn. Sp. Pl. p. 1561. Sw. Fl. Ind. Occ. p. 1739. Syn. Fil. p. 143. Willd. Sp. Pl. v. p. 508. Hedw. Fil. cum Ic. Hook. et Grev. Ic. Fil. t. 206. T. pedicellatum, Desv. (according to Sprengel). T. lacerum, "Desv. Journ. Bot. iii. t. 10." T. Brasiliense, Desv. in Mém. Soc. Linn. ii. p. 328, t. 7, f. 4. Plum. Fil. t. 50, E.—β. more divided, the numerous segments crowded.—γ. fronds equally divided with β., the segments broader.*

Schlecht. Fil. Cap. in Linnæa, x. p. 553. *Hymenophyllum Filicula*, *Bory in Willd. Sp. Pl.* v. 528. *H. alatum*, *Schkh. Fil.* p. 133, t. 135, b. (*excl. the syn. of Smith and Swartz*), *excellent*. *Didymoglossum decipiens*, *Desv. in Mém. Soc. Linn. Par.* ii. p. 330, t. 7, f. 3, *excl. syn.* *D. Filicula*, *Desv. l. c.* p. 331.

Hab. Mauritius and Bourbon, *Bory, Telfair, Bojer*. Ceylon, *Mrs. Genl. Walker, Macrae*. Bonin, (*Herb. Imp. Acad. Petrop.*) Nepal, *Wallich*. Nilgherries, *Sir Fred. Adams*. E. Indies, *Herb. Wight. propr. n.* 3478 and 150. Luzon, *Cuming*, n. 2. Coral Islands, *Beechey*. Otaheite, *Bennett*. S. Africa, *Drege*. — Apparently a general inhabitant of the East Indies; strangely confounded with our Irish *T. radicans* (*Hymenophyllum alatum*, *Sm.*) by *Schkuhr*, and little understood by botanists in general. Frond 2—4 or 5 inches high, more or less dense in its ramifications or divisions, always very opaque, when dry of a dingy brownish or olive green, the lips of the sunk involucre singularly large and tapering to a rather acute point.

35. *T. radicans*, *Sw.*; caudex very long more or less tomentose, fronds ovate or oblong acuminate erect rather firm membranaceous bi-tri-quadrifid dark green and opaque (when dry) primary divisions ovate or lanceolate cuneate at the base, the segments linear-oblong rather short obtuse emarginate or bifid, involucre supraaxillary cylindrical tapering below sunk in the more or less narrow short segments and hence more or less winged at the sides, the mouth scarcely spreading imperfectly or shortly 2-lipped sometimes wider than the tube, receptacles (when perfect) filiform many times longer than the tube, stipes short or long tereti-compressed winged nearly to the base sometimes broadly so. — *Sw. Fl. Ind. Occ.* p. 1736. *Syn. Fil.* p. 143. *Willd. Sp. Pl.* v. p. 513. *Klotzsch in Herb. Reg. Berol. et in Herb. Hook.* (*not Hook. et Grex. Ic. Fil.* t. 218). *T. scandens*, *Hedw. Fil. cum Ic.* (*tolerably good*), *excl. most of the syn.* *Raddi, Fil. Bras.* p. 65, (*excl. most of the syn.* *Martens et Galeotti, Fil. Mex.* p. 80. *T. diaphanum*, *H. B. K. Nov. Gen. Am.* i. p. 25. *T. ambiguum*, *Sieb. Syn. Fil.* n. 143. *T. anceps*, *Wall. Cat. n.* 166, (*not Hook.*) *T. umbrosum*, *Wall. Cat. n.* 165. *T. speciosum*, *Willd. Sp. Pl.* v. p. 514. *T. pyxidiferum*, *Huds. Fl. Angl.* p. 461, (*not Linn.*) *T. brevisetum*, *Br. in Hort. Kew. ed. 2, v.* p. 529. *T. alatum*, *Hook. in Fl. Lond. n. ser. iv. t.* 53, (*not Sw.*) *T. Europæum*, *Sm. in Rees' Cycl.* *T. Hibernicum*, *Spr.* *Hymenophyllum rupestre*, *Raddi, Fil. Bras.* p. 67, t. 80, (81 in text). *H. alatum*, *Sm. in E. Bot. t.* 1417, (*not Schkuhr, Fil. t.* 135, b.) *Willd. Sp. Pl.* v. p. 526. *H. Tunbridgense*, β . *Sm. Fl. Brit.* p. 1142. *Didymoglossum alatum*, *Desv.* — *Filix humilis repens*, &c. *Dill. in Raii Syn.* p. 127, t. f. 3 (*barren, very good*) and f. 4.

Hab. Jamaica, *Swartz, Bancroft, Purdie and others*; (true form, fronds

ovate or ovato-lanceolate 3—4-pinnatifid, compact, 6—10 inches long, segments rather short; stipes, even from the same caudex, varying from 1—5 inches long and more or less winged). Woods above Port Stewart, *Purdie*; (fronds barren, and perhaps a distinct species, broadly ovate, more deeply divided and spreading segments which are longer, narrower and linear; stipes $1\frac{1}{2}$ to 3 inches). Martinique, *Sieber*; (usual form). Brazil, *Raddi*, *Forbes*, *Macrae*, *Gardner*, n. 203, *Scouler*, *Sinclair*, *Vautier*, n. 165; fronds sessile or nearly so, more elongated, 6—18 inches, primary divisions more distant, segments generally longer and narrower, less spreading, involucre sometimes more spreading at the mouth and rather more distinctly 2-lipped).—Mexico; Vera Cruz, *Linden*; (common form, fronds sessile and stipitate). Xalapa, *Galeotti*, (elongated, fronds on short stipes, mouth of the involucre scarcely spreading, not 2-lipped, otherwise resembling the Brazilian form). Tabasco, *Linden*; (fronds scarcely tripinnatifid, $1\frac{1}{2}$ foot long, very black, primary divisions remote, especially the lower ones, and extending almost to the base, involucre with 2 rounded distinct lips, broader than the tube of the involucre: perhaps a distinct species?)—Forest of Esmeraldas, El Equador, *Col. Hall*; (fronds sessile resembling those from Brazil, but involucre distinctly 2-lipped, as the preceding).—Sandwich Islands, *Owhyhee*, *Menzies*; Oahu, *Macrae*, *Douglas*, *Diell*; (fronds more or less elongated, of the normal form, sessile and stipitate, stipes sometimes 3—4 inches long, involucre with and without lips).—Nepal, in the mountains, *Wallich*; (fronds lanceolate and oblong-lanceolate, 4 inches to a foot long; in other respects resembling the usual structure; involucre scarcely dilated upwards, without lips or very obscurely 2-lipped).—Europe; Teneriffe, *Broussonet*; Madeira, *Lowe and others*. Azores, 2—3000 feet of elevation, *Dr. Hochstetter*, *H. C. Watson*. England, very rare, at the head of a remarkable spring, Belbank, 12 miles from Bingley, Yorkshire, *Dr. Richardson*,* according to Dillenius, in Ray's 'Synopsis,' perhaps extinct. Powerscourt, *Miss Felton*, *Dr. Wm. Stokes*; County of Wicklow, *J. Nuttall, Esq.*; and it has, I believe, been found recently in various localities in the south of Ireland by *Mr. Babington* and *Mr. Winterbottom*; (this form is ovate, compact, almost exactly resembling the normal state, but the stipes is more elongated, sometimes 1 inch, generally 3—4 inches long, receptacles usually short or broken; involucre without lips and not spreading at the mouth, or with short moderately spreading ones).—Iveragh, Ireland, *Sept. 1842*, *Wm. Andrews, Esq.*; (fronds narrower and more elongated, 6—8 or 10

investigated, as far as lay in his power, and more closely than any one else, the subject of its affinity with some exotic species, and clearly insisted upon it, in his letters to me, at a time when I was disposed to entertain a different opinion. My own fern-herbarium affords so ample a suite of specimens from various localities, both in the old and the new world, that I feel a degree of confidence in the correctness of my views, and in the opinion that the above mentioned kinds may be considered forms of one and the same species. Two of them, namely the var. from Jamaica, (*Purdie*) and that from Tabasco, Mexico (*Linden*) may possibly prove distinct, but the former is quite barren, and the latter might, I think, without violence to nature, be considered a strongly marked variety. Of the identity of the ordinary West Indian form, and the first described, as well as that of Nepal, and the specimens from the Azores, Canaries, and Madeira, there can be no reasonable doubt:—and even with regard to the sessile kind so common in Brazil, and of which a sterile frond is well represented by Raddi, (*Fil. Bras. t. 80*); the same is found in the Sandwich Islands, mixed with the usual form, and having a greater or lesser length of stipes. The more or less distinct lips to the involucre is also a variable character, even in our British specimens, and remarkably so in the Sandwich Island ones. Mr. Andrews observes that in his elongated variety from Iveragh, the receptacles do not lie flat on the segments as do those of Killarney, but turn up from the back of the fronds very conspicuously, and are generally much curved. This may be owing to their great length, and the greater or less exposure to the light. Mr. E. Newman, who has devoted such zealous attention to the Ferns of this country, remarked scattered “moniliform or jointed scales” (or hairs) on the Irish *Trichomanes*, not noticed by botanists, and of which he has prepared a wood-cut for the forthcoming new edition of his ‘British Ferns.’ They exist in a greater or less degree on the specimens from other countries; and indeed in other species of the genus also.

36. *T. Kunzeanum*, Hook. ; caudex long creeping, fronds ample tall 3-4-pinnatifid rather rigid very opaque almost black when dry, primary and secondary segments remote arising from slightly winged rachises (almost pinnate with the rachis margined or winged), lowermost superior secondary ones appressed to the main rachis, ultimate segments rather short linear and undivided or somewhat cuneate and bifid, involucre axillary or supraaxillary cylindrical slightly tapering at the base quite free not winged scarcely spreading at the mouth without distinct lips, receptacles much exerted, stipes very long semiterete scarcely winged glabrous. (TAB. XXXIX. D.) — *T. radicans*, Kze. in *Pl. Crypt. Poepp. p. 106*, (*excl. syn.*) — *Adiantum scandens*, &c., *Plum. Fil. t. 93* ?

Hab. Peru, on trees, Pangoa, *Mathews*, n. 1088; Papayaco, *Poeppig* (*in Herb. nostr.*) Caraccas, *Linden*, n. 176.—Very distinct, but perhaps most nearly allied to the preceding, on which account I place it in this section; for the margined, or only slightly winged rachis, would rather have induced me to refer it to the division with the “fronds pinnated, pinnae decomposedly pinnatifid.” It does not appear to be noticed by any author except Kunze, who has referred it to *T. radicans*, Sw., the *T. scandens*, Hedw., from which it is in many respects totally different. The stipes is a span

long. Frond 1 foot to 1½ foot, ovate in circumscription, rather rigid, everywhere quite black in the dry state and opaque, exhibiting very minute semitransparent dots when held between the eye and the light and seen through a magnifier; which dots are the areolæ of the reticulations. Divisions remote, superior secondary ones at the base of the primary ones lying against the rachis. Involucres quite free, not even winged. Plumier's plant may perhaps be intended for the same species; but however excellent that author's work is, for the period at which it was published, many of his species cannot be determined by his figures. I have not seen the present fern from any of the West Indian Islands; only from three localities on the continent of S. America.

37. *T. glauco-fuscum*, Hook.; fronds rather tall oblongo-lanceolate bipinnatifid glauco-fuscous when dry, primary divisions broad-lanceolate, the segments all acute linear simple or forked, involucres supraaxillary on short segments partially sunk short-cylindrical attenuated at the base, the mouth broad spreading scarcely 2-lipped, stipes filiform glabrous indistinctly winged except above. (TAB. XL. A.) *Hook. in Nightingale's Oceanic Sketches, App. p. 131.*

Hab. Pacific Islands, *Sir Thos. Nightingale*. Penang, *Lady Dalkousie*. Ceylon, *Mrs. Genl. Walker*. Philippine Islands, *Cuming, n. 219.*—A well marked species. Stipes slender, filiform, only slightly winged above, 2—4 or 5 inches long. Frond 5—6 or 8 inches; in a dried state at least always of a brownish colour suffused with a glaucous tint, especially on the under side.

Dubious Species of the Section decompoundly pinnatifid.

38. *T. Guineense*, Sw.; "fronds pinnate, pinnæ oblong decurrent inciso-pinnatifid, segments obtuse subserrate (?), costa and stipes margined." *Sw. Syn. Fil. p. 142. Willd. Sp. Pl. v. p. 506.*—Sierra Leone, *Afzelius*.

39. *T. Arbuscula*, Desv.; "fronds deeply bipinnatifid glabrous subimbricated subpinnatifid broader at the apex, ultimate segments oblong obtuse, sori approximate, reniformes

42. *T. album*, Bl.; "frond bipinnatifid ovato-oblong strigose whitish, pinnæ opposite or alternate cuneato-lanceolate pinnatifid, segments cuneiform incised ultimate ones linear subbifid, rachis margined, stipes terete glabrous." *Bl. En. Fil. Jav. p. 226.* — Lofty mountains of Java, *Blume.*

**** Fronds simply pinnated (*Sp. 43—55*).

Fronde tufted. Caudex short creeping or none, (in T. crispum the caudex is sometimes long creeping and the fronds remote). (Sp. 43—51).

43. *T. floribundum*, H. B. K.; fronds tufted erect tall simple (rarely) or pinnated, pinnæ lanceolate spinuloso-serrate upper ones decurrent, involucre urceolato-cylindrical copious marginal upon the pinnæ wholly exerted, the mouth entire slightly spreading, rachis sometimes prolonged at the apex rooting and as well as the costa slightly hairy, stipes long naked.—*H. B. K. in Willd. Sp. Pl. v. p. 505. Nov. Gen. Am. i. p. 25. Hook. et Grev. Ic. Fil. t. 9. T. pinnatum, Sw. Syn. Fil. p. 142. Hedw. Fil. cum Ic. T. rhizophyllum, Cav. Præf. 1801, n. 696. Sw. Syn. Fil. p. 142.* — β . *Vittaria*; frond linear-lanceolate very much elongated undivided. *Splitgerber, Fil. Surin. in Tydschr. Nat. en Physick. vii. p. 440. T. Vittaria, DeCand. Herb. Poiret, Encycl. viii. p. 65. Hook. in Lond. Journ. of Bot. i. p. 137, t. 5.*

Hab. Orinoco, Humboldt and Bonpland. Guiana (Herb. Deless.), Schomburgk, C. S. Parker, Hostmann, n. 63 et 75. Dominica, Sieber. Barbadoes, Baron de Schack. Jamaica, Trinidad, &c. Guatemala, Skinner. Peru Poeppig. Brazil, Gardner, n. 1909 and 4073. — β . Surinam, *Splitgerber, Hostmann, n. 206.* — One of the most splendid of this beautiful genus. Roots coarse, fibrous, descending. Caudex apparently none. Fronds 4 inches to 1½ foot high. Rachis sometimes running out far beyond the frond and proliferous, rooting. Pinnæ 2—6 inches long, from 4 to 20, terminal one often very much elongated, sometimes the lateral ones are wholly abortive or wanting, and then the plant becomes *T. Vittaria*, *DeCand.* and *Hook., l. c.*, which I now agree with *Splitgerber* in considering a remarkable state of *T. floribundum*. It is a foot and a half and more long, quite a simple frond, and, at first sight, very unlike the ordinary state of the plant. Veining close, forked; veins when seen under a lens united by slender transverse ones.

44. *T. pennatum*, Kaulf.; "sterile fronds oblong pinnate sessile, pinnæ oblong obtuse denticulate subimbricate, fertile fronds rhomboid pinnated on a long stipes, pinnæ linear lowest ones obtuse the margins spinuloso-denticulate, upper pinnæ confluent, involucre exerted." *Kaulf. En. Fil. p. 264.*

Hab. Cayenne, (Kaulfuss).—I can see nothing in the author's characters and description to justify the separation of this from *T. floribundum*, and yet so accurate a man as *Kaulfuss* would hardly speak of it as "satis diversa," unless there were some really distinguishing marks.

45. *T. Javanicum*, Bl.; roots long coarse descending wiry fibres, fronds tufted lanceolate rigid (black when dry) pinnated, pinnæ subpetiolate oblong obliquely cuneate at the base obtuse at the apex inciso-subpinnatifid chiefly at the upper margin, involucre in the sinuses of the upper segments of the pinnæ generally solitary urceolate partially sunk, the mouth entire not 2-lipped, stipes and slightly marginal rachis setose.—*Blume, En. Fil. Jav. p. 224. Hook. et Grev. Ic. Fil. t. 240. T. rigidum, Wall. Cat. n. 161 (not Sw.) T. setigerum, Wall. Cat. n. 158. T. rhomboideum, J. Sm. En. Fil. Philipp. (name only). T. curvatum, J. Sm. l. c. (name only). T. alatium, Bory, in Duperrey, Voy. Bot. p. 282, t. 38, f. 2, (not Sw.)*

Hab. Shady places in Java, *Blume. Choppadong, E. Indies, and at Singapore, Dr. Wallich. Penang, Lady Dalhousie. Malay Islands, Barclay. Philippine Islands, Cuming, n. 184 and 169. Oualan, D'Urville.*— Few species are better marked or more easily recognized than the present. It is of a harsh and rigid texture, 8 or 10 inches to a foot high, including the stipes. Pinnæ an inch or more long, more or less incised, sometimes subauriculate near the upper base. Veins close, parallel, stout. Whole plant black in drying.—*T. fuscum*, Bl. (our next species) seems nearly allied to this, but the midrib of the pinnæ is described as paleaceo-hirsute on both sides, and the rachis and stipes as clothed with ferruginous hairs.

46. *T. fuscum*, Bl.; “frond pinnated lanceolate diaphanous, pinnæ alternate subsessile (upper ones adnate) oval obtuse truncated at the base lobato-pinnatifid paleaceo-hirsute on each side the costa, lobes incised, rachis margined above and as well as the nearly terete stipes ferrugineo-hirsute.” *Bl. En. Fil. Jav. p. 225.*

Hab. Lofty mountains of Java, *Blume.*

47. *T. crispum*, L.; fronds generally tufted from a short

Hab. West Indian Islands, probably general, as well as in tropical South America. Brazil, *Martius, Gardner*, n. 207, 208, and 1908. Peru, *Martius*, n. 1788. Surinam, *Hostmann*, n. 505. — A well known and truly splendid species. Stipes 3—5 or 6 inches; fronds 4—12 or 14 inches long. Lips of the involucre much divaricated, and sunk, as well as the tube, in the substance of the frond. Receptacles sometimes very long, 4—5 times the length of the involucre; sometimes very short, probably broken?

48. *T. pellucens*, Kze.; "frond oblong linear acuminate deeply pinnatifid, the segments remote oblong linear obtuse irregularly sinuato-dentate pellucid at the costulæ and veins which are hairy beneath bearing sori at the apex, costæ and margined stipes clothed with hispid brown setæ." *Kze. in Pl. Crypt. Poepp. in Linnæa*, ix. p. 104.

Hab. Huallaga, Peru, *Poeppig*. "Belongs to the same group as *T. crispum*, L., *T. cristatum*, Kze. (*T. crispum*, Sw. and Hook. et Grev.), *T. pilosum*, Raddi, but most distinct." The same author further notices its similarity in texture to *T. pilosum*, but that, in other respects, is very different. It will however be observed, that those species are pinnated, whereas *T. pellucens* is described as pinnatifid. To judge from a very indifferent specimen of the "*T. pellucens*, Kunze," in my possession, distributed by *Poeppig*, this is in reality not distinct from *T. crispum*, and, like it, it is pinnated below, pinnatifid above.

49. *T. plumosum*, Kze.; "frond lanceolate linear acuminate pinnated, pinnæ subadnate oblong-linear attenuated and obtuse at the apex, the sterile margin unequally duplicato-dentate, hairy on each side on the costa and veins upper half soriferous, involucre sunk bidentate, stipes trigonal and as well as the rachis rufo-hirsute." *Kunze, Pl. Crypt. Poepp.* p. 104.

Hab. Pampayaco, Peru, *Poeppig*.—This surely is only another slight variety of *T. crispum*. *Kunze* remarks, "*T. crispum*, L., Sw., Hedw. Ic., pinnis latioribus et brevioribus, involucri non bidentatis paullo latius distat:" but in our specimens of true *T. crispum*, the involucre are bidentate, or, in other words, bilabiate.

50. *T. crinitum*, Sw.; fronds rather small tufted slightly glaucous pinnate, pinnæ ovate or oblong sinuate or pinnatifid, upper ones coadunate sometimes all of them are so (and then the frond becomes pinnatifid), the segments short obtuse, the margins rachis and stipes with long spreading ferruginous hairs, involucre few generally solitary from the apex of the pinnæ sunk urceolato-cylindrical, the mouth spreading scarcely 2-lipped fringed with long hairs.—*Sw. Fl. Ind. Occ.* p. 1730. *Syn. Fil.* p. 143. *Willd. Sp. Pl.* v. p. 507. *Hedw. Fil. cum Ic. (good)*.

Hab. Jamaica, *Swartz, Menzies, Purdie*. St. Vincent, *L. Guilding*.—Stipes slender, filiform, 1—2 inches high; fronds 4—5 inches. In habit somewhat resembling *T. sinuosum*, but the lower portion of the frond is ge-

erally pinnated; the pinnæ are remote, very thin, membranaceous, and almost pinnatifid. Involucres large. In all my specimens there is a glaucous tinge in the dried state.

Dubious Species of this sub-section.

51. *T. depauperatum*, Bory; "fronds pinnate elongate and slender, pinnules on the upper side trifurcate obtuse, sori solitary on the upper side at the base." *Bory, in Duperrey, Voy. Bot. p. 283.* — Onalan, D'Orfar, Isle de Wagiu, *D'Urville.*

Caudex elongate creeping. (Sp. 52—55).

52. *T. venosum*, Br.; caudex very slender creeping filiform, fronds small pinnate, pinnæ linear remote obtuse sinuate or rarely subbipinnatifid upper ones coadunate, lower one on the base above with a solitary segment bearing the sunk involucre which is urceolato-cylindrical, the mouth spreading entire, costa and veins wavy. *Br. Prodr. p. 159. Hook. et Grev. Ic. Fil. t. 78.*

Hab. New Holland; Port Jackson, *Brown, Bynoe.* Tasmania, *Gunn, Brown, J. D. Hooker.* New Zealand, *Menzies, A. Cunningham, J. D. Hooker;* always on the trunks of trees.—A small species, 2—5 inches long, very delicate, glistening. It has a peculiar habit, and is not easily confounded with any other species. The stipes is very slender, filiform.

53. *T. cæspitosum*, Hook.; caudex creeping slender much entangled and matted, fronds small oblong or oval, pinnæ rather few approximate or distant subimbricated oblong obtuse concave subcymbiform, the vein or costa solitary stout, beneath as well as the rachis and short stipes setose with rather long ferruginous hairs, involucres terminal and lateral obovato-cuneate broadly winged at the margins compressed, the mouth spreading with two broad semicircular short lips. (TAB. XL. B.) — *Hymenophyllum cæspitosum, Gaudich. in*

mens from Chiloe are assuredly only a variety, drawn out, as it would appear, by a warmer climate. The fructification is unquestionably that of a *Trichomanes*; but the figures in Gaudichaud give a very imperfect idea of the plant. The brown color of the fronds and the form and disposition of the pinnæ remind one of *Jungermannia sphagnoides*.

54. *T. auriculatum*, Bl.; "frond pinnate linear-lanceolate glabrous, pinnæ alternate cuneato-oblong obtuse multifid auricled at the base above, below obliquely cuneate, the segments truncate denticulate, rachis slightly margined subpubescent, caudex scandent rooting." *Bl. En. Fil. Jav. p. 225*. *T. Belangeri*, *Bory in Belang. Voy. Bot. p. 79, t. 8, f. 1*.

Hab. Mountain rocks in Java, *Blume, Belanger*. — An authentic specimen of this in Mr. J. Smith's herbarium has great affinity with *T. dissectum*; but the pinnæ are very obtuse, and scarcely again pinnatifid.

Dubious Species of this subsection.

55. *T. heterophyllum*, H. B. K.; "sterile frond pinnate, pinnæ obovato-oblong inciso-dentate superior ones confluent, fertile pinnate pinnæ cuneate toothed at the apex, caudex creeping." *H. B. K. Nov. Gen. Am. i. p. 25*. — Woods of the Orinoco. *Humboldt*.

**** *Fronde pinnate or bipinnate, † the pinnæ or pinnules pinnatifidly decomposed.* (*Sp. 56—87*).

Fronde tufted. (*Sp. 56—72*).

56. *T. rigidum*, Sw.; tufted erect, fronds ovate acuminate harsh rigid dark green almost black when dry bipinnate, the pinnules lanceolate or linear-lanceolate cuneate subbipinnatifid more or less deeply, the ultimate segments various in length subacute simple or bifid, rachis terete wingless or as well as the secondary rachis with a very narrow wing or margin sometimes setose, involucre supraaxillary on the inner margin of the lower segments on the upper side of the ultimate divisions suburceolato-cylindrical free, the mouth entire and scarcely spreading not 2-lipped. — *Sw. Fl. Ind. Occ. p. 1798. Syn. Fil. p. 144. Hedw. Fil. cum Ic. (good). Willd. Sp. Pl. v. p. 512. T. Mandioccanum, Raddi, Fil. Bras. t. 79 (80 in text), f. 2. T. pyramidale, Wall. Cat. n. 162. T. achillæifolium, Willd. Sp. Pl. v. p. 512. T. obscurum, Bl.*

† It is very difficult to draw the limit between a frond *pinnate* (in the first instance), with the rachis slightly margined, since that margin is often obsolete, and that winged rachis which might justify the term *pinnatifid*. In *T. rigidum* and *T. anceps*, the term "pinnatifid" is perhaps more appropriate, and the place of them would be in a different section. They are cited here, on account of their close affinity with some of the following species.

Fil. Jav. p. 227. J. Sm. in En. Fil. Philipp.— β . ultimate and penultimate divisions broader and more crowded.

Hab. Tropics in the Old and New World. Jamaica, *Swartz, Menzies*. Dominica, *Dr. Imray*. Martinique, *Sieber*; and probably general in the West Indian islands. Brazil, *Raddi, Douglas, Gardner, n. 605 and 5953, Bunbury*. Peru, *Mathews, n. 1089*. Quito, *Jameson*. Mauritius, *Bory, Bojer, Sieber, Syn. Fil. n. 272, and others*. Pacific Islands, *Nightingale*. Philippine Islands, *Cuming, n. 134 and 189*. Sincapore, *Lobb, Wallich*. Ceylon, *Mrs. Genl. Walker*. Java? *Blume*. South Africa, *Drège*, — β . Pacific Islands, *Nightingale*. — The copious specimens I have examined, to enable me to determine the above references and localities, do not vary in any very remarkable degree. The Mauritius *T. achilleæfolium* is quite the same as our West Indian *T. rigidum*, in every essential particular. In specimens from various countries, there is a difference in the greater or less breadth of the segments, which are generally narrow and more or less acute at the apex. Involucres principally from the inner margin of a segment, which looks like a broad spine. Stipes 4—6 or 8 inches: the frond about the same length: the former with chaffy hairs at the base, rather rough, slightly margined above with an indistinct elevated line. Rachis also margined but winged in the upper part, and the secondary rachis is distinctly margined. Sori rather numerous. The whole plant is singularly black and rigid when dry. I presume Blume's *T. obscurum* to be the same with this plant, as the character does not materially differ. Our var. β . is scarcely distinguishable from *T. elongatum*.

57. *T. millefolium*, Desv.; “fronds subdeltoïd oblong, lower pinnæ decurrently bipinnate, pinnules subdecurrent ultimate ones elongate coadunate somewhat dilated upwards denticulate, sori axillary, receptacles elongated, stipes and rachis naked terete.” *Desv. Mém. Linn. Soc. Par. ii. p. 329*. “*T. rigidum?* *Raddi, Syn. Fil. Bras. i. p. 19, (excl. syn.)*.”

Hab. Brazil? (*Desvaux*). — As the author quotes *T. rigidum*, *Raddi*; it is not unlikely that his plant is also the true *rigidum* of *Swartz*.

58. *T. elongatum*, A. Cunn.; tufted erect rigid dark green, fronds ovate bipinnate, pinnules very close compact imbr.

59. *T. anceps*, Hook. (not Wall. Cat.); 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, involucre supra-axillary free cylindrical tapering below, the mouth entire much spreading not 2-lipped, stipes compressed and flattened marginato-ancipitate above, often subterete or tetragonal (when dry) below. (TAB. XL. C). — *T. elegans*, Rich. in Act. Par. according to Deless. in Herb. nostr. not Rudge. *T. rigidum*, Klotzsch in Herb. Reg. Berol. et in Herb. nostr. *T. villosulum*? Wall. Cat. n. 163 (a very bad specimen, slightly hairy on one side). *T. achilleæfolium*, J. Sm. En. Fil. Philipp. (name only), not Willd. — β . subpiloso-squamose, segments and divisions everywhere very narrow linear-filiform, ultimate segments subsetaceous. (TAB. XL. C. 3).

Hab. Guiana, Richard. Brazil, Sellow. Dominica, Dr. Imray, n. 60 and 61. Gorgona, Pacific, Barclay. Singapore, Cuming, n. 368, Wallich. East Indies, Wallich, n. 163? — β . Philippine Islands, Cuming, n. 162 and 274.—It is possible that this may be a state of *T. rigidum*, but gigantic, 1½ foot to 2 feet high, with a very altered aspect, and in itself highly variable: some smaller specimens are apparently intermediate, while the usual form of our plant is very peculiar. Stipes 6—8 inches, subterete or 4-angular below, above remarkably compressed and more or less winged. Frond with a few minute, scattered, appressed hairs, 1—1½ foot high, harsh, rigid, black, and opaque. Rachis very broad, flattened and margined, ancipitate. Pinnæ remote, opposite or alternate, often 5—6 inches long, the divisions remote, ultimate segments subspinulose or setaceous, more or less elongated.—In β . the segments are almost setaceous, the margin of the rachis and the involucre narrower, the whole with rather copious, appressed, scaly hairs; and sometimes the involucre has no spreading mouth, but are erose as if injured by disease, as the entire plant probably is.

60. *T. fœniculaceum*, Bory; tufted (but from a creeping stout caudex) erect, fronds ovato-lanceolate rigid pinnated brown, pinnæ nearly horizontal approximate deeply tripinnatifid, the segments very narrow linear-setaceous scarcely broader than the vein or costa acute, rachis of the pinnæ compressed ancipitate, main rachis terete with a very narrow sharp edge or margin, stipes terete sometimes obscurely margined, above clothed (as is the rachis) more or less with deciduous brown setæ, involucre supra-axillary short cylindrical tapering below free, the mouth entire not 2-lipped nor spreading. Bory, in Willd. Sp. Pl. v. p. 511. *T. meifolium*, Kaulf. En. Fil. p. 265, t. 2, (not of Bory). *T. gemmatum*, J. Sm. l. c.

Hab. Mauritius and Bourbon, Bory, Carmichael, Bojer. Philippine Islands, Cuming, n. 400. — The characters of this, like many other species of *Trichomanes*, are not easily expressed in words. I derive my authority

for the species from a named specimen of the late Capt. Carmichael, and I have reason to believe it to be the same with that of Bory; but it is the *T. meifolium* of Kaulfuss, who has given a good representation of it. Its mode of growth is very erect, with a stout caudex and rachis and finely cut segments, which may be compared to a larch-tree in miniature. Stipes 3—5 inches, rising 3 or 4 together from a stout, horizontal, setose caudex. Fronds 6—7 inches high, with very close and very fine almost setaceous divisions. Sori copious on the upper part of the frond.

61. *T. myriophyllum*, Desv.; “fronds 4-pinnate, pinnules rather remote, secondary ones subsecundly pinnate and ultimate ones capillary, sori axillary, receptacles somewhat included, rachis downy hairy at the base, stipes terete.” *Desv. in Mém. Soc. Linn. Par. ii. p. 329.*

Hab. Madagascar, (*Desvaur*). “Frond and stipes 8—10 inches high. Very near *T. fœniculaceum*, but different.”

62. *T. bifidum*, Vent.; “fronds bipinnate, pinnules pinatifid, segments linear all bifid at the apex and acute, rachis setose.” *Vent. in Willd. Sp. Pl. v. p. 511.*

Hab. East Indies? (*Willdenow*). “In habit very like *T. rigidum*, but sufficiently distinct in the narrow segments of the pinnules, and in all, even the terminal ones, being bifid.”—It is more than probable that this is one of the East Indian forms of *T. rigidum*. Blume had probably seen an authentic specimen, for he says, under his *T. obscurum* (*T. rigidum?*), “*T. bifidum*, Vent. cui simillimum, differt laciniis omnibus bifidis indusiorumque receptaculis multo brevioribus.”

63. *T. strictum*, Menz.; tufted very erect, fronds lanceolate rigid straight pinnated, pinnæ approximate lanceolate bipinnatifid, the segments linear obtuse loosely reticulated, involucre urceolate free, the mouth slightly spreading entire not 2-lipped, the rachis margined, the stipes elongate terete quite naked.—*Hook. et Grev. Ic. Fil. t. 122. T. leptophyllum, A. Cunn. Fl. Nov. Zel. in Hook. Comp. to Bot. Mag.*

axillary cylindrical tapering below free, the mouth entire slightly spreading, rachis terete furrowed above not winged nor margined for its whole length, pilose with scattered soft brown hairs as well as the terete stipes.—*Bory in Willd. v. p. 514. Hook. Ic. Plant. viii. t. 702. T. Mauritanum, Flugge, MS. (Willd.)*

Hab. In one wood at the great lake, Bourbon, *Bory, Carmichael*.—My specimen of this is from Capt. Carmichael, and wants the lower part of the stipes. Frond 14 inches long (much larger than Willdenow describes it), dark brown, flaccid, truly bipinnate: the ultimate segments and involucre as in *T. strictum*, but the former are much more compound and more flaccid.

65. *T. meifolium*, *Bory in Willd.*; tall tufted erect rigid ovato-lanceolate bipinnate, pinnules lanceolate subbipinnatifid, the segments narrow-linear obtuse, involucre small cyathiform free supra-axillary, stipes and rachis terete clothed with long spreading rufous setæ.—*Willd. Sp. Pl. v. p. 508. "T. ericoides, Hedw. Fil."* *T. lanceolatum, Poiret, Encycl. viii. p. 83, (according to Desvauz).* *T. geminatum, J. Sm. En. Pl. Fil. (name only).*— β . *Bauerianum*; fronds larger (11—14 inches), stipes and rachis with few hairs or naked. *T. Bauerianum, Endl. Prodr. Ins. Norf. p. 17.*

Hab. Bourbon, *Bory*. Java, *Blume*. Philippine Islands, *Cuming, n. 137 and 207. Oahu, Macrae*.— β . E. Indies, *Mr. Ward*. Pacific Islands, *Bennett, Nightingale*. Norfolk Island, *F. Bauer, Mr. Vaughan Thompson*.—The stout stipes (3—5 inches long) clothed with long, harsh, dark brown spreading hairs or setæ, probably deciduous in β . Fronds 8—10 inches, in β . 11—14; segments rather crowded, involucre small, short, spreading and quite entire at the mouth.

66. *T. longisetum*, *Bory*; "fronds triplicato-pinnate, pinnæ patent lax, pinnules linear capillaceous dichotomous incurved, rachis winged above setose below, receptacles filiform five times longer than the involucre." *Bory in Willd. Sp. Pl. v. p. 510.*

Hab. Bourbon, *Bory*.—Willdenow places this next *T. feniculaceum* and *T. meifolium*, and says that from the latter it is sufficiently distinct in the rachis winged above, in the narrow and more distant pinnæ, in the linear-capillaceous pinnules and in the very long receptacles.

67. *T. maximum*, *Bl.*; "frond tripinnate ovate oblong very ample, pinnæ subalternate oblong-lanceolate, pinnules cuneate-oblong partito-pinnatifid, the segments subdichotomopartite, the secondary ones linear subbifid, rachises all winged, stipes elongate glabrous and terete below." *Bl. En. Fil. Jav. p. 228.*— β . *minus*; fronds smaller, pinnæ subopposite, pinnules rather rough beneath with segments inciso-pinnatifid, secondary ones linear subemarginate, stipes winged." *Bl. l. c.*

Hab. Java, and β . Island of Nusa Kambangan, *Blume*.—"Very near *T. meifolium*, Bory in Willd., which differs in the smaller fronds and hairy rachis."

68. *T. polyanthos*, Hook. ; tufted tall rigid, fronds oblong or ovato-lanceolate tapering below pinnate, pinnæ lanceolate horizontal subfalcato-decurved bi-tripinnatifid, the segments linear obtuse, involucre supra-axillary copious large free campanulate upper half very thin and membranaceous, the mouth spreading, receptacles wholly included, stipes and slightly margined rachis stout terete scabrous and more or less hispid. — *Hook. Ic. Plant. v. viii. t. 703*. Hymenophyllum polyanthos, *Hook. in Nightingale's Oceanic Sketches, App. p. 132, (non Sw.)*

Hab. Pacific Islands, *Sir Thos. Nightingale*. — Stipes 3—4 or 5 inches, very stout, as is the rachis. Frond 1 foot high, 4—5 inches broad. Very remarkable in the nature of the involucre, which are quite unlike any others ; large, exactly campanulate, glossy, membranaceous, especially the upper pellucid half, in texture and form more resembling those of *Hymenophyllum* than of *Trichomanes*, but they are not at all 2-valved : the receptacles also are quite included in the involucre in every instance.

69. *T. Smithii*, Hook. ; tufted erect rather small flaccid, fronds slender lanceolate pinnate, lower pinnæ remote short, upper ones crowded and larger, all subpalmato-pinnatifid, segments elongated remote spreading ultimate ones much elongated, the cells large linear transverse arranged in slightly oblique longitudinal lines between the costa and the margin, the margins alone with a series of small quadrangular cells, involucre supra-axillary on short segments narrow urceolate dark brown coriaceous slightly winged below, the mouth spreading, stipes filiform slightly hairy. — *Hook. Ic. v. viii. t. 704*. — *T. angustatum, J. Sm. En. Fil. Philipp. (not Carn.)*

natifid, involucre copious marginal on almost all the pinnæ quite sunk broadly oblong-cuneate the narrow base often nearly reaching the costa of the same texture as the frond, the mouth laterally 2-lipped more or less spreading, receptacles much elongated, stipes generally short stout not winged clothed with dense ferruginous wool. (TAB. XLI. A.)—*Sw. Fl. Ind. Occ. p. 1734. Syn. Fil. p. 143. Willd. Sp. Pl. v. p. 506. Hedw. Fil. cum Ic. (bad), not Hook. et Grev. Ic. Fil. t. 10.*

Hab. Jamaica, *Swartz, Dr. Bancroft.* Colombia, *Hartweg, n. 1531.*—Stipes 2—5 inches long, stout, rufo-tomentose. Fronds among the largest and most elegant of this beautiful genus, 1—1½ foot long. Pinnæ very crowded, thin and membranaceous, undulato-crisped: fructifications sometimes so copious as to occupy every lobe and vein of the pinnæ, and these are large and almost equally transparent with the frond.

71. *T. Lambertianum*, Hook.; caudex scarcely creeping lanuginose, fronds linear oblong obtuse rigid opaque pinnated, pinnæ sessile densely crowded imbricated erecto-patent subsecund densely rufo-tomentose especially everywhere beneath oblong-ovate obtuse rigid membranaceous bipinnatifid subplicate, the segments oblong obtuse entire or bifid with a stout costa, involucre copious from the upper pinnæ marginal almost wholly sunk in a lateral segment oblong-cuneate of the same texture as the frond, the mouth laterally 2-lipped more or less spreading, receptacles elongated, stipes stout elongated clothed with dense ferruginous wool. (TAB. XLI. B.)

Hab. Woods at Pillao, Peru, *Ruiz et Pavon in Herb. Lambert.*—I am indebted to Mr. Fielding for a specimen of this curious *Trichomanes*, which was derived, as well as his own specimens, and those in the Banksian herbarium, from the museum of the late Mr. Lambert. The present has many points in common with the preceding, yet is, I think, truly distinct. The stipes is stout, 4—5 inches long, clothed with dense, woolly, rusty tomentum. The frond, apparently erect, 8—10 inches long, scarcely 2 inches wide, and nearly of the same width throughout, peculiarly stiff and rigid, ferruginous from copious rust-coloured hairs, which, on the under side, form a dense covering of wool. The pinnæ point upwards and forward, so as to be subsecund, and they are so closely placed as to be imbricated, they are sessile, rather deeply pinnatifid, with the segments oblong and obtuse, often again divided, so that the pinnæ may be said to be pinnatifid. The fructifications are confined to the upper portion of the frond, and are there conspicuous by the copious long receptacles.

72. *T. pallidum*, Bl.; fronds bipinnatifid oblong sparingly setose glaucous, younger plants pinnatifido-digitate, pinnæ subalternate cuneato-oblong pinnatifid, the segments cuneiform subbifid, ultimate ones linear obtuse emarginate, rachis winged, stipes terete glabrous." *Bl. En. Fil. Jav. p. 225.*—*β. glaucum*; pinnæ nearly opposite approximate pinnatifid, segments obtuse emarginate. *Bl. l. c.*

Hab. Woods, Java, *Blume*. "Closely allied to *T. lucens*," Sw. — I believe the true *T. lucens* is little known or understood. I have never seen any East Indian *Trichomanes* at all resembling it; nor does *Blume's* character of *T. pallidum* in the least agree with it.

Fronde from an elongated creeping caudex. (Sp. 73—87).

73. *T. dissectum*, J. Sm.; caudex long creeping stout setose, fronds erect rigid black when dry scarcely stipulate lanceolate pinnate, pinnæ petiolate semiovato-lanceolate obliquely cuneate at the base inciso-pinnatifid on the superior margin and the upper half of the inferior margin, the segments unequal oblong or linear subincised, involucre terminal on the segments and supra-axillary scarcely sunk small urceolato-cylindrical copious, rachis terete and as well as the stipes hispid.—*J. Sm. in En. Fil. Philipp. (name only). Hook. Ic. Plant. v. viii. ined.*

Hab. Luzon, *Cuming*, n. 129.—At first sight this seems allied to *T. javanicum* (n. 45), being pinnated, rigid and black, but it is in reality very different. Caudex long, stout. Fronds with scarcely any stipes, 6—8 inches long. Rachis hispid, pinnæ tapering into a short stalk, pinnatifid only on the upper side, except towards the apex; the segments lacinated or incised, each segment frequently bearing an involucre. Receptacle protruded. Its resemblance to *T. auriculatum*, Bl. is considerable, but, as already observed, the pinnæ are more acuminate and more divided, so as to be pinnatifid.

74. *T. melanorhizon*, Hook.; caudex creeping, and as well as the thick numerous branching roots densely woolly with black hairs, fronds short ovate almost sessile pinnate, pinnæ bipinnatifid, the segments narrow-linear acute glabrous, involucre in the axils of the upper segments urceolato-cylindrical partially sunk, the mouth with 2 semiorbicular lips.—*T. bilingue, J. Sm. in En. Fil. Philipp. Hook. Ic. Pl. viii. t. 705.*

Hab. Leyte, Philippine Islands, *Cuming*, n. 316. — Caudex and short

Hab. Jamaica, *Sloane, Swartz, Bancroft, Macfadyen, Purdie, &c.* Mexico, *Schiede et Deppe, Galeotti*.—An elegant, very distinct, but little understood species, often perhaps confounded with *T. radicans*, but totally different in a variety of particulars. It has indeed the same long creeping caudex; but the frond (6 inches to a foot long) is remarkably thin, membranaceous, pellucid, yellow-green, glossy, and truly bipinnate; the involucre wholly sunk in the frond. Stipes 3—4 or 5 inches long.—Linnæus, Willdenow and others have referred to Plumier, t. 93, for this plant; but it is quite different, and possibly our *T. Kunzeanum*; though it does not correctly resemble any species known to me. Sloane's figure, on the other hand, is very characteristic. I have only seen West Indian and Mexican specimens.

76. *T. angustatum*, Carm.; caudex creeping slender and matted, fronds pendent? flaccid lanceolate pinnate, pinnæ bipinnatifid, the segments narrow-linear glabrous simple or bifid obtuse, involucre urceolato-cylindrical sunk in the frond, the mouth spreading obscurely 2-lipped, the rachis throughout and stipes slender filiform terete naked.—*Carm. in Linn. Trans.* xii. p. 513. *Hook. et Grev. Ic. Fil.* t. 166. *T. fulvum*, *Klotzsch, in Herb. Reg. Berol. et in Herb. Hook.* *T. tenerum*, *Spr. (according to Klotzsch)*.

Hab. Tristan d'Acunha, *Carmichael*. Brazil, *Gardner*, n. 204 and 5952, *Sellow*. Esmeraldas, El Equador and Pichincha, *Jameson*. Peru, *Matheos*, n. 1784. Gonga Sokoo, *Barclay*.—Caudex short, $\frac{1}{2}$ an inch to 2 inches long, slender, filiform. Frond varying in length, 3—5 inches, very flaccid, slender, graceful and probably pendent.

77. *T. exsectum*, Kze.; caudex creeping, fronds pendent flaccid lanceolate or oblong pinnate, pinnæ bipinnatifid, the segments narrow linear glabrous simple or bifid obtuse, involucre oblong sunk in the frond, the mouth spreading scarcely 2-lipped, the rachis winged above naked below as is the whole stipes.—*Kze. Anal. Pteridogr.* p. 47, t. 29, f. 2.

Hab. Juan Fernandez, *Bertero*, n. 1542, in *Herb. nostr.*, *Gay*, (*Kunze*), *Capt. P. P. King, R.N. (in Herb. Heward)*, *Cuming*, n. 1335. Chiloe, *Cuming*, (*Kunze*). Valdivia, *Bridges*, n. 800.—Professor Kunze has well distinguished this species from *T. angustatum*, and his figure gives a good representation of our smaller specimens (for they vary from 4 inches to more than a foot), but the receptacle is longer than in ours, probably from being more perfect. It is a larger plant generally than *T. angustatum*, the rachis is decidedly winged above, the involucre are more oblong, almost cylindrical, but tapering at the base, and the lips are much smaller.

78. *T. trichoideum*, Sw.; caudex creeping, frond broadly lanceolate tripinnate, segments linear-capillary a little broader upwards bifid or forked, involucre terminal on short lateral segments stipitate urceolato-cylindrical, the mouth spreading entire, stipes slender filiform.—*Sw. Fl. Ind. Occ.* p. 1741. *Syn. Fil.* p. 144. *Willd. Sp. Pl.* v. p. 509. *Hook. et Grev. Ic. Fil.* t. 199. *T. pyxidiferum*, *Schkuhr, Fil.* t. 134, (*T. cuneiforme in text*). *T. tenellum*, *Hedw. Fil. cum Ic.*

Hab. Jamaica, Swartz, Bancroft, Menzies, Purdie. Mexico, Schiede in *Herb. Hook.* Vera Cruz and Xalapa, *Galeotti*, n. 6394. St. Domingo, (*Schkuhr*).—Stipes 1—2 inches tall, very slender. Fronds 3—6 inches, cut into very fine capillary segments, scarcely so broad as the filiform rachis.

Dubious Species of this Section.

79. *T. tamarisciforme*, Jacq.; “fronds bipinnate, pinnules pinnatifid lobate, lobules oblong, involucre sunk? (urceolis insertis), stipes and rachis rounded somewhat hairy.” *Sw. Syn. Fil.* p. 515. *Jacq. Coll.* iii. p. 285, t. 21, f. a. *Willd. Sp. Pl.* v. p. 515.—Mauritius, (*Swartz*). Bourbon (*Willdenow*), *Jacquin*.—The figure of *Jacquin* is a very unsatisfactory one.

80. *T. tenuifolium*, Cav.; “fronds tripinnate, pinnules capillary with one sorus, receptacles very much elongated.” *Cav. Præl.* 1801, n. 697. *Sw. Syn. Fil.* p. 144. *Willd. Sp. Pl.* v. p. 508.—Hab. Chiloe, *Cavanilles*.—“Frond 3—4 inches long. Lower pinnæ opposite, upper alternate. Pinnules capillary. Fructifications solitary in the apices of the pinnules, involucre oblong, pedicellate, receptacles 3—4 times longer than the involucre.”

81. *T. diffusum*, Bl.; frond bipinnatifid diaphanous glabrous, pinnæ alternate or opposite remote lanceolate, lowermost ones stipitate upper confluent lobato-pinnatifid, segments linear obtuse dentate, involucre solitary or in pairs, rachis margined above, stipes terete glabrous.” *Bl. En. Fil. Jav.* p. 225.— β . pinnæ all sessile, segments nearly entire, rachis margined for its whole length. *Bl. l. c.*—Mountains of Java, *Blume*.

82. *T. cupressoides*, Desv.; “fronds elongated deltoid decumbently tripinnatifid, ultimate pinnæ appressed veined toothed at the apex, lowermost bicuspidate-subulate at the

85. *T. stylosum*, Poir.; "fronds subtripinnate, pinnæ alternate, pinnules decurrent, segments solitary, receptacles exerted."—*Poir. Encycl. Bot.* viii. p. 32.—Madagascar, *Du Petit Thouars*.

86. *T. davallioides*, Gaud.; "fronds scattered lanceolate bipinnate subtripinnate 1 foot high, pinnules lanceolate pinnafid and cut, segments oblong obtuse at the apex 2-3-fid, sori oblong axillary subpedicellate, rachis and stipes margined, caudex climbing hairy." *Gaudich. in Freycin. Voy. Bot.* p. 378.—Sandwich Islands, *Gaudichaud*.

87. *T. venustum*, Desv.; "fronds everywhere decurrent subtripinnate, segments linear emarginate bifid and obtuse, sori axillary and terminal, receptacles included, stipes short margined, caudex climbing?"—*Desv. in Mém. Linn. Soc. Par.* p. 328.—Brazil, (*Desvauz*).

T. undulatum. Wall. Cat. n. 160.—"Mauritius," *Wallich*.—Quite unknown to me.

T. compressum, Desv. "Mag. Nat. Berol. 1811, p. 329."—I have no access to the work just mentioned, and the name only is given by *Desvauz*, in *Mém. Linn. Soc. Par.* ii. p. 330.

T. alchemillæfolium, Wall. Cat. n. 159. Mauritius, *Telfair*.—Probably *T. meifolium* or *T. achilleæfolium*.

T. cormophyllum, Kaulf. En. Syn. Fil. p. 266, and *Drège*, Herb. Cap.—See under *Alsophila Capensis*, p. 37).

T. capillatum, "Taschner Dissertatio de Trichom. Jena, 1843," (quoted by *Presl*, Hymen. p. 65, under *Didymoglossum capillatum*, Pr.)

T. flabellatum, *Bory*, in *Belanger, Voy. Bot.* p. 77, from the Mysore, who considers that it may be the same as *T. digitatum*, Sw.

T. adiantinum, *Bory*, in *Belanger, Voy. Bot.* p. 78; "fronds stipitate entire flabellato-abbreviate, fructiferous at the crenate margin." Mauritius and Bourbon, *Belanger*.

T. loreum, *Bory*, in *Belanger, Voy. Bot.* p. 79, is the same as *T. lanceum*, Willd.

T. radicans, supra, p. 125.

The name of our friend *J. T. Mackay Esq.* ought assuredly to have been associated with the discoverers of this interesting plant in Ireland. It was, as I have since learned, in the summer or autumn of 1804, that *Dr. Stokes*, accompanied by *Miss Fitton* (not *Felton*), detected a single plant without fruit near the *Powerscourt waterfall*, and sent a specimen to *Sir J. E. Smith*.

In October of the same year Mr. Mackay had the good fortune to find an abundant station, and in fine fructification, in the county of Kerry; and his specimens were published in 'English Botany' in the following year, and distributed among botanists, and to cultivators at home and abroad. In 1806, Mr. Nuttall detected the plant in Hermitage-glen, county of Wicklow, where, as at Powerscourt, and I fear in Mr. Andrews' station, it has been almost exterminated by the rapacity of collectors. Botanists are sometimes taunted with illiberality in concealing the stations of rare plants; but there is often a necessity for it. About eight years ago, Mr. Robt. Ball detected a new station in the county of Waterford.

Dr. Presl's recent work, entitled 'Hymenophyllaceæ,' published at "Prague, 1843," in 4to., with 12 plates, has only reached our hands at the period when our two genera, *Hymenophyllum* and *Trichomanes*, were almost wholly in type; so that it has been impossible to refer to it under our species. It is too important a publication to pass over in silence, and I cannot do better than to give here an enumeration of the Genera (19 in number) and Species into which this acute observer has thought proper to divide the group; premising, however, that I cannot agree with the author in thus multiplying genera, which do not appear well marked either with regard to habit, or to characteristic distinctions. The venation is too uniform to afford any good or tangible marks, and the variations of form in the involucre or indusium is more useful as affording specific, rather than generic characters.

Conspectus of the Genera and Species of Presl's

'HYMENOPHYLLACEÆ,'

(including *Hymenophyllum* and *Trichomanes*, Sm.)

Trib. I. TRICHOMANOIDEÆ, Pr.

(This group corresponds with the genus *Trichomanes*, Sm. "Involucre tubular with an elongated receptacle capsuliferous at the base").

Sect. 1. TRICHOMANEÆ, Pr.

I. FEEA, Bory. — *F. polypodina*, Bory (*Trich. spicatum*, Hedw.). *F. nana*, Bory.

II. HYMENOSTACHYS, Bory. — *H. elegans*, Pr. (*Trich. elegans*, Rudge).

T. pilosum, Raddi. *T. crispum*, L. *T. pilosum*, Kze. *T. Hænkeanum*,³ Pr. (*T. crispum*, Pr. in *Rel. Hænk.*) *T. Sellowianum*,⁴ Pr. *T. asplenoides*,⁵ Pr. *T. dimidiatum*,⁶ Pr. *T. Javanicum*, Bl. (*T. rigidum*, Wall.) — § II. *Eutrichomanes*, Pr. *A. Flabellata*, Pr. *T. Boleri*, Hook. et Grev. (*T. undulatum*, Wall.) *T. digitatum*, Sw. (*T. lanceum*, Bory). *T. saxifragoides*,⁷ Pr. *T. palmatum*,⁸ Pr. — *B. Pinnata*, Pr. *T. Hookeri*, Pr. (*T. muscoides*, Hook. et Grev.) *T. erosum*, Willd. *T. parvulum*, Poir. (*T. Sibthorpioides*, Bory). *T. Thouarsianum*,⁹ Pr. *T. Poeppigii*,¹⁰ Pr. (*T. sinuosum*, Knze. in *Poepp. Fil.*) *T. sinuosum*, Pr. (*T. incisum*, Kaulf.) *T. cognatum*,¹¹ Pr. *T. lucens*, Sw. *T. alatum*, Sw. *T. Bancroftii*, Hook. et Grev. (*T. coriaceum*, Kze. *T. pinnatifidum*, Willd. *Herb.*) *T. Ankersii*, Parker. *T. intramarginale*, Hook. et Grev. *T. Luzonicum*,¹² Pr. *T. acutum*,¹³ Pr. *T. venosum*, Br. *T. Belangeri*, Bory. *T. melanostictum*, Schlecht. *T. brachypus*, Kze. (*T. radicans*, Hook. et Grev.) *T. radicans*, Sw. *T. pyxidiferum*, L. *T. ambiguum*, Sieb. *Sym. Fil.* n. 143. *T. Brasiliense*, Desv. *T. Bauerianum*, Endl. *T. trichoidem*, Sw. *T. tenerum*, Spr. *T. exsectum*, Kze. *T. angustatum*, Carm. *T. Mandioccaum*, Raddi. *T. scandens*, L. (*T. radicans*, Kze. Hymenophyllum *radicans*, Poepp. *Fil. exsic.*) *T. umbrosum*, Wall. *T. strictum*, Menz. *T. tamarisciforme*, Jacq. *T. achilleifolium*, Willd. *T. longisetum*, Bory. *T. Millefolium*,¹⁴ Pr. *T. apiifolium*,¹⁵ Pr. *T. bifidum*, Vent. *T. eminens*,¹⁶ Pr. *T. fœniculaceum*, Bory. *T. meifolium*, Bory. *T. intermedium*, Kaulf. — § III. *Pachychætum*,

³ The plant of Hænke I had supposed to be *T. crispum*, L.

⁴ *T. Sellowianum*, Pr. Hymen. p. 37; "frond linear-lanceolate elongate acute deeply pinnatifid obtuse at the base, segments oblong obtuse unequally denticulate ciliated waved separated by a rounded sinus alternate contiguous horizontal, lowest ones rather smaller deflexed, veins ditrichotomous, on one side with the costa pubescent, receptacles very long, stipes convex on one side channelled on the other and as well as the convex rachis hirsute with appressed hairs. Brazil, Sellow."

⁵ *T. Javanicum*, nob. supra, p. 130. (*T. curvatum*, J. Sm.)

⁶ *T. dissectum*, J. Sm. et nob. sup. p. 140

⁷ *T. parvulum*, nob. supra, p. 118. ⁸ *T. proliferum*, nob. supra, p. 118.

⁹ *T. Thouarsianum*, Pr. Hymen. p. 40; "frond ovate obtuse deeply pinnatifid acute at the base, with two opposite segments and the terminal one cuneate bifid, the lobes linear entire or toothed and with the teeth emarginate, limb of the involucre patent entire, stipes shorter than the frond and as well as the rhizoma filiform. Bourbon, P. Thouars."

¹⁰ *T. sinuosum*, nob. supra, p. 140.

¹¹ *T. cognatum*, Pr. Hymen. p. 41; "frond oblong-lanceolate obtuse glabrous or ciliated with bi-trifid hairs pinnatifid the narrow base tapering into a stipes, segments ovate-oblong obtuse and obtusely dentate separated by an obtuse sinus, veins simply branched, sori immersed, limb of the infundibuliform involucre truncated, stipes below filiform articulated above the base, rhizoma angled paleaceo-pilose. Brazil, Beyrich." "Quam maxime cognatum *T. sinuoso*, a quo pluribus notis differt et transitum in *T. alatum* quodammodo efficere videtur."

¹² *T. humile*, nob. supra, p. 123. ¹³ *T. glauco-fuscum*, nob. supra, p. 128.

¹⁴ Not of Desvaux. It is *T. anceps*, nob. supra, p. 135.

¹⁵ *T. meifolium*, nob. supra, p. 137. ¹⁶ *T. meifolium*, nob. supra, p. 137. •

- Pr.* *T. Luschnatianum*,¹⁷ *Pr.* *T. rigidum*, *Sw.* *T. firmulum*,¹⁸ *Pr.* *T. pyramidale*, *Wall.* *T. speciosum*, *Willd.* *T. brevisetum*, *Spr*
- VI. RAGATELLUS, *Pr.*—*R. crinitus*, *Pr.* (*Trichomanes*, *Sw.*)
- VII. CEPHALOMENES, *Pr.* Tab. V.—*C. atrovirens*, *Pr.*—(This would appear to be a remarkable plant, to judge from the description and figure: but my astonishment is great on finding that this supposed new genus is Mr. Cuming's n. 169 from the Philippine Islands, identical with *Trichomanes Javaicum*, Blume, and of Presl himself; and the *T. rhomboideum*, J. Sm.—To such errors must the multiplying of genera on the most trivial characters necessarily lead. The receptacle is not, in my specimens, terminated with the globose apex represented by Presl, tab. 5; nor is there any character by which it can be distinguished specifically from the *Trichomanes* now mentioned.)
- VIII. NEUROPHYLLUM, *Pr.* Tab. IV. C.—*N. Vittaria*, *Pr.* (*Trichomanes* *Vill. DeCandl.* *T. floribundum*, *B. Hook. supra*, p. 129). *N. pinnatum*, *Pr.* (*Trich. floribundum*, *H.B.K.*) *N. pennatum*, *Pr.* (*Trich. pennatum*, *Kaulf.*; too near our *T. floribundum*).
- IX. MICROCONIUM, *Pr.* Tab. VI. A, B.—*M. cuspidatum*, *Pr.* (*Trichomanes* *cuspid.* *Willd.*)—It appears to me that there can hardly be a question of this being our *Trichomanes Bojeri*, *Hook. et Grev. Ic. Fil.* t. 155, et *supra*, and of Presl, from the Mauritius; and it may be equally the *T. cuspidatum*, *Willd.*, whose description however is very unsatisfactory. If I am right in my conjecture, the margin in the figure just quoted, A, is much broader than I have seen it.—*M. Berteiroanum*, *Pr.* fig. B.—No one can possibly look at this figure and compare it with that of *Trichomanes muscoides*, *Hook. et Grev. Ic. Fil.* tab. 179, without seeing that the two plants are *identical*, and they are from the same country. The venation and margin are as distinctly and accurately laid down in the 'Icones Filicum,' as in the work now under consideration, and the figure was well known to Dr. Presl: yet by a strange inconsistency he makes a new genus of it in the one case, and, in the other, a new species of his own genus *Trichomanes*, *T. Hookeri*, p. 16.
- X. ABRODICTYUM, *Pr.* Tab. VII.—*A. Cumingii*, *Pr.* *Cuming's* n. 208 and 358, from the Philippine Islands. This plant corresponds with our *Trichomanes Switzii*, a plant certainly very remarkable in the

B. Pinnata, Pr. D. reptans, Pr. (Trich. reptans, Sw.) D. Kraussii, Pr. Trich. (Hook. et Grev.) D. muscoides, Pr. (Trich. Sw. Tr. apodum, Hook. et Grev.) D. quercifolium, Pr. (Trich. Hook. et Grev.) D. minutulum, Gaud. D. alatum, Pr. (Hymen. alatum, Schk. Fil. t. 135, b.) D. decipiens, Desv. D. Filicula, Pr. (Trich. bilabiatum, Nees et Bl. Hymen. Filicula, Bory). D. brevipes,¹⁹ Pr. D. undulatum,²⁰ Pr. D. serrulatum,²¹ Br. § II. Chilodium, Pr. D. Neesii, (Trich. Bl. Trich. denticulatum, Nees et Bl. non Cav.) D. longisetum,²² Br. § III. Crepidium, Pr. D. humile, Pr. (Trich. Forst.)

XII. MERINGIUM, Tab. VIII. B. — M. Meyenianum, Pr. M? Blumeanum, Pr. (Hymenophyllum pectinatum, Nees et Bl. Hym. Blumeanum, Spr.) (With the species of this genus I am unacquainted. *Meringium*, the author says, is allied to *Didymoglossum*; differing in the involucre, which has a short campanulate tube, and a limb deeply bipartite, the segments wide, concave, at length divaricated, with thicker receptacles. His first species, *M. Meyenianum*, is a native of Manilla. The second, "doubtful" as to genus, is the *Hymen. Blumeanum* of Spr. and Blum. En. Fil. Jav. [omitted in our species], thus characterized; "froud pinnatifid or bipinnatifid brown glabrous, pinnae alternate approximate cuneato-oblong pinnatifid, segments linear subhifid obtuse almost retuse, valves of the involucre subrhombic-ovate obtuse, stipes terete. *Hym. pectinatum*, Nees et Bl. in Act. Nat. Cur. xi. t. 12, f. 5." Java, *Blume*, who observes that it comes very near *Hym. sanguinolentum*).

XIII. HEMIPHLEBIUM, Pr. Tab. IX. — H. pusillum, Pr. (Trich. Sw.)

Trib. II. HYMENOPHYLLOIDÆ, Pr.

(This corresponds with *Hymenophyllum*, Sm. "Involucre bifid, composed of 2 plates (laminæ), about equal in length with the receptacle.")

XIV. LEPTOCIONIUM, Br. Tab. XI. D. — L. dicranotrichum, Pr. L? fucoides, (Hymenophyllum, Sw.)

XV. MYRMECOSTYLUM, Pr. Tab. X. A. — M. tortuosum, Pr. (Trichom. Banks, MS. Hymenoph. Hook. et Grev.) M? dichotomum, Pr. (Hymenophyllum, Cav.) M. clavatum, Pr. (Hymenoph. Sw.)

XVI. PTYCHOPHYLLUM, Pr. Tab. XI. E. — Pt. plicatum, Pr. (Hymen. Kaulf.)

XVII. HYMENOPHYLLUM, Pr. Tab. XI. A, B, C. Tab. XII. A, B. — § I. Sphærodium, Pr. H. Wilsoni, Hook. (H. Tunbridgense, Schk. Fil. t. 135, d.) H. Meyeri,²³ Pr. (H. Tunbridgense, b. Drège). H. antarcticum, (H. Tunbridgense, Sieb. Syn. Fil.) H. Menziesii,²⁴ Pr.

¹⁹ This is probably No. 2 of Mr. Cuming from Luzon, and if so it is our *T. Filicula*, supra, p. 124, with which species the author compares it.

²⁰ Probably united to our *Tr. Filicula* or *Tr. humile*, two species with which Presl compares it: from Luzon, Cuming.

²¹ This, the n. 221 of Cumiug's Philippine Island plants, is the same with *Hymen. bivalve*, J. Sm., H. Smithii, nob. supra, p. 97.

²² This I have no hesitation in referring to *Tr. rigidum*, supra, p. 133.

²³ The plant of Drège is referred to *H. Wilsoni*, supra, p. 96; and our author says of it, "valde affinis *H. Wilsoni*."

²⁴ This scarcely seems, from the description, different from *H. Wilsoni*,

§ II. *Euhymenophyllum*, *Pr.* *A. Pilosa*, *Pr.* *H. valvatum*, *Hook. et Grev.* *H. blepharodes*,²⁵ *Pr.* *B. serrulata*, *Pr.* *a. Evoluta*, *Pr.* *H. minimum*, *Less. et Rich.* *H. Tunbridgense*, *Sw.* *H. asperulum*, *Kze.* *H. cupressiforme*, *Labill.* *H. Dregeanum*,²⁶ *Pr.* (*H. Tunbridgense*, *a. Drège*). *H. Peruvianum*, *Hook. et Grev.* *H. seselifolium*,²⁷ *Pr.* *H. multifidum*, *Sw.* *B. Dimidiata*, *Pr.* *H. unilaterale*, *Bory.* *H. Serra*,²⁸ *Pr.* *H. pectinatum*, *Cav.* *H. secundum*, *Hook. et Grev.* *C. Integra*, *Pr.* *H. asplenioides*, *Sw.* *H. fumaroides*, *Bory.* *H. Thunbergi*, *Eckl.* (*H. Tunbridgense*, *Kze. partim*). *H. flabellatum*, *Labill.* *H. nitens*, *Br.* *H. fraternum*,²⁹ *Pr.* *H. Poepigianum*,³⁰ *Pr.* (*H. clavatum*, *Kze.*) *H. Jalappense*, *Schlecht.* *H. Grevilleanum*, *Pr.* (*H. polyanthos*, *Hook. et Grev.*) *H. polyanthos*, *Sw.* (*H. Millefolium*, *Schlecht.* and *Mathews, Pl. Peruv. Eszicc. n. 1790*). *H. emarginatum*, *Sw.* *H. ? Javanicum*, *Spr.* (*H. crispum*, *Nees et Bl.*) *H. dædaleum*, *Bl.* *H. paniculiflorum*,³¹ *Pr.* — § III. *Cycloglossum*, *Pr.* *H. cæspitosum*, *Gaud.* *H. Cumingii*,³² *Pr.* *H. semibivalve*, *Hook. et Grev.* *H. decurrens*, *Sw.* [*a. Jacquinianum*, fronds lanceolate, *Jacq. Coll. ii. 2, f. 1, 2*]. *β. Sieberianum*, fronds ovate. [*Trich. clavatum*, *Sieb.*] *H. Kohautianum*,³³ *Pr.* (*Trich. clavatum*, *Sieb.*) *H. Schomburgkii*, *Pr.* (*Hymenoph. Schomb. Pl. Gui. Exs. n. 509*). — § IV. *Craspedophyllum*, *Pr.* *H. marginatum*, *Hook. et Grev.*

XVIII. SPHÆROCIONIUM. — Tab. IV. B. Tab. X. B, C. — I. *Stellata*, *Pr.*

which is found in the adjacent island of Tierra del Fuego. *H. Menziesii* was gathered by Mr. Menzies in Staten Land.

²⁵ *H. blepharodes*, *Pr. Hymen.* p. 51; "frond oblong-lanceolate narrow acuminate pinnate, pinnæ opposite and alternate petiolulate lanceolate obtuse deeply pinnatifid, segments linear obtuse emarginate mucronato-serrulate, sori sessile ovate obtuse, segments of the involucre ciliato-serrate at the apex at length very patent longer than the receptacle, rachis winged above, below and the terete costa and stipes with simple or forked scattered hairs. Martinique, *Kohaut*."

²⁶ This, the *H. Tunbridgense*, *a.* of *Drège*, I had considered to be a state of that species.

²⁷ May not this also be *H. Wilsoni*? From Chili (Chiloe?), *Cuming*.

²⁸ *H. Wilsoni*?

S. hirsutum, Pr. (Hym. Sw.) *S. sericeum*, Pr. (Hym. Sw.) *S. tomentosum*, Pr. (Hym. Kze.) *S. interruptum*, Pr. (Hym. Kze.) *S. aureum*,³⁴ Pr. *S. Plumieri*, Pr. (Hym. Hook. et Grev. excl. Syn. Plum. H. hirsutum, Pr. in *Rel. Hænk.*) *S. Sieberi*,³⁵ Pr. (Trich. alatum, Sieb.) *S. pulchellum*, Pr. (Hym. Schl.) *S. vestitum*,³⁶ Pr. *S. hirtellum*, Pr. (Hym. Sw.) *S. ciliatum*, Pr. (Hymen. Sw.) *S. Grevilleanum*, Pr. (Hymen. ciliatum, Hook. et Grev.) *S. lineare*, Pr. (Hymen. Sw.) *S. Boryanum*, Pr. (Hymen. Willd.) *S. commutatum*, Pr. (Hymen. Boryanum, Rad.) *S. elasticum*, Pr. (Hymen. Willd.—Probably the *H. flavo-aureum*, Bory, in Belanger, Voy. with a very brief and imperfect character, may be referred hither). II. *Pilosa*, Pr. *S. diversilobum*,³⁷ Pr. *S. Schiedeanum*,³⁸ Pr. (Hymen. ciliatum, Schlecht.) *S. trifidum*, Pr. (Hymen. Hook. et Grev. This species, at p. 91, supra, under this name of *H. elegans*, ought to bear that of *Hym. lineare*, Sw. Syn. Fil. p. 147, and to have the station of "Jamaica, Swartz," added to it). *S. pendulum*, Pr. (Hymen. Bory, in Belanger, Voy. Bot. p. 79, t. 8, f. 2. This is said to be from Bourbon; but the figure is so exact a representation of our *H. elegans*, supra, p. 114, *H. lineare*, Sw., that I do not see how the species is to be distinguished). *S. cristatum*, Pr. (Hymen. Hook. et Grev.) *S. bivalve*, Pr. (Hymen. Sw.) *S. scabrum*, Pr. (Hymen. Less.) III. *Glabra*, Pr. *S. infortunatum*, Pr. (Hymen. Bory). *S. australe*, Pr. (Hymen. Willd.) *S. ricciæfolium*, Pr. (Hymen, Bory). *S. rupestre*, Pr. (Hymen, Raddi). *S. caudiculatum*, Pr. (Hymen. Mart.) *S. productum*,³⁹ Pr. *S. dilatatum*, Pr. (Hymen. Sw.) *S. crispatum*, Pr. (Hymen. Hook. et Grev.) *S. macrocarpum*,⁴⁰

form naked, sori half immersed, involucre bifid as far as the middle, segments obovato-orbicular entire as long as the receptacle. Martinique, *Kohaut*."

³⁴ The *Hym. sericeum* of *Herb. Reg. Berol.* in my herbarium is undoubtedly the true *H. sericeum*.

³⁵ The specimens of *Trich. alatum* of *Sieb. Fl. Mart. Suppl. n. 71*, without fructification, in Dr. Presl's possession, are the authority for this species, which the author compares with his *S. aureum* and *S. Plumieri*.

³⁶ *Filicula digitata*, *Plum. Fil. p. 73, t. 50, f. B*, is an authority for this: and that is our *Hymen. Plumieri*, supra, p. 89.

³⁷ *S. diversilobum*, Pr. *Hymen. p. 59*; "frond glabrous linear-lanceolate acute at both extremities, below twice-above simply pinnated, pinnae adnate the lower ones divided into three, the middle into two pinnules, the upper undivided and the pinnules linear emarginate denticulate, teeth ciliiferous, rachis and stipes winged denticulato-ciliate the hairs simple, sori half immersed, involucre bifid to the middle the segments orbicular ciliate. Antilles?"

³⁸ This is said to differ from *Hym. ciliatum* "præter alias notas pilis ciliisque simplicibus nec apice stellato-ramosis."

³⁹ Probably Mr. Cuming's plant from Chiloe, n. 4, which we have referred to *H. caudiculatum*, *Mart.*

⁴⁰ This, which is Cuming's "130," and according to Presl, from the Philippine Islands, stands in our herbarium as identical with *H. caudiculatum*, destitute of cauda if the fructification extends to the apex, caudate when the apex is barren. The station and number are by accident omitted at p. 102. I had feared indeed there was some error with regard to the station in my herbarium; but the number in Presl, and the same plant bearing the same number in Mr. Smith's herbarium, from Mr. Cuming's Philippine Island plants, confirms the locality, and the identity of the species.

Pr. *S. badium*, *Pr.* (Hymen. Hook. et Grev.) *Cuming*, *Pl. Philip. n.* 112). *S. gracile*, *Pr.* (Hymen. Bory). *S. demissum*, *Pr.* (Hymen. Sw.) *S. sanguinolentum*, *Pr.* (Hymen. Sw.) *S. undulatum*, *Pr.* (Hymen. Sw.) *H. fumarioides*, *Kaulf. Kunze*). *S. axillare*, *Pr.* (Hymen. Sw.) *S. abietinum*, *Pr.* (Hymen. Hook. et Grev.)

XIX. HYMENOGLOSSUM, *Pr.*—*H. cruentum*, *Pr.* (Hymen. Cav.)

SUBORD. III. — DAVALLIÆ.

Sori globose or more or less elongated, situated at the apex of a vein or veinlet, rarely on the back (below the apex). *Involucre* superficial, inserted at the base of the sorus and covering that sorus in the form of a scale, which is generally half cup-shaped more or less elongated, sometimes semicylindrical, rarely ovate, or orbicular, or reniform, always free at the apex sometimes also at the sides, but almost invariably fixed by a broad base, and at or near the margin of the fronds or segments of the fronds; varying much in texture, from membranaceous to coriaceous.—*Tufted or creeping Ferns, tropical or subtropical, rarely inhabiting temperate climates, and chiefly the Old World, frequently with a stout scaly horizontal caudex, of which the Davallia Canariensis, or Hare's-foot Fern, is an example; sometimes tufted. Fronds simple or pinnatifid or variously and compoundly divided, membranaceous or coriaceous. Veins simple or forked, not in any instance, that I am aware of, anastomosing.*

One Many authors unite this group as Suborder of Ferns with Dicksonia.

1. DAVALLIA, Sm.

Davallia, Sm. (HOOK. GEN. FIL. XXVII). *Wibelia*, Bernh. Dicksoniæ sp. *Auct.* *Microlepia*, Pr., J. Sm. (HOOK. GEN. FIL. TAB. LVIII. A.) *Saccoloma*, Kaulf. (HOOK. GEN. FIL. TAB. LVIII. B.) *Aspidii* sp. *Bl.* *Stenolobus*, Pr. *Cibotii* sp. *Pr.* *Leucostegia*, Pr., J. Sm. (HOOK. GEN. FIL. TAB. LII. A.) *Odontoloma*, J. Sm. *Humata*, Cav. *Nephrodii* sp. *Gaudich.* *Nephrolepidis* sp. *Pr.* *Prosaptia*, Pr. *Polypodii* sp. *J. Sm.* *Acrophorus*, Pr.

Sori dorsal, near or at the margin of the frond or segments of the frond, terminal upon a vein or veinlet, globose or more or less elongated. *Involucre* orbicular, oval or elongated, often semicylindrical or half cup-shaped, attached to the under side of the sorus (and covering that organ) by a broad base, united or free at the sides, the apex free, open at the top towards the margin. *Capsules* stalked, the stalks very long in such species as have elongated involucre.—*Tropical or subtropical Ferns, rarely of temperate climates, chiefly of the Old World, varying much in size, and in the texture of the fronds, membranaceous or coriaceous, mosily stipitate. Caudex creeping, or none. Veins pinnated upon a central costa, simple or dichotomous.*

Obs. After a careful investigation of numerous species, I cannot but come to the conclusion that the original *Davallia* of Sir James E. Smith should remain entire as a genus, of which the type may be considered the well known *D. Canariensis*. It is quite true, if we look only to certain species of the many new genera that have been separated from it, such as of *Humata*, *Odontoloma*, *Saccoloma*, *Leucostegia*, &c., we shall find apparently sufficient indications of generic difference: but if we take a comprehensive view of the respective species, we shall find that in point of generic marks they gradually pass one into the other, so that I cannot even satisfy myself of the efficiency of them as sectional characters or subgenera. It may be remarked, that Mr. J. Smith places many species in *Microlepia*, which Presl, its founder, never intended to refer to it. On the other hand, *Saccoloma*, as it stands in Presl, is made up of *Saccoloma*, Kaulf. and J. Sm., *Microlepia* sp. of J. Sm. and *Odontoloma*, J. Sm. *Humata* of Cavanilles and J. Sm. is included in *Davallia* by Presl, and I think correctly, when the different form of the involucre in some of the species is considered. *Prosaptia* of Presl, seems to me without sufficient reason removed to the *Gymnosoreæ*, and Mr. J. Smith goes further, and makes of it a *Polypodium*. I speak however only of *Prosaptia contigua*, *pinnatifida* and *Emersoni*. There is something so peculiar in the habit of the plant, and in the figure given by Presl, of *Prosaptia bipinnata*, that I do not know where it should be referred. *Leucostegia* of Presl (*L. immersa*), has a very peculiar appearance, and is well described by Presl. "Frondis — pagina superiore pallidior faciem paginæ inferioris reliquarum Filicacearum præferente, inferiore intensius viridi nitidior faciem superiorem referente." This is very distinctly the case, and it is so in a less degree with some true *Daval-*

liæ (such as *D. solida* &c.) With this *Leucostegia* of Presl, Mr. J. Smith has combined the *Davalliæ*, *parvula*, *falcinella*, *chærophylla* &c. The venation is alike in all as to ramification, or at least there is no marked difference; the veins coming from a central costa are simple or forked: in some of the *Humata* group, and in one of the *Eudavalliæ*, they are peculiarly broad and dark-coloured.

Subgen. I. *HUMATA*, Cav. *Involucres orbicular or reniform, rigid, subindurated, the sides as well as the apices free. Caudex long, creeping, very scaly. Fronds small, coriaceous, entire or once or more pinnatifidly divided.* §§ *Humata and Pachypleura, Colposoria, Pr. in part.*

* *Fronds simple entire, or, the fertile only, sinuated.*

1. *D. heterophylla*, Sm.; caudex long creeping scaly and hispid with the long reflexed points of the scales, fronds coriaceous stipitate arising from a scaly bulb, sterile ones oblong- or ovato-lanceolate acuminate entire often waved, fertile ones linear-lanceolate acuminate deeply sinuato-pinnatifid the lobes horizontal crenate, involucres reniform copious on the crenatures of the lobes. — *Sm. Act. Taur. v. p. 415. Willd. Sp. Pl. v. p. 465. Sw. Syn. Fil. p. 130, and 337. Hook. et Grev. Ic. Fil. p. 230.* — *Humata ophioglossa*, “*Cav. Præl. 1801, n. 678.*” — *Davallia pinnatifida*, *Sw. Syn. Fil. p. 130. Willd. Sp. Pl. v. p. 465.* *Humata pinnatifida*, “*Cav. Præl. 1801, n. 679.*” — *Davallia lobulosa*, *Wall. Cat. n. 241.*

Hab. Malay Islands, probably general, (*Swartz, Smith*). *Java, &c. Blume, Zollinger, n. 920. Penang, Wallich. Singapore, Thos. Lobb. Isle Samar, Cuming, n. 335.* — An extremely beautiful species, with a very long, creeping stipes, densely clothed with imbricated scales and coarsely hispid from the long setaceous reflexed points of these scales. At different distances, and from a scaly bud or bulb, the fronds arise, solitary. Stipes $\frac{1}{2}$ an inch to 2 inches long, naked, slightly winged upwards. Fronds 3—5 inches long, but varying a good deal in width, quite entire though

** *Fronde pinnatifid, the lower segments bipinnatifid, rarely pinnated.*

3. *D. parallela*, Wall.; caudex creeping paleaceous, fronds stipitate coriaceous ovato-lanceolate acuminate deeply pinnatifid nearly to the rachis, segments close parallel horizontally patent linear or linear-oblong subfalcate entire, the lowermost pair sometimes with a solitary obtuse lobe at the base beneath rarely more, involucre semiorbicular copious marginal but all pointing towards the apex of the segments in two close parallel lines (not pointing towards the margins), veins thickened sunk. (TAB. XLII. A.)—*Wall. Cat. n. 251.*—*Nephrodium Gaimardianum, Gaud. in Freyc. Voy. Bot. t. 12, f. 1.*— β . fronds and segments narrower, all even the lowest pair of segments destitute of lobe. *Humata pectinata, J. Sm. En. Fil. Philip. l. c. not Wall. and Hook.*

Hab. Singapore, *Wallich, Thos. Lobb.* Moluccas (Ravach) and Sandwich Islands, *Gaudichaud.*— β . Luzon, *Cuming, n. 61.*—A species undoubtedly nearly allied to the following (*D. pectinata*), but distinct. The shape of the frond is less deltoid, it is not so deeply divided; the segments closer and more parallel, and these are quite entire, except in the lowest pair, where there is generally a solitary lobe near the lower base of each. The fructifications are more copious and more compact, and the apex of the involucre points to the extremity of the segments not to the margin.

4. *D. pectinata*, Sm.; caudex creeping paleaceous, fronds stipitate coriaceous ovato-lanceolate subdeltoid deeply pinnatifid nearly to the rachis below pinnated, segments or pinnæ linear-oblong sub-lanceolate spreading crenate (rarely entire) the inferior ones pinnatifid the lowest pair unequally so the inferior lobes being the longest, involucre semiorbicular a little distant one on the tooth of each crenature obliquely inclined towards the margin.—*Sm. Act. Taur. v. p. 414. Sw. Syn. Fil. p. 130. Willd. Sp. Pl. v. p. 465. Hook. et Grev. Ic. Fil. t. 139.*

Hab. Otaheite, *Nelson (in Herb. Banks.), Menzies (in Herb. nostr.)* Society Islands, *Mathews, n. 24. Sir Thos. Nightingale.* Java, *Blume.* Island of Jobie, *Barclay.* Coral Islands, *Beechey.*—Sir Jas. Smith gives the East Indies as a locality, on the authority of *Mr. Hurlock*; but perhaps erroneously, for I have never seen it from the continent of India, only from the Pacific.

5. *D. alata*, Bl.; "frond linear-lanceolate pectinato-pinnatifid subpubescent beneath, segments linear obtuse entire with decurrent wings, sori marginal, stipes short winged and as well as the rachis subpubescent." *Blume, En. Fil. Jav. p. 230.*

Hab. Fissures of rocks, Java, *Blume.* "Very closely allied to *D. pectinata*, Sm., but different in the shorter laciniae," *Bl.*—May it not be *D. parallela*, or a slight variety of it?

*** *Fronde subternate and pinnatifid, or bi-tripinnatifid.*

6. *D. pedata*, Sw.; caudex creeping paleaceous, fronds stipitate very coriaceous small deltoideo-cordate somewhat 5-angled tripartito-pinnatifid, the segments patent but inclining upwards oblong obtuse, fertile ones crenato-dentate, the two lower primary divisions obliquely ovato-acuminate, involucre small semiorbicular or nearly orbicular alternating with the teeth of the serratures placed close to the margin and pointing to it, stipes elongated chaffy below. (TAB. XLV. A.) *Sm. Act. Taur.* v. p. 414. *Sw. Syn. Fil.* p. 131 and 341 (*excl. syn. Cav.?*) *Wall. Cat. n.* 250. *D. cordifolia*, *Reinw.* (*fid. J. Sm.*) *D. subimbricata*, *Bl. En. Fil. Jav.* p. 231 (*according to an authentic specimen in herb. J. Sm.*) *Humata pedata*, *J. Sm.* — *Adiantum repens*, *Linn. Suppl.* — β . *minor*, *Nees et Bl. Pl. Jav. in Act. Nat. Cur.* xi. t. 13, f. 1.

Hab. Mauritius, and Marianne Isles (*Swartz*), and Bourbon, *Wallich*, *Bojer*, *Carmichael*. Singapore and Sylhet, *Wallich*. Ceylon, abundant, *Mrs. Genl. Walker*. Java, *Blume*.—This varies in size from 2—6 inches, but scarcely in form, which appears to me very constant, the fertile specimens however being always the largest and the most divided.

7. *D. intermarginalis*, Bl.; “frond on a long stipes ovate deeply pinnatifid coriaceous glabrous, the segments linear-oblong obtuse crenated in the middle and at the apex, the lowest ones auricled below, involucre reniform intermarginal, stipes compressed glabrous, caudex creeping paleaceousquamulose.” *Bl. En. Fil. Jav.* p. 230.

Hab. Trees in the interior of Java, *Blume*. “Distinguished from the *D. pedata*, Sm., *D. subimbricata*, Bl.—see *D. pedata*, supra,—and *D. sessilifolia*, by the sori being within the margin (intermarginal), and not at the margin.”

8. *D. sessilifolia*, Bl.; “frond sessile cordato-oblong

Hab. Marianne Islands, (*Willdenow*).— From the more full description of Willdenow, as well as from the specific character, I suspect this is a mere state of *D. pedata*, and indeed his remark is “simillima præcedentis (*D. pedata*):” yet he puts it in a different section, “fronde ternata,” to which the species has perhaps a better claim than to be placed in his first division “fronde sinuata v. pinnatifida.” He quotes Cavanilles’ *Humata trifoliata* under this species, which Swartz refers to *D. pedata*, and probably correctly.

10. *D. Belangeri*, Bory; caudex creeping chaffy, fronds deltoideo-ovate very coriaceous acuminate bipinnatifid tripinnatifid below glabrous and destitute of scales, primary segments oblong-lanceolate obtuse cuneate at the base lowest pair obliquely ovate the lower segments longest, ultimate ones subcuneate rather short obtuse crenate, stipes glabrous, fructifications small on the teeth of the crenatures, involucre nearly orbicular.—*Bory, in Belang. Voy. Bot. p. 72, t. 7, f. 1.*

Hab. Trunks of trees, Bintenzorg, Java, *Belanger*. Mergui, n. 461, *Mr. Griffith*.—Habit of *D. pedata*, but distinct, being twice or even thrice pinnatifid, the primary segments more numerous, more distant and more divided.

11. *D. alpina*, Bl.; “frond stipitate 5-angled cordato-ovate pinnated coriaceous glabrous, pinnæ sessile linear-lanceolate inciso-serrate bearing sori at the incisures, lowest ones larger rhomboid-ovate deeply pinnatifid, segments serrated (serrulate in the sterile plant), involucre reniform, rachis margined and the stipes subpaleaceous, caudex creeping paleaceous-squamose.” *Bl. En. Fil. Jav. p. 231.*

Hab. Summit of Mount Gede, Java, *Blume*. “Habitu similis *Davallia pedata*, Sm.”—probably allied to, if not the same as, *D. Belangeri*. *Blume* places it among the pinnated species.

12. *D. Cumingii*, Hook.; caudex long creeping paleaceous, stipes elongated setoso-paleaceous, fronds coriaceous dimorphous, rachis and costa beneath with brown subulate scales, sterile ones very small cordate obtuse tripartito-pinnatifid the segments erecto-patent (5—10) the upper ones coadunate the two lowest ones obliquely ovate pinnatifid at the lower margin, all the segments obtuse serrated, fertile fronds larger cordato-ovate acuminate bipinnate the lowest pair with the inferior pinnæ pinnatifid the lower segments longest, all of them dentato-serrate, fructifications small in the sinuses of the teeth, involucre suborbicular. (TAB. XLV. B.)—*Humata pedata, J. Sm. En. Fil. Philipp. l. c.*

Hab. Isle of Samar, Philippine Islands, *Cuming*, n. 138.—The barren fronds of this have a good deal the appearance of *D. pedata*, but the fertile ones are extremely different, and in habit approach nearest to the following one, yet really distinct. They are, however, smaller, less compoundly divided, and the scales on the fronds are of a very different character.

13. *D. vestita*, Bl.; caudex creeping paleaceous, stipes elongated paleaceous with lanceolate chaffy scales, fronds coriaceous (a span or more high) bipinnate, pinnæ lanceolate subpetiolate pinnatifid the lowermost ones at the base again pinnate inferior segments the largest, all of them serrato-dentate, rachis and costa beneath beset with broadly ovate obtuse chaffy appressed subpeltate scales, fructifications small in the axils of the teeth, involucre suborbicular rather broader than long. (TAB. XLI. C.) — *Bl. in En. Fil. Jav. p. 233.*

Hab. Trunks of trees, mountains of Java, *Blume, Mr. Millett.* — This is quite distinct from any species with which I am acquainted, especially in the presence of copious rounded obtuse scales appressed to the under side of the frond upon the rachis and costa. The stipes is about a span long: the frond equally long, tripinnate below, the primary pinnæ numerous remote. Blume says of it, "*D. alpina*, nob. habitu similis, sed fronde majori bipinnata diversa;" and he indicates two varieties; "*var. B*; frond larger, lower pinnæ bipinnatifid, pinnules oblong-lanceolate rather obtuse, segments subinciso-serrate." — "*Var. C*. frond more slender, lowest pinnæ subbipinnatifid, pinnules (of the lowest pinnæ) only inciso-serrate." The latter inhabits Moluccas and the Celebes Islands. It is the former state apparently that we possess from Mr. Millett, and which we have here figured.

14. *D. bipinnatifida*, Bl.; "bipinnate (quincangular ova-to-oblong) coriaceous glabrous, lowest pinnæ bipinnatifid, pinnules lanceolate acuminate coarsely serrated, the segments (or secondary pinnæ) linear acute crenulate, crenules each with a single sorus, involucre subreniform, rachis margined, stipes terete glabrous, caudex creeping paleaceous." *Bl. En. Fil. Jav. n. 234.*

Hab. On trees in mountain woods of Java, *Blume.* "Priori (*D. vestite*) maxime affinis, pinnulis acuminatis et grosse serratis distincta." The author does not notice the numerous scales, which are so striking a feature in

ovato-lanceolate, segments subovate or obovate obliquely cuneate at the base paler and slightly concave on the upper side, sori close to the margin, involucre large orbiculari-reniform close-pressed slightly convex. — *Wall. Cat. n. 256. Leucostegia immersa, Pr. Tent. Pterid. cum Ic. Hook. Gen. Fil. l. c.*

Hab. Northern India, Sheopore and Nepal, *Wallich. Assam, Mrs. Mack, Griffith, Major Jenkins. Khasiya, Griffith, Mr. Edgeworth.* — A very remarkable plant, apparently common in Northern India. The involucre are large and lie singularly close to the pagina of the segment, and on that side which is pale and slightly convex (from the curvature of the margin), peculiarities which characterize the anterior or upper side in most fronds: so that, as Presl well observes, unless you look carefully at the rachis and stipes, you would say that the fructification was on the superior side instead of the inferior. Stipes 4—6 or 7 inches high, sometimes a foot high. Frond about the same length.

16. *D. ? nodosa, Hook.*; “frond tripinnate membranaceous furfuraceous on both sides of the veins, pinnules sessile (chaffy beneath at their insertions) oblong-lanceolate, secondary ones sessile oblong obtuse pinnatifid, segments cuneiform obtuse, lowest ones inciso-serrate or at the base again subauriculate, sori solitary submarginal, rachis nodose above at the insertion of the pinnæ and ferrugineo-tomentose, stipes slightly rough or glabrous paleaceous below.” *Bl.* — *Aspidium nodosum, Bl. En. Fil. Jav. p. 171. Acrophorus nodosus, Pr. Tent. Pterid. p. 93, cum Ic.* — *Var. B.* frond very large decomposed, the segments pinnatifid, *Bl. l. c.*

Hab. Woods of the lofty mountains of Java and Molucca, and *var. B.* summit of the mountains Gede, Burangrang and Patuha in Java, *Blume.* — Of this plant, I regret to say, I know nothing, but from the remarks of Blume and Presl, and the figure of the latter author. Blume arranges it in *Aspidium*, and expresses no doubt of the propriety of so doing. Presl makes a distinct genus of it, and places it between *Cystopteris* and *Leucostegia*. Judging from his figure, I do not see how it differs from *Davallia*, but he says “hocce genus *Cystopteridi* valde affine est, differt sori in venulis apicalibus;” — and under *Leucostegia* he says, “*Acrophoro* affinissimum est.” Mr. J. Smith does not appear to notice the genus. Link (in *Fil. Spec. Hort. Reg. Berol. cult. p. 41*) unites it with *Cystopteris*.

17. *D. chærophylla, Wall.*; caudex creeping stout clothed with compact imbricated very broad and obtuse scales, fronds rather small (1-2 feet) ovate acuminate membranaceous flaccid generally pale green 3-4-pinnate, rachides winged, primary pinnæ oblong ovate acuminate, secondary and tertiary ones ovate obtuse, pinnules lanceolate deeply pinnatifid with linear-lanceolate falcate segments entire or with an inner tooth, involucre on the middle of the segment below the sinus of the tooth and at the axil of a pair of veinlets reniform

rather large, stipes a little scaly below and rising from a very scaly gemma, all the scales oval obtuse. (TAB. LI. A.)—*Wall. Cat. n. 259. D. ligulata, Wall. MSS. in Herb. Hook. Leucostegia ligulata, J. Sm.*

Hab. Northern India, Nepal, *Wallich. Maamloo, Khasiya &c. Griffith. Masuri, Mr. Edgeworth. Simlu, Lady Dalhousie, (Fielding). Assam, Mrs. Mack, Major Jenkins.*—Caudex remarkable for the obtuse imbricated scales, which also extend to the stipes on the lower part. Stipes 6—8 inches high. Frond 1—2 feet, generally pale green.

18. *D. affinis*, Hook. ; caudex creeping thick clothed with long narrow subulate scales, fronds ample tall ovato-lanceolate membranaceous 3-4-pinnate or supradecomposed, primary pinnæ petiolate ovato-lanceolate acuminate, secondary petiolate oblong-ovate, pinnules ovate deeply pinnatifid, the segments ovate acute subsalcate entire or generally (the fertile ones) with a tooth on the inner margin, involucre small hemispherical or subreniform placed near the centre of a segment below the sinus of the tooth, (veins slender black). (TAB. LII. B.) *Leucostegia affinis, J. Sm. En. Fil. Philipp. l. c. (name only).*

Hab. Luzon, *Cuming, n. 215, and n. 117. Ceylon, Mrs. Genl. Walker, apparently abundant. Penang, Lady Dalhousie. Java, Mr. Millett.*—An extremely handsome species, with more ample fronds (2—3 feet high), and more copiously divided than the preceding, of a very membranous but rather firm texture, darker colour, and with a slender black vein in the segments. Probably in naming this *Leucostegia affinis*, Mr. J. Smith had in mind our *Davallia chærophylla*, Wall., which is its nearest affinity, but besides the differences just mentioned, the scales of the caudex and of the lower part of the stipes are of a totally different character,

19. *D. Novæ Zelandiæ*, Col. ; caudex creeping slender hairy as the lower part of the caudex and the axils of the pri-

mentose with jointed soft ferruginous hairs, not at all scaly, sending down numerous hairy fibrous roots from the base. Stipes 6—8 inches high, mahogany brown, shining: main rachis the same, flexuose and slender. Frond 8 inches to a foot long, membranaceous, but very firm, thrice pinnated. Sori large in proportion to the segments, often equal in breadth to the segments on which they are placed. The colour of the frond is brownish green, slightly glossy, much paler below. Mr. Heward has given a very appropriate name to the species in his herbarium, which we would gladly adopt, but that Mr. Colenso's name is sent to us as published in the 'Tasmanian Journal of Science' in a number probably which has not yet reached this country.

20. *D. membranulosa*, Wall.; caudex hispid with very long slender subulate rigid membranaceous scales, frond small very thin and membranaceous ovato-lanceolate and as well as the slender stipes and rachis pubescenti-hirsute bipinnate, pinnæ alternate lanceolate their rachis winged, pinnules lanceolate pinnatifid, the segments ovato-lanceolate subfalcate very acute entire or rarely toothed, involucre small ovato-subrotund acute very thin and membranaceous fixed by the broad base the rest free. (TAB. LIII. A.) *Wall. Cat. n. 255.*

Hab. Nepal, Wallich.—A small and very delicate species, with the habit of *Cystopteris*, but the sorus is at the apex of a vein, although the involucre is more sharp-pointed than is usual with *Davallia*. Caudex with long ferruginous narrow subulate scales. Stipes 2—3 inches high, and, as well as the rachis, which is winged above, very slender, almost filiform. Frond a span long. Primary pinnæ 2 inches long, lanceolate, of a red-brown colour.

21. *D. falcinella*, Pr.; caudex creeping rather thick branched densely covered with spreading very long subulato-setaceous scales paler at the apices of the caudex, frond deltoideo-cordate sub-membranaceous 4-pinnatifid (rachis everywhere winged), ultimate pinnules oblong pinnatifid, segments lanceolate subfalcate acute entire, in the fertile specimens bidentate the teeth unequal spreading, the sorus occupying the sinus between two veins but not reaching to the margin, involucre large in proportion to the size of the segments nearly orbicular flat truncated at the apex, rachis not winged.—*Presl, Reliq. Henk. i. p. 66, t. 11, f. 2. Leucostegia, J. Sm.*

Hab. Malay Islands, Sorzogon (Presl). Leyte, Cuming, n. 304.—A small elegant species, with a singularly crinite caudex and a small frond (4—5 inches long), which exhibits a considerably different appearance in the fertile and in the sterile state: in the former the ultimate lacinia dividing into two unequal spreading slightly incurved teeth, between which, at a little distance from the margin, the large flat involucre is inserted. This involucre is scarcely fixed by a sufficiently narrow base to justify the species being placed in this division, yet the habit of the plant and the flat (not convex or semiterete) involucre, seem rather to point out its affinity to be with the present.

22. *D. parvula*, Wall.; caudex long creeping clothed with lax subulate scales, frond very small deltoid tripinnatifid glabrous rigid (from the stout costæ), segments linear throughout slightly grooved above when dry unequally forked and acute at the apices, sori at the sinus of the forks, involucre suborbicular dilated above and broader than the segments.—*Wall. Cat. n. 247. Hook. et Grev. Ic. Fil. f. 138. Leucostegia, J. Sm.*

Hab. Singapore, *Dr. Wallich*, 1822. — I am not aware that this beautiful little fern, of which the fronds are scarcely more than an inch long, and the stipes about the same length, has been detected by any one except *Dr. Wallich*, and by him only in the island of Singapore. It there forms large tufts with its long interlaced creeping caudices, bearing numerous fronds which arise pretty close together, but from different distances. The rigidity of the frond seems due to the wide and stout costæ, and the very small quantity of foliaceous substance, which merely forms a sometimes scarcely perceptible narrow wing.

23. *D. pulchra*, Don; “frond ovate pinnate glabrous, leaflets deeply pinnated, segments inciso-lobate, lobes linear-lanceolate acute, sori solitary, involucre scarioso, stipes and rachis very glabrous.” *Don, Prodr. Fl. Nep. p. 11. Leucostegia, J. Sm.*

Hab. Nepaul, *Wallich*. “Fronds very elegant, a foot high or more, slender, full green, finely cut.” — This is in all probability some one of *Dr. Wallich's* species elsewhere mentioned; but, with such a meagre description, and no figure, I am unable to refer it to its proper place.

Subgen. III. PROSAPTIA. *Sori marginal, terminal upon a segment or lobule of the frond. Involucre cuneato-semiterete, truncate and opening at the apex: its texture that of the frond, of which it appears to be formed. — Tufted rather small Ferns, natives of the Malay Archipelago, Ceylon, and the Pacific Islands. Fronds almost sessile, erect, simple, pinnatifid or sub-*

24. *D. Emersoni*, Hook. et Grev.; tufted, fronds aggregate sessile lanceolate pinnatifid from the margin half-way down to the costa attenuated and entire at the apex, the lobes oblong obtuse entire bearing 1—6 sori at the apices. *Hook. et Grev. Ic. Fil. t. 105.*—*β. minor*; smaller, segments rarely bearing more than one sorus. *D. serræformis*, *Wall. Cat. n. 249. Hook. Ic. Pl. t. 93.* Polypodium serræforme, *J. Sm. Prosaptia, Pr.*

Hab. Ceylon, *Dr. Emerson, Mrs. Genl. Walker.*—*β.* Penang, *Dr. Wallick, Lady Dalhousie.* Luzon, *Cuming, n. 261.*—Varying in height from 6 inches to a foot.

25. *D. contigua*, Sw.; tufted or with a very short somewhat creeping caudex, fronds aggregate lanceolate attenuate at both extremities on a short stipes pinnatifid throughout from the margin almost to the costa glabrous, segments linear entire or subpinnatifid with one or more lobules towards the extremity, sori solitary terminal upon a segment or lobule.—*Sw. Syn. Fil. p. 130. Willd. Sp. Pl. v. p. 465. Bl. En. Fil. Jav. p. 230. Hook. et. Grev. Ic. Fil. t. 141.* Prosaptia, *Pr.* Polypodium, *J. Sm.* Trichomanes contiguum, *Forst. Prodr. n. 463, (et in Herb. Banks.)*

Hab. Pacific Isles, Huaheine? *Forster.* Otaheite, *D. Nelson.* Java, *Dr. Horsfield, Blume.* Ceylon, *Dr. Emerson, Mrs. Gen. Walker,* Philippine Islands, *Cuming, n. 216.*—Habit of the preceding, but more deeply divided, even to the very apex, the segments much narrower, with a great disposition to be again pinnatifid, and bearing only one terminal sorus upon each segment or lobule.

26. *D. Preslii*, Hook.; frond pinnatifid nearly to the costa hairy as well as the involucre. Prosaptia pinnatifida, *Pr. Tent. Pterid. p. 166 (name only), t. 6, n. 25, (not Davallia pinnatifida, Sm.) Davallia pectinata, Meyen, Herb. (not Sm.)*

Hab. Luzon, (*Presl*).—I have drawn up the above brief character from *Presl's* figure, in the absence of any description. It would seem to be a hairy state of *D. contigua*.

Dubious Species of this Subgenus.

27. *D.?* *bipinnata*, Hook.; frond bipinnate, pinnae broad half ovate truncate at the base above, involucre standing forward from the margin beneath. Prosaptia, *Pr. Tent. Pterid. p. 166, (name only), tab. 6, f. 19.*

Hab. West Indies, (*Presl*).—The native country of this plant, no less than the different habit and peculiar fructification (as far as can be learned from the figure), would lead to the opinion that it is far removed from *Prosaptia*.

Subgen. IV. EUDAVALLIA. Sori marginal or nearly so, frequently in a sinus of the segments or terminal upon the segments.

Involucres elongated more or less, between memb-anous and coriaceous, approaching to semicylindrical, urceolate or cuneate, the sides as well as the base confluent with the frond, the apex only free and usually truncated.—Chiefly *F.* Indian and Malayan Ferns. *Caudex long, creeping, stout, scaly. Fronds coriaceous, frequently ample, ternati-pinnate or compoundly pinnate, the pinnæ more or less pinnatifid, the segments generally more or less attenuated (not dilated upwards).* HOOK. GEN. FIL. TAB. 27. *Davallia, J. Sm. in part. Stenolobus, Pr. and Davallia, § 3. Colposoria, in part, and § 4. Odontosoria, in part, Pr.*

Obs. This group has its representative in *D. Canariensis, Sm.*, which I consider to be the type of that author's genus *Davallia*. It is a natural assemblage, including species of great beauty; mostly bearing ample, coriaceous, glossy fronds, with coriaceous involucres, which in general may be described as half tubular, the sides as well as the base being incorporated with the frond, and in that respect approaching the previous subgenus, *Prosaptia*; but differing from it in habit and in the texture of the involucre and in the presence of the long scaly creeping caudex. Some of the present group, with the most elongated involucres, Professor Presl has distinguished as a genus, by the name of *Stenolobus*, and, misled, perhaps, by Schkuhr's figure of *D. solida* (the type of this genus), he has described the stalks of the capsules as arising from a slender filiform receptacle, which as Mr. J. Smith has justly observed, is by no means the case: and the species of the genus in question have nothing to distinguish them even as a section from these true *Davallia*. Mr. J. Smith, on the other hand, has united with them the species of the section "*Odontosoria*" of Presl, which, as it appears, are fully entitled by character and habit to be kept separate from them. The difficulty of discriminating several of the species of this group, it must be confessed, is very great; for the pinnæ, or segments, often vary much in form in different parts of the same plant; and even figures are scarcely sufficiently characteristic, except they are upon a large scale.

* *Fronds small, ternate or quinate.*

the fertile ones, differing from each other indeed only in the shorter and broader pinnæ of the sterile individuals. — Caudex with closely imbricated paleaceous scales, having long wiry points. Stipes 3—4 inches long, terminal pinna 4-5 inches long.

29. *D. pentaphylla*, Bl.; frond ternate or quinato-pinnate coriaceous quite glabrous, pinnæ lanceolate cuneate at the base unequally serrated, fertile ones (ternate) narrower elongated, sori oblong truncated marginal, stipes glabrous, caudex creeping. *Bl. En. Fil. Jav. p. 232.*

Hab. Woods of Java, Province of Bantam, Tjanjor, &c. *Blume.* — An equally elegant species with the preceding, and very distinct from it.

** *Fronde decomponndly divided.*

30. *D. solida*, Sw.; tall, caudex stout creeping clothed with densely imbricated scales, fronds coriaceous tri-subquadripinnate, pinnæ acuminate, pinnules trapeziform acuminate pinnatifid many-veined, terminal ones crenato-serrate coadunate into an acuminate point, involucre linear-oblong sunk in a tooth or segment having a narrow wing on each side or entire. — *Sw. Syn. Fil. p. 132 and 345. Willd. Sp. Pl. v. p. 470. Schkh. Fil. t. 126.* “*D. procera, Hedw. Fil. Fasc. iv. tab. (in descr. elegans)*” *vide Sw.* — *β. latifolia*; pinnules wider, the soriferous segments entire (without terminal teeth). (TAB. XLII. B.) *D. ornata, Wall. Cat. n. 246. Stenolobus ornatus, Pr. (name only).* — *γ. caudata*; pinnæ narrower, apices of the pinnules long caudate, involucre with a small incurved terminal tooth on one or both sides, sometimes entire. *D. caudata, Wall. Cat. n. 2220, an Sw.?* *Stenolobus Kunzeanus, Pr. Tent. Pterid. p. 130, t. 4, f. 30, (name and figure only).* “*D. elegans, Kze. herb. nec Swartz,*” (*Pr.*) *D. solida, B. lacera, Bl. En. Fil. Jav. p. 234. Trichomanes solidum, Forster, Prodr. n. 475.*

Hab. Pacific Islands, *Forster.* Otaheite, *Menzies, Nightingale.* New Ireland, *Barclay.* Pitcairn's Island, *Mathews.* Malden Island, *Macrae.* Java, *Millett, Blume.* — *β.* Penang, *Wallich, Lady Dalhousie.* Singapore, *Wallich.* Luzon, *Cuming, n. 78.* — *γ.* Singapore, *Wallich.* Island of Vanicoro, (*Presl*). Java, *Blume.* — A very variable plant, as it appears to me, of which the figure of Schkuhr exhibits, perhaps, the more usual form: our plate on the other hand the larger state; while our var. *γ.* to which I think *Stenolobus Kunzeanus, Pr.* may be referred, represents the opposite extreme. In this, and several others of the present section, the broad pinnules exhibit a rather close and copious venation, but there is an entire absence of the striæ or pseudo-veins, by which, and by the longer involucre, the present species is distinguished from *D. elegans.*

31. *D. Lindleyi*, Hook.; caudex creeping short thick densely clothed with subulate ciliated scales, fronds small coriaceous glabrous bi-tripinnate deltoideo-ovate on a long

stipes, pinnæ pinnatifid ultimate ones and segments lanceolate (sterile ones broad) pinnatifid, lobules short truncate soriferous almost wholly occupied by the somewhat half-cup-shaped or urceolate truncated involucre. (TAB. LVIII. B.)

Hab. New Zealand, (*Dr. Lindley*).—A small plant, not in a very perfect state, the fructified frond being young, resembling *D. solida* in miniature, especially in the structure of the sterile frond: but the sori are very different, and more like those of *D. pyxidata*, being short and as it were sunk in the truncated lobule, which has a very slight external margin or wing, formed of the frond itself. Stipes of the sterile frond 5 inches high; frond 3 inches: of the fertile one a span high; its frond 4 inches. I possess a larger specimen, given me by the late Mr. Lambert, and marked as from Jamaica, but probably by mistake. It seems to be identical with this from New Zealand.

32. *D. caudata*, Cav.; “fronds decompose, leaflets lato-lanceolate subbipinnatifid attenuated at the apex, pinnæ acuminate somewhat eared at the base above, crenatures obtuse.” *Cav. Præl.* 1801, n. 694. *Sw. Syn. Fil. p.* 132. *Willd. Sp. Pl. v. p.* 472.

Hab. Philippine Islands (*Swartz*).—This I do not know; but it may probably be a variety of *D. solida*, than which Swartz says it is “larger, with the leaflets nearly opposite broadly lanceolate subfalcate pinnated, ending in an elongated apex: the pinnæ trapezio-lanceolate acuminate an inch and a half long; lower ones incised subpinnatifid; superior ones undivided, all obtusely serrated at the margin. Fructifications inserted at the serratures, oblong, obtuse.”

33. *D. Mauritiana*, Hook.; caudex very stout creeping densely woolly with long subulate ciliated and hairy scales, fronds ample deltoid between coriaceous and membranaceous 4-pinnate, pinnæ caudato-acuminate, pinnules ovate acuminate deeply pinnatifid, segments lanceolate or linear slightly patent laciniated or again pinnatifid, laciniæ linear

involucres half cup-shaped a little elongated sunk inserted upon the lobe compressed truncate at the mouth.—*Ses. Syn. Fil. p. 132, and p. 347. Willd. Sp. Pl. v. p. 471. Wall. Cat. n. 253.*—*α. bidentata*; glossy, pinnæ acuminate, fertile lobules with 2 unequal incurved teeth one on each side of the sorus. *D. bidentata, Schkh. Fil. t. 127.*—*β. pulchra*; fronds very coriaceous green when dry, pinnæ much acuminate, pinnules blunt, fertile lobules truncate or rarely with 2 short erect teeth. (TAB. XLIII. A.)—*γ. subunidentata*; opaque, segments moderately acuminate, lobules truncate with one short tooth or rarely two and then unequal. (TAB. XLIII. B.)—*δ. conifolia*; similar to the last, but the segments narrower, and more deeply cut. *D. conifolia, Wall. Cat. n. 252.*—*ε. edentula*; similar to the last, but fertile lobules without teeth.—*ζ.* same as the last, but with 2 short diverging teeth on the fertile lobules.

Hab. *α.* China, Canton, Swartz. Tranquebar, Java, (Willdenow). Madras Peninsula, Heyne, Dr. Wight. Penang, Wallich. East coast of tropical New Holland, Brown, A. Cunningham. Madagascar, Dr. Lyall, Bojer.—*β.* Sincapore, Thos. Lobb. Otaheite, Menzies. China, Beechey.—*γ.* Java, Zollinger, n. 147.—*δ.* Rangoon, Wallich.—*ε.* Mergui, Griffith, n. 67.—*ζ.* Ceylon, Mrs. Genl. Walker.—Apparently a very general plant in the East Indies, both on the Continent and Islands, and in Tropical New Holland. Remarkable for the elegant divisions of its fronds, and for the dark-coloured lines upon the segments, giving them a striated appearance, but which can hardly be called true veins, for they are often not visible when the frond is held up between the eye and the light, although the real veins then become more apparent. I regret that this striated appearance is omitted (nor is it easy to represent it in a figure) both in the plate of Schkuhr, and in the outline sketches here given: but something of the kind is shown upon our *D. elata*, Tab. LV. A.

35. *D. nitidula*, Kze.; “frond triangular subcoriaceous nearly glabrous paler beneath subtripartite tripinnate, pinnæ alternate petiolate patent ovate acuminate slightly curved lowest ones more remote nearly opposite, secondary pinnules from a cuneate base unequally ovate obtuse pinnatifid or incised, segments cuneato-oblong retuse or subemarginate at the apex subincised bearing sori, involucres obovate truncated, rachis and moderately long stipes flexuose glabrous, caudex creeping chaffy.” Kze. (TAB. XLIV. A.)—*Kze. Fil. Austr. t. 37, in Linnæa, x. p. 545, and in Schkh. Fil. Suppl. Afr. f. 2.*

Hab. South Africa, Drège.—Kunze’s representation of this plant is excellent, and I would not have published my present figure (admirably as it represents a portion of the plant), but that it was prepared before I was acquainted with Kunze’s plate. The affinity of the species is surely with *D. elegans*, I think rather than with *D. elata*, as the accurate Kunze intimates. It differs however from our last species in the absence of striae.

36. *D. elata*, Sw.; caudex — ? fronds 3-4-pinnate subcoriaceous glabrous, pinnæ attenuato-caudate, ultimate pinnales or segments ovato-lanceolate sub-obtuse pinnatifid striated, segments inciso-serrate lower ones again pinnatifid, sori in the axils of the serratures (*i. e.* with a tooth on the outside) rather small upper half (or nearly so) free attenuated forming a lip. (TAB. LV. A.)—*Sw. Syn. Fil. p. 131 and 344. Schkuhr, Fil. i. 127, b. Willd. Sp. Pl. v. p. 472. Wibelia elata, Bernh. in Schrad. Journ. 1801, p. 122, t. 1, f. 2. Trichomanes elatum, Forst. Prodr. n. 474. Davallia epiphylla, Forst. Prodr. n. 471. Sw. Syn. Fil. p. 134 and 352. Willd. Sp. Pl. v. 473. Schkuhr, Fil. t. 127, b. Trichomanes epiphyllum, Forst. Prodr. n. 471. Wibelia multifida, Bernh. in Schrad. Journ. l. c. f. c, a, b.*

Hab. Otaheite, *Forster, Menzies*. Western Java, *Blume*. — In habit closely allied to *D. elegans*, and like it striated or marked with lines or pseudo-veins between the veins: but the involucre are very different, and well defined both by *Bernhardi*, who made a genus of it, and by *Swartz*: still none of the figures of *Bernhardi* or of *Schkuhr* represent the true form of the involucre. An examination of the Banksian herbarium has satisfied me that the *Trichomanes elatum* and *T. epiphyllum* are one and the same species of *Davallia*.

37. *D. Fejeensis*, Hook.; caudex — ? frond coriaceous, as it would appear decomposundly pinnate, pinnæ lanceolate acuminate deeply pinnatifid the segments erecto-patent almost appressed narrow linear simple or bifid, involucre linear sunk in the apices of the narrow elongated segments so as to have a narrow wing on each side (no teeth). (TAB. LV. D.)

Hab. Nukalau island of the Fejee group, *Barclay*. — I have only seen a small specimen (about thrice the size of the figure, tab. LV. D.) which is in my own herbarium, and a still smaller one in that of Mr. J. Smith, yet

nearly erect teeth monosorous), stipes and rachis glabrous." *Bl.*—*Sw. Syn. Fil. p.* 192. *Willd. Sp. Pl. v. p.* 475. *Bl. En. Fil. Jav. p.* 256.—*Var. B.* frond more membranaceous (tenuiore), the segments of the pinnules narrower on the lower margin not unfrequently entire. *Bl. l. c.*

Hab. East Indies, *Swartz.* Trees and rocks in shady and moist places, western Java.—*B. Moluccas, Blume.*—With this I am unacquainted. *Blume* remarks that "its nearest affinity is with *D. elata*, from which it differs in the frond being more spreading, more rigid, in the secondary pinnules being much elongated towards the extremity, and in the segments of the pinnules being narrower and simply serrulate."

39. *D. divaricata*, *Bl.* (non *Schlecht.*); "frond ample triplicate-pinnate glabrous, pinnæ and pinnules subalternate remote ovato-oblong very much acuminate, secondary ones pinnatifid, segments subfalcato-linear subinciso-serrate, serratures bearing sori in the middle, stipes and rachis glabrous, caudex paleaceous." *Bl. En. Fil. Jav. p.* 237.—*Var. B.* more slender in every part, secondary pinnules pinnatifid only below, the rest coarsely inciso-serrate. *Bl. l. c.*

Hab. Mountain woods of Java, *Blume.* "From *D. elata*, to which it approaches very near, it differs in the large and very patent frond, in the narrower and more distant segments, and in the sori being remote from the margin of the incisures, not inserted upon the teeth." *Bl.*

40. *D. mucronata*, *Bl.*; "frond bipinnate and as well as the trigonous stipes glabrous ferruginous, pinnæ alternate ovato-oblong caudate, lower ones pinnatifid, pinnules pinnatifid mucronate, secondary ones linear rather acute unequally serrulate, serratures incurved bearing sori in the middle, sori subrotund." *Bl. En. Fil. Jav. p.* 235.

Hab. Lofty mountains of Java, *Blume.*—*Blume* places this next to *D. elegans*, and observes that *D. caudata*, *Cav.* seems to differ in the pinnules or segments being crenated.

41. *D. decurrens*, *Hook.*; caudex — ? frond ample coriaceous-membranaceous 3-4-pinnate, pinnæ distant lanceolate acuminate lower pinnules pinnatifid petiolate upper ones and the segments of the pinnules oblong rather acute decurrent so as to form a winged rachis, the segments serrated, each lobule bearing an oval truncated involucre below the apex in the sinus, having a short blunt tooth on the outside (veins pinnated, no striæ). (TAB. XLIV, B.)—*D. alata*, *J. Sm. En. Fil. l. c. name only (not Bl.)*

Hab. Isle of Bohol, Philippine Islands, *Cuming.*—*Mr. J. Smith* had given a very appropriate name to this plant, but which is not tenable, being previously taken up by *Blume* for another species. The present is very distinct: the pinnæ are below pinnated, but the superior pinnules or segments, though distant by the decurrent bases, which give a winged

character to the rachis. There are no striæ or pseudo-veins, as in *D. elegans* and *D. elata*, and the involucre is inserted below the apex of the teeth or lobules.

42. *D. polyantha*, Hook. ; tall coriaceous, frond 3-4-pinnate, pinnæ distant ovato-lanceolate acuminate, lower pinnules deeply pinnatifid almost to the rachis petiolate, upper ones and the segments of the pinnules oblong rather acute, ultimate ones decurrent so as to form a winged rachis, all of them crenato-serrate, veins pinnated no striæ, each lobule bearing an oval truncated involucre rather considerably below the apex with a very short erect tooth on the outside (often obsolete). (TAB. LIX. A.)

Hab. Singapore, *Thos. Lobb*. — I was at first disposed to refer this to the *D. decurrens*, just described (*D. alata*, J. Sm. not Bl.), but I feel satisfied that it is different. It is of a more rigid and coriaceous texture, more glossy; the winged rachis is only confined to the upper segments; the lower segments are more deeply pinnatifid, and the involucre (which are copious in both) are a little different in form, and more distant from the margin.

43. *D. Vogelii*, Hook. ; caudex long creeping stout densely clothed with shaggy hair-like subulate fimbriated scales, frond rather small deltoid-ovate submembranaceous 4-pinnate, pinnæ ovato-lanceolate, ultimate pinnules lanceolate decurrent acute sharply pinnatifid segments acute incurved not striated, involucre half oval truncated inserted below the transverse sinus of the segment (or tooth). (TAB. LIX. B.)

Hab. Fernando Po, *Dr. Vogel*. — A rather small plant: frond scarcely a foot long, yet in habit and ramification and form of the pinnæ and segments so much resembling *D. elegans*, that I can point out no other marks of distinction, save the more membranaceous texture, the total absence of striæ or pseudo-veins, and the longer segments or teeth extending far beyond the involucre.

tion of the fructifications, which a good deal resemble those of the *Leucostegia* group, though the habit of the plant is that of *Eudavallia*. In the var. β . the texture is much more coriaceous, and there is an appearance, though obscure, of the striæ or pseudo-veins which are so remarkable in *D. elegans*.

45. *D. bullata*, Wall.; small, caudex creeping clothed with copious subsquarrose ferruginous subulate crinite scales, frond deltoideo-ovate submembranaceous tripinnate, fertile specimens copiously bullate on the upper side, lower primary pinnæ subopposite ovate acuminate, pinnules lanceolate deeply pinnatifid, segments entire or again inciso-pinnatifid, segments falcato-incurved linear acute, involucre oblong-cup-shaped truncate from the inside of the falcate segment arising from the sinus of a small inner tooth. (TAB. L. B.) *D. bullata*, *Wall. Cat. n. 258*.

Hab. Nepal, *Dr. Wallich*, 1821. Assam, *Mrs. Mack*. — A small plant with a very long creeping caudex, densely clothed with dark brown scales. Frond about a span long; seen on the upper surface it presents a great number of oval swellings, which correspond with the sori on the opposite side, so that if these fructifications were terminal on a narrow segment, they would resemble those of *Loxsonia*. It is these numerous swellings, no doubt, that suggested the specific name to Dr. Wallich.

46. *D. Canariensis*, Sm.; caudex long stout creeping densely clothed with lanceolato-subulate ciliated often cobwebby scales, fronds deltoid decomponently pinnate subcoriaceous (frequently pale green when dry) bullate on the upper side, primary pinnæ very broad, ultimate pinnules lanceolate deeply pinnatifid, the segments oval or oblong subcuneate acute soriferous simple or bearing a horn-like segment or tooth on the outside, ultimate rachis of the pinnæ winged, involucre cuneato-cup-shaped truncate terminal on the margin. (TAB. LVI. A.) *Sm. Tent. Fil. Gen. Dorsif. p. 14. Sw. Syn. Fil. p. 194. Willd. Sp. Pl. v. p. 474. Trichomanes, L. Polypodium Lusitanicum, L.*

Hab. Canary Islands, frequent. Portugal, (*Willd.*) Madeira, common, *Mason, Lowe, Capt. Finlay, Dr. Lemann, Tangier, Saltmann*. — A well known Fern, having been long cultivated in our gardens under the appropriate name of *Hare's Foot Fern*; yet I am not aware that any figure has been given of it, save the very indifferent ones of Magnol and Plukenet. Distinct as the species is to the eye, it is, like many other of the Ferns, extremely difficult to define the characters in words. It is, however, remarkable for the broad deltoid form of the frond and its very compound ramification: in the ultimate divisions and the penultimate ones the rachises becoming winged, and then the frond should be described as pinnatifid rather than pinnate.

47. *D. pyxidata*, Cav.; caudex stout creeping densely clothed with subulate ferruginous cobwebby scales, fronds

coriaceous deltoideo-ovate stipitate (stipes about as long as the frond) tripinnate bullate on the upper side, pinnæ broad lanceolate, pinnules and segments mostly rather obtuse pinnatifid or incised, incisures generally retuse soriferous, involucre truncated at the mouth. (TAB. LV. C.)—*Cav. Præl.* 1801, n. 694. *Sw. Syn. Fil.* p. 192. *Willd. Sp. Pl.* v. p. 471. *Br. Prodr.* p. 157.— α . pinnules mostly obtuse and incisures retuse. (TAB. NOSTR. LV. C. f. 1, 2). *Sieb. Syn. Fil.* n. 126. *Fl. Mixt.* n. 240.— β . pinnæ and pinnules more attenuated, incisures more acute, sori narrower. (TAB. NOSTR. LV. C. f. 3, 4). *D. solida*, *Hook. et Arn. Bot. of Beech. Voy.* p. 75, (not Swartz).

Hab. α . New Holland, (*Cavanilles*), *Brown, Allan and Rich. Cunningham, J. D. Hooker.* Norfolk Island, *Dr. V. Thomson.*— β . Port Jackson, *Fraser.* Sydney, *A. Cunningham.* Coral Islands, *Beechey.*—The remark on the difficulty of discriminating different species of Ferns, offered under the preceding, is peculiarly applicable to the present one: for, assuredly, in various specimens and in different parts of the same specimen, not unfrequently, there are various forms of the segments and of the portions of the segments which bear the sori: so that on the one hand it approaches some of the narrow states of *D. solida*, except that the sori are shorter, and on the other *D. Canariensis*, which latter however is always more compound. I am disposed to refer the *D. solida* of *Hook. and Arn.* l. c. to the present species. The frond is nearly a foot long, and the stipes about the same length.

Subgen. V. SACCOLOMA. *Sori marginal or a little within the margin. Involucres small, membranaceous, half-cup-shaped, or more rarely reniform, arising from the apex of free parallel veins, often intramarginal, and the margin being sometimes crenated and membranaceous, gives the appearance of accessory involucre. Tropical Ferns, of the Old World. Fronds generally tufted or fascicled, or creeping, once or rarely twice pinnated, herbaceous and membranaceous, rarely subcoria-*

thin margin beyond the sori crenate serrated and often lobed towards the attenuated apex obliquely cuneate at the base, veins close parallel simple or forked, involucre shallow half-cup-shaped forming a continuous line along the margin. — *Spr. Syst. Veget.* iv. p. 119. *Saccoloma elegans*, *Kaulf.* "in *Berl. Jahrb. f. die Pharm.* 1820, p. 51." *En. Fil.* p. 224, t. 1, f. 12. *Hook. Gen. Fil.* t. 58, f. 1—4. *Kze. in Schkh. Suppl.* t. 41. *Neuropteris elegans*, *Desv. Mem. de la Soc. Linn. Par.* v. p. 292, t. 8, f. 2.

Hab. Brazil, *Langsdorff, Sellow, Mrs. M. Graham, Beyrich, Prince de Nieuwied, Riedel, Gardner*, n. 159 and 5325, (woods, Gongo Soko). Isthmus of Panama, *Dr. Sinclair, Barclay*. Interior of Westmoreland Co. and Fox's Gap, St. George, Jamaica, *Purdie*. Guiana, (*Desvoux*). — A splendid and truly beautiful Fern, which, according to Mr. Purdie, who has recently had the good fortune to discover it in Jamaica, "grows, or rather climbs, to the height of 20 feet," no doubt by means of its caudex, which he adds is "creeping." The fronds themselves are 5—6 feet and more in height. Stipes 1—4 feet and, as well as the main rachis, glossy brown. Pinnæ of a delicate, membranaceous, semipellucid texture, bright green, often a foot long and 1—2 inches wide; the base obliquely cuneate, sometimes, as if by accident, deeply lobed in the lower half (as figured by Kunze, l. c.), attenuated into a narrow caudate serrated acumen at the extremity. Sori so close as apparently to form an almost uninterrupted line on both margins, nearly from the base of the pinnule to the base of the acumen.

As already observed, Professor Kunze (and Mr. J. Smith) considers the crenatures of the pinnæ of *Saccoloma* as spurious involucre, and he describes, in *Schkh. Fil. Suppl.* p. 86, a nearly allied genus with which I am unacquainted, and which he thus characterizes: —

"*AMAUROPELTA*, *Kze. Sori apici venarum subclavato inserti, orbiculares, plani, lineam submarginalem formantes. Indusium duplex: spurium, crenæ marginis lacinearum primo revolutæ, demum retractæ; verum, coriaceum, rugulosum, orbiculare, basi excisum (atroviens), margine extenuato circumcirca apertum.*"

"*A. Breutelii*. — Frons coriacea, pinnato-pinnatifida, basi pinnarum subpinnata. Venæ e costa laciniarum ortæ, furcatæ, rarius simplices.

"Hab. St. Kitts, *Breutel*."

49. *D. Imrayana*, *Hook.*; fronds (tufted?) ovato-lanceolate pinnated, pinnæ submembranaceous opaque oblong-lanceolate obtuse petiolulate very unequally and somewhat doubly crenate obliquely cuneate at the base, sori forming a continuous intramarginal line one at the base of each tooth or lobule of the crenatures, veins oblique once to thrice forked somewhat divaricating, involucre reniform. (TAB. XLIX. A.) — *Hook. Gen. Fil.* t. 58, B. f. 5, 6. *Kze. in Schkh. Fil. Suppl.* t. 86.

Hab. Dominica, *Dr. Imray*. — A very distinct and well marked plant, yet assuredly allied to the preceding. Kunze has retained this in *Saccoloma*, and correctly enough; but it is quite evident the crenated margin forms

nothing that can be assimilated to an involucre. The stipes is from a span to a foot long, glossy brown. Fronds about the same length. Pinnules 1—3 inches, rather remote, opaque (not glossy), membranaceous: veins obscure, except when the frond is held between the eye and the light.

50. *D. Hookeriana*, Wall.; fronds (tufted?) tall lanceolate pinnate, pinnæ subpetiolate lanceolate from a broad hastate base gradually acuminate submembranaceous duplicato-crenate sparingly hairy on the costa and veins beneath, veins parallel dichotomous, sori approximate forming a continued line at the base of the crenatures of the margin, involucre half-cup-shaped, stipes and rachis pubescenti-hirsute. (TAB. XLVII. B.)—*Wall. Cat. n. 2684.*

Hab. Mountains of Sylhet and Kamoun, *Wallich. Assam, Major Jenkins.*—Stipes a foot or more long, pubescent, at length glabrous. Rachis hirsuto-pubescent. Frond 2 feet and more long. Pinnæ spreading, 4—5 inches long, subpetiolate, hastate at the base, the upper lobe the longest and sharpest. Crenatures of the margin, similar to what are described in the two preceding species, extend beyond the sori; but in no way and at no stage of growth so covering the fructifications, as to constitute even a spurious involucre.

51. *D. villosa*, Wall.; fronds (tufted?) tall broadly ovato-lanceolate firm membranaceous, pinnæ elongate lanceolate subfalcate acuminate pinnatifido-lobate the acuminate apices serrated pubescenti-villous beneath most so on the costa and prominent veins unequally cuneate at the base and subpetiolate, lobes acute crenato-dentate, veins pinnate, sori solitary in the axils of the smaller and upper lobes or serratures and distant from the margin, marginal on the small teeth of the larger lobes, involucre broad half-cup-shaped densely villous, rachis and stipes downy the latter at length glabrous. (TAB. XLVIII. A.)—*Wall. Cat. n. 244 (not Don).*
D. scabra, Don.

appropriately named it *calvescens*. The veins, and especially the involucre, are quite glabrous, the pinnæ are more distinctly petiolate, and the whole frond is more elongate.

53. *D. Khasiyana*, Hook. ; fronds (tufted ?) very tall lanceolate bipinnate, stipes elongated, rachis and veins pubescenti-hispid, primary pinnæ petiolate lanceolate acuminate, secondary or pinnules mostly petiolulate subdimidiato-ovate obtuse pinnatifid chiefly on the upper edge, lower lobes obovate deep the rest short, all of them angulato-dentate, veins pinnated with a few scattered hairs beneath, involucre small half-cup-shaped in the axils of the teeth. (TAB. XLVII. A.) — β . more glabrous, pinnules less petiolate, less deeply pinnatifid, with fewer and more obtuse lobes.—(Tab. LVII. A.) *Microlepia cristata*, *J. Sm. En. Fil. Philipp. l. c. (name only)*.

Hab. Khasiya hills, north of India, *Griffith*. Java ; pinnules smaller, (*Count Hoffmasegg*). Ceylon, *Mrs. Gen. Walker*. β . Isle of Ronin, (*Herb. Imp. Acad. Petrop.*) Luzon, *Cuming*, (n. 95). — Stipes 2½ feet long, and the lower portion of the frond 2 feet more. The primary pinnæ are 6—8 inches long : the lower pinnules sometimes almost pinnated. The general form of these pinnules assimilates the species with many of the group or subgenus *Microlepia*, and it may be said to form the passage to them. But I place it here on account of its general affinity with the two preceding species, and its fronds being much less divided than in the true *Microlepia*.

54. *D. lonchitidea*, Wall. ; caudex creeping thick, fronds ample tall tripinnate (primary and secondary pinnules much petiolated) every where glabrous coriaceo-membranaceous, pinnæ large spreading ovato-lanceolate much and narrow-acuminate deeply pinnatifid often pinnated at the base, segments patent lanceolate (often very broad) acuminate lobato-dentate, rachis and costa flexuose, veins pinnated, sori solitary generally in the axils of the teeth near the margin, involucre small half-cup-shaped. (TAB. XLVI. B.) — *Wall. Cat. n. 240*. *Microlepia*, *J. Sm. Gen. Fil. Davallia platyphylla*, *Don, Prodr. Nep. p. 10*.

Hab. Nepal, *Wallich*. Peninsula of Madras, *Wight*, n. 140. Ceylon, *Mrs. Gen. Walker*. — One of the noblest of the genus, from the size of its fronds and the large and broad pinnules on long glossy petioles. These fronds are much divided, the segments bearing copious fructifications. *Mr. J. Smith* places this species in *Microlepia*, but if "habit is to be the principal mark of distinction," as *Mr. J. Smith* observes, it surely is more nearly allied to the original *Saccoloma* than to *Microlepia*.

55. *D. pinnata*, Cav. ; caudex creeping scaly, fronds lanceolate pinnate glabrous, pinnæ remote shortly petiolate subcoriaceous opaque linear-lanceolate gradually acuminate obliquely cuneate at the base the upper ones sessile and decurrent, sori a little distant from each other but forming a continued series one at the base of each tooth or serrature,

veins sunk obsolete (inconspicuous) generally forked, the upper veinlet bearing the sorus, involucre small half-cup-shaped, stipes and subtrigonal rachis glossy. (TAB. LX. B. f. 1, 4).—*Cav. Præl.* 1801, n. 689. *Sw. Syn. Fil.* p. 131. *Willd. Sp. Pl.* v, p. 468. *D. flagellifera*, *Wall. Cat.* n. 243. *Hook. et Grev. Ic. Fil.* t. 180. *D. angustata*, *Wall. (according to Presl, not according to our specimen from Wallich).* *Saccoloma pinnatum*, *Pr. Microlepiea*, *J. Sm. Gen. Fil.*

Hab. Philippine Islands, (*Cavanilles*). Luzon, *Cuming*, n. 139. Penang, *Wallich*, *Lady Dalhousie*. Java, *Blume*.—Evidently allied in habit and fructification to the original *Saccoloma*, and Presl has done right in placing it there, if that genus were worthy of being retained; it differs however from every known species of *Davallia*, except the following, with which it came mixed in *Cuming's* plants from the Philippine Islands, and from which it may not be specifically distinct.

56. *D. Luzonica*, *Hook.*; caudex short entangled somewhat creeping paleaceo-crinite, fronds ovato-lanceolate pinnate, pinnæ lanceolate deeply pinnatifid sessile subcoriaceous lobate on the long narrow acumen, segments linear crenato-serrate, veins pinnated obsolete, sori at the base or in the axils of the teeth, involucre small half-cup-shaped, rachis and stipes subtrigonal. (TAB. LX. B. f. 2, 3, 5).

Hab. Luzon, *Cuming*, (with the preceding, n. 139).—Had I received this separately from the preceding, I should have felt satisfied of its being a distinct species: but coming in company with that, and finding it to have the same harsh almost coriaceous texture, and other points in common with it, I was led, at first, to look upon it as a variety: still, having no intermediate states, I think it safest to give it as distinct: and the characters are very apparent on the slightest glance at the figures.

57. *D. serrata*, *Bl.*; "frond pinnate glabrous, pinnæ alternate subsessile linear-lanceolate falcato-acuminate duplicato-serrate cuneate at the base, sori submarginal, stipes glabrous

(subfalcate), the upper forming the segment of a circle, and more or less toothed or lobed or serrated. Lobules soriferous. *Saccoloma*, Pr. *Lindsæa*, *Blume*, *Kze.* and others. (HOOK. GEN. FIL. TAB. CXIV. B.)

Obs. The present is a tolerably natural group, in habit closely allied to *Lindsæa*, and again, on the other hand, through *D. Imrayana*, to our subgenus *Saccoloma*. The last mentioned species possesses, indeed, the involucre rather of the present group: but the form of the pinnules and general habit lead me to prefer placing it amongst *Saccoloma*. In one species, *D. Kunzeana*, there is a disposition in the veins to become reticulated.

* *Simply pinnate.*

58. *D. Boryana*, Pr. ♂ caudex very long stout creeping on trees and scandent, fronds rigid membranaceous linear-lanceolate elongate pinnated attenuated at the base, pinnæ half oblong obtuse or acute obliquely cuneate at the base, lower margin entire quite straight, upper lobulato-crenate often serrate, principal vein parallel with and close to the lower margin giving out upwards 5 or 6 simple or forked veins, sori transversely oblong shallow half-cup-shaped inserted at the base of almost every lobule. — Pr. *Reliq. Hænk.* i. p. 66. *Hook. et Grev.* t. 143. *Dicksonia repens*, *Bory*, *Voy.* ii. p. 323. *Sw. Syn. Fil.* p. 198. *Willd. Sp. Pl.* v. p. 482. *Davallia repens*, *Desv.* *D. Macræana*, *Hook. et Arn. Bot. of Beech. Voy.* p. 108 (younger state, which is also the *Odontoloma Hookeri*, *J. Sm.*) *Odontoloma Boryanum*, *J. Sm.* — β . lobules serrated. *Hook. Gen. Fil.* t. 114, B. *Presl, Tent. Pterid.* t. 4, f. 20.

Hab. On trunks of trees; Bourbon, *Bory*. Mauritius, *Neraud*, *Telfair*, *Wallich*, *Carmichael*. Philippine Islands, *Hænke*, *Cuming*, n. 50. Brahmakoond in Upper Assam, and Khasiya hills, *Griffith*. Sandwich Islands, *Macrae*, *Barclay*, *Beechey*, *Nightingale*. — An elegant Fern, climbing over the trunks of trees, with a long scaly caudex, at length naked, glabrous and shining brown. Stipes and rachis stout, rigid, straw-coloured, frondose often to the very base. Fronds about a foot long. Pinnæ, though thin and semitransparent, of a firm and, as it were, rigid character, scarcely an inch long: the upper margin more or less crenated with little lobes, and, as represented in the 'Genera Filicum,' occasionally serrated. Sori sometimes, though rarely, confluent, giving the plant still more the character of *Lindsæa*.

59. *D. pulchella*, *Hook.*; small slender, caudex creeping filiform with scattered scales, frond linear-lanceolate pinnated rather flaccid, pinnæ approximate oval subdimidiate obtuse, lower margin slightly curved, upper with 3 or 4 broad irregular crenatures, principal vein diverging upwards from the lower margin and bearing 2 or 3 simple or forked veins, involucre small subreniform inserted at the base of the lobules rarely confluent, stipes and rachis firm straw-coloured filiform.

(TAB. LIII. B.) *Odontoloma pulchellum*, *J. Sm. En. Fil. Philipp.* (name only). *Field. et Gardn. Sert. Plant. t. 51.*

Hab. Luzon, *Cuming*, n. 217.—A very distinct species, though allied to the preceding. It is much smaller, very slender and graceful in every part. Pinnæ approximate, only slightly dimidiate, the lower margin not forming a straight line, but a curve, with the convex side outwards: the veins are free and distinct, and the principal one does not run parallel with and close to the lower margin, as in the preceding, but inclines upwards from its commencement. Two outer veinlets next the apex often bear one sorus. The figure in Messrs. Fielding and Gardner's 'Sertum Plantarum' is very accurate, and I should not have again given it here, but my plate was prepared before their's was published.

60. *D. Parkeri*, Hook.; small flaccid, caudex short creeping sending out long smooth fibrous radicles, fronds narrow-lanceolate from a rather broad base, pinnæ close membranaceous thin half oval broad and subfalcate (lower margin incurved), upper margin unequally lobato-crenate with 3—5 lobes, principal vein not parallel with the lower margin but slightly diverging and bearing 3—4 simple or forked veins, involucre small subreniform at the base of the lobules sometimes confluent (2 veinlets bearing 1 sorus), stipes and rachis filiform dark coloured. (TAB. LIII. C.)

Hab. British Guiana, *C. S. Parker*.—Quite different from the two preceding. Fronds very flaccid and thin, shorter and broader than the last, especially at the base, with very differently formed pinnæ, and dark-colored stipes and rachis.

61. *D. hemiptera*, Bory; "caudex creeping slender scaly, fronds linear pinnate, pinnæ alternate dimidiate pinnatifid above, segments bifid." *Bory in Belanger Voy. Bot. p. 75, t. 7, f. 2.* *Saccoloma?* *hemipterum*, *Pr.* *Davallia digitata*, *Kaulf. Herb.* (according to *Presl*).

Hab. On the trunks of trees, forests of Java, *Belanger*.—To judge from

** *Bipinnate, pinnules entire or only lobulate.*

64. *D. Kunzeana*, Hook. ; "frond ovato-triangular membranaceous rather firm glabrous bipinnate, pinnæ shortly petiolate, lowest ones opposite patenti-erect lanceolate acuminate, pinnules sessile dimidiato-oblong obtuse at the base above truncato-cuneate, uppermost ones gradually minute subconfluent, lowest ones flabellate, all of them incisedentate on the upper margin, the teeth rounded soriferous, sori linear-oblong (transversely), stipes and rachis tetragonous glabrous." *Bl. Lindsæa davalloides*, *Bl. En. Pl. Jav. p.* 218. *Kze. in Schk. Fil. Suppl. p.* 12, *t.* 7. "*L. pectinata*, *Reinw. MSS.*"

Hab. Mountains of Java, *Blume*.—A very handsome plant, according to Kunze's figure; with pinnules resembling those of *D. Boryana*, but the plant is bipinnate. According to my views of the genera of Ferns, this cannot be referred to *Lindsæa*, for the involucre is not only much smaller than the lobe which bears it (which the author above quoted considers the outer indusium), but the colour and texture are quite different, as represented in Kunze's plate. The fructification, indeed, and the habit of the species are in perfect accordance with the *Odontoloma*-group of *Davallia*, and the plant should not be separated from it. The veins in the magnified figure not only meet at the sorus, as is common to others of this subgenus, but they anastomose once below the sorus towards the apex of the pinna, exhibiting an approach to reticulated venation. *Blume* observes of this plant (and I am unacquainted with it myself, save from figure and description) "*a Lindsæa composita*, *Willd.*, facillime distinguitur pinnulis marginæ superiori incisiss, terminalibus decrescentibus."

*** *Bipinnate, pinnules deeply pinnatifid.*

65. *D. Blumeana*, Hook. ; caudex creeping, stipes very long triquetrous firm, frond ovate bipinnate, pinnæ alternate lanceolate attenuate, pinnules membranaceous sessile half-oblong, from the upper edge cut down to the base in a pinnatifid manner into extremely narrow linear distant simple or generally forked segments much dilated at the apex and soriferous mostly toothed, vein solitary in each segment, involucre minute transversely oblong smaller than the apex of the segment subreniform. (TAB. LIV. A.) — *Lindsæa tenuifolia*, *Bl. En. Fil. Jav. p.* 219. *Odontoloma tenuifolia*, *J. Sm. En. Fil. Philipp. l. c.*

Hab. Parasitic on trunks of trees in the forests of Java, *Blume*. Isle of Leyte, *Cuming*, n. 309.—A most distinct, well marked and elegant species, possessing the dimidiate pinnules so common to the present subgenus; though at first sight appearing very different, on account of the long, narrow, deep segments; so narrow that the vein seems only to have a wing on each side and running parallel with it. It is one of those species which exhibit a strong affinity with *Lindsæa* as well as *Davallia*; but the circumstance of the involucre being much smaller than the terminal lobe, and

withering, as it often does, while the apex of the lobe is still green and vigorous, induces me to prefer placing it in *Davallia*: and it is in perfect harmony with individuals of the present subgenus. — Stipes a span or more high, triquetrous, stout, firm, brownish straw-colour, glossy. Frond a span or more long, ovate in circumscription. Primary pinnae patent, 4—5 inches long, much attenuated; the rachis throughout firm, stout and wiry, stramineous. Pinnules $\frac{1}{4}$ to $\frac{3}{4}$ of an inch long, truly dimidiate, half-ovate, the lower margin forming a straight or falcate line, the upper the segment of a circle, deeply divided to the lower margin into narrow linear simple or forked segments, resembling some *Trichomanes* or *Hymenophyllum*: the apex dilated and usually toothed, bearing the sorus: the uppermost pinnules are gradually smaller and are reduced to extremely narrow simple or forked almost setiform segments.

Subgen. VII. MICROLEPIA, Pr. *Sori intramarginal, on a small tooth or lobule generally below a sinus of a lobe. Involucre small, membranaceous, half-cup-shaped, the mouth truncated (rarely suborbiculari-reniform), from the apex of a free, more or less divaricating, vein or veinlet. — Tropical Ferns of the Old and New World. Caudex creeping (probably in all). Fronds mostly ample, decompound, membranous or verging towards it; ultimate pinnules or lobules usually small and bearing small fructifications.* (HOOK. GEN. FIL. TAB. LVIII. A.)

Obs.. Of all the groups or subgenera of *Davallia*, this is to me the least satisfactory, and I preserve it in deference to those who are in favour of constituting *Microlepia* a distinct genus. The *D. polypodioides* may be considered the type of this, and the most distinct in habit and character and in the small cup-shaped involucre, which afford something tangible: still we have in *D. Jamaicensis* a fern with so completely the habit and general appearance of *D. polypodioides*, that, were it not for the involucre, I should take it for the most common form of that species, but the involucre are quite those of a *Leucostegia*. Again, some species have an elongated half-cup-shaped, or if I may so say, cuneated involucre; these, both in fructification and texture of the frond, resemble *Saccoloma*, and

(not Blume).—*Dicksonia straminea*, Bory, in *Duperrey, Voy. Bot. p. 280?* (not Labill.).

library of the H. C. Botanic Gardens, Calcutta.' The laudable object which Mr. Griffith had in view in their publication is thus stated in the Preface. "I have not yet become acquainted with the circumstances, owing to which the *Flora Indica* has not been heretofore completed, or with the reason of its being so disfigured by obscurities and typographical errors. But considering it to be a positive duty of all Superintendents of public institutions to make known to the fullest extent the meritorious labours of their predecessors, I have availed myself of the permission of Government to place on record the labours of Dr. Roxburgh in this department of Botany. The neglect under which these MSS. have been buried since 1817, and the absolute want of his authentic Herbarium, under which these Botanic Gardens labour, prevent me effectually from doing justice to the memory of Roxburgh, beyond showing the extent to which he had observed the higher Cryptogamic plants. His names probably in very many instances have been passed over, and the law of priority of publication and definition may hinder many from being adopted. But I am sure that Botanists will exert themselves and determine that his MS. names shall not be passed over in favour of any other MS. names, given in neglect of Roxburgh's characters, descriptions or drawings."—"I beg to address myself here in particular to Sir Wm. Hooker, who is said to be engaged in a work on the *Species of Ferns*."

Mr. Griffith here seems to forget that the various circumstances which prevent him from doing that justice which he complains has not been rendered to the memory of Dr. Roxburgh, must equally exist in my case, and even more so; for, in many instances, to compensate for very inefficient descriptions, he has had the original drawings to refer to: but, although references are given to plates apparently intended to accompany the work just mentioned, and said to be reduced copies of Roxburgh's invaluable series of botanical drawings, yet none such have come with the copy received by me. Here then, in cases where the nomenclature of Dr. Roxburgh and Dr. Wallich may be at variance, I have to choose between the generally very *incomplete definitions* now first published of the former, and *authentic specimens* given with names, which, as well as the printed Catalogue, have been distributed with an unexampled liberality, of the latter. The very first species which it has been my lot to investigate, happens to be the one to which this note is appended, an Amboyna specimen received from Mr. Webb. Had I been left to Dr. Roxburgh's character of little more than four brief lines, I should have failed to determine my plant; but by means of Dr. Wallich's specimen I am able to ascertain it and to show that Dr. Wallich has done that justice to the memory of Dr. Roxburgh, which in this instance at least (and I fear it will be so in many others) Mr. Griffith's laudable publication of Dr. Roxburgh's MSS. will fail to accomplish.

I must here again beg to repeat my feeble testimony to the immense services rendered to the cause of Indian Botany by Dr. Wallich, in distributing, with names and a Catalogue, the treasures collected by himself and others in the Honourable Company's territories. The genera and species (I speak especially in reference to the Ferns) are discriminated with a degree of accuracy and judgment which show that they have been care-

Hab. Moluccas, *Rozburgh*. Amboyna, *A. Smith*, in *Herb. Banks.* (and in *Herb. Hook.* from *P. B. Webb, Esq.*) Offack, Terre des Papous, *D'Urville*, (in *Herb. Hook.*)—Stipes a foot and more long, erect, flexuose, rather slender, rigid, glossy brown, almost black below. Frond a foot or more high; readily distinguished among this group of Ferns by the subcoriaceous texture, long attenuated lower pinnæ, and the lanceolate, acuminate pinnules, together with the position of the sori in the sinus of the segments. I am induced to consider Bory's *Dicksonia straminea* to belong to this, rather than Labillardiere's plant; not only from the description, but from my possessing a specimen from D'Urville, of our present *Davallia*, gathered at Offack.

67. *D. inequalis*, Kze.; caudex creeping, frond ample tripinnate glabrous coriaceous-membranaceous rather glossy full green when dry, ultimate pinnæ distant obliquely subrhombic-lanceolate or ovato-lanceolate the base attenuate-cuneate subpetiolate acute or acuminate inciso-lobate and serrate, the upper ones coadunate into a narrow pinnatifid apex the lobes very acute, veins prominent, ultimate rachis slightly winged, sori generally at the base of an axillary tooth, involucre half-cup-shaped subcuneate (i. e. the base attenuated) broader in age.—Kze. *Syn. Pl. Crypt. Poepp.*, p. 87. *Pl. Poepp. in Herb. Hook.*—*α. major*; ultimate pinnæ 1—2 or 3 inches long. (TAB. LVII. B.) *Davallia alata*, *Heward, Mag. of Nat. Hist.* 1838, p. 465.—*β. intermedia*; ultimate pinnæ $\frac{3}{4}$ to $\frac{1}{2}$ an inch long.—*γ. minor*; ultimate pinnæ $\frac{1}{2}$ an inch rarely exceeding an inch long, of a rather more rigid texture. (TAB. LVIII. A.) *Microlepia alata*, *J. Sm. En. Fil. Philipp. l. c.*

Hab. *α.* Peru; Maynas, *Poeppig*; Pangoa, *Mathews*, n. 1097. Brazil; Corcovado, and damp woods in the Organ mountains, *Gardner*, n. 202; Ilhios, (*Moricand*). Trinidad, *Lockhart, Aldridge*.—*β.* Jamaica, *Heward, Wiles*. Ceylon, *Mrs. Gen. Walker*. Isle of Mindoro, *Cuming*, n. 360 (frond more membranaceous).—*γ.* Luzon, *Cuming*, n. 119. *Herb.*

68. *D. distans*, Kaulf. ; "fronds tripinnate, pinnules ovate obtuse cuneate at the base upper ones confluent, fertile ones crenulate above, involucre subrotund." *Kaulf. En. Fil. p. 223.*

Hab. Brazil, (*Herb. Martens*).—"Primary and secondary pinnæ very distant : pinnules membranaceous, $\frac{1}{4}$ an inch long. Position of the fructification nearly as in *Davallia adiantoides* (*Dicksonia Plumieri*, nobis)."—Imperfect though the description is, Mr. J. Smith and Mr. Gardner have believed the *D. inequalis* to be intended by it ; with which however it does not at all accord.

69. *D. hirta*, Kaulf. ; tall, fronds erect rigid ovato-lanceolate much and gradually acuminate rather glossy tripinnate, pinnules approximate rhomboid-lanceolate subdimidiate acute decurrent, upper ones coadunate, all of them inciso-pinnatifid, segments acute, sori small on the inner margin in the sinus of a lobe, involucre half-cup-shaped, veins prominent and hairy especially beneath, rachis hispido-tomentose.—*Kaulf. En. Fil. p. 223.* *Dicksonia Kaulfussiana*, *Gaud. in Freyc. Voy. Bot. p. 368?* (*See mention of this plant, supra, p. 71.*) *Davallia villosa*, *Don, according to Sprengel.*— β . larger and with laxer ramification.

Hab. Sandwich Islands ; Oahu, *Chamisso, Beechey, Barclay, Dr. Diell, Douglas, and others.* Nepal? (*Don*).— β . Ceylon, *Mrs. Gen. Walker.*—A very beautiful and very distinct Fern, with something of the rigid habit and general appearance of the *Polystichum* group of *Aspidium* : though more divided. Stipes and main costa rigid : the form of the ultimate pinnules and their sharpness bring the species near to *Dav. inequalis*, but the habit of the plant, and the hairiness and the involucre are considerably different.

70. *D. polypodioides*, *Don* ; caudex creeping, frond large ovate or deltoid acuminate tripinnate flaccid more or less hairy or downy especially on the veins and costæ beneath, primary pinnæ and lower secondary ones distant and acuminate, pinnules oblong or rhomboid-lanceolate obtuse deeply pinnatifid, the lobes ovate or obovate entire or irregularly inciso-lobate or again pinnatifid suboblique very obtuse, sori rather large (when perfect) usually solitary on the entire lobes, several on the pinnatifid ones and in the sinuses within the margin, sometimes on a small tooth more numerous on the superior margin, involucre small half-cup-shaped glabrous or rarely hispid, rachis downy or hispid on the underside.—*Don, Prodr. Fl. Nep., p. 10.* *Microlepia polypodioides*, *Pr.* *Dicksonia polypodioides*, *Sw. Syn. Fil. p. 137 and 356.* *Willd. Sp. Pl. v. p. 488.* *Davallia flaccida*, *Br. Prodr. Nov. Holl. p. 157.* *Bl. En. Fil. Jav. p. 237.* *Don, l. c. p. 10?* *D. Nepalensis*, *Spr.?* *Microlepia flaccida*,

J. Sm. Polypodium Speluncæ, *L.* Polypodium nudum, *Forst. Prodr.* n. 446 (according to *Herb. Banks.*) Polypod. cristatum, *Houtt.* (according to *Brown*). Cænopteris Japonica, *Willd. Phyt.* p. 8 f. 1? (*Br.*) Dicksonia flaccida, *Hook. et Arn. in Bot. of Beech. Voy.* p. 108, in part.—*a.* subglabra; fronds nearly glabrous or but slightly hairy or pubescent. *D. virens*, *Wall. Cat.* n. 264. *D. Roxburghii*, *Wall. Cat.* n. 2218. *D. puberula*, in part, *Wall. Cat.* 262|2.—*β.* pubescens; fronds pubescent with short close down extending often to the involucre. *D. puberula*, *Wall. Cat.* n. 262|5. *D. rhomboidea*? *Wall. Cat.* n. 262|3. *D. pyramidata*, *Wall. Cat.* n. 261.—*γ.* hispida; fronds hairy or hispid especially on the underside upon the costa and veins and often on the involucre. *D. pilosula*, *Wall. Cat.* n. 263.—*δ.* rhomboidea; larger in every part, nearly glabrous pubescent or hairy. *D. rhomboidea*, *Wall. Cat.* n. 257. *Microlepia rhomboidea*, *Pr. Tent. Pterid.* (name only), and also f. 22, single lobe. *J. Sm. Gen. Fil.* (name only).

Hab. Tropical or subextratropical regions, probably throughout the world. New Holland (Tropics), *Brown*.—*a.* Ceylon, *Mrs. Gen. Walker*. East Indies, *Roxburgh*, *Dr. Buchanan Hamilton*. Madras Peninsula, *Dr. Wight*. Mergui, *Griffith*. Assam, *Griffith*, *Major Jenkins*. Singapore, *Tovay*, *Nepal*, &c., *Wallich*. Java, * *Millett*, *Blume*. China, *Beechey*. Oahu, *Menzies*, *Beechey*. Brazil, *Swainson*, *Macrae*. Fernando Po, *Dr. Vogel*.—*β.* Singapore, and Penang, and Martaban, *Wallich*. Assam, *Jenkins*. Mergui, *Griffith*. Java, *Zollinger*, n. 513. Macalisberg, subtropical South Africa, *Burke*, n. 513.—*γ.* Nepal (with long scattered hairs), *Wallich*. Ceylon, (almost hispid beneath), *Mrs. Gen. Walker*. Courtalam, *Wight*. Amboyna (ex *Herb. P. B. Webb*). Khasiya (very hispid especially beneath and on the involucre, the ultimate lobes of the pinnules more uniform, frond narrower), *Griffith*.—*δ.* Nepal, *Wallich*. Assam, *Griffith*, *Jenkins*. Luzon, *Cuming*, n. 7, according to Mr. J. Smith; but my specimens rather resemble *a.* The mass I study the Ferns and

deal the appearance of *Dicksonia cicutaria*, Sw. and is, I fear, often confounded with it. Blume mentions a var. "pinnulis secundariis sursum subinciso-crenatis deorsum integerrimis."

71. *D. proxima*, Bl.; "frond (ample) tripinnate glabrous somewhat downy on the costæ beneath, pinnæ alternate remote, pinnules lanceolate very much acuminate, secondary ones sessile trapezoideo-oblong obtuse incised, superior ones entire confluent, lower ones slightly pinnatifid, sori punctiform placed near the margin semiorbicular, rachis and stipes a little rough." *Bl. En. Fil. Jav. p. 238.*

Hab. Java, Blume.—"Closely allied to *D. flaccida*, Br. (*D. polypodioides* nob.): but distinct in the subcoriaceous frond and the longer caudate pinnules." In the province of Bantam the same author finds a var. "B;" with the secondary pinnules rather remote, oblong-obtuse, doubly inciso-serrate,—(an species?)

72. *D. Jamaicensis*, Hook.; frond ample tripinnate flaccid glabrous or with a few scattered hairs beneath on the veins and costa and rachis, primary and secondary pinnæ oblong moderately acuminate, ultimate pinnæ subdimidiato-oblong obtuse deeply pinnatifid the segments longer on the upper margin all of them ovate slightly falcate obtuse dimidiate entire at the lower margin 2—3 lobed at the superior one, sori at a little distance from the margin on a lobule near the sinus, involucre suborbiculari-reniform (!) flat.—*Davallia flaccida*, Hook. et Arn. in *Bot. of Beech. Voy. p. 101 in part.*

Hab. Jamaica, Wiles, Dr. Bancroft, McFadyen. Oahu? Beechey.—A species so much resembling *D. polypodioides*, that I can point out no mark of distinction save the different form of the involucre, and that, instead of being half-cup-shaped as in the *Microlepia* group, is broad and flat and between orbicular and reniform, quite free at the apex and sides and attached only by a rather broad base. This is invariably the case in three specimens received from three different collectors in Jamaica; and on carefully inspecting one of my specimens of supposed *Dav. polypodioides* from Oahu I find a similar involucre; but being young the form is not so clearly and satisfactorily defined as in the West India plant.

73. *D. trichosticha*, Hook.; frond ample submembranaceous bi-tri?-pinnate, primary pinnæ a foot long the rachis winged above, ultimate pinnæ or pinnules sessile obliquely cuneate at the base oblong-lanceolate acuminate pinnatifid deeply so toward the base, upper inferior lobe the largest, all of them ovate obtuse nearly entire or crenato-lobate slightly hairy above densely and minutely pubescent almost concealing the veins beneath, sori small rather distant from the margin, involucre small half-cup-shaped very downy.—*Microlepia trichosticha*, J. Sm. *En. Fil. Philipp. l. c. name only.*

Hab. Isle of Samar, *Cuming*, n. 328.—Allied in some respects to *D. polypodioides*, especially to the larger state of it, var. *rhomboidea*; but the only specimens I have seen are less compoundly divided, the pinnæ are more regularly pinnatifid, and there is a compactness in the downy clothing beneath (almost pulverulent) covering the whole underside of the frond, different from what I have observed in any allied species.

74. *D. ciliata*, Hook.; caudex creeping crinite, frond ovato-lanceolate very flaccid membranaceous hairy especially on the veins (hairs soft silky), pinnate, pinnæ from a broad base oblong acuminate bipinnatifid, primary segments oblong obtuse separated from each other almost to the rachis, ultimate ones ovate subfalcate very acute ciliated entire or with one or two minute teeth, sori small at a distance from the margin almost in the centre of a segment, involucre small half-cup-shaped ciliated, stipes and main rachis (which is rigid) pubescent with short brown hairs. (TAB. LX. A.)—*Leucostegia hirsuta*, *J. Sm. En. Fil. Philipp. l. c. name only*, (not *Davallia hirsuta*, Sw.)

Hab. Luzon, *Cuming*, n. 174.—An elegant and well marked species, yet the involucre is not that of *Leucostegia*, but of the *Microlepia* group, with which the plant quite accords in habit. The caudex is creeping, about the thickness of a duck's quill, clothed with long crinite hairs. Stipes about a span long, brown, with short pubescence, which extends to the main rachis. Frond $1\frac{1}{2}$ to 2 feet long, broad or ovato-lanceolate, acuminate, first pinnate, with the pinnæ twice pinnatifid in a very regular and beautiful manner; the veins are clothed, and the margin and involucre are fringed, with very slender soft hairs.

75. ? *D. gracilis*, Bl.; "frond bipinnate below, above simply pinnate, pinnæ lanceolate very much acuminate, pinnules linear rather obtuse subserrulate decurrent glabrous, sori submarginal, stipes tetraquetrous hairy at the base, above as well as the rachis glabrous. —Var. B. pinnules elongato-linear." *Blume En. Fil. Java*, n. 233. *Microlepia gracilis*, *J. Sm.*

sori solitary in the sinuses, rachis margined, stipes tetraquetous glabrous." *Blume En. Fil. Jav. p. 237.*

Hab. Moluccas, *Blume*.—With this I am unacquainted. *Blume* says of it "habitu maxime similis *Davallia gracili*."

77. *D. splendens*, Bl. "frond bipinnate membranaceous and as well as the stipes glabrous, pinnæ subopposite, pinnules cuneate at the base lower ones ovato-lanceolate acuminate pinnatifid upper ones confluent into a dentate acumen, segments oblong obtuse subserrate, sori —?" — *Bl. En. Fil. Jav. p. 234.*

Hab. Isle of Banda, *Blume*.—"Between *D. adiantoides*, Sw. (*Dicksonia Plumieri*, nobis) and *D. arborescens*, Willd. (*Dicks. Pavoni*, nob. supra p. 74), differing from the former by its obtuse lacinia, and from the latter by its caudex not being arborescent?" — The only *Davallia* that I am acquainted with that can be likened to our *Dicksonia Plumieri*, is *Dav. inæqualis*, Kze. and it is probable that the present and two preceding species should be placed next them.

Dubious Species of this Subgenus.

78. *D. Brasiliensis*, Hook.—*Microlepia Brasiliensis*, *Presl, Tent. Pterid. p. 125 (name only) tab. 4, f. 23.* There is little in the figure now quoted, which only gives a solitary pinnule, to distinguish it from *D. inæqualis*, of which a pinnule is also represented on the same plate, *fig. 21.* I am not aware that the plant is anywhere described.

79. *D. Manilensis*, Hook.—*Microlepia Manilensis*, *Presl, in Herb. Meyen, and in Tent. Pterid. p. 125 (name only).*

80. *D. humilis*, Hook. — *Microlepia humilis*, *Presl, Tent. Pterid. p. 125 (name only).* "*Dicksonia humilis*, *Willd. Herb. n. 20164.*" Of this and the preceding I am not aware that any thing further than their names is anywhere recorded.

Subgen. VIII. CUNEATÆ. — *Davallia* § *Odontosoria*, *Pr. in part, and § Colposoria, Pr. in part.* *Davallia (vera) J. Sm. in part.* — Sori transversely oblong, nearly of the same texture as the frond, placed at the apex of a narrow segment and generally occupying the whole breadth of that apex, so that, in many, if the apex of the segment were altered in texture, it would be considered a portion of the involucre, and resemble the fructification of a *Lindsæa*. — Ferns of the tropics, or subextratropical, both of the Old and New World. Caudex creeping or none? Fronds coriaceous or submembranaceous, sometimes herbaceous, often firm and dark brown in drying, erect and unarmed, or scandent and spinous, generally much decomposed, the segments or divisions cuneate, mostly narrow

and linear with a much attenuated base, always glabrous. Veins either single, or solitary in the centre of each narrow segment, dividing and forked with nearly parallel branches to meet a forking of the segment. (Presl, Tent. Pterid. TAB. 4, f. 27.)

Obs. The present appears to me an extremely natural group, having assuredly a peculiar habit, and sori that resemble nearly as much those of some *Lindsæa* as the type of *Davallia*; yet no one that I am aware of has sought to separate it from the latter genus. Presl, indeed, has placed some in his § *Colposoria*, which, if I understand them rightly, ought unquestionably to be referred to his § *Odontosoria*.

* *Fronds not scandent, unarmed.*

81. *D. tenuifolia*, Sw.; caudex creeping (short?) woolly with subulate ferruginous scales, stipes long, frond erect ovato-lanceolate generally elongate glabrous subcoriaceous brown when dry bi-tri-pinnate with the rachis compressed and winged (or in other words bitripinnatifid), the segments or ultimate divisions approximate forked linear-cuneate truncate the apex slightly erose, involucre terminal and solitary or in pairs short (transversely) oblong slightly erose.—*Sw. Syn. Fil.* p. 133 and 350. *Willd. Sp. Pl.* v. p. 477, (excl. the syn. of *D. venusta*, Schkh. *Fil.* t. 128). *Pr. Tent. Pterid.* t. 4, f. 27. *Bl. En. Fil. Jav.* p. 239. *D. remota*, Kaulf. *Hook. et Arn. Bot. Beech. Voy.* p. 108. *Bory, in Duperrey, Voy. Bot.* p. 280. *Adiantum cuneatum*, *Forst. Prodr.* (not L.)— β . segments broader.

Hab. East India and East Indian Islands, probably general. Assam, Griffith, Jenkins. Nepal, and Kamoun, Wall. Sylhet, De Sylos. Khasiya, Griffith. Madras Peninsula, Wight. Mauritius, (Sw.) Wallich Cat. n. 246, and others. China, Beechey. Java, Blume, Millett. Ceylon, abundant, Mrs. Gen. Walker and others. Sandwich Islands, Macrae, Barclay, &c. Madagascar, Dr. Lyall, Boyer.— β . Luzon, Cuming, n. 69. China, Beechey. Bonin (Herb. Linn. Acad. Petrop.)—A well marked

D. tenuifolia, Sw. in the smaller fronds, the oblong almost hypocrateriform sori immersed in the apex of the lacinia." *Bl.*

83. *D. Chinensis*, Sw. ; caudex creeping crinite with glossy brown subulate scales, frond ovato-lanceolate shorter than the stipes glabrous opaque coriaceous (as if fleshy when recent) dark brown ferruginous beneath bipinnate, pinnæ lanceolato-ovate deeply pinnatifid, pinnules rather distant obovato-cuneate the apex more or less rounded and entire attenuated below simple or 2—3-lobed, lobes short somewhat rounded, veins several obscure sunk, sori solitary or two in each lobe and then subconfluent, in age very prominent, superior rachises winged. — *Sw. Syn. Fil. p. 133. Willd. Sp. Pl. v. 474. Langsd. et Fisch. Fil. p. 23, t. 27 (excellent). Trichomanes Chinense, Osb. Voy. ed. Angl. ii. p. 357, t. 6. Linn. Sp. Pl. 1562. Davallia Chusana? Willd. Trichomanes Chusanum? L. Davallia ferruginea? Cav. Præl. n. 691. Sw. Syn. Fil. p. 134. Bl. En. Fil. Jav. p. 239? Nees. et Bl. Act. Acad. Cur. xi. t. 12, f. 4?*

Hab. China, *Osbeck, Beechey*. Isle of Bonin (*Herb. Act. Petrop.*) Philippine Isles? *Cavanilles*. Java, *Blume?* — I was disposed to consider this a variety of *D. tenuifolia*, Sw., receiving it, as I have done, from China (but from China alone) in company with that species: still, a further examination of specimens leads me to the conclusion that it is truly distinct; and though a rude, yet the figure in *Osbeck* is a faithful representation of the species. It is generally much smaller than *D. tenuifolia*, and the stipes considerably shorter in proportion, the texture is far thicker, more coriaceous, and one could suppose it to be almost fleshy when recent; the pinnules are much broader, not truly cuneate, but obovato-cuneate; that is, the angles are rounded off and the apex is quite entire. The colour, when dry, is even of a darker brown, at least above, for the underside is almost always ferruginous: and the veins are sunk and obsolete, of course, more copious in proportion to the breadth. I am uncertain as to *Blume's D. ferruginea*, and am rather disposed, judging from his figure, to refer to a somewhat broader state of *D. tenuifolia*, our var. *B.* Of *D. Chusana* I am doubtful also.

84. *D. clavata*, Sw. ; caudex creeping lanate with dark brown articulated hairs, stipes erect elongated pale straw-colour, frond erect ovato-lanceolate rather short lax submembranaceous tripinnate, the segments or pinnules distant ultimate ones very narrow linear-cuneate simple or forked glabrous, the apex sharply inciso-dentate, rachis compressed slightly winged, involucre terminal subtund transverse often erose. — *Sw. Syn. Fil. p. 133. Willd. Sp. Pl. v. p. 478. Adiantum clavatum, L. — Adiantum minus, foliis in summitate retusis, Plum. Fil. t. 101, B. — Davallia venusta, Schk. Fil. p. 122, t. 128. Kze. in Pl. Crypt. Poepp. in Linnæu, ix. p. 87. D. tenuifolia, Poepp. "Fil. Exsicc. Cub." (Kze.)*

Hab. West Indian Islands, Martinique, *Plumier*; Cuba, *Poeppig*; Bahamas, *Swainson*. Jamaica, *Wiles*, *Mc Fadyen*, *Purdie* (*White-Hall*, *St. Thomas*' in the East).—Quite distinct from *D. tenuifolia*, and apparently peculiar to the new world (and confined to the tropical islands) as the latter is to the old world. It is usually smaller than *D. tenuifolia*, far more slender, and delicate, of a much paler colour, with very elongated narrow-cuneate or rather clavate segments. The ordinary height is a foot (of which the stipes is about half); but Mr. *Purdie*'s specimens are two feet long and exceedingly graceful. *Schkuhr*'s figure, above quoted, is very good, and it is strange that it should ever have been quoted as *D. tenuifolia*. *Plumier*'s figure is characteristic, though coarse and the segments too broad.

85. *D. retusa*, Cav.; erect, frond ample decomponently pinnate, pinnæ much acuminate, pinnules rhomboideo-lanceolate tapering into a short petiole sometimes again pinnate below, ultimate pinnules or segments broadly cuneate entire or bi-trifid many-nerved, sori at the truncated apex generally confluent so as to form a transverse linear involucre (resembling that of *Lindsæa*). (TAB. LII. A.)—*Cav. Præl. n. 692. Sw. Syn. Fil. p. 133. Willd. Sp. Pl. v. 476. J. Sm. En. Fil. Philipp. l. c. Pr. Reliq. Hænk. vi. p. 66.*

Hab. Philippine Islands, (*Cavanilles*); Luzon, *Cuming*, n. 411.—A tall growing species, but not scandent, much branched, at least four times pinnate. Pinnules large, from the confluence of several lobes. The fructifications, if viewed from beneath, exactly resemble those of *Lindsæa*; but on the back of the segment, the substance of the frond itself will be seen to extend to the apex. The rachis is glossy chestnut brown: the frond deeper brown, opaque and rather paler beneath.

86. *D. bifida*, Hook. and Grev.; rather small, roots tufted, caudex obsolete, stipes erect, frond ovate or deltoid membranous tender bright green tripinnate, ultimate pinnules bifid or bipartite all of them linear cuneate glabrous truncate and erose at the apex, sori terminal or nearly so, invo-

slender. (TAB. L. C.) β . pinnæ scarcely more than pinnatifid, segments larger and broader. *D. Goudotiana*, *Kze. Anal. Pterid. p. 35, t. 22, f. 2.*

Hab. Madagascar, at Emirne, *Dr. Lyall. β . Madagascar, Goudot.*—My specimen which I had called *D. Emirnensis*, MSS. is unquestionably the same species with *D. Goudotiana*, *Kze.*, and being more compound, it is probably the more fully developed state: hence I have been led to consider *Kunze's* plant as the variety. It is an extremely distinct species and probably very rare.

88. *D. Schlechtendahlia*, *Pr.*; frond ample spreading 3—4 pinnate subrigid, primary pinnæ spreading or deflexed, secondary and pinnules dichotomously divided divaricating distant the segments narrow linear single-veined slightly dilated upwards (hence cuneate) grooved on the underside, rachis 4-sided and as well as the main rachis everywhere zigzag, sori terminal solitary, involucre broad ovate or obovate the apex free forming with the apex of the segment two rounded lips. (TAB. LIV. C.)—*Presl, Tent. Pterid. p. 129 (name only).* *D. divaricata, Schlecht. in Linnæus, v. p. 617 (not Blume).* *Martens and Galeotti, Syn. Fil. Mex. p. 77.*

Hab. Mexico, *Schiede and Deppe*: Slate district, east of Oaxaca, 3—5000 feet of elevation, *Galeotti, (n. 6372).*—A singular, and apparently a somewhat scandent, Fern, copiously and deeply divided into very narrow, divaricating, rather rigid segments, deep brown in colour. Here the fructification, though truly that of a *Davallia*, puts on the appearance of that of an *Hymenophyllum*, so much does the apex of the segment of the frond resemble one of the lips of an involucre, to which the involucre itself is parallel. The segments are as narrow as those of *D. Blumeana* (*supra, p. 177*), but the composition of the frond and the sori are quite different.

89. *D. meifolia*, *H. B. K.*; “fronds tripinnate glabrous, pinnules bipartite, segments cuneate, sorus subrotund terminal, sterile ones emarginate or bifid.” *H. B. K. Nov. Gen. Am. i. p. 23. Presl, Reliq. Hænk. i. p. 67. Darea fumarioides, Willd. Sp. Pl. v. p. 299.*

Hab. Caracas and Chacao, *Humboldt. Panama. (Presl).*—With this I am unacquainted: and neither of the authors who have described it alludes to its affinities. *Mr. J. Smith* considers it may be *D. gibberosa*, *Sw.*

90. *D. thecigera*, *H. B. K.*; “fronds at the apex bi- at the base tripinnate glabrous, pinnules linear-cuneate furnished with a rounded sorus beneath the apex, involucre entire, rachis alato-marginate.” *H. B. K. Nov. Gen. Am. i. p. 23.*

Hab. Province of Venezuela, *Humboldt.*—May not this, which is unknown to me, be a form of *D. clavata*?

91. *D. cuneiformis*, Sw.; "fronds triplicato-pinnate, pinnales subtripartite, segments alternate obovato-cuneate truncated, involucre spreading." *Willd. — Sw. Syn. Fil. p. 133. Willd. Sp. Pl. v. p. 477. D. didyma, "Hedw. Fil. fasc. 4." Trichomanes cuneiforme, Forst. Prodr. n. 469.*

Hab. Pacific Isles, *Forster*. — The specimen is so bad in the Banksian Herbarium, that I can make nothing of it.

92. *D. biflora*, Kaulf.; "fronds bi-tripinnate coriaceous, the apex and lower pinnæ caudate, segments cuneiform truncate with about two sori, involucre subrotund." *Kaulf. En. Fil. p. 221.*

Hab. Manilla, *Chamisso*. — "Differs from *D. cuneiformis*, Sw. in the coriaceous frond with wider segments, the involucre subrotund entire."

Doubtful Species of this division.

93. *D. ? triloba*, Willd.; "fronds pinnate, pinnæ alternate petiolate tripartite, segments subrotundo-obovate" (cuneate) "obtuse inciso-crenate." *Willd. Sp. Pl. v. p. 468. Adiantum trilobum, L. — Ad. humile trifoliatum et repens, Plum. Fil. p. 82, t. 99, f. C.*

Hab. Hispaniola, *Plumier*. — This and the following are taken up by Willdenow solely from the figures of Plumier: but whatever may be the genus of those, the present would seem to belong to *Adiantum*, if Plumier's description may be depended upon.

94. *D. ? trifoliata*, Sw.; "fronds bipinnate, pinnales ternate sessile very narrow linear truncate, rachis flexuose." *Willd. — Sw. Syn. Fil. p. 133. Willd. Sp. Pl. v. p. 478. Adiantum trifoliatum, L. — Adiantum triphyllum et retusum, Plum. Fil. p. 81, t. 99, f. B.*

Hab. Hispaniola, *Plumier*. — A fern with the slender pendent habit of some *Trichomanes*. The real nature of the sori is unknown.

unequally bi-trifid the lobes broad cuneate 2—4-veined, rachis wiry flexuose or zigzag prickly with curved spines, involucre terminal rather small cup-shaped or half oval not confluent less than the diameter of the segment. (TAB. LJV. B.)—*D. aculeata*, Sm. in *Act. Taur.* 1793. *Sw. Syn. Fil.* p. 134. *Fl. Ind. Occ.* iii. p. 1699. *Willd. Sp. Pl.* v. p. 479. *D. dumosa*, Sw. *Syn. Fil.* p. 135 and 353. *Willd. Sp. Pl.* v. p. 486, (not Kunze). *Adiantum aculeatum*, L. "*Spreng. Anleit.*"—*Adiantum frutescens, spinosum et repens*, Plum. *Fil.* p. 77, t. 94.—*Sloane, Jam.* i. p. 99, t. 61.

Hab. West Indian Islands, *Menzies*. Hispaniola, *Plumier*. Jamaica, *Swartz, Dr. Bancroft*. Dominica, *Dr. Imray*, n. 7.—This has all the appearance of a large climbing Fern. The caudex, Plumier tells us, "is no thicker than a writing pen, but it extends in every direction by means of long branches, which are as hard as wood and quite black and woolly. Fronds are produced from this caudex of prodigious length, with their stipes and rachis polished like ebony, and beset with hooked spines: from these spring long branches, sometimes alternate, sometimes opposite, waved and tortuous; from each bend or angle a branch proceeds, beset with pinnules or leaves resembling those of the Maiden-hair," *Adiantum Capillus*. "The whole plant, however," continues Plumier, "resembles a *Rubus* rather than an *Adiantum*, in consequence of its spiny character. It occupies a great quantity of surface and invests the largest forest-trees if growing near them. I have seen a whole field entirely covered with this Fern, in a place which the Buccaneers call 'Spiny bottom.' The same Buccaneers call the plant the *French Fern*."—By its broader pinnules and segments this plant seems to bear the same relation to *D. fumarioides*, that *D. retusa* does to *D. tenuifolia*.

It will be seen that I have differed from all my predecessors in uniting the *D. dumosa* with *D. aculeata*. For the *D. aculeata* the authority is Sloane's figure, which is sufficiently characteristic. The *D. dumosa* is a species wholly taken up from Plumier, whose figure is equally satisfactory, if we only make allowance for a little exaggeration in the spines of our plants. Sprengel seems to have been the first to consider Plumier's plant distinct, and to have misled the excellent Swartz, who in the *Flora Ind. Occ.* correctly enough referred to Plumier's figure for *D. aculeata*, which in his *Synopsis Filicum* he has removed to *D. dumosa*, in which work however he has under both species included the *Adiantum aculeatum*, L.: and, so conscious was he of the similarity of the two, that he observes, under *D. dumosa*, "simillima *D. aculeate* toto habitu, ita ut non valde miror Cel. Sprengelium l. c. hanc pro illam habuisse."

99. *D. fumarioides*, Sw.; fronds spreading ample scandent subtriplicate-pinnate firm submembranaceous, lower primary pinnæ 3—4-pinnate, pinnules ovato-lanceolate deeply bipinnatifid, segments cuneate digitated, the segments linear-cuneate obtuse single-veined, rachis wiry flexuose or zigzag prickly with decurved spines, sori solitary terminal, involucre cup-shaped or half-oval as broad as the segment.—*Sw. Syn. Fil.* p. 135. *Fl. Ind. Occ.* iii. p. 1701. *Schkh. Fil.* t. 129 (*excellent*). *Willd. Sp. Pl.* v. p. 480. *D. aculeata*,

"*Hedw. Fil.*" (according to Willd.) *Trichomanes aculeatum*, Sw. *Prodr.* p. 137. *Acrostichum aculeatum*, L. *Davallia dumosa*, Poepp. *Fil. Cub.* (in *Herb. Hook.*) and *Kze. Crypt. Poepp. in Linnæa*, p. 88.* (not Sw.)

Hab. West Indian Islands. Jamaica, Sloane, Swartz, Menzies, Wiles, McFadyen; Cuba, Poeppig.

Subgenus IX. DAREOIDEÆ. Sori lateral or sublateral, and more or less oblique upon a more or less dilated terminal segment. Involucre always close to the margin, broader than long, terminal upon a vein, somewhat cup-shaped, open only at the truncated mouth and forming a compressed pouch at the edge of the segment, of nearly the same texture as the frond.—Tropical or subextratropical Ferns, of the Old and the New World. Root tufted, fibrous. Stipes linear, compressed, sometimes with a few scattered scales. Fronds a span to a foot or more long, at first pinnate then compoundly pinnatifid, or deeply divided throughout in a bi-tri-pinnatifid manner, into narrow, linear segments, only a little dilated at the apices, everywhere glabrous, opaque, the texture moderately firm (probably rather fleshy when recent), single-veined, the vein sunk, obscure; colour pale green.

Obs. This is indeed a small though a very natural subgenus; in colour and texture so much resembling the group *Darea* among *Asplenium*, that I have derived the name of the subgenus from that circumstance: and the general obliquity of the sorus, opening towards the margin, strengthens the similarity. The resemblance is the greatest with *Asplenium (Darea) Shuttleworthianum*, Kze., in Schkuhr's *Suppl.* t. 14. There however the involucre are more elongated and are more decidedly lateral.

100. *D. gibberosa*, Sw.; frond ovate bi-subtripinnate subcoriaceous opaque, pinnæ acuminate deeply bipinnatifid, segments rather distant linear dilated at the apex simple or obliquely bifid gibbous on one side 1-veined, sorus on the

Fronde $1\frac{1}{2}$ to 2 feet high. Fructifications copious, one on almost each dilated apex of a segment, in a sinus of two unequal lobes, of which one is gibbous. The involucre is oblique, and opens towards the axis of the pinnules.

101. *D. Lindenii*, Hook. ; tufted, root fibrous but having a short thick rootstock, fronds (a span long) ovato-lanceolate bipinnatifid pale green, primary divisions lanceolate in circumscription, ultimate ones remote and rachis linear, the forms dilated upwards blunt and bearing the sorus obliquely in the inner margin, involucre cup-shaped compressed truncated generally with a short blunt falcate tooth on the outer margin formed by a prolongation of the segment, stipes longer than the frond compressed narrow-linear green, and as well as the frond bearing scattered brown at length deciduous subulate scales. (TAB. LVI. B.)— β . smaller segments narrower, apices of the segments more acute.

Hab. Caracas, *Linden*, n. 70 ; *Hartweg*, n. 1507 ; *Funck*, n. 648.— β . Organ mountains, on the stem of an old tree, *Gardner*, n. 200.—Very distinct from the preceding, and more allied to the following, from which it may be known by its smaller size, of a darker green, with more slender (yet decidedly compressed) stipes, shorter fronds, broader, with more distant segments and oblique sori, in which latter respects it approaches to *D. gibberosa*. Our var. β . from Brazil is more slender, with narrower segments, the ultimate ones more acute: but I see no other differences.

102. *D. Schimperii*, Hook. ; tufted (a foot high), root fibrous, fronds pale whitish green lanceolate with scattered brown deciduous scales, tripinnatifid, segments linear distant dilated at the apex and obtuse simple or forked on the lower ones sometimes pinnatifid, sori terminal solitary slightly oblique, involucre cup-shaped truncate rarely (the inferior ones) with a tooth on the outside, stipes shorter than the frond linear flat as broad as the segments with small scattered distant scales. (TAB. L. A.)—*D. concinna*, *Schimper*, *It. Abyss. Sect. 2da*, n. 1184, "*specimina maxima*," (not *Schrad.*)

Hab. Trunks of trees near Adesula, Abyssinia, *Schimper*.—This is a very different plant from the following, *D. concinna*. Its roots are tufted and fibrous, but in the centre of the fibres is a short cormus or root-stock, with some dark brown, glossy scales. Stipites crowded, several from the same root, linear, pale, almost white, flattened, with a few scattered dark brown scales, which are probably deciduous. Fronds a span and more high, lanceolate, bipinnatifid: primary segments or divisions lanceolate in circumscription, ultimate ones distant, and rachis of the same width as the stipes. Involucre terminal, solitary, a little oblique on each segment, slightly winged on each side, truncated.—Allied to *D. gibberosa*, but truly distinct, everywhere pinnatifid. Color very pale.

103. ? *D. concinna*, *Schrad.* ; "frond lanceolato-oblong

obtuse curved thick coriaceous glabrous above, beneath with scattered brown scales, more or less deeply pinnato-pinnatifid, pinnæ alternate patent ovate cuneate at the base, segments linear-spathulate curved bordered, the margin thickened reflexed retuse bi- or trifold, sori and involucre large semiorbicular, rachis flattened costate margined, stipes short ascending, caudex creeping densely clothed with brown rigid scales." *Kze.*—" *Schrad. Fil. Cap. in Goett. Gel. Anz.* 1818, n. 92, p. 918, not *Presl.*"* *Kze. Emend. ad Acotyl. Afr. Austr. in Linnæa*, xiii. p. 152, et in *Schk. Fil. Suppl.* p. 75, t. 37. *D. campyloptera*, *Kze. Acot. Afr. in Linnæa*, x. 544.

Hab. Interior of South Africa, *Drège, Krauss*, n. 742. — With this species I am not acquainted, and I am probably wrong in referring it to this subgenus: but I am induced to do so from the circumstance of Schimper having considered his plant, just described (*D. Schimperii*, nobis), to be a large state of it. It has not the habit, nor apparently the fructification, of this group.

Species of the Genus altogether doubtful.

104. *D. glauca*, Cav.; "leaves tripinnate, pinnules alternate glaucous, pinnules linear pinnatifid acute." *Cav. Præl.* 1801, n. 693. *Sw. Syn. Fil.* 134. *Willd. Sp. Pl.* v. 474.

Hab. Alps, Peru (*Cavanilles*). Probably not of this genus.

105. *D. hirsuta*, Sw.; "fronds subbipinnate pubescent, pinnules coadunate lanceolato-falcate crenated towards the apex." *Sw. Syn. Fil.* p. 131 et 243. *Willd. Sp. Pl.* v. 469. *Trichomanes hirsutum*, *Thunb. Jap.* 339, (*non Linn.*)

Hab. Japan, *Thunberg*.

106. *D. Magellanica*, "Desv.; frond glabrous, pinnules oblong lower ones sinuato-pinnatifid, upper ones toothed at the apex, sori scattered." *Spr. Syst. Veget.* iv. 120.

108. *D. wrophylla*, Wall. Cat. n. 2683; from the mountains of Sylhet, I have not been able to find in my own, nor in any other collection.

109. *D. cordifolia*, Roxb.; "creeping, petioles smooth, fronds about 6 inches high long-cordate polished and very firm oppositely pinnate, leaflets confluent falcate obtuse deeply crenate the lower pair semicordate, fructifications marginal with very distinct roundish hard scaly involucre." *Roxb. Crypt. Pl. Ind.* 52.

Hab. Mountains north of Rohilcunde, *Roxburgh*. "The habit of this species is remarkably hard and smooth."

110. *D. serrata*, Roxb.; "rachis 3-sided, fronds alternately pinnate, leaflets linear firm and smooth serrate, fructifications solitary at each serrature, involucre forming a small pouch after the capsules expand." *Roxb. l. c.* 52.

Hab. Prince of Wales' Island, *Dr. Roxburgh*.

111. *D. pilosa*, Roxb.; "fronds alternately bi- and tripinnate hairy, leaflets deeply crenate or pinnatifid, ultimate segments therefore semicircular somewhat crenulate and generally 3-flowered, involucre ciliate and separating outwards." *Roxb. l. c. p.* 53.

Hab. Eastern parts of the Delta of the Ganges, and thence introduced by Dr. Buchanan to the Calcutta Botanic Garden, *Roxburgh*.

112. *D. trapeziformis*, Roxb.; "stipes smooth nearly as long as the ovate-oblong alternately bipinnate and tripinnatifid fronds (1—2 feet high), leaflets subtrapeziform obtuse and more or less divided into rounded segments, fructifications generally in a single spot near the bottom of the fissures of the ultimate segments, involucre opening on the anterior margin forming a pouch." *Roxb. l. c. p.* 54.

Hab. Malaccas, *Roxburgh*. "Of a soft texture, tending to be villous."

(*D. angustifolia*, Roxb. l. c. p. 51, is *D. angustata*, Wall. (et nob. supra, p. 152), according to Griffith).

D. multiflora, Roxb. l. c. p. 53, is *D. parallela*, Wall. (et nob. supra, p. 153) according to the same authority.

D. longifolia, Roxb. l. c. p. 52, is probably *D. Emersoni*, Hook. et Grev. supra, p. 159.

(*D. ? achillæifolia*, Wall.; caudex ? flagelliform extremely long, semiterete branched stout creeping here and there woolly rooting spinescent, fronds distant alternate from two opposite sides of the caudex (?) bipinnate, pinnæ articulated

on the rachis oblong horizontally patent, the rachis winged, pinnules submembranaceous cuneate subdigitate unequally bi- or trifid, the segments cuneate, involucre ——— ? TAB. LVI. D.)—*Davallia achillæifolia*, *Wall. Cat. n. 248*.

Hab. Penang, *Dr. Wallich*. — Caudex, if it may be so called, perhaps, more correctly, creeping stipes, many feet long, as thick as a swan's quill, flexuose, branched but compressed or slightly channelled on the underside, destitute of scales, but furnished with short, distant, slightly curved spines on the convex or semiterete side. Fronds (or primary pinnæ) small, 4—6 inches high, almost sessile, narrow-ovate, submembranaceous. Pinnæ opposite or alternate, jointed on the rachis and deciduous, oblong-lanceolate, pinnatifid (or pinnate with a winged rachis), the segments or ultimate pinnules small, cuneate in the undivided ones, subflabellate in those which are twice or thrice lobed; the lobes with a single vein. There are small dark-colored deciduous scales scattered on the fronds and rachis.

The above description, together with our figure, TAB. LVI. D., will give a tolerably correct idea of this singular Fern, or state of a Fern; for Mr. J. Smith has pointed out to me in his collection a specimen he received from Professor Reinwardt of Leyden, under the name of *Lomaria polymorpha* (*Lomaria aculeata*, Bl. En. Fil. p. 205), which appears almost identical with this. Blume, however, places it among his doubtful *Lomaria*, and it seems to be the state he alludes to as “*var. B. laciniis cuneatis bitrifidis*.” Mr. J. Smith, too, finds a similar production on specimens of his *Stænochlæna* (*Acrostichum*, L.) *scandens*, from Mr. Cuming, which he has fully described in his Enum. Fil. Philipp. in Hook. Journ. of Bot. iii. p. 401, where he remarks “these abnormal fronds are usually about 3 inches in length and tripinnatifid, not unlike some delicate multifid species of *Davallia* or *Cheilanthes*. They are found on a lengthened rachis, like parts of the rhizoma, which are either smooth or aculeated. From Mr. Cuming's authority and Reinwardt's specimen, there can be now no doubt that it is a peculiar growth, common to more than one species of this genus. I am not, however, in possession of sufficient evidence to enable me to state under what circumstances it takes place, although, probably, I am not far wrong in saying that it may be considered analogous to the trichomanoid growth found on the stipes of *Henitelia* (*Alsophila*) *Capensis*,” (v. supra, p. 37). — In this view of the subject I heartily concur; it will probably be

habiting temperate climates both of the old and new world, and both hemispheres. Fronds generally small, delicate, membranaceous, bi-tripinnatifid or pinnate. Veins pinnate and forked, veinlets free, terminating a little within the margin.

Obs.—A genus founded on the well-known *C. fragilis*, whose fructification has been viewed by authors in very different lights, hence the copious list of synonymous genera: and it must be confessed that the smallness of the fructification, together with the very delicate succulent nature of the involucre when fresh, membranous when dry, soon becoming revolute and shrinking, has occasioned much of the difficulty. The few species which it contains are found to be extremely variable, and they have been needlessly multiplied; while on the other hand species have been added which clearly have no connexion with it. Confined to its legitimate species it is a very natural genus, and may assuredly be considered a connecting link between the *Davalliaceæ* and *Aspidiaceæ*, harmonizing better with the former than with the latter, especially with that group, or subgenus, as it is here called, of *Davallia*, *Leucostegia*. The involucre forms a kind of cup at the base, holding, as it were, in the young state, the sorus, and having a broad point of attachment. On account of the affinity with *Davallia*, I place the genus between that and *Lindsea*, some of whose species, as has been already intimated, bear also a close affinity to *Davallia*.

1. *C. fragilis*, Bernh.; fronds broad lanceolate bipinnate, pinnæ ovate or lanceolate variously toothed or lacinated or pinnatifid the segments more or less acute entire or again toothed, sori scattered more or less distant sometimes crowded and almost confluent, rachis winged.

a. *vulgaris*; fronds decomposed pale green, sori rather large generally crowded, involucre usually acuminate conspicuous.

Cystopteris fragilis, Bernh. *Neu. Journ. Bot.* ii. p. 27. *Polypodium*, L. *Aspidium*, Sw. *Willd. Sp. Pl.* v. p. 280. *Schkk. Fil.* t. 54 (*excellent*), and *vars. tt.* 55, 56. *Cyathea*, Sm. *Engl. Bot. t.* 1587. *Cyathea*, Sm. *Eng. Fl.* iv. p. 289. *C. orientalis*, Desv.

Hab. (a.) Rocks and walls, chiefly in northern or alpine regions throughout Europe. Kamtschatka, (*Herb. nostr.*) Iceland, *Hooker*. Abyssinia, *Schimper*. — N. America, from the middle states to the Polar sea: among the Rocky Mountains, and both on the Pacific and Atlantic sides of that continent. Madeira, *Mund* (*Herb. Carmichael*), *Loue* and others). Northern India, Afghanistan, *Griffith*. Kaffre country, Cape of Good Hope, *Ecklon*.

The type of this species, which I here call a. *vulgaris*, is familiar to every European botanist, and scarcely less common in moist mountain rocks in N. America; but no one can have seen an extensive suite of specimens, from the same or from different localities, without being aware of the varied aspect it exhibits. In South America it assumes rather a different character from the European plant, chiefly however depending on colour, whence it may be called

- b. *nigrescens*; fronds as in a, but when dry generally becoming dark olive or blackish.

Cystopteris fumarioides of some authors (scarcely of Presl). *C. translucens*, Desv. *Aspidium fragile*, Mart. et Galeot. *Fil. Mex.* p. 67.

Hab. Andes of Peru, Maclean, and Puruchucha, Mathews, n. 601. Columbia, Hartweg, n. 1526; Pasco, Cruckshanks (small and approaching *C. dentata*). Quito, Jameson. Guatemala, Skinner. Peak of Orizaba, Mexico, Galeotti, n. 6239.

- c. *dentata*; fronds bipinnate, pinnæ ovato-lanceolate, pinnales ovate obtuse bluntly and unequally toothed rarely pinnatifid.

European and Northern Asiatic Synonyms.

Cystopteris dentata, Hook. *Brit. Flor. ed. 5*, p. 441. *Aspidium*, Sw. *Willd. Sp. Pl.* v. p. 273. *Cyathea*, Sm. *Eng. Bot. t.* 1588. *Cystea*, Sm. *Engl. Fl.* iv. p. 300. *Polypodium dentatum*, Dicks. *Crypt.* iii. 1, t. 7. *P. Rhæticum*, Dicks. *Cyathea fragilis*, β. Sm. *Fl. Brit.* p. 1199. *Cyathea angustata*, Sm. *Eng. Fl.* iv. p. 301. *Cystopteris Canariensis*, Pr. *Aspidium*, Willd. *Herb.* *Aspidium Pontederæ*, Willd. *Sp. Pl.* v. p. 273. *Cystopteris retusa*, Decne. in Jaquem. *Voy. Bot.* p. 176, t. 177.

North American Synonyms.

Cystopteris tenuis, Schott. *Aspidium tenue*, Sw. *Willd. Pl.* v. p. 279. Schk. *Fil. t.* 53 b, (excellent). *Nephrodium tenue*, Mich. *Cystopteris fragilis*, β. Hook. *Fl. Bor. Am.* ii. p. 260. *C. atomaria*? Muhl. *Willd. Sp. Pl.* v. p. 279.

South American Synonyms.

Cystopteris fumarioides, Kze. in Poepp. *Fil.* p. 97. *Athy-*

Such, in our view of the subject, is the range and such the synonyms of this plant, and if it were worth the labour of investigation, the latter might be increased two-fold. Deavaux adds five names of Poiret to the list of synonyms, and among the sixteen species of *Cystopteris*, given as such, by that author, probably several might with propriety be referred to the present.

2. *C. alpina*, Desv.; fronds broad-lanceolate tripinnate, pinnules confluent ovato-oblong pinnatifid rather spreading, the segments broadly and shortly linear obtuse with 2 or 3 blunt erect teeth, involucre short and jagged, rachis winged.—*Hook. Brit. Fl. ed. 5, p. 441.* *Aspidium, Sw. Willd. Sp. Pl. v. p. 282. Schkh. Fil. p. 60, t. 62.* *Polypodium alpinum, Jacq. Ic. Rar. iii. t. 642, (excellent).* *Polypodium crispum, Gouan.* *Cystopteris regia, Pr.* *Cystea regia, Sm. Eng. Fl. iv. p. 302, (excl. the alpine station).* *Cyathea regia, Sm. Fl. Brit. p. 1140.* *Polypodium regium, Linn.* *Aspidium, Sw. Willd. Sp. Pl. v. p. 281.*

Hab. Alps, chiefly in the South of Europe. England; on a wall (since destroyed) at Low Layton, Essex, *T. F. Forster, Esq.*—An elegant bright green species, very different from the preceding, although nearest to some small states of *var. a*, and difficult to be defined in words.

3. *C. Tasmanica*, Hook.; small delicate, stipes short and rachis capillary, fronds oblong pinnated, pinnæ broadly ovate inciso-lobate upper ones decurrent lower ones petiolate and pinnatifid the segments ovate obtuse entire or slightly toothed, sori few very minute, involucre ovate acuminate, rachis winged above.

Hab. Van Diemen's Land, *R. Gunn, Esq.*—I was at one time disposed to refer this to one of the states of the *var. dentata* of *C. fragilis*, but the fact of Mr. J. Smith having received from the same country, though from a different source, an exactly similar plant, together with the delicate habit, large (comparatively) and broad, little divided pinnæ, and minute fructifications, induce me to keep it distinct. Caudex slightly creeping. Whole plant, including the stipes, 4—5 inches high.

4. *C. bulbifera*, Bernh.; frond broad-lanceolate or ovato-lanceolate and elongated bipinnate, primary pinnæ horizontal oblong-lanceolate from a broad base acuminate, pinnules oblong obtuse spreading pinnatifid toothed or pinnatifid, the segments entire or of the base of the lowermost pinnæ almost again pinnatifid, rachis not winged, that of the pinnæ often bulbiferous beneath, involucre subglobose.—*Aspidium bulbiferum, Sw. Syn. Fil. p. 29. Schkh. Fil. p. 55, t. 57, (excellent).* *Willd. Sp. Pl. v. p. 275.* *Polypodium, L.* *Nephrodium, Mich. Am. ii. p. 268.*

Hab. N. America, chiefly in the middle United States and Canada.—I have not seen this from a locality further south than Kentucky, except in one instance, from Virginia (*Mr. Greene*), nor further north than about

Quebec and Montreal. It is a most distinct species, with rather a stout, glossy, pale-coloured stipes and rachis, a remarkably elongated frond (sometimes 2 feet or more long), the pinnæ short, spreading horizontally, frequently opposite, and the pinnules again spreading at right angles, or nearly so, with their rachis, and that rachis often producing large, dark green, fleshy bulbs beneath, especially near the axil, which are well represented in Schkuhr.

5. *C. montana*, Link; fronds triangular short on a long stipes tripinnate, pinnæ and pinnules spreading ultimate pinnules narrow oblong inciso-dentate or pinnatifid, the segments toothed at the apex, rachis not toothed, involucre subrotund very obtuse.—*Aspidium*, Sw. *Willd. Sp. Pl. v. p. 286. Schkh. Fil. p. 61, t. 63, (excellent)*. *Polypodium*, *Haenke. P. myrrhidifolium, Vill. Delph. iii. p. 851, t. 53.*

Hab. Alps of the middle and south of Europe, but more frequent in the north, in Lapland, and in Norway very abundant. Only a single station has been discovered of it in Britain; on Ben Lawers, one of the Breadalbane mountains in Scotland, *Mr. Wilson*. Rocky mountains in N. America, *Drummond*.—A species well distinguished by its small triangular fronds and long stipes. The caudex is long, creeping, filiform, scaly, the stipes red-brown, scaly below.

6. *C. crenata*, Fries; “fronds triangular tripinnate, pinnules oblong obtuse subduplicato-crenate hairy beneath towards the apex acute confluent by the decurrent base, sori oblong, stipes chaffy.”—*Fries, Novit. Fl. Suec. p. 165. Aspidium crenatum, Sommerf. in Vet. Ac. Handl. 1834, p. 104.*

Hab. Gulbrandsdal, Sweden, *Sommerfelt*.—“Very rare, and a most distinct species of this genus, differing in the form of the sori nearly as *Aspidium Filix-femina* does from its congeners. A soft, delicate, marcescent, pale green Fern, 2 feet high. Stipes slender, fragile, glabrous, paleaceous, with blackish brown distant scales. Frond more than a foot long, triangular; primary and secondary pinnæ elongated, the outermost ones diminishing in size, thence acute. Rachis of the pinnules winged. The sori upon the lateral nerves oblong, lunate according to *Sommerfelt*, the indusium

blackish color. The form of the pinnæ and segments approaches that of *C. bulbifera*, but they are broader, and much less divided. The fructification, though old, is clearly that of a *Cystopteris*.

8. *C. albescens*, Link; "frond tripinnatifid its outline lanceolate, pinnules oblong inciso-pinnatifid crenulate with minute hairs on the superior surface attenuated at the base."—*Link, Fil. Hort. Berol. p. 47.*

Hab. Iceland? (*Link*).—"Fronds scarcely 3 inches high, pinnæ about 6 lines long, lower ones inciso-pinnatifid, upper undivided confluent; sori few lateral."—Of this I know nothing. The learned author compares it with *Hymenocystis*, Mey., but the "sori are not surrounded on all sides by the involucre."

9. *C. squamata*, Decne.; "fronds tripinnate on both sides as well as the stipes and rachis glabrous, pinnæ stipitate ovate or ovato-oblong, pinnules ovate towards the apex pinnatisected, the segments rather obtuse, involucre small roundish, capsules stipitate, sori verrucose, rhizoma creeping scaly, scales ovate peltate brownish."—*Decne. in Jacquem. Voy. Bot. p. 178.*

Hab. Cashmere, between Carli and Candahar, *Jacquemont*.—The above character, quoted from the Voyage of Jacquemont, is all we know relative to this plant, and is quite insufficient for its determination.

Doubtful Species, together with some that can be referred to other Genera.

C. obtusa, Presl, is *Woodsia obtusa* of this work, p. 62, (*Aspidium obtusum*, Willd.)

C. obovata, Pr. — The author gives this as the *Asplenium obovatum* of Viviani, and as such it is figured in Hook. et Grev. Ic. Fil., with the true fructification of an *Asplenium*.

C. atomaria, Pr. (*Aspidium*, *Muhl. et Willd.*)—I have quoted this doubtfully under *C. fragilis*, β . *dentata*; but I must acknowledge that I have never seen any authentic plant under that name, and can only judge from the locality and the description. I think Willdenow would have included it under his *Aspidium tenue*, had he been acquainted with that species at the time he received the specimens and name from Muhlenberg.

C. emarginata, Pr. Tent. Pterid. p. 93; name only.

C. leptophylla, Pr. (*Lonchitis tenuifolia*, *Beyrich's Herb.*) As Beyrich's plants were, I believe, chiefly from N. America, this will probably prove one of the many varieties of *C. fragilis*. Name only given.

C. atrovirescens, Pr. (*Cystopteris* sp. *Hort. Bot. Berol.*) Name only.

C. vestita, Pr. (*Dicksoniæ* sp. *Herb. Bras. Reg. Berol. n.* 118.)—This, judging from an authentic specimen received from Dr. Klotzsch, is the *Woodsia incisa* of Gill. and Hook. et Grev. Ic. Fil. t. 191. (See p. 63 of the present volume).

C. odorata, Pr. (*Aspidium odoratum*, *Bory*), from Mauritius. My specimen so named from Sieber, and which quite agrees with the description, is doubtless a *Lastræa*.

C. ? Brasiliæna, Pr. (*Aspid. Brasilianum*, *Br.*)—Name only.

C. gigantea, Pr. (*Aspidium foliosum*, *Wall.*) is *Diacalpe aspidioides*, Bl., and of this work, p. 59.

C. comosa, Pr. (*Polypodium foliosum*, *Wall.*), is *Alsophila comosa* of this work, p. 53.

C. aspidioides, Pr. (*Dicksonia aspidioides*, *Willd. Herb.*)—Name only. An *Diacalpe* ?

The *Aspidium viridulum*, Desv. Mag. Nat. Ber. 1811, p. 321, (*Polypodium adiantifolium*, Poir. Enc. v. p. 541),—the *Aspidium elatum*, Bory (*Aspid. Boryanum*, Willd.), *Aspid. scandicinum*, Willd., and *Aspid. Javense*, Willd., Desvaux refers to *Cystopteris*, but I know not upon what authority.

TRIBE IV. LINDSÆÆ.

Sori linear, transverse, more or less elongated, interrupted or continuous, marginal, uniting the apices of 2 or more free veins, or of several anastomosing ones. *Involucre* linear, marginal, double, often toothed, opening outwardly; one formed by the margin of the frond more or less scariose, the other accessory, thin, scariose, parallel with it or a little below it, including the *capsules* in the sinus.—*Tufted or generally creep-*

anterior or superior one frequently, however, broader than the inferior, the inner one appearing in that case to be intramarginal.

1. LINDSÆA, *Dry.*

Isoloma, *J. Sm.* *Schizoloma*, *Gaud.* *Synaphlebium*, *J. Sm.*

Sori marginal, double, continuous or interrupted. *Involucre* opening outwardly, formed of 2 linear membranes, of which the inferior may be considered accessory, uniting the apices of 2 or more veins. — *Tropical* or *subtropical* Ferns, *with frequently a creeping caudex*. Fronds *stipitate, simple or variously divided*. Pinnæ *equal or dimidiate*. Veins *free or simply anastomosing (without veinlets in the areolæ)* Costa *central or excentric, or wanting*. (HOOK. GEN. FIL. TAB. LXIII. A. and B., TAB. CII. and TAB. CI.)

Subgen. I. *Eulindsæa*. *Veins simple or forked*. *Lindsæa* and *Isoloma*. *J. Sm.*—Sp. 1—47.

* *Fronds simple*.

1. *L. reniformis*, *Dry.*; frond simple subcoriaceous orbiculari-reniform with a deep sinus.—*Dry. in Linn. Trans.* iii. p. 40, t. 7, f. 1. *Sw. Syn. Fil.* p. 118. *Willd. Sp. Pl.* v. p. 420. *Kze. in Schkh. Fil. Suppl.* t. 16, f. 2.

Hab. French Guiana, *Alex. Anderson, (Dryander)*. British Guiana, *Schomburgk*, n. 533.—Caudex short, creeping. Roots fibrous, wiry. Stipites a span high, somewhat tufted, ebony black. Fronds 2—3 inches in diameter: veins radiating, dichotomous; in one of my specimens 2 branches of the veins sometimes converge, thus anastomosing. Involucre continuous round the whole margin to a little distance from the sinus.

2. *L. sagittata*, *Dry.*; frond simple submembranaceous broadly ovato-sagittate acuminate.—*Dry. in Linn. Trans.* iii. p. 40. *Sw. Syn. Fil.* p. 118. *Willd. Sp. Pl.* v. p. 420. *Hook. et Grev. Ic. Fil.* t. 87. — *Adiantum* &c. *Aubl. Guyan*, ii. p. 964, t. 366.

Hab. French Guiana, *Aublet*. Guadalupe, (*Sprengel*) — A very rare species and quite distinct from the preceding one. Fronds more membranaceous, acuminate at the point and at the two deflexed lobes. Involucre everywhere continuous except at the point and the sinus, accessory one distant from the margin.

** *Fronds pinnate*.—Sp. 3—25.

† *Costa excentric or marginal, or obsolete*. *Sori on the superior margin of the unequal pinnæ*. *Lindsæa, J. Sm.* Sp. 3—22.

3. *L. cultrata*, *Sw.*; caudex creeping, fronds pinnate long-lanceolate, pinnæ submembranaceous horizontal ovate, the upper base truncate rather acute slightly arcuate at the upper margins the apex (usually) directed upwards, shortly and retusely lobed, the lobes bearing the oblong sori, stipes and rachis generally pale brown, the former occasionally black.—*Sw. Syn. Fil.* p. 119. *Willd. Sp. Pl.* v. p. 422. *Schkh. Fil.*

t. 114. *Hook. et Grev. Ic. Fil. t. 144.* *Adiantum cultratum*, *Willd. Phytogr. 14, t. 10, f. 2.*

- β. *minor*; smaller, pinnæ more obtuse, upper margin especially towards the apex curved a little downwards.
- γ. *pallens*; more flaccid, upper margin more lobed, sori more numerous shorter and smaller. *L. pallens* (*an Davallia?*), *Wall. Cat. n. 148.*
- δ. *attenuata*; tall, rather rigid, pinnæ longer and almost acuminate. *L. attenuata*, *Wall. Cat. n. 151.*
- ε. *lucens*; tall, pinnæ very obtuse and soriferous uninterruptedly to the apex, opaque (not pellucid) subcoriaceous glossy. *L. lucida*, *Wall. Cat. n. 145, (not Blume).*
- ξ. *Assamica*; pinnæ very obtuse and soriferous to the apex (not glossy) subcoriaceous, sori scarcely ever interrupted.

Hab. East Indies, apparently common, from Bengal (*Wallich*) to Sylhet and Assam, *Wallich, Griffith.* Java, *Blume, Lobb.* Ceylon, *Mrs. Gen. Walker, Mr. Hardie.* Philippine Islands, *Cuming, n. 243.*—β. Mergui, n. 877, and 96, and Bootan, *Griffith.* Luzon, *Cuming, n. 65, (L. cultrata, J. Sm.)*—γ. Nepal, *Dr. Wallich.* Sylhet, *De Sylva, (Wall.)*—δ. Assam, n. 862, and Khasiya, *Griffith.* Chapidong, *Wallich.*—I think I am correct in referring the above to *L. cultrata*, of which the figure in 'Icones Filicum' excellently represents the usual form. The more remarkable states are var. γ. *pallens*, in some specimens of which the upper margin of the pinnæ is so divided, and consequently the sori so interrupted, that there is no wonder Dr. Wallich should be disposed to look upon it as a *Davallia*—scarcely recognizable from *D. Boryana*;—and vars. ε. and ζ. in which the sori are very continuous and extended even over the blunt apex. In all, however, the inferior and superior involucre seem to be of the same texture and parallel, in that respect differing from *Davallia*.

4. *L. adiantoides*, J. Sm.; small tufted, caudex none, fronds pinnated lanceolate, pinnæ lax very thin membranaceous

ing to the broad apex, veins subflabellate, stipes elongated and rachis ebony black glossy. (TAB. LXIV. A.) — *J. Sm. MSS. (omitted by Mr. Smith in the Enum. Fil. Philipp. published in Hook. Journ. of Bot. v. iii.)*

Hab. Luzon, *Cuming*, n. 175.—A very distinct and rare species, caudex and coarse roots and stipes and rachis black. Pinnæ as in *L. adiantoides*, and as in many *Adianta*, deciduous, rather thick and somewhat coriaceous, entire, but sometimes with a little auricle at the superior angle next the rachis, quite sessile, very obtuse; involucre rather broad, continuous and extending to the rounded apex.

6. *L. Lobbiana*, Hook.; caudex somewhat creeping, fronds tufted pinnate linear-lanceolate much acuminate, lower pinnæ remote, the rest approximate, all of them slightly petiolate patent submembranaceous subnitent obliquely flabellate or half ovate, the superior base truncate, upper margin curved (convex) lobate soriferous, sori interrupted linear, stipes rather short and rachis brown. (TAB. LXII. C.)

Hab. Java, *Mr. Thos. Lobb*.—A very handsome and apparently distinct species, in many respects however according with the characters of *L. lucida* and *L. gracilis*, Bl., from the same country. But, without a figure, I should despair of making the character of the present one intelligible, so difficult is it to define in words the forms of the pinnæ of these plants. It is a very handsome species, a foot or a foot and a half long (the base and apex only being represented on our plate), erect, rather rigid. Stipites (much tufted) and rachis glossy brown, pale. Fronds deep green, a little shining. All the pinnæ are lobed in the upper margin, and the sori are as long as the lobes are broad.

7. *L. concinna*, J. Sm.; caudex somewhat creeping, fronds tufted pinnate linear-elongate acuminate, lower pinnæ remote, the rest close, all of them patent small submembranaceous pale obliquely flabellate obtuse few-veined, sorus continuing along the convex upper margin which is entire except sometimes in the lower pinnæ, stipes rather short and rachis brown. (TAB. LXI. B.)—*J. Sm. in Hook. Journ. Bot. iii. p. 415, (name only).*

Hab. Luzon, *Cuming*, n. 198.—Allied to the preceding, but rather smaller (a foot long), narrow, paler colored, not at all glossy; the pinnæ, especially the upper ones, closer to one another and to the rachis, quite entire, except sometimes in the lower ones, and approaching to flabelliform. Mr. J. Smith likens this to *L. elegans*, Hook., in *Ic. Pl. i. t. 98*, from Columbia, but that I fear is only an unbranched state of *L. stricta*.

8. *L. scandens*, Hook.; caudex very long stout climbing and rooting, clothed with ferruginous scales, fronds distant lanceolate elongate (large) pinnate subsessile dark green rather rigid, pinnæ approximate oblong-oval subdimidiate subfalcate obtuse entire truncate at the superior base which is

close to and parallel with the pale brown rachis, lower vein marginal strong, sori linear continuous along the upper margin and apex. (TAB. LXIII. B.)—*L. decomposita*, *J. Sm. in Hook. Journ. Bot.* iii. p. 415.

Hab. Luzon, *Cuming*, n. 405. Isle of Leyti, *Cuming*, n. 306. Pulo Penang, *Lady Dalhousie*.—This and the following are by far the largest of the simply pinnated group of true *Lindsæa* (*Eulindsæa*), and remarkable for the stout scaly climbing caudex, with distantly placed, long fronds, and dark green, closely placed pinnæ. In this, too, the fronds are nearly sessile, the stipes and rachis pale brown, semiterete.

9. *L. oblongifolia*, Reinw.; caudex long scandent scaly, fronds stipitate elongate (large) lanceolate attenuated, pinnules oblong obtuse superior base and lower margin straight truncate, upper margin and blunt apex crenate, involucre interrupted marginal, lower nearly marginal, stipes and rachis pale brown. (TAB. LXI. D.)—*L. oblongifolia*, *Reinw. MSS. (according to J. Sm.)*

Hab. South Camarines, Malay Archipelago, *Cuming*, n. 186.—Much resembling the foregoing, *L. scandens*, but the stipes is longer, the pinnæ narrower, less falcate, upper ones slightly crenate or lobed, so that the involucre is interrupted.

10. *L. linearis*, Sw.; caudex creeping brittle, fronds distant linear acuminate membranaceous pinnate, pinnæ rather rigid sessile flabellate (when dry revolute) the anterior margin soriferous uninterrupted, the involucre broad, sterile pinnæ subdimidiato-ovate toothed, stipes long glossy and the rachis purple brown.—*Sw. Syn. Fil.* p. 118 and 318, t. 3, f. 3. *Br. Prodr. Nov. Holl.* p. 156. *Kze. in Schkh. Suppl.* p. 30, t. 16. *Adiantum lineare*, *Poir. Encycl. Bot. Suppl.* i. p. 139. *Lindsæa lunata*, *Willd. Sp. Pl.* v. p. 421. *L. imbricata*, *Desv.*

the tetragonous stipes and rachis. Resembling also *L. flabellulata*, Dry., from which it appears to differ in the lower pinnæ being incised above only, not pinnatifid on both sides.—But assuredly the *L. flabellulata* of Dryander has no specific resemblance to *L. cultrata*.

12. *L. gracilis*, Bl.; “fronds pinnate membranaceous glabrous (shining above) pinnæ subsessile dimidiato-ovate obtuse the superior base truncate, the superior margin incisedentate, sori linear interrupted, stipes and rachis tetragonous glabrous.” *Bl. En. Fil. Jav. p. 217.*

Hab. Mountain places, province of Bantam, Java, *Blume*. — “Differs from the preceding (*L. lucida*, Bl.) in the slender stature and more obtuse pinnæ.”

13. *L. pectinata*, Bl.; “fronds pinnate elongate membranaceous glabrous, pinnæ subsessile dimidiato-oblong obtuse, the superior base truncate, the superior margin repando-denticulate, sori linear subcontinuous, stipes very short and rachis tetragonous glabrous.” *Bl. En. Fil. Jav. p. 217.*

Var. B. “pinnæ narrower, sori subrotund separated.” *Bl. l. c.*

Hab. Rocks and trees in the interior of Java. — *B.* On trees near Buitenzorg, Java, *Blume*. — “Differs from the preceding (*L. lucida*, *L. gracilis*, *L. pectinata*, Bl., &c.), in the elongated frond, the very short stipes, and in the inner involucre being exceedingly narrow.”

14. *L. Bantamensis*, Bl.; “fronds pinnate membranaceous glabrous very shortly stipitate, pinnæ subsessile dimidiato-oblong obtuse at the upper margin slightly incised, segments linear obtuse entire or emarginate.” *Bl. En. Fil. Jav. p. 218.*

Hab. Mountain woods, province of Bantam, Java, adhering to trunks of trees, *Blume*. — “Distinguished from the preceding (*L. pectinata*) by the more tender frond and the pinnæ at the upper edge slightly incised.”

15. *L. hymenophylloides*, Bl.; “fronds pinnate membranaceous glabrous shortly stipitate, pinnæ subsessile dimidiato-oblong obtuse deeply incised at the upper edge, segments linear obtuse bifid or twice bifid, sori subrotund.” *Bl. En. Fil. Jav. p. 218.*

Hab. On trees, interior of Java, *Blume*.

16. *L. parvifolia*, Pr.; “fronds linear pinnate, pinnæ alternate sessile rhomboid dimidiate crenulate above rounded at the apex retuse at the base, stipes and rachis semiterete margined.” *Pr. Tent. Pterid. p. 131.* *L. microphylla*, *Presl, Reliq. Hænk. i. p. 59, t. 10, f. 2, (not Sw.)*

Hab. Mexico, (*Presl*). — “Caudex subrotund, minute, hairy. Stipes half an inch. Frond 6—7 inches. Pinnæ 2 lines long, rather narrower than long, sessile, alternate, rhomboid-dimidiate, very glabrous. Veins fla-

bellate. Sori wanting."—The figure has to me quite the appearance of small unbranched states of *L. stricta*, Dry., also an inhabitant of Mexico, and is indeed the very next species which is described in the work above quoted. Kunze, however, is of a different opinion, and mentions its affinity with *L. linearis*, Sw., of New Holland, when describing that species.

17. *L. Leprieurii*, Hook. ; caudex filiform creeping, fronds oblong membranaceous pinnate, pinnæ half-ovate acuminate deflexo-falcate truncate at the superior base which is parallel to the obscurely winged rachis, lower vein parallel to, but a little distant from, the margin, terminal pinnæ with 3 acuminate lobes, sorus narrow continuous distant from the margin, stipes and rachis tetragonal dark glossy brown. (TAB. LXII. D.)

Hab. French Guiana, in mountainous places, *M. Leprieur* (*Herb. Rothery*).—Plant small, scarcely a span high. Stipes dark brown, almost black and glossy. Pinnules an inch or more long, decurvo-falcate, especially the lower one. Lower valve of the involucre much narrower than the upper which is quite foliaceous, not differing in texture from the rest of the pinna. Terminal pinna formed of 3 combined pinnæ, with a main nerve running through the centre.

18. *L. falciformis*, Hook. ; small tufted, caudex creeping clothed with chaffy hairs, stipes very short brown and as well as the rachis somewhat 4-angled, fronds lanceolate pinnate, pinnæ half oval-oblong obtuse falcate deflexed especially at the very obtuse apex, involucre continuous marginal, lower vein parallel to, but distant from, the margin. (TAB. LXIV. B.)

Hab. British Guiana, *Schomburgk*.—Stipites tufted, very short. Fronds somewhat rigid, small, with rather numerous and rather close-placed pinnæ.

19. *L. crenata*, Kl. ; caudex creeping clothed with fulvous hairs, fronds erect strict rigid oblong-lanceolate pinnate, pinnæ approximate horizontal subcoriaceous opaque (not

20. *L. pumila*, Kl.; small tufted, caudex somewhat creeping, fronds lanceolate pinnate submembranaceous, pinnæ erecto-patent rather distant obliquely cuneate with obtuse angles and few veins, sorus marginal continuous but not occupying the entire breadth of the pinnæ, stipes brown and as well as the straw-coloured rachis tetragonal. — *Klotzsch*, in *Linnæa*, 1844, p. 545.

Hab. British Guiana, *R. Schomburgk*.—A small, pale green, delicate species, scarcely more than four inches high, including the stipes. It seems to be a distinct species, bearing perfect fructification, but it is, perhaps, most nearly allied to the unbranched state of *L. stricta*, though of a far more delicate texture and with differently shaped pinnæ, for all are obliquely cuneate.

21. *L. dubia*, Spr.; caudex creeping slender, stipes rather long dark brown at the base, fronds ovate-oblong pinnate, pinnæ patent linear-lanceolate acuminate, slightly falcato-incurved, obliquely cuneated at the base, lobato-serrate on both margins towards the rather obtuse apex, main vein or costa excentric but distant from the inferior margin, becoming central towards the apex, and there only, throwing out veins on both sides, sorus marginal on the upper edge and continuous, except at the apex, where it is interrupted on the lobes or teeth, appearing occasionally on both margins. (TAB. LXIV. C.)—*Spreng. Syst. Veget. iv. p. 79. L. tenera, Kaulf. Fn. Fil. p. 219.*

Hab. French Guiana, *Richard*; British Guiana, *Schomburgk*.—A most distinct and well-marked species, evidently tending to unite the group or genus *Isoloma* (J. Sm.) with true *Lindsæa*; for the upper portion of the principal vein is central, the rest excentric; and the sori are produced only on the upper margin in the latter case, on both margins, occasionally, in the former.

22. *L. acutifolia*, Desv.; “fronds pectinato-pinnate, pinnæ on both sides pulverulento-tomentose (tomentum deciduous) lanceolate entire acute contracted below truncate at the base and above auriculate, sorus continuous, rachis tomentose.”—*Desv. Mem. Soc. Linn. ii. p. 312.*

Hab. Mauritius, (*Derraux*).—“Pinnæ an inch and a half long.” I have seen no *Lindsæa* corresponding with this from the Mauritius.

† *Costa central. Sori on both margins of the equal pinnæ. Isoloma, J. Sm. Sp. 23—25.*

23. *L. Walkeræ*, Hook; caudex tall creeping clothed with scale-like hair, stipes very long and as well as the rachis dark purple glossy, fronds broad-lanceolate pinnate, pinnæ coriaceous subopposite remote lanceolate or linear-lanceolate

equal, costa central, veins copious almost parallel with the costa, sorus marginal continuous on both sides. (TAB. LXIX. A.)

Hab. Ceylon, *Mrs. Gen. Walker*.—A very fine and distinct species, with the habit of *L. (Schizoloma) ensifolia*. Caudex thicker than a crow's quill, creeping, clothed with ferruginous, scale-like hairs. Stipes often a foot long, dark purple-black, glossy; rachis the same colour. Frond, six inches to nearly a foot long, of from six to seven pairs (for they are nearly opposite) of linear-lanceolate, acuminate, subcoriaceous pinnæ, with a terminal petiolated one, rather obtuse at the point; the base cuneate; their sides equal; costa central, throwing out numerous almost parallel, or but slightly spreading, dichotomous veins. Sori on both sides and forming the margin, continuous, narrow. The terminal pinna is sometimes lobed or angled on one or both sides of the base.

24. *L. lanuginosa*, Wall.; caudex tall robust, fronds oblong-lanceolate pinnated, pinnæ subcoriaceous approximate very numerous oblong approaching to lanceolate more or less falcato-incurved obtuse or acute deciduous, the sides equal, the base truncate sessile below clothed with deciduous wool, costa central, veins spreading copious in old fronds terminating on the upper side in white cretaceous dots just within the margin, sorus on both sides and at the margin continuous, stipes short and rachis (stout) more or less woolly. (TAB. LXIX. B.—*Wall. Cat. n. 154. Isoloma, J. Sm.*

Hab. Growing on trees in Singapore and Penang, *Dr. Wallich*; New Guinea, *Mr. Hinds*.—This has, probably, the longest fronds of any in the genus. Some of my specimens are two feet long, and stout in proportion, and in none do I appear to have the entire stipes. Caudex unknown to me. Stipes and rachis pale brown, terete, furrowed on one side. Pinna very numerous, 2—3 inches long, very deciduous, as in *Nephrolepis*, Schott, which the plant resembles in habit and in the presence of the cretaceous white dots. It is difficult to obtain perfect specimens.

25. *L. divergens*, Wall.; caudex creeping, stipes and rachis

forked veins, which terminate in clubbed apices at some little distance from the margin in the sterile fronds.

Obs. Some species of *Lindsæa* that have been supposed to be simply pinnate and described as such, for example *L. stricta*, *L. falcata*, will be found among the compound ones; and others, with reticulated veins, among the *Schizoloma* group.

*** Fronds bi-tripinnate (in some states only pinnate) or decomposed.

Sp. 26—47.

(Costa excentric or marginal or obsolete. Sori on the superior margin of the unequal pinnae. *Lindsæa*, *J. Sm.*, *g.*)

26. *L. cuneata*, Willd.; "frond pinnate, pinnae lanceolate elongated and pinnated at the apex, segments cuneiform rounded and entire at the apex."—*Willd. Sp. Pl. v. p. 423. L. heterophylla*, *Bory, MSS.*, (not *Dry.*)

Hab. Woods, Bourbon, *Bory*, (*Willd.*).—This seems to be only known to *M. Bory* and to *Willdenow*, the latter of whom, after a meagre description, remarks, "In litteris adnotavit Illustr. *Bory de St. Vincent*, frondem esse valde polymorpham."

27. *L. flabellulata*, *Dry.*; caudex creeping, stipites tufted generally elongated, fronds linear-lanceolate and pinnate or deltoid and caudate bipinnate, pinnules approximate shortly petiolate rather rigid flabellate and approaching to lunate or subrhomboid with the sides unequal the base obliquely cuneate, sometimes the upper ones are confluent, the superior margin crenulate or soriferous, sori continuous or interrupted, involucre toothed.

a. Dryandri; pinnules lunulato-flabellate. *L. flabellulata*, *Dry. in Linn. Trans. v. iii. p. 41, t. 8, f. 2.*

β. polymorpha; pinnules more frequently rhomboid-cuneate. *L. polymorpha. Wall. Cat. n. 14. Hook. et Grev. Ic. Fil. f. 75.*

γ. gigantea; two feet high, pinnules large in proportion rhomboid flabellate, terminal ones always confluent and much acuminate. (TAB. LXIII. C.).

Hab. *a.* China, *Sir G. Staunton, Bart.*, *D. Nelson*, and *Captain Beechey*. *Sumatra, C. Miller. Port Essington, N. Coast New Holland. Java, Lobb.*—*β.* Singapore, *Wallich.*—*γ.* Java, *Lobb.* Assam and Khasiya hills, *Griffith.*—A very variable plant, but happily there are good figures to refer to and authentic specimens at hand to aid in its determination.

28. *L. tenera*, *Dry.*; caudex creeping scaly, stipites tufted, fronds deltoid-ovate 3—4 pinnate, pinnules all petiolate cuneate or obliquely cuneate membranaceous variously cut and lobed, the lobes soriferous at the apices.—*Dry. in Linn.*

Trans. v. iii. p. 42, t. 10. L. interrupta, Wall. Cat. n. 2195. Vittaria interrupta, Roxb. Crypt. Pl. Ind. p. 49.

Hab. East India, *Missionaries of the Soc. of United Brethren (Dryander)*. Madras, *Dr. Wight, Wallich*, (n. 2195). Malacca, *Cuming*, n. 399. Mount Ophir, and in Java, *Thos. Lobb*.—This certainly resembles some states of *L. flabellulata*, but the texture is much thinner and more membranaceous, the pinnules more cuneated and much more uniform, more decidedly and constantly petiolate and more lobed, so that the sori, being on comparatively narrow lobes, the fructification is much interrupted; and the pinnules are nearly confluent. Dryander's figure is highly characteristic, except that the specimen is a small one and the pinnules scarcely so much lobed as usual. Our specimens are generally a foot and a half long, the stipes about equal in length to the frond or longer.

29. *L. media*, Br.; "fronds bipinnate deltoid, pinnules obovato-rhomboid subcoriaceous, inferior ones lobed, the rest entire, the superior edge unisorous, sorus continuous the sterile ones serrated at the apex, stipes tetragonous."—*Br. Pordr. Fl. Nov. Holl. p. 156.*

Hab. Tropical shores of New Holland, *Brown*. E. Coast of Tropical New Holland, *A. Cunningham*.—A span to nearly a foot high. In general aspect much resembling *L. tenera*, but the pinnules are less lobed and the whole more rigid and subcoriaceous.

30. *L. filiformis*, Hook.; small, caudex? rachis long slender filiform flexuose scandent semiterete grooved anteriorly, frond bipinnate, pinnæ nearly opposite secund linear-lanceolate, pinnules very small distant petiolate obliquely- or dimidiato-ovate membranaceous obscurely lobed and unisorous on the anterior margin, vein 2—3 branched, 2 superior branches bearing the sorus. (TAB. LXIII. D.)

Hab. British Guiana, *Schomburgh*.—I regret that I possess but an imperfect specimen of this curious little fern. This is a span long, about one-half being represented at our TAB. LXIII. D. The caudex is wanting. The rachis, as I take it to be, is long and flexuose, glossy, the pinnæ nearly

elongated at some distance from the margin, stipes brown, rachis straw-colour. (TAB. LXV. B.)

Hab. St. Catharine's, Brazil, *Captain Beechey*.—Stipes and frond each 6—8 inches long. This again is a very Davalloid-looking plant, of the "cuneate" section or Subgenus of that family, and in many respects allied to *Davallia bifida*. Here, however, the ultimate lobes are never single-veined, but they bear 2—4 veins, and the sorus is lengthened out transversely in proportion.

32. *L. Gardneri*, Hook ; frond subdeltoid acuminate membranaceous dark green rather rigid 3—4 pinnate, pinnæ half-ovate with the superior base truncate or smaller and obliquely cuneate cut about half-way down into broadly cuneate toothed segments which are approximate entire or 2-lobed the apices uni- or bisorous, sori reniform terminating 2 or 4 veins. (TAB. LXV. C.)

Hab. Organ Mountains, Brazil ; on a dry shady bank, *Mr. Gardner*, n. 156. — Nearly allied to the preceding, but darker-coloured in every part, more rigid, the pinnules much less deeply divided and the divisions more approximate (having much narrower sinuses).

33. *L. elongata*, Lab. ; caudex creeping, stipes terete furrowed on one side hispid at the base, frond deltoid-ovate bi-tripinnate, pinnæ ovate or lanceolate acuminate ultimate ones pinnatifid, pinnules and segments obovate obtuse fertile ones truncated, all of them coriaceous many-veined somewhat toothed, sori terminating the lobes but opening downwards (on the underside).—*Labill. Sert. Austr. Caledon. p. 6, t. 9.*

Hab. New Caledonia, *Labillardière*.—The author just mentioned has well figured and described this plant ; and no other botanist seems to have gathered it, so that it is probably peculiar to New Caledonia : but it is again one of those ferns which has as strong a claim to be placed in the Genus *Davallia* as in *Lindsæa*. In habit and texture it is allied to *Davallia retusa* (p. 188, t. 52, A.), but is much smaller, much less divided, more coriaceous, more closely-veined, and the lobes and ultimate pinnules are less truncate and cuneate, especially the barren ones ; so that if placed in *Davallia* it could not well be referred to the cuneate section along with that species. I am indebted to P. B. Webb, Esq., for an original specimen of *Labillardière*.

34. *L. pendula*, Kl. ; caudex creeping clothed with compact paleaceous hairs, stipes elongated, frond (rather small) ovate bipinnate, pinnæ horizontal linear obtuse terminal one elongated, pinnules all pendulous and secund obovate obliquely cuneate subcoriaceous, sori quite marginal broad. (TAB. LXV. A.)—*Klotzsch, in Linnæa, 1844, p. 548.*

Hab. British Guiana, *Rich. Schomburgk, in Herb. J. Smith*.—This is a very remarkable species, extremely unlike any other, of which I have seen no specimen, save one sent by Dr. Klotzsch to Mr. J. Smith, and which is

here figured. The pinnules are small, uniform, invariably pendant, not only on the nearly horizontal pinnæ, but upon the erect terminal one, and though distichous in insertion they all point to one side so as to be secund.

35. *L. quadrangularis*, Rad.; stipes 4-sided, frond bipinnate, pinnæ linear-lanceolate elongated attenuated rather slender, pinnules half-ovate subtrapeziform obtuse, superior base truncated occasionally subauriculated, gradually smaller towards the apices of the pinnæ, superior margin straight erosodentate, sori within the margin continuous or interrupted.—*Raddi, Fil. Bras. p. 55, t. 74.*

β. rather larger, sori more interrupted. *L. trapeziformis, Langsd. et Fisch. Fil. p. 21, t. 24.* *L. pallida, Kl. in Linnæa, 1844, p. 547.*

Hab. Rio Janeiro, *Raddi (Herb. nostr.)* Brazil, *Mr. Gardner, n. 158, 1225, 2987.*—β. British Guiana, *R. Schomburgk (Klotzsch), n. 1205.* St. Catharine, Brazil, *Langsdorff; Allan Cunningham.* Columbia, *Linden.* Venezuela, *Aldridge.* Dominica, *Dr. Imray.*—A variable plant, of which the β. seems to be the most common form and the one nearest to *L. trapeziformis.*

36. *L. horizontalis*, Hook.; stipes upwards 4-sided, frond bipinnate, pinnæ broad-lanceolate acuminate, pinnules approximate horizontal half-ovate narrow elongated straight rather acute gradually smaller towards the apex of the pinnæ, superior base truncate, superior margin quite entire, sori a little within the margin continuous. (TAB.-LXII. B.)

Hab. Dry woods, Organ Mountains, *Gardner, n. 157.* Pangoa, Peru, *Mathews.*—Resembles *L. quadrangularis*, but the pinnæ are much broader, the pinnules are almost exactly horizontal, larger indeed, but longer and narrower in proportion, more acute, the superior margin quite entire, sori always continuous.

37. *L. trapeziformis*, Dry.; stipes 4-sided, frond bipinnate

in *Linn. Trans.* iii. p. 41, t. 7, f. 2. *Sw. Syn. Fil.* p. 118. *Willd. Sp. Pl.* v. p. 422. *L. divaricata*, *Kl. in Linnæa*, 1844, p. 547. *L. Portoricensis* and *L. Brasiliensis*, *Desv. (fide Spr.)*

7. much smaller, firmer and somewhat coriaceous. *L. parasitica*, *Wall. Cat.* n. 2196. *Vittaria parasitica*, *Roxb. Crypt. Pl.* p. 48.

Hab. West Indies and tropical S. America, and β . Guiana, *Hostmann*, n. 108; and *Schomburgk*, n. 347. Brazil, East Indies, and Penang, *Wallich*. Mergui and Malacca, *Griffith*.— γ . Malacca, *Cuming*, n. 333. Penang, *Lady Dalhousie*. Prince of Wales' Island, *Dr. Roxburyk*; on the trunks of trees. — Assuredly a very protean species, and widely extended in the tropics of the Old and of the New World. So variable are the pinnules in different specimens and even on the same plant, that it is next to impossible to form a specific character which shall distinguish them. The figure of Dryander does not represent the more usual form, though the superior pinnules not unfrequently assume that character. The larger specimens with the more falcate pinnules are the most abundant and the most widely extended both in the East and West Indies. Where the one is found, however, the other is generally found also. Mr. Griffiths remarks of his recent specimens, that in certain lights they exhibit a metallic blue tinge; and this is singularly the case with a *Lycopodium* (*Sect. Stachygyndrum*), now cultivated in the stoves of our botanic gardens. The *Lindsæa falcata* of Dryander is simply a young, less divided state of *L. trapeziformis*.

38. *L. arcuata*, *Kze.*; "frond bipinnate, pinnæ (3—7) alternate linear-oblong acuminate, pinnules dimidiato-ovate falcate, lowest and ultimate ones flabelliform, all incurved at the obtuse apex, sori continuous on the superior margin." *Kze. Syn. Pl. Crypt. Poepp.* p. 86.

Hab. Woods Pampayaco, Peru, *Poeppig*.—"Frond 7—12 inches, glabrous. Its place is near *L. trapeziformis*." *Kze.*

39. *L. caudata*, *Hook.*; stipes terete and as well as the rachis deep brown glossy, frond bipinnate, pinnæ narrow numerous (11—17) lanceolate the apex long attenuate caudate, pinnules half ovate lunulato-falcate decurved membranaceous close, superior base truncate upper margin forming almost the segment of a circle quite entire, terminal ones gradually smaller on the caudex or tail-like point, sori at the very margin and continuous to the obtuse apex.

Hab. Adam's Peak, Ceylon, *Mrs. Gen. Walker*.—I was at first disposed to refer this to a state of *L. trapeziformis*, but the more numerous pinnæ, tapering to a tail-like point, blunter pinnules, exactly marginal sori, terete and darker coloured stipes, seem to indicate a specific distinction; and these characters exist in four fine specimens sent at different periods. I am not disposed at all times to lay much stress on the 4-sided or terete stipes, which differences are, sometimes at least, caused by the greater or less state

of ripeness of the plant. The present species dries of a very dark colour; *L. trapeziformis* generally of a light colour.

40. *L. stricta*, Dry.; stipes terete grooved on one side, frond rigid (rufescent) bi- rarely tri-pinnate (simply pinnate when young), pinnæ linear elongated straight gradually attenuated erect or slightly patent terminal one elongated, pinnules trapezoid flabelliform or lunulato-cuneate gradually smaller upwards subcoriaceous a little distant, upper base truncated lower margin often arched upper semicircular entire or (barren) serrated (or the pinnæ are sometimes lunate with a cuneate base), sori continuous (sometimes short) very broad placed at some distance within the superior margin, often bent back or downwards when dry.—*Dry. in Linn. Trans.* iii. p. 42. *Schkh. Fil. t.* 114. *Willd. Sp. Pl. v. p.* 425. *Sw. Syn. Fil. p.* 119. *L. Javitisensis*, *H. B. K., Willd. Sp. Pl. v. p.* 424. *Raddi, Fil. Bras. p.* 56, *t.* 75, *f.* 1. *L. gracilis*, *Kl. in Linnæa*, 1844, p. 549. *L. Raddiana*, *Kl. in Linnæa*, 1844, p. 549. *L. elata*, *Desv.* *L. pusilla*, *Splitg. En. Fil. Surin. p.* 35.—Frond simple; *L. rigescens*, *Willd. Sp. Pl. v. p.* 424. *L. elegans*, *Hook. Ic. Pl. t.* 98. *L. microphylla*, *Presl, Rel. Hænk. p.* 59, *t.* 10, *f.* 2 (*barren*)?*

β. *tripinnata*; frond tripinnate larger more membranaceous, pinnules more frequently lunate.—*Gardn. Bras. Coll. n.* 5323.

Hab. Throughout tropical America, especially on the western side. West Indies, Trinidad, and Columbia, *Funk, Cuning, n.* 1101. Santa Martha, *Purdie*. Mexico, *Hænke, Otto*. Isle of Gorgona, west of Panama, and Sandwich Islands (?), *Barclay*. Brazil, *Gardner, n.* 5324.—β. Minas Geraes, *Gardner, n.* 5323.—An extremely variable plant, as is so much the case with the individuals of this genus, in size, ramification, and in the form of the pinnules, though the common form has a very peculiar aspect

frequently curved or falcate, pinnæ 3—7 or 13 linear-strap-shaped very much elongated especially the terminal one acuminate falcate, pinnules approximate horizontal semi-ovate very obtuse membranaceous entire gradually smaller towards the apex, superior base truncate, upper margin semicircular, lower straight or slightly arched, sorus narrow a little within the margin continuous but frequently abbreviated not occupying the whole of the upper margin. (TAB. LXII. A.) *Dry.* in *Linn. Trans.* iii. p. 42. *Sw. Syn. Fil.* p. 119. *Willd. Sp. Pl.* v. p. 434. *L. rufescens*, *Kze. in litt.* (*vide J. Sm.*) *Adiantum Guianense*, *Aubl. Guian.* p. 963, t. 365.

β. major; larger, 1½, 2, or 3 feet, pinnules less approximate. *L. Moritziana*, *Kl. in Linnæa*, 1844, p. 548.

Hab. Guiana, common, *Aublet, Schomburgk*, n. 346; *Hostmann*, n. 96.—*β.* French Guiana, frequent, *Leprieux (Herb. Rothery)*. Bluefield Mountains, Jamaica, *Purdie*. Venezuela, *Aldridge*.—This fern is much more uniform in its habit than the preceding. What I have called our *β.* is larger and with more lax or distant pinnules than *α.* which is well represented in *Aublet*, and (*α. pinna*) in our Tab. 62, A. Still there seem to be intermediate states between this and *L. stricta*.

42. *L. rigida*, *J. Sm.*; caudex long creeping scaly, rough with short distant inconspicuous prickles, frond bipinnate rigid (rufescent) subfalcate, pinnæ 7-9 remote linear alternate falcate terminal one very long, pinnules approximate coriaceous flabellate or rhombic- or oblong-flabellate, upper base truncate, lower margin straight or slightly arched, upper one semicircular lobed and crenated margined, veins very prominent on both sides, sori abbreviated quite marginal on one or two terminal lobes, involucre coriaceous. (TAB. LXIII. A.)—*J. Sm. in Hook. Journ. of Bot.* iii. p. 415, (*name only*).

Hab. Malacca, *Cuming*, n. 397. Mount Ophir, Malacca, *Griffith, Mr. Thos. Lobb*.—A most distinct and very handsome species. Habit of some of the commoner forms of *L. stricta* of the New World, but always more or less falcate in the fronds and in the pinnæ, far more coriaceous and rigid, with singularly prominent pale veins, of which those bearing the sori seem to be connected by a transverse one as far as the sorus extends. Involucres opening quite at the margin (never bending back or down) and singularly rigid and coriaceous.

43. *L. Lessonii*, *Bory*; caudex filiform creeping scaly, stipes tetragonal filiform, frond (small) broad lanceolate membranaceous pinnate and especially below bipinnate, pinnæ oblong-lanceolate lobed (or pinnated) cuneate at the base, ultimate ones and pinnules cuneate decurrent, their apices toothed, costa central in the undivided pinnæ, with the sori

on the lobes intramarginal, terminal and continuous on the cuneate pinnules.—*Bory in Duperrey, Voy. p. 278, t. 3, f. 2. All. Cunn. Fl. N. Zel. in Hook. Comp. Bot. Mag. ii. p. 366. L. discolor, Colenso.*

Hab. New Zealand, Northern Island, *Duperrey, All. Cunningham, Mr. Colenso, J. D. Hooker.*—The figure in *Duperrey* well represents our form, but the specimens are generally much more truly bipinnate, sometimes almost to the apex, more frequently in the lower portion of the frond. *Dr. Hooker* suspects, and with some justice, that the species is only a simpler form of the following, though intermediate states are rare.

44. *L. trichomanoides*, *Dry.*; caudex filiform creeping scaly, stipes tetragonal filiform, frond (small) broad lanceolate membranaceous bipinnate sub-tripinnate, pinnules cuneate decurrent entire or lobed toothed, sori intramarginal at the apex of the lobes and occupying their whole breadth.—*Dry. in Linn. Trans. v. iii. p. 43, tab. 11. Sw. Syn. Fil. p. 119. Schkh. Fil. p. 106, t. 114. All. Cunn. Fl. N. Zel. l. c. p. 366. L. viridis, Colenso. n. 299; and in Tasman. Journ. ii. p. 174. Adiantum cuneatum, Forst. Prodr. n. 461. (not Lindsæa cuneata, Willd.)*

Hab. New Zealand (Bay of Islands, *Mr. Menzies*). Northern Island, *All. Cunningham, Mr. Colenso, J. D. Hooker, Dr. Sinclair.*—Larger than the preceding (sometimes nearly a foot high, including the stipes), and much more compound, bipinnate and even tripinnate, segments and pinnules all wedge-shaped, confluent.

45. *L. microphylla*, *Sw.*; stipites short cæspitose, frond elongated oblong-lanceolate tripinnate, primary pinnæ distant, pinnules small broad cuneate toothed simple or bi-trifid, sori intramarginal, involucre toothed scarcely extending to the margins.—*Sw. Syn. Fil. p. 120. and 319. Willd. Sp. Pl. v. p. 426. Br. Prodr. p. 156. Hook. et Grev. Ic. Fil. t. 194.*

Hab. New Holland, about Port Jackson, abundant. *Sieb. Syn. Fil. n. All. Cunningham.*—A distinct and well marked form, and cuneate tapering into a kind

Hab. British Guiana. *R. Schomburgk*.—No remarks on the affinities of this are given.

47. *L. cuneifolia*, Pr. "fronds ovato-triangular quadruplicato-pinnate tripinnate at the apex, primary and secondary pinnæ alternate acuminate, tertiary obtuse, pinnules cuneate truncate at the apex bi-trifid, sori linear continuous, rachis glabrous." *Presl, Reliq. Hænk.* 1, p. 60.

Hab. Island of Luzon. (*Presl.*)

Dubious species, or wholly unknown.

L. bilobata, Pr. name only.

L. truncata, Pr. name only, said to be a *Vittaria* of Gaudichaud, but I do not find such a species described.

L. pelacophylla, Pr. in Herb. Meyen.

L. securifolia, Pr. in Herb. Meyen.

L. brevifolia, Reinw. in Pr.

Subgen. II. *Schizoloma*, Gaud. *Veins more or less anastomosing, with no free veinlets in the areolæ.*—Sp: 48—60.

* *Fronds simple or only lobed.*

48. *L. cordata*, Gaud.; caudex creeping short, stipites tufted elongated, fronds coriaceous, sterile ones ovato-cordate obtuse entire, fertile linear-lanceolate or tripartite with the segments linear-lanceolate, costa prominent beneath, veins reticulated, sorus continuous the whole length of each margin. (TAB. LXVI. A.) *Schizoloma cordatum*, Gaud. *Ann. Sc. Nat.* 1824, p. 507; in *Freye. Voy.* p. 179, t. 16.

Hab. Rawak in the Moluccas, *Gaudichaud*. New Guinea, *Hinds*.—A highly peculiar and *Acrostichum*-like fern, apparently of very rare occurrence.

49. *L. Griffithiana*, Hook.; lax and flaccid, caudex creeping short, stipites shorter than the elongato-lanceolate simple membranaceous costate frond, veins reticulated, sorus continuous round the entire margin. (TAB. LXVIII. B.)

Hab. Mergui, East Indies, *Griffith*.—The caudex, in the only specimen I possess, bears 5 fronds, and all of them accord in the quite entire nature of the frond.

** *Fronds pinnate (or, when young, simple).* Sp. 49—56.

† *Costa central. Sori on both margins of the nearly equal pinnæ.* Sp. 49-54.

50. *L. pentaphylla*, Hook.; lax and flaccid, caudex creep-

ing short, stipites shorter than the pinnated membranaceous frond, pinnæ about 5-costate, lateral ones ovate-oblong obtuse, terminal one elongated lanceolate, veins reticulated, sorus continuous round almost the entire margin. (TAB. LXVII. A.)

Hab. New Holland, *Mr. Bynoe*.—This may possibly be a state of *L. ensifolia*, but the very short side pinnules are at variance with such an opinion.

51. *L. ensifolia*, Sw. ; firm and rigid, caudex very short creeping, stipes (as well as the rachis) glabrous as long as, or longer than, the pinnated frond, pinnæ 5—13 linear-ensiform or lanceolate erecto-patent submembranaceous sterile ones subserrate, veins reticulated, sorus continuous round the whole margin.—*Sw. Syn. Fil. p. 118, t, 137.*

α. Fronds linear-ensiform obtuse. *L. ensifolia*, *Sw. Syn. Fil. p. 118, t. 317.* *Willd. Sp. Pl. v. p. 420.* *Hook. and Grev. Ic. Fil. tab. III.* *Schizoloma ensifolium*, *J. Sm. Lindsæa lanceolata*, *Labill. Pl. Nov. Holl. ii. p. 98, t. 248, f. 1.* *Br. Prodr. Nov. Holl. p. 156.* *L. membranacea*, *Kze. in Linnæa, v. xviii, p. 121.* *L. pteroides*, *Wall. Cat. n. 2193.* *L. sublobata*, *Kze. in Linnæa, v. xviii, p. 121.* *Schizoloma Billardieri*, *Gaud. in Freyc. Voy. Bot. p. 380, t. 17.* *Pteris stricta*, *Lam. Pteris angulata*, *Pr. Pt. angustata*, *Wall.*

β. pinnules very long attenuated. *L. attenuata*, *Wall. Cat. n. 2192.*

γ. pinnules broad-lanceolate attenuate. *L. longipinna*, *Wall. Cat. n. 2194.*

Hab. Chiefly the tropical parts of the Old World. Madagascar (*Kaul-*

Tab. 63, B, which is a new species of *Adiantum*, nor Kze. *Anal. Pterid. p. 37, t. 25*). *Schizoloma macrophyllum*, Pr.

Hab. Guiana (*Kaulfuss*).—I must acknowledge myself to have committed a gross error in representing the fructification of the plant figured in the 'Genera Filicum,' TAB. LXIII. B, as a *Schizoloma*, Gaud. It was sent to me as the *L. macrophylla*, Kaulf., by M. Moricand: but a subsequent inspection has proved that we were deceived. By a singular reduplication, if I may so call it, of the involucre of this plant, it assumes, even under a lens, at first sight, quite the appearance of a *Lindsæa*. On soaking a portion of a pinna the real structure is exhibited, and the fern proves to be a new species of *Adiantum*, (*Hewardia*, J. Sm.) It is, I think, more than probable that the learned author of 'Analecta Pteridographiæ' has been equally deceived with myself, for the plant he figures with the fructification of a *Lindsæa* is a Brazilian plant and apparently derived from the same source as mine. Kaulfuss' plant, however, let it be observed, is from French Guiana (not Brazil). It remains to be ascertained whether Kaulfuss himself was not in a similar manner misled, and whether the fructification of the original species is not that of *Adiantum*. If it is not so, I can only say I am totally unacquainted with the true *L. macrophylla*; and I am not aware that any botanist since the time of Kaulfuss has noticed it. *L. macrophylla*, according to that author, is a very striking plant. "Caudex a foot high, frond 7 inches long, pinnæ 5—7, 3 inches long, an inch or more broad." In everything but the fructification (supposing Kaulfuss to be correct on that point) our plant of the 'Genera Filicum' quite accords with *L. macrophylla* Kaulf.

53. *L. Guerinianu*, Gaud. MSS.; caudex slightly creeping scaly, stipes rather long and rachis terete, frond lanceolate pinnate, pinnules nearly horizontal approximate subcoriaceous opaque ovate acute subfalcato-incurved obscurely serrate, the superior base truncate and subauriculate, the sides nearly equal, costa and reticulated veins immersed obsolete, sorus continuous occupying both margins.—*Schizoloma Guerinianum*, Gaud. in *Freye. Voy. p. 380, t. 18*.

Hab. Molucca Islands (Rawak), *Gaudichaud*. Island of Celebes, *Herb. Norris*, (*J. Smith*).—Ten inches to a foot or more high, including the stipes, which is about equal in length to the frond. It is a very distinct species and apparently very rare. Its pinnae are about 3—4ths of an inch long, smaller upwards, and they are deciduous at a joint as in *L. (Isoloma) lanuginosa*, Wall. *Gaudichaud* notices on the epidermis of the pinnae minute microscopic scales, which in the living state have a whitish furfuraceous appearance.

54. *L. Fraseri*, Hook.; caudex creeping scaly, stipites much shorter than the elongated linear-oblong pinnated frond, pinnae thin membranaceous nearly opposite remote cordato-ovate obliquely cuneate at the base obtuse obscurely lobed serrated partially reticulated, main vein or costa central

upper pinnae gradually smaller and subtrapezoid, sori marginal interrupted. (TAB. LXX. B.)

Hab. North coast of New Holland, Stradbroke Island, *Fraser*. Port Essington, *All. Cunningham*.—Mr. J. Smith has suggested that this may be a state of *L. heterophylla*, Dry.; but my specimens from Mr. Fraser and those of Mr. Smith from Mr. Allan Cunningham are so perfect and uniform and so different from that species that I am unwilling to unite them. Here the stipes (dark brown below) is shorter than the frond, the latter being 8—10 inches or almost a foot long, rachis straw-coloured slender, pinnae remote, except the uppermost ones, generally opposite or nearly so, remote, membranaceous, pellucid, the largest of them about three-quarters of an inch long.

†† *Costa excentric marginal or obsolete. Sori on the superior margin of the unequal pinnae.* (*Synaphlebium*, *J. Sm.*), Sp. 55, 56.

55. *L. intermedia*, Hook.; stipes longer than the frond tetragonus, frond oblong pinnated, pinnae rhomboideo-lanceolate submembranaceous rather rigid reticulate, inferior half obliquely cut out to the costa, the rest of the pinnae with the costa or principal vein central, sorus continued round the margin except in the lower base. (TAB. LXVII. B.)

β. *minor*; *Synaphlebium recurvatum*, *J. Sm. in Lond. Bot. Journ.* v. iii. p. 415 (*name only*), *excl. the syns.*

Hab. Phillipine Islands, *Cuming*, n. 464; and β. Malacca, n. 392.—This is another instance, in my opinion, of the instability of the Genus *Synaphlebium* (*J. Sm.*), as distinguished from *Schizoloma* (supposing that itself to be a good Genus). In the present instance one-half of the pinnae is indicative of the former Genus, the other of the latter. There is probably an error in numbering some of Mr. Cuming's specimens of this fern. His n. 404, according to Mr. J. Smith, is a true *Lindsæa*, which he refers to *L. decomposita*, and seems to answer to my n. 405, which I have referred to *L. scandens*, Hook. Mr. Cuming's n. 392 is a small var. of this species which Mr. J. Smith refers to *L. recurvata*, Reinw.

occupied by the costa, and no portion of the costa is distant from the margin. It is probably the *L. nitens* of Blume, a name it scarcely merits; and being thus doubtful, I prefer the more appropriate one of Wallich, and it seems to be the same species to which Reinwardt has given the same name adopted by Presl, who, however, refers it to *Lindsæa*, though it properly belongs to his *Schizoloma*.

*** *Fronds bipinnate or decomposed.* Sp. 57—60.

57. *L. heterophylla*, Dry.; frond lanceolate or deltoid pinnate with pinnules pinnatifid or bipinnate, pinnæ or pinnules lanceolate or rhomboid—cuneate or nearly orbicular petiole or sessile subcoriaceous membranaceous opaque, veins both forked and reticulated, sori continuous.

α. frond lanceolate pinnate, pinnæ mostly rhomboid-lanceolate. *L. heterophylla*, Dry. *Linn. Trans. v. iii. p. 41, t. 8, f. 1.* *L. variabilis*, Hook. et Arn. *Bot. of Beech. Voy. t. 52, (right hand figure).*

β. frond deltoid, lower pinnules elongated pinnatifid. *Schizoloma heterophyllum*, J. Sm. in Hook. *Journ. of Bot. iii. p. 414.*

γ. frond broad lanceolate mostly bipinnate, pinnules suborbicular small, terminal ones generally lanceolate often pinnatifid at the base. *L. variabilis*, Hook. et Arn. *Bot. of Beech. Voy. p. 257, t. 52, (left hand figure).* *L. Finlaysoniana*, Wall. *Cat. n. 2197.*

Hab. α. Malacca, Robertson, (*Dryander*).—3. Luzon, Cuming, n. 275.—γ. Singapore, Wallich. Isle of Loo Choo, Beechey.—Appropriate as Dryander's name is for the original species, it becomes still more so now that other states of it are detected. Mr. Dryander's plant is the more simple form, merely pinnated; the plant figured as *L. variabilis* in the Botany of Beechey's Voyage above quoted, left hand figure, is an intermediate state, and the *L. Finlaysoniana* of Wallich is the most compound of all. The pinnæ or pinnules vary from orbicular (small and ecostate) to lanceolate (large in proportion) with a central costa, and the veining is as variable as the pinnules, sometimes forked and not uniting, sometimes anastomosing.

58. *L. propinqua*, Hook.; stipes tetragonous about as long as the frond, frond bipinnate ovato-acuminate in circumscription, pinnæ 5—7 oblong-lanceolate terminal one elongated, pinnæ thin membranaceous reticulated oblong subtrapezoid, the apex rounded the base obliquely cuneate tapering into a short petiole, the lower margin formed by the costa, upper margin crenato-lobate, sori interrupted. (TAB. LXVI. B.) Hook. in Nightingale's *Oceanic Sketches*, App. p. 130.

Hab, Navigator Islands, Sir T. Nightingale.—A very distinct species

from any previously described, with singularly thin, membranaceous pinnules, the sterile ones much more deeply lobed than the fertile ones.

59. *L. obtusa*, J. Sm.; caudex creeping, stipes tetragonal twice or thrice longer than the frond, frond pinnate broadly ovate or subdeltoid, pinnæ 4 — 5 oblong-lanceolate subcoriaceous-membranaceous firm reticulated, pinnules oblong somewhat 4-angled rarely subrecurvo-falcate apex very obtuse, superior base truncate, the lower margin formed by the costa, superior margin slightly lobed, sori broad interrupted.—*Synaphlebium obtusum*, J. Sm. in *Hook. Journ. Bot.* p. 415, (*name only*).

Hab. Malacca, *Cuming*, n. 394.—Allied to the preceding, but different in the much smaller size, firmer texture, dissimilar shape of the pinnules, which, however, form almost an exact parallelogram in most instances with 4 somewhat acute angles, copious and broad sori, interrupted indeed but placed close together in consequence of the proximity of the lobes.

60. *L. davalloides*, Bl.; caudex creeping, stipes and rachis long tetragonous glabrous, stipites tufted, frond subdeltoid-ovate bipinnate, pinnæ erecto-patent lanceolate acuminate, pinnules dimidiato-oblique membranaceous reticulated (reticulations few) the apex obtuse, superior base truncate, costa at the inferior margin, superior margin rather deeply but irregularly lobed, sori interrupted linear confined to the apices of the lobes. (TAB. I, XVIII. A.)—*Bl. En. Fil. Jav.* p. 218. *Kze. in Schkh. Fil. Suppl.* p. 12, t. 7, (*sori not accurate*). *L. lobata*, *Wall. Cat.* n. 152. *Davallia Kunziana*, *Hook. supra*, p. 177.

Hab. Singapore, *Wallich*, 1822, *T. Lobb. Java*, *Blume*, *T. Lobb.* (*Herb. Jav.* n. 216.) Malacca, *Griffith*.—Misled by Kunze's figure of the fructification of this plant, I was induced to refer it to *Davallia*, at page 177 of this work: but now that I find it is the *L. lobata* of Wallich, and that I have recently received fine specimens from Java, gathered by Mr. Thos.

ment on both sides. Veins internal, transverse, subapproximate, flexuose, very much branched. Veinlets anastomosing copiously into unequal somewhat 6-sided areoles; the areoles bearing forked veins, whose ultimate branchlets are free, and clavate at the apex.

1. *D. Panamense*, Hook. Gen. Fil. Tab. 62.

Hab. Isthmus of Panama, coast of the Pacific, Cuming, n. 1124. New Grenada, Purdie.—A very rare and singular fern, with the habit of *Vitis*, but broader than any known species and more rigid, fructification of a *Lindsaea*, and with the venation of *Amphibletra* among the *Adiantum* group, or *Gymnopteris* among the *Acrostichum* group. The fronds are 2 to 3 feet long and more, the sterile ones much broader than the fertile, but the sterile sometimes become fertile towards the apex.

END OF VOL. I.

MEMORANDUM

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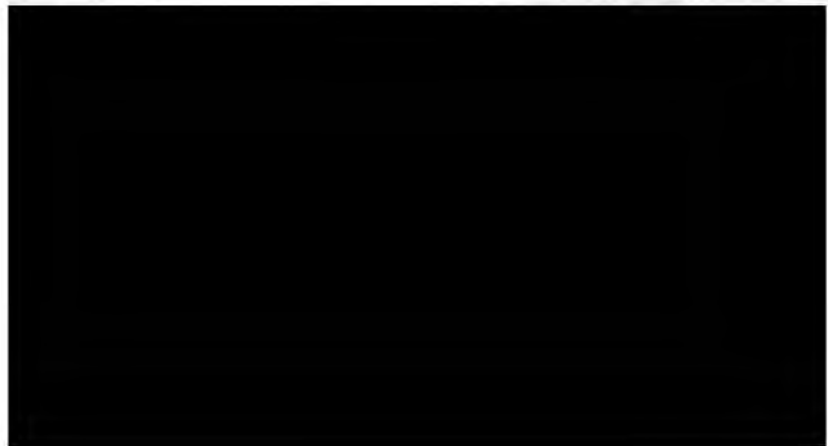
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ERRATA.

At Page 150, for SUBORD. III. read TRIBE III.

” ” and on line the eighteenth from the bottom, for “Suborder of ferns” read *Tribe of ferns*.







TAB. I.

A. GLEICHENIA SPELUNGE, Br.—p. 2.

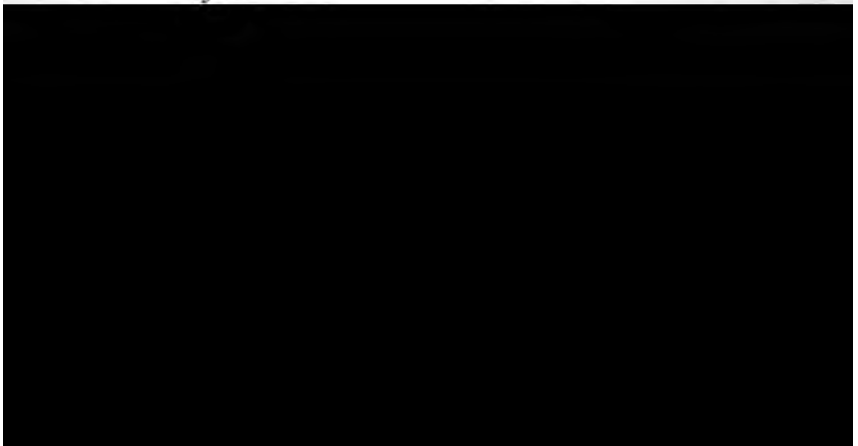
Fig. 1. Small entire plant, *nat. size.* Fig. 2. Portion of a larger frond. Fig. 3. Fertile segments, *magnified.*

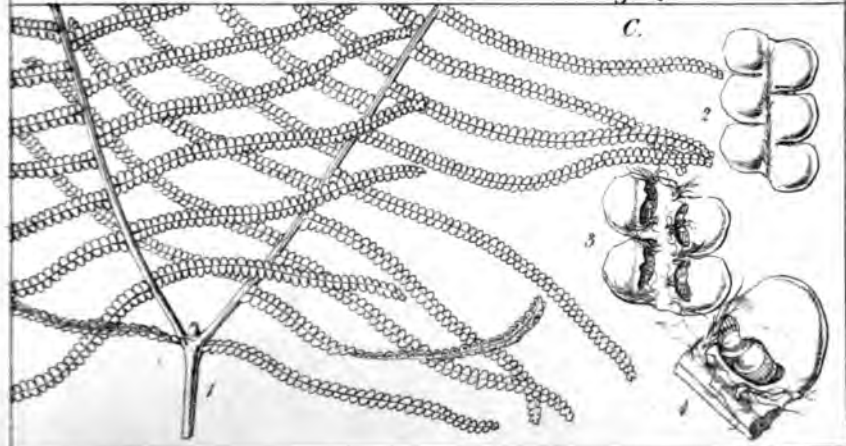
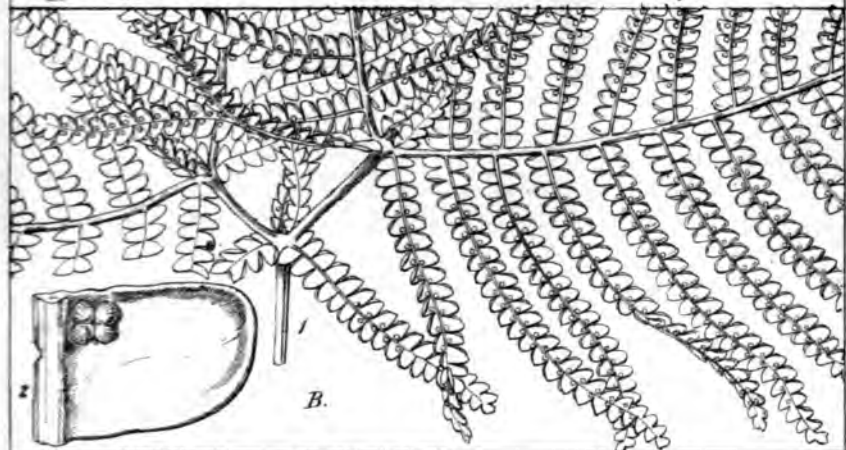
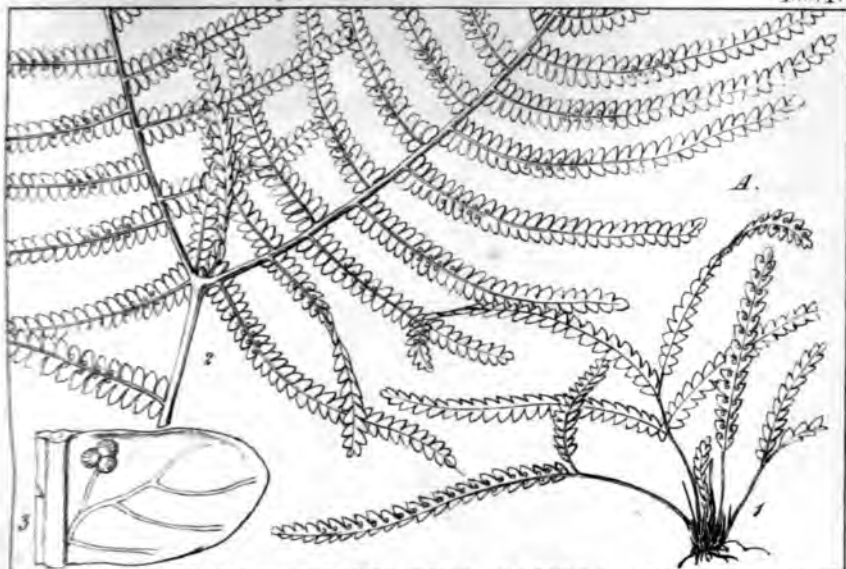
B. GLEICHENIA RUPESTRIS, Br.—p. 2.

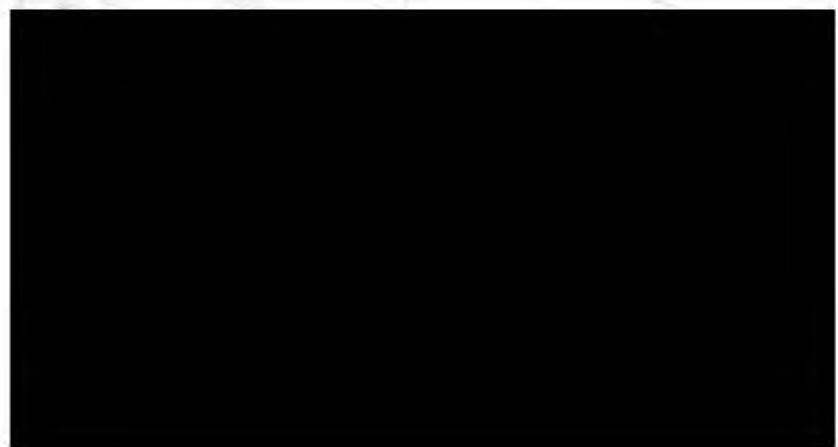
Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Fertile segment; *magnified.*

C. GLEICHENIA DICARPA, Br.—p. 3.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Upper side of a fertile portion of a pinna; and Fig. 3. Lower side of ditto; *magnified.* Fig. 4. Single segment; *more magnified.*









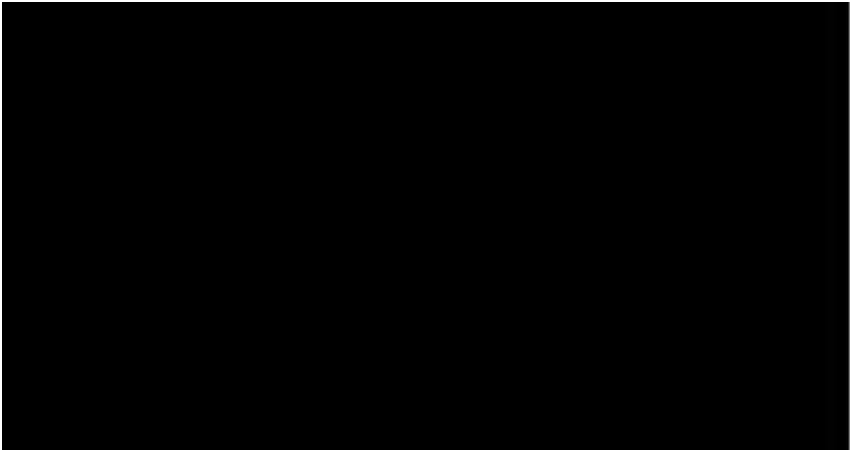
TAB. II.

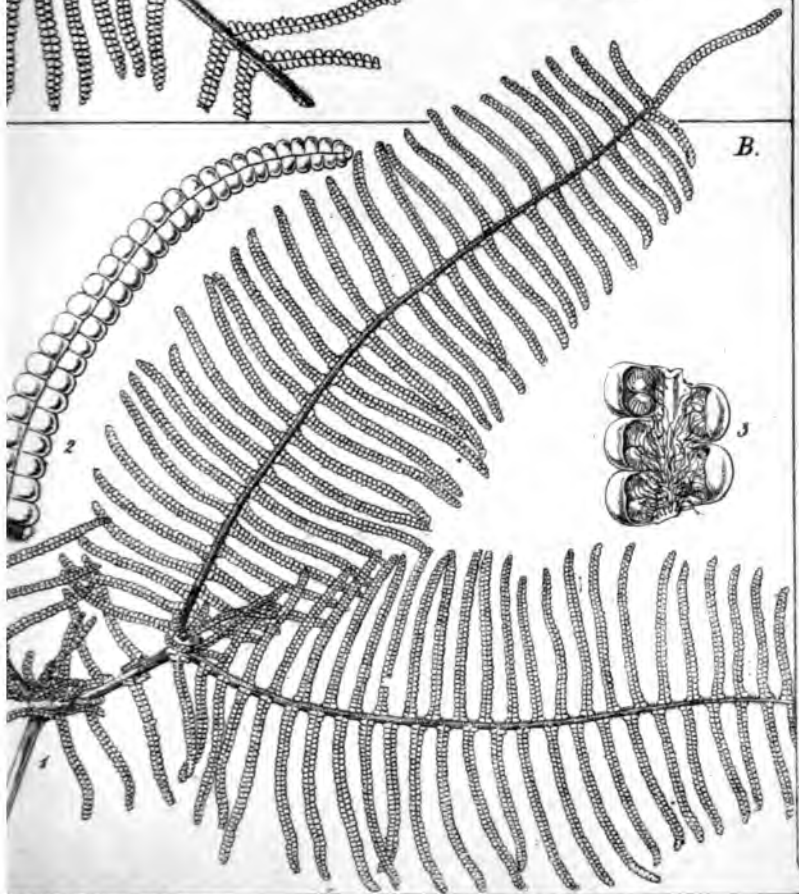
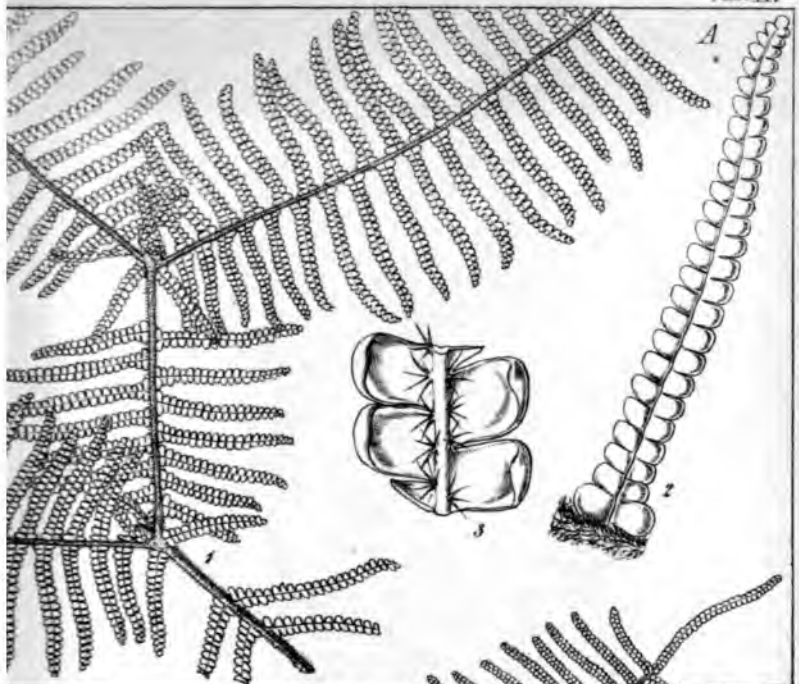
A. GLEICHENIA SEMIVESTITA, *Lab.*—p. 3.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Upper side of a pinna; *magnified.* Fig. 3. Lower side of a portion of a pinna (sterile); *more magnified.*

B. GLEICHENIA HECISTOPHYLLA, *All. Cunn.*—p. 4.

Fig 1. Portion of a frond; *nat. size.* Fig. 2. Upper side of a pinna; *magnified.* Fig. 3. Under side of a portion of a fertile pinna; *more magnified.*









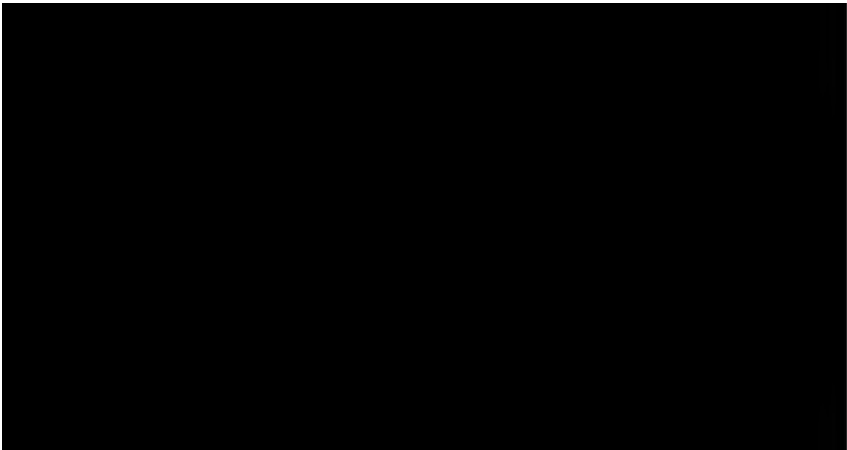
Tab. III.

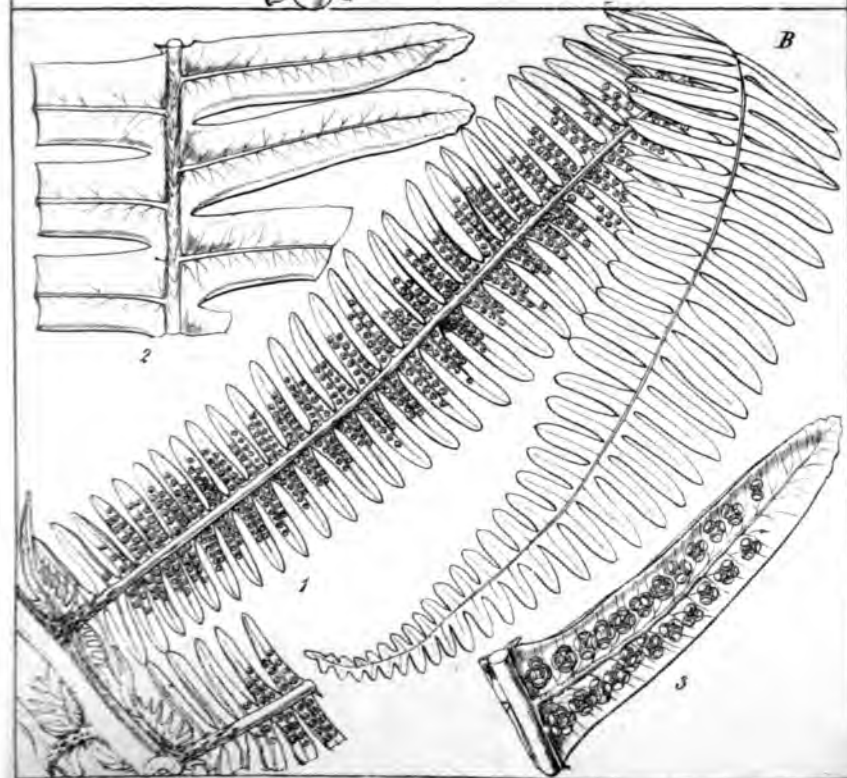
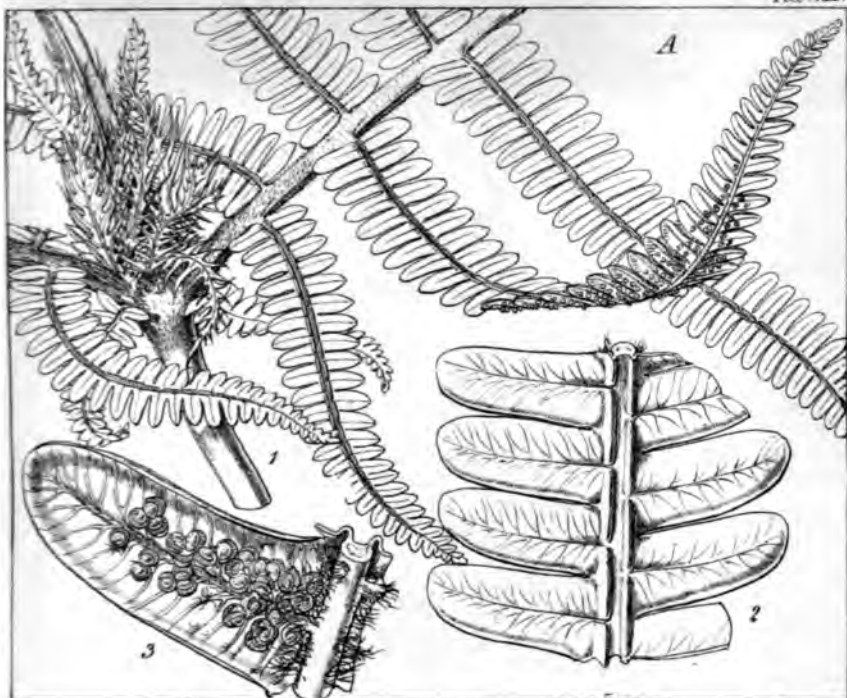
A. *GLEICHENIA GIGANTEA*, Wall.—p. 5.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Upper side of portion of a pinna; *magnified.* Fig. 3. Under side of a fertile segment; *more magnified.*

B. *GLEICHENIA GLAUCA*, Sw.—p. 4.

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. Upper side of a portion of a pinna; *magnified.* Fig. 3. Under side of a fertile segment; *more magnified.*







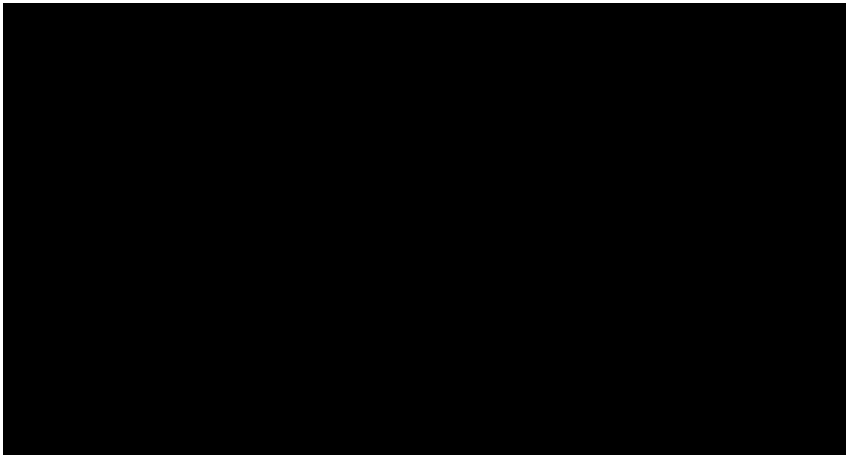
TAB. IV.

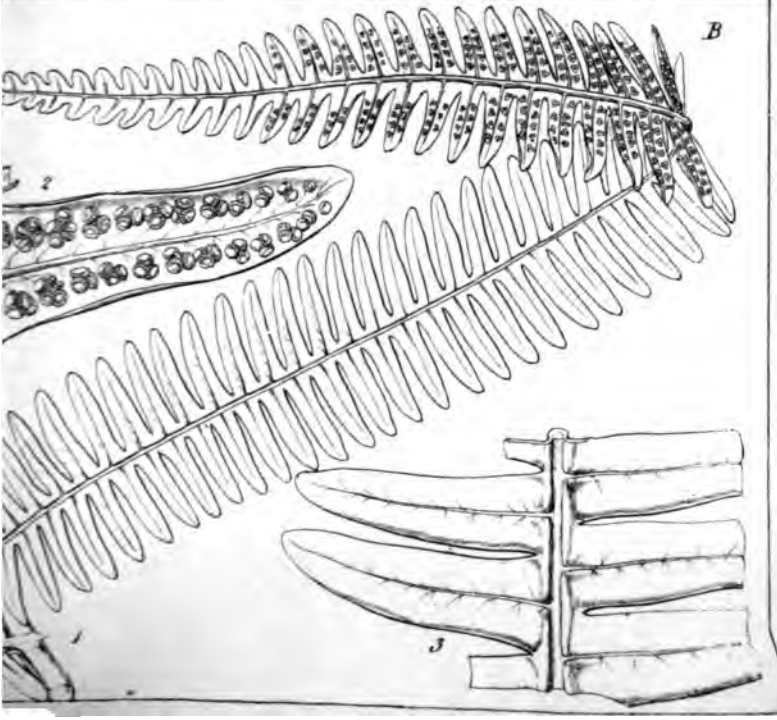
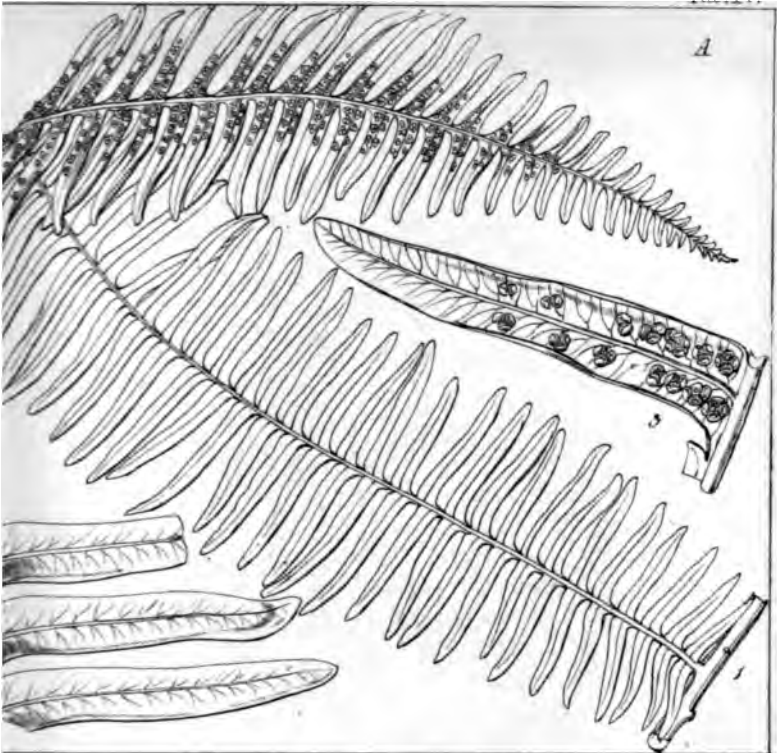
A. *GLEICHENIA BANCROFTII*, Hook.—p. 5.

Fig. 1. Fertile pinna; *nat. size*. Fig. 2. Upper side of a portion of ditto; *magnified*. Fig. 3. Under side of a segment of ditto; *more magnified*.

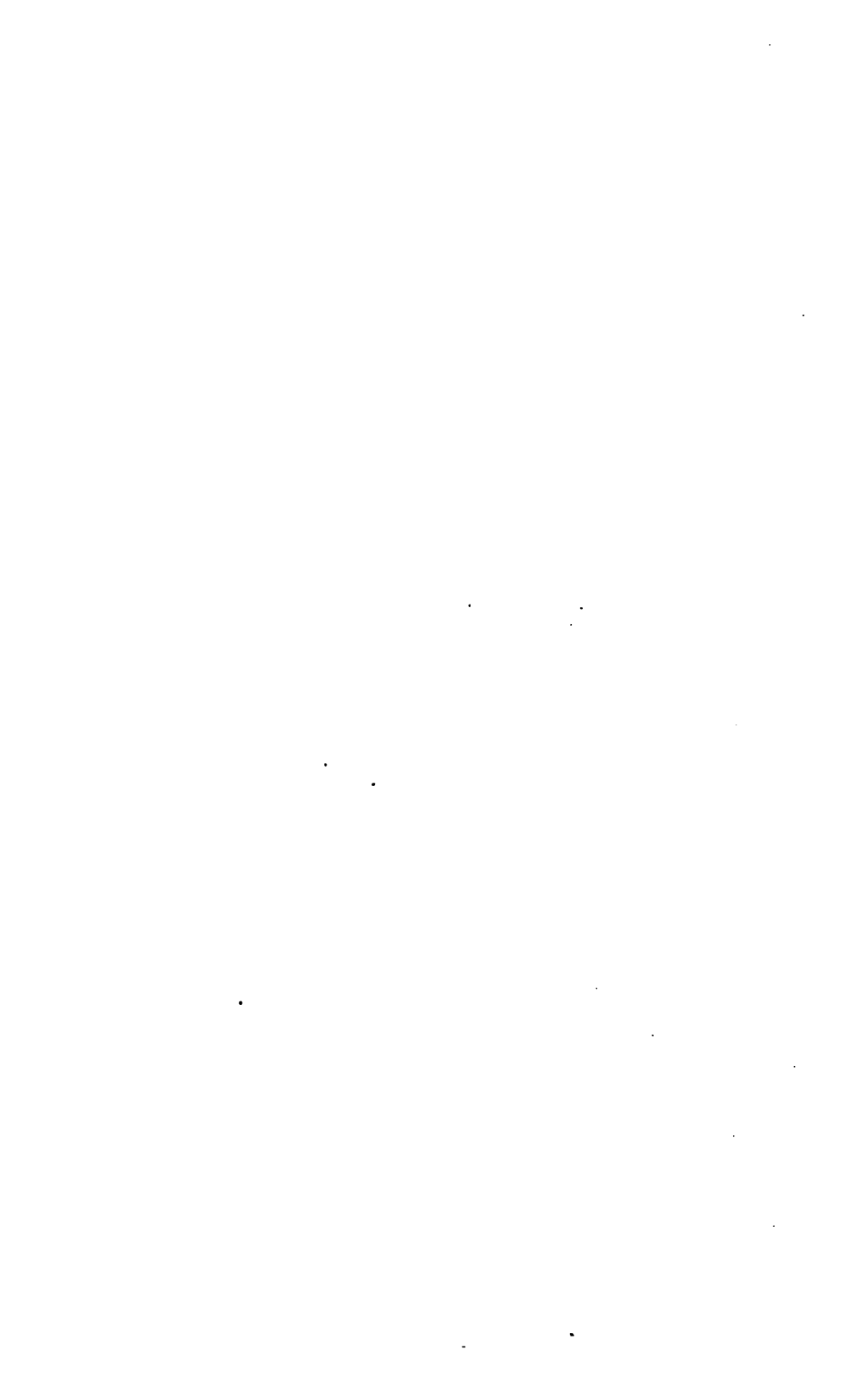
B. *GLEICHENIA EXCELSA*, J. Sm.—p. 5.

Fig. 1. Fertile pinna; *nat. size*. Fig. 2. Under side of a segment of ditto; *magnified*. Fig. 3. Upper side of a portion of a pinna; *magnified*.









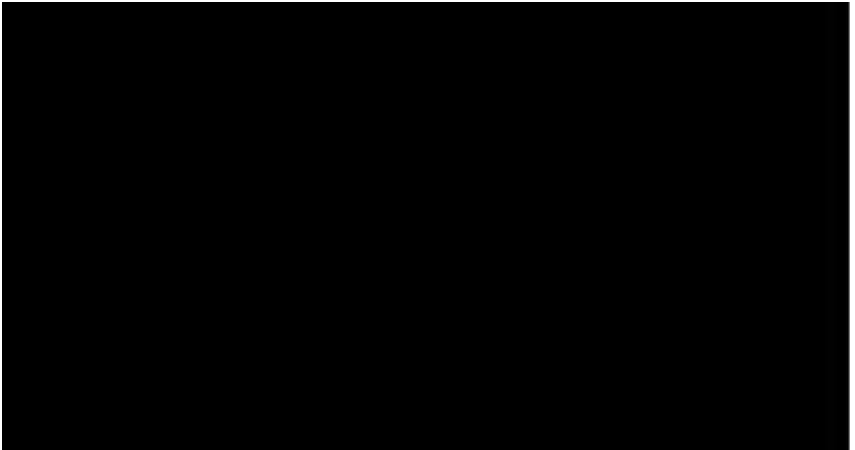
TAB. V.

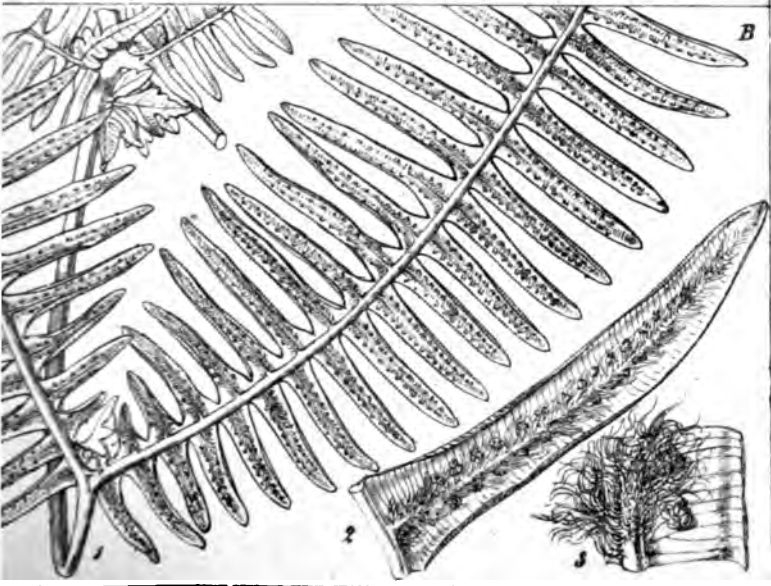
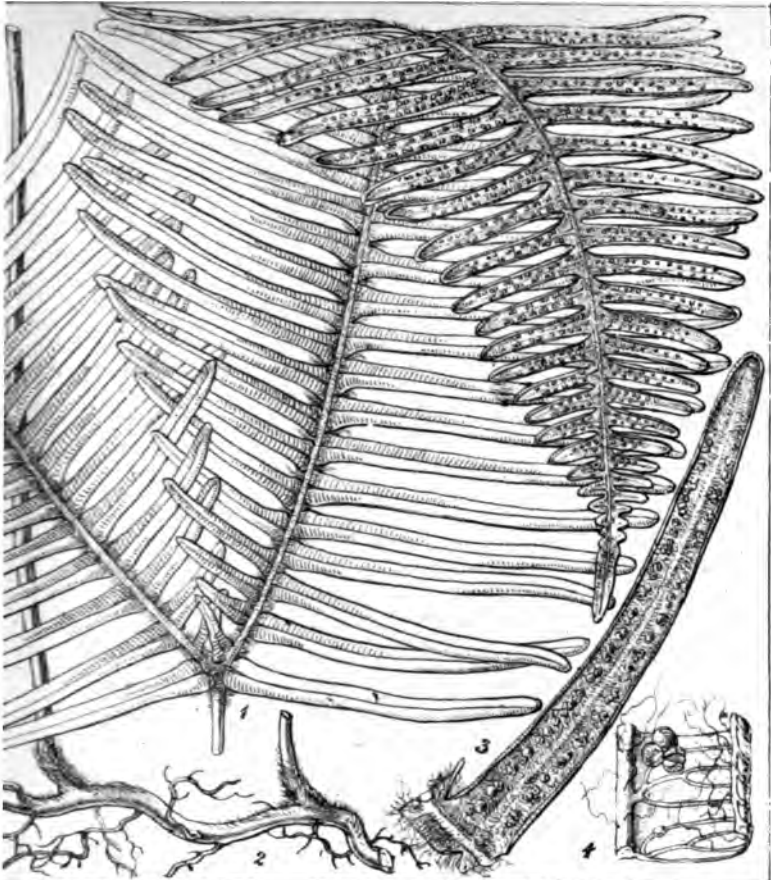
A. GLEICHENIA NERVOSA, *Kaulf.*—p. 12.

Fig. 1. Fertile segment, under side; *nat. size*. Fig. 2. Portion of the same; *magnified*. Fig. 3, 4. Frond, nearly entire; *nat. size*.

B. GLEICHENIA KLOTZSCHII, *Hook.*—p. 13.

Fig. 1. Fertile segment, under side; *magnified*. Fig. 2. Portion of the same; *more magnified*. Fig. 3. Portion of a frond; *nat. size*,









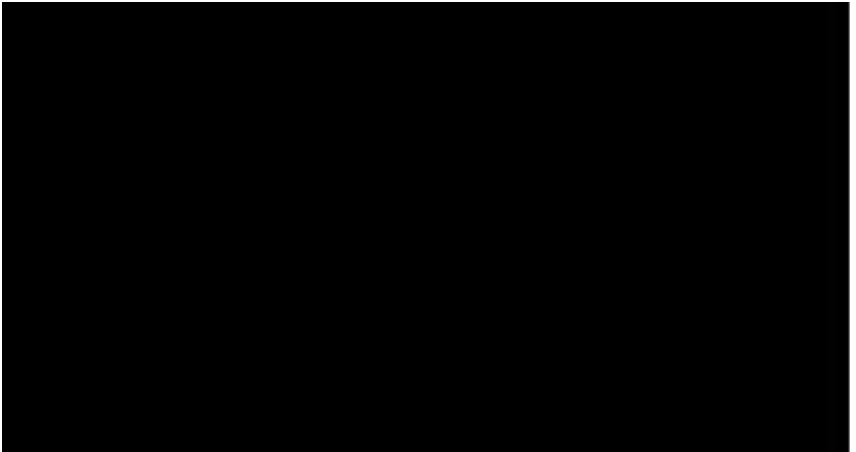
TAB. VI.

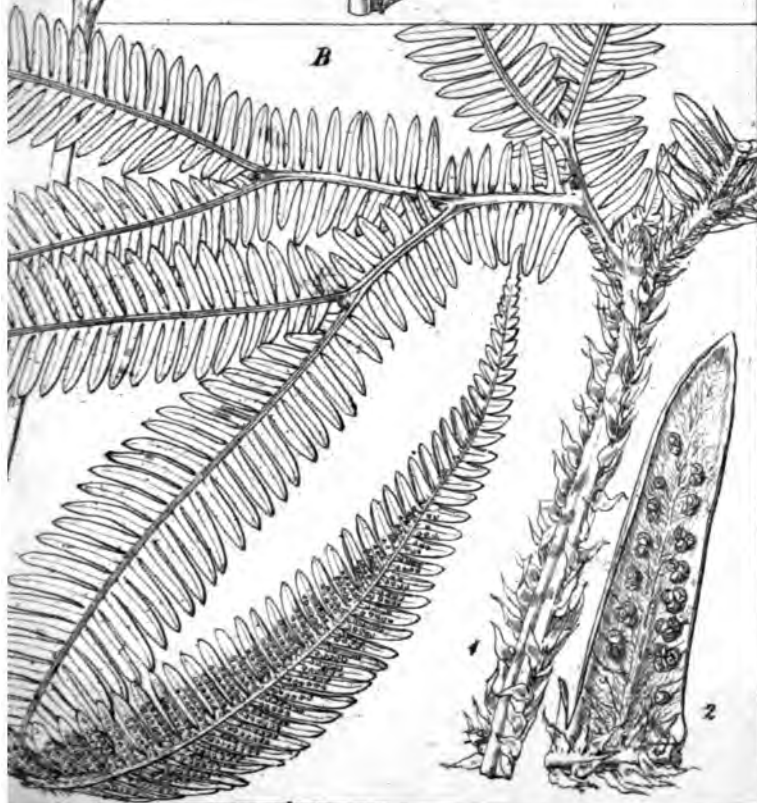
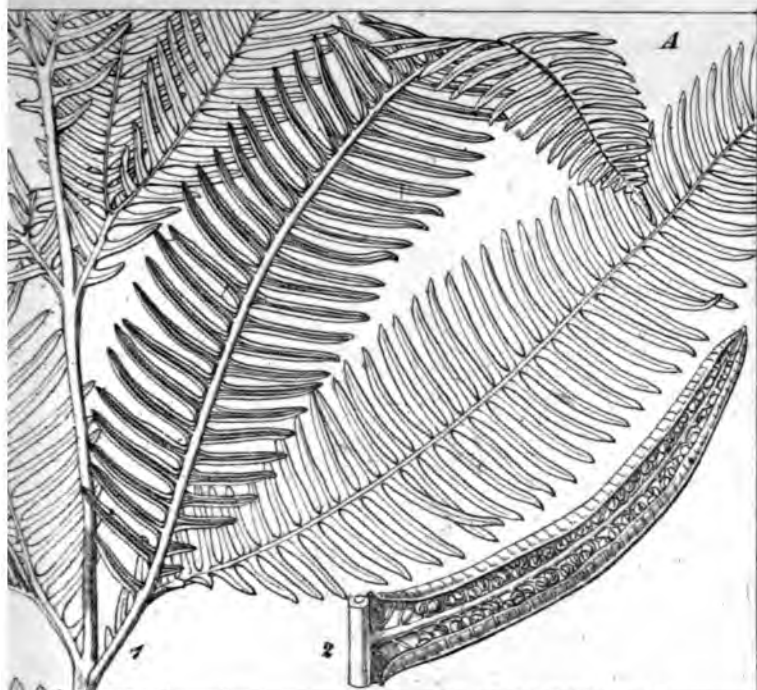
A. GLEICHENIA CRYPTOCARPA, Hook.—p. 7.

Fig. 1. Fertile segment, under side; *magnified*. Fig. 2. Nearly entire frond; *nat. size*.

B. GLEICHENIA CUNNINGHAMI, Hew.—p. 6.

Fig. 1. Fertile segment, under side; *magnified*. Fig. 2. Portion of a frond; *nat. size*.









TAB. VII.

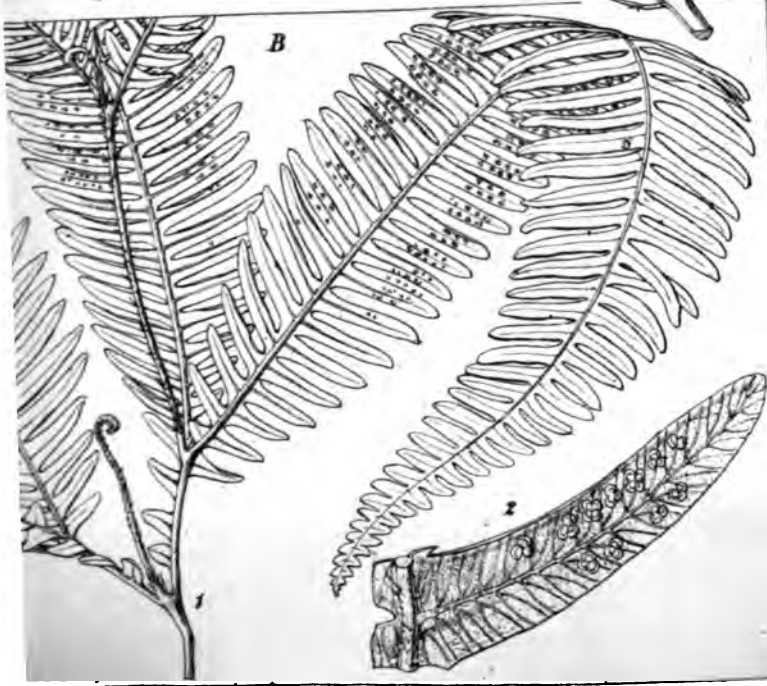
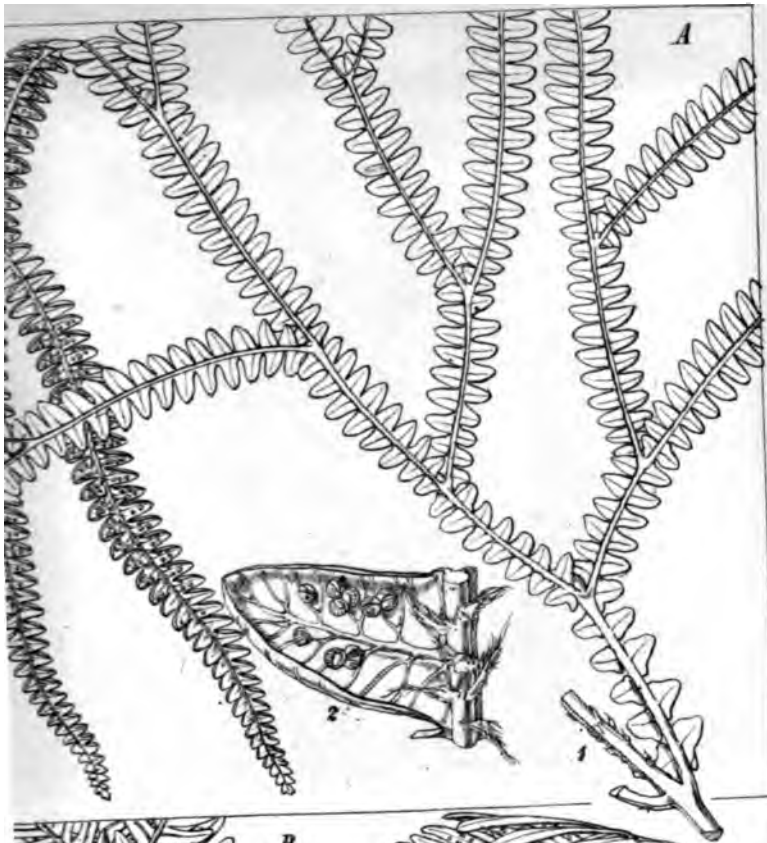
A. GLEICHENIA REVOLUTA, H. B. K.—p. 7.

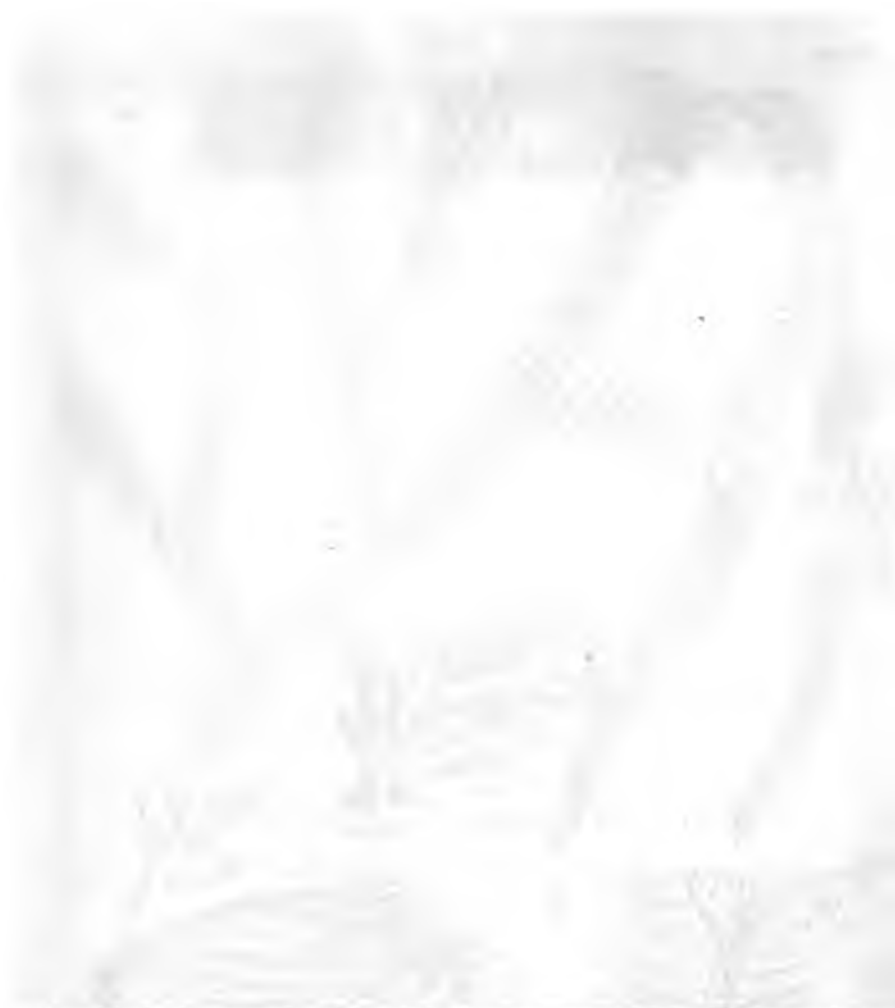
Fig. 1. Fertile segment, under side; *magnified*. Fig. 2. Portion of a frond; *nat. size*.

B. GLEICHENIA MATHEWSII, Hook.—p. 9.

Fig. 1. Fertile segment; *magnified*. Fig. 2. Portion of a frond; *nat. size*.







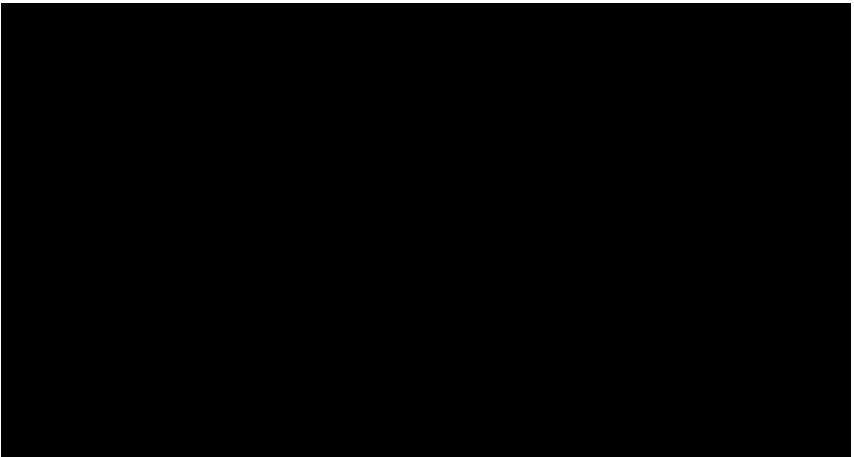
TAB. VIII.

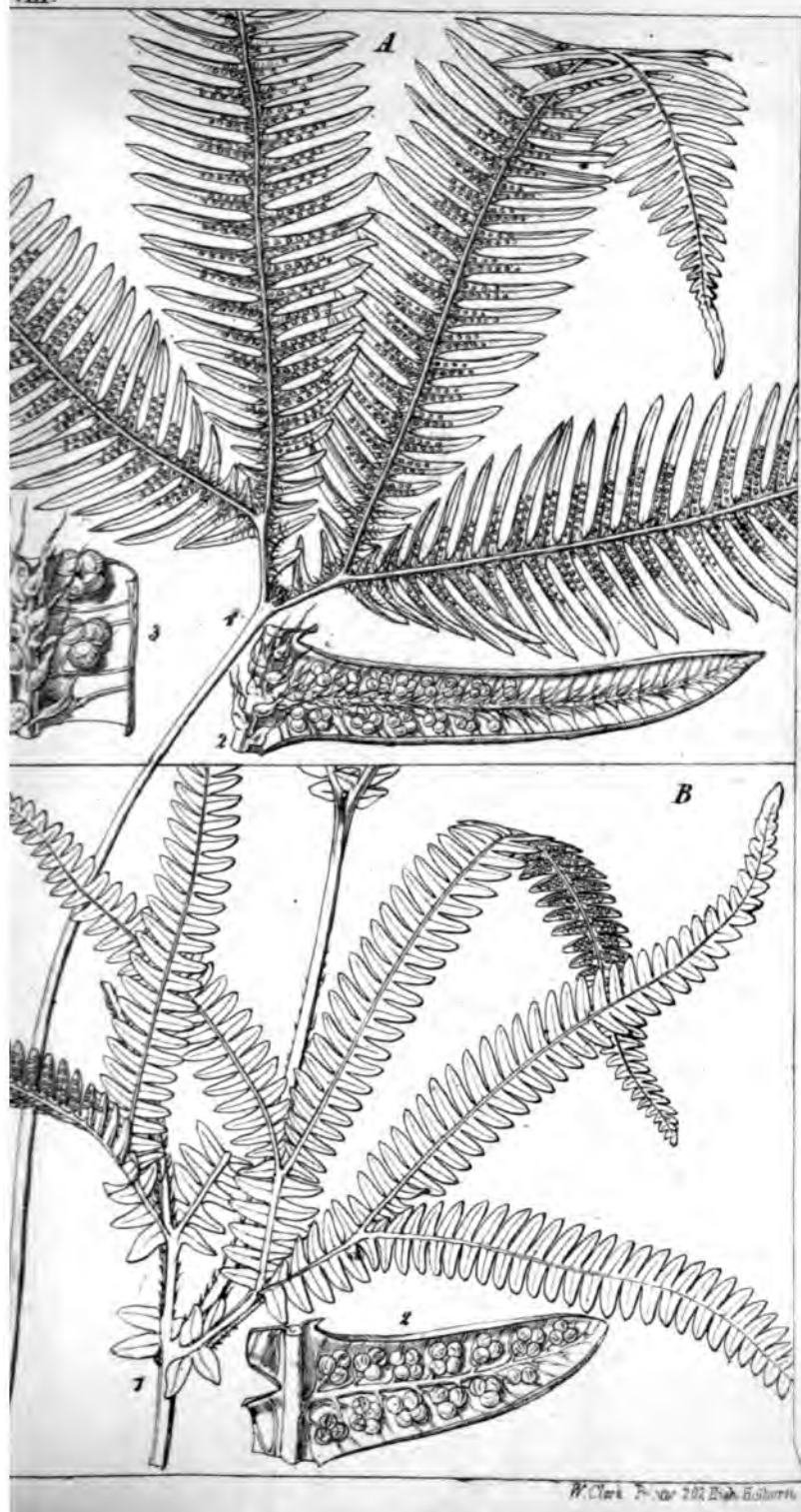
A. GLEICHENIA ACUTIFOLIA, Hook.—p. 7.

Fig. 1. Fertile frond; *nat. size.* Fig. 2. under side of a segment; *magnified.* Fig. 3. Portion of ditto; *more magn.*

B. GLEICHENIA PEDALIS, Kaulf.—p. 6.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Fertile segment, under side; *magnified.*









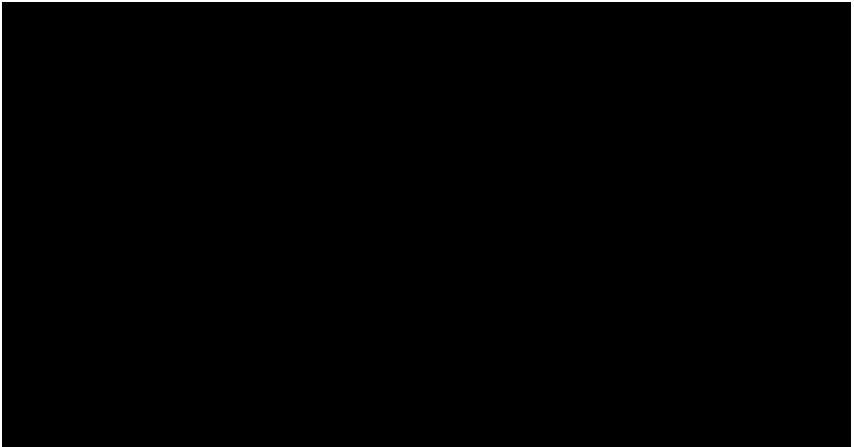
TAB. IX.

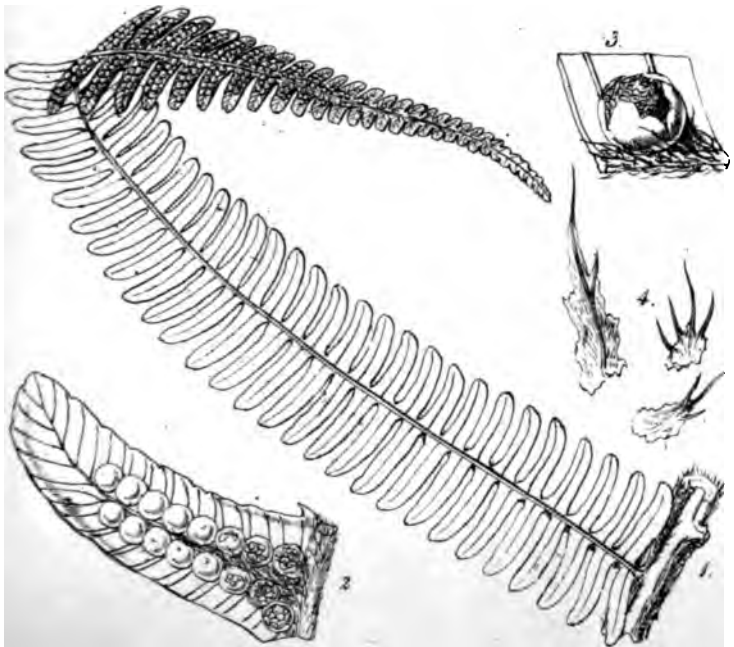
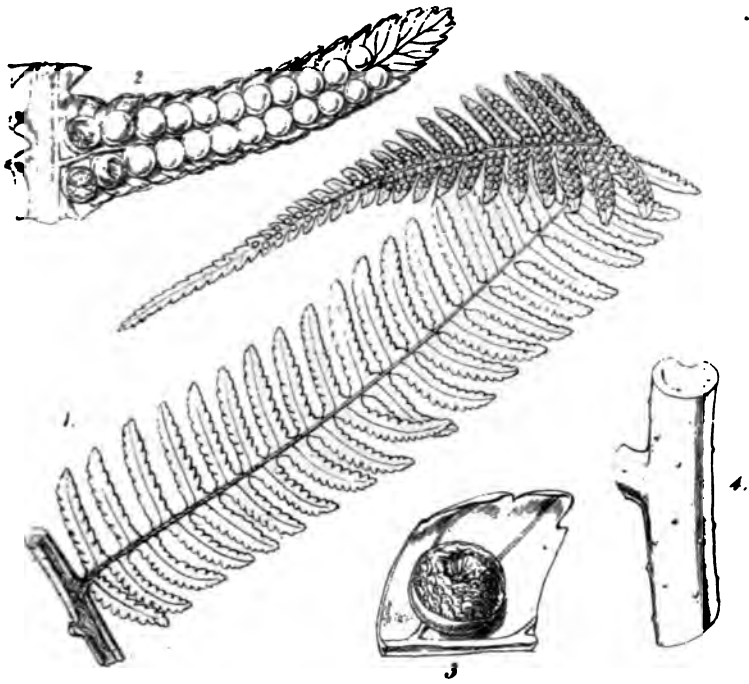
A. *CYATHEA SERRA*, Willd.—p. 17.

Fig. 1. Fertile pinnæ; *nat. size.* Fig. 2. Segment of ditto, under side; *magnified.* Fig. 3. Sorus; *more magnified.* Fig. 4. Portion of the stipes and rachis; *nat. size.*

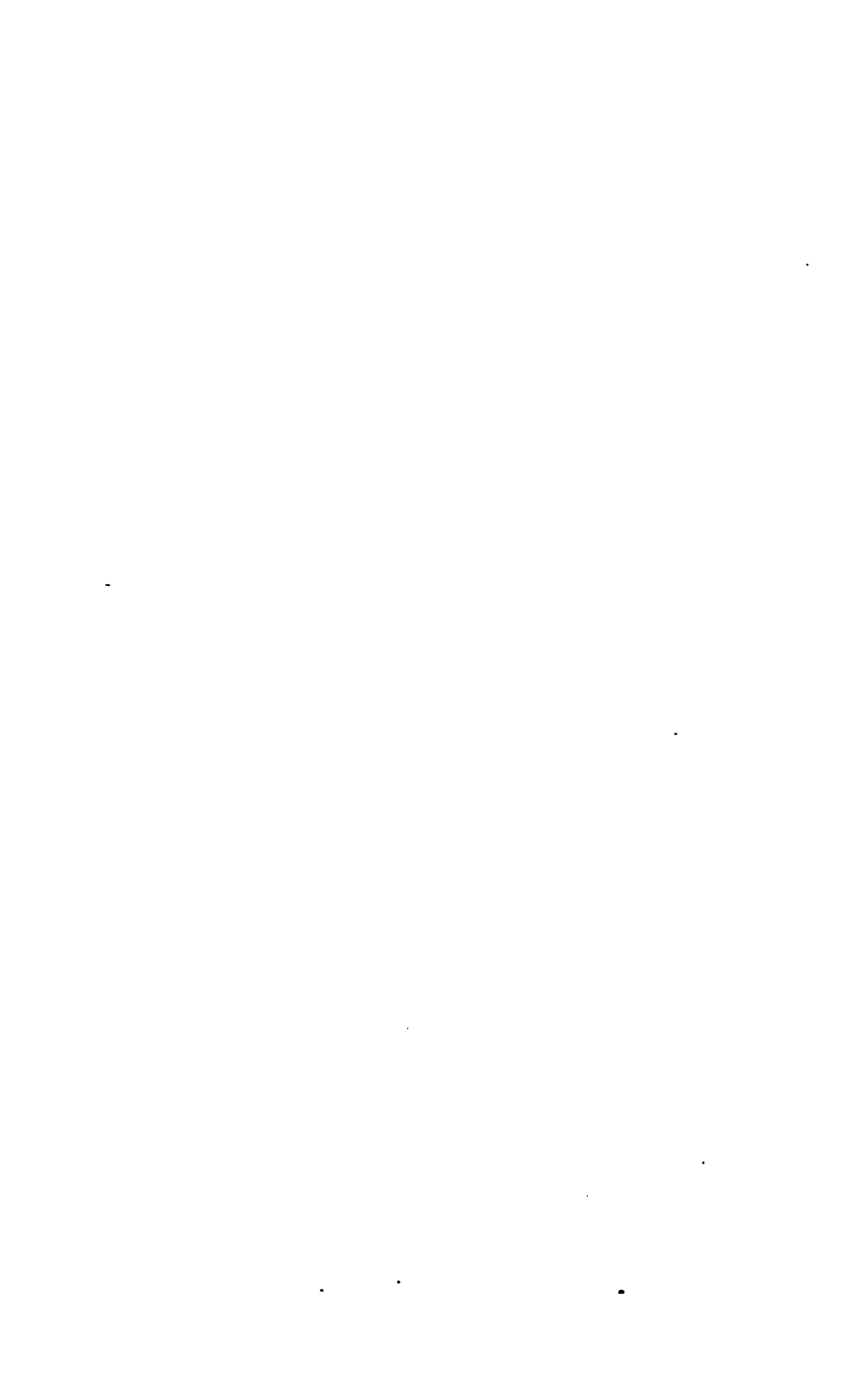
B. *CYATHEA IMRAYANA*, Hook.—p. 18.

Fig. 1. Fertile pinna; *nat. size.* Fig. 2. Segment of ditto, under side; *magnified.* Fig. 3. Sorus. Fig. 4. Scales from the rachis; *magnified.*









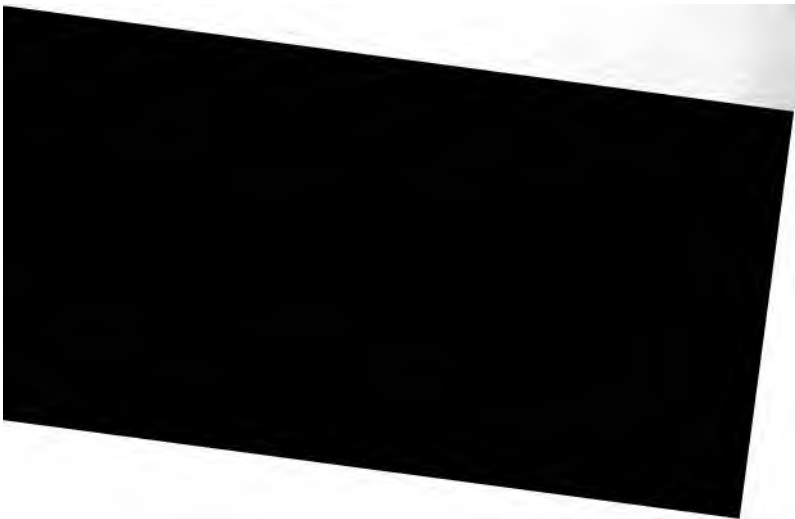
TAB. X.

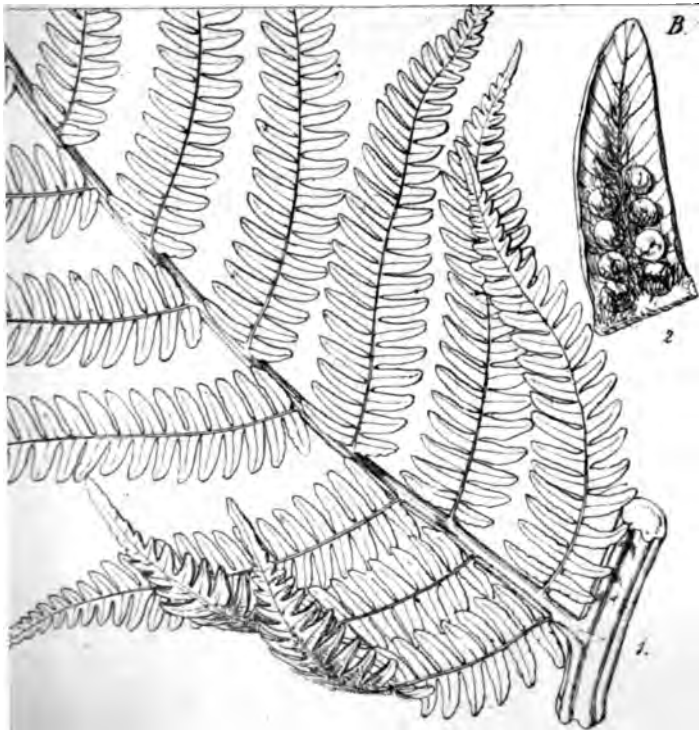
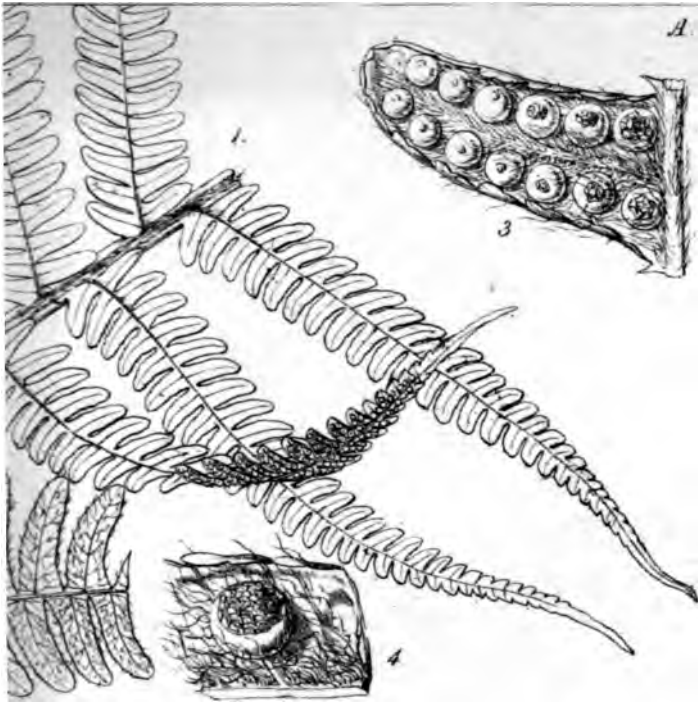
A. *CYATHEA GARDNERI*, Hook.—p. 21. (Tab. X. B. in text).

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. Upper side of a pinna; *magnified.* Fig. 3. Under side of ditto; *more magnified.* Fig. 4. Sorus; *more magnified.*

B. *CYATHEA DRÈGEI*, Kze.—p. 23.

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. Segment of ditto, under side; *magnified.*









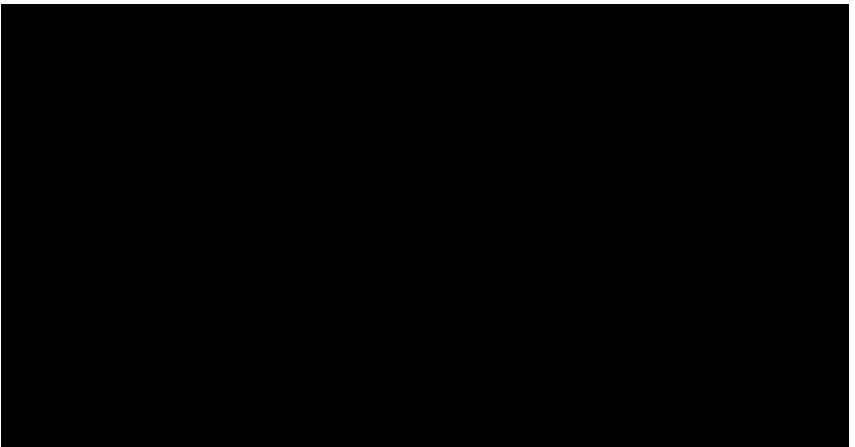
TAB. XI.

A. *CYATHEA DIVERGENS*, Kze.—p. 19.

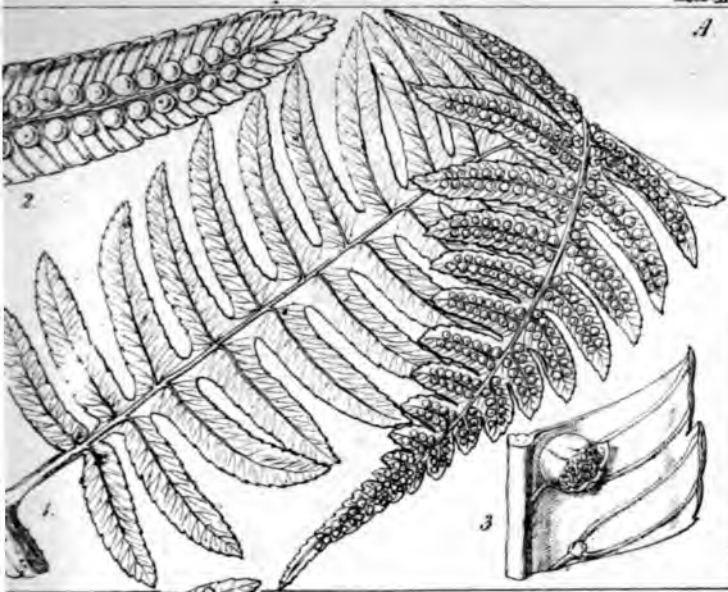
Fig. 1. Fertile pinna; *nat. size*. Fig. 2. Segment of ditto, under side; *magnified*. Fig. 3. Portion of a fertile segment with a sorus; *more magnified*.

B. *CYATHEA CANALICULATA*, Willd.—p. 23.

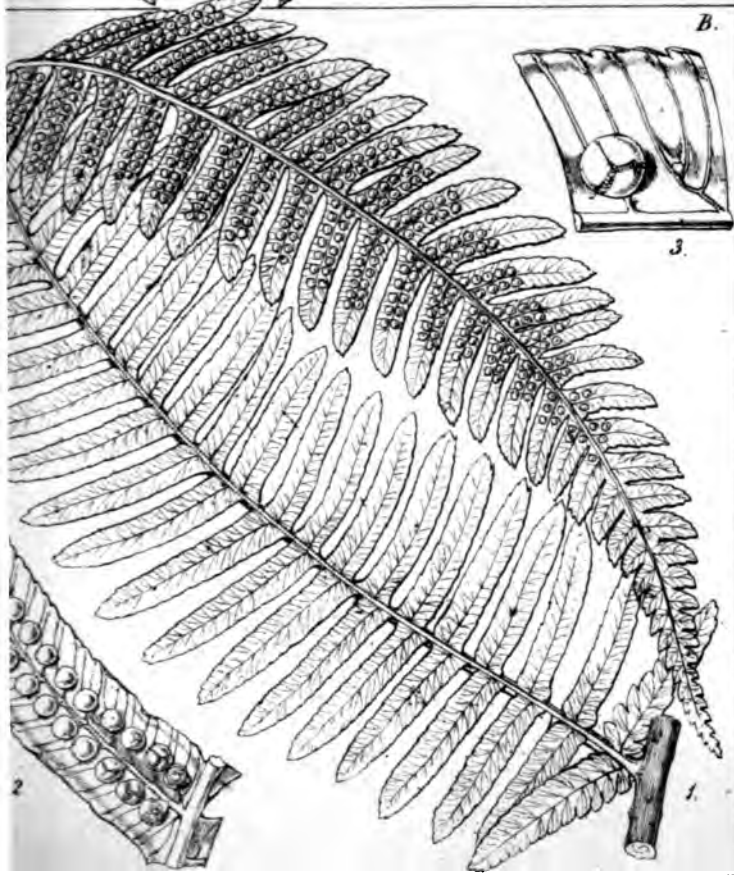
Fig. 1. Fertile pinna; *nat. size*. Fig. 2. Segment of ditto; *magnified*. Fig. 3. Portion of ditto, with a sorus; *more magnified*.

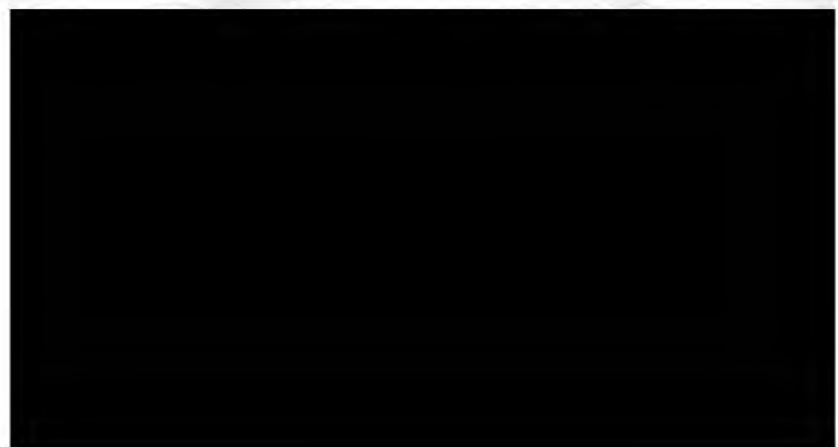


A.



B.







TAB. XII.

A. *CYATHEA CUSPIDATA*, Kze.—p. 19.

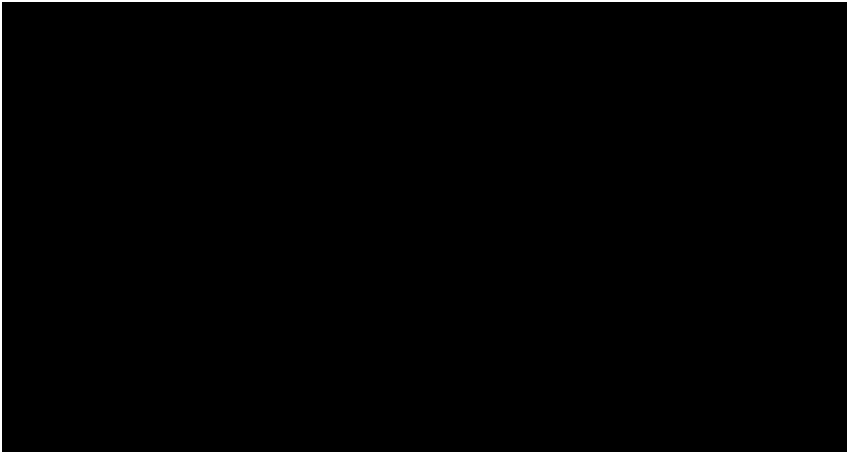
Fig. 1. Fertile pinna: *nat. size.* Fig. 2. Segment of ditto; *magnified.* Fig. 3. Portion of ditto, with a sorus; *more magnified.*

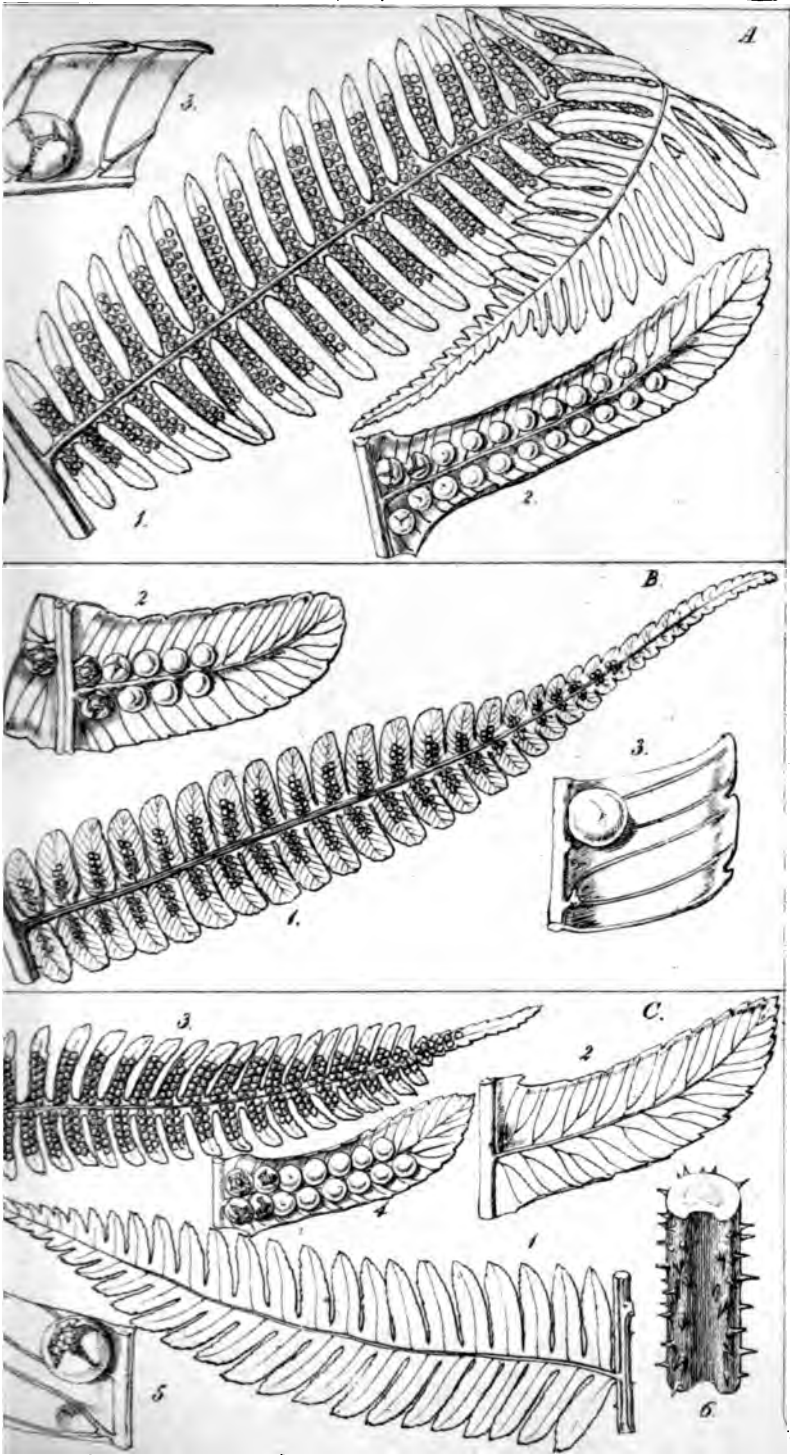
B. *CYATHEA EXCELSA*, Sw.—p. 24.

Fig. 1. Fertile pinna; *nat. size.* Fig. 2. Segment of ditto; *magnified.* Fig. 3. Portion of ditto, with a sorus; *more magnified.*

C. *CYATHEA SPINULOSA*, Wall.—p. 25.*

Fig. 1. Upper side of a sterile pinna; *nat. size.* Fig. 2. Segment of ditto; *magnified.* Fig. 3. Fertile pinna, *nat. size.* Fig. 4. Segment of ditto; *magnified.* Fig. 5. Portion of ditto, with a sorus. Fig. 6. Portion of the stipes; *nat. size.*









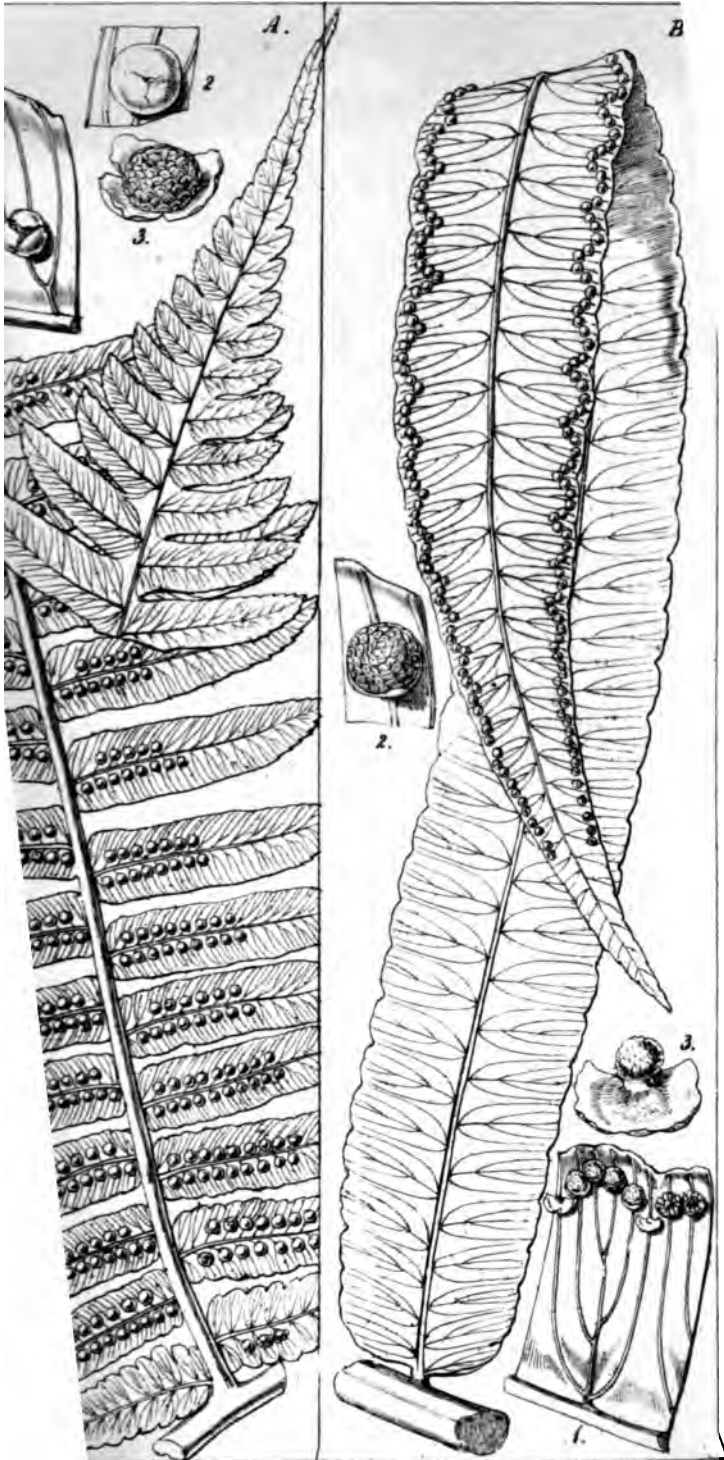
Tab. XIII.

A. *CYATHEA CANALICULATA*, γ . *latifolia*, *Hook.*—p. 24.

Pinna; *nat. size.* Fig. 1. Portion of a fertile pinnule; *magnified.* Fig. 2. Sorus; and Fig. 3. sorus further advanced; *more magnified.*

B. *HEMITELIA SPECIOSA*, *Kaulf.*—p. 28.

Pinna; *nat. size.* Fig. 1. Portion of ditto: *magnified.* Fig. 2. Sorus; *magnified.* Fig. 3. Receptacles and involucre; *magnified.*







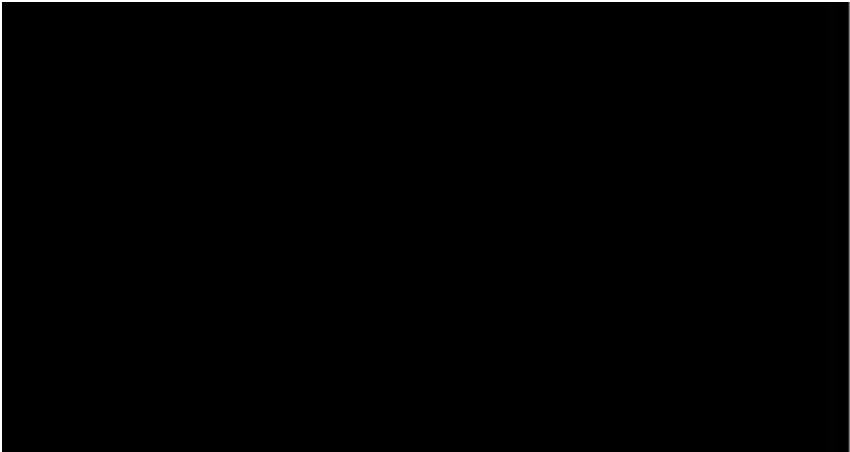
TAB. XIV.

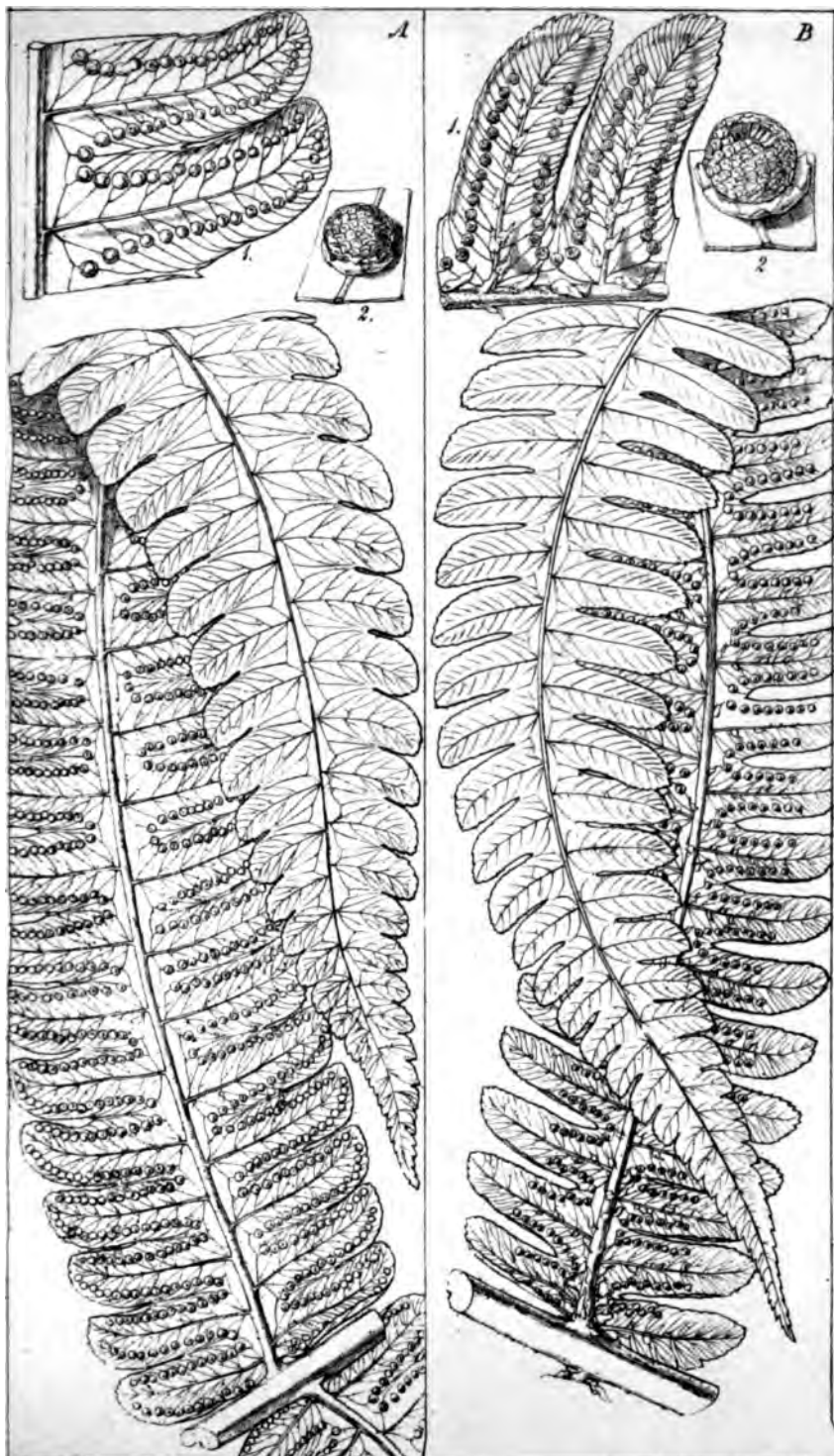
A. HEMITELIA OBTUSA, *Kaulf.*—p. 29.

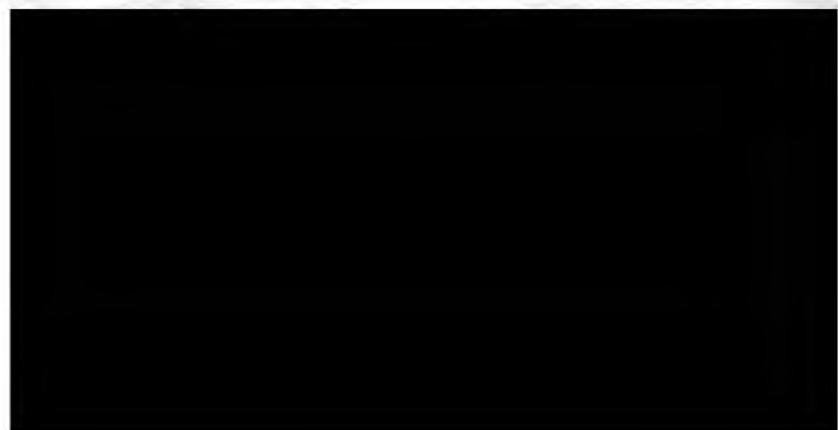
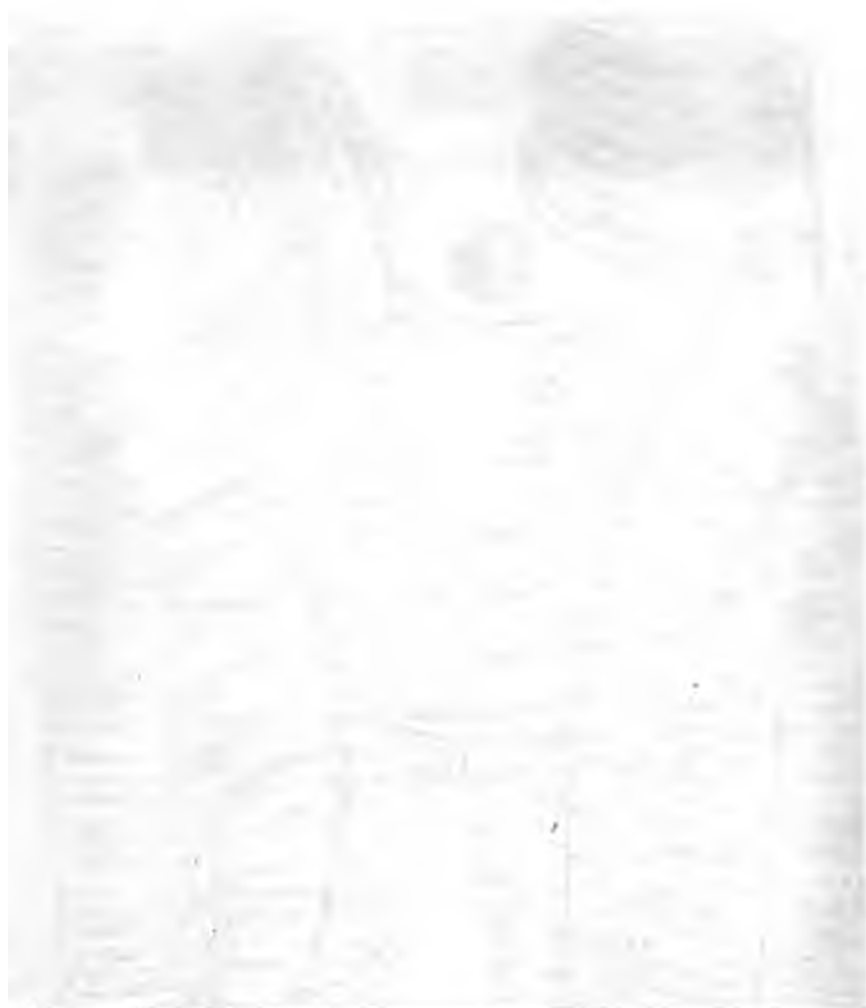
Pinna; *nat. size.* Fig. 1. Fertile segments, under side; *magnified.* Fig. 2. Sorus; *more magnified.*

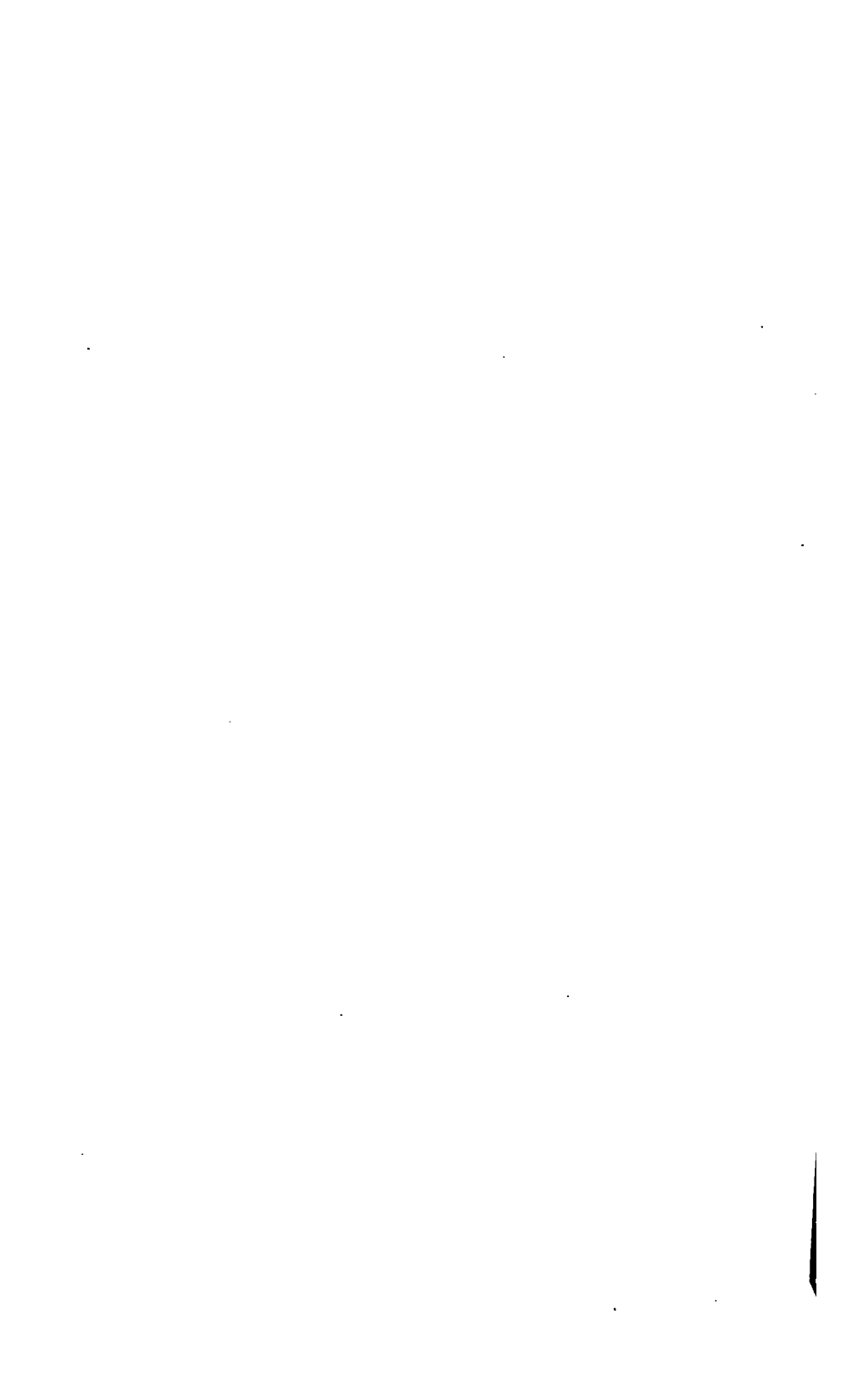
B. HEMITELIA GRANDIFOLIA, *Spr.*—p. 30.

Pinna; *nat. size.* Fig. 1. Fertile segments, under side; *magnified.* Fig. 2. Sorus; *more magnified.*





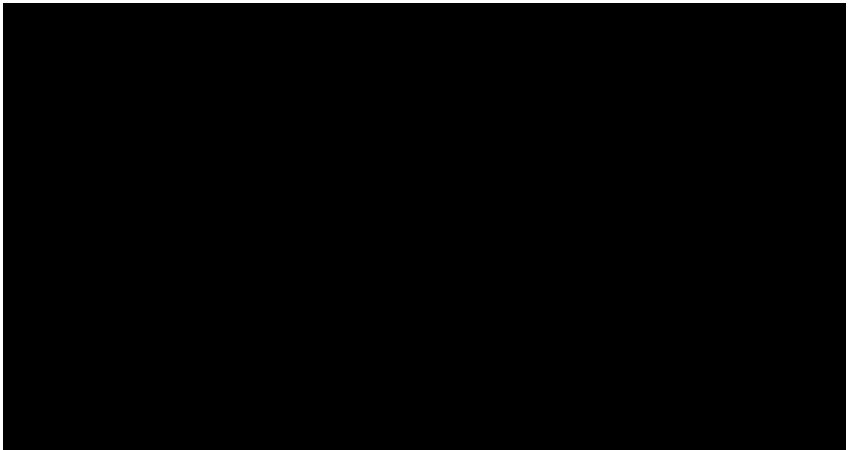


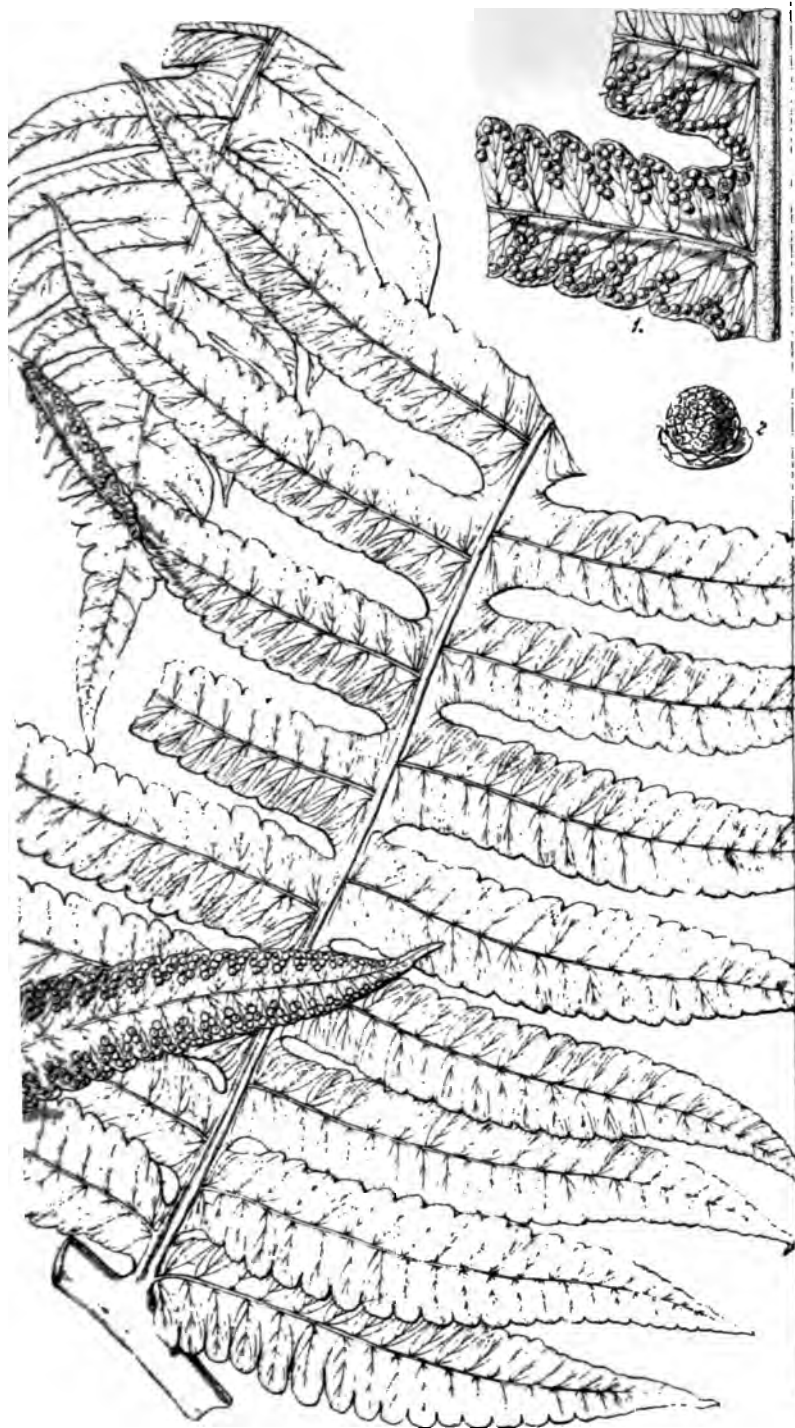


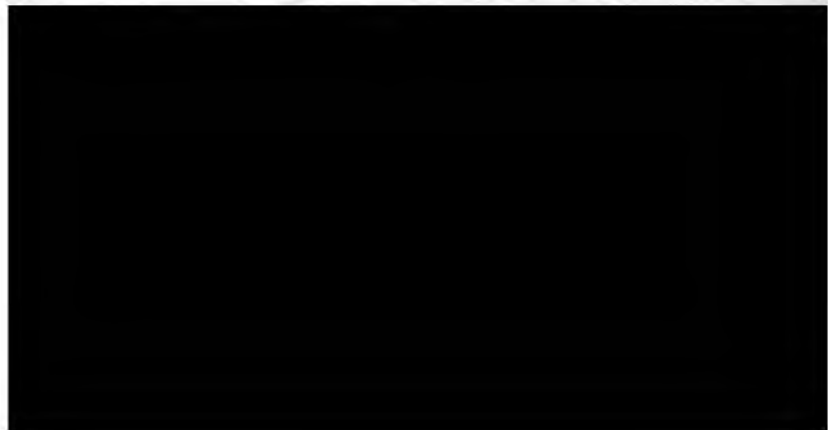
TAB. XV.

HEMITELIA HORRIDA, Br.—p. 30.

Pinna; *nat. size.* Fig. 1. Portion of fertile segments; *magnified.* Fig. 2. Sorus; *more magnified.*





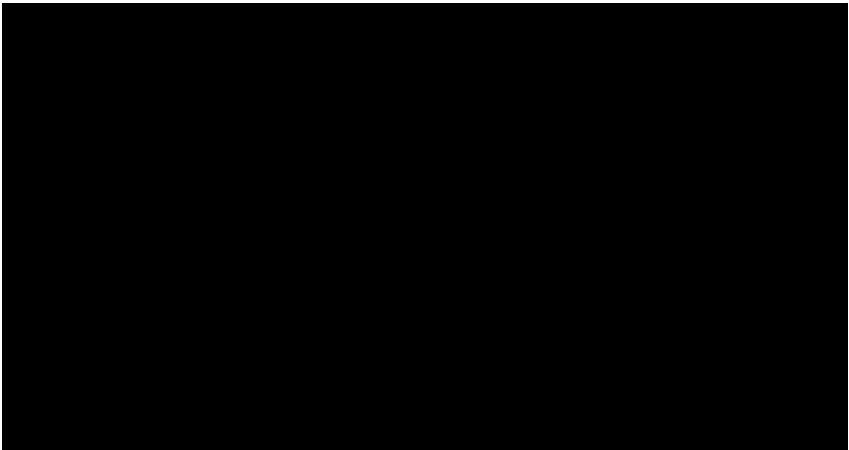


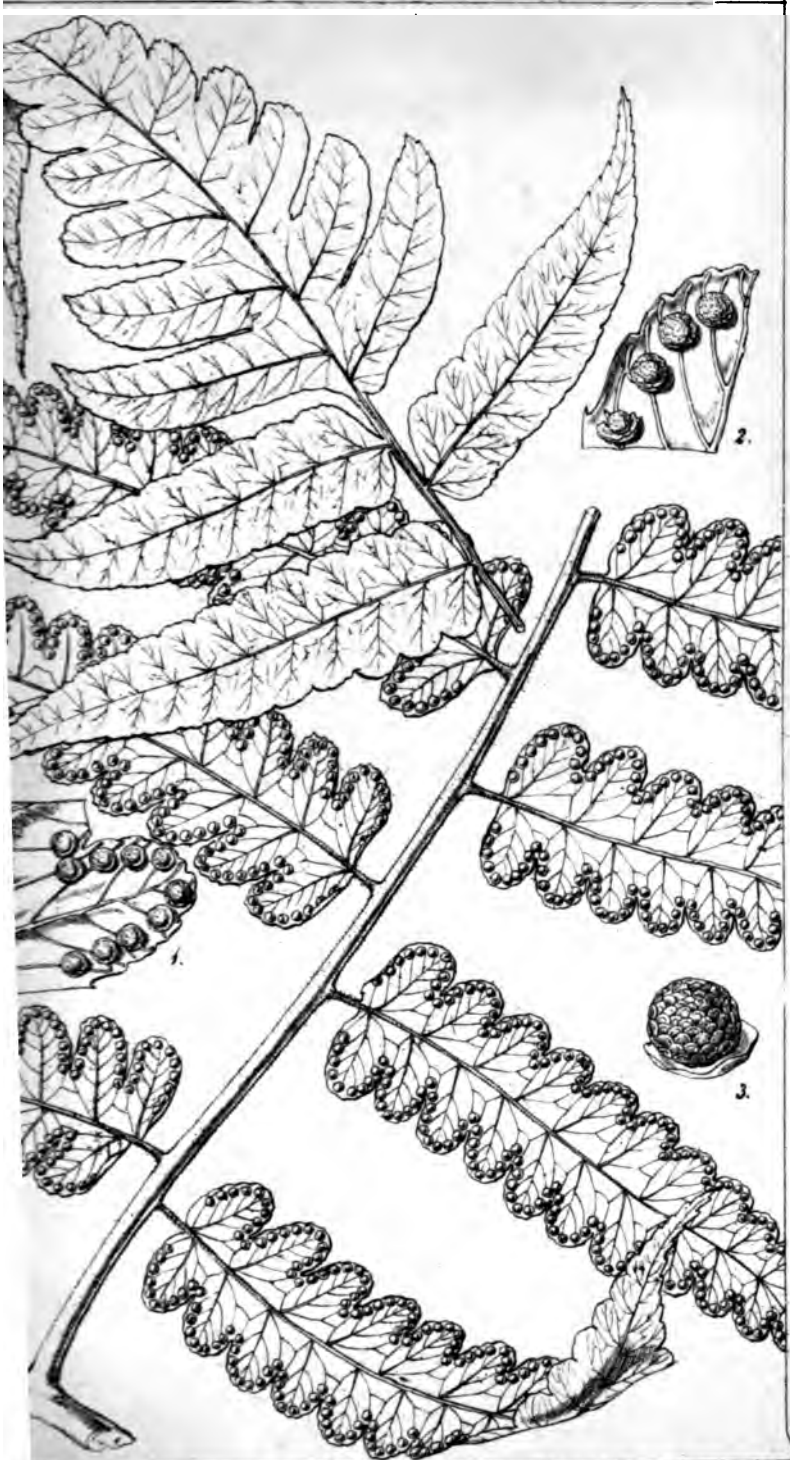


TAB. XVI.

HEMITELIA PETIOLATA, Hook.—p. 31.

Pinna; *nat. size.* Fig. 1. Fertile segment, under side;
magnified. Fig. 2. Portion of the same; *more magni-*
fied. Fig. 3. Sorus; *more magnified.*









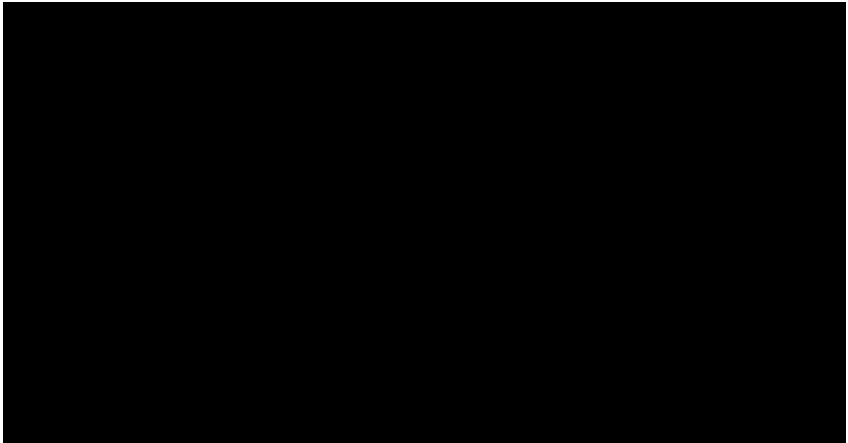
TAB. XVII.

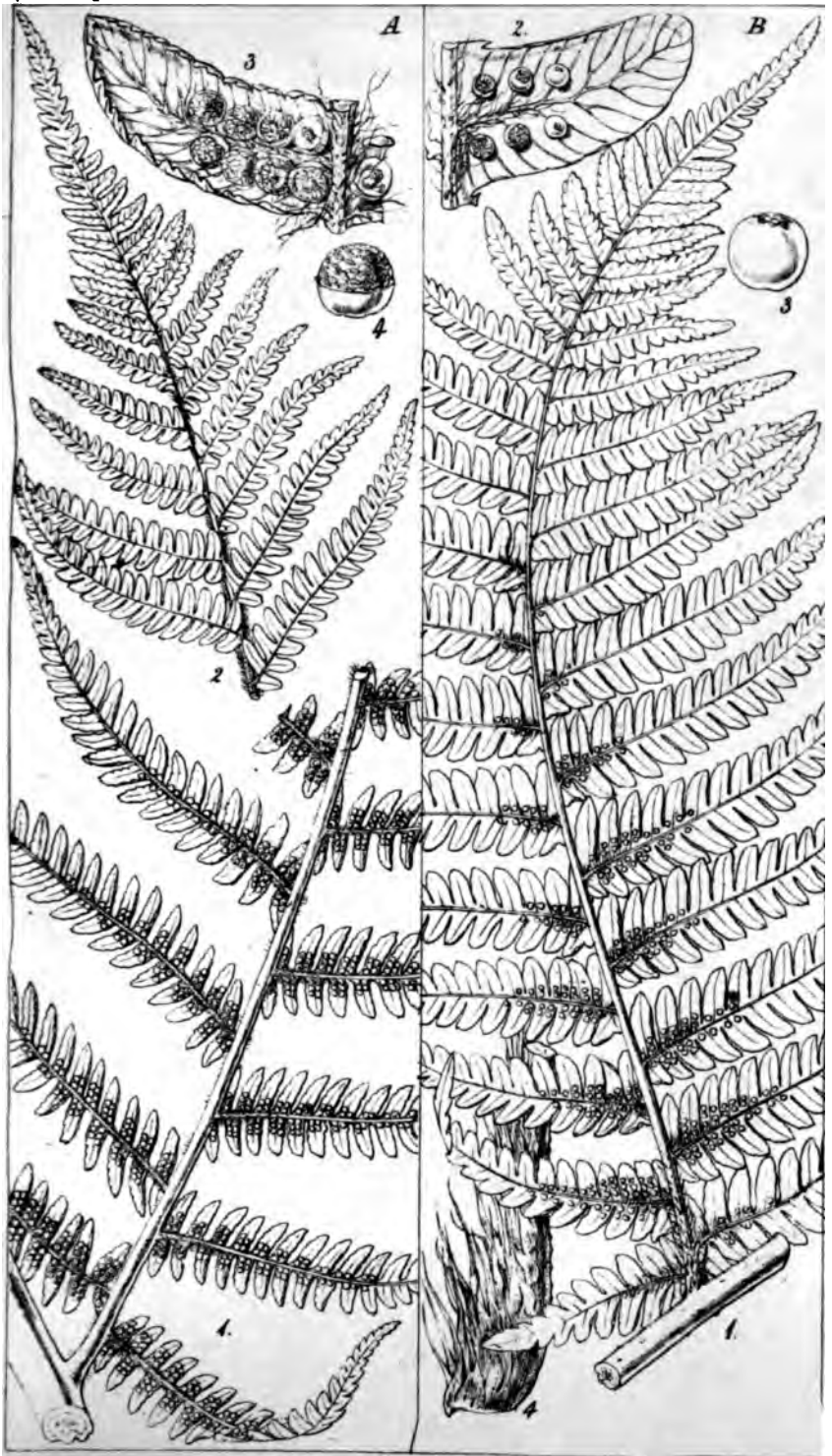
A. *CYATHEA DRÈGEI*, *β. Hook.*—p. 23.

Fig. 1, 2. Fertile pinna; *nat. size.* Fig. 3. Segment of ditto,
under side; *magnified.* Fig. 4. Sorus; *more magnified.*

B. *CYATHEA BURKEI*, *Hook.*—p. 23.

Fig. 1. Fertile pinna; *nat. size.* Fig. 2. Segment of ditto;
magnified. Fig. 3. Sorus; *more magnified.* Fig. 4. Base
of the stipes; *nat. size.*









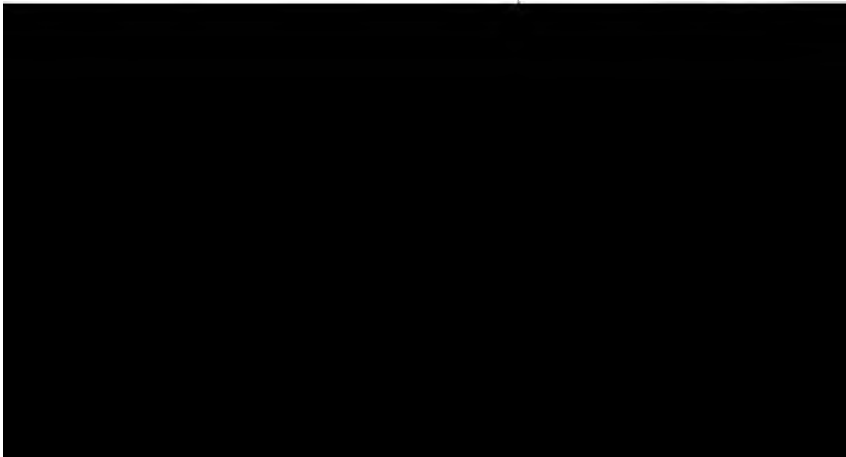
TAB. XVIII.

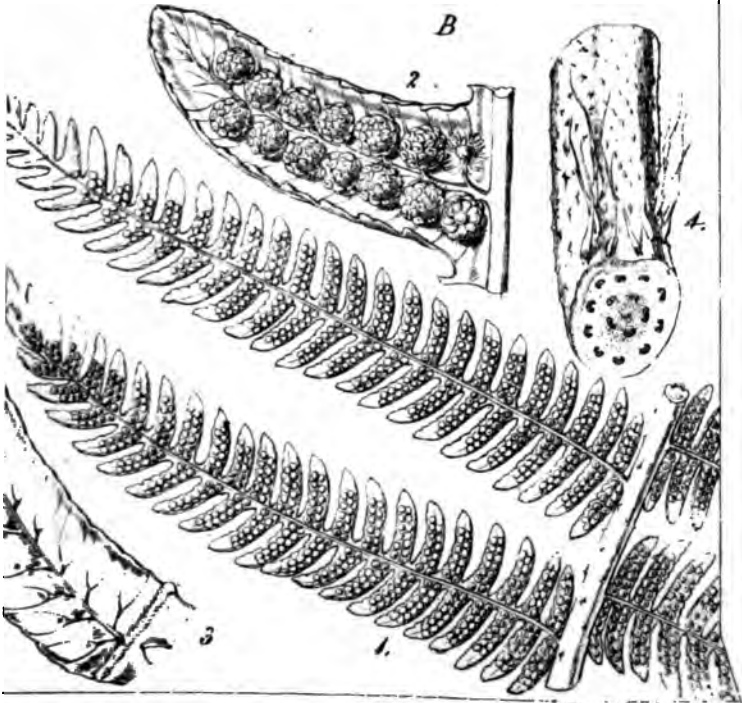
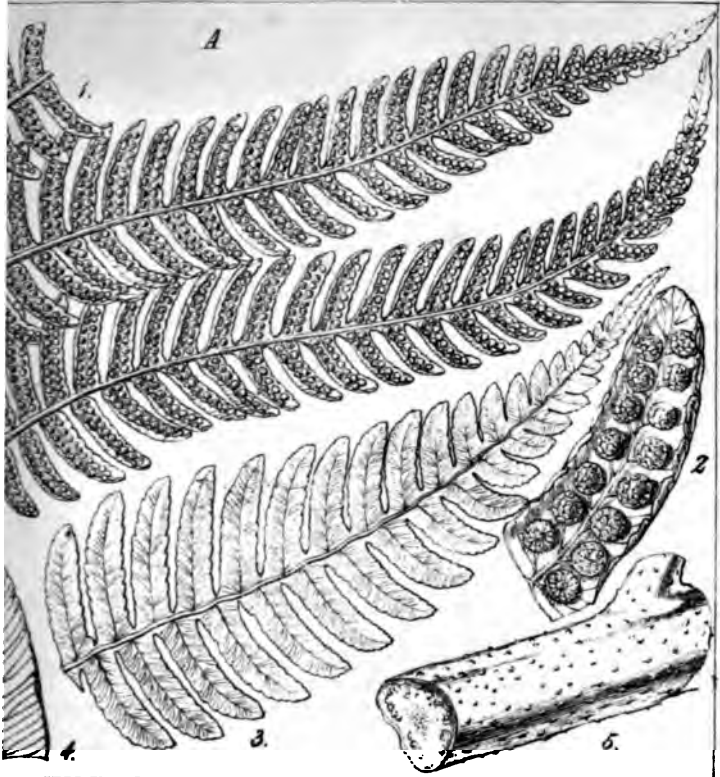
A. *ALSOPHILA EXCELSA*, Br.—p. 49.

Fig. 1, Fertile portion of a frond; *nat. size.* Fig. 2. Segment of the same, under side; *magnified.* Fig. 3. Portion of a sterile pinna; *nat. size.* Fig. 4. Segment of ditto; *magnified.* Fig. 5. Portion of the stipes; *nat. size.*

B. *ALSOPHILA CONTAMINANS*, Wall.—p. 52.

Fig. 1. Fertile portion of frond; *nat. size.* Fig. 2. Segment of ditto, under side; *magnified.* Fig. 3. Upper side of ditto; *magnified.* Fig. 4. Base of the stipes; *nat. size.*









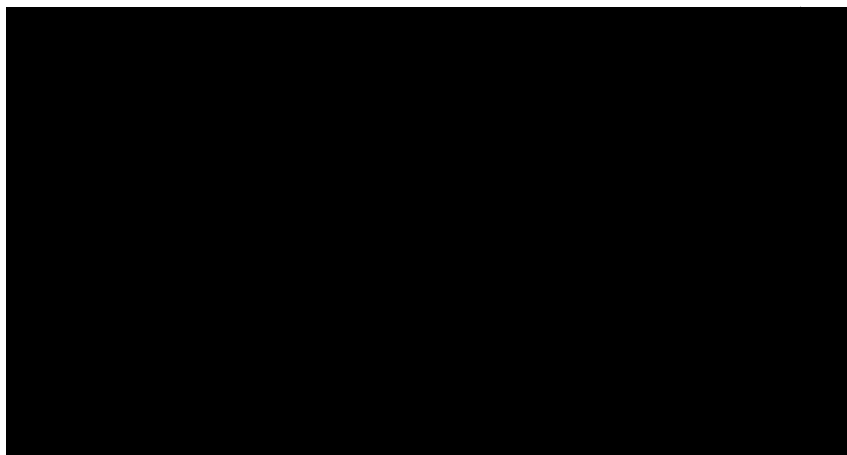
TAB. XIX.

A. *ALSOPHILA AUSTRALIS*, Br.—p. 50.

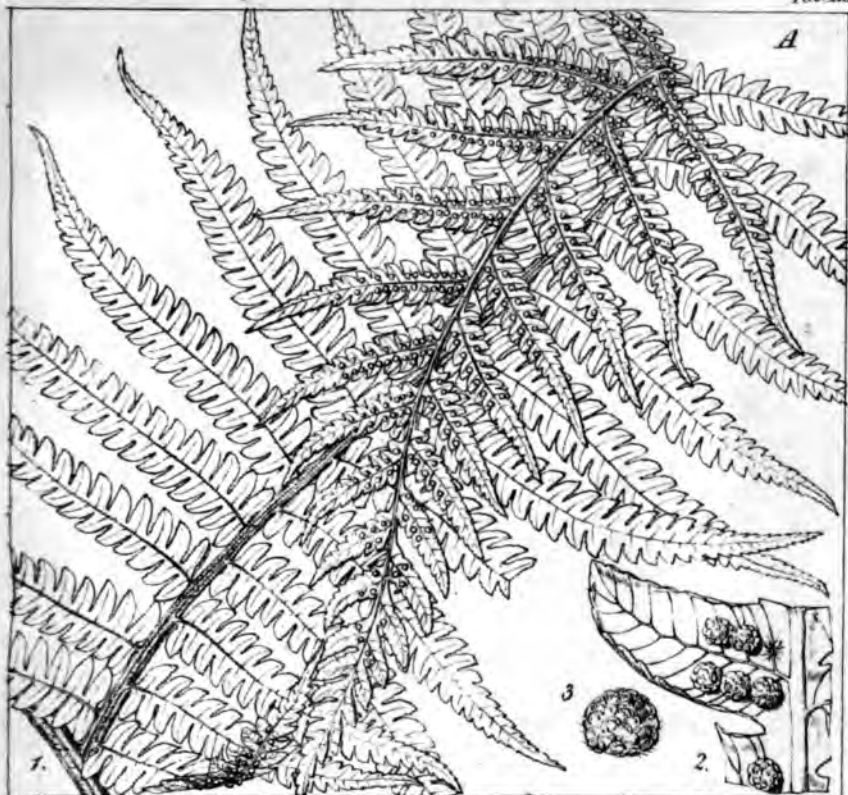
Fig. 1. Fertile pinna; *nat. size*. Fig. 2. Portion of a pinnaule of the same, *magnified*. Fig. 3. Sorus; *more magnified*.

B. *ALSOPHILA ASPERA*, Br.—p. 39.

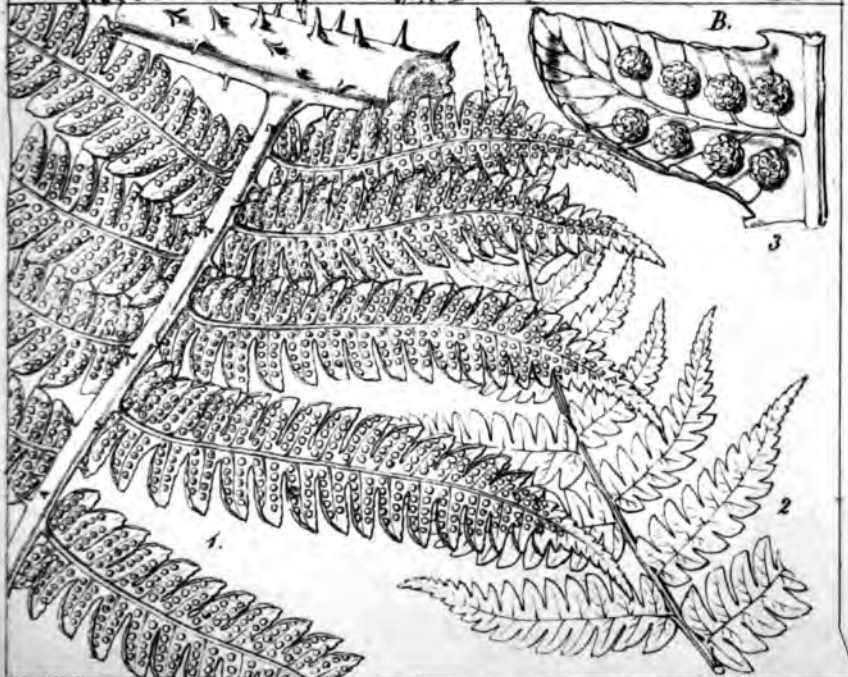
Fig. 1, 2. Fertile pinna; *nat. size*. Fig. 3. Segment of ditto, under side; *magnified*.



A



B.



[The text in this section is extremely faint and illegible due to low contrast and blurring. It appears to be a list or a series of entries.]



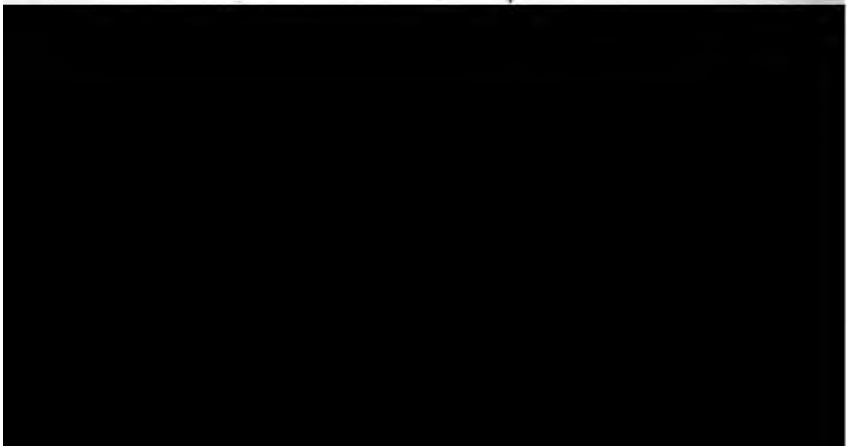
Tab. XX.

A. *ALSOPHILA COMOSA*, Wall.—p. 53.

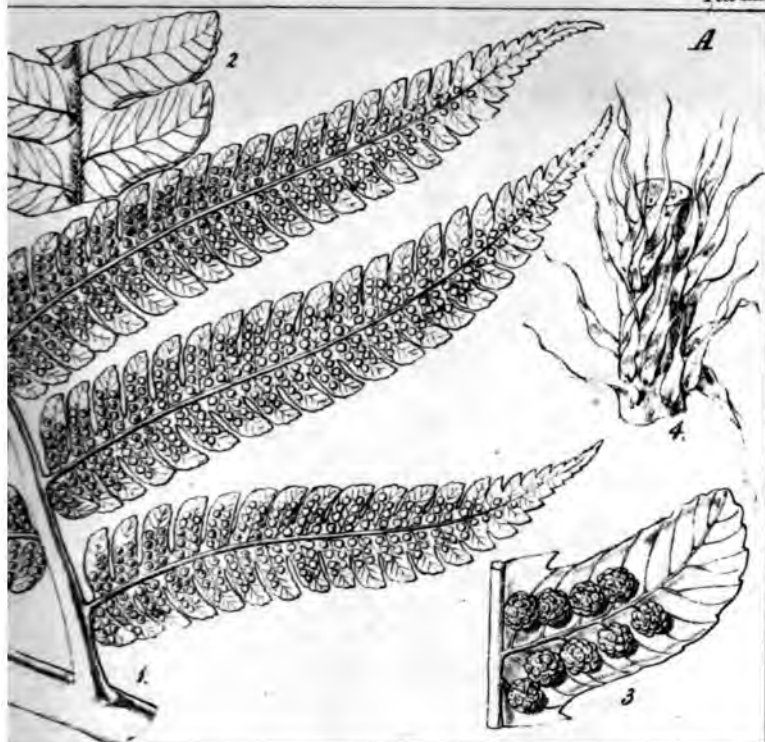
Fig. 1. Portion of a fertile pinna; *nat. size*. Fig. 2. Portion of a pinnule, upper side; *slightly magnified*. Fig. 3. Fertile segment, under side; *magnified*. Fig. 4. Base of the stipes; *nat. size*.

B. *ALSOPHILA CAUDATA*, J. Sm.—p. 52.

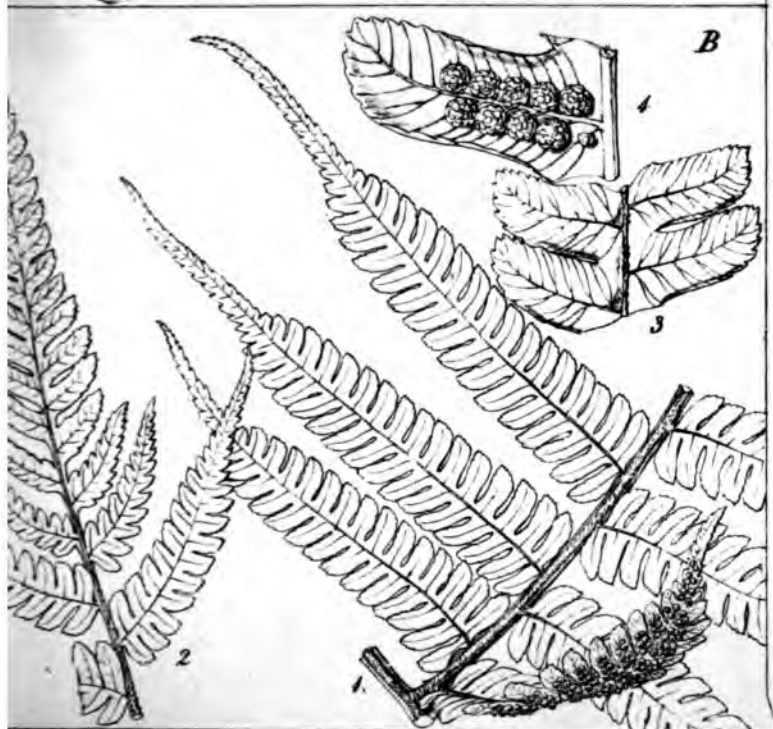
Fig. 1, 2. Portions of a fertile pinna; *nat. size*. Fig. 3. Portion of a pinnule of the same, upper side; *magnified*. Fig. 4. Segment of the same, under side; *more magnified*.



A



B







TAB. XXI.

A. *WOODSIA GUATEMALENSIS*, Hook.—p. 60.

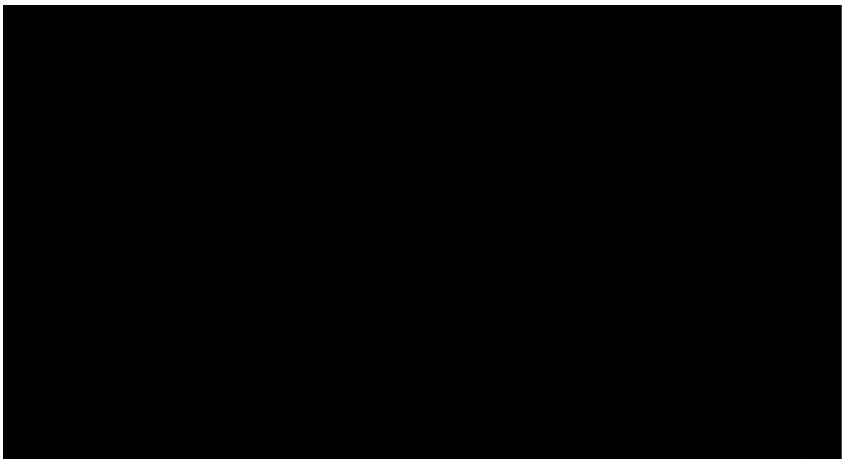
Fig. 1. Portion of a frond; *nat. size*. Fig. 2. Segment of a pinna; *magnified*. Fig. 3, 4. Sori; *more magnified*.

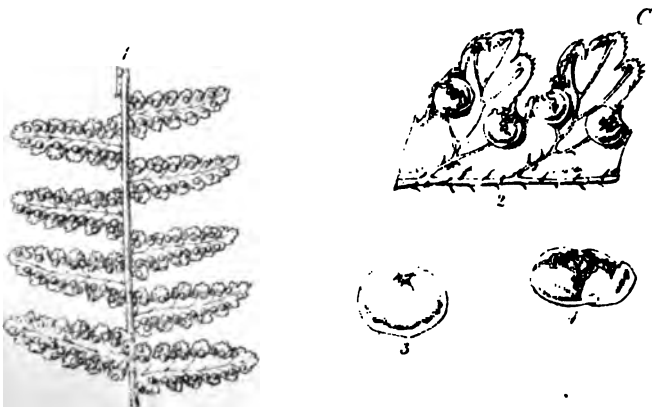
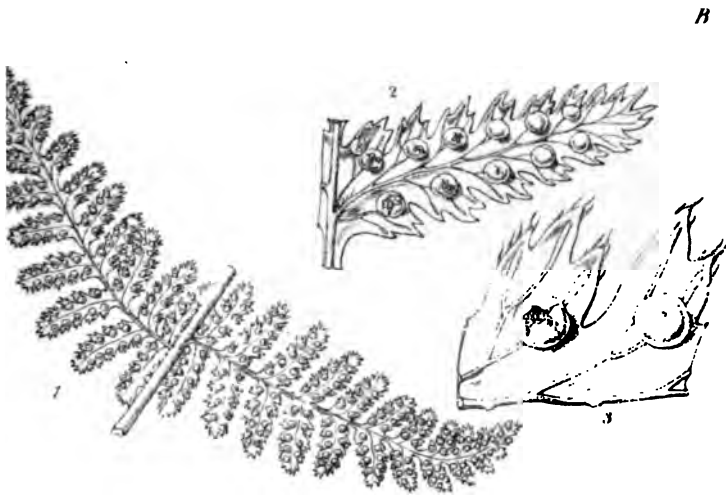
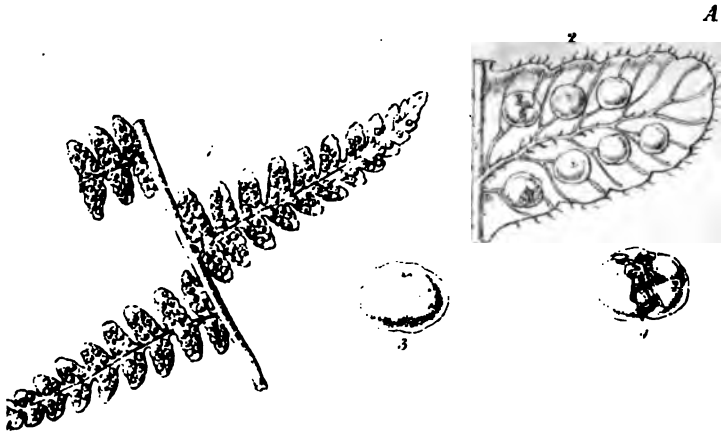
B. *WOODSIA PERUVIANA*, Hook.—p. 61.

Fig. 1. Portion of a frond; *nat. size*. Fig. 2. Pinnule; *magnified*. Fig. 3. Portion of the same with two sori; *more magnified*.

C. *WOODSIA ELONGATA*, Hook.—p. 62.

Fig. 1. Portion of a frond; *nat. size*. Fig. 2. Portion of a pinna; *magnified*. Fig. 3, 4. Sori; *more magnified*.









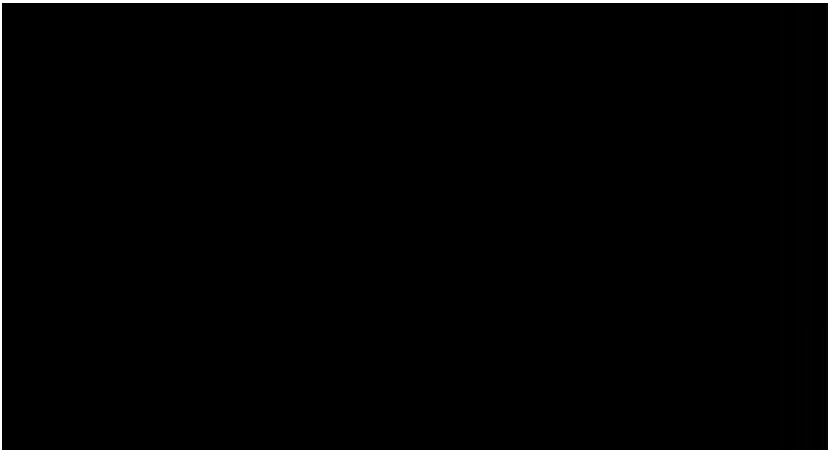
TAB. XXII.

A. *DICKSONIA ARBORESCENS*, *L'Herit.*—p. 66.

Fig. 1. Much reduced sketch of the entire plant. Fig. 2. Pinna; *nat. size.* Fig. 3. Pinnule, seen from the upper side, with sori; *magnified.* Fig. 4. Sorus; *more magnified.*

B. *DICKSONIA SELLOWIANA*, *Hook.*—p. 67.

Fig. 1. Two pinnules, sterile; *nat. size.* Fig. 2. Segment from the same; *magnified.* Fig. 3. Fertile pinna; *nat. size.* Fig. 4. Segment from the same, with sori; *magnified.* Fig. 5. Portion of the stipes; *nat. size.*



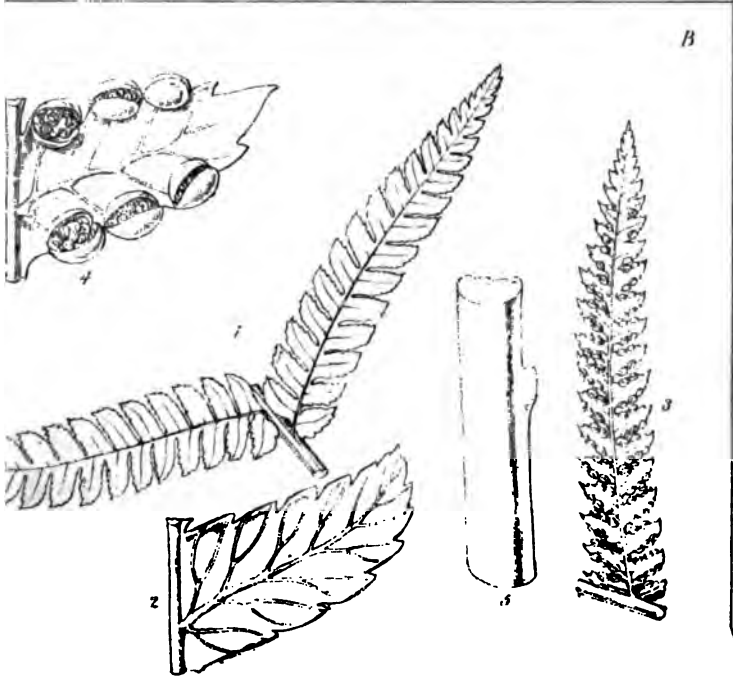




TABLE XXIII.

A. *DICKSONIA BERTEROANA*, Hook.—p. 67.

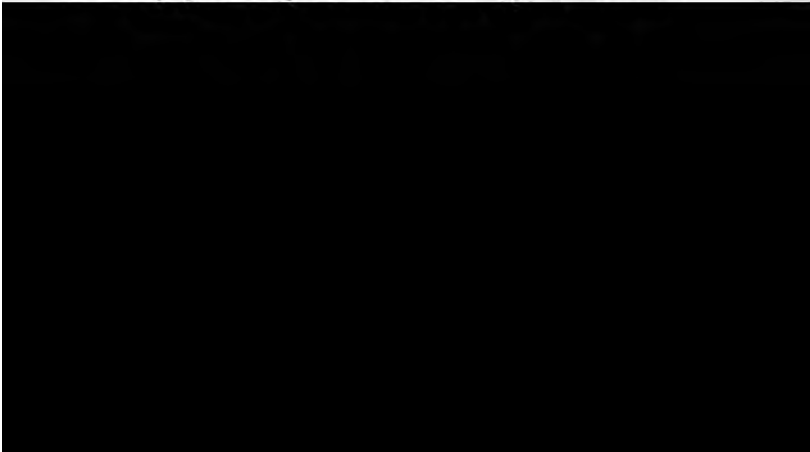
Fig. 1. Small portion of a sterile frond; *nat. size.* Fig. 2. Pinnule; *magnified.* Fig. 3. Fertile pinna; *nat. size.* Fig. 4. Pinnule of the same; *magnified.* Fig. 5. Fertile pinna, slight variety; *nat. size.* Fig. 6. Pinnule of the same; *magnified.*

B. *DICKSONIA FIBROSA*, Colenso.—p. 68.

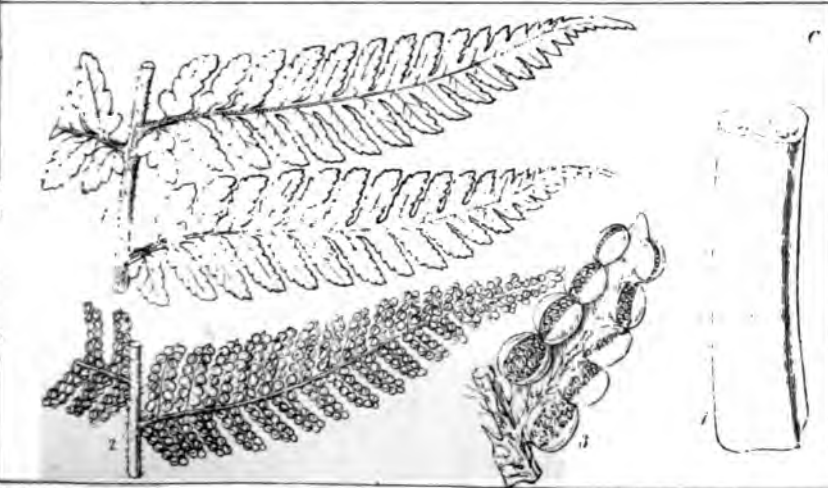
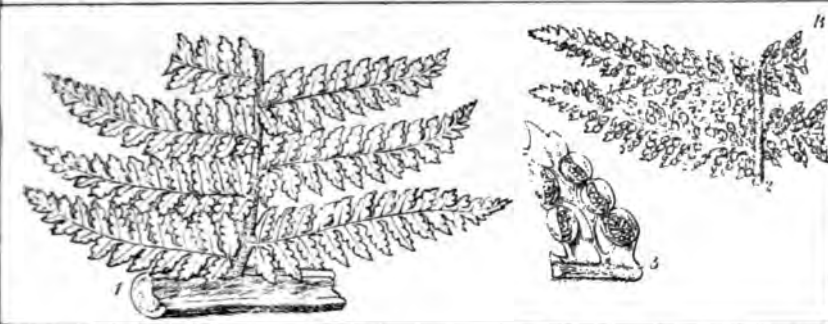
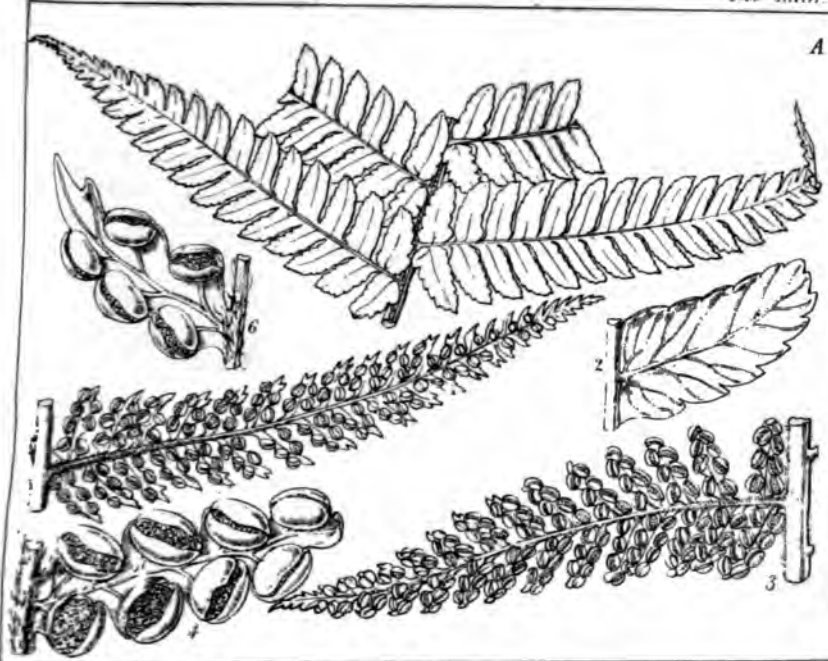
Fig. 1. Small portion of a sterile frond; *nat. size.* Fig. 2. Small portion of fertile ditto; *ditto.* Fig. 3. Pinnule from the same; *magnified.*

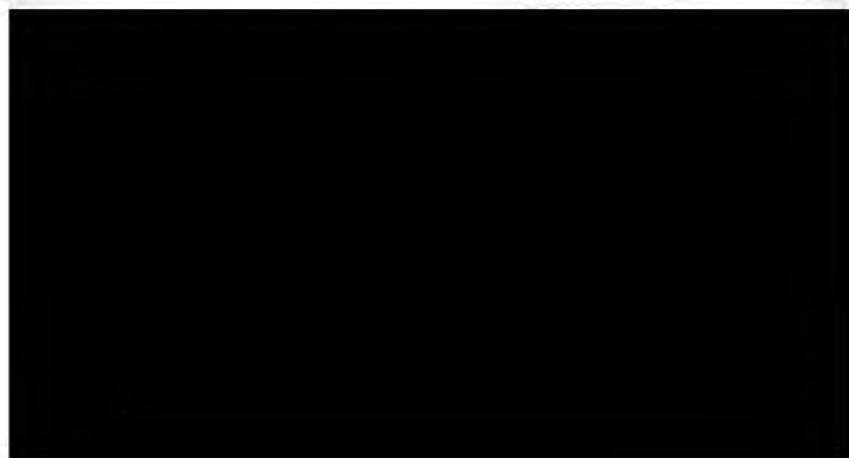
C. *DICKSONIA LANATA*, Colenso.—p. 69.

Fig. 1. Portion of a sterile frond; *nat. size.* Fig. 2. Portion of fertile ditto; *ditto.* Fig. 3. Pinnule of the fertile frond; *magnified.* Fig. 4. Portion of the stipes; *nat. size.*



A





TAB. XXIV.

A. *DICKSONIA CONIIFOLIA*, Hook.—p. 70.

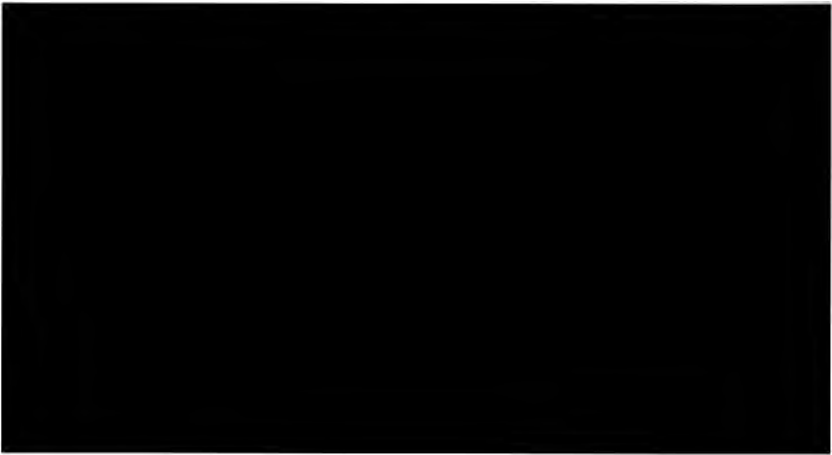
Fig. 1. Portion of a sterile frond; *nat. size.* Fig. 2. Portion of fertile ditto; *ditto.* Fig. 3. Pinnule; *magnified.* Fig. 4. Two sori; *more magnified.*

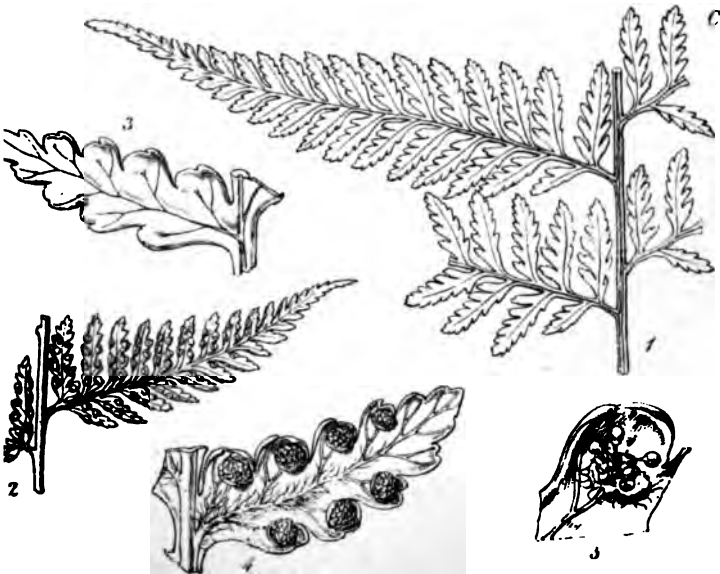
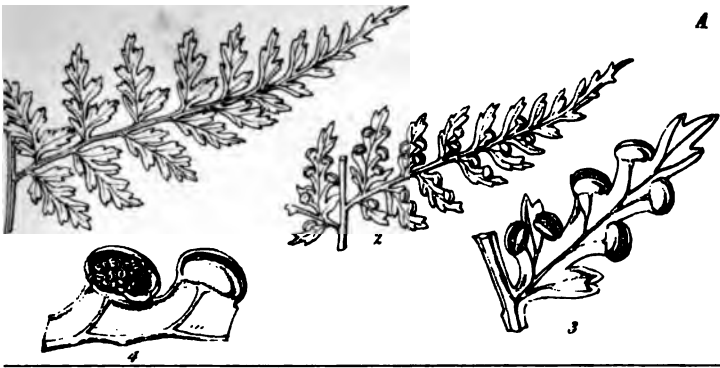
B. *DICKSONIA MARTIANA*, Klotzsch.—p. 70.

Fig. 1. Portion of a sterile frond; *nat. size.* Fig. 2. Portion of fertile ditto; *ditto.* Fig. 3. Two segments with sori; *magnified.*

C. *DICKSONIA DUBIA*, Gaud.—p. 71.

Fig. 1. Portion of a sterile frond; *nat. size.* Fig. 2. Fertile pinna; *ditto.* Fig. 3. Upper; and fig. 4, under side of fertile segments; *magnified.* Fig. 5. Sorus; several of the capsules having been removed; *more magnified.*









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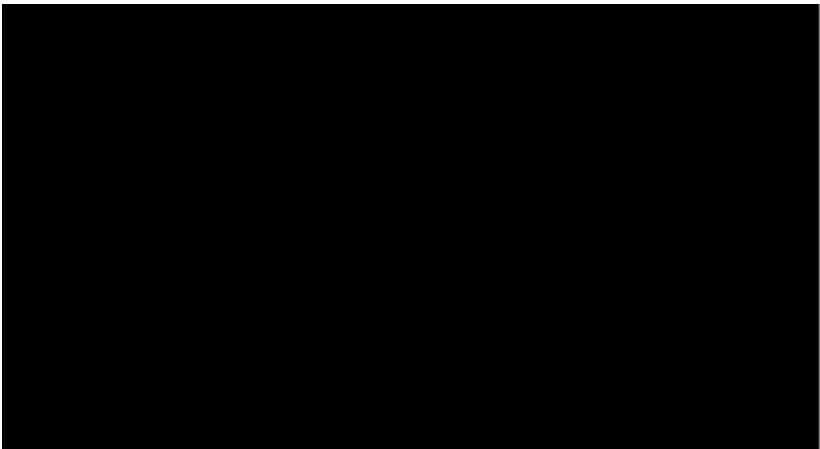
TAB. XXV.

A. *DICKSONIA SORBIFOLIA*, Sm.—p. 72.

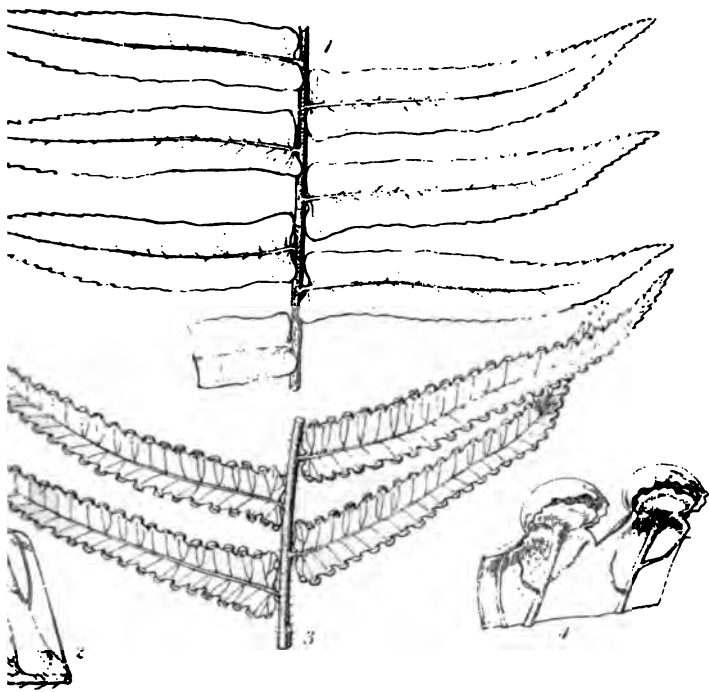
Fig. 1. Portion of a sterile frond ; *nat. size.* Fig. 2. Portion of a sterile pinna, to show the venation ; *magnified.* Fig. 3. Portion of a fertile frond ; *nat. size.* Fig. 4. Portion of a pinna from the same with two sori ; *magnified.*

B. *DICKSONIA LINDENI*, Hook.—p. 72.

Fig. 1. Portion of a fertile frond ; *nat. size.* Fig. 2. Portions of pinnæ with sori ; *magnified.*



A



B







TAB. XXVI.

A. *DICKSONIA PAVONI*, Hook.—p. 74.

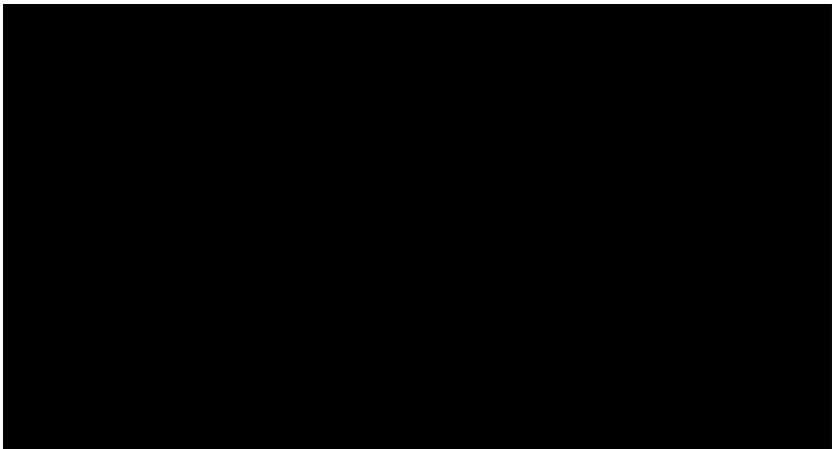
Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2, 3. Portions of segments with sori; *more or less magnified.*

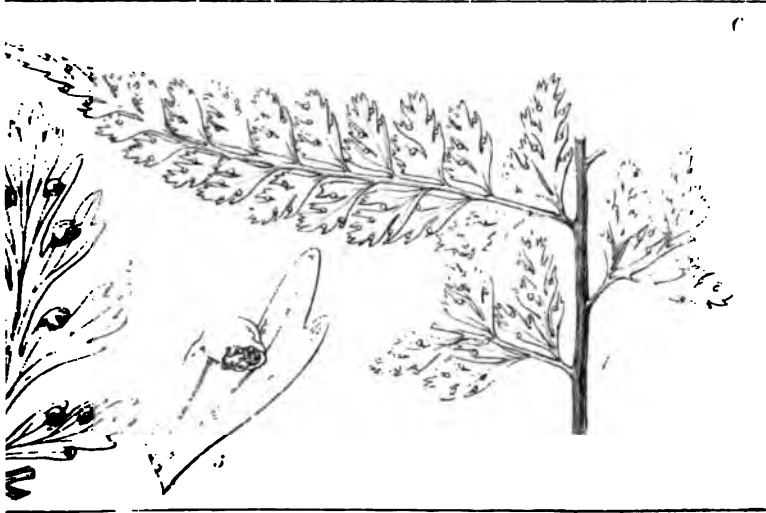
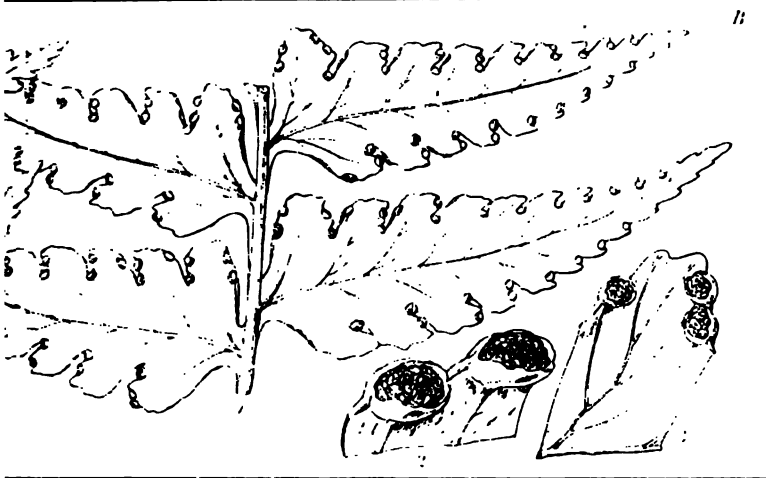
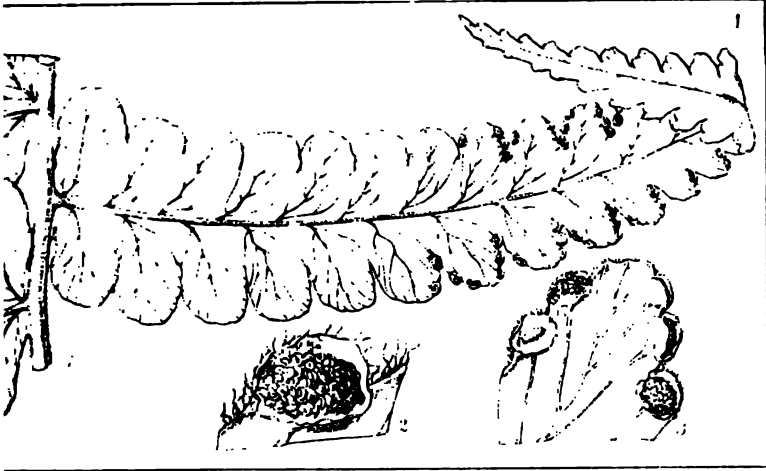
B. *DICKSONIA ADIANTOIDES*, H.B.K.—p. 75.

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2, 3. Portions of segments, with sori; *more or less magnified.*

C. *DICKSONIA APIIFOLIA*, Sw.—p. 77.

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. Pinnule of ditto; *magnified.* Fig. 3. Segment with sorus; *more magnified.*







TAB. XXVII.

A. DICKSONIA RUBIGINOSA, *Kaulf.*—p. 79.

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. Segment of ditto; *magnified.* Fig. 3. Portion of the same; *more magnified.*

B. DICKSONIA ANTHRISCIFOLIA, *Kaulf.*—p. 79.

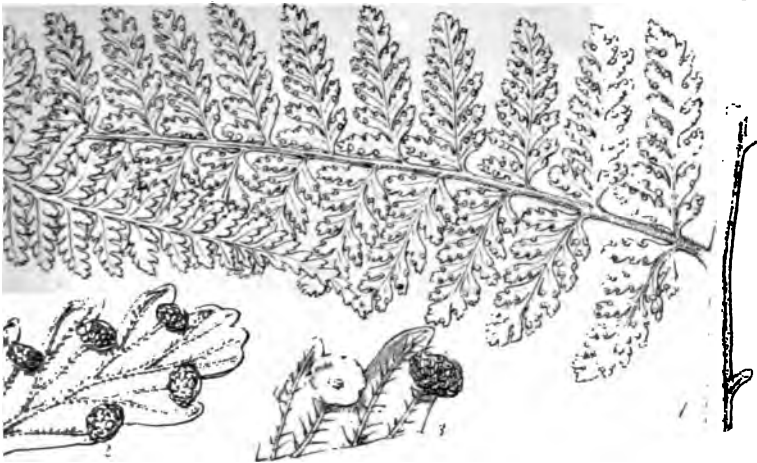
Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2, 3. Segment and portion of ditto; *more and less magnified.*

C. DICKSONIA APPENDICULATA, *Wall.*—p. 79.

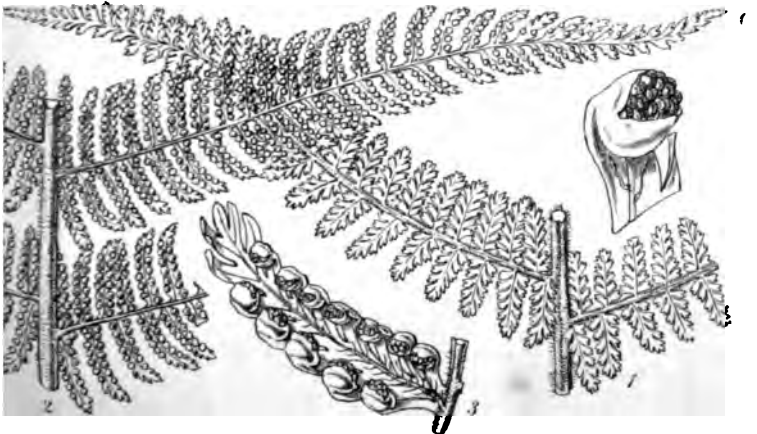
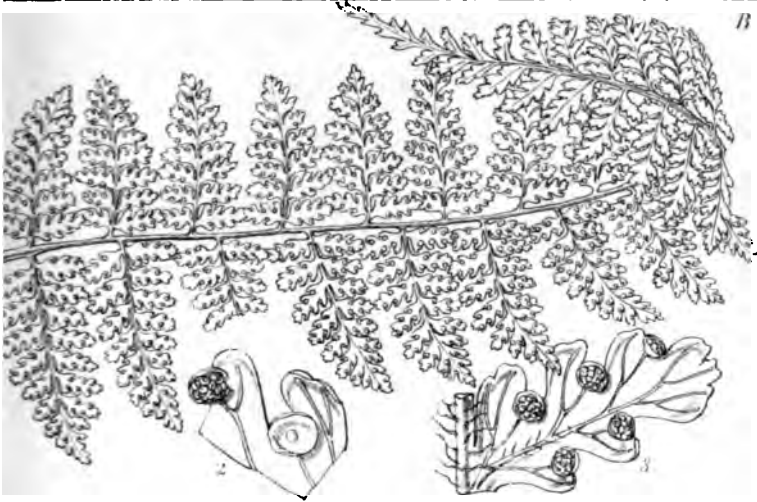
Fig. 1. Portion of a sterile frond; *nat. size.* Fig. 2. Portion of a fertile ditto; *ditto.* Fig. 3. Pinna from the same; *magnified.* Fig. 4. Sorus; *more magnified.*



4



B





TAB. XXVIII.

A. *DICKSONIA DELTOIDEA*, Hook. p. 80.

Fig. 1. Portion of a fertile frond; *nat. size*. Fig. 2. Segment of ditto; *magnified*. Fig. 3. Single sorus; *more magnified*.

B. *DICKSONIA SCABRA*, Wall.—p. 80.

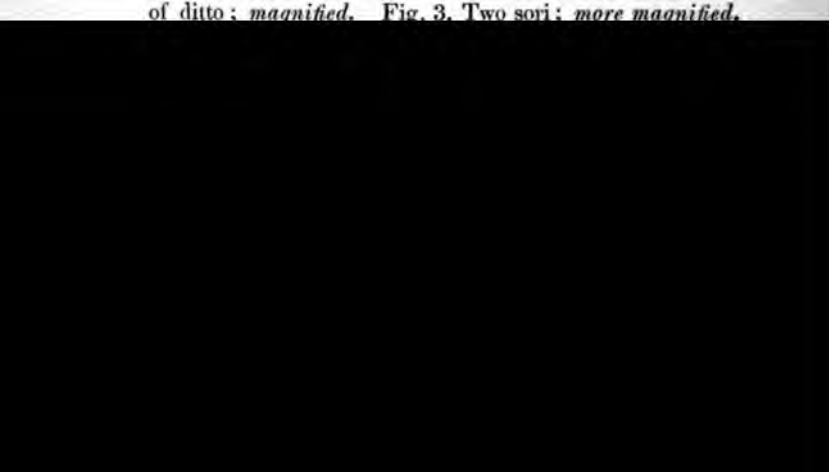
Fig. 1. Caudex and portion of the stipes; *nat. size*. Fig. 2. Portion of a fertile frond; *ditto*. Fig. 3. Segment of ditto; *magnified*. Fig. 4. Sorus; *more magnified*.

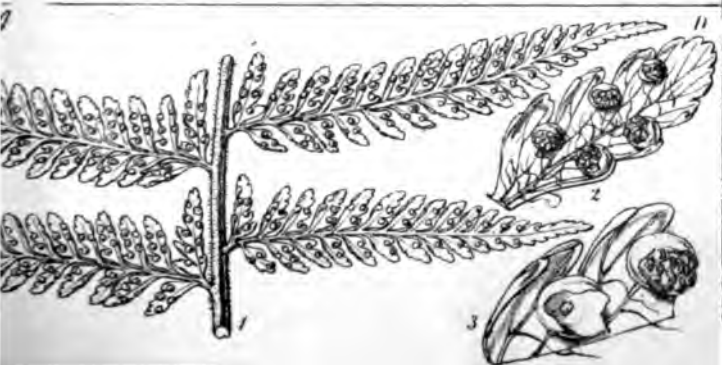
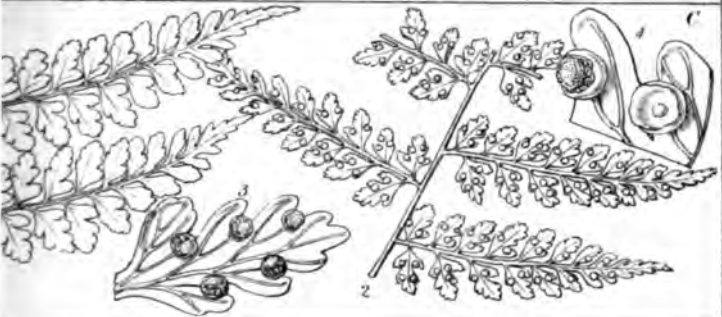
C. *DICKSONIA CUNEATA*, Hook.—p. 80.

Fig. 1. Portion of a sterile; and fig. 2, portion of a fertile frond; *nat. size*. Fig. 3. Pinnule of ditto; *magnified*. Fig. 4. Two sori; *more magnified*.

D. *DICKSONIA SMITHII*, Hook.—p. 80.

Fig. 1. Portion of a fertile frond; *nat. size*. Fig. 2. Pinnule of ditto; *magnified*. Fig. 3. Two sori; *more magnified*.





TAB. XXVIII.

A. *DICKSONIA DELTOIDEA*, Hook. p. 80.

Fig. 1. Portion of a fertile frond; *nat. size*. Fig. 2. Segment of ditto; *magnified*. Fig. 3. Single sorus; *more magnified*.

B. *DICKSONIA SCABRA*, Wall.—p. 80.


Fig. 1. Caudex and portion of the stipes; *nat. size*. Fig. 2. Portion of a fertile frond; *ditto*. Fig. 3. Segment of ditto; *magnified*. Fig. 4. Sorus; *more magnified*.

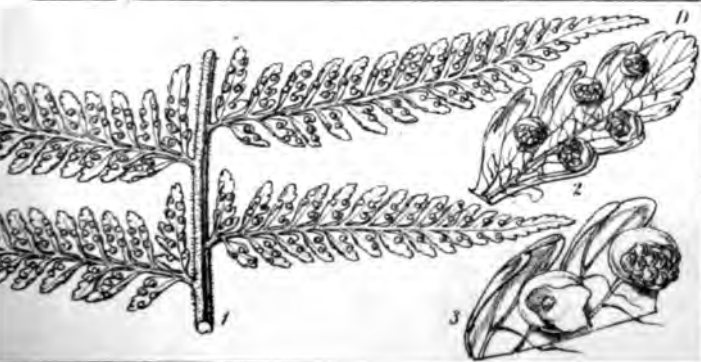
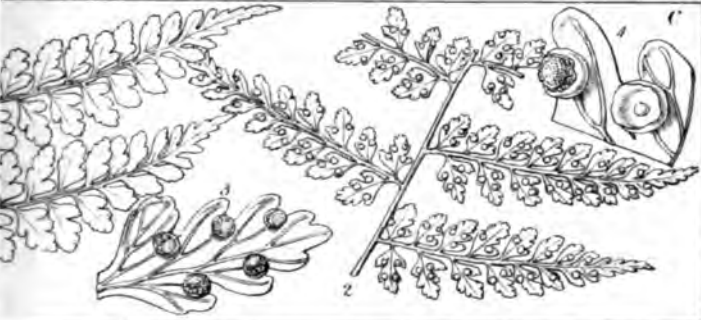
C. *DICKSONIA CUNEATA*, Hook.—p. 80.

Fig. 1. Portion of a sterile; and fig. 2, portion of a fertile frond; *nat. size*. Fig. 3. Pinnule of ditto; *magnified*. Fig. 4. Two sori; *more magnified*.

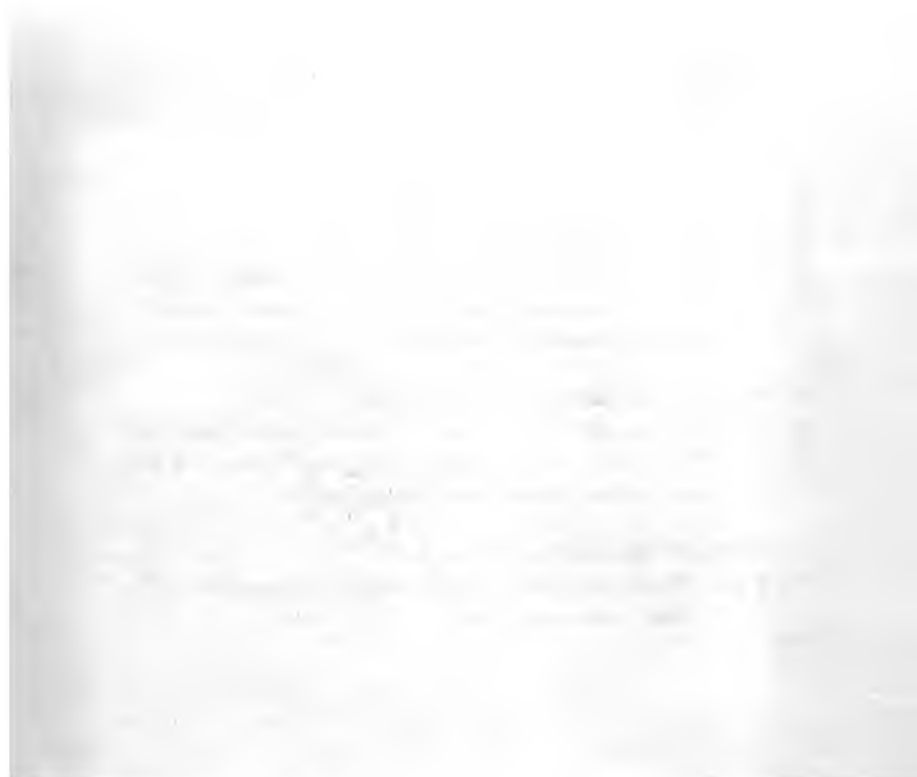
D. *DICKSONIA SMITHII*, Hook.—p. 80.

Fig. 1. Portion of a fertile frond; *nat. size*. Fig. 2. Pinnule of ditto; *magnified*. Fig. 3. Two sori; *more magnified*.









TAB. XXIX.

A. *CIBOTIUM GLAUCUM*, *Hook. et Arn.*—p. 82.

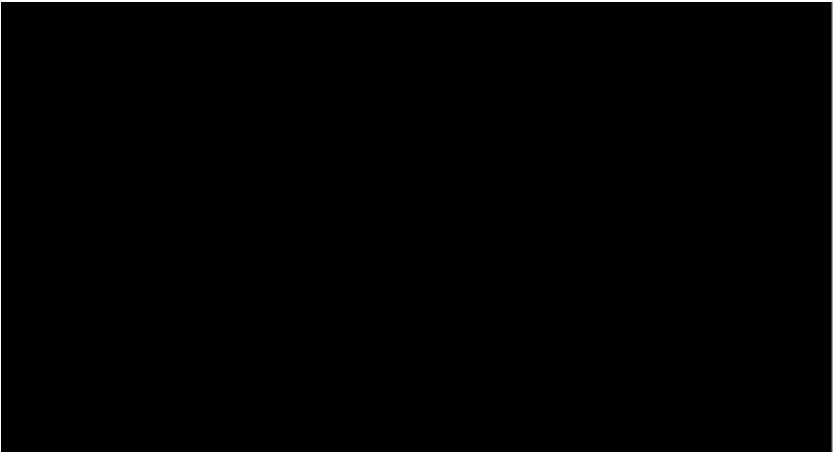
Fig. 1. Pinna; *nat. size.* Fig. 2. Segment; *magnified.* Fig. 3. Sori; *more magnified.* Fig. 4. Portion of a segment, to show the venation; *magnified.*

B. *CIBOTIUM ASSAMICUM*, *Hook.*—p. 83.

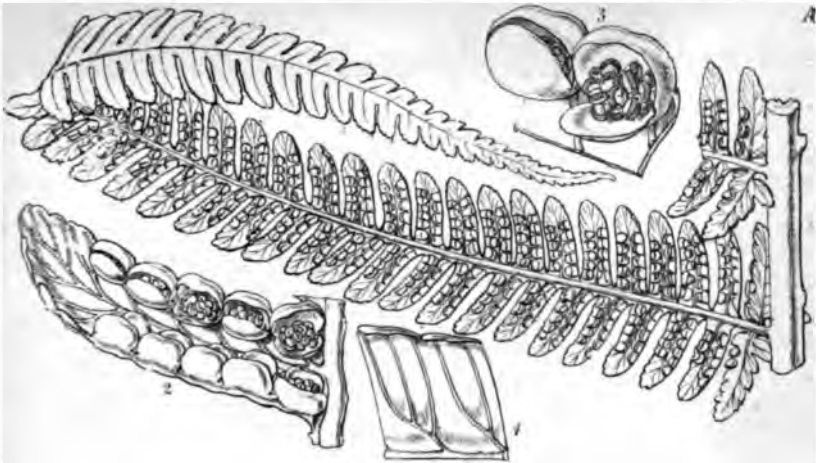
Fig. 1. Pinna; *nat. size.* Fig. 2. Segment; *much magnified.* Fig. 3. Sori; *more magnified.* Fig. 4. Portion of a segment, to show the venation; *magnified.*

C. *CIBOTIUM MENZIESII*, *Hook.*—p. 84.

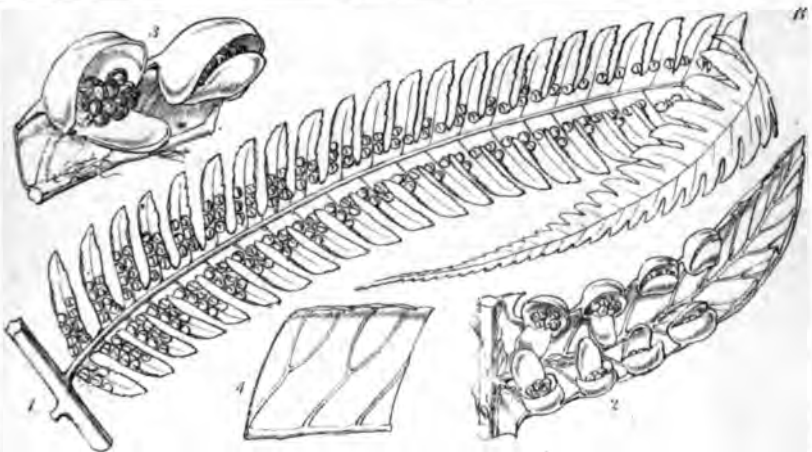
Fig. 1. Pinna; *nat. size.* Fig. 2. Segment; *magnified.* Fig. 3. Sori; *more magnified.*



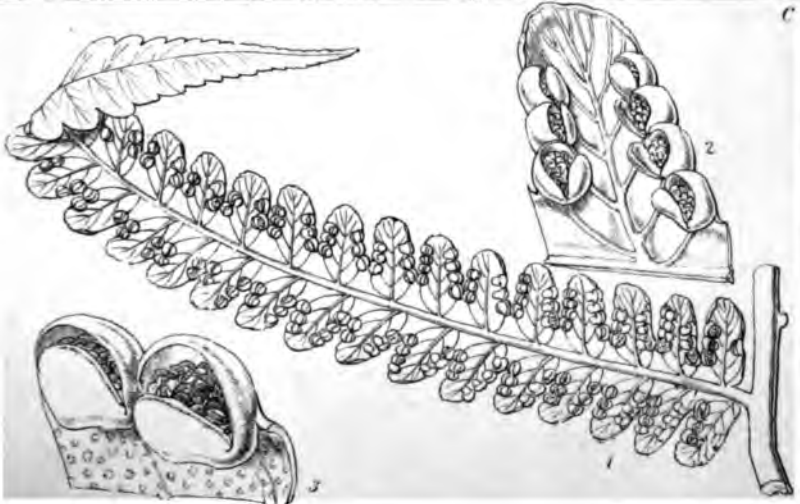
A



B



C







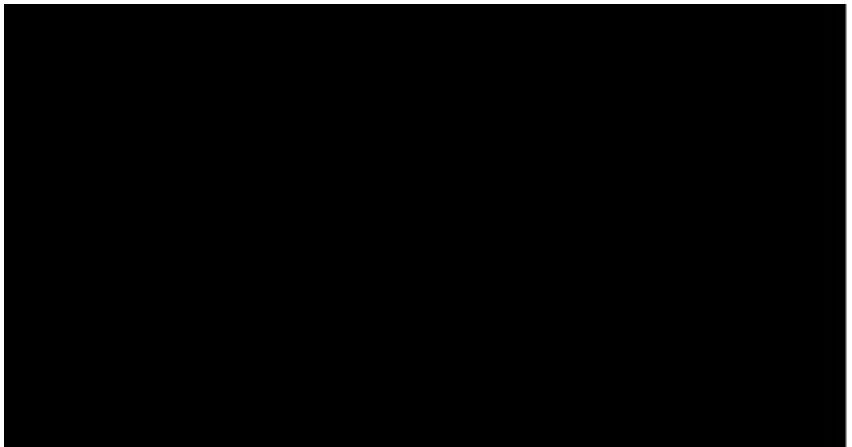
TAB. XXXX.

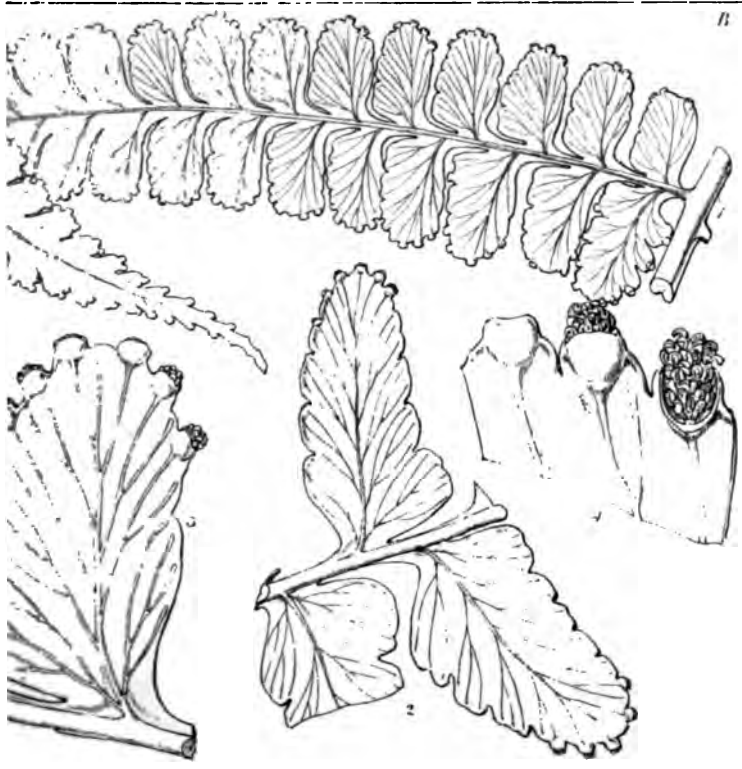
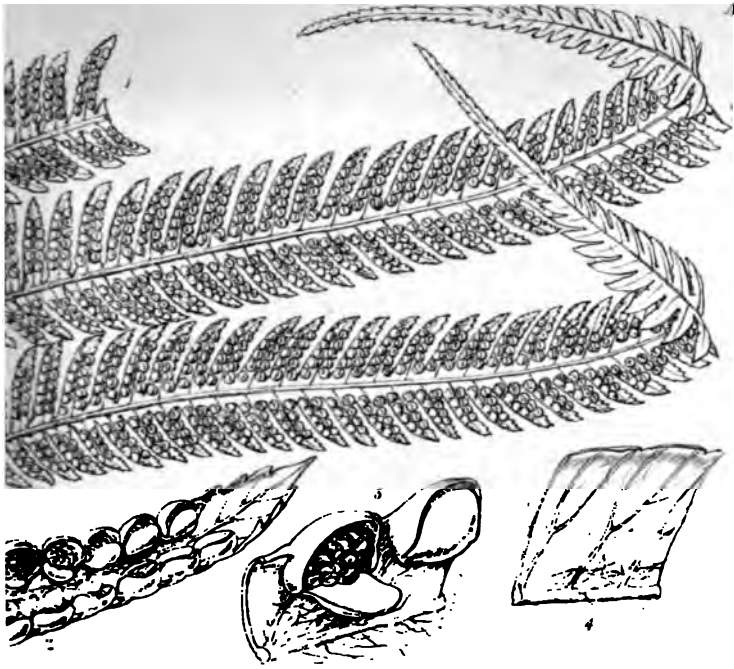
A. CIBOTIUM SCHIEDEI, *Schlecht. & Cham.*—p. 84.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Segment; *magnified.* Fig. 3. Sori; *more magnified.* Fig. 4. Portion of a segment, to show the venation.

B. DEPARIA MATHEWSII, *Hook.*—p. 85.

Fig. 1. Pinna; *nat. size.* Fig. 2. Portion of a larger pinna; *ditto.* Fig. 3. Segment or pinnule; *magnified.* Fig. 4. Sori; *more magnified.*









TAB. XXXI.

A. HYMENOPHYLLUM CRUENTUM, *Cav.*—p. 87.

Fig. 1. Plant; *nat. size.* Fig. 2. Sori; *magnified.*

B. HYMENOPHYLLUM ABRUPTUM, *Hook.*—p. 88.

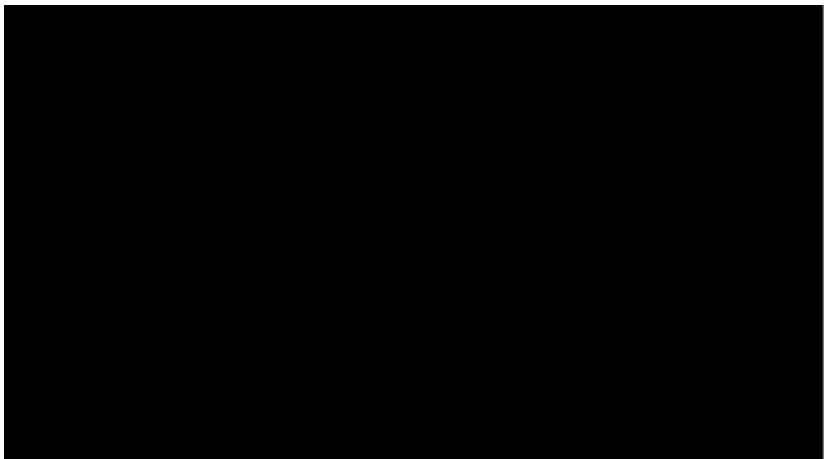
Fig. 1. Plant; *nat. size.* Fig. 2. Sorus; *magnified.*

C. HYMENOPHYLLUM BORYANUM, *Willd.*—p. 89.

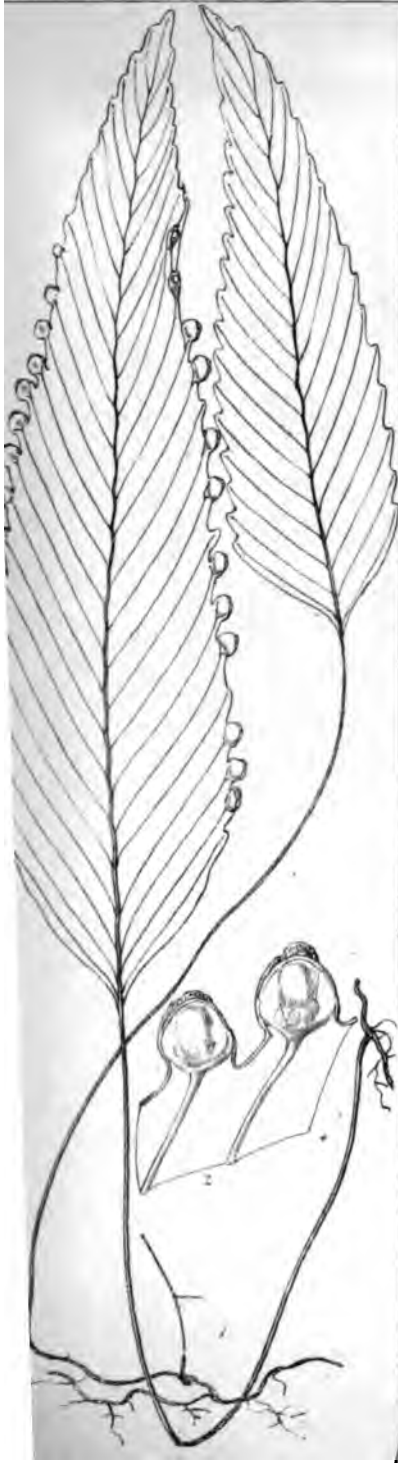
Fig. 1. Plant; *nat. size.* Fig. 2. Sorus; *magnified.*

D. HYMENOPHYLLUM HIRTELLUM, *Sw.*—p. 90.

Fig. 1. Plant; *nat. size.* Fig. 2. Sorus; *magnified.*



B





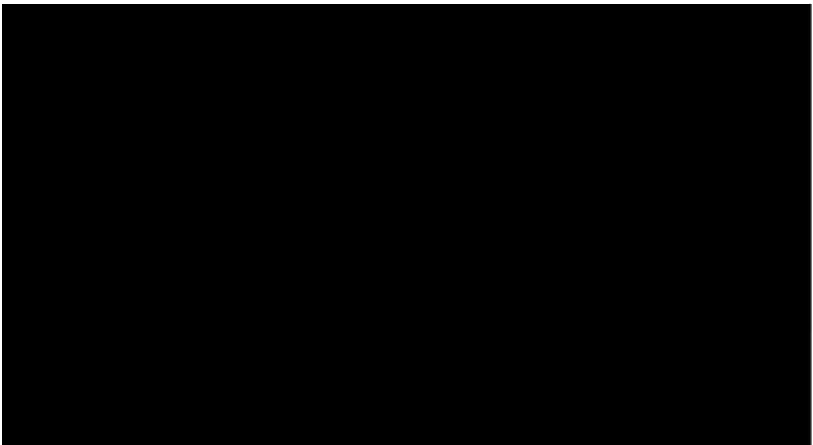
Tab. XXXII.

A. HYMENOPHYLLUM CHILOENSE, Hook.—p. 90.

Fig. 1. Plant; *nat. size.* Fig. 2. Segment of a frond; *magnified.*

B. HYMENOPHYLLUM ORGANENSE, Hook.—p. 90.

Fig. 1. Lower portion of a plant; *nat. size.* Fig. 2. Segments with sori; *magnified.*









TAB. XXXIII.

A. HYMENOPHYLLUM PULCHELLUM, *Schlecht.*—p. 91.

Fig. 1. Upper extremity of a frond; *nat. size.* Fig. 2. Pinna from the same; *magnified.* Fig. 3. Sorus; *more magnified.*

B. HYMENOPHYLLUM INTERRUPTUM, *Kze.*—p. 92.

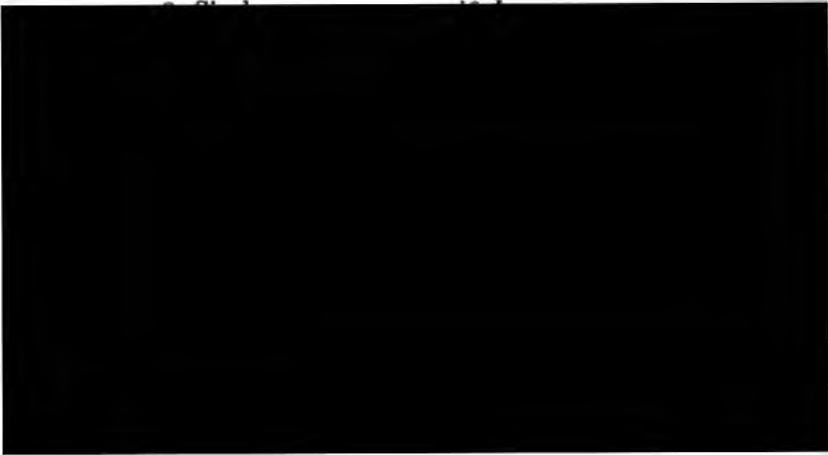
Fig. 1. Upper extremity of a frond; *nat. size.* Fig. 2. Sori; *magnified.* Fig. 3. Single sorus; *more magnified.*

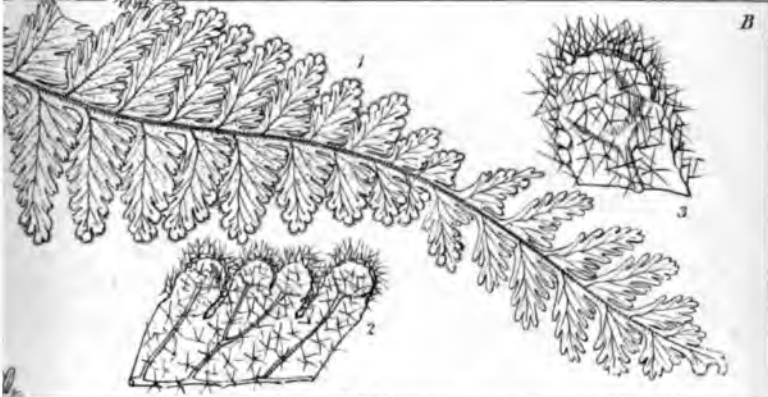
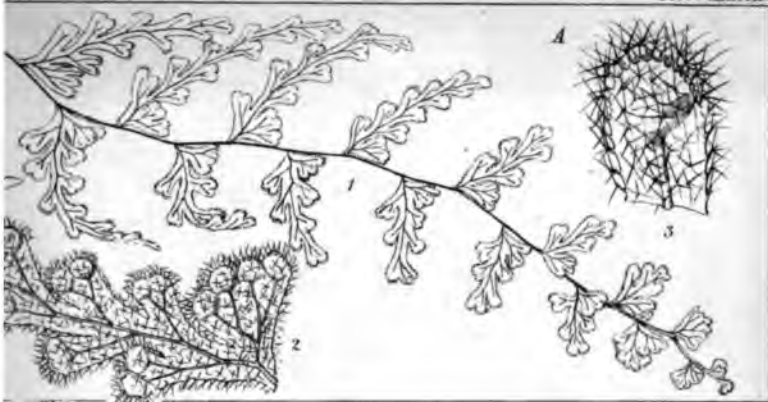
C. HYMENOPHYLLUM BERTEROI, *Hook.*—p. 93.

Fig. 1. Plant; *nat. size.* Fig. 2. Segment, with sori; *magnified.*

D. HYMENOPHYLLUM OBTUSUM, *Hook. et Arn.*—p. 93.

Fig. 1. Plant; *nat. size.* Fig. 2. Segments; *magnified.* Fig.







TAB. XXXIV.

A. HYMENOPHYLLUM ÆRUGINOSUM, *Carm.*—p. 94.

Fig. 1. Plant; *nat. size.* Fig. 2. Segment of the frond, with two sori; *magnified.*

B. HYMENOPHYLLUM LANCEOLATUM, *Hook. et Arn.*—p. 94.

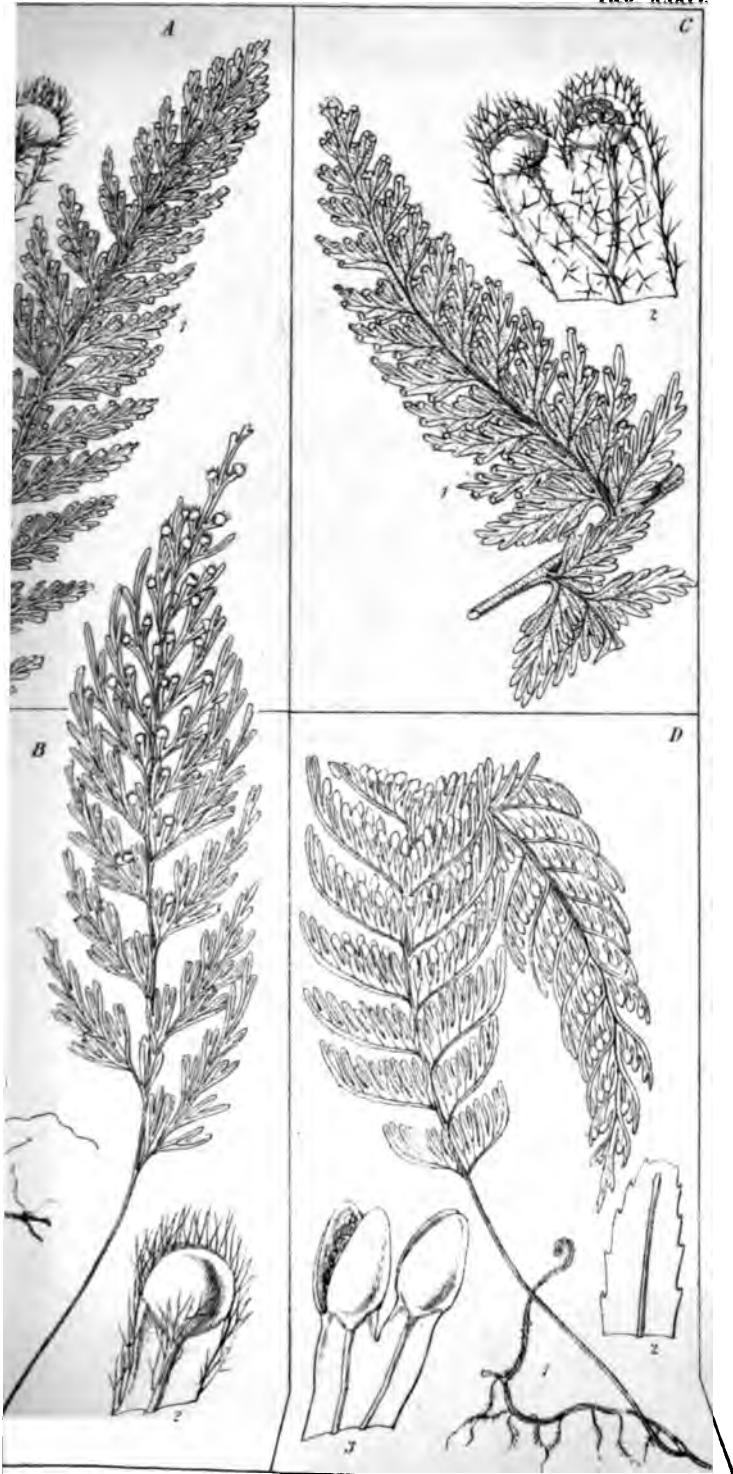
Fig. 1. Plant; *nat. size.* Fig. 2. Apex of a segment, with sorus; *magnified.*

C. HYMENOPHYLLUM LINDENI, *Hook.*—p. 94.

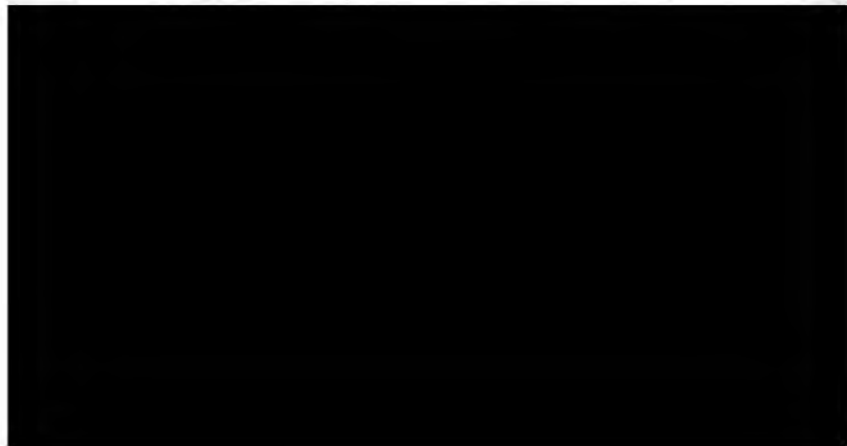
Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Segments with sori; *magnified.*

D. HYMENOPHYLLUM PECTINATUM, *Cav.*—p. 96.

Fig. 1. Plant; *nat. size.* Fig. 2. Sterile apex of a frond; *magnified.* Fig. 3. Sori; *magnified.*



The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be supported by a valid receipt or invoice. The second part outlines the procedures for handling discrepancies between the books and the actual cash on hand. It states that any variance must be investigated immediately and reported to the appropriate authority. The third part provides a detailed breakdown of the monthly financial statements, including the income statement, balance sheet, and cash flow statement. Each statement is accompanied by a brief explanation of its components and how they relate to the overall financial health of the organization. The final part of the document contains a summary of the key findings and recommendations for improving financial control and transparency.



Tab. XXXV.

A. HYMENOPHYLLUM JAMESONI, Hook.—p. 96.

Fig. 1. Upper half of a frond; *nat. size.* Fig. 2. Pinna, with the crested rachis; *magnified.* Fig. 3. Sorus; *magnified.*

B. HYMENOPHYLLUM SMITHII.—p. 97.


Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Segments of ditto, with a sorus; *magnified.*

C. HYMENOPHYLLUM BRIDGESII, Hook.—p. 97.

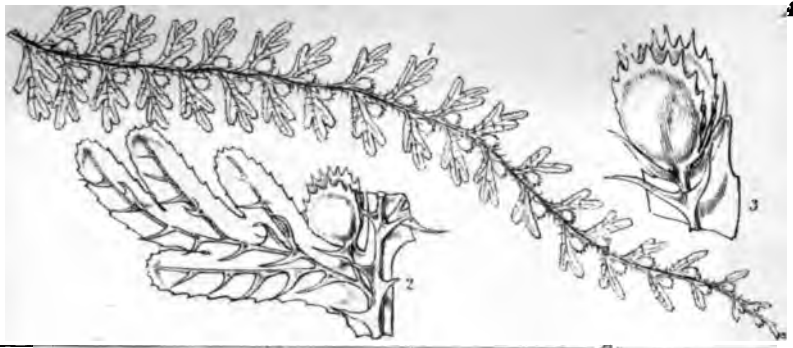
Fig. 1. Sterile pinnae, and fig. 2. fertile pinnae of a frond; *nat. size.* Fig. 3. Pinnule with sori; *magnified.*

D. HYMENOPHYLLUM BIVALVE, Swartz.—p. 98.

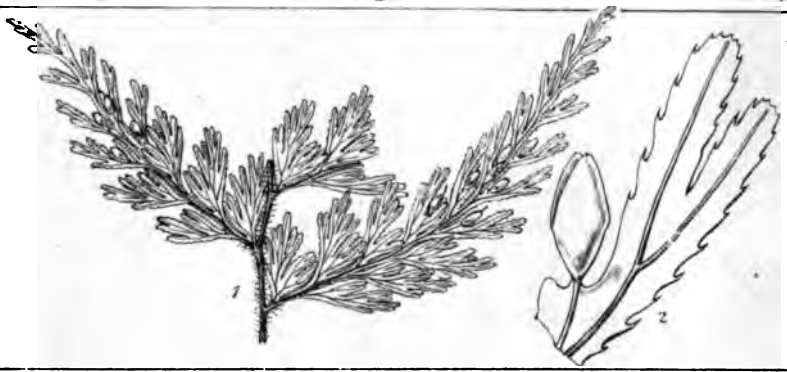
Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Pinna with sori; *magnified.* Fig. 3. Sorus; *more magnified.*



A



B



C



D





TAB. XXXVI.

A. HYMENOPHYLLUM DICHOTOMUM, Cav.—p. 98.

Fig. 1. Stipes; and fig. 2. Portion of a frond; *nat. size.* Fig. 3. Portion of the rachis; *magnified.* Fig. 4. Segments with a sorus; *magnified.*

B. HYMENOPHYLLUM ATTENUATUM, Hook.—p. 99.

Fig. 1. Stipes; and fig. 2. Portion of a frond; *nat. size.* Fig. 3. Segment with sori; *magnified.*

C. HYMENOPHYLLUM FIMBRIATUM, J. Sm.—p. 102.

Fig. 1. Lower part of a frond and stipes; and fig. 2. Extremity of a frond; *nat. size.* Fig. 3. Segments with sori; *magnified.*

D. HYMENOPHYLLUM FUCIFORME, Sw.—p. 103.







TAB. XXXVII.

A. HYMENOPHYLLUM PULCHERRIMUM, *Col.*—p. 103.

Fig. 1. Stipes ; and fig. 2. Portion of the frond ; *nat. size.* Fig. 3. Segment of a frond ; *magnified.*

B. HYMENOPHYLLUM PROTRUSUM, *Hook.*—p. 104.

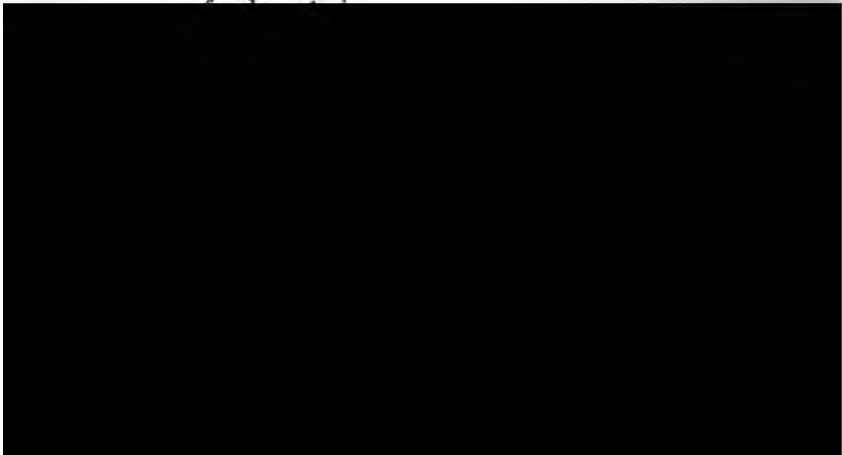
Fig. 1. Stipes and base of a frond ; and fig. 2. Apex of a frond ; *nat. size.* Fig. 3. Segments with sori ; *magnified.*

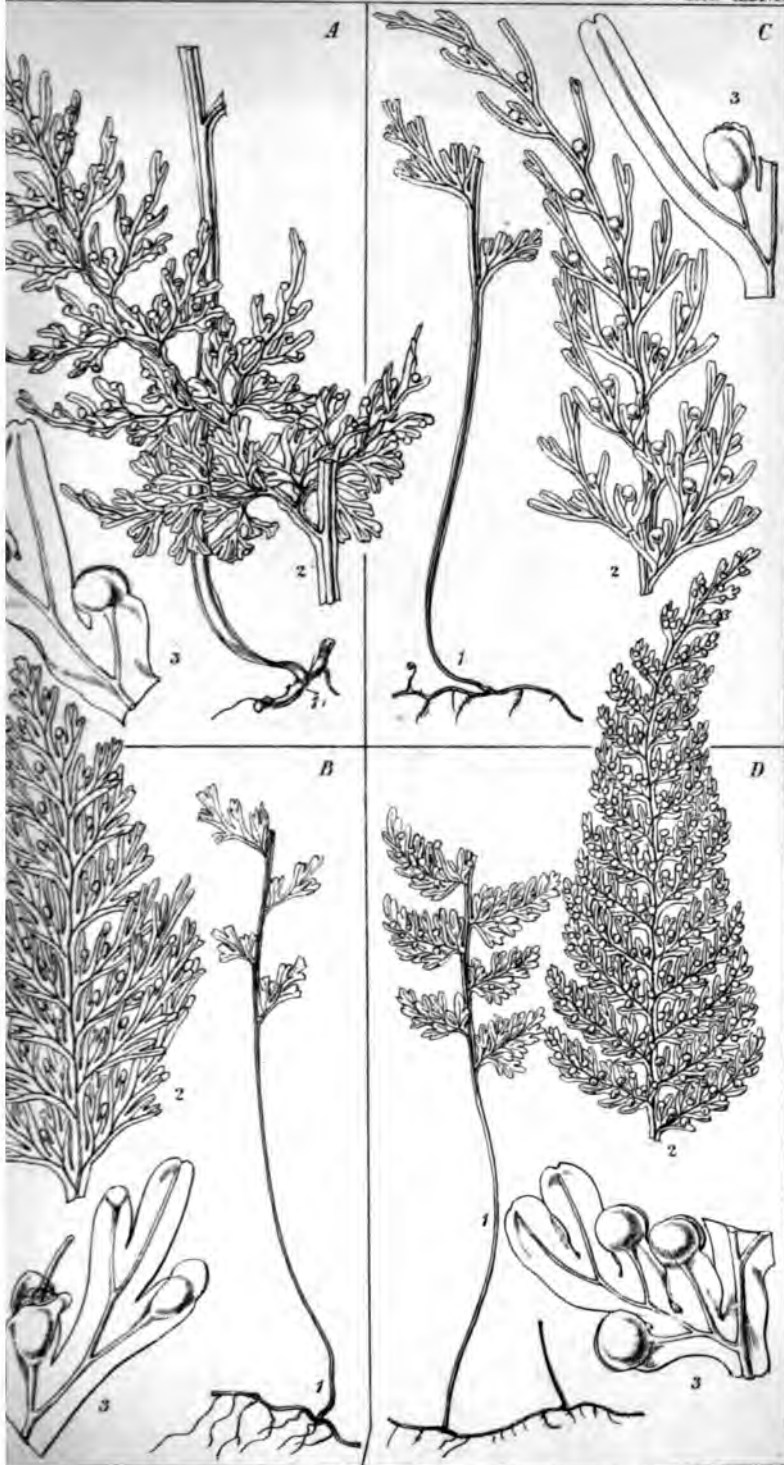
C. HYMENOPHYLLUM RECURVUM, *Hook.*—p. 104.

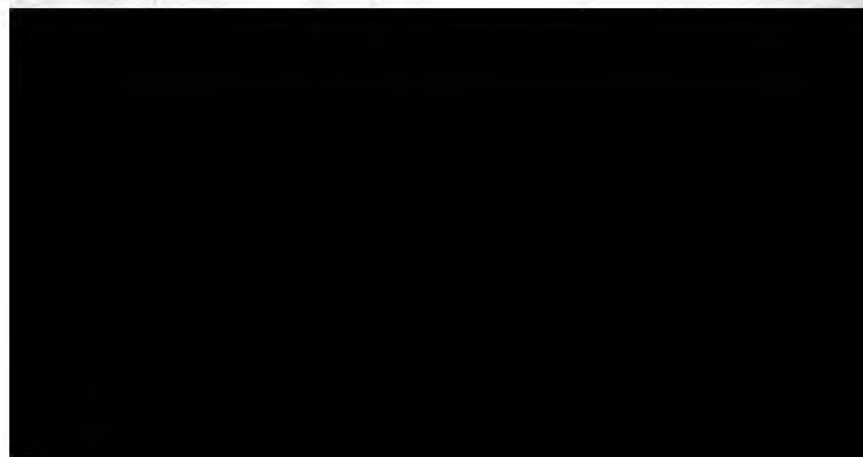
Fig. 1. Stipes and base of a frond ; and fig. 2. Extremity of a frond ; *nat. size.* Fig. 3. Segment with sorus ; *magnified.*

D. HYMENOPHYLLUM MYRIOCARPUM, *Hook.*—p. 106.

Fig. 1. Stipes and base of a frond ; and fig. 2. Apex of a









Tab. XXXVIII.

A. HYMENOPHYLLUM EXSERTUM, *Wall.*—p. 109.

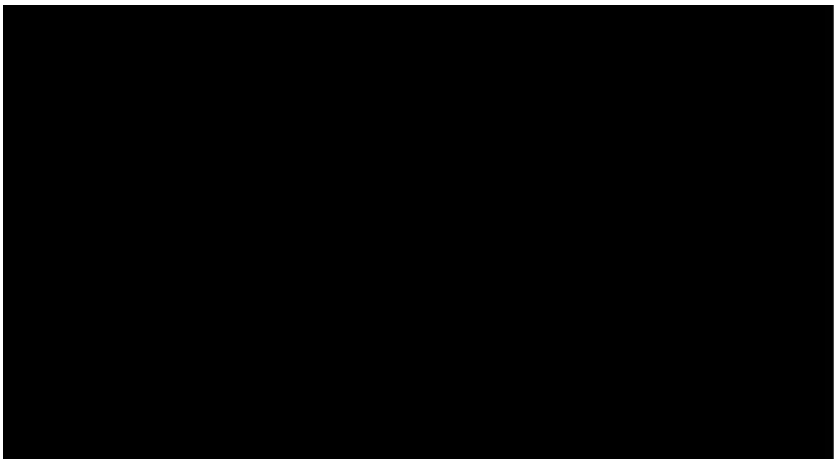
Fig. 1. Plant; *nat. size.* Fig. 2. Pinna; *magnified.* Fig. 3.
Sorus; *more magnified.*

B. HYMENOPHYLLUM CAPILLACEUM, *Roxb.*—p. 109.

Fig. 1. Plant; *nat. size.* Fig. 2. Pinna; *magnified.* Fig. 3.
Sorus; *more magnified.*

C. HYMENOPHYLLUM RENIFORME, *Hook.*—p. 110.

Fig. 1. Plant; *nat. size.* Fig. 2. Pinna with sori; *magnified.*
Fig. 3. Single sorus; *more magnified.*









TAB. XXXIX.

A. TRICHOMANES PARVULUM, Poir.—p. 118.

Fig. 1. Plant; *nat. size.* Fig. 2. Portion of the same; *magnified.* Fig. 3. Sori; *ditto.*

B. TRICHOMANES PROLIFERUM, Bl.—p. 118.

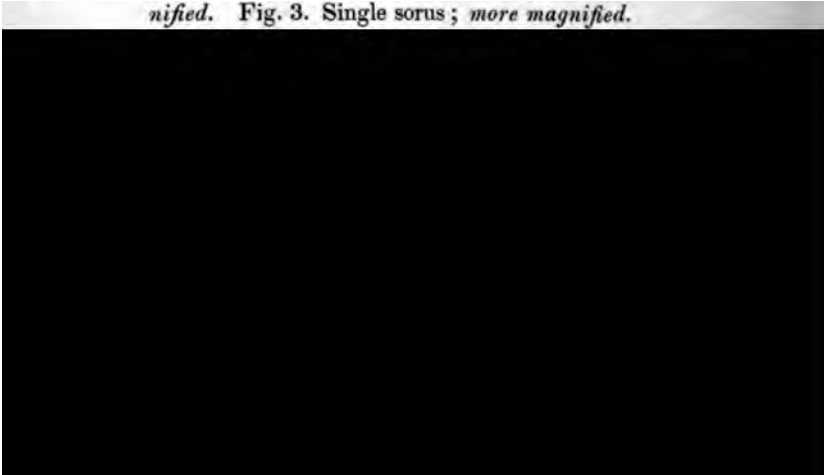
Fig. 1. Plant; *nat. size.* Fig. 2. Frond; *magnified.* Fig. 3. Sori; *ditto.*

C. TRICHOMANES ATTENUATUM, Hook.—p. 122.

Fig. 1. Stipites; and fig. 2. Upper portion of a frond; *nat. size.* Fig. 3. Sori and portion of a segment; *magnified.*

D. TRICHOMANES KUNZEANUM, Hook.—p. 127.

Fig. 1. Pinna; *nat. size.* Fig. 2. Segment, with sori; *magnified.* Fig. 3. Single sorus; *more magnified.*





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Tab. XL.

A. TRICHOMANES GLAUCO-FUSCUM, Hook.—p. 128.

Fig. 1. Plant; *nat. size.* Fig. 2. Fertile portion of a segment; *magnified.* Fig. 3. Sorus; *more magnified.*

B. TRICHOMANES CÆSPITOSUM, Hook.—p. 132.

Fig. 1, 12. Plant with terminal sori; *nat. size.* Fig. 2. Sorus; *magnified.* Fig. 3. Plant with lateral sori; *nat. size.* Fig. 4. Sorus; *magnified.*

C. TRICHOMANES ANCEPS, Hook.—p. 135.

Fig. 1. Pinna of α .; *nat. size.* Fig. 2. Fertile portion of β .; *magnified.* Fig. 3. Pinna of β .; *nat. size.*









TAB. XLI.

A. TRICHOMANES LUCENS, Sw.—p. 138.

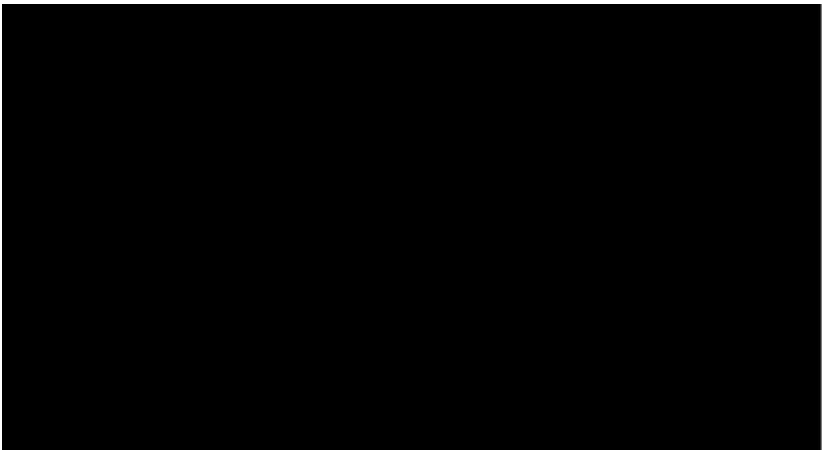
Fig. 1. Pinnæ; *nat. size.* Fig. 2. Portion of a fertile pinna;
magnified. Fig. 3. Sorus; *more magnified.*

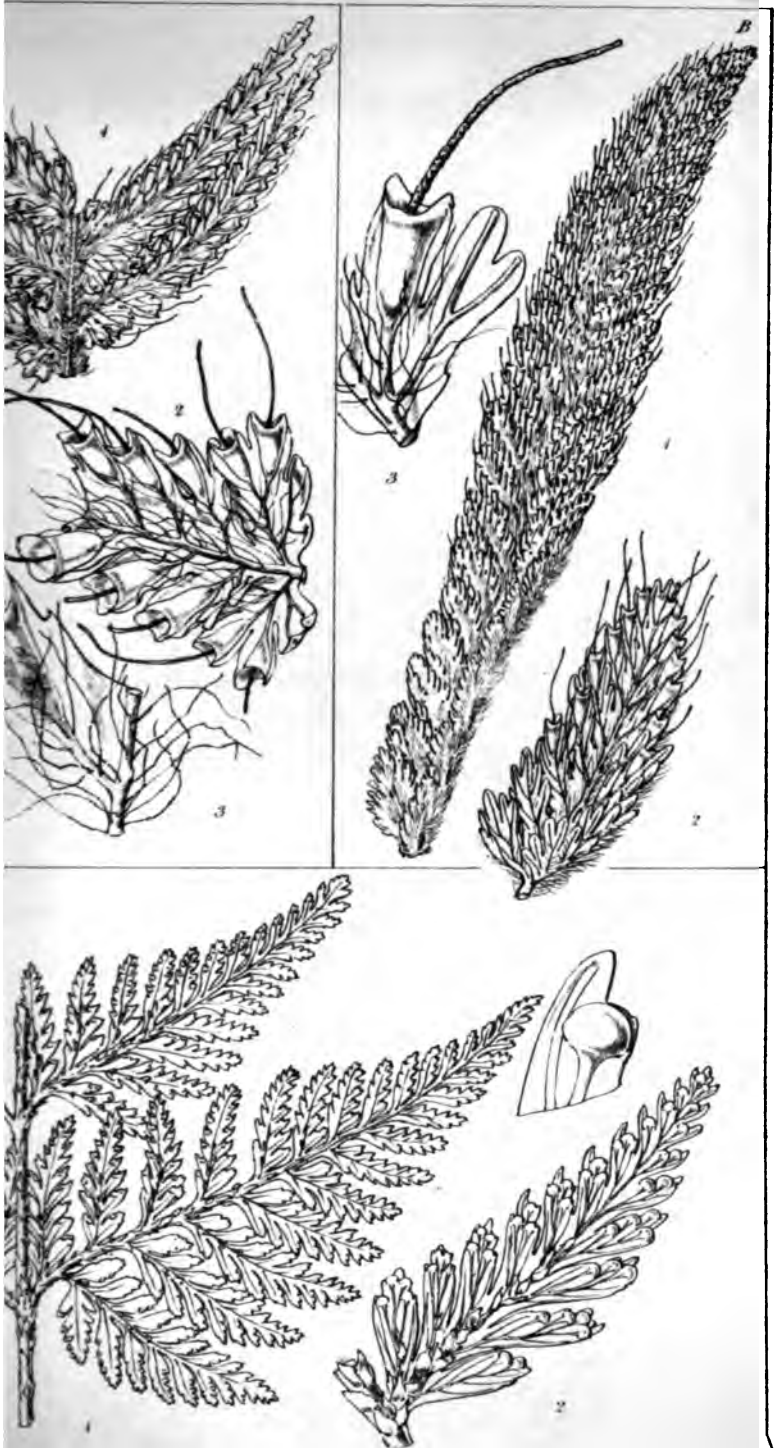
B. TRICHOMANES LAMBERTIANUM, Hook.—p. 139.

Fig. 1. Upper portion of a frond; *nat. size.* Fig. 2. Pinna;
magnified. Fig. 3. Fertile portion of the same; *more
magnified.*

C. DAVALLIA VESTITA, Bl.—p. 156.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Fertile portion
of the same; *magnified.* Fig. 3. Sorus; *more magnified.*





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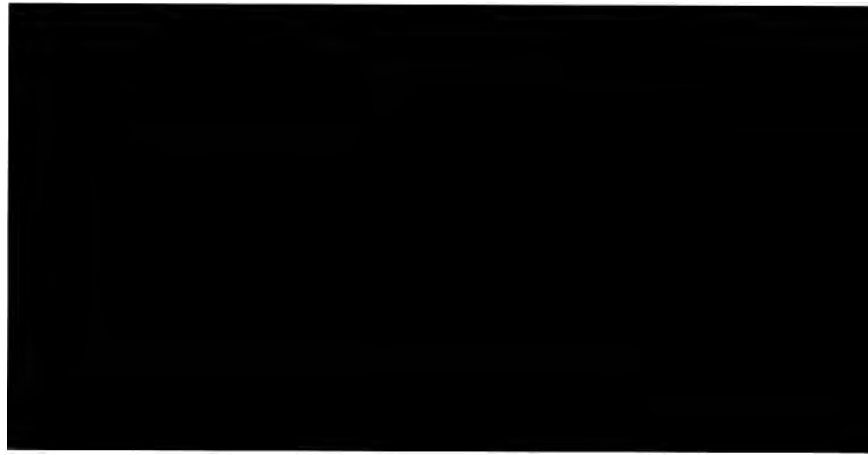


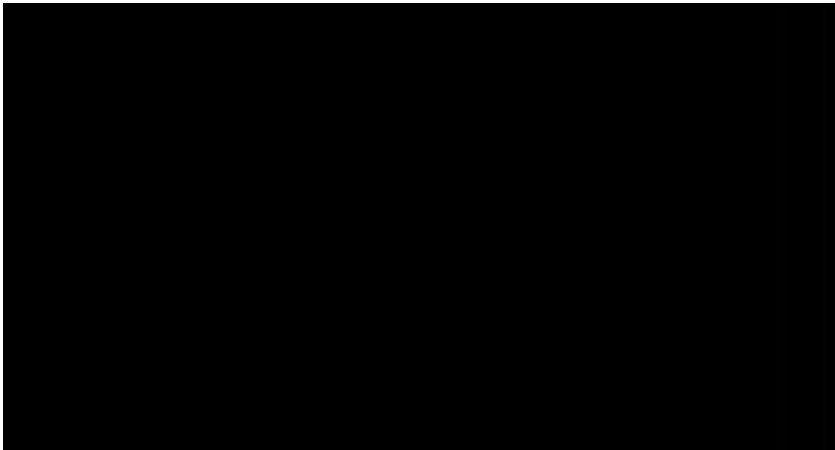
TABLE XLII.

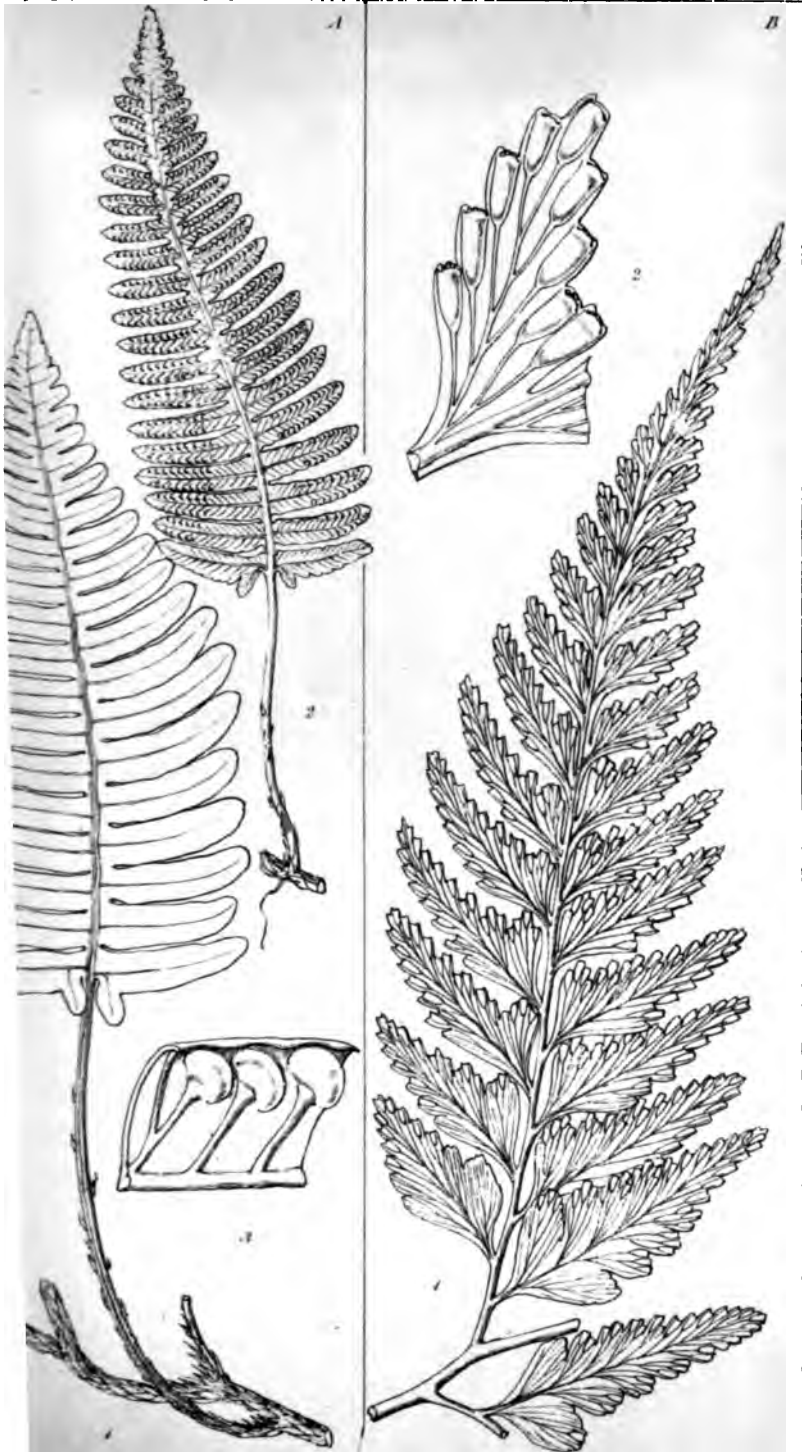
A. *DAVALLIA PARALLELA*, Wall.—p. 153.

Fig. 1, 2. Sterile and fertile plants; *nat. size*. Fig. 3. Portion of a fertile segment; *magnified*.

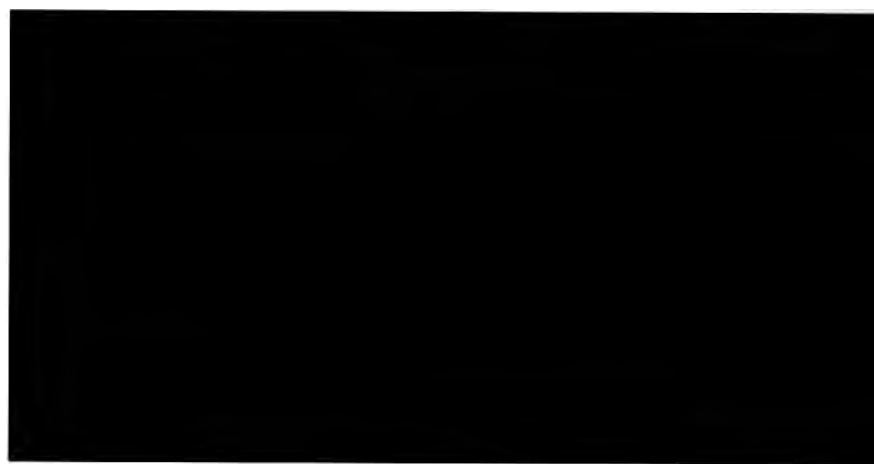
B. *DAVALLIA SOLIDA*, Sw. *var. β. latifolia*, Hook.—p. 163.

Fig. 1. Portion of a frond; *nat. size*. Fig. 2. Fertile segment; *magnified*.





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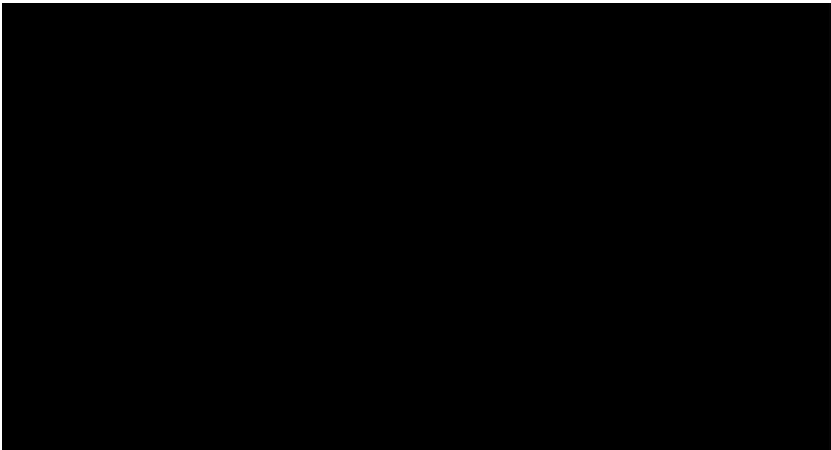
TAB. XLIII.

A. *DAVALLIA ELEGANS*, Sw. var. *a. bidentata*, Hook.—p. 165.

Fig. 1. Portion of a plant; *nat. size.* Fig. 2. Fertile pinna;
nat. size. Fig. 3. Sorus; *more magnified.*

B. *DAVALLIA ELEGANS*, Sw. var. *δ. coniiifolia*, Hook.—p. 165.

Fig. 1. Portion of a plant; *nat. size.* Fig. 2. Fertile pinna;
magnified. Fig. 3, Fertile pinna; *more magnified.*



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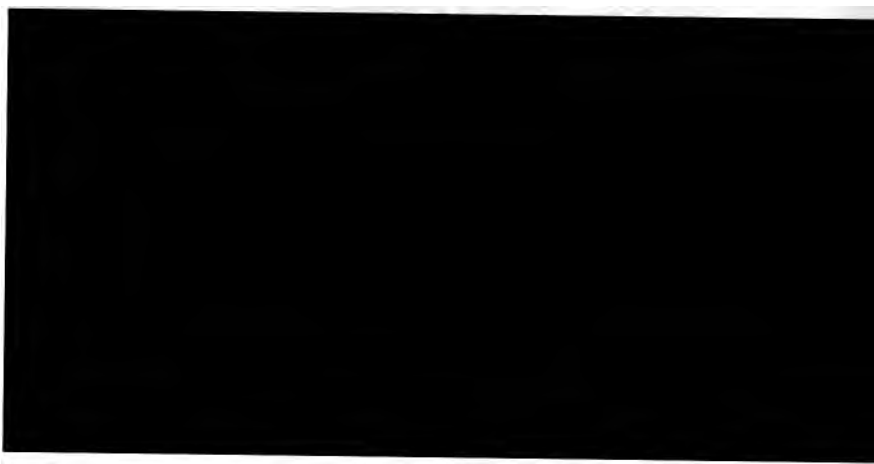


TABLE XLIV.

A. *DAVALLIA NITIDULA*, Kze.—p. 165.

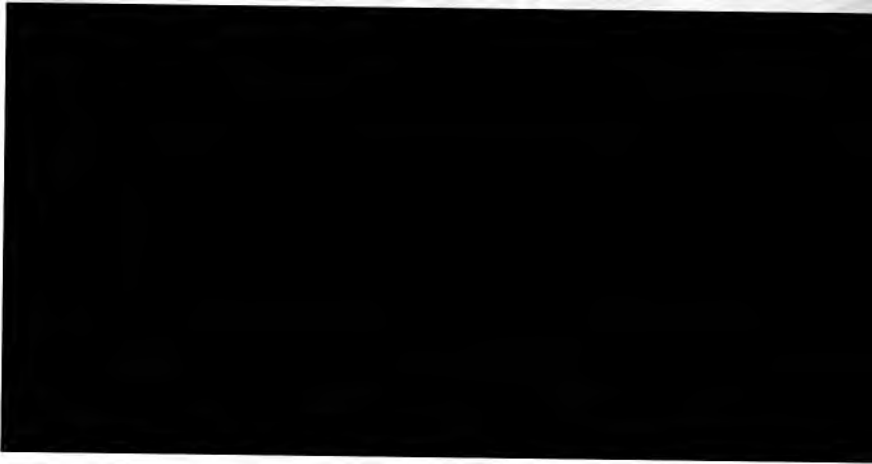
Fig. 1. Portion of a plant; *nat. size.* Fig. 2. Fertile pinna;
magnified. Fig. 3. Sorus; *magnified.*

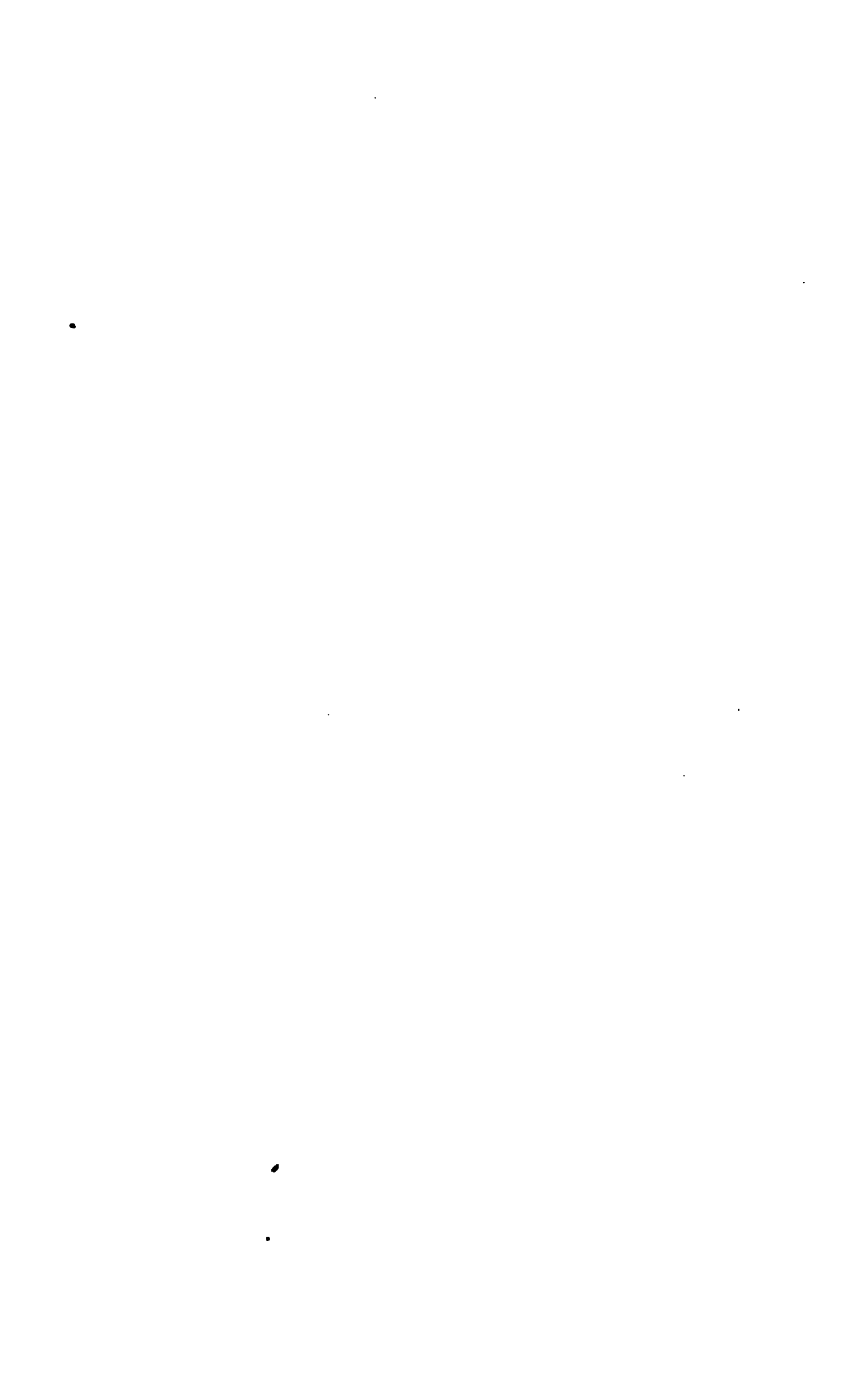
B. *DAVALLIA DECURRENS*, Hook.—p. 167.

Fig. 1. Portion of a plant; *nat. size.* Fig. 2. Fertile pinna;
magnified. Fig. 3. Sorus; *magnified.*









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TAB. XLV.

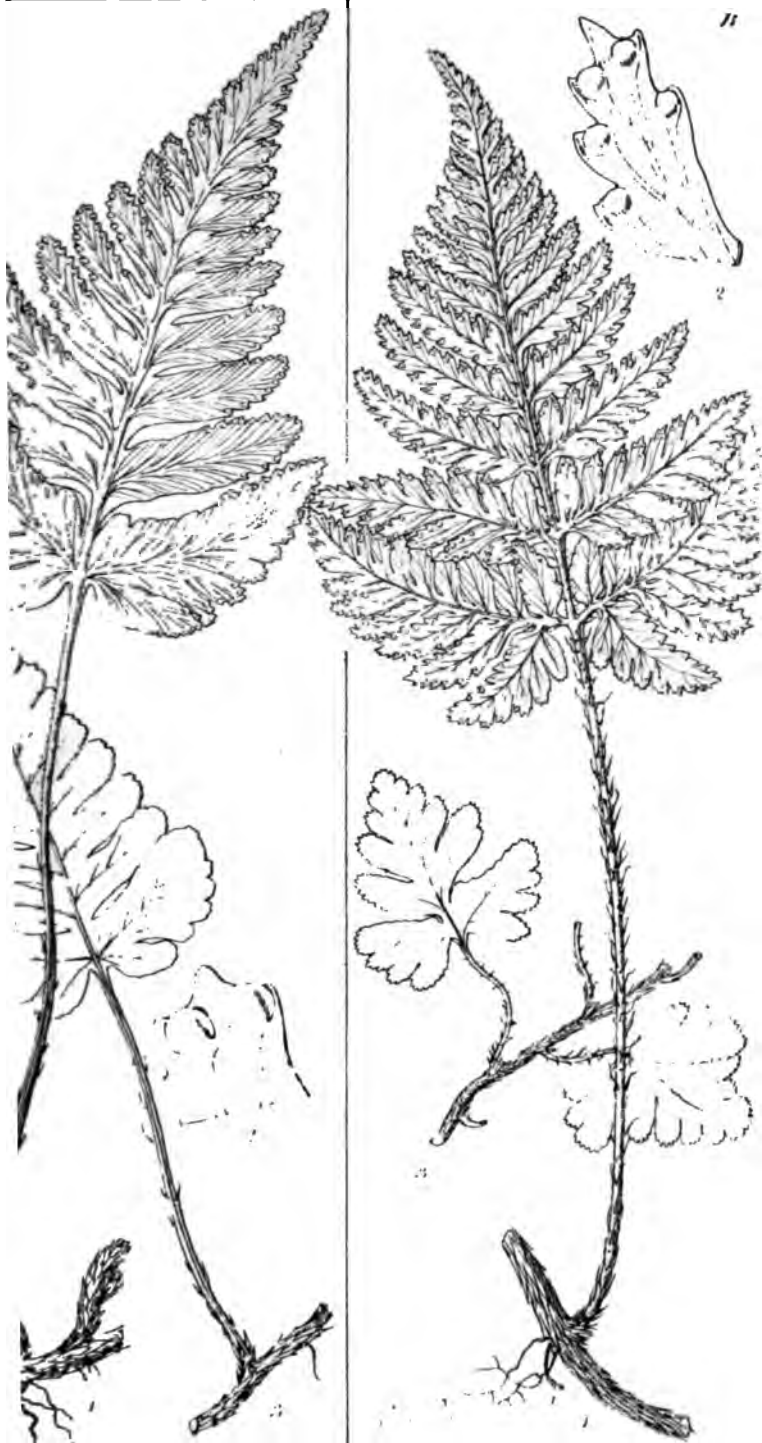
A. *DAVALLIA PEDATA*, Sw.—p. 154.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Sori; *magnified.*
Fig. 3. Sterile plant; *nat. size.*

B. *DAVALLIA CUMINGII*, Hook.—p. 155.

Fig. 1. Fertile frond; *nat. size.* Fig. 2. Segment with sori;
magnified. Fig. 3. Sterile frond; *nat. size.*







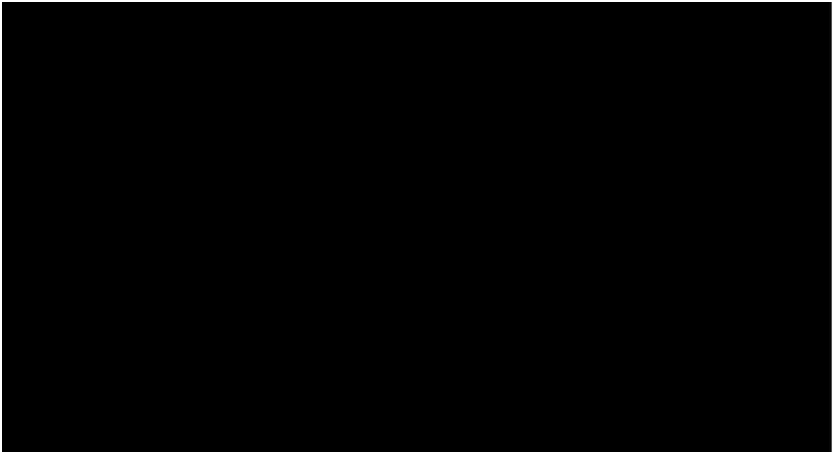
TAB. XLVI.

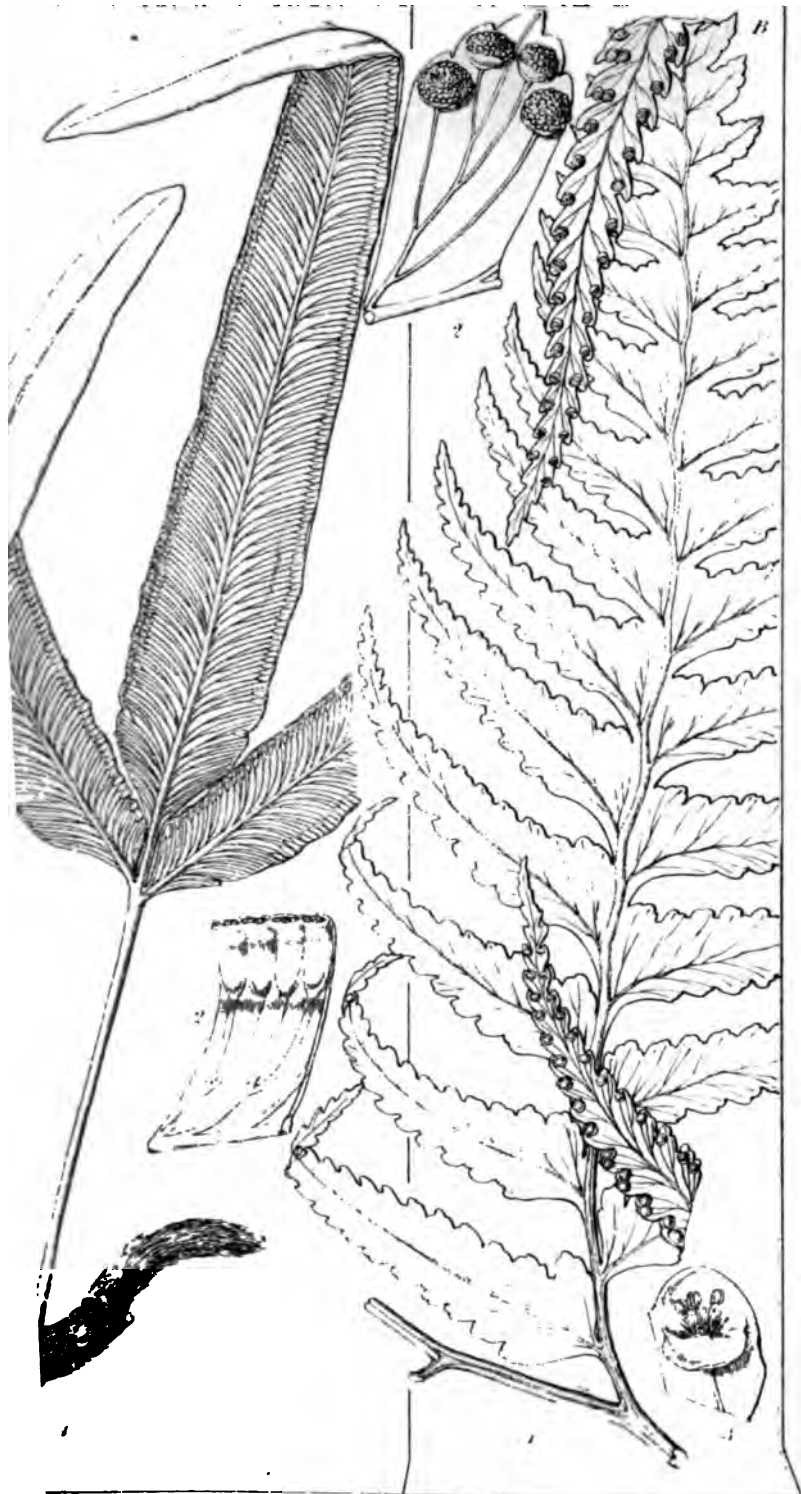
A. *DAVALLIA TRIPHYLLA*, Hook.—p. 162.

Fig. 1. Fertile frond; *nat. size.* Fig. 2. Sori; *nat. size.*

B. *DAVALLIA LONCHITIDEA*, Wall.—p. 173.

Fig. 1. Pinna; *nat. size.* Fig. 2. Segment with sori; *magnified.* Fig. 3. Sorus, with the involucre forced back; *more magnified.*





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1911

Received of the Treasurer of the
Board of Education the sum of
\$100.00 for the year ending
June 30, 1911.

Wm. H. ...
Treasurer

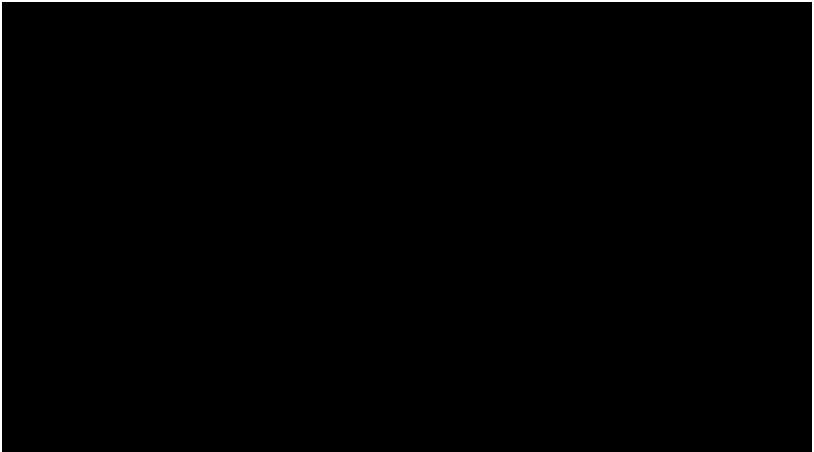
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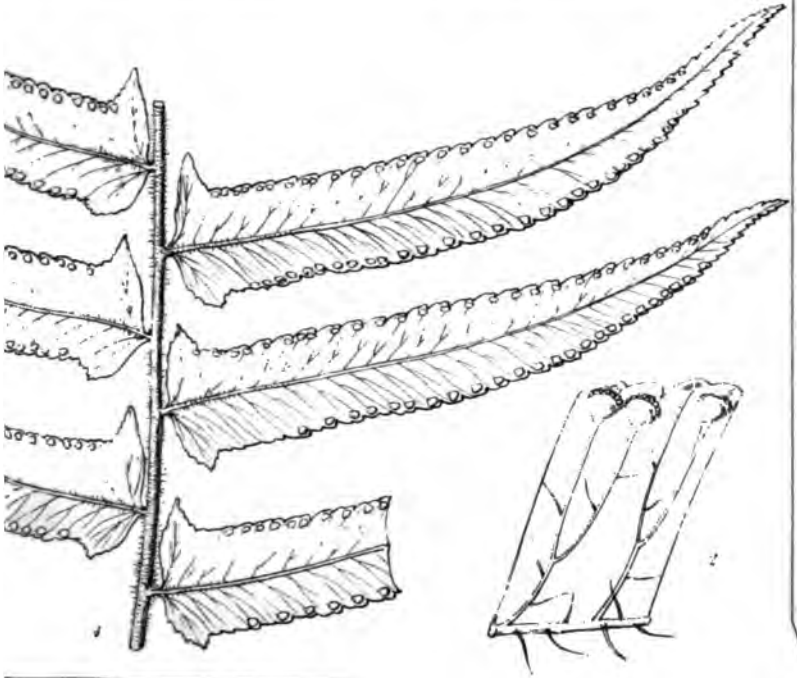
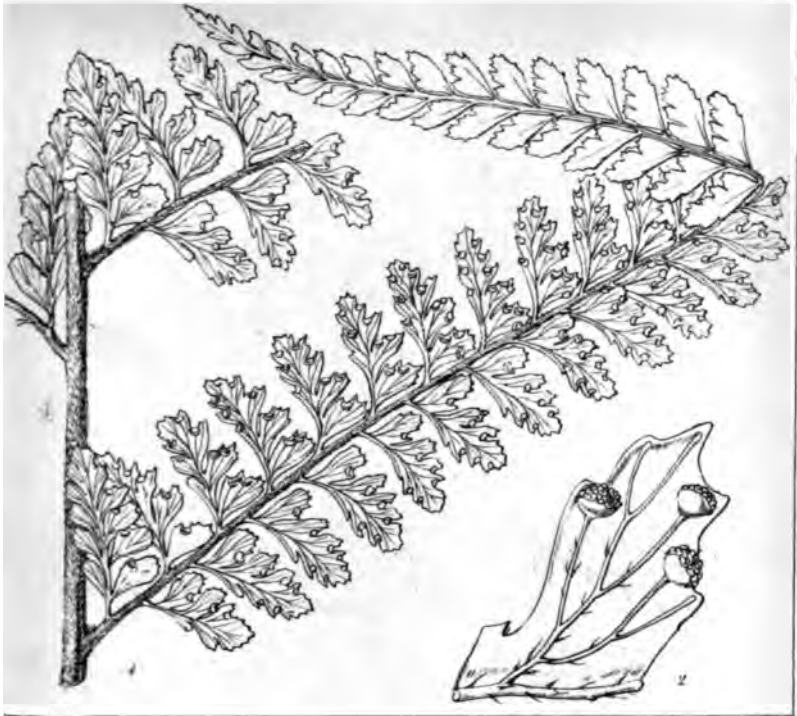
A. *DAVALLIA KHASIYANA*, Hook.—p. 173.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Segment with sori; *magnified.*

B. *DAVALLIA HOOKEIANA*, Wall.—p. 172.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Sori; *magnified.*





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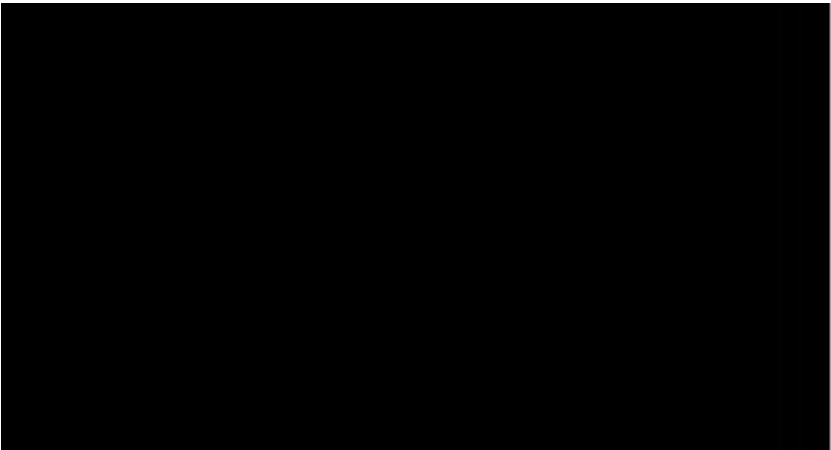
TAB. XLVIII.

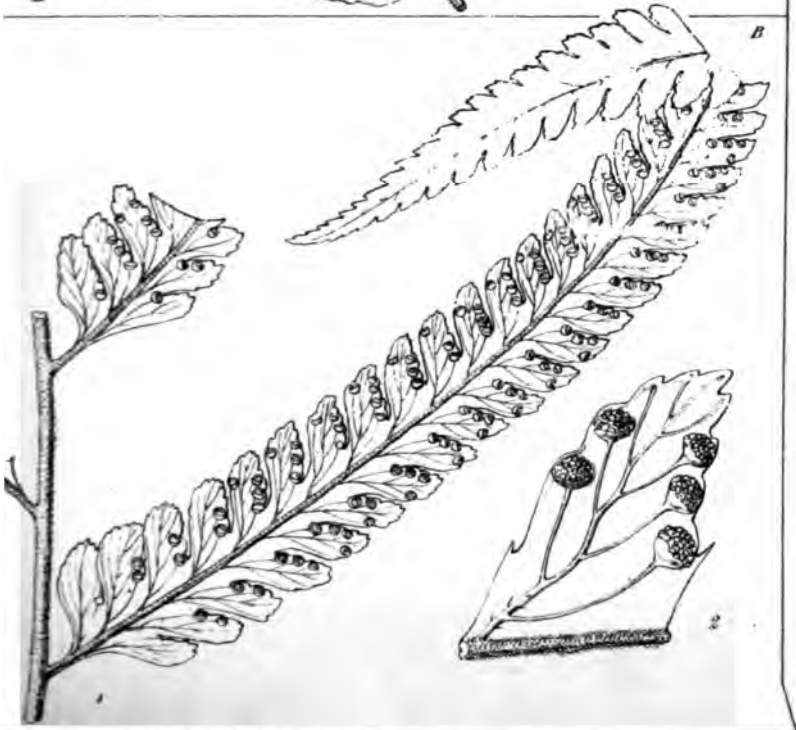
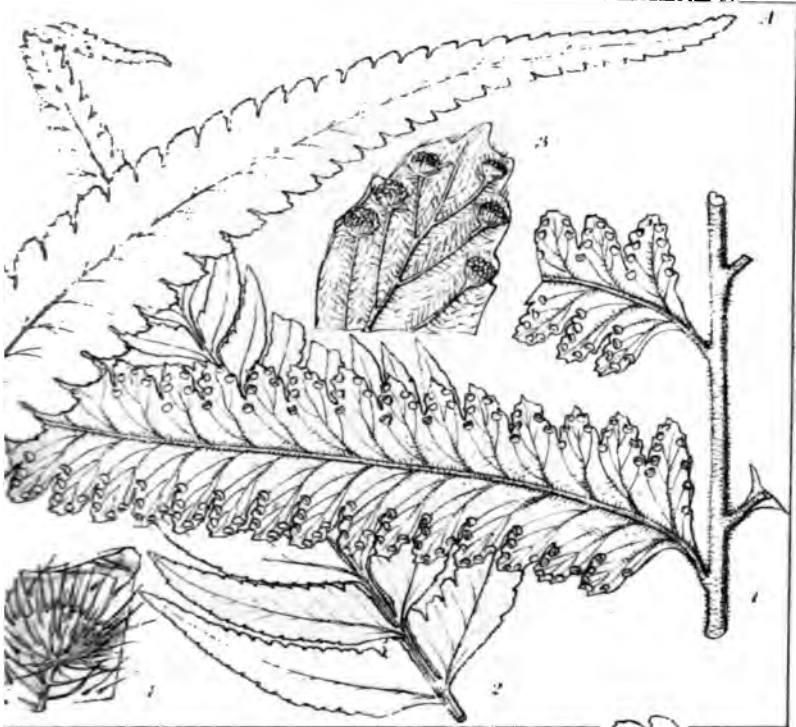
A. *DAVALLIA VILLOSA*, Wall.—p. 172.

Fig. 1. Pinna, and fig. 2, apex of a frond; *nat. size.* Fig. 3. Segment with sori; *magnified.* Fig. 4. Sorus; *more magnified.*

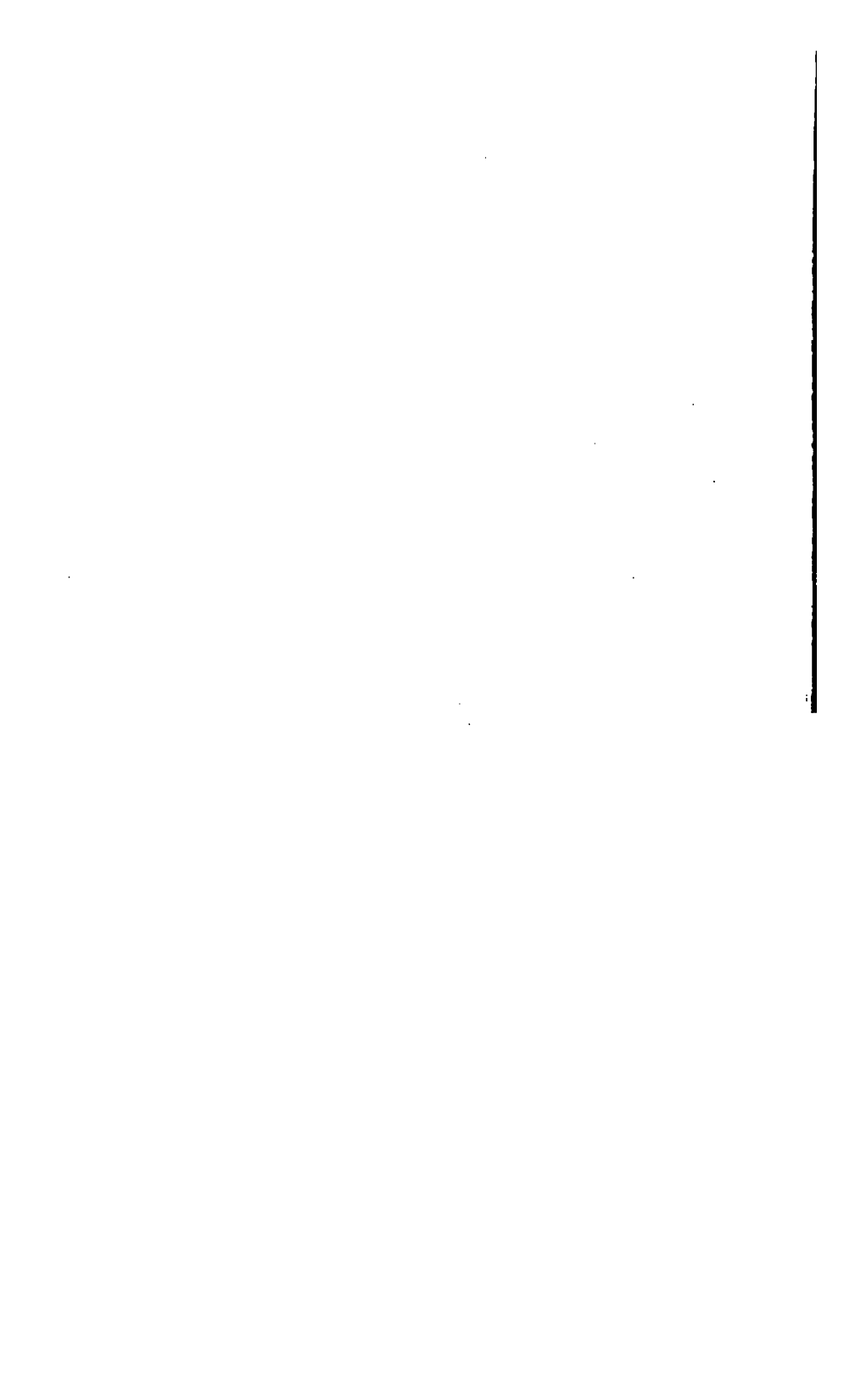
B. *DAVALLIA CALVESCENS*, Wall.—p. 172.

Fig. 1. Pinna; *nat. size.* Fig. 2. Segment, with sori; *magnified.*





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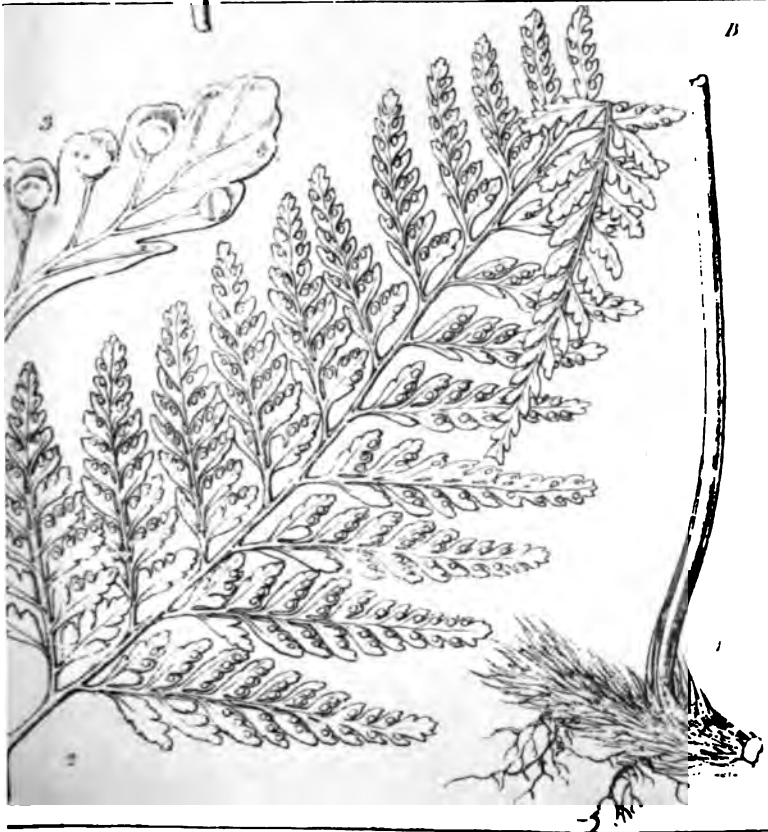
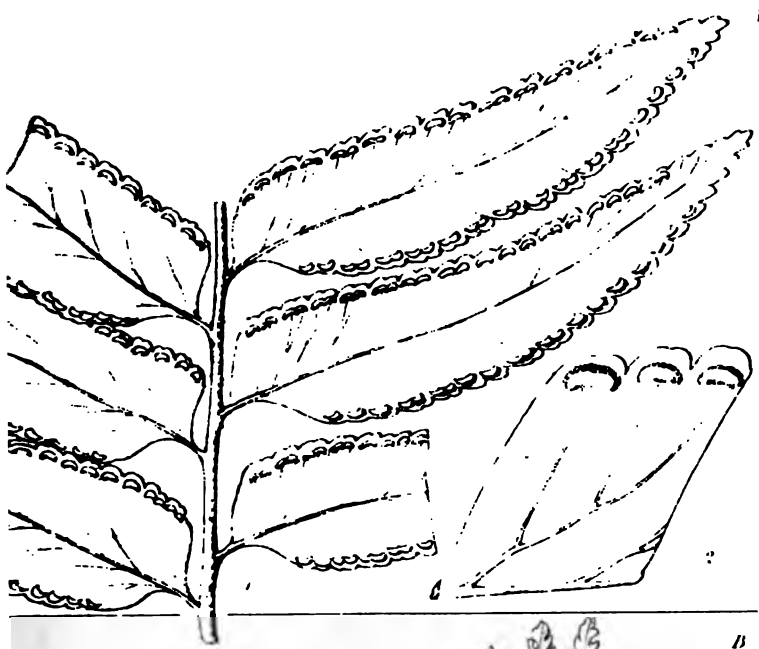
Tab. XLIX.

A. *DAVALLIA IMRAYANA*, Hook.—p. 171.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Portion of a pinna, with sori; *magnified.*

B. *DAVALLIA GRIFFITHIANA*, Hook.—p. 168.

Fig. 1. Stipes and caudex, and fig. 2. Portion of a frond; *nat. size.* Fig. 3. Pinnule, with sori; *more magnified.*





TAB. L.

A. *DAVALLIA SCHIMPERI*, Hook.—p. 193.

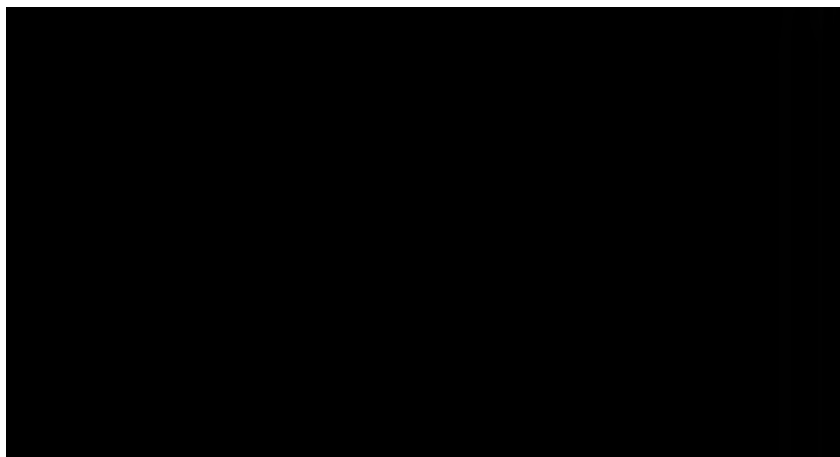
Fig. 1, 2, 3. Frond, (in portions); *nat. size.* Fig. 4. Sorus;
magnified.

B. *DAVALLIA BULLATA*, Wall.—p. 169.

Fig. 1, 2, 3. Portions of a frond; *nat. size.* Fig. 4. Pinna,
with sori; *magnified.*

C. *DAVALLIA GOUDOTIANA*, Kze.—p. 189.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Pinna, with
sori; *magnified.* Fig. 3. Sorus; *more magnified.*



TAB. LI.

A. *DAVALLIA CHREROPHYLLA*, *Wall.*—p. 157.

Fig. 1. Stipes and caudex; and fig. 2. Pinna; *nat. size.* Fig.
3. Pinnule, with sori; *magnified.*

B. *DAVALLIA NOVÆ ZELANDIÆ*, *Col.*—p. 158.

Fig. 1. Stipes and caudex; and fig. 2. Pinnæ; *nat. size.* Fig.
3. Pinnule with sori; *magnified.*





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TAB. LII.

A. *DAVALLIA RETUSA*, Cav.—p. 188.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Pinna; *magnified.* Fig. 3. Sorus; *more magnified.*

B. *DAVALLIA AFFINIS*, Hook.—p. 158.

Fig. 1. Stipes and caudex; and fig. 2. Pinna; *nat. size.* Fig. 3. Pinnule with sori; *magnified.*



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TAB. LIII.

A. *DAVALLIA MEMBRANULOSA*, *Wall.*—p. 169.

Fig. 1. Lower portion; and fig. 2. Apex of a frond; *nat. size.*

Fig. 3. Segment of a fertile pinna; *magnified.* Fig. 4. Sorus; *more magnified.*

B. *DAVALLIA PULCHELLA*, *Hook.*—p. 175.

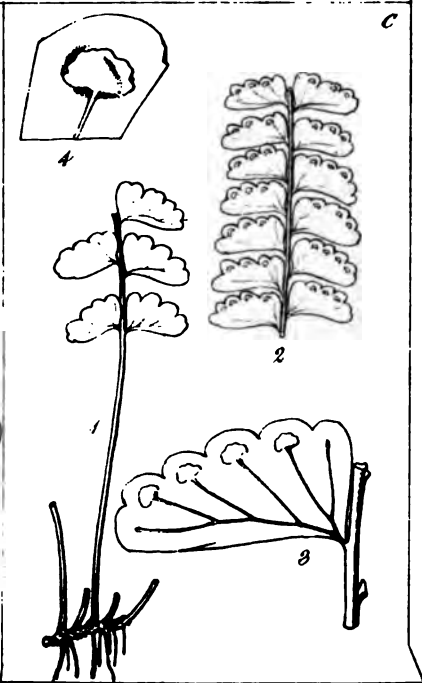
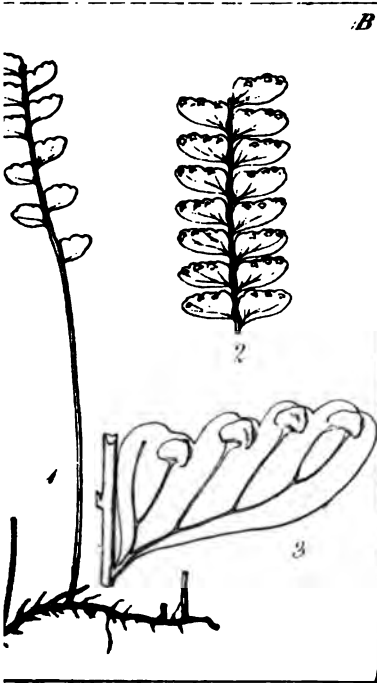
Fig. 1. Lower; and fig. 2. Middle portion of a frond; *nat. size.*

Fig. 3. Pinna with sori; *magnified.*

C. *DAVALLIA PARKERI*, *Hook.*—p. 176.

Fig. 1. Lower; and fig. 2. Middle portion of a frond; *nat. size.*

Fig. 3. Pinna, with sori; *magnified.* Fig. 4. Sorus; *more magnified.*



TAB. LIV.

A. *DAVALLIA BLUMEANA*, Hook.—p. 177.

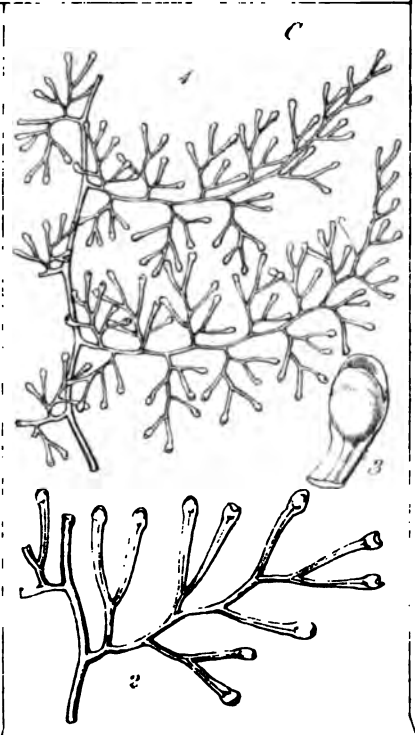
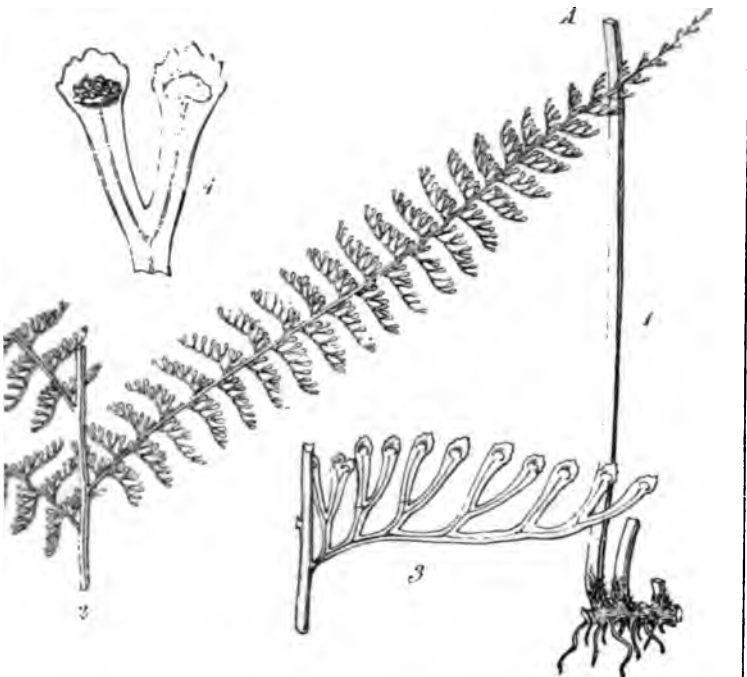
Fig. 1. Stipes and caudex; and fig. 2. Portion of the frond; *nat. size*. Fig. 3. Pinna, with sori; *magnified*. Fig. 4. Sori; *more magnified*.

B. *DAVALLIA ACULEATA*, Sw.—p. 191.

Fig. 1. Portion of the frond; *nat. size*. Fig. 2. Pinna, with sori; *magnified*. Fig. 3. Sorus; *more magnified*.

C. *DAVALLIA SCHLECHTENDALII*, Pr.—p. 189.

Fig. 1. Portion of a frond; *nat. size*. Fig. 2. Pinna, with sori; *magnified*. Fig. 3. Sorus; *more magnified*.





1870

Received of the Hon. the Secy of the Navy
the sum of \$1000.00 for the purchase of
the schooner "Albatross" for the
U.S. Fish Commission.

Witness my hand and seal this 1st day of
January 1870.

John A. King
Secretary of the Navy

TAB. LV.

A. *DAVALLIA ELATA*, Sw.—p. 166.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Portion of a pinnule; *magnified.* Fig. 3 and 4. Sori; *more magnified.*

B. *DAVALLIA MAURITIANA*, Hook.—p. 164.


Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Pinna, with sori; *magnified.* Fig. 3. Sorus; *more magnified.*

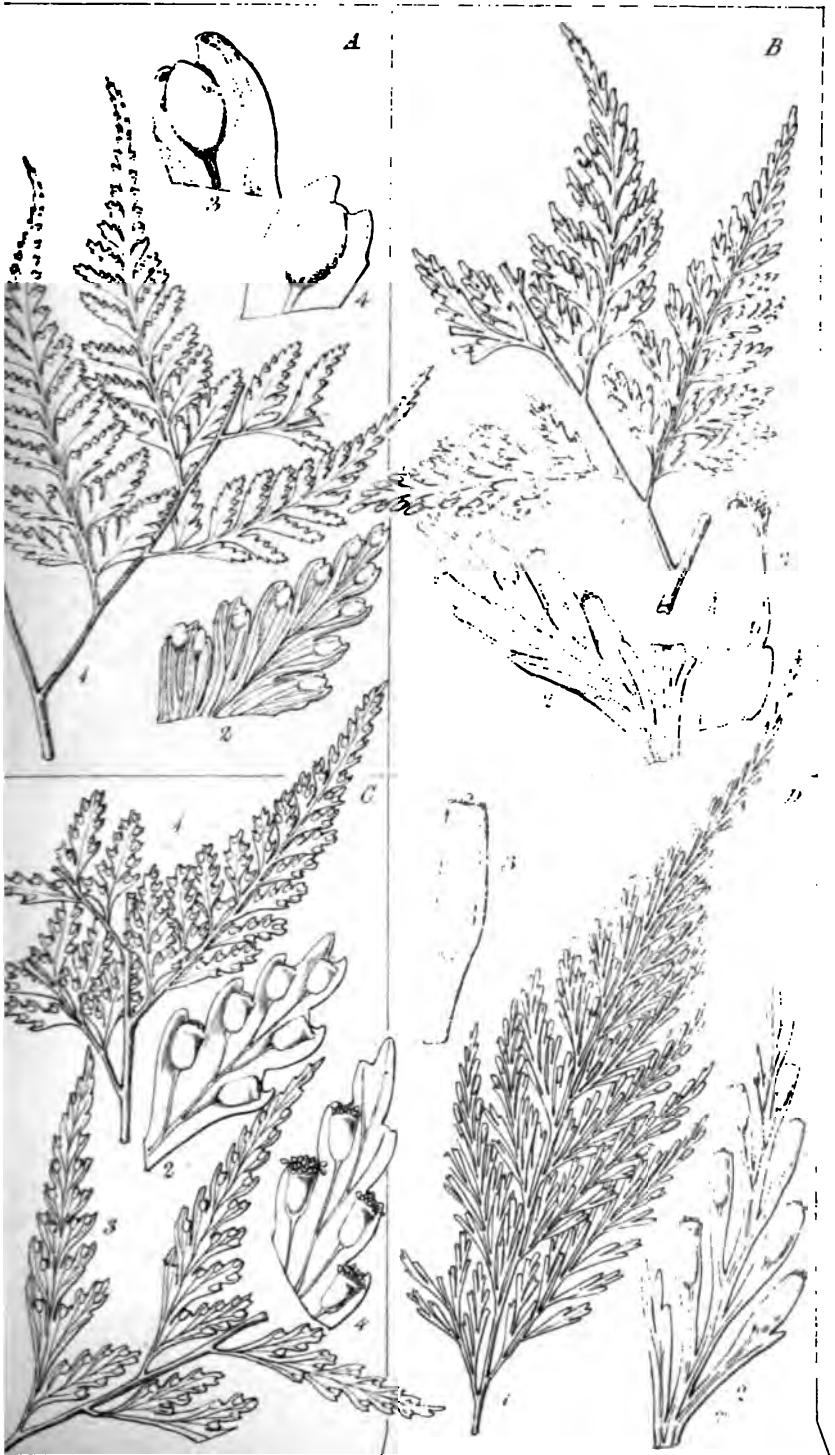
C. *DAVALLIA PYXIDATA*, Cav.—p. 169.

Fig. 1. Portion of the frond of *a.* *nat. size.* Fig. 2. Pinnule, with sori; *magnified.* Fig. 3. Portion of the frond of *var. β.* *nat. size.* Fig. 4. Portion of a pinnule of ditto, with sori; *magnified.*

D. *DAVALLIA FEJRENSIS*, Hook.—p. 166.

Fig. 1. Apex of a frond; *nat. size.* Fig. 2. Portion of a pinnule, with sori; *magnified.* Fig. 3. Sorus; *more magnified.*







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TAB. LVI.

A. *DAVALLIA CANABIENSIS*.—p. 169.

Fig. 1. Portion of a Frond; *nat. size*. Fig. 2. Segment, with sori; *magnified*. Fig. 3. Sorus; *more magnified*.

B. *DAVALLIA LINDENI*, *Hook.*—p. 193.

Fig. 1. Rachis and pinnæ, and fig. 2. Apex of a frond; *nat. size*. Fig. 3. Segments, with sori; *magnified*.

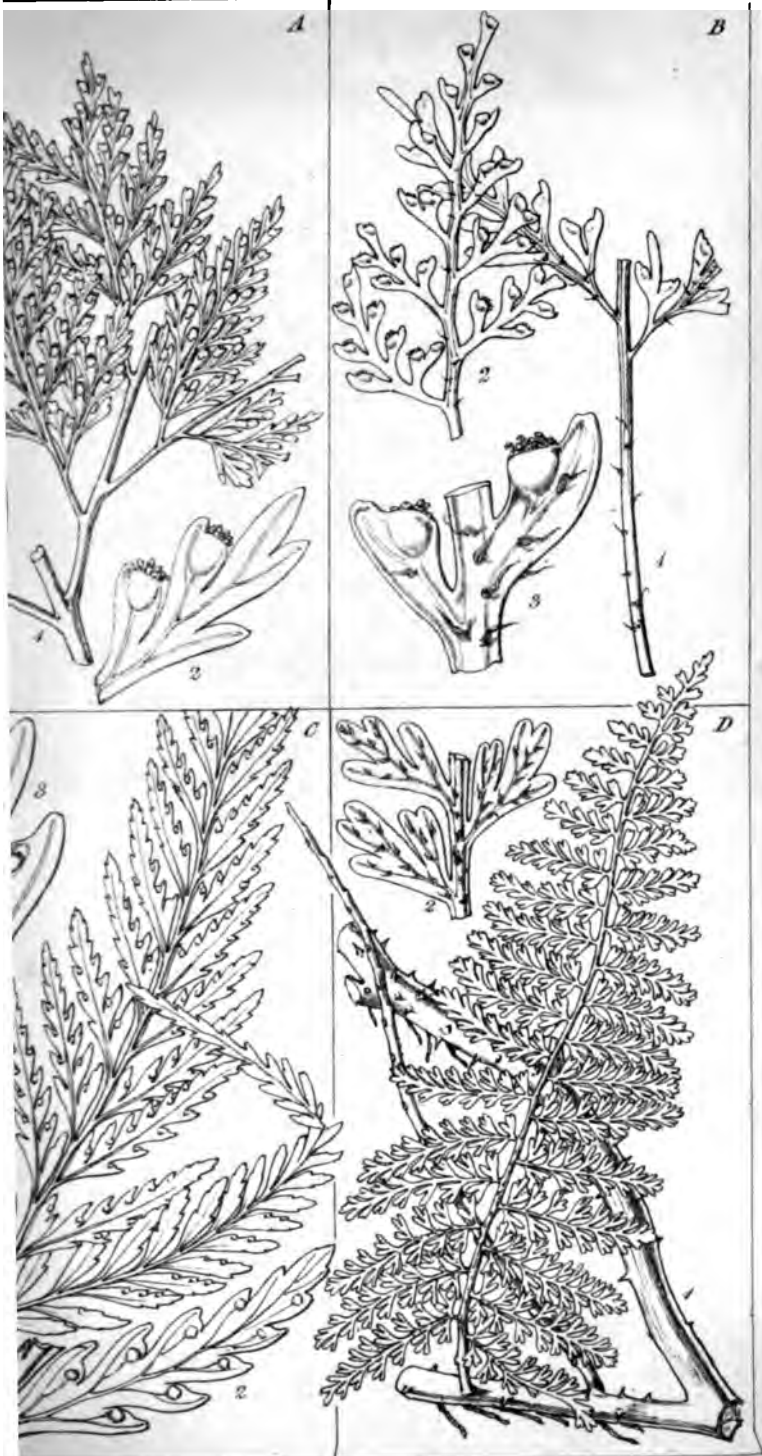
C. *DAVALLIA AMBOYNSIS*, *Hook.*—p. 178.

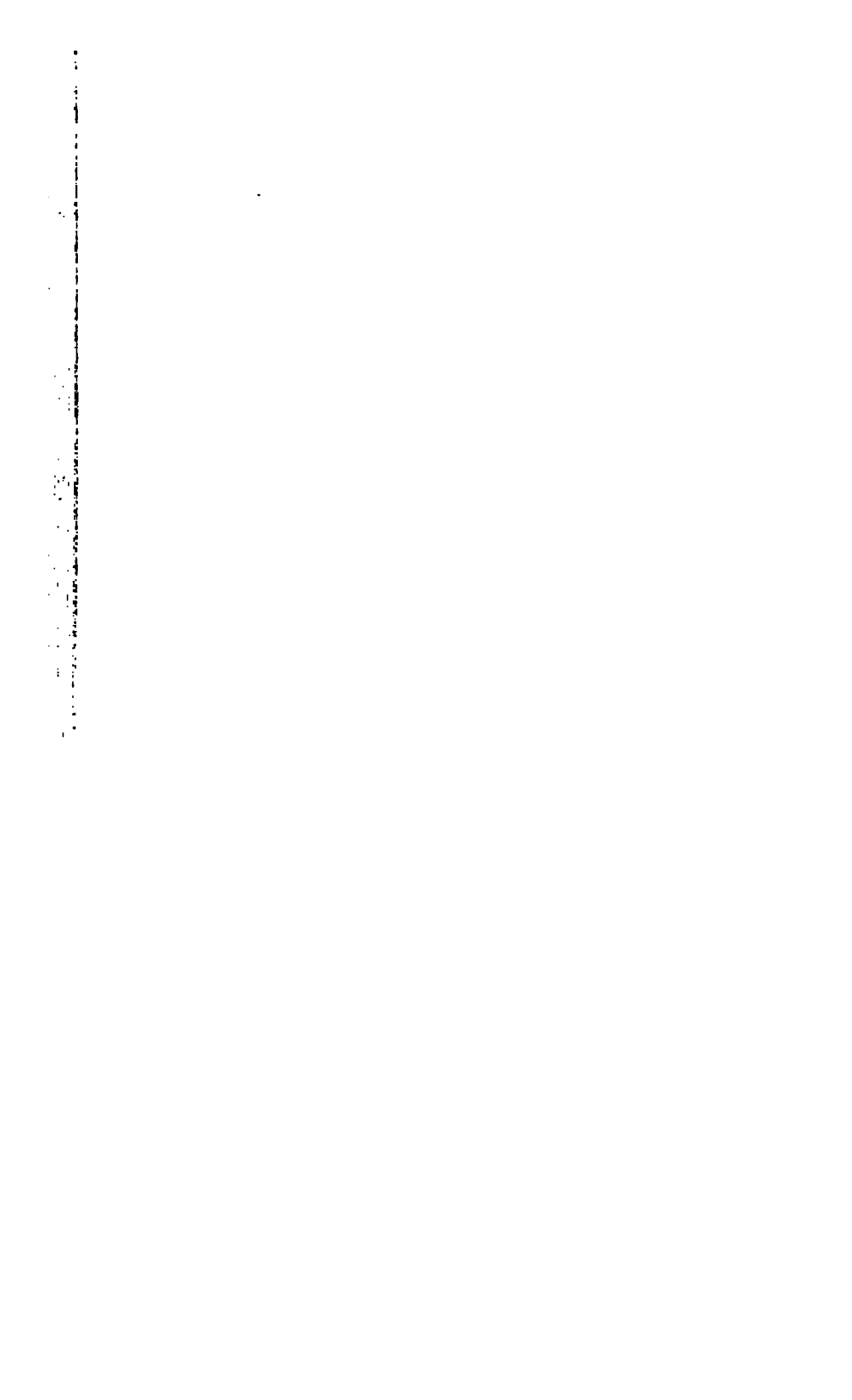
Fig. 1. Portion of a frond; *nat. size*. Fig. 2. Pinnule, with sori; *magnified*. Fig. 3. Segment, with sori; *more magnified*.

D. *DAVALLIA* ? *ACHILLÆIFOLIA*, *Wall.*—p. 197.

Fig. 1. Caudex and frond; *nat. size*. Fig. 2. Segments and









TAB. LVII.

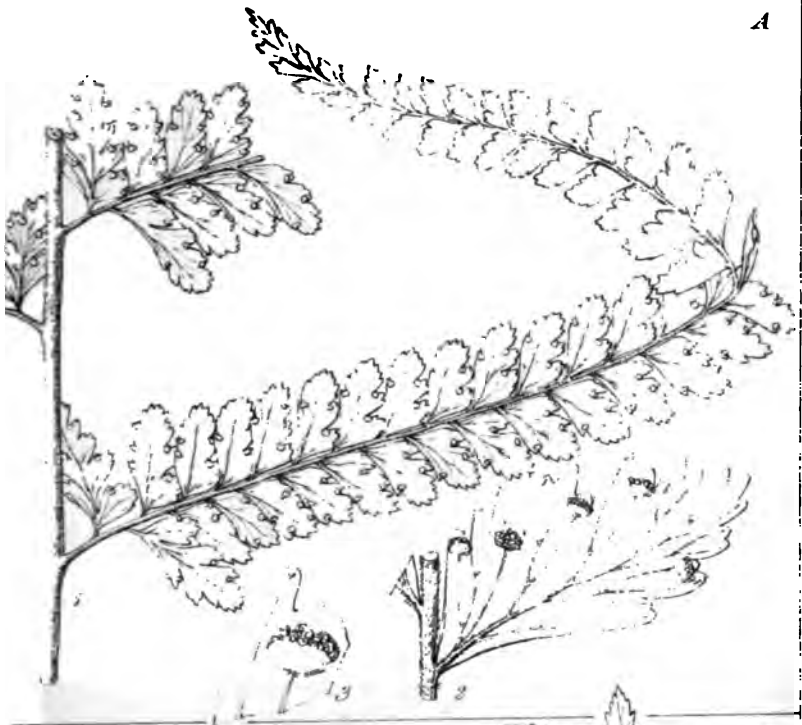
A. *DAVALLIA KHASIYANA*, *Hook.* var. *β.*—p. 173.

Fig. 1. Pinna; *nat. size.* Fig. 2. Pinnule, with sori; *magnified.* Fig. 3. Sorus; *more magnified.*

B. *DAVALLIA INÆQUALIS*, *Kze.*—p. 180.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Pinnule; *magnified.* Fig. 3. Sorus; *more magnified.* (See TAB. LVIII. A.)

A



B



TAB. LVIII.

A. *DAVALLIA INÆQUALIS*, *Kze.* var. γ . *minor*, *Hook.*—p. 180.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Pinna, with sori; *magnified.* Fig. 3. Sorus; *more magnified.*

B. *DAVALLIA LINDLEYI*, *Hook.*—p. 164.

Fig. 1. Stipes, with caudex, and fig. 2. Portion of a barren frond; *nat. size.* Fig. 3. Sterile pinnule; *magnified.* Fig. 4. Portion of a fertile frond; *nat. size.* Fig. 5. Pinna, with sori; *magnified.*

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1. The first part of the document is a list of names and titles, including the names of the authors and the titles of their works. This list is organized in a structured manner, likely serving as a table of contents or a reference list for the document.

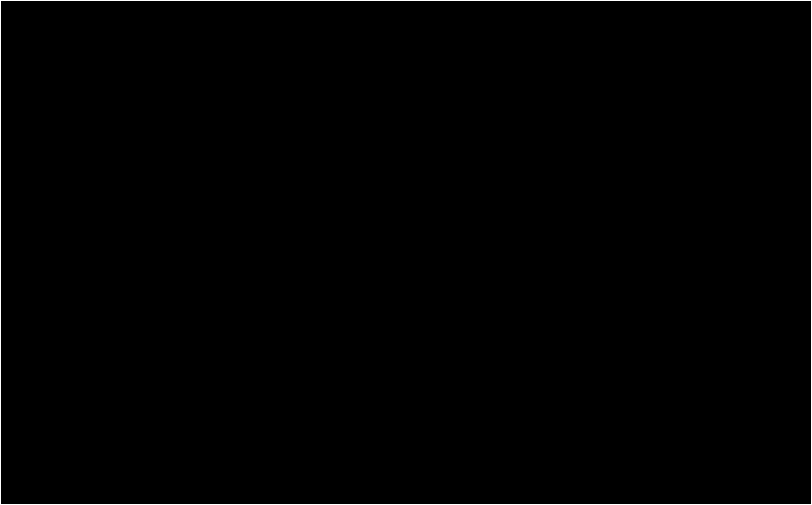
TAB. LIX.

A. DAVALLIA POLYANTHA, *Hook.*—p. 168.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Pinnule, with sori; *magnified.* Fig. 3. Sorus; *more magnified.*

B. DAVALLIA VOGELII, *Hook.*—p. 168.

Fig. 1. Caudex and stipes, and fig. 2. Portion of a frond; *nat. size.* Fig. 3. Pinnule with sori; *magnified.*





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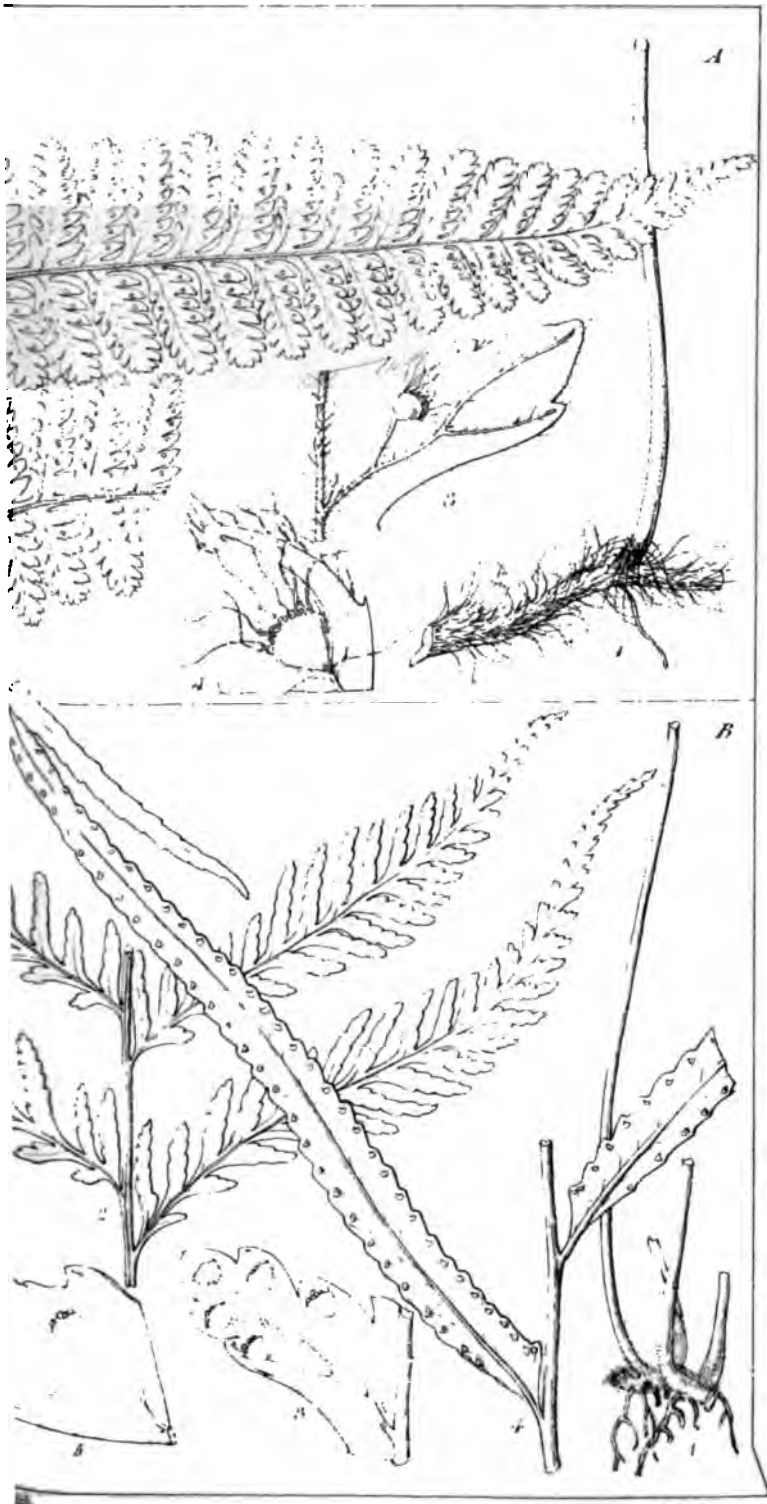
TAB. LX.

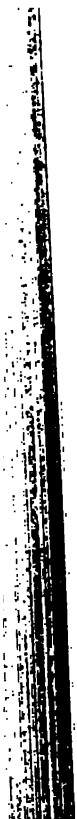
A. *DAVALLIA CILIATA*, *Hook.*—p. 184.

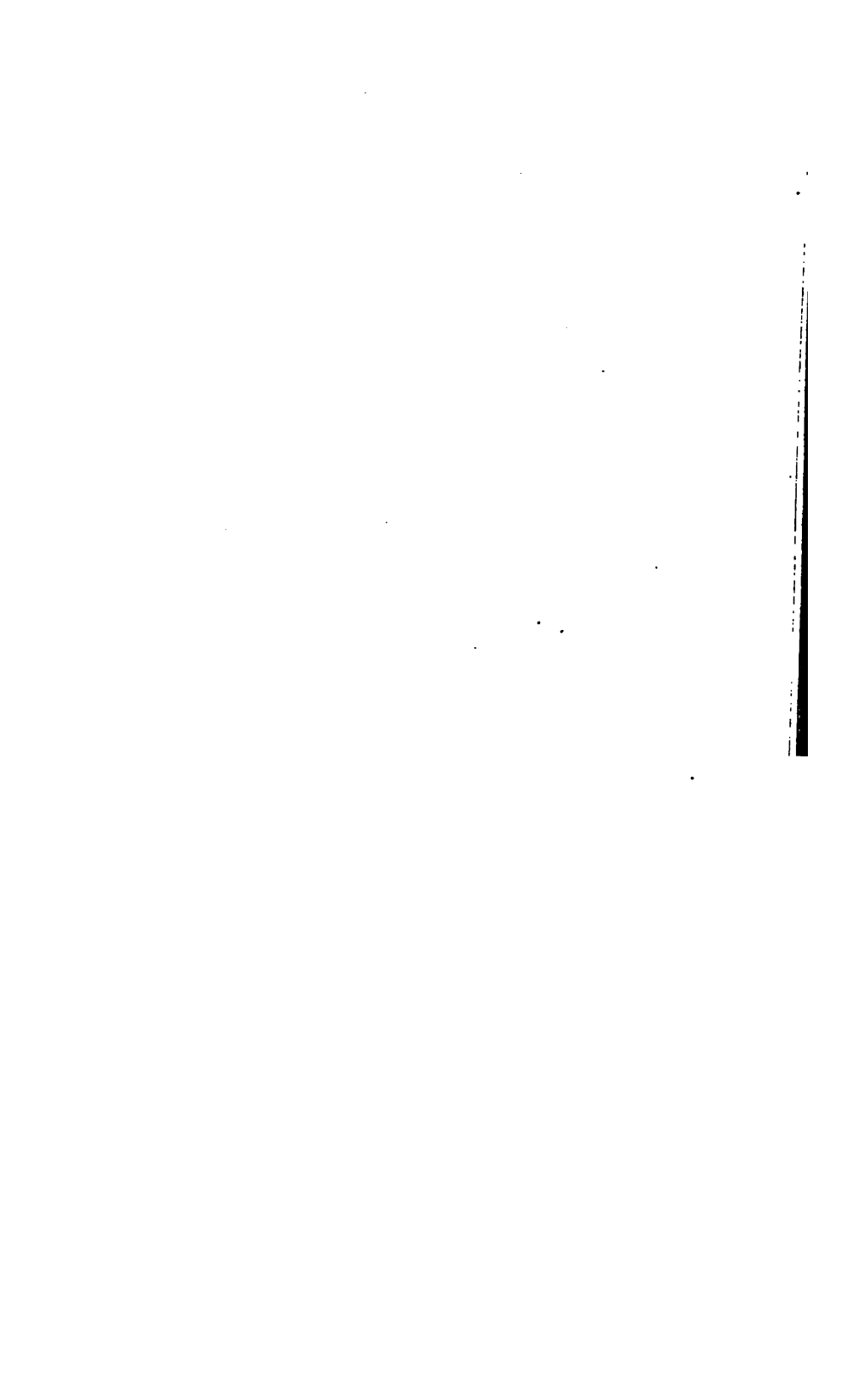
Fig. 1. Rachis and lower portion of the stipes, *nat. size.* Fig. 2. Portion of the frond, *nat. size.* Fig. 3. Fertile segments, *magnified.* Fig. 4. Sorus, *magnified.*

B. Figs. 1 & 4, *DAVALLIA PINNATA*, *Cav.*—p. 174.

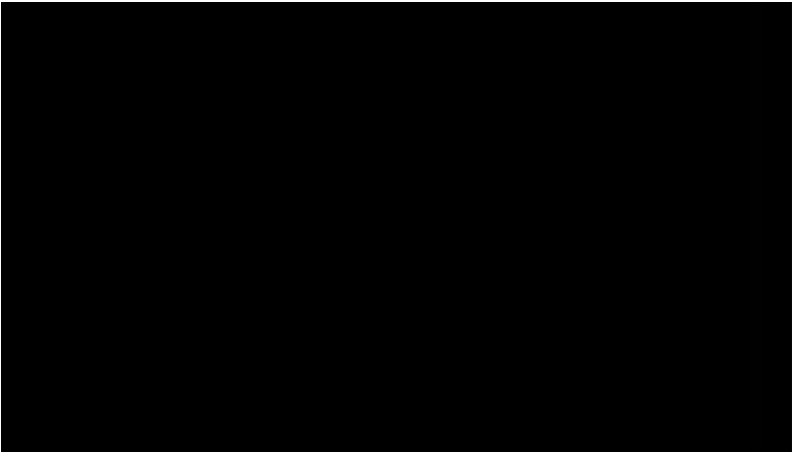
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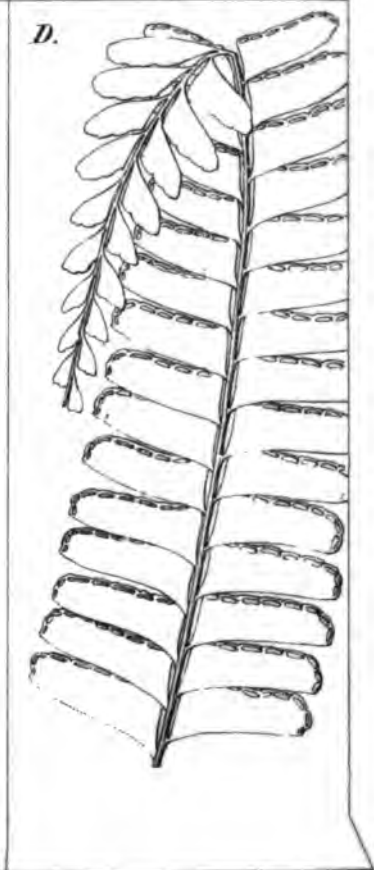
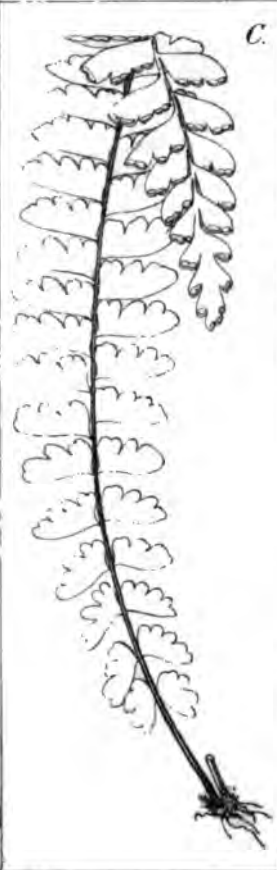
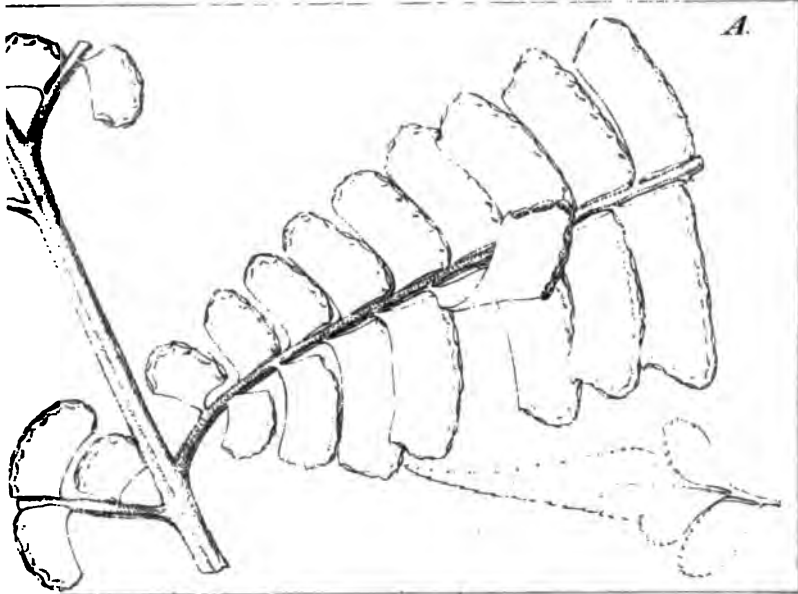






TAB. LXI.


- A. ADIANTUM (*to be described in vol. 2*).
- B. LINDSÆA CONCINNA, *J. Sm.*—p. 205.
Upper and lower portion of a plant, *nat. size.*
- C. LINDSÆA ADIANTOIDES, *J. Sm.*—p. 204.
Plant, *nat. size.*
- D. LINDSÆA OBLONGIFOLIA, *Reinw.*—p. 206.
Upper portion of a plant, *nat. size.*
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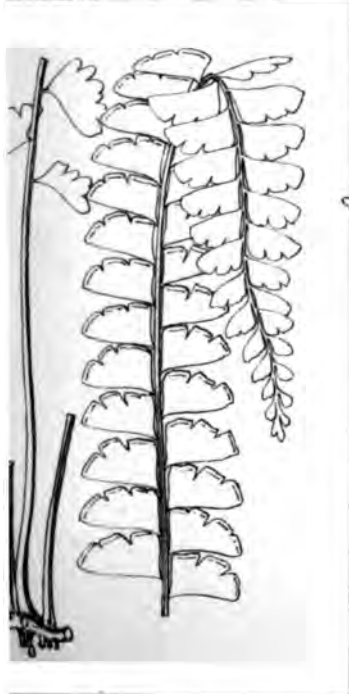
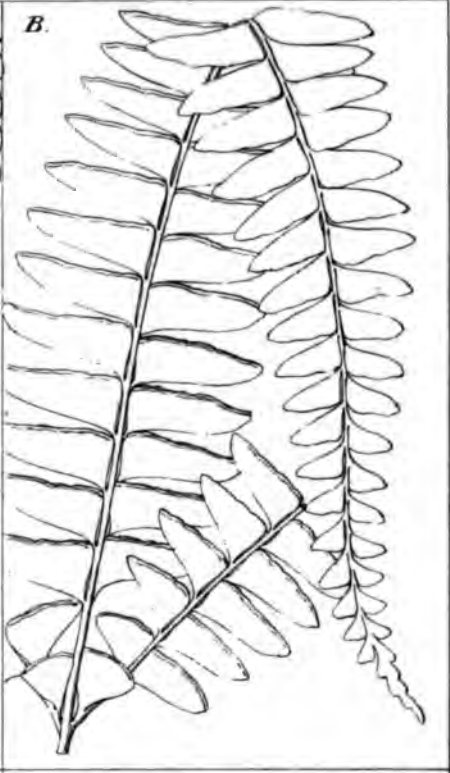
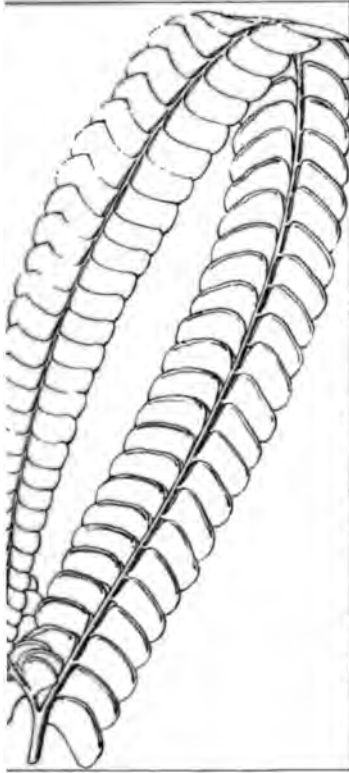




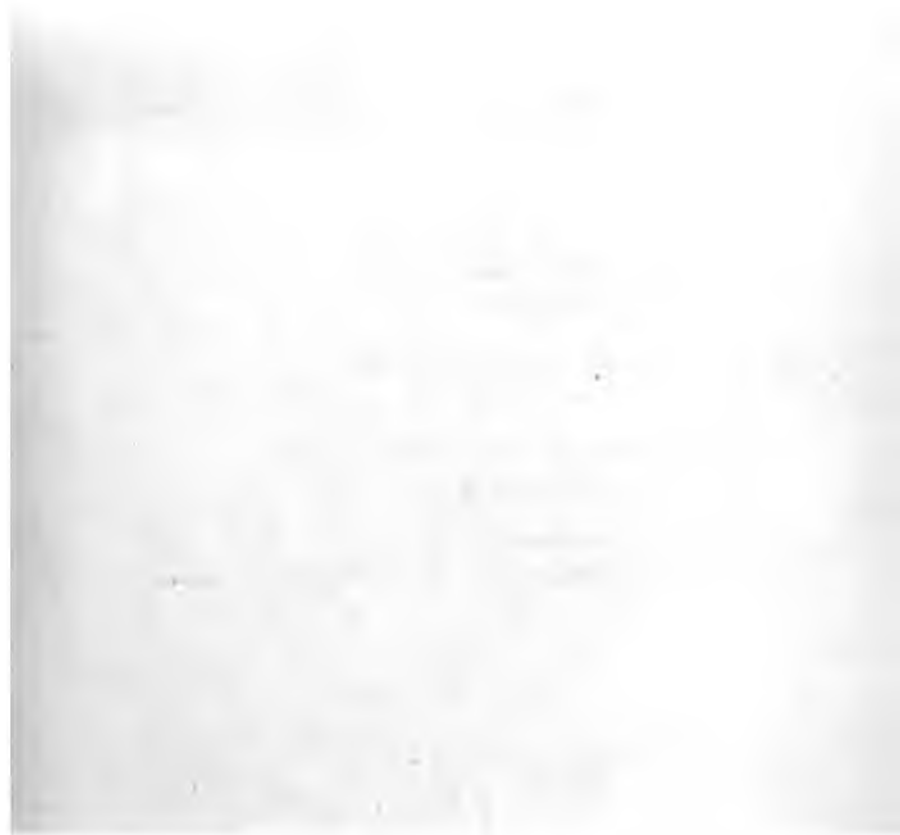


TAB. LXII.

- A. *LINDSÆA GUIANENSIS*, *Dry*—p. 216.
Portion of a plant, *nat. size*.
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- C. *LINDSÆA LOBBIANA*, *Hook.*—p. 205.
Upper and lower portion of a plant, *nat. size*.
- D. *LINDSÆA LEPRIEURII*, *Hook.*—p. 208.
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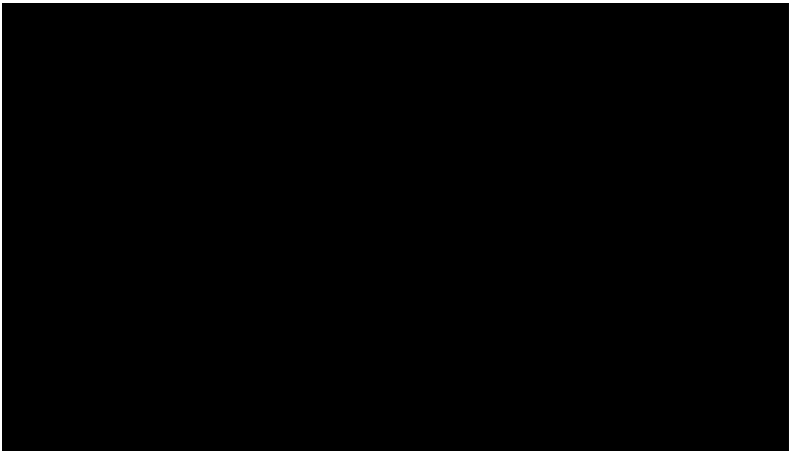


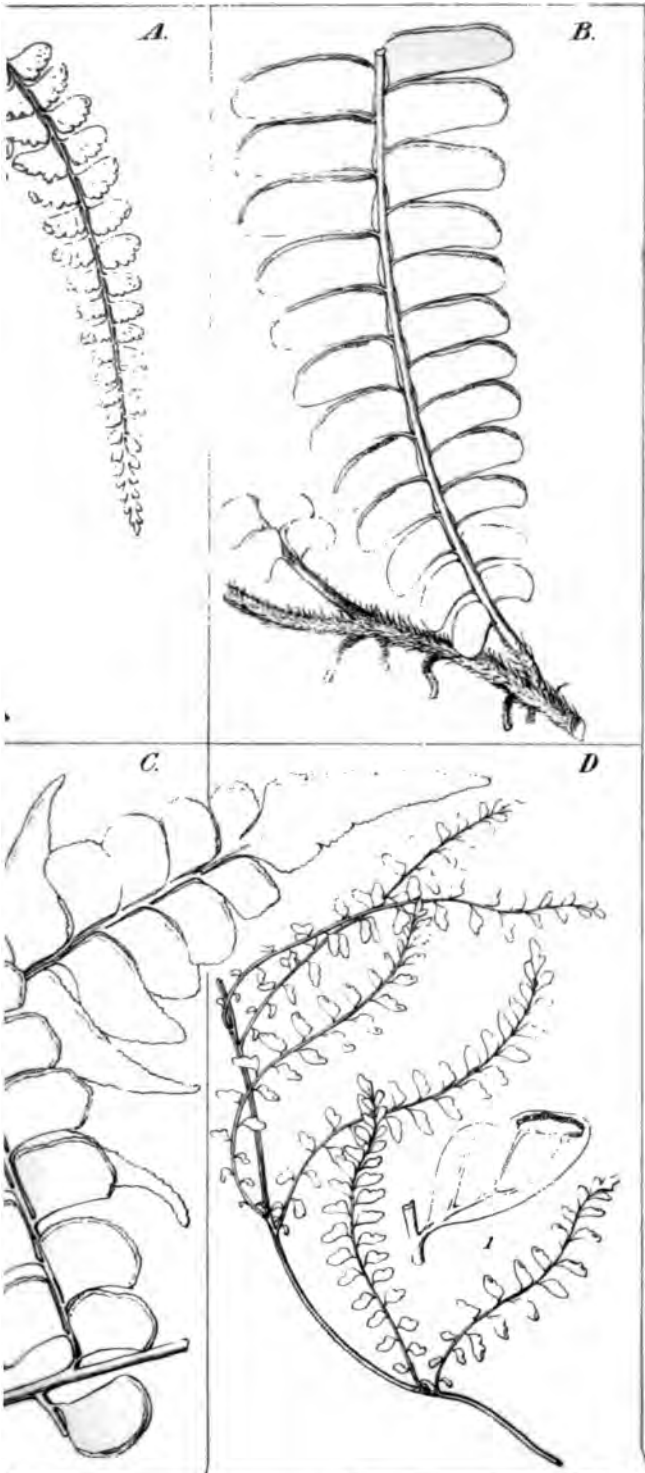
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- A. *LINDSÆA RIGIDA*, *J. Sm.*—p. 217.
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- B. *LINDSÆA SCANDENS*, *Hook.*—p. 205.
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- C. *LINDSÆA FLABELLULATA*, *γ. Hook.*—p. 211.
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- D. *LINDSÆA FILIFORMIS*, *Hook.*—p. 212.
. Portion of a plant, *nat. size.* Fig. 1. Fertile pinnæ, *magnified.*









TAB. LXIV.

A. *LINDSÆA OVATA*, *J. Sm.*—p. 204.

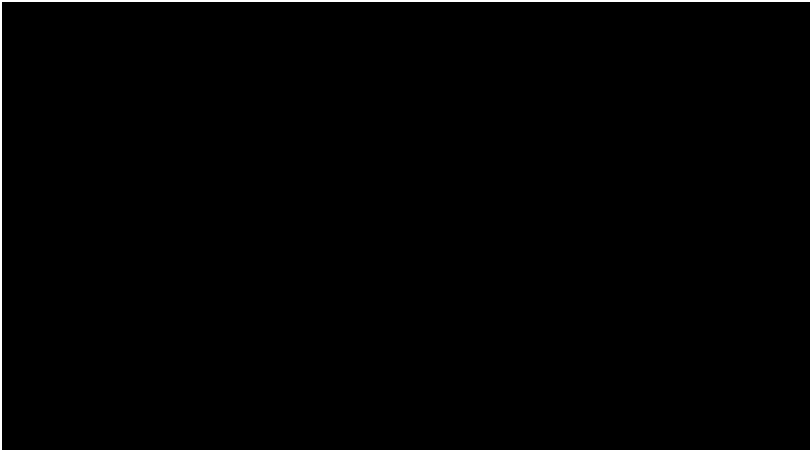
Plant, *nat. size.* Fig. 1. Fertile pinnule, *magnified.*

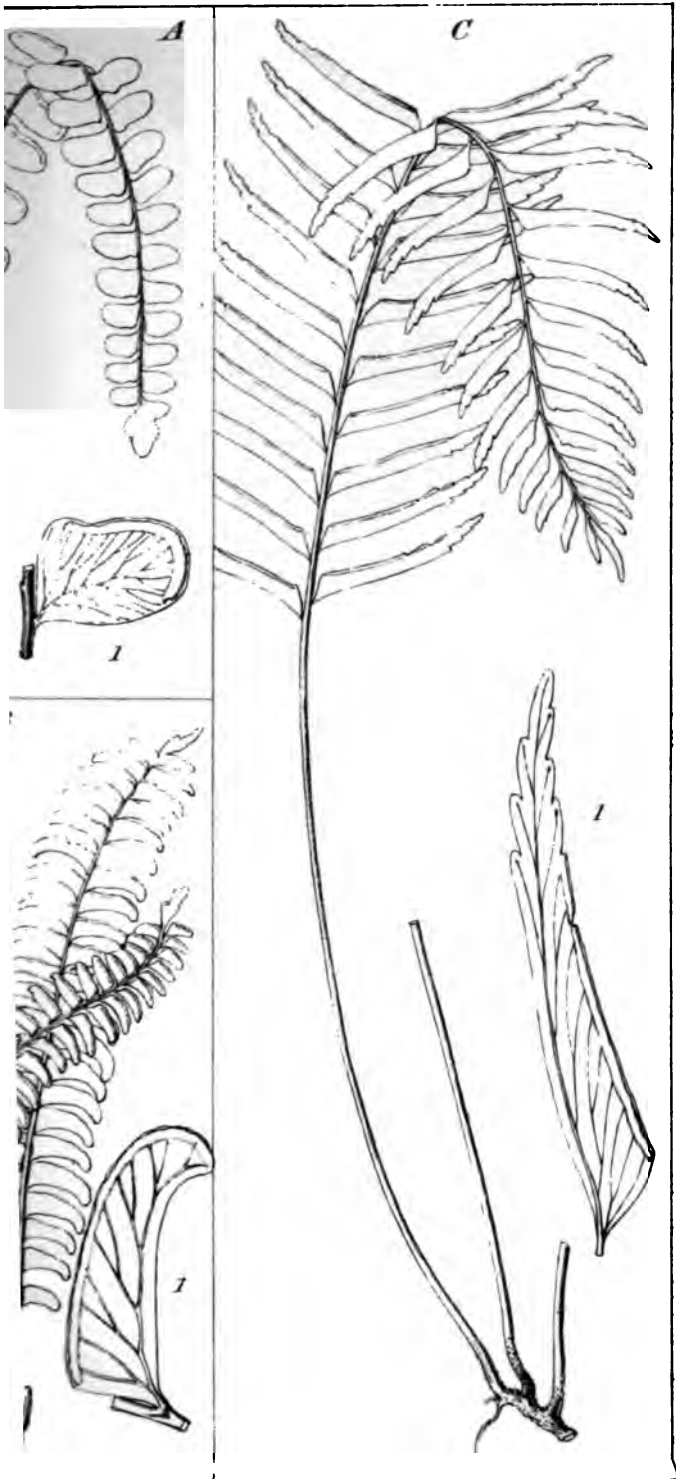
B. *LINDSÆA FALCIFORMIS*, *Hook.*—p. 208.

Plant, *nat. size.* Fig. 1. Fertile pinnule, *magnified.*

C. *LINDSÆA DUBIA*, *Spr.*—p. 209.

Plant, *nat. size.* Fig. 1. Fertile pinnule, *magnified.*





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TAB. LXV.

A. *LINDSÆA PENDULA*, *Kl.*—p. 213.

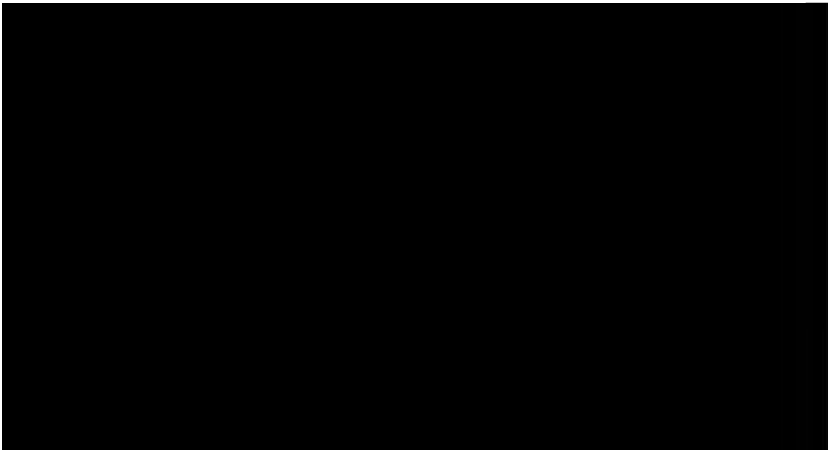
Upper and lower portion of a plant, *nat. size.* Fig. 1. Fertile pinnules, *magnified.*

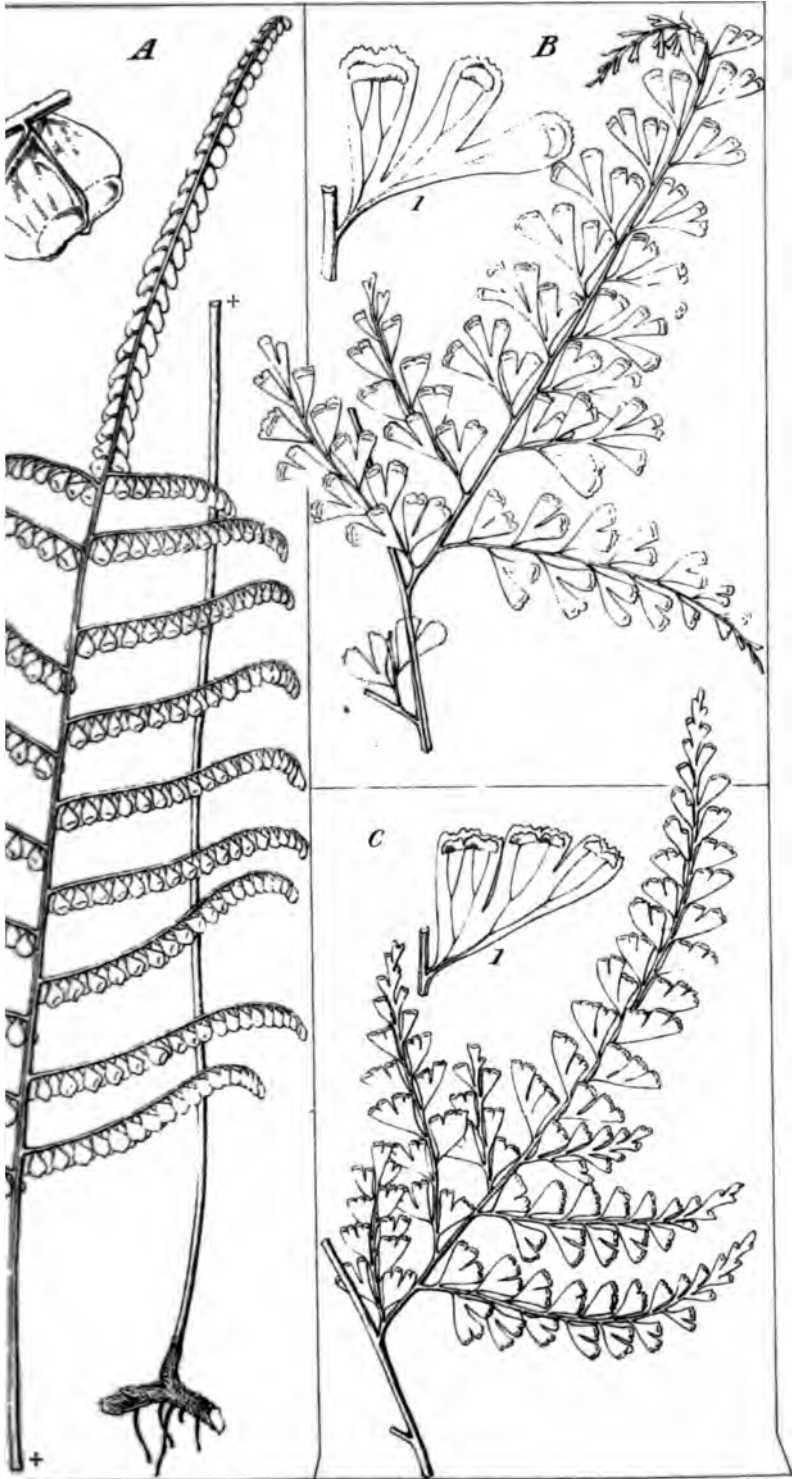
B. *LINDSÆA CATHARINÆ*, *Hook.*—p. 212.

Portion of a plant, *nat. size.* Fig. 1. Fertile pinnæ, *magnified.*

C. *LINDSÆA GARDNERI*, *Hook.*—p. 213.

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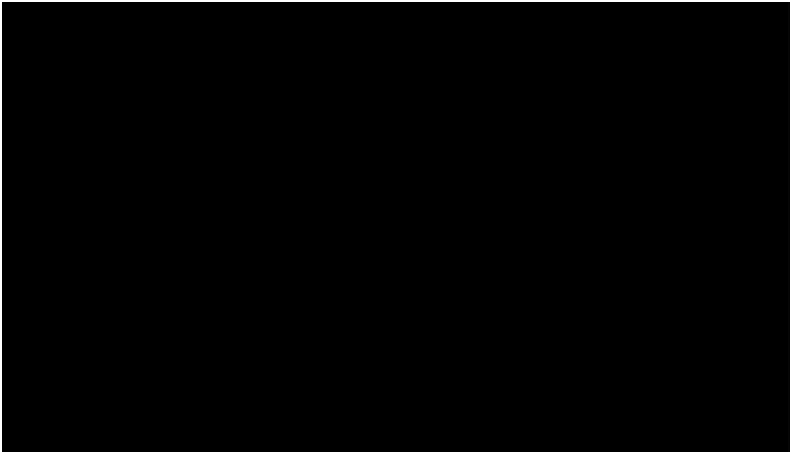
TAB. LXVI.

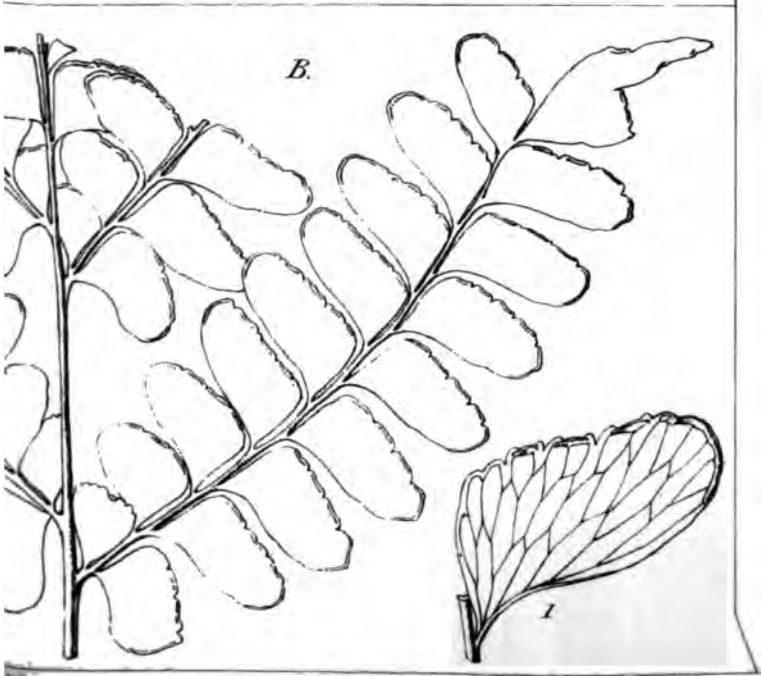
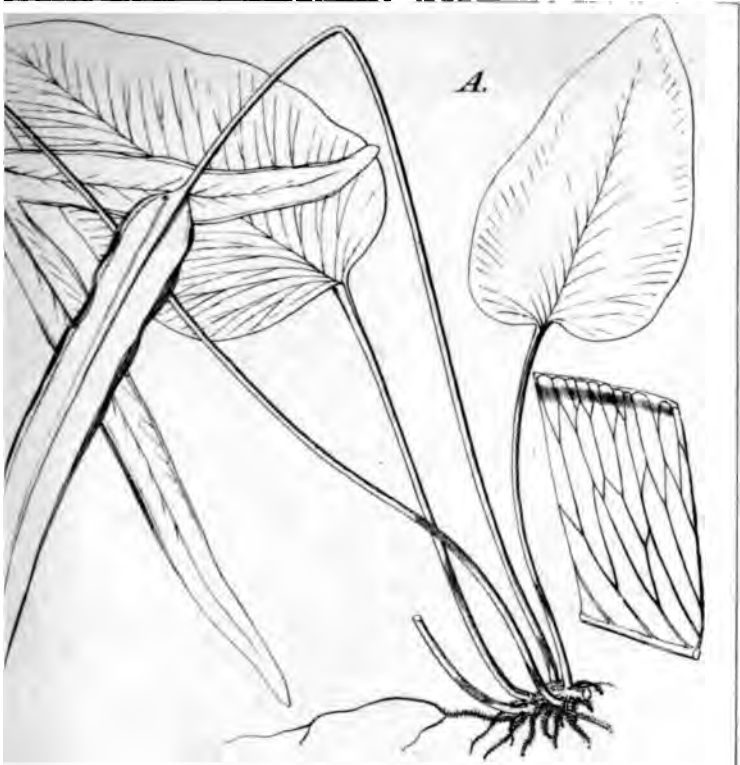
A. *LINDSÆA CORDATA*,—p. 219.

Plant with sterile and fertile fronds, *nat. size*. Fig. 1. Portion of a sterile frond, *magnified*.

B. *LINDSÆA PROPINQUA*. *Hook.*—p. 223.

Portion of a frond, *nat. size*. Fig. 1. Fertile pinnule, *magnified*.









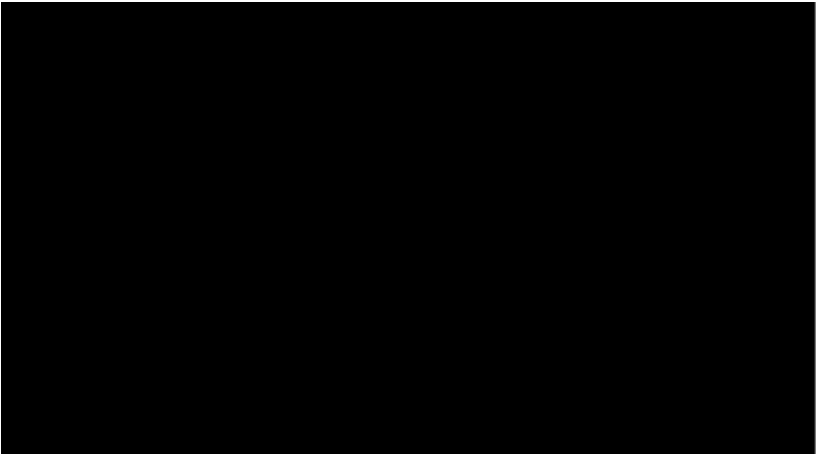
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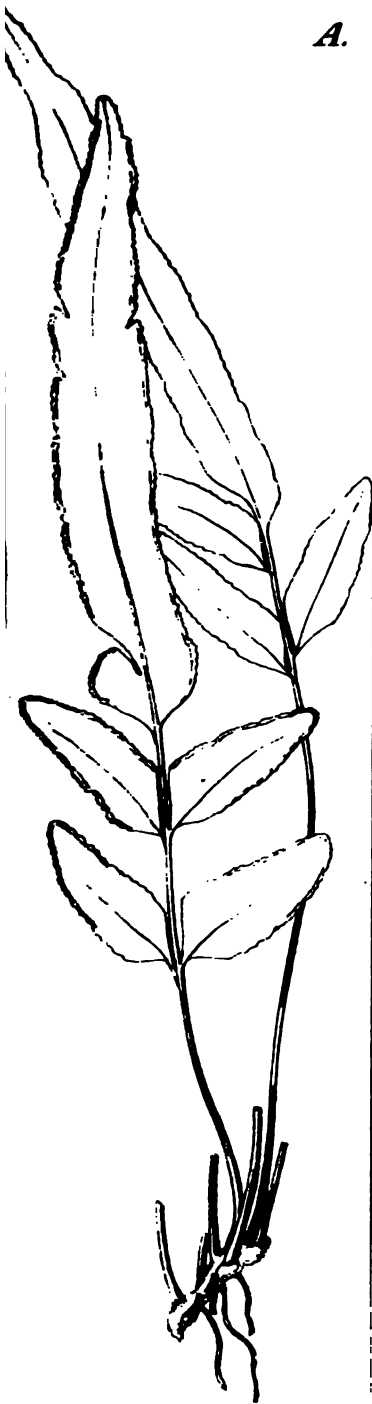
TAB. LXVII.

A. *LINDSÆA PENTAPHYLLA*, *Hook.*—p. 219.
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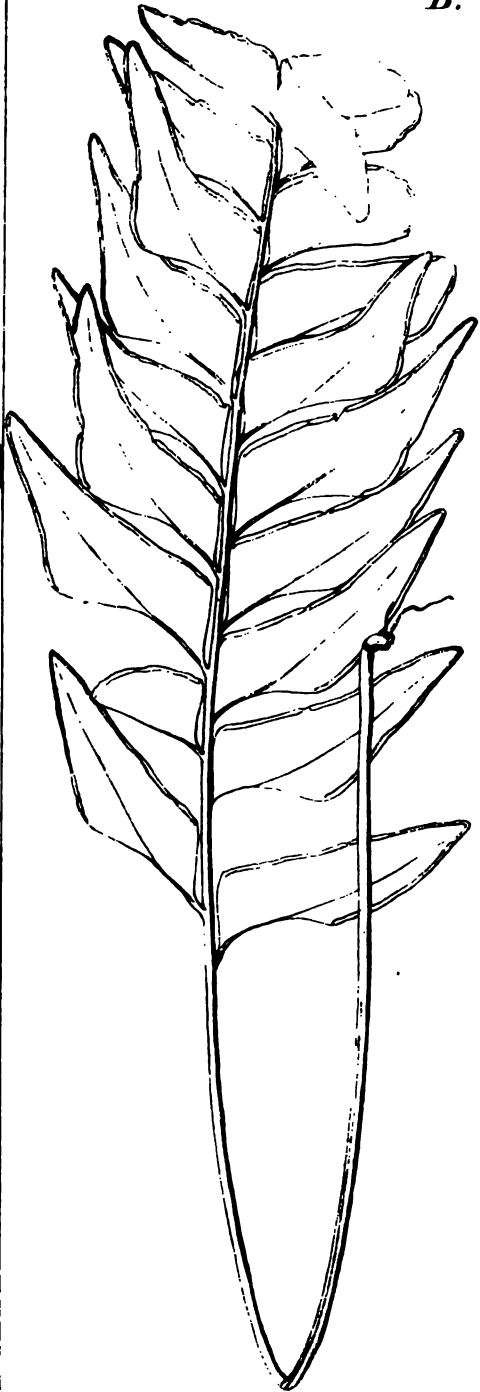
B. *LINDSÆA INTERMEDIA*, *Hook.*—p. 222.
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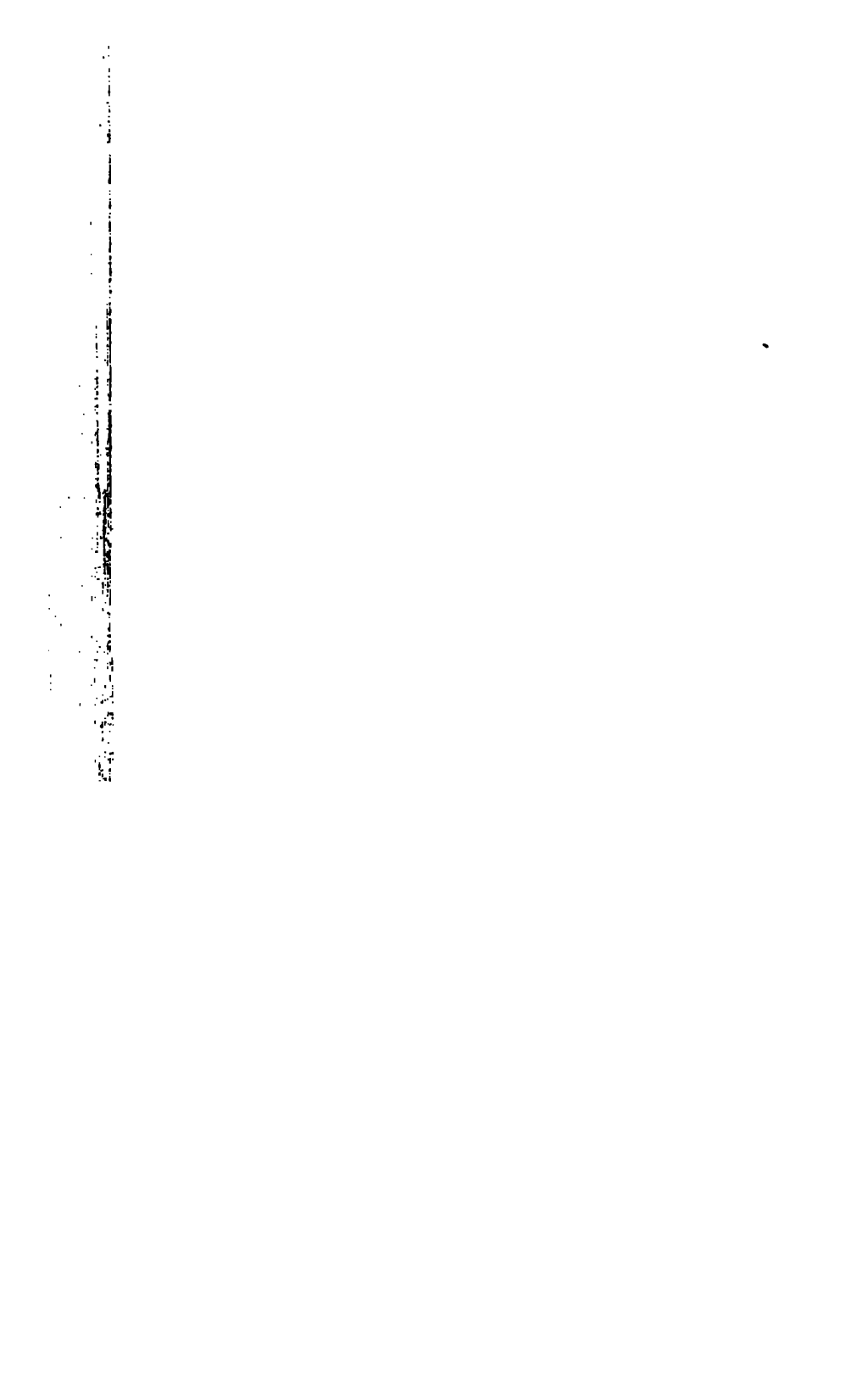


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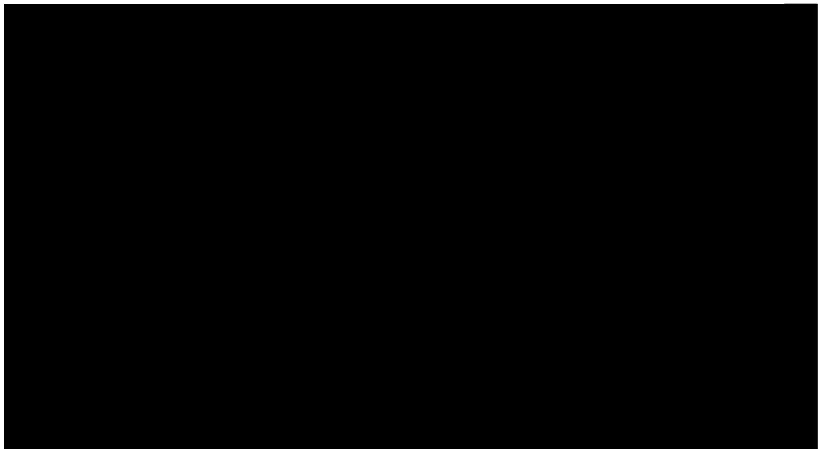
TAB. LXVIII.

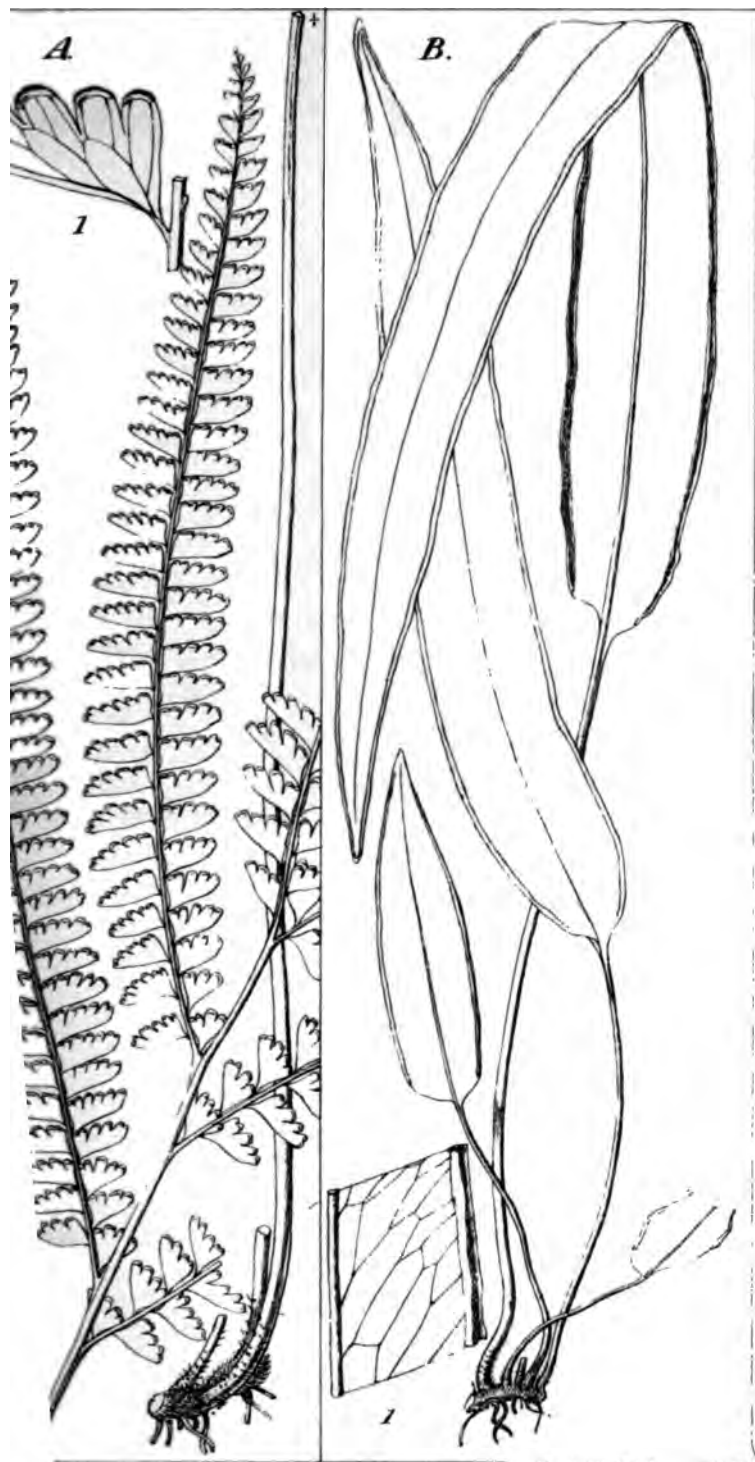
A. *LINDSÆA DAVALLOIDES*, *Bl.*—p. 224.

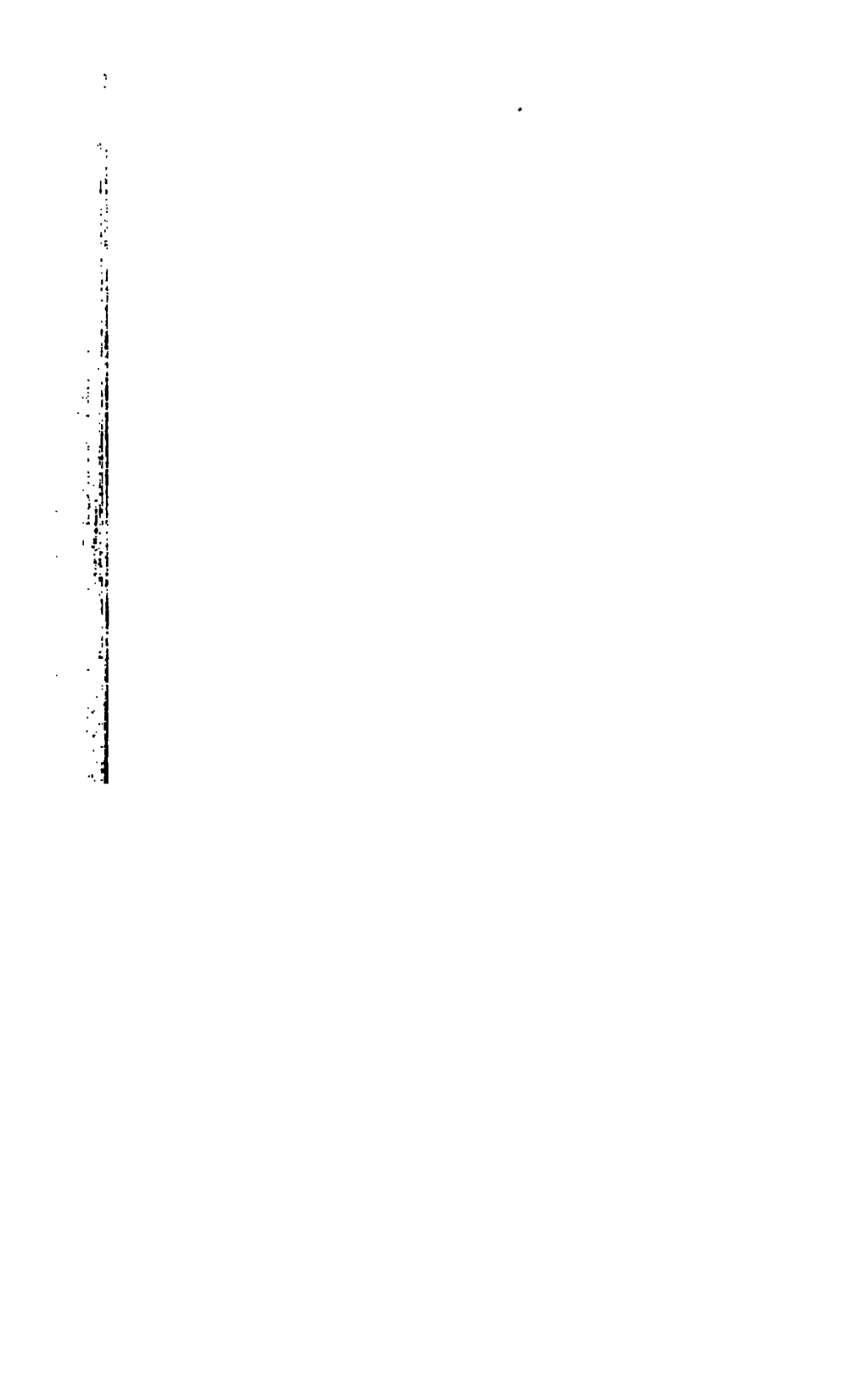
Portion of stipes and frond, *nat. size.* Fig. 1. Fertile pinnule,
magnified.

B. *LINDSÆA GRIFFITHIANA*, *Hook.*—p. 219.

Fronds, *nat. size.* Fig. 1. Portion of the fertile frond, *magni-*
fied.







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Tab. LXIX.

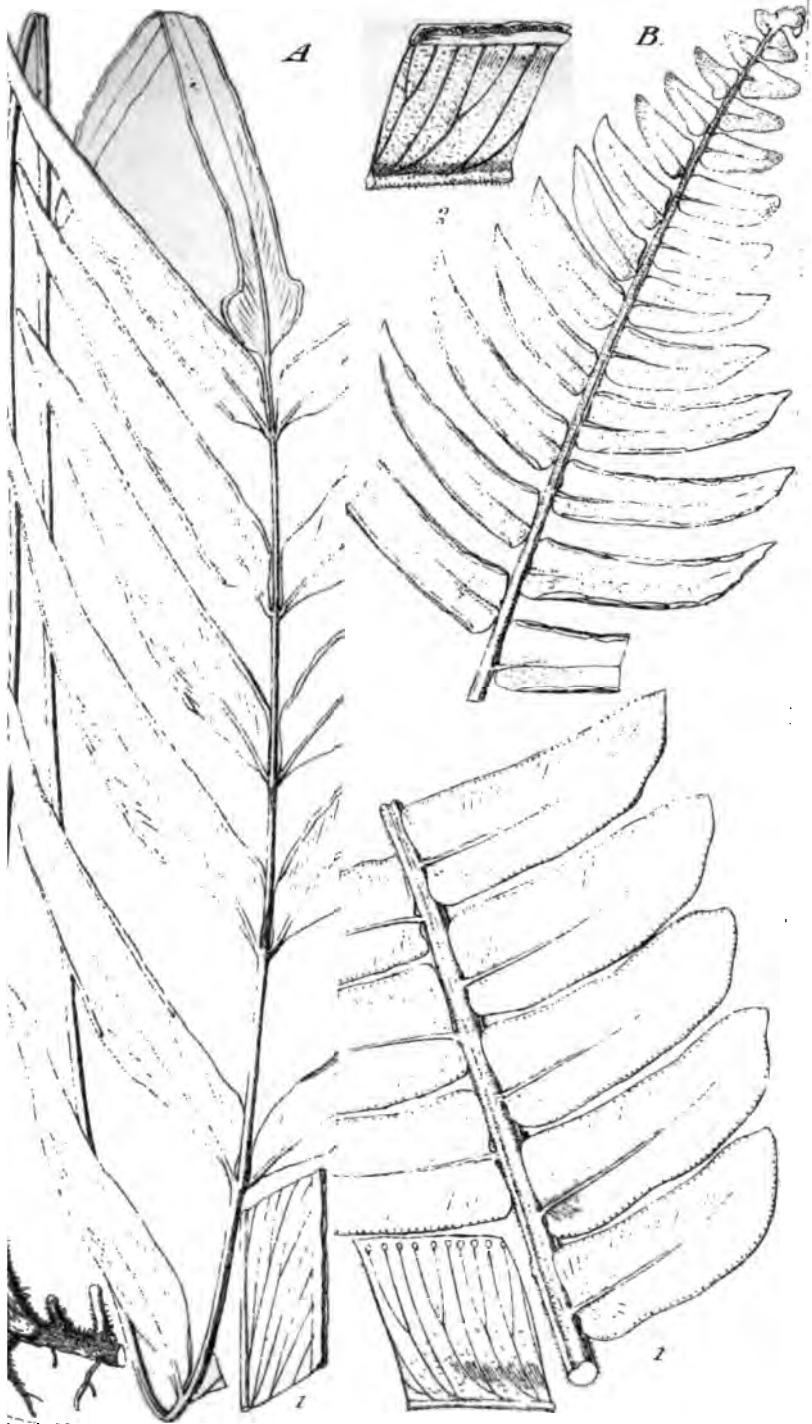
A. *LINDSÆA WALKERRE*, *Hook.*—p. 209.

Plant, *nat. size.* Fig. 1. Portion of a fertile pinna, *magnified.*

B. *LINDSÆA LANUGINOSA*, *Wall.*—p. 210.

Fig. 1. Lower and sterile portion of a frond, *nat. size*; with a portion of a pinna, *magnified.* Fig. 2. Upper and fertile portion of a frond, *nat. size*; with a portion of a pinna, *magnified.*

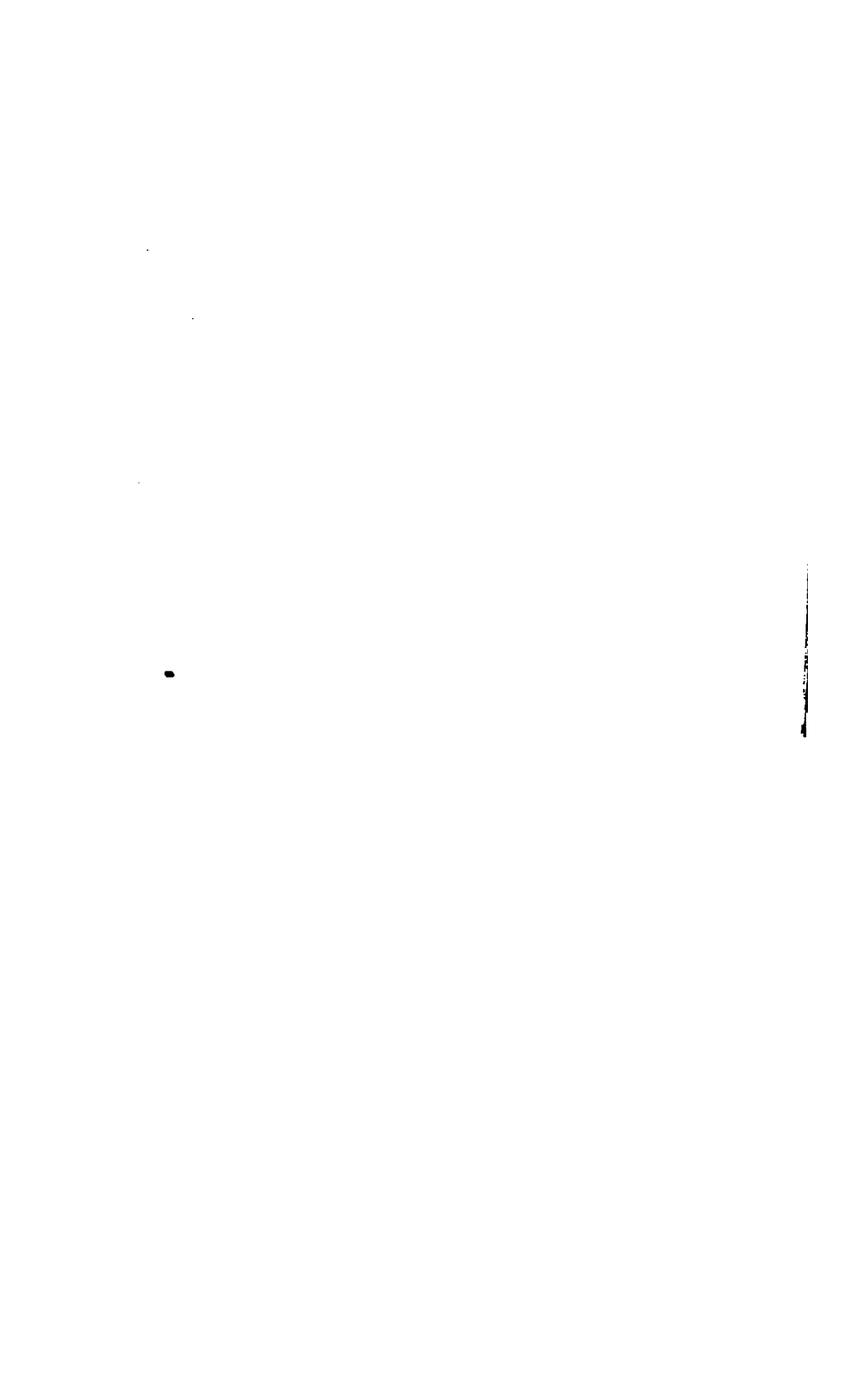




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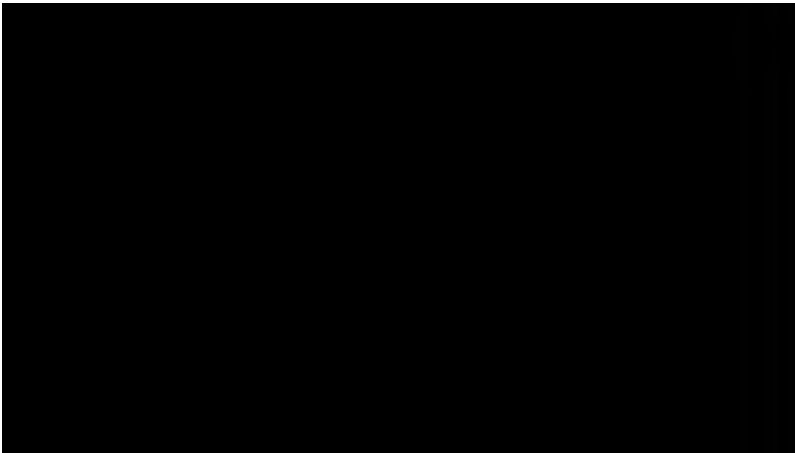
TAB. LXX.

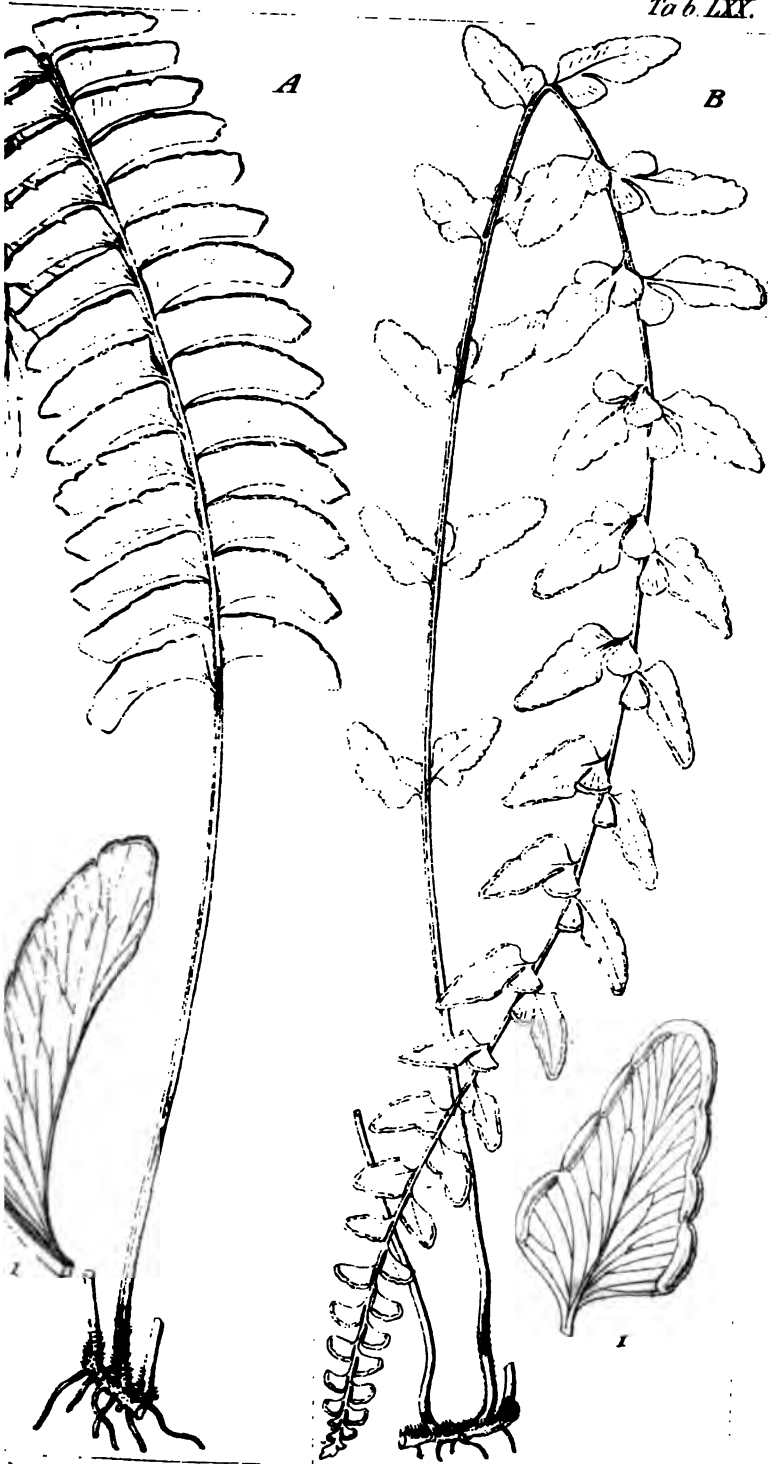
A. LINDSÆA RECURVATA, *Wall.*—p. 222.

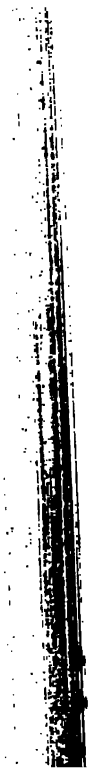
Plant, *nat. size.* Fig. 1. Fertile pinna, *magnified.*

B. LINDSÆA FRASERI, *Hook.*—p. 221.

Plant, *nat. size.* Fig. 1. Fertile pinna, *magnified.*







SPECIES FILICUM.



SPECIES FILICUM;

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

ACCOMPANIED WITH NUMEROUS FIGURES:

BY

SIR WILLIAM JACKSON HOOKER, K.H.,

D.C.L. OXON., F.R.S., F.A.S., AND F.L.S.;

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

VOL. II.

CONTAINING



ADIANTUM—CERATOPTERIS.

PLATES LXXI.—CXL.

LONDON:

WILLIAM PAMPLIN, 45, FRITH STREET, SOHO SQUARE.

MDCCLXVIII.

PRINTED BY
JOHN EDWARD TAYLOR, LITTLE QUEEN STREET,
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PLATES LXXI.—CXL.



SPECIES FILICUM.

SUBORD. IV.—PTERIDEÆ.

Sori orbicular, oblong or linear, often continuous, marginal, situated at the apices of the veins or veinlets. *Involucre* formed of the replicate margin of, but mostly differing in texture from, the frond, taking the same shape as the sori, membranaceous or coriaceous, covering the capsules or sometimes bearing them on its underside (*Adiantum*), opening towards the axis of the frond or pinnule.—*Tufted or creeping Ferns, inhabiting various parts of the world, chiefly tropical.* Fronds *simple or variously divided and compound.* Veins *simple or forked or anastomosing.*

The present group corresponds, generally, with the *Pterideæ*, J. Sm., (excluding however all of his second section "*Metasora*," except *Lomaria*), and almost entirely with the *Adiantaceæ* of Presl. The name *Pterideæ* appears preferable, as expressing the most familiar Genus belonging to it. To me it seems the Suborder cannot be advantageously divided into sections, the Genera of which it is composed passing too gradually the one into the other to allow of it.

1. ADIANTUM, L.

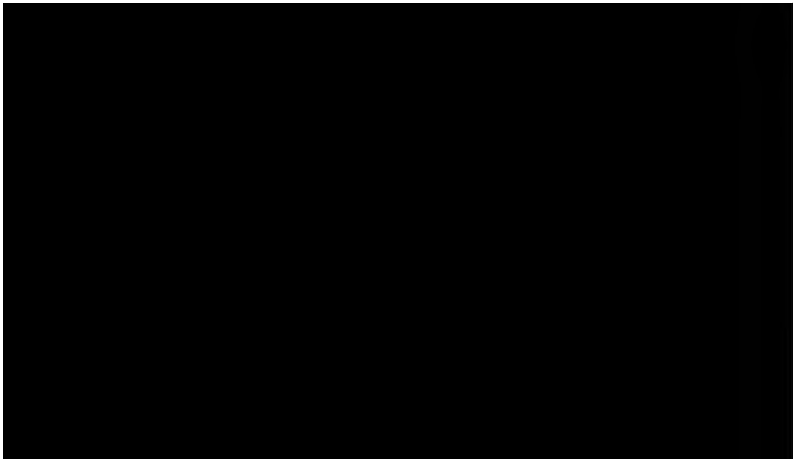
Adiantum, Linn. (HOOK. GEN. FIL. TAB. LXVI. B.)
Hewardia, J. Sm. (HOOK. GEN. FIL. TAB. LXXXIX.).

Sori marginal, globose, reniform, oblong or linear, distinct, or more or less confluent and continuous. *Involucre* the same shape as the sori, formed of the reflexed margin of the frond, on the underside, and bearing the capsules beneath, which capsules have their origin upon veinlets running into the involucre. *Capsules* stalked.—*Ferns of temperate or chiefly tropical countries, abounding in the New World, with simple or pinnate or compoundly divided fronds (never*

pinnatifid), variable in texture from membranaceous to coriaceous. Costa, if present, excentric, generally indistinct or obsolete. Veins simple or usually forked, sometimes radiating, rarely (in *Hewardia*, J. Sm.) anastomosing. Stipes frequently black and glossy. Pinnules often cuneated and oblique.

This Genus may be said to be a natural one, that is, generally easily recognized, even when destitute of fructification; the essential character, however, consisting in the position of the capsules or sori upon the underside of the involucre: by that mark alone are some species with small and distinct sori to be distinguished from *Cheilanthes*,* while others almost merge into *Pteris*. If, however, the Genus is, as a whole, well marked, great indeed is the difficulty of defining the limits of the species, or of knowing what are the species of authors without the aid of faithful figures, or authentically named specimens. In the several stages of growth, too, some species assume totally different appearances, and all kinds of shapes of pinnules are seen on one and the same frond. The presence or absence of fructification also changes considerably the outline of a pinnule. I regret, for my friend Mr. Heward's sake, that I cannot concur with those who consider the anastomosing of the veins as alone sufficient to constitute a genus of the *Hewardia*, J. Sm., and I shall be gratified if Mr. Smith himself would see the matter in the same light, and distinguish some better marked plant with the name of so excellent a man and so great a lover and student of Ferns. *Hewardia adiantoides*, as will be shown, is not the only *Adiantum* in which the veins anastomose; and there are various degrees of union, and in plants not otherwise allied to each other; so that such a character cannot be held to afford even tolerable sections: nor, practically, can such characters, derived from the fructification, as those of "*Sori inæquales v. lineares, continui, vel breviores contigui*" (*Adianta Minervæ, von Martius*), and "*Sori æquales, globosi, distincti. Indusium semilunatum*" (*Adianta Veneris, von Mart.*) of Presl. Such characters, distinct enough in some, seem to be combined in other individuals in one and the same species. In subsections they may be with some convenience employed.

§ I. *Frond simple.* (Sp. 1—3).



Copious specimens in my possession of both—the *reniforme* from Madeira and Teneriffe, the *asarifolium* from Mauritius and Bourbon—incline me to a different opinion: the western one is uniformly more slender and longer in proportion in the stipes, less scaly; the frond smaller, of a thinner texture, with a broad and shallow sinus, and constantly smaller and less densely approximated involucre. *A. asarifolium* is altogether and always a stouter and coarser plant. It is not a little remarkable that these two species appear peculiar to their respective localities, nothing like them having been detected in any part of the vast intermediate continent of Africa. Whether the following is allied or not, cannot be determined from the figure of Petiver.

3. *A. Philippense*, L.; “frond reniform, simple, alternate, petiolate, lobed, many-flowered.” *Linn. Sp. Pl.* 1556. *Sw. Syn. Fil.* 120. *Willd. Sp. Pl.* v. 428.—*Petiv. Gazoph.* 8, t. 4, f. 4.

Hab. “Philippine Islands.”—Petiver seems the only authority for this dubious plant, as well as for its locality.

§ II. *Fronds pinnate, rarely subbipinnate.* (Sp. 4—32).

* *Sori continuous and solitary, or more or less elongated and unequal.* (Sp. 4—11).

4. *A. macrophyllum*, Sw.; frond pinnate, pinnæ large chartaceous opaque somewhat glaucous beneath sessile or on very short petioles subfalcate, lower ones opposite, sterile ones broadly but obliquely ovate acuminate slightly lobed and serrated, fertile ones narrower obliquely and angulato-cuneate at the base, sori linear elongated more or less interrupted, stipes and rachis ebeneous glabrous.—*Sw. Syn. Fil.* p. 122. *Willd. Sp. Pl.* v. p. 429. *H. B. K. Nov. Gen. Am.* i. p. 16 et vii. t. 666. *Hook. et Grev. Ic. Fil.* t. 132.—*Br. Jam.* t. 38, f. 1.

Hab. West Indies and tropical America, common.—A very fine and well-marked species; yet the shape of the pinnæ is highly variable. In one specimen we find the lower pinnæ pinnate, but it seems a monstrosity.

5. *A. platyphyllum*, Sw.; “fronds pinnate, pinnæ petiolate ovate attenuate at the apex entire oblique at the base and gibbous at the upper base glaucous beneath, sori oblong contiguous occupying the whole margin.” *Sw. Kongl. Vetensk. Ac. Handl.* 1817, p. 74, t. 3, f. 6. *Kze. Anal. Pterid.* p. 31, t. 20, an *Kze. in Linnæa*, ix. p. 79? (not *Kze. Poepp. Fil. exsic. in Herb. Hook.*).

Hab. Near Villa Rica, Brazil, *Freyreis* (*Swartz*). Brazil, *Herb. Kaulf. propr.*, sterile (*Kunze*). Pampayaco, Peru, *Poeppig* (*Kunze*).—*Swartz's* figure represents a very remarkable Brazilian plant, such as neither myself nor Mr. J. Smith have seen, with quite the habit, so far as can be judged from the figures, of our *A. Wilsoni*; the pinnæ few (four),

large, broad-ovate, long-petioled, sharply acuminate, quite entire (under the microscope said to be obsoletely serrulate), the rachis and stipes quite glabrous, but the sori are not contiguous,—they are broken up into several large, broad, and more or less elongated contiguous ones. Kunze, in his valuable 'Analecta Pteridographica,' gives a figure and description unquestionably of the same species (from Pampayaco, in Peru); one specimen represented at his f. B. (Tab. 20) is the very prototype of Swartz's figure. Unfortunately my specimen of Poepp. Plant. Exsicc., from Professor Kunze himself, is a very different fern, and a rather unusually large state of *A. Kaulfussii* (*A. obliquum*, Sieb., Hook. & Grev.), with short petioles, narrower and smaller, gradually acuminate pinnae, the sterile ones, or sterile portions, slightly lobed and conspicuously serrated, narrow sori and downy rachis. Presl, too, cites *A. platyphyllum* of Poeppig, Plant. exsicc., under *A. obliquum* (meaning no doubt the *A. Kaulfussii*, Kze. Herb. and Klotzsch, often taken for *A. obliquum*), and retains *A. platyphyllum* of Swartz as a distinct species. I can only do the same, referring to the latter the figure of Kunze above quoted.

6. *A. lucidum*, Sw.; frond oblong pinnate rarely below subbipinnate, pinnae alternate on short petioles approximate ovato-lanceolate or lanceolate much acuminate rarely obtuse chartaceous the sterile serrated ones the broadest olivaceous green and glossy on both sides, the margins at the superior base truncate parallel with the rachis, lower margin dimidiato-cuneate, sori continuous uninterrupted along both margins to their apex, stipes and especially the rachis rough with ferruginous hairs. (TAB. LXXIX. C.)—*Sw. Syn. Fil. (excl. syn. of Pteris lucida, Cav. ?)*. *Kze. in Linnæa*, ix. p. 78 (*who ad- duces here A. asperum, Desv., Pteris aspera, Poir. & Presl.*). *A. Poeppigianum, Presl, Tent. Pterid. (name)*.—*β. major*.—*γ.* veins of the pinnae often anastomosing. (TAB. LXXIX. C. f. 4).

Hab. Tropical America and West-Indian Islands. *β.* Cayenne, *LePrieur*.—*γ.* Caripi, near Pará, *R. Spruce*, n. 39.—This is a common plant, and I have copious specimens from various tropical regions of the New World;

7. *A. Seemanni*, Hook. ; caudex creeping knotted sending down copious woolly roots, fronds ovate pinnated, pinnæ few large 4—6 on long slender petioles obliquely and broadly celloideo-ovate acuminate not lobed coriaceous-membranaceous, sterile ones closely and deeply inciso-serrated striated with the copious veins dark brown green and glossy above glaucous and opaque beneath, sori contiguous short oblong or linear-oblong and elongated more or less combined and continuous hard and coriaceous, stipes rachis and petioles black ebeneous and very glossy. (TAB. LXXXI. A.)

Hab. San Lorenzo, Veraguas, central America, Pacific side, *Seemann*, 1838, n. 1124.—All my specimens are simply pinnate, exhibiting no disposition to be compound, or I should have arranged the species with the *Pentadactylon* group; though even among them there is nothing approaching this in the almost coriaceous texture of the fronds, the deeply and spinulose serrated margins of the sterile portions, the undivided (not lobed) margins and the confluent and often continuous lines of very unequal coriaceous involucre. In these particulars this fine species stands unique, and I have much pleasure in dedicating it to its discoverer, who accompanied Captain Kellett in his voyages of research in the Pacific, in the quality of Naturalist, and detected this plant at Veraguas in March, 1838. Many of the pinnæ are 4 inches long and 2½ broad. Were the sterile pinnules entire, I could almost consider it identical with *A. platyphyllum* of Swartz and Kunze; but I am quite puzzled with Kunze's specimens of "*platyphyllum*," which, as before observed, are *A. Kaulfussii*, a species with which this has little affinity.

8. *A. Phyllitidis*, J. Sm. ; frond broadly ovate or suborbicular pinnate, pinnæ 4—6 alternate petiolate large elliptical-lanceolate much acuminate opaque dark brown and coriaceous when dry, sterile ones unequally and obscurely serrate upper superior margin rounded at the base lower obliquely cuneate, veins forked free, sori continuous along both margins, petiole decurrent upon the rachis, stipes and rachis rough with ferruginous hairs. *J. Sm. Fil. Schomb. in Hook. Loud. Journ. Bot. i. p. 197.* (TAB. LXXII. B.)

Hab. British Guiana, *Sir Robert H. Schomburgk*, n. 300.—Mr. J. Smith, the only author who has noticed this plant (and the only specimens known are those from Sir R. H. Schomburgk), justly observes, "This is rather a peculiar *Adiantum*: the circumstance of the petiole not being articulated with the rachis gives the species such a distinct and very marked character, that in the absence of sori it would scarcely be considered an *Adiantum*." In drying the pinnæ become brown; and the peculiar evenness and smoothness of the surface convey the idea that in a fresh state they are fleshy. The venation is forked (not reticulate), indistinctly visible. In size and general appearance, and in the continuous sorus, the affinity is clearly with *A. dolosum*, Kze., and our *A. Wilsoni*. It would seem from a further remark of Mr. J. Smith, l. c., that he considered Kunze had mistaken this for the *Lindsæa macrophylla*, Kaulf.; but Kunze has since shown that it was *A. dolosum*, Kze. and of this work, which he had con-

founded with (not taken for) *Lindsaea macrophylla*. The one (*A. dolosum*) has a reticulated venation, the other (*A. Phyllitidis*) has not.

9. *A. Wilsoni*, n. sp.; frond ovate pinnate, pinnæ 3—7 alternate petiolate large ovate-acuminate (sterile ones sharply and irregularly serrated) coriaceous dark green above paler and slightly glaucous beneath, both the margins at the base more or less rounded but the sides unequal not cuneate, costa distinct and ebeneous at the base, veins forked here and there anastomosing, sori continuous on both margins and nearly to the apex, stipes and rachis ebeneous glabrous. (TAB. LXXII. A.)

Hab. Shady, rather dry and gravelly places near Bath, Jamaica, *Mr. Wilson*.—I name this species in compliment to Mr. Wilson, the intelligent Curator of the Bath Botanic Garden, Jamaica, from whom Mr. Smith and myself have received dried specimens as well as living ones, which latter are growing and fructifying vigorously in the stoves of the Royal Gardens. Although very distinct as a species, it seems to hold an intermediate rank between *A. Phyllitidis* of J. Sm. and the *A. dolosum*, Kze. Its stipes and rachis are glabrous, the surface of the pinnæ is nearly as smooth and even as in the former, but occasionally the veins are slightly prominent. In the partial anastomosing of the veins the species approaches the latter: from both it is at once known by the broader and greener pinnæ, and the more rounded and more equal sides at the base. In cultivation the young fronds are sometimes seen quite simple, cordate, and finely but unequally serrated, as represented at our fig. 1. of Tab. LXXII. A. 1.

(Veins everywhere anastomosing, 10, 11).

10. *A. dolosum*, Kze.; frond ovate pinnate (very rarely subbipinnate below), pinnæ alternate very short-petioled subcoriaceous-chartaceous olive brown and slightly glossy when dry large lanceolate or elliptical-lanceolate very much acuminate almost caudate often falcate sterile portion serrulate, costa ebeneous at the base, the upper margin at the base

dor, Seemann.—Our observations on the *Lindsæa macrophylla* of Kunze, 'Analecta Pteridographica,' have elicited the fact that an *Adiantum* from Moricand (the plant we had the opportunity of inspecting) was confounded in that work with *Kaulfus*' original plant, which the learned author assures us is a true *Lindsæa*, as there described and figured. He has now in the 21st volume of the 'Linnæa' rightly described the plant of Moricand as a new species of *Adiantum* (*Hewardia*, J. Smith, on account of the copiously reticulated venation) under the name of *A. dolosum*, and has added another station for this apparently rare plant, namely, Mariepaston, in Surinam, where it was detected by Kappler. We, too, have had the good fortune to receive very fine specimens lately, collected by Mr. Seemann in El Equador, on the Pacific side of Tropical America. It is a most distinct and very fine species. Some of Mr. Seemann's specimens have pinnae a span long (one pinna measures eight inches! and the broadest pinna is nearly two inches wide); so that it well deserves the title Kunze has given to it of "*Filix memorabilis*."

11. *A. Hewardia*, Kze.; frond broad irregular pinnate or below bipinnate, pinnules alternate rather remote all petiolate more or less acuminate membranaceous olive brown when dry, the base unequal the upper margin rounded or truncate the lower cuneate, costa evident ebeneous below, veins everywhere anastomosing and forming irregular oblong hexagons, sori continuous on both margins generally to the very apex, stipes and rachis ebeneous glossy.—Kze. *Schkh. Fil. Suppl. p. 104, t. 49.* *Hewardia adiantoides*, *J. Sm. in Hook. Journ. of Bot. iii. p. 432 tab. 16, 17; and iv. p. 161. Hook. Gen. Fil. t. 89.*

Hab. French Guiana, *Martin, Le Prieur*.—I am indebted to my friend Mr. Heward for my specimens of this rare plant, and it seems an ungrateful return to be instrumental in abolishing a Genus which he so richly merits; but I confess I cannot see that it is agreeable to Nature to separate a Genus of Ferns on account of the mere anastomosing of the veins of the pinnae, unaccompanied by any peculiarity of character or by a different habit. We have shown, too, that there are various grades of union of the otherwise dichotomous veins in this genus. We allow that the affinity of this is with *A. dolosum*, in which the reticulation exists, though less prominent: it is equally allied to *A. Wilsoni*, in which the anastomosing character is still less apparent, and perhaps yet more closely allied to *A. Phyllitidis*, in which the veins are all forked and free!

** *Sori suborbicular or oblong, not much elongated, nor continuous (12—32).*

12. *A. Kaulfussii*, Kze.; frond pinnate (very rarely below subbipinnate), pinnae alternate short-petioled chartaceous ovato-lanceolate obtuse or acuminate obscurely costate near the petiole the base above truncately cuneate below dimidiate-cuneate glossy above glaucous and opaque beneath, the sterile ones lobed and serrated, sori all along the upper and lower margins generally to the apex oblong curved approximate rarely confluent and continuous, stipes and rachis ebe-

neous more or less fusco-pubescent. *Kze. in Linnæa*, 1848, p. 221. *A. obliquum*, *Sieb. Fl. Martin*, n. 371. *Kaulf. En. Fil.* p. 200. *Hook. & Grev. Ic. Fil.* t. 190, not Willd.— β . pinnæ larger and broader. *A. platyphyllum*, *Poep. Fil. Exsicc. in Herb. nostr.* (not Sw., nor *Kze. in Anal. Pterid.* p. 31, t. 20).

Hab. Tropical America, West Indies, Mexico.— β . Amazon River, *Poeppig in Herb. nostr.*—This also appears a well-marked species: the under side of the frond is, I believe, invariably glaucous. Myself and others had considered it to be the *A. obliquum* of Willd., but as that author says nothing of the glaucous hue, even in his full description, I the more readily follow Kunze in his name of *A. Kaulfussii*. I am satisfied that the *A. platyphyllum* from the Amazon, of Poeppig's *Fil. Exsicc.*, is a mere variety of this.

13. *A. obliquum*, Willd.; frond oblong pinnate or very rarely below subbipinnate, pinnæ alternate approximate short-petioled ovato-lanceolate obtuse or (especially the sterile sublobato-serrated ones) acuminate obscurely costate dark olivaceous green on both sides shining above, the margin at the upper base truncate and parallel with the rachis the lower margin dimidiato-cuneate, sori numerous oblong curved occupying the upper and lower margin to the very apex rarely subconfluent, stipes and especially the rachis rough with ferruginous down. (Tab. LXXIX. A.)—*A. obliquum*, *Willd. Sp. Pl.* v. p. 429 (excl. syn. *A. lucidum*, *Sw.* and *Pteris lucida*, *Cav.*) *Klotzsch, in Linnæa*, xviii. p. 550.— β . *major*; pinnæ longer and more acuminate. (Tab. LXXIX. A. f. 1).

Hab. S. America, Porto Rico and Caraccas, *Bredemeyer in Willd. British Guiana*, *Sir R. H. Schomburgh. Rich. Schomburgh, Klotzsch, in Herb. nostr.*, n. 1175 and 1127.— β . Columbia, Pacific side, *Cuming*, n. 1202.

perior margin lobed, lobes bidentate, sori reniform between the incurved teeth of each lobe, stipes and rachis ebeneous glabrous. (TAB. LXXIII. A.)

Hab. Cuba, *Linden* (1843-4), n. 1867.—I do not find this anywhere described, but it seems a perfectly formed plant, with the slender rachis and petioles such as are seen in *A. lunulatum*, but with very differently shaped pinnae, differently colored, having strongly toothed lobes even in fructification, and a creeping scaly caudex. Can it be a simply pinnated form, with narrower pinnae, of *A. cristatum*?

15. *A. deltoideum*, Sw.; caespitose (a span high) fronds linear-oblong pinnated (rarely bipinnate), pinnae membranaceo-chartaceous rather distant petiolate obliquely cordato-rotundate obscurely lobato-crenate, fertile ones deltoid or obliquely deltoid angles obtuse, sori linear interrupted or sometimes continuous nearly to the apex, stipes short ebeneous very paleaceo-hirsute at the base and a line of delicate chaffy hairs is continued up the front of the stipes and of the ebeneous rachis.—*Sw. Syn. Fil. p. 122. Fl. Ind. Occ. iii. p. 1705. Kze. Anal. Pterid. p. 32, t. 17, f. 2.*

Hab. Jamaica, on calcareous rocks, *Swartz, Purdie, Mc' Nab. St. Domingo, Bertero*. Crevices of rocks near the sea-shore, Cuba, *B. D. Greene, Esq.*—A most distinct and well marked species: the fructification is confined to the inferior and superior margins, not reaching quite to the apex: and the truncated base, whence the veins diverge, has no sorus. Our specimens are nearly all simply pinnate, which appears to be the normal character. Kunze's plant, from St. Domingo, represents a lower pinna again divided, as described by Swartz. Kunze compares the plant, and not inaptly, to *Pteris calomelanos* in habit. Some of our specimens are thrice the size of the largest figured by Kunze.

16. *A. Shepherdi*, Hook.; frond linear-oblong (a foot and more high) very much elongated slightly attenuated upwards and obtuse erect stiff, pinnae quite sessile densely imbricated chartaceo-coriaceous reniform obliquely inserted lower ones distichous upper ones all secund radiato-venose the veins prominent obscurely lobed when sterile, the fertile ones crenato-lobate with narrow incisions the margin thickened all round, involucre cordato-reniform inserted at the bottom of the narrow sinus their margins membranaceous, stipes —? rachis ebeneous very glossy glabrous stout. (TAB. LXXIII. B.)

Hab. Mexico, *W. Bates, Esq.*, 1834.—Of this singular plant I have but a solitary, and, I regret to say, imperfect, specimen, presented to me by my good friend Mr. Henry Shepherd, Curator of the Liverpool Botanic Garden, whose knowledge and love of Ferns justly entitle him to the compliment of having it bear his name. The root and stipes are wanting. All that I possess is figured at Tab. LXXIII. B. The peculiar direction of the pinnae may not be, and probably is not constant, but their form and

texture, without the trace of a petiole, and their thickened margins, are quite peculiar. The plant is of a firm and rigid habit, with a stout rachis, the upper part of which is wholly concealed by the arrangement of the pinnæ. I regret that the exact locality of this Fern in Mexico is not stated.

17. *A. lobatum*, Pr. ; "fronds oblong bipinnate pinnate at the apex glabrous, pinnæ and pinnules alternate petiolate oblong lunate rotundate lobato-incised crenulate, terminal ones subtrilobed, sori solitary lunate, involucre reniform."—*Presl, Reliq. Hænk. p. 62, t. 10, f. 5.*

Hab. Mexico, *Hænke*.—In size and general aspect this has so much the appearance of *A. Galeottianum* (from the same country) that I have been almost tempted to make that a synonym of the present species ; but nothing is said about the texture, which in our *A. Galeottianum* is thick and subcoriaceous, and where, moreover, the pinnules are much more orbicular, and the sori more numerous and less lunate. Presl has omitted the present species in his 'Tent. Pteridograph.' Professor Kunze refers it to *A. Chilense*.

18. *A. Galeottianum*, Hook. ; frond broadly lanceolate (a span long) pinnate lowermost pinnæ again pinnate, pinnæ subopposite all petiolate cordate or subrotund almost exactly equilateral coriaceous emarginate or truncated rarely subcuneate at the base the rest obscurely lobed with narrow sori-ferous sinuses, the margin slightly thickened all round, involucre reniform-cordate subcoriaceous situated at the bottom of the shallow sinuses, rachis and stipes rather stout ebeneous glabrous. (TAB. LXXX. B.)

Hab Mexico, near Oaxaca, elevation 3000 feet, *Galeotti*, n. 6561.—A very distinct species of *Adiantum*, and not taken up by Martens and Galeotti in their Syn. Fil. Mexic. Indeed, it appears to belong to a collection gathered subsequently, if I may judge from the high number it bears. Its nearest affinity is perhaps with our *A. Shepherdii*, but the arrangement and insertion of the pinnæ, as well as their shape, are very different, and

times again pinnated, pinnae alternate approximate very membranaceous opaque dull brown bearing a few scattered black hairs semiovate slightly arcuate upper margins at the base truncated and parallel with the rachis, apex very rounded, superior margin lobed with deep and shallow sinuses and there bearing the sori distant from the margin or outline of the entire pinna, involucre small reniform-rotundate, stipes and rachis very slender ebeneous glabrous. (Tab. LXXX. C.)—*Blum. En. Fil. Jav. p. 215.*

Hab. Near Lingain Jattie, Province of Cheribou, Java, *Blume. Luzon, Cuming, n. 55.*—I am indebted to Dr. Blume for an authentic specimen of this most delicate of ferns, whether the slenderness of its stipes and rachis or the thinness of the pinnae be considered. The able author compares it with the *A. rhizophorum*, Sw., observing that it differs in the want of an elongated rooting apex, and in the position and form of the sorus. It is also unlike in the shape and texture of the pinnules, in the greater length of the rachis, and in being somewhat bipinnate below, as is shown by Mr. Cuming's specimens, which are otherwise identical with Professor Blume's plant.

(*Rachis often proliferous at the extremity of the pinnae.* 21—32).

21. *A. lunulatum*, Burm.; frond oblong pinnate, pinnae alternate rather long-petiolate membranaceous oblong-lunate dimidiate below, upper margin lobed truncate at the base uppermost pinna cuneate, sori linear approximate and often confluent, stipes and rachis ebeneous glabrous the latter often extended beyond the pinnae and proliferous.—*Burm. Fl. Ind. p. 235. Willd. Phytog. xiv. t. 9. f. 1. Sp. Pl. v. p. 430. Sw. Syn. Fil. p. 121. Hook. & Grev. Ic. Fil. t. 104. Wall. Cat. n. 77. Pteris lunata, Retz Obs. ii. p. 28, f. 4. Adiantum arcuatum, Sw. Syn. Fil. p. 122. A. lunatum, Cav. Præl. 1801, n. 676.—Rheede, Malab. xii. p. 72, t. 40.*

Hab. Throughout the hot parts of the East Indies; Malay Islands and Peninsula (*Wallick*), Ceylon, Java, &c., &c. Africa; Cape de Verde Islands, *Mr. Miller*. Quorra, near Attah, *Dr. Vogel* (Niger Expedition). S. America; Acapulco (*Willd.*); Mexico (*Hænke*). Organ Mountains, Brazil, *Gardner* (in Herb. nostr. without No.). Minas Geraes, *Claussen*. On the ruins of the old city of Panama, *Seeman, n. 10.*—This species is very constant to its characters in all the multitudinous examples I possess, whether from the Old or from the New World. In the latter country it seems to be very rare. The pinnae vary from one inch to 1½ inch in length: in their delicate palish green colour and membranous texture and rather long petioles the present and two following species resemble *A. Capillus-Veneris*. The involucre are, however, linear or linear-oblong, their length depending on the size of lobe they occupy; and, according as the sinus between the lobes is narrow or more or less broad, is necessarily the contiguity of the sori: sometimes the sori are lunate.

22. *A. deflectens*, Mart. ; "rhizoma simple short, fronds pinnate sometimes rooting and gemmiferous at the extremity, petioles paleaceous at the base and as well as the rachis black glabrous, pinnae transversely oblong or trapezoid, posterior sides rectilinear or with the interior side shorter rounded entire, anterior sharply toothed entire or here and there inciso-lobate, sorophorous lobules 1-5 orbicular-oblong." *Mart. Ic. Plant. Crypt. Brasil. p. 94 (note).*

Hab. Rough rocky banks of the Tapajoz, at Santarem, Province of Pará, *Martius*.—"Plant a span long. Fronds erecto-patent or arcuato-deflexed, rooting and producing new gemmæ. Pinnae alternate, about twenty, lowermost 4-6 lines long, 2-3 lines wide, decidedly inciso-lobate, upper ones gradually decreasing in size and less incised. In habit very near *A. arcuatum*, Sw."—As the *A. arcuatum*, Sw. is now acknowledged to be the same as *A. lunulatum*, and as *A. lunulatum* is unquestionably a Brazilian plant, may not this be a state of it?

23. *A. dolabriforme*, Hook. ; frond oblong pinnate, pinnae alternate rather long-petioled membranaceous obliquely subrotundato-cuncate deeply cut into many narrow irregular generally bidentate lobes, sori rotundate or reniform, stipes and rachis ebeneous glabrous the latter often extended beyond the pinnae and proliferous. *Hook. Ic. Plant. ii. t. 191.*

Hab. Natividade, Brazil, *Gardner*, n. 3553 ; Aracipe, on rocks in a shady ravine, n. 2019, and between Canabrava and Franquirra, n. 2392. Moist rocky places, Isthmus of Panama, *Seeman*.—An equally large plant as *A. lunulatum*, and as already observed, in *Ic. Pl.*, l. c., approaching very near to that species : but specimens sent by Mr. Gardner at different periods, and from different localities, retain the above characters, *i. e.*, the lower and upper base of the leaflets are more nearly equal and straight, giving a cuneate form, rounded above and deeply cut into narrow lobes, with usually a tooth on each side the sorus. No such form appears in the numerous specimens of *A. lunulatum* from the East Indies. It appears to be not uncommon in some parts of Brazil, for Mr. Gardner observed

brown only a little chaffy, the rest as well as the rachis glabrous very glossy. (Tab. LXXX. A.).—*Sw. Syn. Fil. p. 422 & 320. Willd. Sp. Pl. 5, p. 433.* *A. caudatum*, *Bory, Itin. i. p. 198 (not Linn.)*.—*β. major*; a foot to a foot and a half long.

Hab. Moist rocks and wooded hills, Mauritius and Bourbon, *Bory, Carmichael, Sieber, n. 300, Bouton, Bojer, Gardner, &c.*—*β.* Mountain at St. Denis, Bourbon (Herb. nostr. from the Museum of Nat. Hist. of Paris).—Difficult as this species may be to define in a few words, it is, however, truly distinct from *A. caudatum*, not only in being everywhere glabrous, but in the colour and texture of the pinnules, which are firm and almost coriaceous, and in the veins, which are here so delicate as to be seen only like fine and closely packed lines or striæ on the surface. I possess copious specimens from Mauritius and some from Bourbon, and perhaps it is confined to those islands. I have one individual of the true plant indeed from Dr. Wight, without any locality, labelled "*A. rhizophorum*;" specimens, I think, of this are mixed among the *A. caudatum*," and my friend Dr. Arnott has added "Wight, Cat. 130 d (partim)," but no such plant is there. In size it is usually smaller than *A. caudatum*; but my Bourbon specimens from the Paris herbarium are larger than any *caudatum*, yet exhibiting all the characters of *A. rhizophorum*.

25. *A. soboliferum*, Wall.; everywhere glabrous fronds (a foot high often soboliferous, *Wall.*) broadly lanceolate pinnated, pinnæ submembranaceous sessile or lower ones only on very short petioles semielliptical slightly falcate obtuse the upper base truncated and parallel with the rachis upper margin rather equally lobed, sterile ones denticulate, lobes soriferous, sori subreniform, stipes ebeneous, rachis and stipes with a membranous margin on each side! (Tab. LXXIV. A.).

Hab. Mountains of Ava, *Dr. Wallich, 1826.*—Although my own specimens from the generous Wallich do not exhibit the radican and stoloniferous character which suggested the name, it is quite natural that the species should be occasionally so, its nearest affinity being with *A. caudatum*, from which it is at once distinguished by its entirely glabrous fronds and stipes, and from that and all others by the decided membranaceous wing on both sides the rachis and stipes, most apparent, indeed, in the sterile specimens, but existing in all.

26. *A. caudatum*, L.; fronds linear-oblong elongated attenuated often rooting at the apex and there bare of pinnæ, pinnæ nearly sessile alternate rather thick membranaceous dimidiato-oblong the upper base truncated and parallel with the rachis the upper margin more or less deeply lobed, the lobes often bifid soriferous villous in every part with rufous hairs or more or less glabrous, veins generally prominent, involucre nearly orbicular or subquadrate hairy or glabrous, stipes generally short rather stout and as well as the rachis

more or less clothed with fulvous chaffy hairs.—*Linn. Mant.* p. 308. *Sw. Syn. Fil.* p. 122. *Schkh. Fil. t.* 117. *Willd. Sp. Pl.* v. p. 433. *Hook. Ex. Fl. t.* 104. *Burm. Zeyl.* viii. t. 5, f. 1. *A. incisum*, *Forsk. Ægypt. Arab.* p. 187. *A. vestitum*, *Wall. Cat. n.* 75. *A. flagelliferum*, *Wall. Cat. n.* 76 (*pinnæ narrower and more rigid*). *A. hirsutum*, *Bory, It. i.* p. 198. *Willd. Sp. Pl.* v. p. 432. *Wall. Cat. n.* 2176. *A. Capillus Gorgonis*, *Webb, in Hook. Niger Flora, (Spicil. Gorgon.),* p. 192 (*segments of the pinnæ a little larger and somewhat divaricated*).— β . *pinnæ generally quite glabrous, the margin frequently ciliated*. *A. ciliatum*, *Blume in En. Fil. Jav.* p. 215, *et in Herb. nostr.* (*pinnæ rather more deeply cut than usual*).

Hab. Apparently throughout all India, from Scinde (*Stocks, n.* 624, small), Madras (*Wight, 131 and n.* 130, *d*, *pinnæ deeply cut the segments divaricating*) 130, *c*, (small and old). Bengal, Nepal (*Wallich, &c.*), Behar (*Edgeworth*), Assam, Boutan, Mishmee Mountains (*Griffith, Jenkins*), Malay Islands, *Blume, Cuming, n.* 2921, *Lobb*. China, *Breechey, Millett*; Mauritius, Ceylon.— β . In the same countries as the hirsute form. Java, *Blume*, Madras, *Wight* (2-19 and 130 and 130 A.). Arabia Felix, *Forskall*. Cape de Verde Islands, *Forbes, Vogel*.—It were endless to enumerate the several varieties of this. The ordinary state of the plant is well represented by Schkuhr, and in the Exotic Flora above quoted; and the plant appears from age and locality often to become glabrous, with a dry and parched character, the under side of the segments of the pinnæ channelled (by the reflexion of the sides). The more beautiful state is what Willdenow calls *A. hirsutum*, when it has no elongated rooting extremity, but that has properly merged into *caudatum*, it being often rooting and proli-ferous at the end of a caudate rachis. It seems to inhabit all the warmer or hot parts of the Old World; and the *A. Capillus Gorgonis*, Webb, from the Cape de Verde Islands, is assuredly but a slight variety.—The caudex is rather stout and creeping, bearing wiry roots and tufted fronds. In the perfect state of this plant the colour inclines to deep yellowish olive-green (when dry) and the veins are rather distant and prominent; the rachis and

different), "nor *A. caudatum*, Sw., nor *flagelliferum*, Roxb. n. 76," (for in those varieties of one and the same plant the fronds, and, especially, the stipes, are more or less clothed with fulvous hairs or chaff): "it differs from all in the integrity of the pinnæ." On these grounds I give it as distinct, though we need more copious specimens to see that it does not pass into *caudatum*. The texture is more truly membranous than in that species: the nerves are the same, but though conspicuous from the pellucid nature of the parenchyme, they are not prominent on the surface: the fertile pinnæ scarcely exhibit an appearance of lobes; and the contiguous sori form a pretty even line at the edge.

28. *A. calcareum*, Gardn. ; fronds a span long pinnate oblong or lanceolate tapering rooting and proliferous at the extremity, pinnæ membranaceous nearly sessile upper ones dimidiate subtriangular, lower ones flabellate all deeply cut into oblong or cuneate narrow emarginate lobes, involucre reniform occupying the notch on the lobes, stipes and rachis ebeneous glabrous the latter rooting.—*Gardn. in Hook. Ic. Plant. v. t. 467.*

Hab. In clefts of calcareous rocks near Natividade, Province of Goyaz, Brazil, *Gardner*, n. 3551.—Although approaching to *A. filiforme*, and to small specimens of *A. dolabriforme*, this appears really distinct, and, but for the tender, membranaceous and glabrous fronds, it resembles the East-Indian *A. caudatum*, which has the lower pinnæ sometimes flabellate.

29. *A. pumilum*, Sw. ; "frond (small) pinnate, pinnæ subrotund serrulate terminal one larger trapezoid, sori nearly solitary on the superior margin."—*Sw. Fl. Ind. Occ. iii. p. 1703. Willd. Sp. Pl. v. p. 431. Mart. Ic. Plant. Crypt. Brasil. p. 94, tab. 56, f. 4.—Pluken. Alm. t. 251, f. 4 ("haud male," Mart.)*

Hab. Trunks of old trees and shady rocks, Jamaica, rare, *Swartz*.—This little *Adiantum* is quite unknown to me. I have seen nothing that corresponds with it from Jamaica, the only recorded station, unless in calling it a "*planta Antillana*," *Martius* should intend it to be understood as inhabiting the Antilles generally. The figure of *Plukenet*, quoted by *Swartz* and *Martius*, is recorded by the latter as "*haud male*." To me that figure, destitute of fructification, has more the habit of an *Asplenium* than of an *Aspidium*; and it is unfortunate that, although *Martius* describes the fructification, he does not represent it, nor say from what source his specimens were derived. He gives the figure and the full character, to show its affinity to, as well as the distinguishing character of, his *A. delicatulum*; but it does not help us to understand *Swartz's pumilum*. If it has, as *Swartz* and *Martius* describe (though not so figured by *Plukenet*), a filiform, creeping caudex, it cannot be closely allied to *Martius's A. delicatulum*.

30. *A. filiforme*, Gardn. ; fronds a span or more long pinnate lanceolate tapering almost all rooting and proliferous at the extremity, pinnæ membranaceous small alternate petioled distinct rather obliquely and broadly cuneate lobed and fim-

briato-serrate, young sterile ones obovate fimbriated, sori rounded-terminating a toothed or toothless lobe, stipes short and the rooting rachis ebeneous glabrous.—*Gardn. in Hook. Ic. Plant. vi. t. 503.*

Hab. Shady clefts of sandstone rocks near the city of Oeiras, Province of Piahy, Brazil, *Gardner*, n. 2391. Montagne de Mahuri, Cayenne, *Le Prieur (in Herb. Hook.)*—Very different as it appears at first sight from *A. dolabriforme*, yet I must confess that recent investigation, and especially specimens lately received from Mr. Seeman of the latter, as mentioned under *A. dolabriforme*, have shaken my confidence in this as a species. Our figure above quoted is, however, a faithful representation.

31. *A. delicatulum*, Mart.; “rhizoma very short simple, fronds small slender pinnate, petiole and rachis filiform paleaceo-pilose at the base, pinnæ rather remote obovato-rhomboid equally cuneate at the base, upper margin rounded incised and subulato-dentate, sori in the anterior margin solitary or two orbicular-oblong.” *Mart. Ic. Plant. Crypt. Brasil. p. 93, t. 56, f. 2.*

Hab. On stones in warm shady places in the district of the river Japura, Brazil, *Martius*.—It appears evident from *Martius*’s well-executed figures, that the young state of the frond only with a very small (and as represented) solitary, imperfect sorus was seen: in this state we have exactly the young substerile fronds of *A. filiforme*, *Gardn.* The plant has a very different appearance when the fertile pinnæ and the rooting rachis appear, as shown in *Hook. Ic. Plant. f. 503.* *Martius* compares his species with the little known *A. pumilum*, *Sw.*

32. *A. rhizophytum*, Schrad.; “rhizoma simple short, fronds pinnate, petioles paleaceo-pubescent elongated and rooting at the apex, pinnæ glabrous subtriangular-flabelliform, the posterior margin straight, interior shorter, anterior rounded denticulate lobed and soriferous, lowermost ones wider and semiorbicular, sorophorous lobules linear-oblong glabrous.”

large pinnules approximate tapering upwards gradually to a small point chartaceo-membranaceous scarcely glossy, sterile ones large (2 inches and more long) acuminate lobed and serrated, fertile ones and those of the simply pinnated and those of the terminal pinna large ($1\frac{1}{2}$ —2 inches), those of the lower pinnæ much smaller, all lanceolate acuminate or acute arcuato-falcate coarsely serrated at the apex, upper base truncated parallel and close to the rachis often forming a sharp auricle, lower margin dimidiate, sori linear solitary arcuate generally confined to the base of the upper margin very rarely appearing on the lower, stipes ebeneous shining, rachis slightly rough with ferruginous hairs.—*Presl, Reliq. Hænk. p. 61, Tab. 10, f. 3.*

Hab. Guayaquil and Mexico, *Hænke*; apparently entirely confined to the Pacific side of Mexico and Columbia. I possess specimens, sent from Guayaquil, Solanga, Buba, and Gorgona, by *Messrs. Jameson, Hinds, Barclay and Seeman*.—*Presl's* figure is an admirable representation of this plant, in a state, intermediate, as it were, between the simply pinnate and the bipinnate form. In the more fully developed form, the pinnules of the lower pinnae have a good deal of affinity with *A. pulverulentum*, but they are more falcate, while the sterile pinnules and those of the terminal pinnae have quite a peculiar aspect, and are so large that I have measured some three inches long, they are singularly falcate and much and finely acuminate. I consider the species very distinct, and its circumscribed locality seems to strengthen the view of its being so. If it is a form of *A. pulverulentum* it would be likely to appear in other parts of tropical America, where that species is so abundant.

34. *A. pulverulentum*, L.; frond large (1—2 ft.) broadly ovate bipinnate, pinnæ lanceolate, pinnules close numerous gradually becoming smaller to the point shortly petiolate rather membranaceous than coriaceous full green glossy oblong dimidiate obtuse upper base truncate parallel with and close to the rachis lower ones deltoid uppermost ones very small narrow almost obovate, sori linear continuous only occupying the superior (or part of the superior) margin, rachis and stipes rough with ferruginous hairs.—*Willd. Sp. Pl. p. 446. Sw. Syn. Fil. t. 119 (good). Plum. Fil. t. 5, f. 7. A. umbrosum, Willd. Sp. Pl. v. p. 447 (Pr.). A. monosoratum, Willd. l. c. p. 445? A. Kunzeanum, Pr. Tent. Pterid. p. 157? (name).*

Hab. West Indian Islands, frequent; Tropics of America, as Mexico, New Grenada, Guiana, and Brazil.—A more tender and membranaceous plant than *A. villosum*, with smaller, more copious and much denser pinnules, tapering gradually to the narrow point, obtuse, except when sterile and bearing a solitary line of fructification on the upper margin only, and generally not occupying the whole length of that. *Presl* makes a new species (*A. Kunzeanum*) of *Kunze's A. pulverulentum* from Cuba (*Poeppig*); but as my specimen of *Poeppig's* plant in no way differs from the true *pul-*

rulentum, I venture to reduce Presl's *A. Kunzeanum* to a synonym in this place.—*A. microphyllum*, Kaulf. and Kze. in Herb. nostr., from Cuba also (*Poeppig*), much resembles small specimens of the present plant; but the stipes and rachis are truly muricated.—The figure in Sloane of the *A. serrulatum* of Swartz, Jam. 2, t. 37, f. 2, agrees with the simply pinnated forms of this species.

35. *A. serrulatum*, L.; “fronds pinnate or bipinnate, pinnæ oblong-lanceolate dimidiate truncate at the base serrulate, upper margin bearing the sori, stipes glabrous.”—*Willd.*—*Linn. Sp. Pl. p. 1557. Sw. Syn. Fil. p. 122. Fl. Ind. Occ. iii. p. 1709. Willd. Sp. Pl. v. p. 436. Sloane, Jam. i. t. 35, f. 2 (frond simply pinnate).*

Hab. Jamaica, *Swartz*.—I quote the synonyms, as I find them in *Swartz* and *Willdenow*. *Plukenet*'s figure may be anything. *Linnæus* only refers to *Sloane*, and that is really a good representation of an unbranched state of *A. pulverulentum*. *Presl* does not notice this species.

36. *A. villosum*, L.; frond large (1—2 ft.) bipinnate, ultimate pinnæ longest, pinnules nearly sessile approximate or crowded oblong-ovate or ovate-lanceolate subcoriaceous glossy blackish green obtuse or acuminate the lower margin dimidiate upper base truncate parallel with and close to the rachis, ultimate pinnule larger than the rest rhomboid-acuminate, sori continuous generally occupying the whole margin except the lower dimidiate portion, rachis and stipes rough with chaffy brown hairs.—*Willd. Sp. Pl. v. p. 444. Swartz, Syn. Fil. p. 124. Schk. Fil. tab. 120.—β. sori very broad with the copious capsules.*

Hab. West Indian Islands, Trinidad, Jamaica, St. Vincent, Cuba, New Grenada, and Guiana.—*β. Trinidad, Lockhart.*—The figure of *Schkuhr* above quoted is a faithful resemblance of a rather luxuriant state of this plant; but more frequently the pinnules exhibit the form of what may be called an oblique parallelogram, and are then generally more crowded. I

667. Willd. *Sp. Pl.* v. p. 435. *A. fructuosum*, Kze., and *A. tetraphyllum*, Sieb., *Syn. Fil.* n. 158 (according to Presl).

Hab. Near Caripé, Venezuela, *Humboldt*.—Humboldt and Kunth say of this "an idem cum *Adianto villosum*?" Willdenow says "ab *A. villosum* diversum, fronde simpliciter pinuata bipinnatave, pinnulis non trapeziis acuminatis, soris semper continuis."—Presl retains it as a species, and refers to it *A. fructuosum*, Kze., and *A. tetraphyllum*, Sieb. *Syn. Fil.* n. 158. Of the latter I possess an authentic specimen, and have little hesitation in pronouncing it a small state of *A. villosum*, of which the plant under consideration is perhaps an unusually large form.

38. *A. falcatum*, Sw.; "fronds pinnate or bipinnate, pinnules at the base above rectangular trapezoid acuminate falcate serrated at the apex, sori on the superior and anterior margin continuous." *Sw. Syn. Fil.* p. 123. *Fl. Ind. Occ.* iii. p. 1715. Willd. *Sp. Pl.* v. p. 435. *Sloane, Jam.* i. t. 53, f. 1. *Pluken. Alm.* ii. t. 253, f. 1.

Hab. Jamaica, *Swartz*.—This Swartzian species, again, like *A. serrulatum* and *denticulatum* of the same author, is omitted in Presl's *Tentamen Pteridographiæ*. Sloane's and Plukenet's figures quoted by Swartz, and which are perhaps the best authority for the present plant, might, I think, be safely referred to *A. villosum*.

** *Sori short, equal or nearly so (not continuous).* (Sp. 39—54.)

39. *A. obtusum*, Desv.; 1—2 feet high (frond dark brown when dry) bipinnate, pinnæ distant lanceolate attenuated scarcely acuminate, pinnules rather distant coriaceous chartaceous glabrous glossy above dimidiato-oblong very obtuse and rounded at the apex upper base truncated sometimes slightly falcate sterile ones denticulato-serrate in the upper margin and round the apex, sori copious approximate semi-oval or semiorbicular thick corneous extending round the apex, stipes ebeneous glabrous but a little rough to the touch, rachis ferrugineo-tomentose.—*Desv. in Berl. Mag.* p. 327. *Hook et Grex. Ic. Fil.* tab. 188. *A. cassioides*, Desv. (*Kze*).— β . pinnules larger and more elongated and more obliquely cuneate at their base.

Hab. Tropical America, frequent. Brazil, *Gardner*, n. 71, Guiana, Jamaica, and other West Indian Islands. Cumana, *Funck*, n. 193, "*A. rhomboideum*." Myobamba, Peru, *Mathevs*.— β . Trinidad, *Baron de Schach, Lockhart*. St. Vincent's, *Rev. L. Guilding*. French Guiana, *Le Prieur*. Brazil, *Gardner*, n. 3550. Bay of Choco, West Coast of Columbia, *Hinds*.—Characteristic as is the figure we have quoted in the 'Icones Filicum' of the ordinary state of the plant, yet I possess forms of it much at variance with that figure, having much larger, and in proportion much longer pinnules, with more copious sori; and Kunze observes (*Linnaea*, 1848, p. 223) of this fern, "Variat pinnulis majoribus et minoribus, modo imbricatis (*Ad. cassioides*, Desv.) modo remotiusculis." Again the sterile plant has a still different appearance, with somewhat trapezoid pinnæ, broader at the base, and much thinner texture. An indifferent spe-

cimen of this kind with very imperfect fructification, marked "*A. Kunzei* *Miq.* (Surinam)," I possess from Dr. Miquel. Under *A. obtusum*, Kunze, in 'Linnæa,' l. c., refers to this, where he says in a note, "*A. Kunzei*, Miquel in *Diar. Inst. Reg. Bat. a.* 1843, p. 5, f. 1, et *Ad. hirtum*, SPLITZ. in *Tydschr. voo. Naturl. Gescheids, en Phys. t.* 7, p. 40 (non Klotzsch), sunt species mihi nondum visæ."

40. *A. hirtum*, Kl.; rather small, fronds bipinnate, pinnæ 10—14 or 15 linear-lanceolate acuminate patent, pinnules numerous dark green glaucous and concave beneath chartaceous dimidiately oblong very obtuse approximate villous with rufous hairs beneath truncated at the superior base, lowest pinnules subrhomboid, terminal one narrow trapeziform superior margin and apex crenato-serrate, lobules soriferous, sori copious small close-placed, involucre oblong-reniform often jagged at the margin, stipes ebeneous nearly glabrous smooth, rachis ferruginous subtomentose. (TAB. LXXXII. A.) *Klotzsch*, in *Linnæa*, xviii. p. 563. "*A. terminatum*, *Kze. n. sp.*" *Moricand*, *Herb. Braz.* *A. striatum*, *Hook. in Spruce, Herb. Amaz. n.* 14 (non Schk).

Hab. British Guiana, *Richard Schomburgk*, n. 1144, *Kl. in Herb. J. Sm.* Surinam, *Hostman*, n. 843 and 94, and *Herb. Mig.* n. 1172 (in *Herb. Hook.*). Brazil, Ilhios, *Moricand*. Parà, *Spruce*, n. 14, var. ? Panama, *Seenan* (sterile. Pinnæ glabrous).—I have drawn up my character and made the figure from Klotzsch's specimen; and all my other specimens from the several localities above-mentioned precisely accord with it, save the var. ? noticed from Panama, which seems to differ only in having the pinnules destitute of any villosity.

41. *A. Cayennense*, Willd. mst.; large, fronds bipinnate, pinnæ oblong-lanceolate subchartaceous acuminate patent, pinnules subdimidiato-oblong (almost a parallelogram) deorsely subfalcate full green very dense rather shining truncate at the base, superior margin and apex coarsely crenate serrulate in the sterile ones, lobules soriferous, involucre oval-oblong

The pinnules close-placed, rather chartaceous than membranaceous, large (for this group), very obtuse, in shape, if I may so express myself, almost a four-sided parallelogram, but with a downward curvature (deorsum falcata): the sori moderately large, oval-oblong, close-placed, very regular, often extending round the apex, and from 9 to 12 or 13 on a pinna.—A still smaller state of this plant, as I am disposed to consider it, is the *A. Schomburgkianum*, Klotzsch in Herb. J. Sm. n. 1184, from British Guiana.

42. *A. Klotzschianum*, Hook.; large, fronds bipinnate, pinnae lanceolate shortly acuminate, pinnules dimidiato-oblong obtuse submembranaceous dark green (almost an oblique parallelogram) deorsely subfalcate, very obscurely crenate truncate at the upper base, the small blunt teeth soriferous, involucre exceeding very regular 17 to 24, rachis slender compressed downy on the upper side dark purple shining and glabrous beneath, stipes long erect stout ebeneous with a faint line of hairs on one side, candex creeping stout. (TAB. LXXXII. C.) *A. tomentosum*, Klotzsch, in *Linnæa*, xviii. p. 558. Kze. in *Linnæa*, 1848, p. 224. *A. Brasiliense*? Hook. in Spruce, *Herb. Amaz. n. 51*. *A. politum*, J. Sm. in Hook. *London Journ. of Bot.* i. p. 198 (not Humb.)

Hab. British Guiana, Rich. Schomburgk, n. 1202, Klotzsch, in Herb. J. Smith). Sir R. Schomburgk, n. 349 (in Herb. J. Sm. and Hook., from the Berbice). Surinam, Keppeler, n. 1773, c. (Kunze).—This I consider a very good, and it assuredly is a very fine species and worthy of bearing Dr. Klotzsch's name, to which, by the right of priority, indeed, it is by no means entitled; but the appellation *A. tomentosum* is quite inapplicable to a plant which has no further approach to tomentum than a delicate down or pubescence on the upper surface of the compressed rachis; whereas the preceding species, next to which Dr. Klotzsch has justly placed it, and its closest ally, *A. Cayennense*, Kl., have the rachis all over, and the stipes too, densely fusco-(paleaceo) tomentose. So that till I read the descriptions more carefully I imagined that the authentic names of the specimens in Mr. J. Smith's Herbarium had been transposed. Kunze, however, in the '*Linnæa*,' l. c., strangely separates these two plants, &c., placing between them *A. villosum* (a monosorous species, if the true plant is intended), whereas the sori are, here, according to Klotzsch, 18—22 on a pinnule), and *A. pachysorum* (the same as *A. prionophyllum*, according to Presl); and Kunze further says, "Distinctissima species. Rhizoma illi *Ad. Cayennensis* simile, phyllopodia breviora, alterna, magis remota, ferrugineo-paleacea, radiculæ frequentiores. Stipites basi non adscendentes, sed stricti, sparsim ferrugineo-paleacei." Mr. Spruce's specimen, which is perfect, corresponds precisely with Dr. Klotzsch's. Both have the decurvo-falcate pinnules very crowded; but the sori and rachis are quite different.

43. *A. prionophyllum*, H. B. K.; often large (1—2 feet and more), frond rather compact bipinnate, pinnae 5—11 lateral ones horizontal terminal one elongated all commonly caudate at the extremity, pinnules approximate so as gene-

rally to touch each other horizontal membranaceous or subcoriaceous dark green rather glossy oblong slightly hairy beneath anteriorly falcate obtuse or acuminate slightly petiolate superior base truncate and parallel with the rachis obtuse, upper margin and apex incisely lobed, terminal narrow linear elongate caudate incised, sori several 6—9 along the upper margin approximate short oblong rather small, stipes angled and as well as the rachis everywhere clothed with rufous chaffy hairs.—*A. prionophyllum*, *H. B. K. Nov. Gen. Am. i. p. 16.* *Hook. in Spruce, Herb. Amazon. n. 49.* *A. tetraphyllum*, *Willd. Sp. Pl. v. p. 441.* *Klotzsch, in Linnæa, xviii. p. 1551.* *Miquel, in Herb. nostr. A. ternatum, Willd. Sp. Pl. v. p. 436 (according to Presl, who quotes the n. 20075, in Herb. Willd., which Dr. Klotzsch, in Linnæa, xviii. p. 551, retains as a distinct species).* *A. rigidum, Link Fil. Sp. 59, not Presl (according to Klotzsch).* *A. fructuosum, Link Hort. Berol. ii. p. 14, not Kunze (according to Klotzsch).* *A. elatum, Desv. (according to Presl).* *A. pachysorum, "Reich. in Plant. Surin." (Presl).*

Hab. Tropical America.—“Caripé, Prov. Cumana, *Humboldt and Bonpland.* Martinique (*small*), *Sieber n. 196, in Herb. nostr. and n. 370, in Herb. J. Smith.* Trinidad, *Baron de Schach, Aldridge.* Jamaica, *Wiles and others.* Surinam, *Miquel.* Esmeraldas, *Seemann.* Tumaco, *Hinds.*— β . pinnules chartaceous or almost coriaceous. Guadeloupe, *Le Prieur, (Herb. nostr. Mus. Paris.* *Adiantum, n. 4).* Trinidad, *Lockhart,* (pinnules less outward). St. Vincent, *Rev. L. Guilding (one form approaching A. intermedium, but glossy and not glaucous.)* Jamaica, *Dr. Bancroft.*— γ . pinnules shorter, chartaceo-membranaceous, approaching our *A. fructuosum.* Esmeraldas, *Seemann.* Fernando Po (African Island), *Vogel.*—I have unfortunately no means of determining what *Adiantum* is the *tetraphyllum* of Willd., or the *prionophyllum*, H. B. K., having seen no authentic specimen: in the above synonyms I have been chiefly guided by my excellent friend, Dr. Klotzsch, who has made the Fi-

) is referred to *A. varium*, Humb. (Nov. Gen. Am. vi. p. 16, f. 667) a species with continuous sori; while the *fructuosum* of Kunze "in Poeppig, l. Cub. nec in descr." constitutes a new species with Presl, *A. macrocarum*, Pr. Again *A. pachysorum*, Reicheub., referred hither by Presl, is maintained as a good species by Kunze in Linnæa, 1848, and compared with him with *A. villosum*, L. It will thus be seen how difficult it must be, for any who has not the opportunity of consulting the Herbaria of Berlin, to ascertain what is the true *A. prionophyllum*, H. B. K. I have been aided by Dr. Klotzsch's reference to Sieber's "n. 196, Synopsis Filicum, p. 10, Martinique." This is identical with my plant from the Amazon, Mr. Bruce, n. 49, and with a Surinam specimen from Dr. Miquel; and from them I have drawn up my character. I possess, however, a host of specimens exhibiting forms which, if seen separate, might well be supposed to constitute distinct species, but among which there are intermediate states, and states, too, which seem to me (and I may say also to the very practised eye of Mr. J. Smith) to form connecting links with what the ablest botanist have deemed quite distinct. All that I have brought here have the pinnules elongated and more or less falcate, the curvature pointing upwards. No figure could do justice to this Fern, except on a very large scale.

44. *A. rhomboideum*, H. B. K.; "fronds bipinnate, pinnules subrhomboid shortly petiolate upper margin subcrenate glabrous exterior angle obtuse, rachis hairy with piliform scales, stipes glabrous, sori numerous oblong." *H. B. K., Nov. Gen. linn. i. p. 16. Klotzsch, in Linnæa, xviii. p. 551.* (Dr. Klotzsch makes 2 vars. ? "*a. laxum*; pinnis patentibus axis. *A. serrato-dentatum*, Willd. *Sp. Pl. v. p. 445.*—*β. tritum*; pinnis erectis strictis. *A. rigidum*, Presl, in *Herb. Berol.*" (*an Tent. Pterid?*).

Hab. Caripé, Venezuela, *H. B. K.*—Brazil, *Willd.* Essequibo, *R. Schomburgk.*—*β.* Cumana, *Moritz*; British Guiana, *R. Schomburgk.*—Whatever the *A. rhomboideum* is, the var. *β.* of Klotzsch, or *A. rigidum* Pr., ought, if Presl knows his own species, to be the *fructuosum* of Link, Hook. Berol., and that, according to Link, the *fructuosum*, Kze. in Chakur, Suppl. Tab. 15. But I have already, under *A. prionophyllum*, had occasion to observe how the learned differ on this knotty point. Both real and Klotzsch retain this as a species.

45. *A. laxum*, Kze.; "frond bipinnate lax, pinnules subsessile rhomboid obtuse superior base truncated lower one straight superior and exterior margin of the sterile ones duplicato-serrate subincised, sori oblong subcontiguous, rachis and stipes hairy." *Kze. in Linnæa, ix. p. 79.*

Hab. Roots of trees, Cuba. *Poeppig (Kunze).*—"Circumscription of the frond ovate, pinnæ distant generally 6, oblong acuminate, lowest pinnules abbreviated subflabellate, outermost one rhomboid-lanceolate. Texture of the frond membranaceous, glabrous, veined, resembling *A. intermedium*, Sw. (*A. fovearum*, *Raddi*, *A. triangulatum*, *Klfs.*), but differing much in the form of the pinnules."—*Kze.*

46. *A. Hænkeanum*, Pr.; "pinnæ alternate petiolate ob-

long-lanceolate acute sharply and unequally serrated the superior base truncate rotundate, lower one cut off, sori on both margins oblong, rachis villosopaleaceous." *Presl, Reliq. Hænk. p. 62.*

Hab. Guayaquil, *Hænke*.—"Affine *A. vario* et *prionophyllo*, *Humb.*, sed magnitudo frondis, serratura pinnularum, et conditio sororum pro nova specie certant."—*Presl.*

47. *A. fructuosum*, *Spr.*; "frond ovato-oblong membranaceous rather firm bipinnate, pinnæ alternate petiolate erectopatient (or patent) elongated lanceolato-linear acuminate, fertile pinnæ dimidiate oblong the apex obtuse or rounded the base above truncate lowest ones subflabellate entire, ('margine superiore exterioreque, superioribus, margine superiore crenatis,') crenatures sorophorous, sterile and superior oblong subfalcate the upper and exterior margin duplicatoserrate or incised, sori about 6 large oblong subcontiguous, involucre canescent, rachis and long angled stipes stout ebeneous rufous-hirsute." *Kze. Spreng. Syst. Veget. iv. p. 113.*—*Kunze, Syn. Fil. Poep. Linnæa, ix. p. 81, and in Schkuhr, Fil. Suppl. p. 28, t. 15. A. macrocarpum, Presl. A. prionophyllum, Martens & Gal. Syn. Fil. Mex. p. 69, (not H. B. K.)*

Hab. Tropical America, *a. strictum*. Cuba, *Poeppig*. Vera Cruz, Mexico, *Linden*, n. 78. Cordillera of Oaxaca, *Galeotti*, n. 6416. New Grenada, *Cuming*, n. 1183. Brazil, *Gardner*, n. 3549.—*β. laxius*; pinnæ subflexuose, pinnules less close, fructifications smaller. Berbice, *Sir R. H. Schomburgk*. Guiana, *Parker*.—It has not been difficult to find plants in my herbarium quite corresponding with the excellent figure of *A. fructuosum*, *Kze.* in his Supplement to the Filices of *Schkuhr*; but whether *A. fruct.* be really and permanently distinct in all its characters (and I have taken *Kunze's* own specific character) is another matter. It is chiefly distinguished from our *A. prionophyllum* by the large and few sori, and by the involucre being generally pale-coloured, canescent, but not downy

involucres semiorbicular small not contiguous but at regular distances and often extending round the apex, stipes and rachis ebeneous perfectly glabrous. (TAB. LXXXIV. B.).

Hab. Pacific side of Tropical America.—Island of Gorgona, *Barclay, Fide*. Salango, *Seemann*.—A very fine, and, I believe, very distinct species: specimens from three collectors exhibit not the slightest variation. The habit is that of our *A. prionophyllum*; but the fronds and pinnæ are much larger, of a stiffer and more rigid habit than the normal state of that species, the pinnæ are petiolate (or bare of pinnæ for half an inch or an inch) below, the pinnules invariably very approximate regularly crenate-lobate (not toothed or serrated) the upper ones gradually smaller obliquely uneate and terminating in a long tail-like point, narrow and slender, two inches long: the involucres are small, placed at regular distances, and in old specimens they stand out erect (being reflexed from their natural position) at the apex of a lobule, and look as if placed on a broad stalk; and the rachis and stipes are entirely destitute of hairs or chaffy scales.

49. *A. intermedium*, Sw.; frond bipinnate, pinnæ about 5—7 lateral ones horizontal terminal one elongated, pinnules subpetiolate chartaceous ovato-oblong obtusely acuminate obliquely cuneate at the base, upper base parallel with the rachis dull green glaucous beneath sterile ones obscurely lobate serrate, sori copious approximate, involucres oblong subfalcate, stipes 3-angular ebeneous, rachis ferrugineo-hirsute, caudex creeping elongated paleaceous.—*Sw. in Act. Holm.* 1817, p. 76. *A. fovearum*, *Raddi Fil. Bras.* p. 53, t. 77 (good). *Link Fil. Hort. Berol.* p. 68. *A. Brasiliense*, *Link Hort. Berol.* ii. p. 13 (non *Raddi*). *A. argutum*, *Splitzgerb. Tydschrift voor Naturl. Gescheid.* vii. p. 39.

Hab. Tropical America, frequent, especially in Brazil (*Gardner, n.* 2758, 1228). Ilhios (*Moricand, A. triangulatum*). Guiana, frequent. Amazon, *Spruce, n.* 48, "in vicinibus Parà, July, Aug. 1849." New Grenada, *Linden (n.* 259). Mexico, *Jurgensen, n.* 765. *Galeotti, n.* 6491, *Linden, n.* 78. Guayaquil, *Hartweg, n.* 706. Peru, *Matthevs, n.* 1857 (larger and less glaucous). West Indian Islands. Jamaica, *Dr. Distin, &c.* Trinidad (*cult. in Hort. Liverp.*) less glaucous). Dominica, *Dr. Imray*. Guadeloupe, *L'Herminier*.—I follow Presl in considering the *A. fovearum* of *Raddi*, which is an excellent representation of our plant, to be the *A. intermedium* of Swartz, in *Act. Holm.*; although that author does not notice the glaucous underside of the pinnules, which, if not an invariable character, is very nearly so. Professor Kunze well observes of this species, "magnitudine et forma pinnularum, plus minus attenuata, variabilis, tamen facile recognoscenda." Yet even with many of the best marked species of ferns there are puzzling states; and we have specimens of this which border very closely upon *A. prionophyllum* or *A. fructuosum*. Kunze, as well as Presl, refer hither the *A. triangulatum* of Kaulfuss, which I have ventured to keep distinct. Frond 6—8 inches to a foot long, with the stipes equal in length or longer.—Kunze, in *Linnæa*, 1848, p. 222, says, in a note at the close of his observation upon *A. intermedium*, "Hic inserendum *Ad. tetraphyllum*, H. B., Klotzsch, Linnæa, p. 351, Miquel," &c. But whether he thereby means it to be understood that *A. tetraphyllum* should

be considered a synonym of *A. intermedium*, or that it should rank next it, I do not know.

50. *A. glaucescens*, Kl. ; frond bipinnate, pinnæ about 5—9 lateral ones horizontal terminal one elongated, pinnules subpetiolate membranaceous oblong-dimidiolate obtuse very glaucous beneath lower margin straight for its whole length upper base truncate and parallel with the rachis upper margin when sterile scarcely lobed or serrated fertile one slightly lobed, sori on the lobes of the upper margin distinct but approximate, stipes and rachis slender black ebeneous very glossy and glabrous, rhizoma very short thick, fibres tufted.—*Klotzsch in Linnæa*, 1844, p. 552, and in *Herb. J. Sm.*— β . larger, less glaucous, rachis with very sparse minute chaffy hairs.

Hab. British Guiana, *Rich. Schomburgh (Klotzsch)* and *Sir Rob. H. Schomburgh (in Herb. nostr.)*. French Guiana, (*Delessert in Herb. nostr.*) Near Pará, Brazil, *Spruce*, n. 46, and β . No. 48, "Tanaii ad Rio Acara, juxta Pará."—The delicate membranaceous frond and slender, graceful, very glossy and glabrous stipes and rachis of this fern, with its obtuse and differently shaped pinnules, seem to distinguish it from *A. intermedium* ; and our Guiana specimens from two localities exactly correspond with Dr. Klotzsch's plant in *Herb. J. Smith*. Our No. 46, too, of Mr. Spruce from the Amazon, is equally identical, and the short thick rhizoma, tufted fibrous root (no creeping caudex), unknown to Dr. Klotzsch, would seem to confirm the specific identity. Our n. 48, from Mr. Spruce, however, from Tanaii (another 48 of the same able botanist is *A. intermedium*), has a stouter stipes, larger frond and a few scattered hairs on the rachis, but otherwise agrees with *glaucescens* : its root was not seen.

51. *A. triangulatum*, Kaulf. ; frond bipinnate, pinnæ 5—9 terminal one elongated, pinnules subpetiolate chartaceous dark green on both sides rather glossy ovato-oblong subfalcate (curved upwards) obtusely acuminate obliquely cuneate

medium) he yet pronounces *A. fovearum*, Raddi, to be a synonym. If Dr. Klotzsch's specimens which we have received be the true plant of Kaulfuss, I am inclined to keep it separate from *intermedium*, though it is very closely allied. It still more nearly resembles the *A. villosum*, L.; and our specimen from Maynas, gathered by Poeppig, is inscribed by Kunze with that name. The sori are, however, here copious and nearly equal, though contiguous, but not continuous.—What I call var. *l.?* may be something very different: it exists in Mr. J. Smith's Herbarium, and has the pinnules 2 inches and $2\frac{1}{2}$ long, and narrow: in other respects it resembles our *triangulatum*.

52. *A. denticulatum*, Sw.; “fronds pinnate or bipinnate, pinnules trapezoid oblong acuminate subcrenato-denticulate the upper margin soriferous.”—*Sw. Fl. Ind. Occ. p. 1711. Syn. Fil. p. 123. Willd. Sp. Pl. v. p. 434. Adiantum latifolium, Lam. Encycl. excl. syn. Plum. Fil. t. 52, simple. Pluken. Alm. ii. t. 252, f. 5, Sw., also simple and without fructification.*

Hab. Jamaica, Swartz. Martinique, Plumier.—Most recent botanists are silent on the subject of this fern, and Presl excludes it from his catalogue. The figures referred to by Swartz are very unsatisfactory: both represent the fronds simply pinnate, Plumier's figure alone has fructification: each pinnule exhibits 3 large lunulate sori. Swartz notices its affinity with the *A. serrulatum*, for which Sloane's figure 1, t. 35, f. 2, is quoted, but which appears to be a simply pinnated state of *A. pulverulentum*, of the monosorous group. This would seem to have distinct and equal sori.

53. *A. proximum*, Gaudich.; fronds bipinnate, pinnæ 9 or 10 alternate, pinnules oblong dimidiate truncate at the base villous beneath, sterile ones with the superior margin and apex dentato-suberrate, serratures denticulate, fertile ones entire ovato-oblong obtuse, superior margin and apex soriferous, sori distinct oblong subreniform, stipes subglabrous, rachis villous, caudex creeping.—*Gaudich. in Freyc. Voy. Bot. p. 403.*

Hab. Brazil; Rio Janeiro, Gaudichaud.—Said to form a sort of connecting link between *A. villosum* and *serrato-dentatum*, but having the sori free, numerous and subreniform, and consequently belonging to the polysorous group.

54. *A. Lancea*, Linn.; “fronds pinnate (bipinnate, Sw.) pinnæ (and pinnules Sw.) opposite oblong, terminal ones triangulari-hastate.”—*Linn. Sp. Pl. p. 1557, Swartz, Syn. Fil. p. 123. Willd. Sp. Pl. v. p. 440. Sieb. Thes. ii. p. 65, t. 64, f. 78.*

Hab. Surinam (Sieber).—Linneus seems to have taken this up wholly from Sieber's figure, and no modern author appears to be acquainted with it.

§ IV. *Fronde pedately tripartite*,* (all *polysorous*). (Sp. 55—65).

55. *A. pedatum*, L.; frond flabelliform bipartito-pedately divided tripinnate, secondary pinnæ lanceolate, pinnules membranaceous dimidiate oblong antrorsely subfalcate broadest at the superior truncated base very obtuse lowest ones triangular-cuneate all petiolulate, superior margin obtusely lobed, lobes soriferous, sori oblong rarely curved, stipes and rachis ebeneous glabrous.—*Linn. Sp. Pl.* 1557. *Sw. Syn. Fil.* 121. *Schkuhr, Crypt. t.* 115. *Willd. Sp. Pl. v. p.* 438. *A. boreale*, *Pr. Tent. Pterid. p.* 158.

Hab. North America, Virginia to Canada (Lake Huron), N. West America; California (*Douglas, Barclay*) to Sitka, *Barclay*. Unalashka, *Chamisso*. Northern India, Kamoun, *Dr. Wallich*. Jumnotri, *Dr. Cantor*.—A very handsome species: the perfect frond is bipartite, each primary ramification spreads and is recurved, bearing on the upper side several secondary pinnæ, the ultimate one (or apex of each primary ramification) is forked. The specimens, from Northern India, are identical with those of the New World. The Unalashka plant is referred confidently by Kaulfuss to *A. pedatum*, although Presl has named it as a distinct species. It is probably the same as the Sitka plant, and there can be no question of its identity with ours.

56. *A. tetragonum*, Schrad.; “caudex creeping, frond pedato-tripinnate, stipes tetragonous slightly furfuraceous, rachis pubescenti-paleate, tertiary pinnæ (or the pinnules) ovate much acuminate, superior base rounded inferior cuneate both margins subincised, lobes truncated soriferous the point naked (not soriferous) serrated, sori linear.”—*Mart.—Schrad. in Goett. Gel. Arnz.* 1824, p. 872, n. 8. *Mart. Ic. Plant. Crypt. Braz. p.* 93, t. 63.

Hab. Brazil; Woods of Bahia, between Almada and Ferradas, *Martius*.—*Martius* has devoted a large quarto plate to a beautiful coloured representation of this fine species, which evidently belongs to the same group

broad orato-lanceolate acuminate, pinnules very shortly petiolulate (almost sessile) bright green rather firmly membranaceous dimidiato-oblong or lanceolate very obtuse or more or less acuminate deorsely falcate (rarely straight) broadest at the superior truncated base (but which is obtuse or rounded off), superior margin and apex serrated and slightly lobed, lobes soriferous, sori on the upper margin only linear or narrow-oblong straight angled, stipes on one side and the rachis moderately but distinctly pubescent. (TAB. LXXXIV. C.).—*Kaulf. En. Fil. p. 202. Link Fil. Hort. Reg. Berol. p. 68.*

Hab. Brazil (*Kaulfuss*). Dry woods, Sierra de Santa Brida, Prov. of Goyaz, Brazil, *Gardner*, 4074.—I have drawn my description mainly from dried specimens and living plants sent from the Botanic Garden of Berlin, with which Mr. Gardner's plant quite coincides. It is clearly a good species, that is, different from any other that has come under Mr. Smith's or my observation; but as I have already observed, *A. angustatum*, *Kaulf.* (also from Brazil), is probably a mere form of it; possibly, too, *A. humile*, *Kze.*; and, if any of the pinnules bear sori on the lower as well as the upper margin (which I have never found to be the case) it would appear almost identical with *A. tetragonum*, *Schrad. and Martius, Ic. Pl. Crypt. t. 63.*

58. *A. humile*, *Kze.*; "frond subpedate, branches 3—5-pinnate, pinnæ oblong dimidiate subfalcate superior base truncated, auricle obtuse dentated, lower base nearly straight, superior and exterior margin of the sterile ones sharply serrated, of the fertile ones crenated, sori oblong distinct, rachis and stipes short paleaceo-hispid."—*Kunze, in Linnæa, ix. p. 80.*

Hab. Woods of Huallaga, Province of the mission of Tocache, *Poeppig (Kunze)*.—"Nearest to *A. curratum*, *Kaulf. Enum.*, which differs in the superior base of the pinnule being rounded, not auriculated, in the margin being inciso-dentate, the laciniaë soriferous. Scarcely a foot high; stipes nearly equal in length to the frond."—*Kze. l. c.*

59. *A. patens*, *Willd.*; frond flabelliform bipartito-pedately divided tripinnate, secondary pinnæ lanceolate obtuse straight, pinnules chartaceous (brown when dry) dimidiato-oblong very obtuse generally straight sometimes deorsely falcate, upper base truncate sterile ones crenato-lobate the sinuses (4—5 on a pinnule) soriferous, involucre reniform-orbicular large with a deep sinus at length coriaceous pale and submembranaceous at the margin, stipes and rachis ebeneous very glossy the latter pubescent.—*Willd. Sp. Pl. v. p. 439. Klotzsch, in Linnæa, xviii. p. 556. (TAB. LXXXV. A.)*

Hab. Caraccas, *Bredemeyer*; Cerro de Pinal, on the Pacific side and

Island of Salango, *Seemann*. Acapulco, *Dr. Sinclair*. Sta. Martha, *Funch*, n. 442.—For my finest specimens of this I am indebted to Captain Kellett, R. N., commanding H. M. Surveying ship "Herald," who much contributed to the success of the naturalist, Mr. Seemann, in a four years' cruise in the Pacific, during which, two voyages were made to the Arctic regions by Behring's Straits in search of the gallant Franklin and his officers and crew. The species was sent home by Mr. Seemann from the two localities above mentioned. In its regular pedate-flabellate ramifications it most resembles *A. pedatum*; but the whole plant is smaller, there are fewer branches, the form and texture of the pinnules are different, and the fructification is totally at variance with that of *A. pedatum*. The involucre are singularly large for the size of the pinnules, at length thick and coriaceous in the disk, but remarkably depressed there. In the ramification and form of the involucre the species exhibits the closest affinity with *A. pubescens*; where, however, besides the pubescent character of the pinnules, their shape is different, much more obtuse, and not glaucous beneath, and the involucre are much smaller and more numerous.

60. *A. Lindsæa*, Cav.; "frond pedate, branches pinnate, lower pinnæ rotundate, superior ones trapezoid, sori linear, stipes glabrous." *Willd. Sp. Pl. v. p. 439. Sw. Syn. Fil. p. 121.*

Hab. Quito (*Cavanilles*).—I have never seen any *Adiantum* from Quito, corresponding with this brief character, though the ferns of that region are tolerably familiar to me through the kindness of Professor Jameson. Nor does any author, since *Cavanilles'* time, speak of it from his own knowledge.

61. *A. angustatum*, Kaulf.; "frond pedate, branches pinnate, pinnæ linear-lanceolate, superior base truncate, inferior subdimidiate serrated at the apex, superior margin incisedentate, segments soriferous, stipes pubescent." *Kaulf. En. Fil. p. 202.*

Hab. Brazil, (*Kaulfuss*).—"Pinnæ thin (tenuis) full green, lower ones half an inch long, deltoid, the rest an inch and a half long, 3 lines wide at

440. *A. fuscum*, *Retz Obs.* ii. p. 28, t. 5. *A. amœnum*, *Wall. Cat.* n. 78. *Hook. et Grev. Ic. Fil.* t. 103. *Pluken. Alm.* t. 4, f. 3.

Hab. China, *Osbeck*, *Beechey*, *Oman*, *Vachel*. Nepal, *Srinuggur* and *Kamoun*, *Wallich*. Assam and *Khasiya*, *Malacca*, *Griffith*. Ceylon, *Gardner*. Java, *Lobb*, *Zollinger*.—The firmer texture, the short often quite cuneate and broad pinnules, but especially the elongated sori (resembling those of *A. obtusum*) readily distinguish this fern from all the pedate species. It is probably a native of all the warmer parts of India and China.

63. *A. hispidulum*, Sw.; frond narrow flabelliform bipartito-pedately divided tripinnate, secondary pinnæ linear-lanceolate acuminate falcate, pinnules chartaceous rigid close dimidiate oblong-cuneate olive brown when dry glaucous beneath striated pubescenti-hirsute especially beneath (often glabrous) subspinuloso-serrate, superior base truncate apex obtuse, sori copious small on the upper margin and reaching to the apex (on almost every pinnule) 7—11 on each pinnule in the sinus of the serratures, involucre orbicular-cordate hispid or glabrous convex, stipes triquetrous ebeneous scabrous, rachis ebeneous hispid or pubescenti-scabrous. *Sw. Syn. Fil.* p. 124 and 321. *Willd. Sp. Pl.* v. p. 444. *Br. Prodr.* p. 155. *A. pubescens*, *Schkr. Fil.* 108, t. 116, (a good general resemblance). *Willd. Sp. Pl.* v. p. 439. *A. pedatum*, *Forst. Prodr.* p. 83, n. 458, (not *Linn*). *A. nervosum*, *Sw. Syn. Fil.* p. 123. *Willd. Sp. Pl.* v. p. 443. *A. plicatum*, *Kaulf. En. Fil.* p. 201. *A. scabrum*, *Wall. Cat.* n. 79. *A. flabellulatum*, *Wall. Cat.* n. 2177, (not *Linn*.)

Hab. Society Islands, *Forster* (in *Herb. nostr.*), *Beechey*, *Barclay*, *Cuming*, n. 1415, *Mathews*, n. 11. Austro-Caledonia, *Labillardiere*. New Holland, Port Jackson to the Tropics, *Brown*, *Fraser*, *Cunningham*, *Clowes*, *Mitchell*, n. 184 and 339, *Sieber*, *Sinclair*. Dunk Island, *Dr. Mc Gillivray*. New Zealand, *Fraser*, *All. Cunningham*, *Colenso*, *Sinclair*, *Hooker*, *Lyall*. Norfolk Island, *All. Cunningham*, *Dr. Falconer*, *Dr. Vaughan Thomson*. Ceylon, *Mrs. Genl. Walker*, *Gardner*. Bourbon, *Capt. Carmichael*, *Herb. nostr.* (ex *Herb. Paris*). Mauritius, *Telfair*, *Wallich*, &c. East Indies; *Dindygul*, elev. 1500—2000 feet, *Dr. Wight* in *Wall. Cat.* n. 2177. *Neilgherries*, *Gardner*. Java (*Hoffmansegg*, in *Herb. nostr.*) *Amboyna*, (in *Herb. nostr.*).—Few Ferns are better marked than the present, few less understood, and few more widely dispersed, judging from specimens in my own herbarium. I possess one marked “Chacapoyas, Peru;” but I do not venture to give the station without expressing my doubt if there be not some error.

(Veins every where anastomosing.)

64. *A. (Hewardia) Le Prieurii*, n. s.; frond subcordate

dichotomously radiating pedately tripinnate, pinnules approximate petiolulate unequally semiovate obtuse (sterile apices acuminate and slightly serrate) crenato-lobate membranaceous, veins anastomosing opaque olive-brown the base obliquely cuneate, sori linear-oblong on each lobe rarely on the lower margin. (TAB. LXXXII. B.)

Hab. Berbice, *Sir R. H. Schomburgk*. Moist declivities of the mountain Matouri, at Notaille and Oyapoch, French Guiana, *Le Prieur* (who sends it marked "*A. trapeziforme*."—*A.* most distinct and well defined species, having the mode of growth of *A. pedatum*, and almost equally membranaceous pinnæ. These pinnæ when dry assume a dark olive-brown colour. Each lobe is truncated and terminated with a transverse linear-oblong sori. The veining is very apparent, frequently anastomosing; so that this would be a *Hewardia* if that genus were tenable, and if the character were derived wholly from the venation.

(*Indistinctly pedate.*)

65. *A. affine*, Willd.; frond subpedately bi- more rarely tri-pinnate, pinnæ lanceolate acuminate slightly falcate lax, pinnules very membranaceous olive-brown (when dry) dimidiate broadly ovate-rhomboid obtuse cuneate at the base, superior base truncated sometimes retrorsely subfalcate glabrous except a few scattered slender stiff hairs or setulæ, superior margin and round the apex crenato-lobate, the deep sinuses soriferous, involucre rather small 7—8 on a pinnule orbicular-reniform or orbicular-crescent-shaped submembranaceous, stipes triquetrous and slender, rachis ebeneous glossy glabrous.—*Willd. Sp. Pl.* v. p. 448. *Endl. Prodr. Fl. Norf.* p. 14. *All. Cunn. Bot. Nov. Zeal. in Hook. Comp. Bot. Mag.* ii. p. 366. *A. trapeziforme*, *Forst. Prodr.* p. 83, n. 460. *Schkh. Fil. t.* 121, (*not Linn.*) *A. setulosum*, *J. Sm.*

§ IV. *Fronds tripinnate or decomposed.*

Sori almost invariably short, equal or nearly so, rarely continuous or elongated, as in A. speciosum and fumarioides.)

* *Trapeziforme† groupe.* (Sp. 86—72.)

66. *A. trapeziforme*, L.; glabrous, frond large supra-decompound, pinnules large chartaceo-membranaceous glaucous beneath all petiolate obliquely rhombeco-cordate acuminate toward the apex (and often the sterile lobes) inciso-serrate upper base truncate, inferior base very oblique lobes soriferous, involucre oblong-reniform, stipes rachis and pedicels obscurely intensely black. *Sw. Syn. Fil. p. 29. Willd. Sp. Pl. v. p. 447. A. rhomboideum, Schkh. 114, t. 122, (good). A. pentadactylon, Langsd. et Fisch. Ic. Fil. p. 22, t. 25, (excellent). Hook. et Grev. Ic. Fil. t. 98. A. eminens, Pr. Pterid. v. 155, and Reliq. Hænk. (as A. trapeziforme). A. Klotzschianum, Pr. Tent. Pterid. p. 158? A. formosissimum, Klotzsch in Linnæa, xviii. p. 556. Sloane Jam. i. t. 59, (very good).— β . pinnules smaller obtuse. Plum. Fil. t. 95.— γ . pinnules approximate suboblong obtuse.*

Hab. West Indian Islands Jamaica, Cuba, *Linden, n. 1859. Mexico, Galeotti, n. 6338* (pinnæ often longer and narrower). Central America, Pacific side, *Sreman. Caraccas and Brazil, frequent.— β . Mexico, near Vera Cruz, Linden, n. 70. γ . Cordillera of Vera Cruz, Mexico, Galeotti, n. 6338. Cuba, Poeppig (Kunze in Herb. nostr). Guatemala, Skinner. —This fine species, from 2—4 feet high, has been much misunderstood, mainly owing to sufficient allowance not being made for those variations to which Ferns, in general, seem peculiarly liable. Our best authority for this particular species is the figures quoted by Linnæus. Among them is Sloane's Jamaica, t. 59, whose description seems to have suggested the specific name "*A. nigrum ramosum maximum, foliis magnis trapezii in modum figuratis,*" and this figure Linnæus pronounces "*bona.*" He further quotes Plumier, Fil. t. 95, which Willdenow undertakes to pronounce "*mala;*" but we will venture to say, that although it does not well exhibit the character of the normal form of *A. trapeziforme*, it does that of a common state of the species. Willdenow, however, and properly, brings as a synonym to *A. trapeziforme* the *A. rhomboideum* of Schkuhr, t. 122; but that author, Schkuhr, excludes the figure of Plumier altogether. Humboldt and Kunth have an *A. rhomboideum*, which has nothing to do with Schkuhr's *rhomboideum*. This latter Dr. Klotzsch, in his notes on the Ferns of *Æquinoctial America* (Linnæa, xviii. p. 556) takes up, as an entirely new species, under the name of *formosissimum*, and places in a different section from his *A. Peruvianum*, l. c., p. 555, which is closely allied to the true *trapeziforme*.—The *A. trapeziforme* of Schkuhr, Tab. CXXI. b, said to be a native of Jamaica, is quoted by Willdenow as the *A. affine* of New Zealand, upon what authority is not stated, but it is very unlike any New*

† This and the following groups are merely noted as aids to the student: they pass into other forms and possess no decided marks.

Zealand Fern with which I am acquainted.—Var. β . I consider a less perfect form of *trapeziforme*, with smaller, rounder, more entire, and blunt pinnules.—Our γ . has the pinnules more approximate, more spreading, almost horizontal, the inferior oblique base cut off as it were by a much longer line, and hence the form of the pinnæ rather approaches to oblong; but intermediate gradations exist in our herbarium among some specimens; and upon these varieties themselves there are, here and there, cordately rhomboid pinnules. Our specimen of *A. trapeziforme* of Cuba, *Poeppig* (from Kunze), evidently belongs to this variety, which may, I think, be seen to pass into our next species, *A. cultratum*, chiefly differing by its blunt pinnules.

67. *A. cultratum*, J. Sm. mst.; frond ample decomposed, pinnules chartaceo-membranaceous approximate petiolate (upper ones shortly so) spreading nearly horizontally oblong obliquely rhomboid very obtuse lobed and subincised upper base truncate and parallel with the rachis lower base elongated and arched (rarely straight) lobes soriferous, involucre oblong-reniform, stipes rachis and pedicels ebeneous intensely black. *A. cultratum*, (*an Pr. Tent. Pterid. ? p. 157*). *J. Sm. Herb.*

Hab. St. Vincent, *Macrae*, in *J. Sm. Herb.* St. Catharine's, Brazil, *Armstrong*.—Were this and the normal form of *A. trapeziforme* only to be seen, few would hesitate in pronouncing them two good and distinct species. But with the large suite of specimens we have the good fortune to possess, a passage to this from *A. trapeziforme*, through Galeotti's n. 6336, and our var. γ . of the latter species to the present, may without much difficulty be traced; indeed it differs from the last-mentioned variety of *A. trapeziforme* in little else than the very obtuse pinnules. The narrow and oblong, and spreading and approximated pinnules give the peculiar feature; but in our *A. cultratum* some of the pinnules approach very nearly to cordato-rhomboid.

68. *A. subcordatum*, Sw.; fronds ample supradecomposed, pinnules large chartaceo-membranaceous glaucous beneath all petiolate obliquely rhomboid-cordate acuminate slightly

think Mr. Gardner's n. 5299 may be considered just intermediate between *A. trapeziforme* and *A. subcordatum*.

69. *A. Peruvianum*, Kl.; fronds ample decomposed, pinnules very large chartaceous slightly glaucous beneath all petiolate obliquely trapezoid obtuse (rarely acuminate) the angles rounded superior margin duplicato-crenate lobules soriferous, sori approximate reniform, stipes rachis and pedicels ebeneous intensely black. (TAB. LXXXI. C.) *Kl. in Linnæa*, xviii. p. 555. *A. populifolium*, *J. Sm. mst.*

Hab. Peru (Vitoc, *Herb. Ruiz and Pavon, Klotzsch*); *Mathews*, n. 1854. —This is, in every respect, a much stouter and more rigid plant than *A. trapeziforme* or *A. subcordatum*, with the pinnæ coriaceous, 2½ and 3 inches long, and almost exactly trapeziform, their two lower sides, however, more or less unequal, the upper sides or margins rather crenate than lobed, all the angles (except the point of insertion with the petiole) obtuse; though in some pinnules the apex is acuminate, and hence showing a great affinity with the two preceding. This species or form we only know as Peruvian, from Ruiz and Pavon and Mathews' collections.

70. *A. Mathewsonianum*, Hook.; glabrous, frond large supradecomposed, pinnæ lanceolate, pinnules approximate obliquely rhomboid-ovate rather long petiolate sub-acute rigid chartaceo-membranaceous glossy striated superior base truncate inferior base (or lower half of lower margin) straight and horizontal, the rest moderately lobed and serrated, lobes soriferous, involucre rather large hard broad semilunate, stipes and rachis everywhere ebeneous glossy glabrous. (TAB. LXXXIV. A.)

Hab. Chacapoyas, Peru, *Mathews*, n. 3296.—I have seen this fine species in no collection save from Mathews, and it appears to me to be very distinct, allied on the one hand to the groupe to which *A. trapeziforme* belongs, and on the other to *A. Brasiliense* and its allies. I prefer placing it here, on account of the very distinct petioles (1—2 lines long) of the pinnules. The texture of the frond is firm, rigid, chartaceous: the sori extend a considerable way beyond the apex on the lower margin (8—10 on each pinnule) and are large, firm and thick, occupying the sinus of a lobe, lunulate, but becoming broader beyond the base.

71. *A. sinuosum*, Gardn.; frond tripartite, branches pinnate, pinnules all petiolate large rhomboidly subcordate membranaceous the bases very unequal upper margin inciso-lobate, sterile lobes especially sinuate and emarginate, lobules soriferous, involucre in a rather deep sinus reniform, stipes rachis and petioles ebeneous dark-brown. *A. sinuosum*, *Gardn. Herb. Bras. n. 3552*, and in *Hook. Ic. Plant. tab. 504*. —β. smaller more membranaceous, pinnules less sinuated.

Hab. Dry rocky places, near the summit of the Sierra de Natividade, Province of Goyaz, Brazil, *Carduer.*—*β.* Cerro of Santana, Guayaquil, El Equador, *Professor W. Jameson.*—The present species seems to me very different from any previously described one, and to unite the *trapeziform* groupe with the *Capillus-Veneris* form. In no other individual of the present division is the involucre situated at the bottom of a deep sinus of a lobe; yet the size of the pinnules and general aspect of the plant induce me to place it here.

72. *A. amplum*, Pr.; “fronds subovate dilated below tri-above bi-pinnate, pinnules petiolate alternate rhomboid rotundate or obtuse incised at the upper margin, incisures emarginate serrulate, involucre reniform, stipes and rachis very glabrous.” *Presl, Reliq. Hænk. p. 63.*

Hab. Mexico and Guayaquil, *Hænk.*—“Fronde 2 feet high, a foot and a half broad: pinnules 6 lines long, 5 broad.” The author observes, “Affine *A. trapeziformi*, L. et præsertim *A. affini*, Willd.; à priori differt pinnulis minoribus rotundato-obtusis, incisuris emarginatis, soris lunatis, nec sublunatis, à posteriore pinnulis exacte rhombeis, incisuris denticulatis.”—Now the *A. trapeziforme* of Linnæus is, as is well known, a species of very marked character: the *A. affine*, is, according to Willdenow, a New Zealand plant, and of which he observes “sequenti (*A. Capillo-Veneris*!) affinium, quam *A. trapeziformi*,” so that it becomes extremely puzzling to know where to place this.

* * *Capillus-Veneris* groupe. (Sp. 73—93.)

73. *A. Capillus-Veneris*, L.; frond ovate tri-quadri-pinnate, pinnules delicate membranaceous glabrous obliquely broad-cuneate (sometimes approaching to rhomboid) tapering into a rather long slender petiolule, the superior margin deeply and irregularly inciso-lobate, lobes very obtuse or truncate sori-ferous (sterile ones subinciso-dentate), sori as broad as the lobe oblong or subreniform, stipes and slender rachis everywhere ebeneous glossy and quite glabrous. *Linn. Sp. Pl. p. 1558.*

agascar (*Bojer*). China, *Fortune*. South Africa, Algoa Bay, Uitenhage. Sandwich Islands, *Menzies*. Throughout the temperate parts of North America, east and west side. Guatemala (with var. β .), *Skinner*. Mexico var. β .), *Galeotti*, n. 6361. Trinidad, *Lockhart*. Dominica, *Dr. Inray*. Jamaica, *Dr. Wright*.—A very universally diffused and well-marked species, varying, however, like many other Ferns, in the general outline and the more or less deeply cut pinnules.

74. *A. Æthiopicum*, Linn.; frond oblong-ovate triquadri-angulate, pinnules sub- or quite membranaceous glabrous sub-orbicular suddenly and obliquely cuneate at the base into a rather and very slender petiolule, superior margin more or less lobed, lobes shallow emarginate, the sinus or notch of the lobe soriferous, sori rather large 2—6 on a pinnule, involucres oblong-lunulate, stipes and slender rachis everywhere benevolent shining and glabrous. (TAB. LXXVII. A.) *Linn. Sp. Pl. p. 1560. Willd. Sp. Pl. v. p. 452. Swartz, Syn. Fil. p. 125. Pluk. Alm. x. t. 253, f. 2 (bad). A. thalictroides, Willd. Herb. in Schimp. Herb. Abyss. n. 19, (involucres white). A. pellucidum, Mart. et Galeot. Fil. Mex. p. 272, t. 19.*

Hab. South Africa, frequent. Tristan d'Acunha, *Carmichael*. Madagascar, *Dr. Lyall*. Abyssinia (exactly resembling in colour and rather firm texture the *A. assimile* of Australia). Neigherries (*Sir F. Adam*). South America, not unfrequent; Quito, *Jameson*, n. 56 and 209 (pinnules of a firmer texture). Peru, *Mathews*, n. 3295. Guatemala (*Skinner*) and Mexico, *Galeotti*, n. 6562; *Hartweg*, n. 1624. Caraccas, *Linden*, n. 84. Brazil, *Sellow*, *Hinds*, *Boog*. Mendoza, *Gillies*.—Evidently allied to small-pinnuled specimens of *A. Capillus-Veneris*, but truly and constantly distinct; firstly, in the more orbicular and less sharply and gradually attenuated base of the pinnules, and secondly, in the fructification, the sori here being placed in the sinus of a notch in the lobe, and the involucres quite broad, lunate or reniform (not occupying the whole apex of a lobe). It is true the Cape of Good Hope is the only station assigned for this plant by Willdenow; but I cannot myself see how the ferns I have here adduced from other localities, both of the Old and New World, can be distinguished from it; and in order that others may judge of one from a S. American locality, I give a figure of that, considering it to be true *Æthiopicum*, from Guatemala.

75. *A. assimile*, Sw.; "fronds supradecomposed quite glabrous, pinnules rhomboid-subrotund inciso-crenulate in the anterior margin, sinuses narrowed and soriferous, involucres reniform, rachis and stipes very smooth." *Br.—Sw. Syn. Fil. p. 125 and 322, t. 3, f. 4. Willd. Sp. Pl. v. p. 453. Br. Prodr. Fl. Nov. Holl. p. 155. A. trigonum, Labill. Nov. Holl. ii. p. 99, t. 248, f. 2. Willd. Sp. Pl. v. p. 453.*

Hab. Van Diemen's Land, *Labillardière*, *Gunn*, *J. D. Hooker* and others. New South Wales. Port Jackson, *Brown* and others. Encounter

Bay, *Whitaker*. Subtropical New Holland, interior, *Major Mitchell*, n. 340 and n. 183. Swan River, *Drummond*. E. Coast, tropics, *All. Cunninghamham* (pinnules a little larger than usual). New Zealand, Northern Island, *Colenso*, *Dr. Sinclair*, *J. D. Hooker*, &c.—I retain this *Adiantum* as a species with much hesitation, and out of respect to others; for I do not myself see how it can be distinguished from some of the common forms of *A. Æthiopicum*, a very widely dispersed fern, as I have already shown, both in the Old and in the New World, and therefore not unlikely to exist in Australia and New Zealand. Our copious specimens are generally of a brighter green and of a firmer texture than is usual in the dried specimens of that species; but the prevailing form of the pinnules and the position and shape of the involucre are alike in both; so that, had no *A. assimile* been published, I should without hesitation have referred the Australian plant to *Æthiopicum*. Swartz, with whom the species originated, only alludes to its affinity with *A. fragile* “sed laxius, stipite longiore, fronde minus divisa et pinnulis minime basi cuneatis.” His figure, it will be seen, is a good representation of *A. Æthiopicum*. Labillardiere’s description and figure of *A. trigonum*, l. c., equally well accord with *A. Æthiopicum*, and that Mr. Brown has rightly referred to Swartz’s *assimile*; while of this *A. trigonum* Willdenow observes, “valde simile *A. Æthiopico*, sed characteribus indicatis diversum:” yet in his specific character there is nothing whatever to distinguish it,—“frondibus triplicato-pinnatis, pinnulis subrotundo-rhombis obtuse trilobis apice crenatis, indusiis lunatis, stipite trigono.” Were I myself to frame a character it would be verbatim that of *Æthiopicum*.

76. *A. pulchellum*, Bl.; “fronds divaricated triplicato-pinnate membranaceous glabrous, pinnules petiolate trapezoid obtuse crenulated at the upper margin, lowest ones obovato-rotundate, involucre reniform glabrous, stipes semiterate shining black-purple.” *Bl. En. Pl. Jav. Fil. p. 216*.

Hab. Woods, interior of Java, *Blume*.—“Maxime simile *Adianto Æthiopico*, L., cui differt forma pinnularum.” *Bl.*

77. *A. fumarioides*, Willd.; “fronds triplicato-pinnate, pinnules subrotundo-rhomboid obtuse undivided crenated at the apex, fructiferous ones entire terminated with the linear

b. Brazil, *Sellow* (*Klotzsch in Herb. nostr.*)—The specimen I am provided with of this remarkable plant, consists of a stipes about a foot long bearing the base of a frond about 5 inches in length, showing a ramification similar to that of *A. Capillus-Veneris*, but with longer petiolules projecting out at right angles from the secondary or tertiary rachis, the lobes about as large as in the species just mentioned, but of a totally different shape, almost resembling the leaves of *Geranium dissectum*, and, if not quite, equilateral, and so unlike those of any *Adiantum* that will be seen that Willdenow had considered it a *Lygodium*. In absence of fructification I can give no opinion of the true genus; and neither Presl nor Klotzsch has, as far as I know, given anything but the name of this plant, I cannot say if they had the means of determining it to the proper genus.

c. *A. emarginatum*, Bory; "fronds bi- (tri-) pinnate, pinnules obcordato-cuneate, sterile ones serrulated at the apex, sori oblong." *Willd.—Bory in Willd. Sp. Pl. v. p. 449.* Pinnules larger. (TAB. LXXV. A.)

d. Rocky places by torrents in the Isle of Bourbon, *Bory. Néraud*, Herb. Hook., ex Herb. *Delessert*.—*β. Madras Peninsula, Dr. Wight*, Herb. n. 135. Malacca, *Griffith*.—From Bourbon I possess a specimen under this name, given me, with many other fine things, by the late and distinguished M. Benj. De Lessert, and which sufficiently accords with Willdenow's brief character and remarks. It has quite the habit of rather pinnated specimens of *A. Ethiopicum*, but with sori resembling both position and form those of *A. Capillus-Veneris*; hence the just remark of Willdenow "valde simile præcedenti sed statura constanter minor, pinnulæ nunquam lobatæ semper obcordatæ." Dr. Wight's specimen, l. c., accords with the Bourbon plant; except that the pinnules are again rather larger (all bearing fructification). Mr. Griffith's specimen from Malacca precisely agrees with Dr. Wight's *Adiantum*, and being only partially pinnate the serrulated apices are very apparent. But in all these I see nothing to distinguish them from the South American *A. Chilense*. The name is very incorrect; for Willdenow says "pinnulæ apici præemarginatæ majores obcordatæ, lobis quandoque leviter emarginatis." I need not tell any one accustomed to study ferns, how variable is the form of the pinnæ and pinnules on one and the same specimen.

e. *A. cuneatum*, Langsd. and Fisch.; frond rather small, pinnules more or oblong-ovate triquadripinnate, pinnules membranaceous glabrous on rather long slender petiolules cuneate (more or less broadly) superior margin rounded conspicuously 2—4-lobed, lobes obtuse deeply emarginate or bifid, their segments entirely incurved connivent, sinus or narrow deep cleft of each soriiferous, sori rather large, involucre orbicular-cordate membranaceous, stipes and slender rachis everywhere ebeneglossy glabrous. *Langsd. and Fisch. Ic. Fil. Brasil. t. 1. p. 26 (good).* *Willd. Sp. Pl. v. p. 450.* *Raddi, Fil. Ital. t. 78, f. 2.* *Hook. and Grev. Ic. Fil. Rar. Tab. 30.*

Hab. Brazil, St. Catharine's, *Chamisso, Raddi* (in Herb. nostr.) and others. Organ Mountains, near Rio, *Gardner, n. 198*. South Brazil, *Sellow, Tweedie*. Uruguay, *J. Baird*.—Certainly allied to *A. Æthiopicum*, but the pinnules are invariably cuneate and the lobes deep (so that the sori are placed higher up on the lobes than the base of the sinuses of the lobes), and the two segments of the soriferous lobes are always so narrow and so incurved as to conceal the fissure, well represented in the Ic. Fil. Rar. It is rather a small species; the largest specimen I have is 12—14 inches long: the more usual size is as given in Langsdorff and Fischer, and in the Ic. Fil. above quoted. I have seen the true form of this plant only from Brazil; and it is very constant to its characters. The name has been applied to *Adianta* of other countries, which have appeared to me different.

81. *A. glaucophyllum*, Hook.; tall frond ovate supradecom-
poundly pinnated, pinnules rigid chartaceous glabrous
glaucous on both sides on rather long slender petioles cuneate
(generally narrowly so) superior margin rounded 2—4-lobed,
lobes obtuse emarginate or bifid their segments falcately
incurved connivent, sinus or cleft of each lobe soriferous,
sori rather small, involucre orbicular-cordate subcoriaceous
when old, stipes and slender rachis everywhere ebeneous
glossy glabrous. *A. cuneatum*, var. *angustifolium*; *Mart.*
and Galeot. Fil. Mex. p. 70.

Hab. Cordillera of Mexico, inhabiting the cold region, at an elevation of 9000 to 10,500 feet above the level of the sea, *Galeotti, n. 6266*, and 6359 (the latter with narrower and more rigid almost coriaceous pinnules), and n. 6566; Pic d'Orizaba, 9750 feet; *Linden, n. 48*; *Jurgensen, n. 322*; *Mr. Parkinson*. "Teapisca (Chiapas)," *Linden, n. 1550*. Veraguas, Central America, *Seemann*.—M. M. Martens and Galeotti referred their two *Adianta* from Mexico, n. 6226, and n. 6359 to the *A. cuneatum* of Langsdorff and Fischer, as narrow pinnuled varieties; and I was disposed to do the same, until I observed that my Mexican specimens, from seven different localities as far as I can judge, all agreed in being of a larger size and more compound than that species, with narrower, more rigid, and always glaucous pinnules, together with a less deep and narrow notch for the re-

a rather large sorus at the bottom, involucre reniform-cordate submembranaceous, stipes and slender rachis everywhere ebeneous glossy glabrous. (TAB. LXXVI. B.) *A. venustum*, *Don, Prodr. Fl. Nep. p. 16. Wall. Cat. n. 81.*

Hab. Northern India. Nepal, *Hamilton*; and at Srenuggur, *Kamroop, Wallich*. Simla, *Lady Dalhousie, Edgeworth*. Mussourie, *Dr. Bacon, (Herb. T. Thomson, n. 612)*. Meerut, *Dr. T. Thomson, Herb. n. 118*. Khasiya, elevation 6,500 feet, and Afghanistan, *Griffith*.—This I consider a distinct and well-marked species, approaching *A. cuneatum* and *glaucophyllum*; but with less divided (almost entire, except the serratures) pinnules; while the constantly few sori with their peculiar insertion, the colour (always pale greenish-brown when dry), the texture (rather papyraceous than chartaceous, yet firm), the copious, though minutes erratures, where there are no sori, and general aspect, readily distinguish it. All my several specimens are very uniform, and are quite peculiar to the mountain country in the north of India.

83. *A. fragile*, Sw.; fronds tufted ovato-lanceolate triquadripinnate, pinnules on short very slender petiolules thin membranaceous obovato-cuneate rounded at the apex and serrated in the sterile, 3 or 4-lobed in the fertile ones, very deciduous (on being dried), fertile lobes retuse bearing a sorus in the sinus, involucre oblong straight, stipes very short (sometimes scarcely any) and as well as the rachis everywhere glabrous ebeneous and glossy, root of tufted wiry fibres clothed with ferruginous wool. *Sw. Fl. Ind. Occ. iii. p. 1721. Syn. Fil. 125. Willd. Sp. Pl. v. p. 451. A. cuneatum, Kze. Pl. Exsicc. Poepp. (in Herb. nostr., an Linnaea, ix. p. 82?)*

Hab. Calcareous rocks, *Jamaica, Swartz, Dr. Wright, Poeppig, Otto, Wilson, Purdie*.—I have received specimens of Jamaica from five different persons of this singular plant, all exhibiting the same unfortunate character of abedding every leaflet in the act of drying: so that the specimens have come home showing the tufted root above described, a perfect skeleton of wiry stipites (growing in tufts) with the exceedingly slender and equally wiry rachis very much branched, and the pinnules all lying apart from the plant. Not a specimen is fit for the herbarium, nor fit for making a drawing. There are ample characters however, for recognizing the species. I know no *Adiantum* with so peculiar a growth, so tufted, so very short in the stipes, and with such deciduous pinnules. In other respects, these latter, a good deal resemble *A. cuneatum* of Brazil, and *A. venustum* of northern India.

84. *A. excisum*, Kze.; small (a span to a foot high), fronds densely tufted oblong or broad-lanceolate bi-tripinnate, pinnules very small on short petiolules thin flaccid membranaceous blackish-green flabellate 2—3-lobed (never serrated) few-nerved, lobes bifid bearing a sorus at the bottom of the sinus, involucre reniform large (for the size of the pinnule)

thin and membranaceous, stipes in general short and scaly (scales deciduous) and as well as the very slender filiform rachis flaccid brown shining glabrous or slightly squamose, root fibrous. *A. excisum*, *Kunze in Linnæa*, p. 82. *Analect. Pterid.* p. 33, t. 21.

Hab. Chili, *Poeppig*. Valparaiso, *Macrae, Cuming*, n. 492, *Bridges*, n. 550.—I do not find that this remarkable species is taken up by any author except *Kunze*; though it has been long in our herbaria. From a dense fibrous root, the fibres wiry and clothed with rusty wool, arises a tuft of fronds from a span to a foot at most in height including the usually short stipes, and this stipes is partially scaly; scales large, distant, lanceolate, membranaceous, deciduous: the whole plant singularly weak and flaccid, pellucid, but of a blackish green colour. The longest pinnules are scarcely more than two lines long, flabelliform, with the nerves very few and distant, so that never more than two communicate with the involucre: involucre generally 2 or 3 on each pinnule, rarely 4. The texture of the frond is more like that of *Cystopteris fragilis* than any *Adiantum*. It has no resemblance to any other species of the genus: and has the smallest pinnules of any with which I am acquainted.

85. *A. concinnum*, *H. B. K.*; frond large 1—2 feet long tripinnate, pinnules all petiolulate membranaceous glabrous rhomboid or rhombéo-obovate more or less obliquely cuneate at the base inciso-lobate (rarely entire or obscurely lobed and serrated), lobes obtuse mostly entire emarginate with the lobules or segments connivent soriferous in the sinus, lowest pinnules of each primary and secondary pinna erect and appressed to the rachis (!), sori 8—10 on a pinnule reniform, stipes rather short, main rachis rather stout straight partial ones slender, both stipes and rachis everywhere ebenaceous glossy glabrous. *H. B. K. Nov. Gen. et Sp. Am.* i. p. 17, and 7, t. 668. *Willd. Sp. Pl.* v. p. 451. *A. tenerum*, *Schkuhr, Fil.* t. 121, (exl. the syn.) *A. affine*, *Mart. and*

uled variety, as I have considered it, has at first sight a very different appearance, but some of my Guatemala specimens exhibit intermediate grades of pinnule. Mathews, n. 1850, is more lax and has more deeply cut pinnules than usual.

86. *A. scabrum*, Kaulf. ; "fronds bi- or tripinnate, pinnules orbicular reniform denticulate hairy and albo-farinose beneath, stipes paleaceo-scabrous, rachis very scabrous, sori subcontinuous." *Kaulf. En. Fil. p. 207. Hook. and Arn. Bot. of Beech. Voy. p. 53.*

Hab. Chili, *Chamisso* ; Conception, *Capt. Beechey, R. N.*—I have only seen one specimen corresponding with Kaulfuss' description; that is from *Capt. Beechey's* voyage, and without fructification. I dare not venture an opinion on such. The pinnules in shape resemble the more entire form of those of *A. Chilense*; the farinaceous substance resembles that of *A. sulphureum*, but is white. The name is scarcely appropriate, being only applicable, and not in a marked degree, to the stipes and rachis.

87. *A. Chilense*, Kaulf. ; frond ovato-deltoid (a span to a foot long) tripinnate, pinnules all petiolulate coriaceous-membranaceous glabrous or hirsute subrhomboid-reniform more or less obliquely cuneate at the base often truncated there, the margin irregularly lobed and the sterile ones dentato-serrate, lobes or lobules retuse (with a broad shallow sinus) soriferous, involucre oblong-reniform coriaceous distant in the more lobed pinnules, crowded in those that are nearly entire, stipes and rachis everywhere ebeneous glossy and quite glabrous. *A. Chilense, Kaulf. En. Fil. p. 207. Kunze, in Linnæa, ix. p. 83.*— β . *hirsutum, Hook. (TAB. NOSTR. LXXV. B.) Hook. et Grev. Ic. Fil. t. 173. Kze. l. c. p. 83. A. scabrum, Kze. l. c. p. 84? Plant. Poepp. exsicc. (in Herb. nostr.)*

Hab. α . and β . Chili, Conception to Valparaiso, *Chamisso, Capt. King, R. N., Beechey, Macrae.* Juan Fernandez, *Bertero.* β . has been found by *Mr. Nuttall*, at Monterey, in California, (*Herb. nostr.*)—The hirsute var. of this plant (and there are all gradations of hairiness) seems to have been generally taken for Kaulfuss' *A. scabrum*: but he expressly says of the leaflets of that plant "foliola subtus albo-farinosa." Poeppig's *A. scabrum*, from Chili, is simply a hairy state of this. My friend Nuttall's *A. dilatatum*, mst., from Monterey, Upper California, is identical with this var. Prof. Kunze refers to this species the *A. lobatum*, Presl, *Reliq. Hænk.*, i. p. 62, t. 10, f. 4 (v. supra, p. 10), but he only judges from the figure and description: that species is said to be bipinnate and to inhabit Mexico; it may, however, be the same as *A. Chilense*, and probably was from Chili; for the station given of Hænke's plants are little to be depended upon.

88. *A. sulphureum*, Kaulf. ; small tufted; frond ovate tripinnate, pinnules membranaceous all petiolulate small obovato-reniform obliquely cuneate lobed glabrous dark green

above pale and clothed with yellow pulverulent substance beneath, lobes more or less deeply emarginate soriferous in the notch, sori reniform or oblong subreniform copious contiguous, stipes and rachis ebeneous glossy glabrous.—*a. minus*; fronds four or five inches long, pinnules small, sori reniform. (TAB. NOSTR. LXXVI. A. two lower right hand figures). *A. sulphureum*, *Kaulf, En. Fil. p. 207. Kunze in Linnæa*, ix. p. 84.—*β. majus*, one foot high; pinnules larger, sori oblong reniform (TAB. NOSTR. LXXVI. A. the upper and lower left hand figures). *Kunze, Analect. Pterid. p. 34, t. 22. f. 1, a.* (*A. sulphureum*, sterile.)

Hab. Chili, *Chamisso, Poeppig, Bertero. Conception, Cuming, n. 151.*—*β. Cordillera of Peru, various places, Mathews, n. 1250.*—The affinity of this is doubtless with *A. Chilense*, especially what I have here called the variety *majus*, and which, judging from its locality and from its much larger size, I am almost disposed to distinguish, under the name of *A. Peruvianum*, both from *A. Chilense* and from *A. sulphureum*. From the former it may be known by its larger size, in every respect, more distant pinnules on longer petioles, paler colour of the pulverulent substance, scarcely emarginate or retuse lobes and straighter sori; from *A. Chilense* by the membranaceous pinnules and the presence of the sulphur-coloured pulverulent substance. *Kunze's figure, Analect. Pterid, l. c., t. 22, f. 1, a., seems to be identical with my var. β. as far as I can judge from the figure: but it is sterile.*

89. *A. sessilifolium*, Hook.; frond ovate acuminate (8—10 inches) bi- (tri-?) pinnate, pinnules sessile (or only the lowermost ones subpetiolulate) chartaceous glossy olive-green with scattered hairs on both sides subreniformi-obovate very obliquely cuneate, upper base truncate the margin much but not deeply lobed, lobes rather deeply emarginate the sinus of the notch soriferous, sori copious large contiguous, involucre

e." *Hook. fil. Pl. of Galapag. in Linn. Trans. xx. p.*

b. Charles Island, Galapagos, *Chas. Darwin, Esq.*—"A small species, nearly allied to one that is a native of New Zealand, in which the upper parts of the pinnæ are crenate." *Hook. Fil.*

. *A. Henslovianum*, *Hook. fil.*; "fronds bi- or rarely ternate elongato-ovate, primary pinnæ attenuated, secondary few, pinnules lax divaricated shortly petiolate rhomboid membranaceous above crenately lobate, sori in the middle of the lobes rather large, rachis puberulous stipites brunneous." *Hook. fil. l. c. p. 169.*

b. James and Charles Islands, Galapagos, *C. Darwin, Esq.*—As the names of this and the preceding species are not alluded to, and since I do not possess specimens, the place of them in the genus is doubtful to me.

. *A. speciosum*, *Hook.*; large, frond ovate acuminate (3-lobed) tripinnate, pinnules chartaceous glabrous petiolulate ovate deltoid or subrhomboid with a rather unequal base (oblong-pinnatifid, lobes cuneate truncated all soriferous at the base), sori linear as long as the lobe, stipites very stout dull greenous subscabrous, rachis glossy pubescent on the upper part. (TAB. LXXXV. C.)

b. About the village of Sasaranga, El Ecuador, Pacific side, *Seebeck, n. 953, Aug. 1847. Peru, Mr. Mc Lean.*—This is one of the finest ferns I have marked species with which I am acquainted, and has really pinnatifid pinnules. It is true that this pinnatifid character in the younger leaflets indicates that as the growth advances they will break up into other forms; but the ultimate pinnules (and I have seen only tripinnate specimens) in the most perfect form are equally pinnatifid. These pinnules are only an inch and more long, all the lobes cuneate and truncated, and the base of the lobe is terminated by a transverse, linear, rather narrow involucre enclosing its whole breadth. The stipite is nearly 2 lines wide, but I do not possess the lower portion.

b. *A. tenerum*, *Sw.*; frond rather large (1½—2 and even 3-lobed) 3—4-pinnate, pinnules all petiolate submembranaceous greenish-green (very deciduous when dry) rhomboid with an unequal base very unequal the margins irregularly lobed (the outer ones deeply so and lacinated) lobes and lobules retuse serrated, sori rather numerous approximate, involucre short kidney-shaped, stipites and rachis ebeneous glossy everywhere quite glabrous. *Sw. Fl. Ind. Occ. iii. p. 1719. Syn. p. 125. Willd. Sp. Pl. v. p. 450 (not Schkuhr). Plukenet. t. 254, f. l. (very characteristic but too small).*—*B.* pinnules shorter more approaching to orbicular, fertile ones

nearly entire, sterile ones crenato-lobate.— γ . pinnules larger more firm subchartaceous slightly lobed glaucous green.

Hab. West Indian Islands, probably general. Jamaica, Swartz, *Mc Fadyen*, Wilson, Bancroft, Distin, *Mc Nab*, Purdie. Cuba, Poeppig (*Kr. in Herb. nostr.*) Otto, (*Klotsch. in Herb. nostr. n. 233*). Guadeloupe, *L'Hermonier*, (*Herb. nostr. ex. Herb. Paris*). St. Vincent, *L. Guilding*. Bahamas, Swainson. Antigua, *Dr. Nicholson*. Central America, *Seemann*.— β . Acapulco and Realego, *Dr. Sinclair*.— γ . Veraguas, *Seemann*.—Pinnules generally about three quarters of an inch long. Although the term "*rhomboid*" aptly expresses the general form of these pinnules, yet many of them, especially the uppermost and the sterile ones, depart from this form, as is common to other *Adianta*: the lobing too is more or less deep, and the plant varies much in size. Some of our smallest specimens approach our larger forms of *A. fragile*; and, as in that species, the pinnules are, when dry, extremely caducous. Swartz compares it with *A. Capillus Veneris* and *A. trapeziforme*, and some states do exhibit pinnules of such a form as to justify such an opinion. Others again border on the more lax state of *A. concinnum*.—Var. β . has shorter and rounder pinnules, our var. γ . larger and more chartaceous ones.

* * * *Cristatum group*.† (Sp. 94—108).

94. *A. cristatum* L.; frond subtriangular-ovate bi-subtripinnate secondary pinnæ subapproximate lanceolate caudately acuminate terminal one elongated lowest pair generally bipartite, pinnules close-placed horizontally patent rigid-chartaceous dark olive brown striately veined when dry obliquely oblong-ovate acute generally antrorsely subfalcate, superior base truncate inferior cuneate glabrous gradually smaller upwards, terminal one elongated very narrow, sterile ones coarsely serrato-dentate, sori semioval or more rarely oblong chiefly confined to the superior margin (if extended round the point the apex becomes very obtuse)

unless when the fructifications extend round the apex, and the rough and even muricated stipes. Jacquin's figure represents the habit of small specimens very well, but not the pinnules, which are too short and too blunt.

95. *A. microphyllum*, Kaulf.; frond subtriangular ovate bi-subtripinnate, secondary pinnæ subapproximate narrow-lanceolate much acuminate terminal one elongated lowest pair generally bipartite, pinnules close-placed horizontally patent chartaceous brown or dark green obliquely oblong-ovate very acute antrorsely falcate, superior base truncate inferior cuneate gradually smaller upwards, terminal one usually elongated subrhomboid, sterile ones dentato-serrate, sori subbinous (1—4) linear generally confined to the lower portions of the superior margin, rachis slightly fusco-pubescent, stipes black minutely muricato-scabrous. *A. microphyllum*, Kaulf. *En. Fil.* p. 204. *A. striatum*, Schkuhr. *Fil. t.* 18, f. a—g. (very good).—*a.* pinnules submembranaceous olive-green. *Kze. in Linnæa*, ix. p. 80. *Pl. Exsicc. Poep. in Herb. nostr.*—*β.* rigid almost coriaceous dark brown (when dry). *Klotzsch, in Linnæa*, xviii. p. 554, and in *Otto, Pl. Cub. exsicc. in Herb. nostr. n.* 230.—*γ.* rigid, chartaceous olive-brown, pinnules gradually tapering on the long point to an extremely minute ultimate one.

Hab. Jamaica (*Schkuhr*). *a.* Cuba, *Poeppig* (*in Herb. nostr.*) Jamaica, *Mr. Lane*.—*β.* Cuba, *Otto* (*Klotzsch, in Herb. nostr.*)—*γ.* St. Mary's, Jamaica, *Purdie*.—It is unwillingly that I keep this fern distinct from *A. cristatum* of Linnæus. It is true the sori are found very much elongated and constantly so on all the specimens I have noticed above: and they again exhibit three rather distinct appearances. What I call *a.*, which, being *Poeppig's* plant from Cuba, described by *Kaulfuss* (and of which *Schkuhr's* figure is a good representation), may be considered the type of the species, has greener and much more membranaceous pinnules.—*Var. β.* has all the harshness and dark colour of true *A. cristatum*: *γ.* is remarkable for the very regular manner in which the pinnules gradually diminish to a narrow point at the extremity.

96. *A. Kunzeanum*, Kl.; 1—2 feet high, frond bipinnate dark green, pinnæ 3—7 lanceolate acuminate terminal one very long lower ones sometime bipartite, pinnules approximate chartaceo-membranaceous rather glossy broad dimidiato-oblong or subobcordate often deflexo-falcate, superior base truncated inferior one cuneate, the sterile ones obscurely lobed and serrated, fertile ones with coarser falcate teeth at the upper margin and apex, sori in the deep sinus between two connivent teeth, involucre semilunate, stipes ebeneous sca-

brous, rachis ferrugineo-pilose with woolly hairs. *Klotzsch, in Linnæa*, viii. p. 555, et in *Otto, Pl. Exsicc. Cub. n. 83* (in *Herb. J. Sm., not of Presl*). *A. melanoleucum, Willd. Sp. Pl. v. p. 443*. *A. lætum, Presl, Tent. Pterid. p. 158*. *A. cristatum, Kunze, in Linnæa*, ix. p. 81.—*Plum. Fil. t. 96*.

Hab. West Indian Islands. St. Domingo? *Plumier, Jamaica, Wila, Mac Nab. Cuba, Poeppig (Kunze); Otto, Klotzsch, n. 63* (in *Herb. J. Smith*).—Perhaps two better marked species of *Adiantum* of the present section at least, can scarcely be found than *A. cristatum*, L. and *A. Kunzeanum*, and yet few have been less understood. The excellent Swartz probably gave rise to the confusion, by quoting under the *A. cristatum* of Linnæus, the figure in *Plum. Fil. t. 96*. He observes, it is true, "huic (*crist. L.*) similima sed forte diversa." Thus, too, throwing a doubt on the true *cristatum* of Linnæus. Plumier's figure now quoted is a fair representation (exaggerated as most of his figures are) of the fern called *cristatum* by Kunze; who, as well as other botanists, has been induced to call the true *cristatum* by the name of *A. striatum*. We have again a choice of name for Kunze's *cristatum*. Willdenow by his reference to Plumier "*A. lunulis albicantibus signatum, p. 70, f. 96,*" certainly seems to have had this fern in view in his *Spec. Plant.*: but the name, however it may answer to Plumier's description, does not answer to the plant. *A. lætum*, Presl, appears to be nowhere described, whereas Dr. Klotzsch has well distinguished the species, and I gladly adopt his name.

97. *A. crenatum, Willd.*; fronds bipinnate, lower pinnae bi- or tripartite, pinnules ovato-oblong superior base truncated, inferior abscisso-cuneate, superior margin crenated and as well as the apex serrated, sori oblong, stipes glabrous. *Willd. Sp. Pl. v. p. 446. Plum. Fil. t. 53*.

Hab. Hispaniola, Martinique (*Willd.*)—On this I dare not hazard an opinion, although a figure is quoted in Plumier. Sprengel refers it to *A. politum*, H. B. K. Presl takes no notice of *A. politum*, but retains *A. crenatum*, and brings to it "*A. striatum, Poeppig, Fil. Exsicc. Kunze?*" so

long linear-lanceolate coarsely serrated, stipes aculeate, caudex creeping." *Willd. Sp. Pl. v. p. 442.* *Polypodium pyramidale*, *Linn. Sp. Pl. p. 1554.* *Sw. Syn. Fil. p. 72.*—*Pet. Fil. p. 40, t. 4, f. 2* (according to *Linnæus*). *Plum. Fil. t. 54* (according to *Swartz and Willdenow*).

Hab. America, (*Linnæus*). *Hispaniola*, *Plumier*. *Linnæus* only quotes *Petiver's* figure; *Swartz and Willdenow* only *Plumier's*.—If an *Adiantum* at all, and a good species, and if *Plumier's* figure be any authority for the *Linnæan* plant, it may rank near *A. cristatum*, L.

100. *A. polyphyllum*, *Willd.*; "fronds quadruplicato-pinnate dimidiate obtuse truncated at the base, superior margin inciso-serrate, serratures denticulated, sori oblong." *Willd. Sp. Pl. v. p. 454.* *H. B. K. Nov. Gen. Am. i. p. 21?* (not *Kunze*, according to *Presl and Klotzsch*).

Hab. S. America, *Caraccas*, *Bredemeyer*, (*Willd.*)—It is in vain, without authentic specimens, or a good description, to attempt to identify this plant. *Kunth*, under his *A. polyphyllum*, gives, in the specific character, "pinnules rhomboid-oblong obtuse shortly petiolate upper margin and apex deeply duplicato-crenate,—sori numerous subreniform."—It is no wonder that with such conflicting and inadequate characters other botanists should be led astray. Thus, *Kunze's A. polyphyllum*, for which he cites both *Willdenow* and *Kunth* without doubt, is pronounced by *Presl* to be different from that of *Willdenow*, and called by him *A. myriophyllum*, and by *Klotzsch A. macrocladum*. I must acknowledge the *Willdenowian* plant to be unknown to me.

101. *A. macrocladum*, *Kl.*; large quite glabrous, frond bipinnate tripinnate below, pinnæ distant broad-lanceolate attenuated at the base and at the extremity, pinnules dark brownish green opaque submembranaceous crowded slightly imbricated patent obliquely oblong scarcely subfalcate very obtuse cuneate at the base superior base truncated upper margin and apex regularly crenato-serrated, sori copious very small on every lobule on the upper margin, sori small semi-oval, stipes (tall) and rachis everywhere ebeneous and shining. (TAB. LXXXIII. B.).—*A. macrocladum*, *Kl. in Linnæa*, xviii. p. 554. *A. polyphyllum*, *Kze. in Linnæa*, ix. p. 82, (excl. syn.). *Poeppig, Plant. Exsicc. Peruv.* *A. myriophyllum*, *Presl*, (name in *Tent. Pterid.*)

Hab. Peru, *Poeppig*, (*Kunze in Herb. nostr.*).—I have only seen the solitary specimen from *Kunze*, and this is remarkable among the much-branched *Adianta* for the very compact and closely placed pinnules of an almost exactly oblong (or parallelogram) form, obliquely cuneate at the base, and for the small sori. *Klotzsch* says "ab *Ad. polyphylo* differt, rachibus pulverulentis (which is certainly not the case in my specimen) nec nitidis, pinnulis falcatis (scarcely so in our specimen) crenato-denta-

tis, nec lobato-crenatis, soris minoribus numerosioribus, indusiis obovato-orbicularibus, striatis, nec reniformibus."

102. *A. Wilesianum*, Hook. ; large quadripinnate, pinnæ all distant lanceolate acuminate, pinnules dark brown-green subchartaceous scarcely glossy ovato-lanceolate falcate obtusely acuminate obliquely cuneate at the base superior base truncate upper margin and sometimes the apex crenato-lobate, lobes of the upper margin soriferous, sori in a crenature or sinus of the lobe, involucre reniform rather large firm thick, stipes ebeneous glossy glabrous, rachis rufo-pubescent on the under side. (TAB. LXXXIII. C.) An *A. crenatum*, Willd. *Sp. Pl.* v. p. 446? An *Plum. Fil.* t. 53?

Hab. Jamaica, *Wiles* (in *Herb. J. Smith*). Tabasco, Mexico, *Linden*, *Fil.* n. 1903. — This appears distinct from any species I know. Can it be the *A. crenatum* of Willdenow? who quotes Plumier, t. 53, which is not a very bad representation of this species. If so, it is a native of Martinique and St. Domingo also.

103. *A. Brasiliense*, Raddi ; frond rather large quadripinnate, pinnæ approximate all broadly lanceolate acuminate, pinnules closely placed membranaceous olive-brown (when dry) patent oblong subfalcate obtuse obliquely cuneate at the base truncate at the superior base lobed at the upper margin, the lobes crenate and soriferous, sori 5—7 on the superior margin 1 on each lobe, involucre short-oblong reniform convex rather large, stipes and rachis ebeneous glossy, the underside ferrugineo-pubescent. *A. Brasiliense*, *Raddi, Fil. Brasil.* p. 56, t. 76. *A. pubescens*, *Raddi, Syn. Fil. Brasil.* n. 129.—*Plum. Fil.* t. 53, according to *Raddi*, (but scarcely so).

Hab. Brazil, near Rio, *Raddi, Mrs. Calcott, Gardner*, n. 59, *Burchell*

superior margin only 5—7 in a sinus or notch of the lobe obovato-reniform large convex thick and hard especially in the disk, stipes and rachis everywhere ebeneous very glossy glabrous. (TAB. LXXXIII. A.)—“*A. cardiochlæna*, *Kze.*” *Sonder in Herb. nostr.* An *A. polyphyllum*, *Willd. Sp. Pl. v. p. 454?*—*β. rigidum*; pinnules subchartaceous, sori larger thicker and more prominent dark brown.

Hab. Caraccas, *Moritz*, ex *Sonder in Herb. nostr.*, and *Miquel*, n. 15. Venezuela, *Funck*, n. 439. Trinidad, *Aldridge*, in *Herb. J. Smith.*—*β. Caraccas*, *Linden*, n. 125.—A beautiful and, I think, a well-marked species, and it is a comfort to have a named specimen to refer to it for its authentication; but whether it be a MS. name, or already published by Professor Kunze, I have no means of knowing. It may possibly be the same as *A. polyphyllum*, *Willd.*, which I see is mentioned by Klotzsch as found by *Moritz*, n. 59 (my specimen bears no number) at Caraccas. If I could be sure of this, I would gladly restore the older name. My var. *β.* differs in the more chartaceous and firmer texture and the larger and darker-coloured and very prominent sori. This species approaches our *A. Mathewsianum* (p. 35), but there the frond is less divided, the pinnules are more rhomboid or cut off as it were at the base by a rather short oblique line, whereas the lower margin in our present species is formed by a straight longitudinal line nearly as long as the pinnule itself.

105. *A. Lobbianum*, *Hook.*; frond rather ample (a foot and more long) tripinnate, ramifications spreading, secondary pinnae lanceolate acuminate straight firm, pinnules dimidiato-ovate (lower ones subrhomboid) chartaceous sometimes slightly antrorsely falcate superior base truncate superior margin and round the obtuse apex slightly lobed and serrated, lobules soriferous, sori few generally confined to the lower part of the upper margin small 4—6 on a pinnule, involucre very small black nearly orbicular, stipes elongated and as well as the slender rachis ebeneous glossy glabrous. (TAB. LXXXVI. C.)

Hab. Java, *Thos. Lobb*, n. 264.—My several specimens of this fine fern are very constant in form, and it is difficult to say which are its nearest affinities. The involucre are peculiarly small and dark-coloured, spreading after the dispersion of the capsules.

106. *A. formosum*, *Br.*; tall spreading, frond large supra-decompound deltoid, pinnules small chartaceous obliquely rhomboid-cuneate obtuse lobed or incised and serrated glabrous olive-brown when dry upper base truncate, lobes soriferous oblong-reniform, stipes long rough and as well as the flexuose rachis (partial ones pubescent) ebeneous glossy. (TAB. LXXXVI. B.)—*Brown, Prodr. Fl. Nov. Holl. p. 155, (not All. Cunn.)*

Hab. About Port Jackson, abundant, *Brown* and others. Mangatainoka,

N. Zealand, *Colenso*.—A species apparently very common about Port Jackson, but I have not received it from any other locality or country, save the solitary one given by Mr. Colenso. It is a large (3 feet high) and very distinct species, very compound in its ramifications, and easily distinguished from the two following (*A. Cunninghamsi* and *A. fulvum*) by the position and form of the involucre, here terminating a lobule and oblong, curved or approaching to reniform; in those situated in a sinus and rotundato-reniform, or orbicular-crescent-shaped with a deep rounded notch or sinus.

107. *A. Cunninghamsi*, Hook.; frond (8—10 inches) deltoid subpedately tri-quadrifid, secondary pinnæ lanceolate, pinnules rather small chartaceous glabrous olive-brown very glaucous beneath dimidiate broad oblong obtuse often subrhomboid obliquely cuneate, superior base truncate upper margin and round the obtuse apex lobed, lobes emarginate obtuse, sinuses of the lobes soriferous, sori numerous rather large 7—10 on a pinnule, involucre orbicular-cordate with the sinus deep and narrow, stipes smooth elongated and as well as the flexuose rachis everywhere ebeneous glossy and quite glabrous. (TAB. LXXXVI. A.) *A. formosum*, *All. Cunn. Bot. N. Zeal. in Hook. Comp. to Bot. Mag. i. p. 366*, (and of other authors on N. Zealand Botany), *not Br.*

Hab. N. Zealand, Northern Island, *A. Cunningham*, *Sinclair*, *Colenso* (nos. 1670, 2037, 2045 and 6), *J. D. Hooker*, &c. &c.—This is a well-marked species of the same group, as to habit, with the foregoing and following one; but the pinnules are always larger, more generally oblong, very glaucous beneath, the sori larger, and always placed in a notch of a lobe of the margin (not in the sinus between the lobes, nor from the apex of a lobe), the stipes is quite smooth and the rachis is everywhere perfectly glabrous. Numerous specimens gathered at different periods are quite uniform as to the above characters. The fructifications are very conspicuous on the glaucous surface of the pinnules from their dark brown colour with a pale membranous margin, giving the edge of the pinnule an ocellated appearance.—Caudex very long, creeping, as thick as a goose-quill.

Hab. New Zealand, Northern Island, *Colenso, J. D. Hooker, Dr. Sinclair, &c.* Banks' Island (off the southern or Middle Island), *Raoul*.—Dr. Hooker, on his return from the Antarctic voyage, brought home copious specimens of this species, gathered by Mr. Colenso and himself in N. Zealand, and Mr. Raoul has named it and clearly defined it in his beautiful and accurate work above quoted. The term he uses for the pinnules ("oblique cultriformes") is singularly applicable to the majority of the pinnules as distinguishing the species from its nearest affinity *A. Cunninghamsi* (*A. formosum* of N. Zealand botanists), with which it quite agrees in the position and form and colour of the involucre:—but the plants are much larger (2—2½ feet, including the stipes), never glaucous, but pale and rather bright olive-green beneath, even when dry; the stipes too is singularly rough, almost muricated, scaly at the base where it rises from the elongated stout caudex. *A. affine* (our No. 65) is a much smaller more slender and more pedate plant, with very thin membranous pellucid pinnules, and more membranous white-coloured involucre, seated in a deeper sinus. Some of our specimens of *A. fulvum* have rigid slender hairs or aciculi like those of *A. affine*, but they are deciduous or not constant nor common.

Dubious Species or Synonymes to other Plants.

Adiantum rotundatum, Kze.; "frond linear-lanceolate glabrous pinnated, pinnæ alternate petiolate approximate transversely oblong subfalcate very obtuse ultimate ones obovate small truncated at the base, upper margin and at the apex inciso-lobate, lobes obtuse toothed at the point, fertile ones excised, involucre large reniform brown, the base of the glabrous stipes and the rachis chaffy." *Kze. Fil. Afr. Austr. in Linnæa*, x. p. 528, (*not Desv.*)

Hab. "Specimen Lutetiæ Parisiorum ex amica manu Mairii accipi, in cujus herbario schedulæ, 'promontorium Bonæ Spei' adscriptum fuit. Quis ibi collegerit nescio."

"Quamquam de patria speciei non omnino certus sim, tamen insignem plantam hic præterire nolui. Specimen 16 pollices longum, simul sumpto stipite 6-pollicari, supra sulcato, purpureo, nitidissimo, basi paleis linearibus rufis obducto. Rachis stipiti similis, sed paleis sparsis tenuissimis. Pinnæ maximæ 9 lineas longæ, versus basin minus, quam apicem versus decrescunt. Laminae obovatæ, 3 tantum lin. longæ, 2 latæ et vix amplius lobatæ. Proximum *A. lunulatum*, Burm. (Hook. et Grev. Ic. Fil. t. 104), quod vero pinnis lunatis, longius pedicellatis, imprimis vero soris linearibus confluentibus abundè differt." *Kze. l. c.*

Adiantum Capense, Thunb. and Kze. in *Linnæa*, x. p. 530, is *Cheilanthes Capensis*, Sw. and others.

Adiantum radiatum, L., will here be found under *Hypolepis*.

Adiantum decipiens, Desv.; "pinnæ glabrous oblong obtuse dimidiate the base truncate, upper margin lobato-subincised, segments contiguous retuse, involucre smooth, stipes and rachis sparsely paleaceo-pilose rooting at the apex." *Desv. in Mém. Soc. Linn. ii. p. 307.*

Hab. Java. "Præcedenti (*A. rhizophoro*, Sw., *A. caudato*, nobis), proximum, sed diversissimum."

Adiantum papyraceum, Desv.; "pinnæ subopposite subrhomboid cuneate and entire at the base dentato-incised striated, capillary stipes and rachis pubescent." *Desv. l. c. p. 307.*

Hab. "Mauritius."

Adiantum cassioides, Desv.; "fronds densely pinnated, pinnæ imbricato-pinnate, pinnules rhomboid-ovate cuneate at the base denticulated, stipes angular, rachises pubescent." *Desv. l. c. p. 310.*

Hab. Warmer parts of America, (*Desv.*). "Pinnæ of *A. obtusum*, but the frond more leafy." *Desv.*

Adiantum rotundatum, Desv.; "pinnules ('pinellis consistentibus') subrotundato-cuneate entire obscurely sinuoso-trilobate, sori subreniform, stipes glabrous." *Desv. l. c. p. 310.*

Hab. Peru, (*Desv.*). "Lower pinnæ about 6 inches long; pinnules 4—5 lines broad, less than that in length."

Adiantum pauperculum, Kze. in Schk. Fil. Suppl. ii. p. 65, t. 127, will be here placed under *Hypolepis*.

Adiantum pallens, Sw., forms our next genus, *Ochropteris*, J. Sm.

2. OCHROPTERIS, J. Sm.

(HOOK. GEN. FIL. TAB. CVI. A.) *Adiantum*, Sw. *Cheilanthes*, Bory, Pr.

Sori marginal, always occupying the apex of a lobe, transversely oblong, uniform. *Involucre* of the same shape with

1. *O. pallens* (TAB. LXXVII. B.), J. Sm. Gen. Ferns, p. 46.—*Adiantum pallens*, Sw. *Syn. Fil. p.* 125 et 323. Willd. *Sp. Pl. v. p.* 453. *Cheilanthes davallioides*, Bory, in Willd. *Sp. Pl. v. p.* 461.

Hab. Mauritius, *Grandal* (Sw.) and others.—Bojer states that it is found in Madagascar. Swartz, at p. 125 of his 'Species Filicum,' gives "Mauritius?" with a mark of doubt of its native country, and "Chusan" without any question; the latter apparently upon the authority of a most unsatisfactory figure in Plukenet's 'Amalth. Bot.' of a "Filix Adianto nigro officinar. similis, pediculo viridi, pinnulis magis eleganter incisus; ex insula Cheusan, tab. 403, f. 2." We have received many ferns from China of late, and particularly from Chusan, but this species was never among them, and we doubt if it is found there at all. Our copious specimens from different individuals are entirely from Mauritius, and it is probably peculiar to that country, unless Bojer should be correct in giving Madagascar.—Stipes 2 feet long; frond about equal in length with the stipes.

3. LONCHITIS, Linn.

Lonchitidis sp. *L. et Auct.*

Sori marginal, situated in the sinuses of the segments of the frond, oblong or linear, reniform or lunate, situated at the apex of several converging veinlets. *Involucre* more or less elongated, of the same shape with the sorus, membranous, scariose, formed of a reflexed but changed portion of the frond, covering (while young) but not bearing the capsules.—Ferns of *Mauritius*, *Madagascar*, *the Cape*, and *S. America*. *Rhizoma subglobose*. *Fronde fascicled, large, submembranaceous, bi-tripinnate, the pinnæ sinuato-pinnatifid: the sinuses only soriferous*. *Veins anastomosing* and forming very irregular hexagons, several veinlets uniting at the sinus to bear the sorus*.

Obs. Notwithstanding that the fructification resembles that of *Cheilanthes*, and especially that of *Hypolepis*; yet the species are widely distinct in habit from those two genera: and, in conjunction with the reticulated frond, may well be allowed to remain as a genus. It would indeed be a reticulated *Pteris* (or *Litobrochia*) but for the short sori: and hence the *L. hirsuta*, Linn. (not of Sieber) of the West Indies, though with the fructification of *Lonchitis*, chiefly confined to the sinus of the lobules, is now transferred to *Pteris*, on account of pinnato-furcate venation. In *Lonchitis*, if I may

* From the costa or midrib on the pinnules, parallel pinnated veins diverge, corresponding with a lobe at the margin, these veins are connected by a veinlet running parallel with the midrib and at a little distance from it, forming a number of transversely oblong areolæ; all between these areolæ and the margin is more or less closely reticulated.

so say, the centre of the sorus, be it long or short, is in the very axil of the sinus, whence it extends along the margin on both sides. In *Pteris* it originates at the side of the lobes, and extends to the axil.

1. *L. aurita*; "fronds pinnate, pinnæ pinnatifid lowermost ones bipartite the lobes obtuse waved toothed at the apex, stipes aculeated." Sw.—*Linn. Sp. Pl. p. 1536. Willd. Sp. Pl. v. p. 462. — Plum. Fil. 14, t. 17. "Petiv. Fil. p. 172, t. 4, f. 4."*

Hab. Martinique.—This is quite unknown to me; and is perhaps altogether taken up, by Linnæus and succeeding authors, from the figures above quoted. It has the reticulated venation and the short lunate sori of true *Lonchitis*; but the bipartite lower pinnæ and the aculeated stipes are at variance with other species of the genus. It appears to be unknown to any author since the time of Plumier: according to his figure however the sori are quite those of the present genus, in shape and situation.

2. *L. Lindeniana*; fronds ample (bi?) pinnate thick-membranaceous opaque on both sides copiously clothed with fulvous hairs, pinnæ (or pinnales) sessile a span long broad-lanceolate acuminate deeply pinnatifid the ultimate ones decurrent into a bipinnatifid apex, lobes ovate with very deep sinuses, upper ones rounded with small shallow sinuses all copiously reticulated, sori numerous small lunulate and occupying the axil of the shallow sinuses or elongated and though the centre appears to be in the very axil of the sinus the two extremities extend up the entire sides of the sinus, stipes (of which we have only a small portion) unarmed and as well as the main rachis furrowed on one side densely beset with spreading ferruginous hairs. (TAB. LXXXIX. A.)

Hab. Caraccas, S. America, *Linden, n. 543.*—It is also in Mr. J. Smith's herbarium from the Paris garden (*Jardin des Plantes*) without any locality

sessile pinnatifid at the apex, pinnules sessile broad-lanceolate acuminate sinuato-pinnatifid much reticulated, the lobes entire or sinuato-lobate, the sinuses soriferous, stipes and rachis everywhere densely hairy.—“*Willd. Herb.*” *Kaulf. En. Fil. p.* 195. *Presl, Tent. Pterid. p.* 163, *t.* 6, *f.* 29, (*pubescence omitted*). *Hook. Gen. Fil. t.* 68, *A.* *L. hirsuta*, *Bory, Voy. i. p.* 321, (*name only*). *Wall. Cat. n.* 2190. *Sw. Syn. Fil. p.* 93, (*in part*). *Schkh. Fil. p.* 81 (*in part*), *tab.* 2, *not tab.* 86, (*not Linn.*)

Hab. Mauritius, *Bory, Commerson (in Herb. nostr.)*, *Sieber, Wallich, Telfair*, and others.—This species has been much misunderstood and mixed up with others. I have copious specimens from Mauritius, where it is abundant in moist woods, and to which island I believe it is peculiar. *Bory*, who perhaps first noticed it, considered it to be the *L. hirsuta* of Linnæus, a West Indian plant, for which the authority is Plumier; “*Fil. villosa, pinnis quercinis*,” *tab.* 20; but that has free, not anastomosing, veins. That author (*Bory*) expressly gives it as a native of Mauritius, for when speaking of his *L. glabra* of Bourbon, he says, “*Je remarquai (in Bourbon) un beau Lonchite dont les feuilles ont une couleur obscure, et qui je crois différent du Lonchite velu (L. hirsuta, L.) si commun à l’Isle de France.*” Yet *Swartz*, on *Bory*’s authority, evidently I think by mistake, gives “*Bourbon*” as the country of this. *Willdenow* rightly confines the *L. hirsuta*, *L.* to the West Indies, whence we have specimens showing the venation of true *Pteris*. *Kaulfuss* first took up the Mauritius species with the MS. name from *Willdenow*’s own herbarium.—The fronds are dingy brown when dry.

4. *L. Natalensis*, *Hook.*; fronds ample bipinnate moderately hirsute on both sides with pale-coloured hairs, pinnæ more or less petiolate the upper half pinnatifid, pinnules few sessile broad-lanceolate acuminate much reticulated nearly entire or moderately lobed in the lower half, lobes rounded entire short, the sinuses and entire margins soriferous, sori small, stipes and rachis downy. (TAB. LXXXIX. B.)—*L. glabra*, *Pappe, MS. in Herb. Hook.*—(*not Bory*).

Hab. Shady places at Port Natal, South Africa: communicated by *Dr. Pappe*, 1845.—I find nothing like this among my copious specimens of *L. pubescens* from Mauritius. The size is about the same, but the fronds are less pubescent and less densely hairy, drying of a full green colour; the pinnæ or primary divisions are stalked, and a great portion of them, the upper half, are pinnatifid, the lobes there and the pinnæ below more entire, the lobes, when lobed at all, short and never again sinuated or lobed, and the sori are smaller, frequently appearing where there is no perceptible sinus:—the rachis and stipes are not densely hairy with patent fulvous hairs, as in *L. pubescens*, but simply downy.

5. *L. glabra*, *Bory*; fronds (2 feet long) bipinnate membranaceous with scattered fulvous hairs on the stipes rachis midrib and veins on both sides, pinnæ sessile oblong-ovate

acuminate reticulated with very few areolæ pinnatifid at the apex, pinnules lanceolate obtuse lobato-pinnatifid all of them decurrent so as to constitute a broadly winged rachis to the pinnæ, the inferior pinnule above (next the main rachis) dwarf, lobes rotundate entire, sinuses soriferous, sori small lunate, stipes paleaceous below.—*L. glabra*, *Bory*, *Voy. i. p. 321. Sw. Syn. Fil. p. 93. Willd. Sp. Pl. v. p. 463. Kze. Schkh. Fil. Suppl. p. 153, t. 66. "Schlecht. Adumbr. Fil. Cap. p. 47, t. 27."* *Kunze in Linnæa, Fil. Afr. Austr. x. p. 528 : and in Drège, Pl. Cap. Exerc.*

Hab. Bourbon, *Bory*. South Africa, *Drège, Dr. Alexander*.—The specimen from which I have drawn up my character and from which the figure is made, is a part of the South African collections made and distributed by Drège, with the name "*L. glabra*, *Bory*," attached: it ought therefore to be the same as the *L. glabra* of Kunze in the '*Linnæa*' above quoted, which is from a plant of Drège. Kunze refers it without doubt to the *L. glabra* of Bory and Schlechtendal, and of the latter author he adduces the description and figure, p. 47, t. 28, of his '*Adumbratio*.' My copy (incomplete) of that work, though presented by the author, does not contain so many pages nor so many plates, and I have no means of testing their identity. It is probably the same as Bory's plant of Bourbon, for that author says the frond is of a full or dark green colour, and Willdenow says "*pinnulæ bipollicares lanceolatæ acuminatæ (scarcely in our specimens) sessiles alato-decurrentes apicem versus confluentes*" &c., which is a characteristic mark in our plant.

6. *L. Madagascariensis*, Hook.; fronds bipinnate? pinnæ pinnate throughout slightly hairy, pinnules shortly stipitate triangulari-oblong gradually acuminate much reticulated below sinuate scarcely lobate the base broadly cordate, terminal one large attenuated deeply sinuate towards the base and hastate, sori somewhat elongated situated in the shallow sinuses, rachis (of the pinnæ) slender downy. (TAB.

3. HYPOLEPIS, *Bernh.*

(HOOK. GEN. FIL. TAB. LXVII. A. ("Cheilanthes") and B.)—*Cheilanthis* Sp. *Sw. et Auct.* *Adianti* Sp. *Bory.* *Lonchitidis* Sp. *L.*

Sori marginal, subglobose, small, distinct, uniform. *Involucres* of the same shape as the sorus, formed of the more or less changed and reflected margin of the frond, usually situated in a sinus and covering the sorus, which occupies the apex of a veinlet. — *Tropical or subtropical Ferns, having a more or less creeping rhizoma. Fronds variable, simply pinnated or more frequently bi-tri-quadrifid; sometimes compoundly pinnatifid (H. Californica), generally membranaceous or chartaceous, rachis and stipes sometimes opaque and pubescent or muricated, sometimes ebeneous and very glossy. Sori frequently in a sinus of the lobes or teeth of the pinnule, and occupying their lower and inner side. Veinlets forked, free, often diverging, never anastomosing, the apex of a single one bearing the sorus.*

Obs. With few exceptions, the species of this genus have been referred to *Cheilanthes*. It was established by Bernhardt, in Schrader's 'Neues Journal für die Botanik,' erster band, p. 34. "HYPOLEPIS; *Sporangia catheto-gyrata in receptaculo punctiformi. Hyposporangia propria semiorbicularia, margine recto affixa, circulari, libera.*" — The only Fern which he refers to it is *Lonchitis tenuifolia*, Forst. (*Cheilanthes arborescens*, Sw.) Presl, in his 'Tentamen Pteridographiæ,' both by the several species he adduces, and by his character of the fronds, "amplæ supradecompositæ;" limits the genus to those very much branched and generally membranaceous species (corresponding with the *Microlepia*-group of *Dicksonia*), —and of which *Lonchitis tenuifolia*, L., is the type: and Mr. J. Smith adopts the same view of the genus *Hypolepis* as Presl, as we find by the references in his 'Arrangement and Definition of the Genera of Ferns,' and by his remarks there. "This genus," he observes, "is formed of a group of species characterized by their large decomposed fronds, which arise from a lengthened creeping rhizoma, similar in habit to some of the large-fronded species of *Polypodium*, and differing from them only in the soriiferous crenule being altered in texture, and reflexed, forming a simple lateral *indusium* with the *sporangia* in its axis, and therefore not distinct in that respect from the genus *Cheilanthes*: but their whole habit naturally indicates them to be a distinct group from the species which I retain as true *Cheilanthes*." — Practically, however, it seems impossible to restrict *Hypolepis* to the large decomposed fronds. Species with less divided fronds, yet in other respects of similar habit, claim admission, and I cannot in any way see how the composition alone can form the character of this or any other genus of Ferns. Kunze, though he does not adopt the genus *Hypolepis*, yet often alludes to it as a genus of others, and in his 'Index Filicum in Hortis Europæis cultarum,' in vol. 23 of the 'Linnæa,' under *Cheilanthes*, has distinguished by the letter (b) what would be *Hypolepis*, and it is quite

clear from this that he is not guided by the composition of the frond, but by the nature of the involucre, separate and free and more or less approaching to orbicular: *Hypolepis*, in fact, in the sense in which *Bernhardi* intended it. This is the principle I have followed in the genus as here laid down; and if thereby I have not preserved *Hypolepis* with so marked a natural habit as by the arrangement of *Presl* and *J. Smith*, yet I have weeded *Cheilanthes* of several rather anomalous species of that genus, in which, as it now stands, the sori are more or less confluent, and border so closely upon *Pteris*, that clearly defined limits cannot possibly be detected between them. Thus, I have referred *Adiantum radiatum*, L. (*Cheilanthes*, *Br.* and *J. Sm. MS.*) to *Hypolepis*, rather than to *Cheilanthes* proper, and others with a somewhat similar habit. On the other hand, I have preserved *Cheilanthes spectabilis*, *Kaulf.*, in *Hypolepis*, where *Link* and *Presl* and *Kunze* have placed it, although the involucre is frequently continuous. It is a remarkable fact in this species, that, sometimes, the sori are seen in nearly round dots, in other specimens elongated to a considerable extent. Such and other difficulties are met with in almost every extensive genus of Ferns, and should lead us not to think harshly of others whose views on the genera of Ferns may happen to differ from our own.

(*Tri-quadri-pinnate, or more or less tri-quadri-pinnatifid. Hypolepis, Pr., J. Sm.*)

1. *H. tenuifolia*, *Bernh.*; fronds ample quadripinnate membranaceo-chartaceous, primary pinnæ ovate acuminate, secondary and tertiary lanceolate acuminate rather remote, pinnules narrow-oblong slightly falcate and acuminate entire or toothed or lower ones pinnatifid monosorous on the inner margin of the lobe, involucre semiorbicular submembranaceous, stipes slightly rough towards the base generally pale (sometimes darker) brown more or less hairy, rachis and midrib generally downy with crisped hairs, costa and often the underside of the pinnules slightly hairy and occasionally glandular. (TAB. LXXXIX. C.) — *Bernhardi* in *Schrad. Neues Jour. für die Bot.* 3, p. 34. *Presl Tent. Pterid.* p.

lenso, J. D. Hooker, and others. Luzon, *Cuming*, n. 118 and 233 (stipes and rachis browner).— β . New Zealand; Wahaki, *Dr. Sinclair*. Bay of Islands, J. D. Hooker.— γ . Between Cape Brett and Wangarei Bay, East Coast, N. Zealand, near the coast; scarce, and found nowhere else. (TAB. XC. A.) *Rev. W. Colenso*, n. 420.—Our specimens most in accordance with Forster's plant are those from the Coral Islands (some without any habitat given) in the late Capt. Carmichael's collection, and some of Dr. Hooker's from New Zealand. Forster's original plant is, however, rather more slender and the pinnæ and pinnules more erect and attenuated than any we possess: and it must be confessed that the difference between that and our var. γ . strike the eye, at first sight, as being very considerable. Certainly no figure of any small portion of a plant will give an accurate idea of the species itself, still less of the varieties. Yet from New Zealand alone, I possess specimens which almost satisfy me that I am correct in making varieties rather than in forming species. Even of the most remarkable variety, that of our valued friend Mr. Colenso, I find a specimen marked "N. Zealand," from Capt. Carmichael's herbarium, which seems to unite β . with γ .—We have received this and other species from N. Zealand as "*Cheilanthes ambigua*, A. Rich.": and we are not sure but this is the *C. ambigua* of Allan Cunningham, judging from a specimen we have received from Mr. Heward. Richard expressly says of his *C. ambigua*, "Au premier abord, et quand les fronds sont bien développées, on pourrait la prendre pour une espèce de *Polypodium*. En effet les sores sont arrondis, distincts et nus, correspondant à chacune des dents ou divisions des lanières. Mais si l'on examine ces frondes avant leur épanouissement, on voit alors que les divisions sont recourbées en dessous, et qu'elles recouvrent complètement chacun des sores, en lui formant une sorte d'involucre, sans néanmoins changer de nature." (Voy. de l'Astrolabe, Bot. i. p. 84).—All this seems to point to a *Polypodium* common in New Zealand, frequently confounded with our *H. tenuifolia*, for its general aspect is very similar, probably identical with the New Holland *Polypodium rugulosum*, La Bill., and also with *Cheilanthes viscosa*, Carm., of Tristan d'Acunha, (*Polypodium*, *Spreng.*) In an old state of these, the teeth or lobules of the pinnules may be seen to form an arch over the sori without altering in texture: this however is very different from the involucre of *Hypolepis*: as may be seen in a portion we have represented of the var. γ . of the present species. (TAB. XC. A.)—There is probably some error in this species being called by Forster, and others after him, an "arborescent" fern.

2. *H. Guianensis*, Kl.; "rhizoma? frond tripinnatifid ovato-acuminate, rachises and stipes yellowish unarmed subviscoso-pubescent, pinnæ broadly lanceolate acute, secondary pinnæ lanceolate falcate obtuse sparingly puberulous on both sides, beneath bright above brownish green, pinnules lanceolato-oblong subfalcate rounded at the apex obsolete pinnatifido-lobate sessile." *Klotzsch, in Linnæa*, 1847, p. 339.

Hab. British Guiana, *R. Schomburgk*, n. 1166. — "Frond 2 feet long. Superior pinnæ 3 lower ones 6 inches long attenuate confluent towards the apices."—Of this species I know nothing, and nothing is said of the sori and involucre.

3. *H. dicksonioides*; "frond ample ovate membranaceous

on both sides (more copiously beneath) glanduloso-pilose tri-pinnato-pinnatifid less divided at the apex, pinnæ subopposite and as well as the primary pinnules ovato-oblong acuminate, secondary ones oblong obtuse pinnatifid, segments shortly oblong subtruncate at the apex inciso-serrate, the base above or on both margins soriferous, sori solitary, stipes and rachis furrowed above and as well as the creeping caudex reddish-yellow glanduloso-pilose." *Kze.*—*Cheilanthes dicksonioides*, *Endl. Prodr. Fl. Norf. p. 15. Kze. in Schkh. Fil. Suppl. i. p. 13, t. 8. Hypolepis Endlicheriana, Presl, Tent. Pterid. p. 162. —β. phyllochlæna; indusio (spurio) frondoso. Kze. in Linnæa, t. 17, p. 275.*

Hab. Norfolk Island, *Bauer, (Kunze).* —β. *Neilgherries, (Kunze).* —Kunze in the work just quoted gives as synonymes, Endlicher's *Cheilanthes dicksonioides* and Presl's *Hypolepis Endlicheriana*, and in 'Linnæa,' xxiii. p. 243, he adduces *Dicksonia davallioides*, Br. Prodr. p. 159, (*Sitobium, J. Sm.*): but, judging from the figure, for I have never seen an authentic specimen of the species, I do not at all see how this plant differs from the New Zealand state of what I have considered a slight variety (β.) of *Hypolepis tenuifolia*. At any rate it must be very closely allied to it, and I place it near to that, although its author compares it with *H. repens*, a species, as far as I know, confined to the New World. In the 'Linnæa' above quoted, too, Kunze gives his *C. dicksonioides* as a native of N. Holland.—Kunze again in the 'Linnæa,' xvii. p. 275, in describing the Ferns of the Neilgherry hills, notices a *Cheilanthes (Hypolepis)* which he does not distinguish from the *dicksonioides* except by the (spurious) frondose indusium.

4. *H. anaurorachis*; "frond membranaceous piloso-sca-brous ovate acuminate bi- or tri-pinnato-pinnatifid less divided at the apex, pinnæ petiolate divergent ovato-oblong acuminate the lowest ones opposite, primary pinnules decurrent oblong obtuse, secondary ones sinuato-incised the segments nearly entire serrate on both sides, involucre

involucres obsolete, stipes and universal rachis sparingly setose." *Cheilanthes setigera*, *Blume, Enum. Fil. Jav. p.* 138.

Hab. Lofty mountains of Java. — This and the three following species of *Cheilanthes* of Blume I refer to *Hypolepis* (three of them from individual knowledge), because the author says of them in his *Enum. Fil. Jav. p.* 135, "tam habitu quam forma sororum maxime cum *Cheilanthe arborescente*, Sw., congruunt;" and he adds "melius forsitan foret, species, quarum sori unico laciniarum lateri insident, a ceteris, ut genus *Cheilanthem* inter et *Louchitidem* intermedium separare." — Of the present, *H. setigera*, he remarks that it differs from the following in the sharper pinnules, the segments narrower and toothed, the universal rachis furnished with long setæ.

6. *H. alpina*; "frond below tri- above bi-pinnatifid membranaceous pubescent, pinnules sessile lanceolate rather obtuse deeply pinnatifid confluent above, sori solitary at the interior margin of the crenulations, involucres dentiform, stipes and rachis rough." *Cheilanthes alpina*, *Bl. Enum. Fil. Jav. p.* 138. — β . frond coriaceous, pinnules acute, segments crenate the margins recurved, stipes and rachis tomentose. *Bl. l. c.*

Hab. Summit of Mount Gede in western Java; β . on the lofty mountains of Java, *Blume*. — "The place of this is after *Cheilanthes repens*, Kaulf."

7. *H. resinifera*; "frond below tri- above bi-pinnatifid subcoriaceous beneath resinoso-punctate, pinnules sessile lanceolate acuminate deeply pinnatifid confluent above, the segments oblong obtuse inciso-crenate subauriculate at the base above, sori solitary at the interior margin of the crenulations, involucres dentiform, rachis tomentose above, stipes rough." *Cheilanthes resinifera*, *Blume, Enum. Fil. Jav. p.* 138.

Hab. Thick woods interior of Java, *Blume*. "Near the latter species (*C. alpina*), but distinct in the much acuminated pinnules, resinoso-farinoose beneath, hairy, the lower crenule or lacinula of the segments larger on the upper side."

8. *H. polypodioides*; "frond (ample) triplicato-pinnate, pinnules petiolate ovato-lanceolate acuminate bipinnatifid confluent above, secondary ones oblongo-lanceolate deeply pinnatifid, the segments obtuse subduplicato-serrate, sori distinct, involucres dentiform, stipes and rachis pubescent scabrous." *Cheilanthes polypodioides*, *Bl. Enum. Fil. Jav. p.* 139.

Hab. Gede and other high mountains of Java, *Blume*. — "*Cheilanthes arborescens*, Sw., differs from this in the glabrous frond and the solitary sori at the interior or superior margin of the segments: from *C. resinifera* it is distinguished by the larger triplicato-pinnate frond, and by the larger, acuminated primary pinnules." *Bl.*

9. *H. pallida*; "frond ample triplicato-pinnate subcoriaceous, beneath (pale yellowish and) pubescent, pinnules petiolate oblong-lanceolate acuminate bipinnatifid confluent above, secondary pinnules oblong obtuse pinnatifid, the segments obtuse crenulate, sori solitary on the anterior margin of the lacinix, involucre dentiform, stipes and rachis scabrous tomentose above." *Cheilanthes pallida*, *Bl. Enum. Fil. Jav. p.* 139.

Hab. Woody mountains, Province of Bantam, western Java. — "From *Ch. arborescens*, Sw., this is distinguished by its frond being pubescent beneath; from *Ch. polypodioides*, in the smaller and more rigid pinnules, the segments shorter, obsolete crenulated, mono- rarely poly-sorus."—Of this and *H. polypodioides* and *alpina* I have been favoured with portions of specimens from the distinguished author, but they will hardly suffice to justify me in forming an opinion about them. They assuredly border very closely on *H. tenuifolia*.

10. *H. repens*, Presl; fronds ample tri-pinnate between membranaceous and coriaceous yellow or tawny green (when dry) opaque, primary pinnæ ovate acuminate, secondary ones lanceolato-acuminate glabrous or very sparsely hirsute, pinnules or ultimate segments oblong obtuse slightly falcate entire or pinnatifid, lobes oval-oblong obtuse bearing usually a single sorus on their anterior margin, involucre small squamiform, stipes and principal rachises glabrous yellow-brown glossy aculeated. (Tab. XC. B.) *Presl, Tent. Pterid. p.* 162. *Lonchitis repens*, *L. Swartz, Syn. Fil. p.* 93. *Willd. Sp. Pl. v. p.* 464. *Cheilanthes repens*, *Kaulf. Enum. Fil. p.* 215. *Ch. aculeata*, *Kze. in Linnæa*, 1850, *p.* 245. *Kaulf. in Bot. Zeit.* 1823, *p.* 367. *Hypolepis repens et aculeata*, *J. Sm. Sieber, Fl. Martin. n.* 373. *Plum. Fil. t.* 12, (much exaggerated).— β . ? *inermis*; rachises and stipes smooth (not aculeated).

subtripinnate or tripinnato-pinnatifid the apex more simple, primary pinnæ remote shortly petiolate subopposite divergent-patent oblong attenuated with an upward curvature, secondary rather remote sessile divergent from a broader base oblong attenuated slightly curved, tertiary approximate decurrent from the adnate base shortly oblong obtuse pinnatifid, segments falcato-ovate obtuse sparingly crenate or with the pinnules sinuated the lobes suborbiculate, sori large situated in the upper base of the lacinia solitary in the sinus rarely two, the second on the opposite side of the sinus, indusium marginal herbaceous, the costæ beneath convex yellowish, sulcate above and together with the stout rachises and short or moderately elongated stipes purple-brown viscosely hispid, rhizoma creeping squarrosely piloso-paleaceous, scales of a rusty colour." *Kze.* — *Cheilanthes resistens*, *Kunze*, in *Linnaea*, xvii. p. 275.

Hab. Neilgherries (*Kunze*). — Instead of the copious specific character occupying just half a page of the 'Linnaea,' we wish the able author could have given us a figure, which would have been far more intelligible. We are not however at a loss for the affinities of this (if it be really distinct). "It comes near" he says "to the western *Cheilanthes repens*, Kaulf.: but differs in the stouter rachises, of a purplish brown colour, not aculeolate, but glandularly or viscidly hispid; in the more coriaceous frond, in the distinctly crenato-serrated pinnules, and the herbaceous indusium."

12. *H. parallelogramma*; frond ample (10—20 feet long) nearly glabrous glossy bi-scarcely tri-pinnate subcoriaceous yellow-brown when dry, primary pinnæ ovate acuminate, secondary sessile or nearly so narrow oblong much acuminate subfalcate closely pinnated at the base (in some) the rest closely pinnatifid, pinnules and lobes adnate parallelogram, fertile ones sinuato-lobate at the margin the sinuses soriferous, involucre semilunate hard coriaceous, stipes and rachis tawny brown rough with minute points scarcely aculeolate. (TAB. LXXVIII. A.)—*Cheilanthes parallelogramma*, *Kze.* in *Linnaea*, ix. p. 83.

Hab. Woody mountains of Pampayaco, Peru, *Poeppig* (in *Herb. nostr.*) Bamboo-grounds, rare, Tovar, Columbia, *Moritz*, (*Herb. Sonder*, n. 338). — My specimen of this from Dr. *Poeppig* had, evidently by mistake, a label with the name "*Dicksonia erosa*, *Kze.*" attached to it: a Fern found by that author in the same country. The present is well described by *Kunze* in the volume of the 'Linnaea' above quoted. He justly observes "*Similis C. repenti*, Kaulf., sed abunde differt." It is the most coriaceous and glossy in its frond of any species of *Hypolepis* I know: the nerves of the pinnules are strong and prominent beneath: the texture thick and opaque. Our figure gives an excellent representation of a perfect pinna in the upper part of the plant: below, where the pinnules are again

divided, they are more acute and acuminate. Kunze and Moritz and Poeppig describe the plant as attaining a length of 20 feet! The fine specimen for which I am indebted to Mr. Sonder is 8 feet long.

13. *H. nigrescens*, Hook. ; fronds ample straggling submembranaceous 3-4-pinnate glabrous brownish black when dry opaque, primary pinnæ distant often opposite very patent ovate acuminate, secondary and tertiary pinnæ rather short oblong moderately acuminate, ultimate pinnules or segments oblong obtuse pinnatifid, lobes oval obtuse entire bearing a small single sorus on the anterior margin, involucre very small squamiform, stipes and principal rachis flexuose glabrous polished dark brown aculeated. (TAB. XC. C.) *H. repens*, *J. Sm. Enum. Fil. Philip. in Hook. Journ. Bot.* iii. p. 404.

Hab. Jamaica, *Wilson, Wiles, Purdie*, (*Herb. Hook. et J. Sm.*) Caracas, *Linden*, n. 5 and 6. Luzon, *Cuming*, n. 271.—In words or even in a small figure it is scarcely possible to define the characteristic distinctions of this plant, which in many respects resembles *H. repens*. Mr. J. Smith indeed published the Philippine Island plant as such, and stated that it exactly accorded with the plant of that name from Jamaica. This is so far true that he rightly considered the plant of Cuming identical with what he and I independently of each other had considered the *H. repens*; that is, a Jamaica *Hypolepis* which accorded with the ordinary description of the *H. repens*. As already stated, however, I have adopted another form of *Hypolepis*, viz., that of Sieber and Kaulfuss, as the true *H. repens*; and the present species is at once, by the eye, distinguishable from that, by its more lax habit, more membranaceous texture, shorter pinnæ, and much shorter ultimate pinnules, with fewer and smaller fructifications. The aculeated stipes and rachis are the same in both.

14. *H. anthriscifolia*, Pr. ; fronds ample tripinnate hairy on the midrib and veins beneath tender green membranaceous, primary pinnæ oblong ovate acuminate, secondary ones broad oblong acuminate, pinnules linear-oblong subfalcate deeply pinnatifid, lobes small uniform entire or one- or two-

identical therewith, and I am certain that those from the Cape here adduced, and which have been taken up by Kunze under the name of *Cheilanthes commutata*, are in no way different. I bring hither the *Cheilanthes sparsisora* of Schrader, in consequence of the remark of Kunze in the 'Linnæa' above quoted, "Sequenti (his *Ch. commutata*—our *Hyp. anthriscifolia*) omnino similis videtur."

15. *H. elata*, Pr.; "frond triangular (triplicato)-quadri-pinnato-pinnatifid tender membranaceous, pinnæ and primary pinnules petiolate subalternate very remote erecto-patent and as well as the secondary ones sessile ovato-lanceolate very acuminate, tertiary ones oblong obtuse inciso-pinnatifid or sinuated on each side slightly clothed with whitish hairs, sori and true involucre semiorbiculate situated in the sinus of the lacinia, stipes elongated and as well as the rachis flexuose purple clothed with reddish chaffy hairs and rough." *Cheilanthes elata*, Kze. in *Linnæa*, x. p. 542. *Hypolepis elata*, Pr.

Hab. South Africa, in woods at Koratra, Drège, (in *Herb. nostr.*)—" *C. Bergiana* differs in the pinnae and pinnules not being acuminate, in the segments being obliquely obovate and stipes short. *C. sparsisora*, Schrad., according to the very short diagnosis, has the frond less divided, the segments nearly inciso-serrate: *C. commutata* has the involucre fixed near the sinus, &c."—Our own specimen from Drège is so withered and badly preserved that it would be difficult from it to speak of its affinities. As far as can be judged, it is little if at all different from *Hypolepis* (or *Cheilanthes*) *aspera*, Kaulf. sent also by Drège.

16. *H. aspera*, Pr.; "fronds tripinnate, pinnules lanceolate pinnatifido-incised, segments subdentate, rachis asperous, sori solitary at the superior base of the lacinia, involucre squamiform-subreniform." Kaulf. — *Prest. Tent. Pterid. p. 162*. *Cheilanthes aspera*, Kaulf. in *Linnæa*, vi. p. 186. Kze. in *Linnæa*, x. p. 544.

Hab. South Africa, Ecklon, Drège. — If Drège's specimen so named, which I possess, be the same with Ecklon's described by Kaulfuss, the plant scarcely appears to be different from *H. anthriscifolia*: my specimen (a very perfect one) is more rigid and less deeply cut in the ultimate pinnules. Kunze, too, *l. c.*, observes, "a precedente (*C. commutata*, Kze., *C. anthriscifolia*, Schlecht.) satis differre videtur, fronde rigidiori, subcoriacea; pinnis erecto-patentibus lacinia subdentatis, rachique aspera:" and adds "a *C. repens*, Klfs. longius distat." Kaulfuss compares it with *Hypolepis* (*Cheilanthes*) *repens*, "cni proxima," he says: the latter differing in the obtuse pinnules dilated at the apex in the aculeated rachis and smaller involucre.—Indeed it may be truly said that all the preceding species and some of the following have a very close affinity with each other.

17. *H. Bergiana*; fronds tripinnate thin tender-membranaceous semipellucid dark olive-green (when dry) sparsely hirsute on both sides with fulvous hairs, primary pinnae ovate moderately acuminate, secondary ones oblong rather obtuse,

tertiary ones or pinnules and primary lobes subovate rather oblique entire or pinnatifid, involucre (young) very small situated at the inner margin of a lobe or lobule membranaceous, stipes and primary rachises deep purple-black and as well as the secondary rachises and costa clothed with rusty hairs.—*Cheilanthes Bergiana*, "*Schlecht. Adumbr. Fil. p. 51, (t. 30, adhuc inedita).*" *Kunze, in Linnæa, x. p. 541.*

Hab. South Africa, *Ecklon, Drège (in Herb. nostr.), Krebs.* — I regret that, as before observed, my copy of Schlechtendal's 'Adumbratio Filicum' does not extend to p. 51; and I have no access to a description or authentic specimen or figure, unless Drège's specimen marked "*Cheilanthes Bergiana, Schlecht.*" may be considered so. This too I am sorry to say is but the lower portion of a young frond, with a stipes scarcely more than a span long. Judging from this it is distinct from any *Hypolepis* I am acquainted with: in the form of its ultimate lobes and pinnules showing some affinity with *H. repens*; but in little else. *Kunze* observes, "E distinctissimis generis! Specimina nostra triplicato-tri-s. quadripinnata inter longitudinem 4 et 16 pollicum variant. Caudex repens, radicibus elongatis ramulosis. Quoad reliqua v. descriptionem Schlechtendalianam."

18. *H. rugulosa*; fronds rather large tripinnate rigid coriaceous opaque dark brown when dry slightly hairy beneath, ramification much divaricated, primary pinnae ovate acuminate, secondary broad-lanceolate moderately acuminate, pinnules oblong rather obtuse deeply pinnatifid the segments entire or more or less incised, sori transversely oblong one on each lobe, the lobe obliquely reflexed forming the involucre becoming thick and hard at the base the apex scariose, stipes and very flexuose primary rachis red-brown glossy slightly viscido-hirsute and rough scarcely aculeolate. — *Pteris rugulosa, La Bill. Sert. Austro-Caledonicum, p. 6, t. 8. Guillem. Zeph. Tait. p. 18. Cheilanthes divaricatissima, Dryand. in Herb. Banks MSS.*

nate, primary and secondary pinnæ ovato-lanceolate, tertiary ovate obtuse deeply bipinnatifid, primary segments obovate ultimate segments cuspidato-acute, sori solitary on the inner margin of the ultimate segments, involucre evidently formed of a closely reflexed lacinia covering the sorus, stipes as long as the frond and rachises yellow brown slightly asperulous and as well as the midrib beneath hirsute with rather long crisped jointed hairs, caudex very long creeping naked (not scaly). (TAB. XCV. B.)—*Cheilanthes* n. sp. *Colenso*, *MSS.* n. 921.

Hab. Wood of a shaded moist dell, near the summit of Ruahine Mountain range, N. Zealand, and only in that spot, *Rev. W. Colenso*.—None of the present genus has the elegance of the present species, which Mr. Colenso has rightly determined to be new. My largest specimens scarcely exceed a foot in height, and the pinnules are far more deeply and beautifully cut than in *A. anthriscifolia* of Mauritius and the Cape. Here however the fronds are small and rigid and quite opaque. It is most evident in this species that the involucre is formed of the unchanged and reflected lacinia of the pinnules, bent down upon the sorus. Caudex long and creeping.

20. *H. hostilis*, Pr.; frond triangular-ovate tripinnate, primary pinnæ petiolate remote and as well as the secondary ones sessile alternate patent-divergent lanceolate, pinnules opposite adnate oblong obtuse inciso-pinnatifid, the segments cuneate at the base subfalcate, secondary rachises margined, primary rachis and stipes aculeolate for much of their length. *Kze. Presl, Tent. Pterid. p.* 162. *Cheilanthes hostilis*, *Kze. in Linnæa*, vi. p. 86.— β . *major*; fronds beneath hirsute with crisped subglandular hairs, stipes and all the rachis aculeolate.

Hab. Hualaga, Upper Peru, *Poeppig*. Cocos Island, Pacific, *Banks*. "Habit almost of *Dicksonia*. Caudex creeping, slender, clothed with brown scales. Stipes a foot and more long, dark brown at the base. Frond a foot or a foot and a half long, slender, dark green. Sori solitary at the base of the lacinia; involucre spurious, at length evanescent. Allied to *C. repens*, which latter differs in the erecto-patent and much broader divisions of the fronds, and in sori being solitary in the pinnules."—A not very perfect and young, but authentic, specimen of this is in my possession. It has a very close affinity with my *H. nigricans*: but wants the very large and copious aculei of that species: and seems to hold nearly the same relation with that, that my var. β . of *H. repens* does with the normal state of that plant.

What I here make var. β . is perhaps the more perfect state of this species: the frond is 2—3 feet long, of a rich tawny brown colour, more aculeolate and with the pinnules hairy with crisped and somewhat glandular hairs beneath.

21. *H. Purdieana*, Hook.; fronds rather small ovate-oblong moderately acuminate thick-membranaceous bipinnate hirsute with viscid tawny hairs beneath, pinnæ sessile ovato-

lanceolate rather obtuse the rachis winged, pinnæ oblong obtuse lobed at the margin, the lobes rounded entire or 2—3 toothed each lobe bearing a sorus on its inner margin, involucre moderately small semiorbicular of the texture of the frond slightly scariose at the margin, stipes and main rachis orange-brown asperulous viscidly hairy the latter winged towards the apex. (TAB. XCI. B.)

Hab. Paramo of Ruiz, New Grenada, *Purdie*, (Herb. nostr. and J. Smith).—A distinct and well marked species. Stipes 8 or 9 inches long rather stout, dark brown and glossy at the base, then orange-brown, as is the main rachis, both of which are covered with ferruginous viscid hairs. Frond about as long as the stipes, bipinnate. Primary pinnæ 2 to 2½ inches long, beneath more or less glandularly hairy. Pinnules ½ an inch long and about as much broad. The sori eventually become rather large and force back the distinct but herbaceous involucre which has a pale scariose edge. The secondary rachis is everywhere winged.

(*Frond rather small bipinnate*).

22. *H. distans*; glabrous small (1 or 1½ foot high), frond ovato-lanceolate glabrous brown when dry generally distantly bipinnate, pinnæ nearly opposite lanceolate acuminate, pinnules sessile lanceolate rigid subcoriaceous rather deeply pinnatifid, lobes ovate spreading, sterile ones inciso-dentate fertile ones slightly toothed, sori in their inner margin solitary, stipes about equal in length with the frond and as well as the rachis and even the midrib (beneath) aculeolate, caudex much creeping densely paleaceo-hirsute. (TAB. XCV. C.) *Cheilanthes distans*, *Col. MSS. n. 1782*.

Hab. Hokianga, on the west coast of the northern island, and in the valley of the Hutt, N. Zealand, *Rev. W. Colenso*. Northern extremity of the northern island, *Edgerley*.—This is simply bipinnate, and quite unlike

the rest and the pinnules deeply pinnatifid oblong patent, the segments erecto-patent linear-lanceolate veined mucronato-serrate or incised the apex subtruncate bi-tridentate cuneate at the base, the sinus soriferous, sori and involucre marginal subrotund, stipes quadrangular moderately long, primary and secondary rachis margined furrowed purple quite smooth, caudex creeping weak densely fusco-paleaceous." *Kze.* Cheilanthes (Hypolepis) Schimper, *Kunze, in Schk. Fil. Suppl. p. 52, t. 26.*

Hab. Abyssinia, *Schimper, (n. 1651).* — A very peculiar plant, with the habit, as *Kunze* well observes, of some small *Davallia*. We have an analogue in the following species. The frond is 3—4 inches long, pale green when dry; the stipes rather longer, in my specimens. *Kunze's* figure is excellent.

24. *H. Californica*; densely tufted from a short scaly creeping root, fronds small triangular slightly acuminate thin-coriaceous glabrous brown when dry deeply quadripinnate (or more correctly quadripinnatifid) lower pinnæ ovate the rest lanceolate, ultimate pinnules lanceolato-subulate the apices spinulose the sides inciso-serrate, the serratures or lacinulæ sharp pointing upwards soriferous in their sinuses, involucre pale membranaceous reniformi-lunulate rather large directed downwards, stipes dark purple glossy semitere, rachises furrowed above compressed subulate, caudex creeping rather thick clothed with black-purple scales. (TAB. LXXXVIII. A.) *Aspidotis Californica, Nutt. MSS. in Herb. nostr.* Cheilanthes *Coulteri, Harv. MSS. n. 820, in Herb. nostr.*

Hab. Sa. Barbara, California, *Nuttall, Dr. Coulter.* — I have just alluded to the peculiar habit and general appearance of *H. Schimperii*. Our present species, though from a widely different part of the globe, must rank close to that; and Mr. Nuttall is perhaps not far wrong in considering his species deserving of forming a genus (*Aspidotis*) to which, if adopted, *H. Schimperii* must be added. Our plant has almost the same beautifully cut fronds as *Davallia parrula*, Wall. (*Hook. et Grev. Ic. Fil. t. 138*). The divisions being all nearly the same in diameter; the ramification may rather be considered pinnatifid than pinnate. Our present species is essentially distinguished by the peculiarly acuminate and spinulose points of the ultimate segments. In *H. Schimperii* the involucre arise from the margin and are directed towards the costa: here from the sinus of a nearly erect, or at most erecto-patent serrature or lacinula, and its direction is thence downward towards the base of the pinnule. Stipes a span long: frond about 3 inches.

(*Adiantoidea*).

25. *H. Capensis*; caudex creeping scaly copiously root-

ing, stipites sparsely tufted 4—6 inches long slender ebeneous shining scaly with long subulate ferruginous scales only at the base, fronds deltoid membranaceous quite glabrous except a few lax scattered long hairs on the rachises 4 inches long bi-tripinnate, pinnules obovate or oval-oblong rarely oblong decurrent and except some next the main rachis coadunate obscurely crenato-dentate sometimes ciliated rarely pinnatifid, sori copious approximate membranaceous semi-ovate or lunate jagged or ciliated at the margin. (TAB. LXXVII. C.) — *Cheilanthes Capensis*, Sw. *Syn. Fil.* p. 128. Ch. prætexta, Kaulf. *En. Fil.* p. 212. *Adiantum Capense*, Thunb. *Prodr.* p. 173. *Kze. in Linnæa*, x. p. 530.

Hab. Cape of Good Hope, Thunberg, Drège, Ecklon, Zeyher, and others. Algoa Bay, Forbes. — A very distinct species, with a decidedly creeping scaly caudex. The fronds membranaceous conspicuously penniveined, the veins slender forked. The plant dries of an olive-brown colour. We cannot agree with Kunze in placing this in the genus *Adiantum*, though we confess it is not in nature and habit allied to any species of *Hypolepis* or of *Cheilanthes*.

(Fronds with tufted roots, no creeping caudex. Cheilanthoides).

26. *H. radiata*; fronds radiate involucrate at the base of the ray, rays lanceolate acuminate pinnate, pinnules horizontal numerous approximate oblong subfalcate auricled at the superior base, sori copious all round the margin and auricle rather small semiorbicular membranaceous, stipites tufted (from a short thick rooting scaly caudex) exactly terete ebeneous, rachises ebeneous grooved above. (TAB. XCI. A.) — *Adiantum radiatum*, Linn. *Sp. Pl.* p. 1536. Sw. *Syn. Fil.* p. 121. Willd. *Sp. Pl.* v. p. 437. Plum. *Fil.* t. 100.

Hab. Tropical America, abundant; West Indian Islands, Brazil, Columbia, central America, Mexico, Peru; from various collectors. — Extremely

27. *H. pedata*, Hook. ; fronds glabrous small (4—6 inches long) ternately-divided lower lateral divisions unequally bifid (the lowest and shortest one branched pinnate) middle division and superior branch of the lower division bipinnate, pinnules dimidiato-ovate acute obliquely cuneate at the base auricled at the base above, a few of the lower ones of the principal pinnæ subbipinnate or pinnatifid, sori marginal rather small not copious, involucre membranaceous oblong-reriform, stipes elongated (1—1½ foot long) ebeneous glossy as well as the rachis, which is slightly furrowed on the upper side. (TAB. XCII. A.)

Hab. Jamaica, *Purdie*. — This I consider a perfectly new and very distinct species: in some, indeed in many respects, allied to *H. radiatum*, especially in the full dark green colour when dry of the frond, paler beneath, the opacity of the auricled pinnules, the immersed and (except when held up between the eye and a strong light) obsolete veins, the similar lateral involucre, the same ebeneous stipes and rachises. There is even a disposition to be radiate in the ramification; for the two lowest primary pinnæ are nearly opposite, much longer than the rest; and they at the base send out each a divaricating branch (pedate), forming with the terminal or central primary pinna a deeply 5-angled frond. It is an exceedingly pretty plant, and very constant to its characters in all the numerous specimens I possess.

28. *H. spectabilis*, Link; glabrous, fronds 2 feet or more long broad oblong acuminate submembranaceous bright green (when dry) 3-4-pinnate, primary pinnæ deltoideo-acuminate secondary ones lanceolate ultimate ones subdimidiato-oblong sessile decurrent at the base the upper ones confluent, all nearly entire, sori very small not numerous on both margins fewer on the lower very small squamiform nearly white distinct or sometimes confluent, stipes elongated and as well as the rachises ebeneous glossy. (TAB. LXXXVIII. B.) *Cheilanthes spectabilis*, *Kaulf. En. Fil. p. 214.* *Cheil. Brasiliensis*, *Raddi, Fil. Bras. p. 60, t. 75, f. 2.* *Hypolepis*, *Presl, Tent. Pterid. p. 166.* *Aspidium conifolium*, *Pr.*

Hab. Brazil. Common about Rio. Organ Mountains, *Gardner, n. 198.* Pernambuco, *Swainson.* S. Brazil, *Sellow (in Herb. nostr.)* Rio Grande, *Mr. Fox (Herb. n. 123).* — Raddi's figure above quoted is a fair representation of the entire plant. A common state of the fructification is as represented at our TAB. LXXXVIII. B., while it must be confessed that other specimens exhibit the involucre more or less confluent, and this plant has perhaps as strong a claim to *Cheilanthes* as to *Hypolepis*. Some of my specimens are nearly 4 feet long, including the almost black glossy stipes. I think it ranks better near *H. radiata* and *H. pedata* than with *Cheilanthes*, as I am disposed to consider the limits of the latter genus.

29. *H. paupercula*; laxly tufted, frond ovato-acuminate

5—8 inches long chartaceo-membranaceous pellucid pale green bi-subtripinnate, pinnules distant elliptical approaching to rhomboid very obtuse at the apex and the base petiolulate deciduous, petiolule short intensely black glossy dilated at the apex and inserted a little within the margin beneath, veins and marginal sori few remote, involucre pale membranaceous subrotund rather large, stipes and rachises dark black-purple glossy slender. (TAB. LXXXVIII. C.) *Adiantum pauperculum*, Kze. in *Schkh. Fil. Suppl.* ii. p. 65, t. 127. *Cassebeera micromera*, 'Hort. Berol.' Klotzsch, in *Herb. nostr.*

Hab. Province of St. Jago, Cuba, Linden, n. 1864.—A very remarkable plant, but assuredly rather referrible to *Hypolepis* or *Cheilanthes* than to *Adiantum*. In age the involucre are often seen spread open, yet not bearing the sori. The shape of the pinnules is very constant, and a great peculiarity, noticed though not represented by Kunze, is the dense black short petiolule to each pinnule, which on careful inspection will be found to be attached to the pinnule a little within the margin, and there articulated: from this petiole the pinnule is easily detached, and the petiole remaining on the rachis is seen to be dilated at the top into a small disk, which is the point of attachment. I know not that this curious species has been found anywhere but in Cuba and by Linden. Some of our specimens are tripinnate, as represented by Kunze.

30. *H. Gardneri*, Hook. ; tufted small (3 inches high), fronds oblong-lanceolate pinnate glabrous, pinnæ sessile horizontal herbaceous oblong obtuse subfalcate entire or slightly lobed dimidiato-cuneate at the base and auricled at the base above, sori several approximate marginal extending to the auricle, involucre membranaceous between reniform and semiorbicular rather small, stipes very short (scarcely any) and as well as the rachis glossy purple-black ebeneous. (TAB. XCII. B.)

Hab. Side of a narrow ravine on the summit of the Serra de Natividade, Brazil, Gardner, n. 3556.—Perfectly distinct from any other *Hypolepis* or

4. CHEILANTHES, Sw.

(HOOK. GEN. FIL. TAB. CVI. B.) *Cheilanthis* Sp., Sw. et *Auct.* *Adianti*, *Allosori*, *Pteridis*, *Cassebeeræ*, *Notholensæ*, *Hypolepidis* Sp., *Auct.*

Sori subglobose, marginal, small, generally upon a lobule or tooth of the margin of the frond which becomes reflexed. *Involucre* usually at first punctiform, semiorbicular or subreniform or oblong, formed of a reflexed tooth or lobule and more or less of the texture of the frond, or membranaceous and diaphanous, entire or jagged or toothed or ciliated, more or less confluent, so as often to be continuous; sometimes its situation is a little intramarginal.—*Tropical or extratropical mostly small Ferns, inhabiting dry rocky places, with a tufted root or rather short creeping rhizoma or caudex. Fronds tufted more or less, often densely so, membranaceous, glabrous, or hairy, woolly or more or less scaly, never simple, more or less compound, rarely simply pinnate, bitripinnate or variously pinnatifid, pinnules and segments generally small, their margins recurved in fructification. Stipites and principal rachises usually ebeneous (dark purple-black) and glossy. Veinlets forked, free, conspicuous or obsolete, their apex bearing a single sorus.*

Vain is the attempt to form any definite character which shall decide the proper limits of this Genus. A glance at the above synonyms will suffice to show the views that different authors entertain respecting it. From *Adiantum* indeed the habit is very different, as well as the position of the sori upon the involucre in *Adiantum*; on the margin of the frond in *Cheilanthes*, (χῆλος, margin, and ἀνθός, a flower). In separating *Hypolepis* from it, I have been induced to refer to that Genus (by no means generally adopted), species which many would retain, and perhaps justly, in *Cheilanthes*. But a much greater difficulty exists in drawing the line of distinction between *Notholens*, on the one hand, and *Pteris* or *Allosorus*, on the other. *Notholens* is characterized by the absence of an involucre; but in the young state of many species the reflexed margin of the pinnule can hardly, if at all, be distinguished from a true involucre: while, in old specimens of some acknowledged species of *Cheilanthes*, the involucre is so forced back by the capsules, and concealed by them, that its presence is not easy to be recognized at all, especially in those species where the involucre is of the same texture as the frond. Then with regard to *Pteris* and *Allosorus*, it is quite certain that where the involucre of *Cheilanthes* are confluent, as is so frequently the case (not so in true *Hypolepis*) and continuous, the fructification to all appearance is that of *Pteris* and *Allosorus*. It is true that in most cases the specimen, in some of the pinnules, does exhibit free and punctiform involucre, (as we have observed of some of the *Hypolepis* genus): but there are numerous other cases of species, referred

to *Cheilanthes*, where all the involucre are continuous. Generally speaking, the less the margins of the pinnules are lobed or divided, the more continuous and Pteroid are the involucre. The difficulties above stated are well and briefly noticed by Presl. "Sori demum confluentes vel subcontinui, aut Pteridi aut *Allosoro* subsimiles. In quibusdam *Cheilanthis* speciebus, e. g. in *C. microphylla*, *C. odora*, et cæ., indusium tam angustum observatum, ut nonnunquam vix adesse videatur; tales species, si sori conflui marginem frondis undique occupant, *Notholena* simulant." Removing several species of original *Cheilanthes* to *Cassebeera* does not seem to me to lessen the difficulty of defining *Cheilanthes*; and assuredly in natural habit they have nothing to do with the original *Cassebeera*.—I find it vain to attempt to form any well-defined groupes of the species of *Cheilanthes*. The ramification is very variable on the same or different specimens of a species: and those four groupes here given must be accepted as merely provisional.

(*Fronde simply pinnate*).

1. *Ch. micropteris*, Sw.; small, everywhere clothed with glandular hairs, caudex horizontal scaly, roots cæspitose wiry fibrous, stipites short densely crowded from one point ebeneous glossy copiously rufo-paleaceous at the base, fronds linear 3—4 inches long pinnated, pinnæ alternate ovate or subrotund crenate at the base obscurely toothed or lobate convex on the upper surface, involucre formed of the margin of the lobes 3—5 on each pinnule often confluent convex much inflected. — *Sw. Syn. Fil. pp. 126 et 324, t. 3, f. 5. Willd. Sp. Pl. v. p. 455.*

Hab. Pelileo, Quito, (*Swartz*). Brazil, *Sellow*, (*Klotzsch*, in *Herb. nostr.*) Sierra do Tondil, Argentine republic, *Tweedie*. — It would be a great boon to the students of Ferns, if the species of Ferns were in general as distinct as the one now under consideration. It is from a finger's length to scarcely a span high, the stipites densely tufted upon a short thick horizontal scaly caudex, which sends down numerous wiry fibrous roots. The short stipes and simply pinnated frond as well as the rachis are glandularly hairy: the pinnules are small, generally deflexed, convex, crenate or lo-

each of the three primary divisions pinnatifid, at their base bipinnatifid, the margin crenated, involucre membranaceous brown confluent transversely waved and crenated. *Kze. in Linnaea*, 1850, p. 242. *Pteris argentea*, *Gmel. in Nova Acta Petrop.* xii. t. 12, f. 2. *Swartz, Syn. Fil.* p. 105 (not Br.) *Langsd. et Fisch. Plantae des Voy. Russ., Fil.* p. 19, t. 22. *Allosorus*, *Presl. Cassebeera*, *J. Sm.* *Pteris pedata*, var. *Linn.*

Hab. Siberia, *Gmelin*; in the fissures of rocks, near the river Katunja Altai, *Ledebour*. Besides from Altai, I possess specimens of this rare and elegant little Fern from Kamtschatka (*Herb. Besser*), from Dahuria (*Fischer*), and from Lake Baikal (*Turczaninow*).—This has the look of a tropical species, with its white powdery surface beneath, and possesses a form so much resembling the West-Indian *Pteris* (*Allosorus*) *pedata*, *Linn.*, that *Linnæus* considered it a variety of that species, and published it as such, with the observation, “*planta Sibirica minor et subtus nivea, margine ferrugineo.*” It will be seen by the synonyms what conflicting opinions there are respecting the proper genus of this plant. It ranks naturally near *Ch. farinosa*; but the involucre is always continuous, as in *Pteris* or *Allosorus*, but waved and crenated.

3. *Ch. farinosa*, *Kaulf.*; roots tufted, stipites more or less elongated ebeneous glossy deciduously scaly, fronds subcoriaceous from a span to a foot long deltooidly lanceolate or lanceolate glabrous white and powdery beneath pinnate the apex pinnatifid acuminate, pinnæ mostly lanceolate pinnatifid the one or two lowermost pair more or less half deltooid bipinnatifid below, involucre brown scariose rounded sometimes confluent and then waved and lobed, the margin entire or toothed and jagged. *Kaulf. Enum. Fil.* p. 212. *Hook. et Grev. Ic. Fil.* t. 134, excl. *Syn. Reliq. Hænk.* (involucre small entire). *Pteris farinosa*, *Försk. Fl. Egypt. Arab.* p. 187. *Vahl, Symb.* iii. t. 75. *Swartz, Syn. Fil.* p. 105. *Ch. dealbata*, *Don, Prodr. Fl. Nep.* p. 16. *Wull. Cat. n.* 71, (excl. subnum. 4). *Schimp. in Herb. It. Abyss. n.* 1123. *Kunze, in Linnaea*, xxiv. p. 271. *Pteris argyrophylla*, *Sw. Syn. Fil.* p. 105. *Pt. argentea*, *Bory.* *Pt. decursiva*, *Försk. et Sw.* *Cassebeera*, *J. Sm.* *Allosorus*, *Presl.*— β . powdery substance beneath nearly obsolete and usually pale sulphur colour.— γ . small, compact rigid. *Ch. rigidula*, *Wall. Cat. n.* 2175.

Hab. Arabia, *Förskal.* Abyssinia, near Ser Acaba, *Schimper.* East India, plentiful. Nepal and Simla and adjacent region, *Edgeworth, Wallich, Lady Dalhousie.* Mussoree and Nynee Tab, *Dr. T. Thomson.* Almora, 5,000 feet of elevation, *Messrs. Strachey and Winterbottom.* Scinde, *Dr. J. E. Stocks.* Madras Peninsula, *Dr. Wight, n.* 137 and 138. Assam and Khasya, *Griffith, T. Lobb.* Neilgherries, *T. Lobb, Sir F. Adam.*

Bourbon, *Bory*. Ceylon, *Gardner*, n. 1168, *Mrs. Genl. Walker*. Phillipine Islands, *Cuming*, n. 235. Java, *Zollinger*.— β . Oaxaca, Mexico, *Galeotti*, n. 6551. Bombay and other localities, often growing with var. *a*.— γ . Bundydroag, Madras, *Dr. Wight*.—We had two if not more grounds for adopting the specific name of "*farinosa*" for this plant in the 'Icones Filicum,' and not *dealbata* of Mr. G. Don. 1. We believed it to be identical with the *Pteris farinosa* of Förskall: and, 2. There already existed a *Ch. dealbata* of Pursh, a N.-American plant. It is true that Pursh's *dealbata* has been more recently referred to *Notholena*, and Kunze has, in his "Notes on some Ferns of the United States" in 'Silliman's Journal' (July, 1848), said, "I would not have looked for this plant under *Cheilanthes*;"—yet we think *Notholena* treads too closely upon the heels of *Cheilanthes* to make it desirable to increase unnecessarily the number of specific names common to both. In regard to the identity of our *Ch. farinosa* and the *Pteris farinosa*, published in 1775, of Förskal, it is probable that authors differ from us on that ground rather in consequence of the locality (Egypt) than from any positively distinct character traceable in Förskal's description or Vahl's figure: few probably have seen authentic specimens. Kunze however observes ('Linnæa,' xxiv. p. 274), "*Cheilanthes* (*Pteris*, Försk.) *farinosa*, Kaulf.—non Hook. et Grev.—ipso b. auctore in recensione operis laudati jam testante, ab hac nostra differt et adhuc tantum in Arabia et Abyssinia (coll. Schimperiana sub n. 1123) reperta est. Differre imprimis videtur pinnis remotioribus, indusiis contiguis et indumento pulveraceo tenuiore."—We have no access to Kaulfuss' Egyptiaco-Arabian specimen; but we have before us Schimper's Abyssinian species, n. 1123, and we have no hesitation in saying that it is identical with the ordinary East Indian forms above noted. If then Abyssinia and Arabia be considered its western boundary, it may be traced thence easterly, almost uninterruptedly to Java and the Phillipine islands. Species growing in so vast a range may be expected to vary considerably. The same root, from Abyssinia, of Mr. Schimper, has one frond quite white and pulverulent beneath, and another frond with only a faint trace of powdery substance: and this makes it doubtful if our following species (*Ch. rufa*) should be retained as such. No less striking differences occur in the involucre, sometimes rounded and distinct, at other times continuous for a great length of the margin, more or less lobed and cut (rarely entire), and more or less toothed or ciliated. Our β . is never quite destitute of powdery substance: and I have received from Mexico (*Galeotti*)

Hab. Mexico, *Hænke*. Rio Grande de Lerma, *Galeotti*, n. 6442. On rocks and walls in the temperate regions of Mexico, *Siebold*, in *Herb. nostr.*—To this plant Presl brings as synonymes the *Pteris argyrophylla*, Willd., and *Pt. argentea*, Bory, “fide plantæ Boryanæ in Herb. Willd.,” which are the same as our *Ch. farinosa*, (*Pteris*, *Forsk.*) Martens and Galeotti, ignorant of Presl’s name for it, figure and describe it (not very satisfactorily) under that of *Ch. candida*, and they add the remark, “species proxima *Ch. farinosa*, Hook. et Grev., sed in hac pinnæ nec pinnatæ nec profundè pinnatifidæ.” We have never seen the ordinary state of *Ch. farinosa*, with the copious pure white pulverulent substance beneath, from Mexico: but Mr. J. Smith and myself possess from Galeotti (Oaxaca, n. 6551) what exactly corresponds with our var. β . of *Ch. farinosa*: so that there is good reason to believe that that species and its varieties may be found in the New as well as the Old World. Kunze does not allow that the “fig. 1, a,” belongs to Martens and Galeotti’s plant: but it is probably as faithful as most of the other magnified figures of those authors. Presl, in his ‘*Reliquiæ Hænkeanæ*,’ observes of this plant, “*Habitus Pteridis*, sed pro specie *Pteridis* non agnosco, quia indusium non continuum sed squamæforme, et tot quantum sori:” yet in his ‘*Tentamen Pteridologiæ*’ he refers it to *Pteris* (*Allosorus*). Kunze contends for its being a true *Cheilanthes*. The fact is, the involucres resemble those of other species of this genus in being sometimes squamæform and distinct: sometimes combined and continuous.

5. *Ch. rufa*, Don; roots tufted, stipites rather short with few spreading scales and shaggy as is the whole rachis with very copious spreading ferruginous hairs, fronds about a span long ovato-lanceolate subcoriaceous hirsuto-pubescent above, white and pulverulent beneath, the margin densely ferrugineo-hirsute pinnate pinnatifid at the apex, pinnæ oblong very obtuse pinnatifid, the lower ones subovate sub-bipinnatifid, involucres dark brown membranaceous approximate and free or continuous and waved and crisped or lobed and toothed at the margin often quite concealed by the copious ferruginous tomentose shaggy hairs. *Don*, *Prodr. Fl. Nep.* p. 18. (TAB. XCIX. A.) *Ch. farinosa*, var. *vestita*, *Wall. Cat.* n. 71, (4).

Hab. Mareko, Nepal, *Dr. Wallich*. Rocks, Mergui, Mishmee and Khasya, *Griffith*. Simla, *Edgeworth*.—In none of the numerous states of *Ch. farinosa*, do I find anything approaching to hairiness: in the present plant, from four different localities, the shaggy copious ferruginous hair, long spreading on the stipes and main rachis, quite crisped and woolly at the margin of the frond, is quite a remarkable feature. The fronds, too, are less divided, in the lower pinnæ especially, but on this character very little dependence can be placed. In other respects, and especially in the white pulverulent under surface (though often quite concealed by the hairiness) the plant resembles some states of *Ch. farinosa*.—Here are, at any rate, tangible characters, if constant. Original specimens, given by Mr. Don to Mr. J. Smith, show this to be intended for his *Ch. rufa*.

(*Pinnæ or pinnules large for the Genus, broad; not white or pulverulent nor scaly beneath*).

6. *Ch. Dalhousiæ*, Hook.; roots tufted, stipites rather short ebeneous glossy deciduously scaly, fronds about a span long deltoidly lanceolate glabrous on both sides and perfectly free from powdery substance beneath pinnate the apex deeply pinnatifid and acuminate, pinnæ upper ones lanceolate pinnatifid, the rest broader and bipinnatifid, lowest pair very broad at the base with their lowest inferior segments (or pinnules) much longer than the rest, the margin crenated sometimes in the barren portions ciliated, involucre brown scarioso reniform close but generally distinct sometimes confluent and then less ciliated but lobed and jagged. (TAB. LXXVIII. B.)

Hab. Simla, *Lady Dalhousie, Mr. Edgeworth. Mokargari, Kumaon* 4500 feet of elevation, *Messrs. Strachey and Winterbottom*.—Did I possess only a solitary specimen of this, or were the specimens any of them mixed up with *Ch. farinosa*, I should have been disposed to consider it a powderless variety of that species: but there is not a trace upon any of my specimens of that pulverulent substance seen more or less copiously upon all true *farinosa*, and these have been found by three different persons at different periods, yet only in two localities. I venture therefore to offer it as distinct. Its fronds are of a thin membranaceous texture, turning pale olive-brown in drying, and the fructifications present nearly the same variations in the involucre that we see in *Ch. farinosa*. It naturally ranks with that species, though here artificially placed in another section.

7. *Ch. pteroides*, Sw.; caudex thick creeping scaly, stipes 1—2 feet long and as well as the rachises (which are woolly at their axils with slender scales) stout ebeneous glossy, frond ample glabrous 1—1½ foot long tripinnate, pinnæ and pinnules distant, the latter petiolulate often an inch long cordate elliptical obtuse crenate opaque brown when dry, involucre copious contiguous yet distinct subrotund membranous brown

(*Pinnae and pinnules as in the preceding group, but densely clothed with imbricated scales*).

8. *Ch. squamosa*, Gill.; roots tufted, stipites 1—2 inches long and as well as the general and partial rachis and costa and pinnules beneath densely clothed with and concealed by the copious large ovate acuminate ciliated membranaceous ferruginous scales, fronds 4—5 inches long ovato-lanceolate bipinnate subcoriaceous glabrous and naked above (fringed with the scales beneath), pinnules large oblong sinuato-lobate, involucre submembranaceous narrow continuous. *Gill. in Hook. et Grev. Ic. Fil. tab. 151.*

Hab. Rocks, Cerro del Morro, San Luis, Argentine Republic, *Dr. Gillies*.—A most distinct and well-marked species, which, as far as we know, has never been detected by any botanist save *Dr. Gillies*. It has no natural affinity with the preceding broad-pinnuled species, nor has it any with the scaly species allied to *Ch. lendigera*.

(*Fronds generally decomposed, the pinnules small, glabrous or hairy or scaly*.—*Eucheilanth*es).

9. *Ch. fragrans*, Webb et Bert.; small, roots cæspitose, stipites short glossy deep brown bristly with deciduous subulate ferruginous scales, fronds glabrous ovato-lanceolate bipinnate or at the base subtripinnate, primary pinnæ broad-ovate lower ones distant, pinnules (fructiferous) convex on both sides oblong or ovate crenato-lobate, involucre copious small approximate one or more on each lobule their margin toothed or crenate pale and membranaceous often confluent. — *Webb et Berth. Phytogr. Canar. p. 453* (non Sw.) — *Polypodium fragrans*, *Linn. Mant. 2, p. 307*, (non Sp. Pl. p. 1550). *Desf. Fl. Atl. ii. p. 408, t. 257.* *Pteris acrosticha*, *Balb.* — *Pteris fragrans*, *Lag.* — *Adiantum fragrans*, *Viv.* *Cheilanth*es odora, *Sw. Syn. Fil. p. 127 et 327.* *Schkuhr, Fil. p. 115, t. 123.* *Ch. suaveolens*, *Sw. Syn. Fil. p. 127.* *Schkuhr, Fil. p. 116, tab. 19,* (*Adiantum fragrans*, on the plate). *Sibth. Fl. Græc. t. 966.* *Ch. Maderensis*, *Lowe, Nov. Fl. Mad. p. 6.*

Hab. Rocky places throughout the region of the Mediterranean. "Civæ est hæc planta" says *Mr. Webb*, "oræ utriusque sinus ingentis Mediterraneæ, a Syria (*Labillardière*) ad Hispaniam, unde per Lusitaniam et Maderam Fortunatas attingit." Switzerland is perhaps its most northern locality. *Dr. Alexander* finds it in *Dalmatia*. We have to add one very distant locality, viz., *Affghanistan*, *Mr. Griffith*, n. 13, in herb. nostr.—The student of Ferns is much indebted to Messrs. *Webb* and *Berthelot* for determining the proper name and settling the synonymy of this species in their noble work on the *Cauary-island* plants. They observe, "Linnæus plantam nostram sub nomine *Polypodii fragrantis* (*Mant. nov. Sp. Plant.*), quam secum a Gallia communicavit doctus monachus *Gabriel* (cui *Sco-*

Iopendra Gabrielis, Syst. Nat. vol. i. p. 1063 dicata) optime descripsit. Confusio et specierum perturbationes cum Swartzio, quod rarum, ortæ, qui nomina duo diversa plantæ Linnæanæ, Linnæanum alteri Indicæ, nisi forsitan eadem, indidit; planta enim valde polymorpha; utcumque autem erit *Cheilanthes* (*Polypodium*, Linn.) *fragranti* veræ restituendum nomen suum et Swartziana, dum legitima, *Cheilanthes Swartzii* vocanda."—Polymorphous as this species is, it is much less so than most species of the Genus or of the Family: and we can refer to the figures of Schkuhr, both his tab. 19 and 123 (though he considered the two plants as distinct), and to Sibthorpe, and Desfontaines, for faithful representations of the entire plant: but the fructification is nowhere well exhibited. Irregular as is the form of the involucre, and however these may be distinct or combined, it will be observed that while their lower portion or base is evidently formed of the inflexed margin of the frond, green and herbaceous, the rest is a pale membranous dilatation as it were of it.

10. *Ch. tenuifolia*, Sw.; caudex short creeping scaly, stipes elongated rarely scaly, frond submembranaceous glabrous 3—4 inches to a span and more long ovate acuminate or more or less deltoid subtripinnate, ultimate lobes of the primary and secondary divisions the largest more or less pinnatifid, pinnales elliptic oblong or oblong-lanceolate subpinnatifid or crenate with broad blunt teeth, involucre mostly elongated more or less confluent more or less crenated or denticulate sometimes transversely wrinkled, stipes and rachis purple-black, main rachis winged above, secondary and tertiary rachises all with a narrow wing. (TAB. LXXXVII. C.)—*Sw. Syn. Fil.* p. 129 et 332. *Schkuhr, Fil.* p. 117, t. 125. *Willd. Sp. Pl.* v. p. 460. *Br. Prodr.* p. 155. *C. rupestris*, *Wall. Cat. n.* 67. *C. micrantha*, *Wall. Cat. n.* 68. *Aspidium tenue*, *Retz, Obs.* vi. p. 39. *Pteris humilis*, *Forst. Prodr. n.* 421? *Trichomanes tenuifolia*, *Burm. Ind.* p. 237. *Dryopteris campestris*, &c., *Rumph. Amb.* vi. p. 77, t. 34, f. 2.

Hab. East Indies (*Swartz*), more especially in the hilly eastern provin-

Lobb, from Java and Sincapore: and our figure above quoted will give a better idea of the plant than whole pages of description can do.

11. Ch. *Preissiana*, Kze.; "frond coriaceous glabrous short-oblong bipinnato-pinnatifid or tripinnate, pinnæ triangular-oblong inferior ones ascending remote, pinnules or laciniae from a cuneate base ovate (in young cultivated fronds trapezio-ovate) rather obtuse incised or pinnatifid, sori sub-continuous, involucre at length inciso-laciniate, rachises flexuose and as well as the longish stipes purple-ebeneous paleaceo-villous, rhizoma short horizontal fusco-paleaceous." *Kunze, in Pl. Preiss. ii. p. 112.*

Hab. Rocky places, York district, Swan River, *Herb. Preiss. n. 1308.* Island of Bouron, *Labillardiere.* New Zealand, *Lesson.*—"Antea," says *Kunze, l. c.*, "hanc plantam *Cheilanthis ambigua*, Rich. (Voy. de l'Astrol. Bot. i. p. 83) credidi; sed nunc filicem eandem Lessonianam, quam ex amicæ manu Mèrattii acceperam, a Richardo neglectam, et *Ch. ambiguam* vix veram generis speciem esse vero similis mihi videtur. Hanc nondum vidi. Nostra habitu *Ch. tenuifolia*, Sw., haud absimilis; differt rachibus pilosis, stipite longiori et soris continuis." *Kze. l. c.*—I regret to say that rich as is my herbarium in Swan River Ferns, and in those from New Zealand, I do not find any that I can satisfactorily refer to *Kunze's Ch. Preissiana*. The *Cheilanthes ambigua*, Rich., I have had reason to suppose might be possibly *Hypolepis tenuifolia*, *Bernhardi*, and of this work, or else a *Polypodium* with the habit of *Hypolepis* (Pol. viscosum, *Spreng.*—*P. rugulosum*, *Br. ?*). The comparisons made by *Kunze* make it more difficult to comprehend the species in question.

12. Ch. *Sieberi*, Kze.; caudex creeping setaceo-paleaceous, stipites 2—6 inches long and as well as the rachises ebeneous, fronds quite glabrous subcoriaceous linear-oblong erect rigid bi-tripinnate, primary ones short pointing upwards lower ones petiolate subtriangular acuminate, pinnules oblong decurrent lower ones inciso-pinnatifid upper ones entire or sinuated the margins much recurved especially when dry, sori punctiform and semiorbicular or more or less combined and continuous, the edge pale and membranaceous toothed. (TAB. XCVII. B.) *Kunze, Ind. Sem. Hort. Lips. an. 1839, et in Plant. Preiss. ii. p. 112.* Ch. *tenuifolia*, *Sieb. Syn. Fil. n. 116. Fl. Mixt. n. 250. Link, Fil. Sp. Hort. Berol. p. 64, (excl. syn.)*

Hab. N. Holland; Sydney, *Sieber, Fraser.* Subtropical interior, *Col. Mitchell.* Endeavour River, *Allan Cunningham.* Swan River, *Drummond, Preiss.*—New Zealand, northern island, *Mr. Colenso, J. D. Hooker, Dr. Logan.* Middle island, *Akaroa, Raoul.* Houraki Gulf, *Dr. Lyall.*—I retain this, with much hesitation, as a species distinct from *Ch. tenuifolia*: true indeed there are some specimens which in the narrow fronds and erect rigid habit are much at variance with the ordinary form of *tenuifolia*;

but then there are intermediate forms which seem to combine them. I cannot agree with Kunze in saying of it, "a *Ch. tenuifolia*, Sw., abunde differt fronde membranacea:" for our specimens are, except those in a very young state, more rigid. That author also notices its affinity with *Ch. repens*, Wall.,—which latter is true *tenuifolia*.

13. *Ch. microphylla*, Sw.; caudex subrepent, stipes rather short and rachises deciduously ferrugineo-pubescent or hirsute, fronds lanceolate pubescent or glabrous elongate lanceolate bi- rarely subtripinnate, pinnæ lanceolate, pinnules oblong obtuse entire or more or less crenate or pinnatifid, involucre copious rounded or elongated frequently much confluent.—*Sw. Fil. p. 127. Willd. Sp. Pl. v. p. 458. Ch. micromera, Link, Hort. Berol. ii. p. 36. Link, Sp. Fil. Hort. Berol. p. 64, (fide Kze.) Ch. pubescens, H. B. K. (fide Schlecht.) Cassebeera, J. Sm. Adiantum microphyllum, Sw. Fil. Ind. Occ. iii. p. 1713. Adiantum nigrum, &c., Sloane, Jam. Hist. i. p. 93, t. 13, f. 2. Lonchitis minima, &c., Plum. Fil. p. 44, t. 58.*

Hab. West Indian Islands generally, (Swartz). Jamaica, abundant, *M'Fadyen, Hartweg, n. 1581, Wilson, Purdie. Cuba, B. D. Greene, Esq. Mexico, Karwinski, Galeotti, n. 6557, and 6564, Dr. Coulter (Rio del Monte, small, pinnules few, broad, n. 1678). Sierra Madre, N.W. Mexico, Seemann, n. 1931. New Mexico, El Paso, C. Wright, n. 823, (small). Columbia, Moritz. Venezuela, Linden, n. 842. Peru, Mathews, n. 3297. Valley of the Andes of Peru, 6000 feet, Dr. Jameson. Punta of St. Elena, Salto and Panama, Tweedie.—To say that this is a variable species, is only what may be said of almost all Ferns: and I do not see that any the most minute description can meet the difficulties of the case: for they rather tend to confuse and to mislead. The general form of the frond is tolerably well expressed in Plumier, though on his usually exaggerated scale: but there are some states that bring our species into near relationship with *Ch. tenuifolia*: our largest specimens on the other hand have an affinity with some states of *Hymolepis spectabilis*. The involucre is particularly*

naceous dark green distant oblong but subcordate at the base and the lower ones shortly stipitate (only 2 or 3 of the terminal ones decurrent and confluent) lobato-pinnatifid or crenato-lobate the lobes soriferous, involucre semiorbicular 1—8 on each lobe more or less combined their edges pale submembranaceous crenate. (TAB. XCVI. B.)

Hab. River Parana, S. Brazil, *Tweedie*.—I cannot refer this to any described species. In habit it approaches very small specimens of our *Hypolepis spectabilis*, and might perhaps have been placed near it in the same questionable genus; in some respects also to states of *Ch. microphylla*:—but the ramification is much more simple and uniform. Our tallest specimen (and it is only a part of a frond, 17 inches long) is not broader than our specimens which are less than a span long, and all are alike bipinnate. The lower pinnules are shortly petiolate or stipitate. The caudex creeps considerably, and is scarcely thicker than a crow-quill. — I have received this plant only from Mr. Tweedie.

15. *Ch. Seemanni*, Hook.; roots tufted, stipites 3—6 inches in length scaly below with black subulate scales and as well as the general and partial rachis ebeneous-purple, fronds glabrous submembranaceous dark green about equal in length to the stipes oblong-lanceolate bipinnate, primary pinnæ rather distant oblong acuminate patent, pinnules often quite opposite horizontally patent oblong sessile and decurrent so as to form a narrow wing on the rachis lobato-pinnatifid, lobes or segments equal in size generally one or two more on the upper margin, all soriferous, involucre one on each lobe semiorbicular membranaceous pale brown all free and distinct. (TAB. XCVII. A.)

Hab. Sierra Madre, N.W. Mexico, *Seemann*:—came mixed with *n.* 1931 (*Ch. microphylla*, Sw.) — At first sight this resembles *Ch. Tweediana*, but the pinnæ will be found very different, and the deep segments or lobules of the pinnules, more in number on the upper margin than on the lower; each lobule bears a distinct sorus at its apex, covered while young with a semiorbicular membranaceous and diaphanous involucre. Although mixed with *Ch. microphylla*, there is no difficulty in separating the one from the other.

16. *Ch. Moritziana*, Kze.; stipes 5—6 inches long ebeneous glossy ferrugineo-paleaceous at the base, frond ovato-lanceolate acuminate a span to 10 inches long firm rigid yet somewhat membranaceous dark green glabrous 3—4-pinnate or tripinnato-pinnatifid, the ultimate pinnules oblong-cuneate slightly lobed or toothed, partial and universal rachises pubescenti-scabrous, involucre small generally formed of the involute apex of a single lobe rarely subconfluent. (TAB. XCIX. B.) *Kze. in Linnæa*, 1850. p. 244 et 307. *C. clongata*, *Kl. MSS.*

et *Pl. Exsicc.* (not Willd.) *C. microphylla*, *Klotzsch*, in *Linnaea*, xx. p. 337, (excl. syn. *C. Klotzschiana*, *Kze*, que *Gymnogramma flexicaulis*, *Kl.*) *Kze.*

Hab. Venezuela, and in Mexico, *Schiede*, n. 800.—Our figure and specific character are taken from specimens kindly sent to us by Dr. Sonder, gathered at La Guayra by Moritz, (*Coll. III.* n. 263). It is a very elegant and we believe very distinct species, better deserving the name of *microphylla* than the *Ch. microphylla*, Sw., with which it has been compared, and which Kunze says differs “fronde basi haud dilatata, semper bipinnata, pinnis ultimis majoribus, rachi primaria valida stipiteque brevitate denae rufo-paleaceis.” To us its nearest affinity seems to be *Ch. tenuifolia*; but it is much more delicate in all its parts: the primary pinnæ are more numerous, more approximate, and the ultimate pinnules and lobes are more cuneate at their base. Our figures will show the differences better than words can do.

17. *Ch. elongata*. Willd. *Herb.*; “fronds bipinnate, lower pinnules sinuato-pinnatifid obtuse glabrous, indusium obsolete subcontinuous.” *Kaulf. En.* p. 213, (not *Kl. MSS.*) *C. Linkiana*, *Kze.* *C. microphylla*, *Lk.* (not Sw.) *Kunze*, in *Linnaea*, xxiii. p. 213.

Hab. W. Indies, Hispaniola, (*Kaulf.*)—“Sori contiguous confluent. Involucres obsolete, sub-continuous and ciliated.”—Such is all the description we have of Willdenow’s *Ch. elongata*. But from some of Kunze’s references I judge it may be placed near *Ch. Moritziana*, *Kze.*

18. *Ch. obtusata*, Pr.; “fronds oblong glabrous bipinnatifid, pinnæ sessile subopposite oblong-lanceolate obtuse deeply pinnatifid, laciniae ovato-oblong obtuse, lower ones incised-crenate, involucres dentiform, rachis and costæ villous beneath, stipes flexuose, caudex creeping paleaceo-villous.” *Presl, Reliq. Hænk.* p. 6, t. 11, f. 1. *Tent. Pterid.* p. 160.

Hab. Mountains of Peru, *Hænke*.—“Ab affini *Ch. microphylla*, Sw., dif-

adultiora ob indusia spuria fere explanata *Polypodii* characteres præ se ferunt." — I place this, with which I am unacquainted, near *Ch. obtusata*, Presl, in consequence of the following additional remark of Kunze. "Magnitudo et habitu fere *Ch. obtusata*, Pr., quæ vero nostra differt, laciniiis crenato-incisis et indumento glanduloso." — In another place Kunze speaks of his *Ch. crenata* as synonymous with *Ch. elegans*, when he says ('*Linnæa*, xxiv. p. 275), under *Ch. bullata*, "habitu fere *Ch. elegantis*, Desv., s. *crenata* meæ."

20. *Ch. Wrightii*, Hook.; small nearly glabrous, caudex creeping branched scaly about as thick as a crow-quill, stipes rather distant 2—3 inches long and as well as the main rachis brown-ebeneous grooved on one side sparsely hairy with slender spreading hairs, frond about equal in length with the stipes bi-scarcely tripinnate quite glabrous rigid subcoriaceous dark green above pale beneath, primary pinnæ subovate in circumscription rather distant especially the lower pairs which are nearly opposite, pinnules oblong more or less decurrent upper ones confluent pinnatifid with smallish lobes, the smaller lobes with the apex revolute and forming squamiform but close-placed distinct involucre the larger ones with the sides (generally) involute resembling confluent or more or less elongated involucre. (TAB. CX. A.)

Hab. Collected in the expedition from Western Texas to El Paso, New Mexico, May—October, 1849, *Charles Wright*, n. 823.—A small and very pretty, and as far as I can judge, very distinct species, somewhat allied in its fructifications to the East Indian *Ch. varians* of Dr. Wallich, but very much smaller and with ample distinguishing characters from that. *Ch. Alabamensis* is a much larger plant, more regular in its ramification and very uniform in the continuous involucre, as may be seen by the figures. The present is, in its squamiform involucre, much more truly a *Cheilanthes*.

21. *Ch. subvillosa*, Hook.; stipes shining brown slightly scaly, frond broad-lanceolate or ovate pinnate thin submembranaceous glabrous above, soft villous about the rachises beneath, pinnæ all obtuse upper ones lanceolate the rest broad deltoid-lanceolate or ovate pinnatifid, rarely the lowest lacinia again pinnatifid, the margin nearly entire, involucre of nearly the same colour and texture as the frond sometimes subrotund and free mostly continuous lobed and crenated, main rachis especially above villous. (TAB. XCVIII. B.)

Hab. Western Himalaya, *Mr. Edgeworth*. — With a good deal the aspect of our *Ch. Dalhousie*, the present plant is nevertheless very distinct and perhaps ought to be referred rather to *Allosorus* (Presl) than to *Cheilanthes*; for the involucre is more generally continuous than in separate scales, though so lobed and crenate that it quite vacillates between the two genera. I have seen nothing corresponding with it in any other collection. Our specimens have unfortunately no root, and the stipes of all is broken.

The figures represent a medium sample. In one of our specimens the pinnae are more, and in another less, divided than is here represented.

22. *Ch. bullosa*, Kze.; "rhizoma short thick obliquely descending," stipites 6—8 inches long terete asperous at the base and as well as the rachis and stout prominent partial rachis beneath which extends to the apex of the pinnae deep glossy ebeneous, frond rigid coriaceous glabrous (dark olive-brown when dry) oblong-lanceolate opaque above and there under the microscope as it were minutely granulated pinnato-pinnatifid 6—8 inches long, pinnae rather distant nearly opposite the lower ones sometimes sub-bipinnate ovato-oblong patent deeply pinnatifid the lobes linear crenate on the lowest inferior ones often again pinnatifid singularly bullate on the upper side in consequence of the sunken costa and veins (the spaces between them thus being convex), the primary lobes of the pinnae are rather distant, so that the pinnae may almost be said to be pinnate with a winged rachis, the margins of the lobes and teeth of the crenatures are much reflexed and form semiorbicular involucre pale at the edge which become united and more or less continuous and slightly erose at the margin in age becoming more membranous. (TAB. XCVI. A.) *Kunze in Linnæa*, xxiv. p. 274.

Hab. Neilgherry Hills, *Schmid, Koch (Kunze), Dr. Gideon Thomson*.—"Species valde insignis," as Professor Kunze well observes. That able author compares it with "*Ch. elegans*, Desv. (*Ch. crenata* (Kze.), in habit; but with *Ch. pruinata* and *Mysurensis* in characters. It is however very distinct from any of them and from every species. The stipes and main and partial rachis are stout, glossy purple-black, the former asperous at the base; the partial rachis singularly stout and prominent beneath, and its glossy black colour extends to the apex of the pinnae. The upper side of the frond is remarkable for its very opaque surface, apparently caused by minute granulations there, and the costa or partial rachis and veins are much sunk,

24. *Ch. varians*; root tufted, stipites 4—6 inches long slender ebeneous glossy plane and margined on the upper side obsoletely setoso-paleaceous, fronds submembranaceous glabrous about a span long the pinnatifid apex acuminate, pinnated above bipinnated below, primary pinnæ distant spreading or a little curved upwards sessile, superior ones lanceolate acuminate sinuato-pinnatifid at their base and somewhat auricled at the upper base, lower ones deltoid acuminate pinnate at their base pinnatifid acuminate (caudate) in the upper half, pinnules lanceolate acuminate or acute pinnatifid below, the lowest inferior pinnæ the longest. (TAB. CIII. A.) *Pteris varians*, *Wall. Cat. n. 86*. *Pt. cæspitosa*, *EjUSD. Cat. n. 90*. *Cheilanthes tenuifolia*, *J. Smith, in Hook. Lond. Journ. Bot. iii. p. 404*, (n. "408," from Luzon only).

Hab. Mountains of Ava, and of Sylhet (*De Sylva*), *Dr. Wallich*. *Mergui*, Assam, (*Simons*, n. 262). *Khasyna*, *Griffith*. *Moulmaine*, *T. Lobb*, n. 391. *Luzon*, *Cuming*, n. 408. — Though by no means inclined to unite this, with *Mr. J. Smith*, to *Cheilanthes tenuifolia*, I am not indisposed to refer it to the same Genus, though it is very questionable whether it should be placed in *Cheilanthes* or in *Pteris*, as our friend *Dr. Wallich* has done: and if this latter distinguished and zealous botanist were to ask a reason for doing so, I could only say that the fructification is in part *Cheilantheid* and in part *Pteroid*. I am sure if *Mr. J. Smith* had possessed our numerous specimens from Eastern Bengal, and observed their uniformity, he would not have referred it to any described species of *Cheilanthes*. *Dr. Wallich's* appropriate name of *varians* refers to the varying form of the pinnæ on the same individual plant; the upper ones are simple and scarcely even lobed, the middle ones are deeply pinnatifid at their base, while the lowest ones are pinnate at their base. The *Pt. cæspitosa*, *Wall.*, offers no point of difference from *Pt. varians*, *Wall.*

25. *Ch. Alabamensis*, *Kze.*; caudex creeping clothed with dense glossy brown woolly scales, stipites 4—5 inches long deep glossy black as well as the main and lower part of the secondary rachis which are hairy on one side, fronds quite glabrous subcoriaceous about as long as the stipes broad lanceolate acuminate pinnated pinnatifid above below bipinnate, primary pinnæ approximate ovate-lanceolate acuminate, pinnules or lobes of the upper pinnæ lanceolate rather acute entire or auricled or lobate at the base, pinnules of the lowermost pinnæ almost again pinnate, involucre submembranaceous mostly continuous all round the lobes and pinnules the edges slightly erose. (TAB. CIII. B.) *Kze. in Silliman's Journ. 1848*, p. 87. *Linnaea*, 1850, p. 242. *Pteris Alabamensis*, *Buckley, in Sill. Journ. 1843*, p. 177. *Pteris gracilis*, *Rugek, Coll. Pl. Am. (not Kaulf.)*

Hab. Southern United States, growing in tufts on limestone rocks, banks of the Tennessee river, Alabama, *Mr. Buckley*. Broad river, Tennessee, *Rugel*. Capville, Upper Georgia, *Herb. Shuttleworth*.—Notwithstanding the remark of Professor Kunze, that this is a very distinct species, to me it appears to be too nearly allied to some of the forms of *Ch. microphylla*; the form, I mean, having the most compact and acute pinnules, and with continuous involucre. Indeed Kunze himself says "it resembles *Ch. micromera*, Sw., and my *Ch. Linkiana*, (*Ch. micromera*, *Link*)." This *Ch. micromera* of Link, Kunze has since referred to *Ch. microphylla*: and we may, in this form, conceive that *Ch. microphylla* has attained its northern limits in the Southern States of N. America.

26. *Ch. Moluccana*, Bl.; "frond bipinnate subcoriaceous and as well as the rachis and stipes pubescent, pinnules obovate obtuse crenulate confluent above, sori continuous, involucre obsolete, stipes and rachis black-purple." *Blume, En. Fil. Jav. p. 136*.

Hab. Banda, in the Molucca Islands, *Blume*. "Locus inter *Ch. microphyllam*, Sw., et *Ch. vestitam*, Sw." *Bl.*

27. *Ch. Kleinhoffii*, Bl.; "frond pinnate pubescent beneath, pinnae subopposite ovato-oblong obtuse repando-crenulate, upper ones entire, lower ones auriculato-trilobate, involucre obsolete continuous, rachis and stipes pubescent." *Blume, En. Fil. Jav. p. 137*.

Hab. Java. "Ex herbario javanico Cl. Kleinhoff sub nomine *Acrostichum appendiculatum*, Willd. accepi." *Bl.*—The above is all the information we possess respecting the two supposed species, *Ch. Moluccana* and *Ch. Kleinhoffii*, Bl.

28. *Ch. multifida*, Sw.; caudex short thick slightly creeping clothed with black subulate scales, roots tufted fibrous, stipites 4—6 inches long plane and marginate above on the upper side terete below a little scaly at the base and as well as the rachises stout rigid deep ebony-black glossy, fronds

iz. Blume's specimens from Java, and those from St. Helena, are identical with our numerous ones from South Africa.

29. *Ch. triangula*, Kze.; "frond triangular thick coriaceous glabrous tripinnate, pinnæ and pinnales petiolate remote patent, secondary pinnales or laciniæ oblong obtuse sinuato-lobate marginate the margin inflexed crenate, involucre marginal and as well as the sori at length diffuse contiguous, stipes and rachises flexuose rigid purple slightly hairy, caudex short." *Kunze, in Linnæa*, x. p. 536.

Hab. Caffraria and near the Cape, *Eklon*. Rocky places in the Sneeuwbergen, Witbergen and Compasberg, *Drège*. Natal, *Krauss*, n. 385. — "In habit resembling *Ch. multifida*, Sw., but differing in the triangular frond, which is triplicato-pinnate and the pinnæ not glandular beneath." Yet *Kunze* describes his var. *β. flexa* of *Ch. multifida* as "fronde subtriangulari (novella) subglandulosa." — *Drège*, according to my herbarium, distributes two forms under this name, one marked (*d*) with young fructification, which I consider identical with *Ch. multifida*, Sw.; the other marked (*b*) without fructification, and sufficiently agreeing with *Kunze's* description of the frond of *Ch. triangula*, differing from *Ch. multifida* in the "triangular frond" and in the larger pinnales. *Krauss's* solitary Port Natal specimen in my herbarium, seems the same as this latter, but is less triangular. It has the fructification of *Ch. multifida*, and seems almost to unite the two. At any rate, we know other species of *Cheilanthes* to vary as much or more than those we are now considering.

30. *Ch. Mathewsii*, Kze.; caudex stout creeping clothed with black-brown shining scales, stipites 2—4 inches long ebeneous glossy slightly downy above, fronds a span to nearly a foot long coriaceous linear-lanceolate rather obtuse tapering much below in consequence of the contracted pinnæ there, glabrous above, the stiff rigid rachis glanduloso-pubescent, pinnate scarcely bipinnate, pinnæ subpetiolate approximate above very distant and gradually becoming very small below deltoid more or less acuminate sometimes caudate, the segments or pinnales linear-oblong deeply crenated with the margin recurved so as to give almost a beaded appearance to the pinnæ, the teeth of the crenatures bear the squamæform distinct but approximate involucre. *Kze. in Schkuhr, Fil. Suppl. p. 50, t. 25.* *Ch. pruinata*, *Kauf. En. Fil. p. 210.* *Ch. pruinosa*, *Kunze, in Linnæa*, xxiii. p. 245.

Hab. Peru, (*Kaulfuss*). Crevices of rocks and dry places, Huamantanga, *Mathews*, n. 605. Bolivia, *Tweedie*, (smaller, pinnales shorter). — *Kunze's* plate gives a very good general representation of this very distinct Fern: except that the very beaded outline of the segments of the pinnæ is not shown. Many of our specimens are much more slender and many much longer, but they do not, although very copiously in fructification, exhibit such large, white involucre. — The texture is peculiarly firm and rigid, the

fronds drying to a dirty olive-brown colour. In the 23rd volume of the 'Linnæa,' Kunze refers the species to "*Ch. pruinosa*, Kaulf.": — but Kaulfuss's name is *pruinata*, and that name must have been given from a character which does not exist in the perfect specimens of the species, and which was probably the effect of some injury, "pinnulæ supra crusta tartarea tectæ."

31. *Ch. hirta*, Sw.; roots tufted, caudex subrepent, stipites short 2—4—6 inches long glossy purple-brown terete very hairy and more or less glandular shaggy at the base with very long glossy fuscous subulate scales, frond 1—1½ foot long lanceolate or broad oblong-lanceolate lengthened (in outline and circumscription) by the small contracted distant pairs of lower pinnae, subcoriaceous hairy on both sides bipinnate or tripinnate, primary pinnae crowded or lax lanceolate the lower ones opposite very distant gradually becoming small the lowermost pair often scarcely a line long, pinnules oblong or ovate pinnatifid or crenulate, the lobes with the margin recurved and bearing the copious more or less confluent sori. (TAB. CI. B.) *Sw. Syn. Fil. p. 128 et 329. Will. Sp. Pl. v. p. 458. Adiantum Cafferum, Sw. in Schrad. Journ. 1800, ii. p. 85. Blume, En. Fil. Jav. p. 137. Kunze, in Linnæa, x. p. 539.* — Var. *parviloba*; frond bi-tripinnate calvescent, pinnae lanceolate elongate and remote, pinnules sub-trilobed or auriculate at the base, lobes obtuse convolute, middle one oblong-linear, stipes slightly paleaceous at the base, rachis paleaceo-hirsute. *Ch. parviloba, Sw. Syn. Fil. p. 128 et 331.*

Hab. Cape of Good Hope: extending East to Graham's Town and Port Natal, thence North to Macalisberg, (*Burke*). Lofty mountains of Java, *Blume, in Herb. nostr.*—It would be hardly possible, with the most elaborate figures, to give a good idea of this protean species. The accurate Kunze enumerates four forms in the 'Linnæa,' vol. x.; but it would be as easy to constitute twenty as four.—The more usual state of the plant from the vicinity

oblong, tertiary and the laciniae roundish-ovate, all glabrous above beneath paleaceo-hirsute, involucre marginal crenulate and as well as the sori continuous, stipes flexuose sparingly and the rachises densely paleaceo-hirsute purple, caudex creeping branched flexuose." *Kze.* (TAB. CII. A.) *Kunze*, in *Linnaea*, x. p. 538.

Hab. Rocky shady places in Sneeuwbergen, *Drège*.—"Approaches *Ch. hirta* and somewhat *Ch. lendigera*; but it differs from the latter in the curved pinnae and very narrow scales, from the former in the more compound frond, remote pinnae, with the pinnules twice as large and the stipes glabrous. A foot high." *Kze.*—Our specimens from *Drège*, marked *Ch. induta*, *Kze.*, *a.*, are much less paleaceo-hirsute (hence a good deal resembling *Ch. multifida*, only that is quite glabrous) than those marked *β.*, which are very paleaceo-hirsute beneath, while the upper side of the frond and stipes and rachises are glabrous.—Our figure is taken from the specimen marked *β.*

33. *Ch. pubescens*, *H. B. K.*; "fronds at the apex bi- at the base tripinnate, pinnules oblong or obovate-rotundate obtuse subsessile entire upper ones confluent, rachises pubescenti-hirsute, stipes glabrous." *H. B. K. Nov. Gen. Am. i. p. 21. Presl, Tent. Pterid. p. 160.*

Hab. At the bases of the mountains near Xalapa, Mexico: elevation 4,200 feet. *H. B. K.*—"Fronds 4—5 inches long, at the apex bi- at the base tripinnate: primary pinnae subopposite, lower ones scarcely an inch long, superior ones confluent; secondary pinnae alternate, 3 lines long: pinnules alternate, obovate-rotundate or oblong, subsessile, pubescent, entire, a line long, terminal ones smaller, confluent. Universal and partial rachis nearly terete, black, pubescenti-hirsute. Stipes as long as the frond, terete, black, glossy, pubescent above, towards the base clothed with subulate, diaphanous, ferruginous scales. Sori marginal, at length confluent. Sporangia ferruginous. Indusium crenate, diaphanous, glabrous." *H. B. K.*—This species is acknowledged as such by *Presl* and others, yet I do not anywhere find its affinities alluded to.

34. *Ch. MacLeanii*, *Hook.*; roots tufted from a knobbed scaly caudex, whole plant clothed with spreading glandular jointed hairs the shorter hairs the most generally glanduliferous, stipites aggregate 2—4—5 inches long and as well as the main rachis ebeneous glossy, fronds 6—8 inches or even a foot and 14 inches long linear-oblong bi- subtripinnate membranaceous but rather rigid dark dirty-brown when dry, primary pinnae petiolate subopposite in rather distant pairs especially the lower ones long-ovate, pinnules large (for the size of the plant) broad ovate the lower ones petiolulate and distant, upper ones confluent all lobed or pinnatifid very obtuse, involucre squamiform semiorbicular glossy-brown close pressed over the sorus all free but closely placed. (TAB. CX. B.)

Hab. Andes of Peru, *John MacLean, Esq.*—One of the most distinct of any species of the genus, of a very dingy, dirty, dark brown color (in its dry state), remarkable for the large size of the pinnules and their distant position from each other on the rachis, and for the copious glandular hairs with which the whole plant is clothed. I have not observed that any of the involucre are confluent; but although at first they are close-pressed to the under-side of the frond, the sori eventually force them back and they form a ragged edge to the pinnules and the lobes. I have never received this *Cheilanthes* from any collector but Mr. MacLean.

35. Ch. *Mysurensis*, Wall.; roots densely cæspitose the fibres very woolly, stipites slightly scaly below short 1—2 inches and as well as the main rachises deep glossy ebenaceous rigid, frond a span or more long in outline narrow-oblong acute tapering below by the diminishing of the pinnae glabrous membranaceous but firm bipinnate, lower pinnae very small all of them oblong-ovate sessile frequently opposite pinnate below, the upper half pinnatifid, pinnules or segments linear-oblong plane (much incurved if dried without pressure) toothed or lobato-pinnatifid, each tooth or lobe bearing one or two subconfluent small whitish suborbicular sori. (TAB. C. A.) *Wall. Cat. n. 66.* Ch. *fragrans*, *Swartz, Syn. Fil. p. 127 et 325, t. 3, f. 6,* (not *Polyp. fragrans, Linn. Mant. ii. p. 307, which is Ch. fragrans of Webb and Bert. and of this work; nor Pol. fragrans, Linn. Sp. Pl. p. 1550, which is Aspidium fragrans, Sw. Lastrea, Pr.*) Ch. *Swartzii, Webb et Bert. Phytogr. Canar. p. 454 in note.* Ch. *opposita, Kaulf. En. Fil. p. 211,* (incorrect in the locality, "Cape of Good Hope"). *Asplenium Mysorense, Heyne, in Roth, Nov. Sp. Ind. Or. p. 395?*

Hab. "One of the most common Ferns in the Madras Peninsula, found among rocks and hills, at all heights, from 50 feet to 3,000 feet above the level

Madras Peninsula, it seems quite confined to that district, and to the mountains of Ceylon, where it has been recently found by the lamented Mr. Gardner.

36. *Ch. Chusana*, Hook.; small, root tufted, stipites tufted very short 2—4 lines long slightly scaly (scales small subulate) and as well as the main rachis ebeneous glossy plane on one side or furrowed above, frond lanceolate attenuated below 3—4 inches long rather rigid subcoriaceo-membranaceous glabrous bipinnato-pinnatifid, primary pinnules petiolate subdeltoïd, lower ones opposite and gradually smaller the rest alternate, secondary pinnæ rather distant and as well as the laciniaë linear crenato-lobate or lobato-pinnatifid obtuse, involucre in pairs formed of the inflexed lobules membranous and pale only at the edge distinct but copious and approximate. (TAB. CVI. B.)

Hab. Cliffs, Chusan, *Mr. Alexander*.—Apparently a very distinct species from any hitherto published, but allied to *Ch. Mysurensis*. It differs from it in the small size, broader and shorter primary pinnæ, but especially in the involucre, which are more decidedly inflexed margins of the pinnules, and always in pairs. The stipes, short as it is, is ebeneous, glossy, and plane on the upper side, and where it forms the primary rachis it is distinctly furrowed. I have seen this in no collection but that received from Mr. Alexander.

37. *Ch. tenuis*, Pr.; "fronds ovate tripinnate bipinnate at the apex, pinnules sessile oblong obtuse nearly glabrous, upper ones confluent, sori distinct, rachises and stipes villosopaleaceous." *Presl, Reliq. Hænk. p. 65.*

Hab. Mexico, *Hænke*.—Presl says nothing about the affinities of this species, and only gives descriptive notes; "Caudex very short small, clothed with black setæ. Stipes 3 inches high filiform terete blackish-brown; villous with piliform articulated brown paleæ. Frond an inch and a half long as much wide at the base, below tri- at the apex bipinnate. Pinnæ lanceolato-oblong, obtuse, subopposite shortly petiolate. Pinnules sessile oblong obtuse deeply crenate bearing scattered hairs, 2 lines long, 1 broad: upper ones confluent. Rachises blackish brown villous with piliform articulated paleæ. Sori small distinct, situated in the sinuses of the membranaceous crenulated involucre."

Lendigera-group.

* *Hairy, rarely scaly or chaffy.*

38. *Ch. lendigera*, Sw.; caudex much creeping villous with brown chaffy hairs, stipites distant a span to a foot long brown and as well as the rachises more especially densely clothed with tawny brown long scarcely chaffy hairs most copious and persistent in the rachises more or less deciduous on the stipes, fronds a span long oblong or ovato-lanceolate subcoriaceous

3- sub 4-pinnate, primary pinnæ patent from a broad base oblong acuminate, pinnules orbicular sessile, sterile ones crenato-lobate in fruit subglobose (from the great reflexion of the margins) glabrous above very villous beneath with long tawny hairs, involucre a broad white plane membranaceous margin continued all round the pinnule. (TAB. CIV. B.) *Ch. lendigera*, Sw. *Syn. Fil. p.* 128 and 328. *Ch. lentigera*, Willd. *Sp. Pl. v. p.* 460, not Mart. and Galeotti, (according to their specimens, n. 6391 and 6437). *Pteris lendigera*, "Car. Præl. 1801, n. 664." *Cheilanthes lanuginosa*, Mart. et Galeotti, *Syn. Fil. Mex. p.* 75, t. 20, f. 2. — β . hairs of the rachis less copious and more chaffy. (TAB. CVI. A.) *Ch. minor*, Mart. et Galeotti, *Syn. Fil. Mex. p.* 75, t. 21, f. 1.

Hab. Quito and New Spain, (Swartz). Real del Monte and Pic de Orizaba, Mexico, elevation 6,500—9,500 feet above the sea, Galeotti, n. 6430. Guatemala, Skinner. High mountains of Sierra Nevada, Santa Martha, Purdie, (very fine).— β . Cordillera of Vera Cruz, Linden, n. 49. Galeotti, n. 6256, and n. 6467 and 6257, (from the Peak of Orizaba, 11,500 feet).—This does not appear to be a common plant in collections; and, notwithstanding the accuracy of Dr. Swartz's description above quoted, I fear it is often confounded with others of the *Lendigera*-group, a small section always more or less copiously woolly or scaly, with the pinnules, in fructification at least, so orbicular and subglobose as to resemble small lentil-seeds, whence more recent authors, supposing that *lentigera* (lentil-bearing) rather than *lendigera* (nit-bearing) was intended by Cavanilles, have adopted Willdenow's orthography. This species is readily distinguished from its near ally, *Ch. myriophylla*, Desv., by the absence of the copious and decidedly chaffy scales of the latter. *Ch. lendigera* has no true scales, though the hairs sometimes become chaffy, i. e., broader and membranaceous at the base. I have seen no specimens from Quito, a habitat given, probably after Cavanilles. My finest specimens were gathered by Purdie on the Nevada de Sta. Martha, New Grenada. — I cannot consider the *Ch. minor* of Martens and Galeotti otherwise than as a mere variety of this plant, in which the hairs are so dilated below (though long and slender) as to have a chaffy appear-

Link, Fil. Hort. Berol. p. 65. Kze. in Silliman's Am. Journ. 1848, p. 87, (name and remarks).

Hab. Mexico: raised from spores taken from a native specimen by *Professor Link*. Southern United States of America. North Carolina, *Rugel* (according to *Kunze*): also sent to Dr. Kunze by *Dr. Asa Gray* from Tennessee. Rattene mountains, head waters of the Colorado, *Gordon, in Herb. nostr.* Collected in an Expedition from Western Texas to El Paso, New Mexico, *Ch. Wright, n. 816.* — Brief as is the account given us of *Ch. tomentosa* by Professor Link, we can have little difficulty, though we do not possess authentic samples, in referring to it our specimens of *Cheilanthes* from Mr. Gordon and Mr. Chas. Wright. Link well observes, “frons 6—8 pollices longa, pinnæ vix pollicem longæ, petiolus (stipes) cum rachi pilis longis squamiformibus albis:” and further, “affinis *Ch. vestita*, at differt primo intuitu rachi dense et albo-pilosa, quæ in *Ch. vestita* pilis laxè positis ferrugineis obsita.” Our specimens have the hairs of the upper surface and margin white, while the tomentum beneath is tawny: — the aspect is much whiter than any of our specimens of *Ch. vestita*. The whole plant, too, is stouter, intermediate in this respect between *Ch. vestita* and the following, *Ch. Bradburii*: — but the chief distinction from the former (*Ch. vestita*) is to be found in the presence of the erect appressed scales on the stipes, rachis, and especially on the under side of the secondary rachises, much the same character, indeed, by which *Ch. myriophylla* is distinguished from *Ch. lendigera*, only here the true scales are less numerous, and confined to the underside of the principal rachises, and scarcely conspicuous enough to justify our placing *Ch. tomentosa* in the following sub-group.

40. *Ch. Bradburii*, Hook.; root of copious fibres from a short thick horizontal caudex, stipites clustered 5—8 inches long stout brown and ebeneous scaly with long glossy ferruginous subulate scales at the very base, the rest and the rachises densely clothed with long tawny soft woolly hairs mixed with very slender long paleaceous ones, fronds oblong-lanceolate rigid 8—12 and even 14 inches long 3—4-pinnate slightly woolly with white deciduous hairs above permanently woolly with short tawny wool beneath, primary pinnules rather distant lower ones more so and petiolate all oblong subacuminate, pinnules small oval or obovate entire or only lobed as an indication of more compound pinnation, the margin recurved with a pale distinct membrane at the edge constituting the nearly continuous involucre. (TAB. CIX. B.)

Hab. Southern United States, Manitou rocks, 250 miles up the Missouri, *Mr. Bradbury*. Texas, *Drummond, second collection, n. 254; Lindheimer, Fl. Texana Exsiccata, fasc. iv. n. 743.* “Jamaica, *Mr. Wiles*,” (given me as such by Mr. Lambert; but possibly one of Mr. Bradbury's, so named by mistake). Afghanistan? *Griffith, in Herb. nostr.* — Very closely allied to *Ch. tomentosa*, Link, it must be confessed; yet I think distinct in its stronger, stouter habit and larger size, more tawny (for the sparse white hairs on the upper side do not give the hoary appearance so conspicuous in *Ch. tomentosa*), the absence of real scales (although the hairs are often

paleaceous), the more oval pinnules, but above all the distinct and rather broad membranaceous margin to the involucre. All the characters of our American specimens exist equally in the Afghanistan ones.—As Mr. Lambert, I believe, possessed a full collection of Mr. Bradbury's plants from the Missouri, I cannot help expressing a suspicion that the specimen he gave me as from "Mr. Wiles, Jamaica," is a Missourian one.

41. *Ch. Szowitzii*, Fisch. et Mey.; roots densely tufted from a short thick caudex, stipites crowded 2—4 inches long slender and as well as the principal rachises ebeneous somewhat hairy mixed with copious long spreading subulate scales, fronds 3—4 inches long oblong-lanceolate quite glabrous above densely woolly and generally tawny beneath tri-subquadripinnate, primary pinnæ ovate acuminate approximate or distant, pinnules small subrotund or subcordate sublobate, terminal ones often larger and oblong, the margin revolute forming nearly a continuous involucre the edges obscurely membranaceous. *Fisch. et Meyer, in Hohenacker, En. Pl. Prov. Talysch, p. 11.*—*α. nudiuscula*; woolly covering short and entirely confined to the underside of the pinnules. (TAB. XCIV. B.) *Cheilanthes suaveolens, β.*, fronde subtus villosihirsuta, *Hohenacker, in Herb. nostr.*—*β. Stocksii*; woolly covering of the under-side of the frond exceedingly dense tawny, so copious and spreading as at first sight apparently to invest the whole frond.

Hab. *α.* Rocks near the fort of Schuscha, in Talysch, province of Karabagh, Caucasian Alps, *Hohenacker*. Crevices of rocks, Pushut, Kooner-Kafanistan, in Afghanistan, *Griffith, n. 11, in Herb. nostr.* Indus valley, 7,500 feet; rocks, Kashmir; and in Western Tibet, 8,500 feet, *Dr. T. Thomson*.—*β.* Chilil Tun, Scinde, *Dr. Stocks, n. 1020, in Herb. nostr.* Afghanistan, with *α.*, *Griffith*. Iskardo, valley of the Indus, 7,000 feet, *Dr. T. Thomson*.—So closely does this *Cheilanthes* resemble in habit and ramification and woolliness the North American *Ch. vestita*, that notwithstanding the respective countries are so widely apart, I was disposed to con-

stipes lanceolate or ovato-lanceolate tri-quadrifidate hirsute with longish soft hairs above and, at the margins beneath and on the partial rachis, densely woolly the wool more or less tawny, primary pinnæ ovate the lower two pairs generally remote upper ones more crowded, pinnules small nearly orbicular obscurely crenato-lobate at the margins the terminal pinnule generally larger and more oblong, the margin recurved and forming the nearly continuous involucre not membranous at the edges. (TAB. CVIII. B.) *Sw. Syn. Fil. p. 128?* *Schkuhr, Fil. p. 1162, t. 124?* *Willd. Sp. Pl. v. p. 456.* *Ch. lanuginosa, Nutt. MS. in Herb. nostr. Adiantum vestitum, "Spreng. Anleit. iii. p. 122."* *Aspidium lanosum, Sw. Syn. Fil. p. 58, (Willd.) Nephrodium lanosum, Mich. Am. ii. p. 270. Notochlaena vestita, Desv. J. Sm.—β. smaller, tripinnate, primary pinnæ all distant.*

Hab. N. America. Not unfrequent in the Southern States; westward to Texas and El Pasco (New Mexico), *C. Wright, n. 818.* Missouri, St. Louis, *Engelman, (var. β.);* Independence, *Nuttall,* to the Rocky Mountains in about lat. 52°. California, and New Caledonia, Oregon, *Douglas.*—What we here describe and figure as *Cheilanthes vestita* is, we know, the plant so considered by American botanists, and is no doubt the *Nephrodium lanosum* of Michaux, *Fl. Bor. Am. (1803),* and he properly describes the fronds as "lanosissima." Swartz, however, who adopts Sprengel's (prior?) specific name, *vestita*, given in a work to which I have no immediate access, describes the fronds as *hispidulous.* Schkuhr adopts the same term, and figures a plant, the under side of which gives no idea of the really woolly nature of the frond; having, moreover, entire oblong pinnules, with a solitary terminal involucre.—The hairs of this species are everywhere crisped and woolly, very dense on the under side, often sparse and deciduous on the upper side.

Lendigera-group.

** *Very scaly.*

43. *Ch. scariosa, Pr.;* caudex 3 inches and more long descending radice the summit densely crinite with ferruginous chaffy hairs, stipes 1—2 inches long and as well as the rachis and lanceolate bipinnate frond (about a span long) clothed above with dense silky wool and beneath everywhere with closely imbricated white diaphanous ovate scales ciliated and villous at the margin often rich brown in the centre, bipinnate, pinnæ short lanceolate of 5—9 almost globose coriaceous pinnules glabrous above woolly beneath crenato-lobate at the margin, the margins involute and forming the involucre. (TAB. CIV. A.) *Pr. Reliq. Hænk. p. 65. Kunze, in Linnaea, ix. p. 85. Acrostichum scariosum, "Willd. Sp. Pl. v.*

p. 125." *Sw. Syn. Fil.* p. 16. *A. lanuginosum*, "*Willd. in Act. Erford.* 1802, p. 31, t. 3, f. 4."

Hab. Mountains of Peru, *Dombey, Presl*. Fissures of rocks between San Rafael and Huarriaca (Huanuca?), Peruvian Andes, *Poeppig*. Limestone rocks ascending the Cordillera from Tarma, Andes, Peru, *Mathews*, n. 610, *MacLean*. — I have not had the opportunity of seeing the figure of this plant published by Willdenow, nor have I any specimens from Mexico, where the plant is said by Willdenow to have been found, and where it was detected by Karwinsky, according to Kunze. Our Peruvian specimens are extremely distinct from *Ch. lendigera*, to which Presl says it is "maxime affinis," nor should we be at all disposed to say with Kunze, "*Ch. squamosa*, Hook. et Grev. t. 151, difert fronde bipinnata." Presl remarks that Willdenow's specimens are "quadripinnate." Ours are bipinnate, as Swartz and Kunze describe the species: but so dense is the mass of silky wool on the upper side (springing indeed from the rachis but covering and concealing the whole frond) and so dense the mass of scales beneath, that it is only by carefully removing these coverings that the true nature of the ramification or the pinnules themselves can be seen. It is an extremely beautiful white and silvery species, probably rare: for ourselves, we have only received Andine Peruvian specimens from Messrs. MacLean and Mathews. When dry, the pinnæ are very apt to roll or to be reflexed back towards the upper side of the rachis. — I dare not quote the *Ch. scariosa* of Dr. Klotzsch, '*Linnaea*,' xx. 338 as a synonyme to our plant. His is a plant from Caraccas, of Moritz, n. 33, and he further quotes Hartweg's n. 1518 from Columbia, both of which are clearly what we here consider *Ch. elegans*, and he quotes *Ch. lendigera* of Presl, not his *Ch. scariosa*, which latter, nevertheless, I think is clearly ours, for he speaks of the frond as "*squamis lanceolatis scariosis albis diaphanis densissime obtecta*." Willdenow, too, the original authority for our plant, expressly says, "*singularis filix fronde bipinnata ex toto squamis albis nitidis obtecta ita ut de pinnulis nemo aliquid observet*," which could not be said of Moritz' n. 33, nor Hartweg's n. 1518: a species of *Cheilanthes* that must have been familiar to Willdenow. Klotzsch, on the other hand, gives the Herbarium of Ruiz and Pavon as containing his *Ch. scariosa* "in Andium montibus ad Huanuci et Tarmi tractus," which seems to be exactly the region of our plant. He further quotes a Peruvian plant of Dombey's

minute sessile orbicular and subglobose from the inflexed fructified margins glabrous above very hairy beneath, involucre a continuous membrane forming a pale edge to the recurved margin (the hairs of the partial rachises and of the under side of the pinnules often long and crisped and more or less enveloping the whole of the minute pinnules). (TAB. CV. A.) *Desv. in Journ. de Botanique*, ii. p. 44, t. 13, f. 1. *Kunze, in Linnæa*, ix. p. 85? *Ch. elegans, Kunze, according to his specimen (of Poeppig) from Peru, in Herb. nostr. H. B. K. Nov. Gen. Am. i. p. 22, (according to Kunze). Notholæna mollis, Kunze, in Linnæa*, ix. p. 54, (according to his specimen from Poeppig in my Herbarium).

Hab. South America, (*Desvaux*). Andes of Quito, *Jameson*. Loja, *Equador, Seemann*, n. 948. San Rafael, Huanuco, elevation 6,000 feet, Peru, *Poeppig, MacLean*. Chacapoyas, and Purrochuca, on dry sandy banks, *Mathews*, n. 607. Bolivia, *Penland*. Sta. Martha, *Pardie*. Toluca and near Oaxaca, Mexico, *Andrieux*. — A species first distinguished from *Ch. lendigera* by *Desvaux*. It is much smaller than that, has tufted stipites springing from a small nodose caudex, narrower fronds, copiously clothed at the back with scales (springing from the rachises) as well as hairs, smaller but equally rounded, and sessile pinnules. *Kunze's Ch. elegans*, of his distributed specimens, is clearly our *Ch. myriophylla*. He refers the *Ch. myriophylla* of H. B. K. to his *Ch. elegans*, but whether justly so or not I am unable to say.

45. *Ch. Lindheimeri*, Hook.; caudex very long about as thick as a crow-quill creeping branched and entangled clothed with brownish scales, stipites scattered 4 inches to a span high ebeneous beset with subulate narrow lanceolate cinereous appressed more or less deciduous scales, more abundant upwards and in the rachises, where they are copiously mixed with larger ovate fimbriated brown scales covering the under side of the pinnæ and fine cinereous wool which more or less densely covers and conceals the upper side of the pinnæ, fronds 3—5 inches long ovato-lanceolate subcoriaceous tripinnate, primary pinnæ oblong acuminate approximate lower ones more distant nearly opposite, secondary pinnules crowded linear oblong, pinnules very minute densely crowded sessile subglobose glabrous above woolly beneath the margins much recurved, involucre formed by the continuous recurved margins having a very narrow membranous edge. (TAB. CVII. A.)

Hab. Western Texas, *Lindheimer, Fl. Tex. Exsic. n. 744, (1847)*. Between Western Texas and El Pasco, New Mexico, *C. Wright, n. 817, (1849)*. Sierra Madre, New Mexico, *Seemann, n. 1934, (smaller specimens, but otherwise identical)*.—It is not without considerable hesitation that I constitute a new species of this, yet I cannot by any means satisfactorily refer it to

any described one. The copious scales on the under side of the frond readily distinguish it from *Ch. lendigera*, which it resembles in the long creeping caudex. The rounded sessile pinnules keep our plant distinct from *Ch. elegans*, and the very woolly or tomentose upper side of the frond, the very crowded pinnules and secondary pinnae and compact habit, and above all the long creeping caudex separate it both from *Ch. elegans* and *Ch. myriophylla*.

46. *Ch. elegans*, Desv.; roots tufted, caudex scarcely any nodose clothed with dark brown appressed bristly scales, stipites tufted a span to nearly a foot long clothed as well as the rachises with numerous pale brown hairs, the partial rachises in addition with copious brown fringed scales concealing the under side of the pinnules, main rachis often zigzag, fronds a span and more long broad-oblong or ovato-lanceolate tripinnate acuminate, primary pinnules often lax from a broad base oblong acuminate, secondary pinnulae lanceolate rarely again pinnated, pinnules very minute glabrous above villous beneath obovato-globose (subpyriform) with the margins much recurved tapering at the base (especially the terminal ones) into a distinct short petiole, involucre apparently formed of the recurved margin of the pinnules with scarcely any membranous edge, (hairs of the partial rachis and under side of the pinnules woolly with the wool concealing more or less the entire minute pinnules). (TAB. CV. B.) *Desv. in Journ. Bot.* ii. p. 43, t. 13, f. 1. *Kunze, in Linnæa*, ix. p. 85? *Ch. lendigera*, *Mart. et Galeotti, Syn. Fil. Mex.* p. 74, and *Ch. paleacea*, p. 76, t. 21, f. 2. *Ch. lendigera*, *Moritz, in Herb. Caracas (not Sw.)*, n. 33.

Hab. Chili, (*Desraux*). Quitinian Andes, *Jameson*. Columbia, between the village and bridge of Guapulo, *Hartweg*, n. 1518. Andes of Peru, *MacLean*. Caracas, *Moritz*, *Linden*, n. 512. Mexico, *Bates*. Oaxaca, and near Tampico, elevation 6,500—8,000 feet, *Martens and Galeotti*, n.

47. *Ch. Fendleri*, Hook.; small, caudex creeping scaly, stipites sparse scattered slender brown scaly with subulate appressed scales, in the main and secondary rachises the scales become more copious broader ovate acuminate white glossy brown at the base, fronds 2—3 inches long ovate-lanceolate subcoriaceous pale green quite glabrous on both sides tripinnate, primary pinnules ovato-lanceolate obtuse, pinnules rather large for the size of the frond convex broad cuneate sessile somewhat decurrent retuse at the apex entire or 2—3-lobed, the margins of the lobes merely incurved scarcely confluent and forming the involucre. (TAB. CVII. B.)

Hab. New Mexico, *Fendler*, in *Pl. Nov. Mex. n.* 1015, (1847).—In many respects this species of *Cheilantes* approaches the *Lendigera*-group: but it is the smallest of that section, and has the pinnules larger than any. There are no hairs on this plant whatever; where the scales are discontinued on the under side, as at the secondary pinnæ, the pinnules are seen to be quite glabrous, and the rachises even of the primary pinnæ have no scales or clothing of any kind, and are of the same texture and pale green colour as the pinnules.

48. *Ch. speciosissima*, Alex. Braun; stipes 3—4 inches long squamose with copious large ferruginous lanceolate spreading scales, the same scales are continued but diminishing in size upwards on the main rachis and on the partial rachises and becoming rather chaffy hairs, frond ample broad-lanceolate acuminate $1\frac{1}{2}$ —2 feet in length coriaceous rigid bipinnato-pinnatifid ferruginously hairy on both sides but especially beneath, primary pinnæ approximate linear-oblong acuminate sessile 2—4 inches long pinnatifid at the apex, secondary pinnules oblong obtuse broadest at the base pinatifid, lobes or segments oblong obtuse entire the margin much recurved, involucre continuous formed of the recurved margins become membranaceous and more or less cut or jagged at the edge.—*Alex. Braun*, in *Kunze, Analect. Pteridogr.* p. 35, t. 23. *Kunze*, in *Linnæa*, xiii. p. 145. *Benth. Plantæ Hartw.* p. 54. *Ch. scariosa*, *Mart. et. Galeotti, Syn. Fil. Mex.* p. 74. *Plecosorus*, *Fée*.

Hab. Mexico, *Karwinski*. Near Real del Monte, *Hartweg*. *Coscoma-tepec*, *Vera Cruz*, *Linden*, n. 44. Peak of *Orizaba*, 12,000 feet elevation, *Galeotti*.—*Kunze* may well speak of this noble plant as "*Filix vere speciosissima*:"—some of our specimens show that they attain a length of frond exclusive of stipes, of 2 feet. Yet this species has been referred by *Martens* and *Galeotti* to *Ch. scariosa*, *Kaulf.* (*Acrostichum scariosum*, *Swartz and Willdenow*). *Kunze's* figure and description are alike excellent.

(*Rachis zigzag*).

49. *Ch. dichotoma*; roots tufted, plant wholly glabrous, stipites (4—6 inches long) as well as the zigzag rachis slender ebeneous glossy, fronds a span to a foot long oblong tri-quadripinnate, tertiary pinnæ often trifoliate, pinnules sparse remote small cordate or ovate subtrilobate or incispinnatifid ultimate lobes often cuneate, each bearing 1—3—4 free rounded small involucre pale at the apex, often confluent. (TAB. CII. B.) *Swartz, Syn. Fil. p. 129 and 335, t. 3, f. 7. Willd. Sp. Pl. v. p. 560. Hypolepis trifida, Klotzsch, in Herb. nostr.*

Hab. Mount St. Antonio, Quito, *Née, (Swartz). Brazil, Sellow, from the Royal Berlin Herbarium. Uruguay, Mr. Jas. Baird, in Herb. nostr.* — Our first knowledge of this plant is from Swartz, who describes and figures it from Quitinian specimens, gathered by Luis *Née*. Dr. Klotzsch, unaware of that description, has given it as a new species of *Hypolepis*. It is, however, a true *Cheilantes*, according to our view of the Genus, and very different from any other species known to me. The roots are densely tufted, as well as the stipites. Stipes and very zigzag and extremely slender capillary rachises glossy ebeneous, plane on the upper surface and margined: lower part of the stipes only scaly. The fronds are quite glabrous, a foot long, primary pinnules elongated, secondary and tertiary shorter, pinnules often ternate (whence probably the name *trifida*), small, sparse, not much unlike the smallest leaflets of *Thalictrum alpinum*. The species is probably quite confined to South Brazil; and it is more than likely that the Quitinian locality given by Swartz has originated in some error.

50. *Ch. flexuosa*, Kze.; "frond rigid subcoriaceous puberulous ovate-oblong acuminate at the base quadri- tri- or bipinnate less divided at the apex, primary pinnæ opposite or alternate petiolate (ad tripinnatis), lower ones arrect or patulous upper ones patenti-divergent, ultimate pinnules petiolate suborbicularo-ovate crenate or incised, sori of few

ntensely black glossy subulate scales at the base 8—10 inches long slender and as well as the rachises purple-brown glandularly hirsute, fronds submembranaceous pale green minutely glandularly pubescent 6 inches long deltoid ternately ripinnate, pinnæ (except the lowest usually opposite pair) approximate and compact, upper ones lanceolate, middle ones ovato-acuminate, lowest ones deltoid the lower inferior divisions the longest, pinnules rather small obovate convex (the margins much rolled back when dry) lobed or more or less pinnatifid, involucre membranaceous whitish punctiform or more or less continuous frequently the reflexed termination of a lobule. (TAB. XCIII. B.) *Link, Fil. Sp. Hort. Reg. Ber. p. 36*, (not *Carm. Fl. of Trist. da Cunha, which is a Polypodium*). *Ch. Kaulfussii, Kze. in Linnæa, xxiii. p. 244?* — *β. minor*; lobules of the pinnules in the dried plant cochleate.

Hab. "Mexico," (*Link*). Realego, El Equador, *Dr. Sinclair*. Central America, *Barclay*.—*β.* Sierra Madre, N.W. Mexico, *Seemann*, n. 1994.— [I am not aware that this is noticed by any author save *Link*, who describes it from a cultivated plant in the Berlin Garden, and by *Kunze* in his 'Inlex Filicum cultarum,' in the 23rd vol. of the 'Linnæa,' who however only changes the name of "*viscosa*," *Kaulf.* (*Link?*) to *Kaulfussii*, on the ground that it is not *Ch. viscosa* of *Carmichael*. Such indeed is the fact; but as *Capt. Carmichael's* original plant is in my possession, I can testify to its being no *Cheilanthes*, but a *Polypodium*, nearly allied to, if not identical with, *P. rugosulum* of *Mr. Brown's* *Prodromus*. Our figure and specific character are taken from native specimens, which, however, seem to differ in no respect from cultivated ones sent from Berlin to the Royal Gardens of Kew. It is a well-marked species, though save in the absence of the glandular hairs, a good deal allied to *Ch. charophylla*, as far as can be judged from that figure. In the native dried specimens the pinnules and lobes are remarkably convex, in our smaller variety from Sierra Madre particularly so; giving the ramifications quite a beaded appearance.

52. *Ch. leucopoda*, *Link*; "frond ternately quadripinnate, ultimate pinnules crenato-pinnatifid with scattered hairs above and below, stipes and rachis whitish, hairs viscid." *Link, Fil. Sp. Hort. Reg. Berol. p. 66. Kze. in Linnæa, 1850, p. 244.*

Hab. Mexico, (*Link*). — "Frond with the stipes scarcely 4 inches long, primary pinnæ an inch and a half, secondary 1 inch, tertiary 4 lines, ultimate ones a line long, with long white spreading hairs on the stipes and rachis."

Link, who alone has described this species as above, and it must be confessed very unsatisfactorily, places it next *Ch. viscosa*, but without offering any remarks on its affinities.

53. *Ch. marginata*, *H. B. K.*; caudex short thick horizontal clothed with subulate black scales, stipites 2—4—6

inches long and as well as the main rachis ebeneous, fronds 3—6 inches long glabrous thick-membranaceous rather soft and flaccid deltoid-ovate tri-quadrifid, pinnules all oblong-obovate or subcuneate entire or lobed auricled at the base above and more or less deeply pinnatifid all of them decurrent so as to form a winged rachis, lobes oblong-ovate, sterile pinnules and lobes the broadest and penniveined, all of them crenate at the margin, involucre on the teeth of the crenatures broad membranous suborbicular rarely free (the edge very thin and fringed) mostly combined and forming a continuous lobed or broadly crenated involucre extending all round the margin.—*H. B. K. Nov. Gen. et Sp. Am.* i. p. 18, and vii. t. 669. *Link, Fil. Sp. Hort. Berol.* p. 62. *Ch. rufescens*, *Link, l. c.* *Ch. chærophylla*, *Kze. in Linnæa*, xxiii. p. 243, and 307. *Allosorus ciliatus*, *Presl, Rel. Hænk.* i. p. 59. *Kunze, in Linnæa*, ix. p. 56, and in *Poepp. Pl. Exsic. (Herb. nostr.)* *Allosorus chærophyllus*, *Mart. et Gal. Fil. Mex.* p. 47, t. 11.

Hab. Rocky places, Peripe, Andes of Quito, 7000 to 8000 feet elevation, *Humboldt and Bonpland*: and on old walls near Quito, *Jameson, Hartweg*, n. 1513. Andes of Huano, Peru, *Poeppig, MacLean*. Mexico, *Hænke*; Juquilla, Andes of the Pacific Ocean and Oaxaca, *Martens and Galeotti*, n. 6367 and 6844. Real del Monte and Xalapa, *Dr. Coulter*, n. 1676 and 1677. Caracas, *Linden*, n. 508. Venezuela, *Funch and Schlim*. St. Sebastian, Sierra Nevada, Sta. Martha, N. Grenada, and Jamaica, *Purdie*. Tondil and Salto, Argentine Republic, *Tweedie*.—A very remarkable and easily distinguished plant, and pretty widely distributed, even well figured (both by Humboldt and Galeotti), yet strangely misunderstood. Kunze, who distributed Poeppig's *Allosorus ciliatus* under that name, did not seem to be aware that Martens and Galeotti's *Allosorus chærophyllus* was identical with it, for he separates it from *Allosorus*, with the remark "indusia spuria lobulata et sæpius interrupta ad *Cheilanthes* sine dubio delegant." He was familiar with the Mexican and Peruvian plants, yet

sulcate above black-purple beneath, involucre marginate crenulated continuous, sori rather broad." *Kunze, in Linnæa*, x. p. 535.

Hab. Fissures of rocks, Silverfontain, Little Namaqua Land, Cape of Good Hope, *Drège*.—"I have seen only three fronds (2½—3 inches long) of this species, destitute of caudex: in habit it resembles small specimens of *Pteris pedata*; but it is bipinnato-pinnatifid. Our *Ch. triangula* differs from this in the tripinnate frond, the pinnæ and pinnules petiolate, in the sulcated stipes, &c. Our *Ch. multifida*, *β.*, *flexa*, differs in the true indusia (indusium veris) and in the puberulous rachises, &c." *Kze.*—I have myself but a solitary specimen of this from *Drège*. It appears a good species, with quite pteroid involucre. But one needs copious specimens in different stages of growth to speak with confidence.

55. *Ch. Atherstonii*, Hook.; root? caudex? stipes a span and more long stout and as well as the principal rachis all purple-ebeneous and very glossy, frond deltoid less than a span long everywhere glabrous coriaceous pale green 4-pinnate (pteroid), primary pinnæ ovato-deltoid and as well as the secondary and tertiary pinnæ petiolate the lower distant upper ones more approximate, pinnules sessile (upper ones coadunate) oblong entire or pinnatifid in their lower half, involucre formed of the inflexed margins of the pinnules pale and membranaceous at the edge rarely solitary and single generally coadunate so as to be continuous the edge more or less crenate or lobed.

Hab. District of Somerset, S. Africa, *Mr. Atherstone*.—I possess no species with which I can say this is closely allied among *Cheilanthes*; nor among *Allosorus*, to which this might with about as much propriety be referred. The whole Fern is 12—14 inches long, very hard, rigid, and particularly glossy and stout in the stipes and primary rachises.—Perhaps its nearest ally is *Kunze's Ch. deltoidea*, but that is a very much smaller plant and much less compound. The pinnules of *Ch. Atherstonii* are about 2 lines long and two-thirds of a line wide.

56. *Ch. cuneata*, Link; caudex short creeping, stipes 1—1½ foot long and as well as the main rachis ebeneous glossy grooved on the upper side smooth, frond glabrous subcoriaceous ovate or broad-ovate acuminate 6—12—14 inches long 3—6 inches across tri-quadripinnate, primary and secondary pinnules ovato-acuminate, the rest and the pinnules lanceolate cuneate below all of them decurrent so as to form a narrow green margin or wing on each side the furrow of the rachis, ultimate pinnules shortly but sharply almost pungently acuminate entire or auricled on the upper inferior margin or pinnatifid with lanceolate entire sharp lobes, all slightly serrated, involucre marginal or subentire pale membranaceous punc-

tiform or linear often quite continuous slightly waved and jagged or crenated. *Link, Fil. Sp. in Hort. Berol. p. 63. Kze. in Schkuhr, Fil. Suppl. p. 73, t. 36. Otholoma, Link. Cassebeera, J. Sm. Allosorus, Pr. Allosorus pulchellus, Mart. et Galeot. Fil. Mex. p. 47, t. 10, f. 2.*

Hab. Mexico, Province of Oaxaca, elevation above the sea 7,000 feet, *Galeotti, n. 6560. Cerro de Pinel (n. 1450), Sierra Madre, N.W. Mexico, Seemann, n. 1932. Sierra San Pedro Nolasco, Talca &c., Jurgensen, n. 670.*—The frequently continuous sori would lead to the opinion that this should be ranged in *Pteris* or *Allosorus*: other specimens, and I cannot say depending on age, have quite the small rounded punctiform involucre of *Cheilanthes*, yet gradually upon the same specimen more or less combined and continuous all round a lobe or pinnule. As *Cheilanthes*, it is extremely distinct from any other: the pinnules and lobes are harsh and rigid and almost cuspidate, so as to resemble those of some *Polystichum*. Our specimens from Sierra Madre are very much larger and more divided than those of Kunze's figure: the fronds and the stipes too are very brittle. Some of my specimens correspond so exactly with Martens and Galeotti's figure and description of their *Allosorus pulchellus*, that there cannot be a question of the identity of the two.

57. *Ch. profusa*, Kze.; roots slightly creeping scaly, stipites 2—4 inches long and as well as the rachises hispid with spreading subulate paleaceous scales, frond oblong-lanceolate acute subcoriaceous pinnate, pinnæ often opposite glabrous, uppermost lanceolate approximate subcoadunate entire, lower ones ovate or deltoid acuminate distant very shortly petiolate deeply pinnatifid at their base sometimes pinnate, pinnules and laciniaë lanceolate rarely slightly lobed or pinnatifid often curved a little upwards, costæ hispid with appressed narrow subulate scales, involucre of the same texture as the frond continuous, — from the same root another form of frond appears smaller with fewer and more approximate pinnæ which are ovate blunt and only sinuato-lobate the edges membra-

58. *Ch. cornuta*, Kze.; "frond lanceolato-linear bipinnate, pinnæ ovate approximate the lowest subopposite petiolate, pinnules sessile subternate bi- or trifid oblong obtuse curved coriaceous, sori at length diffuse, stipes and rachis rigid (setaceo-paleaceous at length) naked." *Kze. in Linnæa*, x. p. 534.

Hab. Worcester District, Cape of Good Hope, *Ecklon and Drège*.—"A species not to be compared with any unless with several contracted forms of *Ch. hastata*; but the rigidity of the frond, its nearly linear outline and diffuse sori readily distinguish it."—Kunze's specimens would appear to have been far from good. If those of Drège himself in my herbarium are to be depended upon, this is nothing more than, not even a variety of, *Ch. profusa*, next before which Kunze places it, but without the slightest allusion to its affinity with that species. My specimen is marked by Drège "*Cheilanthes cornuta*, Kze., a." The slight curvature upwards of the pinnules which suggested, I apprehend, the specific name, is common to the normal state of *Ch. profusa*: and there can be no question of the identity of the two, unless Drège has made some mistake.

59. *Ch. pulchella*, Bory; roots cæspitose, stipites 4—6 inches long purple-brown glossy scaly below, fronds ovate or deltoid-ovate acuminate tripinnate coriaceous glabrous, primary pinnæ all more or less caudate at the apex, lowest pair dimidiato-deltoid their lowest inferior pinnæ elongated pinnate or pinnatifid, pinnules or lobes oblong or linear-oblong obtuse entire, involucre membranaceous intramarginal continuous brown transversely wrinkled and lobed at the edge. (TAB. XCIV. A.)—*Bory in Willd. Sp. Pl. v. p. 456. Webb and Berth. in Phytogr. Canar. p. 453, t. 252, (excellent). Cheilanthes n. sp.? Schimp. Coll. It. Abyss. n. 1431.*

Hab. Teneriffe, *Bory*. Canary and Palma, *Webb et Berthelot, Dr. Lemann*. Madeira, *Webb et Berthelot*. Rocks in the valley of Mai Mezano near Djeladjeranne, Abyssinia, *Schimper*.—Schimper's specimens are smaller than most (but not than all) of Mr. Webb's and Dr. Lemann's specimens of this very pretty fern; but in no other respect different. We have thus another station to add. Messrs. Webb and Berthelot had observed on its geographical station, "Fortunatarum et Maderæ! cives est pulchra species autochton."—It would be a *Pteris* or *Allosorus*, of the group which produce intramarginal sori, but for the transversely wrinkled involucre indicating what is considered the normal character of *Cheilanthes*,—interrupted sori.

60. *Ch. coriacea*, Desne; "cæspitose (2—3 decimetr.), stipites terete ferruginous clothed with hairs and attenuated scales, fronds bipinnate simply pinnate above, pinnæ opposite, lower ones bifid, the segments approximate linear-oblong obtuse entire coriaceous furrowed on the upper side and opaque,

beneath in the younger state covered by the ferruginous shining indusium." *Decaisne, Plantes d'Arabie, p. 190.*

Hab. Haguef, Arabia Felix, *Botta*.—"Allied to *Cheilanthes pulchella*. This plant, the *Ch. pulchella*, together with a new Abyssinian species" (not further noticed by the author), "exhibit, in their younger state, the pinnules wholly covered by an indusium, which is smooth and shining and gives to the inferior surface a coppery appearance. Notwithstanding this character, these three plants belong to the group of *Ch. farinosa*, remarkable in the form, the consistence and colour of the stipes. The mode of division of the fronds and the bifurcation of the inferior pinnule, while giving to these plants a peculiar character, unite them much more intimately with *Cheilanthes*, than with *Allosorus*, to which genus M. Presl refers them."—Of this I have seen no authentic specimen, and am unable to refer it from the description to any known species.

61. *Ch. viridis*, Sw.; "fronds bipinnate, pinnules ovate entire, terminal ones larger ovato-lanceolate or subhastate, stipes smooth." *Sw.—Sw. Syn. Fil. p. 127. Willd. Sp. Pl. v. p. 456. Adiantum viride, Vahl, Symb. p. 104. Pteris viridis, Forsk. Arab. p. 186. Allosorus hastatus, Pr.*

Hab. Arabia Felix, *Förskahl*.—I am unacquainted with this species, which Swartz and Willdenow refer to *Cheilanthes*, but which others refer to *Pteris*, and Presl, perhaps justly, considers identical with his *Allosorus hastatus* (*Pteris* Sw.)

62. *Ch. hirsuta*, Link; "frond tripinnate oblong in circumscription, pinnules lanceolate obtuse crenulate attenuated at the base, involucre breaking into a thin lax tomentum (indusio in tomentum tenue laxum abeunte) and covering the whole under side of the pinnules." *Link, Hort. Berol. ii. p. 41; Fil. Sp. Hort. Berol. p. 63. Kze. in Linnæa, xxiii. p. 244. Othonoloma, Link, olim. (Kze.)*

Hab. Mexico, (*Kunze*).—"Fronde a foot and more long, pinnules 2—6 lines long, outer ones (externæ) very long, a little more than a line wide."

margin reflexed crenato-sinuate, teeth scaberulous, indusia marginal membranaceous, sori minute at length spreading, rachis subflexuose and the ascending short stipes sparingly paleaceous pubescent pale, caudex creeping paleaceous." *Kunze, En. Fil. Mex. in Linnæa*, xiii. p. 143, in *Schuhler, Fil. Suppl.* p. 71, t. 35.

Hab. Mexico, Ehrenberg.—A very pretty and distinct species, judging from Kunze's figure, with an exceedingly pale straw-coloured stipes. The pinnæ very uniform, deeply pinnatifid with oblong segments, and in the principal figure at least having a continuous involucre like *Pteris* or *Allosorus*.

64. *Ch. aspera*, Hook. ; roots densely tufted, stipites 2—3 inches long and as well as the main rachis and lower half of partial rachis ebeneous rough with minute points and partially scaly, scales pale ash-colour, fronds 4—4½ inches long lanceolate bipinnate subcoriaceous pale green, primary pinnæ distant below petiolate from a broad base ovato-acuminate, pinnate below pinnatifid above, pinnules and segments broad oblong when sterile, linear when fertile, entire or slightly auricled on each side at the base crenato-undulate towards the margin and there especially rough with short harsh white hairs often bi-tripartite or geminate, involucre continuous formed of the reflexed margins pale and membranous at the edges crenate and transversely undulate, on the ridges of the undulations the white rigid hairs are particularly apparent. (TAB. CVIII. A.)

Hab. Collected in an Expedition from Western Texas to El Paso, New Mexico, *Chas. Wright*, 1849.—This has a good deal the habit and general appearance of *Cheilanthus canescens* of Kunze, and has as much claim to be placed in the genus as that species, the continuous involucre being however that of *Pteris* or *Allosorus*. Our plant is much more delicate and graceful, the stipes and main rachises ebeneous, the primary pinnæ again truly pinnate. But the remarkable character exists in the transversely waved margin of the fertile pinnæ and segments, and the harsh rigid simple or bi- and sometimes tripartite white hairs seen on the ridges, especially of the undulations. It is assuredly a very distinct and new species.

65. *Ch. caudata*, Pr. "fronds bipinnate subtriangular glabrous, pinnules pinnatifid, lateral lobes roundish, terminal one linear, sori confluent, involucre obsolete, rachis and stipes glabrous." *Br. Prodr.* p. 156.

Hab. Tropical New Holland, *Brown*.—I have seen a specimen of this in the Banksian Herbarium, and know of nothing exactly corresponding with it: yet, without more specimens for examination I would not venture to describe it, or to say it is decidedly distinct. It has some affinity with small specimens of *Ch. tenuifolia*, but it has very elongated terminal pinnules, both at the main apex of the frond and on the branches. It may

safely be placed in the pteroid group of *Cheilanthes*: — the sori are sometimes distinct, more often continuous.

66. *Ch. intramarginalis*; roots tufted fibrous, stipites crowded 4—5 inches long scaly with black deciduous scales, below ebeneous as well as the rachis (which is downy on one side), fronds 4 inches to a span long deltoideo-ovate coriaceo-membranaceous pinnato-pinnatifid below bipinnatifid, pinnæ very patent remote opposite sessile dimidiately ovate acuminate the extremity long-caudate, lobes or segments linear or linear-oblong the upper ones decurrently confluent those on the lower half of the pinnæ the longest especially in the lowest pair where they are sometimes again pinnatifid, involucre broad membranaceous brown continuous (rarely interrupted) subcrenated transversely wrinkled. — *Pteris intramarginalis*, *Kaulf. in Schlecht. et Cham. Fil. Mex. Linnæa*, v. p. 613. *Kunze, Analect. Pteridogr.* p. 21, t. 17, f. 1. *Allosorus*, *Pr. Pteris inframarginalis et Pt. fallax*, *Mart. et Galeot. Fil. Mex. p. 53*. *Cheilanthes Priono-pteris*, *A. Braun, MS.* (sive *Kunzii*). *Cassebeera, J. Sm.*

Hab. Mountains of Mexico, Xalapa, Oaxaca, Vera Cruz, &c.. *Schiede and Deppe, Karwinski, Martens and Galeotti*, n. 6329, 6389, and 6467, *Linden*, n. 40 and n. 1531. Guatemala, *Skinner*. — It is not unwillingly that I place this Fern, which has almost invariably continuous involucre (though thin and membranaceous, transversely wrinkled and more or less crenated) in *Cheilanthes*: but it has so close an affinity with our *Ch. nitidula* that I am unwilling to separate them generically. The general aspect is similar, the texture and venation (elevated beneath the frond), the opposite and here remarkable dimidiate pinnæ, and above all, the intramarginal insertion of the involucre (more striking in this species than in *Ch. nitidula*), are alike in both. Hence Kunze was led to observe of this, "fructificatio ab illa *Pteridis*, ubi sori et indusia margini contigua, paullisper recedit:" and in regard to Al. Braun having referred our present plant to *Cheilanthes*, he remarks "quamquam *Cheilanthes* firmis characteribus non-

brous pinnato-pinnatifid below sub-bipinnate, pinnæ approximate nearly opposite broad-lanceolate dimidiate (the inferior half being broadest) deeply pinnatifid nearly to the rachis lowest pair again subpinnate and the secondary pinnæ pinnatifid, lobes all oblong entire or sinuate gradually coming to a sharp point the lower base decurrent the lowest inferior lobes the longest, involucre subintramarginal continuous rarely here and there interrupted broad flat membranaceous brown close-pressed frequently lobed and crenated and transversely wrinkled. *Hook. Ic. Pl. x. ined.* *Pteris nitidula, Wall. Cat. n. 89.* *Allosorus nitidulus, Presl.*

Hab. Kamaoun, Dr. Wallich. Rocks, Simla, Dr. T. Thomson. Pundkester, N. India, Mr. Edgeworth. — This, like many others we have placed under *Cheilanthes*, has nearly an equal claim to be considered an *Allosorus*, as it is considered by Presl, or a *Pteris*, according to Wallich, its discoverer. It has no small affinity with *Ch. pulchella* and *Ch. cuneata*, but is quite distinct from both, and apparently a rare species. We possess Dr. Wallich's original specimens from the alpine districts of Kamaoun, gathered by his collector, Mr. Blinkworth; others from Mr. Edgeworth, and we find excellent specimens in Dr. Thomson's rich Himalayan Herbarium. No description of it however has yet been published. In the younger fronds the veins are very obscure: in the older ones they are prominent or elevated beneath. Sterile fronds are broader and more membranaceous: hence Presl has placed it in a division of *Allosorus* "frondibus dissimilibus pinnullis laciniisve angustioribus integris," along with his *Allosorus* (*Cryptogramma, Br.*) *crispus*. — Dr. Wallich's specific name, we presume, refers rather to the glossy character of the stipites and rachis than to the fronds, which we find to be somewhat opaque.

(*Pteroides*,—clothed with yellow powder beneath).

68. *Ch. chrysophylla*; roots fibrous, stipites tufted 2—4 or 5 inches long purple-ebeneous hispid with sparse black subulate scales denser below, fronds subcoriaceous deltoid-ovate acuminate 3—4 inches long dark olive-green and glabrous above golden-yellow and powdery beneath pinnate, pinnæ mostly lanceolate the lowest pair deltoid all pinnatifid, lowest inferior segments of the lowest pinnæ lanceolate subsinuate, the rest oblong or ovate entire or crenulate, involucre formed of the reflexed margin of the frond continuous even to the apex of the segments but crenate, the edge thin membranaceous (not ciliated). *Ch. chrysophylla, Hook. Ic. Pl. x. t. 901, (ined.)*

Hab. Bare rocks, Kala-Panee, Khasya (1850), Drs. Hooker and Thomson. — It is impossible not to see the striking affinity between this species and the *Ch. farinosa*, Kaulf. (p. 77), and figured in the 'Icones Filicum,' t. 77, inasmuch that, at the first aspect, save in the very different colour of the powdery substance on the underside of the frond (here bright gold)

the two might be considered identical. But independently of the crenated margin of the segments of the frond in the present *Cheilanthes*, the involucre will afford abundant marks of distinction; in *Ch. farinosa* wholly membranaceous rounded and more or less combined at the base (in that sense often continuous): here the involucre are formed of the reflexed margin of the frond itself and of the same texture, altogether continuous, but the edge membranaceous and merely crenated; never toothed or ciliated. It is the regular crenation that induces me to refer this and the following species to *Cheilanthes*, rather than to *Pteris* (or *Allosorus*), and assuredly among the latter genus I know of none that assimilates with this.

69. *Ch. ochracea*; roots fibrous, stipites crowded very short clothed with oblong obtuse spreading chaffy scales and as well as the rachis dark ebeneous purple, fronds submembranaceous broad-lanceolate scarcely a span long dark green slightly hairy above beneath densely clothed with a golden-ochraceous pulverulent substance pinnate, pinnæ almost always opposite lanceolate obtuse lowermost subdeltoid all of them pinatifid nearly to the rachis, segments oval obtuse entire or obscurely crenate ciliated, involucre continuous narrow formed of the reflexed margin of the frond the edges membranaceous and crenated (not ciliated). *Hook. Ic. Plant. t. 904, ined.* *Allosorus ochraceus*, *Hook. in Benth. Plantæ Hartwegiana*, p. 55.

Hab. Mexico; moist shady places, Morelia, *Hartweg*, n. 418.— In this very distinct Fern the involucre is narrow, continuous, and quite pteroid, but crenated, as if formed of originally distinct but confluent sori: so that, as will be seen in Mr. Bentham's work above quoted, my views were not quite decided whether to place it in *Allosorus*, *Nothochlæna*, or *Cheilanthes*. I am here led to refer it to the latter genus from many points of similarity with our last species, *Ch. chrysophylla*, in the similarity of involucre in the two, and especially in the presence of the golden powdery substance clothing the whole under surface of the frond. In the species now before us this pulverulent substance is so dense, the colour so approaching ochraceous, that it looks as if it had been smeared with that well-known paint,

At p. 78, n. 5, under *Cheilanthes rufa*, Don, insert

Hab. Ascent of Mahadel, Chuma, in Khasya, *Dr. Hooker and Thomson*; less red than *Dr. Wallich's* specimens, and, on the under side of the frond, whitish.

At p. 80, n. 6, under *Cheilanthes Dalhousiæ*, Hook., insert

Hab. Simla, *Dr. T. Thomson*.

At p. 81, n. 9, under *Cheilanthes fragrans*, Webb et Berth., insert

Hab. Peeahwar Hills, *Major Vicary*.

At p. 81, under *Cheilanthes squamosa*, n. 8, insert

Var. β .? *brachypus*, Kze. in *Linnæa*, xviii. p. 340; pinnae and pinnules very obtuse subparallel hoary-villous above, the lower ones smaller, stipes very short. *Kze.* *Ch. brachypus*, *Kze. in Linnæa*, xxiii. p. 243 and p. 307.

β . Mexico, tropical, *Leibold*.—In the '*Linnæa*' for 1844, this was given by Kunze, doubtfully, as a variety of *Ch. squamosa*; but subsequently, in 1850, it is considered by that author, a good species, though I am not aware if any specific character is published. *Dr. Kunze* observes of *Ch. brachypus*, l. c. "Cultura ex sporis repetita tamquam species propria probata. Ut varietatem *Ch. squamosæ*, dubie quidem, in describendis filicibus *Leiboldianis* (*Linnæa*, xviii. p. 340) plantam breviter exposui."—A specimen we possess from Kunze as this plant seems identical with our *Ch. squamosa*; but the stipes is rather shorter. Mexico is quite a new habitat for that species: and the same has likewise been found, with longer stipites at Sonsonati, Guatemala, by *Mr. Skinner*; and in Surinam by *Dr. Hostmann*.

At p. 82, after n. 9, should have been inserted

9.* *Ch. andina*, Hook.; caudex short rooting scaly, stipites tufted 1—2 inches long and as well as the main and partial rachis partially scaly dark ebeneous glossy, fronds $1\frac{1}{2}$ —2 inches long deltoideo-oblong subacuminate tripinnate subcoriaceous glabrous dark brown (when dry), primary pinnae (especially the lower ones) distant deltoid-ovate, secondary ovate-oblong pinnatifid (rarely again and only those of the lower primary pinnae) pinnate, lobes small rotundate entire or obscurely crenate, involucre formed of the inflexed margin of the lobules membranaceous or entire at the edge and more or less interrupted.

Hab. Lofty Andes of Peru, *John MacLean, Esq.*—A small and I must confess rather an obscure plant, possessing few or no satisfactory distinguishing characters, of a dingy brown colour in its dry state, with somewhat the aspect of *Ch. fragrans*, near which perhaps it might be placed. The whole plant does not exceed $3\frac{1}{2}$ inches. Stipes and rachises very ebeneous black. Pinnules in 7—9 almost opposite pairs: the lowest pair distant, all glabrous, and all with an evident recurvature of the margin forming the involucre which are thin and membranaceous only at the edge. Sori rather large, so as to be by no means covered by the involucre.

At p. 84, under *Ch. microphylla*, in line 12, insert " (TAB. XCVIII. A.) "

At p. 98, under *Ch. Szowitzii*; β . *Stocksii*, insert " roots highly aromatic," and

Hab. Peshawur Hills, *Major Vicary*.

Dubious Species of Cheilanthes, or to be removed from the Genus.

Cheilanthes Sellowiana, *Pr. Tent. Pterid.* p. 160.

Ch. digitata, *Presl, in Herb. Meyen. et l. c.* p. 160.

Ch. Meyeniana, *Presl, in Herb. Meyen. et l. c.* p. 160.

Ch. auriculata, *Link et Kze. is Allosorus, Pr.*

Ch. hastata, *Kze. is Pteris, Sw. Allosorus, Pr.*

Ch. hastæfolia, *Schrad. is Allosorus, Pr.*

Ch. ferruginea, *Willd. is var. β . of Notholæna rufa, according to Presl, Reliq. Hænk. i. p. 19.*

Ch. candida, *Mart. et Galeotti, is Nothochlæna.*

Ch. contigua, *Wall. Cat. is Onychium.*

Ch. contracta, *Kze. is Allosorus, Auct.*

Ch. angustifolia, *H. B. K. is Onychium, according to Kze.*

Ch. crenulata, *Spr. is Allosorus cæspitosus, Pr.*

Ch. crenulata, *Link, according to Galeotti is Allosorus ciliatus, Pr.*

Ch. decomposita, *Willd. is Allosorus angustifolius, Pr. and Onychium angustifolium, Kze.*

Ch. heterophyllus, *Willd. is Allosorus heterophyllus, Pr.*

Ch. gracilis, *Kaulf. is Allosorus, Pr., Pteris, Mich.*

5. CASSEBEERA, *Kaulf.*

OK. GEN. FIL. TAB. LXVI. A.) *Martius, Presl, and
ith, in part.* *Adiantum* Sp., *Smith, Swartz.*

i subglobose or elliptical intra-marginal, frequently 2
ent ones from as many veinlets on an emarginated

Involucre inserted within the margin, of the same
as the sorus, opening towards the costa, generally ob-
or elliptical, membranaceous, brown, pressed down upon
rus.—*Tropical or extratropical, small Ferns of Brazil,
iting dry rocky places, having a rather short, horizon-
ensely scaly caudex or rhizoma. Stipites tufted, ra-
ong in proportion to the fronds, ebeneous as well as the
es and the midrib beneath. Fronds of a singularly
coriaceous, hard texture, quite glabrous, tripartite
: or pinnate, even bipinnate, the pinnæ oblong or
, simple and lobed or again pinnate, rarely and only
bipinnate, with the segments rotundate. Veinlets
l, quite internal, so that not a trace of them can be
without dissection. Sori generally 2 combined (on the
vation of 2 veinlets) on the lobules of those species
have trifoliate or simply pinnate fronds, so that each
bears as many sori as there are lobes: while in the
(rarely tri)- pinnate species the pinnules bear but
mple or double sorus, though the involucre is sometimes*

Genus *Cassebeera* was established by Kaulfuss upon a remarkable-
Brazilian Fern, the *Adiantum triphyllum*, Smith; to which he
new species, *Cassebeera pinnata*, equally from Brazil, and an un-
l congener. A third species of the Genus was detected by the late
rdner in the Diamond district of Brazil, and is figured in the
Plantarum,' under the name of *Cassebeera gleichenioides*, Gardn.
the frond is more compound, but the habit and fructification are the
; in the other *Cassebeera*. Thus limited it is a natural and a good

Presl however in his 'Tentamen Pteridographiæ' has placed in it
Cheilanthes pteroides of Swartz and the present work, which it must be
ed has considerable affinity in the fructification and in the texture
frond, but not in habit. Mr. J. Smith takes another view of the
Cassebeera altogether; restoring indeed *Cass. pteroides* to *Cheilan-*
at uniting with the original species of Kaulfuss, the *Pteris pedata*
entes, Linn., *Pteris hastata* of Swartz, our *Cheilanthes intramargi-*
ogether with *Cheilanthes farinosa, cuneata, microphylla, tenuifolia*
authors and of this work: so different are the opinions of botanists
ve most devoted attention to the Family, on the subject of Genera
s. Few however are more guided by attention to natural affinities
r. J. Smith: and he says "On comparing the Adiantoid section

of *Pteris*, and part of *Cheilanthes* with the original species of *Cassebeera*. I find that several of the species of both these Genera (*Pteris* and *Cheilanthes*) so well agree in habit and in structure of the sori, that I have been induced to place them under *Cassebeera*." Martius in his admirable illustration of *Cass. pinnata* (Ic. Plant. Crypt. Brasil. p. 91, tab. 61) dwells wholly upon its distinction from *Adiantum* and *Lindsaea*, with which it has little in common. It may be very difficult to define the Genus accurately in words; but I am clearly of opinion that if retained at all, and no one seems to doubt the propriety of so doing, it should be restricted to the original species:—if abolished it would be difficult to say which of the established Genera should receive them. I cannot agree to the observation of Prial, "Genus hoc (*Cassebeera*) magis artificiale quam naturale est."

* *Fronde digitate or pedate.*

1. *Cass. triphylla*, Kaulf.; frond tripartite or digitately pedate, segments lanceolate crenato-lobate.—*Kaulf. Enum. Fil. p.* 216. *Hook. Gen. Fil. t.* 66, A. *Adiantum triphyllum*, *Smith, Ic. ined. t.* 74. *Swartz, Syn. Fil. p.* 120. *Willd. Sp. Pl. v. p.* 428.

Hab. Buenos Ayres, *Commerson*. Monte Video and South Brazil, *Sellow, Isabelle, Tweedie*. Porto Alegre, *Mr. Fox*, (in *Herb. nostr.*)—It is quite a mistake in those who have described this Fern as if it were triphylous, or trifoliate, or ternate: so far from there being 3 distinct leaflets or pinnae, the normal form I suspect to be pedate, that is deeply divided into 3 segments (or tripartite), with the lateral segments again divided, but never into separate pieces. The true nature of this frond is given at t. 66, A., of our 'Genera Filicum,' in the more usual form of the plant, when the lower lateral segments are suppressed: but there are never distinct leaflets or pinnae as in the following species.—The caudex is stout, horizontal, 2 inches long, clothed with subulate, black, glossy scales; on the underside with numerous descending wiry fibrous roots; above throwing up many crowded, wiry, almost black, ebeneous, flexuose stipites, 3–6 inches long, terminated by the, usually, deeply tripartite, small, coriaceous frond. When dried without pressure, the sides are apt to be revolute, and

** *Fronds pinnate or bipinnate.*

2. *Cass. pinnata*, Kaulf.; frond pinnate, lower pinnae again divided or pinnated, pinnules petiolate elongated linear-oblong acute crenato-lobate, lobes broad generally emarginate (duplicato-lobate).—*Kaulf. Enum. Fil. p. 217, t. 1, f. 11. Martius, Ic. Plant. Crypt. Bras. p. 91, t. 61. Kunze, Analecta Pteridograph. p. 37, t. 24. Spreng. Syst. Veget. iv. p. 118.*

Hab. South Brazil. Province of St. Catherine, *Chamisso, Sellow. Minas Geraes, Langsdorff.* Stony shady places, Province of St. Paul, Brazil, Serra de Natividade, *Gardner, n. 3556.*—A much larger, stouter and more robust plant than *Cassebeera triphylla*. The caudex is similarly horizontal, bearing the same wiry roots. The stipites are less crowded; the rachis a span to a foot long, less glossy and ebeneous than the preceding species. The frond is simply pinnated, as shown by Kaulfuss and Kunze and as in our specimens from Natividade: but not unfrequently bipinnate, as represented by Martius, and as in our specimen from Sellow. The pinnae and pinnules are 2 inches and 2½ inches long: and the black midrib runs up almost to the apex. In our best specimen from Gardner the scales of the caudex are bright tawny.

3. *Cass. gleichenioides*, Gardn.; fronds bipinnate, pinnules petiolate linear-elongated deeply pinnatifid or even pinnated, lobes or ultimate pinnules orbicular-subquadrate when dry recurved the margin (beyond the involucre) thickened entire.—*Gardn. Plant. Exsicc. Bras. n. 5295. Hook. Ic. Plant. vi. t. 507.*

Hab. Bushy rocky places, Diamond district, Brazil, *Gardner, n. 5295.*—Imagine an unusually large specimen of *Cass. pinnata* more divided (*i. e.* more bipinnated than usual), and instead of having the shallow lobes to that species, to have those lobes, or the sinuses of those lobes, cut down to the very rachis into roundish lobes or ultimate pinnules with the margin or edges of those pinnules thickened, and you have an idea of the structure of the present species. The scales of the caudex of this as well as of the preceding species, are bright tawny, not black as we find them in *Cass. triphylla*. Our tallest fronds of this are 6—7 inches long, and the deeply divided, convex and nearly opposite ultimate pinnules of a rounded form, have quite the appearance peculiar to some *Gleichenia*, whence Mr. Gardner's appropriate specific name. We find the capsules upon long stalks, which seem to be characteristic of the other species. Although this is found in tropical Brazil, it is probably a mountain plant: and all the species may be said to belong to the temperate rather than tropical regions.

(At p. 108, line 4, for *Allosorus pulchellus*, read *All. decompositus*).

6. ONYCHIUM, *Kaulf.*

(HOOK. GEN. FIL. TAB. XI.) *Leptostegia*, *Don.* *Cheilanthis* Sp., *Wall. H. B. K.* *Pteridis* Sp., *Hook. et Gres. Desv.* *Trichomanis* Sp., *Thunb.* *Lomariæ* Sp. *Scolopendrium*, *Hamilton.*

Sori linear, placed opposite each other, on each side of a midrib of the segment or pinnule and at or near the margin, or rather the margin of the pinnule is often suddenly rolled in and there bears the involucre, giving an appearance of the margin being extended beyond the involucre; these sori are inserted upon a linear receptacle running within the fold of the margin. *Involucres* linear, and being opposite, and each occupying nearly the whole space between the rachis and the margin, they have the appearance of opening in the middle by a longitudinal suture; white or yellow, membranaceous.—*Tropical or subtropical Ferns.* Roots *fibrous, tufted.* Fronds *stipitate, varying in size, decomposundly pinnatifid, the primary divisions narrow, 1-nerved, the fructified portion broader and penniveined, the veins simple, extending to the longitudinal receptacle which bears the capsules, and confluent with it.*

In the Genus now under consideration we have examples, among the suborder *Pterideæ*, of plants with fructification bordering more closely upon the normal state of *Pteris* and *Lomaria*; that is, continuous and not broken up into scales, or not deeply crenated and jagged at the margin: but each fertile lobe or pinnule has its margin occupied by an uninterrupted sorus and involucre. Kaulfuss however selected two species which have a peculiar habit, originally specified with narrow divisions, the ultimate segments of the

1. *O. auratum*, Kaulf.; roots of densely tufted fibres, stipes cæspitose a span to a foot and more long hispid with few narrow scales only at the base and as well as the bases everywhere pale brown or straw-colour glabrous and sessy, frond a span to a foot or a foot and a half long ovato-cuneate acuminate submembranaceous but firm and glossy compound four times or more pinnatisected (primary and secondary divisions pinnated) segments all narrow linear sub-cuneate short (in the sterile portions) ultimate ones acute entire or inciso-dentate, segments all pointing upwards linear, fertile segments elongated siliquiform especially the terminal ones and mucronate, sori linear-elongated occupying the whole back of the fertile segments, involucre golden brown meeting at their edges. *Kaulf. Enum. Fil. p. 144.* *Lomaria aurea*, *Wall. Cat. n. 38.* *L. caruifolia*, *Wall. Cat. 39.* *L. decomposita*, *Don, Prodr. Fl. Nep. p. 14.* *Pteris rhysocharpa*, *Hook. et Grev. Ic. Fil. t. 107.* *Pteris siliculosa*, *Desv.* *Allosorus auratus*, *Presl.*

Hab. East Indies and Malay Islands. Manilla, *Chamisso*. Luzon, *Cuzyg. n. 38*; *Thos. Lobb, n. 452.* Java, (ex Herb. Miquel. n. 21). Bootan, *Wallich, Boot.* Nepal, Kamaon (probably its western limits), *Hamilton, Wallich.* Khasya, *Simons, n. 246*; *J. D. Hooker, and Dr. T. Thomson.*—The figure in 'Icones Filicum,' above quoted, does ample justice to this plant as far as an entirely fructified specimen is concerned, and it is certainly one of the most beautiful of Ferns, whether in that or in the sterile state (of which we now possess copious specimens), when the fronds have quite a different appearance, being everywhere multifidly cut into copious, crowded, narrow, short and linear or somewhat cuneate segments, tapering at the base, and resembling the very compound leaf of some umbelliferous plant (whence *Wallich's* name *caruifolia*). Other specimens again are partly (above) like after the manner of *Osmunda regalis* or *Allosorus* (*Ceratodactylis*, *J. D. Thomson.*) *Karwinskii* of *Kunze*, and apparently by a transformation of the laciniae of the pinnæ and pinnules, which become larger, more elongated, entire and mucronated, often an inch long, and so resembling the pods of some *Leguminosæ* as to suggest to *Desvaux* the specific name of "*siliculosa*." The other side of these is a beautiful golden colour, but less deep in our specimens from Khasya and the Malay Islands, in consequence, probably as *Mr. Smith* suggests, of the moister climate.

[I quote *Don's Lomaria decomposita* with doubt, because he not only does not notice the remarkable colour of the fructifications, but because he distinguishes his *Leptostegia lucida* generically from this plant, whereas no botanist could see these two species without pronouncing them to be identical to Genus. The usual colour of the fronds, especially the sterile fronds, of our plant, is to be pale light yellow-green (when dry), but we have specimens from Assam with very dark foliage and with narrower and more elongated segments.

2. *O. lucidum*, *Spreng.*; caudex creeping? stipites six

inches to a foot and more long and as well as the rachises pale brown or stramineous, frond a foot and more long ovato-acuminate membranaceo-coriaceous glossy 3—4 times pinnatisected (primary and secondary divisions pinnated) segments uniform or nearly so in the sterile and fertile ones, all narrow linear a little tapering below ultimate ones moderately long all gradually acuminate (not mucronate even in the fertile ones), sori oblong short occupying nearly the whole of the back of the segments, involucre white or cream-colour membranaceous meeting at the back. *Spreng. Syst. Veget.* iv. p. 66. *Hook. Gen. Fil. t. xi.* Cheilanthes lucida, *Wall. Cat. n. 69.* Cheilanthes contigua, *Wall. Cat. n. 69.* Leplostegia lucida, *Don, Prodr. Fl. Nep. p. 14.* Scolopendrium lucidum, *Hamilton's MS. (fide Don).*

Hab. East Indies and Kamaon, Nepal, *Hamilton, Wallich, Lady Dalhousie, Dr. T. Thomson, Strachey and Winterbottom* (elevation 700—7500 feet), n. 1, 2. Mussoorie and Gurwal, *Dr. T. Thomson.* Simla, *Lady Dalhousie, Edgeworth, Griffith.* Mishmee, *Griffith.* Khasya, *T. Lobb.*—In the sterile specimens of this plant, there is a great resemblance to those of the preceding (*O. auratum*), but the fronds, though varying much in size, are generally broader in proportion to their length, with commonly more spreading pinnae and the ultimate segments more entire. In fructification the differences are very apparent: the sori being formed on the unchanged segments, they are consequently very small in comparison, short, oblong, and of a pale white or cream-colour, never golden coloured. The *Cheilanthes contigua* of Dr. Wallich has the fronds a little broader and the segments narrower, and they form no permanent or tangible variety.

Kaulfuss' representation of a fertile portion of the frond of his *Onychium Capense* (*O. Japonicum*, *Kze.*, our next species) is a faithful representation of our plant.

3. *O. Japonicum*, Kunze; "fronds flexuose decomposed, branches triplicato-pinnate, the segments oblong acute." *Kaulf. — Kunze in Schkuhr. Fil. Suppl. n. 11.* *Onychium*

Capense of Kaulfuss was not of African origin. Kunze, in 'Linnæa,' x. l. c. observed that "he had seen a specimen of Kaulfuss' *O. Capense* in Roemer's Herbarium, found by Thunberg," and, afterwards, having ascertained that it was from Japan, and in reality Thunberg's *Trichomanes Japonicum*, he very properly restored that specific appellation. It is now a question whether our *O. lucidum*, like many other northern Indian forms, may not extend its range as far as Japan. Thunberg's description, brief as it is, would seem to confirm such an opinion. "Frons supra decomposita glabra, stipite torto sulcato. Pinnulæ ultimæ acutæ subtrifidæ. Fructificationes solitariae in ultimis laciniis; membrana tegens tenuissima alba." *Thunb. l. c.*

4. *O. angustifolium*, Kunze; "fronds bipinnate, pinnules linear acuminate sessile entire and as well the rachis glabrous." *H. B. K. Kunze, in Schkuhr, Fil. Suppl. ii. p. 11.* *Cheilanthes angustifolia*, *H. B. K. Gen. et Sp. Am. i. p. 17.* *Spreng. Syst. Veget. iv. p. 116. Presl. Ch. decomposita, Willd. Suppl. (according to Sprengel).*

Hab. Mexico, on the Mountain Jorullo, at between 3000 and 4000 feet of elevation.—"Fronds 4 inches and more long, bipinnate; pinnæ alternate, 2 inches long. Pinnules linear, acuminate, sessile, entire, glabrous, an inch and a half to two inches long, scarcely a line wide, lower ones sometimes bipartite, middle nerve prominent beneath, naked. Universal and partial rachises glabrous, naked, somewhat winged, greenish. Stipes 8 inches long, naked, nearly terete, castaneous, shining. Sori marginal, at length confluent. Sporangia cinnamon-brown. Indusium continuous, arising from the margin of the frond, fimbriato-crenate, diaphanous, glabrous. Perhaps a species of *Pteris*."—I am not acquainted with this plant, which Kunze refers to *Onychium*; but I am not aware that any further information is given respecting it, beyond what I have here copied from Humboldt.

5. *O. strictum*, Kunze; caudex 2—3 inches long oblique rather stout nodose throwing out wiry roots more copiously from the upper extremity, stipites numerous partially scaly a span to a foot long crowded from the apex of the caudex and as well as the slender rachises pale straw-colour glossy, fronds a span long submembranaceous green glabrous opaque ovate decompoundly pinnatisected, the segments all very narrow and acute opposite entire or bi-trifid subcuneate, tertiary rachises winged: the fertile laciniæ are a little larger and wider sharply acute bi- or trifid beyond the fructification, bearing the sori on the disk short linear-oblong nearly white. —*Kunze, in Schkuhr's Fil. Suppl. ii. p. 11.*

Hab. St. Jago de Cuba, on Mount Leban, Linden, n. 1870.—This is a very distinct and well marked species, and with all the characters of *Onychium*, which is thus found in the New as well as the Old World. The caudex or rhizoma of my specimen is singularly nodose or tuberculated, and one that apparently elongates upwards and bears the fronds altogether from the extremity. It is remarkable for the great length of the stipites in

comparison of the fronds, and for the opposite segments, of which the ultimate ones have one or two or three sharp points. Involucres small but swollen, as it were, from the copious capsules of the sori.

6. *O. melanolepis*, Dcne.; caudex short a little creeping with rigid and appressed black scales, stipites tufted from the apex of the caudex 3—6 inches long very slender and as well as the rachises flexuose canaliculated glabrous glossy stramineous (when dry), frond membranaceous 3—6 inches long veined glabrous pale green ovate tripinnato-pinnately-sected sterile lacinia narrow cuneate tri-quinquefid and incised, the lacinulae sublinear apiculate, fertile ones oblong cuspidate bearing the pale membranaceous almost white involucres on the disk, the apex acute free entire. — *Dcaisne, Pl. de l'Arabie Heur. Archiv. du Mus.* ii. p. 189. *Kze. Schkuhr, Fil. Suppl.* ii. p. 9, t. 104, f. 2. *Hook. Ic. Plant.* x. t. 9. *Cheilanthes leptophylla*, *Br. in Salt's Abyssinia, App.* iv. p. lxx. (name only). *Allosorus cuspidatus*, *Jaubert et Spach, Illust. Pl. Orient.* iii. p. 1, t. 201.

Hab. Abyssinia, *Salt, H. Schimper, n.* 1672. South Persia, rock of Mount Pire-zend, between Shiraz and Kazeroum, *Aucher-Eloi, n.* 5488. Caves in the Island of Karih, Persian Gulf, and at Dalechy, *Kotschy, n.* 10 and 198.—A small and very distinct species, long known to that Chief of Botanists, Mr. Brown, and named by him, without description, in the Appendix to Salt's Abyssinian travels. More recently it has been taken up and both described and figured by continental botanists, 1st, as *Allosorus melanolepis*, Dcne.; and 2ndly, as *Allosorus cuspidatus*, Hochstetter. By Kunze it has been properly referred to *Onychium*. It is a plant of very delicate texture, like unusually slender specimens of *Gymnogramma leptophylla*.

O. Krebsii, *Kunze, in Linnæa*, x. p. 504, from Graham's Town, South Africa, proves to be a *Scolopendrium*, according to the same author, on an examination of more perfect

7. LLAVEA, *Lagasca* (not *Liebm.*).

Ceratodactylis, *J. Sm.* (HOOK. GEN. FIL. TAB. XXXVI.)*
Allosorus, *Kze.* *Botryogramme* and *Ceratodactylis*, *Fée.*

Sterile and *fertile pinnules* different on the same plant. *Sori* linear or oblong, occupying nearly the whole length of the pinnated veins of the upper pinnules of the frond which are much altered and elongated, siliquiform. *Involucre* formed by the incurved, continuous, membranous, dilated margins of the pinnules, covering and concealing the fructifications (as in *Cryptogramme*).—*A solitary species of Mexico.* *Caudex* short, thick, and, as well as the lower part of the long, *flexuose, straw-coloured stipes, scaly.* Frond ample, 3-pinnate; rachises *flexuose, slender.* Sterile pinnules *ovato-cordate, thin, but subcoriaceous, firm, the veins closely pinnated, forked, slender, prominent, the margin cartilaginous finely spinulososerrated,* fertile pinnules *confined to the upper portion (and forming a panicle), narrow, elongated, nearly terete, acuminate, less rigid than the sterile pinnules: the margins membranaceous, involute, and forming the involucre, finally spreading.*

This is in every respect a very striking plant, closely allied in its fructifications to *Cryptogramme*, Br., but with a very different habit, in some respects approaching *Osmunda*. It is this peculiar habit mainly that justifies the separation from *Allosorus* or *Pellaea*.

1. *Ll. cordifolia*, *Lagasca*, Gen. et Sp. Pl. 1816, p. 33; Dict. des Sc. Nat. xxvii. p. 89. *Ceratodactylis osmundioides*, *J. Sm.* in *Hook. Gen. Fil.* t. 36. *Fée*, *Gen. Fil.* p. 228. *Allosorus Karwinskii*, *Kze.* in *Linn.* xiii. p. 138. *Benth. Plant. Hartw.* p. 54. *Kze.* in *Schkuhr, Fil. Suppl.* p. 7, t. 4. *Hook. Ic. Plant. Rar.* iv. t. 387 et 388. *Botryogramme Karwinskii*, *Fée*, *Gen. Fil.* p. 166, t. 15 C.

Hab. Mexico, *Lagasca*, *Liebold*, *Liebm.*; Oaxaca, *Karwinski*, *Galeotti*, elev. 5-7000 feet; Barranca de la Encarnacion, near Zimapan, *Hartweg*, *Dr. Coulter*, n. 1684; Amatenango, Chiapas, *Linden*, n. 1522; Sierra San Pedro Nolasco, Talca, etc., *Jaryensen*, n. 680.

Having, after the fullest consideration, deemed the present fine plant worthy of forming a genus, distinct from *Allosorus*, to which I had been disposed to refer it, the next step was to consider the priority of name for the genus; and it

* In this figure of Mr. Bauer, as observed by Mr. J. Smith, the fold of the involucre has been mistaken for an additional receptacle, and represented accordingly.

will be allowed, I think, on all hands, that the excellent Lagasca, hitherto altogether overlooked, has claims to that; his brief but correct character being published as above stated in 1816, forty years ago. Probably, if we may infer from the generic name, M. La Llave was the first to discover the plant, which appears to be wholly confined to Mexico; and it certainly does not associate well with the other species of *Allosorus* of Presl (*Pellea* of Link, and of this work), whatever may have been in the mind of the original constructor of the genus, Bernhardt, in his miserably defined character. It is strange that M. Fée should not have recognized in Bauer's figure (Gen. Fil. l. c.), and Mr. J. Smith's description accompanying it, his own genus *Botryogramme* (hence he has this plant under two different genera and different names); and still more strange that he should place these far away from each other and from *Cryptogramme*, to which, in the fertile portions of the fronds, and in the general nature of the fructification, it has a very close affinity. In its large size and in the form of the pinnules, and in the upper leaflets only being fertile, it is remarkably distinct. If not a scandent plant, it seems to have a rambling habit, with the main and secondary rachis often flexuose; the barren pinnules have a thickened, narrow, almost cartilaginous margin, which is spinuloso-serrate.

8. CRYPTOGRAMME,* Br. (1823.)

(HOOK. GEN. FIL. TAB. CXV. B.) *Allosorus* sp., *Bernhardt*. *Allosorus* and *Gymnogramme*, *Presl*. *Phorolobus* (1827) and *Cryptogramme*, *Desv*. *Phorolobus*, *Fée*. *Cryptogramme* and *Allosorus*, *Mettenius*. *Pteris*, *L. MS.*, *Sm*. *Osmunda*, *L.*

Sterile and fertile fronds different from the same root. *Sori* short, or oblong and linear, situated upon and towards the apex of the pinnated veins, occupying a greater or lesser length of those veins, in age concealing the whole back of the pinnules. *Involucre* continuous, formed of the revolute, membranous, dilated margins of the pinnules, which almost meet at the back, concealing the fructification, except in the very mature state. *A solitary species inhabiting the moist*

bipinnate, with linear or linear-oblong, somewhat siliquiform pinnules, pinnately veined.

Unquestionably the first who separated this from the genus *Pteris* was Bernhardt, and he included *Pt. crispa*, L., in his *Allosorus*, with the very imperfect character "*Sporangia* cathetogyrata, sessilia, subaggregata. *Hyposporangia* subcommunia, margine libero subpellucida;" but that genus *Allosorus* has been made a receptacle for Ferns of very varied structure, according to the different views of authors respecting the limits of the genera, especially of those included in this work under the name of *Pelles*. Presl retains the plant under consideration in his genus *Allosorus*, with the majority of the species of which it has little in common, and, strangely enough, he removes the *Cryptogramme acrostichoides* of Mr. Brown, and *C. Brunoniana*, Wall., which we have ventured to consider as not specifically distinct, far away in his genus *Gymnogramme*. *Phorolobus* of Desvaux, adopted by Fée, is of more recent date than Mr. Brown's *Cryptogramme*, unless Desvaux has published it in some earlier work than I am aware of, viz. the 'Mém. de la Soc. Linnéenne' (if he has he gives no reference to it in this work), and he quotes Mr. Brown's *Cryptogramme* in the same volume and in the same essay as a different genus. His character, moreover, is no improvement on Bernhardt's, and he includes a species from China, one from the West Indies, and a third from Australia!

In taking the bold step to unite several supposed species into one, as I have here done, contrary to the judgment of the most distinguished botanists, it is necessary that I offer explanation, especially when, in conjunction with my friend Dr. Greville (*Icones Filicum*), I published as distinct two of the species I propose to abolish, viz. the N. American *C. acrostichoides*, Br., and the Northern Indian *C. Brunoniana**, Wall. I would however call attention to the remark made, firstly, under *C. acrostichoides*: "Mr. Brown has drawn up the character of the genus so as to include our *Pteris crispa*, which he nevertheless considers a doubtful species of *Cryptogramme*. To us, however, there appears no generic difference; and the fertile fronds have the closest similarity in almost every particular except the shorter sori (in *C. crispa*). In the sterile fronds the pinnules are much broader, and never wedge-shaped in the plant before us (*C. acrostichoides*)." Under *C. Brunoniana* we observed, "This, though from so remote a country (Himalaya), is yet almost identical with that of Nootka Sound and subarctic America (*C. acrostichoides*); the only difference exists in the sterile fronds," &c." If indeed there was a manifest difference in the sori, so as to constitute different genera, between *C. crispa* and *C. acrostichoides* and *Brunoniana*, as Presl, and lately Mettenius, maintain is the case, the first could upon no account be united with the two latter; but I think I may appeal to the magnified representations of the sori of *C. crispa*, as given in our 'Genera Filicum' and in Fée's 'Genera Filicum,' and of those of the two kinds in the 'Icones Filicum,' in support of my views that there is no available distinction; and I have copious specimens before me at this moment of our British species (*C. crispa*), in proof that, as in *C. acrostichoides*, these sori occupy so much of the veins, and are "ita approximati, ut discus totus pinnulæ explanatæ capsulis maturis tectus est, et in hoc stadio filix species *Grammitidis* vel *Acrostichi* quasi evadit," Br. Our specimens, gathered in an advanced state in Galloway, Scotland, have the involucre quite spreading, and exposing the sori occupying nearly the whole veins.

When an old plant is found in a very distant part of the world from its previously known locality, one is apt to look upon it as something new; and, as is

* *Cryptogramme Jamesoni*, Hook. and Grev., noticed under this species in *Icones Filicum*, is *Cheilanthes marginata*, H.B.K. (and of this vol., p. 105), though omitted in the synonyms of that plant.

the case with the Cedar of Lebanon and the Cedar of Himalaya, it is very difficult to remove the impression once made upon the mind, although no tangible character to distinguish them can be detected.

I shall now consider the different variations or forms of our plant, as much as possible under their respective countries, for I allow that the mass of specimens from Europe, Asia, and America, exhibit some slight differences, often not easily defined.

1. *C. crispa*.

a. *forma Europæa*; rather slender subflaccid, pinnules of the sterile fronds of two kinds, subobovate deeply cut into 2-5 oblong segments, rarely elliptical and pinnatifido-serrated, those of the *mature* fertile fronds linear-oblong with the margins or involucre more or less recurved, sometimes quite spreading, and then the pinnules are elliptical.—*Cryptogramme crispa*, *Br. in Rich. App. to Franklin's First Journ.* p. 54. *Hook. Gen. Fil. t.* 113. *Hook. et Arn. Brit. Flora*, ed. 7, p. 59, t. 10, f. 5. *Phorolobus crispus*, *Desv. in Mem. de la Soc. Linn. de Paris,** p. 291, "t. 11" (*Pritzell*). *Fée; Gen. Fil. p.* 130, t. 6 D. *Allosorus crispus*, *Bernh. Neues Journ. für die Botanik, part 2,* p. 36. *Presl. Mettenius. Allosorus minutus*, *Turcz. Plant. Imag. et Descr. Fl. Russ.* p. 9, t. 3 (small var. fertile frond partially barren). *Pteris crispa*, *Linn. MS. Sm. E. Bot. t.* 1160. *Willd. Sp. Pl. v.* p. 395. *Pteris Stelleri*, *Gmel. Allosorus Stelleri*, *Rupr. Ledeb. F. Ross. iv.* p. 526. *Pteris minuta*, *Turcz. Cat. Pl. Baic. Osmunda*, *L. Sp. Pl. p.* 1522. *Acrostichum*, *Vill. Onoclea*, *Hoffm.*

Hab. General throughout Middle and Northern Europe, especially in mountain regions and moist districts, as far north as Lapland and Lake Baikal, Siberia; † south to the Pyrenees, Spain; Asturias, *Durieu*; Sierra Nevada, *Boissier*, elev. 8-9000 feet; and to Mount Olympus in Asia Minor, *Sibthorpe*.

Notwithstanding that our learned friend, Mr. Brown, framed his character of *Cryptogramme* with a view to include our *C. crispa*, "quæ dubia quidem species, ob soros abbreviatis potius subrotundos quam lineares," we are disposed to consider it by no means generically distinct, and not even specifically so, either from that gentleman's *C. acrostichoides*, or from the *C. Brunoniana* of Dr. Wallich. It is true that the chief distinction between the plant now under consideration and the two latter is, that *C. crispa* has often the fertile pinnules when mature narrower, with smaller or shorter sori and fewer sporangia, but that is very variable in different specimens, and these sori do not extend and become so completely confluent over the back of the pinnules as generally to force back the involucre, and thus to present a broader surface of pinnule, as is more or less common to the other two kinds; but this is a character not unlikely to depend on soil and climate, and which, in other Ferns, would not be considered of specific, much less of generic value. Another peculiarity in this state of *C. crispa* is, that its habit is more slender than the continental forms, though even this is by no means universal; some of our specimens are very stout and firm.

b. *forma Indica*; erect stout somewhat rigid, pinnules of the sterile fronds varying as in the European form, those of the *mature* fertile fronds rather broad-oblong with the margins (or involucre) spread open (not permanently revolute).—*Cryptogramme Brunoniana*, *Wall. Cat. n. 396. Hook. et Grev. Ic. Fil. t. 158. Mettenius. Gymnogramme Brunoniana, Presl, Tent. Pterid. p. 219. Phorolobus Brunonianus, Fée, Gen. Fil. p. 131.*

Hab. N. India. On the higher alps of Kamoun, *Blinkworth (Wallich), Messrs. Strachey and Winterbottom*, elev. 12,000 feet; Balti, N. W. Thibet, *Shayak Valley*, elev. 9000, *Dr. Thomson*. Above Simla, *Col. Bates*. Choir, N. India, *Mr. Edgeworth*. Interior of Sikkim-Himalaya, elev. 11-13,000 feet, *Hooker and Thomson*.

I place this variety next to the European form, because, in the aggregate of specimens before me, the sterile fronds are exactly as in our European plant, that is, of two kinds, the one kind with the obovate segments deeply divided, serrated, single-nerved, the other with the pinnules elliptical, deeply serrated and pinnately veined, whereas the fertile pinnules more resemble those of the following

Lapland. 3. "*Homopteris*, Rupr.; frondes omnes consimiles, pinnae superiores fertiles, inferiores plerumque steriles." To this is referred *A. minutus*, Turcz. et Trautv. (*Pteris Stelleri*, Gmel., *Pteris minuta*, Turcz. in *Cat. Baik.*), native of Siberia. With regard to the supposed species from Kadiak (Kadjak) and from Sitcha, I can only say that our specimens from those very countries are identical with our European form. The true *Allosorus* or *Cryptogramme crispa* will not belong to his second section, if the character "cujus (pinnulae) margo semper involutus" is of any importance, as I have shown above. In regard to his third section, it is evident that its main or principal character depends upon the "frondes omnes consimiles, pinnae superiores fertiles," &c.; but I have Spanish specimens of *Cr. crispa* with the upper half of the pinnules of the frond fertile, and the lower sterile, and Scotch ones with the lower half fertile and the upper half sterile. It is only by means of an extensive series of specimens from various localities that we can show that these trifling differences, made so much of by those who see specific distinctions in every deviation from the normal form of a plant, can be duly appreciated.

(American) form, although they are not quite so large; but, while the majority of the Indian specimens are as here described, there are others that are more slender and flaccid, with fronds and narrower fertile pinnules, in short, in all particulars resembling our own native specimens.

c. forma Americana; erect generally rather stout, pinnules of the sterile fronds usually elliptical or ovate and more or less deeply and regularly serrated, those of the *mature* fertile fronds rather broad-oblong with the margins (or involucres) much spread.—*Cryptogramme acrostichoides*, *Br. in App. Franklin and Richardson's First Journ. pp. 39 and 54. Hook. et Grev. Ic. Fil. t. 29. Fée, Gen. Fil. p. 131. Allosorus crispus, Kaulf.*

Hab. N., and chiefly N. W., America, Hudson's Bay Company's territories, between 56° and 60° north, *Sir John Richardson*. First found by *Mr. Menzies* at Nootka Sound. Abundant on dry rocks between the grand rapids and great Falls of the Columbia, and on the mountains of Macgillivray's River, and sparingly in the Rocky Mountains near the source of the Columbia, 1825, 6, and 7, *Douglas*. (The specimens from these stations may be considered the types of the *C. acrostichoides*, *Br.*, and were the first recognized specimens referred to *Cryptogramme*; and they have the broad, flattened, mature, fertile pinnules, and generally elliptical, rigid, sterile ones.)—Island of Kodiak (*Ruprecht*); North-west coast of America, both at Kodiak and Sitka, *Barclay*; Unalashka, *Chamisso*; Sitka, *Mertens e Rupr.*; all these, and specimens just received (March, 1857) from *J. A. Lapham, Esq.*, gathered on Isle Royale, Lake Superior, by *W. D. Whitney, Esq.*,—the only locality known within the U. States,—possess quite the European form.

9. PELLÆA, *Link* (1841), *Fée*.

ALLOSORUS, in part *Presl*, scarcely of *Bernhardi*. (HOOK. GEN. FIL. TAB. V., and TAB. CXV. A., as PLATYLOMA, *J. Sm.*) *Pteridis sp.*, *Linn.* and *others*.

Sori linear or oblong, occupying the upper portion of the simple or forked veins, at length becoming confluent and

ovis rachis mostly ebeneous, glabrous and glossy, or less clothed with chaffy hairs or scales.

names which I now bring under the genus *Pellæa* of Link, I have been led, in my miscellaneous writings on Ferns, to refer to *Allosorus*, a genus named by Bernhardt, maintained and greatly extended by Presl, and more fully circumscribed by Kunze. But it must be acknowledged to have undergone so many changes and rejections that I am not sure if Bernhardt would have included any of the species now generally referred to it, as belonging to his *osorus*. We have elsewhere, in discussing the genus *Cryptogramme* of Presl, noted Bernhardt's definition of *Allosorus*, and that author further reviewed *Journal für die Botanik*, vol. i. part 2, p. 36), "The genus *Allosorus* includes all the *Adianta spuria* of Swartz, besides *Adiantum pusillum*, *Pteris acrosticha* of Balbis,—*Cheilanthes fragrans* of this volume, p. 81), *Pteris crispata*, and probably *heterophylla*, Sw. I have given it the name in consideration of the diversity in the grouping of the *sporangia*" (thus those who name them *Allosorus* do so in error). "In some they are mostly solitary, as in *osorus pusillus*, in others they are clustered. In some there is only one *sporangium*, in others several."—Now as Swartz has no group or name for "*Adianta spuria*," it may admit of doubt as to what is here meant by it, and Fern writers seem to consider it to mean species of *Cheilanthes*. It is certain, that the Linnæan *Pteris crispata* is not mentioned as if it were the type of the genus; and we cannot but think that so ill-defined a genus as this of Bernhardt, is better abolished. And such seems to be the opinion of others, or they only maintain it for *Pteris crispata*. Professor Link,* established the genus *Pellæa*,† or the legitimate species of *Allosorus* and Kunze, and Mr. J. Smith,‡ in 1842, published his genus *Platyroma*, which refers the *Allosorus* just mentioned, in part at least, to that genus, and the *isobea* of Kaulfuss. In fine, M. Fée, in his elaborate 'Genera Filices' shows the preference to *Pellæa*, and we gladly follow him. We now consider the *fructification*, the difference between *Pteris* and *Pellæa* is that whereas in the former the sori arise from a longitudinal continuous vein in the axis of the involucre, in *Pellæa* the sori are in reality separate, their origin on the apex of the veins, more or less covered when young by the involucre, but eventually becoming confluent, so as to form apparently a single marginal sorus. It is true this is too often a microscopical character, but we are able to avail ourselves of it; but happily there is a habit which, in the case of pteridaceous plants, comes to our aid as a secondary character of great importance. "On les reconnaît" (the species of *Pellæa*, says M. Fée), "à la présence de l'épaisseur des lames, souvent opaques et à la couleur verte olivâtre qui se renforce en se desséchant. Les stipes et les nervures principales ont une consistance crustacée fragile et cette couleur noire luisante, si remarquable dans *Adiantum*. Elles ne produisent que bien rarement des écailles fronduleuses; leurs dernières divisions tendent à la forme linéaire, ou se terminent en pointe." Still it must be confessed that many of these marks are inconstant, and

cum Species in Horto Regio Berolinensi cultæ.'

1 *πελος* vel *πελλος*, *niger*, *fuscus*, "stipes rigidus, badius, unde Pellæam nomen habet." It is a little unfortunate that there should have been many years ago a *Pellia*, named in honour of a learned Florentine Advocate, *Pellia*, the Epiphyllous group of *Jungermannia* among *Hepaticæ*: a genus now known to Link, probably not adopted, even at the time his *Pellæa* was first generally received.

ook. Bot. Journal, vol. iv. p. 159 and 160.

unless the peculiar character derived from the position of the sori be considered and be constant, there is but little that will enable us to distinguish them from some species of *Pteris* on the one hand, and from those species of *Cheilanthes* which have less interrupted sori on the other. Nor is it more easy to define the exact limits of the species, so variable are they in the form of the pinnæ in different stages of development and even on different parts of the same frond. We trust our figures will be found useful to the student in the determination of the species.

No acknowledged *Pellæa* (or *Allosorus*) is known to have anastomosing veins.

* *Fronde more or less pedate.*

1. *P. pilosa*; small, fronds subcordiform, fertile ones deeply subquinelobately pedate (hence in a sense pinnate) coriaceous opaque, primary lobes ovate petiolate deeply bipinnatifid, segments narrow-oblong entire, rachis and costa (beneath) hairy, sterile ones quinelobately pedate primary lobes broad pinnatifid ultimate lobes short very obtuse upper surface subglabrous beneath clothed with copious chaffy hairs, stipes and rachis ebeneous more or less paleaceous-hispid. (TAB. CXIV. B.)—*Pteris pilosa*, Poir. in *Encycl. Méth.* v. p. 717. Sw. *Syn. Fil.* p. 163. Willd. *Sp. Pl.* v. p. 362. *Cheilanthes heterophylla*, Willd. *Herb.* *Allosorus heterophyllus*, Presl, *Tent.* (name only).

Hab. "Isles Maurices" (*Herb. Lamarck.*); Isle of Bourbon, *Herb. Mus. Paris.* (in *Herb. Nostr.*)

I had the pleasure to receive specimens of this rare plant from the Paris Museum, under the name of *Cheilanthes heterophylla*, Willd. It does not appear to be anywhere described under that name, and is clearly the *Pteris pilosa* of Poiret, from the "Isles Maurices" (which probably includes Bourbon, for it seems unknown in the Mauritius. It is allied in general structure to our *P. geraniifolia*, and to our var. *b. columbina* of *P. lomariacea*; but the fertile frond is more compound and pinnated, and the sterile fronds are clothed with chaffy hairs.

b. Brazil; about Rio, *Raddi and others*. S. Brazil, *Sellow*. Santa Marta, *Abria, Purdie*. Venezuela, near Tovar, *Fendler (Pl. Venez. n. 92)*. Madagascar and Mauritius, *Bojer*. Cape of Good Hope, *Menzies, Drège*. Nilghiri, *E. a. Heyne (Walllich)*, *MacIvor, Gideon Thomson, Esq.* Luzon, *Cuming*. Mars, *Langsdorff*. Volcano, Owhyhee, *Macrae*. Fiji Islands, and Island of Sum, *Milne (Voyage of H.M.S. Herald)*. Galapagos, *Douglas*.—It is very able in any one who at a first glance shall refer this plant to some of the son and more compound forms of *Pteris* (*Litobrochia* or *Doryopteris* of au-) *pedata*, or still more in any one who shall unite with it our *Pteris Beecheyana* of this volume, and the more so as the opacity of the fronds renders it very alt to distinguish the nature of the sunken venation,—reticulated in *Pl.* 's and *Beecheyana*, forked and free in our plant. The frond is, indeed, gene- more compound, and of a somewhat thinner substance.

P. lomariacea; a foot and more high, root cæspitose, ds cordate or cordato-ovate coriaceous very opaque, ste- ones extremely variable pinnatifidly 3- or 5-lobed more as divided into secondary lobes which are oblong or ob- o-rotundate, fertile ones similarly divided, the lobes or nents linear-elongated remote with broad and very ob- sinuses, sori in age broad, stipites elongated (especially re fertile fronds) black-ebeneous deciduously hairy below, le ones much longer than the sterile ones.

septemloba; sterile fronds about 7-lobed, lobes oblong, simple.—*Pteris lomariacea*, *Kze. in Herb. Monac. et Vin- (fide Klotzsch)*. *Doryopteris lomariacea*, *Kl. in Linnæa*, p. 343. *Pteris septemloba*, *Kl. in Herb. Berol.*

columbina; sterile fronds broad-cordate sub-5-lobed, s closely pinnatifid rotundate or obovate short.—*Pellæa mbina*, *Hook. MS. in Herb. Nostr.* (TAB. CXII. A.)

digitato-palmata; larger and very coriaceous, sterile d broad-palmate 7-lobed, lobes acute, fertile ones deeply tate with seven flabellate elongated (4 inches long) entire two lesser deflected lobes.

b. a. British Guiana, *Rich. Schomburgk, n. 1197 (Klotzsch in Herb. Nostr.)*. Walls, Infecionado, Diamond district, Brazil, *Gardner, n. 5297*.—b. Summit e Organ Mountains, Brazil, *Gardner, n. 5930*.—c. Rocky, elevated places in ame locality with a, Diamond district, Brazil, *Gardner, n. 5298*.—In the s-group of Ferns we have, among the *pedate* forms, a set with free venation, (correctly or not) ranked with *Pellæa* (*Allosorus* of most authors); and a ith reticulated or anastomosing venation, ranked by some in *Litobrochia*, by s constituting the genus *Doryopteris*; each possesses two species so exactly r, so completely the analogues of one another, that but for the difference in sation, I do not see how they are to be distinguished: this happily puts an o all doubt respecting *specific* identity. *Pteris* (or *Doryopteris*) *Beecheyana*, t, is *Pellæa geraniifolia* with reticulated veins, as our present plant *Pellæa* 'acea is *Pteris* (or *Doryopteris*) *pedata* with free veins. Our excellent | Dr. Klotzsch has assuredly consulted the natural affinity, in uniting, as he one (in *Linnæa*, v. xx. p. 342), these two groups of *pedate Pteridea* into

one genus, but we hardly think that Mr. J. Smith (with whom the venation is a *sine quâ non*) will sanction the adoption of his *Doryopteris* for it. Dr. Klotzsch too overlooks the character (if indeed there be such a character *constant*) of the sori being on the veins or veinlets in *Platyloma*, J. Sm. (corresponding with *Pellæa*), and the continuous marginal receptacle of his *Doryopteris*. I shall have occasion to refer to this subject in considering the genus *Pteris* as adopted in this work.

Pellæa lomariacea I believe to be a very distinct species from the preceding, tolerably constant in the form of the fertile frond, and, like *Pteris pedata*, singularly variable in the sterile frond, which is always smaller, and on a much shorter stipes than the fertile one. In the form I have called (a.), the type of the species, the sterile frond is not peculiarly different from the fertile one; in both the stipes is twice the length of the sterile one, and from 1 to nearly 2 feet long. The second var. (b.) is best understood by the figure of the sterile and fertile frond at Tab. CXII. A. Our var. (c.) is a very remarkable one; the frond is broader than long in both the sterile and fertile frond: the former is quite palmate, cut only about halfway down into seven broad segments, altogether resembling a 7-lobed ivy-leaf; while in the fertile frond the divisions reach almost to the base, the segments are linear, flabellately disposed; at the base are two deflected, lesser lobes. Indeed the three varieties have, at first sight, so distinct an appearance from each other, that did we not know how liable allied species are to sport, they would not be suspected to belong to one and the same species.

4. *P. Tamburii*, Hook.; caudex . . . , frond 6 inches long submembranaceo-coriaceous white and powdery beneath deeply and pedately 5-partite, primary lobes deeply pinnatifid the segments subovate a little falcate usually obtuse undivided or subpinnatifid crenate with a black dot in the sinus of the crenatures, lower or lateral primary lobes ovato-acuminate in circumscription, central primary lobe broad lanceolate, veins sunk obscure (except when held between the eye and the light) forked free terminating in a 2-lobed sori-ferous apex which is confluent with a marginal line, involucre subintramarginal universal and continuing all round to the points of the lobes slightly sinuate and a little transversely waved, sori subconfluent but all originating on the 2-lobed apex of the vein, stipes longer than the frond and

lobed apex, which lobes are the receptacles of the capsules, and are more or less confluent with the marginal line or nerve, and it is these receptacles which occasion the black dots at the edges of the frond beneath. In age the sori diverge so as to be almost confluent, but they are not continuous on the marginal nerve as in *Pteris*; on the other hand neither are they decurrent on the veinlets; so that it may be considered a dubious point whether this should be considered a *Pellæa* or *Pteris*.

** *Fronde pinnate; pinnae entire.*

5. *P. paradoxa*; pinnated, pinnæ (9-24 or 25) shortly petiolated (upper ones sessile) large cordato-oblong acute or obtuse glabrous, veins especially beneath obsolete, sori (mature) very broad, involucre very narrow never covering the mature sori, stipes elongated, rachis paleaceo-villous at length glabrous. (TAB. CXI. A.)—*Adiantum paradoxum*, Br. *Prodr.* p. 155. *Allosorus paradoxus*, Kze. *Platyloma Brownii*, J. Sm. in *Hook. Gen. Fil. sub.tab.* 115 A. (name only, the figure is that of *Pellæa falcata*); and in *Hook. Journ. of Bot.* iv. p. 160. *Pellæa cordata*, Fée, *Gen. Fil.* p. 130. *Pteris cordata*, Sieb. *Fl. mixta*, n. 269. *Pteris latizona*, All. *Cunn. MSS.*

Hab. N. S. Wales, P. Jackson, Brown, Sieber. Brisbane River, in dry shady woods, All. Cunningham, Dr. F. Mueller (fronds glaucous beneath).—Mr. Brown, probably considering the receptacular veins to extend into the involucre as in *Adiantum* (though to me the real involucre appears to be exterior to these, the portion bearing the sori never being folded in), was induced to refer this fine plant to that genus, and to give it the name of *A. paradoxum*; for it has all the habit of his *Pteris falcata*, which he places in the *Adiantoid* section of *Pteris*. But a careful examination of the sori in the latter plant shows that they have the same origin, and are of precisely the same nature as in his *Adiantum paradoxum*. Mr. J. Smith has consequently, and with much propriety, placed them next each other, in his genus *Platyloma*, with some other pteridoid plants taken mainly from *Allosorus* of Prial. This genus however proves identical with the older one of *Pellæa*, Link, is confirmed by Fée, and is, I think, and as I have already observed, to be preferred to *Allosorus*. Our remarks made under the next species (*P. falcata*), will tend to prove that this plant has a greater affinity with the *P. falcata* than either Mr. Brown or Mr. J. Smith suspected. *P. paradoxa* is a foot to a foot and a half long, the rachis generally a little flexuose, stout. Pinnæ from an inch and a half to three inches long, and from half an inch to full an inch wide. The mature sori form a very broad, continuous band along the spreading portion of the pinnule, and are never, that I can find, covered by the involucre. The *Pellæa cordata* of M. Fée, l. c., founded on the 'Flora Mixta' of Sieber, n. 269, from N. S. Wales (not "from the Cape"), is precisely the *Pellæa paradoxa*.

6. *P. falcata*, Fée; caudex creeping, frond linear-oblong pinnate, pinnæ (26-40 or 50) on very short petioles (the upper ones sessile) oblong-lanceolate generally subfalcate truncate or subcordate at the base acute and often mucronate at the point glabrous or sometimes ferrugineo-hirsute the hairs frequently arising from little bulbs or tubercles, veins

obsolete, involucre narrow when young involute, mature sori forming a broad band just within the narrow involucre, stipes and rachis stout erect clothed with chaffy scales and often spreading hairs.—*Fée, Gen. Fil. p. 129.* *Pteris falcata, Brown, Prodr. p. 154. Presl. Hook. Fil. Fl. N. Zeal. ii. p. 24.* *Allosorus falcatus, Kze. in Linnæa, xxxiii. p. 219.* *Platyloma falcatum, J. Sm. in Hook. Gen. Fil. t. 15 A. (under the name of Platyloma Brownii).*

β. setosa; stipes and rachis setose with copious spreading ferruginous hairs, pinnæ subhirsute, the hairs often arising from little bulbs or tubercles.—*Pteris seticaulis, Hook. Ic. Plant. Rar. iii. t. 209.* *Pt. alternifolia, Wall. n. 2182.*

γ. nana; small, pinnæ sharply auriculated at the base and strongly mucronate at the point. (TAB. CXI. B.)

Hab. New South Wales and Van Diemen's Land, *Brown, Allan Cunningham.* (Blue Mountains), *R. Gunn, Sieber.* Darbin Creek, *Dr. Mueller.* Raoul Island. Kermada Isles, and Sunday Island, *Macgillivray, n. 952,* and *Mitæ, n. 63 (Voy. of H.M.S. Herald, 1854,* specimens having the pinnæ quite like those of *P. paradoxa*), Auckland, N. Zealand, Northern Island, *Sinclair, n. 51.*—*β.* India, Dindigul, and Neilgherries, Madras Presidency, *Dr. Wight and G. Gardner.* Penang, *Lady Dalhousie.*—*γ.* Dry, leafy woods, Brisbane River, *Allan Cunningham.*—Except the usually taller, but narrower, and more numerous pinnated fronds, with narrower pinnæ, and stipes and rachis squamuloso-hirsute, we see no difference between this and the *P. paradoxa*: and certainly the specimen communicated by Mr. Smith to the 'Genéra Filicum,' and there figured (tab. 115 A.) under the name of *Platyloma Brownii* (*Pellæa paradoxa*), belongs to the present plant, as shown by the form of the pinnæ, clothing of the rachis, etc. If I succeeded in showing a very close affinity between the present and preceding species, it will not be more difficult, thanks to copious specimens, in the herbarium and cultivation, to indicate as great a similarity between the present and the following, *Pellæa rotundifolia.*

7. *P. rotundifolia*; caudex long creeping, fronds pinnate linear rigid decumbent or suberect, pinnæ (30–40) small oval or subrotund rarely oblong-subovate subcordate at the base

Island, *Forster*, *All. Cunningham*, *Coleenso*, *D'Urville*, *J. D. Hooker*, *Sinclair*, etc. Norfolk Island, *Kunze*.—This handsome species, or, as I fear it ought more correctly to be considered, form of *P. falcata*, is peculiar to New Zealand, unless *Kunze* is correct in giving it as a native also of Norfolk Island: and the true *P. falcata*, gathered only by Dr. Sinclair in New Zealand, seems very rare; but most botanists find intermediate forms between the two. Indeed our growing plants in the temperate Fern-house at Kew, will show, from the same root, fronds with very varied forms of pinnules, subrotund, oval and oblong. Dr. Hooker's and Mr. Coleenso's native specimens exhibit the same variations, so that the former (*Fl. N. Zeal.* vol. iii. p. 25) has expressed his belief that *P. rotundifolia* will prove to be a form of *P. falcata*.

In this and the two preceding species it is but rare that a true involucre (a narrow, inflexed, membranous edge) is to be seen, or only in the very young state of the fructification, so that the fully formed sori may be said to arise from a quite exposed spreading portion of the pinna: if indeed that portion bearing the sori were at any time folded in, as in *Pteris*, it would be an involucre, resembling that of *Adiantum*. I have never seen it in that state.

8. *P. Doniana*; a foot to a foot and a half high, caudex short creeping with copious tufted fibrous roots, frond broad lanceolate pinnated, pinnæ few (10–12–18) 2–3 inches long subcoriaceous on short petioles glabrous oblong-ovate gradually acuminate coarsely serrated in the barren portion, the base obtuse or slightly cordate, veins obscure forked free (not visible except the pinna is held between the eye and the light), sori on all the pinnæ (of the fertile specimen) very narrow even when mature continued from the base nearly to the serrated point, involucre very narrow slightly intramarginal and flattened upon the sorus obscurely transversely wrinkled, stipes and rachis stout strict with a unilateral pubescent line, and as well as the petioles and lower portion of the costa intensely ebeneous black glossy. (TAB. CXXV.)—*Platyroma Donianum*, *J. Sm. MS.*

β. pinnules narrower more coriaceous and opaque glaucous beneath.

Hab. Tropical Western Africa, Island of St. Thomas, Bight of Biafra, *G. Don. Acra*, *Dr. Vogel*.—β. Abeokuta, *Dr. Irving*.—Mr. J. Smith first directed my attention to a solitary specimen of this Fern in his Herbarium, on which he had remarked, "Habit of *Platyroma paradoxum*, but with very narrow sori." Specimens in my own Herbarium are from Acra, and a slight variety is from Abeokuta, sent to me by the late Dr. Irving, who, had his life been spared, would have contributed largely to our knowledge of tropical African botany. Although so closely allied to our *Pellæa paradoxa*, the narrow lines of fructification bring it near in the structure of the pinnæ (not in composition) to the large varieties of *P. hastata* (see our Tab. CXVI. f. 1); but there the veining is very conspicuous, even to the naked eye; here it is sunk in the substance of the pinna, yet tolerably conspicuous when held between the eye and the light, which is not the case with *P. paradoxa*, nor is it indeed with the var. β. of our present plant; yet I cannot but consider these two as identically one species, and very different from all other known *Pellææ*.

*** *Fronde bi-tripinnate.*

9. *P. gracilis*; caudex 4-6 inches high very slender filiform slightly scaly, fronds thin-membranaceous pale-green bipinnate, sterile pinnules obovate or subrhomboidal sinuately-lobate, fertile ones lanceolate obtuse crenate all more or less petiolate, terminal ones elongated, veins remote simple or forked, sori subrotund, involucre broad continuous very thin membranaceous whitish subconvex but close-pressed, stipes very slender dark-brown glossy, superior rachises winged. (TAB. CXXXIII. B.)—*Allosorus gracilis*, Pr., Gray, *Man. of the Bot. of North. U. St.* p. 264. ed. 2. p. 591. t. 9 (*excellent*). *Pteris gracilis*, Mich. Fl. ii. p. 262 (*not Fée*). *Cheilanthes gracilis*, Kaulf. *Enum. Fil.* p. 209.

Hab. N. America; Canada (near Malbays), Michaux; *Goldie in Herb. Nostr.* Shaded calcareous rocks, Vermont to Wisconsin, rare, Dr. Asa Gray. Dells of the Wisconsin river, J. A. Lapham, Esq. Near New York, Dr. Knickerbocker; Penn-Yan, Dr. Sartwell in *Herb. Nostr.* Northern India; Champwa, Kumaon, elev. 10,000 feet, Messrs. Strachey and Winterbottom in *Herb. Nostr.* Bali, N. W. Tibet, elev. 9000 feet; temperate regions, Dr. T. Thomson.—The rarity of this pretty and very delicate Fern, the difficulty of obtaining perfect specimens, and the general resemblance of the fronds to that of some of the states of *Cryptogramme crispata*, together with my detecting specimens identical with them among Dr. Thomson's and Messrs. Strachey and Winterbottom's plants, gathered by them as *Cryptogramme crispata*, induced me for a long time to refer them to a form of that species; nor did the excellent figure recently published of *Allosorus gracilis*, in Dr. Asa Gray's second edition of his 'Manual of the Botany of the Northern United States,' sufficiently convince me of my error. Upon laying my doubts before Dr. Gray, however, he most kindly sent me a beautiful suite of specimens from Mr. Sullivan (gathered by Dr. Sartwell) with the expression of regret that they are destitute of "root-stock, which is never collected, but it has a very small and filiform one,—not the thick rhizome of *Allosorus crispus*; nor do the fronds grow in tufts, as in that species, but scattered, so that the various shapes of frond may be found in the same patch (if the sparse assemblage may be so called); they are not clustered in one root." Thus although

more or less ferrugineo-pilose (a span to a foot-and-a-half and more tall), caudex short thick nodose scaly, fronds laxly tufted coriaceous ovato-lanceolate pinnate or below bipinnate, pinnæ subopposite petiolate, pinnules 3-7 (terminal one the longest) oblong or linear-oblong obtuse rarely with a blunt opaque mucro the base truncate or subcordate sometimes hastate or auriculate sterile ones denticulate, veins indistinct, sori broad continuous, involucre formed of the incurved margin of the pinnule the edge only submembranaceous and crenulate, stipes and rachis very black glossy ebeneous.—*Link, Fil. Hort. Berol. p. 59. Fée, Gen. Fil. Pteris atro-purpurea, Linn. Sp. Pl. p. 1534. Mich. Am. ii. p. 261. Sw. Syn. Fil. p. 106. Schkuhr, Fil. 93. t. 101. Willd. Sp. Pl. v. p. 375. Allosorus atro-purpureus, Kze. Presl. Platyloma, J. Sm.*

β. nana. Pteris gracilis? nana, Richardson in Frankl. Voy. App. Bot. p. 39 (not Mich.).

Hab. N. America; probably generally through the United States from Texas (*Drummond*), through the Alleghanies to Massachusetts, through Canada to the "woody country of subarctic America, between N. lat. 54° and 64°," when it becomes very dwarf, not an inch high (*Richardson*), and westward to the limestone rocks of the Sashatchawan, *Douglas and Drummond*.—Very variable in size, from the dwarf form just mentioned to 2 feet in height, yet departing but little from the normal character here described. Fertile pinnules from $\frac{1}{2}$ to 1 inch long; terminal ones often 2 inches and more long; sterile ones $\frac{1}{2}$ an inch broad. Stipes often equal in length to the frond.

11. *P. dura*; a span to a foot high, frond oblong pinnate or below bipinnate, pinnæ opposite, pinnules opposite and alternate glabrous sessile or scarcely petiolated erectopatient rigid entire linear-elongate or obtuse subcordate or with a sinus at the base, involucre narrow membranaceous continuous quite round the apex, stipes about as long as the frond ebeneous naked, rachis ebeneous rough with short fulvous chaffy curled hairs. (TAB. CXIII. A.)—*Allosorus durus, Presl. Pteris dura, Bory in Willd. Sp. Pl. v. p. 376. Bojer, Hort. Maurii. p. 400. Pteris angusta, Bory in Willd. Sp. Pl. v. p. 388.*

Hab. Mauritius and Madagascar, *Bojer*.—I received two specimens of this very distinct plant from the late Professor Bojer; the one simply pinnate, marked "*Pteris dura*, Bory;" the other, "*Pteris angusta*, Bojer," with all the lower pinnæ again pinnated, but I think evidently one and the same species. Willdenow compares it with the *Pteris* (*Pellæa*) *atropurpurea*. It is indeed similar in texture, size, and somewhat in ramification; but the great length of the narrow pinnules will distinguish this form from that and all others of this genus. The frond is 5 inches to a span long; pinnules $1\frac{1}{2}$ to 2 inches long, exactly linear and of the same width throughout; the rather narrow membranous involucre is con-

tinued all round the blunted apex of the pinnule, and a kind of margin to this involucre is formed by the inflexion of the edge of the frond; veining indistinct; midrib stout on the under side; stipes and rachis very black and glossy, the latter partially clothed with fulvous, frizzled, chaffy hairs.

12. *P. calomelanos*, Link; glabrous, caudex short thick very scaly, fronds subspithameous cæspitose subcoriaceous oblong-triangular bipinnate, pinnules all petiolulate cordato- (rarely subhastato-) triangular very obtuse entire sometimes subtrilobate or sinuate at the margin, the sinus deep and narrow, veins dichotomously radiated, sori continuous, involucre membranaceous, stipites short scaly at the base and as well as the slender rachises and petioles black-ebeneous very glossy.—Link, *Fil. Hort. Berol.* p. 61. *Fée, Gen. Fil.* p. 129. *Allosorus calomelanos*, Presl, *Tent. Pterid.* p. 153. Hook. *Bot. Mag. t.* 4700. *Pteris calomelanos*, Sw. *Syn. Fil.* p. 106. Willd. *Sp. Plant.* v. p. 393. Kze. in Linn. p. 525. Schlecht. *Adumbr. Fil. Cap.* 43. t. 24. *Platyloma*, J. Sm. *Pteris hastata*, Thunb. (not of others).

Hab. Mountain districts, South Africa, growing in rocky places at elevations above the sea varying from 400 to 4000 feet, according to Drège; about the Cape, Table Mountain, etc., Dr. Pappe, Capt. Carmichael. Graham's Town, Mr. Atherstone. Macalisberg, Zeyher and Burke, and Mr. Anderson. Isle of Bourbon, Capt. Carmichael in *Herb. Nostr.* North-western India; Simla, Major Madden; Kumaon, below Almora, elev. 4000 feet, Strachey and Winterbottom; Tikri in Karli, Himalaya, 5-6000 feet elev., Mr. Edgeworth.—An elegant and graceful Fern, apparently a dry-country species, and by no means confined, as had been long supposed, to the mountain regions of the Cape of Good Hope. We are enabled to give the above localities from fine specimens in our Herbarium. It is strange that Kunze (in Linnæa, vol. x. p. 525) should say of this plant, "Neque ad *Allosorum*, neque ad *Cheilanthem* pertinet, et veros *Pteridis* characteres offert." There can be little doubt of its belonging to the same group or genus of *Pteridea* as *Allosorus cordatus* and its allies.

13. *P. auriculata*, Link; glabrous, a span high, caudex

riculata, Link. Kze. in *Linnaea*, xxiii. p. 242. Cassebeera, J. Sm. *Allosorus*, Presl.

Hab. South Africa, rocky mountains about Cape Town, Clanwilliam district, etc.—A very distinct species, less harsh and rigid than the *Pellææ* in general, with a good deal of the habit of *Cheilanthes Capensis*. The forked venation is very distinctly seen when held up between the eye and the light. Mr. Brown correctly notices (*Prodr. Fl. Nov. Holl.* p. 154) that the “*involucrum fornicatum margine interiore inflexo soros includit, itaque et ob habitum separari (a Pteride) debet.*” This involucre is very well represented in Dr. Greville’s excellent figure (*lc. Fil. Kar.* t. 116. f. 1). Our largest specimens are a foot long; young ones have the fronds very flaccid and subpellucid; older ones with mature fructification more rigid and opaque.

14. *P. Seemanni*, Hook.; much tufted 4–6 inches high, caudex short thick (not creeping) densely fibrous, fronds ovato-lanceolate membranaceous opaque obsoletely pubescent pale and subglaucous beneath bipinnate, pinnules sessile ovate or subcordate obtuse upper ones confluent inferior ones of the pinnæ free sinuato-pinnatifid with few and very obtuse lobes, veins sunk obsolete (except seen between the eye and the light) several times forked approximate, veinlets parallel, sori narrow, involucre entire, stipes short (1–3 inches) slender pale brown a little scaly at the base, rachises herbaceous. (TAB. CXVII. B.)

Hab. Mazatlan, Mexico, *Seemann*, n. 1447.—A very distinct species from any known to me, with very much the habit and mode of growth, dense fibrous roots, and thin submembranaceous tufted fronds of the Cape *P. auriculata*; but the fronds are broader, more compound, the pinnules larger, more confluent, the stipes and rachis more herbaceous, the veins closer, more parallel, more frequently forked; the fronds are opaque, and the veins only to be seen when the specimen is held between the eye and the light.

15. *P. Skinneri*, Hook.; a span and more high, caudex . . . , fronds deltoideo-ovate acuminate bipinnate submembranaceous glabrous or very sparsely and minutely hairy beneath veined, primary pinnæ few distant petiolate, secondary ones or pinnules sessile rhombo-acuminate, upper ones coadunate and entire, those of the lower pinnæ sessile decurrent lobed or pinnatifid segments acute or acuminate, veins obliquely parallel several times forked, sori continuous, involucre narrow submembranaceous close-pressed, stipes scaly only at the base, and the rachises stramineous glossy. (TAB. CXVIII. B.)

Hab. Guatemala, *G. U. Skinner*, Esq.—Four specimens of this Fern, sent to me by Mr. Skinner, are all that is known to me of this very distinct Fern, and I cannot refer it to any described species, nor point out any one to which it is closely

allied. The fronds in the dry state are quite tawny; the stipes and rachises pale stramineous.

16. *P. ternifolia*, Fée; glabrous, spithameous to a foot high, caudex short bulbiform scaly, fronds coriaceous dark-green narrow oblong lanceolate pinnate, pinnæ opposite trifoliolate (pseudo-verticillate) sessile, pinnules (reflexed when dry) linear mucronate uniform (mucro short opaque) two lateral ones sessile intermediate or terminal one subpetiolulate, veins immersed obscure, sori continuous all round the point, involucre broad plane formed of the rigid margin of the pinnule the edge only submembranaceous, stipes and rachis black-ebeneous very glossy.—Fée, *Gen. Fil.* p. 129. *Allosorus ternifolius*, Kze. in *Linnæa*, xxiii. p. 220. *Pteris ternifolia*, Cav. *Presl*, 1801, n. 657. *Hook. et Grev. Ic. Fil. t.* 126. *Pteris verticillata*, Sw. *Syn. Fil.* p. 103. *Willd. Sp. Pl. v.* p. 375. *Presl, Reliq. Hænk. i.* p. 57. *Platyloma ternifolium*, *Brackenw. U. S. Expl. Exp. Fil.* p. 94. *Pteris Peruviana*, *Poir.* (*Kze.*)

Hab. Andes of Peru, *Jos. Jussieu (Cav.)*. Purrucuchu, *Mathews*. Baños, *Brackenridge*. Huanuco, *Pöppig*. Quito, on old walls and buildings, *Jamess*. Caracas, *Linden*, n. 513. Sierra Nevada, N. Granada, *Schlim*, n. 848. Sierra de Achira and El Moro, Andes of Chili, *Gillies*. Mexico, *Schaffner*. Sandwich Islands, *Menzies, Douglas*. On Mouna Loa and Mouna Kea, elev. 9000 feet, in great luxuriance, *Brackenridge*.—One of the most distinct of all Ferns. We do not see why the excellent Swartz should have changed the name *ternifolia* of Cavanilles (1801) to *subverticillata*, in his 'Synopsis Filicum' (1806), quoting too, as he does, Cavanilles' name and date of publication.

17. *P. Wrightiana*, Hook.; glabrous tufted (spithameous), caudex short thick nodose scaly, fronds coriaceous pale glaucous green broad lanceolate bipinnate, pinnæ opposite sessile trifoliolate lowest pair pinnate, pinnules of all the pinnæ linear oblong (sterile ones broad oval) with a rather entire

ternifolia, as far as I have yet seen, has the pinnæ invariably trifoliolate; no instance, in all my numerous specimens, of an approach to the pinnæ becoming pinnate; the colour too is a dark olive-brown (when dry), never in the least glaucous; and in all the entire frond is fertile, the mucro short opaque. Our plant now under consideration, in three very perfect specimens, has the fronds of a pale glaucous green, the superior pinnæ are trifoliolate, the lowermost pair are pinnate, and these latter are moreover generally sterile, and of a broad, oval form, plane; all too are terminated by a cartilaginous, distinct, pellucid mucro. How far difference of climate may affect these plants it may be hard to say, and whether the more compound nature of the frond, and the more decided mucro, and the very different colour, etc., may be due to the more northern latitude, I will not undertake to determine.

18. *P. longimucronata*, Hook.; glabrous (a span to a foot high) tufted, caudex short thick nodose scaly, fronds coriaceous glauco-pruinose ovato-lanceolate bipinnate, pinnæ nearly opposite sessile, pinnules 7-9-13 opposite (in rather distant pairs) linear-oblong a little broader at the base sessile acute rather long cartilagineo-mucronate at the point terminal ones petiolulate, sori continuous, involucre broad formed of the coriaceous hard inflexed margin of the pinnule, stipes and sometimes pruinose rachis black-ebeneous very glossy. (TAB. CXV. A.) *β. minor*. *Allosorus mucronatus*, *D. C. Eaton, MS. (and in Sillim. Journ. July, 1856).*

Hab. New Mexico, *C. Wright, Coll. N. Mex. 1851-52, n. 2131. β. Bernicia, California, Major Eaton, U.S.A.*—My specimens of *P. longimucronata* and the last species of *Pellæa* are from the beautiful collection of the Plants of New Mexico, made by Mr. C. Wright, who accompanied the U. S. Boundary Commission, under the command of Colonel Graham. They have several points in common with each other and with *P. ornithopus* and *P. ternifolia*, as observed under our last described species. This, however, is much further removed from the latter species than is *Pellæa Wrightiana*, which indeed may be considered an intermediate form. The present is broader in its outline or circumscription, than that species, and it is throughout bipinnate, and with smaller pinnules, though the fronds are often longer; a trifoliolate pinna is rarely to be found on any of my specimens. The general aspect of this little group is not unlike that of the fronds of *Pellæa andromedafolia*, but the pinnules are longer and narrower in proportion, and acute and strongly mucronate.*

19. *P. ornithopus*, Hook.; glabrous (a span to a foot high), caudex short thick nodose scaly, fronds tufted coriaceous strict rigid ovate or ovato-lanceolate bipinnate, pinnæ and secondary pinnæ opposite distant the latter 3-foliolate,

* Since most of the above was in type I have received, through the kindness of Daniel C. Eaton, Esq., New Haven, Connecticut, specimens of my *P. Wrightiana* (from the Valley of the Rio Grande), and of *longimucronata, β* (from California), both as "*Allosorus mucronatus*" of that author, above quoted. The very brief character given in 'Silliman's Journal' does not enable me to determine which of the two is the true *mucronatus*, otherwise that name has the right of priority.

pinnules short subcylindrical-terete sessile (rarely subpetiolulate) mucronate reflexed (when dry) ultimate ones solitary, sori continuous, involucre formed of the revolute margins of the pinnules scarcely thinner at the edge, stipes and rachis dark purple somewhat glaucous scarcely glossy. (TAB. CXVI. A.)

Hab. California, *Hartweg*, n. 2042. "Between the Mississippi and the Pacific Ocean, near the 35th parallel of lat., in 1853 and 4:" the specimens marked by Dr. Asa Gray "*Pteris andromedifolia*, Kaulf., var., Cohon Pass" (most likely gathered within the limits of California), Dr. J. M. Bigelow. Dry hills about Monterey, *W. Lobb*.—That this plant belongs to the same group with *P. Wrightiana* and *P. mucronata* and *P. tenuifolia* no one can doubt who has the opportunity of comparing them, for they all have characters in common: but the present differs from the rest specifically, if I may judge from the several specimens in my possession, and from three different collectors. The fronds are from a span to a foot high, bipinnate: the secondary pinnæ all trifoliolate, except the ultimate ones, which are simple and solitary, all opposite, and the pinnule so formed and so arranged in the trifoliolate pinnæ as to resemble the claws of the foot of a small bird, each terminated with a distinct mucro. I have never received any specimens but from California. The terete appearance of the pinnules is caused by the strongly revolute margins, completely enclosing the fructifications, with a deep line or furrow, formed by their approximated margins, at the back of the frond.

20. *P. rigida*; caudex scarcely any, roots tufted very wiry, fronds ovate or deltoid-ovate bi-tripinnate, pinnæ opposite, pinnules sessile subopposite or alternate deltoid-lanceolate rather obtuse, the margins crenate and ciliate, decurrent at the base, inferior ones often with an acute lobe on the upper base, sori continuous formed of the revolute margin subcrenate, stipes and rachis purple-ebeneous glossy very paleaceous, scales spreading.—*Allosorus rigidus*, *Presl, Kze. Syn. Fil. Pæp. in Linnæa*, ix. p. 55, and in *Linnæa*, xiii. p. 137. *Liebm. Fil. Mex. p. 70. Pteris rigida, Sw. Syn. Fil. p. 104 and 209. Willd. Sp. Pl. v. p. 384. Pteris costalis*

erect, rigid; frond 5 inches long, subdeltoideo-ovate, coriaceous, dark brown in the dry state, slightly hairy; frond tripinnate (in the smaller specimens bipinnate, with most of the pinnules decurrent and confluent); the lower pinnules of the primary and secondary pinnæ with an acute lobe or auricle on the upper side of the base, and sometimes on the lower (showing a disposition to become pinnatifid), and then the pinnule is hastate. The lowest pinna of the lowest pair of primary pinnæ being longer than the rest, and a little deflexed, give a somewhat pedate form to the outline of the frond. The species is remarkably distinct, and correctly figured by Presl.

21. *P. consobrina*, Hook.; a span to a foot and a half high, caudex short thick paleaceous, frond triangular coriaceous 3-pinnate glabrous, pinnules sessile (not decurrent) oblong obtuse obscurely crenulate or ovate and deeply pinnatifid veined, segments oblong obtuse terminal one elongated, involucre subintramarginal membranaceous crenato-lobate at the edge, stipes long and very stout paleaceous only at the very base and as well as the rachis black-purple glossy. (TAB. CXVII. A.)—*P. consobrina*, Kze. in *Linnæa*, x. p. 526. *Pteris obscura*, Boj. MS. in *Herb. Hook.*

Hab. South Africa, among *Mimosæ*, Key River, woods in Uitenhage, Ecklon. Clefts of rocks in the Witbergen Mountains, Drège. Graham's Town, *Atherstone*. Port Natal, Dr. Stanger. Madagascar, Bojer.—An authentic specimen from the author satisfies me that I am correct in referring the above specimens in my Herbarium, from Graham's Town, Natal, and Madagascar, to the *Pteris consobrina* of Kunze. They all agree in the very stout, elongated stipes, triangular, decomposed frond: the pinnules however vary much in size in the different samples. In the perfect state of the fructification the sorus is clearly intramarginal, but when more advanced the patent involucre conceals that character. It may be considered allied to *P. hastata*, which has however a different form of frond, and is much less compound. Kunze compares it with *Pteris* (*Cheilanthes*, Hook.) *Capensis* (Tab. Nostr. LXXVII. A.), but, I think, with little reason.

**** Mostly tripinnate or decomposed.

22. *P. hastata*, Link; generally quite glabrous from a few inches to two feet or more, caudex nodose scaly, root fibrous, fronds oblong subcoriaceous opaque pinnate more frequently bi-tripinnate, pinnules oval or lanceolate obtuse or acuminate cordate or subcuneate at the base auriculate on one side or hastate sessile (rarely subpetiolulate) crenulate at the margin, terminal ones of the primary pinnæ often the largest, veins dichotomous free distinct on the under side, sori continuous, involucre rather narrow (in part formed of the substance of the leaf) membranaceous crenated and sinuated, stipes more or less long scaly at the very base, and rachises which are erect stiff, rarely a little sinuous, dark-purple ebeneous glossy. (TAB. CXVI. B.)—Link, *Fil. in Hort. Berol.* p. 60. *Fée*, *Gen. Fil.* p. 129. *Allosorus hastatus*, Pr. *Tent.*

Pterid. p. 153. *Pteris hastata*, Sw. *Syn. Fil.* p. 105. Willd. *Sp. Pl.* v. p. 391. Cassebeera, J. Sm. *Adiantum*, Linn. *Suppl.* p. 447. *Pteris viridis*, Försk. *Pteris auriculata*, Thunb. *Prodr.* p. 172. *Cheilanthes hastata*, Kze. in *Linnæa*, x. p. 532, and xxiii. p. 243. *Pteris adiantoides*, Willd. (*vide Schlecht.*) *Pteris polymorpha*, Poir.—Var. *macrophylla*; much larger in every part. (TAB. NOSTR. CXVI. B. f. 4.) *Cheilanthes hastata*, var. *macrophylla*, Kze. in *Linnæa*, x. p. 532. *Cheilanthes macrophylla*, Kze. l. c. xxiii. p. 244.—Var. *stenophylla*; bipinnate, pinnæ and pinnules linear-lanceolate acuminate undivided or hastate lobes elongated, partial rachises pubescent. Kze. in *Linnæa*, x. p. 533 (under *Cheilanthes*). *Pteris hastæfolia*, Schrad. *Pteris spiculata*, Schkuhr, *Fil.* t. 100.

Hab. S. Africa, frequent, from the neighbourhood of Cape Town to Graham's Town, Natal, and Algoa Bay, numerous botanists and travellers. Island of Nissobé, Mozambique Channel, Madagascar, Dr. Lyall, Bojer. Mauritius, Telfair, Carmichael, Sieber, *Syn. Fil.* n. 80, Wallich. Bourbon (*Herb. Mus. Paris.*).

If we do not accord with Professor Kunze in referring this plant to *Cheilanthes*, we nevertheless heartily assent to his remark in the 'Linnæa,' vol. x. p. 533, "Felix, si quæ ulla, magnitudine frondis, divisionumque ambitu, necnon indumento, imprimis rachium partialium et stipitis, maxime variabilis," and in his uniting the *P. hastæfolia* of Schrader with it as a mere variety "*stenophylla*;" and we cannot but regret that in a subsequent Memoir (*Linnæa*, vol. xxiii. p. 243), he has separated these plants as three distinct species, viz., 1, *Ch. macrophylla*, 2, *Ch. hastæfolia*, and 3, *Ch. hastata*. Our numerous specimens show to us clearly that they are but one; and Kunze himself says of his β . *canonica*, the normal form, that it is intermediate between his α . *macrophylla* and his γ . *stenophylla*. Of this latter we find so good a representation of a portion of frond in Schkuhr's 'FIL.' t. 100, under the name of *Pteris spiculata*, that we quote it without hesitation, and in all probability there is some error in regard to the country of that plant. It is given as "In Americ. Bor. Florida? s. in montibus Alleghanis saxosis, Mich." Hence some have considered it to belong to *Pellæa atro-purpurea*, the only N. American species which approaches it. We give here a figure of the pinnæ of the normal form of this plant, and of the *macrophylla* of Kunze.

these and from all others with which I am acquainted. The caudex is unknown to me; the stipes nearly a span long, and the frond about the same length. The entirely sessile and even subdecurent pinnules are a striking character in this plant.

24. *P. Boivini*, Hook.; cæspitose, a span to a foot high, caudex nodose with copious woolly fibres, fronds subtriangular-ovate bi-tripinnate glabrous, pinnules elliptical or ovate sessile coriaceous spreading horizontally very obtuse on very short petiolules subcordate at the base all entire opaque, veins forked free internal obsolete, involucre subintramarginal rather narrow membranaceous obscurely crenate at the edge, stipes subflexuose stout, and as well as the wiry rachises black-ebeneous glossy. (TAB. CXVIII. A.)

Hab. South-eastern Africa, Macalisberg, *Zeyher and Burke*. Island of Nisobé, east coast of Africa, *M. Boivin*. Mauritius, *Bojer*.

To this plant there seems to be no evident caudex; several stipites rise from a very tufted fibrous root, are at first more or less curved or flexuose, then erect and remarkably strict where they form the main rachis. The secondary rachises, which are sometimes a little hairy, stand out horizontally, and the pinnules at right angles from these, and appear to be soon deciduous, falling off from the rachises, leaving their short petiolules, the denuded fronds then very much resembling some black marine coral. This species again has a certain affinity with *P. Asitata*, but the pinnules are very different in shape, and never again divided or pinnatifid; still more affinity with the North American *P. atro-purpurea*, but that also has differently formed pinnules. Nor is it far removed in general habit from the Mauritian *Pteris* (*Litobrochia*, *Presl*, *Doryopteris*, *J. Sm. and Fée*) *articulata*, *Kanlf.*; but in that the pinnules are much larger, and in the fertile ones gradually and much acuminate, and in the copiously anastomosing venation (though difficult to be seen) there is ample means of distinction. I may however observe that in our *P. Boivini* I have seen some of the veins, though rarely, anastomosing. It is not the normal state of the venation.

25. *P. robusta*, Hook.; "fronds uniform? (not of two kinds), fertile one coriaceous glabrous oblong obtuse tripinnate or bipinnate-pinnatifid, pinnules or lacinia ovate or elliptical cuneate at the base, general rachis and stipes short semiterete stout curved flexuose purple, caudex stout creeping densely ferrugineo-paleaceous," *Kze.* — *Allosorus robustus*, *Kze. in Linnæa*, x. p. 502, and in *Schkuhr, Fil. Suppl.* ii. p. 7. t. 104.

Hab. South Africa; stony mountains in Namaqua Land, *Drège*.—My own specimens of this, I think, very distinct plant, are derived from the same source as those described by Kunze, the author of the species; and as the entire stipes and caudex are wanting to me, I give his character, which, together with his figure above quoted, appear to be very faithful. He seems however to have a groundless fear lest it might prove to be identical with *Cryptogramme* (*Allosorus*) *crispa*. "Hæsitavi paullisper," he says, "num speciem *A. crispa* similem separarem, nec ne fide comparatione speciminum *A. crispæ* e diversissimis regionibus persuasum mihi est, utramque esse diversam." "In our present plant," Kunze goes on to

say, "I have only seen fertile fronds from the caudex:—this caudex is nearly as thick as the little finger, creeping, densely ferrugineo-paleaceous, bearing a few short roots. Stipes scarcely an inch long, above slightly grooved, flexuose, very stout, black-purple. Frond three inches long, oblong in circumscription, pinnules and segments crowded; rachis like the stipes, stout, curved, and flexuose, purple." The very crowded fertile pinnules, their broader and shorter form, but above all the texture, and the texture of the involucre formed of the incurved coriaceous pinnule, scarcely membranaceous, even at the edge, and its very sinuated and crenated margin will readily distinguish this *Pellæa* from any state of *Cryptogramme crispæ*.

26. *P. cordata*, J. Sm.; caudex short creeping stout densely clothed with ferruginous subulate scales, frond erect ovate-oblong bi- rarely below tripinnate, pinnules on short petioles cordato-ovate obtuse firm subcoriaceous distinctly veined glanduloso-pubescent, stipes pale-coloured (substramineous) stout sparsely and deciduously scaly and erect and as well as the rachises straight.—*J. Sm. Cat. Kew Ferns*, p. 4 (not *Pellæa cordata*, *Fée, Gen. Fil.* p. 128). *Allosorus cordatus*, *Presl, Tent. Pterid.* p. 153. *Kunze in Linnæa*, xiii. p. 135. *Hook. Bot. Mag.* t. 4698. *Platyloma cordatum*, *J. Sm. in Bot. Mag. Comp.* lxxii. p. 21. *Pteris cordata*, *Cav. Præl.* 1801, n. 662. *Sw. Syn. Fil.* p. 106. *Willd. Sp. Pl.* v. p. 392. *H.B.K. Nov. Gen. Am.* i. p. 15 (not *Pteris cordata*, *Sieb. Fl. Mixt.* n. 269.) *Pellæa sagittata*, *Link, Fée.* *Allosorus sagittatus*, *Presl, Kze. Fil.* p. 48. t. 24. *Pteris sagittata*, *Cav. Præl.* 1801, n. 661. *Sw. Syn. Fil.* p. 106. *Willd. Sp. Pl.* v. p. 392. *H.B.K. Nov. Gen. Am.* i. p. 14.

Hab. Mexico (*Andrieux*, n. 41, *Dr. Coulter*, n. 1688, *Schaffner*, n. 5), and Columbia, *Linden*, n. 504, and *Suppl.* 304.—We are not the first (in *Bot. Mag.* under t. 4698,) to express doubts as to the *P. sagittata* being really distinct from the *P. cordata*, and an examination of numerous specimens has led to the conclusion that there is no real distinction between them. The younger the pinnules the more sagittate or almost hastate the form; and even in the adult pinnules

obtuse varying extremely in size on different specimens glabrous obscurely veined firm subcoriaceous, rachises singularly flexuose (zigzag), caudex stout firm straight or nearly so with scattered deciduous scales and as well as the rachises reddish or brownish straw-colour.—*Link, Fil. Sp.* p. 60. *Fée, Gen. Fil.* p. 129. *J. Sm. Cat. Kew Ferns*, p. 3. *Allosorus flexuosus, Kaulf. Ind. Fil. MS. fide Kunze in Linnæa*, xiii. p. 136. *Kunze, in Schk. Fil. Suppl.* p. 46. t. 23. *Hook. Bot. Mag.* t. 4762. *Platyloma flexuosum, J. Sm. En. Fil. in Bot. Mag.* 72, *Comp.* p. 21. *Pteris flexuosa, Kaulf. MS. in Linnæa*, v. p. 614 (excl. the synonyms). *Hook. Ic. Plant.* ii. t. 119.

Hab. Peru; Chacapoyas, *M^r Lean, Mathews.* Quito, *Dr. Jameson*, n. 11. Columbia, Merida, *Moritz*, n. 67. Venezuela, Tovar, *Fendler*, n. 89. Mexico, *Liebmann.* Talca, etc., *Jurgensen*, n. 688; Tacubaga, *Schaffner*, n. 3 (fronds 2 feet long, pinnules very small, scarcely 3 lines long); Oaxaca, *Galeotti*, n. 6558. N. W. Mexico, *Seemann*, n. 1940 (pinnules an inch long). Between Western Texas and El Paso, New Mexico, *Chas. Wright*, n. 825.—In the majority of specimens of this handsome Fern, it is easy enough to separate them from the preceding, *P. cordata*; and in a state of cultivation, as they appear in the temperate Fern-house at Kew, they maintain their respective characters; but we do receive from our botanical travellers, mixed with the true *P. flexuosa*, specimens which, if they had been sent apart, we should be disposed to refer to *P. cordata*, accompanied by others which, being partially zigzag only at the summit of the frond, seem to indicate a passage from the one to the other. We have faithfully figured the two in the 'Botanical Magazine,' and every one must form his own judgment of the value of the characters. Among the Ferns such difficulties meet us at every step. The stipes and rachises are more or less downy or glabrous. As we have observed in the Bot. Mag. l. c., the very pale almost straw-colour of the stipes and rachises are at variance with a part of Professor Link's generic character of *Pellea*: "stipitibus fusco-badiis, nigrescentibus, lucidis."

28. *P. andromedæfolia*, *Fée*; caudex short thick densely clothed with long silky subulate flexuose chaffy scales, frond ovate (6 inches to a foot long) bi-tripinnate, pinnules sessile thick fleshy (almost black when dry) elliptical veined glabrous rarely pubescent the margins revolute, stipes chaffy at the base erect stiff glabrous and as well as the straight or slightly flexuose rachises purplish straw-colour often with a deciduous whitish bloom.—*Fée, Gen. Fil.* p. 129. *Allosorus andromedæfolius, Kaulf. in Kunze, Analect. Pteridogr.* p. 18. t. 11. *Syn. Fil. Pap. in Linnæa*, ix. p. 56. *Revis. Acotyl. Cap. in Linnæa*, x. p. 503. *Pteris andromedæfolia, Kaulf. Enum. Fil.* p. 188. *Crypteris divaricata*, and *C. pubescens, Nutt. MSS. in Herb. Hook.*

Hab. California, *Dr. Coulter*, n. 823; San Francisco, *Chamisso, Dr. Sinclair.* Monterey, *Nuttall, W. Lobb.* Chilian Andes, *Macrae, Cumings*, n. 184, *Bridges*, n. 557. Kendo, S. Africa, *Drège, in Herb. Nostr.*—Kunze has well observed of this, "Species affinis *Allosoro cordato* et *A. flexuoso*. Uterque vero differt folio:."

cordatis, hic imprimis rachi scandente." It evidently belongs to the same natural group as they, but is smaller in all its parts; the pinnules are sessile (except sometimes the terminal ones), almost invariably elliptical in form, not cordate at the base, turning of a very dark colour, almost black, when dry. The stipes and rachises partake more of a purplish hue, and they have often a whitish bloom upon them. I have never seen specimens corresponding with this species from Mexico, Columbia, and Peru: it seems confined to the drier countries of California, Chili, and the Cape of Good Hope! in the latter country, I apprehend, being very rare. Kunze's figure in the *Analecta Pteridogr.* is a good representation of the species.

29. *P. pulchella*, Fée; roots cæspitose, caudex none, plants densely tufted small scarcely a span high, fronds 3-4 inches long ovate-oblong bi-tripinnate, pinnules small glabrous subcoriaceous cordato- or ovato-elliptical petiolulate glabrous very obtuse the margins reflexed, the petiolules sometimes rather long very slender, stipites scaly only at the very base and rachises everywhere ebeneous-black glabrous and glossy.—Fée, *Gen. Fil.* p. 129. *Allosorus pulchellus*, *Mart. et Gal. Syn. Fil. Mex.* p. 47. t. 10. f. 1. *Allosorus formosus*, *Liebmann. Fil. Mex.* p. 68.

Hab. High mountain regions of Mexico, elev. 7-8000 feet, growing in tufts from the fissures of rocks south of Sola, *Martens and Galeotti*. Oaxaca, *Liebmann*. Rocks near Ciudad Real, Chiapas, *Linden*, n. 1546. In Monte San Felipe, *Andrieux*, n. 42. Between Western Texas and El Paso, New Mexico, *Mr. Chas. Wright*, n. 824. Lofty Andes of Peru, *Mr. M'Lean*.—This again, in the nature and character of its pinnules, has considerable affinity with our last species, but in them only. They are smaller and more cordate at the base, and are borne on rather long petiolules. In some pinnules the sori are so exposed as to represent a *Nothochlæna*, in others the margin forms a very distinct involucre. The tufted fronds, glossy ebeneous stipites and rachises, are very peculiar. I possess no authentic specimens of this from the authors, but I cannot doubt that the specimens here adduced are identical with the *Allosorus pulchellus* of *Martens and Galeotti*. *Liebmann* changed the name of *Allosorus pulchellus* to *Allosorus formosus*, because there was an *Allosorus pulchellus* of *Bory*, but that is now referred to *Cheilanthes*.

tion convinced me that I was in error in so doing. It has not the two fronds of that plant, and the involucre is of a totally different character. It is formed of the reflexed margin of the pinnule, but there is an intramembranaceous involucre of a distinct texture from the frond. I refer with little hesitation to *Pellaea*, from all the species of which it is very distinct, as seen better from the figure than from any laboured description. I find similarity on the upper side of the pinnules when highly magnified, as shown in our figures (Tab. CXXV. f. 2), namely, an appearance of white, close-parallel hairs lying in the direction of the margins, tapering at each end, hairs of some Malpighiaceus plant. A high magnifying power shows these are not separable from the cuticle, but are rather lodged in it. Can they be looked upon as raphides? Mr. Brackenridge's figure and description of *Onychium*, which I only discovered since my Plate was prepared, are both very different and that author justly remarks its close resemblance (at first sight of *Allosorus acrostichoides*, which we consider the same as *Cryptogramme*). The rigid habit and different nature of the involucre forbid its being referred to *Onychium*.

P. ? nudiuscula; "frondibus pinnatis utrinque pubescentibus, pinnulis linearibus integris infimis subincisis, involucre angustissimis," *Br.*—*Pteris nudiuscula*, *Br. Prodr. Nov. p.* 155. *Nothochlæna pilosa*?, *Hook. et Arn. Bot. of Voy. p.* 74.

Tropical New Holland, *Mr. Brown*.—The solitary specimen I possess of the known Fern, from the herbarium of the late Capt. Carmichael, to whom it was given by Mr. Brown, has no distinct involucre, and has so many points in common with Dr. Arnott's and my *Nothochlæna pilosa* (*Bot. of Beech. Voy. p.* 74), that I should have little hesitation in considering them to be one and the same. But Mr. Brown describes the involucre as "angustissima," and one of his own specimens justifies him in doing so. It is well known however to every student of Ferns what a close relationship there is between *Nothochlæna* and *Pteridea*, and how difficult it is to decide whether a more or less reflected involucre is to be considered an involucre or not. Mr. Brown's plant has the sori arranged from the veins apparently in short lines, and therefore would come into the genus, or *Pellaea* of more recent authors, and I think it right to retain it, for at least, among the *Pteridea*, and we may hope that Dr. Mueller, on his next visit to tropical Australia, will send home perfect and copious speci-

pinnate, primary pinnæ mostly opposite, their lowest inferior pinnæ elongated and deflexed, pinnules linear-oblong broader and crenate or lobulate in the sterile plant (and confluent) narrower and more or less elongated and linear in the fertile, terminal pinnule elongated subcaudate, involucre occupying the entire length of all the pinnules meeting at the back (as in *Cryptogramme*) downy fringed and waved at the margin, capsules large, stipites and main rachis black rigid, partial rachises winged. (TAB. CXIX. B.)—*Allosorus decompositus*, *Mart. et Gal. Fil. Mex. p. 48. t. 10. f. 2.* *Allosorus angustifolius*, *Pr.*, according to *Liebm. Fil. Mex. p. 67*, and *Ch. angustifolia*, *H.B.K. Nov. Gen. Am. i. p. 21*, which *Kunze* quotes under his *Onychium angustifolium* (see p. 123 of this volume).

Hab. Mexico, Pacific side, *Beechey*; Western Cordillera of Oaxaca, elev. 4500-6500 feet, *Martens and Galeotti*, "n. 6362," *Liebmann*; Sierra San Pedro, Nolasco, etc., *Jurgensen*; Sierra Madre, N. W. Mexico, *Seemann*, *Dr. Coulter*, n. 1687. Tovar of Venezuela, *Fendler*, *Plant. Venez. Fil. n. 90.* Guatemala, *Stinner*.—This plant has but slight affinity with *Cheilanthes cuneata** (p. 107), *Link.* and *Kze. Fil. Suppl. t. 36*, much more with *Cheilanthes marginata*,† *H.B.K.* (p. 105); but it is very distinct in the generally larger size, narrower and longer pinnules, the caudate terminal one, and especially the continuous uniform involucre. Some of the lesser fertile pinnules have a near resemblance to those of *Cryptogramme crispata*, *Br.*, but the ramification is more regularly pinnate, and the barren fronds scarcely differ from the fertile fronds, except in the greater breadth of the divisions and in being less compoundly pinnated. *Martens* and *Galeotti's* figure fairly represents the plant of the natural size, but the fertile pinnules are very incorrect, especially the involucre. Our figure represents the finest of our specimens, for they vary much in size.

33. *P. hirsuta*, *Hook.*; subspithameous, caudex creeping thick clothed with dense subulate scales, frond rigid deltoid closely tripinnate below 4-pinnate, primary divisions opposite

and secondary ones generally so, pinnules linear-oblong obtuse often pinnatifid shaggy beneath with minute glossy crisped ferruginous scales, involucre copious formed of the reflexed margins of the pinnules continuous rather rigid crenato-lobate, rachises compressed and channelled castaneous glossy margined with ferruginous scales, stipes much longer than the frond stout strongly grooved terete slightly scaly near the base.—*Allosorus hirsutus*, *Presl, Reliq. Hænk.* i. p. 59. t. 10. f. 1 (not *Pteris hirsuta*, *Sw.*). *Kunze in Linnæa*, ix. p. 56. *Cheilanthes Chilensis*, *Fée, Gen. Fil.* p. 156. *Gay, Fl. Chil.* vi. p. 194.

Hab. Andes of Chili, *Hænk*; at La Guardia and at Antuco, in South Chili, *Pappy, C. Gay, Thos. Lobb, Cuming*, n. 199 and 253 (fronds narrower and less branched). Near Valparaiso, "in marahea," *Bridges*.—A very distinct and well-marked species; yet, though an old and well-known plant, the descriptions and figure are entirely overlooked both by *Fée* and *M. Gay*, and they have made of it a new species of *Cheilanthes*. The perfect fronds are quite triangular, densely 3-4-pinnate, about 3-4 inches long, beneath of a rich brown, from the deep colour of the rachises, and the dark ferruginous crisped scales, which give a shaggy appearance to the under side of the pinnules, and to the margins of the rachises. *Preal's* figure well represents the upper side of the plant of the natural size, but it is destitute of any analysis of fructification. He seems to be the only author, except *Kunze*, to whom this plant is known, yet it is found by every botanist who has sent collections from Chili.

Dubious Species of Pellæa.

Allosorus involutus, *Pr.*, from the Cape, *Thunberg*.—*Pteris involuta*, *Sw. Syn. Fil.* pp. 104 and 300. *Kunze*, in *Linnæa*, x. p. 526, says, "A *Thunbergio* in *Prodromo et Fl. Capensi omissa, mihique plane ignota.*"

Allosorus Domingensis, *Pr.*, seems to be only known as *Pteris Domingensis* of *Spreng. Herb.*

Allosorus aurantiacus, *Pr.*; "fronds pinnate somewhat hairy above, beneath clothed with a golden farina, pinnæ opposite deeply pinnatifid, segments ovato-oblong obtuse crenate ciliate," *Willd.*—*Pteris aurantiaca*, *Cav. Præl.* 1801, n. 659. *Willd. Sp. Pl.* v. p. 382.—New Spain, near *Chalma*, *Cav.*

Allosorus sulphureus, *Pr.*; "fronds trifoliate, lateral leaflets auriculate at the base ('foliis lateralibus folio brevioribus ad basin auctis'), intermediate leaflet petiolate all pinnated clothed with sulphur-coloured powder beneath," *Cav. Præl.* 1801, n. 667. *Willd. Sp. Pl.* v. p. 562.—New Spain, near *Chimapan*, *Cav.*

Allosorus farinosus, Kze. in *Schk. Fil. Suppl.* ii. p. 5. t. 103, is *Gymnogramme ornithopteris*, *Klotzsch in Linn.* xx. p. 413.

10. PTERIS, Linn., Sw., and Willd. (for the most part).

(HOOK. GEN. FIL. TAB. LXIV. A.) *Heterophlebium*, Fée. *Campteria*, Presl (HOOK. GEN. FIL. TAB. LXV. A). *Litobrochia*, Pr. (HOOK. GEN. FIL. TAB. LXV. B. f. 6). *Doryopteris*, J. Sm. *Amphiblestra*, Pr. (HOOK. GEN. FIL. TAB. CXX. C.)

Sori marginal, linear, continuous, occupying a slender filiform receptacle in the axis of the involucre. *Involucre* marginal, generally narrow, continuous, formed of the dilated, more or less changed and usually membranaceous margin of the frond, at first revolute, at length often spreading in age, so as to expose the line of fructification.—Ferns *tropical or subtropical and of temperate regions*. Root sometimes composed of densely tufted fibres from the swollen base of the united stipites, with no perceptible caudex; at other times there is a distinct caudex more or less elongated, creeping and scaly. Fronds rarely simple and small, more or less lobed or palmate, generally compound and often of a very large size (1 to 5–6 and more feet), mostly of a tender and submembranaceous texture and of a bright green, sometimes coriaceous and very opaque. Veins generally very distinct, simple, sometimes flabellate, or pinnate, with the veinlets simple or more or less anastomosing: this tendency to become reticulated is sometimes confined to the margins of the pinnules (*Heterophlebium*, Fée), or the union of the veins takes place more or less near to the

Willdenow. *Pellea* (or *Allosorus*) is the only group excluded, and I am far from being convinced that that is a correct measure, and that it should not form rather a section or subgenus of *Pteris*, with which many of its species are so closely allied by nature and the general essential characters.

It may be worth while to examine a little into the supposed advantages or disadvantages to be derived from the changes that have taken place in the genus *Pteris*, since the days of Willdenow.

Bernhardi was the first (in 1806) to propose the separation of *Allosorus* from *Pteris*; and if by his saying it was intended to include (besides *Cheilanthes fragrans* and *Pteris crispa*) "all the *Adianta spuria*" of Swartz, he meant Swartz's second group or section of *Pteris*, "*Adiantoideæ*," which comprises all Swartz's species of the genus *Pteris*, which had the "*stipes fuscus Adianti*," irrespective of any other character. Gaudichaud's characters for dividing *Pteris* into sections, given in Freycinet's Voyage, are too vague to merit much attention, and no one seems to have followed up Bernhardi's views till Mr. Brown's valuable disquisitions on the "Modifications of vascular structure, or the various ramifications of the bundles of vessels or veins of the frond, combined with the relation of the sori to their trunks or branches, as the most advantageous source of character for subdivision, not in *Polypodium* only, but in other extensive genera of Ferns,"* appeared first in the 'Prodromus Fl. Nov. Hollandiæ' (1810), then in Dr. Wallich's 'Plantæ Asiaticæ Rariores' (1830), and the subject was more fully discussed, at a later period, in the 'Flora Javæ' (1838). These induced Dr. and Professor Presl, in his 'Tentamen Pteridographiæ, seu Genera Filicacearum præsertim juxta venarum decursum et distributionem exposita,' 18, to give a degree of importance in the formation of genera far beyond the views of the illustrious author just mentioned, and to separate from the genus *Pteris* of the older authors, besides *Allosorus* (which he makes to include several species), *Cheilanthes*, *Onychium*, *Pteris aquilina*, and its allies, *Haplopteris*,† (*Pteris scolopendrina*, Bory), *Mono-gonia* (since abolished), characterized by the lowest opposite veins uniting in an acute angle at the apex, *Campteria*, *Litobrochia*, and *Amphiblestera* (already noticed). This work is rendered the more valuable from the number of figures illustrative of his views, in general faithfully, if not artistically, executed. This multiplication of the genera of Ferns, upon what we conceive to be slight grounds, is carried out to a still greater extent in the same author's 'Epimeliæ Botaniciæ,' 1849; but no change is there attempted among the *Pterideæ*. The excellent Agardh (Recens. Sp. Pteridis, 1839) excludes the *Allosori* of Bernhardi and Presl, but otherwise preserves the Linnæan genus *Pteris*, and makes an excellent use of the venation, as of great importance for characters of the subdivisions.

Link (in 1841) took a more correct view of *Allosorus*, by confining it to the *Pteris* (*Cryptogramme*, Br.) *crispa*, in which he has been followed by many others. He constituted the genus *Pellea*, referring to it a tolerably natural group of old *Allosorus*, in which, as explained at p. 131, we have followed him. He

* Brown, under the description of *Polypodium* (*Dipteris*) *Horsfieldii*, in 'Flora Javæ,' p. 3.

† Fée places Presl's *Haplopteris* amongst the "Incerta Genera." Moore (Index Filicum, p. xli.) places it next to *Pteris*, and on the authority of original specimens in Herb. Heward, describes the indusium as truly pteroid. I have every reason to believe that the Fern on which I founded my genus *Teniopteris* (Gen. Fil. t. LXXVI. B), *T. Forbesii*, from the Mozambique coast, a Vittaroid Fern, is identical with it; and there the sori are so sunk, and the edges or margins so dilated, that they may easily be taken for a double involucre; in some cases even the sorus in age conceals the inner of these two supposed involucre, and then the outer one resembles that of a *Pteris*; hence Presl's *Haplopteris*, a name, if the genus were a valid one, is to be preferred to *Teniopteris* or to *Tenioptis* of J. Sm., which is identical with it, and of earlier date.

considers the essential character to depend upon the "indusium e margine frondis reflexo in limbum membranaceum transeunte," to distinguish it from "*Pteris*,—indusium margini frondis adnatum, ab ipso distinctum, limbo membranaceo." He has thus preserved *Pteris* nearly in the same state as Professor Agardh, and apparently coming to the same conclusion, quite independent of any knowledge of each other's views.

Mr. J. Smith's "Arrangement and Definition of the Ferns," though read before the Linnæan Society in 1840, was not published till 1842 (in Hook. Journ. of Botany, vol. iv.). This author's views, as he tells us, so nearly coincided with those of Presl, that he thinks it necessary to explain that he never saw Presl's 'Tentamen' till 1838. Here *Allosorus* (Bernhardi, J. Sm.) is placed among the *Nudisori*, and reduced to *A. crispus* and its supposed allies, "*A. gracilis*, *A. ciliatus*, Pr., and *A. hirsutus*, Pr.," while the majority are united with *Cassebeera*, Kaulf., and the rest constitute the genus *Platyzoma*, J. Sm., with the exception of *Ceratodactylis*, J. Sm. (*Allosorus*, Kze.), and which I have clearly ascertained to be *Llavea* of Lagasca. *Amphiblestra* is retained, and *Litobrochia*, with which *Campteria* is united, and *Doryopteris* is formed, at the expense of *Litobrochia*, of *Pteris palmata* and its allies: but we scarcely see on what ground, since the *Cassebeera pedata* and its affinities, which hold the same relation to that genus that *P. palmata* does to *Litobrochia*, remain there. *Pteris* is confined to the free-veined species, and stands exactly as in Presl.*

The only remaining author worthy of notice, who has written on the Filices on a comprehensive scale, and whose works generally on the Ferns are full of the most valuable information, M. Fée, has, in his 'Genera Filicum' (his 'Cinquième Mémoire sur la famille des Fougères') in the main followed Presl's views. He establishes the genus *Heterophlebium* (already noticed) for the *Pteris grandiflora*, L., and other authors. His *Pteris* however includes the *Aquilina*-group, which Presl refers to *Allosorus*: and he adopts *Pellea* of Link, for the species of *Allosorus*, as we have ourselves done. *Doryopteris* is made to include the *Pteris articulata* of Kaulfuss, which, though agreeing in venation, and perhaps texture of frond, is at variance with the character of the genus: "Les frondes ont une forme pédière ou hastée, qui donne à ses plantes un port curieux;" whereas *P. articulata* has quite the habit of *Pellea*, especially of *Pellea hastata*.

Having thus enlarged upon the changes the genera have undergone, according to the views of some of the more recent writers on Ferns, in the old genus *Pteris*, it may be as well here, and to avoid needless repetition, to express our opinion that as new light is continually being thrown upon this family of plants, it is premature to sanction the great multiplication of genera by laying stress on the nature of the venation when unaccompanied by any corresponding changes in fructification or any marked differences in habit, and more philosophical to con-

§ EUPTERIS.—Veins free, not anastomosing.

* Fronds pinnated; pinnae all undivided.

Pt. (Eupteris) *longifolia*, L.; large (1–2 feet), caudex stout knotty, frond lanceolate attenuated below pinnules numerous approximate linear-lanceolate elongated gradually acuminate, terminal one sometimes the largest petiolate, the base truncate or cordate auriculate and hastate, lower pinnules gradually shorter, stipes more or less hairy.—*Linn. Sp. Pl.* p. 1531. *Jacq. Hort. Schœnbr. t.* 100. *Schkuhr, Fil. t.* 88. *Ag. Sp. Pterid. p.* 3. Pt. *α*, *Bory in Belang. Voy. Willd. Blume. Hook. et Arn. f. Beech. Voy. and others, p.* 250. *t.* 251. Pt. *vittata*, L. *Sp. Pl. v. p.* 368. *Osb. It. t.* 4. *Sw.* Pt. *obliqua*, . Pt. *lanceolata*, *Desf.* Pt. *ensifolia*, *Sw. Willd.* Pt. *ii*, *Desv.* Pt. *semihirta*, *Lk.* Pt. *acuminatissima*, *Bl. U. Jav. p.* 208. Pt. *amplectens*, *Wall. Cat. (et in Herb. t.) Ag. Sp. Pterid. p.* 1. Pt. *diversifolia*, *Sw. Syn. Fil. et* 288. *Ag. Sp. Pterid. p.* 6. Pt. *trapezoides*, *Burm. f. 66. f. 2.* Pt. *microdonta*, *Gaud. Voy. p.* 387. Pt. *β*, *olia*, *Brackenridge in Bot. of U. St. Explor. Exped. p.* Mr. Webb adds to these synonyms *Pteris Indica*, *Poir.*, *æquilateralis*, *Poir.*, and *Pt. Guichenotiana*, *Gaudich. Decaisne*, Hab. Timor: to which we will also venture to add *Pt. æqualis*, *Presl, Reliq. Hænk. i. p.* 54, *Pt. Bahamensis*, *Gen. p.* 125. *Plum. Fil. t.* 69.—*β. sagittata*, pinnules dilato-sagittate at the base (monstrosity). Pt. *stipularis*, *w. Willd.*—*γ.* pinnules very narrow linear rigid.

“Sparsa est hæc Filix per totius terræ orbis regiones temperatas atque subtiles, et 37 gradum in Europa attingit,” as Mr. Webb justly observes in the ‘*ra of the Canaries*,’ and as my Herbarium alone would abundantly testify. It occurs in the East and West Indies, Arabia, Mauritius, Bourbon, Algeria, &c. I may add as follows, from my Herbarium: in Europe, Canaries, &c. *ad others*; Malaga, and about Yanguera in Spain. *Boissier and Reuter*, in places in Spain, *Bourgeau, n.* 1545; Castania, near Messina and Ischia, *n. Dr. Alexander.* Abyssinia, *W. Schimper, n.* 279. Mascato, *Aucher. n.* 5489. In the New World, Jamaica, Cuba, Bahamas, St. Domingo, &c., it is only almost confined to the W. Indian islands; very rare on the continent of America; Mexico, *Presl* (and see under var. *γ.*). Africa, St. Antonio and St. *Vogel*; Isle San Nicol, Cape de Verdes, *Forbes*; Madagascar, *Boivin and Macaliberg*, interior of S. Eastern Africa, *Burke*. On the continent of most universal, Nynee Tal in the north-west, *T. Thomson*, west and east of *Lawaddy, Wallich*; Ceylon, China, from various travellers; Loo-choo, &c. Frequent in the Malay Archipelago, *Wallich*. (Borneo) *Motley*; *Marriffith*; Singapore, *Lobb*; Penang, *Lady Dathousie*; Java, *Blume*; *Amherb. Webb.*; Luzon, *Cuming*. Feejee Islands, *Mitne*. Pacific islands: *boob, Brackenridge*; New Hebrides, *Aneiteuu*, and Isle of Pines, *Mac-*

gillivray, Milne, Barclay. S. Australia; Rivers Mitchell and Buchan, *Dr. F. Mueller.*—*Var. β.* Isle of Bravie, Senegambia, *Dr. Brunner.*—*γ.* Venezuela, *Moritz*, n. 15, *Fendler*, n. 105, *Birschill.*

To avoid giving what might be considered too long a catalogue of varieties for this widely diffused and readily distinguished plant, I have thought it better to include in the specific character the comparatively trifling differences in the forms of the pinnae, rather than to group them under the six several heads (only depending on the more or less dilated form of the base of the pinnae) as the excellent Agardh has done in his 'Recensio Specierum Generis Pteridis.' It is indeed quite true that many of those forms are considered by authors as distinct species, but more frequently they are so esteemed from a false notion that, however a plant of the *New World* may resemble another of the *Old World*, their widely separated localities forbid their being considered specifically the same. To the general distribution however of this plant in warm or tropical countries we have this remarkable exception, viz., though our earliest knowledge of the species is derived from the West Indian islands, St. Domingo, Jamaica, I have no knowledge of its being found upon the vast *continent* of America, either north or south, except in Mexico (*Prest*), and in Venezuela, *Moritz and Fendler.* The specimens from the latter country, and from different localities, are remarkable for their stiff, rigid habit, and very narrow pinnae. The most remarkable form of the plant is what we have here called *var. β. sagittata.* The only specimen we have seen is from Dr. Brunner, gathered in Senegambia; and it is so abnormal a form that it may almost be looked upon as a monstrosity or disease: but a variety of the same nature has been figured by Plumier in his 'Fougères de l'Amérique' (by which country the French West Indian islands are implied), tab. 70, a figure which, like almost all the figures of that author, is greatly exaggerated. An authentic specimen of *Pt. equalis*, from *Prest* himself, proves that to be a common form of our plant. We have plants before us, which vary in height from 4–5 inches to 4½ feet, as grows on some rockwork in a greenhouse.

2. *Pt. (Eupteris) Moluccana*, Bl.; frond glabrous ample pinnate tall broad-oblong (not attenuated at the base), pinnae elongated broad-linear subfalcate obliquely cuneato-attenuate at the base nearly sessile firm-membranaceous satiny narrow caudato-acuminata and spinuloso-serrate at the apex very finely transversely striated with the close-placed but (on both sides) conspicuous simple or forked veins, involucre narrow continuous, rhachis subtriangular furrowed at the sides

elongated broad-linear subfalcate obliquely attenuate at the base nearly sessile firm subcoriaceous very opaque with a short but finely acuminate entire point, uppermost ones recurved, sterile ones margined beneath with the slightly indented edge, veins quite obsolete above, beneath forming very close indistinct transverse striæ, involucre very narrow continuous, stipes and rachis (subterete furrowed on one side) and midrib beneath pale-brown and very glossy. (TAB. CXIV. A.)—*Pteris opaca*, *J. Smith, En. Fil. Philipp. in Hook. Journ. of Bot.* iii. p. 403 (name only). *Pycnodoria opaca*, *Presl, Epimel. Bot.* p. 100.

Hab. Isle of Samar, in the Philippines, *Cuming*, n. 342.—It is not the limited number of words that constituted the Linnæan law for framing a specific character, that will suffice to distinguish this from the preceding (*Pt. Mokuccana*), and as they are truly different. The present is to be recognized by the usually smaller stipes, their opaque texture and very indistinct nervation, quite obsolete on the upper side, beneath not to be perceived without the use of a lens, and then only exhibiting very closely placed indistinct striæ. One of our specimens has forty-five pinnae, another has five, one only three; in the latter cases the terminal pinna is much elongated, and is, in one case, a foot and a half long!

We are unable to conceive why *M. Presl* has formed a new genus of this, *Pycnodoria* (*σικκος*, *crassus*, and *δοπα*, *cutis*). No doubt it has a thick and opaque involucre in comparison with its close ally, *Pt. Mokuccana*, but he attributes to it the involucre or indusium of *Lindsæaceæ*: "A Pteride, quæcum *J. Smith* commiscuit, offert indusio proprio *Lindsæaceo*." On the closest inspection of the involucre, it is as represented in our figure, and we agree with *M. Fée*, who observes, respecting *Pycnodoria*, "Nous ne voyons pas en quoi elle diffère des autres *Pteris*. Le port est le même ainsi que l'organisation," etc.

* *Fronde pinnated, lower pinnae more or less divided; pinnules distinct sometimes confluent*.—The species of the previous subsection have the fronds simply pinnated; those of the present have the lower pinnae generally again pinnated, indicating a passage to the truly bi-tripinnated kinds.

4. *Pt. (Eupteris) Cretica*, *L.*; a foot and a half (more or less) high, caudex short thick subrepent, frond often a foot long broad-ovate more or less acuminate firm coriaceous-membranaceous bright-green glossy, pinnae 3 to 13 or 14 on each side rather remote a finger's length to a span long, sterile ones lanceolate, fertile ones linear-lanceolate acuminate sometimes very much so sessile or the upper ones more or less recurved, lowest pair and frequently 2 or 3 or more pairs above them bi-tri- (or more) partite or pinnated, the segments mostly on the lower half, sterile portions strongly spinuloso-serrate (rarely obtusely serrate or subentire), veins simple or forked close almost horizontal, involucre quite marginal narrow, stipes generally longer than the frond, and the rachises stramineous or pale-brown smooth or minutely

rough upon the surface.—*Linn. Mant. p.* 130. *Sw. Syn. Fil. p.* 96. *Willd. Sp. Pl. v. p.* 374. *Ag. Sp. Pterid. p.* 9. *Pteris semiserrata, Försk. Pt. læta, Wall. Cat. n.* 95. *Pt. heterophyllus, Poir. Schkuhr, Fil. t.* 90. *Pt. serraria, Sw. Syn. Fil. p.* 96. *t.* 289. *Willd. etc. Pt. pentaphylla, Willd. Pt. nervosa, Thunb. Fl. Jap. p.* 332. *Wall. Cat. n.* 96. *Pt. vittata, Bory in Belang. Voy. Pt. multiaurita, Ag. Pterid. p.* 12. (*taller form, and with more numerous pinnæ*). *Pt. triphylla, Mart. et Gal. p.* 51. *t.* 31 (*not Ag.*).

Var. *stenophylla*; fronds digitate or subpinnate at the apex of the stipes, pinnæ 3–5 entire or nearly entire.—*Pt. stenophylla, Hook. et Grev. Ic. Fil. t.* 130. *Ag. Sp. Pterid. p.* 11. *Pt. digitata, Wall. Cat. n.* 91. *Pt. angusta, Wall. in Herb. Hook. Pt. tæniosa, J. Sm. in Hook. Journ. of Bot. iii. p.* 405. (*name only*).

Hab. Perhaps the most northern localities recorded for this Fern are given by *Ledebour*, in 'Fl. Rossica;' Turcomania, in Uralian Siberia, at the river Baker in the Caucasian provinces; South of Switzerland, Nice, and various countries bordering on the Mediterranean, Corsica, Crete, etc. etc. Arabia, *Fürskal*; Abyssinia, *Schimper, n.* 1312. S. Africa, east of the Cape, *Uitenhage, Zeyher, Drège, Harvey*; Macalishberg, *Sanderson*. Persia; *Gurril, Dr. Fischer*. India, in various localities, and generally exactly the European form; Nilghiri, *Maclean, Dr. Schmidt*; Calcutta to Nepal, *Wallich*; Simla, *Col. Bates*; Mussoorie, *Dr. Thomson, Jacquemont*; Punjaub, *Jacquemont*; Houtan, *Booth* (fertile pinnæ an inch broad); Sikkim-Himalaya, 6000 feet, Ratory Valley, and Khasia, *Hooker and Thomson*; Kumaon, 3000 feet, *Strachey and Winterbottom*; Eastern Nepal (small state of the plant, with generally few and subdigitate pinnæ, approaching our *Pt. Tamburii*, but the pinnules are spinuloso-serrate), *Wallich*. Isle Bourbon (*Herb. Mus. Paris.*), *Dr. Wallich*; Penang (stipes rough), *Lady Dalhousie* (upper pinnæ decurrent); Java, *Blume*; Luzon, *Cuming, n.* 45; Ceylon, *Mrs. General Walker* (pinnæ numerous, lowest pair petiolate and pinnate, stipes rough), *Gardner*; Sandwich Islands, *Douglas*. Feejee Islands, *Milne*. Loo-choo, *Beechey*. N. America, rocks on the Apalacha river (ternate quinately and pinnate, upper pinnæ sometimes decurrent). Mexico, *Liebmann, Galeotti, n.* 6377, *Linden, n.* 1545

pinnæ 3-5 subradiate linear sessile slightly tapering below much and narrowly acuminate the sterile portions coarsely and deeply spinuloso-serrate especially towards the apex, involucre rather broad subintramarginal membranaceous close-pressed, veins simple, stipites numerous tufted very slender and as well as the midribs of the pinnæ (very prominent beneath) stramineous. (TAB. CXXX. A.)

Hab. Dry sheltered rocks, Eastern Nepal, and Sikkim-Himalaya, elev. about 9000 feet, *Drs. Hooker and Thomson*.—Different as this may appear at first sight from the ordinary and many of the extraordinary forms of *Pteris Cretica*, it is nevertheless of the same group with that species, and very nearly allied to it, and could I see any variation, any passage, from what I have described as the normal form, towards *Pt. Cretica*, I would not have ventured to place it in the rank of a species; but all Dr. Hooker's specimens have the remarkably graceful slender character represented in our figure; the pinnæ spring from the apex of the slender pale-coloured stipes; the number of pinnæ is usually five, sometimes four or three. When three, the pinnæ are alike, and rise from one common point; when four, each is geminate or united at the base into two pairs; when five, the central one is simple, and the lateral pairs are geminate: and it is this character of the lower pair of pinnæ being compound or partite which shows the affinity with *Pt. Cretica*, to which may be added another common to the two species: the very coarse and deep serratures, each serrature terminated with a spine or bristle. The caudex is generally rather short, but horizontal and creeping, bearing very numerous stipites from the upper side, and numerous descending, slender, but wiry roots below. A slight variety may be noticed with the serratures of the pinnæ muticous.

6. *Pt. (Eupteris) pellucida*, Pr.; 1½ to 2 and even 3 feet high, caudex short thick scarcely creeping, frond a foot and more long sometimes quite simple (TAB. CXXIX. B.) broad-lanceolate mostly ternate or pinnate ovate in circumscription coriaceous-membranaceous bright-green lucid (rather than pellucid), pinnæ 3 to 11 or more, generally broad (an inch to 1½) 6-10 inches long, entire or rarely subserrated at the very acuminate apex, the margin often crisped sessile or the upper ones sometimes decurrent generally all entire or lowest pair bipartite, veins simple or forked close almost horizontal, involucre quite marginal narrow, stipes very variable in length stramineous or tawny smooth or subscabrous. (TAB. CXXIX. B. represents only the simple-fronded form.)—*Presl, Reliq. Hænk. p. 55. Ag. Sp. Pterid. p. 10, in note. Pt. nervosa? Wall. Cat. n. 96 (not Thunb.). Pt. crispata, Wall. MS. Pt. serrata, Wall. MS.*

Hab. India; Luzon, *Hænké, Cuming, n. 85. Irawaddy, Wallich. Mishmee and Khasia, Griffith; Chittagong and Cachar, etc., Hooker and Thomson. Assam, Simons. Nepal, Kumaon, Sylhet, Wallich, Col. Bates.*—This Fern is briefly described only by *Presl (l.c.)*, from sterile specimens, as it would appear, quoted by *Agardh*, nominally retained as a species by *J. Smith and Fée, and Cuming's*

n. 85 is probably correctly referred to it. Assuredly if the *extreme* varieties of this plant and of *Pt. Cretica* were alone taken into consideration, the two would appear very distinct; but I am myself disposed to consider the present form mainly due to peculiarity of climate, the several specimens I have referable to it being natives of the Malay Archipelago and Peninsula, and extending, as so many Malayan plants do, thence towards Nepal. The main feature in this plant is the large size of the pinnæ; and, in the greater proportion of specimens, the fronds are simply pinnated even to the base, with the lower pair rarely divided: such specimens then having very much the appearance of small individuals of *Pteris* (§ *Heterophlebium*) *grandifolium*, of the W. Indies, from which however the venation will at once distinguish it. The points of the pinnæ too are almost invariably entire, and never in the least spinulose: and, what is very remarkable, it is not uncommon for the fronds to be quite simple (undivided) even when fructified (see our Tab. CXXIX. A.): these sometimes apart from the pinnated state, sometimes from the same root as they. Presl, who calls the species *pellucida*, probably intended it to mean shining or glossy (as *pellucidulus* is explained to mean), for it is in reality much more opaque than the *Pt. Cretica*, the species with which he himself compares it.

7. *Pt.* (Eupteris) *umbrosa*, Br.; frond 1½–2 feet high pinnated subcoriaceous-membranaceous dark-green glossy, pinnæ 15–17 (upper ones chiefly) subopposite narrow-lanceolate very acuminate finely serrated in the sterile portions particularly at the apices their bases singularly decurrent, lowest pair deeply bi-tri-quadripartite, the lobes chiefly pointing downwards, involucre continuous narrow, stipes rough and as well as the rachis (broadly winged with the decurrent pinnæ) tawny. (TAB. CXXX. B.)—*Br. Prodr. Fl. Nov. Holl. p.* 154. *Ag. Sp. Pterid. p.* 13.

Hab. Australia; Port Jackson, *Brown, Sieber*, n. 128, *Brackenridge*. Port Stephen, *Captain King*. N. Australia, *Dr. F. Mueller*.—Assuredly very nearly allied to *Pt. Cretica*, but remarkable for the singularly decurrent pinnules; and when the pinnules are exactly opposite, for their decurrent bases, which are often a little contracted above, and give an urn-like form to the winged internodes of the main rachis. When the pinnæ are alternate and distant, the decurrent wing is much more uniform. The veins are simple or forked.

Agardh, who drew up his notes from specimens in the Paris Herbarium. Blume says of it, "Near *Pt. serrulata*, Linn., but distinct in the pinnae not being sharply serrated;" and Agardh observes, "Between *Pt. scabripes*" (which I consider identical with *Pt. Cretica*, and *Pt. serrulata*, L.), "but differs from the former in the more numerous and decurrent pinnae, and from the latter in the breadth of the pinnae."—It is probably some large state of *Pt. Cretica* with decurrent pinnae, or of *Pt. umbrosa*.

9. *Pt. (Eupteris) aspera*, Fée; "fronds oval-lanceolate multifrondulate, stipes spinescent squamose fulvous, frondules narrow sessile auriculate opposite at the base above alternate, margins convolute glabrous linear very long-acuminate, mesoneure robust, sporothecia continuous, indusium narrow often elegantly crenulated, receptacle slender linear, sporangia ovoid, annulus 18-articulate, spores trigonous blackish."—Fée, *Gen. Fil. p.* 126 (not Lam.).

Hab. Isle of Bourbon (*Montbrison*).—"Tall, flexible; pinnules 40-jugate." "Longueur totale 78-80 centim. Les pinnules centrales ont environ 10-12 centim. de long sur 4 millim. de large; les entre-nœuds laissent entre eux un intervalle de 9-12 millim."—I am unacquainted with this, and dare not venture to offer an opinion respecting its affinities. It is probably nearly allied to a simply pinnated form of *Pt. Cretica*, inasmuch as the author places it between *Pt. stenophylla*, Hook. and Gr. (*Pt. Cretica*, var.), and *Pt. pellucida*, Presl, *Cum. Philipp. p.* 85.

10. *Pt. (Eupteris) crenata*, Sw.; 1½-2 feet and more high, caudex creeping scaly with long subulate rigid curved scales, fronds 6-8 inches to a foot and more long ovate or (fertile) lanceolate submembranaceous firm bipinnate, terminal pinna much elongated often exceedingly long and caudate generally auriculate on each side at the base, sterile pinnules oblong or obovate obtuse half an inch long coarsely serrated sessile very often confluent and more or less decurrent sharply serrated, veinlets simple or forked thickened at the apex, fertile pinnules linear more or less elongated often much acuminate serrated at the sterile apex, involucre intramarginal occupying nearly the whole length of the pinnules, stipites slender smooth stramineous short in the sterile fronds much elongated. (TAB. CXXVII. A.)—Sw. *Syn. Fil. p.* 96 et 290. *Willd. Sp. Pl. p.* 373. *Br. Prodr. p.* 154. *Ag. Sp. Pterid. p.* 14. *Pt. ensiformis*, *Wall. Cat. n.* 2481, and *Pt. multidentata*, n. 2681. *Pt. caudata*, *Loureiro, Coch. p.* 835. *Pt. heterodactyla*, "Reinw." *J. Sm. in Hook. Journ. of Bot. iii. p.* 405, name only. *Burm. Zeyl. t.* 87.

Hab. E. Indies, Tranquebar; Malabar coast, *Dr. Wight*, n. 82. Gualpara, Madras, Sylhet, *Dr. Wallich*; Khasia, and Terrya Ghat, below Darjeeling, *Hooker and Thomson*; Bootan, *Booth*. Assam, *Griffith*. Ceylon, abundant. China:

Chusan, *Alexander*; Hongkong, *Col. Champion*. Luzon, *Cuming*, n. 45 and 46, *Thomas Lobb*. S. Pacific islands, Feejee, N. Hebrides, Aneiteum, abundant, *Milne, Brackenridge*. Tropical N. Holland, *Sir Joseph Banks*.—A very variable plant it must be allowed, for whereas some of our specimens have so much in common with *Pt. mutilata*, that we have been almost led to think the two might be united, others are so different that it would seem from them as if there could be no connection between them. Among the most remarkable of these are *Cuming's* specimens from Luzon, n. 46, in which the primary pinnæ (in the sterile plant) may be said to be reduced to the terminal pinnules, which are more than 6 inches long and $\frac{3}{4}$ of an inch broad, the two or three lower pinnules being rather auricles at the base than real pinnules, and confluent with the principal one: the terminal pinna of the frond is nearly 10 inches long, and much acuminate. *Burmans's* figure above quoted is a fair representation of the type of the species.

11. *Pt. (Eupteris) mutilata*, L.; a span to a foot and more high, caudex short subrepent, roots tufted, fronds 3–5 inches long ovato-lanceolate acuminate submembranaceous firm pinnate, lower pinnæ (rarely any superior ones) again pinnate, pinnules sessile those of the sterile fronds $\frac{1}{2}$ – $\frac{3}{4}$ of an inch long elliptical a little waved at the margin but entire with a slender cartilaginous edge, rarely minutely denticulate towards the apex often mucronate, upper ones a little decurrent, terminal one caudate, veinlets simple or forked slightly incrassated at the apex, pinnules of the fertile fronds longer and narrower more apart linear-lanceolate obtuse, involucre marginal continuous round the apex very narrow membranaceous, stipites slender stramineous castaneous at the base very glossy, those of the fertile fronds thrice longer than the sterile ones. (TAB. CXXXI. A.)—*Linn. Sp. Pl.* p. 1533. *Sw. Syn. Fil.* p. 99. *Willd. Sp. Pl.* v. p. 378. *Ag. Sp. Pterid.* p. 15. *Plum. Fil. t.* 51.— β . fertile fronds larger bipinnate, pinnules numerous more approximate.—*Pt. concinna*, *Heward in Mag. of Nat. Hist. N. Ser.* 1838, p. 461.

to the other: the present however is much the smaller plant, the sterile pinnules are shortly petiolate, free and distinct, not confluent with the adjacent ones, entire or nearly so. The terminal pinnæ never become so remarkably elongated as in the *Pt. crenata* (for which Loureiro's name of "*Pt. caudata*" is a very appropriate one), and we do not find that gradual change from the sterile into a fertile frond that is common in *Pt. crenata*. Perhaps, though a very minute character, that which distinguishes this species the most certainly from *Pt. crenata* is the slender cartilaginous margin of the sterile pinnules. This structure does not exist at all in *Pt. Cretica*, nor do the pinnæ, in our present species, show any disposition to become confluent. In the fertile fronds, too, the pinnules are not only sessile, but decurrent for a short way upon the rachis.

I think I am correct in referring Mr. Heward's *Pt. concinna* to *Pt. mutilata*, as a more compound state or variety. Mr. Smith's specimens, all that I have seen, are only fertile fronds.

12. *Pt. (Eupteris) Hookeriana*, Ag.; "frond pinnate, pinnæ on each side 5-6, upper ones sessile, 2-3 of the inferior ones petiolulate, sterile ones serrated, stipes smooth stramineous trisulcate," *Ag.—Ag. Sp. Pterid. p. 12.*

Hab. Ceylon, *Emerson, Mrs. General Walker, Gardner, n. 1242.*—"Species," says Agardh, "ut crediderim, bene distincta, inter antecedentes simpliciores sequentesque pinnulatas, quasi intermedia. Ab antecedente," *Pt. multiaurita*, Ag., which I consider simply a much developed form of *Pt. Cretica*, "substantia coriacea, pinnis paucioribus attamen magis divisa, earumque forma facile distinguitur." Specimens in our Herbarium, which are the authority for this species, differ in no essential particulars from *Pt. Cretica*.

13. *Pt. (Eupteris) scabripes*, Wall.; "frond pinnate, pinnæ on each side 2-3 sessile, uppermost ones decurrenti-confluent, lowest bi- or tri-partite, sterile ones lanceolate serrate, fertile ones linear-ensiform, veins once forked, stipes scabrous black-purplish," *Ag.—Wall. Cat. n. 9. Ag. Sp. Pterid. p. 11.*

Hab. Mountains of Penang, *Wallich.*—This again, I fear, is only a variety of *Pt. Cretica*, with dark-coloured scabrous stipes, yet the careful Agardh held it to be distinct.

14. *Pt. (Eupteris) prionitis*; "fronds pinnate unequally bi-partite at the base sometimes pinnatifid, rachis pale striated glabrous, frondules shortly petiolate rather obtuse rounded at the base entire, sterile ones linear-lanceolate acuminate serrated above with unequal teeth crenate below the base entire, nervelets bifurcate slender not reaching to the margin, fertile ones linear crenate towards the sterile apex, rhizome about as thick as a swan's quill, sporothecia narrow, indusia thin membranaceous, sporangia ovate, annulus of twenty joints, spores thick trigonous, sporangiastra intestiniform torulose contorted and whitish," *Fée, Gen. Fil. p. 127.*

Hab. "Philippine Islands, *Cuming, n. 46.*"—Mr. Cuming's *Pteris*, n. 46, of the Philippine Islands, both Mr. J. Smith and myself have without hesitation

referred to *Pt. crenata*, Sw. As M. Fée however remarks that his plant so numbered is not the *Pt. crenata*, Sw., it is probable that some other Fern has been distributed, having the same number, but with which we are not acquainted.

15. *Pt. (Eupteris) heterophylla*, L.; a span to a foot high, caudex scarcely any, roots fibrous cæspitose, fronds submembranaceous ovate bi-tripinnate, pinnæ and pinnules subopposite, pinnules of the sterile fronds obovato-oblong obtuse deeply and coarsely serrated the obliquely cuneate base tapering into a short petiole, veinlets simple or forked clavate at the apex, fertile pinnules narrow-oblong with a few coarse serratures only at the apex, involucre membranaceous subintramarginal short not extending to the base or apex, stipites slender glossy stramineous generally longer than the fronds, rachises slightly winged.—*Linn. Sp. Pl. p. 153. Sw. Syn. Fil. p. 101. Willd. Sp. Pl. v. p. 394. Ag. Pterid. p. 15. Hook. Bot. Mag. t. 4925. Fée, Gen. Fil. p. 125, 126. Plum. Fil. p. 84. t. 37. Sloane, Jam. i. t. 53. f. 2.*

Hab. West Indies: Jamaica, *Sloane, M'Fadyen, Purdie, Dr. Alexander*; St. Domingo, *Plumier*; Cuba, *Linden, C. Wright, Pl. Cub. n. 859.* Brazil: Rio, *Lady Calcott*.—Pinnules from $\frac{1}{4}$ an inch to an inch long. A very distinct species of *Pteris*, wholly confined to tropical America, and chiefly to the W. Indian islands. The constant accompaniment of barren fronds from the same caudex or root as the fertile one, and the general form of the pinnules, remind one of *Cryptogramme crispa*.

16. *Pt. (Eupteris) laurea*, Desv.; "fronds bipinnate, pinnæ triphyllous, lowest ones subpinnulate, pinnules petiolate lanceolate subduplicato-serrate, fertile repand, veins forked, stipes smooth," *Ag.*—"Desv. Prodr. Fil. p. 299 (*vide specim. in Herb. Thouars, named by Desvauz himself*)." *Ag. Pterid. p. 16.*

Hab. Madagascar, *Goudot (Herb. Delessert, and Mus. Paris).*—"Frond about 3 feet high. Stipes the size of a goose-quill, clothed at the base with brown, linear attenuated scales with a black costa. Pinnæ all triphyllous, the lower

linear-lanceolate elongated acuminate, 3 to 5 or 6 inches long entire at the margin or subsinuato-crenate serrated only at the apex simple (undivided) or here and there with only a single or two horizontal lobes or ears near the base (rarely above the base) at other times the upper pinnæ are sparsely lobed and the lower ones gradually more so, the lowest ones pinnatifid in their lower half with 4-6 oblong-lanceolate lobes on each side spreading horizontally (almost pectinated), veins approximate simple or once forked, veinlets reaching to the margin, sori continuous but not extending to the apex, involucre marginal membranaceous narrow, stipites short in proportion to the length of the fronds and rachises slightly rough to the touch bright tawny glossy. (TAB. CXXVII. B.) Pt. heteromorpha, *Fée, Gen. Fil. p. 125, 127.* Pt. propinqua, *J. Sm. En. Fil. Philipp.; in Hook. Journ. of Bot. iii. p. 405 (not of Agardh, and name only).*

Hab. Luzon, *Cuming, n. 409.*—This Fern is only known to botanists through Mr. Cuming's specimens from Luzon, and Fée has done well to name it *heteromorpha*. It is very variable, scarcely any two specimens being alike, and yet there is no great variety of form in the pinnules on the same plant: they are either entire or lobed or pinnatifid with from 1 to 10 or 12 segments: and the most numerous segments are on the lower pinnæ. Sometimes upon a specimen pinnæ are seen having only a solitary segment on one side at the base (semi-hastate). Its affinity is probably with *Pt. crenata*; yet some of our specimens have so many of the pinnæ regularly pinnatifid, that it might almost be referred to the next subsection or group.

18. Pt. (*Eupteris*) *serrulata*, L. fil.; a foot and a half to 2 feet high, caudex none, root of copious wiry fibres, frond ovate a foot and more long membranaceous pellucid bipinnate, pinnæ opposite, pinnules linear acuminate elongated (especially the terminal ones) sterile portions spinuloso-serrate all decurrent on the rachis so as to represent a bipinnatifid frond, lowermost pinnules sometimes again divided (bipartite) one or two of the lowest pairs often free (not decurrent) fertile ones the narrowest, veinlets simple or forked nearly horizontal, involucre subintramarginal membranaceous rarely reaching to the apex, stipes slender generally shorter than the frond brown-stramineous glossy.—*Linn. fil. Suppl. p. 425 (excl. syn.). Sw. Syn. Fil. p. 97. Willd. Sp. Pl. p. 373. Schkh. Fil. t. 91 (excellent). Ag. Pterid. p. 13.*

Hab. China, on various authorities. Hongkong, *Col. Champion. Swartz* adds Ceylon; but I have never seen specimens save from China, and a very young and rather dubious one from Nangasaki, Japan (*Babington in Herb. Nostr.*).—A well-known plant from being long cultivated in our gardens. Most of our copious specimens exhibit a deeply pinnatifid, rather than a pinnated frond, but analogy

with allied species, *Pt. Cretica*, *Pt. umbrosa*, etc., lead to the supposition that the broadly winged rachis is caused by the decurrent and confluent bases of the pinnae, and the more so as sometimes two or more of the lowest pairs are free, distant, and the rachis not winged between them. The primary pinnae, whether simple or compound, are rather distant, so that there are not in general more than five to seven pairs; of these sometimes all but the lowest pair are simple (undivided), sometimes all but the uppermost pair are pinnated, and in one case the lowermost pinnule is forked or bipartite. Terminal pinnae are occasionally 6-8 inches long.

19. *Pt. (Eupteris) luxuriosa*, Kze.; "frond subcoriaceous glabrous short triangular-ovate acuminate curved and flexuose, subtripartite bi-tripinnate more simple above, pinnae on each side 3-5, inferior ones long, superior ones shortly petiolate, petiole decurrent, lowest very large enlarged downwards (*deorsum auctis*) triangular, all the partial pinnae or segments from a decurrent base linear-lanceolate sometimes abbreviated sublobate, terminal ones all very long, fertile narrower sterile and denticulate at the apex, sterile pinnules wider unequally dentato-serrate, primary and secondary rachises naked at the base, above winged with the decurrent pinnae and as well as the short stipes angled flexuose purplish straw-colour, rhizome vertical thickly clothed with scales (? phyllobasis) and roots fusco-paleaceous in the interstices."—*Kze. in Linn. xxi. p. 289 and 321.*

Hab. Marianne Islands, Manilla (*Kze.*).—"The plant first appeared in the Berlin Garden, and was considered to be a variety of *Pt. serrulata*. 'Hæc vero differt fronde longiore, angustiore, pinnis magis furcatim quam pinnatim divisa, pinnis ensiformibus, infimis magis æqualibus, rhachi stipiteque validioribus, ramis flexuosis, petiolis alatis,'" *Kze. l. c.*

20. *Pt. (Eupteris) melanocaulon*, Fée; "fronds ovoid bitrifid at the base pinnated at the apex, stipes capilliform black smooth shining fragile, mesoneure very black, frondules

21. Pt. (*Eupteris*) *distans*, J. Sm.; 1½–2 feet high, caudex none, roots tufted fibrous, frond a foot or more long submembranaceous lanceolate pinnate, superior pinnæ numerous linear-oblong subfalcate approximate and most of them confluent at the base spinuloso-serrated at the apex, the rest of the pinnæ again pinnated very distant, pinnules linear-oblong approximate and often confluent at the base, terminal pinnule very long linear caudate spinuloso-serrate, veinlets forked, involucre slightly intramarginal membranaceous not reaching to the apex of the pinnules close-pressed, stipes short and rachis tawny or brown scabrous. (TAB. CXXIV. B.)—*J. Smith in Hook. Journ. of Bot.* iii. p. 405 (name only).

Hab. Luzon, *Cuming*, n. 410.—A very remarkable, and assuredly quite distinct, species; nor have we seen any specimens which show much affinity to any known species: the several samples we have seen of Mr. Cuming are uniformly the same. Perhaps instead of considering the frond as bipinnate, it would be more correct to describe it as pinnate, with the pinnæ deeply pinnatifid (pectinately so); thus, what we have called the numerous, closely-placed, and at the base confluent, pinnules, would be the lobes or segments of long pinnatifid pinna, with its terminal lobe narrow-caudate, and the inferior pinnated pinnæ would in like manner be pinnatifid pinnæ, with few segments, and with the terminal lobe elongated, but in some of our specimens these segments are quite free and independent of the rest, and in themselves true pinnules.

22. Pt. (*Eupteris*) *semipinnata*, L.; 1–3 feet high, caudex stout creeping villososquamoso fibrous-rooted, fronds broad-lanceolate acuminate submembranaceous pellucid pinnate, superior pinnæ approximate linear-oblong sessile at the base adnate and decurrenti-confluent, lateral ones distant subpetiolate semi-ovate, superior margin entire, inferior subpectinato-pinnatifid (lowest pair sometimes bipartite) the extremity long-caudate, the segments oblong all spinuloso-serrated in the sterile fronds, linear and entire except at the apex in the fertile ones, veins simple and forked, involucre subintramarginal membranaceous often continued round the apex, stipes rather stout castaneous or purple-ebeneous very glossy.—*Linn. Sp. Pl.* p. 1534. *Swartz, Syn. Fil.* p. 97. *Willd. Sp. Pl.* p. 388. *Ag. Pterid.* p. 17. Pt. flabellata, *Schkh. Fil. t.* 93 (not *Th.*). Pt. alata, *Lam. (not Gaud.)*. Pt. dimidiata, *Blume, Fil. Jav.* p. 210 (not *Willd.*). *Osbeck, It. Chin. t.* 3. f. 1.—β. superior lateral pinnæ pectinato-pinnatifid on both sides, segments of the upper side abbreviated and gradually reduced to the lowest pinnæ where they are only auricled at the base above.

Hab. India: Tranquebar, Sylhet, *Wallich*, and Khasia, elev. 3–4000 feet, *Thom-*

son and Hooker. Ceylon, Mrs. Gen. Walker. Assam, Jenkins, Simons. Luzon, Cuming, n. 258. Borneo, Mr. Barber. China, Osbeck and others: Macao, Fachel; Koo-lung-Loo Island, Alexander. Japan, Miss Nelson.— β . Nangasaki, Japan, Mr. Babington.—An extremely distinct and well-marked species, of which however our var. β is a very remarkable variety.

23. Pt. (Eupteris) *Dalhousiæ*, Hook.; tall 2-3 feet and more high, frond ample 1-2 feet subcoriaceous-membranaceous glossy bi- tri- below subquadripinnate, pinnæ and pinnules all remote, superior pinnæ simple (undivided) and pinnules all linear-sublanceolate very much elongated acuminate and serrated remarkably alato-decurrent on the rachis, lower primary pinnæ not decurrent petiolate falcate (lowest pair sometimes bipartite) the upper margin entire (rarely with one segment) the lower pinnate (or pinnatifid) with 5 or 6 (more or less) long pinnæ decurrent so as to form a very broad winged rachis, veinlets simple or forked, involucre subintramarginal narrow membranaceous continuous along the rachis rarely reaching the acuminate apices, stipes very glossy and as well as the firm prominent costa bright glossy tawny or purple-brown. (TAB. CXXI. A.)

Hab. Penang, *Lady Dalhousie*. Java, *Thomas Lobb*, n. 206.—It is impossible to do justice to this large and beautiful species in the small space allotted to our figures. It is evidently allied to *Pt. semipinnata*, L., having the majority of the pinnæ again pinnate, or, if the term is preferred, pinnatifid only on the lower side; but is at once distinguished from that by its great size, by the very remote superior pinnæ, and by the great length of all the segments. In one of our specimens the lowest pinnæ are bipartite, and each segment represents as it were a frond in its structure, the apex having the simple pinnæ on both sides, and the lower pinnæ being unilaterally divided. Mr. J. Smith has marked the specimen in his herbarium, from Java, as *Pt. venulosa*, Bl.; but whatever uncertainty there may be about that species, it cannot be our present one, for Blume and Agardh could not have overlooked the peculiar division of the pinnæ, so much like that of *Pt. semipinnata*.

mineous-brown and a little scaly at the base. (TAB. CXXIII. A.)

Hab. East Indies: Mishmee, *Griffith*.—I have never seen this in any collections but those of the late Mr. Griffith from Mishmee. The several specimens are extremely uniform in their character, only varying a little in size, and in the greater or less number of compound pinnæ at the base of the frond, from one to three pairs; and I can refer to no known species with which it can be confounded.

*** *Fronde variously divided, rarely once pinnate with the pinnae pinnatifid; more frequently 2-3- or 4-pinnate, especially below.*—This section includes a heterogeneous group, which it is impossible to separate and characterize, so varied is the ramification even in one and the same species.

25. Pt. (Eupteris) *Madagascarica*, Ag.; frond bipinnate, pinnules distant on rather long petioles linear-lanceolate narrow acuminate serrated at the sterile apex, inferior ones (on the branch) subpinnate, pinnules few 1-3 short, veins stout (for the size of the pinnules) forked, veinlets spreading, involucre subintramarginal very narrow membranaceous, rachis slender subflexuose scabrous beneath. (TAB. CXXII. A.)—*Ag. Pterid. p. 17.*

Hab. Madagascar, *Bojer*, in *Herb. Nostr.*—Agardh describes this as the third species of a singular form of *Pteris*; the two others being *Pt. laurea* and *Pt. (Litobrochia) triphylla*; peculiar to Madagascar, more compound than they, subtripinnate. Pinnæ elongated, nearly a foot long; petioles nearly 3 lines long. The pinnules have a tendency to the ternary division, also characteristic of the two just mentioned, but eventually to become pinnate. The form of the pinnules themselves is also different, elongato-lanceolate, much attenuated and lengthened at the apex, and there coarsely serrated. The veins are all forked, their branches patent. Rachis (and also the stipes?) very scabrous beneath. The branch of this may be from a very compound Fern, and the rachis seems to have a disposition to be scandent and the pinnæ to be refracted. It is a very peculiar species, as may be seen from our figure.

26. Pt. (Eupteris) *triphylla*, Ag.; frond (a solitary and sterile specimen) $1\frac{1}{2}$ foot long oval membranaceous glossy bi-subtripinnate, all the pinnæ long-petiolate, superior ones and secondary pinnæ mostly triphyllous rarely pentaphyllous, pinnules oblong terminal ones very much elongated (2-5 inches long) all obtuse subcrenate a little serrate towards the apex, veins forked once or twice or more on one and the same pinnule both free and united by arched (or angulato-arched veins) next the midrib (as in *Campteria*, Ag.), rachises slender smooth tawny. (TAB. CXXXI. B.)—*Ag. Pterid. p. 16.*

Hab. Madagascar, *Dr. Lyall* (in *Herb. Nostr.*).—Professor Agardh's description (*l. c.*) from our specimen is very faithful. "The frond is probably large, a foot and a half long. Rachis brown, very smooth, with about eight pairs of pinnæ. All the pinnæ petiolate, petioles an inch long, at length pinnated, pinnules

nearly all triphyllous and petiolate. Foliolcs of the pinnules linear, 2 inches long, rather less than $\frac{1}{2}$ an inch broad, slightly crenulated, obtuse; lateral ones shorter, sessile."—Our specimen unfortunately possesses neither stipes, nor caudex, nor fructification, and I should hardly have deemed it worthy of a figure, distinct as it no doubt is as a species, but for the sake of showing the venation which, on one and the same pinnule (and common to most of the pinnules), exhibiting one-half the veins united by arched (or angularly-arched) veins adjacent to the midrib, while the rest are free, thus, as it were, uniting in one and the same specimen, the supposed generic characters of *Campteria* (itself a passage to *Litobrochia*) and true *Pteris*. As a species this is remarkable for the pinnæ, in themselves not unlike those of *Pt. crenata*, being all long-petioled.

27. *Pt. (Eupteris) semidentata*, Fée; $1\frac{1}{2}$ foot high, frond more than a span long ovato-deltoid acuminate submembranaceous but firm tripinnate, pinnules patent distant $\frac{1}{2}$ — $\frac{2}{3}$ of an inch long narrow-oblong subfalcate opposite or nearly so more or less decurrent, apex (or sterile portion) coarsely serrated, serratures mucicous, terminal pinnules caudate acuminate serrated, sori subintramarginal not extending to the base nor apex, involucre membranaceous even close-pressed, veins obscure not prominent simple or forked (never anastomosing), stipes brown at the rather thickened base, the root and the slender rachises (winged by the decurrent pinnules) stramineous very slender. (TAB. CXXVIII. B.)—*Pteris semidentata*, Fée, *Gene Mém.* p. 32. t. 18. f. 3.

Hab. Province of Ocaña, N. Granada, Paramos, elev. 8–10,000 feet, Schum., n. 482.—This I cannot but consider a new species, though evidently allied to our next species, *Pteris gracilis*, and, like it, it has not the anastomosing veins of *Litobrochia*. It is a larger-growing plant, is less compound, with larger, broader, more obtuse, more patent, more apart, subfalcate, and less decurrent pinnules, with fewer and smaller serratures, always mucicous: the texture is less pellucid, the veining seen with more difficulty. I have only a solitary specimen, of which our figure represents one of the lowest primary pinnæ.*

to the base nor to the apex, involucre membranaceous close-pressed entire, veins all simply pinnated elevated, veinlets simple rarely forked each terminating in the seta, stipes and very slender and mostly winged rachises fulvous-brown glossy naked. (TAB. CXXVIII. A.)—*Pteris gracilis*, Fée, *Gen. Fil.* p. 128 (not Michaux, v. supra, p. 138). An *Pteris spinulosa*, Raddi, *Fil. Bras. t. "70 bis,"* not "70"?

Hab. Brazil, Clausen (Fée): Rio, Forbes. S. Brazil, Tweedie.—I have long known this in my herbarium, and considered it as a new species of *Pteris*, although marked by the learned Agardh as *Pteris* (*Litobrochia*) *leptophylla*, Sw. (*Pt. spinulosa*, Raddi). Certainly, except in the rather smaller size of the pinnales, it seems to be identical with the second figure of Raddi's *Pt. spinulosa* (tab. "70 bis," not tab. "70"); and, as M. Fée justly remarks of his *Pt. gracilis*, "*Litobrochia leptophyllæ* affinis, nervillis vero liberis, fronde magis dissecta, segmentis angustioribus, dentibus apice setaceis" (so they are also in *spinulosa*). The veins are indeed all free. Still I am not sure that this character, albeit considered generic, will justify the separation even specifically. In all the very narrow segments of true *Pt. leptophylla* or *spinulosa*, the veinlets are free, and in proportion as they are broader and more widely decurrent, they anastomose. More copious specimens, should we be so fortunate as to procure them, can only settle the question satisfactorily. *Pteris gracilis*, of Michaux, being now universally referred either to *Allosorus* or *Pellaea*, Nob., sets that name free to be here retained.

29. *Pt. (Eupteris) irregularis*, Kaulf.; 2-4 feet high, caudex?, frond 1-2 feet and more long ample ovate submembranaceous tri-subquadripinnate, pinnæ alternate all of them except the lower primary pinnæ which are petiolate decurrent so as to form a very broad wing on all the rachises, wings of the main rachis contracted where they join the next pinna below so as to form a repand margin, ultimate pinna oblong-lanceolate a little falcate sometimes linear-lanceolate and much acuminate, the sterile apices slightly serrated, all the margins soriferous, the sori extending generally even to the apices, involucre narrow submarginal membranaceous, veinlets mostly forked, stipes nearly as thick as one's little finger triangular castaneous chaffy with subulate scales at the base, rachises and costa stout prominent beneath glossy and brown.—*Kaulf. Enum. Fil.* p. 189. *Ag. Pterid.* p. 18. *Pt. alata*, Gaud. in Freyc. *Voy. Bot.* p. 391. t. 19 (excellent). *Hook. et Arn. in Bot. of Beech. Voy.* p. 107. *Pt. elongata*, Nutt. MSS. (var. with long tapering pinnules).

Hab. Sandwich Isles, and apparently confined to that group of islands. Our specimens are all derived from Oahu, Chamisso, Gaudichaud, Douglas, n. 31, Beechey, Nuttall, Seemann, n. 2238, Brackenridge.—One of the most distinct and remarkable of the genus, resembling a multipinnatifid leaf of some coarse umbelliferous plant, varying much in the length and in the breadth of the pinnæ, and in the leafy or winged rachises, whence probably Kaulfuss's name of *irregu-*

laris, though we confess we should have preferred the name given two years later by Gaudichaud of *alata*; the costa is peculiarly stout and prominent, and generally of a rich chestnut colour, as is the very thick triangular stipes, which is chaffy with narrow subulate scales at the base. The root or caudex I have not seen.

30. Pt. (*Eupteris*) *scaberula*, A. Rich.; a foot and a half to 2 feet and more high, caudex very long creeping here and there rooting thicker than a crow's quill brown glossy but rough and partially paleaceo-hirsute, frond more or less erect ovate or broad-lanceolate rigid coriaceous everywhere resinoso-glandulose and subpubescent tri- rarely subquadripinnate, primary pinnæ varying much in length and outline lowest pair of them always very distant from those above them, secondary pinnæ lanceolate acuminate, ultimate pinnales very small a line more or less long serrated and towards the lower part of the secondary pinnæ pinnatifid, veins indistinct simple, involucres formed by the revolute membranaceous margin which is soon forced back by the spreading of the sori, stipes 4 to 8 or 10 inches long and as well as the flexuose main rachis rich tawny-brown rough with resinous points. (TAB. XCIII. A.)—*A. Rich. in Voy. de l' Astrol. i. p. 82. t. 11. A. Cunn. Bot. N. Zeal. in Hook. Comp. Bot. Mug. ii. p. 365 (et Pt. microphylla, p. 366). Hook. fil. Fl. N. Zeal. ii. p. 25. Allosorus, Presl.*

Hab. New Zealand: Northern and Middle Islands, as far south as Akaroa, frequent. *Allan Cumingham, D'Urville, Bidwill, Sinclair, Colenso, J. D. Hooker, Lyall, Raoul.*—One of the most elegant of Ferns, and most distinct. Indeed it is difficult to mention any species with which it has a close affinity. In its very creeping root, and coriaceous texture, and somewhat in its ramification, it seems allied to the *Aquilina*-group, but the frond is very much and very minutely divided. The stipes and flexuose main rachis are of a rich tawny hue, rough to the touch. I possess specimens varying from a span almost to 3 feet in height. The primary pinnæ vary extremely in length, and somewhat in the compactness or closeness of the pinnales; and the lowermost pair of primary pinnæ I observed to

entire at the edge, capsules frequently orange-colour, stipes and primary rachis rich chestnut-coloured glossy, secondary and tertiary rachises more or less winged with the decurrent pinnules. (TAB. CXX. B.)—*Brown, Prodr. Nov. Holl. p. 154. Ag. Pterid. p. 40. Hook. fil. Fl. N. Zeal. ii. p. 25. Pteris affinis, Rich. in Bot. of the Astrolabe, p. 81. A. Cunn. in Hook. Comp. Bot. Mag. ii. p. 365. Pt. chrysocarpa, Link, Hort. Berol. p. 33. Pt. tenuis, A. Cunn. l. c. p. 365.*

Hab. New Holland: Port Jackson, *Brown, Sieber, etc.*; Victoria, *Robertson. Port Stephens, Capt. King* (with very narrow, firm, linear segments). Tasmania, *R. Gunn, n. 1538, and n. 41* (with the ultimate simple pinnules an inch and more long, firm and crenato-lobate, capsules very copious and bright-orange). Norfolk Island, *Dr. V. Thomson.* New Zealand: Auckland, *Sinclair*; Bay of Islands, *Dr. Hooker* (some specimens very finely cut); Hutt Valley, *Dr. Lyall*; Wangaroa, *Allan Cunningham.* Lord Howe Island, *Macgillivray, n. 699, Milne, n. 27.*—*Dr. Hooker* speaks of this as a species of Juan Fernandez and Chili, but that plant is the *Pt. Chilensis* of authors; and he further remarks that *Pt. tremula* so closely resembles *Pt. arguta* of the south of Europe, etc., that he thinks it possible that all may prove to be one widely-diffused species. Although I am not prepared to subscribe to the latter opinion, I am quite unable to point out in words, still less in a diminutive figure, the marks by which this may be distinguished with certainty from the following (*Pt. Chilensis*). Indeed each of these two species (if they be such) are so variable in themselves, that they present forms quite distinct from what may be considered their normal states. Mr. Cunningham describes it under two different names in his 'Prodromus of the New Zealand Flora,' and in neither did he recognize the *Pt. tremula* of Mr. Brown, which he must have been familiar with as an Australian species. The most uniform marks of our present plant (*Pt. tremula*), as distinguishing it from *Pt. Chilensis*, may perhaps be found in the larger size, more elongated outline or circumscription of the frond, more compound, with the segments broader and longer in some cases, in others longer and narrower; when a pinnule is pinnatifid, the segments are generally more numerous, the involucre is more continuous, less thin and membranous, of an olive-green colour, entire at the margin; the capsules are very copious, and generally of a golden colour. Still, most of these are but relative characters, or, as in the case of the involucre, too minute to be surely depended upon. *Pt. arguta* is always a much larger and stouter plant, with broader segments and short sori, never reaching to the apex, and rarely more than half the length of the segment. *Pt. Chilensis*, like it, is sometimes sporuliferous at the base of the lobes. In our figures of the two species (at Tab. CXX. A. and B.) we have endeavoured to represent such a portion of each as shall best explain our meaning. Some of the specimens with more rigid fronds approach the *Aquilina*-group.

32. *Pt. (Eupteris) Chilensis, Desv.*; $1\frac{1}{2}$ –3 feet high, caudex short thick and repent, frond deltoid membranaceous tender 3–4-pinnate, ultimate pinnæ or pinnules about $\frac{1}{2}$ an inch to an inch long ovato-lanceolate sessile more or less decurrent at the base, terminal ones confluent all undivided or pinnatifid below with 2–5 oblong rather obtuse lobes, sterile ones broader, fertile ones sometimes linear serrated at the apex, veins lax, veinlets forked, involucre subintramarginal con-

tinuous sometimes reaching to the apex of the pinnules white thin membranaceous slightly crenate and fimbriate at the margin, stipes about a foot long and main rachises stramineous or brown glossy, secondary rachis slightly winged with the decurrent bases of the pinnules. (TAB. CXX. A.)—*Desv. Berl. Mag. Nat. Hist.* 1811, p. 325. *Hook. et Arn. Bot. of Beech. Voy.* p. 53. *Kze. in Linnæa*, ix. p. 76. *Ag. Pterid.* p. 41. Pt. tenera, *Kaulf. Enum.* p. 191. *Colla, Plant. Rar. Bert.* iv. p. 76. *Gay, Fl. Chil.* vi. p. 56.

Hab. Chili, *Pöppig, Beechey, Gay*: Andes. *Cuming*, n. 634; Valparaiso, *Cuming*, n. 634, and Concepcion, n. 148. Juan Fernandez, *Bertero*, n. 1558 (in *Herb. Nostr.*), *Cuming*, n. 1330. *Douglas*, n. 12. Agardh gives Peru, *Dombey*, probably on the authority of the Paris Herbarium, but I have never seen it from that country. (See remarks on this species under our preceding one.)

33. Pt. (Eupteris) *laciniata*, Willd.; everywhere more or less hirsute, frond ample 4-4½ feet long tender herbaceous-membranaceous (brown when dry) bipinnate ultimate pinnæ or pinnules pinnatifid, primary secondary or ultimate ones confluent and decurrent lanceolate acuminate pinnatifid, lobes varying in length and breadth more or less ovate or oblong obtuse everywhere entire, veins branched, zigzag veinlets few distant forked all arising from the main veinlet distant from the costa, sori short in general, involucre marginal never reaching to the sinuses nor to the apex of the lobes nor to the acuminate apices of the pinnæ, stipes (stout) and rachises ferruginous hairy or somewhat scaly. (TAB. CXXXII. B.)—*Willd. Sp. Pl.* p. 397. *Schkuhr, Fil. t.* 86 (not t. 2). *Liebm. Fil. Mex. (in part)*, p. 75. *Lonchitis hirsuta*, *Linn. Sp. Pl.* p. 1536. *Willd. (in part)*. *Pteris villosa*, *Sw. Syn. Fil. pp.* 100 and 295? *Filix villosa*, pinnulis quercinis, etc.,

and ramification of the frond, the villous surface, the short sori, are quite peculiar. It has no spinules at the base of the lobes.

It is remarkable that so common a species as this evidently is should not have found a place in Agardh's 'Recensio Specierum Generis Pteridis.' He probably considered it a *Lonchitis*; and it is, we presume, the *Lonchitis hirsuta*, L., of Grisebach's 'Plantæ Caribæe.'

34. Pt. (Eupteris) *marattiaefolia*, Hook.; frond (a portion probably only under examination) broad-ovate acuminate submembranaceous firm glabrous pale green bipinnate, primary pinnæ petiolate ovato-lanceolate, secondary or pinnules moderately distant 2-3 inches and more long less than half an inch broad lanceolate sharply acuminate and serrated especially at the apex sessile the base obliquely cuneate and decurrent so as to form a very narrow wing on the rachis but not extending to the pinnules beneath except in the superior ones, terminal leaflet longer and more acuminate than the rest, lowest pinnule of the inferior pinnæ with a lobe or auricle on the upper base, veins conspicuous slightly elevated on the under side forked free, involucre narrow formed of the dilated margin of the pinnule membranaceous in interrupted lines and scarcely continued beyond the middle or lower half of the pinnule, stipes (?) and rachis stramineous glossy. (TAB. CXXII. B.)

Hab. Chiloe, Capt. Philip King, R.N.—A most distinct and well-marked species, of which the only specimens I have ever seen are those given me by Capt. King, and Mr. J. Smith's specimens derived from the same source. The name *marattiaefolia* is expressive of the nature of the pinnules of this plant, which are moreover conspicuously veined very much in the same manner as in that genus. The sori sometimes continue uninterrupted for nearly two-thirds the length of the pinnule, but they are more frequently broken into short lines. It is probable that better specimens will exhibit a more compound nature, for, in our incompletè one, the lowest pinnules have an auricle or lobe at the superior base, indicating a disposition to further division. All the veinlets are clavate and pellucid at the apex, and do not attain quite to the margin.

(Fronds pinnate; pinnae deeply pinnatifid, all uniform, not again pinnated.)

35. Pt. (Eupteris) *patens*, Hook.; frond ample erect strict membranaceous dark- (when dry blackish-) green pinnate, pinnæ alternate very long (8-12 inches) strict horizontally patent numerous approximate elongato-oblong acuminate rarely subcaudate sessile or lower ones shortly petiolate deeply pinnatifid almost to the very rachis, segments horizontal very uniform linear scarcely acuminate obtuse often opposite sterile ones serrulate the base dilated decurrent-confluent on both sides especially at the lower base sometimes apart, veins all free simple or once or twice forked,

sori continuous almost to the apex, stipes and rachis stout erect strict purplish-chestnut colour. (TAB. CXXXVII.)—*Pt. excelsa*, var., *J. Sm. Herb.* *Pt. decussata*, *J. Sm. in Hook. Journ. of Bot.* iii. p. 405 (name only).

Hab. Ceylon, *Mrs. Gen. Walker, Gardner*, n. 1126. Luzon, *Cuming*, n. 103. Society Islands, *Bidwill*.—Nowhere can I find this fine species described, and yet it appears to be a well-marked and very distinct kind. It is undoubtedly the plant n. 103 of Mr. Cuming's Luzon collections, and hence is the *Pt. decussata* of Mr. J. Smith, in *Hook. Journ. of Bot.* l. c., but no character or observations are offered, and in his own herbarium Mr. Smith refers his species to *Pt. excelsa*, Gaud., of which he considers it a variety; he does so in the belief that the lowest pair of pinnæ are forked or divided, though neither his own specimens nor my more numerous ones in their lower pinnæ exhibit any such character; but even should it be so, I believe there are sufficient differences to warrant its being considered a new species, and this will be at once seen by our respective figures (Tab. CXXXVI. and Tab. CXXXVII.). The very strict habit of the main and secondary rachises, the horizontally patent, uniform, narrow segments, are quite unlike what we see in *Pt. excelsa*.

36. *Pt.* (*Eupteris*) *litobrochioides*, Kl.; "frond pinnate, pinnæ 3-4 pairs very large much acuminate (long caudate) attenuated and decurrent at the base pinnato-partite (rather deeply pinnatifid), segments lanceolate falcate acute serrated, sinuses rather obtuse, veins forked, stipes and rachis glabrous yellowish-brown grooved above."—*Kl. in Linnæa*, xx. p. 341.

Hab. British Guiana, *Richard Schomburgk*. Cataracts of the Aripecurú, prov. Pará, n. 1137, Amazon, *R. Spruce*, n. 561, larger, darker green and less falcate segment.—An authentic specimen of this, with apparently a perfect frond, is about a foot and a half long, the texture subcoriaceous, colour pale green, caudex very long, finely acuminate, stipes and rachis very glossy and smooth. Our plant from the Amazon appears to be a perfect frond, about 2 feet long, pinnæ longer, all dark-green and uniform, the main rachis is stout, not glossy, and a little mucronated; neither of these has the lower pinnæ bipartite, or I should have referred them to the next subsection. It has indeed a very close affinity with the East Indian *Pt. longipinnula*, Wall.

nor could justice be done to such figures except they were executed on a large scale.—If the Author of the present work has few or no authentic specimens or figures to refer to for the original species, he is fortunate in having the advantage of possessing in his herbarium authentic specimens of the majority of those described by Agardh in his well-known 'Recensio Specierum Generis Pteridis,' and which are of no small value on the present occasion.)

37. Pt. (Eupteris) *longipinnula*, Wall.; tall, frond ample oblong-ovate coriaceo-submembranaceous shining, pinnæ large (often a span long) broad lanceolate pectinato-pinnatifid rarely bipartite, segments spreading nearly horizontally linear-oblong subacute entire, terminal one more or less elongated, lowest pair unequal short decurrent into a short petiole, involucre very narrow extending from the sinus nearly to the apex, veins prominent forked from their base, stipes elongated (2-3 feet long) and as well as the rachis and costa usually of the same colour as the frond (rarely brown) glossy. (TAB. CXXXIV. A.)—*Wall. Cat. n. 108. Ag. Sp. Pterid. p. 19.*

Hab. Mountains of Penang, *Wallich*; Labuan (with only five pinnæ), *Thos. Lobb*; Bhotan, *Griffith*; Nepal. Sikkim, 2-4000 feet, *Dr. Hooker*; Assam. *Simons*; Khasia, 2-3000 feet, and Sylhet, *Drs. Hooker and Thomson*; Cotalam, Madras, *G. Thomson, n. 139, in part.*—A large species, several feet high, including the stipes, the pinnæ having very much the general appearance of those of the next group, but here the pinnæ are generally all uniform, that is, the lowest pair not again divided, and this is the case with all our numerous specimens save one, where a forking takes place. The species too is remarkable for the short, lower, unequal and decurrent segments of the pinnæ, and the generally green colour of the stipes, rachises, and costæ, and for the conspicuous venation, the veins rather distant and forked to the base. Agardh, under *Pt. longipinnula*, in a note, makes allusion to the *Pt. attenuata*, Sw. (not Blume), and of which a segment of a pinna is figured by Presl in his Tent. Pteridograph. t. 5. f. 18. The latter author says of it, "*Pt. arguta* affinis, sed pinnæ infimæ non partitæ sed indivisæ." But all is doubtful about that plant, and the two authors had probably different species in view.

38. Pt. (Eupteris) *quadriaurita*, Retz; caudex short erect, fronds often large ovato- or cordato-ovate acuminate coriaceo-membranaceous pinnate, pinnæ 5-21 or more mostly opposite sessile lanceolate deeply pinnatifid (so as to leave a narrow wing to the rachis), segments oblong obtuse mostly entire, terminal ones caudate, lowest pair of pinnæ (sometimes more) bipartite or rarely bearing 2 or 3 pinnæ on the lower side, lowest segments subdecurrent on a short petiole, veins forked basal ones terminating at or above the sinus, involucre occupying nearly the whole length of the margin of the segments, stipes elongated stramineous or brown smooth and glossy or scabrous. (TAB. CXXXIV. B.)—*Retz,*

Obs. vi. p. 38. *Willd. Sp. Pl.* p. 385. *Ag. Sp. Gen. Pterid.* p. 24. *Pt. nemoralis*, *Hook. Gen. Fil.* t. 54 a. *Pt. biaurita*, var., *Sw. Syn. Fil.* p. 98. *Pt. calcarata*, *Bory in Bel. Voy.* p. 42 (*fide Ag.*).

Hab. Ceylon and East Indies ("v. sp. in *Herb. Retz.*," *Agardh*). But of this protean and wide-spread species we shall do best, perhaps, to notice the variations, and such synonyms as we can authenticate, under the following localities:—

ORIENTAL.—Ceylon, *Gardner, Mrs. Gen. Walker, Dr. Maxwell*, varying much (as in other countries) in size of frond, and number of pinnæ, and in the nature of the apex of these pinnæ; sometimes the segments gradually form a serrated acute point, sometimes the terminal one is singularly elongated, 2–4 inches, forming a long cauda. Dr. Maxwell's specimens are proliferous from the veins on the under side of several of the segments in a very remarkable manner; or can these productions be parasites? These do not appear to become frondose or even herbaceous, but are tufted and branched so as, in the herbarium, very much to resemble in size and appearance dried specimens of the well-known *Alga. Laurencia obtusa*, but of a dark-brown colour. From Ceylon we have received, both from *Gardner*, n. 1133, and from *Mrs. Gen. Walker*, a remarkable abnormal state of this species, having only the middle of the pinnæ pinnatifid, and this in a very irregular and unequal manner, the segments becoming confluent into a tail-like point, and below confluent and more or less decurrent to the base. Madras Peninsula, *Dr. Wight*, n. 87, 4–5 feet high, the pinnæ with tail-like points 4 inches long; Cochin, *Rev. E. Johnson*, with long, very acuminate points; Cotalam, *G. Thomson*, n. 140 b; Concan, *Mr. Law*; Nilghiri, *Mac Icar*, n. 22, *G. Thomson*, n. 110 b. Punjab, Rajaori Mountains (stipes red, subsabrous), *Jacquemont*, n. 1272. Scinde, *Dr. Stocks*, frond subpellucid. Nepal, stipes reddish and scabrous (*Pt. aspericaulis*, *Wall. Cat.* n. 107; *Ag. Sp. Gen. Fil.* p. 22. *Pt. pectinata*, *Don, Prodr.* p. 15). Simla, *Col. Bates, Dr. Thomson*, n. 143 a. Kumaon, *Strachey and Winterbottom*, n. 6, 7000 feet elev., numerous close-placed pinnæ. Sikkim, 3–11,000 feet, *Drs. Hooker and Thomson*, n. 143 b, 146, and 143 c, stipes very rough; Rating valley, *Dr. Hooker*, n. 143 b, spinules copious, even on the costa of the segments, n. 139 c. Bhotan, *Griffith*, n. 2813, stipes very rough. Gowhatty, Assam, *Mr. Simons*, with caudiform points, 2–4 inches long, slightly serrated, and from the Miku hills, with the same proliferous character as noticed under Ceylon specimens. Chittagong, very spinulose, even on the costa of the rather long (inch and a half) narrow segments of the pinnæ, *Drs. Hooker and Thomson*. Malay Islands, Luzon, *Cuming*, n. 79, large, pinnæ numerous, *Pt. spinescens*, *Presl, Reliq. Hank.* according to *J. Sm. & Ag. Sp. Gen. Pterid.* n. 30.

n. 253 and 413, var. *setigera*, pinnae narrow, long-caudate, spinules on the rachises copious, and setae on the costae of all the segments, stipes and main rachis rough (Tab. CXXXV. A). This is remarkable for the copious spinules on the rachises of the pinnae, and the lesser ones or setae on all the costae of the segments. It is the *Pt. asperula*, J. Sm., name only, in Hook. Journ. of Bot. iii. p. 405. China, Hongkong, *Seemann*, n. 2384. In India a not uncommon form of the species now under consideration has been named by Dr. Wallich (Cat. n. 104) *Pt. subquinata*, and retained as such by Agardh, Sp. Gen. Pterid. p. 21; but it is simply a small and broadstate of *Pt. quadriaurita*, with few (5-8 or 10) pinnae, gradually however passing into the more copiously pinnated states. We have such from Nepal, Kumaon, *Strachey and Winterbottom*, n. 5, 3000 feet elev., and Dr. Wallich, Pt. Grevilleana, Wall. Cat. n. 2680, *Ag. Sp. Gen. Pterid.* p. 23 (pinnae 3-5). Bhotan, *Griffith*; with this are specimens having only three pinnae, and others with simply a lanceolate, pinnatifid frond, yet bearing copious fructifications. Island of Bonia (*Imp. Acad. Petersb.*).

AFRICA.—Senegambia, *Heudelot*. Fernando Po, *Dr. Vogel, Capt. Trotter's Niger Expedition, Mr. Barter in Dr. Baikie's Second Niger Expedition, 1857* (the prototypes of this in almost everything but the venation, *Pt. (Campteria) nemoralis* and *bisaurita*, are also sent from tropical Africa). Madagascar, *Dr. Lyall (Pt. pyrophylla, Bl., according to Agardh)*.

PACIFIC ISLANDS.—Abundant in Feejee, Solomon's group, and adjacent islands, *Macgillivray and Milne, in Denham's Voyage of the Herald*; but all the numerous specimens are dark, rather bright green, the stipites and main rachises black, and very glossy; it is probably included in the "*Pt. nemoralis, Willd.*," of Brackearidge's Filices of the United States Exploring Expedition. Dr. Harvey's specimens, which he gathered in the Feejee Islands, are similar, but with the stipes and main rachises castaneous.

TROPICAL AMERICA.—Jamaica, *Macfadyen*, large membranaceous pinnae very deeply pinnatifid, Pt. Blumeana of *Ag. Sp. Gen. Pterid.* p. 23 (the specimen from Jamaica). Blue Mountains, *Purdie*, stout, firm, rigid, pinnae numerous, acuminate, not caudate. Mexico, *Liebmann (Pt. nemoralis, Liebm.)*, *Galeotti*, n. 6291 (*Pt. nemoralis major, Mart. et Gal. Fil. Mex.* p. 53). Quebrada of Huanacabra, Peru, *Mathews*, n. 982, very large, frond nearly 3 feet long, with numerous pinnae, 8-10 inches long. Guatemala, *G. U. Skinner, Esq.*, common East Indian form. Coyba, Panama, *Seemann*, n. 48, caudate pinnae and segments broad, less deeply pinnatifid than usual; Boquete, Panama, common form, but large. *Seemann*, n. 1119. Tablazo, N. Granada, *Holton*, n. 51. Venezuela, *Moritz, Fendler*, n. 103, *Linden*, common forms. Caracas, *Birschell* (same as from Jamaica). Minas Geraes, Brazil, *Gardner*, n. 5302 (same as the preceding).

The Fern here referred to *Pt. quadriaurita* is that which Agardh ascertained to be so by an inspection of the original plant in the Retzian Herbarium; but it is clear that this has been by many botanists considered to be the *Pt. nemoralis* of Willdenow, or the *Pt. bisaurita*, L. Presl and others have shown that the latter author, in his herbarium, has confounded two species, and indeed in Presl's views two genera (*Campteria* and true *Pteris*), under that name. The *Campteria* Agardh has no doubt correctly referred to *Pt. bisaurita*, L. *Pt. nemoralis* he retains, and places next to our *Pt. quadriaurita*, with characters however which would seem to combine these two species (or genera), and my own investigations would lead to this conclusion.*—See our *Pt. (Campteria?) nemoralis*.

* Rather than add needlessly to the array of synonyms under *Pt. quadriaurita*, or appear to treat lightly the views of one so experienced in the study of Ferns as Mr. J. Smith, I here give in a note his character of a *Pteris* long known to him and long cultivated in the gardens of Kew under the name of

Pt. (Eupteria) felosma, J. Sm.; "fronds pinnate, pinnae sessile lanceolate deeply

39. *Pt. (Eupteris) pungens*, Willd.; "fronds pinnate, pinnae subpetiolate lowest ones bipartite, segments linear-lanceolate serrated at the base equally and broadly confluent, veins forked inferior basal one geminate proceeding from the costa, stipes externally aculeate and purplish," *Ag.—Willd. Sp. Pl. v. p. 387 (according to Ag.). Ag. Sp. Gen. Pterid. p. 28. Pt. macroura, Willd. Sp. Pl. v. p. 380. Pt.*

pinnatifid, the apex caudate and entire the lower pair bipartite, costae spinulose on the upper side, laciniae linear-lanceolate obtuse entire slightly falcate, veins forked close to the costula free the pair terminating in the sinus of the laciniae." *J. Sm. En. Ferns of Kew, Dec. 1845; Comp. to Bot. Mag. lxxii. p. 24; Cat. Kew Ferns, p. 4; Cat. Cult. Ferns, p. 36.*

Hab. "Jamaica. Cult. in (since) 1822.—Fronds 2-3 feet high, rising from an erect rhizome. Pinnae 6-8 inches long, terminated by a long, lanceolate cauda."

Now in all the above characters there is nothing whatever at variance, but everything to correspond, with the common form of *Pt. quadriaurita*, with which the author does not compare it, but says, in regard to its affinities: "It has been long known by the names of *Pt. Plumieri* and *Pt. nemoralis*, but the latter is given under *Cempteris*: and as the figure of Plumier, Fil. t. 15, is also quoted for *Pt. biaurita*, which can only be known as distinct from the present species by the anastomosing of the lower veins, and which characterizes *Cempteris* from true *Pteris*, I therefore view this as an undescribed species; and as my attention has often been called to it by its peculiar smell, I have chosen to designate it by the above name. I possess native specimens of the same from Jamaica."—I, too, possess specimens from Jamaica, which I believe to be identical, but which are certainly included in what I venture to consider *Pt. quadriaurita*. Kunze retains the species, or at least the name, in his Index Fil. Hort. Europ., without any remark. Mettenius, on the other hand, unhesitatingly refers it to *Pt. repandula*, Link, making it a synonym along with *Pt. Blumeana*, Ag., and gives India, Brazil, and Columbia as the native countries. (See Metten. Fil. Hort. Bot. Lips. p. 81.) The peculiar odour to which Mr. J. Smith alludes, arises from some minute glandular hairs, chiefly on the under surface of the frond, but which are quite scentless in the dry state.

Of *Pteris sulcata*, Hort. Berol., Mr. J. Smith remarks: "This is so like my *Pt. felosma*, that I hesitated whether it was truly distinct: its chief difference is

acuminata, Desv. (*vide* Ag.). *Pt. biaurita*, β *edentula*, Kze. in *Linnaea*, ix. p. 75? *Plum. Fil. t. 13 and 14* (Ag.).

Hab. Martinique and Hispaniola, Plumier. French Guiana, Leprieur. Trinidad, Sir Ralph Woodford. Porto Rico, Baron de Shack. Peru? Poeppig.—This is a large handsome-growing plant, of which the figures in Plumier are perhaps less exaggerated than usual, yet, except the greater size, I do not see how it is to be separated from our *Pt. quadriaurita*. Willdenow says it is distinguished from its allies by the aculeated stipes (our plant from Porto Rico, referred to by Agardh, has the stipes quite smooth), and by the lower pinnæ, not the lowest only, being bipartite. Agardh, on the other hand, who has examined Plumier's original plant, as well as other specimens, remarks that he has only seen the lowest pinnæ bipartite, as in our specimens. The name ("*pingens*") is given by Willdenow, no doubt from the presence of the spinules seen at the union of the costule with the costa, represented, but much exaggerated, by Plumier, tab. 14; but they are common to most, if not all, of this group. My original specimens of Kunze's *Pteris biaurita*, β , are very different from our *Pt. biaurita*, and may perhaps be referred here. They have nothing of the venation of *Campteria*, to which genus or section that species is now referred.

40. *Pt. (Eupteris) deltea*, Ag.; frond a foot long ovate-acuminate membranaceous pinnate, pinnæ (about 13) subpetiolate lanceolate acuminate caudate lowest pair with two unequal pinnæ at their base all of them pinnatifid even to the rachis so as to be almost pinnulate, segments lanceolato-triangular sharply acuminate subserrate decurrent at the base, veins obscure forked near the middle, sori elongated, involucre narrow, stipes and main rachis brown, secondary rachises stramineous. (TAB. CXXXV. B.)—*Ag. Sp. Gen. Pterid. p. 33.*

Hab. Otaheite, Menzies (not Mathews, as in Agardh). The form of the segments, so deeply cut indeed as to be almost distinct-pinnules, is very peculiar; nevertheless it may possibly prove to be an abnormal form of *Pteris quadriaurita*. Our specimen, described by Agardh, is unique as far as we know.

41. *Pt. (Eupteris) excelsa*, Gaud.; frond ample 5–6 feet long submembranaceous light green pinnate, pinnæ large remote 6 inches to a foot long numerous ovato-lanceolate caudate sessile, lower ones long-petiolate, lowest pair of pinnæ bipartite all deeply pinnatifid nearly to the costa, segments (2–4 inches long) from a broad base linear-lanceolate obtuse serrated subfalcate lower base decurrent, veins free forked at or near the middle, involucre continuous from the base almost to the apex rather broad, stipes very stout and flexuose, rachises bright castaneous glossy. (TAB. CXXXVI.)—*Gaud. in Freyc. Voy. Bot. p. 388. Ag. Sp. Gen. Pterid. p. 21. Brackenr. Fil. of the U. S. Expl. Exp. p. 115. Pt. terminalis, Wall. Cat. n. 101. Ag. Sp. Gen. Pterid. p. 20. Brackenr.*

Fil. of the U. S. Expl. Exp. p. 115. Pt. firma, Wall. Cat. n. 100 (segments $\frac{1}{2}$ an inch broad).

Hab. East Indies: Nepal and Silhet, *Wallich*; Simla, *T. Thomson* (8000 feet), *Col. Bates*; Garwhal, *T. Thomson*; Kumaon, *Blinkworth, Edgeworth, Strachey and Winterbottom*. Mountains of Ava (very large, lower bipartite pinnae 16 inches long, segments $\frac{1}{2}$ an inch wide), *Wallich*. Mountains near Baños, Luzon, *Brackenridge*. Sandwich Islands, frequent, *Gaudichaud, Brackenridge (and in Herb. Hook. and Lindl.)*.—This, judging from the comparatively small portions in our herbaria, must be one of the very finest species of this group or subsection of *Pteris*; and yet, except in size and the more deeply cut, almost pinnulated pinnae, it is not easy to say how it is specifically distinct from some forms of *Pt. quadriaurita*, while in the broad and decurrently confluent bases of many of the segments it resembles *Pt. deltes*. It could only be the widely different localities that induced Professor Agardh to keep *Pt. terminalis* of Wallich distinct from *Pt. excoles* of Gaudichaud; for he well observes of the latter, "Antecedenti (*Pt. excoles*) simillima et forsitan nimium affinis."

42. *Pt. (Eupteris) ligulata*, Gaud.; "fronds ternato-pinnate, pinnae pinnato-partite auriculate, auricles elongate ensiform undivided (*integræ*) coarsely serrated or lobed, segments linear-lanceolate subdecurent, veins forked the lowest springing from the costa," *Ag.—Gaud. in Freyc. Voy. Bot. p. 385. Ag. Sp. Gen. Pterid. p. 23.*

Hab. Vaigiou, Molucca Islands, *Gaudichaud*.—This Fern is quite unknown to me. Gaudichaud arranges it in the same section with *Pt. pedata*, Willd., and *Pt. geraniifolia*, Raddi; but Agardh, who appears to have possessed specimens and to have seen others in the Herbarium of Delessert and of the Paris Museum, places it between his *Pt. Blumeana* and *Pt. Grevilleana*, Wall. (both of which we are disposed to refer to *Pt. quadriaurita*), and he says of it, "Species valde paradoxa; *Pt. Grevilleana* mihi videtur proxima, licet ab hac quoque non parum discrepat. Neque inter species *Adiantoides* (*Pellea*, nobis) jure disponitur."

43. *Pt. (Eupteris) arguta*, Ait.; fronds ample pedately ovate firm-membranaceous pinnate, lowest pair of pinnae

Ægypt. Arab. p. 187, *fide Ait. (non Linn. fil.)* Pt. incompleta, *Cav. (Willd.)*. Pt. palustris, *Poir. (Webb)*.

Hab. Arabia, *Förskal*. Madeira, Canary Islands, the Azores (*Seuber*), *Mason*, and all travellers. Portugal (*Herb. Gundelheimer, Schlecht.*), rare, Serra de Cintra, *Webbitch*, in *Herb. Nostr.*—*Förskal*, if Aiton is correct in referring his *Pt. serrulata* here, is the first botanist who appears to have recognized and described this species, as an Arabian Fern; though Agardh is of a different opinion, and says on the *serrulata* of *Förskal*, "Quoad descriptionem ad veram *Pt. serrulata* referre malle." The 2nd edition of 'Hortus Kewensis' gives the Cape of Good Hope as a locality, as does Schlechtendal (who adds Mauritius), and probably they are not far wrong in doing so, as Brackenridge cites St. Helena; but the *Pteris* here intended is now generally considered a distinct species, the *Pt. flabellata*, Thunb., as is the Azorian specimen by Agardh, in my herbarium, although in his 'Spec. Gen. Pteridis' he places it under *Pt. arguta*. Our present plant is indeed one very difficult to define specifically. It is usually of a firm texture, dark full green colour, the segments of the pinnæ gradually (but not finely) acuminate, distinctly serrated; with abbreviated sori generally commencing at the base and not extending beyond the middle of the segments. More or less these characters prevail in the following supposed species, and our Azores plant has assuredly as strong a claim to be ranked with the one as with the other. *Pt. quadrifurcata* chiefly differs by the blunter and entire segments of the pinnæ.

44. Pt. (*Eupteris*) *flabellata*, Th.; fronds ample pedately ovate membranaceous pinnate, pinnæ generally sessile lanceolate acuminate lowest pair of pinnæ bipartite or unequally pinnate a span or more long deeply pinnatifid nearly to the costa, segments 1–1½ inch long linear or linear-oblong sub-falcate scarcely acuminate rather obtuse serrate broadest and decurrent at the base, veins forked near the middle lowest inferior one arising from the main costa bifurcate its veinlets spreading, sori rather narrow elongated often extending from the base of the sinus nearly to the apex of the segments, stipes elongated and rachises smooth stramineous very glossy.—*Thunb. Prodr. F. Cap. p.* 733. *Sw. Syn. Fil. p.* 99. *Willd. Sp. Pl. v. p.* 396. *Ag. Sp. Gen. Pterid. p.* 37. "Pt. elegans, *Jacq. Fragm. p.* 74. t. 116" (*Kze.*). *Pt. arguta, Schlecht. Ad. Fil. Prom. Bon. Sp. p.* 43. *Kze. in Linnæa, vi. p.* 186, et in *Rev. Acot. Afr. in Linnæa, x. p.* 524.—Var. *Americana*; stipes brownish, *Ag. Sp. Gen. Pterid. p.* 37. "Pt. lata, *Link, Hort. Berol. ii. p.* 28."—Var. *Ascensionis*; stipes sometimes rough at the base, frond 6 inches to a foot high. *Pt. Ascensionis, Sw. Syn. Fil. pp.* 100 et 294. *Schkuhr, Fil. t.* 94. *Willd. Sp. Pl. v. p.* 400. *Lonchitis Ascensionis, Forst. in Com. Soc. Gætt. ix. p.* 72.

Hab. South Africa, *Thunberg* and various travellers: Table Mountain, *Dr. Alexander*; Uitenhage (*Harvey, n.* 528, in *Herb. Nostr.*); Macalisberg, *Zeyher* and *Burks*, *Mr. Sanderson* (pinnæ elongated, segments quite linear). St. Helena, *Cuning, n.* 425, *Dr. Hooker* (southern declivity of Diana's Peak). Abyssinia,

by streams in mountain districts near Sabra, *Schimper, It. Abyss. U. It.* 1842 (common form), and *Schimper, Herb. Mus. Par.* 1853, n. 280, larger, 6 feet high, including the stipes, frond glaucous, stipes glossy, as if varnished, dark brown near the base, above bright chestnut-colour on one side, stramineous on the other (*Herb. Nostr.*). Var. *Americana*, "St. Vincent (*Herb. Hook.*)? Brazil (*Link*)" *Ida Ag.* — Var. *Ascensionis*, Island of Ascension, *Forster, Dr. Curror, Dr. Hooker*, (Green Mountain, 1200–1800 feet elev., erect or prostrate), *Seemana*.—In the present case, as with many other Ferns, I fear it is only the very southern locality that induced Thunberg and other able botanists to separate *Pt. adbellata* from *Pt. arguta*; there is hardly any other difference than the more membranous and softer texture and elongated sori to distinguish the present one. *Pt. Ascensionis* owes its dwarf and stunted form to the bare and exposed rocks of the "Insula sterilissima Ascensionis," as Swartz calls it.

45. *Pt. (Eupteris) paleacea*, Roxb.; 3–5 feet high, fronds spreading horizontally 1–2 feet and more long subcordate coriaceous very firm and rigid glossy pinnate below tri-subquadripinnate, pinnæ close-placed compact, lowest primary pinnæ half-cordiform bearing their pinnæ and pinnules on the lower or inferior side, superior pinnæ and pinnules sessile all lanceolate deeply pinnatifid nearly to the rachis, segments from $\frac{1}{2}$ an inch to an inch long from a broad base linear-oblong subfalcate obtuse quite entire, veins forked, involucre intramarginal copious throughout the whole frond rigid-membranaceous brown not extending to the base nor the apex of the segments, stipes 2–4 feet long stout and as well as the principal rachises beneath very shaggy with copious large dark-brown crisped scales which are deciduous leaving rigid prominent prickly tubercles on the pale-brown surface. (TAB. CXXXII. A.)—*Roxb. in Beatson's Fl. of St. Helena*, p. 349; *ejusd. Bot. of St. Helena (not paged). Ag. Sp. Gen. Pterid.* p. 33.

Hab. Summit of Diana's Peak, St. Helena, *Menzies, in Herb. Nostr., Roxburgh*, and all botanical visitors of that Peak, *Cuming*, n. 424, *Nuttall, Dr. J. D. Hooker*,

ovate pinnate, lower pair of pinnæ bipartite or again pinnate chiefly on the lower side, all the pinnæ and pinnules lanceolate acuminate sessile coriaceous-membranaceous subscabrous minutely pellucido-punctate pinnatifid not to the base (but so as to leave a rather broad uniform membrane on each side the main costa) with subopposite lanceolate subfalcato-acuminate serrated segments decurrent at the base and there even subauriculate, veins thick forked 4 or 5 (often simple) are situated within the decurrent base and arise from the costa, sori narrow often extending nearly to the apex of the segments, stipes elongated blackish-purple glossy. (TAB. CXXXVIII. A.)—*Bory*, in *Willd. Sp. Pl.* v. p. 386 (not *Gaud.*). *Ag. Sp. Gen. Pterid.* p. 31. *Pt. angusta*, *Bory*, in *Willd. Sp. Pl.* v. p. 388 (*Ag.*). *Pt. elastica*, *Tausch.* in *Sieb. Fl. Maurit.* n. 15 (*vide Presl*). *Pt. Mascarenensis*, *Spreng. Syst. Veget.* p. 75 (*vide Presl*). ? *Var.*; stipes stramineous, *Ag. l. c.* p. 32.

Hab. Woods in Mauritius and Bourbon, *Bory*, *Néraud*, *Bojer* and *Bouton* in *Herb. Nostr.* *Var.*? with stramineous stipes; Bourbon, *Carmichael* in *Herb. Nostr.*—*Agardh* remarks of this, "Species pulcherrima cum nulla alia confundenda." It has indeed a peculiar appearance for one of this (which may be called) the *quadriaurita* group. It is of a somewhat coriaceous texture; the segments are singularly decurrent at the base (almost auricled), and nearly opposite, not so deeply pinnatifid as in *Pt. arguta* and *Pt. flabellata*: the texture, too, is remarkable, when held up between the eye and the light, full of minute pellucid dots. The veins are particularly conspicuous, thick, and 4 or 5 spring from the main costa, occupying the decurrent subauriculated base. I am doubtful if the variety from Bourbon, above alluded to, be identical. It partakes of some of the characters and some states of *Pt. flabellata*, or, as Captain Carmichael had named it, *Pt. arguta*.

47. *Pt.* (*Eupteris*) *Swartziana*, *Ag.*; "frond pinnated, pinnæ shortly petiolate subpinnatisected with the lowest pair often pinnulated, segments triangular-lanceolate obtuse serrated subdecurrently confluent at the base, veins forked basal inferior one arising from the costa, sori elongated, stipes eventually castaneous."—*Ag. Sp. Gen. Pterid.* p. 34. "*Pt. bi-aurita*, *Sw. Syn. Fil.* p. 98 (*excl. the synonyms and localities*). *Willd. Sp. Pl.* v. p. 384 (*excl. syn.*). *Link, Hort. Berol.* ii. p. 28. *Hook. et Grev. Ic. Fil. t.* 142. *Pt. allosora*, *Link, Hort. Berol.* p. 31? (*vide spec. from H. Berol. sent to Mr. J. Smith*)." *Ag.*

Hab. West Indies, Jamaica, *Higson* (*Herb. Grev.*), *Bancroft*, in *Herb. Nostr.* (named by *Agardh*, but it has narrower segments than in the figure of *Ic. Fil. l. c.* and more the character of *Pt. flabellata*, *Purdie* (exactly corresponding with the figure just mentioned). Isle of Bourbon, *Commerson* (*Ag.*).—A Fern, as it appears to me, almost intermediate between *Pt. quadriaurita* and *Pt. flabellata*, necessarily partaking not a little of the character of *Pt. arguta*. The learned *Agardh* confirms our views, expressed in the 'Icones Filicum,' of its being

the *Pt. bismaria* of Swartz and Willdenow, though not of Linnæus, which is a species having more or less anastomosing veins, but it is never the case with this. Our figure in the 'Icones Filicum' will show what is intended by this species.

48. *Pt. (Eupteris) Kingiana*, Endl.; "frond pinnated, pinnæ subpetiolate pinnatisect the lowest ones pinnulate, segments lanceolate-linear obtuse serrated decurrenti-subappendediculate, veins forked basal inferior one arising from the main costa bifurcate, stipes and costa (the latter sometimes stramineous) black-purple glossy," *Ag.—Engl. Prodr. Fl. Norfolk. p. 13. Ag. Sp. Gen. Pterid. p. 34.*

Hab. Moist shady places, Norfolk Island, *All. Cunningham, C. J. Simmons, Esq., Dr. V. Thomson, Milne, in Denham's Surveying Voyage*, "Species, ut crederim certe distincta, at characteribus difficiliter circumscribenda. Frons tota atro-virescens, costis discoloribus variegata, inter pulchriores totius generis."—I can agree with most of the above observations of Agardh; yet were it not for the high authority of Endlicher and Agardh, I should be disposed to consider it one of the many forms of *Pt. tremula*, of which I have recently received specimens from New Zealand that I can scarcely distinguish from what Agardh has considered and marked as *Pt. Kingiana*, from Norfolk Island. Agardh is of opinion that this is the South African *Pt. elegans* of Jacquin, which Kunze, with more justice, perhaps, refers to *Pt. flabellata*. (See our notes on the affinity of *Pt. tremula*, p. 175, with *Pt. arguta*.)

49. *Pt. (Eupteris) Trattinickiana*, Endl.; "frond membranaceous tripartite, branches pinnate, pinnæ pinnatifid, segments oblong-linear obtuse distinct (*discreta*) sharply serrulate, veins forked, sori interrupted."—*Endl. Prodr. Fl. Norfolk. p. 14. Ag. Sp. Gen. Pterid. p. 44, note.*

Hab. Norfolk Island, *Ferd. Bauer (Endl.)*. "Rami pinnati laterales divaricato-patentes. Pinnæ approximativè alternæ, paribus 1½–2 pollicares dissitis, 4–5 pollicares, usque ad costam pinnatifidæ. Lacinie oblongo-lineares, erecto-patentes obtusæ, 9 lineas longæ, 3 lineas latæ, alternæ, discretæ, infima basi subpinnatifidæ, omnes argute serrulatæ. Indusia membranacea, interrupta, sæpius unilateralia."—If this had been placed by Endlicher next to his *Pt. Kingiana*, I should have thought it quite likely to be a state of that plant, passing into *Pt. tremula*.

Hab. Java, *Blume*. East Indies, mixed with *Pt. nemoralis*, *Wallich*. Mauritius and Madagascar, *Bojer*, in *Herb. Hook.*—Too near, I fear, *Pt. quadriaurita*.

51. *Pt. (Eupteris) catoptera*, Kze.; “frond thin coriaceous finely alutaceous beneath (*subtilissime alutacea*) and sparsely setulose pinnated, pinnæ sessile ones lowest pinnulated downwards, segments (spinuliferous above) confluent at the base oblong-linear obtuse entire, veins forked the basal ones extending to the margin above the sinus, stipes rachis and costa stramineous,” *Kze. in Linnæa*, xviii. p. 119.—*Pt. biaurita*, *Kze. Recens. Nov. Fil. Cap. in Linnæa*, x. p. 436. *Pt. nemoralis*, *Ag. En. Sp. Gen. Pterid.* p. 25 (*in part*).

Hab. Port Natal, *Gueinzins*.—“In vicinitate *Pt. pyrophila* (s. *Pyrophylla*) ut dicitur, collocanda.”

52. *Pt. (Eupteris) Novæ-Caledoniæ*, Hook.; frond ample bright-green membranaceous pinnate (below bipinnate?), pinnæ petiolate a span and more long lanceolato-acuminate deeply pinnatifid down to the rachis, segments linear or linear-lanceolate almost horizontal straight (not falcate) rather obtuse strongly serrated close-placed leaving a very narrow sinus, inferior ones truly apart so that the pinnæ are below pinnated slightly decurrent (but not dilated) at their base, veins simple or forked all arising from the costule, sori abbreviated broad copious on almost every segment, on the upper segments generally confined to the inferior margin, main rachises bright-castaneous glossy, principal costæ passing into stramineous.

Hab. New Caledonia, on the ground, in low, moist situations: fronds sometimes 10 feet high, *Mr. C. Moore* (of Sydney).—At the risk of being considered to be adding needlessly to the number of species of the *Quadriaurita* group, I still venture to consider the present truly distinct. I regret that though the specimens are otherwise in a beautiful state, and 2 feet long, they do not exhibit the lower ramifications of the frond. The aspect is very peculiar, from the distinctly petiolated pinnæ, the small (1 inch long) narrow segments of a bright green colour, cut down to the very costa, some even quite free, their close proximity to each other sometimes closing the very narrow sinus, and from the very copious broad sori, so that, looking at the back of the frond, there is as much space occupied by the red-brown fructifications as by the green frond, though the sori are abbreviated, and though the upper segments have only the lower margin soriferous. The veins are obscure, but none seems to spring from the main costa, all from the costules. It is very different from *Pt. arguta*, which nevertheless may be its nearest affinity.

53. *Pt. (Eupteris) Cræsus*, Bory; “fronds bipinnate below, the pinnules subpetiolate pinnatisect, the segments triangular-oblong obtuse dentate decurrent at the inferior base excised and nearly separated (*discretis*) at the superior base,

veins forked, lower basal one arising from the costa twice forked, sori whitish, stipes black-purple," *Ag.—Bory, It. ii. p. 192 (fide specim. in ips. Hbriio. Ag.). Sw. Syn. p. 103. Willd. Sp. Pl. v. p. 372. Ag. Sp. Gen. Pterid. p. 39.*

Hab. Bourbon, in rocky places, *Bory*.—I am unacquainted with this species, and am equally ignorant of its affinities. Agardh, who has examined and described it from authentic specimens, places it the first in a section along with *Pt. Pseudo-Lonchitis*, *Bory* (which is a *Campteria*, Pr.), and *Pt. tremula*, Br., and *Chilensis*, Desv., etc. *Bory*, its discoverer and first describer, says, "Cette belle plante a quelques rapports avec notre *Pteris argentea*" (*Cheilanthes farinosa*, *Kaulf.* and this work) "et avec le *Pteris biauwaita*, L.;"—two plants having very little connection with each other. The lower pinnæ, that author says, are opposite and bipartite; lower segments, especially externally, pinnate or pinnatifid; the margins crenate. Willdenow places it between "*Pt. aspera*, Lam." and *Pt. denticulata* (*Litobrochia*, Pr.). Swartz refers it to his group of *Pteris*, which has the dark glossy stipes of *Adiantum*; and Fée to the *Aquilina* group, next to *Pt. esculenta*, but whether from a personal knowledge of the plant or not we are ignorant.

54. *Pt. (Eupteris) aspera*, Lam.; "fronds pinnate, pinnæ lanceolate acuminate entire truncate at the base rounded above (*sursum rotundatis*), lower ones striated crenated, stipes rough."—*Lam. Cycl. v. p. 713. Sw. Syn. Fil. p. 102. Willd. Sp. Pl. v. p. 372 (not aspera, Fée).*

Hab. Cayenne (*Lam.*).—Swartz places this in the same group with *Pt. Crævus* (our foregoing species), Lamarck among some very dubious species, but near *Pt. crenata*, as Willdenow has done. It is in vain to guess its affinity.

55. *Pt. (Eupteris) deflexa*, Lk.; frond ample tri-quadrifid (primarily ternate) coriaceous firm rigid, pinnules petiolate lanceolate gradually acuminate deeply almost to the base pinnatifid, segments subtriangular-oblong slightly falcate curved upwards mucronate and spinuloso-serrate in the sterile portions, veins conspicuous prominent simple

imum fere huic convenit; pro certo itaque species esse distinctas affirmare voluerim, licet hucusque tantas ramificationis differentias in una eademque specie invenire non observaverim." Our plant is remarkable for the harsh and coriaceous fronds, prominent venation, mucronate segments, and subspinulose serratures. It has also the spinules so common in the group to which *Pt. quadriaurita* belongs, and a small plant of this has exactly the same ramification as the ordinary form of that species; that is to say, subdeltoid, ternate (from the two lower pinnae being opposite, and larger than the rest, and compound), with one or more pinnae, of which those on the inferior side are longer than those of the superior (unequally pinnate). In texture, and general habit, this species is allied to *Pt. Jameconi* and *muricata* and *coriacea*, but it wants the curiously mucronated rachises and costa of those species, though there is an approach to that in the stipes being rough at the base.

56. *Pt. (Eupteris) Gaudichaudii*, Ag.; "fronds ternate, branches subsimple pinnate, pinnae subpetiolate deeply pinnato-partite, segments triangular-lanceolate serrated mucronate, veins forked, the inferior basal vein arising from the costa and the superior one axillary extending to the margin above the sinus."—*Ag. Sp. Gen. Pterid. p. 42. Pt. palustris, Gaud. in Freyc. Voy. p. 391 (excl. synonymy).*

Hab. Rio Janeiro, Brazil, *Gaudichaud, Lund*.—"Stipes on the superior side brownish, scaberulous, tripartite. Branches elongated, with numerous pairs of pinnae (14-16). Pinnae 3-4 inches long, about an inch and a half (*angue et dimidia vis latiores*) wide, almost pinnatisect or deeply pinnato-partite. Segments lanceolato-falcate, subdecurrently confluent at the base, sharply serrated, the terminal tooth mucronate. Substance rigid, coriaceous." This description sufficiently accords with our preceding species, *Pt. deflexa*, Lk.; so that Agardh's views of the very close affinity of the two plants, expressed under the latter species, may be considered correct.

57. *Pt. (Eupteris) pellucens*, Ag.; fronds ample membranaceous ternately divided lateral divisions as well as the intermediate ones multipinnate, pinnae shortly petiolate lanceolato-acuminate long-caudate at the apex deeply almost to the rachis pinnatifid, segments spreading oblong-subquadrate obtuse subtruncate approximate sharply toothed at the apex, the base decurrent glabrous, sori lateral on the segments never extending to the sinus nor to the apex, veins rather remote all forked basal ones arising from the axil of the costula and extending to the margin much above the sinus, stipes and rachis brown or stramineous smooth.—*Ag. Sp. Gen. Pterid. p. 43. J. Sm. in En. Fil. Philip. in Hook. Bot. Journ. iii. p. 405. Pt. intermedia, Bl. En. Fil. Jav. p. 211?*

Hab. East Indies, *Wallich* ("Vidi in Hbris. Banksii et Hornemannii," *Agardh*). Luzon, *Cuming*, n. 8. Java? *Blume*. Hills of Assam, *Simons*, n. 261. Bhotan, *Griffith*, n. 2816, *Booth*. Khasia and Sikkim, *Hook. fl. et Thomson*.—A distinct and well-marked species. Pinnae 4-6 inches long, less than an inch wide, seg-

ments very regular, remarkable in the form of the segments, an oblong square, singularly obtuse or sometimes truncate, but sharply toothed at the apex. Spinules on the rachis at the base of the lobes frequent. By some accident this species does not seem to have been generally distributed by Dr. Wallich; at least I have never seen Wallichian specimens, which are the authority for the plant of Agardh. Like many other Ferns, it is common to Eastern Bengal and the Malay Islands. Blume's *Pt. intermedia* (not of Kaulfuss) seems to be the same plant, as far as can be judged from his brief character.

58. *Pt. (Eupteris) stridens*, Ag.; "lateral branches of the ternate frond bipartite, intermediate one pinnate, pinnæ lanceolato-acuminate pinnatisected, segments triangular-lanceolate entire cartilagineo-marginate and submucronate, veins forked distinct (*discretis*)."—*Ag. Sp. Gen. Pterid. p. 45.*

Hab. Jamaica, *Bancroft (Herb. Hook.)*, *Lunan (Herb. Greville)*.—"Stipes stramineous, and, together with the frond, a foot and a half high, glabrous and nearly smooth (*sublaevis*). Fronds ternate, lateral branches scarcely a foot long, pinnated, sending down from below a pinnated auricle; intermediate branch pinnated, lowermost segment subpinnatifid. Pinnæ of the lateral branches usually alternate, of the intermediate one opposite, shortly petiolate, 2-5 inches long, scarcely more than an inch wide at the base, towards the apex gradually attenuated, pinnatisected. Segments approximated at the base, lanceolate, obsoletely falcate, margined with a very slender cartilaginous line, sterile ones entire, shortly mucronated at the apex. Veins all forked or simple, inferior basal one from the axil of the costa, superior one springing from a little above the axil. *Indusia* whitish, abrupt at each extremity ('*utrinque abrupta,*') obtuse. Colour dark green, and the substance of the frond is rigid and harsh (*stridens*)."—I have little to add to the above character and description. My own specimen, from which Professor Agardh drew up his description in part, is but a portion of a frond, a foot long. Dr. Greville's was evidently more perfect. Assuredly its affinity is with *Pt. deflexa*, Lk.; but the segments, though mucronated at the point, are quite entire at the margin.

59. *Pt. (Eupteris) coriacea*, Desv.; frond 1½-2 feet long broad-deltoid ternate (subpedate) coriaceous pale-green bipinnate, pinnæ subpetiolate lanceolate finely acuminate into a serrated point pinnatifid nearly to the rachis (or con-

h compactly placed, slender, white or stramineous, rather long spines, the texture as the rachis, while the main rachis is merely rough with small, elevated spinous points. It is a very fine and handsome fern with very narrow segments or pinnules.

t. (Eupteris) *Jamesoni*, Hook. ; 1-2 or 2½ feet (perhaps more) high, frond a span to a foot and a half long deltidate coriaceous glabrous glossy above pinnate, subinnæ simple (undivided small) ¼ an inch to an inch intermediate and inferior ones lanceolate much acuminate or nearly so and again pinnate, lowermost pair bitwo or three of the lowermost of these pinnules much larger than the rest, ultimate pinnules (and the superior ones) oblong-lanceolate subfalcate mucronate singularly distinct and confluent sterile ones strongly spinuloso-sericeous sunk on the upper side elevated on the under side or usually forked, involucre intramarginal on the perfect specimen continuous from the base to the middle apex rather broad membranaceous, stipes longer than the frond stramineous rough on the under side as well as rachises and costa of the pinnules with scattered spines same colour and texture as the stipes, costa and even rachis beneath partially chaffy with small deciduous ovate imbricate brown crisped scales. (TAB. CXXXIII. A.)

Indes of Quito, Professor W. Jameson. Ocafia, New Granada, Schlimm. No species of *Pteris* can well be more distinct than this, and yet I find it difficult to give its distinguishing characters in a few words or a few lines. Its most remarkable features, the singularly hard and yet usually wavy rachis on the under side of the stipes, rachises, and costa, of the same colour and texture as the stipes, it approaches *Pt. coriacea*, Deav., but it is a smaller and simpler compound plant, with very much larger and broader ultimate pinnules, from half an inch to an inch long, and a line and a half to two lines of spinous points however are much less numerous than in *Pt. coriacea*, especially the costa of the pinnules, but they are there accompanied by scattered, brown scales, of which there is no trace in that species. The strong spinous points of the sterile portions of the plant entirely disappear in the perfect specimen, and these have the involucre occupying the whole length of the rachis rather a broad edge, formed of the substance of the frond; in other specimens they are distinctly intramarginal. I have never received this plant from Professor Jameson, but from two different stations, and in different degrees of perfection, showing, by the presence of the essential characters in each, that the species may be considered a good one.

t. (Eupteris) *muricata*, Hook. ; caudex?, frond 20 (and more?) long ovate acuminate coriaceous very firm below tri-pinnate, pinnæ petiolate opposite or nearly opposite in stant pairs primary superior ones and secondary inner ones lanceolate long-acuminate into a serrated point, with numerous compact confluent at the base linear-

oblong subfalcate acute and mucronate, those of the inferior primary pinnæ free distant entire or again pinnatifidly pinnate, veins forked, involucre intramarginal, stipes terete and flexuose, rachis ferruginous and costa beneath thickly muricated with hard spinous points. (TAB. CXXIII. B.)

Hab. Tropical America, Antioquia in New Granada, *Mr. Jervise*.—If not *sui generis* botanically speaking, it may truly be called *sua species*, for I know none with which it can be confounded; in texture and somewhat in ramification it approaches the *Aquilina* group, but it is remarkable for the flexuose rachis, and that, together with the portion of the stipes which is attached to the frond, covered with numerous, close-placed, small spinous tubercles, or rather raised points. Something of the kind is seen on the stipes and rachis of *Pt. paleacea*, when the scales are fallen off.—Antioquia, the native country of our plant, is in the very centre of tropical America, between 5° 40' and 8° north, long. 75° and 76° 30' west, in the department of Cundinamarca, a country abounding in mountains, and almost unknown to the botanist, whom it would repay well in the exploring its vegetable riches.

62. *Pt. (Eupteris) muricella*, Fée; “fronds pinnated above and bipinnated at the base of a soft consistence transparent with oblong toothed segments crenulated at the apex having on the rachis of the pinnules and on the costa long sharp soft and whitish points, petiole strongly furrowed reddish, rachis whitish, sporothecia short occupying the middle of the lobes (*médians*) with a rather large reddish indusium.” *Fée, Fil. 8me Mém. p. 73.*

Hab. Mexico, near Cordoba and Huatusco, *Schaffner*, n. 143. — “Soft and delicate species, allied to *Pt. repandula*,* *Link, Sp. Fil. p. 56*; but in our plant the apex of the segments is strongly crenulated, while it is said of *Pt. repandula*, ‘*pinnulis integerrimis*,’ a character found in the *Pt. nemoralis*, *Willd.*”

63. *Pt. (Eupteris) paucinervata*, Fée; “fronds pinnate at the base and pinnatifid at the apex which is terminated by a long linear undulated point, rootstock (*souche*) upright with

Hab. Mexico, near Mirador, *Schaffner*, n. 152.—The author offers no comparison between this and any other *Pteris*; I am therefore ignorant of its affinities. He only further adds that "it is a species very remarkable for the blood-red-coloured petioles, the caudiform appendage which terminates the pinnules, and for the distant nervils."

(*Involucre double! inner one sometimes obsolete. Fronds coriaceous, 3-4-pinnate, erect or scandent; margin of the pinnules strongly recurved. Caudex quite subterraneous, very long, creeping. Fronds distant on the caudex.*—PTERIS, § ORNITHOPTERIS, *Ag.*; § AQUILINOPTERIDÆ, *Gaud.* ALLOSORUS, § AQUILINI, *Pr.*—Easily as the outer involucre of the *Pteris aquilina* is to be seen, even with the naked eye, the inner one, except in a peculiar state of the sorus (before it is mature), can only be brought to view by careful dissection under the microscope.* I have however satisfied myself of its existence, though I have often failed to detect it: indeed the fact appears to be ignored by the

* Its presence was detected by the late Thomas Smith, Esq., of the Temple, London, and communicated to me in 1819, in a letter which I published in the 'Flora Scotica,' and which deserves here to be recorded. He considered this inner involucre (I scarcely know upon what grounds) to be the *real* involucre. "It will be found," he says, "exactly opposite to that which is seen on the edge of the frond, and, between the two, the line of capsules is placed. It may be called the inner involucre, and much resembles the outer, having, like that, a ciliated edge; but, instead of being flat, it curls inwards, covering the capsules in their young state, and being itself covered by the outer one. It is best, perhaps, seen when the capsules are about half ripe, at which time it is nearly the same breadth as the outer one, and is readily seen by the assistance of the microscope. In texture it seems to differ a little from the outer."

"According to the principles upon which genera are formed in this Order, the inner involucre appears to afford a character which would justify the forming a new genus. I have found it in *Pt. caudata*, which is very nearly allied to *aquilina*; it also occurs in *Pt. esculenta*, and our mutual friend Brown authorizes me to say that it is found in a small group of the genus *Pteris*, the species of which agree in habit, and are mostly extratropical, differing from the tropical species in having a thicker and harder frond, and not a thin filmy one, which exists in most of the latter. It is perhaps not unworthy of remark that this involucre is never seen, except when there is fructification. The outer one, it is well known, is almost always present, whether there is fructification or not, a circumstance, I believe, which does not generally take place in a true involucre."—*Smith, in Letter, Aug. 1819.*

Since the above was sent to press, I have been favoured by my friend Mr. Wilson, of Warrington, with excellent magnified drawings of the double involucre both of *Pt. (Ornithopteris) aquilina* and *scalaris*, which will occupy Tab. CXXI. (the first plate of our Vol. III.), for they show the nature and structure better than any description of mine can do. I may add here however the following observations of Mr. Wilson:—"The interior (true?) involucre of *Pt. scalaris* is thrice as broad as that of *Pt. aquilina*, and is the more conspicuous from the narrowness of the marginal cover, and the absence of the fringe of ciliary processes; but if smaller in *Pt. aquilina*, it is almost as easily found, from its being coloured. I do not find any interior involucre in the American forms of *Pt. aquilina*, but as it does occur, though not constantly, in *Pt. esculenta*, Forster, I may on a future attempt find some traces even in them."—He has since found the inner cover to exist in several forms of the N. American *Pt. aquilina*, even in specimens on which he had not succeeded in detecting it before; "sometimes being obvious enough in one part, and in another quite obsolete."

most distinguished writers on Ferns. It is however figured by Mr. Jenner (woodcut) in Mr. Newman's 'History of British Ferns,' p. 31, and the latter author has suggested the formation of a genus under the name of *Eupteria*. I have recently, and, I am sorry to say, since the execution of the plate where a figure of the species is given, detected a double involucre in an allied species (*Pt. scalaris*, Moritz), in which the inner one is, in a certain state of the fructification, as much developed as the outer, so that I do not hesitate to consider it characteristic at least of a group of my section *Eupteria*.)

64. *Pt.* (*Ornithopteris*) *aquilina*, L. ; caudex running long and deep underground, stipites erect remote stramineous or tawny, fronds ample subdeltoid coriaceous tripinnate glabrous or hairy beneath, primary divisions long-petiolate, ultimate pinnæ sessile, pinnules spreading linear more or less approximate entire or hastate or below deeply pinnatifid sometimes to the apex, segments ovate or oblong or linear upper ones decurrent at the base the confluent portion sometimes forming a lobe or auricle, ultimate segments often elongated the margins closely reflexed more or less crenulated, veins approximate simple or forked, involucre double continuous membranaceous more or less villous or ciliated (inner one sometimes obsolete).

a. glabra ; fronds destitute of pubescence or but slightly downy beneath.—*Pt. aquilina*, *Linn. Sp. Pl. p. 1533. Sw. Syn. Fil. p. 100. Willd. Sp. Pl. v. p. 402. Ag. Sp. Gen. Pterid. p. 49. Engl. Bot. t. 1679. Allosorus aquilinus, Pr. Pt. caudata, Schkuhr, Fil. t. 95 et 96. Hook. et Arn. Bot. of Beech. Voy. p. 455 (non Linn.). Pt. recurvata, Wall. Cat. n. 113. Ag. Sp. Gen. Fil. p. 50. Pt. firma, Wall. Cat. n. 100. Pt. excelsa, Bl. En. Fil. Jav. p. 213 (fide Ag.), not Gaud. Pt. latiuscula, Desv.*

β. lanuginosa ; fronds evidently pubescent or silky-tomen-

Jacq. Collect. p. 273. Jacq. Ic. Rar. t. 645 (excellent). Sw. Syn. Fil. p. 101. Willd. Sp. Pl. v. p. 401. Ag. Sp. Gen. Pterid. p. 48.—Plum. Fil. t. 29. Sloane, Hist. Jam. i. p. 101. t. 63.

δ. esculenta; pinnules remote narrow-linear superior ones chiefly decurrent and more or less confluent, the decurrent portion forming a shallow rounded lobe or auricle (the segment of a circle), fronds generally quite glabrous.—*Pt. esculenta, Forst. Prodr. p. 79. Plant. Escul. p. 74. Sw. Syn. Fil. pp. 101 and 296. Schkuhr, Fil. t. 97. Labill. Nov. Holl. ii. p. 95. t. 244. Willd. Sp. Pl. v. p. 401. Br. Prodr. Fl. Nov. Holl. p. 154. Bl. En. Fil. Jav. p. 214. Ach. Rich. Fl. Nov. Zeal. p. 79. Endl. Prodr. Fl. Norfolk. p. 12. Ag. Sp. Gen. Fil. p. 47. Pt. aquilina, var. esculenta, Hook. fil. Fl. Nov. Zeal. ii. p. 25. Pt. semihastata, Wall. Cat. n. 102. Ag. Sp. Gen. Fil. p. 48. Pt. densa, Wall. Cat. n. 99. Pt. lorigera, Wall. Cat. n. 103. Pt. arachnoidea (rachis and costa downy beneath), Kaulf. En. Fil. p. 190. Kze. Syn. Pl. Pæp. p. 76. Ag. Sp. Gen. Fil. p. 46.**

Hab. Found, in one or other of its forms, in both hemispheres, in almost all the tropical and temperate parts of the world, in the New as well as the Old, from Lapland, in about 67° N., where it is very rare (*Wahlenberg*), to Akaroa, in New Zealand. Without repeating several stations given by Agardh, I shall offer the following from my herbarium, together with brief notices on any peculiar varieties.

α. glabra;—the common form abounds in Europe and North America and Northern Asia, where it is generally glabrous; in the Scottish Highlands, found at an elevation on the mountains of nearly 2000 feet above the sea-level, and there attaining a height of 5-6 feet in sheltered situations. Altai, *Ledebour*. Avatshka Bay, Kamtschatka, *Seemann* (pinnæ and segments, like some of the North American forms). Messina, Madeira, Cape of Good Hope, where, however, the more common form is our var. *β*; *Macgillivray* and *Milne* send specimens from Table Mountain, with small, obtuse, pinnatifid, sterile pinnules, well represented in *Schkuhr, Fil. t. 96 a*. Hongkong, *Champion*, common; with larger pinnules and segments from Chusan, *Dr. Alexander*, and South China, *Seemann, n. 2390, Beechey*. Isle of Pines, *Macgillivray, Milne*. Java, *Millett* (*Pt. excelsa, Bl.*). North America, two forms: 1, the ordinary form, Canada, *Mrs. Shepherd, Pursh*; Massachusetts, *Boott*; Kentucky, *Short*: and a larger variety, with numerous distinct and frequently entire submembranaceous pinnules, the terminal one very long and caudate, all broad; Canada, *Pursh, Mrs. Percival*; Boston, *Boott*; New Jersey, *M'Nab*; Kentucky, *Dr. Short*; New York and New Jersey, *Dr. Torrey*; New Orleans, *T. Drummond* and *Teinturier*; some of the entire and hastate pinnules and some of the terminal lobes are three inches long (*Professor Agardh* has named these in my herbarium *Pt. Nova-Angliæ, Bory, MS.*); St. Louis, Missouri, *Dr. Engelmann*. South America: Boquete, Veraguas, and Sierra

* Other synonyms might be added, if it were worth encumbering our pages with them. Presl has in this group his *Allosorus villosus, A. Hottentottus, A. Tauricus*; Fée a *Pt. villosa*, which Mr. T. Moore refers hither ("excluding *Cuming, n. 408*"), etc. etc. Mr. Moore has twenty synonyms under the European *Pt. aquilina*, without taking into account *Pt. esculenta, caudata*, etc., of authors!

Madre, *Seemann*; Guatemala, *Skinner*, common European forms; Pernambuco, Brazil, almost every pinnule regularly pinnatifid, as is so common in the var. *β*, but quite glabrous.

β. lanuginosa;—has probably a more extended range than *α*, especially in warm countries. Braemar, Scotland, *A. Croal*, in every respect (except in being less luxuriant) resembling the more common tropical form of this var.; that is, nearly all the pinnules regularly pinnatifid, and very villous beneath. Gottland, Sweden, *P. C. Afzelius* (*Pt. aquilina*, var. *pubescens*, *Afz. fil. in Herb. Nostr.*). Madeira, *Macgillivray and Milne*. Teneriffe, *Bourgeau*. Tauria, *Fischer*. Algeria, *Herb. Nostr.* Senegaambia, *Hendelot*, n. 883. Fernando Po, *Dr. Vogel*, in *Capt. Trotter's Niger Expedition*, and *Barter*, in *Baikie's Second Niger Expedition*; pinnules remote, elongated, but not entire, rachises slightly rough, and more or less shaggy with rufous woolly hair. South Africa, most abundant, received from almost every traveller in the Cape, and of various forms, generally resembling our common European *Pt. aquilina* in ramification, *Dreye* (*Pt. Capensis*, *Th.*, *a* and *c*); some, especially from *Armstrong*, quite rusty beneath, from the masses of fructification; and very compact, with close-placed pinnules and segments; Macalisberg, *Dr. Sanderson* (common form of *Pt. aquilina*). Abyssinia, northern side of mountains 8000–9000 feet elev. above the sea, near Genansa, *Schimper*, *Iter Abyssinicum*, n. 1322 (named *Pt. Capensis*, *Thunb.* = *Pt. lanuginosa*, *b*, *J. Ag.* and n. 856. India, almost universal: Madras Peninsula, *Wight*, n. 89; Cochin, *Rev. E. Johnson*, small, and very thin and membranaceous, with narrow and imperfect involucre; Mahalabeshwar, *Colonel Bates*; Nilagiri, *Hohenacker*, *Gideon Thomson*, *Dr. Schmidt*; Dindhighul (*Wallich*), n. 2178 (*Pt. Wightiana*, *Wall.*); Concan, *Law*; Khasia, *Simons*, *Hooker fil. and Thomson*, n. 561, alt. 2–3000 feet; Northern India: Sikkim, subtropical region, *Kumaon*, *T. Thomson*. Nepal and Sylhet, *Wallich*, *Cat.* n. 101; *Pt. terminalis*, *Wall.*, and n. 113 (*Pt. recurvata*, *Wall.*), *Griffith*. Gurhwal, etc., elev. 7500–9000 feet, *Major Madden*, *R. Strachey*, and *J. E. Winterbottom*. Mauritius, *Wallich*, n. 98 (*Pt. lanuginosa*), and Bory in Sieber, *Syn. Fil.* n. 76, *Gardner*, *Bojer*, *Bouton*; Bourbon (*from Herb. Mus. Par.*). Penang, *Lady Dalhousie*. Luzon, n. 100, and Isle of Bohol, n. 353, *Cuming*, *Gaud.*; Sandwich Islands, Oahu, *Seemann*, n. 1704. N.W. America, common from Cape Mendocino to Puget Sound, and in the interior of the Columbia, *Douglas*. Jamaica (*H. Shepherd*).

γ. caudata;—West Indies: St. Domingo, *Plumier*; Cuba, *Pæppig*, *E. Otto*, n. 331, *Linden*, n. 1861; Jamaica, *Wiles*, *Capt. Finlay*; Venezuela, *Fuuck and Schlim*, n. 983 (with many of the superior pinnules strongly decurrent, and bordering close upon the following var., *Pt. esculenta*), but the decurrent bases do not form lobes.

δ. esculenta;—very abundant in the southern hemisphere.—Woods of the

Macgillivray. India, apparently rare on the continent; Kumaon, *R. Blenkworth*, *Wall. Cat.* n. 103 ("Pt. *lorigera*, *Wall.*"), pinnæ and pinnules very wide apart and very obtuse. Singapore, *Wall. Cat.* n. 102 ("Pt. *semihastata*, *Wall.*"); Penang, *Wall. Cat.* n. 99 ("Pt. *densa*, *Wall.*"). Borneo, *Motley*; Indian Archipelago, *Seemann*, n. 2309.

Every one is familiar with the common Brakes (*Braken*, Scotiçè) of our hills and woods, *Pteris aquilina*, Linn., which I consider, in a more less varied form, to be found almost all over the world. The figure, by "Nature-printing," as given in 'The Ferns of Great Britain and Ireland, by Thos. Moore,' Tab. XLIV., we need not say, *accurately*, represents the normal state of a moderately sized specimen of this plant; and it will there be seen that the upper portion of the frond has the pinnules more elongated, narrow and entire, while those of the lower part are all (except those at the very apex of the pinnæ) very regularly and equally pinnatifid for the whole length. Sometimes, however, the elongated and simpler form of the pinnules is more prevalent; they are placed more apart, the terminal ones are peculiarly elongated and contracted, whence arose the *Pt. caudata* of authors; sometimes nearly the whole plant is made up of the more closely placed and more uniformly pinnatifid pinnules, and these are frequently, especially in warm countries, more or less villous or woolly beneath, and thence we have the *Pt. lanuginosa*, Bory; this is rare in, but not wanting to, the temperate parts of Europe; and, lastly, the *esculenta*-form presents, particularly in the southern hemisphere, another feature—those distantly placed and mostly terminal pinnules which have a decurrent base expand there into a lobe (the segment of a circle), forming an auricle or wing-like appendage to the rachis. With almost innumerable suites of specimens before me, there are so many intermediate grades that I find it in vain to attempt to distinguish them as species. No doubt many will be surprised to be told that our common *Brake* is the same genus and species as the famous *edible Fern* of the South Sea Islanders, but an intelligent and scientific gentleman has recently brought the esculent properties of our *Pteris aquilina* to public notice, and has himself luxuriated upon this vegetable.*

64. *Pt. (Ornithopteris) coriifolia*, Kze.; frond coriaceous glabrous shining paler beneath oblong acuminate tripinnate, pinnæ and lower and middle primary pinnules exceedingly remote (*remotissimis longe*), uppermost ones petiolate approximate at length confluent all of them patent oblong acuminate flexuose or curved, secondary pinnules (*pinellæ*) sessile divergent ovato-oblong obtuse subauriculate, lowest ones especially above abbreviated, all of them slightly pinnatifid, segments ovato-rotundate slightly crenulate beneath with elevated forked veins, the sinuses rounded, sori continuous occupying from the base to the apex of the frond, rachises and stipes short thickened at the base rufo-tomentose flexuose angular rufescent. *Kze. in Linnæa*, xviii. p. 120.

Hab. Cape of Good Hope, *Gueinzus*.—"Planta distinctissima e sectione Aghardiana *Ornithopteridis*, affinis aliquo modo *Pt. Capensis* (our *Pt. aquilina*, B.) s. *Pt. consobrinae* mæx (*Pellæa*, nobis), imprimis sterili nec vero fronde glauca et

* See Dr. Benjamin Clarke, F.L.S., "On *Pteris aquilina* as an Esculent Vegetable," in *Hook. Journ. of Bot.* vol. ix. p. 212.

opaca, sed olivaceo-viridi, subtus pallidiore et insigni modo nitidula, rachesque non eburnæ seu atro-purpureæ, validæ, sed luride rufescentes graciles."—Kunze had seen but one specimen, and it were to be wished he had been more explicit as to its distinctness from the *Pt. Capensis* of Thunberg and Schlechtendal, for the differences he mentions are in contrast with *Pellæa consobrina*, Kze.

65. *Pt. (Ornithopteris) psittacina*,* Pr.; "fronds ovate tripinnate, pinnæ subopposite, pinnules adnate lanceolate rugose ciliate, inferior ones of the lowest pinnæ incisoserrate, rachises pubescent, stipes angled."—*Pr. Delic. Prag.* 1822, p. 185. *Allosorus psittacinus*, *Pr. Tent. Pteridogr.* p. 153. *Ag. Sp. Gen. Pterid. (in note)*, p. 47.

Hab. Rio Janeiro, *Presl*.—The author places this next to *Pt. aquilina* in his 'Pteridographia,' and that is all we know of its affinities.

66. *Pt. (Ornithopteris) scalaris*, Moritz; straggling subsucculent caudex very long creeping villosopaleaceous, frond decomposed (young plants quite glutinous) repeatedly pinnate everywhere clothed with glandular viscid rufous hairs, primary pinnæ 2 feet and more long the branches flexuose intricate, but they and the subdivisions and even the pinnules distant from each other coriaceous rigid, ultimate pinnules from $\frac{1}{2}$ to an inch in length ovate subacute or deltoid-oblong sessile pinnatifid in the lower half ovate, veins sunk obsolete, involucre double, outer formed of the membranaceous dilated recurved margin of the frond continuous round the lobes and to the apex, inner membranous as large as the outer, stipes and very flexuose rachis ferruginous glanduloso-villous. (TAB. CXXI. B.;—and TAB. CXLII. C. in Vol. III.)—*Moritz, Fil. Venezuelæ*, n. 399, in *Herb. Nostr.*, name only. *Pt. glutinosa*, *J. Sm. MS.*

Hab. High mountains of Jamaica, *Wiles, Macfadyen*; Venezuela, Colony of

them with the following remarks:—"Fronds more than decomposed, forked branching. Stipes round, ferruginous, rather hispid. Segments of the fronds irregularly cut (small), round at the top, terminal lobe larger. Fructification in short lines around the margins of the lobes and teeth of the leaflets. A straggling, running, spreading rough species, found only on high mountains." I should much have preferred Mr. J. Smith's appropriate name of *glutinosa*; but the more recent one of Mr. Moritz has derived publicity from being issued with his 'Filices Venezuelae,' s. 399. I am indebted to Mr. Steetz, of Hamburg, for my specimens of this. It is a very young one (yet bearing perfect fructification), and gives no idea of the size and extent and compact and entangled flexuose branches of our Jamaica specimens. Fendler's specimen is very perfect, though small; it has, however, the advantage of possessing both stipes and caudex, and it is from the Venezuelan plant that our drawing (TAB. CXXI. B.) is made. In one instance, in our Jamaica specimens, the singularly flexuose rachis is as thick as a goose-quill. The existence of the double involucre in this species (which I did not detect till after the plate was engraved, or a magnified figure would there have been given) is confirmatory of its belonging to this *Aquilina* group of *Pteris*.

While we were only acquainted with the very obscure inner involucre of *Pt. aquilina*, we were content to let it remain in the genus *Pteris*; but now that we find in an allied species an inner involucre as fully developed as the outer one, which is really the case, it presents a character in the fructification quite at variance with *Pteris*, differing from *Lindsaea* only in this double involucre being reflected upon the back of the pinnule, consequently not opening outwardly, but towards the costa. Its natural place is with *Pteris*, where for the present I retain it, only observing that if deemed necessary to constitute a distinct genus, the name *Ornithopteris* (Ag.) seems unexceptionable.

§ HETEROPHLEBIUM.—Veins close, parallel, dichotomous, free near the costa, anastomosing only towards the margin; fronds pinnate.—Gen. HETEROPHLEBIUM, Fée. LITOBROCHIA, J. Sm. T. Moore.

Oss. *Heterophlebium* is to *Pteris* what *Hemidictyon* is to *Asplenium* in that group of Ferns, and equally deserving of constituting a distinct genus; yet Preat and J. Smith and T. Moore decline to adopt it. Preat even maintains it in *Pteris*, if his *Pt. grandifolia*, L., be really Linnæus's plant.

67. *Pt.* (*Heterophlebium*) *grandifolium*, L.; frond ample lanceolate pinnate glabrous, pinnæ sessile or nearly so numerous lanceolate elongated acuminate entire firm-membranaceous satiny especially beneath obtusely cuneate at the base, veins close parallel simple or forked below uniting and anastomosing only towards the margin, rachis and long stipes pale straw-colour. (TAB. CXIII. B.)—*Linn. Sp. Pl. p.* 1531. *Sw. Syn. Fil. p.* 95. *Willd. Sp. Pl. v. p.* 369. *Presl, Tent. Pterid. p.* 145. *Ag. Sp. Gen. Pterid. p.* 7. *Pt. vittata, Schkuhr, Fil. t.* 89? (*venation incorrect*) not *Linn. Litobrochia grandifolia, J. Sm. En. Kew Ferns, p.* 16. *T. Moore, Ind. Fil. p.* xlv. *Litobr. ampla* and *Litobr. Schiedeana, Presl, l.c. p.* 148 (*according to his definition of the group or section in which he has placed them*). *Heterophlebium grandifolium, Fée, Gen. Fil. p.* 139. *t.* 11 *A. f.* 9, 12.—*Plum. Fil. t.* 105. *Sloane, Jam. t.* 40.

Hab. Tropical America, West Indian Islands, *Swartz, Plumier, etc.* Venezuela, *Fendler, Pl. Venez. n. 96.* New Granada, *Birschel, Holton, Fl. Neogr. Magdal. n. 57.* Mexico, Ficaltepec ad Rio Nautla, *Liebmann, in Herb. Nostr.*—A very fine and very distinct species, if only the venation be attended to; in other respects it bears a close resemblance to *Pteris* (Eupteris) *Mohuccana*, supra, p. 158, and *Pt. opaca*, l. c. See our respective figures, Tab. CXII. B., Tab. CXIII. B., and Tab. CXIV. A. I am indebted to Sir Henry Barkly, while Governor of Jamaica, for a singular abnormal state of this Fern, having several of the pinnæ deeply yet unequally lobed, sometimes down to the costa, and others forked and even bifurcate, with the segments divaricated.

§ CAMPTERIA.—*The lowermost opposite costal veins (or veinlets) meeting, uniting, and forming a series of areoles ("arcs" or arches,) next the costa of the pinnæ (giving out other veinlets), the rest free, simple or forked.*—Gen. CAMPTERIA, *Pr. Tent. Pterid. t. 5. f. 19, 26. Hook. Gen. Fil. t. 264, 265 A.*

Obs. The advocates for deriving generic characters of Ferns mainly from differences in venation, are at variance respecting the genus *Campteria*. Preal and Moore consider it, in the Pterideous group, to be analogous to *Hemistegia* among *Cyathææ*, *Pleocnemia* among *Aspidiææ*, *Digrammaria* among *Asplenicææ*, etc. : and so far they are consistent. Mr. J. Smith and M. Péc on the other hand unite it with *Litobrochia*, the former without even making a section of it, the latter considering it a subgenus. As defined by the author (Presl), the series of arched veins are confined to the costa or midrib of the pinnæ, not extending to the costa or main central vein or costules of the segments (see his figures in *Tent. Pterid. t. 5. f. 19 and 26*);—but in some species of our *Pteris* similar areoles or arches exist also in the costules of the segments while the other veins are free. Such we have referred to our § *Litobrochia*. The character indeed here taken from the veins is wholly artificial; it is unaccompanied by any other peculiarity of form or structure, inasmuch that the most able botanists have, till the venation was considered, been at a loss to distinguish between *Pteris nemoralis* and *Pt. biaurita* and *Pt. quadrifurcata*: nay, it will be seen that our very first species of this section has the veins in question, which should be united to form a *Campteria*, sometimes also free in one and the same specimen. (See too our remarks under § *Litobrochia*.)

(*Pinnate, with the lower pinnæ bifid and even again pinnate or bipinnate; pinnules pinnatifid.*)

68. *Pt. (Campteria) nemoralis*, Willd.; fronds generally

Willd. En. p. 462. Pt. biaurita, Kze. Acotyl. Afr. Austr. p. 436, et var. edentula, Kze. Syn. Pæpp. p. 75 (Ag.). *Campteria Rottleriana, Presl, Tent. Pterid. p. 147. t. 5. f. 26.*

Hab. Agardh gives "East India, China, Ceylon, Bourbon, Guinea, Congo (*Ch. Smith*), Cayenne, Brazil," etc., as localities. My own herbarium only exhibits specimens from E. India, *Wallich*, 1820, mixed with undoubted *Pt. quadriaurita*. Bourbon, *Capt. Carmichael* (named by Agardh); China, Macao, *Rev. G. H. Vachell* (named by Ag.); Ceylon, *Gardner*, n. 1331 (frond 2 feet long, more coriaceous substance opaque dark brown almost black when dry); Sierra Leone, *Barter, in Baikie's 2nd Niger Exped.* (1857); one specimen, gathered at the same time and place, has the lower pinnæ pinnate and bipinnate.—Thanks to the investigations of Professor Agardh in the genus *Pteris*, he has thrown much light on the vexed question of the identity of *Pt. quadriaurita*, Retz, *Pt. nemoralis*, Willd., and *Pt. biaurita*, L. All three are liable to similar variations as to size, and the composition of the lower ramifications or pinnæ,—yet all have the same uniform aspect and general outline; and, as far as has been possible, he has consulted authentic specimens in their determination. The result is that *Pt. quadriaurita* has entirely free venation (§ *Eupteria*); *Pt. nemoralis** vacillates between sections *Eupteria* and *Campteria*, having on the same plant partly the free venation of one, and partly the united basal veins on the segments of the other: and here I must leave it to others to determine how far it deserves the rank of a species; and if not, whether it should be transferred to *Pt. quadriaurita* or to the *Pt. biaurita*, which latter has the perfect venation of *Campteria*, and which we shall consider under our next number.

Agardh has described the present species to be equally widely diffused with *Pt. biaurita*: but at the time he was engaged upon his 'Recensio Specierum Pteridis' he was only able to find in my herbarium two samples, which he named *nemoralis*, and I have since only been able to add two more localities.

69. *Pt. (Campteria) biaurita, L.*; fronds generally ample subcoriaceo-membranaceous pedately ovate pinnate, pinnæ sessile lanceolate acuminate lowest pair bi-tripartite or again pinnate mostly downwards, all the pinnæ deeply pinnatifid (leaving however a broad wing on each side the costa), segments oblong or linear-oblong obtuse entire scarcely falcate, basal veins uniting in pairs into an arch below the sinus and then bearing 4-6 or 8 simple veinlets which extend to the margin at or above the sinus, stipes and rachises stramineous smooth.—"*Pt. biaurita, Linn. Sp. Pl. p. 1534, nec Sw. (Ag.) Willd. Sp. Pl. v. p. 386, in part. Bl. En. Pl. Jav. p. 210. Belang. Voy. p. 42. Wall. Cat. n. 100, in part*

* Agardh's observations upon the *Pt. nemoralis*, Willd., deserve to be here recorded:—"A sequente (*Pt. biaurita*) nonnisi venarum structura differre videtur. Venæ basales nunc omnino discretæ et ad ipsum sinum excurrentes, nunc ex laciniis adjacentibus infra sinum obviæ, et ramis furcæ inferioribus sese *tangentibus vel immo in unum coalescentibus, arcum*, minus tamen quam in sequente specie, regularem, formantes."

(*fide spec. in Hb. Soc. Linn.*)” *Ag. Sp. Gen. Pterid. p. 26.* *Campteria biaurita*, *Hook. Gen. Fil. t. 75 A.* *C. Rottleriana*, *Presl, Pterid. t. 5. p. 26?* *Pteris geminata*, *Ag. Sp. Gen. Pterid. p. 31.* *Pt. Kleiniana*, *Presl, Tent. Pterid. t. 5. f. 19 (Agardh).*—*Plum. Amer. t. 14. Fil. t. 15.*

Hab. The following localities are entirely from our own herbarium. East Indies: Kumaon, *Blinkworth, Strachey and Winterbottom*; Nepal, *Wallich, J. D. Hooker*; Sikkim, 1–4000 ft., *J. D. H.*; Assam, *Griffith*; Khasia, *Griffith*, 2000 ft., *J. D. H.*; Silhet and Chittagong, *Hooker, Thomson, and Griffith*; (*Dr. Hooker and Dr. Thomson's specimens distributed are n. 148–9.*) Ava and Penang, *Wallich*; Concan, *Mr. Law*; Nilgiri, *Gid. Thomson, M' Ivor*. Ceylon, *Gardner*, n. 1130, 1240, 1128. Bourbon (*Herb. Mus. Par.*); Mauritius, *Bojer*; Java, *Millet*; Tropical Western Africa, *Dr. Curror*; Fernando Po, *Dr. Vogel*. West Indies: Antigua, *Dr. Nicholson*, segments narrow distant; Guadaloupe, *L'Herminier*. Brazil, Arayos, *Gardner*, n. 4076.—Specimens entirely according with the character of this species, I possess, as will be seen above, from much more numerous localities and countries than the preceding one. Its essential character consists in the chain or series of areoles, more or less broad, sometimes very narrow, one between every pair of costules (or midrib of the segments), caused by the meeting of the two basal or inferior veins, forming an arch more or less angled, and which gives out free veinlets or branchlets from the upper side, while the opposite boundary of the areole is formed by the costa. In general the two basal veins spring from the axis or sinus formed by the costule, so that the whole space between the base of the costules is occupied by the areole, but at other times one of the two nerves springs from the costa at a distance from the sinus; then the areole occupies only $\frac{1}{4}$ or $\frac{2}{3}$ of the space between the costules. All the other veins are generally free, rarely and only here and there anastomosing; in such cases indicating a passage to *Litobrochia*. Equally rare is it to find the basal veins free, though not unfrequently they unite in such a manner as to form a very acute angle rather than the curvature of an arch.—Both in this and the preceding species we have, like Agardh, felt it impossible to guess at what authors in general have intended by *Pteris biaurita*.

70. *Pt. (Campteria) Galeotti*, Fée; “fronds pinnated bipartite at the base glabrous, pinnules pinnatipartite pectinated shortly petiolated caudiform at the apex, segments oblong numerous almost all fertile leaving between sinuses which

Hab. Shady places, mountains of Java, *Blume*.—"A *Pt. baurita*, L., differt lacinia serratis intermediis acutis." *Bl.*—Agardh questions if it should not be referred to *Pt. quadriaurita*;—and then it would be of the § *Eupteria*.

72. *Pt.* (Campteria?) *atrovirens*, Willd.; fronds pinnate, pinnæ subopposite pinnatifid, segments oblong obtuse unequally toothed at the apex, lowest pinnæ bipartite, stipes smooth," *Willd. Sp. Pl. v. p. 385.*—*Ag. Sp. Gen. Pterid. p. 28, in note.*

Hab. Oware and Benin, western tropical Africa, *Dr. Flüge*.—"Resembling *Pt. baurita*, but the frond is thicker, more rigid, black-green," and, I think, may safely be referred to *Pt. baurita*, a very common species in Western Africa.

73. *Pt.* (Campteria?) *armata*, Pr.; "fronds cordato-ovate glabrous glaucescent pinnate, pinnæ opposite sessile pinnatifid lowest ones bipartite, segments linear obtuse entire unequal, terminal one elongated repand, secondary rachises and costa above spinose, stipes smooth," *Presl, Reliq. Hænk. p. 56.*—*Ag. Sp. Gen. Pterid. p. 29, in note.*

Hab. Island of Sorzogon, *Hænke*.—"A *Pt. pungente diversissima*," *Pr.*—Probably this should be referred to the free-veined *Pterides*, and perhaps to *Pt. quadriaurita*.

(*Tri-quadripinnate; primary ramifications ternate.*)

74. *Pt.* (Campteria) *triplicata*, Ag.; frond bi-tripinnate 1-2 feet long firm-membranaceous, pinnæ ternate and as well as the pinnules long-petiolate, pinnules almost a span long deeply pinnatifid, segments oblong very obtuse or retuse coarsely serrated where sterile, veins forked basal ones united and forming an angular arch between the costules, sori narrow continued to the very apex, stipes channelled smooth.—*Ag. Sp. Gen. Pterid. p. 29.*

Hab. Madagascar, *Goudot, Bernier*; Mozambique, "*Forbes, in Herb. Hook.*"—A very distinct and remarkable species, especially in the disposition of the primary pinnæ to ramify in a ternate manner; the pinnæ and pinnules are long-petiolate. The longest pinnules are nearly a span long; all are lanceolate, pinnatifid, with an elongate terminal segment, serrated where destitute of fructification. The lateral segments or lobes are an inch and a quarter long, $\frac{1}{4}$ of an inch broad, singularly obtuse or even retuse. The sori are copious on almost every segment and extending to the apex. The involucre is of a firm texture, very narrow, dark brown.

75. *Pt.* (Campteria) *Pseudolonchitis*, Bory; "fronds bipinnate, lowest pinnæ bipartite and as well as the pinnules pinnato-partite, segments serrated, those of the pinnæ lanceolate acuminate, of the pinnules oblong obtuse, primary veins monarculate, secondary ones and veinlets all forked," *Ag.*—*Bory, MSS. Willd. Sp. Pl. p. 389. Poir. Encycl. Méthod.*

iv. p. 605. *Bélang. Voy. p. 43. Ag. Sp. Gen. Pterid. p. 39.*
Campteria Pseudolonchitis, Presl, Tent. Pterid. p. 147.

Hab. Bourbon, *Bory*; Madagascar, *Goudot (Bory)*.—"Stipes glabrous. Fronds 2 feet long, bipinnate. Lowest pinnæ bipartite, the next above 3-4-pinnulate; upper ones and pinnules sessile or adnate, 3-7 inches long, an inch broad, pinnato-partite. More adult or terminal segments of the pinnæ lanceolate, sub-decurrenly confluent; younger ones or those of the pinnules more oblong or obtuse. Basal veins all meeting so as to form arches between the costules; secondary ones and veinlets forked or simple, free," *Ag.*—*Agardh*, who has given his description from authentic specimens, places this species between *Pt. Crassus*, *Bory*, and *Pt. tremula*, *Br.*, both of the section *Eupteris*; but as the venation is clearly that of a *Campteria* with compound fronds, I venture to place it here.

76. *Pt. (Campteria) Wallichiana, Ag.*; frond ample glabrous submembranaceous 3-partite, lateral branches compoundly divided terminal one elongated pinnated, pinnæ numerous sessile 4-6 inches long linear-lanceolate acuminate deeply pinnatifid, segments linear-lanceolate obtuse, sterile ones serrulate all approximate about $\frac{1}{2}$ an inch long, basal veins monarculate the rest free and forked rarely a solitary areole at the base of the costule, stipes very long 5-6 feet stout rich castaneous and as well as the paler-coloured rachises very smooth and glossy.—*Ag. Sp. Gen. Pterid. p. 69.* *Pt. umbrosa, Wall. Cat. n. 109 (not of Br.)*. *Pt. pellucens, Ag. Sp. Gen. Pterid. p. 43?* *Pt. connexa, J. Sm. Fil. Philip. in Hook. Bot. Journ. iii. p. 405 (name only)*. *Pt. pectinata, Don, Prodr. Fl. Nepal. p. 15?* (*Agardh* refers to this *Pt. aspericaulis*, *Wall.*, which is however a slight var. of *Pt. quadriaurita*).

Hab. East Indies: Kumaon, *Blinkworth*, in *Wall. Cat. n. 109 (Herb. Nostr.)*, *Strachey and Winterbottom*; N. W. India, *Edgeworth*; Gurhwal, *T. Thomson (n. 1256)*; Sikkim, *Hooker and Thomson, n. 146 a*, and *150 b*; Khasia, *Hooker*

chis rufescent channelled beneath glabrous, pinnules very long-petiolate subpinnate caudate pectinated, segments horizontal divided to the costa linear thick crenulate obtuse repand the sinus broad the apex sterile the base dilated, basal areoles very narrow difficult to be seen indicated at the mesoneure by a rima, sporothecia thick, indusium rather broad, the margin receptaculiform, sporangia ovate on a slender pedicel, annulus 16-18 joints trigonous blackish."—*Litobrochia* (*Campteria*) *Gardneri*, *Fée, Gen. Fil. p.* 139.

Hab. Ceylon, *Gardner, n.* 42 (*Herb. Mong.*).—"Large Fern; stipes and rachis reddish; pinnæ very long, remote."

§ *LITOBROCHIA*.—*Veins uniformly anastomosing, or the areoles, in one or more series, are confined to the costa and costules, the rest of the venation being simple or forked; rarely all are free. Areoles inappendiculate.*—*Gen. LITOBROCHIA, Presl, Tent. Pterid. p.* 148. *t.* 5. *f.* 20, 24, 25. (*Hook. GEN. FIL. TAB. LXV. B.*)

Obs. The genus *Litobrochia* is defined by its author, Presl, as having "venæ in maculas hexagonoideas elongatas vel breves anastomosantes." His first section, however, has the anastomosing venation confined to the margin, constituting the Genus *Heterophlebium* of Fée. On the other hand, M. Fée admits into *Litobrochia Campteria* of Presl, which has the basal veins united, the rest free. We shall find, in our present section, that one well-known species (*Pt. incisa*, Th.) unites in itself three kinds of venation, that of true *Pteris*, of *Campteria*, and *Litobrochia*; and other species, alluded to above, present quite intermediate characters:—so that they do not always serve for specific distinction.

(*Fronds simple (undivided), hastate or sagittate or more or less pedate; stipites black-ebeneous, cæspitose, except in Pt. ludens, where they arise from a creeping caudex.*—*Gen. DORYOPTERIS, J. Sm.; Fée.*—Small coriaceous Ferns, with immersed veins scarcely visible except in very young fronds; with ebeneous stipites. They represent, in *Pteris*, the *Pellæa geraniifolia* and its allies (*fronds more or less pedate*) among the *Pellææ*. Here however there are species with simple fronds or only slightly divided at the base, but in a more or less pedate manner.)

78. *Pt. (Litobrochia) sagittifolia, Raddi*; caudex short thick erect or inclined, fronds fasciculate firm coriaceous a span to a foot long lanceolato-sagittate or hastate acuminate, the deflexed or patent lobes undivided or unequally bipartite, veins everywhere anastomosing with oblong areoles obliquely arranged, sori narrow continuous, stipes and the costa beneath black-ebeneous.

a. sagittata; lobes deflexed undivided.—*Pt. sagittifolia, Raddi, Syn. Fil. Brasil. n.* 106. *Fil. Brasil. p.* 43. *t.* 63. *f.* 1. *Hook. Fil. Exot. t.* 39. *Litobrochia sagittifolia, Pr. Tent. Pterid. p.* 148. *Doryopteris sagittifolia, J. Sm. Cat. Kew Ferns, p.* 4; *Cat. Cult. Ferns, p.* 35. *Fée, Gen. Fil.* 133.

β. hastata; lobes patent undivided or unequally bipartite.—*Pteris hastata*, *Raddi, Fil. Brasil. p. 43. t. 63. f. 2. Hook. Gen. Fil. t. 65 B. f. 1 (bipartite lobe only represented, nat. size)*.

Hab. Brazil, woods in the Mandioca Mountains (both varieties), *Raddi*; Rio, *Burchell, n. 2051, Gardner, n. 36*.—Var. *β*. Rocks, in shady woods, in the Organ Mountains, *Gardner, n. 150 and 151*.—This would seem to be rather a scarce species, judging from the comparatively few specimens we have received: and all are from the vicinity of Rio or from the Organ Mountains. The fronds are from 4 inches to a foot long; the lobes at the base are liable to considerable variation, sometimes deflexed and sagittate, sometimes patent and hastate. In one of our specimens the patent lobes at the base have a slight curvature upwards, are nearly as long as the main portion of the fronds, and are bipartite, the additional lobe (half its size) is strictly deflected so as to be parallel with the stipes.

79. *Pt. (Litobrochia) pedata*, L.; caudex short thick erect or declined copiously rooting, fronds fasciculate when mature coriaceous opaque cordate tripartito-pedate, lateral primary divisions bipartite on the inferior side or on both sides pinnatifid, terminal one pinnatifid generally cuneate and narrowed at the base, the segments with entire lobes or again pinnatifid, ultimate ones oblong with more or less acute sinuses, the margin of the sterile plant crenulated, sori continuous, involucre narrow entire, veins everywhere anastomosing so as to form a network of oblong hexagonal areoles, stipes terete ebony-black hispid at the base.—*Linn. Sp. Pl. p. 1532. Sw. Syn. Fil. p. 105. Langsd. et Fisch. Ic. Fil. p. 12 et 20. Willd. Sp. Pl. p. 358. Schkh. Fil. p. 91. t. 100. Raddi, Fil. t. 65. f. 3. t. 66 and 66 b. Br. Prodr. Nov. Holl. p. 155. Hook. Bot. Mag. t. 3247, and Fil. Exot. t. 34. Pt. palmata, Willd. Sp. Pl. v. p. 357. Pt. collina, Raddi, Fil. Bras. p. 44. t. 65. f. 1, 2. Pt. varians, Raddi, l. c. t. 64. Pt. Mysurensis, Wall. Cat. n. 874. Pt. polytoma, Kze in*

Granada, *Holton* (Ocaña, elev. 4000 ft.), *Schlim*, *E. Otto*, *Purdie* (*large specimens*). Venezuela, *Fendler*, n. 91. Galapagos, *Cuming*, n. 107, *Capt. Wood*, *R.N.*, East Indies, Mountains of Dindighul (*ex Herb. Wight*), included in *Wall. Cat.* n. 87/4, and mixed with *Pellæa geraniifolia*; Nilghiri, *Rev. E. Johnson*. Tropical New Holland, *Brown*.—A well-known and very variable Fern, and so closely allied in form and general appearance to the more compound state of *Pellæa geraniifolia* that the two can hardly with certainty be distinguished without recourse to the venation, and that is often difficult, from its being immersed, and from the thick and very opaque nature of the perfect fronds. Raddi has given good figures of several of the varieties of *Pt. pedata*, and many more might be adduced. Indeed they are of every intermediate grade, from cordate or ovato-cordate, quite undivided, some with the two lobes at the base, to three-lobed, almost regularly five-lobed, with the lobes acute or acuminate, and entire or more or less deeply tripartite, having the two lateral divisions bipartite (so as to take a pedate form, with the intermediate or terminal division three- or five-lobed), till at length we come to the more compound state considered to constitute the *Pt. pedata* of Linnæus, while the less divided is the *Pt. palmata* of Willdenow. In the former state, the terminal or intermediate primary lobe or division is usually narrowed and cuneate at its base. When its base is broader and more gradually decurrent with the lateral lobes, with a broader and more rounded sinus, it then becomes the *P. varians* of Raddi (t. 64), from which the *Pt. collina*, Raddi (t. 65. f. 1), cannot be distinguished. The ultimate lobes, or segments, vary extremely in length and breadth, as the fronds themselves do in size. One of our specimens from Rio (*Gardner*, n. 37) measures 12 inches in the breadth and 10 inches in the length of the frond, and the ultimate lobes are from an inch to an inch and a half in diameter.

80. *Pt. (Litobrochia) decipiens*, Hook.; caudex short thick ascending, fronds fasciculate subcoriaceous opaque pedately cordate in circumscription ternately divided quite to the rachis all the divisions deeply bipinnatifid, the primary segments lanceolate subfalcate acuminate, those of the terminal division opposite cuneately decurrent at the base and there entire (not lobed), those on the lowest side longer than those on the superior side and more divided, ultimate segments triangular-oblong obtuse, sori continuous, veins uniting and anastomosing so as to form large lax oblong areoles and arcs next the costa, stipes hispid at the base and as well as the rachises black-ebeneous.—*Pt. pedata*, *Hook. and Arn. in Bot. of Beech. Voy. p. 107 (excl. the synonyms)*. *Doryopteris pedata*, *Brackenridge, in Fil. U. S. Expl. Exp. p. 403 (as far only as the specimens from the "Sandwich Islands" are concerned)*. *Pteris Beecheyana, Nobis, MSS., and noticed under Pellæa geraniifolia, supra, p. 133.*

Hab. Oahu, Sandwich Islands, *Lay and Collie, in Beechey's Voy., Seemann in the Voy. of the Herald, Brackenridge*.—This I had at one time believed to be identical with *Pellæa geraniifolia*, so exactly does it resemble it in habit and composition; and then, finding it to have unquestionably anastomosing

veins, Dr. Arnott and myself referred it to the *Pteris pedata*; but lately additional specimens from the same locality (Oahu) have led to a more accurate investigation, and to the opinion that it is distinct, from all the varieties of *Pt.* (*Litobrochia*) *pedata*, by the more compound nature of its frond (always tripinnatifid with numerous segments), as it is from *Pellaea geraniifolia* in the reticulated venation. In all probability, Mr. Brackenridge's *Doryopteris pedata*, from the "Sandwich Islands," is our plant; and hence, in his remarks upon it, he says, "some states of *P. geraniifolia*, Raddi (which has a forked free venation), might readily be mistaken for it when not carefully examined."

81. *Pt.* (*Litobrochia*) *decora*, Brackenr.; "cæspitose, stipites smooth semiterete paleaceo-hirsute at the base, fronds glabrous broadly ovate cordate at the base pinnated pinnatifid towards the apex, pinnæ pinnati-partite, segments linear obtuse angled at the sinus, sori subcontinuous."—*Doryopteris decora*, Brackenr. *Fil. U. S. Expl. Exped. p.* 103. *t.* 13. *f.* 1.

Hab. Sandwich Islands, in exposed situations, in crevices of rocks, and among decomposed lava.—"Three to ten inches high: rootstock short, thick, squamose. Pinnæ opposite, of three or four pairs, spreading, deeply pinnatifid. Segments (remote) 1 to 1½ inch long, about two lines broad, linear, obtuse, the lower and inferior one often again divided. Veins very slender and usually evident to the naked eye, forming long, very oblique, angular areoles."—The figure of this represents something very different from this group of *Pteris*, and quite unknown to me: and the author remarks, "Although the fronds are not strictly pedate, yet they may be said to resemble, in many respects, some forms of *Doryopteris pedata*; but its much smaller size, deeper divided and less coriaceous fronds, the narrower and more uniform size of the segments, the sori interrupted in the sinus, together with the paler stipes, readily distinguish it from that species."—It is quite different from our preceding species (*Pt. decipiens*, Hook.), which is equally a native of the Sandwich Islands.

82. *Pt.* (*Litobrochia*) *ludens*, Wall.; caudex long creeping branched thicker than a crow's quill scaly throwing out copious woolly fibrous roots, fronds remote on the caudex long-stipitate coriaceous opaque pale beneath triangulari-subhastate and undivided, or hastately 5-lobed or deeply 3-lobed or 3-partite and

Though belonging to the same group as *Pt. pedata*, and in many respects resembling that species, it is truly and perfectly distinct; equally variable in the form of its fronds, and equally difficult with it to be distinguished in a few words. The caudex indeed would alone afford an excellent character; it is here long, slender, creeping, and branched, with no common point of origin for the fronds; these latter therefore are not fasciculate, but rise solitary from different and distant parts of the caudex. The stipes is rather stout, intensely black and glossy, short (4-6 inches) when bearing the nearly undivided fronds; elongated (14-18 inches) with the more divided and fertile ones: so that it would appear that much of the variation in form is due to the more or less developed state of the plant. In size the fronds are from 2-6 or 8 inches long; in shape, triangular-cordate and quite entire, oblong or hastate, or hastate with the basal lobes bifid: all these are very obtuse; triangular-hastate with the lobes acute, cordato-pedate, deeply trifid or tripartite, each portion three-lobed acuminate, the central (or terminal) portion with the lobes equal, the lateral ones with the lobes on the lower side only,—finally, in the most perfect state, deeply pedately tripartite, each with about three narrow linear-lanceolate segments bordered all round and almost to the apices with the dark-brown continuous sori.

(*Fronds pinnate or bi- and even tri-pinnate. Pinnules free and entire, never pinnatifid, subpetiolulate.*)

83. *Pt. (Litobrochia) splendens*, Klfs.; frond ample pinnated firm-membranaceous dark blackish-green and satiny when dry, pinnæ a span to nearly a foot long often opposite broad-lanceolate finely acuminate serrated at the apex, terminal one sessile its base confluent with the base of the one beneath, lower pinnæ on rather short petioles, veins prominent uniformly anastomosing into sexangular oval or oblong areoles which are placed in almost horizontally patent series, sori rather narrow continuous, involucre very narrow, stipes and rachis slightly asperous.—*Kaulf. En. Fil. p. 186. Ag. Sp. Gen. Pterid. p. 54. Litobrochia splendens, Presl, Tent. Pterid. p. 149.*

Hab. In woods, Brazil, *Chamisso, Freyreis, Beyrich, Sellow (in Herb. Nostr.)*; Organ Mountains, n. 149, and Arrial das Minas, n. 5300, *Gardner*.—Entire fronds of this Fern must have a splendid appearance, judging from the portions sent to us by Mr. Gardner and from the size of the pinnæ, of which our largest is more than 10 inches long: the texture is firm-membranaceous, the surface satiny, the reticulations prominent and quite conspicuous to the naked eye.

84. *Pt. (Litobrochia) chrysodioides*, Fée; “fronds glabrous pinnated, stipites furrowed above, frondules (*pinnæ*) lanceolate incurved shortly petiolate obtuse rotundato-cuneate at the base, nervils sculpturate hexagonoid, mesoneure robust, sporothecia universal, indusium broadish, sporangia elliptical shortly pedicellate, annulus broad 18-20-articulate, spores thick trigonous heteromorphous.”—*Litobrochia chrysodioides, Fée, Gen. Fil. p. 136.*

Hab. "South America" (Fée).—"Felix siccitate subtus lucida, facie *Chrysoidi sculpturati*."—Unknown to me, but much of the character corresponds with our previous species.

85. Pt. (*Litobrochia*) *papyracea*, Fée; "fronds pinnate bipinnate at the base alternate very glabrous, rachis deeply channelled, frondules lanceolate acuminate serrated at the apex acute at the base papyraceous when dry, pellucid membranaceous glossy, petiole and mesoneure channelled beneath, nervils forming hexagonoid unequal areoles (costal ones broad, marginal ones narrow), sporothecia very narrow continuous, indusia with the consistence and colour of the lamina, receptacle thick brown, sporangia ovate, annulus 16-18-articulate, spores blackish."—*Litobrochia papyracea*, Fée, *Gen. Pterid.* p. 136.

Hab. "South America, Gardner.—Felix elata papyracea, frondulis remotis exacte lanceolatis acuminatis."—As a plant of Mr. Gardner's it must have been gathered in Brazil, the only part of South America visited by him. But though a full series of his collections have come to us, we find no bipinnated *Litobrochia* corresponding with the above description.

86. Pt. (*Litobrochia*) *lanceæfolia*, Ag.; frond pinnate submembranaceous, pinnæ linear-lanceolate shortly petiolate finally acuminate entire, veins scarce prominent anastomosing and forming subhexagonal areoles of which a series lies close to and parallel with the costa having an obliquely patent direction towards the margin, sori very narrow continuous or only interrupted towards the apex, rachis glabrous brownish.—*Ag. Spec. Gen. Pterid.* p. 63.

Hab. Interior of Madagascar, Bojer, in *Herb. Nostr.*—Two specimens only are before me, both wanting the stipes, so that it is possible the species may be bipinnate, but it is more probably allied to the Brazilian *Pt. splendens*, Kfz., and simply pinnate. Our largest specimen is 16 inches long; pinnæ 5-7 inches long.

nearly horizontally patent, sori continuous on almost every pinnule moderately broad, involucre very narrow, stipes and rachis glabrous tawny.—*Schlecht. Fil. Mex. in Linnæa*, v. p. 614. *Lieb. Fil. Mex.* p. 79. *Pt. grandifolia*, *Mart. and Gal. Fil. Mex.* p. 52 (not Willd.). *Litobrochia Mexicana*, *Fée, Gen. Fil.* p. 136.

Hab. Mexico; between Mazatlan and Colipa, *Schiede and Deppe*; Sta. Maria, Tlapacoyo, *Liedmann*; Oaxaca, elev. 5000 ft., *Galeotti*, n. 6376. Sierra San Pedro Nolasco, Talea, etc., *Jurgensen*, n. 871 and 715. Tapilula and San Bartolo, Chiapas, *Linden*, n. 1521.—A species clearly allied to the following, *Pt. Hænkeana*, but quite distinct. Pinnules much smaller, narrower in proportion to their length, serrated only (and not spinulosely) at the apex, and, in all my numerous specimens, not only always sessile, but the lower margin is alato-decurrent.

88. *Pt.* (*Litobrochia*) *Hænkeana*, Pr.; frond bipinnate subcoriaceous, pinnules oblong-lanceolate finely acuminate cuneate at the base more or less petiolulate the margins spinulose-serrate, veins sunk everywhere anastomosing, the longest and broadest areoles forming a series next the costa the rest lie in series of narrow-oblong or linear areoles horizontally patent smallest next the margin, sori rather broad continuous, involucre very narrow, stipes elongated and rachises pale-brown, caudex thick elongated horizontal clothed with appressed rigid subulate scales.—*Pteris Hænkeana*, *Pr. Reliq. Hænk.* p. 55. *Ag. Sp. Gen. Pterid.* p. 54. *Litobrochia Hænkeana*, *Presl, Tent. Pterid.* p. 149. t. 5. f. 24. *Pteris ampla*, *Kze. Syn. Pl. Crypt. Pæpp. in Linnæa*, p. 74.

Hab. Peru, Pampayaco, *Pæppig in Herb. Nostr.*; Carrapi, *Mathews*, n. 1803. New Granada, Ocaña, *Purdie, Linden*, n. 1028, *Schlim*, n. 644 and n. 597, elev. 5-7000 ft.; Woods, Antonio, Nevada di Sta. Martha, *Purdie*.—This is a noble species, of which our smallest entire specimen is three feet long. The pinnules are often a span and 10 inches long, and 1½ inch wide.

(Pinnules small, coriaceous, entire.—Pellæoidæ.)

89. *Pt.* (*Litobrochia*) *Burkeana*, Hook.; caudex very short thick erect chaffy at the apex with tawny scales, roots wiry, fronds fasciculate (small) ovate coriaceous opaque glabrous pinnate below bipinnate with three to five pinnules, pinnæ of the upper portion and pinnules of the lower pinnæ articulated on short black petiolules mostly opposite oblong-elliptical or oblong-lanceolate obtuse one to two inches long, veins immersed anastomosing, areoles oblong obliquely arranged, sori narrow continuous to the very apex, involucre membranaceous, stipes and rachis (villous on one side) and

base of the costa beneath intensely black-ebeneous. (TAB. CXXVI. B.).

Hab. S. Africa, Macalisberg, *Burke*.—This has quite the habit of *Pellea*, especially of the N. American *P. atro-purpurea*, and *Pellea Boivini* (Nobis, supra, p. 147, Tab. CXVIII. A.); but besides other characters, this has the anastomosing venation of *Litobrochia*, among which it will naturally rank with *Pt. articulata*, our next species, but with no other known to me; and from that it is abundantly specifically distinct.

90. *Pt. (Litobrochia) articulata*, Klfs.; fronds (about a foot long) deltoid pinnate below horizontally bi- and even tri-pinnate subcoriaceous glabrous ferruginous beneath when dry, pinnæ of the upper portion and pinnules of the lower (all articulated upon short petioles) 1-2 inches long from a broad mostly cordate base ovate or lanceolate rather obtuse distant, veins anastomosing with oblong obliquely arranged areoles generally free and forked at the margin, sori continuous broad, involucre narrow membranaceous, stipes (longer than the frond) and the rachis fulvo-hirsute on one side and the petiolules intensely black-ebeneous. (TAB. CXXVI. A.)—*Pteris articulata*, *Kaulf. in Sieber Syn. Fil. Exsicc. Maurit. n. 77 (Herb. Nostr.)*. *Spreng. Syst. Veget. iv. 76. Bojer, Hort. Maurit. 402. Litobrochia articulata, Presl, Tent. Pterid. p. 149. Doryopteris articulata, Fée, Gen. Fil. p. 133.*

Hab. Mauritius, *Sieber*; arid, rocky places, Cascade of Reduit and that of Tamarin, *Bojer*. Bourbon, *Carmichael*. Madagascar, rocks on the ground at the Chute d'eau d'Ouwilave, Rivière Divoudrou (*Herb. Nostr.*).—With the same general ramification and arrangement of pinnules, and the same ebeneous stipes and rachis as our last species (*Pt. Burkeana*), this is nevertheless a very distinct and remarkable Fern. The frond is deltoid, the primary ramifications opposite and horizontal or nearly so; the pinnules spread at right-angles from the rachises, and are articulated upon little black petiolules, which, when the pinnule has separated after maturity, exhibits a small concave disc at the summit. In the ebeneous stipes this (as well as *Pt. Burkeana*) resembles our first or pedate sub-

thick rooting, fronds deltoid-ovate 1-2 feet long firm-membranaceous dark green bipinnate, pinnæ generally opposite broad-lanceolate (especially the sterile ones) lowest pair chiefly compound pinnatifid with the lowest inferior pinnæ distinct simple or bipartite the rest undivided or pinnatifid on the lower side, uppermost more or less confluent and decurrent but not forming a narrow wing to the rachis, areoles large next the rachis few between them and the margin, sterile pinnæ and apices of the fertile ones spinuloso-serrated, stipites and rachis greenish-brown (in Sellow's specimens pale straw-colour).—*Raddi, Syn. Fil. n. 111. Fil. Brasil. p. 47. t. 68 and 68 bis. Ag. Sp. Gen. Fil. p. 55. Litobrochia Brasiliensis, Pr.*

Hab. Brazil, extremely common, judging from the copious specimens we have received thence, and from that country alone. About Rio, *Raddi*, and all subsequent botanists; *Gardner*, n. 35 (all the pinnæ deeply pinnatifid) and n. 34, etc. South Brazil, *Sellow*; Porto Alegre, Rio Grande, *Mr. Fox* (exhibiting much affinity with *Pt. denticulata*); Ilhios (*Moricand*), San Castaño, Minas Geraes, *Gardner* (possibly *Pt. denticulata*). *Mr. Boog* (no exact locality) sends specimens with the lowest pinnæ almost a foot long, deeply pinnatifid (the lowest segments only free), with eleven large alternate lanceolate segments 4-5 inches long; and *Mr. Gardner*, from Minas Geraes (n. 5670) what appears to be an inferior pinna of this species 1½ foot long, pinnatifid, with nineteen opposite decurrently confluent segments, one of which is 9 inches long, the apices scarcely serrated.—A most variable plant, independent of its disposition to unite with the following species. The larger specimens are more than 3 feet long, including the stipes, and are very handsome.

92. *Pt. (Litobrochia) denticulata, Sw.*; caudex very short scarcely any copiously rooting, fronds fasciculate long-stipitate a span to a foot long deltoideo-ovate membranaceous, pinnæ 7-13 remote decurrent into a long narrow wing on the rachis narrow-lanceolate acuminate tapering at the base, superior ones undivided and confluent the rest bipartite or pinnatifid usually on the lower side only sometimes with the lowest pair long-petioled pinnatifid on both sides, lowest inferior segment bi-tripartite, sterile ones and apex of the fertile ones spinuloso-serrate, areoles large next the costa the rest few, veins nearly all free in the very narrow pinnæ, stipes longer than the frond compressed and the rachis greenish-brown.—*Sw. Prodr. p. 129. Fl. Ind. Occ. p. 1600. Syn. Fil. p. 97. Willd. Sp. Pl. v. 272. Hook. and Grev. Ic. Fil. t. 28 (excl. the syn. of Pt. Brasiliensis, Raddi, and Pt. quadrifida, Pr.), Ag. Sp. Gen. Pterid. p. 56. Pt. tristicula, Raddi, Syn. Fil. n. 112. Fil. Brasil. p. 46. t. 69. Pt. reticulata, Desv. Litobrochia, Pr.*

Hab. Hispaniola, Swartz; Cuba, C. Wright,* 1857, n. 270. Brazil, about Rio, Raddi, Forbes, Armstrong, Boog, Miñe, and Macgillivray.—“Quasi præcedentis (*Pt. Brasiliensis*, Rad.) status junior; ab auctoribus cum ea quoque frequenter confusa vel judicata fuit,” is the remark of Agardh. Dr. Greville and myself had expressed an opinion that these two supposed species were identical, and I confess to the difficulty in determining some of the many varieties of *Brasiliensis*. The winged rachis here and less compound and narrower pinnæ are perhaps the best characters. It is remarkable, however, that *Pt. denticulata*, which is much the rarer of the two in Brazil, and, I believe, only found about Rio, should be detected, as it now has been, in two of the West Indian islands, and even first discovered in one where *Pt. Brasiliensis* has never been known to exist.

93. *Pt. (Litobrochia) leptophylla*, Sw.; caudex small knotted sub-tuberiform, fronds 4–5 inches to a span long pale-green thin-membranaceous pellucid cordate or deltoid subpedate long-stipitate fascicled bipinnate tripinnate below, ultimate pinnæ pinnatifid, pinnules and segments all linear subacuminate decurrent so as to form winged rachises except at the bases of the pinnules slightly falcate, sterile ones (which are lanceolato-acuminated) and apices of the fertile ones setosely serrate, veins forming a single series of large areoles next the costa the rest free, in the narrow pinnules and segments all free, stipites slender longer than the fronds greenish-brown or stramineous.—Sw. in *Act. Holm.* 1817. p. 70. *Ag. Sp. Gen. Pterid.* p. 57. *Presl, Tent. Pterid.* p. 145. *Pt. spinulosa*, Raddi, *Syn. Fil. Bras.* p. 70 and 70 bis. *Cheilanthes spinulosa*, Link, *Hort. Berol.*

Hab. Brazil, whence I have received many specimens from the neighbourhood of Rio, Raddi, Lady Calcott, Boog, Forbes, Macgillivray and Miñe, Gardner, n. 32, Sellow (probably from South Brazil).—This evidently belongs to the same group or set with *Pt. Brasiliensis* and *denticulata*, exhibiting the setiferous serratures, and it cannot naturally be separated from them; yet in one and the same specimen even we find the venation of a *Campteria*, and more copiously that of true *Pteris*, and none of real *Litobrochia*: and I have already intimated my

pinnate membranaceous but somewhat succulent paler and subglaucous beneath dull and opaque, pinnæ 1 to 1½ foot or more long broad-lanceolate acuminate sessile or nearly so more or less deeply pinnatifid, segments oblong or lanceolate generally subfalcate and acuminate serrated at the apex approximate, sinuses obtuse rounded, veins anastomosing and forming a single shallow arc (or costal areole) at the base of and between the segments, broader ones in a series at the segmental costæ, sori continuous at the sinuses, rachises (the stouter ones muricated with short sharp tubercles) brown stramineous glossy.—*Willd. Sp. Pl. p. 381. Kze. Synops. Pl. Pœpp. p. 75. Ag. Sp. Gen. Pterid. p. 58. Litobrochia, Pr.*

Hab. Caraccas, *Bredemeyer*; Pampayaco, Peru, *Pœppig*; New Granada, near Bogotá, *Purdie*; Triana, *Linden*; Antioquia, *Jervise*; Guadaloupe, *L'Herminier*; Ocaña, 7000 ft. elev., *Schlim*, n. 605 (fronds dark-green on both sides, basal areole generally forming two arcs, one long and narrow one, and one shorter and broad one).—In this and some of the following species we have examples of fronds so large that few collectors have gathered sufficiently comprehensive specimens to enable us to form an opinion of the ramification. Willdenow, Agardh, and Kunze describe this as simply pinnate, with the pinnæ pinnatifid: some of my specimens prove that it is at least bipinnate. The texture appears as if of a thick and fleshy character when recent, with sunken veins which are best seen on the under side, where they are of a dark colour upon a pale, somewhat glaucous surface. The segments are not much elongated (2-3 inches long), and all the pinnæ are regularly pinnatifid and nearly sessile, the sinuses vary in breadth, and are sometimes almost biangular. The basal areoles of the venation, as Agardh well observes, form one arc (very rarely two, and then very unequal in size), and this arc lies parallel with and close to the main costa, forming almost a straight line, extending from one costule to the next. The Ocaña specimens from Schlim vary a little from those of other localities, all of which quite accord with Pœppig's plant, which is the authority for Kunze's *Pt. gigantea*, and is, I have no doubt, the same as Willdenow's.

95. *Pt. (Litobrochia) crassipes*, Ag.; "fronds (ample) pinnate, pinnæ pinnatifid the segments on each side equally confluent linear-lanceolate falcate, sinuses rounded, basal veins forming a single arc," *Ag. Sp. Gen. Fil. p. 59.*—" *Pt. gigantea*, *Sieber, Syn. Fil. n. 161. Presl, Reliq. Hænk. p. 55.*"

Hab. West Indies: Martinique, *Sieber*; Island of St. Vincent, *L. Guilding*. New Grenada, *Purdie, Linden.*—I retain this species of Professor Agardh with much hesitation, for I do not myself see how the specimens from St. Vincent, which he had in view when he drew up his specific character and description, differ from *Pt. gigantea*, except in the longer pinnæ, more deeply pinnatifid, with longer segments, in the great thickness of the rachis and upper portion of the stipes, and in the "venæ basales monoarcuatæ, sed ita arcte costæ adpressæ, ut vix nisi apice pinnarum deteguntur:"—nor do the respective specific characters of the learned author point to any marked differences. I have no access to

specimens of *Pt. gigantea* of Presl, and of Sieber, Fl. Martin. n. 366, which Agardh refers hither, but Kunze (Linnaea, vol. ix. p. 76) to *Pt. podophylla*, Sw.

96. *Pt.* (*Litobrochia*) *Berteroana*, Ag.; fronds ample bipinnate below membranaceous glabrous pale-green, superior pinnæ and pinnules broad-lanceolate acuminate deeply pinnatifid sessile and decurrent at the base, segments lanceolate approximate erecto-patent acute or acuminate serrated mucicous, sinuses acute, basal veins mono-arcuate, secondary areoles marginal, sori on the margin of the segments not extending to the apex nor to the bottom of the sinus, involucre rather broad membranaceous, stipes rachises and main costæ tawny very smooth.—*Ag. Sp. Gen. Pterid.* p. 66. “*Pt. tenera*, Kaulf.?” *Bertero, MS. Colla, Pl. Rar. Chil.* iv. p. 38.

Hab. Shady woods, Juan Fernandez, *Bertero, Cuming, in Herb. Nostr.*—Pinnæ a foot long, upper ones and pinnules adnato-decurrent, in the widest part 3–4 inches. Segments 2 and more inches long, sterile ones duplicato-serrate. Sinuses narrow, acute; areoles only one or two between the basal arc and the margin, so that the areoles are comparatively large and few.—Claude Gay, in his ‘*Flora Chilena*,’ has four species of *Litobrochia*, all from Juan Fernandez:—1, *Pt. incisa*, Th., and of this work; 2, *Pt. patens*, Presl, Anal. Pterid., not Hook. (a species not retained in the ‘*Tentamen*’ of that author); 3, *Pt. appendiculata*, Kaulf., always considered the same as *decurrens*, Pr.; and 4, *Pt. decurrens*, of Presl and Raddi; but to none of them can our *Pt. Berteroana* be referred.

97. *Pt.* (*Litobrochia*) *Endlicheriana*, Ag.; fronds ample bipinnate below membranaceous glabrous pale-green, superior pinnæ and pinnules broad-lanceolate acuminate nearly sessile, segments lanceolate scarcely falcate rather obtuse serrated mucicous, sinuses very acute, basal veins mono-arcuate, fourth series of areoles marginal, stipes and rachises tawny glossy.—*Ag. Sp. Gen. Pterid.* p. 66. *Hook. Ic. Plant.* t. 973. *Pt. comans*, var. *Hook. fil. Fl. N. Zeal.* ii. p. 26. *Pt.*

tween the costules and the margin. If this character cannot be depended upon, still less can the other trifling differences in the form of the pinnæ and segments noted by Agardh be considered of value. Indeed the protean forms of the Litobrochia group of *Pteris* seem endless. Dr. Hooker, in his 'Flora of New Zealand,' unites our present plant with the following, *Pt. comans*, but at present I prefer keeping them apart.

98. (*Litobrochia comans*, Forst.; fronds ample pinnate lowest pair bipartite or again pinnate membranaceous dark-green glabrous pinnate generally a span to a foot and more long ovato-lanceolate very deeply pinnatifid cuneate at the base petiolate, segments subopposite decurrenti-confluent (so that the two opposite bases take a wedge-shaped form) linear-lanceolate ensiform patent straight or falcately decurved remote 3 to 4-5 inches long sterile portions strongly serrated, sinuses with a downward direction (*sinubus deorsis*) acute, basal veins form one long or 2-3 shorter arcs, areoles numerous, sori marginal not extending to the apex rarely to the base of the sinus, stipes and rachises stramineous glossy.—*Forst. Prodr.* p. 79 n. 419. *Sw. Syn. Fil.* p. 98 and 292. *Willd. Sp. Pl.* v. p. 381. *Schkuhr, Fil.* p. 86. t. 92. *Ag. Sp. Gen. Pterid.* p. 59. *Litobrochia, Pr. Brackenr. in Fil. U. S. Expl. Exped.* p. 105.— β . pinnæ smaller, segments more or less pinnatifid.

Hab. "New Zealand," *Forster* (in *Florulæ Ins. Austral. Prodr.*). By some unaccountable accident, an original specimen of Forster, in my herbarium, was marked "Ind. Or.," and hence the note to that effect in Agardh. The fact is, it was received without any locality attached to it. It is a remarkably fine specimen (1½ foot long), and certainly I have seen nothing resembling it from New Zealand, rich as our herbarium is in plants of that country; but I have specimens identical with Forster's plant from Tanna, New Hebrides, from Aneiteum, from the Island of Futuna, from Angau in the Feejee group, and our var. β , from Lord Howe's Island, from *Milne and Macgillivray*; so that I cannot but suspect some error in the locality given by Forster, and that Tanna should be substituted for New Zealand, an island we know he visited, and where our collectors remark, "it is abundant in woody places." All Dr. Hooker's *Pt. comans* (Fl. N. Zeal. l. c.) may be referred to the species or variety, as it may be, of *Pt. Endlicheriana* above described. Some of our specimens have pinnæ with segments half a foot long. *Brackenridge* also gives Tahiti, in the Society Islands, and Ovalau, in the Feejee group, as localities.—To me this appears a very distinct species, remarkable for the great size of the pinnæ, and the long, truly ensiform, decurrent, much acuminate segments. The smaller specimens have the segments more or less pinnatifid, when it becomes the var. β of *Brackenridge*,

99. *Pt. (Litobrochia) macilenta*, A. Cunn.; caudex small subrepent, frond broad ovate 3-pinnate 1-3 feet long thin membranaceous pellucid, pinnæ and pinnules remote alternate, ultimate pinnules small (1-3 inches) ovate or deltoid cuneate at the base petiolate pinnatifid, terminal ones elon-

gate acuminate, lobes oblong or ovate acute coarsely incised-serrated at the apex, lobes and serratures submucronate, basal veins forming a single arc and 2 or 3 large areoles are formed on each side of the costule of the segments, the rest of the veins are free, sori on the sides of the lobes often short, stipites as long as the frond castaneous, rachises slender and flexuose stramineous.—*A. Rich. Fl. N. Zeal. p. 82. t. 12. A. Cunn. Specim. Bot. of N. Zeal. in Hook. Comp. Bot. Mag. ii. p. 365. Hook. fil. Fl. N. Zeal. ii. p. 26. Presl, Tent. Pterid. Litobrochia macilenta, Brackenr. Fil. U. S. Expl. Exped. p. 106.*

Hab. Dry woods in the Northern Island of New Zealand, *D'Urville, A. Cunningham, Colenso, Sinclair, J. D. Hooker, Brackenridge.* Akaroa, in the Southern Island, *Dr. Lyall.*—It would be a great blessing if all *Pterises* were as distinct as this. It is difficult to say which are its near affinities. A. Richard justly observes, "Elle se rapproche un peu au *Pteris Vespertilionis* de M. Labillardière, mais néanmoins elle est fort distincte." The pinnules are small, and there are but few areoles, and those confined to the costa and the costule (not extending to the apex of the latter), the rest of the veins are free. Richard's figure faithfully represents the frond, but the venation is inaccurate.

100. *Pt. (Litobrochia) Woodwardioides, Bory*; "fronds pinnate very glabrous, pinnæ sessile pinnatipartite lowest ones bifid, segments oblongo-lanceolate obtuse entire fertile ones acuminate, basal veins forming a single arc, areæ and secondary areoles submarginal," *Ag.*—*Bory, in Willd. Sp. Pl. v. p. 360. Ag. Sp. Gen. Pterid. p. 60. Pt. altissima, Poir, Encycl. p. 122. Sw. Syn. Fil. p. 99, and Willd. Sp. Pl. p. 382 (Ag.). Pt. pellucida, Kaulf., in Sieb. Syn. Fil. n. 74 (Herb. Nostr.). Litobrochia, Pr.*

Hab. Mauritius, *Sieber, Carmichael (in Herb. Nostr.).*—Our specimens, probably wanting the lowest pair of pinnæ, do not exhibit their bipartite character described above, and which if present, would exhibit a form very much resembling

attenuated at the base and more or less decurrent on the rachis, segments lanceolate or linear-lanceolate sterile portions serrated, basal veins mono-arcuate, tertiary areoles marginal, rachis and costæ stramineous glossy.—*Presl, Del. Prag. p. 183. Raddi, Fil. Brasil. p. 48. t. 69 bis. Ag. Sp. Gen. Pterid. p. 61. Pt. appendiculata, Kaulf. Enum. Fil. p. 187. Pt. lata, Kaulf. (Presl).*

Hab. Brazil: shady woods about Rio, *Gaudichaud, Raddi, Gardner, n. 153 and 33, Macgillivray, n. 205, and Milne, Lady Calcott, J. D. Hooker.*—The principal distinguishing mark of this species is to be found in the decurrent base of the pinnæ, especially in the upper part of the frond, which gives a winged character to the rachis. Pinnæ 7–17 on one frond, 6–8 inches long.

102. *Pt. (Litobrochia) spinulifera*, Schum.; frond 1–2 feet long pinnate glabrous, pinnæ petiolate broad-lanceolate acuminate pinnatifid lowest pair bipartite, segments lanceolato-oblong obtuse toothed at the apex, basal veins subbiarcuate, tertiary areoles marginal, costules of the segments with a series of areoles on each side, the rest of the veins free, costæ densely spinuliferous beneath rarely unarmed, stipes and costa often ebeneous at the back, *Ag.*—*Schumacher, Beskr. Guin. Plant. p. 459. Ag. Sp. Gen. Pterid. p. 62.*

Hab. West Africa: Guinea, *Mortensen*; Congo, *Chr. Smith, in Herb. Banks; Fernando Po, Dr. Vogel*; Cape Palmas, *Ansell*; Sierra Leone, *Barter, in Baikie's Second Niger Expedition.*—Frond 2 feet high, pinnate, dark-green. Stipes castaneous, posterior side sometimes ebeneous, muriculated with retrorse spinules, rachis on the anterior side rough. Costæ with numerous spinules beneath, above quite smooth. Pinnæ sometimes a foot long, oblong-lanceolate, the lower pair bifid or bipartite. Sterile segments very obtuse and oblong, entire, or with only 2–3 teeth at the apex; fertile ones more lanceolate, obtuse, and slightly toothed at the point. Our specimens from Vogel, Ansell, and Barter, exactly correspond with the description of Schumacher's plant; sometimes however the spines are absent, and sometimes the colour of stipes and rachises is on the under side purple, or black and glassy. The habit and form of the plant are exactly those of *Pt. quadriaurita* and *Pt. biaurita*, and the three can scarcely be distinguished with certainty but by the venation, one being of the subgenus *Eupteris*, one of *Campteria*, and one of *Litobrochia*.

103. *Pt. (Litobrochia) Kunzeana*, Ag.; fronds ample pinnate (below bipinnate?), pinnæ petiolate a span to a foot long coriaceous-membranaceous broad-lanceolate caudato-acuminate pinnatifid, segments approximate ovate or lanceolate falcate acute or acuminate the apices sharply serrated with rounded sinuses, basal veins bi-triarcuate, sori continuous at the margins and sinuses of the segments the apices sterile. (TAB. CXXXIX.)—*Ag. Sp. Gen. Pterid. p. 62. Pt. podophylla, Kze. Syn. Pl. Pæp. p. 75 (excl. syn.). Filix ramosa arborescens et aculeata, Plum. Fil. p. 6. t. 5 and 11.*

Hab. Martinique, Plumier. French Guiana, Leprieur, Richard (Agardh). Peru, Poeppig (in *Herb. Nostr.*). Pangoa, Peru, Mathews, n. 1109 and 1802. Porto Rico, Riedele (Agardh). Ecuador and Bay of Ellia, Seemann. Jamaica, Purdie.—My knowledge of this fine species is derived mostly from specimens in my herbarium: (1.) from Kunze's "*Pt. podophylla*" (certainly not of Swartz), and to which Agardh has given the name of *Kunzeana*; (2.) from Mathew's specimens, also named by Agardh; and (3.) from specimens gathered by Seemann in Ecuador (figured at our Tab. CXXXIX.), all of which I consider to be specifically identical, and to correspond with the figure above quoted of Plumier, Fil. t. 5. and 11, a Fern which I suspect has been greatly misunderstood. Swartz and others have referred to it a plant (*Pt. aculeata*, Sw. and Agardh) which has so little resemblance to it that Agardh himself refers doubtfully to Plumier's figure for that species; and I think it is impossible to compare our specimens of *Pt. Kunzeana*, named by Agardh, and particularly that state of it which we have received from Ecuador (Seemann), without saying that they are one and the same species. It is quite true, judging from our specimens of portions only of the fronds, it is out of our power to say whether this (and *Pt. aculeata*, to which the character is equally assigned) is *arborescent* or not. Although Plumier calls this "*Filix arborescens ramosa et aculeata*," his description is at variance with this, and to me not very intelligible: "La racine de cette Fougère est composée de beaucoup de fibres épaisses, d'où il sort quelquefois une tige basse, épaisse comme le corps d'un homme, et toute hérissée d'épines très-noires. Il n'en sort bien souvent aussi que de grandes costes (*stipites*), garnies d'épines en si grand nombre qu'elles forment un buisson qui fait peur, ainsi que la tige, qui ressemble plutôt à un hérisson qu'à la tige d'une plante." And again, "*Les costes* (*stipites*), qui naissent *ou du tronc ou immédiatement de la racine*, ont dans leur commencement presque trois pouces d'épaisseur; elles s'élèvent jusqu'à la hauteur d'un homme, diminuant toujours petit à petit, et se partageant à leur sommité en trois branches, dont les collatérales se partageant un peu plus haut en deux autres branches," etc. Now Swartz seems almost to have copied these words into his *Flora Ind. Occ.*, p. 1601 ("*stipites plures, orgyales, sive radicales, sive in caudicem brevem uniti, apice 3-partiti, ramis lateralibus iterum bipartitis*"), so as to render it doubtful if he has not relied wholly on Plumier's description, and had that and Plumier's figure in view, rather than what goes now by the name of *Pt. aculeata*, and which Agardh has determined to be the same as ours. The only aculeated portion of this Fern figured by Plumier appears intended for the base of the stipes, and that is not much unlike what we find in a portion of the stipes of *Pt. gigantea* in our possession.

Although however I unhesitatingly refer *Pt. Kunzeana* to Plumier's "*Filix arborescens ramosa et aculeata*," I am far from being satisfied that it is perma-

104. *Pt. (Litobrochia) elata*, Ag.; frond ample subcoriaceo-membranaceous bipinnate, pinnæ petiolate ovato-lanceolate deeply pinnatifid, segments remote lanceolate long and finely acuminate serrated at the apex, sinuses biangulate, basal veins 3-4-arcuate, third series of areoles submarginal, sori continuous round the sinuses, stipes and rachises pale-brown or straw-colour glossy smooth.—*Ag. Sp. Gen. Pterid. p. 63.* *Pt. macroptera*?, *Lk. Hort. Berol. p. 32 (Ag.)*. *Klotzsch in Linnæa, xx. p. 342*?

Hab. Panama, *Cuming, n. 1267*, and Chirambira, *Seemann (Herb. Nostr.)*. Caracas, *E. Otto, in Herb. Nostr. n. 607*?—"Species," says Agardh, "si quid video certe distincta, sinibus biangulatis et venis pluri-arcuatis necnon petioli longioribus ab affinis diversa. . . . Pinnæ circiter pedales petioli semipollicaribus suffultæ, inferiores pinnulatæ. Lacinie angulo fere recto a parenchymate costæ egredientes, lanceolatæ, et apice longe acuminatæ, medio aliquantulum latiores, majores usque 4-pollicares. Sinus biangulati. Venæ basales plerumque 3 arcus efficiunt, quorum infimus sequentes longitudine sequat. Arcæ secundanæ singulæ, arcibus superioribus duobus interjectæ, costam fere tangunt."—Accurately as Agardh has described this Fern from specimens in our herbarium, I cannot but question its being really distinct from the *Pt. aculeata*. The specimens from Seemann, which I am disposed to consider the same, exhibit some pinnæ quite resembling that species, and having both angled and rounded sinuses. It is probably a very variable species, and our friend Dr. Klotzsch may be quite right in referring to it *E. Otto's n. 607*, which exhibits very varied pinnæ on the same specimen, and upon a large scale. In the authentic sample now before us, the apex of a branch 2 feet long is pinnatifid, with segments 6-7 inches long; below it is pinnated with entire or nearly entire pinnæ of the same length, and below that with ovate, acuminate, pinnatifid pinnæ. The same form I possess from Tovar, Columbia, from Moritz, n. 118, named "*Pt. gigantea*, Herb. Willd.;" and so Dr. Klotzsch says it is the n. 19,990 of that Herb. (but not of Sp. Plant.), and from Fendler,* n. 95; and n. 155 of Linden, Caracas, only differs in having, between the lower pinnatifid pinnæ of the branch and the terminal one, five pairs of remote, entire pinnæ.

105. *Pt. (Litobrochia) propinqua*, Ag.; "frond rigid below bipinnate, pinnules subpetiolate lanceolate wider at the base pinnato-partite, segments lanceolate subfalcate rather obtuse mucronate and sharply serrated, sinuses rather acute, basal veins monoarcuate, secondary or tertiary areoles marginal," *Ag. Sp. Gen. Pterid. p. 65.*—*Pt. polita*, *Link, Hort. Berol. p. 30.* Var. *Cumingiana*, Ag.; narrower, pinnæ 4-5 inches long, and an inch and a half broad (segments shorter and more falcate).—*Ag. l. c.* *Pt. Orizabæ*, *Mart. et Gal. Fil. Mex. p. 53. t. 13.* *Pt. apicalis*, *Liebm. Fil. Mex. p. 78.* *Pt. podophylla*, *Schlecht. in Linnæa, v. p. 614.*

* This fine specimen of Fendler exhibits the stipes as thick as the little finger, which is rough with small points at the base, and, as well as the short portion of a horizontal rhizome, clothed with subulate, black, rigid scales.

Hab. Jamaica, *Drs. Bancroft and Macfadyen, Purdie* (and var. ? with membranaceous, pale-green fronds; larger pinnules, broader at the base, more or less petiolate; segments muticous). Esmeraldas, *Seemann*, n. 98.—Var. *Cumingiana*; Panama, *Cuming*, n. 1182. Venezuela, *Linden*, n. 99. Trinidad, *Lockhart*. St. Vincent, *Lockhart*. Galapagos, *Capt. Wood, R.N.* Mexico, *Galeotti, Liebmann, Linden*, n. 4.—“Stipes stramineous, smooth, trisulcate, several feet high, as thick as a goose-quill. Many of the lower pairs of pinnae pinnulate, the lowest larger than the rest, a foot and a half long, on petioles 1-2 inches long, so that the frond is somewhat ternate. Superior pinnae 7-10 inches long. Veins a little prominent.” Of the var. *Cumingiana* Agardh observes, “Species vix diversa, licet habitu non parum insignis et magis ad *Pt. podophyllum* abiens, sed laciniis mucronatis necnon tota ramificatione ab hac aliena.”

Of this *Pt. propinqua* I may observe, it will be difficult to distinguish it from some states of *Pt. aculeata*, Sw.; and the var. *Cumingiana*, with its more rigid fronds, shorter, more falcate, and often more mucronate segments, is, I fear, identical with *Pt. apicalis* of Liebmann. The pale-green membranaceous state sent by Purdie from Jamaica, besides its larger pinnules, which are more sessile, and more truncated at the base, wants the mucro to the segments, but these distinctions may be due to the plant growing under the shade of trees, and in very moist situations. It is probably wrongly referred here.

106. *Pt. (Litobrochia) hemipteris*, Fée; “fronds pinnatopinnatifid very glabrous, frondules petiolate acuminate nearly opposite, segments slightly falcate toothed mucronated, of the two basal ones the superior one is much the largest.”—*Litobrochia hemipteris*, Fée, *Fil. 8me Mém.* p. 76.

Hab. Mexico, very rare, *Schaffner*.—“Analogous to *Litobrochia Orizaba*, Fée.” “Il faudrait le revoir sur d'autres spécimens.”

107. *Pt. (Litobrochia) setifera*, Fée; “fronds pinnate, rachis reddish trisulcate above (*duos fasciculos vasorum lateram in eversam simulantes ferente*), pinnae pinnatifid glabrous remote lanceolate, terminal segment long-acuminate, segments lanceolate falcate terminated by a very long and slender seta separated by a broad rounded sinus, sporothecia not extending to the serrated apex, indusium rather broad

syn. of Plum.). Willd. *Sp. Pl.* v. p. 398. *Ag. Sp. Gen. Pterid.* p. 68. Pt. sterilis, Pr. Del. Prag. p. 184? Polypodium spinosum, Linn. *Sp. Pl.* p. 1554 (*Ag.*). Pt. Beecheyana, *Ag. Sp. Gen. Pterid.* p. 68. Pt. nemoralis, Hook. et Arn. *Bot. of Beech. Voy.* p. 75. Pt. Protea, Liebm. *Fil. Mex.* p. 76 (*fid. specim. in Herb. Nostr.*).

Hab. West Indian Islands: St. Vincent, most abundant, but the stipes even at the base exhibit no appearance of aculei, L. *Guiding, in Herb. Nostr.* (these being authority for Agardh's plant, *Sp. Gen. Pterid.* l. c., verified by comparison with Swartz's plant, I must consider it the *type* of the species, and any peculiar variation I shall here notice under the respective localities); Cuba, C. Wright, n. 873. Brazil, Sellow (*ex Herb. Reg. Berol.*; an Pt. elata, *Ag.*?). Venezuela, Fendler, n. 97 (small, more rigid, stipes quite smooth to the base). New Grenada, Ocaña, Schlim, n. 77, 5000 feet elev. (terminal pinnæ only with very long, remote segments, 3-4 inches long). Columbia, Salango, lat. 1° 34', Hinds (pinnæ and segments remote and elongated, sinuses subbiangular). Ecuador, Seemann (pinnæ twice and even thrice the ordinary size, not otherwise different). Mexico: Tumaco, Hinds (large); Ycapa, Linden, n. 1509 (pinnules large, and scarcely different from Pt. elata, *Ag.*); Calipa (pinnæ large, membranaceous; segments remote, mostly opposite, and cuneately decurrent). Society Islands, *Nightingale* (copious specimens, large, but ordinary form). Coral Isles, *Beechey* (ordinary form).—This plant has already given occasion to some remarks under Pt. Kunzeana, p. 222, and I have ventured to consider that species (if species it be) as bearing a much greater resemblance to the "*Pteris arboreascens ramosa et aculeata*," Plum. t. 5 and 11, always quoted under our present plant. But I cannot reconcile myself to the fact of either of these being a "*Filix arborea*;" nor do I find the stipes to be, in any specimen, as Swartz describes them, "*aculeati*," and as Plumier represents his species. Sloane's figure, t. 56, often quoted under the present species, Agardh properly excludes as too unsatisfactory.

109. Pt. (Litobrochia) *tripartita*, Sw.; fronds ample tripartite, lateral branches pinnate (bipinnate?) spreading long-petiolate submembranaceous glabrous, pinnules 4-6 inches or more long linear-oblong or linear-lanceolate subsessile acuminate rather deeply pinnatifid, segments approximate linear-oblong falcate (upwards) obtuse or acute entire or scarcely serrated and only at the apex nearly half an inch long, sinuses obtuse, basal veins forming a single arc parallel with the costa, a series of 3 or 4 or more areoles are parallel with the costule, rarely a second series appears between these and the free veins which thence extend to the margin, stipes elongated often stout and as well as the rachises subcastaneous.—Sw. *Syn. Fil.* pp. 100 and 293. Willd. *Sp. Pl.* v. p. 400. Blum. *Enum. Fil. Jav.* p. 211. Presl, *Reliq. Hænk.* p. 58. *Ag. Sp. Gen. Pterid.* p. 72. Pt. semiovata, Poir. *Encycl.* v. p. 723 (*Ag.*). Pt. revolvens, *Ag. l. c.* p. 73. Pt. subpedata, Wall. *Cat.* n. 10 (*young plant*). *Ag. l. c.* p. 71. Pt. intermedia, Bl. *En. Fil. Jav.* p. 211. *Ag. l. c.* p. 71, *note.*

Pt. longipes, Don, *Prodr. Fl. Nepal.* p. 15. *Bl. En. Fil. Jav.* p. 242. *Ag. l. c.* p. 70. *Pt. uniseriata*, Poir. *Encycl. Bot. Suppl.* iv. p. 608. *Pt. linearis*, Poir. *Encycl. Bot.* v. p. 723. *Sw. Syn. Fil.* p. 99. *Willd. Sp. Pl.* p. 379. *Wall. Cat. n.* 105. *Ag. l. c.* p. 70. *Pt. marginata*, Bory, *Voy.* 2. p. 192. *Willd. Sp. Pl.* v. p. 399. *Ag. l. c.* p. 67. *Pt. connexa*, J. Sm. *Fil. Philip. in Hook. Bot. Journ.* iii. p. 405. *Var. β. Jung-huhnii?*, De Vriese in *Herb. Nostr.* (pinnæ longer less deeply pinnatifid, segments wider more falcate). *Var. γ. Milneana*; pinnules broader more deeply pinnatifid, longer segments. (TAB. CXXXVIII. B.)

Hab. East Indies: Molucca, *Gaudichaud*; Java, *Blume, Lobb (De Vriese, var. β, an sp. distincta? but venation the same)*; Amboyna, *Labillardière (in Herb. Nostr., named by Agardh)*; Luzon, *Cuming*, n. 204 (*Pt. connexa*, J. Sm.) and 41 (pinnæ elongated, pinnules crowded, segments deeper and longer). Singapore, *Wall. Cat. n.* 10 (young). Labuan, *Molley, Barber*, (segments of the pinnules acute). Ceylon, *Mrs. Gen. Walker, Gardner*. Bengal, *Sylhet, Wallich*. Mauritius, *Bojer*. Bourbon, *Carmichael (one specimen named Pt. marginata, by Agardh), Herb. Mus. Par.* Isle of Pines and Feejee Islands, *Macgillicray and Milne* (common form); and *var. γ* by the same collectors, and by *Dr. Harvey*. Society Islands, *Nightingale*. Tropical Africa: Isle of Galega, east coast, *Bojer*; and west coast, Fernando Po, *Vogel and Barler, in Baikie's Second Niger Expedition*.—This widely extended, but, I believe, exclusively tropical species (limited however to the old world), has been honoured with many names, not a few of which have been placed among the synonyms by *Agardh*, whilst I am alone responsible for bringing the rest under one species, viz. the *Pt. tripartita*, Sw. Nevertheless, the same author (*Agardh*) has paved the way for this union by the following remark under one of the above synonyms (*Pt. revolvens*, his n. 87):—“Tribum constituunt naturalissimam species (82–87, viz *Pt. Walkichiana*, *Ag., linearis*, Poir., *longipes*, Don, *subpedata*, Wall., *tripartita*, Sw., and *Pt. revolvens*) allatæ, arctissimo invicem affinitatis vinculo junctæ. et ita quidem similes ut eandem esse speciem omnes facile crederes. Differentiæ in externa forma adsunt, sed vix alii characteres quam qui venarum structura nituntur, revera valere videntur. Venæ in *Pt. Walkichiana* (this however I have without hesitation removed to the *Campteria* section) admodum simplices, in sequentibus sensim magis magisque anastomosantibus innuntur, et in ultima specie omnino

as to justify the species being placed in § *Litobrochia*. (See *Pt. Wallichiana*, Ag., at our p. 206, n. 76.)

I would observe that I have more confidence in the several described species I have brought as synonyms under *Pt. tripartita* (and I possess, fortunately, authentic specimens in my herbarium) than I have in the two varieties I have made— β and γ . The first, from Java, has a form of pinnæ and segments almost approaching those of *Pt. podophylla* (our next species), but the texture is much thinner; and that is, I believe, a native only of tropical America: the second var. γ (Tab. CXXXVIII. B.), from the Feejee Islands, has very much the habit and structure of *Pt. (Eupteris) quadriaurita*, and of *Pt. (Campteria) biaurita*, but the venation is quite that of the present species. The Society Islands plant, also referred there, has a peculiar habit, but the frond is sterile and the segments serrated.

110. *Pt. (Litobrochia) podophylla*, Sw.; fronds ample ternate subcoriaceous glabrous, lateral branches 3-4-partite, intermediate one simply pinnate, ultimate pinnæ or pinnules petiolate broad-linear acuminate deeply and regularly pinatifid, segments approximate dimidiato-oval falcate acute (scarcely mucronate) serrate at the apex, sinuses rounded, basal veins monoarcuate, tertiary series of areoles marginal, stipes very stout submucronated near the base and as well as the rachises tawny glossy.—*Sw. Syn. Fil. p. 100. Willd. Sp. Pl. v. p. 403. Ag. Sp. Gen. Pterid. p. 75. Lonchitis pedata, Linn. Sp. Pl. p. 1536. Lonchitis erecta tribrachiata, lateralibus bipartitis, medio recto simplicis, Browne, Jam. p. 89. t. 1.*

Hab. Jamaica, *Browne, Swartz, Tussac, Purdie, Dr. Alexander, Wilson*. Venezuela, *Fendler*, n. 98, *Moritz*, n. 47. Caracas, *Linden*, n. 175, 1539, and n. 542 (var. minor). Bogotá, *Holton*, n. 50. Ecuador, *Jameson*. Ocaña, 4-5000 feet elev., *Schlim*, n. 661.—This is a very fine and really very characteristic species, figured by Patrick Browne in his History of Jamaica, published more than a century ago. It was for a long time supposed to be peculiar to Jamaica, but the researches of travellers prove it to be not uncommon in the northern portion of South America. The form of the pinnules and segments of the *Pt. propinqua*, var. *Cumingiana*, Ag. (*Pt. apicalis*, *Liebm.*), often resembles these, but the habit of the two is very different; our plant is of a firm and rigid texture, with very long straight pinnated pinnæ, narrower pinnules, almost quite sessile, and mucous or nearly mucous and more falcate segments. The primary branches or rachises are thicker than the human finger, very smooth, rich tawny colour.

111. *Pt. (Litobrochia) longibrachiata*, Ag.; "fronds ternate, lateral branches 2-3-partite and as well as the intermediate simple one pinnate, pinnæ subpetiolate ovato-lanceolate pinnato-partite, segments lanceolate falcate nearly entire, basal veins forming a single arc, the fourth and fifth areole marginal," *Ag. Sp. Gen. Pterid. p. 75.*—*Pt. aculeata, Sw. in part (Agardh)*.

Hab. West Indies: St. Vincent, *L. Guilding*, in *Herb. Hook.*; Martinique (*Herb. Paris, and Richard*).—*Agardh* considers this may be, as *Pt. aculeata* is

described to be, an arborescent Fern, and that it has been confounded with that species. There are a very few black spinescent tubercles on the glossy stramineous upper extremity of the stipes, as if the lower portion might like that be much aculeated. In the general form of the pinnæ it certainly very much resembles our *Pt. Kunzeana*, but these are of a much more pellucid and somewhat succulent character, of a pale green colour, as if grown under the shade of trees: yet I cannot agree with the excellent Agardh in its being "distinctissima species." The venation, which he dwells upon, does not appear to me to differ in any essential respect from that of its allies.

112. Pt. (*Litobrochia*) *microdictyon*, Fée; "fronds pinnato-pinnatifid, rachis subtrigonous channelled on the superior side, pinnæ pinnatifid acuminate shortly petiolate alternate, segments lanceolate falcate slightly dilated at the base obtuse crenated spreading at the sinus, basal areole narrow the rest of the areoles minute, sporothecia thick not extending to the margin, indusium very narrow spurious receptaculiform the margin thick and black, sporangia elliptical, annulus 18-20-articulated, spores trigonous blackish, sporangiastrata intestiniform."—*Litobrochia microdictyon*, Fée, *Gen. Fil. p.* 138.

Hab. Philippine Islands, *Cuming*.—A tall Fern, ovoid in circumscription; stipes reddish.—This is placed next to *Litobrochia setifera* by M. Fée; of its exact affinities I am ignorant, as I am also of the following species of M. Fée.

113. Pt. (*Litobrochia*) *Borbonica*, Fée; "fronds pinnato-pinnatifid, stipes yellowish, above broadly canaliculate, pinnæ pinnatifid sessile terminal ones wider on long pedicels acuminate serrated at the apex, segments deeply divided lanceolate rather obtuse crenulate at the apex, sinus narrow, nervils slender not reaching the margin thickened at their apices, areoles of the pinnæ arcuate extended (*extensis*) those of the segments subhexagonoid, rhizome creeping an inch long fibrillose, sporothecia short, indusia broad membranaceous, recep-

que large, pedicel very broad, annulus broad 18-20-articulated, spores rather large irregular trihedral amber-ured margined." *Litobrochia Montbrisonis*, *Fée, Gen. p. 137.*

ib. Bourbon, *Montbrison*.—"Felix insignis, siccitate flavidula, nervillis tenui-rufescentibus."

15. Pt. (*Litobrochia campocarpa*, *Fée*; "fronds 3-4-pinnæ ample, rachis stramineous-yellowish glabrous 3-sulcate, nellæ sessile long-acuminate the apex sterile, segments reviated distinct curved obtuse ovate separated by a ad obtuse sinus, the apex serrated sterile, mucro spicent rigid, basal areoles narrow flexuose, nervils slender ured, sporothecia curved, indusium thick rather broad, rangia elliptical, annulus 20-22-articulated, spores trigons smooth, hairs of the sporothecia (sporangiastra?) citron-ured subtorulose and constricted."—*Litobrochia campocarpa*, *Fée, Gen. Fil. p. 137.* Pt. (*Litobrochia*) *Orizabæ, tzsch, in Linnæa, xx. p. 342 (not Galeotti).*

ib. Columbia, colony of Tovar, *Moritz, n. 47.*—"A large glabrous Fern, ush when dry."

16. Pt. (*Litobrochia Tussaci*, *Fée*; "fronds ample binate, rachis glabrous reddish subcanaliculate in the upper tion narrow and winged, pinnæ alternate shortly stipitate minate, segments falcate acute serrato-mucronulate, ner-sculpturate, the larger are long-petiolate, sporothecia al, indusium broad, the margin receptaculiform, sporan-ovate, annulus 18-articulated, spores irregularly trigonous, rangiastra intestiniform citron-coloured constricted."—*Litobrochia Tussaci*, *Fée, Gen. Fil. p. 138.*

ib. St. Domingo, *De Tussac.*

17. Pt. (*Litobrochia grandis*, *Fée*; "fronds ample very both membranaceous (*consistance sèche*), nervils lax pro-ent on the superior surface, rachis whitish, pinnules ply pinnatifid petiolate, segments lanceolate with a broad is between to the base of which the sporothecia extend unite leaving the apex sterile, this apex is elongated a soft toothed point, the intermediate pinnule is pinna-l."—*Litobrochia grandis*, *Fée, Fil. 8me. Mém. p. 75.*

ib. Mexico, near Mirador, *Schaffner, n. 144.* Cuba, *Morelet.* St. Domingo, *ze.*—"Toute la plante a un aspect légèrement ardoisé," *Fée.*

§ HISTIOPTERIS, Ag.—Fronde decomposit. Pinnules pinnatifid, lowest pair on the larger pinnae often distant from the rest, dissimilar and stipulariform. Venation extremely variable, free, partially united, or universally anastomosing.

118. Pt. (Litobrochia?) *incisa*, Th.; caudex subterranean long creeping (as in *Pteris aquilina*), fronds distant ovate long-stipitate 1-7 feet or more long membranaceous when young, subcoriaceous and paler-coloured in age often glaucous beneath, pinnæ all sessile subadnate horizontal mostly opposite especially the primary ones, pinnules oblong-acuminate more or less deeply pinnatifid, segments ovate or oblong (sterile subsinuato-dentate) or triangular, lowest ones often remote and auriculiform on the rachis, veins all free or forked or the basal ones only of the costa and costules anastomosing, involucre continuous or interrupted membranaceous entire at the edge, stipes rough and muricated at the base and as well as the rachises rich brown or stramineous glossy.—*Thunb. Fl. Cap. p. 733. Sw. Syn. Fil. p. 99. Willd. Sp. Pl. v. p. 396. Schlecht. Adumbr. Fil. Cap. p. 44. t. 25. Bl. Fil. Jav. p. 212. Ag. Sp. Pterid. p. 78. Pappe and Raws. Syn. Fil. Afr. Austr. p. 26. Pt. elegans, Sw. in Act. Holm. 1817, p. 70. Ag. Sp. Pterid. p. 76. Pt. cruciata, Kaulf. in Sieb. Syn. Fil. n. 79. Ag. Sp. Gen. Pterid. p. 79. Pt. pallida, Raddi, Fil. Bras. p. 49. t. 71. Pt. nivea, Bl. En. Fil. Jav. p. 213? Pt. Vespertilionis, Labill. Nov. Holl. p. 96. t. 245. Willd. Sp. Pl. v. p. 400. Br. Prodr. Nov. Holl. p. 154. Ag. Sp. Pterid. p. 80. Hook. fil. Fl. Antarct. i. p. 110. Fl. Nov. Zeal. ii. p. 26. Pt. Australasica, Desv. Prodr. p. 302. Pt. flavescens, Colla, Plant. Rar. Ber. p. 37. Litobrochia, Pr.; Fée; J. Sm.; Th. Moore. L. appendiculata? Cl. Gay, Fl. Chil. vi. p. 491 (not Kaulf.).—β. *gigantea*; scandent, 30 feet long.*

with lowest pair of pinnules very remote from the rest, suborbicular, auriculiform, adnate and appressed to the main rachis: in other respects not different from the common form. New Granada, near Chue Chue, *Purdie*; Antioquia, Prov. Cundinamarca; ultimate pinnules two inches long, often quite entire, linear oblong, stipes and rachis very pale straw-colour, apparently a large plant, *Jervise*.

Here we have again an example of a widely diffused Fern, receiving a great variety of names, from an opinion not a little prevalent, that species are more local than they really are. It is indeed a variable plant, and yet it has a peculiar aspect not difficult to recognize. In an immature living state the fronds seem to have been thick and fleshy, and they dry of a blackish-green colour; when mature, they are firm and rigid, and in texture (and somewhat in habit) approach the *Pteris aquilina* or *Ornithopteris* group. But the most remarkable feature of the plant is the heteromorphous venation. Sometimes entire specimens have invariably free venation; sometimes there will be seen next the costa or costules one or more of the adjacent veins anastomosing. In Dr. Hooker's Sikkim specimens, marked 152 *b*, the anastomosing of the veins is nearly as constant as in *Pt. aurita*, almost indicating a passage from *Pt. incisa* to that, our next species. Mettenius has very correctly figured the venation of both these. I have selected Thunberg's name (*Pt. incisa*) as the oldest of the many before me, though it is more generally known under that of *Pt. Vespertilionis*, because that was accompanied by the first published figure: and many of the Ferns cannot be correctly determined without figures.—The most remarkable state of this species is our *β. gigantes*, which is scandent, and 30 feet long. We shall find a closely allied species (*Pt. sinuata*, Brackenr., our n. 120) to be subsacandent and 18 feet long!

119. *Pt. (Litobrochia) aurita*, Bl.; caudex long creeping subterraneous, fronds ample submembranaceous distant ovate long-stipitate glaucous beneath tripinnate, pinnæ all sessile subadnate mostly opposite horizontal, pinnules opposite sessile lanceolate obtuse more or less deeply lobed and pinna-tifid, segments ovate or oblong (sterile ones subsinuate) or triangular, lowest one often remote and forming auricles on the rachis, superior ones confluent, veins all anastomosing, areoles next the costa and costules the largest and most elongated, involucre continuous or interrupted membranaceous entire at the edge, stipes (upper portion) and rachises castaneous very glossy.—*Bl. En. Fil. Jav. p. 213. Metten. Fil. Hort. Bot. Lips. p. 59. t. 14 (excellent).* *Pt. Brunoniana, Endl. Prodr. Fl. Norfolk. p. 12. Ag. Sp. Gen. Pterid. p. 79. Pt. Morrenhoutiana?, Ag. Sp. Gen. Pterid. p. 79 (as to descr. and specim. in Herb. J. Sm.).*

Hab. Java, *Blume. Luzon, Cuming, n. 192. Moulmein, Lobb. Borneo, Wallace. Ceylon, Mrs. Gen. Walker. Khasya, East Bengal, Griffith. Norfolk Island, Ferd. Bauer, All. Cunningham, margins of watercourses; Dr. Falconer, C. J. Simmons, Esq. Tanna, New Hebrides, Milne. Otaheite (?), Morrenhout. —Dr. Hooker, in his 'Flora Novæ Zelandiæ,' unites this with *Pt. incisa* (*Pt. Vespertilionis, Labill.*), and I am ready to allow that some of his specimens of the latter, from Sikkim, are in favour of such a union. Our Norfolk Island specimens are uniformly larger than *Pt. incisa*, the colour is a darker green even in the mature fronds, and the venation is always anastomosing. It would, too, be difficult to say whether it is not as much allied to the following (*Pt. sinuata*,*

Brackenr.) as to the preceding species (*Pt. incisa*, Th.). If I am correct in referring Agardh's *Pt. Morrenhoutiana* here, it is a native of Otaheite as well as of Norfolk Island. A small specimen so marked, from Otaheite, in Mr. J. Smith's Herbarium seems to be the same. The Tanna plant, from the Voy. of H.M.S. Herald, is identical with the Norfolk Island specimens. Mettenius's figure of *Pt. aurita*, Bl., admirably represents our plant.

120. *Pt.* (*Litobrochia*) *sinuata*, Brackenr.; caudex long creeping subterraneous, fronds scandent ample (18 feet long) submembranaceous dark green glaucous beneath tripinnate, pinnæ opposite or nearly so sessile (sometimes petiolate from the suppression of the lower pair of pinnules) primary ones 1-2 feet long, pinnules sessile broad-lanceolate 2-6 inches long 1-2 inches broad excised at the lower base entire sinuate or more or less deeply pinnatifid with rounded or ovate segments, lowest pair of pinnæ often remote and auriculiform upon the rachis, sometimes quite orbicular and adnate, sometimes suppressed on one or both sides, terminal one confluent, veins all copiously anastomosing to the very margin, basal ones next to the costa and costules elongated forming arches, the rest of the areoles suboval or oblong, sori continuous from the base nearly to the apex, stipes and rachises castaneous very glossy.—*Litobrochia sinuata*, Brackenr. *Fil. of U. S. Expl. Voy.* p. 110. t. 14.

Hab. Ovolau, Feejee Islands, in thickets, at an altitude of 2000 feet, Brackenridge, Milne in Denham's *Voyage of H.M.S. Herald*, n. 290; Dr. Lyall, from Voy. of Captain Erskine, R.N. Angau (same group), Milne, n. 263. Aneiteum, M'Gillivray and Milne.—Mr. Brackenridge has given an excellent plate of this Fern in the Bot. of the U. S. Voyage above quoted. He describes it as a Fern which is subscandent, 18 feet and upwards in height. Dr. M'Gillivray notices it as "climbing in woods, on mountains, with the habit of *Lygodium*." This habit, together with the large size of the pinnules and their uniformly anastomosing venation, would seem to be sufficient for keeping it distinct from *Pt. incisa* (*Vespertilionis* of most authors), were it not for the *Pt. Brunni*, which, though

ments long and acuminate. (TAB. CXL.)— β . pinules almost a foot long glabrous slightly glaucous beneath sinuato-lobate with mostly obtuse lobes.

Hab. Western Africa, south of the tropics, *Dr. Curror*.—The late Dr. Curror collected these in Western Africa in or near Elephant's Bay, about lat. 32° S., but large as our specimens are they have the appearance of being at most only primary pinnae: they exhibit nothing of the ramification of the entire plant. Nor am I sure that I am correct in placing it in this group, or section, of which it wants the entirely glabrous and glossy rachises, yet our specimens of var. β have so much the general appearance of *Pt. sinuata*, Brackenr., that at one time I was disposed to consider them specifically the same.

122. Pt. (*Litobrochia*) *stipulacea*, Hook.; frond ample bipinnate, pinnæ a foot and a half long opposite long-petiolate, petioles swollen at the base and furnished at the anterior base with a pair of orbicular foliaceous appressed auricles or stipules, pinnules (6 inches long) remote petiolulate gradually acuminate quite entire obliquely cuneate at the base, terminal one and lowest pair subhastate chartaceous opaque pale and subglaucous beneath where the costa is prominent, veins copiously and nearly uniformly anastomosing forming oblong 6-sided areoles having an obliquely patent direction those next the costa rather the largest, involucre continuous narrow firm almost the texture of the frond, stipes (portion only) and rachises and costa beneath rich castaneous very glossy.

Hab. Mountains of Sarawak, Borneo, elev. 2700 feet, *Thos. Lobb*.—A pair of pinnæ and a portion of the stipes are all I possess of this very beautiful and very distinct species of *Pteris*. I refer it with little hesitation to the *Histiopteris* (or *Vespertilio*) section, although it has pinnules so much larger, longer than, and different in shape from, any known of that group. The very remote petioles of the pinnæ (almost invariably sessile in the described species of this group) would seem to militate against such an opinion, but if the stipules are to be considered as reduced pinnules, which is probably the case, or auricles, we have a feature common to others of the group. The two pinnæ in our possession are nearly a foot and a half long, exactly opposite, broad ovate in circumscription, again pinnate with very remote nearly opposite petiolulated pinnules 2-3 inches apart. Petioles much swollen at the base, and furnished on the anterior side with a pair of circular, foliaceous, appressed stipules, 2-3 lines broad. Pinnules from 5 inches to a span long, on petiolules 1-3 lines long, linear-lanceolate, gradually acuminate, obliquely cuneate at the base, rarely (terminal and inferior ones) subhastate, or sometimes imperfectly lobed. The venation is throughout copiously reticulated (no free veins), the areoles oblong. Stipes and rachises rich chestnut-colour, very glossy, as if varnished, and there is an indication of their being (as well as the under side of the pinnules) glaucous when recent.

§ AMPHIBLESTRA.—Primary veins pinnated, remote; these are connected by lesser transverse curved ones, and the interstices are occupied by reticulated veinlets, in the areoles of which are free, straight or curved branches.

123. Pt. (*Amphiblestra*) *latifolia*, H.B.K.; frond ample

membranaceous trifoliolate, lower pinnules opposite broad-oblong acuminate obliquely truncate at the base and nearly sessile, intermediate one very large long-petiolate subcordate trifid, its lateral segments oblong acuminate, intermediate one very large ovate acuminate sinuato-lobate, sori narrow continuous even to the apices.—*H.B.K. Nov. Gen. et Sp. Am.* i. p. 14. *Willd. Sp. Pl.* p. 370. *Kze., in Schkh. Fil. Suppl.* ii. p. 43. t. 118. *Amphiblestra latifolia, Presl, Tent. Pterid.* p. 150. t. 6. f. 1. *Hook. Gen. Fil. Suppl.* t. 120 C. *Fée, Gen. Fil.* p. 140. t. 11 B. f. 1, 4, 8.

Hab. Venezuela: Quebrado del Cuchivano, near Cumanacoa, *H.B.K.*: mountains of Caripe, elev. 3000 feet, *Funck, n.* 201.—In the venation of the frond this section (Genus *Amphiblestra*, Presl) corresponds with the section (or Genus) *Gymnopteris* in *Acrosticheæ*, *Drynaria* in *Polypodicæ*, etc. The only species known to us, is a very fine one, and apparently of rare occurrence. Presl has indeed an *Amphiblestra? longifolia*, Tent. Pterid. p. 157, but a name only, for I am not aware that it is anywhere described.

[Obs. Of the Genus *Pteris*, as above considered, very many other supposed species might have been enumerated, but so imperfectly described that it would only have encumbered our pages with useless names, of the very affinities of which species we are wholly ignorant. We fear that more than enough of dubious species are already recorded, nor are we over-confident as to the permanency of some of our own. But we have endeavoured, by our diagnoses and remarks, and, as much as our work would admit, by figures, to render them intelligible to the student.]

11. CERATOPTERIS, Brongn.

Ceratopteris, "*Brongn. Bullet. Soc. Philom.* p. 184, cum ic. (1821)." (*HOOK. GEN. FIL. TAB. XII.*) *Teleozoma, Br. Bot. App. to Frankl. first Journey to the Polar Sea* (1823), p. 54. *Ellobocarpus,* Kaulf. "Entw. d. Fahrenkr."* *Furcaria, Desv.* (1827). *Acrostichum, Linn. Pteris, Sw. Willd. Beauv.*
Barkeria (Hook. Gen. Fil. (1825) tab. L.)

nuous, arising from two principal longitudinal anastomosing veins or *receptacles* on each side costa and the margin. *Capsules* lax, scattered, subglobose, sessile, obscurely reticulated; broad, nearly complete, or reduced to five or six iculations, or quite obsolete. *Involucre* membraninous, formed of the reflexed margins of the are broad, and meet at the back. *Seeds* or very large, obtusely trigonal, each of the three fully concentrically striated, filled with an oleance.—*Tropical aquatic Fern, floating, or attached in shallow waters, very peculiar in habit and mode of growth, extremely variable in form.* Roots tufted. Fronds subsucculent when fresh, pellucido-punctate when dry, and fertile different, several from the same root, sterile and fertile different. Sterile subfoliaceous, simple or divided: young and less divided ones horizontal, more advanced, bi-tripinnate and much dissected, *ct*; veins all anastomosing. Fertile ones generally like the sterile, bi-tripinnate, with linear, obtuse, some-seg segments, everywhere soriferous. Stipites inflated, with large air-cells.

pteris thalictroides.

ris thalictroides, Brongn. l. c. Hook. Gen. Fil. l. c. p. 83. Brackenr. Fil. U. St. Expl. Exped. p. 67. thalictroides, Sw. Syn. Fil. p. 98. Willd. Sp. Pl. v. Acrostichum thalictroides, Linn. Sp. Pl. p. 1527. Fil. . t. 4. Acrostichum siliquosum, Linn. Sp. Pl. 7. Zeyl. n. 376. Amæn. Acad. i. p. 270. f. 3. thalictroides, Br. in Frankl. Journ. l. c. p. 54. Gaudichaudii, Brongn. in Frey. Voy. Bot. i. p. 393. fertile fronds only). Ceratopteris Richardii, Ad. Class. d'Hist. Nat. iii. p. 531. Pteris cornuta, Oware et de Ben. p. 63. t. 38. Le Prieur, Ann. xix. p. 99. t. 3 (young proliferous fronds, capsule, Pt. succulenta, Roxb. in Cal. Journ. of Nat. Hist. Ellobocarpus oleraceus, Kaulf. En. Fil. p. 148. quosa, Mirb. Parkeria pteridioides, Hook. Exot. id 231. Hook. et Grev. Ic. Fil. t. 97. Ceratopteris Sm. Metten. Parkeria Lockhartii, Hook. et Grev. t. 97. Millefolium aquaticum, Rumph. Amb. vi. . f. 1. Planta siliquosa, Pluk. Alm. t. 15. f. 3.

Hab. Tropical and subtropical regions, Asia, Africa, and America, growing in quiet or slightly current waters. India: abundant in the "Gheels" and other still pools, frequently such as are occasionally dry, in all the warm regions, from Punjab (*Jacquemont*), in the north-west to the extreme south, *Wallich*, *Griffith*, *Wight*, *Hooker* and *Thomson*, etc.; and to Chittagong in the east, *Hooker* and *Thomson*, and Moulmein, *Rev. C. S. P. Parish*; Singapore, *Wallich*; Penang, *Norris*. Java, *Blume*. Luzon, *Brackenridge*. Isle of Negros (Philippines), *Cuming*, n. 344. East coast of Timor, *All. Cunningham*. Ladrões, *Gaudichaud*. Hongkong, *Dr. Lorraine*. Tropical Australia: S. Goulburn Islands, *All. Cunningham*; Roper's River, Gulf of Carpentaria, *Ferd. Mueller*. Africa: "in salt waters not far from the sea," Oware, *Palisot de Beauvois*; turfy and marshy places, Senegambia, *Leprieur*, *Brunner*. Madagascar, *Boivin*. Tropical America: French Guiana, *Richard*, *Leprieur*; British Guiana, *C. S. Parker*. West Indies: Jamaica, *N. Wilson*; St. Vincent, *Dr. Wright*; Trinidad, *Lockhart*, *Purdie*. Brazil, *Gardner*, n. 344, 5667, 6111, 1239, and 4397. Bahia, *Saltzman*. New Granada, *Goudot*. Santa Martha, *Purdie*. Mexico, province of Oaxaca, *Liebmann*.

This highly curious and, in form, extremely variable aquatic Fern, has been greatly misunderstood as to its genus and its specific limits, and I plead guilty in having myself contributed to this misunderstanding. I have constituted a new Genus of what I am now satisfied is a legitimate *Ceratopteris* of Brongniart, and I have made two species, both of which may safely be allowed to merge into the *C. thalictroides*, Brongn. (the old *Acrostichum thalictroides*, Linn.). My genus in question, *Parkeria*, was founded upon an aquatic Fern of British Guiana, which I received from my friend C. S. Parker, Esq., in 1824, a period of time when *Ceratopteris* was scarcely known to me, and when it was only known to any one as an East Indian Fern: sufficiently so, however, I believed, to justify me in constituting a new genus, and even a new Order, of *Filices*, seeing that our plant had capsules quite destitute of annulus, while Mr. Brown had recently characterized *Ceratopteris*, his *Teleozoma*, as having "capsule sessile, annulo completo latissimo" (see Hook. Exot. Flora, under tab. 147). Afterwards, on figuring the same plant in the 'Icones Filicum,' from living specimens, Dr. Greville and myself detected a small and very obscure annulus, of from 4-6 articulations, yet of a nature to induce our retaining the genus, and even the Order; ignorant still of Brongniart's having previously, namely in 1821, constituted his Order *Ceratopterideae*. On the present occasion it has behoved me to reconsider my former views, with the aid of extensive suites of specimens which had been accumulating in my herbarium, from the Old and the New World. These showed the most perfect uniformity of external character in all, so that, unless there was a real and tangible difference in the minute organs of fructification, there could be no possibility of distinguishing

real similarity of habit and structure, but because I cannot find a better name than *Pteris*, which has been retained by all other botanists who have retained it among Ferns. Fée excludes *Pteris* and Préal from all the Fern alliances, even the *Pseudo-Filices*, called. Brongniart considers it should rank in the tribe of *Gleichensaceae*. He has placed it on two occasions, once (Prodr. Nov. Holl. p. 154) under *Pteris* again (App. to Frankl. Journ. l. c.) under his *Cryptogramme*, next to *Pteris* placed by Desvaux; and in another place (Plant. Jav. R. ar. p. 5) he writes, "That subgeneric or sectional characters may in several instances be assisted from the seeds of this Natural Order is not improbable, in the case, namely, *Ceratopteris* (or *Teleosoma*), including *Parkeria* in that genus, *the generic character* (as distinguished, we presume, from *Pteris* and *Asplenium*) *appears chiefly to reside in the seeds*, which in their unusual size and marking or striation entirely agree in all the species of the genus, in the original species the annulus is nearly complete; and in *Parkeria*, on the rest of the genus in no other point whatever, the ring is reflexed and faint striate." Kaulfuss includes it in his *Blechnaceae*, along with *Asplenium* and *Lomaria*; J. Smith in his tribe *Polypodiceae*, next after *Pteris*; T. Moore between *Schizaea* and *Osmunda*; Mettenius near *Polytaenium* between *Lecanopteris* and *Gymnogramme*; and, lastly, Liebmann, between *Blechnaceae* and *Hymenophylleae*.

The name *Pteris* Beauvois is probably in error in believing his *Pteris cornuta* (under *Ceratopteris thalictroides*) to have been found in salt water. Neither in the East nor elsewhere is such a locality ascribed to it by any traveller. In the Archipelago this Fern is boiled and eaten by the poor as a vegetable.

The present SUBORD. IV. PTERIDÆ, will be continued and concluded in part of our next volume.

ADDITIONS.

Two new species of *Adiantum* and of *Pellea*, discovered since the present volume was completed, are too important to be omitted in this volume. The figures referred to will be given in Vol. III.

Adiantum asarifolium, p. 2 of this Volume, insert—

Adiantum Parishii, Hook.; small cæspitose no distinct peduncle, roots few fibrous tomentose, fronds orbicular or elliptical membranaceous pellucid, sterile ones crenato-dentate ones pauci-(3-5-)lobate, sinuses deep soriferous, originating from the base flabellato-divergent repeatedly pinnatifid, stipes slender filiform ebeneous-black shining reddened at the summit. (TAB. CXLII. A. in Vol. III.) *il. Exot. i. pl. 51.*

Malay Peninsula. On a limestone, rocky mountain near Moulmein, a-Kabin, at an elevation of 2000 feet above the sea, *Rev. C. S. P.* This extremely interesting *Adiantum*, belonging to a small group of *Pteris*.
L. 11. 2 1

species, of which only two kinds were yet known, and those of very limited geographical range, with simple (undivided) fronds, and from which it is abundantly distinguished in form, texture, and fructification, was discovered by my valued correspondent, a great lover of Ferns, the Rev. C. S. P. Parish, Chaplain at Moulmein. It inhabits, as far as yet known, only one spot on the said mountain, a large mass of rock, about 200 feet below the summit, very difficult of access, and in some lime, the result of the continued filtering and dropping of the rains from a cave above. There it is "tolerably abundant over the space of a few feet, as *Woodsia hyperborea* grows on the eastern precipice of Snowdon, in company with *Cheilanthes farinosa* and other interesting Ferns, but nowhere else has it been seen at all."

The *Adiantum Philippense*, L., which I have, following all preceding botanists, placed in this group (see p. 3 of this volume), is figured by Petiver, the original authority for the plant as pinnate, and I have little doubt but it may be safely referred to *A. lunulatum*, Sw.

After *Pellæa rotundifolia*, p. 136 of this Volume, insert—

7*. *Pellæa Bridgesii*, Hook.; caudex short thick creeping entangled bearing the fronds from the apex clothed with copious subulate ciliated scales, fronds 4–6 inches long oblong-lanceolate firm coriaceous very glaucous pinnated, pinnæ almost invariably opposite (15–21) broad-elliptical cordate short-petiolate very obtuse opaque, the two halves when dry reflected upon each other, veins sunk obsolete, the margin entire with a very slender but not incurved white cartilaginous edge, sori linear on the veins confluent and forming a broad line parallel and a little distance from the margin, involucre none (and no inflection of the margin upon the sori), stipites and rachis dark purple-brown glossy. (TAB. CXLII. B. in Vol. III.)

Hab. Mountains, interior of California, *Bridges*. Sierra Nevada, *Wm. Lobb*.—This is a very remarkable Fern, with much in the habit and in the nature of fructification of *Pellæa* (*Platyloma*, *J. Sm.*) *paradoxa*, *falcata*, and *rotundifolia*, of a singularly glaucous hue, and quite destitute of involucre. In short, as far as the sori are concerned, one can hardly see why it should not range with *Gymnogramme*.

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<i>Kingiana</i> , Endl.	188	<i>Mysurensis</i> , Wall.	208
<i>Kleiniana</i> , Pr.	204	<i>nemoralis</i> , Willd.	202
<i>Kunzeana</i> , Ag.	221	<i>nemoralis</i> , Hook. et	
<i>laciniata</i> , Willd.	176	Arn.	225
<i>lata</i> , Wall.	160	<i>nemoralis</i> , Hook.	180
<i>lanceæfolia</i> , Ag.	212	<i>nemoralis</i> , Wall.	188, 189
<i>lanceolata</i> , Desf.	157	<i>nervosa</i> , Thunb.	160
<i>lanuginosa</i> , Ag.	196	<i>nitidula</i> , Wall.	113
<i>lasiopteris</i> , Bojer	146	<i>nivea</i> , Bl.	230
<i>lata</i> , Kaulf.	221	<i>Novæ-Caledoniæ</i> , Hook.	
<i>lata</i> , Lk.	185		189
<i>latifolia</i> , H. B. K.	233	<i>nudiuscula</i> , Br.	151
<i>latiuscula</i> , Desv.	196	<i>obliqua</i> , Försk.	157
<i>latizona</i> , All. Cunn.	135	<i>oblongifolia</i> , Colenso	136
<i>laurea</i> , Desv.	166	<i>obscura</i> , Bojer	145
<i>leptophylla</i> , Sw.	173, 216	<i>opaca</i> , J. Sm.	158
<i>ligulata</i> , Gaud.	184	<i>orbiculata</i> , Houtt.	80
<i>linearis</i> , Poir.	226	<i>Orizabæ</i> , M. et Gal.	223
<i>litobrochioides</i> , Kl.	178	<i>paleacea</i> , Roxb.	186
<i>lomariacea</i> , Kze.	133	<i>pallida</i> , Raddi	230
<i>lomariacea</i> , var.	132	<i>palmata</i> , Willd.	208
<i>longibrachiata</i> , Ag.	227	<i>palustris</i> , Gaud.	191
<i>longifolia</i> , L.	157	<i>palustris</i> , Poir.	185
<i>longipinnula</i> , Wall.	179	<i>papyracea</i> , Fée	212
<i>longipes</i> , Don	226	<i>patens</i> , Hook.	177
<i>lorigera</i> , Wall.	197, 199	<i>paucinervata</i> , Fée	194
<i>ludens</i> , Wall.	210	<i>pectinata</i> , Don	206
<i>lunata</i> , Retz	11	<i>pedata</i> , Kze.	132
<i>luxuriosa</i> , Kze.	168	<i>pedata</i> , L.	208
<i>macilenta</i> , A. Cunn.	219	<i>pedata</i> , var., L.	77
<i>macroptera</i> ?, Lk.	223	<i>pedatoides</i> , Desv.	132
<i>Macroua</i> , Willd.	182	<i>pellucens</i> , Ag.	191, 206
<i>Madagascarica</i> , Ag.	171	<i>pellucida</i> , Pr.	161
<i>marattiæfolia</i> , Hook.	177	<i>pellucida</i> , Kaulf.	220
<i>marginata</i> , Bory	226	<i>pentaphylla</i> , Willd.	160
<i>Mascarenensis</i> , Spr.	187	<i>Peruviana</i> , Poir.	142
<i>melanocaulon</i> , Fée	168	<i>pilosa</i> , Auct.	132
<i>microdictyon</i> , Fée	228	<i>Plumieri</i>	182
<i>microdonta</i> , Gaud.	157	<i>Plumierii</i> , Willd.	202
<i>microphylla</i>	174	<i>podophylla</i> , Sw.	227

PTERIS	PAGE.	PTERIS	PAGE.
<i>podophylla</i> , Kze.	221	<i>stenophylla</i> , Hook. et	
<i>podophylla</i> , Schlecht.	223	Grev.	160, 163
<i>Pohliana</i> , Presl	132	<i>sterilis</i> , Pr.	225
<i>polymorpha</i> , Poir.	146	<i>stipulacea</i> , Hook.	233
<i>polytoma</i> , Kze.	208	<i>stipularis</i> , L.	157
<i>prionitis</i> , Fée	165	<i>stridens</i> , Ag.	192
<i>propinqua</i> , Ag.	223	<i>subpedata</i> , Wall.	225
<i>propinqua</i> , J. Sm.	167	<i>sulcata</i> , Meyen	182
<i>Protea</i> , Lieb.	225	<i>Swartziana</i> , Ag.	187
<i>psittacina</i> , Pr.	200	<i>tenuosa</i> , J. Sm.	160
<i>Pseudolonchitis</i> , Bory	205	<i>tenera</i> , Kaulf.	176, 218
<i>pungens</i> , Willd.	182	<i>tenuifolia</i> , Brack.	157
<i>pyrophylla</i> , Bl.	188	<i>tenuis</i> , A. Cunn.	175
<i>quadriaurita</i> , Retz	179	<i>terminalis</i> , Wall.	183
<i>quadrifida</i> , Pr.	215	<i>ternifolia</i> , Cav.	142
<i>repandula</i> , Lk.	182, 194	<i>trapezoides</i> , Burm.	157
<i>reticulata</i> , Desv.	215	<i>Trattinickiana</i> , Endl.	188
<i>revolvens</i> , Ag.	225	<i>tremula</i> , Br.	174
<i>rigida</i> , Sw.	144	<i>tripartita</i> , Sw.	225
<i>rugulosa</i> , Labill.	68	<i>triphylla</i> , Ag.	171
<i>sagittata</i> , Cav.	148	<i>triphylla</i> , Mart. et Gal.	160
<i>sagittifolia</i> , Raddi	207	<i>triplicata</i> , Ag.	205
<i>scaberula</i> , A. Rich.	174	<i>tristicula</i> , Raddi	215
<i>scabra</i> , Bory	186	<i>Tussaci</i> , Fée	229
<i>scabripes</i> , Wall.	165	<i>umbrosa</i> , Br.	162
<i>scalaris</i> , Moritz	200	<i>uniseriata</i> , Poir.	226
<i>semidentata</i> , Fée	172	<i>varians</i> , Raddi	208
<i>semihastata</i> , Wall.	197	<i>varians</i> , Wall.	89
<i>semihirta</i> , Lk.	157	<i>venulosa</i> , Bl.	162
<i>semiovata</i> , Poir.	225	<i>verticillata</i> , Sw.	142
<i>semipinnata</i> , L.	169	<i>Vespertilionis</i> , Lab.	230
<i>semiserrata</i> , Försk.	160	<i>villosa</i> , Sw.	176
<i>septemloba</i> , Kl.	133	<i>viridis</i> , Försk.	110, 146
<i>serraria</i> , Sw.	160	<i>vittata</i> , Bory	160
<i>serrata</i> , Wall.	161	<i>vittata</i> , Willd.	157
<i>serrulata</i> , Försk.	184	<i>Wallichiana</i> , Ag.	205





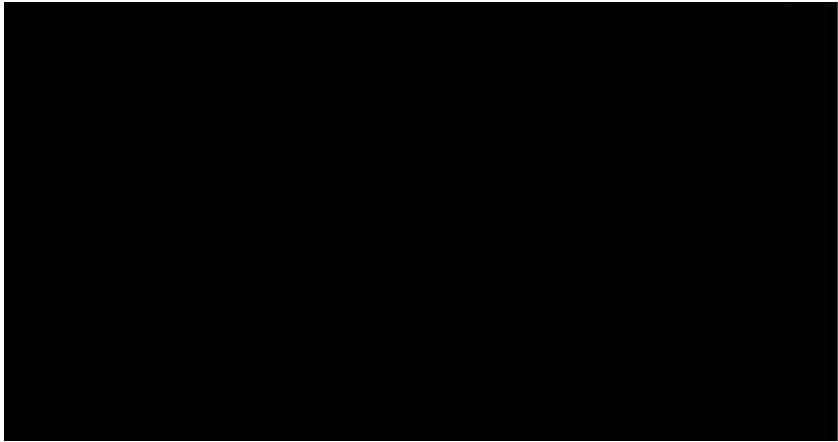
TAB. LXXI.

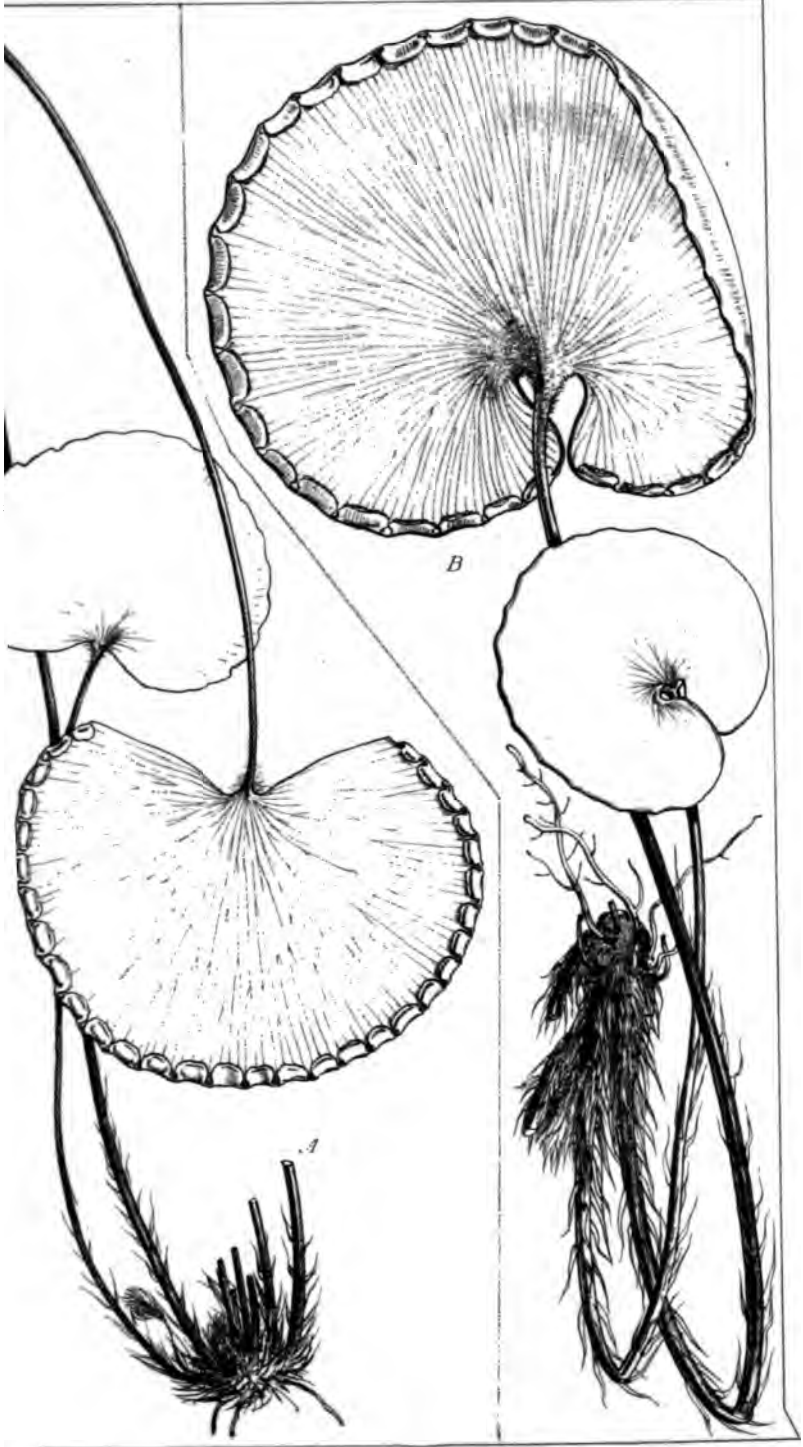
A. *ADIANTUM RENIFORME*, *L.*—p. 2.

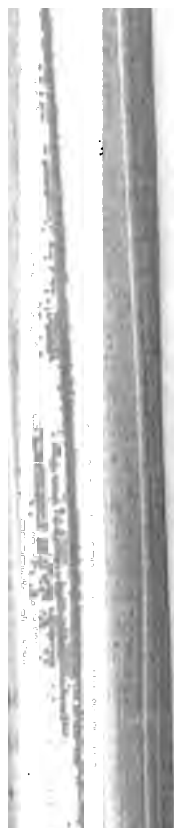
Sterile and fertile frond ; *nat. size.*

B. *ADIANTUM ASARIFOLIUM*, *Willd.*—p. 2.

Sterile and fertile frond ; *nat size.*







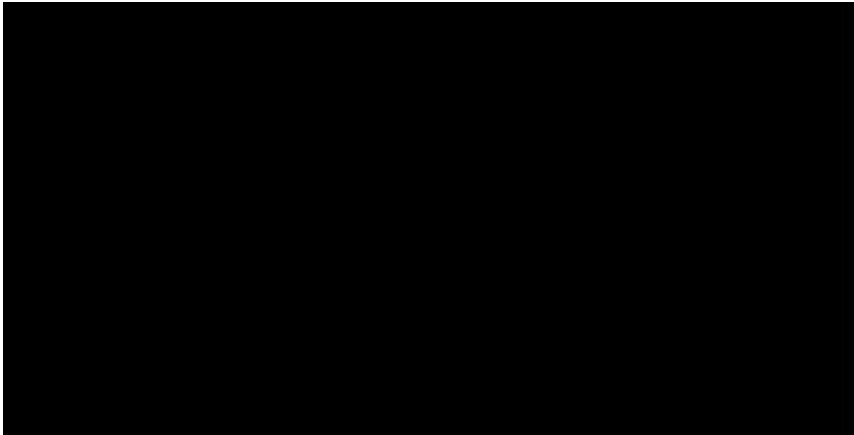
TAB. LXXII.

A. *ADIANTUM WILSONI*, *Hook.*—p. 6.

- Fig. 1. A young and entire frond. Fig. 2; *nat. size.* Fig. 2.
Perfect fertile frond, one pinna removed; *nat. size.* Fig. 3.
Portion of a sorus; *magnified.* Fig. 4. Portion of sterile
pinna, to show the venation; *magnified.*

B. *ADIANTUM PHYLLITIDIS*, *J. Sm.*—p. 5.

- Fertile pinna; *nat. size.*







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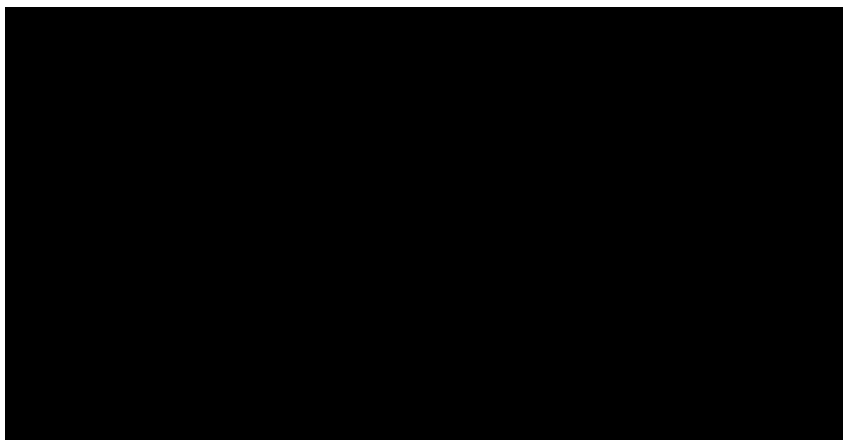
TAB. LXXIII

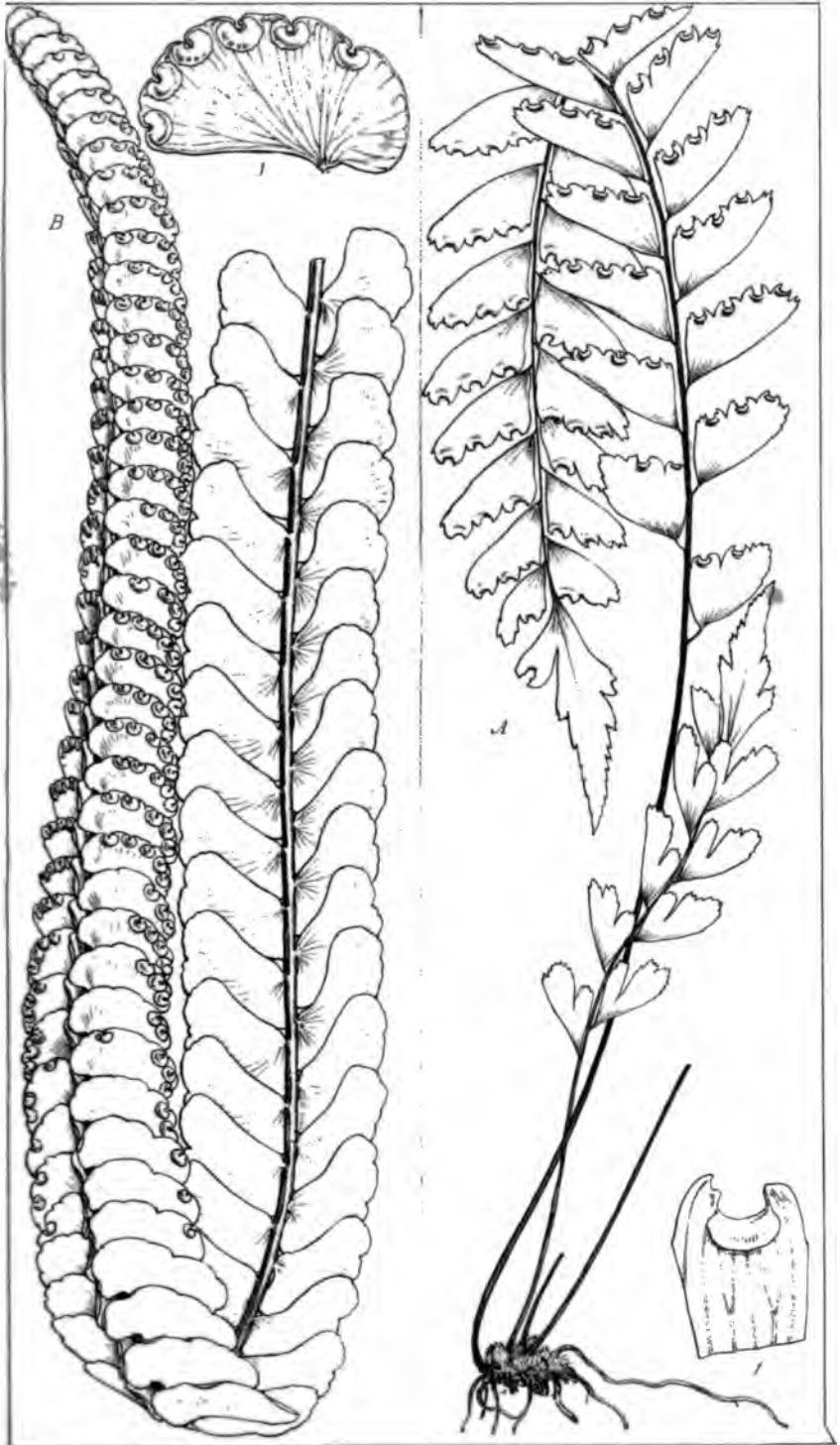
A. *ADIANTUM CUBENSE*, *Hook.*—p. 8.

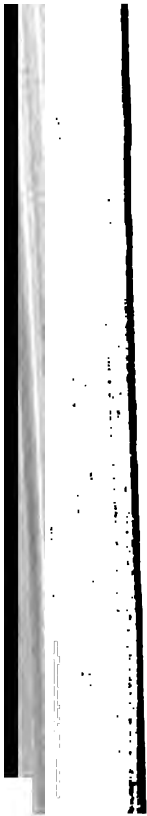
Sterile and fertile frond; *nat. size.* Fig. 1. Sorus; *magnified.*

B. *ADIANTUM SHEPHERDI*, *Hook.*—p. 9.

Portion of the plant; *nat. size.* Fig. 1. Fertile pinna; *magnified.*









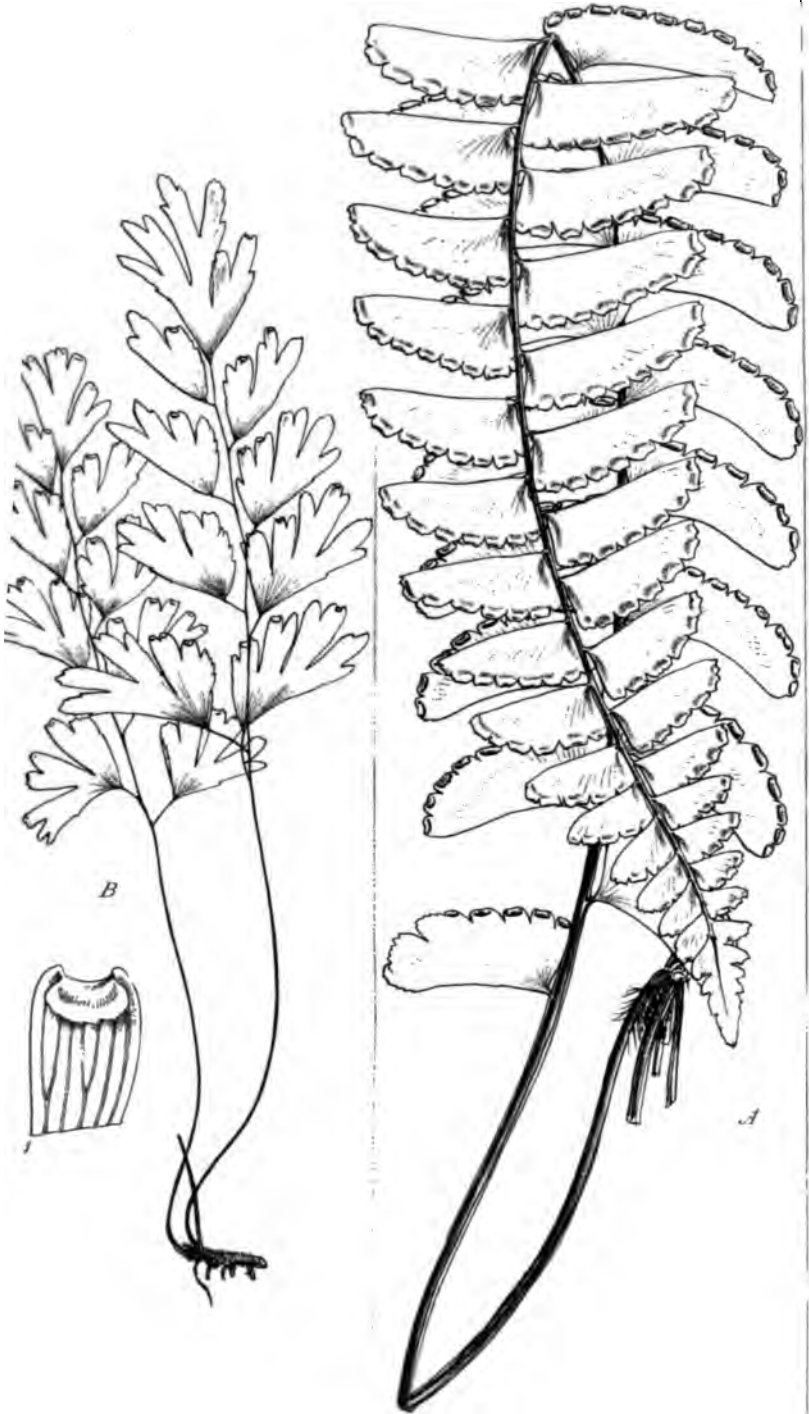
TAB. LXXIV.

A. ADIANTUM SOBOLIFERUM, *Wall.*—p. 13.

Fertile plant; *nat. size.*

B. ADIANTUM CAPILLUS VENERIS, *L.* var. β .—p. 36.

Fertile plant; *nat. size.* Fig. 1. Fertile lobe of a pinnu-
nified.





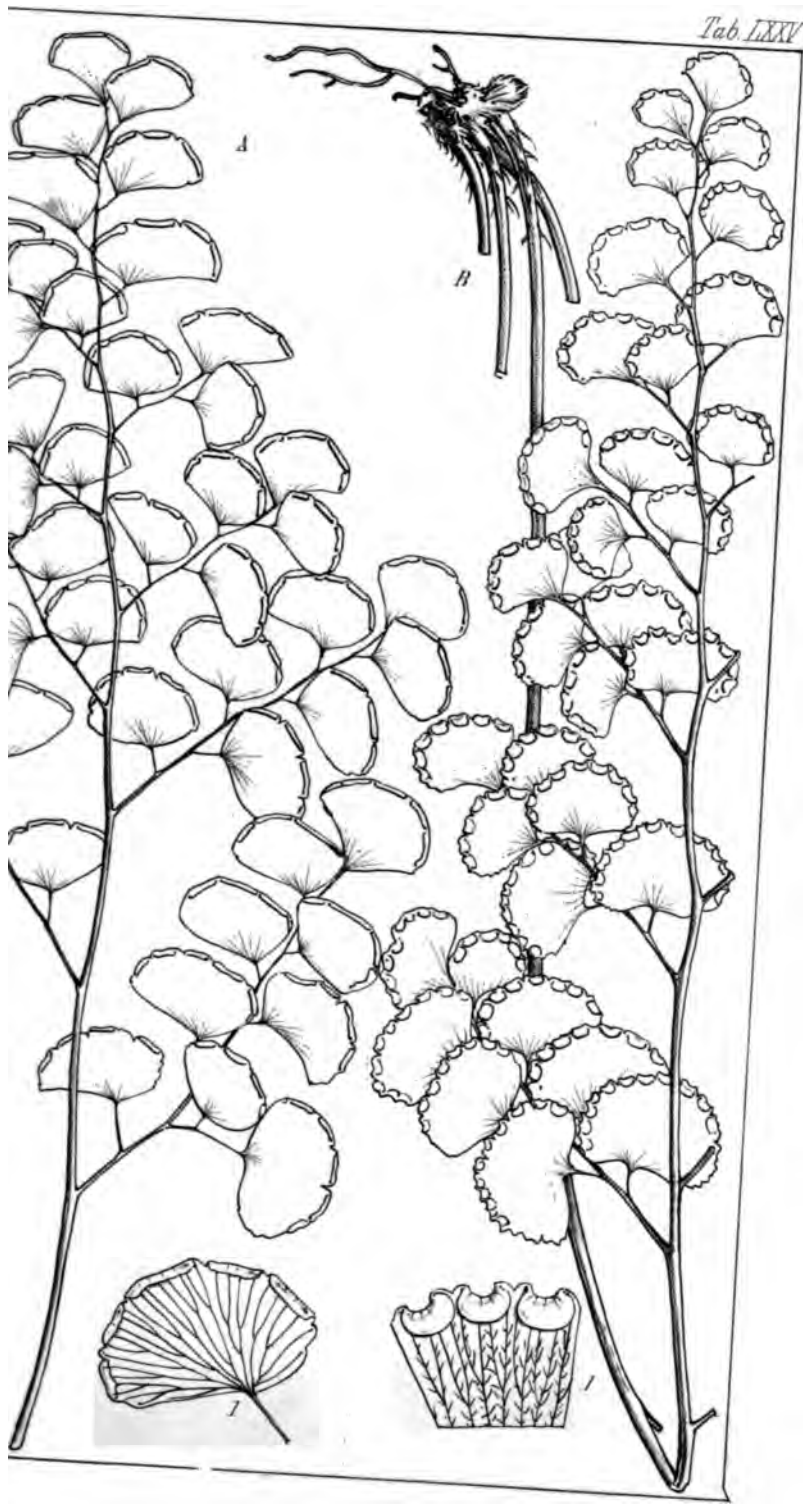
TAB. LXXV.

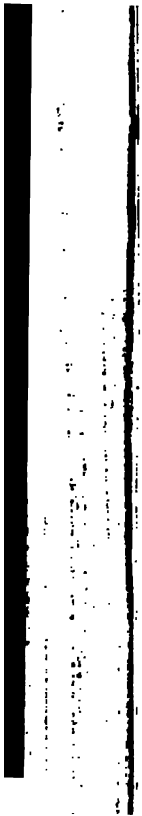
A. ADIANTUM EMARGINATUM, Willd.—p. 39.

Fertile plant; *nat. size.* Fig. 1. Fertile pinnule; *magnifi*

B. ADIANTUM CHILENSE, var. β .—p. 43.

Fertile plant; *nat. size.* Fig. 1. Portion of a pinnule, with
magnified.







TAB. LXXVI.

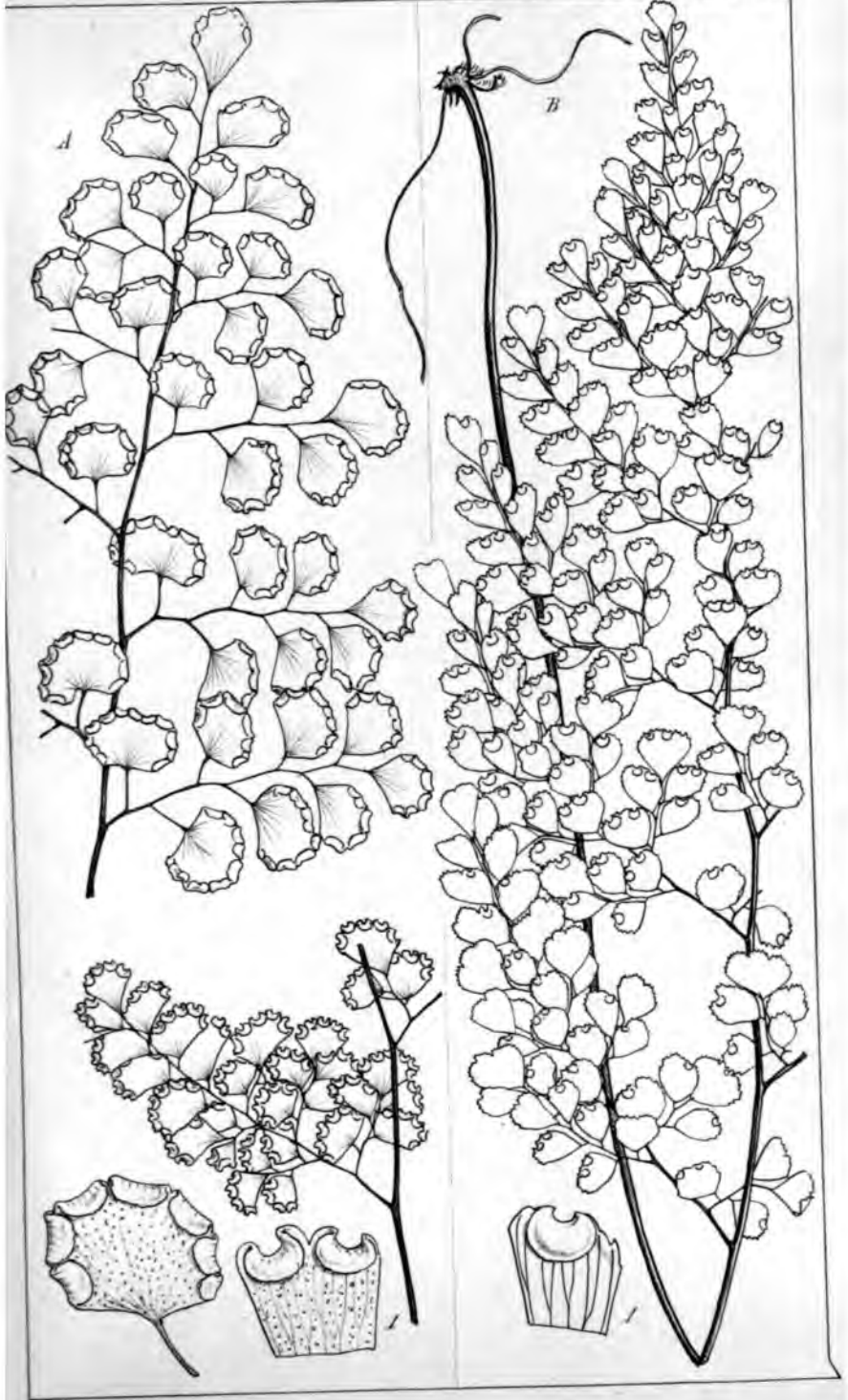
A. *ADIANTUM SULPHUREUM*, *Kaulf.*—p. 43.

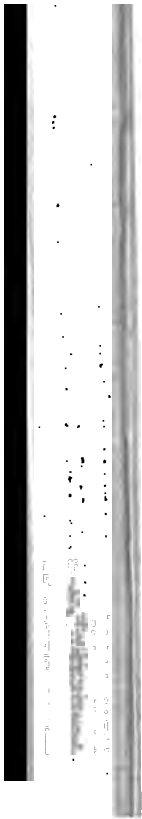
Figs. 1, 2. (Two lower right hand figures), portion of a fertile frond with sori of *a.*; *magnified.* Figs. 3, 4. (Lower left hand figure and upper figure), portion of a frond of *β.*; *nat. size.*: and (lower left hand figure), pinnule with sori; *magnified.*

B. *ADIANTUM VENUSTUM*, *Don.*—p. 40.

Nearly entire plant; *nat. size.* Fig. 1. Sorus; *magnified.*







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TAB. LXXXVII.

A. **HYPOLEPIS CAPENSIS**, *Hook.*

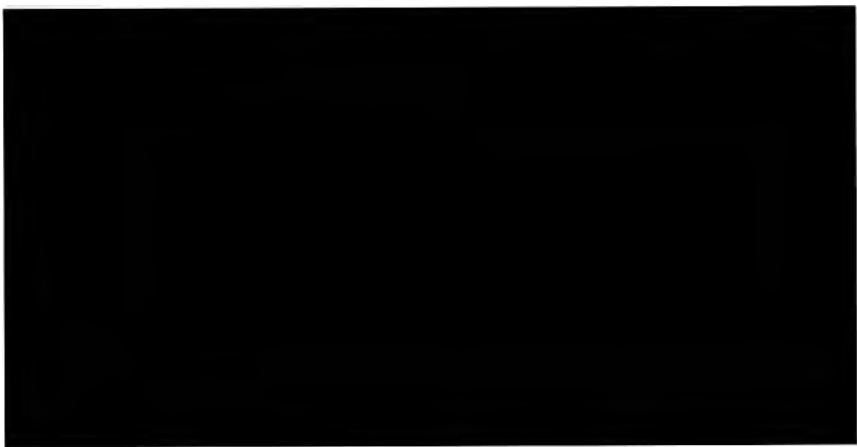
Fertile plant; *nat. size.* Fig. 1. Sterile lobe; and fig. 2, fertile lobe; *magnified.*

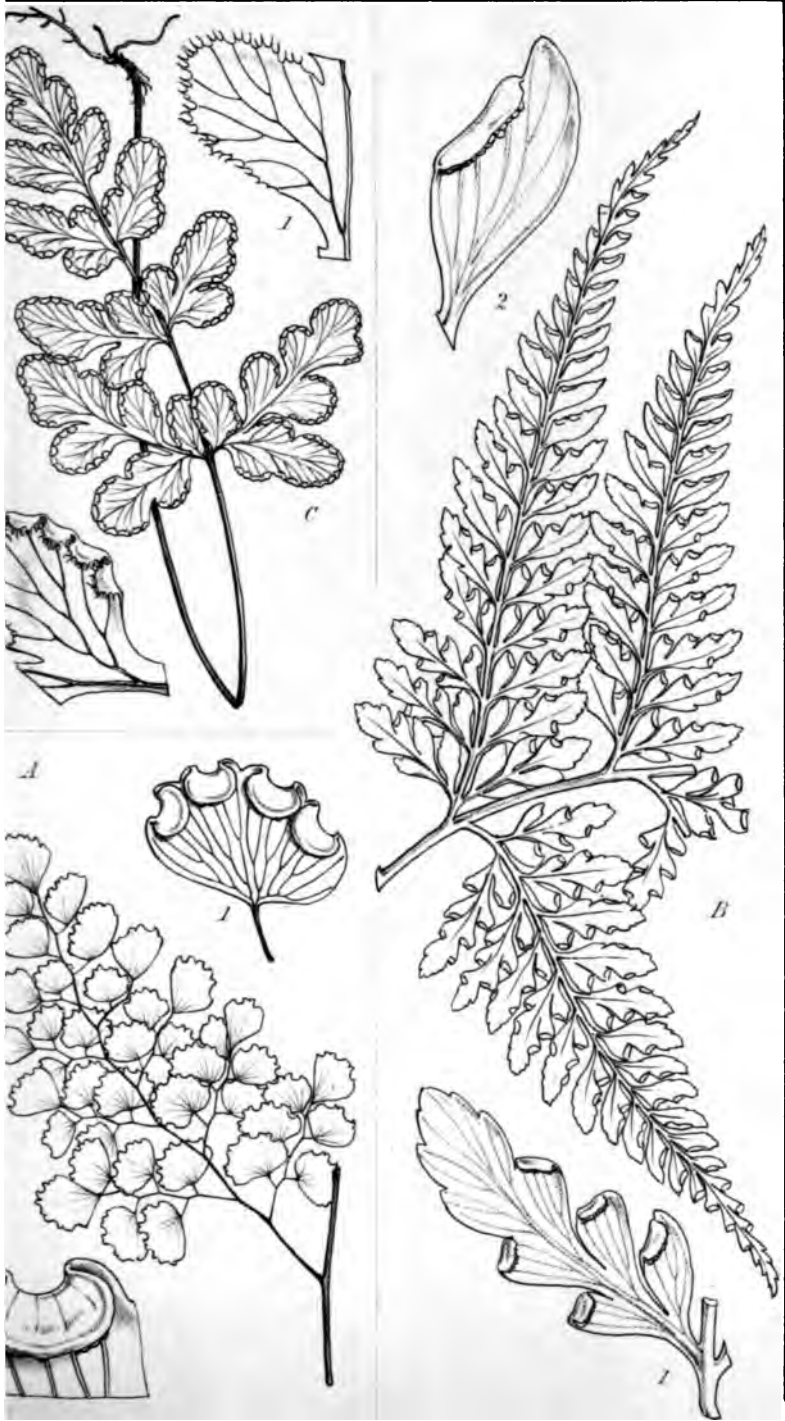
B. **OCHROPTERIS PALLENS**, *J. Sm.*—p. 54.

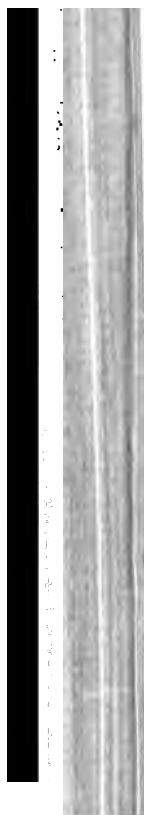
Portion of a fertile frond; *nat. size.* Fig. 1. Fertile pinnule; *magnified.*

C. **ADIANTUM ÆTHIOPICUM**, *L.*—p. 37.

Portion of a frond; *nat. size.* Fig. 1. Fertile pinnule; *magnified.* Fig. 2. Sorus; *more magnified.*







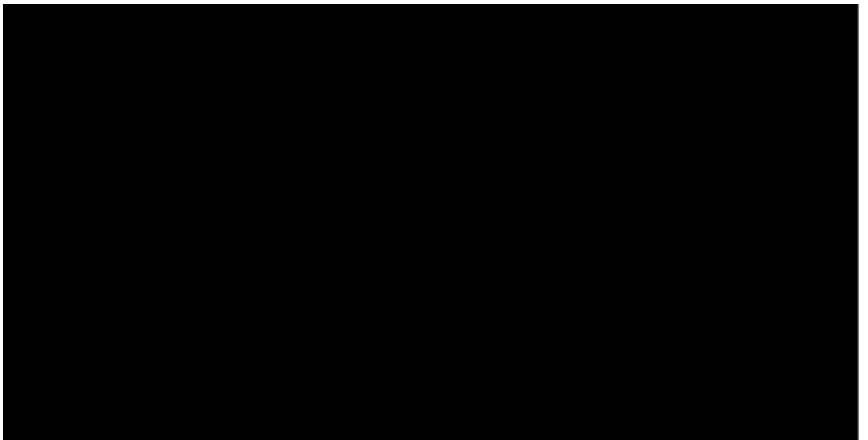
TAB. LXXVIII.

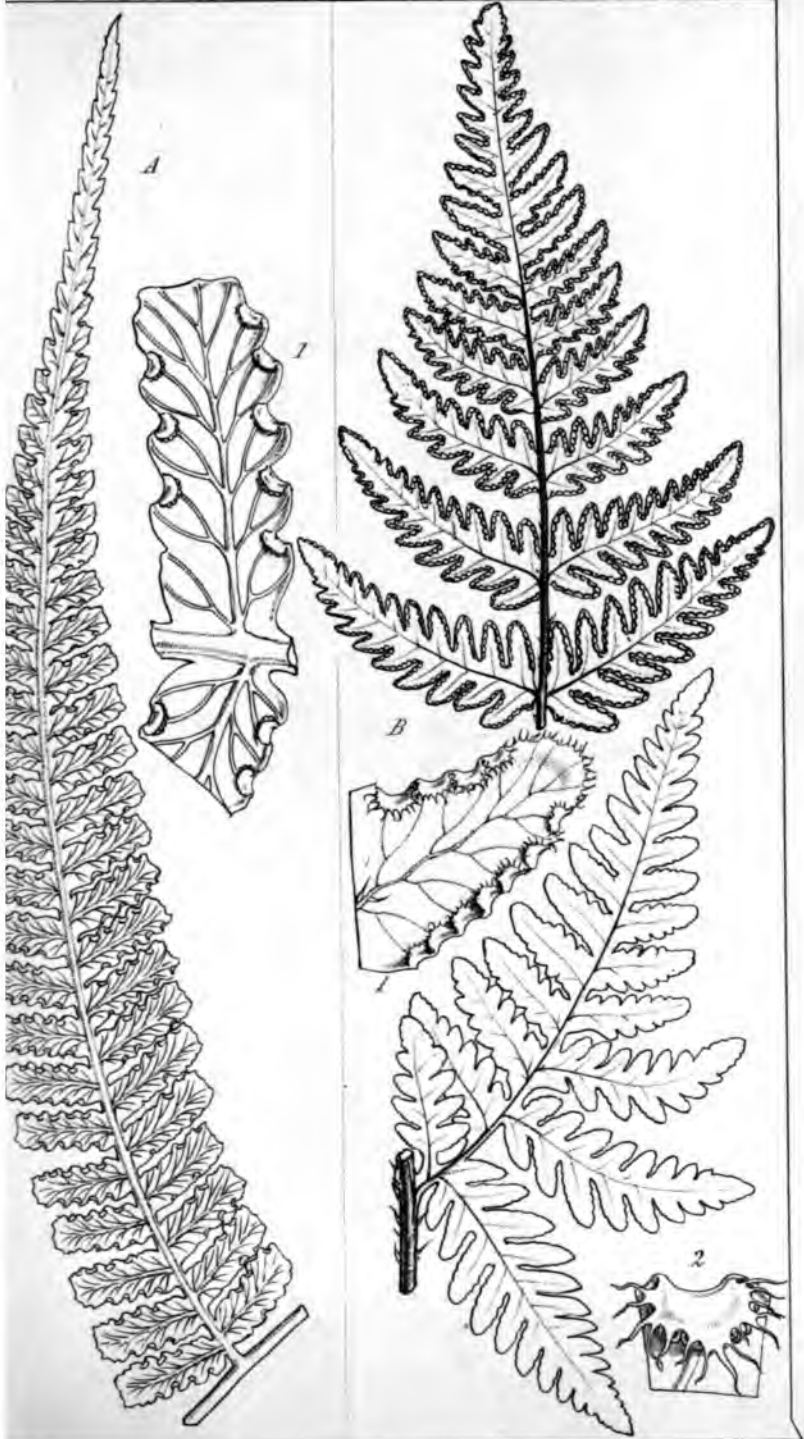
A. *HYPOLEPIS PARALLELOGRAMMA*, Pr.

Fertile ultimate pinna; *nat. size.* Fig. 1. Fertile pinnule; *magnified.*

B. *CHEILANTHES DEALBATA*, Hook.

Upper half of a fertile frond, and a lower pinna of the same (upper side); *nat. size.* Fig. 1. Fertile lobe; *magnified.*
Fig. 2. Sorus; *more magnified.*









TAB. LXXIX.

A. ADIANTUM OBLIQUUM, Willd.—p. 8.

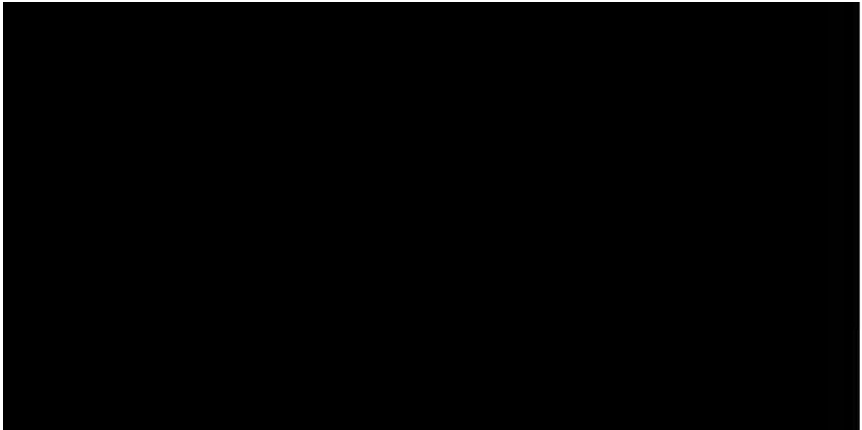
Fig. 1. Sterile pinna of var. β .: *magnified*. Fig. 2. Sori : *magnified*. Fig. 3. Fertile frond ; *nat. size*.

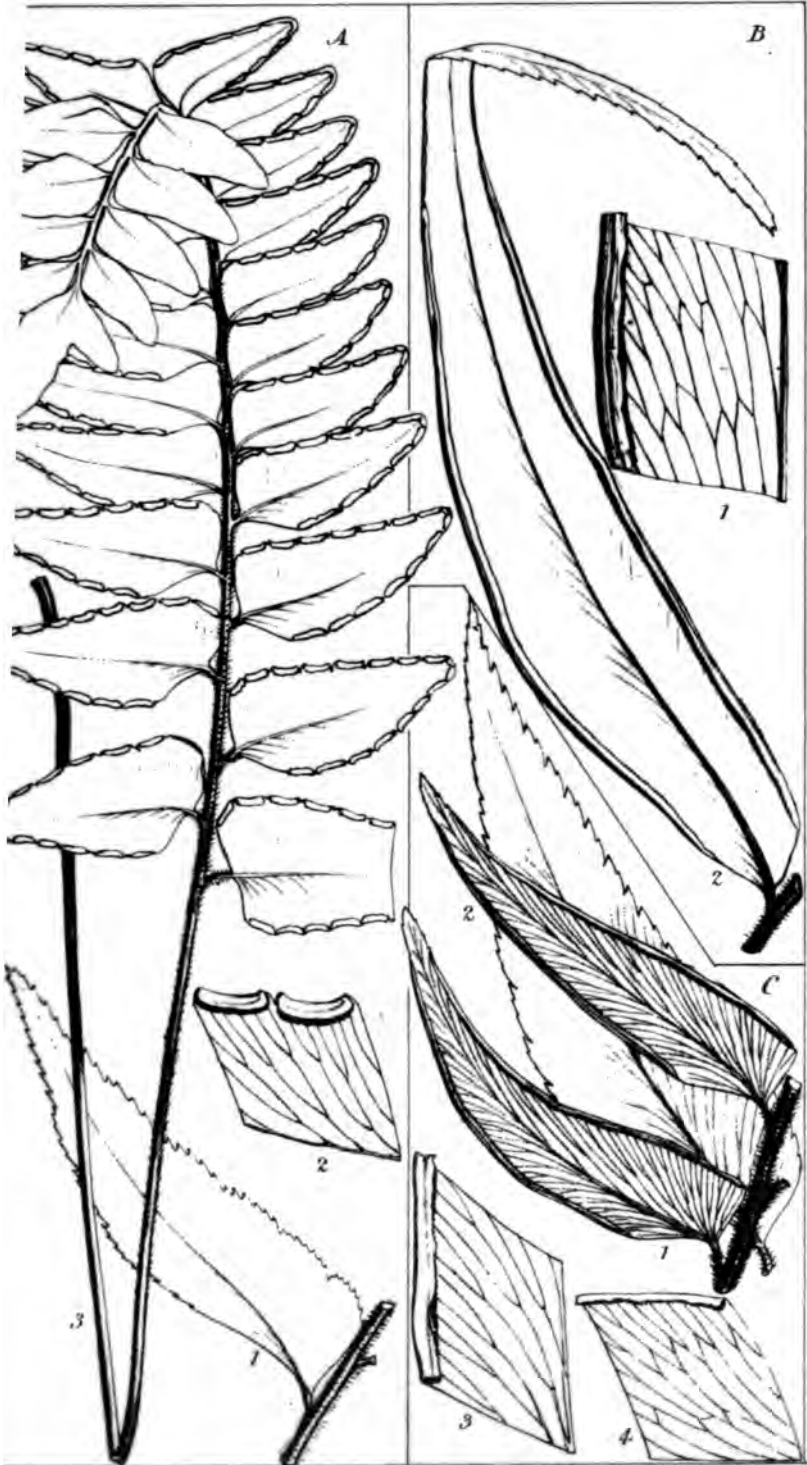
B. ADIANTUM DOLOSUM, Kze.—p. 6.

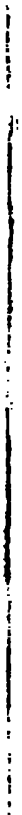
Fig. 1. Portion of a fertile pinna : *magnified*. Fig. 2. Fertile pinna ; *nat. size*.

C. ADIANTUM LUCIDUM, Sw.—p. 4.

Fig. 1, 2. Fertile and sterile pinnæ : *nat. size*. Fig. 3. Portion of a pinna with free veins : and fig. 4, portion of a pinna with anastomosing veins, from the same plant : *magnified*.









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TAB. LXXX.

A. ADIANTUM RHIZOPHORUM, Sw.—p. 12.

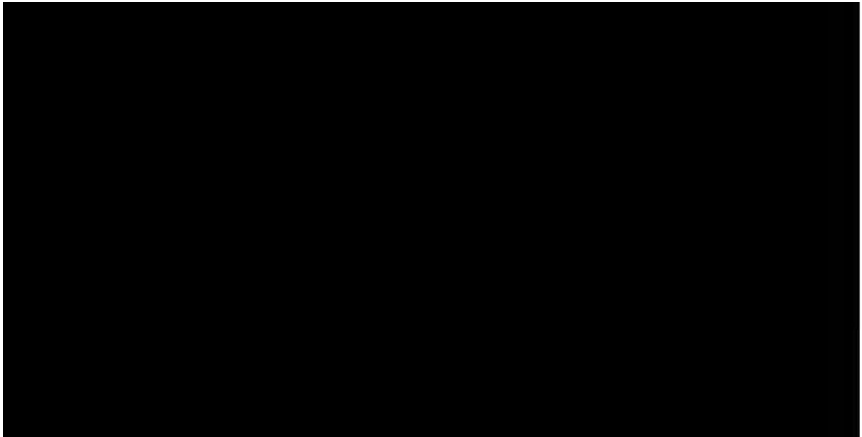
Fig. 1. Portion of a fertile pinnule; *magnified*. Fig. 2. Fertile frond; *nat. size*.

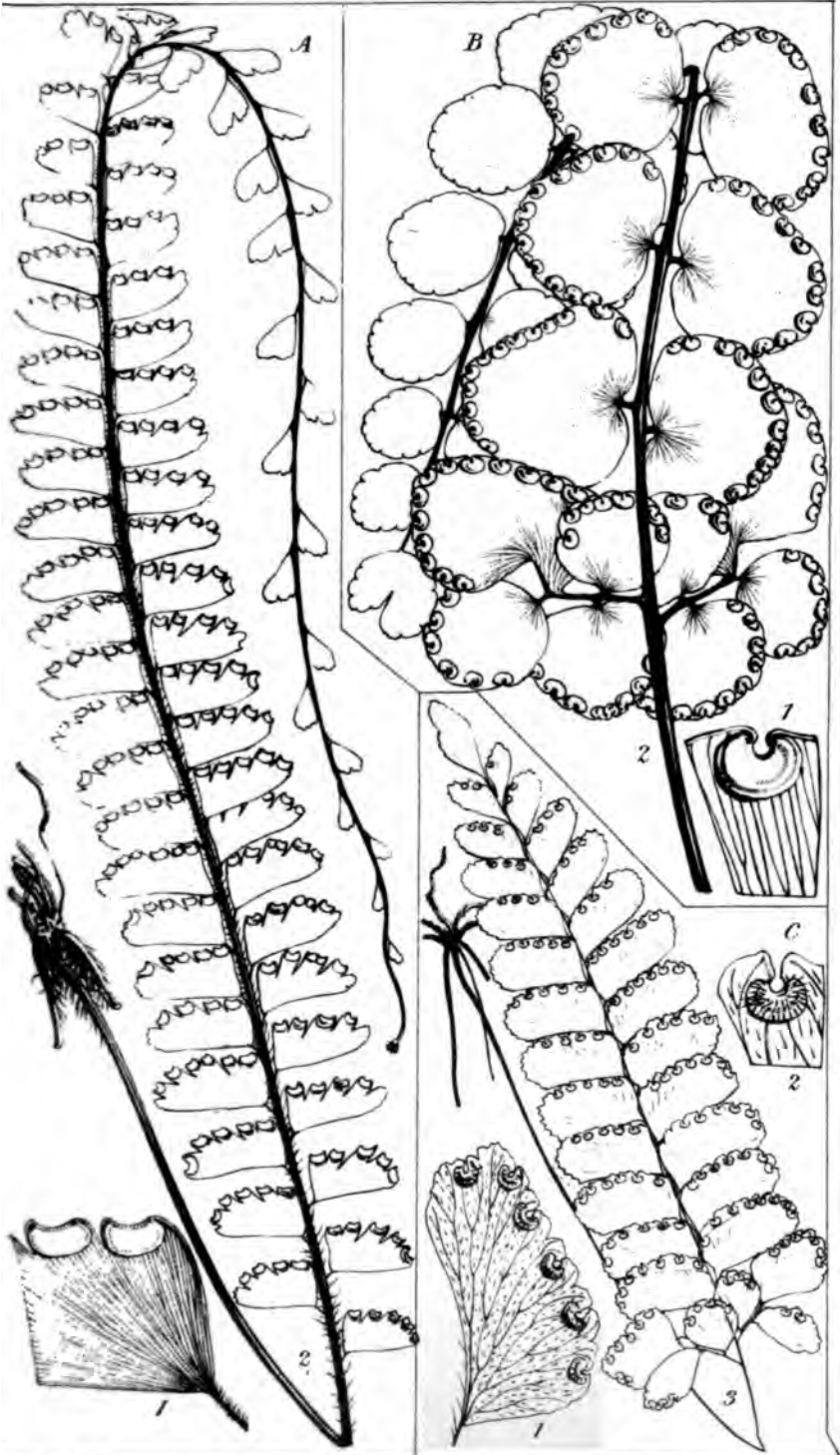
B. ADIANTUM GALEOTTIANUM, Hook.—p. 10.

Fig. 1. Portion of a pinnule, with sorus; *magnified*. Fig. 2. Fertile frond; *nat. size*.

C. ADIANTUM DIAPHANUM, Bl.—p. 10.

Fig. 1. Fertile pinnule; *magnified*. Fig. 2. Sorus; *more magnified*. Fig. 3. Fertile frond; *nat. size*.







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TAB. LXXXI.

A. *ADIANTUM SEEMANNI*, *Hook.*—p. 5.

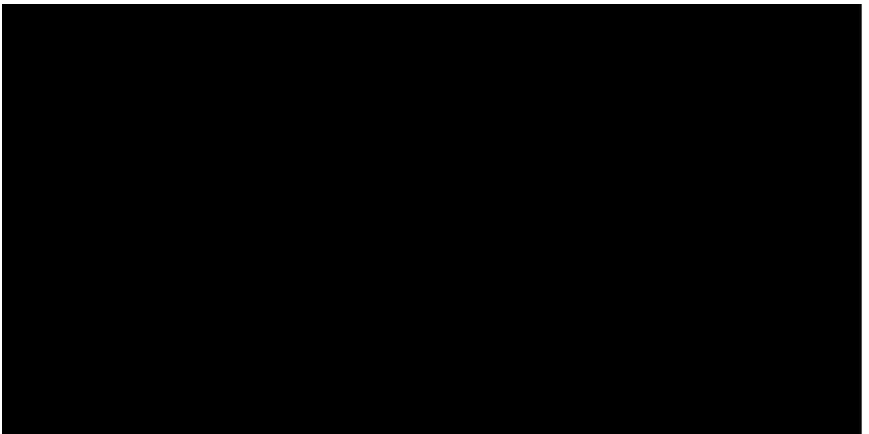
Fig. 1. Sterile pinnule; *nat. size.* Fig. 2. Fertile pinnule; *nat. size.*

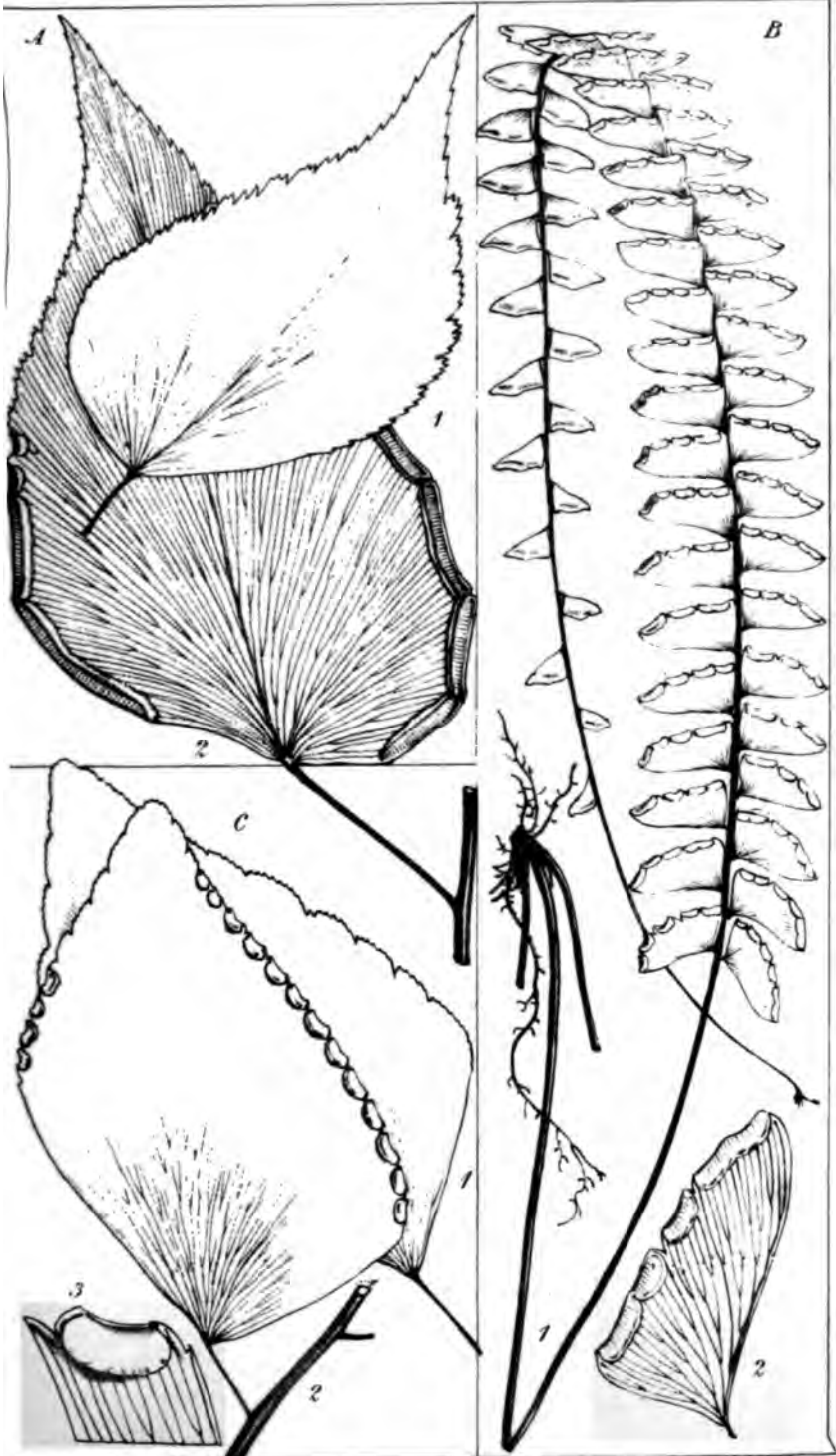
B. *ADIANTUM EDGEWORTHII*, *Hook.*—p. 14.

Fig. 1. Fertile frond; *nat. size.* Fig. 2. Fertile pinna; *magnified.*

C. *ADIANTUM PERUVIANUM*, *Hook.*—p. 35.

Fig. 1. Sterile pinnule; *nat. size.* Fig. 2. Fertile pinnule; *nat. size.* Fig. 3. Sorus; *magnified.*







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TAB. LXXXII.

A. *ADIANTUM HIRTUM*, *Klotzsch.*—p. 20.

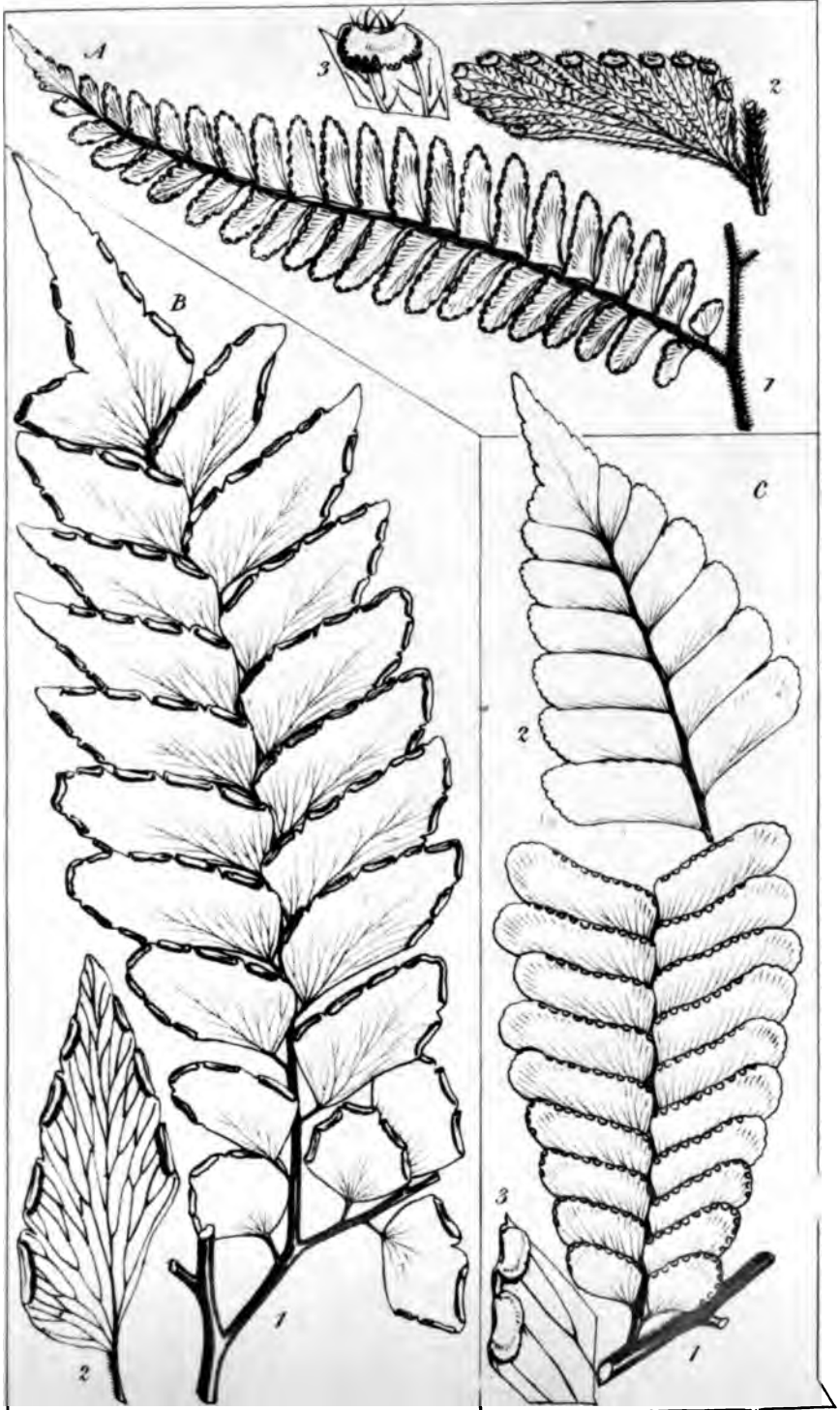
Fig. 1. Fertile pinna; *nat. size.* Fig. 2. Fertile pinnule; *magnified.* Fig. 3. Sorus; *more magnified.*

B. *ADIANTUM LE PRIEURII*, *Hook.*—p. 31.

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. Fertile pinnule; *magnified.*

C. *ADIANTUM KLOTZSCHIANUM*, *Hook.*—p. 21.

Figs. 1, 2. Base and apex of a fertile pinna; *nat. size.* Fig. 3. Sori; *magnified.*





TAB. LXXXIII.

A. *ADIANTUM CARDIOCHLÆNA*, Kze.—p. 50.

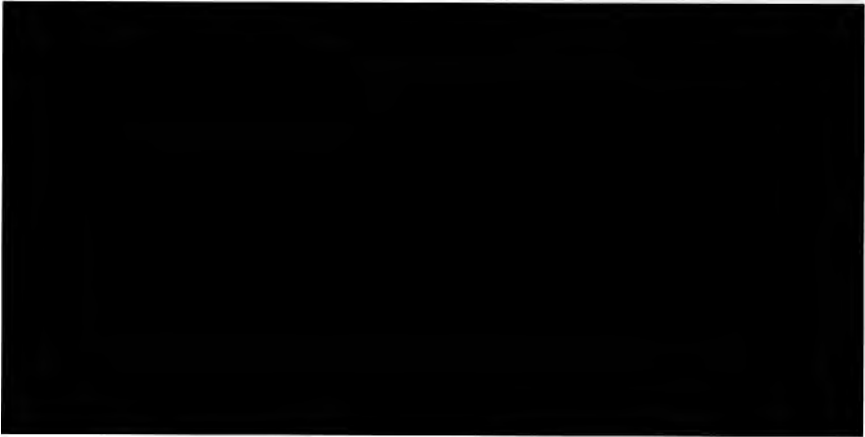
Fig. 1. Fertile pinnule; *magnified*. Fig. 2. Fertile pinna; *nat. size*.

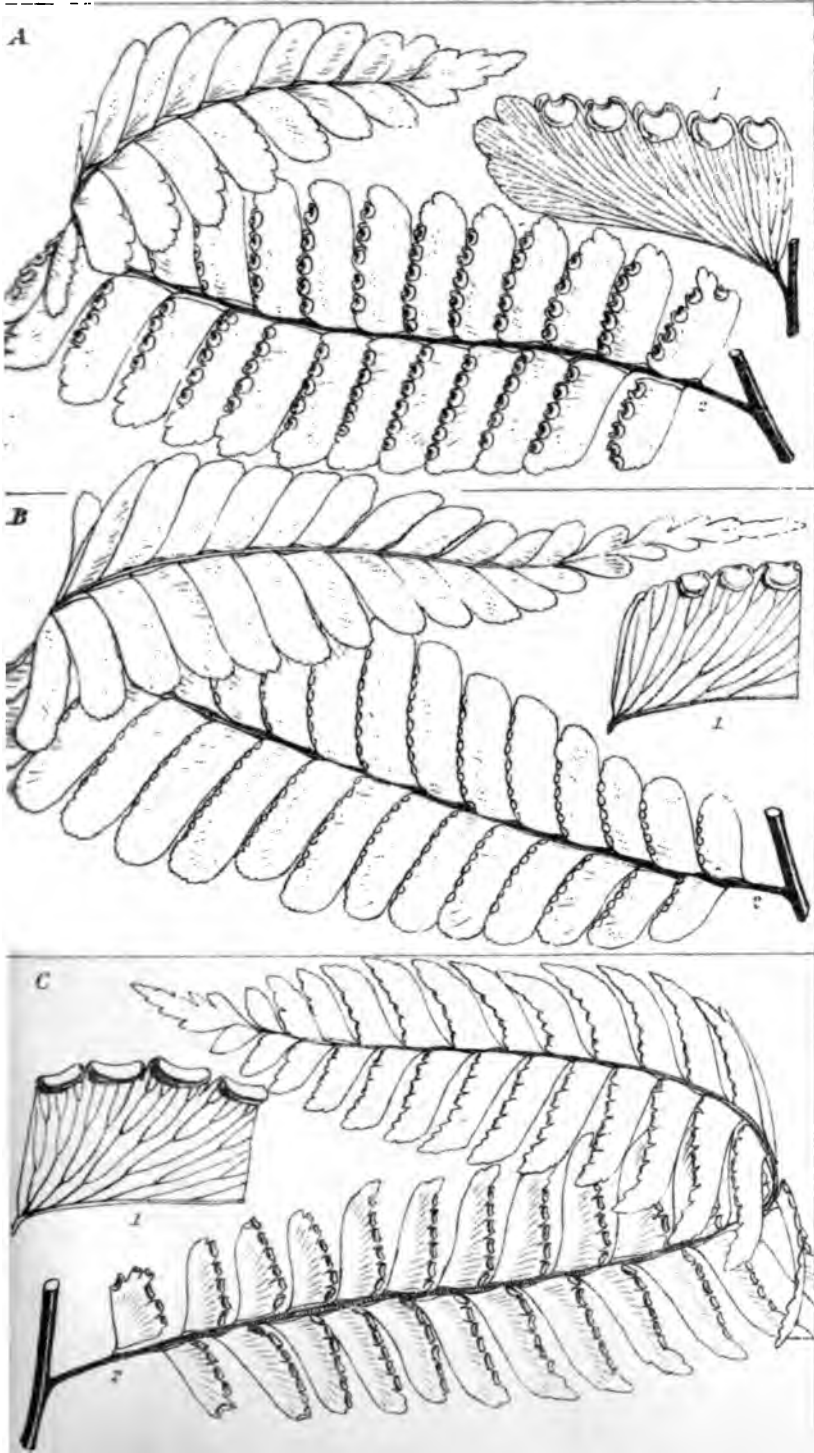
B. *ADIANTUM MACROCLADUM*, Kl.—p. 49.

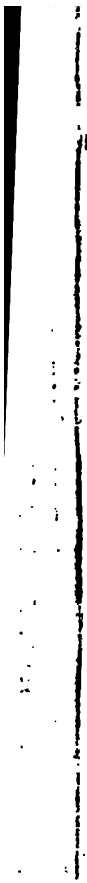
Fig. 1. Portion of a fertile pinnule; *magnified*. Fig. 2. Fertile pinna; *nat. size*.

C. *ADIANTUM WILESIANUM*. Hook.—p. 50.

Fig. 1. Portion of a fertile pinnule; *magnified*. Fig. 2. Fertile pinnule; *nat. size*.









TAB. LXXXIV.

A. *ADIANTUM MATHEWSIANUM*, Hook.—p. 35.

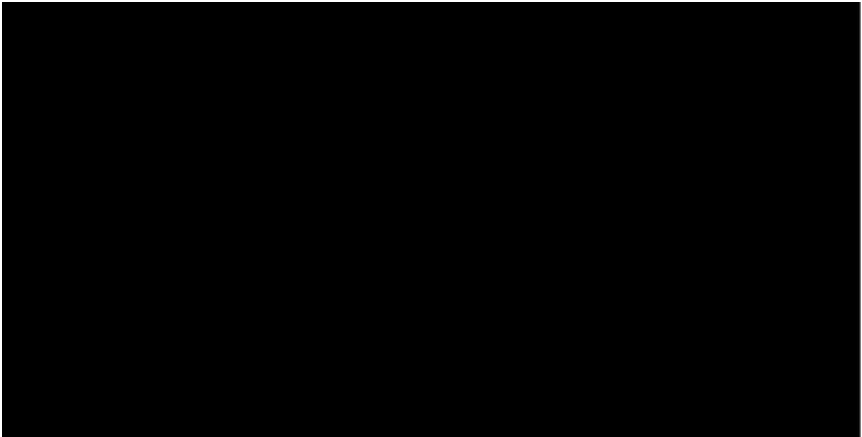
Fig. 1. Sori; *magnified*. Fig. 2. Fertile pinna; *nat. size*.

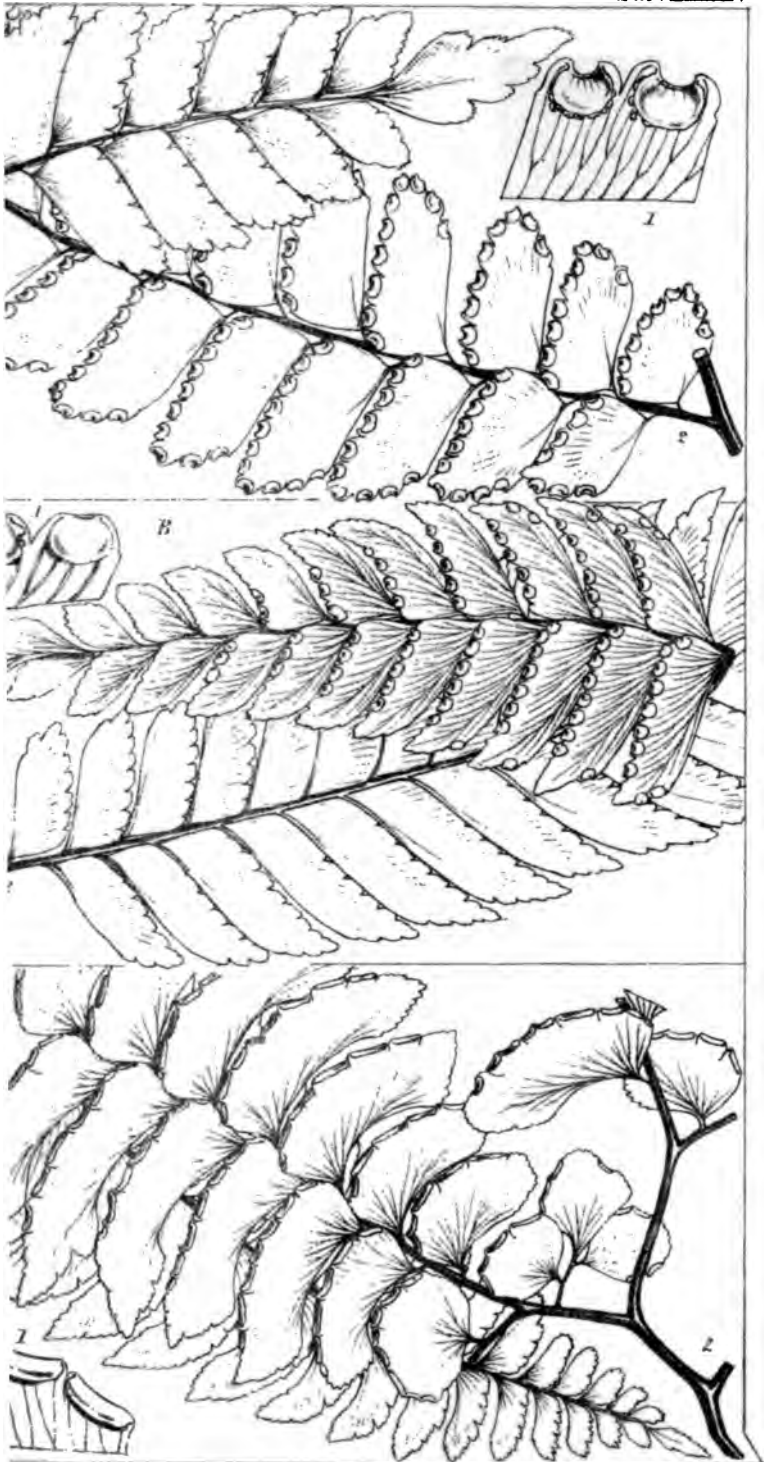
B. *ADIANTUM UROPHYLLUM*, Hook.—p. 24.

Fig. 1. Sori; *magnified*. Fig. 2. Fertile pinna; *nat. size*.

C. *ADIANTUM CURVATUM*, Kaulf.—p. 28.

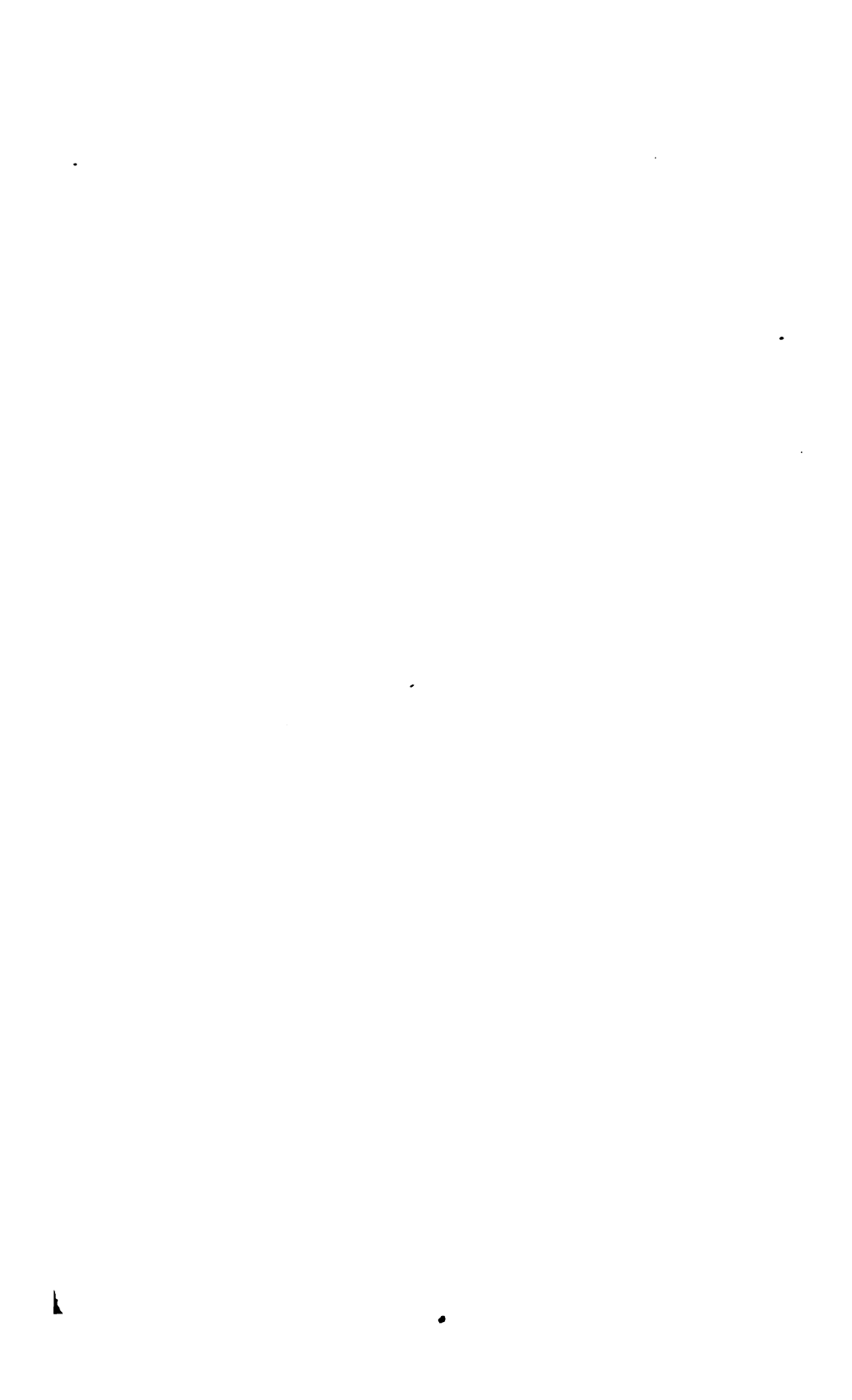
Fig. 1. Sori; *magnified*. Fig. 2. Portion of a frond; *nat. size*.







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TAB. LXXXV.

A. *ADIANTUM FULVUM*, *Raoul*.—p. 52.

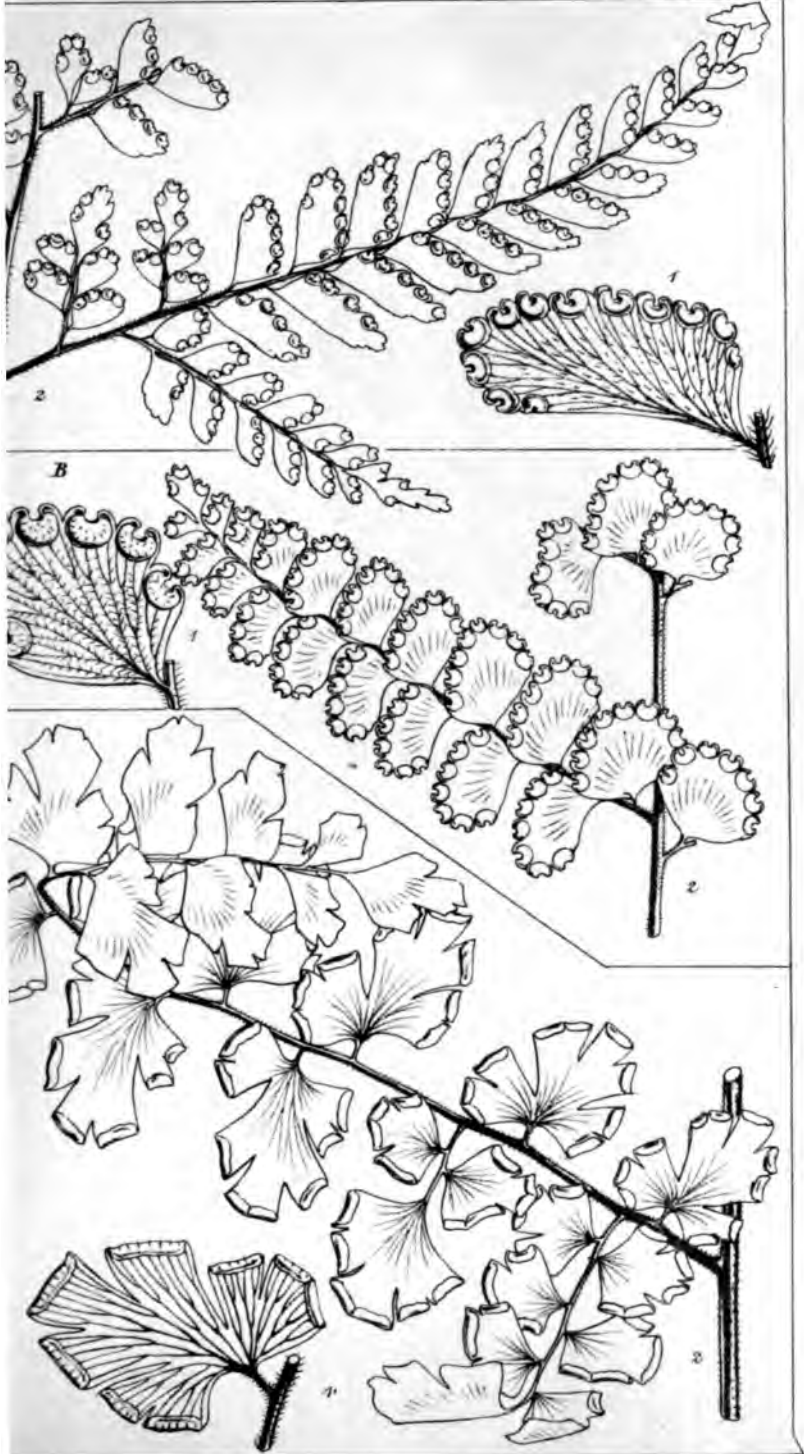
Fig. 1. Fertile pinnule; *magnified*. Fig. 2. Portion of a fertile frond; *nat. size*.

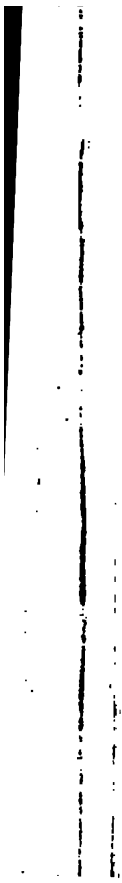
B. *ADIANTUM SESSILIFOLIUM*, *Hook*.—p. 44.

Fig. 1. Fertile pinnule; *magnified*. Fig. 2. Portion of a frond: *nat. size*.

C. *ADIANTUM SPECIOSUM*, *Hook*.—p. 45.

Fig. 1. Fertile pinnule; *magnified*. Fig. 2. Portion of a frond: *nat. size*.







TAB. LXXXVI.

A. *ADIANTUM CUNNINGHAMI*, Hook.—p. 52.

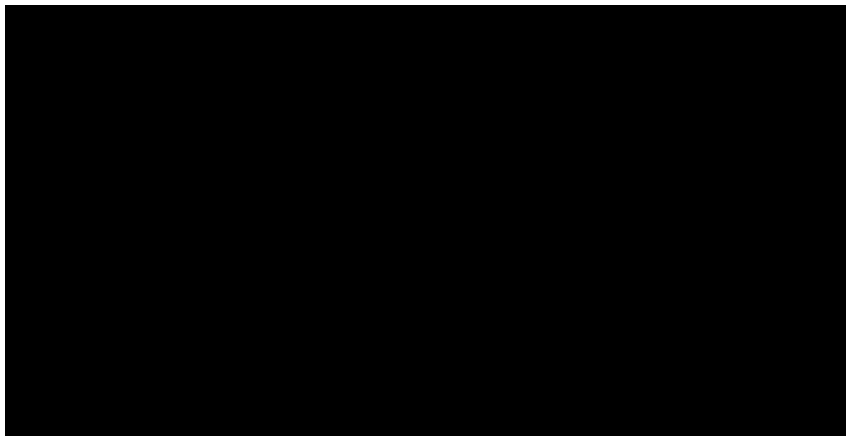
Fig. 1. Sori; *magnified*. Fig. 2. Lower pinna; *nat. size*.

B. *ADIANTUM FORMOSUM*, Br.—p. 51.

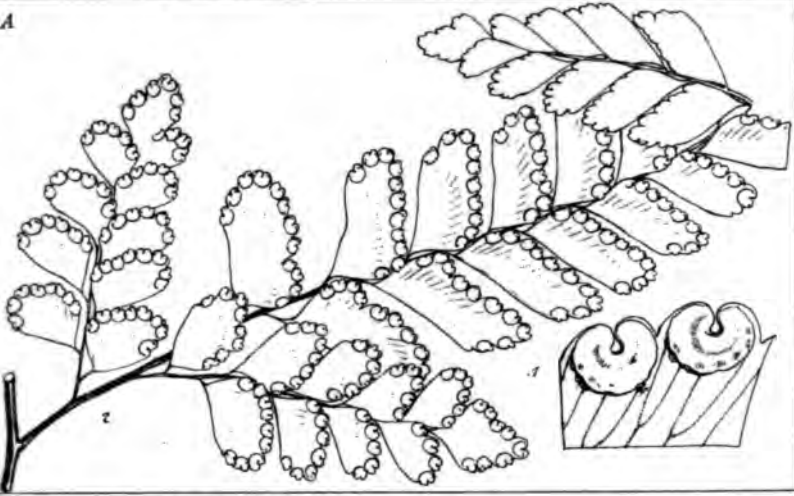
Fig. 1. Fertile pinnule; *magnified*. Fig. 2. Lower pinna; *nat. size*.

C. *ADIANTUM LOBBIANUM*, Hook.—p. 51.

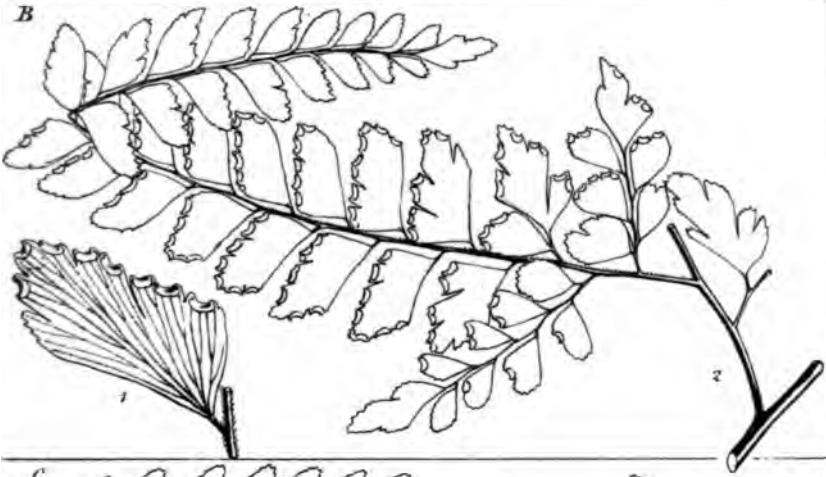
Fig. 1. Sori; *magnified*. Fig. 2. Compound pinna; *nat. size*.



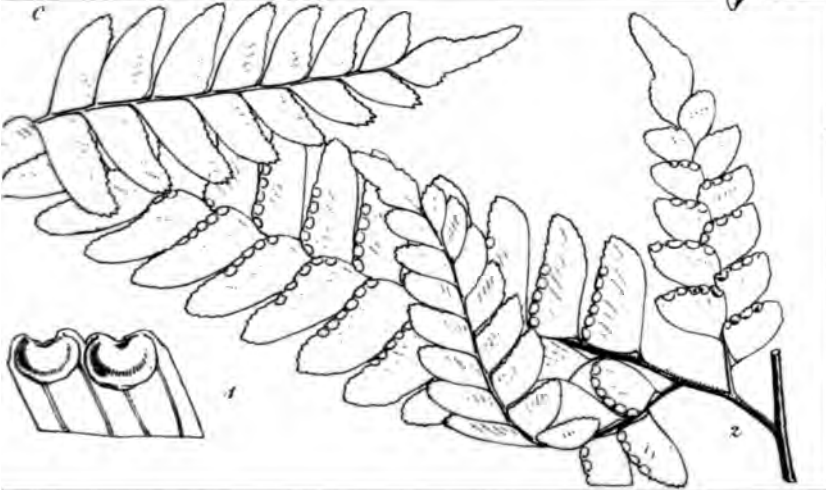
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TAB. LXXXVII.

A. ADIANTUM PATENS, *Willd.*—p. 29.

Fig. 1. Sori; *magnified*. Fig. 2. Portion of a frond; *nat. size*.

B. LONCHITIS MADAGASCARIENSIS, *Hook.*—p. 58.

Upper portion of a fertile frond; *nat. size*. Fig. 1. Portion of a pinna; *magnified*. Fig. 2. fertile pinna; *nat. size*. Fig. 3. Capsules with jointed filaments.

C. CHEILANTHES TENUIFOLIA, *Su.*

Fig. 1. Pinnule; *magnified*. Fig. 2. Portion of a frond; *nat. size*.







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TAB. LXXXVIII.

A. HYPOLEPIS CALIFORNICA, *Hook.*

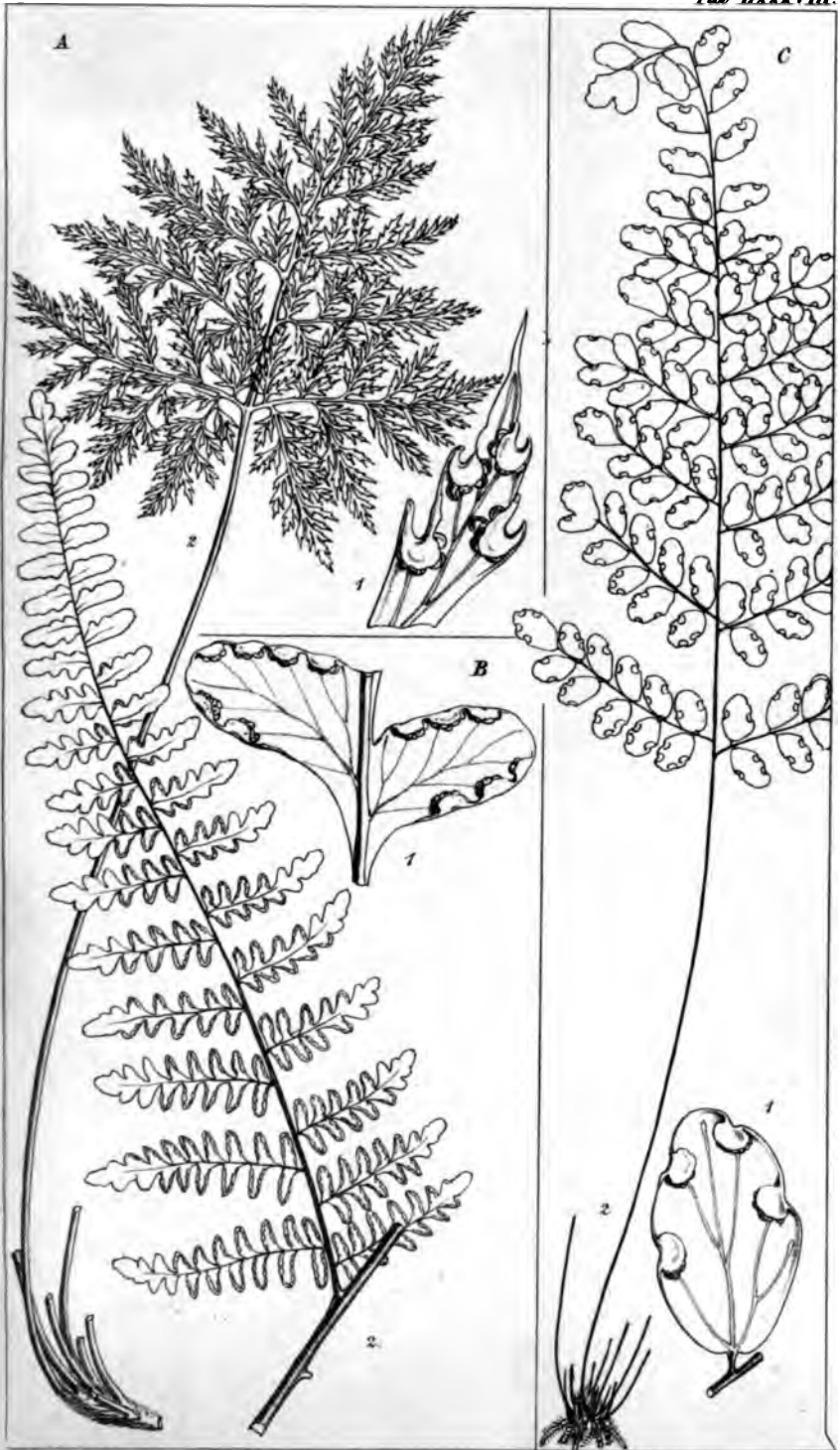
Fig. 1. Fertile segment of a frond; *magnified.* Fig. 2. Entire plant; *nat. size.*

B. HYPOLEPIS SPECTABILIS, *Pr.*

Fig. 1. Fertile pinnæ; *nat. size.* Fig. 2. Compound pinna; *nat. size.*

C. HYPOLEPIS PAUPERCULA, *Hook.*

Fig. 1. Fertile pinnule; *magnified.* Fig. 2. Entire plant; *nat. size.*





Vertical line of text or markings, possibly a scanning artifact or a very narrow column of text.

TAB. LXXXIX.

A. LONCHITIS LINDENIANA, *Hook.*—p. 56.

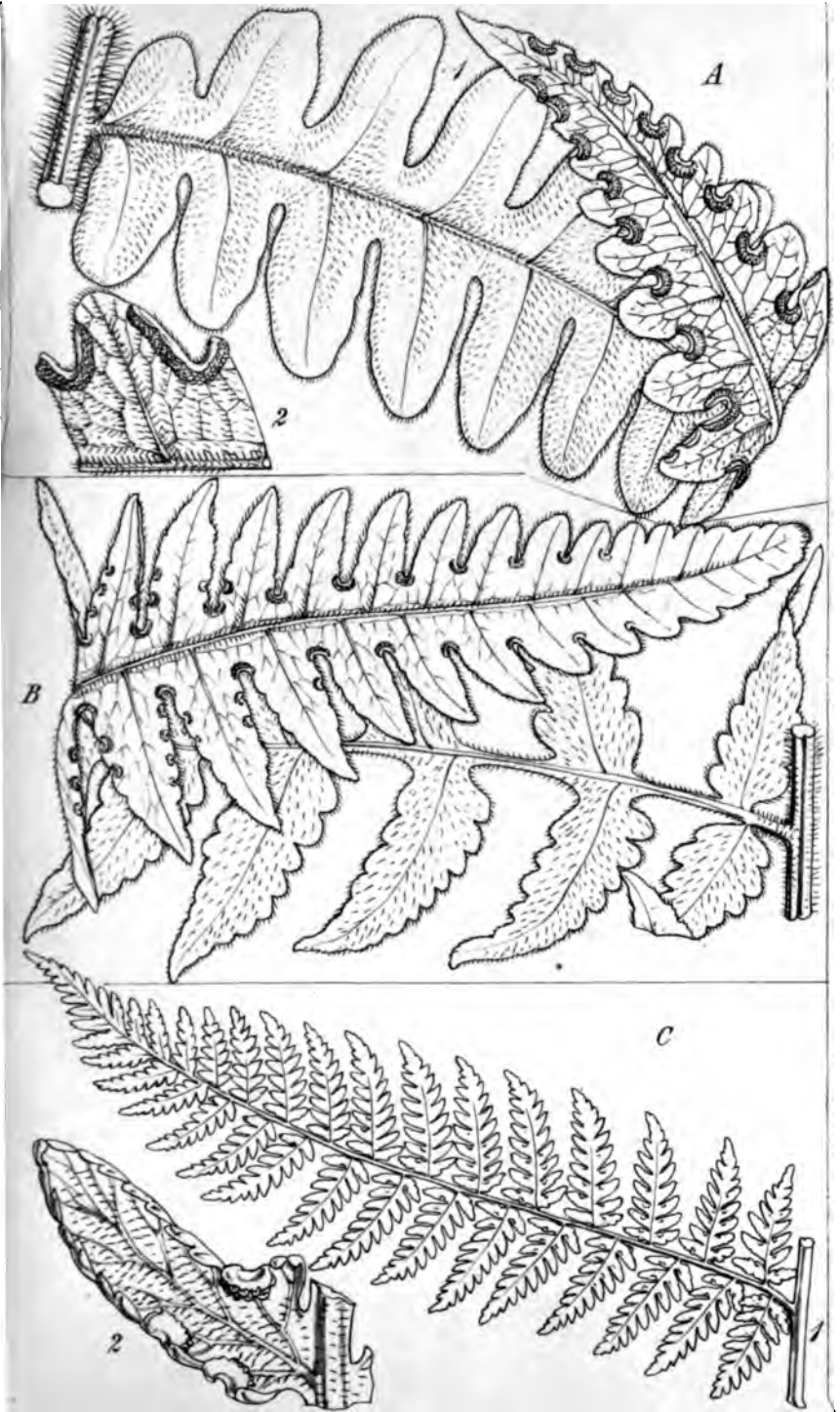
Fig. 1. Fertile pinna ; *nat. size.* Fig. 2. Portion of a pinna with sori ; *magnified.*

B. LONCHITIS NATALENSIS, *Hook.*—p. 57.

Fertile pinnule ; *nat. size.*

C. HYPOLEPIS TENUIFOLIA, *Bernh.*—p. 60.

Fig. 1. Fertile pinna ; *nat. size.* Fig. 2. Pinnule, with sori ; *magnified.*





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TAB. XC.

A. *HYPOLEPIS TENUIFOLIA*, var. γ . Hook.—p. 60.

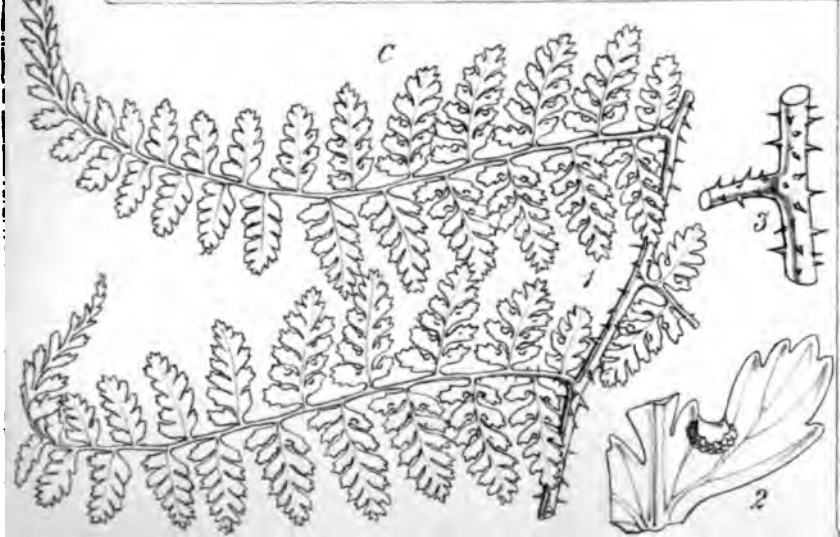
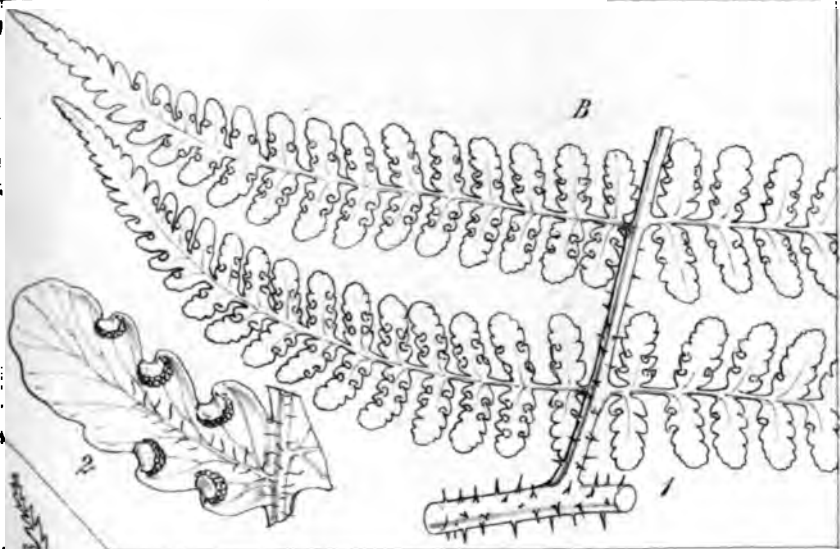
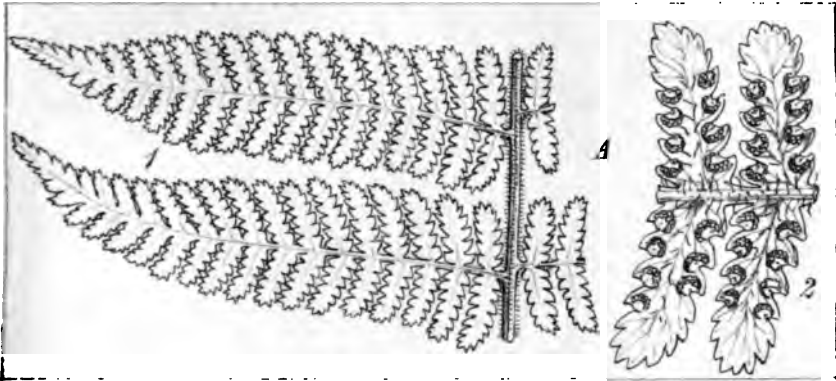
Fig. 1. Fertile pinnæ; *nat. size.* Fig. 1. Pinnules with sori;
magnified.

B. *HYPOLEPIS REPENS*, Pr.

Fig. 1. Fertile pinnæ; *nat. size.* Fig. 2. Pinnule with sori;
magnified.

C. *HYPOLEPIS NIGRESCENS*, Hook.

Fig. 1. Fertile pinnæ; *nat. size.* Fig. 2. Pinnule with a sorus;
magnified. Fig. 3. Portion of stipes and rachis; *nat. size.*



Fitch del et lith.

Paspalum imp.



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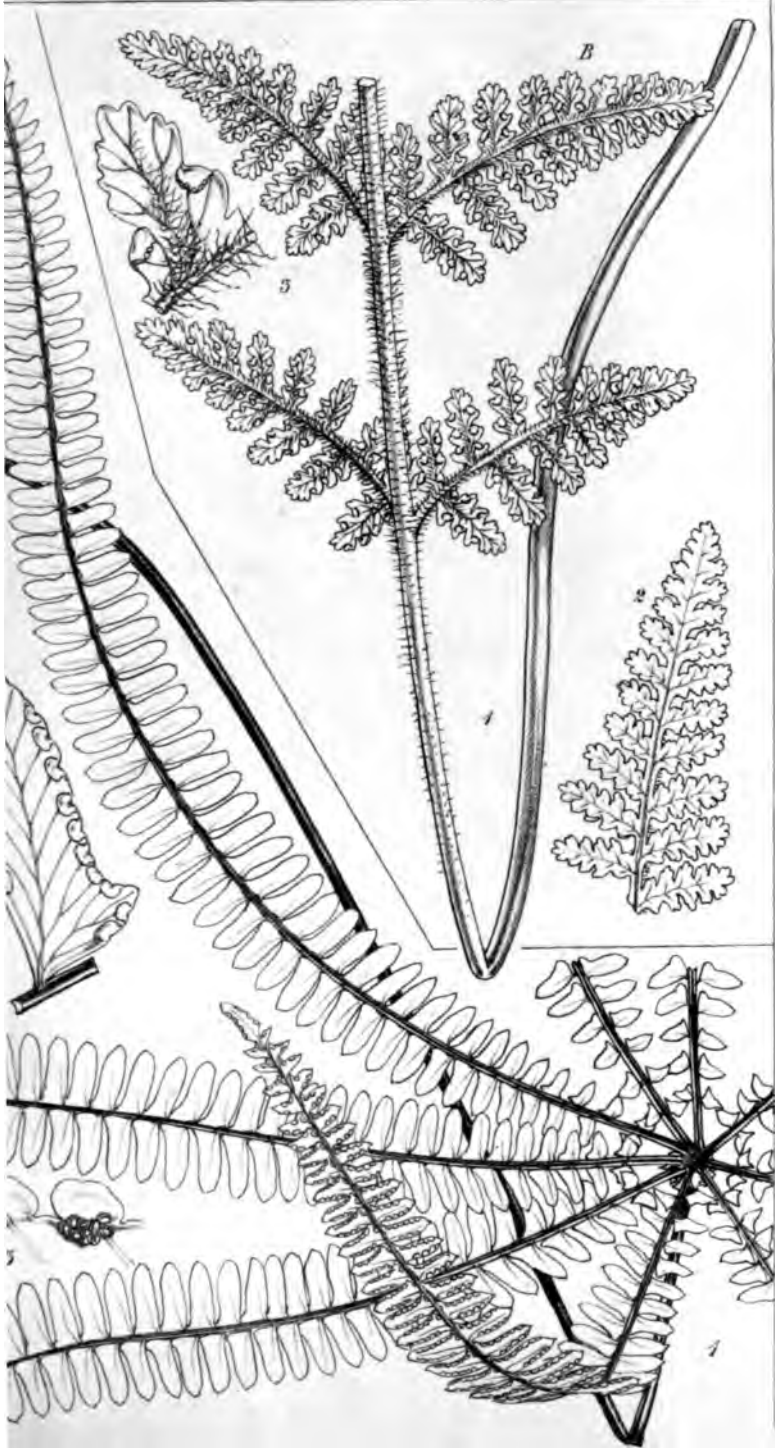
TAB. XCI.

A. *HYPOLEPIS RADIATA*, Hook.—p. 72.

Fig. 1. Portion of a fertile frond and stipes; *nat. size.* Fig. 2. Fertile pinnule; *magnified.* Fig. 3. Margin of a pinnule, with the involucre forced back; showing a sorus with its insertion upon the nerves; *magnified.*

B. *HYPOLEPIS PURDIEANA*, Hook.—p. 69.

Fig. 1. Portion (base) of a fertile frond and stipes; *nat. size.* Fig. 2. Apex of a frond; *nat. size.* Fig. 3. Under side of a fertile lobe; *magnified.*





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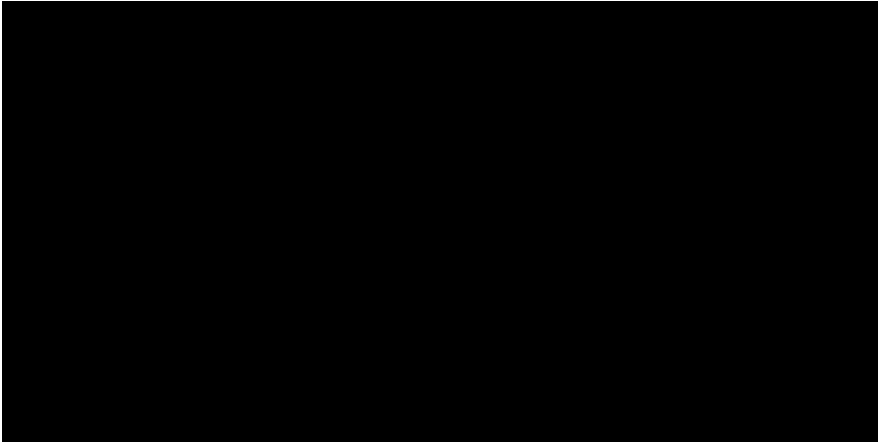
TAB. XCII.

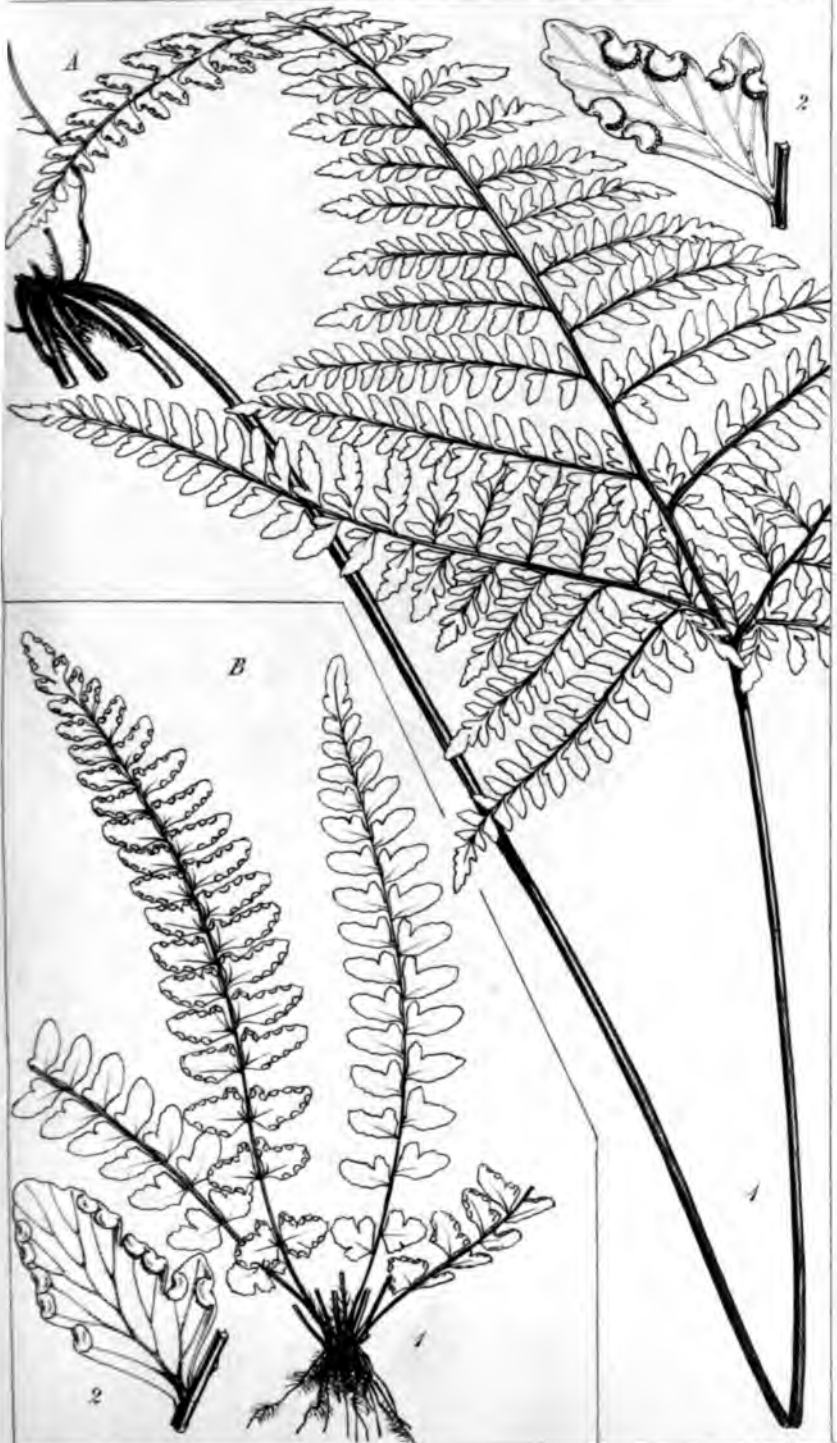
A. *HYPOLEPIS PEDATA*, Hook.—p. 73.

Fig. 1. Frond and stipes (fertile); *nat. size.* Fig. 2. Under side of a fertile pinnule; *magnified.*

B. *HYPOLEPIS MONTICOLA*, Gardn. (H. Gardneri, Hook., *supra*, p. 74).

Fig. 1. Fertile fronds; *nat. size.* Fig. 2. Under side of a fertile pinnule; *magnified.*





Equisetum delatolii

Equisetum longum



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TAB. XCIII.

A. *PTERIS SCABERULA*. *A. Rich.* (*Allosorus scaberulus*, *Presl.*)

Fig. 1. Sterile primary pinna; *nat. size.* Fig. 2. Fertile primary pinna, seen from beneath; *nat. size.* Fig. 3. Apex of a fertile frond, seen from beneath; *nat. size.* Fig. 4. Fertile pinnule, seen from beneath; *magnified.*

B. *CHEILANTHES VISCOSA*, *Link.*—p. 104.

Fig. 1. Frond and stipes, (fertile); *nat. size.* Fig. 2. Fertile pinnule, seen from beneath; *magnified.*









TAB. XCIV

A. CHEILANTHES PULCHELLA, *Bory.*—p. 109.

Fig. 1. Frond and stipes (fertile); *nat. size.* Fig. 2. Fertile pinnule, seen from beneath; *magnified.*

B. CHEILANTHES SZOVITZII, *Fisch. et Mey.*—p. 98.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Portion of a fertile primary pinnule, seen from beneath; *magnified.*







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TAB. XCV.

A. *HYPOLEPIS ANTHRISCIFOLIA*, *Pr.*—p. 66.

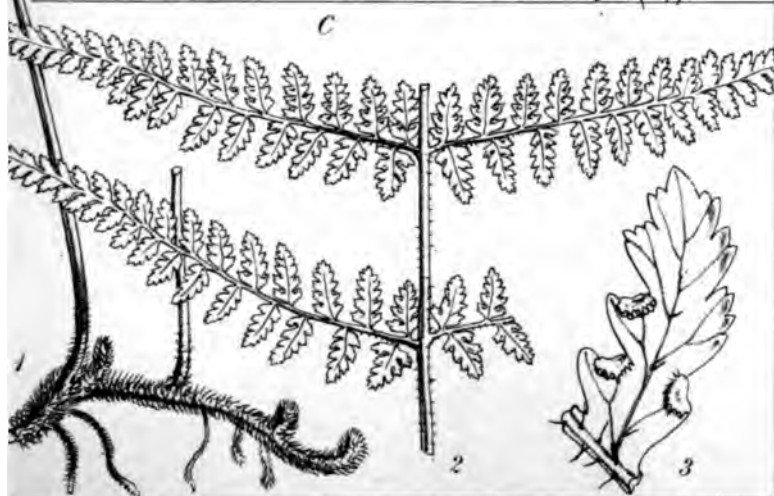
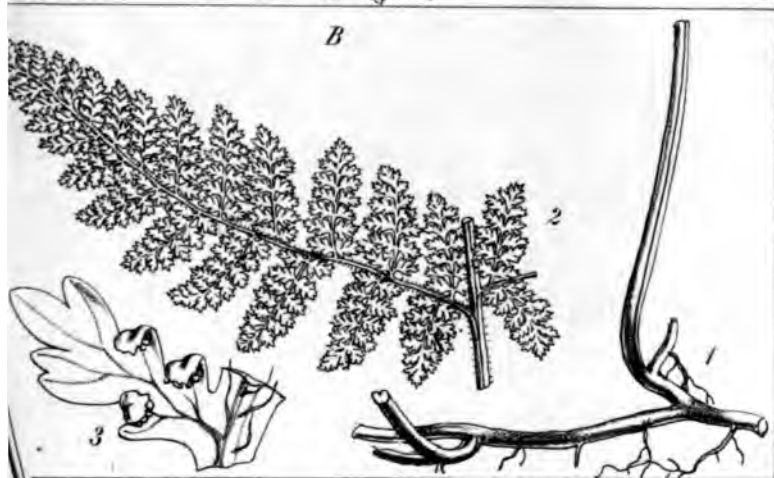
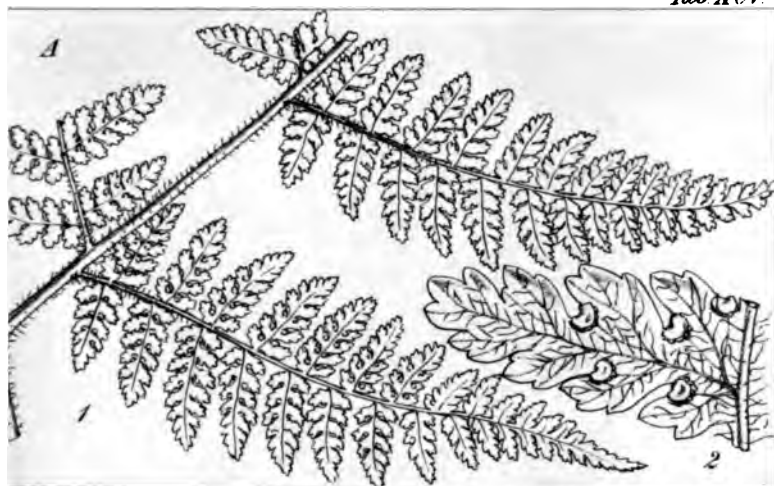
Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. Fertile pinnule or ultimate segment, seen from beneath; *magnified.*

B. *HYPOLEPIS MILLEFOLIUM*, *Hook.*—p. 68.

Fig. 1. Caudex and lower portion of stipes; and Fig. 2. Portion of a fertile frond; *nat. size.* Fig. 3. Fertile pinnule or ultimate segment, seen from beneath; *magnified.*

C. *HYPOLEPIS DISTANS*, *Colenso.*—p. 70.

Fig. 1. Caudex and stipes; and Fig. 2. Portion of a fertile frond; *nat. size.* Fig. 3. Fertile pinnule, or ultimate segment of a frond, seen from beneath; *magnified.*





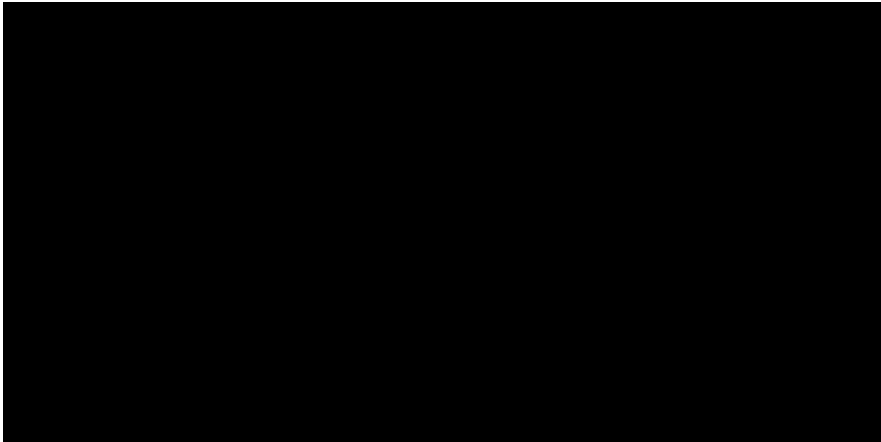
TAB. XCVI.

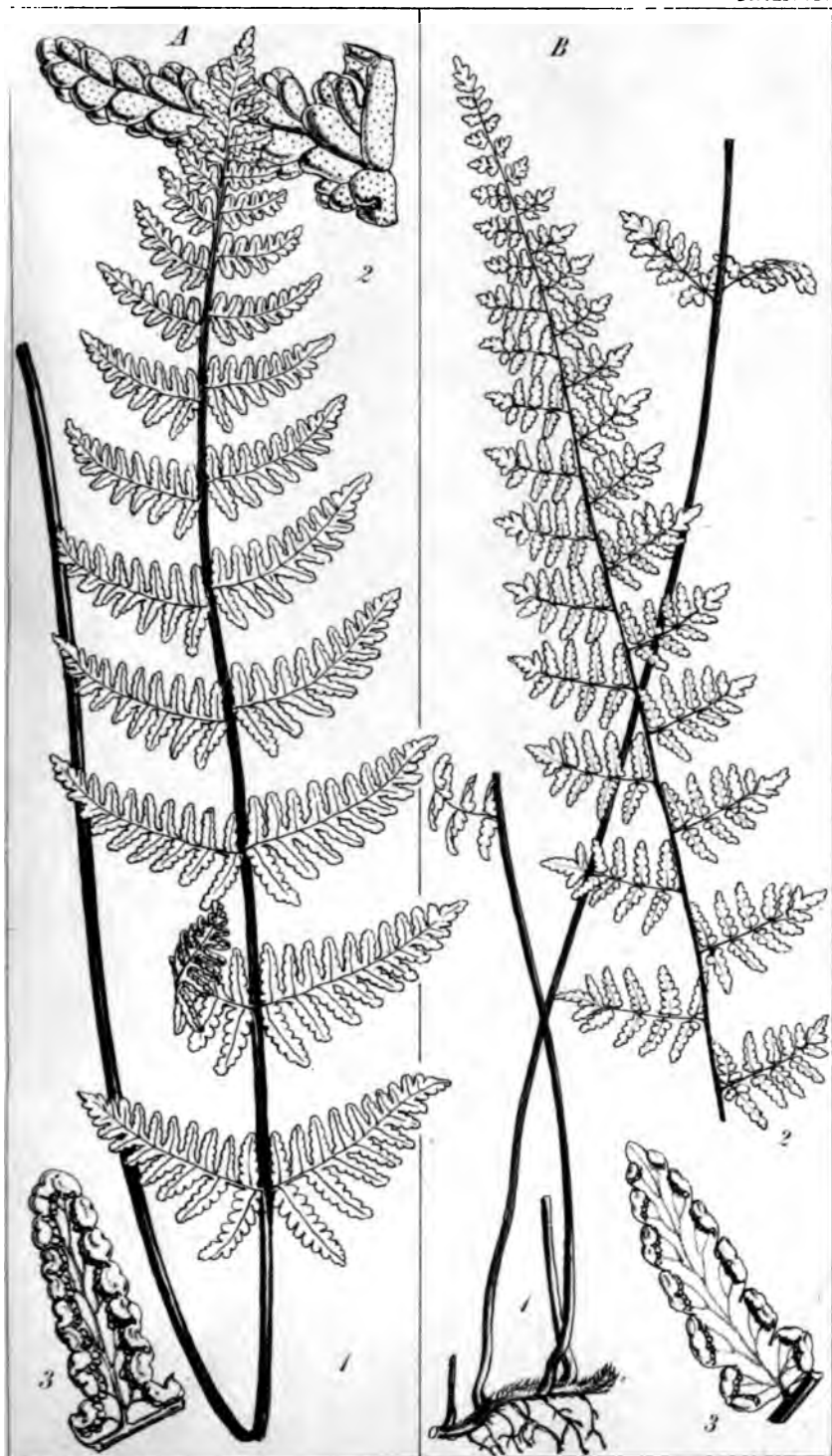
A. CHEILANTHES BULLOSA, Kunze.—p. 88.

Fig. 1. Frond and stipes (fertile); *nat. size.* Fig. 2. Upper side of a fertile segment; *magnified.* Fig. 3. Under side of a fertile segment; *magnified.*

B. CHEILANTHES TWEEDIANA, Hook.—p. 84.

Figs. 1 and 2. Fronds (fertile) and stipes; *nat. size.* Fig. 3. Under side of a fertile pinnule; *magnified.*



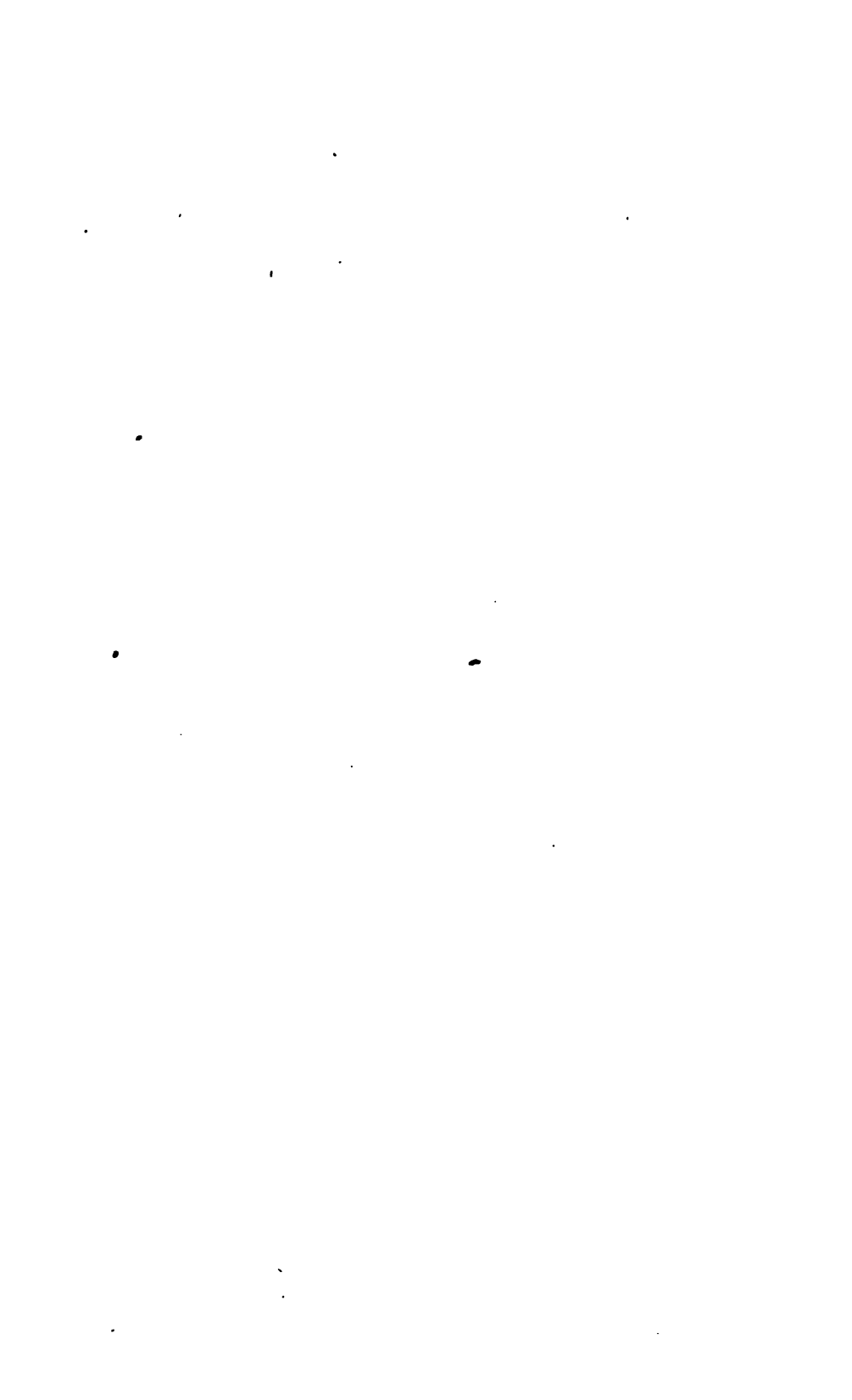


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Pamplin del.



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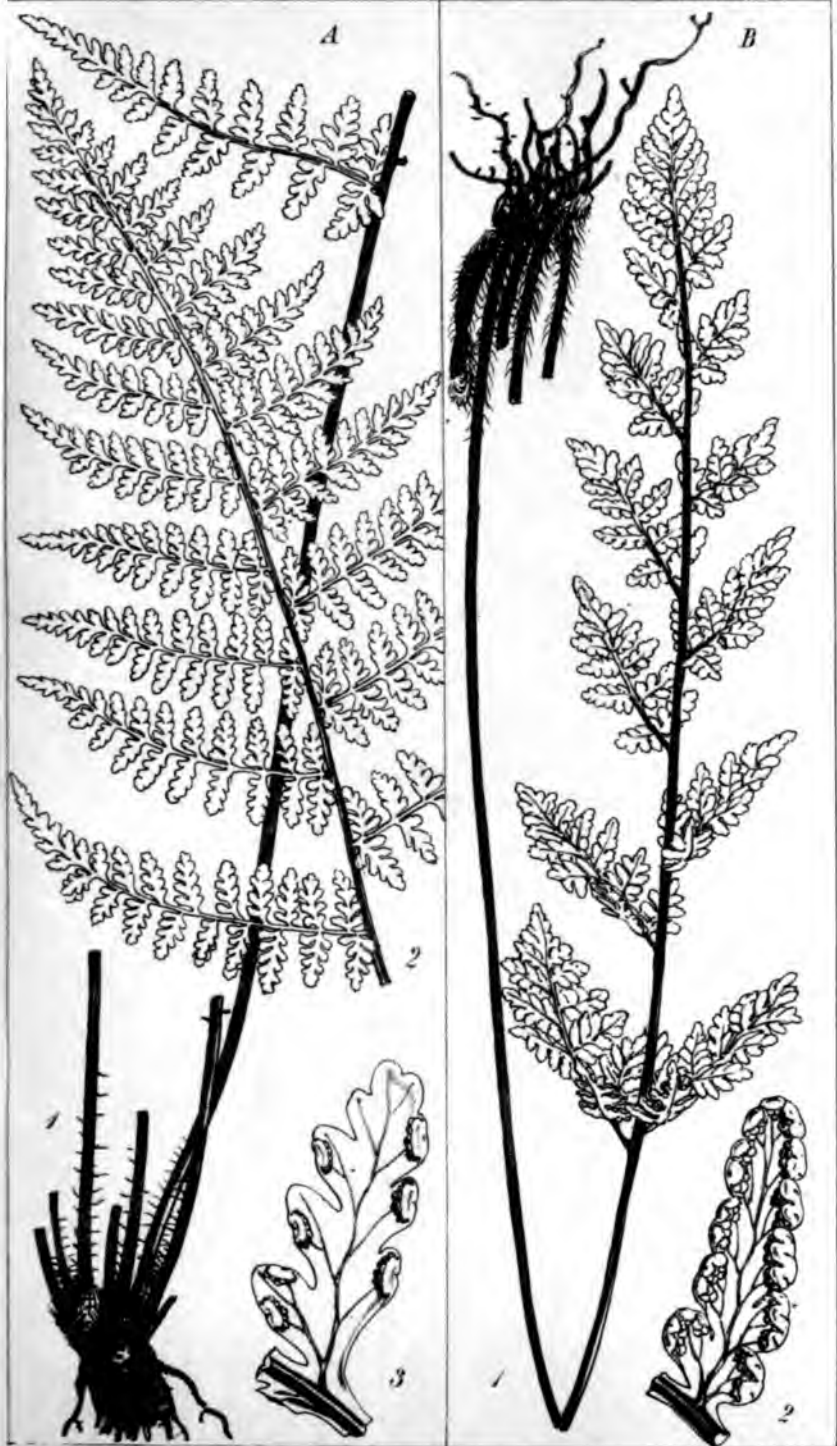
TAB. XCVII.

A. CHEILANTHES SEEMANNI, *Hook.*—p. 86.

Fig. 1. Fertile plant ; *nat. size.* Fig. 2. Ultimate pinnule (fertile) ; *nat. size.*

B. CHEILANTHES SIEBERI, *Kunze.*—p. 83.

Fig. 1. Fertile plant ; *nat. size.* Fig. 2. Pinnule (fertile), seen from beneath ; *magnified.*



Fitch del et lith

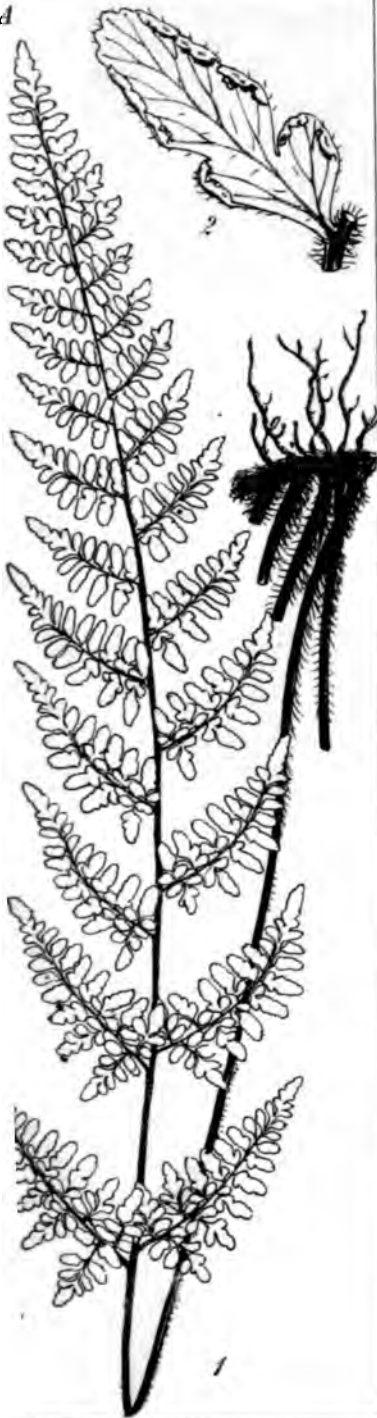
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Tab. XCIX.

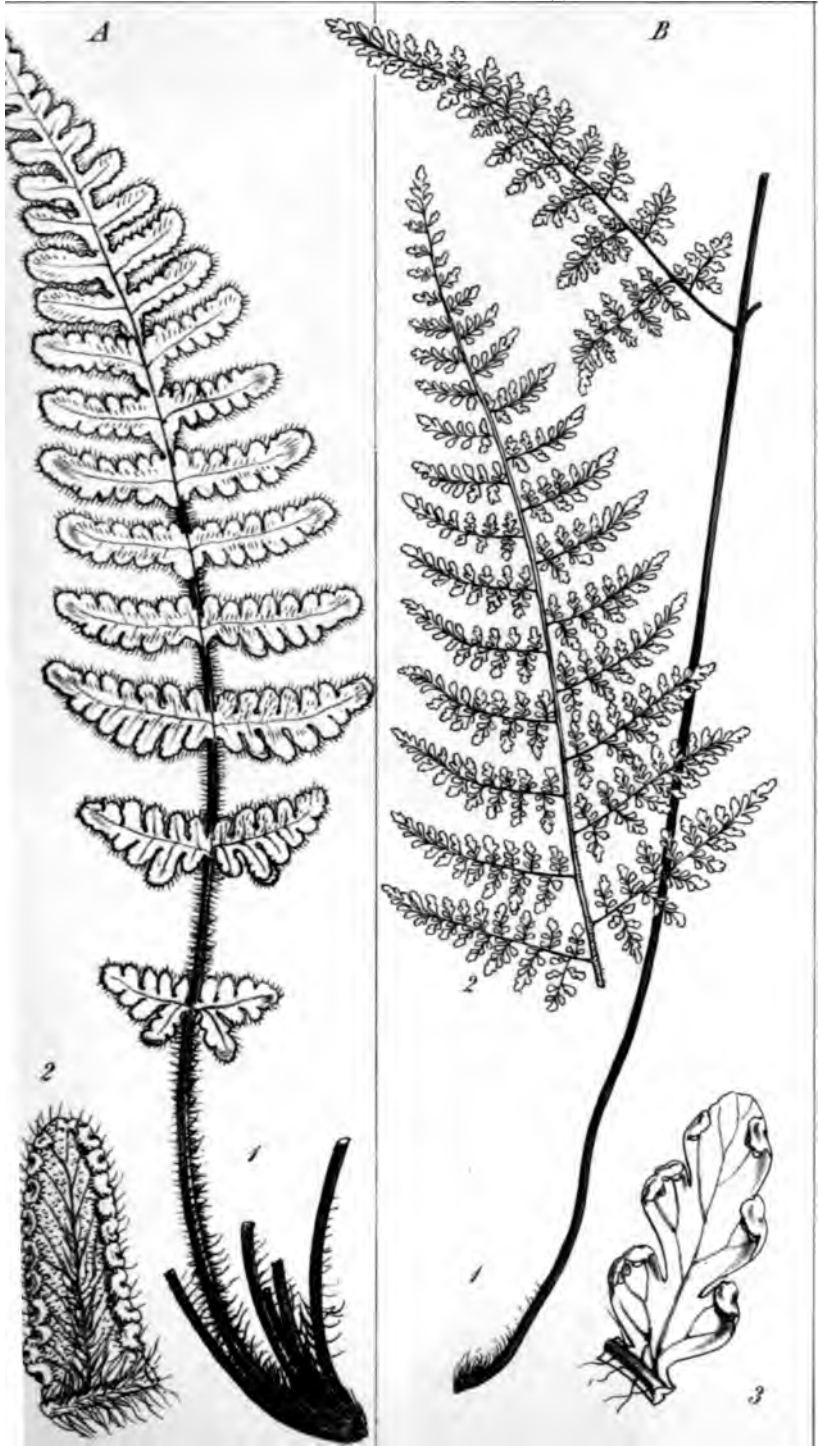
A. CHEILANTHES RUFa, Don.—p. 79.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile segment, seen from beneath; *magnified.*

B. CHEILANTHES MORITZIANA, Kunze.—p. 85.

Figs. 1. and 2. Portions of a fertile frond; *nat. size.* Fig. 3. Pin-
nule (fertile), seen from beneath; *magnified.*







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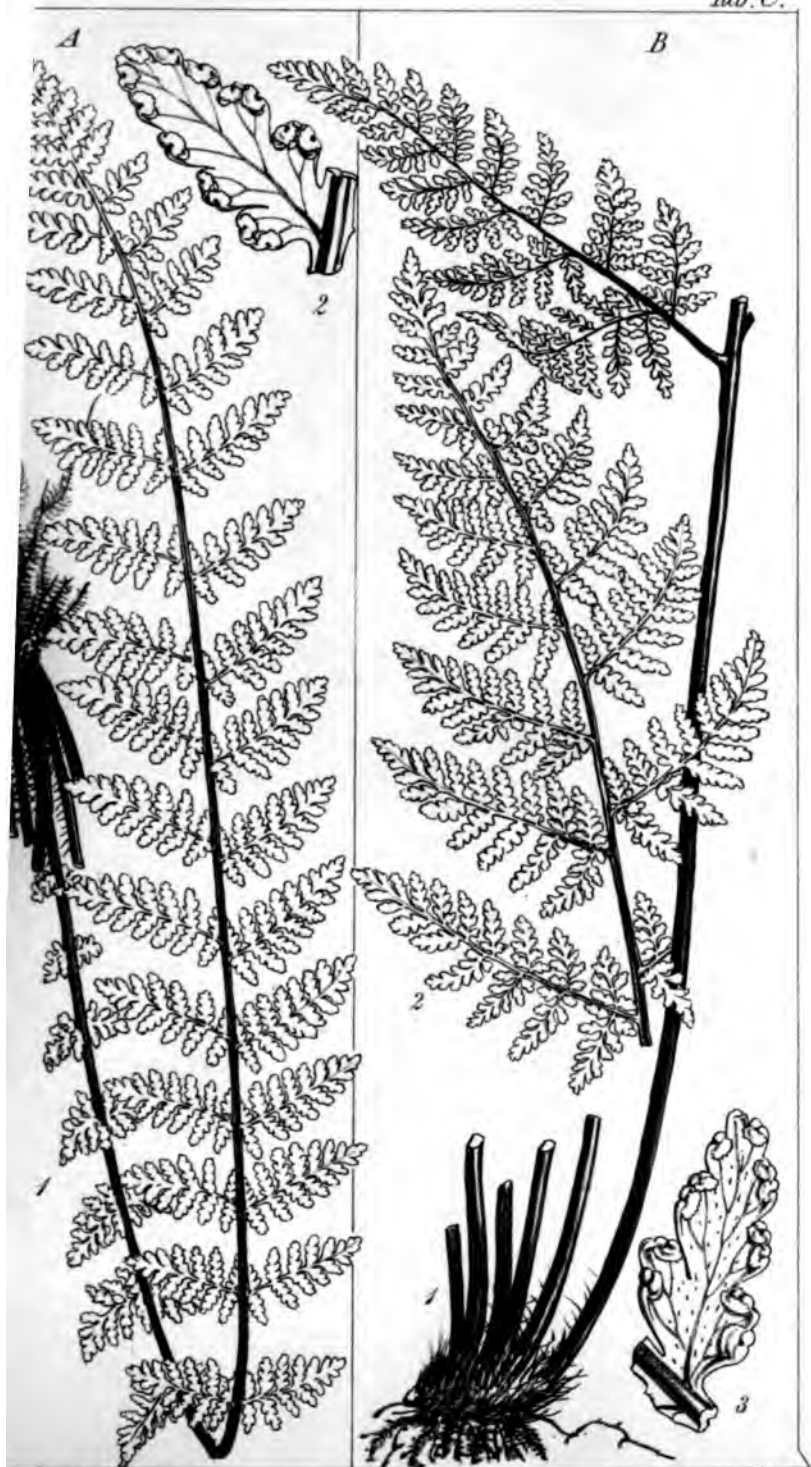
TAB. C.

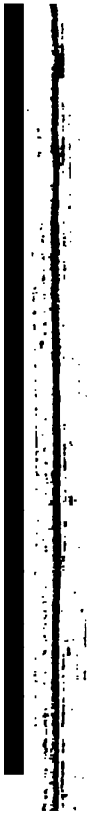
A. CHEILANTHES MYSURENSIS, Wall.—p. 94.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile pinnule, seen from beneath; *magnified.*

B. CHEILANTHES MULTIFIDA, Sw.—p. 90.

Figs. 1 and 2. Portions of a fertile frond; *nat. size.* Fig. 3. Fertile pinnule, seen from beneath; *magnified.*





Tab. Cl.

A. CHEILANTHES PTEROIDES, Sw.—p. 80.

Figs. 1 and 2. Portions of a fertile frond; *nat. size.* Fig. 3. Portion of a fertile pinnule, seen from beneath; *magnified.*

B. CHEILANTHES HIRTA, Sw.—p. 92.

Figs. 1 and 2. Portions of a fertile frond; *nat. size.* Fig. 3. Fertile pinnule, seen from beneath; *magnified.* Fig. 4. Portion of a frond of var. β .; *nat. size.*







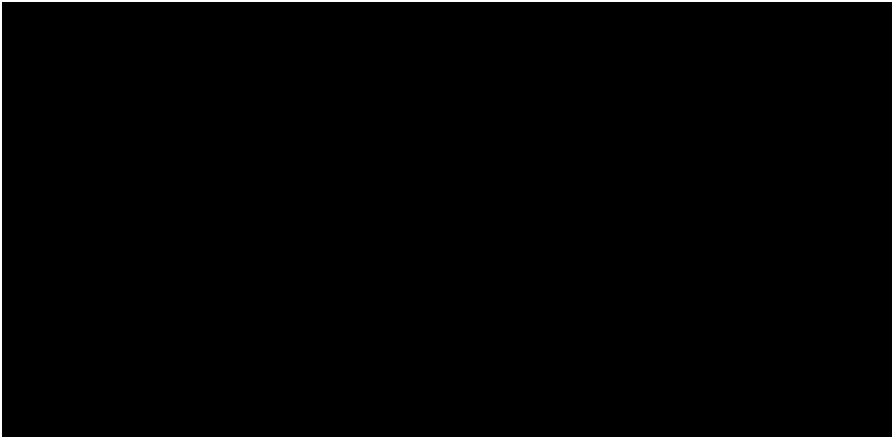
TAB. CII.

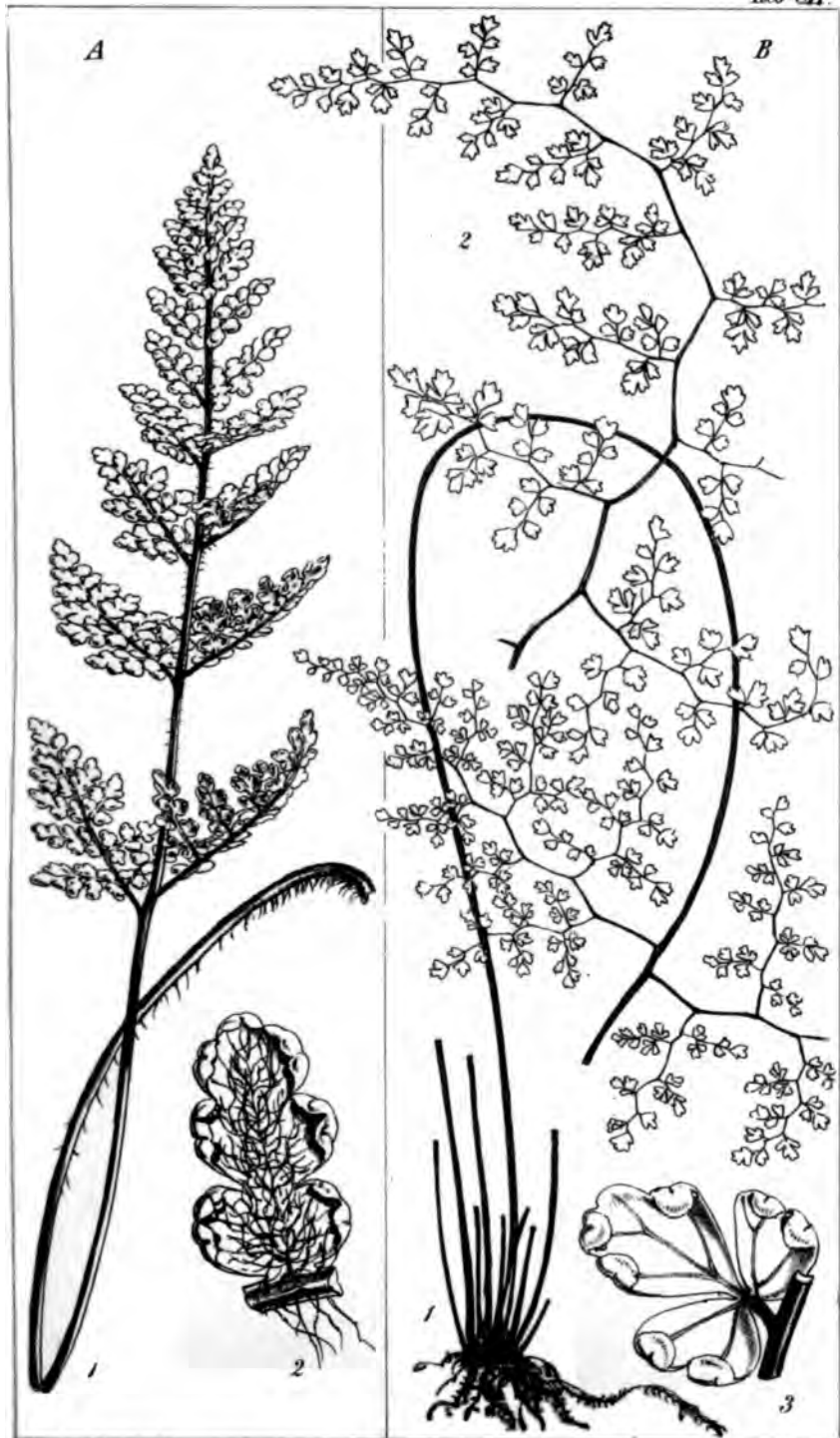
A. CHEILANTHES INDUTA, Kunze.—p. 92.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile pinnule, seen from beneath; *magnified.*

B. CHEILANTHES DICHOTOMA, Sw.—p. 104.

Figs. 1 and 2. Portions of a fertile frond; *nat. size.* Fig. 3. Ultimate fertile pinna, seen from beneath; *magnified.*









Tab. CIII.

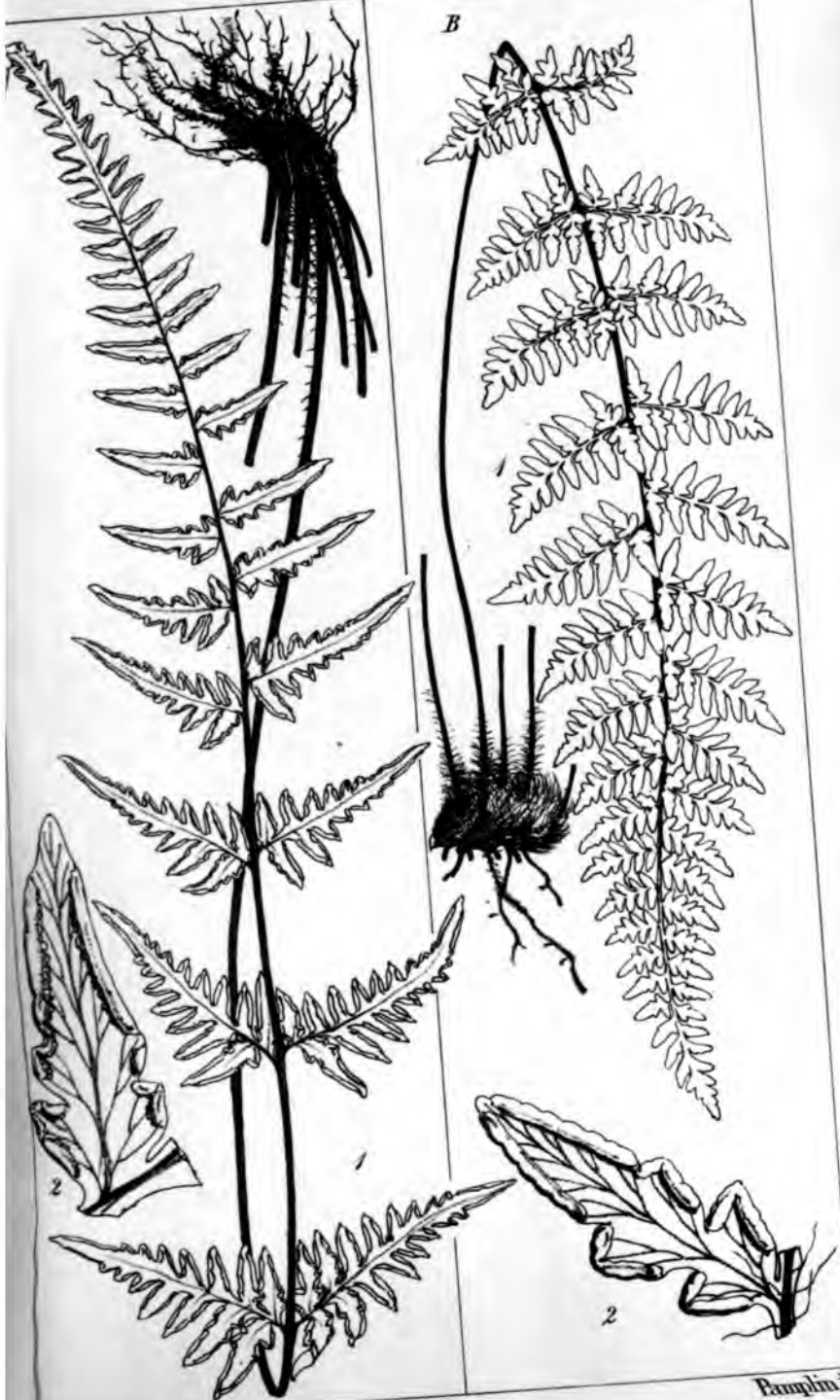
A. CHEILANTHES VARIANS, *Hook.*—p. 89.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile pinnule, seen from beneath; *magnified.*

B. CHEILANTHES ALABAMENSIS, *Kunze.*—p. 89.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile pinnule, seen from beneath; *magnified.*

B





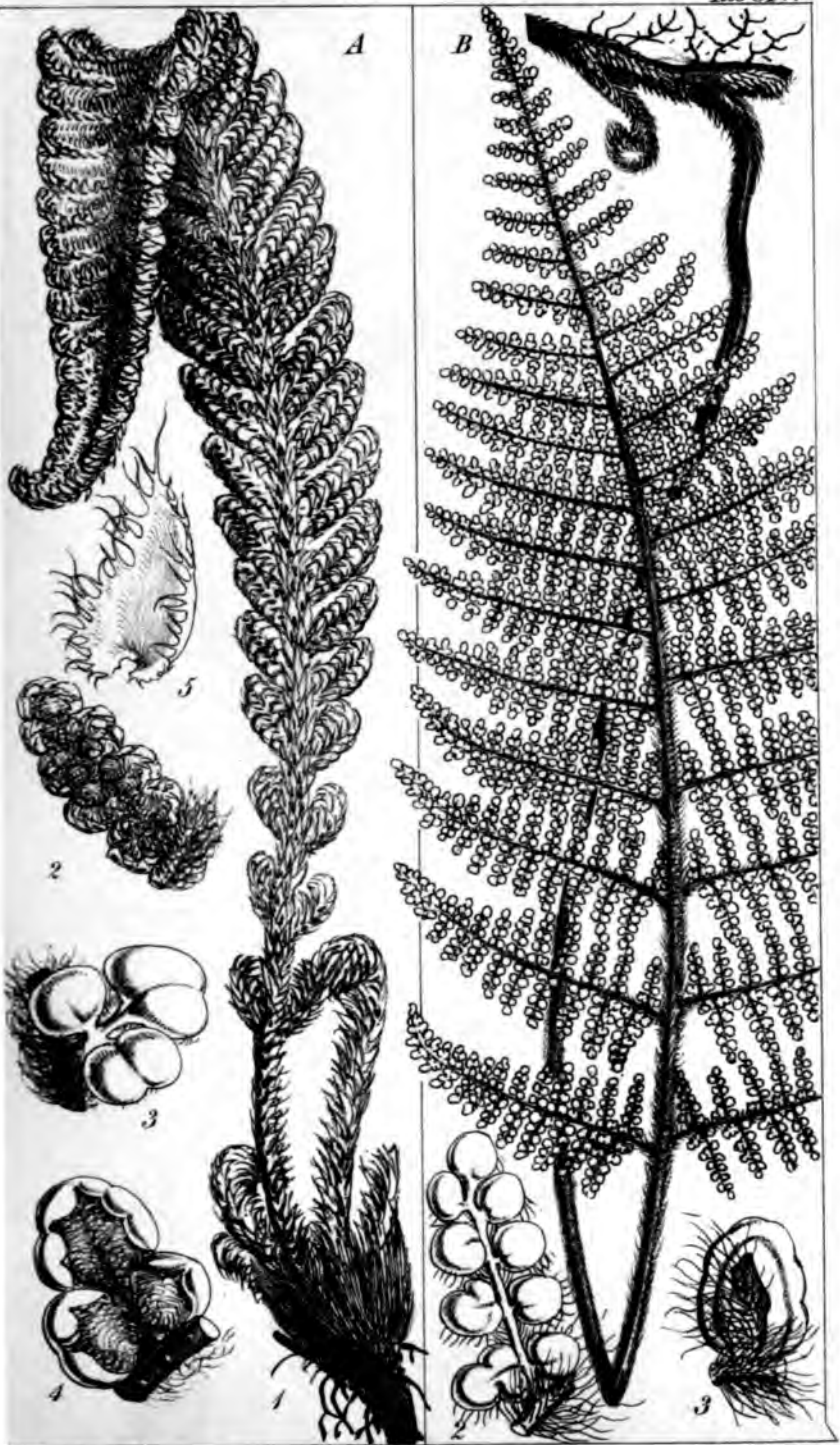
TAB. CIV.

A. CHEILANTHES SCABIORA, Presl.—p. 99.

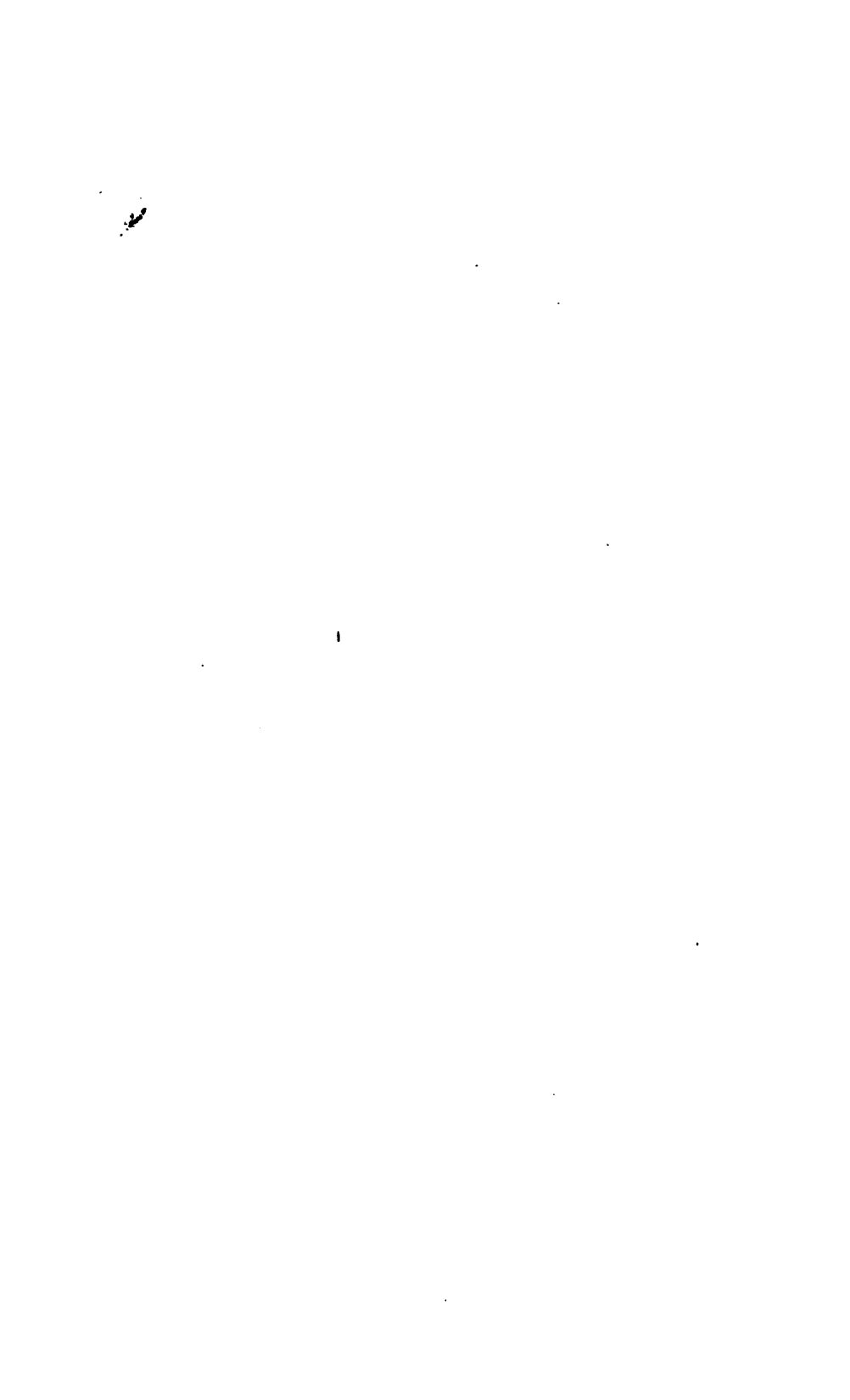
Fig. 1. Fertile plant ; *nat. size*. Fig. 2. Fertile pinna, seen from beneath ; *magnified*. Fig. 3. Ultimate fertile pinna (of three pinnules), seen from above ; and Fig. 4, the same seen from beneath ; *more magnified*. Fig. 5. Scale from the rachis ; *highly magnified*.

B. CHEILANTHES LENDIGERA, Sw.—p. 95.

Fig. 1. Fertile plant ; *nat. size*. Fig. 2. Secondary pinna (fertile), seen from above ; *magnified*. Fig. 3. Fertile pinnule, seen from beneath ; *more magnified*.







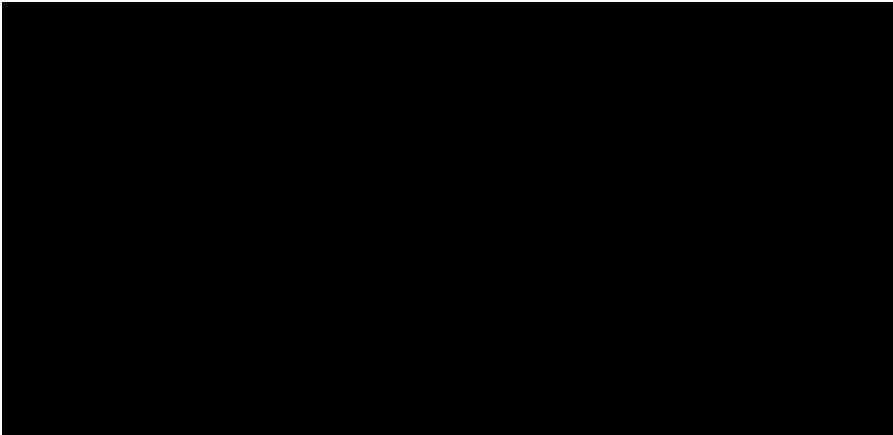
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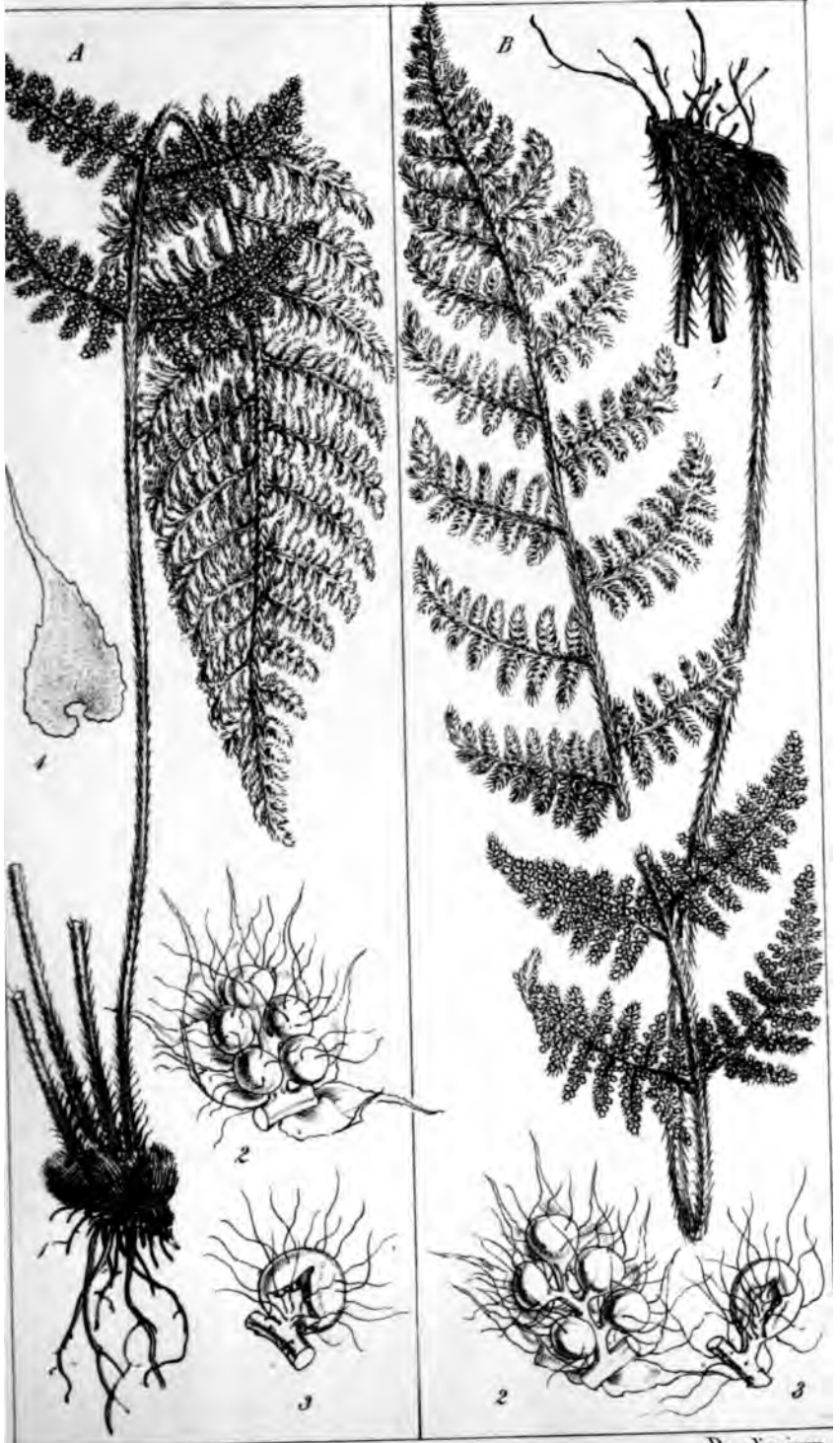
A. CHEILANTHES MYRIOPHYLLA, Desv.—p. 100.

Fig. 1. Fertile frond; *nat. size.* Fig. 2. Secondary pinna (fertile), seen from above; *magnified.* Fig. 3. Fertile pinnule, seen from beneath; *more magnified.* Fig. 4. Scale from the rachis; *magnified.*

B. CHEILANTHES ELEGANS, Desv.—p. 102.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Secondary pinna (fertile), seen from above; *magnified.* Fig. 3. Fertile pinnule, seen from beneath; *magnified.*







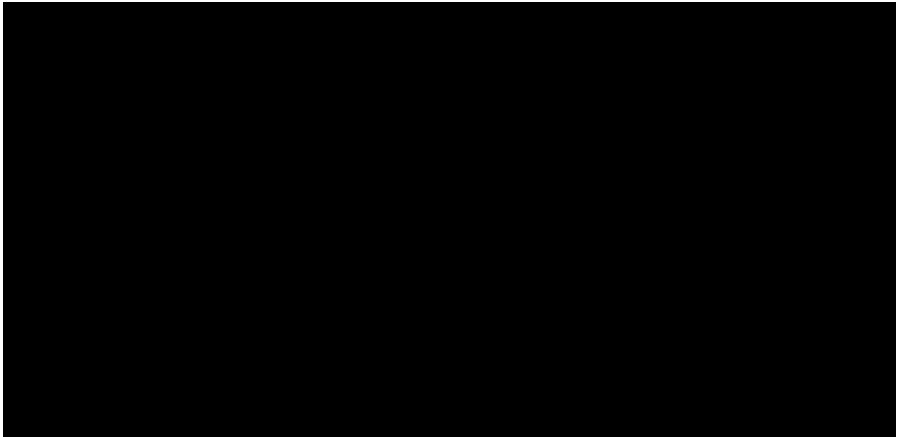
TAB. CVI.

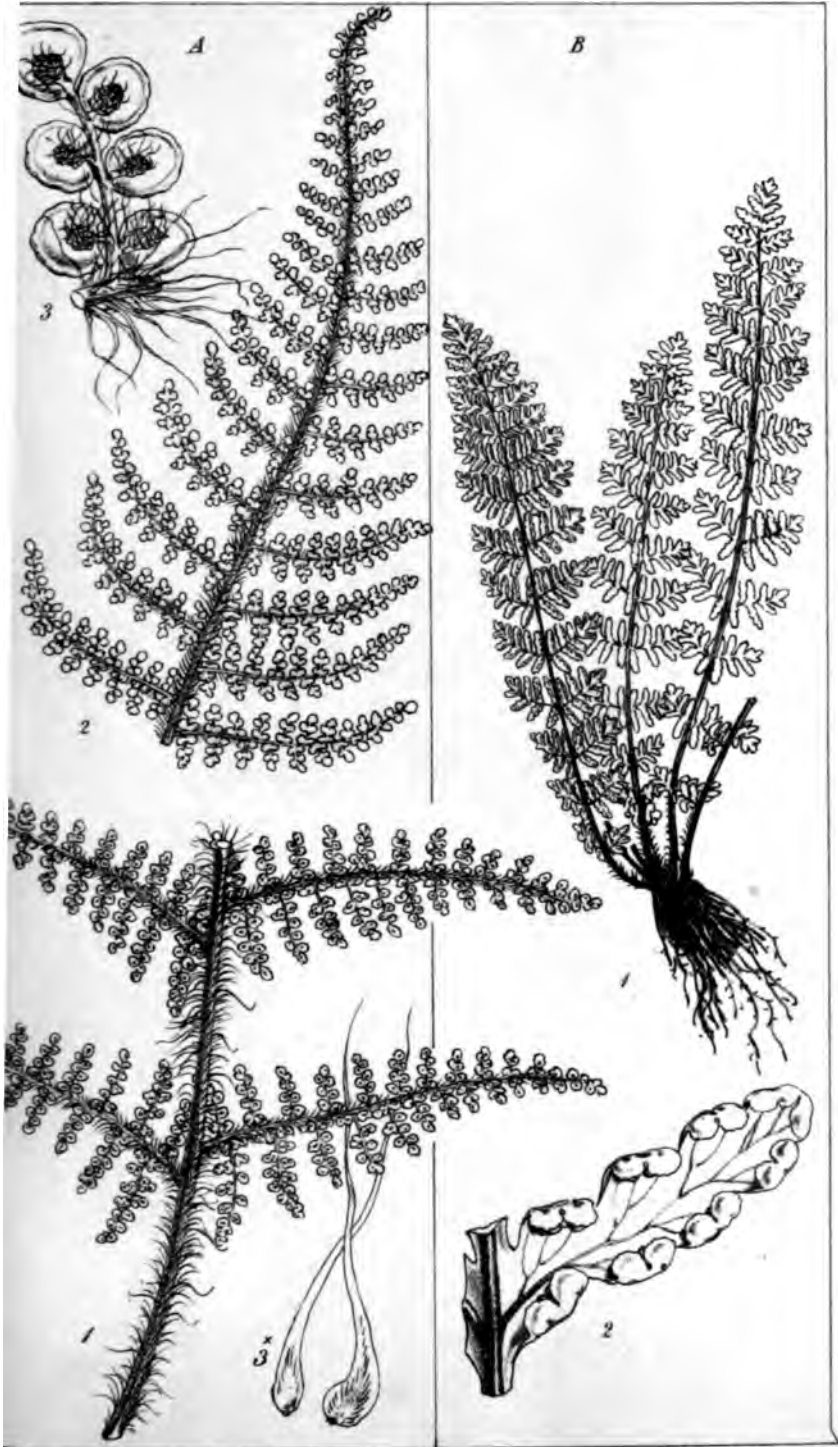
A. CHEILANTHES LENDIGERA, Sw. *β*.—p. 96.

Figs. 1 and 2. Portions of a fertile frond; *nat. size*. Fig. 3.
Secondary pinna, seen from beneath; *magnified*. Fig. 3.*
Chaffy hairs from the rachis; *magnified*.

B. CHEILANTHES CHUSANA, Hook.—p. 95.

Fig. 1. Fertile plant; *nat. size*. Fig. 2. Fertile segment, seen
from beneath; *magnified*.





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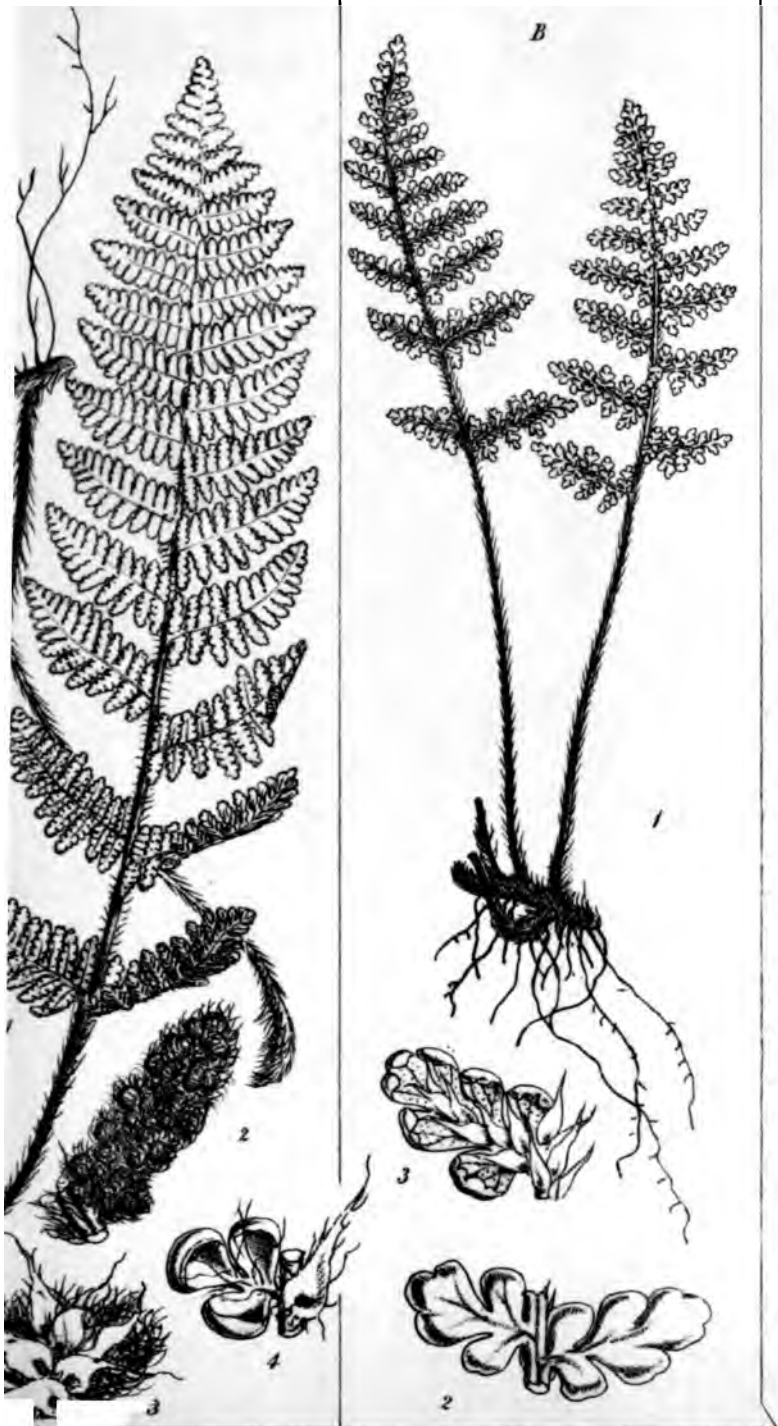
TAB. CVII.

A. CHEILANTHES LINDHEIMERI, *Hook.*—p. 101.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Secondary fertile pinna, seen from above; *magnified.* Fig. 3. Portion of a fertile secondary pinna, seen from beneath; *magnified.* Fig. 4. Ultimate pinna (fertile) of three lobes, or pinnules, seen from beneath; *magnified.*

B. CHEILANTHES FENDLERI, *Hook.*—p. 103.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile secondary pinnules, seen from above: Fig. 3. A fertile secondary pinna, seen from beneath; *magnified.*







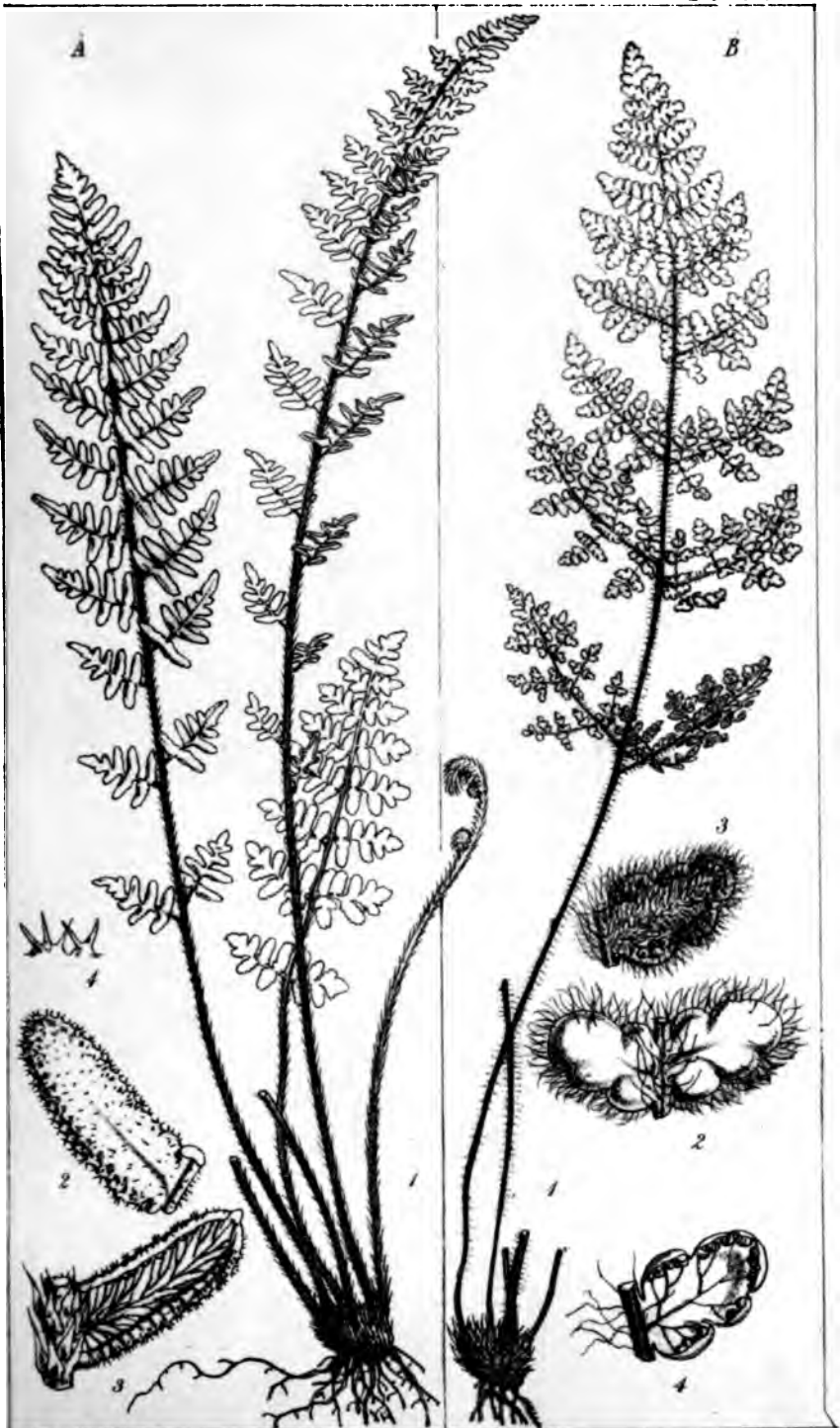
TAB. CVIII.

A. CHEILANTHES ASPERA, Hook.—p. 111.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile pinnule, seen from above; *magnified.* Fig. 3. Fertile pinnule, seen from beneath; *magnified.* Fig. 4. Hairs from the upper surface of the frond; *much magnified.*

B. CHEILANTHES VESTITA, Sw.—p. 98.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Tertiary pinnæ (fertile) seen from above: and Fig. 3. One of the same seen from beneath; *magnified.* Fig. 4. Fertile pinnules, seen from beneath, freed from the tomentum; *magnified.*





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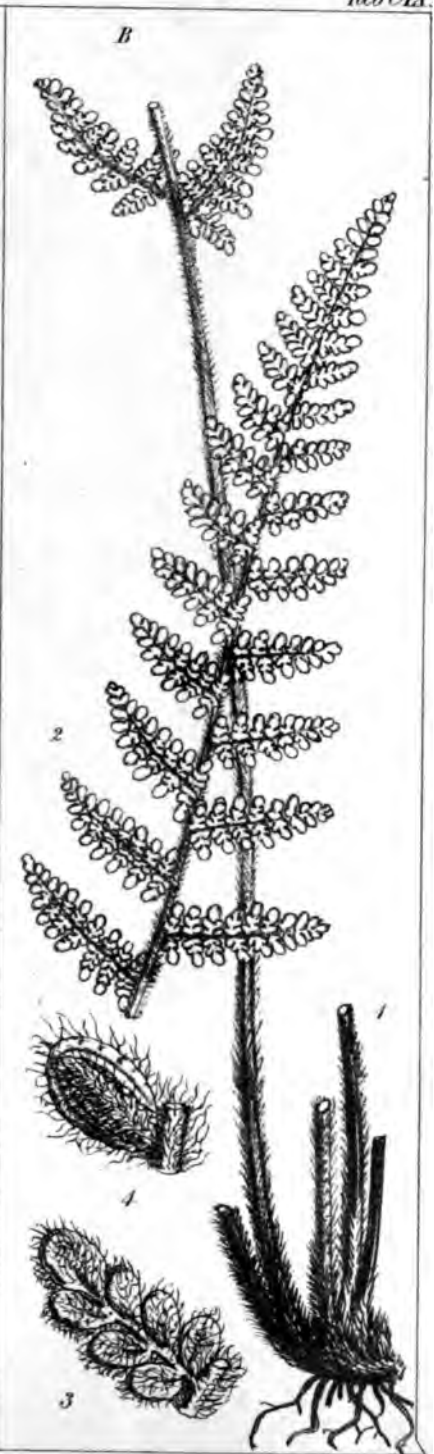
Tab. CIX.

A. CHEILANTHES TOMENTOSA, *Link.*—p. 96.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile secondary pinna seen from above; *magnified.* Fig. 3. Fertile pinnule, seen from beneath; *magnified.*

B. CHEILANTHES BRADBURI, *Hook.*—p. 97.

Figs. 1 and 2. Portions of a fertile frond; *nat. size.* Fig. 3. Secondary fertile pinna, seen from above; *magnified.* Fig. 4. Fertile pinnule, seen from beneath; *magnified.*



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TAB. CX.

A. CHEILANTHES WRIGHTII, Hook.,—p. 87.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile pinnule, seen from beneath; *magnified.*

B. CHEILANTHES MACLEANII, Hook.—p. 93.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile pinnule, seen from beneath; *magnified.* Fig. 4. Glandular hairs from the rachis; *highly magnified.*

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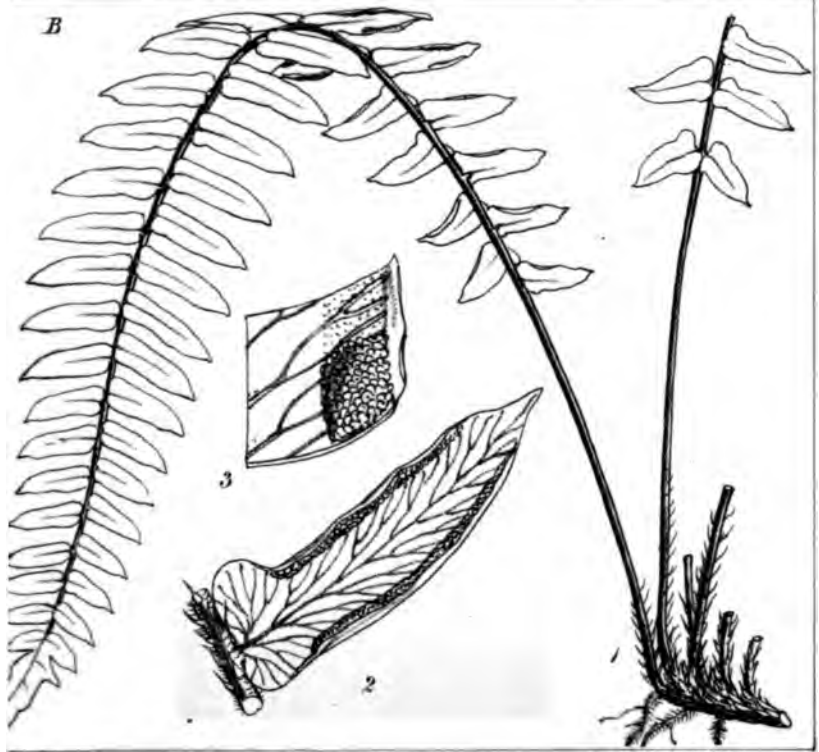
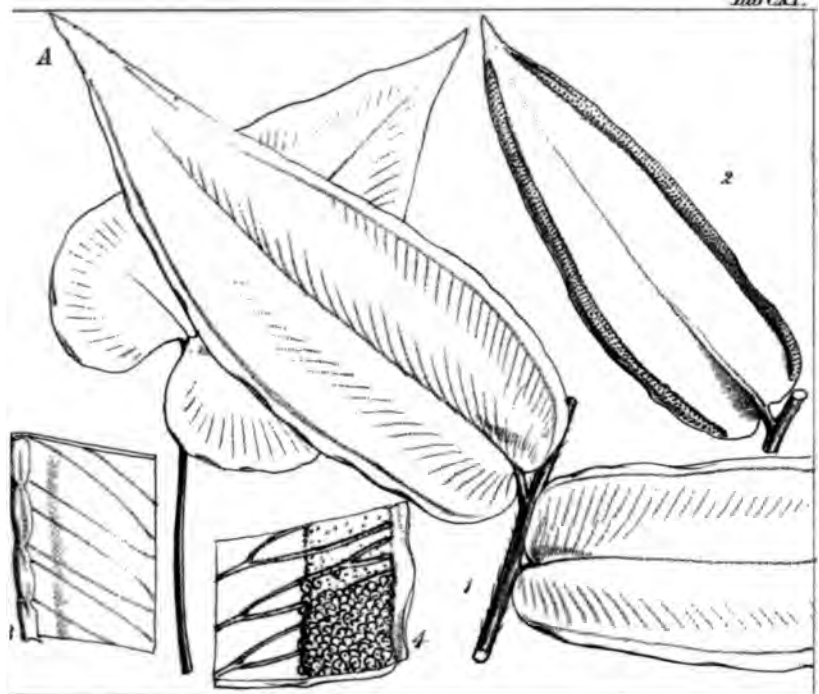
Tab. CXI.

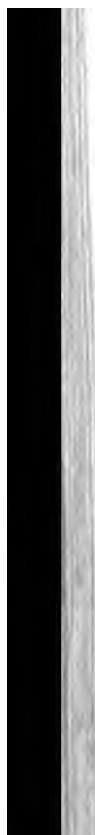
A. *PELLÆA PARADOXA*, Hook.—p. 135.

A young entire (simple) and sterile frond; *nat. size.* Fig. 1.
Two fertile pinnæ, upper side. Fig. 2. Fertile pinna, under side. Fig. 3. Portion of a very young fertile pinna to show the immature involucre and the veins; *magnified.* Fig. 4. Portion of a sorus, showing the receptacle of the sorus; *magnified.*

B. *PELLÆA FALCATA*, γ . *NANA*, Hook.—p. 136.

Fig. 1. Fertile frond of var. *nana*; *nat. size.* Fig. 2. Under side of a fertile pinna; and Fig. 3. Portion of a sorus; *magnified.*





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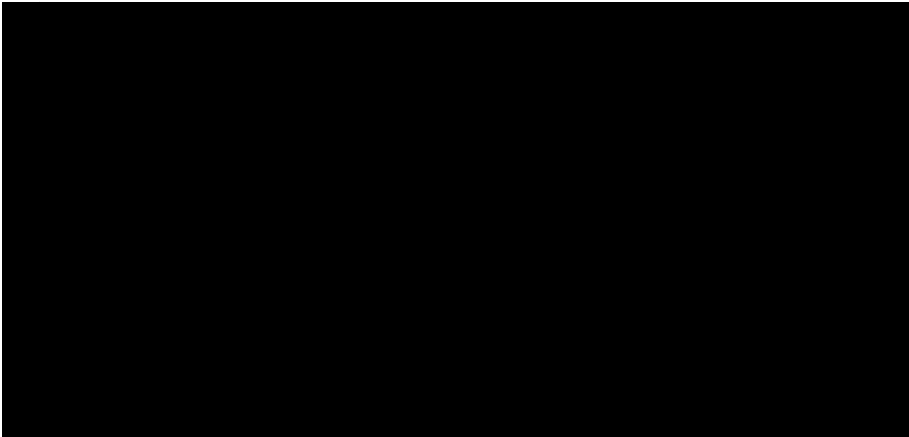
Tab. CXII.

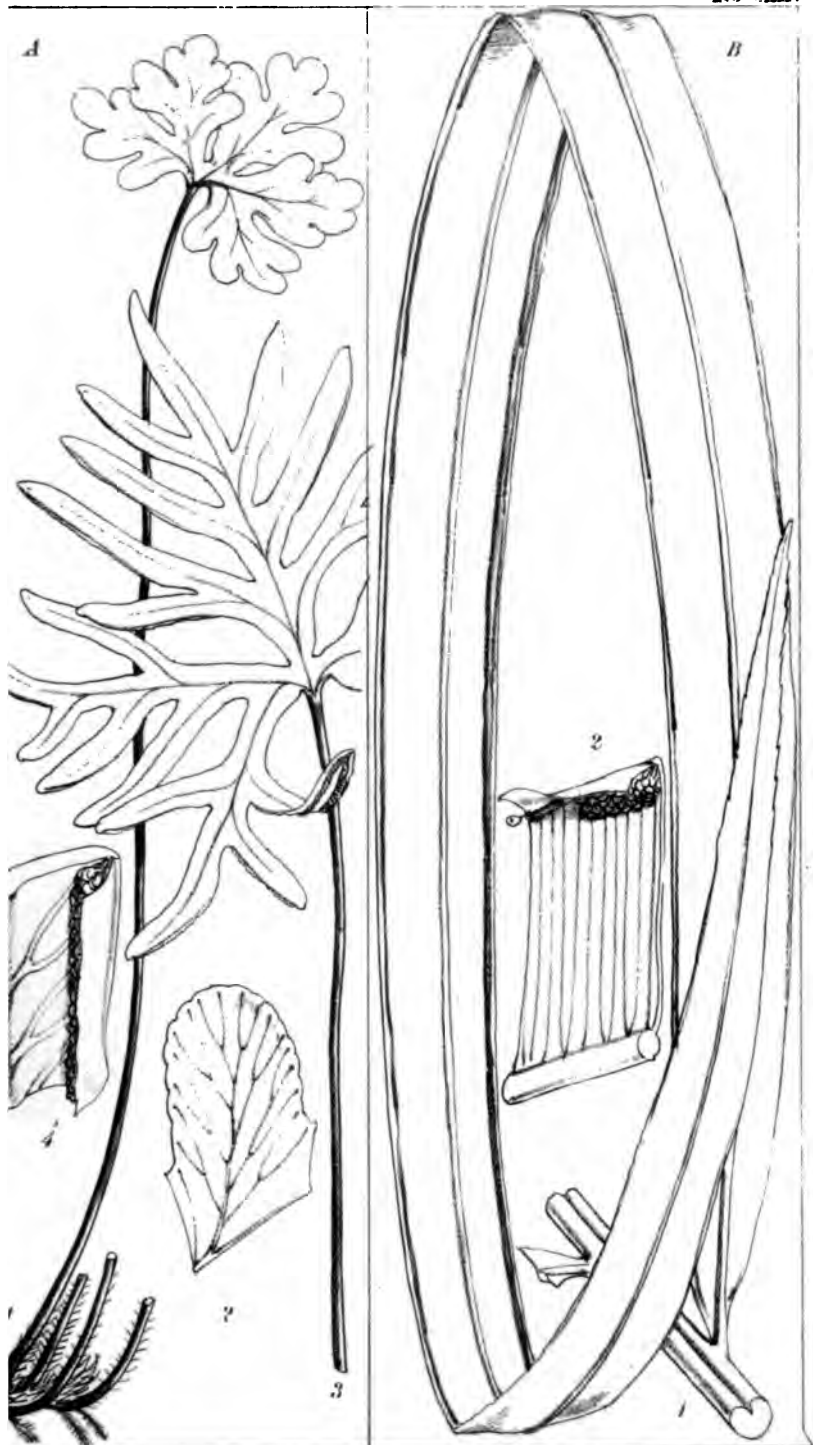
A. *PELLÆA LOMARIACEA*, β . *COLUMBINA*, *Hook.*—p. 133.

Fig. 1. Sterile frond; *nat. size.* Fig. 2. Segment of the same, showing the venation; *magnified.* Fig. 3. Fertile frond; *nat. size.* Fig. 4. Portion of a sorus; *magnified.*

B. *PTERIS (EUPTERIS) MOLUCCANA*, *Bl.*—p. 158.

Fig. 1. Portion of a rachis and a fertile pinna; *nat. size.* Fig. 2. Portion of a pinna and sorus; *magnified.*







TAB. CXIII.

A. *PELLÆA DURA*, *Hook.*—p. 139.

Fig. 1. Fertile frond; *nat. size.* Fig. 2. Under side of a fertile pinna; and Fig. 3. Portion of a sorus; *magnified.*

B. *PTERIS (HETEROPHLEBIUM) GRANDIFOLIUM*, *L.*—p. 201.

Fig. 1. Fertile pinna; *nat. size.* Fig. 2. Portion of the same, showing the nature of the sorus and the venation; *magnified.*





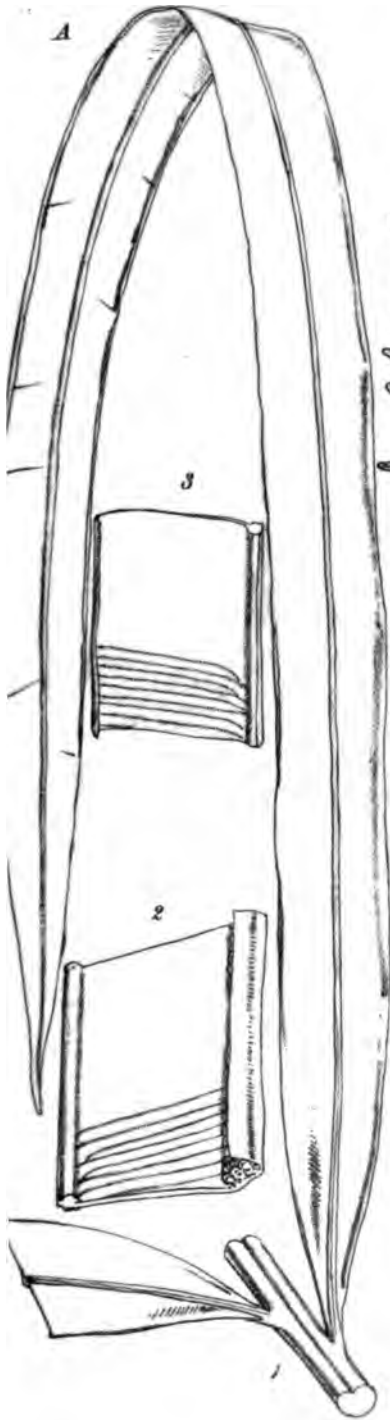
TAB. CXIV.

A. *PTERIS (EUPTERIS) OPACA*, *J. Sm.*—p. 158.

Fig. 1. Portion of a rachis and pinna; *nat. size.* Fig. 2. Portion of a fertile; and Fig. 3. Portion of a sterile pinna, seen from beneath, showing the venation; *magnified.*

B. *PELLÆA PILOSA*, *Hook.*—p. 132.

Fig. 1. Sterile frond; *nat. size.* Fig. 2. Portion of a segment; *magnified.* Fig. 3. Fertile frond; *nat. size.* Fig. 4. Segment, with sori, seen from beneath; *magnified.*





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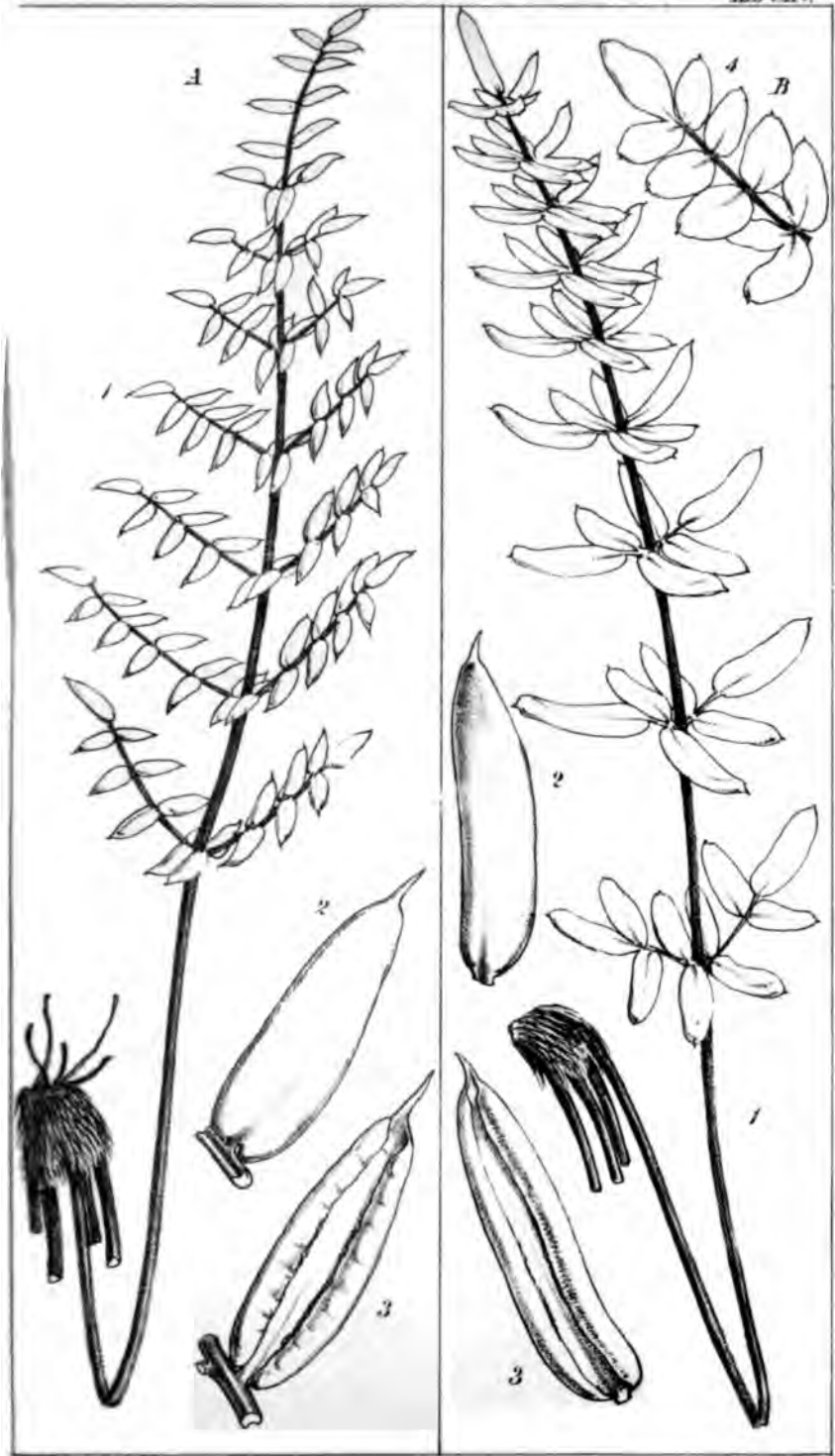
TAB. CXV.

A. *PELLÆA LONGIMUCRONATA*, Hook.—p. 143.

Fig. 1. Fertile plant; *nat. size*. Fig. 2. Fertile pinnule, seen from above; and Fig. 3. Fertile pinnule, seen from beneath; *magnified*.

B. *PELLÆA WRIGHTIANA*, Hook.—p. 142.

Fig. 1. Fertile plant; *nat. size*. Fig. 2. Fertile pinnule, seen from above; and Fig. 3. Fertile pinnule, seen from beneath; *magnified*. Fig. 4. Primary pinna of a sterile frond; *nat. size*.





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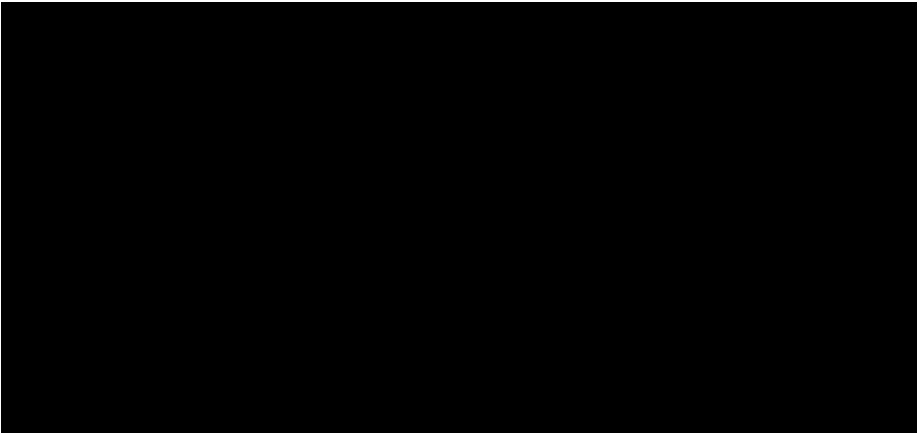
TAB. CXVI.

A. PELLÆA ORNITHOPUS, *Hook.*—p. 144.

Fig. 1. Fertile frond; *nat. size.* Fig. 2. Secondary pinna, seen from above. Fig. 3. Fertile pinnule, seen from beneath; *magnified.*

B. PELLÆA HASTATA, *Link.*—p. 145.

Fig. 1. Portion of a frond, normal form; *nat. size.* Fig. 2. Portion of pinnule, with sorus; *magnified.* Fig. 3. Sterile pinna; *nat. size.* Fig. 4. Pinna of var. *macrophylla*, *Kze.*, with sori, seen from beneath; *nat. size.*

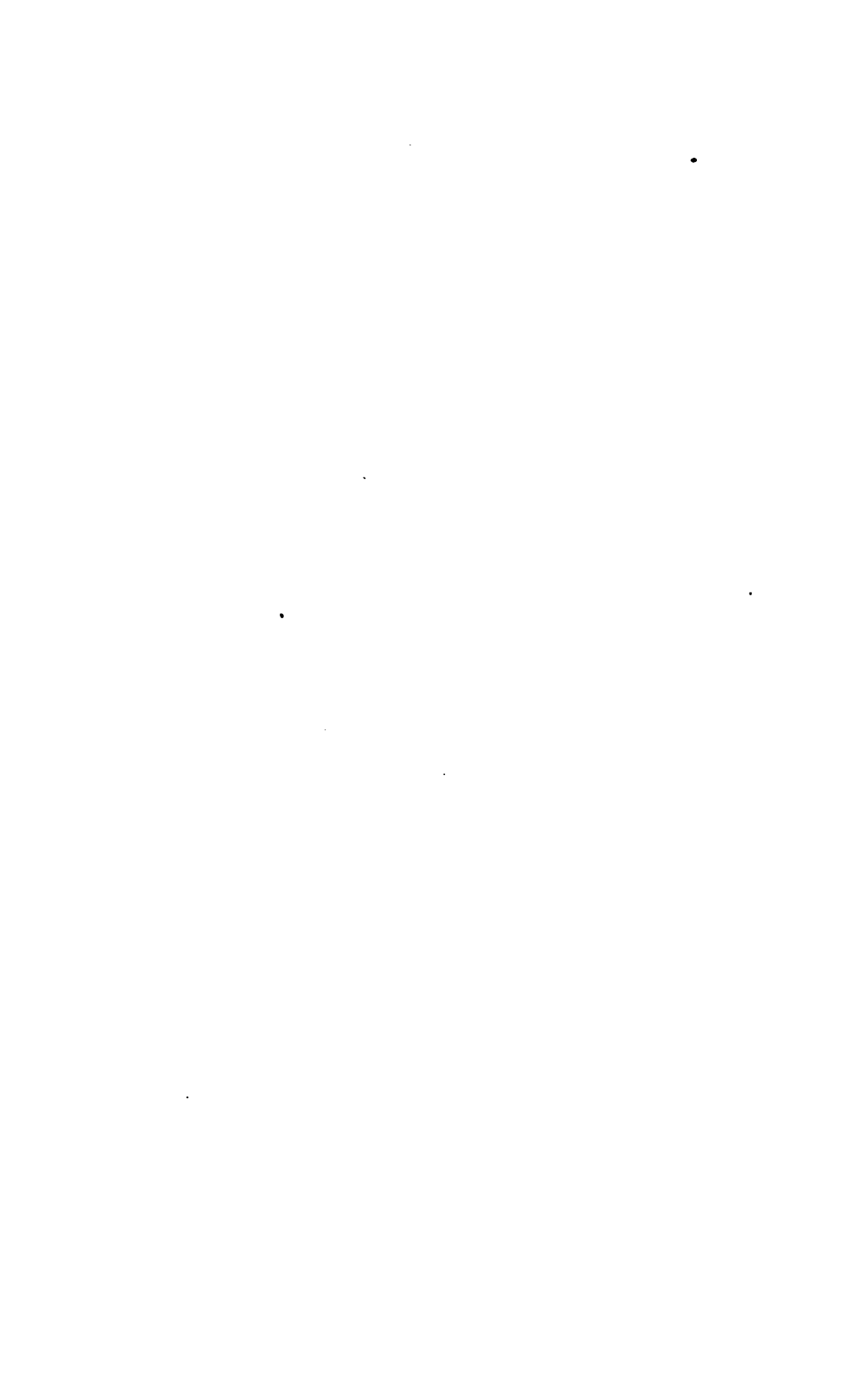






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TAB. CXVII.

A. *PELLÆA CONSOBRINA*, *Hook.*—p. 145.

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. Pinnule, with sori; *magnified.*

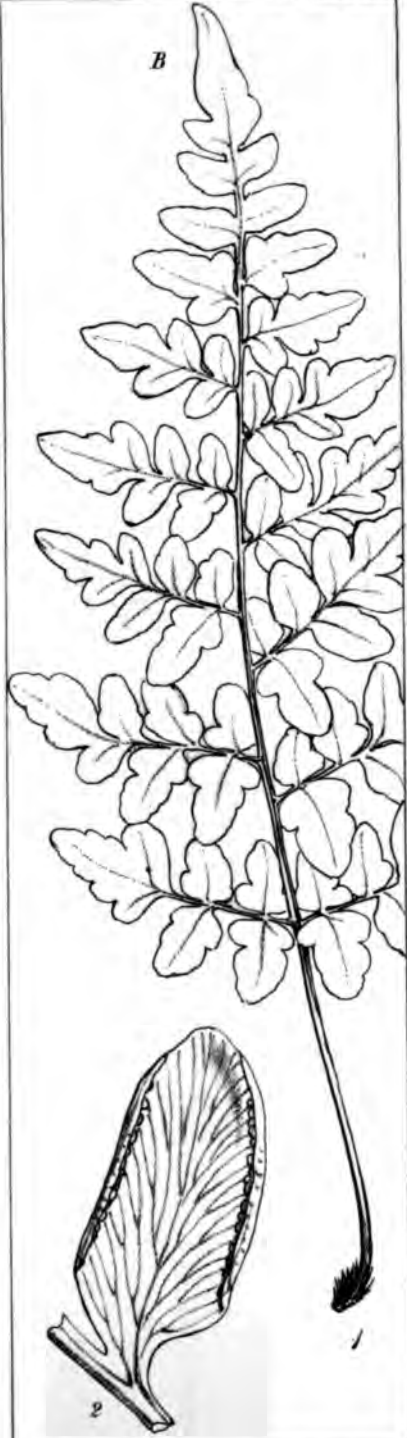
B. *PELLÆA SEEMANNI*, *Hook.*—p. 141.

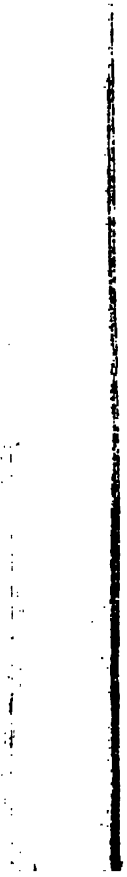
Fig. 1. Fertile frond; *nat. size.* Fig. 2. Fertile pinnule, seen from beneath; *magnified.*

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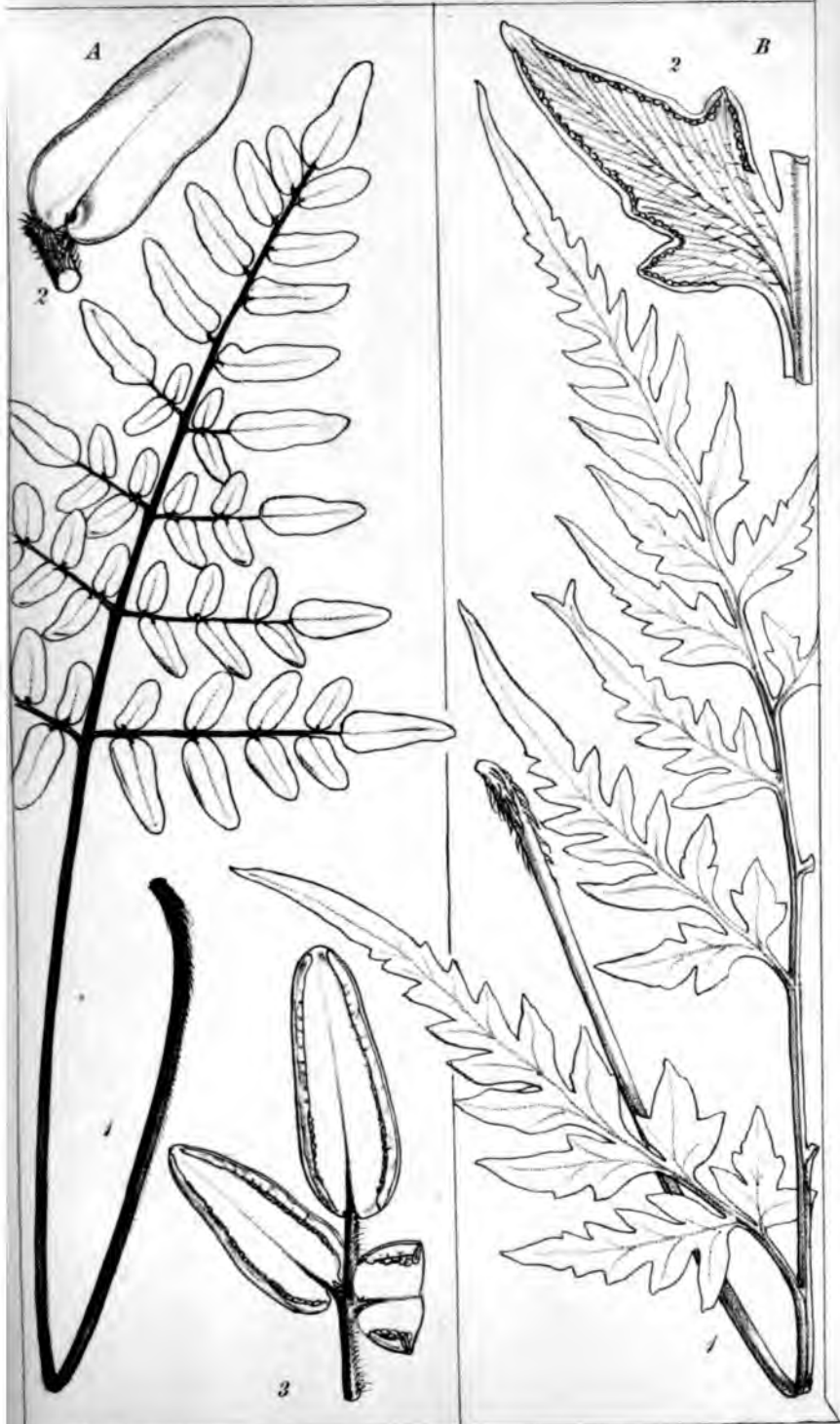
Tab. CXVIII.

A. *PELLÆA BOIVINI*, Hook.—p. 147.

Fig. 1. Fertile frond; *nat. size.* Fig. 2. Upper side of a fertile pinnule; and Fig. 3. Under side of fertile pinnules; *magnified.*

B. *PELLÆA SKINNERI*, Hook.—p. 141.

Fig. 1. Fertile frond; *nat. size.* Fig. 2. Fertile segment, seen from beneath; *magnified.*





TAB. CXIX.

A. PELLÆA BOJERI, *Hook.*—p. 146.

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. U₁
of a fertile pinnule; *magnified.*

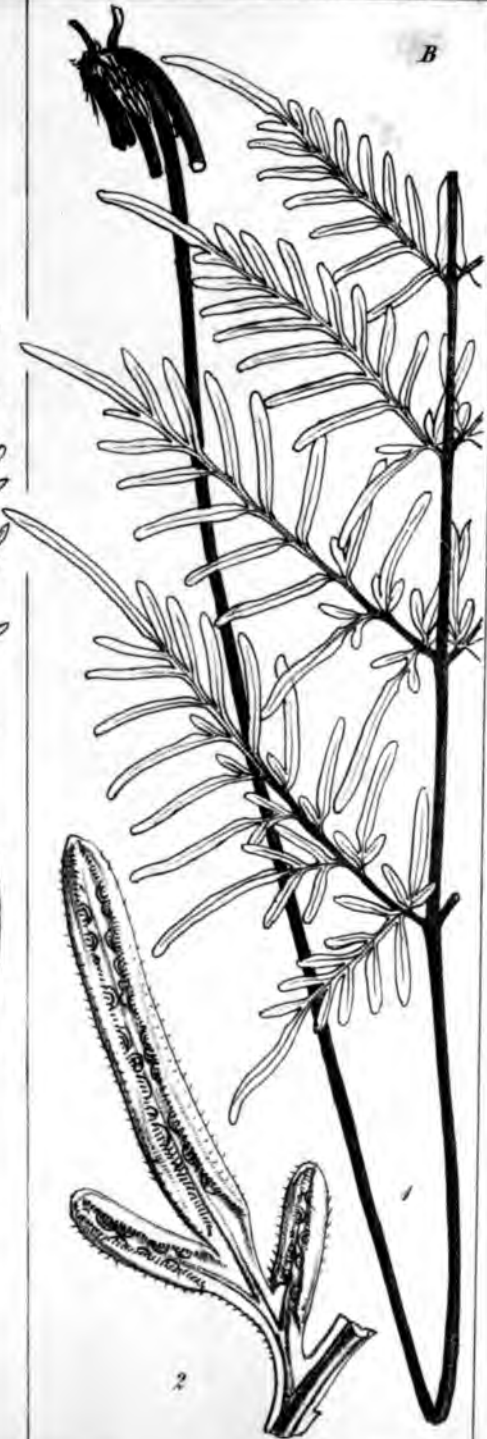
B. PELLÆA DECOMPOSITA, *Hook.*—p. 150.

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2.
pinna, seen from beneath; *magnified.*

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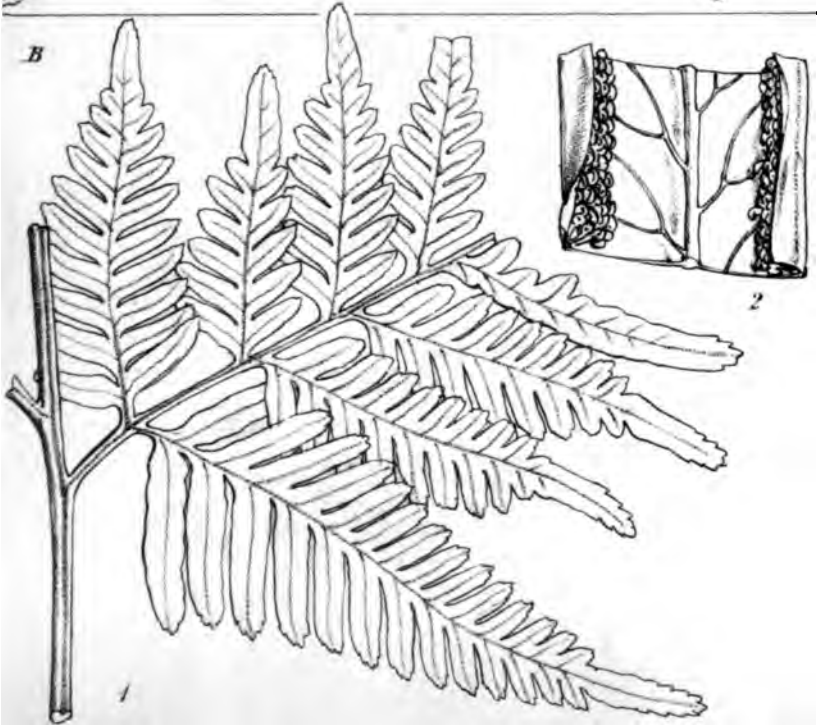
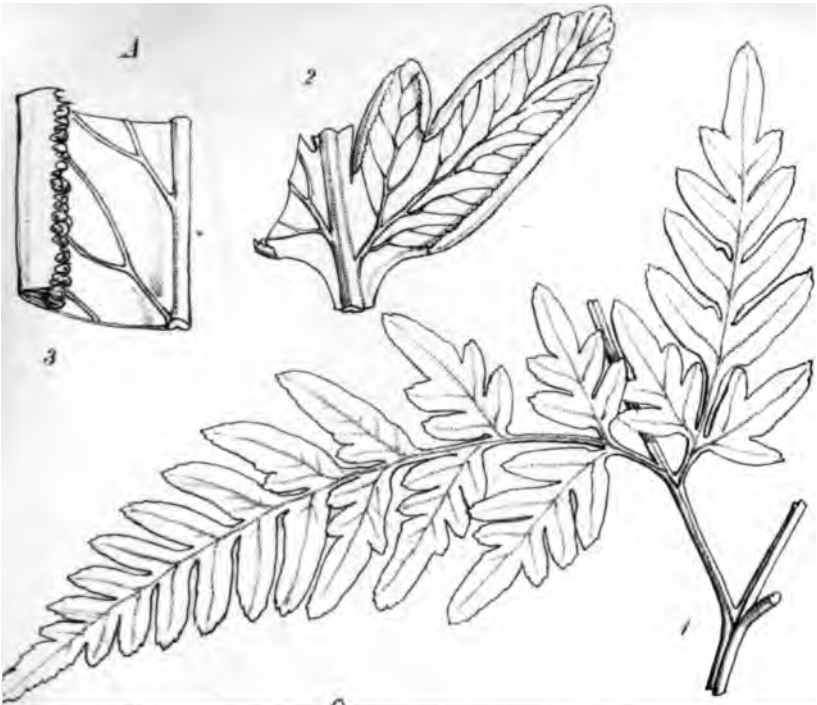
TAB. CXX.

A. PTERIS (EUPTERIS) CHILENSIS, Desv.—p. 175.

Fig. 1. Small portion of a fertile frond; *nat. size.* Fig. 2. Segments of a pinna, with sori, seen from beneath; and Fig. 3. Portion of sorus; *magnified.*

B. PTERIS (EUPTERIS) TREMULA, Br.—p. 174.

Fig. 1. Small portion of a fertile frond; *nat. size.* Fig. 2. Portion of a segment, with sori, seen from beneath; *magnified.*





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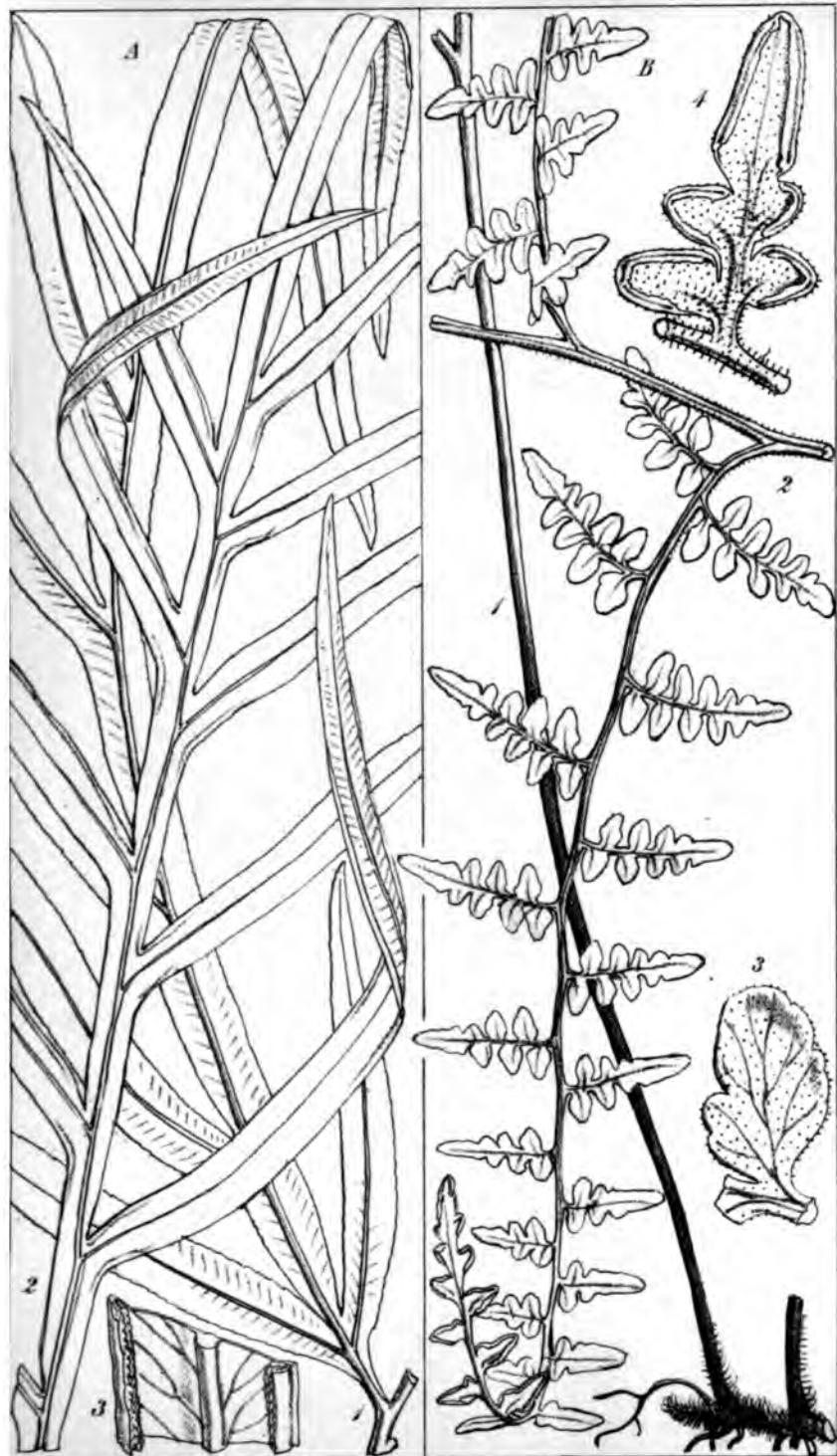
TAB. CXXI.

A. PTERIS (EUPTERIS) DALHOUSIÆ, *Hook.*—p. 170.

Fig. 1. Lowest pinna; and Fig. 2. Extremity of a fertile frond, *nat. size.* Fig. 3. Portion of a segment, with sori; *magnified.*

B. PTERIS (ORNITHOPTERIS) SCALARIS, *Moritz.*—p. 200.

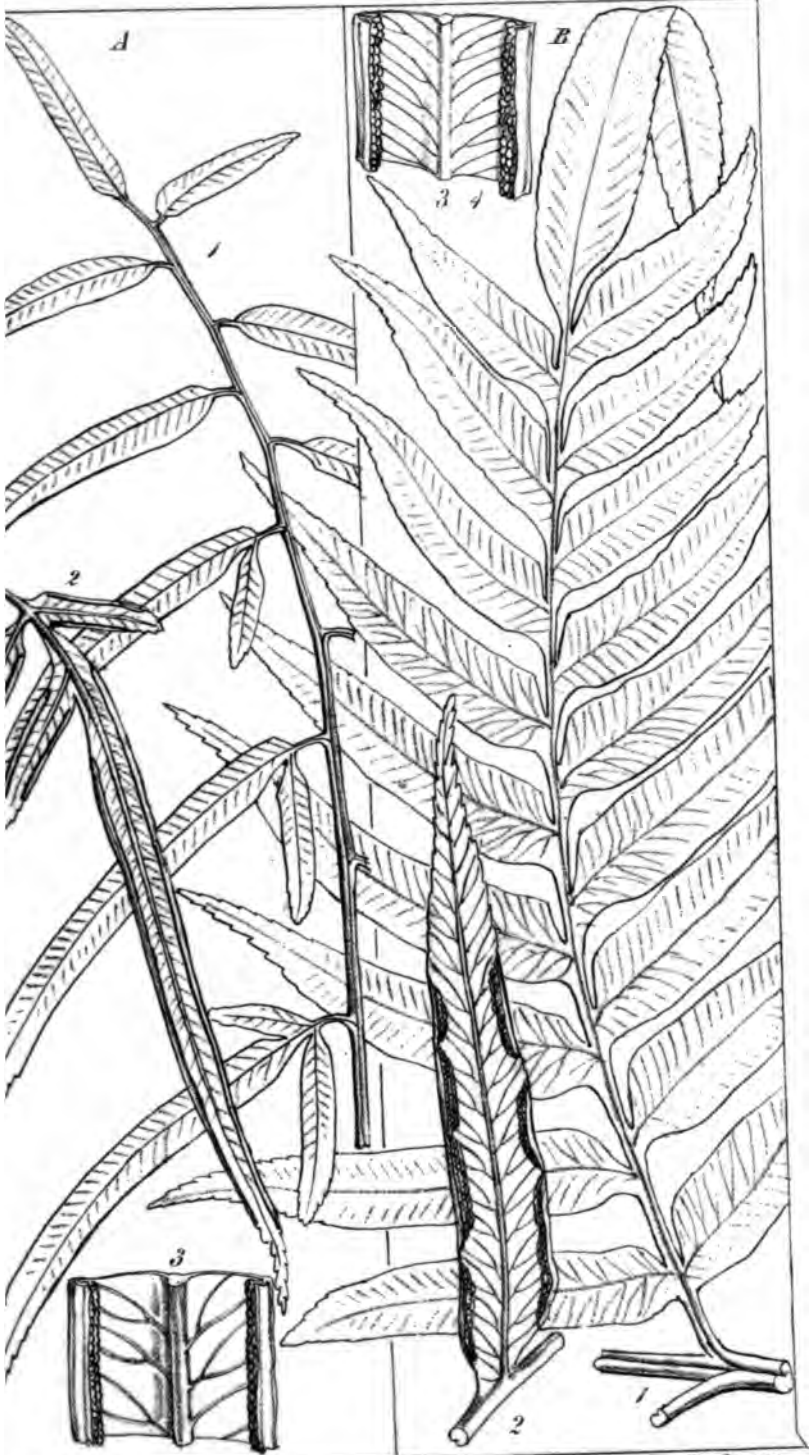
Fig. 1. Caudex and stipes; and Fig. 2. Portion of the fertile frond; *nat. size.* Fig. 3. Sterile lobe or pinnule; and Fig. 4. Fertile pinna, seen from beneath; *magnified.*—[See also TAB. CXLI. C. of Vol. III., for the analysis of the sorus.]



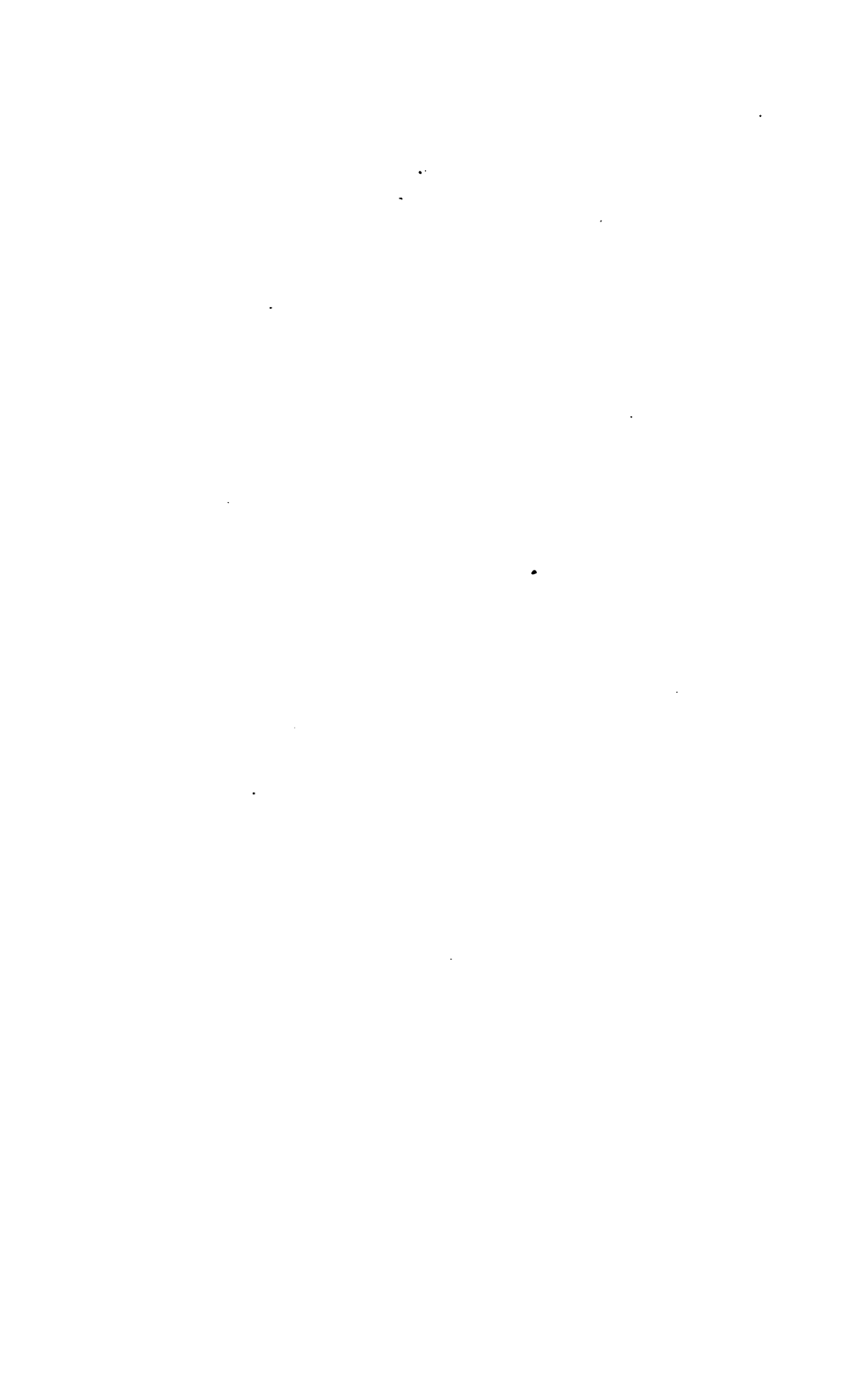


TAB. CXXII.

- A. PTERIS (EUPTERIS) MADAGASCARICA, *Ag.*—p. 17
Fig. 1 and 2. Extremity and lower pinna of a fertile
size. Fig. 3. Portion of a fertile pinnule, seen
neath; *magnified*.
- B. PTERIS (EUPTERIS) MARATTIÆFOLIA, *Hook.*—p. 1
Fig. 1. Primary pinna of a fertile frond; *nat. siz*
Fertile pinnule, seen from beneath; and Fig.
of sori; *magnified*.

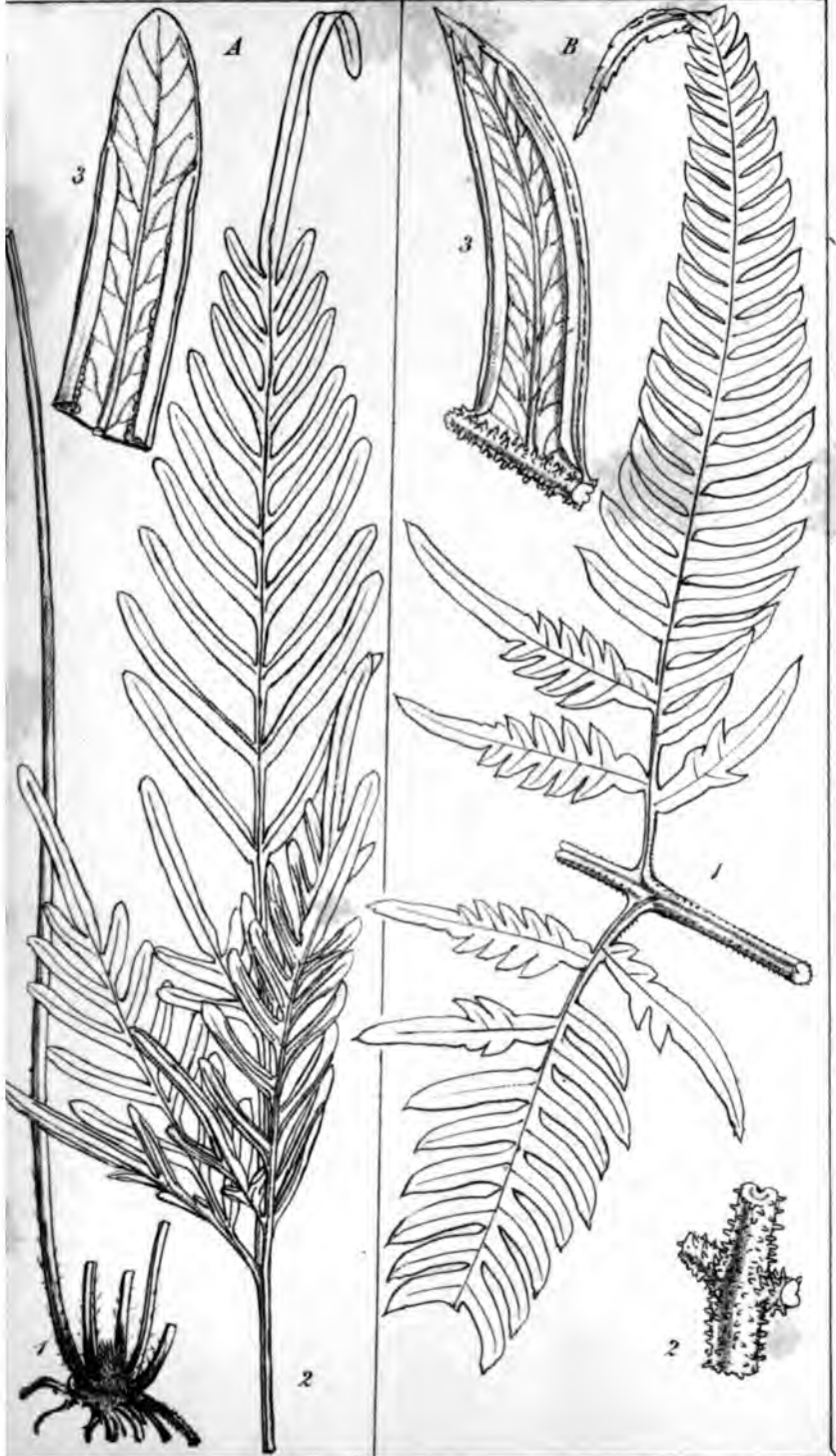






TAB. CXXIII.

- A. **PTERIS (EUPTERIS) GRIFFITHIANA**, *Hook.*—p. 1
Fig. 1 and 2. Fertile frond; *nat. size.* Fig. 3.
segment, with sori; *magnified.*
- B. **PTERIS (EUPTERIS) MURICATA**, *Hook.*—p. 193.
Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Pori-
chis; and Fig. 3. Fertile segment: *magnified.*





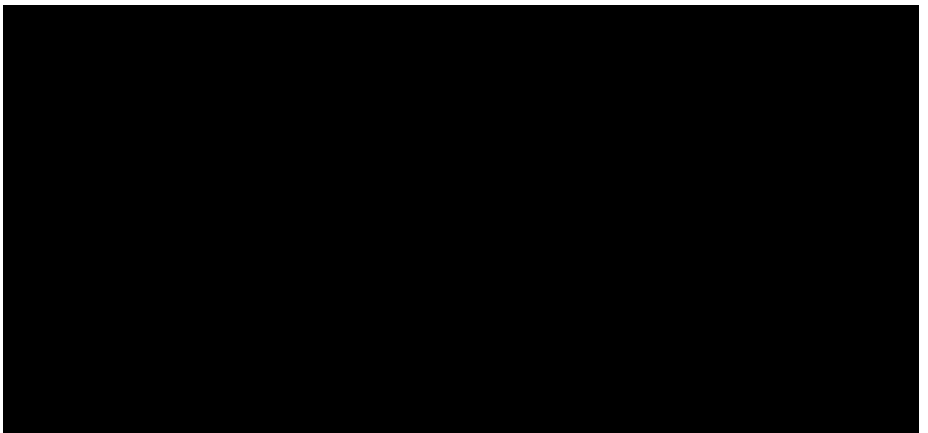
TAB. CXXIV.

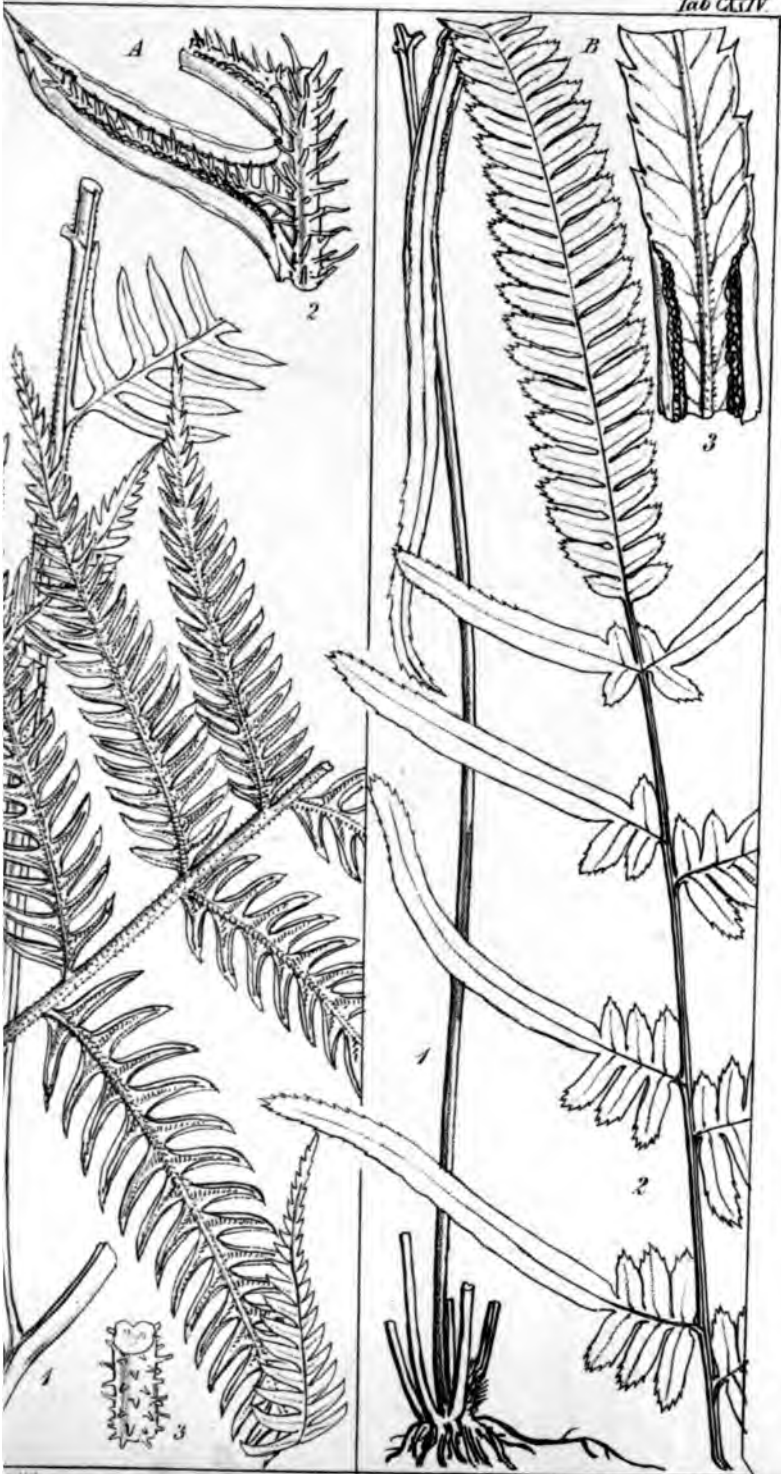
A. PTERIS (EUPTERIS) CORIACEA, *Desv.*—p. 192.

Fig. 1. Portion of the tripartite fertile frond; *nat. size.* Fig. 2. Fertile portion of a pinnule, with its spinulose costa, seen from beneath; and Fig. 3. Portion of the muricated rachis; *magnified.*

B. PTERIS (EUPTERIS) DISTANS, *J. Sm.*—p. 169.

Fig. 1. and 2. Fertile frond; *nat. size.* Fig. 3. Portion of a fertile pinna; *magnified.*







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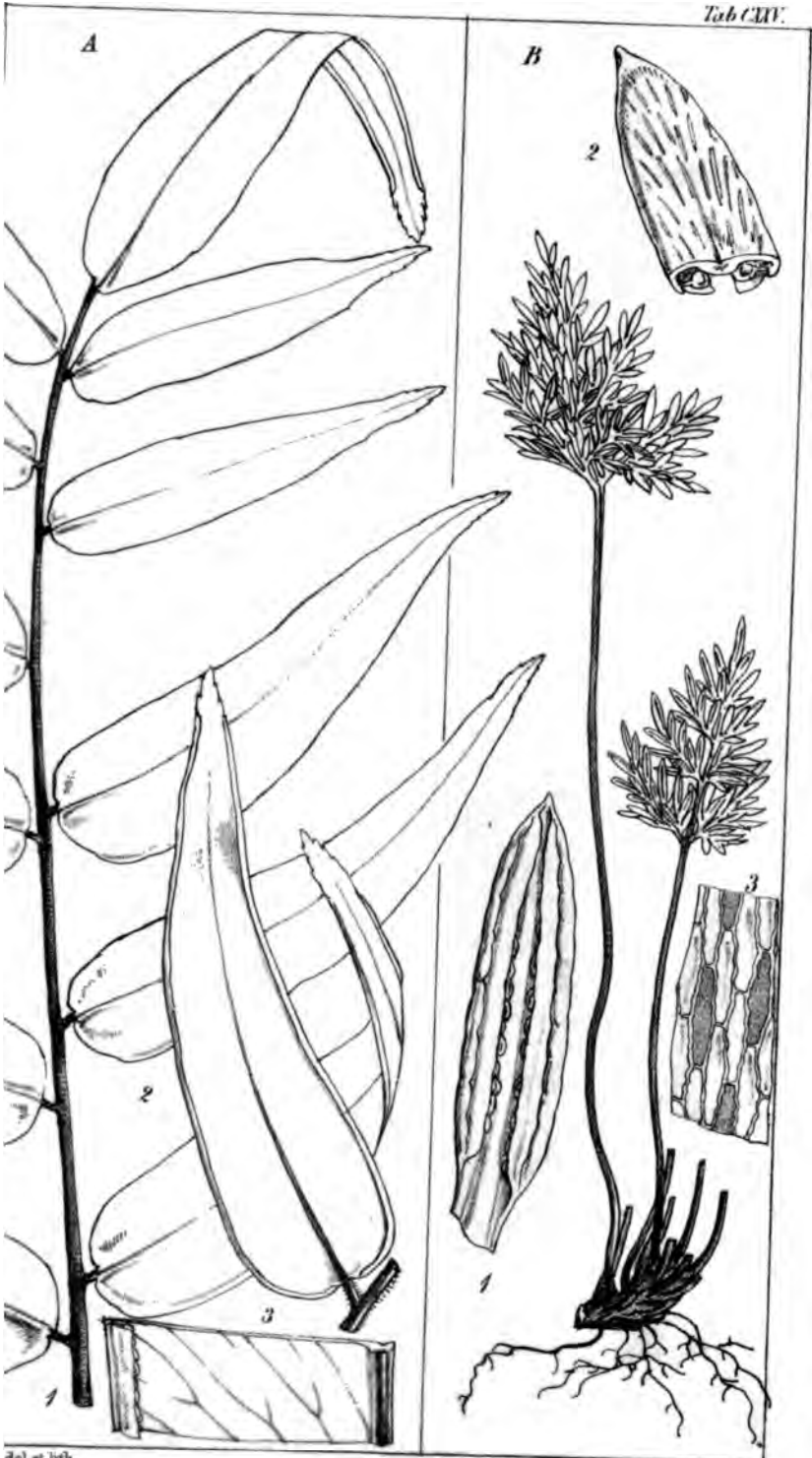
TAB. CXXV.

A. PELLEA DONIANA, Hook.—p. 137.

Fig. 1. Portion of a frond; and Fig. 2. Fertile pinna, seen from beneath; *nat. size*. Fig. 3. Portion of a fertile pinna; *magnified*.

B. PELLEA Densa, Hook.—p. 150.

Fertile plant; *nat. size*. Fig. 1. Fertile pinnule, seen from beneath; *magnified*. Fig. 2. Upper surface of a pinnule, showing the raphides (?), alluded to at p. 156; *magnified*. Fig. 3. Portion of the cuticle of the same; *very highly magnified*.





TAB. CXXXVI.

A. PTERIS (LITOBROCHIA) ARTICULATA, *Klfs.*—p. 214.

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. Portion of a fertile pinna, seen from beneath; *magnified.* Fig. 3. Sterile pinna; *nat. size.* Fig. 4. Portion of the same, showing the venation; *magnified.*

B. PTERIS (LITOBROCHIA) BURKEANA, *Hook.*—p. 213.

Fertile frond; *nat. size.* Fig. 1. Fertile pinnule, seen from beneath; and fertile portion of the same, showing the sorus and the venation; *magnified.*







TAB. CXXVII.

A. PTERIS (EUPTERIS) CRENATA, Sw.—p. 163.

Fig. 1. Lower pinna of a fertile frond; *nat. size*. Fig. 2. Small portion of the same, seen from beneath; *magnified*. Fig. 3. Sterile frond; *nat. size*.

B. PTERIS (EUPTERIS) HETEROMORPHA, L. fl.—p. 166.

Fig. 1. Fertile portion of a frond, seen from beneath; *nat. size*.
Fig. 2. Fertile portion of a segment, seen from beneath; *magnified*.
Fig. 3. Sterile portion of a frond; *nat. size*.





TAB. CXXVIII.

A. PTERIS (EUPTERIS) GRACILIS, *Fée.*—p. 172.

Fig. 1. Sterile pinna; *nat. size.* Fig. 2. Fertile portion of a frond, seen from beneath; *nat. size.* Fig. 3. Sterile segment; *magnified.* Fig. 4. Fertile segment, seen from beneath; *magnified.*

B. PTERIS (EUPTERIS) SEMIDENTATA, *Fée.*—p. 172.

Fig. 1. Portion of a fertile frond, seen from beneath; *nat. size.*
Fig. 2. Fertile segment, seen from above; *magnified.* Fig. 3.
Fertile segment, seen from beneath; *magnified.*





TAB. CXXIX.

A. *PELLEA TAMBURII*, Hook.—p. 134.

Fig. 1. Portion of a fertile frond; *nat. size*. Fig. 2. Apex of a fertile segment, seen from beneath, showing the depressions on the outer surface of the involucre, indicating the insertion of the sori; *magnified*. Fig. 3. Portion of a fertile segment, the involucre laid open, showing the venation and insertion of the capsules; *magnified*.

B. *PTERIS (EUPTERIS) PELLUCIDA*, Pr. (simple-fronded form only).
—p. 161.

Fig. 1. Sterile frond; *nat. size*. Fig. 2. Portion of a fertile frond of the same var., seen from beneath; *magnified*.
Fig. 3. Fertile frond, seen from beneath; *nat. size*.





1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes the need for transparency and accountability in financial reporting.

2. The second part of the document outlines the various methods and techniques used to collect and analyze data. It covers both qualitative and quantitative approaches, highlighting the strengths and limitations of each.

Tab. CXXX.

A. *PTERIS (EUPTERIS) DACTYLINA*, Hook.—p. 160.

Fig. 1 and 2. Sterile and fertile fronds; *nat. size*. Fig. 3. Portion of a sterile pinna; *magnified*. Fig. 4. Portion of a fertile pinna, seen from beneath; *magnified*.

B. *PTERIS (EUPTERIS) UMBROSA*, Br.—p. 162.

Fig. 1 and 2. Lower primary pinna and apex of a sterile frond; *nat. size*. Fig. 3. Segment of a fertile frond, seen from beneath; *nat. size*. Fig. 4. Portion of a fertile segment, seen from beneath; *magnified*.





TAB. CXXXI.

A. PTERIS (EUPTERIS) MUTILATA, L.—p. 164.

Sterile and fertile fronds; *nat. size.* Fig. 1. Sterile pinna, showing the venation and thickened margin; *magnified.*
Fig. 2. Portion of a fertile pinna; *magnified.*

B. PTERIS (EUPTERIS?) TRIPHYLLA, Ag.—p. 171.

Fig. 1. Primary pinna, sterile; *nat. size.* Fig. 2. Portion of a pinnule of the same, to show the venation; *magnified.*



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1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for transparency and accountability, particularly in the context of public administration and government operations. The text highlights how detailed records can help identify inefficiencies, prevent fraud, and ensure that resources are used effectively.

2. The second part of the document focuses on the role of technology in modern record-keeping. It explores how digital systems and software solutions can streamline the process of data collection, storage, and retrieval. The text discusses the benefits of automation, such as reduced human error and faster access to information, while also addressing potential challenges like data security and system integration.

3. The third part of the document addresses the legal and regulatory requirements for record-keeping. It outlines the various laws and standards that govern the retention and disposal of records, ensuring that organizations remain compliant with applicable regulations. The text also discusses the importance of regular audits and reviews to verify that record-keeping practices are up-to-date and effective.

4. The fourth part of the document discusses the impact of record-keeping on organizational performance and decision-making. It explains how access to accurate and timely data can provide valuable insights into trends, patterns, and areas for improvement. The text emphasizes that well-maintained records are a critical asset for any organization looking to optimize its operations and achieve its strategic goals.

5. The fifth part of the document concludes by summarizing the key points and reinforcing the message that record-keeping is a fundamental practice for any organization. It encourages readers to take proactive steps to improve their record-keeping processes and to stay informed about the latest developments in the field. The text ends with a call to action, urging organizations to embrace a culture of transparency and accountability through effective record management.

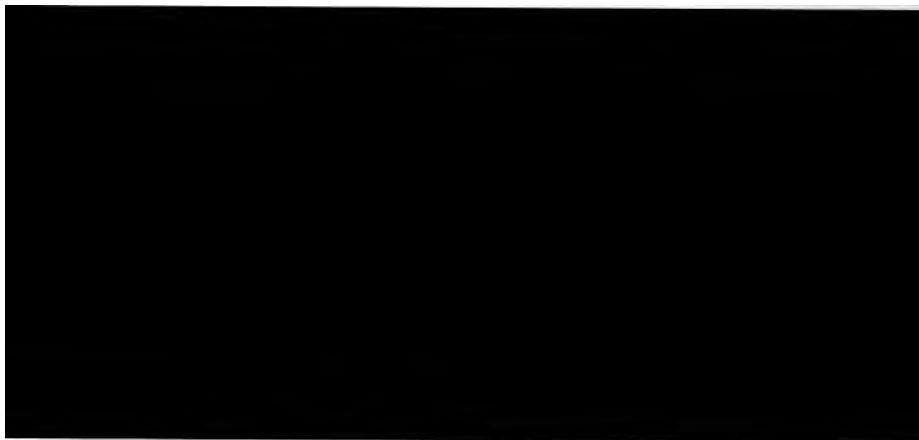
TAB. CXXXII.

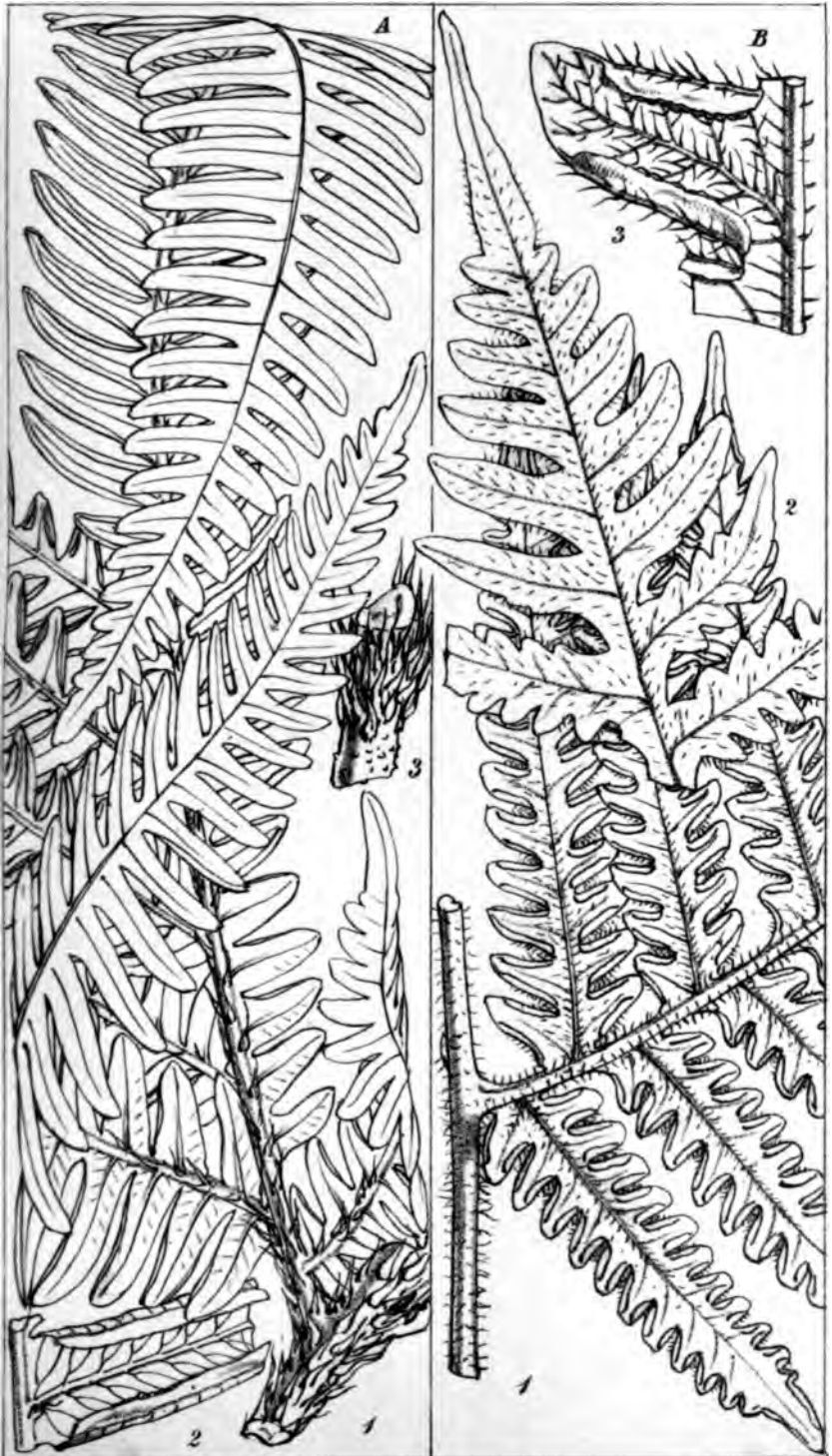
A. PTERIS (EUPTERIS) PALMACEA, *Rorb.*—p. 186.

Fig. 1. Portion of a stipes and fertile frond; *nat. size.* Fig. 2
Portion of a fertile segment; *magnified.* Fig. 3. Por
tion of the stipes, from part of which the scales hav
fallen; *nat. size.*

B. PTERIS (EUPTERIS) LACINIATA, *Willd.*—p. 176.

Fig. 1 and 2. Portions of a sterile and of a fertile frond; *nat*
size. Fig. 3. Portion of a fertile pinna; *magnified.*







Tab. CXXXIII.

A. *PTERIS (EUPTERIS) JAMESONI*, Hook.—p. 193.

Fig. 1. Pinna of a frond; *nat. size*. Fig. 2. Rachis and sterile segment; *magnified*. Fig. 3. Rachis and fertile segment; *magnified*.

B. *PELLÆA GRACILIS*, Hook.—p. 138.

Sterile and fertile frond; *nat. size*. Fig. 1. Sterile pinna; *magnified*. Fig. 2. Fertile pinnule; *magnified*. Fig. 3. Portion of a fertile pinna, with the involucre laid back to show the sori; *magnified*.





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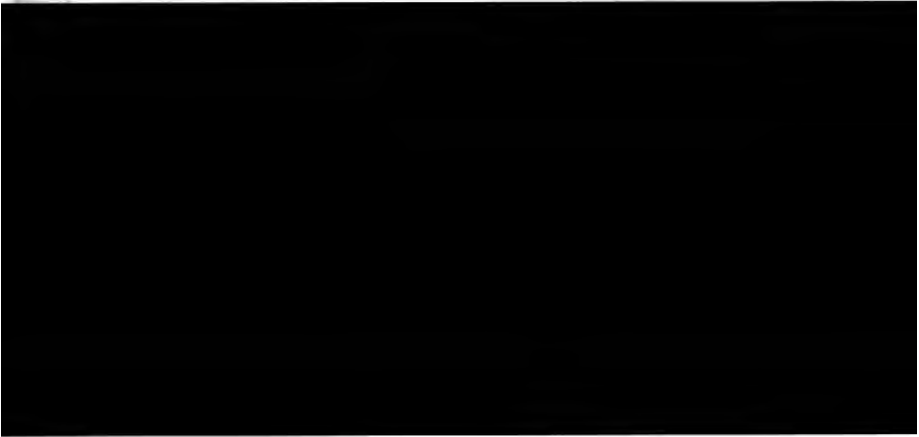
TAB. CXXXIV.

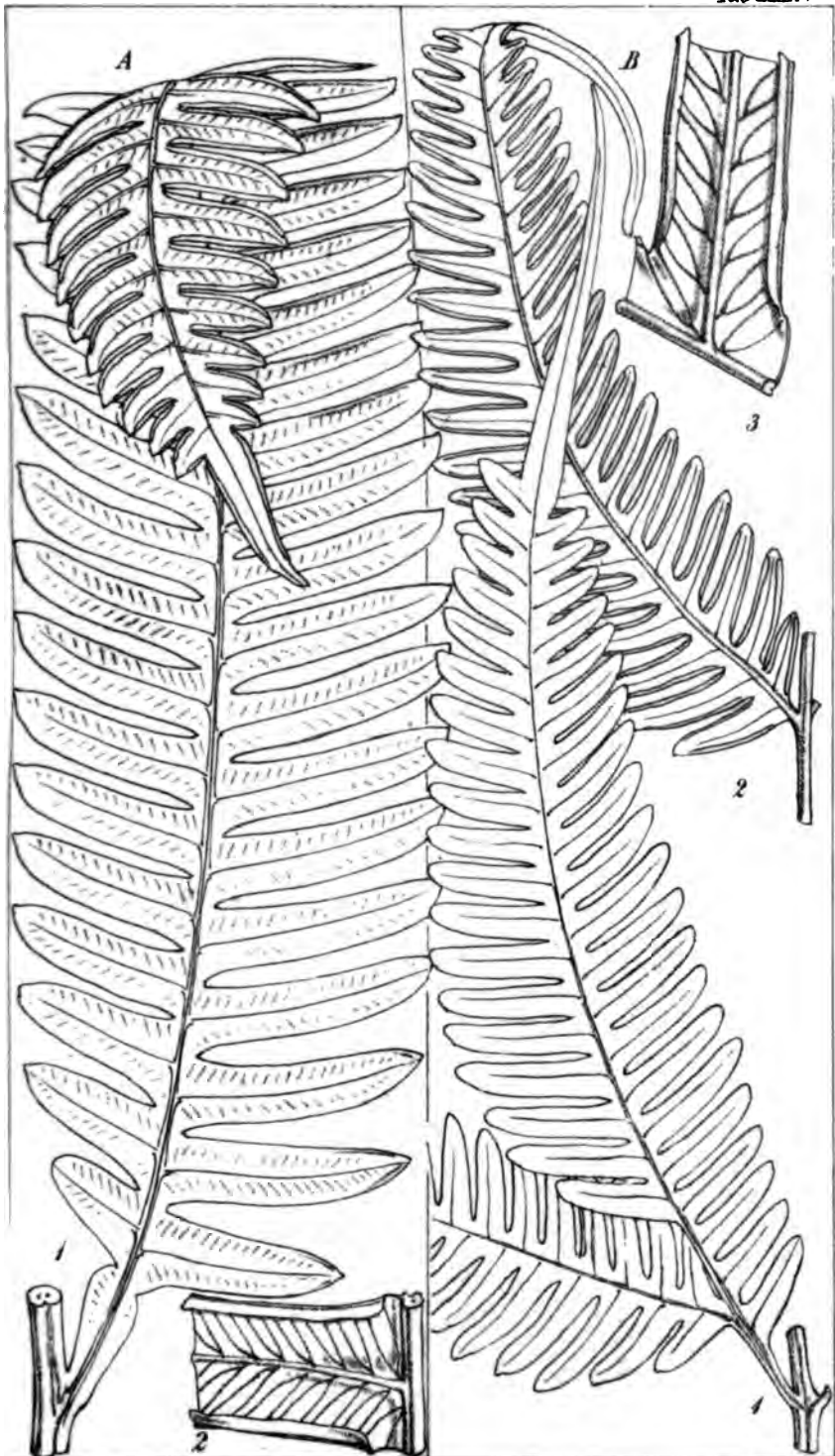
A. PTERIS (EUPTERIS) LONGIPINNULA, *Wall.*—p. 179.

Fig. 1. Pinna of a fertile frond; *nat. size.* Fig. 2. Portion of a fertile segment; *magnified.*

B. PTERIS (EUPTERIS) QUADRIAURITA, *Retz.*—p. 179.

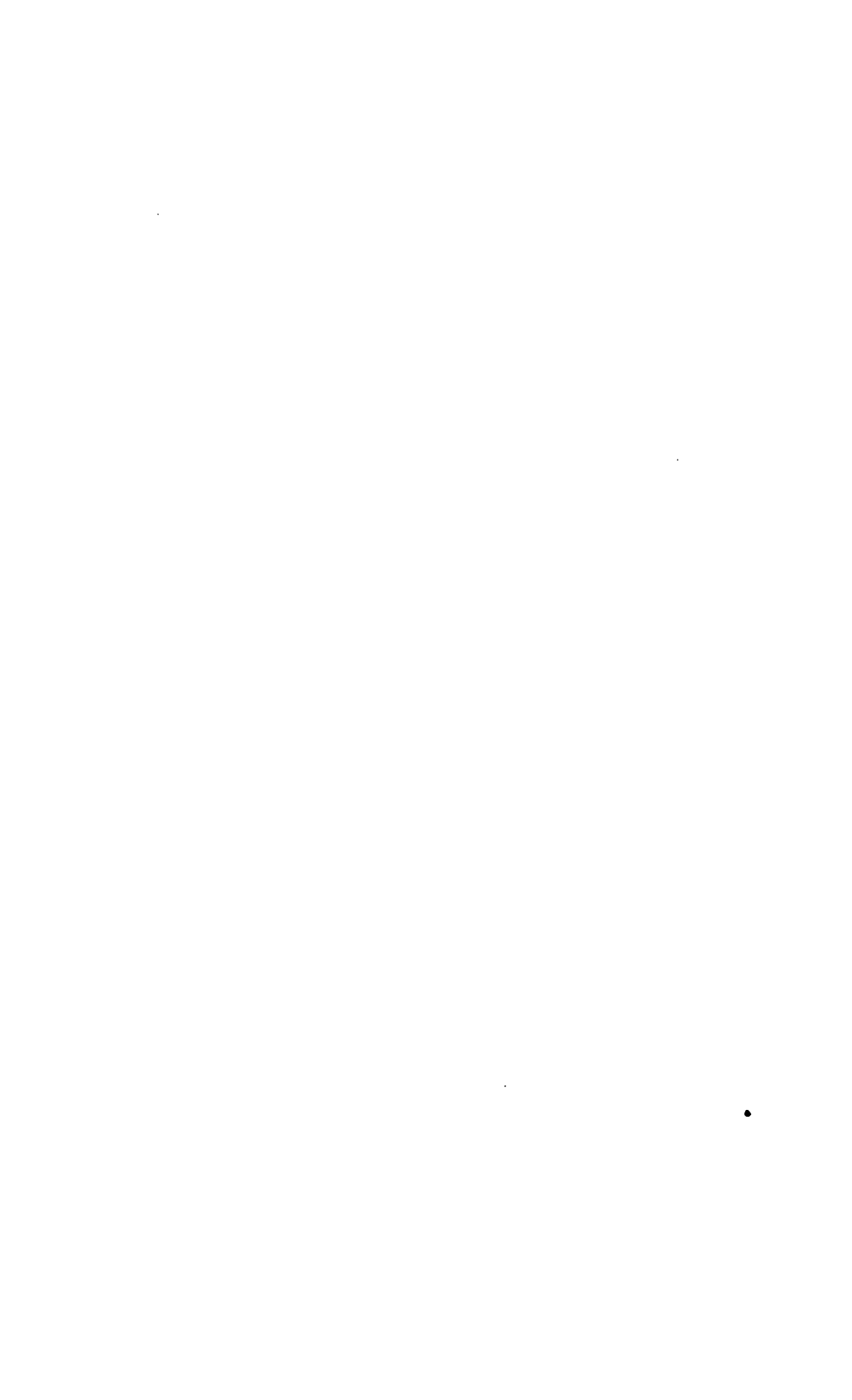
Fig. 1. Lowest pinna of a frond (sterile), showing its bipartite character; and Fig. 2. Intermediate pinna of a fertile frond; *nat. size.* Fig. 3. Portion of a fertile segment; *magnified.*







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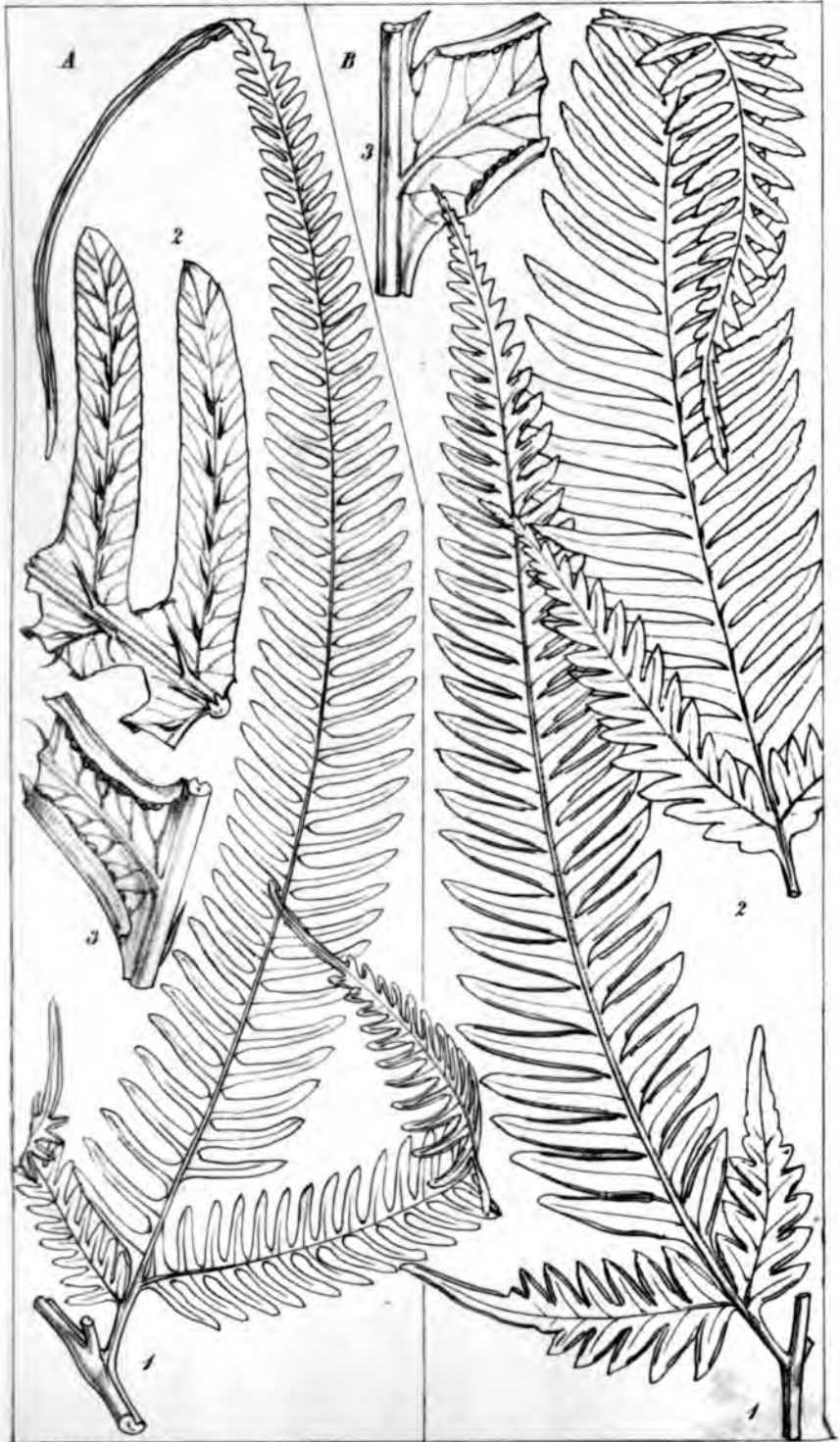
TAB. CXXXV.

A. PTERIS (EUPTERIS) QUADRIAURITA, Retz.—Var. *setigera*.—
p. 181.

Fig. 1. Lower fertile pinna; *nat. size*. Fig. 2. Portion of a
sterile pinna, showing the setiform spines; *magnified*.
Fig. 3. Portion of a fertile segment; *magnified*.

B. PTERIS (EUPTERIS) DELTEA, Ag.—p. 183.

Fig. 1. Fertile primary pinna; and Fig. 2. Sterile primary
pinna; *nat. size*. Fig. 3. Portion of a fertile segment;
magnified.



Fuchs öst. arch.

Fanpian Arch.



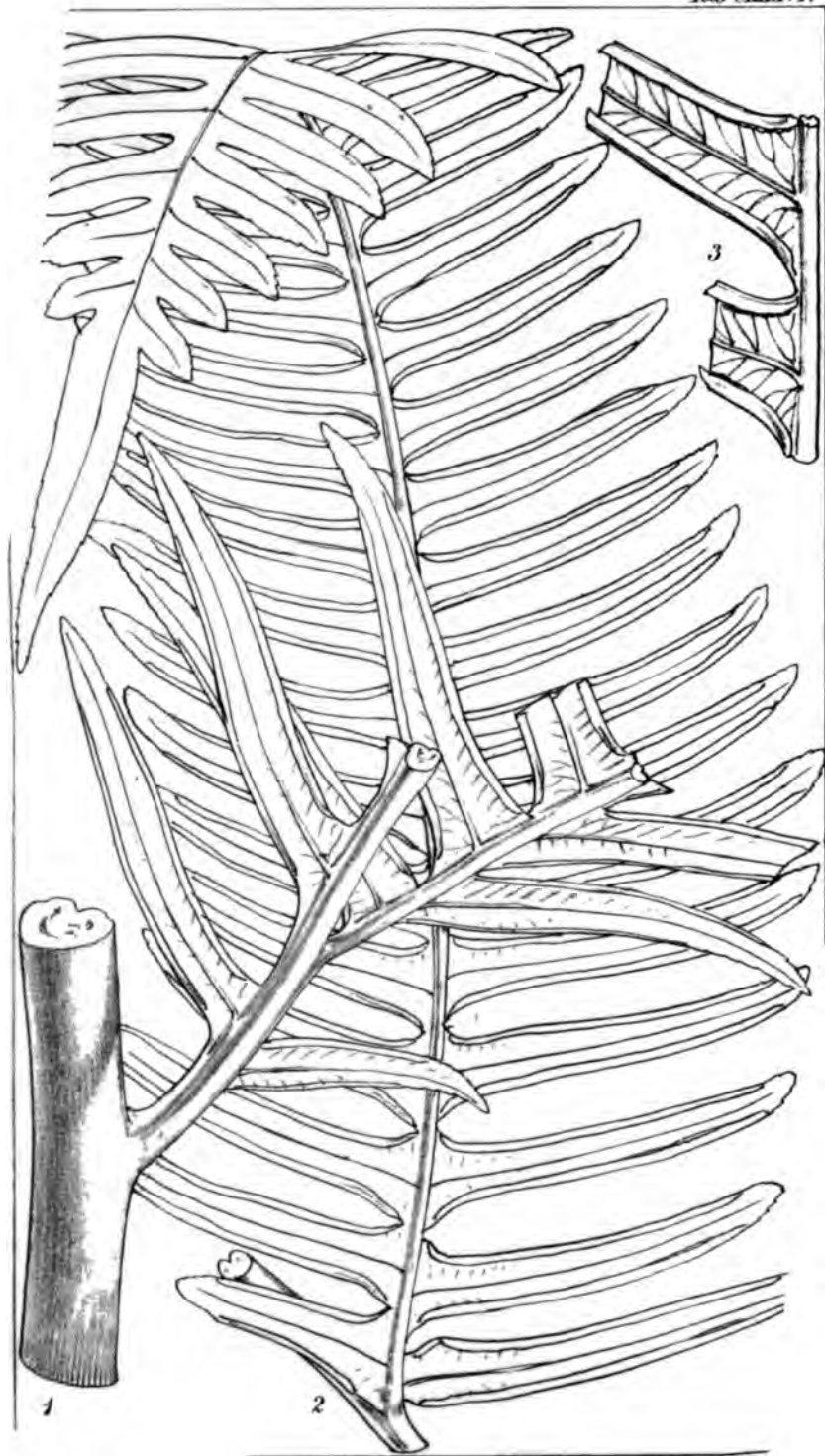
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TAB. CXXXVI.

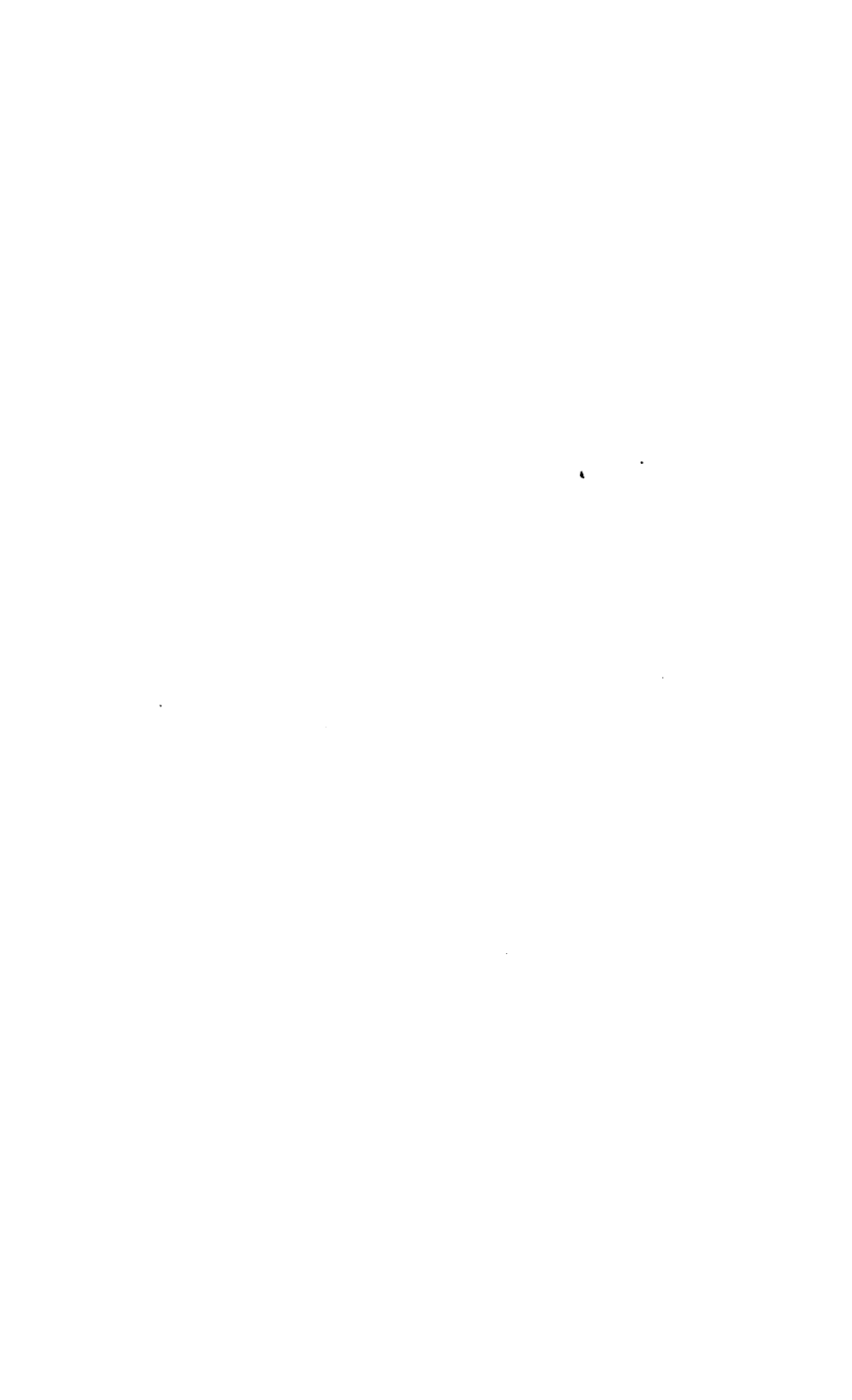
PTERIS (EUPTERIS) EXCELSA, *Gaud.*—p. 183.

Fig. 1 and 2. Portions of a fertile frond; *nat. size.* Fig. 3.
Portions of fertile segments; *magnified.*





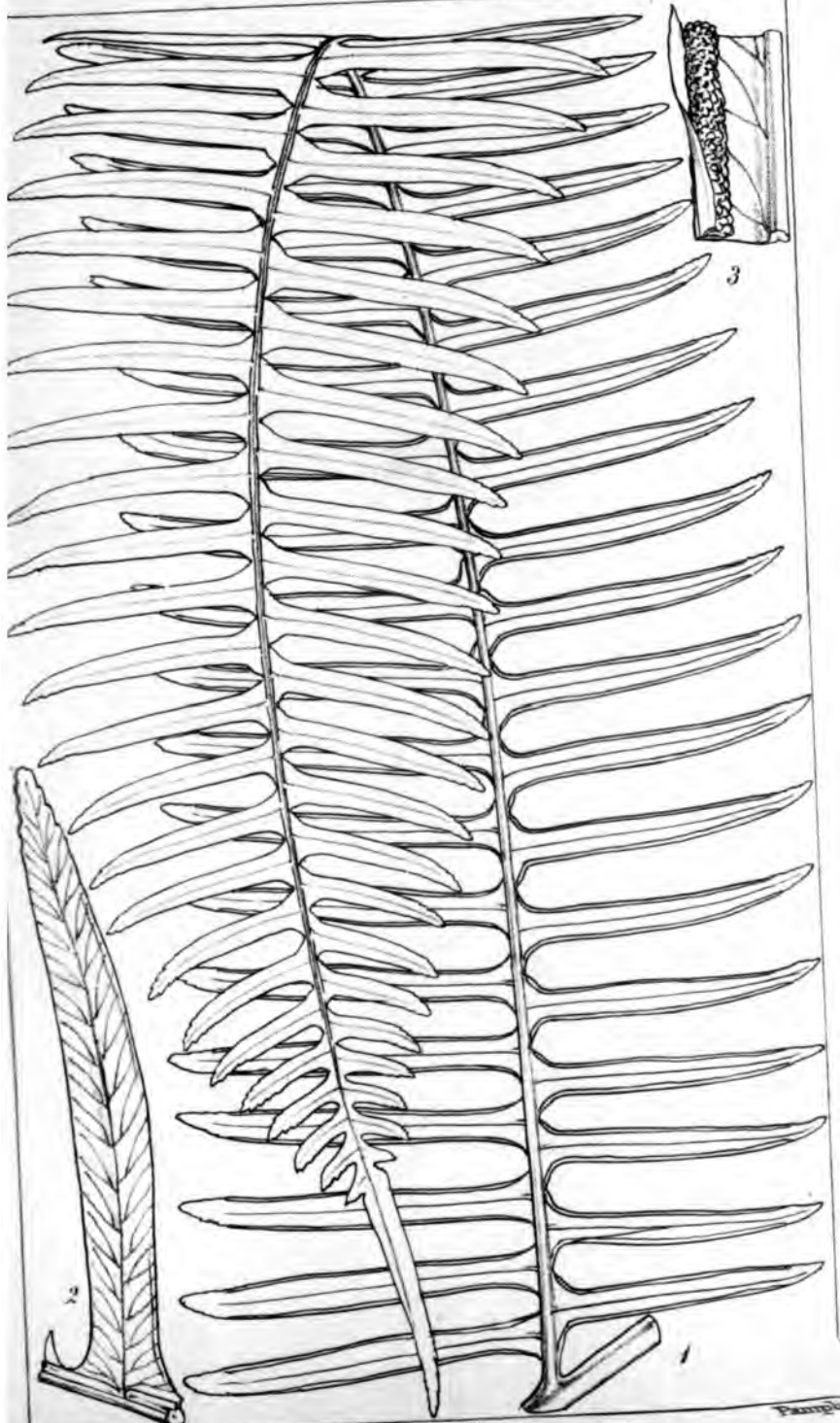
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TAB. CXXXVII.

PTERIS (EUPTERIS) PATENS, *Hook.*—p. 177.

Fig. 1. Fertile pinna; *nat. size.* Fig. 2. Sterile segment;
magnified. Fig. 3. Portion of a fertile segment; *magnified.*





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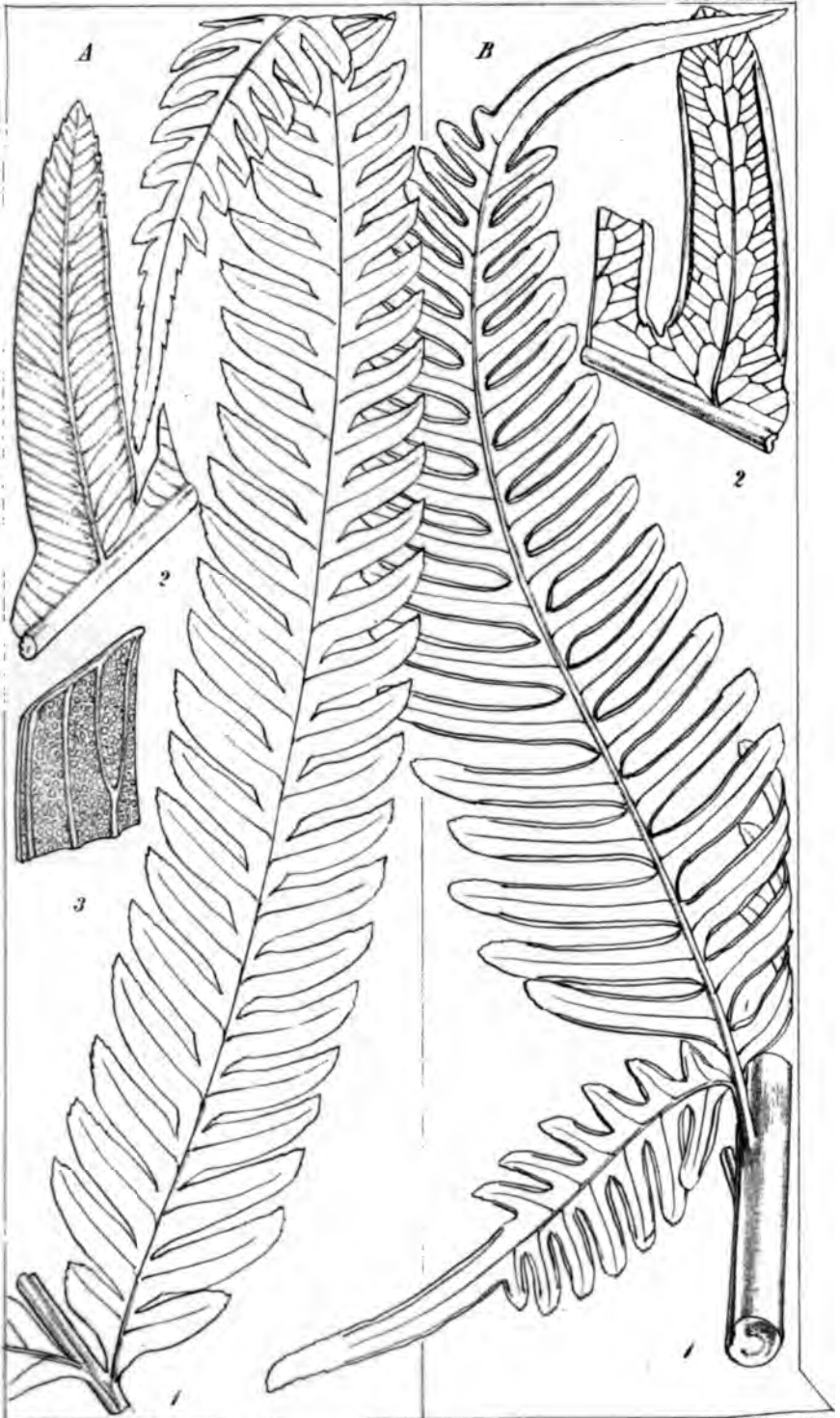
Tab. CXXXVIII.

A. PTERIS (EUPTERIS) SCABRA, *Bory.*—p. 186.

Fig. 1. Sterile pinna; *nat. size.* Fig. 2. Sterile segment of a pinna; *magnified.* Fig. 3. Small portion of a segment, to show the dotted texture; *magnified.*

B. PTERIS (LITOBROCHIA) TRIPARTITA, *Sw.*—Var. γ , *Milneana.*—p. 226.

Fig. 1. Lower pinna of a fertile frond; *nat. size.* Fig. 2. Fertile segment of a pinna, showing the venation; *magnified.*

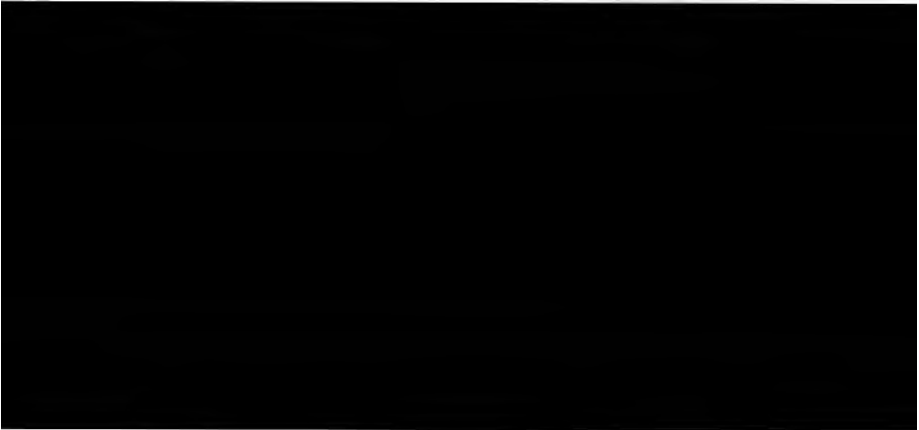


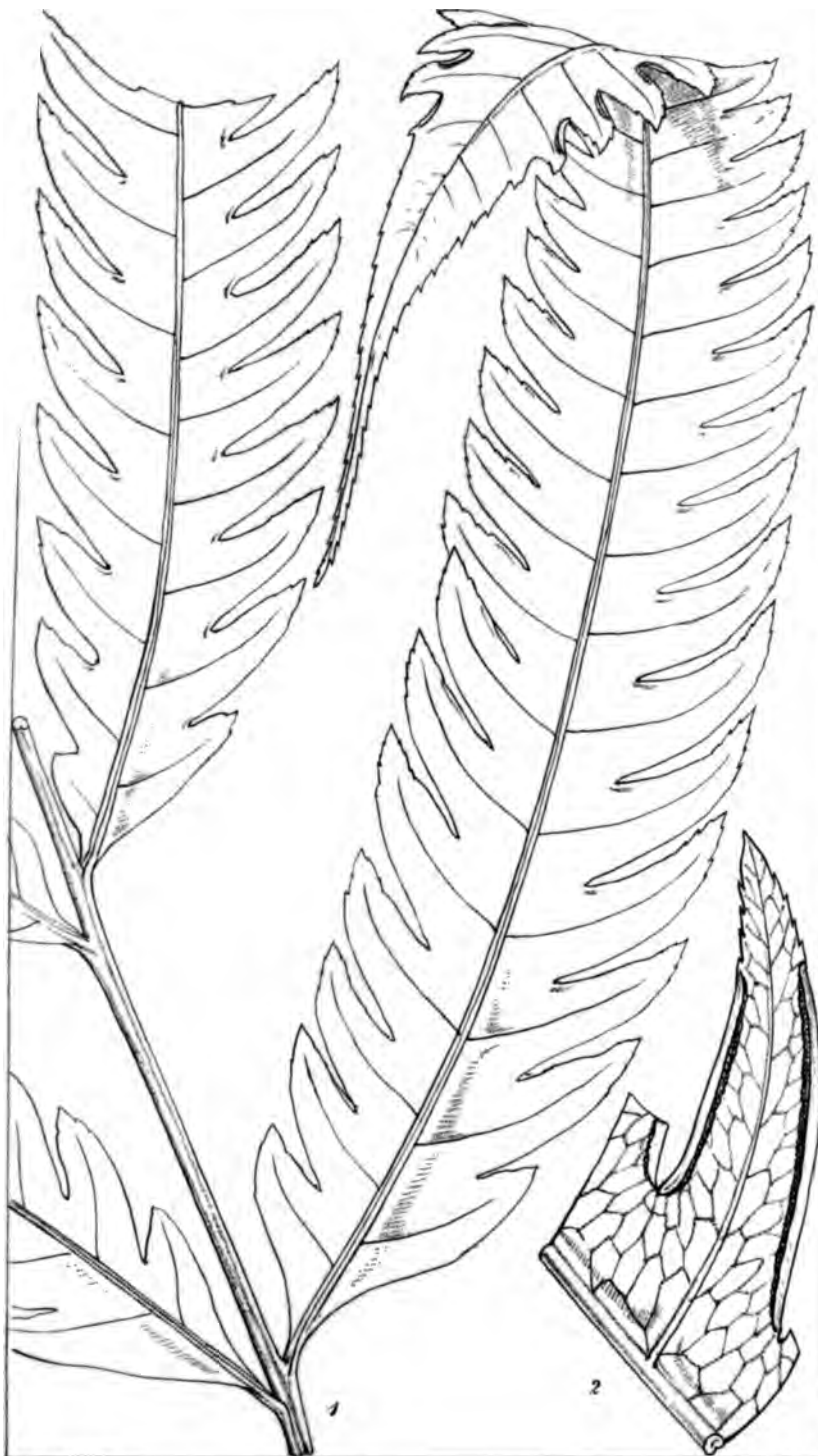


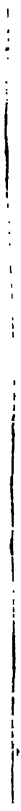
Tab. CXXXIX.

PTERIS (LITOBROCHIA) KUNZEANA, Ag.—p. 221.

Fig. 1. Portion of a fertile frond; *nat. size*. Fig. 2. Portion of a pinna, with sori, and showing the venation; *magnified*.







Tab. CXL.

PTERIS (LITOBROCHIA) CURRORI, Hook.—p. 233.

Fig. 1. Inferior, and Fig. 2, terminal, pinnæ of a fertile frond ; *nat. size.* Fig. 3. Portion of a fertile frond, showing the venation ; *magnified.* Fig. 4. Sorus and receptacle ; *magnified.*

