

QUEENSLAND FERNS.

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HANDBOOK



TO THE

FERNS OF QUEENSLAND,

COMPILED FROM THE

MOST RECENT WORKS ON FERNS;

AND AN

INTRODUCTION TO FERN STUDY.

BY

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WITH XXII PLATES ILLUSTRATIVE OF GENERA,

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NOTICE.

With a desire to render this work as complete as possible, its publication has been somewhat delayed, in the hope that an opportunity might have been afforded me of inspecting the specimens brought by Mr. Hill from his late expedition over new country; and as it is more than probable that some among them may prove new, either to this continent or to science, they would have been described in the present work. As, however, access to these ferns will not be allowed until after the annual report of the Botanic Garden, should any of them then prove worthy of special note, they will be arranged and published separately, so as to allow of their being inserted at the end of this volume.—F. M. B.

P R E F A C E .

THIS little work is meant as a hand-book for those who collect or interest themselves in ferns, in order that they may be able to attach some scientific value to their taste in this respect. The ferns of Australia have not attracted the attention they deserve, either from collectors or scientific men ; and it is certainly not owing to the scarcity of ferns in Australia, nor to the want of interest attached to them. They are both abundant and of high interest ; more especially so in the colony of Queensland, where some of the rarest ferns have representatives. It need scarcely be said that no class of plants is so well worthy of notice, both from scientific men and from amateurs. Little, however, has hitherto been done by the former towards their arrangement, etc., which may be, doubtless, attributed to the fact of the larger and more important classes of the vegetable kingdom absorbing all the spare botanical talent. The indefatigable Baron von Mueller is the only one who has approached the subject. He has published a list of the Australian species known to him, with some observations on their geographical range, in the fifth volume of his "*Fragmenta Phytographia Australiae* ;" and in the same work there are scattered notices here and there, either of new species or new Australian habitat for those known elsewhere. But apart from the fact that this work is in Latin, it is clothed in a scientific dress of severe technical detail, which makes it inaccessible to any but the thoroughly experienced botanist. It is hoped, therefore, that the present contribution will supply the want which is felt by many, and encourage a taste for the subject in those who, for want of such aid, have not been disposed to interest themselves in these most graceful plants. It only remains to add that the

system of classification here adopted is that used by Thomas Moore, Esq., F.L.S., in his "*Index Filicum*," and is based upon the joint recognition of the plan on which the vascular structure is developed and the nature of the fructification. Mr. Moore, being the curator of the Chelsea Botanic Garden, and the author of so many works upon ferns, is, probably, our highest authority on the subject.

The author takes this opportunity of expressing his sincere thanks to Baron von Mueller, F.R.S., F.L.S., etc.; Lewis A. Bernays, Esq., F.L.S.; Joseph Bancroft, Esq., M.D.; Rev. J. E. Tenison Woods, F.G.S., F.L.S.; Walter Hill, Esq.; Charles Prentice, Esq., F.L.S., and several other gentlemen, from whom he has received valuable assistance in obtaining material for the present work.

Brisbane, February, 1874.

INTRODUCTION.



BOTANISTS divide the vegetable kingdom into two divisions. The first of these is called Vasculares; and the second, Cellulares. In the first class of this second division will be found the ferns, order Filices. The essential characters are, that they possess a certain degree of vascularity in their structure, produce spores in small one-celled cases collected into groups, occupying part or the whole of either the back or margin of their fronds. The true ferns have their young leaves rolled up spirally, and, in gradually unfolding, present the form of a crozier, with the exception of the last order—Ophioglossaceæ, in which the vernation is straight; these may be considered spurious ferns. Before we proceed any further, it will be well to become acquainted with the names by which the various parts are known, and also with a few botanical terms it has been found necessary to use, which terms of structure are those adopted by Mr. J. Smith, the curator of the Royal Gardens at Kew, England—a great writer on ferns.

The roots of ferns are fibrous, and, in all the true ferns, covered with a pile of soft, close hairs or down, mostly of a rust-color; and, if growing on rocks or tree-trunks, very much matted. But these, the true roots, must not be confounded with the stems, which often creep beneath the soil, and have the appearance of thick fleshy roots. The roots of the spurious ferns consist of thick, rigid, straight fibres. The stems, or rhizomes, are of two forms; the one creeping beneath or upon the surface of the soil, or upon trunks of trees or rocks, throwing up their fronds at intervals—the growing point of the stem always being in advance of the young fronds, and the

fronds more or less distant. In the other form of stem, the tufted, it consists chiefly of a growing point, from the centre of which the young fronds are developed, the bases of the older fronds forming the trunk, which gradually decays at one end as it extends at the other. The proper roots are protruded from between the bases of the older fronds; these stems are usually decumbent (reclining), but sometimes—as in the tree ferns—they become caudiciform or trunk-like. In the order *Marrattiaceæ* the rhizome is somewhat globose, thick, and fleshy. The leaves of ferns—called fronds—consist of two parts; the stipes or stalk, and the leafy portion which it supports. The stipes are either adherent to the stem, or there is at, or near its base a natural joining or articulation, at which—when its functions are no longer in play—it separates spontaneously. When this latter structure occurs, the frond is said to be articulated with the stem. Sometimes the leafy parts of the frond are articulated in a similar way; but this occurs less frequently. The continuation of the stipes through the leafy part in the ferns having divided fronds, is called the rachis. The fronds, in the leafy part, are either simple or more or less divided, and have different terms applied to them, according to the nature of the division. If a frond is separated into distinct leaflets, and these are simple, it is said to be pinnate; if the leaflets, called also *pinnæ*, are again divided into distinct leaflets, they are said to be pinnate, and the frond is bi-pinnate; when they are again divided, the frond becomes tri-pinnate, and so on. If the divisions are distinct, but are united at the base, and are not otherwise divided, they are then pinnatifid; and so, when twice or thrice divided on the same plan, they become bi-pinnatifid, tri-pinnatifid, and so on. Fronds very much divided, that is, more than tri-pinnate, are, in general terms, called decompound.

The fronds are traversed by a series of veins, the ramifications of the system of vascular structure, which forms the main bulk of the stipes and rachis. The midrib of a frond or pinna is called the costa. The first series of branches from this are the veins; the secondary series, the venules; and the tertiary series, the veinlets. The arrangement is called the

venation. The principal forms of venation have been distinguished by names—such as when the veins are unbranched, they are said to be *simple*. Sometimes they are branched once or oftener, in a dichotomous manner, and are then said to be *forked* or *pinnately costæform*, that is, resembling a midrib, and having the venules or branches either simple or forked. When they are alike on both sides of the central midrib, they are said to be *equal*; in others, they are *radiate*, and have no midrib; in others, *eccentric*, or produced from one side of a marginal rib. In all these cases the apices of the veins may terminate at or within the margin of the frond or of its divisions, when they are said to be *direct* and *free*; but similar forms of venation may occur, having the apices of the veins of either the primary, secondary, or tertiary series combined in some way or other. If the whole system of venation is uniformly combined, so as to form a complete net-work, it is then said to be *reticulated* or *netted*. If the simple, or dichotomous, or pinnately costæform veins are united by a continuous vein, parallel with and close to the margin, this form of venation is called *transverse marginal*. Sometimes the apices of the venules of one series or fascicle combine with the apices of the adjoining series, and this is called *anastomosing*; of this arrangement there are some modifications, such as *angular* or *arcuate anastomosing*, which are still further modified by producing from their exterior side one or more outwardly-directed (excurrent) tertiary veins or veinlets, which are free and terminating in the areoles or margin, or anastomose with the next superior venules. In some forms of reticulated venation, the venules are irregularly combined, the areoles or meshes producing from their sides certain simple or forked, variously-directed veinlets, which terminate within the unequal-sided areoles. This arrangement of the venation is called *compound anastomosing*. Veins are said to be *external* when they are more or less superficial, distinct, or elevated above the surface of the frond; and *internal* when they are immersed in the substance of the frond, in which case they often become indistinct. From some part of the venules, or veinlets, which part becomes thickened, the fructification is produced on what is called the receptacle. This organ,

if situated at the apex of a vein or venule, is said to be terminal; if between the base and apex, medial; axillary, when on the point of forking; and compital, when seated on the angular crossing or points of confluence of two or more venules or veinlets. It consists, in most cases, of one-celled spore-cases or sporangia, more or less completely girt by an elastic ring; but in some cases, of sporangia which are many-celled or destitute of the ring. These spore-cases are mostly collected into masses, which usually consist of multitudes of crowded spore-cases, and are called the sori, which sori are either round or elongated; but sometimes they are of no determinable form, and are then called amorphous. In most cases they are dorsal, that is, on the back part of the frond, but sometimes they are marginal, or extra-marginal. The elongated sori are oblong, linear, or continuous; and either form an angle with the midrib (in such they are said to be oblique) or run parallel with the margin or midrib. In some groups of ferns the sori are entirely exposed on the surface of the frond, while in others they are completely covered by a scale or membrane called the indusium, of which there are some modifications—as cup-shaped, vaulted, etc.; sometimes the fertile frond or portion of frond is contracted, and the sori enclosed by the revolute margins, which thus constitute an universal indusium. The further differences of structure will be explained where they occur, as in *Marattiaceæ*, etc.

GENERA AND SPECIES
OF
QUEENSLAND FERNS.

FILICALES.—Acrogenous plants (point growers) with dorsal or marginal one-celled spore-cases.

Order—**POLYPODIACEÆ**.—Spore-cases furnished with a jointed ring, which is usually nearly complete, sometimes rudimentary. *Spore-cases not valvate*.

Tribe—**POLYPODINEÆ**.—Ring vertical, nearly complete, the spore-cases usually stalked, gibbous (swelled), bursting transversely.

Sect.—**Acrosticheæ**.—Receptacles universal, *i.e.*, occupying almost or quite the entire disk of the fertile fronds, both veins and parenchyma (cellular tissue.)

1. **ELAPHOGLOSSUM**, *Schott.* (*Elaphos*, a deer, and *glossa*, a tongue—the small simple fertile fronds, being supposed to resemble the tongue of a deer.) *Sori* superficial, non-indusiate; the *receptacle* occupying the under surface of the fertile scarcely contracted fronds. *Veins* simple or parallel-furcate from a central costa; *venules* free, clavate at the apex, terminating within the margin.

E. CONFORME, *Schott.* Rhizome woody, wide-creeping, densely clothed with large lanceolate brownish membranous scales, sometimes $\frac{1}{4}$ -inch long and one line broad; stipes, 1 to 12 inches long, firm, erect, stramineous, naked or slightly scaly; fronds, 2 to 9 inches long, $\frac{1}{2}$ to 2 inches broad, the apex acute or bluntish,

the base cuneate or spatulate, the edge cartilaginous, entire, coriaceous ; both sides naked or nearly so ; veins sub-parallel, usually once forked ; sterile fronds usually narrower than the fertile one, the edge inflexed. Rockingham Bay (*Acrostichum conforme*, Sw.)

Fig. 1.—(a). Fragment of the sterile frond ; (b). Fragment of the fertile frond, with the spore-cases partially removed ; (c). Spore-case and Spores.

2. LOMARIOPSIS, Fée. (*Lomaria*, another fern, and *opsis*, appearance). *Sori* superficial, non-indusiate ; the *receptacles* occupying the under surface of the contracted fertile fronds. *Veins* simple or parallelo-furcate from a central costa ; *venules* free, connivent with the margin.

Fig. 2.—(a). Fragment of sterile frond ; (b). Fragment of fertile frond ; (c). Spores and spore-cases.

L. BRIGHTLÆ, F. v. Muell. Caudex long, scandent, angular, half an inch thick, fronds simply pinnate ; rachis not winged, pinnae articulated sterile ones, almost membranaceous, angustate or falcato-lanceolate, conspicuously petiolate, unequally cuneate at the base, slenderly acuminate towards the apex, irregularly repando-crenulate ; 3 to 5 inches long, 4 to 7 lines broad ; fertile fronds, squamose ; pinnae, linear, remote ; sori, yellow.

3. STENOCHLÆNA, J. Smith. (*Stenos*, narrow, and *chlaina*, a cloak.) *Sori* superficial, non-indusiate ; the *receptacles* occupying the under surface of the contracted fertile fronds. *Veins* arcuate at the base, forming narrow costal areoles ; *venules* parallelo-furcate, connivent with the thickened cartilagineo-serrate margin.

S. SCANDENS, J. Smith. Caudex very long scandent (climbing), furrowed, scaleless, but rooting with short-tufted radiating fibres from the angles ; stipes, 4 to 5 inches long, stout ; fronds distant 1 to 3 feet and more long ovato-lanceolate, firm-coriaceous, glossy, pinnated ; sterile pinnae, 3 to 9 inches long, 1 to 1½ inch broad, lanceolate, acuminate, rarely subfalcate, and obliquely cuneate at the base, petioled, the petiole articulated upon the rachis, the margins thickened, entire or more

frequently spinuloso-serrate; veins very close, elevated, extending to, and united with, the thickened margin; fertile fronds, 6 to 12 inches long, $1\frac{1}{2}$ to 2 lines wide, petioled, linear, acuminate. Sometimes the lower half of the frond is sterile, and the upper half fertile. *Acrostichum scandens*; Rockingham Bay.

Fig. 3.—(a). Fragment of sterile frond, showing the elongated costal areoles; (b). Base of sterile pinna, showing the gland; (c). Fertile pinna; (d). Fragments of fertile fronds; (e). Spore case; (f). Spore.

4. **PÆCILOPTERIS**, Presl. (*Pæcilos*, variegated, and *pteris*, a fern). *Sori* superficial, non-indusiate; the *receptacles* occupying the under surface of the contracted fertile fronds. *Veins* pinnate from a central costa, prominent; *venules* arcuately (forming an arch) angularly or irregularly anastomosing veinlets.

P. REPANDA, Presl. Rhizome creeping; stipes, 6 to 12 inches long, of the sterile fronds the longest; fronds, 1 to 2 feet long; sterile ones firm-membranaceous ovate-oblong, acuminate pinnate; pinnæ, 4 to 6 inches long, $\frac{1}{2}$ to 1 inch broad, more or less petiolate lanceolate or oblongo-lanceolate, pinnatifid generally half way down the costa, with ovate-rotundate subfalcate lobes, having rather broad sinuses, serrated at the margin, and generally bearing one or more (rarely two) spinulose subulate setæ in the sinuses; terminal pinna, the longest more deeply pinnatifid with longer segments, and often prolonged, caudato-attenuate to the length of a foot, and proliferous towards the apex; venation manifest, costules remote, connected near the base by a transverse arched venule, forming a series of elongated costal areoles, other venules form two or three smaller and more square-shaped costular areoles, the rest being free; free included veinlets, none; fertile fronds oblong, the pinnæ much smaller and contracted, coarsely crenato-pinnatifid.

Fig. 4.—Fragment of sterile frond.

5. **ACROSTICHUM**, Linn. (From *akros*, high, and *stichos*, order.) *Sori* superficial, non-indusiate; the *receptacles* oc-

cupping the under surface of the upper pinnae. *Veins* uniformly reticulated in small regular hexagonal meshes, without free veinlets.

A. AUREUM, *Linn.* Rhizome short, thick, erect, slightly paleaceous (chaffy) at the summit, emitting a mass of fleshy fasciculated vermicular (worm-like) roots; stipes tufted, 6 inches to 2 feet long, erect, stout; fronds coriaceous (leathery) and hard, or at times sub-membranaceous, sometimes only a span long, and simple (yet fertile), oblong or ternate, or 2 to 6 feet and more long, oblong and pinnate; pinnae usually petiolate, 3 or 4 inches to 1½ feet long, ½ to 3 inches wide, upper ones somewhat contracted and fertile, varying extremely in shape, generally more or less oblong or linguiform (tongue-shaped), obliquely cuneated at the base, the apex obtuse or even retuse or emarginate, sometimes acuminate, the margins slightly thickened and sub-revolute. The whole plant having a more or less yellow tinge. Salt-water creeks.

Fig. 5.—(a). Fragment of sterile frond; (b). Fragment of fertile frond; (c). Spore-case and sporangiastres; (d). Spores.

Sect.—**Platycrieæ**. Receptacles effuse (abundant), occupying a crowded mass of reticulated veinlets, forming large amorphous portions or separate lobes of the fronds, or sometimes definite in form.

6. PLATYCERIUM, *Desv.* (*Platys*, broad, and *keras*, a horn.) *Sori* superficial, non-indusiate; the *receptacles* (a series of crowded anastomosing veins) occupying the under surface of separate lobes, or large amorphous portions of the fertile fronds. *Veins* furcate, free, or here and there anastomosing; *venules* anastomosing in large trapezoid or sub-hexagonal elongated areoles; the veinlets free, divaricate or hamate (crooked) within the areoles. Fronds, heteromorphous (diverse formed), coriaceous, laciniate or lobate, clothed with stellate hairs; the fertile one articulate. Rhizome sub-globose. The primary veins rarely unite, while the secondary ones are compoundly anastomosed.

P. ALCICORNE, *Desv.* (Elk's horn.) A very ornamental epiphytal (growing upon other plants) fern; sterile fronds, sessile, round or elongated, the upper portion more or less lobed, permanent, elevated, spongy, reniform (kidney-shaped), successively imbricated; fertile fronds, simple, divided, horizontal or oblique, thick and coriaceous, 1 to 2 feet long, widening upwards; when young, white on the under surface, and articulated on a short slightly-creeping rhizome; sori amorphous in patches, occupying the lobes or extremities of the fronds—these fronds, also, when young, densely pubescent (downy).

Fig. 6.—(a). Fertile apex of frond; (b). Portion enlarged; (c). Stellate scales from the surface; (d). Spore-case and stalked stellate scale or sporangiastre; (e). Spores.

P. GRANDE, *J. Smith.* (Stag's horn.) The finest epiphytal fern known—somewhat like the above, but the whole plant larger; fertile fronds, two or three times divided, horizontal and pendulous, 2 to 5 feet long, widening upwards, articulated on the rhizome. Sori in a large irregularly-triangular patch at the sinus of the first furcation of the frond; the whole plant covered with a dense tomentum.

Sect.—**Lomarieæ**. Receptacles local, circumscribed, *i.e.*, confined to determinate parts of the veins, definite in form. Sori transverse to the veins (when distinct veins are present); parallel or sub-parallel with the midrib or margin; more or less elongated, usually linear; occasionally oblong or lunately curved; rarely punctiform (then marginal with transverse indusia.) Receptacles seated on, or approximate to, the midrib; therefore, costal or sub-costal (often at the same time marginal, by the contraction of the frond), linear or oblong. Sori linear, superficial, indusiate; veins free.

7. LOMARIA, *Willd.* (This name is derived from *loma*, an edge, in allusion to the position of indusium.) Sori indusiate, linear, continuous, on a broadish linear *receptacle*, occupying nearly the whole under side of the contracted fertile fronds; *indusium* attached at the margin, linear, continuous, scarious, opening along the inward side. *Veins* (sterile) simple or forked from a central costa, the *venules* direct, free; or (fertile),

obsolete. Fronds simple pinnatifid, pinnate, or bi-pinnatifid, the fertile ones contracted. Rhizome short, thick, erect or decumbent, creeping or arborescent.

Fig. 7.—(a). Fragment of fertile frond; (b). Spore-case; (c). Spores.

L. EUPHLEBIA, Kunze. Caudex stout, erect, woody; stipes a foot or more long, naked, erect, triquetrous below; fronds pinnate throughout, ovato-lanceolate, 1 to 2 feet long, 6 to 12 inches broad; pinnæ an inch or more apart at the base, erectopate, narrowed very gradually, and toothed towards the apex; subcoriaceous; veins prominent; fertile frond similar, but the pinnæ more distant, and narrow linear. Mackay River, North Australia.

L. PROCERA, Spreng. Rhizome stout, woody, elongated, clothed with large ovate or lanceolate acuminate ferruginous scales; stipes 6 to 12 inches long, stout, erect, scaly below; barren fronds ovate, 1 to 3 feet long, 6 to 12 inches broad; pinnæ linear, 3 to 12 inches long, $\frac{1}{2}$ to 1 inch broad, the lower ones stalked, the base rounded or even cordate, sometimes auricled, the point gradually narrowed, sometimes slightly toothed; coriaceous; veins fine, parallel, midrib beneath more or less chaffy; fertile pinnæ, narrowly linear, distant, 4 to 6 inches long, $\frac{1}{4}$ -inch broad; rachis stout, erect, more or less scaly; indusium broad, membranaceous, ciliated, sometimes slightly intramarginal. Mount Lindsay. = *Stegaria procera* Arn

L. PATERSONI, Spreng. Rhizome short, creeping; stipes 2 to 3 inches long, wiry, erect, rather scaly below; sterile fronds, about 1 foot long, under an inch wide—broadest, one-third of the distance from the top, narrowed very gradually downwards, the point acuminate, the margin cartilaginous and wavy; coriaceous; veins inconspicuous; fertile frond as long, but only $\frac{1}{2}$ -inch broad; sori occupying the whole space between the midrib and margin. = *Stegaria Patersoni* Arn

8. BLECHNUM, Linn. (Said to be derived from *blechnon*, a Greek name for a fern). Sori indusiate, linear, continuous or interrupted, on a transverse receptacle, approximate to the

costa; central, or sometimes sub-marginal by the contraction of the fronds. *Indusium* linear, opening along the inward side. *Veins* (sterile) simple or forked from a central costa; *venules* direct, free, thickened at the apex—in the fertile fronds, combined near the base or within the margin by the receptacle; fronds simple, pinnatifid, or pinnate; rhizome short, erect, or producing elongated creeping stolones (runners).

B. CARTILAGINEUM, Sw. (Gristly.) Rhizome short, oblique, densely paleaceous, scales black; stipes pale, a foot long, rough, having many black scales; fronds 1 to 2 feet long, oblong-ovate acuminate, pinnatifid (pinnate below), somewhat coriaceous, segments remote from a broad base linear lanceolate acuminate; serrate decurrent at the inferior base, and produced at the superior, mostly forming an acute angle in the sinus; veins simple or forked, closely placed; sori close to costa. This fern is only found in wet places; plentiful in the scrubs around Brisbane.

B. NITIDUM, Presl. Rhizome elongated, erect, paleaceous; stipes 1 or 2 feet long, slightly scaly; fronds 2 to 3 feet long, oblong-ovate, truncate at the base, firm coriaceous pinnatifid almost to the rachis, segments very numerous, approximate linear-lanceolate acuminate more or less falcate, sharply serrated, the lower ones almost equal in length to those above them, and free with decurrent bases, so that the frond is pinnate below; veins very close simple patent; sori close to the costa, continuous from the base to near the apex. This is a handsome species from Seaview Range, and the other ranges near Cardwell.

B. SERRULATUM, Rich. (Having small teeth on the margin). Rhizome ascending sub-erect, rooting and scaly; stipes a foot or more long, glossy semiterete, light above, nearly black at the base; fronds 2 to 3 feet long, oblong-lanceolate, firm, sub-coriaceous, shining, pinnated; pinnae articulated on the rachis, distinct sessile, linear-elliptical, obtuse at the base, terminal pinna elongated, the margins sharply serrated; veins close, compact, simple or forked; sori close to costa, extending from near

the base to near the apex. Quite a swamp fern; common around Brisbane. *Blechnum striatum*, R. Br.

Fig. 8.—(a.) Portion of frond; (b.) Portion of sterile pinna; (c.) Fertile pinna; (d.) Apex of rhizome.

B. ORIENTALE, Linn. Rhizome erect, stout at the extremity, and, as well as the stipes, covered with scales; frond 5 to 6 feet long, ovate-lanceolate acuminate, firm-coriaceous pinnate, pinnæ approximate, numerous, 6 inches to 1 foot long, $\frac{1}{4}$ to $\frac{1}{2}$ an inch broad; linear-lanceolate acuminate, sessile entire, the base mostly truncate; pinnæ on the lower part of the frond much abbreviated; veins simple, rarely forked, very close, parallel, horizontal; sori continuous, close to the costa, indusium in age, firm, rigid, and almost black. This fine handsome species is found—but not very plentifully—at the Herbert River.

Sect.—**Pleurogrammeæ**. Sori linear or oblong, superficial or immersed, non-indusiate.

9. DICLIPTERIS, Brackenridge. (Inclining two ways, veins.) Sori immersed, non-indusiate, linear, continuous, sub-costal; the *receptacle* formed of a simple vein proceeding from each side the costa, near its base, and running parallel with it, sunk in a deep oblique furrow open towards the costa, over which the two lines of spore-cases become confluent. Veins reduced to the costa, and the intramarginal receptacles parallel with it.

D. ANGUSTISSIMA, Brack. Rhizome slender, creeping, tomentose, much interlaced; fronds cæspitose, grass-like, flaccid, 2 or 3 inches to a foot long, $\frac{1}{4}$ to scarcely $\frac{1}{2}$ line wide, linear-filiform for the whole length simple costate; sori narrow linear, sometimes nearly the whole length of frond; the spore-cases lie in two deep oblique furrows—one on each side the costa, and open towards it, but the upper valve of this furrow is thick and herbaceous, and not of the nature of an indusium. Rockingham Bay. (*Monogramme*, Junghuhnii, Hook.)

Fig. 9.—(a.) Fragment of fertile frond; (b.) Spore-case; (c.) Spores. (d.) Fragment of sterile frond.

10. HYMENOLEPIS, *Kaulfuss*. (From *hymen*, a membrane, and *lepis*, a scale). *Sori* superficial, linear-elongate or linear-oblong, on the contracted apex of the fronds; the *receptacles* contiguous to, and coalescent with, the costa, sometimes covered while young by the revolute margin. *Veins* indistinctly pinnate from a central costa, or nearly uniform; *venules* compoundly anastomosing, forming crowded irregular areoles, from which proceed variously-directed included free veinlets.

H. SPICATA, *Presl*. Rhizome short, creeping, scaly, tubercled; fronds simple or forked, tapering below into short stipes, articulated upon the rhizome, the apex of the fertile fronds contracted, and usually curved frond from 4 inches to a foot long, about one-third fertile; veins copiously anastomosing, costules indistinct veniform, the rest of the veins forming uniform areoles enclosing free veinlets. This curious fern is found growing upon the rocks in shady places along Ithaca Creek.

Fig. 10.—(a.) Fertile frond; (b.) Sterile fragment; (c.) Fragment of fertile frond; (d.) Spore-case and sporangiastre; (e.) Spores.

Receptacles marginal or sub-marginal (rarely medial), always remote from the midrib, usually linear; sometimes oblong or punctiform.

Sori non-indusiate (mostly occupying a groove or furrow), sometimes superficial, linear.

Sect.—**Vittarieæ**. *Sori* in an extrorse (turned outward) marginal furrow.

11. VITTARIA, *Smith*. (Name derived from *vitta*, a ribbon). *Sori* non-indusiate, linear, continuous; the *receptacle* lying in a marginal groove. *Veins* obscure, simple, combined at their apices by the receptacle.

V. ELONGATA, *Sw*. Frond coriaceous, narrow-elongated, grass-like; rhizome short, creeping. Mostly found growing upon logs in very damp places; at Rockingham Bay this fern is often found on trees, and then its pendulous fronds are 5 or more feet long.

Fig. 11.—(a.) Frond; (b.) Fragment of same; (c.) Spore-case and spores; (d.) Sporangiaastre.

Sect—Lindsææ. Veins free, except where combined by the receptacle.

12. LINDSÆA, *Dryander*. (Named in honor of Mr. Lindsey, a writer on mosses.) *Sori* indusiate, linear or oblong, continuous or interrupted; the *receptacle* submarginal; *indusium* membranaceous, equalling, or shorter than the margin of the frond, opening on the exterior side. *Veins* ecostate (without a costa) and flabellately forked, or forked from a central costa; *venules* straight, combined at their apices by the receptacle, otherwise free; sometimes thickened at their apices.

L. LINEARIS, *Sw.* Rhizome creeping, brittle; fronds distant, linear, acuminate, membranaceous pinnate; pinnæ somewhat rigid, sessile flabellate, the anterior margin soriferous, uninterrupted, the indusium broad; fronds often a foot or more long; stipes and rachis glossy purple. Mostly found to the south of Brisbane—Eight-mile Plains.

L. CONCINNA, *J. Sm.* Rhizome somewhat creeping; fronds tufted; lower pinnæ remote, the rest close; stipes short, closely allied to the preceding, but much smaller. Seaview Range; on roots of trees.

Fig. 12.—(a). Pinna; (b). Segment showing the indusium.

L. LANUGINOSA, *Wall.* Rhizome creeping, epiphytal in habit. (This fern resembles a *Nephrolepis*.) Fronds 4 or 5 feet long, lanceolate, pinnate; pinnæ coriaceous, numerous, more or less falcate, obtuse or acute, very deciduous; veins spreading, terminating on the upper side in white cretaceous dots, just within the margin; stipes and rachis woolly, hence the name. Found (but not very plentifully) on the Herbert River, on trees in large masses; a handsome species, said to be the largest of the genus.

L. MEDIA, *R. Br.* Rhizome creeping; frond bi-pinnate, deltoid; stipes rather long; pinnules obovato-rhomboid, subcoriaceous, inferior ones lobed, the rest entire, the superior edge unisorous; sorus continuous, the sterile ones serrated at the apex. A neat little fern. Cardwell district.

L. MICROPHYLLA, Sw. Stipes tufted; fronds elongated, oblong-lanceolate, tri-pinnate; primary pinnae distant; pinnules small, broad, cuneate, toothed, simple, or bi-trifid; sori intramarginal; indusium toothed, scarcely extending to the margins; rachis very flexuous. A lovely fern; may be found plentifully in the gullies about Brisbane.

L. INCISA. Rhizome very slender, wiry, creeping, brittle; stipes very slender, glabrous, glossy bright brown, with a deep furrow in front, which also runs along the rachis, 1 to 3 inches long; frond linear, 3 to 12 inches long, 3 to 5 lines broad; pinnate flexuous, membranaceous, finely attenuated towards the apex; pinnae alternate, the lower ones distant and in almost opposite pairs; bi-tripartite very shortly petiolate, somewhat coriaceous, the segments cuneate, often incised; veins twice forked; indusium large, occupying the whole upper edge of the segment. May be found along the Nudgee road, under Casuarina trees. This delicate little fern has often been mistaken for *L. linearis*, Sw., under which name it is stated to have got into several of the home herbariums.

L. DIMORPHA. Rhizome stout, shortly creeping, densely rooting, the apex clothed with bright glossy golden scales; stipes tufted, of the fertile fronds very long, about twice the length of the fertile part of the sterile fronds, shorter, slightly hairy; fronds linear, the fertile ones two or three times longer than the sterile ones; pinnate; pinnae alternate, somewhat distant, revolute lunate, about 2 lines long and 3 or 4 lines broad; indusium large, crenulate, occupying the superior margin of the pinnae; sterile fronds linear, obtuse, pinnate, almost pinnatifid by the decurrent bases of the pinnae forming more or less of a wing to the rachis; pinnae thin, membranaceous, flabellate or sub-rotundate, base shortly cuneate, decurrent on the rachis, superior edge crenulate and somewhat incised; veins two or three times forked. A remarkable and pretty fern, which has often been taken for *L. linearis*, Sw., from which its different habit alone should hold it distinct. Found a few miles out of South Brisbane—Eight-mile Plains.

(Mr. Charles Prentice tells me that he has described this and

the preceding species under the names of *L. incisa* and *L. heterophylla*. His descriptions I have not seen, but have adopted the first name; the other is pre-occupied in the genus.)

13. SCHIZOLOMA, *Gaudichaud*. (Named from *schizo*, to cut, and *loma*, an edge.) This genus differs from *Lindsæa* only in its simply reticulated venation. *Veins* ecostate, or forked from a central costa; *venules* anastomosing in elongated oblique areoles, without free included veinlets, the marginal ones combined by the transverse receptacle.

S. ENSIFOLIA, *Sw*. Rhizome creeping; stipes and rachis glabrous, 2 feet high, frond pinnated; pinnæ several linear-ensiform, erecto-patent; sori continuous round the whole margin, sterile ones subserrate; veins reticulated. This most variable fern is common at Rockingham Bay, where at first sight one might mistake it for *Pteris crenata*.

S. FRASERI, *Hook*. Rhizome creeping, scaly; stipes much shorter than the elongated linear-oblong pinnated frond; pinnæ thin, membranaceous, nearly opposite, remote cordato-ovate obliquely cuneate at the base, obtuse, somewhat lobed, serrated, partially reticulated; costa central; sori marginal, interrupted. Common on the islands of Moreton Bay, and between Brisbane and the Bay.

Fig. 13.—(a). Plant; (b). Fertile pinna.

Sect.—Adianteæ. Receptacles resupinate, that is, the spore-cases are attached to the under surface of the indusium; free veins.

14. ADIANTUM, *Linn*. (*Adiantos*, dry.) *Sori* indusiate, transverse marginal reniform, oblong or linear, continuous or interrupted; *receptacle* on the under surface of the indusium, and proceeding from the apices of two or more converging *venules*. *Indusium* (inverted membranaceous marginal lobe) venulose, sporangiferous beneath on the *venules*. *Veins* flabelately forked, or forked from a medial costa, the furcations repeated; *venules* parallel, free, continued in the fertile parts into the indusium. *Fronde*s coriaceous or herbaceous, simple,

pinnately or pedately divided; *pinnae* often articulated, usually dimidiate with the costa wanting; *rhizome* tufted or creeping.

A. HISPIDULUM, *Sw.* Rhizome short, creeping; stipes tufted, about a foot long; fronds flabelliform, pedately divided tri-pinnate; secondary *pinnae* linear-lanceolate, acuminate falcate; pinnules rigid, close dimidiate (divided into two parts); oblong-cuneate, dark green above, glaucous (greyish blue) beneath, striated, pubescent or hirsute, slightly serrated; sori small, numerous; indusium reniform. A pretty fern; one of the commonest about Brisbane.

A. pubescens? var. of *A. hispidulum*? Rockhampton

A. ÆTHIOPICUM, *Linn.* Rhizome slender, creeping; fronds slender, glabrous, broadly lanceolate, tri-pinnate, a foot or more long, pinnules small, somewhat roundish or sub-rhomboidal, cuneate at the base, bright green, and slightly lobed or crenate at the margins; indusium reniform, rachis and stipes very smooth. This lovely fern may be found in great plenty along most of the creeks. *A. assimile*, *Sw.*

Fig. 14.—(a). Portion of frond; (b). Portion of fertile pinnule.

A. FORMOSUM, *R. Br.* Rhizome long, creeping, generally deep in the ground; frond large, 3 to 4 feet high, supra-decompound deltoid; pinnules small, chartaceous, obliquely rhombocuneate obtuse, lobed or incised, and serrated glabrous; sori small; indusium reniform; stipes and rachis glossy, scabrous. A very ornamental fern, abundant in the scrubs.

A. LUNULATUM, *Burmann.* Rhizome creeping; stipes 4 to 6 inches long, tufted, wiry, naked, polished, dark chestnut-brown; fronds 6 to 12 inches long, 2 to 3 inches broad, simply pinnate, often elongated and rooting at the extremity; *pinnae* $\frac{3}{4}$ to $1\frac{1}{2}$ inch broad, $\frac{1}{2}$ to 1 inch deep, subdimidiate, the lower edge nearly in a line or oblique with the petiole, the upper edge rounded, and, like the bluntly-rounded sides, usually more or less lobed; petioles of the lower ones spreading, $\frac{1}{4}$ to $\frac{1}{2}$ inch long; papyraceo-herbaceous, the rachis and both surfaces naked; sori in continuous lines along the edge. Rockingham Bay.

Sect.—**Cheilantheæ.** Receptacles normal, *i.e.*, the spore-cases attached to the surface of the frond; sori punctiform (dot-like), marginal, terminal on the veins.

15. CHEILANTHES, Sw. (From *cheilos*, a lip, and *anthos*, a flower.) *Sori* indusiate, transverse marginal, generally on a reflexed tooth or lobule; normally sub-orbicular, small, distinct, sometimes contiguous, and by lateral confluence, elongate; the *receptacle* punctiform at the apex of the veins. *Indusium* membranaceous, or formed of revolute portions of the slightly altered margin, of the same form as the sorus. *Veins* simple, or forked from a central costa; *venules* free. Fronds small; stipes and rachis generally ebeneous; rhizome tufted or shortly creeping.

C. TENUIFOLIA, Sw. Rhizome short, creeping, scaly; stipes tufted, elongated, sometimes a foot long but generally shorter; fronds somewhat ovate or triangularly elongate, tri-pinnate, 5 or 6 inches long; pinnules linear-acuminate; segments oblong-ovate, deflexed. This delicate little fern is to be found growing near Doughboy Creek, but is much more plentiful on the Herbert River.

C. SIEBERI, Kunze. Rhizome short, creeping; stipes 3 to 6 inches long, tufted, and, as well as the rachises, ebeneous; frond glabrous, linear-oblong, erect, rigid, bi-tri-pinnate, primary ones short, pointing upwards, lower ones petiolate, sub-triangular acuminate; pinnules oblong, decurrent, lower ones inciso-pinnatifid, upper ones entire or sinuated, the margins much recurved; sori punctiform and semi-orbicular, or continuous, the edge pale and membranaceous, toothed. An elegant little fragile fern, common around Brisbane; may be found growing alongside almost any old log.

Fig. 15.—(a). *Fertile pinnule*; (b). *Portion enlarged.*

C. DISTANS, A. Braun. Rhizome short, stout, hairy, sub-erect; stipes tufted, 1 to 3 inches long, dark brown, paleaceous; fronds 3 to 6 inches long, about one inch broad, somewhat rigid, ferruginously hirsute above, paleaceous beneath, with lanceolate scales, linear-oblong obtuse bi-pinnate; primary

pinnæ petiolate, opposite (or nearly so) erecto-patent, those on the lower part of the frond distant, all pinnatifid at their apices; penules free, obtuse, the margins recurved; sori continuous along the margin. This pretty little plant is very plentiful on the stony ridges around Brisbane. *Nothochlæna distans*, R. Br.

C. NUDIUSCULA, T. Moore. Rhizome creeping, horizontal; stipes 2 to 3 inches long, glabrous or hirsute; fronds pinnate or bi-tri-pinnate, pubescent on both sides, sub-coriaceous, opaque, 3 to 6 inches long, 2 to 4 inches broad; pinnæ and pinnules pinnatifid at their apices, remote, shortly petiolate; segments linear, obtuse or ovato-obtuse, varying much in size and shape; sori broad, continuous, often of a blackish-brown, and at times the capsules are projected beyond the margin of the segments. This species is found along the Herbert River, and several other parts of the north of Queensland. *Pteris nudiuscula*, R. Br.

16. HYPOLEPIS, Bernhardi. (*Hypo*, under, and *lepis*, a scale.) Sori round, terminal, marginal, partly concealed by the reflexed indusioid crenule, and situated opposite the sinus of the segments. Veins forked or pinnate; venules direct, free, the lower exterior one sporangiferous; fronds large, herbaceous, bi-tri-quadri-pinnate; rhizome creeping.

H. TENUIFOLIA, Bernh. Rhizome creeping; stipes strong, 3 or 4 feet long, dark, rough towards the base, more or less hairy; fronds ample, quadri-pinnate; primary pinnæ ovate, acuminate; pinnules slightly falcate and acuminate, entire or toothed, or lower ones pinnatifid, monosorous on the inner margin of the lobe; indusium semi-orbicular, submembranaceous. A very handsome species, from Dalrymple's Gap, Cardwell, and various other places in the colony.

Fig. 16.—(a). Segment; (b). Fragment; (c). Spore-case; (d). Spores.

Sect.—Pterideæ. Receptacle linear, transverse.

17. PTERIS, Linn. (From *pteryx*, a wing.) Sori indusiate, marginal, linear transverse, uniting the apices of the veins.

Indusium of the same form, membranaceous. *Veins* simple or forked from a central costa; *venules* free. *Fronde*s varying from pedate to decomposed, often large, herbaceous or coriaceous. *Rhizome* short, erect, or creeping.

P. GERANIFOLIA, *Raddi*. Rhizome short, erect; stipes tufted, 1 to 6 inches long, ebeneous; fronds palmate, ternate, and pedate, sub-coriaceous, opaque; primary lobes broad-lanceolate, pinnatifid or bi-pinnatifid, terminal one cuneate at the base, secondary ones lanceolate; ultimate segments ovato-lanceolate, entire, and, as well as the sinuses, acute. One of the prettiest of our Queensland ferns; is sometimes met with in the swamps along the Brisbane River, but is most plentiful on the hills about Port Mackay. *Pellaea geraniaefolia*, *Fée.*
Pinna pedate R. Br.

P. LONGIFOLIA, *Linn.* Rhizome short, stout, knotty; fronds 2 feet long, lanceolate, attenuated below, pinnate; pinnae numerous, approximate, linear-lanceolate, terminal one sometimes the largest and petiolate, the base truncate or cordate, auriculate, and even hastate, the lower pinnae gradually shorter; stipes somewhat chaffy. Eight-mile Plains, Toowoomba, &c.

Fig. 17.—(a). *Pinna*; (b). *Fragment*; (c). *Spore-case*; (d). *Spores.*

P. UMBROSA, *R. Br.* Rhizome short, erect; stipes rough, as is also the rachis, which is broadly winged with the decurrent bases of the pinnae; frond 1 to 2 feet high, pinnate, dark-green, glossy; pinnae 15 to 17, opposite and alternate, the opposite pinnae contracted above, giving an urn-like form to the winged internodes, narrow-lanceolate finely serrated; indusium narrow, continuous. Brisbane River; Enoggera Gold-field.

P. CRENATA, *Sw.* Rhizome shortly creeping, scaly; stipes longer than the frond, smooth, stramineous, slender; fronds bi-pinnate, 2 feet or more high, terminal pinna elongated, often very long and caudate, generally auriculate on each side at the base; sterile pinnules oblong or obovate, obtuse, half-an-inch long, coarsely serrated sessile, often confluent, and more or less decurrent; fertile pinnules linear, more or less elongated; apex sterile, serrated and acuminate; indusium intramarginal,

occupying nearly the whole length of the pinnule. This remarkable plant is growing plentifully in some of the creeks near the Vale of Herbert station.

P. TREMULA, *R. Br.* Rhizome short, somewhat erect; stipes 2 or more feet high, rich chestnut-brown, glossy; fronds 2 to 3 or more feet long, ovate or oblong, sub-membranaceous, 3 to 4 pinnate; pinnæ broad-lanceolate; superior pinnules simple linear or linear-oblong, the sterile portions usually serrated, their bases decurrent and confluent; segments of the fertile pinnules often quite linear; indusium sub-intramarginal, continuous round all the segments; capsules a rich orange-color. A very handsome, hardy species; common everywhere.

P. QUADRIAURITA, *Retz.* Rhizome short, erect; stipes elongated, stramineous or brown, smooth or rough; fronds sometimes large, cordato-ovate acuminate, coriaceo-membranaceous pinnate; pinnæ mostly opposite sessile, lanceolate deeply pinnatifid (so as to leave a narrow wing to the rachis); segments oblong obtuse, mostly entire, terminal ones caudate; lower pair of pinnæ bi-partite, or rarely bearing 2 or 3 pinnæ on the lower side; lowest segments sub-decurrent on a short petiole. Veins forked, basal ones terminating at or about the sinus; indusium occupying nearly the whole length of the margin of the segments. Growing in some of the deep gullies near Cardwell.

P. AQUILINA, *Linn.* Rhizome running long and deep in the ground; stipes erect, remote, tawny; fronds large, sub-deltoid, coriaceous, tri-pinnate, 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 linear, upper ones decurrent at the base, the confluent portion sometimes forming a lobe or auricle; margins closely reflexed, more or less crenulated. Veins approximate, simple or forked; indusium double, continuous, membranaceous, more or less villous or ciliated (inner one sometimes obsolete). The well-known common Brake.

18. **LITOBROCHIA**, *Presl.* *Sori* indusiate, marginal, linear, continuous; the *receptacles* linear transverse, uniting the apices of the veins. *Indusium* of the same form, membranaceous. *Veins* simple or forked from a central costa, uniformly reticulated, evident or obscure, the hexagonal simple areoles universal; or, rarely, the basal portion of the veins parallel. *Fronds* various. *Rhizome* short, erect, or creeping.

Fig. 18.—(a). *Segment showing venation*; (b). *Fertile (d)*.

L. TRIPARTITA, *Sw.* *Rhizome* erect; *stipes* stout, 2 feet or more long, and, as well as the rachises, sub-castaneous; *fronds* ample, tripartite, lateral, spreading, long-petiolate glabrous; *pinnules* 6 or more inches long, linear-oblong, sub-sessile acuminate deeply pinnatifid; *segments* approximate, linear-oblong, falcate, 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; veins free between these and the margin. This handsome species is only met with (in Queensland) beyond Rockingham Bay.

L. MILNEANA, *Baker.* *Rhizome* short, stout, erect; *stipes* strong, erect, polished, yellowish brown, 1 to 2 feet high; *fronds* ample, naked; *pinnæ* numerous, pinnatifid, cut down on each side nearly to the rachis; *segments* linear-oblong, falcate, about 1 inch long, 2 to 3 lines wide—the lowest 6 to 9 inches long, 1 to 2 inches broad, with a single similar but smaller pinnule at the base on the lowest side; texture herbaceous; *sori* falling short of the sub-entire tips of the pinnule. A very showy fern, belonging to the Rockingham Bay district.

L. VESPERTILIONIS, *Presl.* *Rhizome* long, creeping rather deep in the ground; *stipes* rough, muricated at the base, and, like the rachis, glossy and of a rich brown; *fronds* distant, decomposed, sub-coriaceous, often glaucous; *pinnæ* all sessile, sub-adsnate, horizontal, mostly opposite; *pinnules* oblong, acuminate more or less, deeply pinnatifid; basal veins of the costa or costules only anastomosing, others forked or free. A fine fern, often growing to the height of 7 or more feet; may be found along the banks of the Brisbane River. *Pteris incisa* *Thunb.*

Sect.—**Woodwardiææ.** Receptacles short, transverse, or arcuate on the venules, sub-parallel with the midrib or margin; sori indusiate.

19. WOODWARDIA, Smith. *Sori* indusiate, linear-oblong, or shorter and sub-lunate near the costa; the *receptacle* seated on the transverse anastomosing veins. *Indusium* plane or convex. *Veins* uniform—the lower ones arcuately anastomosing, forming elongated costal areoles, of one or more series; marginal *venules* free. *Fronde*s pinnate or pinnatifid; *rhizome* short, erect, or decumbent; *sori* immersed or superficial.

W. ASPERA, Mett. Rhizome short, decumbent, black; stipes short; fronds 6 inches to 2 feet long, fascicled, erect; lanceolate acuminate, attenuated at the base, rigid, asperous, pinnatifid almost to the rachis; segments numerous, nearly horizontal, subfalcate, all spinuloso-denticulate; indusium small, evanescent, in one or two rows distant from the costa. *Doodia aspera, R. Br.* Common in most of the scrubs around Brisbane, and easily recognised by its harshness.

Fig. 19.—(a). *Fertile fragment*; (b). *Spore-case.*

W. MEDIA, Fée. Rhizome short, decumbent, scaly; stipes black and scaly at the base; fronds tufted from a few inches to 1½ feet long, membranaceous, lanceolate, pinnatifid in the upper part; the lower pinnate segments and pinnæ approximate, dentate, terminal one elongated; lowest pinnæ distant, and more or less auricled. The commonest fern in Queensland; found everywhere. *Doodia media, R. Br.*

W. CAUDATE, Cav. Rhizome short; stipes tufted, slender, a few inches long, smooth, black at the base; fronds dimorphous, 4 to 10 inches long, flexuose, thin, pale green, oblong pinnate nearly to the summit, the sterile ones the shortest; pinnæ elliptical, obtuse, serrated, upper ones confluent into an oblong-lanceolate apex; fertile fronds longer, narrower, more harsh; pinnæ remote, linear, attenuate, truncate and sub-auricled at the base, the terminal pinna very long, caudate; indusium membranaceous; sori in a single series. This fern is not so common as the other species, and is only found to the south of Brisbane. *Doodia caudata, R. Br.*

Sect.—Aspleniceæ. Sori parallel with the venation, oblique (rarely sub-parallel) to the midrib, oblong linear or more or less elongated, sometimes compound. Sori indusiate, lateral or sub-lateral on the veins.

20. ASPLENIUM, Linn. Sori indusiate, linear, short or elongate, oblique; the *receptacle* lateral on the anterior side of the veins. *Indusium* linear, membranaceous, plane (flat on the surface) or fornicate. *Veins* simple, or forked from a central costa (sometimes single and costæform in the ultimate narrowly-cut segment), or forked from the base of the segment, the costa being evanescent or wanting; *venules* parallel, direct, free. Fronds various, often proliferous.

A. SIMPLICIFRONS, F. v. Muell. Rhizome shortly creeping, scaly; fronds sub-sessile, narrowed gradually to both ends, 12 to 18 inches long, an inch or more broad, the edge entire or very slightly undulating, the point acuminate; texture sub-coriaceous; veins almost horizontal, parallel, simple, or forked, a line apart; sori not touching by a space either margin or costa. Cardwell.

A. ATTENUATUM, R. Br. Rhizome short, copiously rooting; stipes short, tufted, paleaceous, with black scales; fronds coriaceous, firm, from a few inches to a foot long, gradually acuminate, the apex often proliferous, the margin serrated, lobed, or pinnated below; veins forked, distant, patent; sori linear-oblong. This is a well-marked species of common occurrence, on damp, shady banks, from Brisbane to the Pioneer River.

A. FLABELLIFOLIUM, Cav. Rhizome very short, scaly; stipes cæspitose (tufted), 2 to 6 inches long, flexuous; fronds pinnate, 3 to 6 inches long, sometimes the rachis extended, naked, and the apex proliferous, membranaceous, bright green; pinnae flabelliform, 2 to 4 lines long, cuneate at the base, petiolate or sessile; veins flabellate; sori oblique, three or four on each pinna; indusium pale brown. This delicate little fern may be found on the rocks along Enoggera Creek; the species is rare in Queensland.

A. FALCATUM, Lam. Rhizome erect, stout, densely rooting, scaly; stipes 6 to 12 inches long, ebeneous; fronds 1 to 4 feet

long, pendulous, sub-coriaceous, lanceolate pinnate; pinnae horizontal, petiolate, 2 to 6 inches long from a broad obliquely-cuneate base, often caudato-acuminate lobato-pinnatifid, the segments pointing upwards; superior base the broadest, sub-auricled, acute, and, as well as other of the inferior lobes, serrated; inferior base excised towards the apex, the lobes are reduced to remote serratures. Veins approximate, erecto-patent, with forked branches; sori long-linear, diverging from near the costa to near the margin. A most beautiful epiphyte, often found in company with the Bird's-nest and Stag's-horn ferns.

A. PALEACEUM, *R. Br.* Rhizome short; stipes tufted, very short, and, as well as the rachis, densely shaggy, with persistent villose patent scales; fronds firm-subcoriaceous, dark villose, with dark-colored hairs, paler on the under side, 6 to 12 inches or more long, decumbent flexuose, pinnated; pinnae strongly striated, nearly an inch long, sub-petiolate, obliquely rhomboidal ovate, sub-lobate, obtuse, unequally, rather sharply spinuloso-serrated; apex of frond generally proliferous; veins flabellate, approximate, no distinct costa; sori linear, chiefly occupying the disk of the pinna; indusium pale, opening towards the centre. This fern grows on the rocks at Dalrymple's Gap, and also at a few places on the Pioneer River.

Fig. 20.—(a). *Plant*; (b). *Pinna with sori*; (c). *Scales from under side of pinna.*

A. FURCATUM, *Thunb.* Rhizome short, oblique, clothed above with glossy brown, hair-like ciliated scales; stipes tufted, 4 or more inches long, also hairy, ferruginous; fronds 6 to 12 or more inches long, ovato-lanceolate acuminate, coriaceous, rigid, mostly (bi-rarely) tri-pinnate, dark green and glabrous, pale above, often villous beneath; pinnae and pinnules somewhat patent, primary ones petiolate, secondary ones more or less decurrent, generally narrow-cuneate (wedge-shaped) or subspathulate, truncated or rounded or acuminate at the apex, bi-trifid or bi-tripartite, the apices dentate or irregularly incised; veins conspicuous, compact, once or more forked, erect, parallel with the central vein, no distinct costa; indusium very narrow. A curious fern. Cape York.

A. LASERPITIFOLIUM, *Lam.* Rhizome somewhat erect, clothed with satiny ferruginous scales at the top; stipes tufted, a foot or more long, dark glossy; fronds 2 to 4 feet long, ovato-lanceolate finely acuminate, of a dark glossy green, three or four pinnate; primary pinnae long, petiolate from a broad base, broad-lanceolate, finely acuminate into an incised cauda, secondary pinnae several inches long; ultimate pinnules and segments $\frac{1}{4}$ to $\frac{1}{2}$ inch long, cuneate, undivided or deeply pinnatifid or 3-lobed, the lobes or segments narrow-cuneate, sometimes broad, incised or toothed at the apex; veins flabelliform, nearly erect, parallel; sori linear, short, two to four on a pinnule or segment, often exactly opposite to each other, and opening face to face; indusium membranaceous. Found growing on the rocks in the deep gullies at Dalrymple's Gap, and certainly one of the most beautiful ferns of the colony.

A. UMBROSUM, *J. Sm.* Rhizome very stout, ascending, scaly; stipes thick, dark, almost black at the base, a pale green above, and slightly scaly with broad brown scales; frond broad-ovate or sub-deltoid, membranaceous, 3 to 5 feet long, tri-pinnate; primary pinnae distant, 6 to 10 inches long, oblong-ovate, acuminate; secondary ones 2 to 3 inches long, nearly sessile, approximate, oblong-acuminate; pinnules oblong-lanceolate, acute, sessile, and more or less decurrent, inciso-pinnatifid segments acute or bi-dentate, superior ones confluent; veins simple, pinnate or forked; sori copious, five to eight on each pinnule; indusium terete, tender. This and the next species were called *Allantodia*, from the supposed resemblance of the indusium to a sausage. A tender fleshy fern, found in damp shady scrubs. *Allantodia Australis*, *R. Br.*

A. AUSTRALE, *Brack.* Rhizome short and, like the base of the stipes, black, not so scaly as *A. umbrosum*; stipes slender, 6 to 12 inches long; frond bi-pinnate, deltoid, membranaceous (semi-transparent), flaccid; pinnules pinnatifid, attenuated at the apex; lobes oblong-obtuse, inciso-serrate; sori three or four on each pinnule; indusium oblong, flat to the frond. A delicate fern, very much like *A. umbrosum*, but always much smaller in all its parts. *Allantodia tenera*, *R. Br.*

21. THAMNOPTERIS, Presl. (Name derived from *thamnos*, a shrub, and *pterus*, a fern.) *Sori* indusiate, linear elongate, parallel, oblique; the *receptacles* lateral, anterior. *Indusium* narrow, linear, membranaceous, plane. *Veins* simple, or forked from a central costa; *venules* approximate, parallel, united at their apices by a continuous slightly arcuate marginal vein.

T. NIDUS, Presl. Rhizome erect, densely rooting; stipes 2 to 4 inches long, clothed with dark brown scales; fronds fasciculate, coriaceous-chartaceous, broad-lanceolate, 3 to 6 feet long, 3 to 10 inches broad, glossy, narrow below, base obtuse, the upper part sometimes bifid; costa ebeneous black; veins close parallel, horizontally patent; sori very narrow-linear, generally occupying the middle of the frond in the upper half. An epiphyte commonly known by the name of Bird's-nest fern. *Asplenium nidus, L.*

Fig. 21.—(a). Fragment of frond; (b). Spore-case and spores.

22. DIPLAZIUM, Sw. (From *diplazo*, to double.) *Sori* indusiate, linear, all or the lowermost only double; that is, the *receptacles* occupy both sides of the veins. *Indusium* narrow, membranaceous, plane or fornicate; in the double sori, affixed in pairs back to back on opposite sides of the same venule, one opening anteriorly, the other posteriorly, in the simple sori, as in *Asplenium*. *Veins* simple, or forked from a central costa; *venules* direct, free.

D. POLYPODIOIDES, Mett. Caudex erect, 1 to 6 feet high, clothed with lanceolate, acuminate scales; stipes 2 to 3 feet long, pale green or brown, primary and secondary rachises scaly; fronds 4 to 6 feet long, coriaceous-membranaceous, bi-tri-pinnate, pinnatifid at the acuminate apices and at those of the primary pinnæ; primary pinnæ distant, petiolate from a broad base, ovato-lanceolate acuminate; pinnules sessile or sub-petiolate, 2 to 6 inches long, an inch or more wide, from a truncated base, oblong, acuminate pinnate in part; segments serrated, oblong, falcate; veins approximate, simple, or rarely forked, often all soriferous; sori often confluent; indusium pale

brown, breaking irregularly. This noble fern is in great abundance in the swamps at Rockingham Bay.

Fig. 22.—(a). *Portion of frond*; (b). *Segment showing sori*.

23. CALLIPTERIS, *Bory*. (Named on account of its great beauty from *kallistos*, beautiful.) *Sori* and *receptacles* as in *Diplazium*. *Indusium* narrow, plane, double. *Veins* forked or pinnate from a central costa; *venules* anastomosing irregularly at an acute angle, on each opposite pair uniting between the primary veins in superposed acute sub-triangular areoles; the marginal and superior veinlets free.

C. PROLIFERA, *Bory*. Rhizome short, erect, scaly; stipes stout, a foot or more long, densely scaly at the base, muricated; fronds 2 to 4 feet long, broad-oblong, acuminate, sub-coriaceous pinnate, often bearing bulbs at the axis of the pinnae; pinnae large, horizontally patent (spreading), sessile, 6 or more inches long, often 2 inches broad, truncate or sub-cordate at the base, and auricled, the apex acuminate, the margin serrated or crenulated, the terminal pinnae large, hastato-triangular and pinnatifid; veins anastomosing, sori upon most of the veins and anastomosing with them; indusium narrow, mostly diplazioid. A remarkably handsome species from Dalrymple's Gap.

Fig 23.—(a). *Portion of frond*; (b). *Spore-case and spores*.

Sect.—**Hemionitideæ**. Receptacle linear, variously reticulato-anastomosed.

24. ANTROPHYUM, *Kaulfuss*. (Derived from *antron*, a cavern, and *phyo* to grow.) *Sori* non-indusiate, usually immersed, sometimes superficial, narrow-linear, occupying the anastomosed veins which form the sides of the areoles, mostly united; the *receptacles* therefore partially, though generally, reticulated. *Veins* uniformly reticulated from a costa or ecostate, forming elongated sub-hexagonal areoles.

Fig. 24.—(a. and b). *Fragments of frond*.

A. SEMICOSTATUM, *Bl*. Rhizome short; stipes very short; fronds 6 to 12 inches long, 1 to 3 inches broad, coriaceous, spatulate, acuminate, long attenuated and gradually and

decurrently tapering below; veins very conspicuous, areoles exceedingly elongated, costa broad, compressed, occupying only the lower part of the frond; sori sunk, yet rising above the cuticle, very much elongated and parallel, rarely branched or anastomosing, chiefly following the course of the longitudinal veins. A singular fern, found upon the rocks in some of the gullies about Dalrymple's Gap, Cardwell.

A. PLANTAGINEUM, *Klfs.* Rhizome short; stipes a few inches long; fronds 6 to 9 inches long, 1 to 2 inches broad, lanceolate acute or acuminate, broadest one-third of the way down, costa disappearing in the lamina (expanded part), only evident at the base; areolæ 1 to 3 inches long, $\frac{1}{8}$ -inch broad; sori anastomosing, occupying the whole frond, deeply immersed, not quite extending to the margin. Rockingham Bay.

Sect.—**Gymnogrammeæ.** Receptacles linear, simple or forked, at times oblong.

25. DICTYOGRAMMA, *Fée.* (*Diktyon*, a net, and *gramme*, a line.) *Sori* non-indusiate, superficial, narrow-linear, sub-parallel, sparingly anastomosing; the *receptacles* thus reticulated. *Veins* arcuate, forming sub-elongated areoles parallel with the costa; the *venules* anastomosing in about one series of oblong oblique areoles with the marginal veinlets, simple or forked, free and clavate at their apices, or more uniformly reticulated in several series of oblique, oblong, hexagonal, unequal areoles.

Fig. 25.—*Fragment showing the reticulated sori and costal areoles.*

D. PINNATA, *T. Moore.* Rhizome creeping at the apex, clothed with black setaceous hairs; stipes sub-tufted, 6 to 12 inches long, firm, erect, glossy brown as well as the rachis; fronds coriaceous, 1 foot or more long, and nearly as much wide, sub-oval glabrous pinnate; pinnae 5 to 17—petiolate, 5 to 10 inches long, $\frac{1}{2}$ to 1 inch or more broad, lanceolate or linear-lanceolate costate; veins uniformly anastomosing, so as to form copious narrow-oblong oblique areoles; veins soriferous; sori narrow-linear and considerably elongated or short-oblong, and very irregularly scattered. Rockingham Bay.

26. **GYMNOGRAMMA**, *Desvaux*. (From *gymnos*, naked, and *gramma*, writing). *Sori* non-indusiate, linear, sometimes elongated, simple or forked, i.e., bi-partite, oblique, often at length confluent; *receptacles* elongate above, or continued below, the forks of the veins. *Veins* simple, or forked from a central costa, or the costa sometimes indistinct, *venules* free.

G. MUELLERI, *Hook*. Rhizome creeping underground; stipes a few inches long, which, with the rachis, is ebeneous-black, and covered with linear-lanceolate sub-ferruginous appressed scales; fronds 6 or more inches long, about 2 inches wide, carnosu-coriaceous, pinnated (but often mixed with simple fronds); pinnæ alternate distant, half to over an inch long, patent sessile, ovate, obtuse, cordate at the base, entire, clothed on the upper side with dense whitish lanceolate dentato-ciliated scales, emarginate at the base and sub-peltate, and on the under side with ferruginous scales of the same nature, the surface of the pinnæ bright-green when the scales are removed; veins immersed close compact, simple or forked, clothed with the narrow elongated sori for nearly their whole length, and which are (like the veins) simple or forked. This beautiful little fern is plentiful on Castle Hill, Townsville, and may also be found within a few miles of Rockhampton.

Fig. 26.—(a). *Plant*; (b). *Fragment enlarged*; (c). *Scale of frond*.

G. RUTÆFOLIA, *Hook et Grev*. Rhizome very short, rather thick, ascending; stipes herbaceous, glanduloso-villose, densely tufted, about an inch long; fronds 3 inches long, linear-oblong, obtuse, sub-coriaceo membranaceous, clothed with hairs on all sides, which are more or less glandulose at their tips, pinnated, pinnæ alternate, rather distant, $\frac{1}{2}$ to $\frac{3}{4}$ of an inch long, trapezoid-ovate, obovate or flabellate, obliquely cuneate at the base, and tapering into a short petiole, variously lobed or sometimes deeply pinnatifid with narrow cuneate segments; veins flabellato-dichotomous, copious; sori oblong or linear, rarely forked. On rocks in various parts of the colony.

G. PAPAVERIFOLIA, *Kunze*. Rhizome short, erect, paleaceous above, with imbricated linear-lanceolated brown glossy scales;

stipes 1 to 3 inches long, pubescently glanduloso-hirsute (as is the whole plant), densely tufted; fronds 2 to 4 inches long, 1 to 1½ inch broad near the middle, broad oblong-lanceolate obtuse, bi-pinnate or pinnate with pinnatifid pinnæ; pinnæ rather distant, alternate, sub-sessile, sub-obliquely ovate and forming wings on the rachis, entire and mono-disorous, or the lower ones lobed and dentate, their lobes monosorous; sori oval, oblong, prominent, when geminate confluent, capsules rather compact. Tropical Australia.

27. GRAMMITIS, Swartz. (Name derived from *gramme*, a line; the lines of sori.) Sori non-indusiate, oblong or elliptic, oblique; the receptacles medial or sub-terminal. Veins simple, or forked from a central costa; venules free.

G. BILLARDIERI, Willd. Rhizome small, sub-erect, tufted; stipes tufted, very short, hairy; fronds simple, linear, 1 to 6 inches long, light green, attenuated at the base; sori forming two lines, occupying each the upper branch of the vein, confined to the upper portion of the frond. A pretty little fern. Mount Lindsay.

Fig. 27.—(a). Frond; (b). Portion of same; (c). Spore-case.

G. BLECHNOIDES, Greville. Rhizome stout, clothed with dense linear scales; stipes 2 to 3 inches long, rigid, erect, naked; frond 8 to 12 inches long, 1 to 1½ inch broad, cut down very nearly to the rachis throughout; fertile pinnæ confined to the upper half of the frond, longer and narrower than the sterile ones, which are bluntish, about half an inch broad, growing gradually shorter and broader downwards; coriaceous; rachis and both surfaces naked; sori oblong, immersed, in rows near the midrib. Rockingham Bay. *Polypodium contiguum*, Brack.

Sect.—**Platylomeæ**. Receptacles oblong, contiguous, parallel, the spore-cases becoming confluent and simulating, a broad marginal sorus (spuriously-indusiate).

28. PLATYLOMA, J. Smith. (*Platys*, broad, and *loma*, a margin.) Sori spuriously-indusiate, marginal, oblong at the apices of the veins, contiguous; the spore-cases laterally con-

fluent and forming a broadish marginal band. *Indusium* (spurious) formed of a narrow, continuous, attenuated, inflexed portion of the margin. *Veins* simple, or forked from a central costa; *venules* parallel, free, soriferous along a portion of their length at the upper end.

P. BROWNII, *J. Sm.* Rhizome creeping underground; stipes longer than the frond, ebeneous hairy; fronds pinnate; pinnæ several or few (sometimes the frond simple), shortly petiolated (upper ones sessile), large cordato-oblong, acute or obtuse, oblique or sub-falcate, dull green above, glaucous beneath; sori broad along both sides of the pinnæ, from the base to the apex. A variable fern, common in all the scrubs around Brisbane; perhaps better known under Hooker's name of *Pellæa paradoxa*.

Fig. 28.—(a). *Pinnae*; (b). *Fertile fragment*; (c). *Simple frond*.

P. FALCATA, *J. Sm.* Rhizome shortly creeping; stipes and rachis clothed with chaffy scales; fronds pinnate, linear-oblong; pinnæ more numerous than in *P. Brownii*, shortly petiolate, glabrous, coriaceous, linear-lanceolate, acuminate, falcate, cordate at the base; sori linear, continuous, broad. Scrubs around Brisbane, not so often met with as some of the other kinds. *Pellæa falcata*, *Fée*.

P. FALCATA, *var. nana*. Rhizome shortly creeping; stipes densely tufted, clothed with ferruginous hairs; fronds linear, a foot or more long; pinnæ small, sharply auriculated at the base, and strongly mucronate at the point. A common and beautiful variety.

P. ROTUNDIFOLIA, *J. Sm.* Rhizome long, creeping; stipes and rachis clothed with chaffy scales and hairs; fronds pinnate, rigid, decumbent or sub-erect; pinnæ very numerous, small oval or sub-rotund; sori forming a broad band round the pinna. A very pretty species found on Mount Lindsay. *Pellæa rotundifolia*, *Hook*.

Sect.—**Polypodieæ**. Sori naked, i.e., without true indusia (fertile fronds sometimes contracted with involute margins—spuriously indusiate.)

29. NOTHOCHLÆNA, R. Br. (Derived from *nothos*, spurious, and *chlaina*, a cloak.) *Sori* non-indusiate, small, rotundate, oligocarpous (a small number), contiguous, becoming laterally confluent into a narrow line or border; the *receptacles* terminal. *Veins* simple, or forked from a central costa; *venules* free.

N. LANUGINOSA, Desv. Rhizome short, thick, ascending, clothed at the apex with ferruginous scales, whole plant clothed with soft white or ferruginous wool, less dense on the upper side, and there not concealing the green of the pinnules; stipes cæspitose, short, stout, 1 to 2 inches long, dark purple when the tomentum is removed; fronds sub-membranaceous, 5 to 9 inches long, 1 to 2 inches broad elongato-lanceolate, bi-tri-pinnate primary pinnæ one-third of an inch long, oblong secondary ones rotundate, and, if again divided, they are ternate with close-placed orbicular pinnules, the margins of the fertile pinnules narrowly reflexed and minutely crenated; sori forming a broad band just within the margin. A most beautiful little fern. Tropical Queensland.

N. FRAGILIS, Hook. Rhizome (?); stipes 2 to 4 inches long, slender, filiform, glabrous, dark purple as well as the rachises, both of which are very fragile; fronds 1 to 2 inches long, membranaceous, villous on both sides and at the margin, with rather long spreading white hairs, deltoideo-bi-pinnate, tri-pinnate below; primary pinnæ sub-opposite, lowest pair petiolate, unequally triangular, their secondary pinnæ sub-sessile, oblong-ovate, three-quarters of an inch or more long, again pinnated; pinnules, as well as the superior secondary pinnæ, oblong, 3 to 4 lines long, deeply pinnatifid with narrow linear inciso-dentate segments, which bear short, naked, interrupted sori of few capsules, near the slightly-recurved margins.

Fig. 29.—(a). *Fronds*; (b). *Pinna*; (c). *Pinnule*.

30. POLYPODIUM, Linn. Derived from *polys*, many, and *pous*, a foot.) *Sori* non-indusiate, globose or ovoid, superficial or immersed; the *receptacles* terminal or medial on the free veins. *Veins* simple, or forked from a central costa, or simple costæform in the ultimate segments; *venules* free.

P. TENELLUM, *Forst.* Caudex climbing up the trunks of trees by adventitious roots (similar to English Ivy), the young parts clothed with scales; stipes scattered, distant, mostly short, a few inches long, jointed above the base; fronds a foot or more long, 2 to 4 inches broad, pendent, membranaceous, flexuous, elongato-oblong, pinnate; pinnæ 1 to 2 inches long, half an inch or more broad, remote-spreading, lanceolate, long or short-acuminate, very obliquely cuneate at the base, and there tapering into a short petiole, the margin entire or crenate, terminal one quite free and petiolate, all very deciduous, costule slender; veins twice or thrice forked, branches parallel; sori in two series, a little within the margin, globose; rachis tawny. A pretty, delicate climbing fern; may be found in most of the scrubs. *Arthropteris tenella*, *J. Smith.*

P. RUFESCENS, *Blume.* Rhizome short, creeping; stipes 12 to 18 inches long, firm, erect, naked; fronds 12 to 18 inches long, 9 to 12 inches broad, sub-deltoid; lower pinnæ much the largest, deltoid, 6 to 8 inches long, 3 to 4 inches broad; pinnule lanceolate, unequal sided, bluntly lobed, the lowest nearly down to the rachis; texture sub-coriaceous; rachis and both sides naked or slightly pubescent; veinlets pinnate in the lower lobes, three or four on a side; sori medial.

P. RUGULOSUM, *Labillardière.* Rhizome long, creeping, rough; stipes 1 to 2 feet long, varying much in size; fronds 2 to 4 feet long, tri-pinnate pinnæ, lanceolate-acuminate pinnules, segments obtuse, the lower ones distant and pinnatifid, margin slightly crenulated; sori round, sub-marginal; the whole plant mostly covered with glandulous hairs. A very common, coarse-growing fern.

P. HOOKERI, *Brack.* Rhizome small, ascending; stipes tufted, an inch or less long, clothed with soft spreading hairs; fronds 3 to 5 inches long, $\frac{1}{4}$ to $\frac{3}{8}$ of an inch broad, the apex acute or bluntish, margin entire, the lower part narrowed gradually, sub-coriaceous, both sides thinly clothed with soft hairs; veins simple or forked; sori round, in long rows close to the midrib. Rockingham Bay.

P. PALLIDUM, *Brack.* Rhizome short, stout, horizontal, clothed with bright glossy hairs and broad scales; stipes 1 to 2 feet long, paleaceous, the base densely so, rough, and of a dark brown color; fronds 2 to 3 feet long, and about 18 inches broad, bi-tri-pinnate; pinnæ 8 to 12 inches long, 4 to 6 inches broad; pinnules close, linear-lanceolate, 1 to 3 inches long, about half an inch broad, cut down to the rachis; main rachis straw-colored, naked, or more or less fibrillose; rachises of the pinnules and under side finely villose. Veins pinnate to a central costa; venules forked; sori small, medial on the anterior venule; often one or two of the spore-cases of a darker color than the rest. Three-mile Scrub.

Fig. 30.—(a). Upper portion of frond; (b). Base of stipe; (c). Pinnule; (d). Segment showing sori.

31. GONIOPTERIS, *Presl.* (Derived from *gonia*, an angle, and *pterus*, a fern.) Sori non-indusiate, globose; the receptacle medial or terminal. Veins pinnate, prominent; venules (lower pair or more) connivently anastomosing at an acute angle, from whose apex is produced an excurrent veinlet, which is either short and free, or lengthened to reach and unite with the next pair of venules.

G. UROPHYLLA, *Presl.* Rhizome —; stipes 2 feet long, at times very stout, testaceous brown, paleaceous at the base, with rather large dark-brown subulate scales; fronds ample, firm, but not thick, coriaceous, rarely membranaceous, glabrous or pilosulous above, and more or less densely pubescens, and sometimes subscrabrous or minutely glandulose beneath, 2 to 3 and more feet long, sub-ovate, pinnated; pinnæ distant, petiolated below, 8 inches to 1½ foot long, 1 to 2 inches wide from a more or less obtusely and unequally cuneated base, elliptical-oblong, finely caudato-acuminate, quite entire or subsinuated, more or less grossly, obtusely, or rarely acutely serrated upwards, terminal pinna most so, often larger than the rest, and long-petioled; veinlets numerous, 15 to 20 pairs, all connivent save the few in the teeth or serratures; soriferous in the middle, the sori forming two series, each between the costules and the spurious costule, or orbicular or 2-lobed sori are borne

at the point of junction of the 2-veinlets, and are then uniserial. Tropical Australia.

G. GHEISBEGHTII, *Linden*. Rhizome stout, horizontal; stipes 2 to 3 feet long, stramineous, pubescent; fronds membranaceous, 1 to 2 feet long, villosa-tomentose, pinnate; pinnae several, terminal one similar to the rest, long-petioled, 6 to 8 inches long, 1 to 2 inches wide, lower ones sub-petiolate, upper ones sessile, all broad-oblong, rather suddenly and shortly acuminate, the margin sub-entire or crenato-lobate; veinlets numerous, most pairs connivent, the produced veinlet generally free, upper ones free only in the short lobes; sori dorsal on the middle of all the united veinlets, thus forming two series between each pair of costules or primary veins. Tropical Australia.

G. PROLIFERA, *Presl*. Rhizome creeping; stipes somewhat clustered, erect before becoming proliferous, short frond 2 to 3 or more feet long, glabrous, or slightly pilose, pinnate, proliferous at the apices and axils of the pinnae, thus widely extending; pinnae 3 to 6 inches long, sessile or shortly petiolate, oblong-lanceolate, acuminate, sometimes auricled at the base entire, coarsely crenate; venules 4 to 8 pair, connivent and forming a continued spurious vein or costule; sori in the middle of the venule (medial). Common along the Pioneer River, Port Mackay, where it grows to the water's edge, and in wet places in most parts of the north.

G. PÆCILOPHLEBIA, *Hook*. Rhizome creeping under ground; stipes 1 to 2 feet long, firm but slender, glabrous, somewhat rough at the base; fronds 6 to 12 inches long, and about the same broad; firm membranaceous pinnate, pinnae about 7, sometimes more sometimes less, lateral ones in distant pairs, sub-alternate, sub-petiolate, terminal one generally the largest (the lowest pair sometimes lobed at their inferior base), 6 or more inches long, 1 to 2 inches broad; lanceolate acuminate, the margin serrated from near the base to the attenuated apex; primary veins or costules rather distant; venules erecto-patent, 4 to 6 pairs, lowest pair elongated, always free and parallel with the costules, the rest united or free, the united apices

sending out a short free veinlet and forming a continuous vein or spurious costule; sori small, solitary, near the middle of the venule. A fine fern. Herbert River.

G. KENNEDYI, *F. v. Muell.* Rhizome creeping, several inches below the surface of the soil; stipes erect, firm, 2 to 3 feet long, nearly naked; fronds 2 feet long; pinnæ 6 to 12 inches long, 1 to 2 inches broad; sessile acuminate, the lower part sub-entire and obtuse, the upper slightly crenate; texture papyraceo-herbaceous; under surface somewhat downy; venules, 8 to 10 or more on a side; sori medial. A very fine fern. Seaview Range.

(Fig. 31.—(a). *Pinna*; (b). *Portion of same, showing sori.*

32. DICTYOPTERIS, *Presl.* (Derived from *diktyon*, a net.) *Sori* non-indusiate, globose or oblong; compital, *i. e.* the *receptacle* uniting several radiating reticulated veinlets, or medial; *veins* uniformly reticulated (or sub-pinnately branched) from a central costa; the areoles elongated, oblique, without free included veinlets.

D. ATTENUATA, *Presl.* Rhizome creeping, paleaceous with subulate scales; fronds scattered but approximate, a foot or more long, half an inch broad, firm, coriaceous, glossy, linear scarcely acuminate, attenuated into short stipes; costa prominent; sori oblong, uniserial on the upper half of the frond. On trees on the top of some of the highest mountains on the Glengallan run, near Warwick.

(Fig. 32.—(a). *Frond*; (b). *Segment showing sori and receptacle.*

33. PHLEBODIUM, *R. Br.* (Name derived from *phleps*, *phlebos*, a vein; veins conspicuous.) *Sori* non-indusiate, globose or oval; the *receptacles* situated (usually) on the converging apices of two or more included veinlets; *veins* pinnate or pinnato-furcate, from a central costa; the *venules* reticulated in variously-formed, usually elongated, areoles, which produce (a few) sterile excurrent veinlets, especially near the margin; the costal areoles transverse, usually void.

P. AUREUM, *J. Sm.* Rhizome stout, creeping, clothed with bright brown scales; stipes 2 feet long or more, at first prui-

nose (frosted), at length glossy brown; fronds often large, 2 to 5 feet long, glabrous, drooping, pinnatifid, with lanceolate-acuminate, broad undulated membranous segments, 8 to 10 inches long, with entire margins; sori round, in one or two series parallel with the margin. A very showy fern.

Fig. 33.—(a). Portion of frond, showing venation and sori.

34. GONIOPHLEBIUM, *Blume.* (Name derived from *gonia*, an angle, and *phleps*, a vein.) Sori non-indusiate, globose, (rarely oblong); the *receptacles* punctiform (rarely oblong), situated at the apex of the lower anterior venules, or of the simple excurrent free veinlets, one being included within each areole; *veins* forked, or pinnate from a central costa; the lower anterior *venules* usually free and fertile, the rest angularly or arcuately anastomosing (in one or more, frequently several series), and producing from their angles free excurrent veinlets, which are often fertile; the marginal veinlets free.

G. VERRUCOSUM, *Wall.* Rhizome creeping, paleaceous; stipes a foot or more long, articulated on the rhizome; fronds slender, slightly pubescent, 2 to 3 feet long, pendulous; pinnæ numerous, distant, 6 to 9 inches long, an inch or more broad oblong, costate, articulate upon the rachis suddenly and shortly; cuspidato-acuminate entire, or serrated chiefly towards the apex, nearly sessile, the base obliquely cuneate; primary veins slender, but straight and parallel, costuliform, forming with the anastomosing veins 4 or 5 series of areoles each, with a free included veinlet, the lowest series only soriferous; sori sunk in a deep cavity, having a corresponding pustule on the upper side. Tropical Australia.

G. SUBAURICULATUM, *Presl.* Rhizome creeping, scaly; stipes short, only a few inches long; fronds lanceolate, pinnate, from a foot to several feet long; pinnæ membranaceous, bright green, narrow, lanceolate-acuminate, serrate, subauriculate at the base, articulated with the rachis; sori uniserial, yellowish brown, nearer the costa than the margin, forming elevated pustules on the superior side. An elegant fern, forming large patches on the rocks in the Cardwell district, also on trees, Herbert River.

Fig. 34.—(a). Pinna; (b). Portion enlarged, showing sori.

35. NIPHOBOLUS, *Kaulfuss*. (From *niphobolos*, covered with snow--the white starry pubescens of fronds.) *Sori* non-indusiate, globose or elliptic, superficial or immersed, buried amongst dense stellate pubescence; the *receptacles* terminal or medial on the excurrent, free or irregularly anastomosing veinlets; *veins* internal, obscure, pinnate prominent or uniform, from a central costa; *venules* anastomosing, sometimes transversely parallel, forming parallelogramoid areoles, with excurrent or recurrent, free or occasionally connivent, or generally anastomosed veinlets, sometimes uniting in roundish or oblong hexagonal unequal oblique areoles, with variously directed simple or divaricately-forked veinlets.

N. PUBERULUS, *Bl.* Rhizome creeping, branched younger portions squarrose, with rather large bright ferruginous lanceolato-subulate scales; stipes 1 to 3 inches long; frond hard-coriaceous, 1 or 2 feet long, about 1 inch wide, glabrous above, beneath whitish or tawny, stellato-tomentose (which is very deciduous); elongato-lanceolate or linear obtuse, but at times the fronds are deeply lobed; sori small, prominent, generally occupying the upper part of the frond, arranged in 4 or more oblique, very close, series. Herbert River. Perhaps better known by Forster's name, *Polypodium acrostichoides*.

N. RUPESTRIS, *Spreng.* Rhizome slender, creeping, branched tortuous paleaceous; stipes short, 1 to 2 or 3 inches long, articulated upon the rhizome; fronds dimorphous, carnosu-coriaceous, fertile ones linear, 3 to 4 or more inches long, obtuse at the apex, and decurrent at the base, sterile fronds sometimes roundish or oblong-ovate, one or two inches long, but very variable in size; sori large, prominent, often confluent, occupying the upper part of the frond. One of the commonest scrub ferns found growing upon rocks, boughs of trees, &c.

Fig. 35.—(a). *Plant*; (b). *Segment*.

N. CONFLUENS, *R. Br.* Rhizome creeping, very slender, filiform, much-branched, paleaceous; stipes short, a few lines long; fronds dimorphous, coriaceous, glabrous or slightly pubescent above, almost silvery, with minute scales, mixed with stellate hairs beneath; fertile fronds, linear obtuse, 1 to 2 inches

long, 2 to 3 lines broad, sterile ones shorter, orbicular, spatulate; sori large near the margin, oval or confluent, extending the whole length of the frond. On trees near the edge of scrubs. A very pretty species, and like all the genus, at once known by its stellate pubescence and thick fleshy fronds.

36. PLEOPELTIS, *Humb. et Bonpld.*—(From *pleos*, full, and *pelte*, a shield.) Sori non-indusiate, sometimes covered while young by peltate scales, rotundate or elliptic (sometimes with the *receptacles* diffusio-confluent in lines) superficial or immersed, the receptacles compital, *i. e.* produced on the points, whence several reticulated veins radiate, rarely medial; *veins* pinnate, or pinnato-furcate, from a central costa, parallel or flexuose, sometimes evanescent; the *venules* much branched, reticulated in (usually) several series of irregular or hexagonal areoles, within the ultimate of which are produced variously-directed, straight, curved, or hamate (hooked), often numerous, free sterile veinlets, which are generally distinctly clavate (club-shaped at their apices).

P. IRIOIDES, *T. Moore.*—Rhizome creeping, scaly; stipes usually very short, but at times 3 to 4 inches long; fronds 1 to 3 feet long, coriaceous-carnose, linear-lanceolate, attenuated and decurrent at the base, acuminate or obtuse at the apex, undivided or irregularly lobed; sori very small, numerous, scattered on the upper portion of the frond; venation internal. An ornamental fern, plentiful along the coast and on the various islands to the north. *Phymatodes irioides*, *Presl.*

Fig. 36.—(a). Portion of frond, showing venation and sori.

P. PHYMATODES, *T. Moore.* Rhizome black, scaly, creeping, in age covered with a chalky-white coat; stipes from a few inches to a foot or more long; fronds erect, triangularly ovate, pinnatifid, polymorphous, from a few inches to 2 to 3 feet long, decurrent at the base, light green and shining, with oblong-acute coriaceous segments, 6 or more inches long, and from 1 to 2 inches wide; sori often large, oval, or globose, compital, forming a single or double series between the costa and the margin. A remarkable and handsome species. On the islands about Rockingham Bay, &c.

P. LANCEOLA, *Mett.* Rhizome wide, creeping, densely clothed with ovate-acute, bright ferruginous scales; stipes 1 inch long; frond 3 to 5 inches long, $\frac{1}{4}$ to $\frac{1}{2}$ inch broad, apex acuminate, margin entire, revolute, base shortly narrowed, coriaceous, main veins distinct to the edge, with copious fine areolæ with free veinlets; sori in a single row near the midrib. Rockingham Bay.

P. PUSTULATA, *T. Moore*, (Blistered.) Caudex very long, scandent, branched, squarrose (spreading at right angles), with long subulate copious brown glossy scales; stipes slender, 2 to 5 inches long; fronds 6 inches to a foot and-a-half long, 1 to 6 inches broad, membranaceous, flaccid (weak), narrow or broad-lanceolate undivided, and very narrow or deeply and nearly to the rachis pinnatifid acuminate, segments wide apart, 2 to 3 inches long, rarely $\frac{1}{2}$ an inch broad, from a broad decurrent base, gradually tapering into an obtusely acuminate point, venation very manifest, lax, variable, primary veins forming one or two series of rather large oblong areoles, including free veinlets; sori large, uniserial, sub-marginal, immersed, forming blisters on the upper side of the frond. Found climbing on trees, rocks, etc., in many parts of the colony.

Fig. 36.—(b). Portion of frond, showing venation and sori.

37. DRYNARIA, *Bory*. (Name said to be derived from *Dryades*, nymphs of the woods; or *dryinos*, of oak, from their oak-leaf-like sterile fronds.) Sori non-indusiate, rotundate, or by confluence elongated, sometimes immersed; the *receptacle* produced on the points where the several reticulated veins join, *i. e.* compital; veins pinnate, prominent, from a central costa; venules compoundly anastomosing, in two or three series of irregular quadrate areoles, within the ultimate of which are produced free divaricate sterile veinlets.

D. QUERCIFOLIA, *J. Sm.* Rhizome broad, stout, long creeping, densely clothed with red-brown, satiny, lanceolate-subulate, soft scales; fronds coriaceous, of two kinds; sterile ones varying in size from 3 to 12 inches long, and 4 to 8 inches broad, generally dark-brown, glossy, cordato-ovate, variously lobato-pinnatifid,

often half-way down to the costa; fertile ones 2 to 3 feet long, stipitate pinnatifid, with linear acuminate, undulated segments; sori large, two in each primary areole.

D. LINNÆI, *Bory.* Rhizome stout, scales 1 to 2 lines long, broadly ovate, with a short acumen from a peltate base; fronds fertile ones long stalked, 2 to 3 feet long, 6 to 12 inches broad, cut down nearly to the rachis into entire erecto-patent lanceolate lobes, texture rigid, naked on both sides, main veins distinct to the edge, with copious irregular areoles between them; sori copious, scattered, small. This species differs from the last only in the sori being small and scattered. Running up the trunks of trees and over rocks, &c. Cardwell.

D. DIVERSIFOLIA, *J. Sm.* Rhizome short, stout, creeping, clothed with ferruginous scales; fronds coriaceous-membranaceous, of two kinds; sterile ones sessile, cordate-oblong, pinnatifid, a span or more long; fertile ones 2 to 5 feet long, stipitate, pinnate, pinnae a span or more long, linear-lanceolate, acuminate, sub-petiolate, articulated upon the rachis, base cuneate, margins crenulated; sori uniserial. Found growing upon rocks or trees throughout the colony.

Fig. 37.—(a). Fertile pinna; (b). Oak-leaf; (c). Portion of fertile pinna, showing sori.

Sect.—Aspidiæ. Indusium reniform or peltate, attached by the centre or sinus, free at the margins (fertile fronds sometimes involutely contracted.)

38. POLYSTICHUM, *Roth.* (Many rows—sori in rows.) *Sori* indusiate, globose; the *receptacles* medial, or rarely terminal on the venules; *indusium* orbicular, peltate; *veins* pinnato-furcate, or simply forked, from a central costa; *venules* free, the lower anterior one usually, sometimes more, fertile.

P. CORIACEUM, *Schott.* Rhizome creeping, branched, densely clothed with tawny, silky, subulate scales; stipes distant, 1 to 2 feet long, stout, and, as well as the main rachises, deciduously paleaceous; fronds large, 2 to 3 feet long, deltoideo-ovate, acuminate, coriaceous 3-pinnate pinnae, all erecto-patent petiolate, lower ones unequally deltoid acuminate, lowest inferior

secondary pinnæ longer than the superior ones, pinnules an inch or more long, ovate or lanceolate, entire, or more or less obtusely serrate or pinnatifid, segments oblong, acute (but not mucronate, entire or bluntly serrated, ultimate ones of the primary pinnæ confluent; veins sunk and dichotomously fasciated, veinlets close; sori in two rows, nearer the costule than the margin. Brisbane scrubs.

P. ACULEATUM, *Sw.* Rhizome short, sub-erect; stipes tufted, 6 to 12 inches long, more or less clothed with ovate-lanceolate and fibrillose pale brown scales; frond, 1 to 2 feet long, 8 to 12 inches broad, oblong-lanceolate, acuminate, subcoriaceous, pinnæ close, lanceolate, 4 to 6 inches long, $\frac{1}{2}$ to $\frac{3}{4}$ inch broad, pinnule ovate-rhomboidal, unequal-sided, auricled on the upper side at the base; rachis straw-colored, more or less scaly; under surface slightly fibrillose; sori in two rows, nearer the midrib than the edge. Toowoomba.

Fig. 38.—(a). Pinnule; (b). Segment, showing venation and sori; (c). Indusium.

39. SAGENIA, *Presl.* (Derivation unknown.) Sori indusiate, rotundate, superficial or immersed; the *receptacles* terminal on free veinlets, or medial on compital or anastomosing veinlets; *indusium* cordato-reniform, affixed at the deep sinus; *veins* pinnate from a central costa, prominent; *venules* arcuately and compoundly anastomosing, in about two or three series of irregular, unequal, various-shaped areoles, from the sides of which are often produced free, included, divaricate (sometimes fertile) veinlets.

S. MELANOCAULON, *T. Moore.* Rhizome short, ascending; stipes about a foot long, scaly at the base, and, as well as the rachises, ebeneous, polished; fronds 1 to 2 feet long, cordato-ovate, membranaceous, dark green, 3 to 5-nate or pinnated, with 3 to 5 remote pairs and a large terminal one, which is rhomboidal, long-petiolated, deeply pinnatifid, the segments above confluent into a serrated acuminate apex, lateral pinnæ 5 to 8 inches long, oblong acuminate, variously pinnatifid, the lowest pair of pinnæ large, petiolate, obliquely deltoid, acuminate pinnatifid, inferior basal segments much the longest, and

again lobato-pinnatifid, veinlets everywhere anastomosing, the areoles, including free veinlets, simple or forked; sori copious, small. A very beautiful fern. Cardwell.

Fig. 39.—(a). Frond; (b). Segment, showing venation.

40. NEPHRODIUM, *Richard.* (*Nephros*, a kidney—shape of indusium.) *Sori* indusiate, globose; the *receptacles* medial on the venules; *indusium* reniform, affixed at the sinus; *veins* (of pinnæ) pinnate from a central costa, prominent; *venules* simple, the lower pair or more, sometimes all, angularly connivent-anastomosing, producing from the angle an excurrent veinlet, which (in deeply pinnatifid pinnæ) is free, or (in less divided pinnæ) joins the next anastomosed angle.

N. MOLLE, *R. Br.* Rhizome ascending, stout, densely rooting; stipes a span or more long; fronds rather soft-membranaceous, 1 to 3 feet long, oblong-lanceolate, much attenuated, with dwarfed pinnæ at the base, pinnate pinnatifid at the apex, pinnæ numerous, horizontal, sessile, oblong, and generally broadest at the base, or lanceolate, more or less acuminate, 3 to 5 inches long pinnatifid more or less deeply, the segments obtuse or oblong, a little falcate, the lowest pair of venules uniting and sending out a veinlet, which is prolonged to the sinus of the segment, the rest free, simple, rarely forked; sori in two rows, situated near the middle of the free veinlets, or at the junction of the two basal ones, indusium cordato-reniform, more or less villous. A very common species, found in most of the creeks in Queensland.

Fig. 40.—(a). Segment; (b). Indusium.

N. UNITUM, *R. Br.* Rhizome creeping and copiously rooting; stipes 1 to 2 feet long; fronds, sub-coriaceous, glabrous, sometimes of a reddish brown, glossy pinnate, pinnæ numerous, shortly petiolate, 3 to 5 inches long, half an inch wide, linear-lanceolate, acute rather than acuminate, sometimes broader and cuneate at the base, pinnatifid about half way down to the costa, segments rounded or ovate obtuse or acute, venules curved, one or two of the lowest opposite pair united; sori near the middle of the veins, or sub-marginal, sometimes con-

finned to the lobes, sometimes extending to the disk, and at other times forming a continuous intra-marginal line, following the course of the sinuses the whole length of the pinnae; indusium reniform, setose. A swamp fern.

N. PTEROIDES, *J. Sm.* Rhizome ; stipes 1 to 2 feet long, slender, stramineous or greyish, slightly scaly below; fronds 2 to 4 feet long, 1 foot or more broad; pinnae spreading, 4 to 8 inches long, $\frac{3}{4}$ -inch broad, the apex acuminate, the edge cut one-third or halfway down into oblong or sub-triangular lobes; texture papyraceo-herbaceous; rachis and both sides nearly naked; veins pinnate in the lobes with 8 to 10 venules on each side; sori quite marginal and confined to the lobes. Tropical Australia.

41. LASTREA, *Bory.* (Derivation unknown.) Sori indusiate; the *receptacles* medial, or rarely terminal or sub-terminal on the venules; *indusium* roundish-reniform, or sometimes small and irregularly reniform, plane or fornicate, fugacious or persistent, the basal sinus at which it is affixed, variously deep, narrow, broad, or shallow; *veins* simple forked, or pinnate from a central costa; *venules* free, the anterior usually (sometimes more) fertile.

Fig. 41.—(a). Upper portion of pinna; (b). Pinnule enlarged.

L. ARISTATA, *T. Moore.* Rhizome creeping, densely crinite (bearded), with long subulate ferruginous scales; stipes distant, a foot or so long, the base copiously crinite; frond 1 to 2 feet long, deltoideo-ovate, suddenly acuminate, 3 to 4-pinnate, more or less coriaceo-membranaceous, glossy, primary pinnae all petiolate lanceolate, finely acuminate, lowest primary ones with the basal secondary pinnae very much elongated (hence the frond is pedate), and again once or twice pinnated; pinnules obliquely ovate or rhomboideo-lanceolate, petiolulate, subfalcate, subauriculate, mostly mucronato-serrate; sori generally in two rows on each pinnule; indusium rather small, usually plane, orbicular, or subreniform, Brisbane Scrubs.

L. DECOMPOSITA, *Presl.* Rhizome creeping, black, sparsely scaly; stipes a span to 2 or 3 feet long, frond a span to 18

inches long, ovate or deltoid, or sub-quinquangular, acuminate, coriaceous-membranaceous, firm, glabrous, or more or less pubescent on the costæ and veins beneath, bi-pinnate 3 to 4 pinnate below, primary pinnae 4 inches to a span long, broad-oblong, acuminate, basal pair half-ovate, their lower inferior pinnae the longest, pinnules varying exceedingly in size on different plants—from 2 to 3 lines to 1½ inch long, lanceolate or ovato-lanceolate, decurrenti-coadunate, acute or obtuse, variously incised or pinnatifid, the segments acutely serrated, venules simple or forked remote; sori small, distant halfway between the margin and costule; indusium reniform, testaceous (brownish). Brisbane scrubs, everywhere.

42. NEPHROLEPIS, Schott. (From *nephros*, a kidney, and *lepis*, a scale.) Sori indusiate, rotundate; the receptacles terminal on the lower anterior venules; indusium—(1) rotundocordato-reniform, affixed at the sinus (nephroid); (2) subreniform, affixed oblique-transversely by the arcuate posterior margin (davallioid); veins pinnato-furcate, from a central costa; venules direct, free, thickened at the apices.

N. ACUTA, Presl. Rhizome short, erect, producing elongated slender stolones, bearing fasciculate crowns at intervals; stipes 1 to 2 feet long, sub-paleaceous, with subulate long ciliated scales, mixed with longer ones, terete very smooth, olivaceous; fronds 2 to 4 feet long, 8 to 12 inches broad, oblong-lanceolate, membranaceous, more or less firm, horizontal, ½ to 1 inch broad, acuminate obliquely, truncato-cuneate at the base, serrated, or coarsely crenate, sharply auricled above and below; indusium cordate, almost orbicular. Common on the coast to the north, growing over the rocks.

N. REPENS, Brack. Caudex long, filiform, climbing up the trees like ivy by adventitious roots (holdfasts); stipes scattered, short, 2 to 3 inches long, and, as well as the rachis, clothed with a brown pubescence; fronds 4 to 12 inches long, oblong, or linear-oblong, membranaceous, pinnate, pinnae from 1 to 2 inches long, horizontally patent, obtuse or acute, obliquely cuneate at the base, sessile, straight or sub-falcate, superior base truncate, and parallel with the rachis, frequently with a sharp auricle,

the margin entire or crenate, or lobato-dentate, especially on the fertile pinnæ, costæ slender, flexuose, venules forked, upper branch bearing sori at the apex, a short distance from the margin; indusium small, cordato-reniform, soon obliterated. A most beautiful climbing fern. Herbert River. *N. obliterata*, Hook.

N. ATTESCANDENS, Baker. Stipes very short, distant, on slender, wiry, wide creeping rhizome; fronds 6 to 12 inches long, 1 to 3 inches wide; pinnæ $\frac{1}{2}$ to $1\frac{1}{2}$ inches long, $\frac{1}{4}$ to $\frac{1}{2}$ inch broad, distinctly crenato-pinnatifid, the upper edge auricled and truncate, parallel with the stem, the lower oblique; texture papyraceous, rachis and both sides more or less villose, the plant keeping green when dried; indusium very fugacious. This species differs very little from the preceding.

N. TUBEROSA, Presl. Rhizome short, erect, producing elongated slender stolones, bearing fasciculate crowns at intervals, and numerous oval glossy tubers; stipes short, paleaceous; fronds, 1 to 5 feet long, linear lanceolate, acuminate pinnate, pinnæ numerous, approximate, about an inch long, glabrous, horizontal from a truncate or cordate base, more or less auricled above, oblong obtuse, or (especially the fertile ones) crenated, rarely acuminate, often subfalcate, lower and sterile ones shorter and more obtuse, auricle acute; sori transverse, about equidistant from the costa and the margin; indusium firm, coriaceous, reniform, affixed by its oblique arcuate base. Brisbane River, on trees, &c.

Fig. 42.—(a). Portion of frond; (b). Pinna, showing venation and sori.

Sect.—**Cystopteridææ**. Indusium rotundate, attached transversely to the vein by its base, the margins free.

43. HUMATA, Cavanilles. (Derivation unknown.) Sori indusiate, rotundate; the receptacles terminal and vertical, or rarely sub-terminal and oblique on the venules; indusium sub-rubicular-reniform, or transversely oblong-reniform, plane, broadly affixed at the posterior margin; veins stout, often thickened upwards, simple, forked, or pinnate from a central costa; venules free; sori vertical.

H. PEDATA, *J. Sm.* Rhizome creeping, paleaceous; stipes 1 to 3 inches long, chaffy; fronds very coriaceous, small, 2 to 4 inches long, deltoideo-cordate, somewhat 5-angled tripartitopinnatifid, the segments patent, but inclining upwards oblong-obtuse, fertile ones crenato-dentate, the two lower primary divisions obliquely ovato-acuminate; indusium semi-orbicular, or nearly orbicular, alternating with the teeth of the serratures, placed close to the margin and pointing to it. A beautiful little fern. Mount Graham, Herbert River.

Fig. 43.—(a). Portion of plant; (b). Segment showing venation; (c). Segment with sori and indusium.

Sect.—**Davallieæ**. Indusium roundish or oblong, adherent at the base and margins, opening in front, *i. e.* exteriorly.

44. MICROLEPIA, *Presl.* (Derived from *mikros*, small, and *lepis*, a scale.) Sori indusiate, rotundate or transversely oblong, intra-marginal or sub-marginal; the *receptacles* terminal or axillary on the veins or venules; *indusium* semi-orbicular, attached by the base and sides, thus half-cup-shaped, the anterior margin free, truncate or rounded; *veins* simple, forked, or pinnate, from a central costa; *venules* direct, free; *sori* intra-marginal.

M. SPELUNCÆ, *T. Moore.* Rhizome ; fronds large, ovate or deltoid, acuminate tripinnate, flaccid, more or less hairy, especially on the veins and costæ beneath, primary and lower secondary pinnæ distant and acuminate, pinnules oblong or rhomboid-lanceolate, obtuse, deeply pinnatifid, the lobes ovate or obovate, entire, or irregularly inciso-lobate, or again pinnatifid sub-oblique, very obtuse; sori large, usually large solitary in the sinuses within the margin, most numerous on the superior margin. Tropical Australia.

Fig. 44.—(a). Portion of frond; (b). Pinnule showing indusia.

45. DAVALLIA, *Smith.* (In honor of *Edmund Davall*, a Swiss botanist.) Sori indusiate, roundish-oblong, or elongate-oblong, marginal, or sub-marginal; the *receptacles* terminal; *indusium* membranaceous, cup-shaped, or tubulose, affixed at the sides and base, thus forming a vertical oblong semi-cylin-

dricul tubulose cyst, or cup, which is truncate and open at the top, *i. e.* towards the margin; *veins* forked or pinnate, from a costa; *venules* free; *sori* marginal.

D. ELEGANS, *Sw.* Rhizome stout, creeping, scaly and woolly; stipes about equal in length to the frond; fronds 1 to 2 feet long, ovate-acuminate, striated with pseudo-veins between the true veins, ultimate pinnules lobato-crenate, lobules entire, or more usually one-two toothed; indusium half-cup-shaped, a little elongated, sunk, inserted upon the lobe, compressed, truncate at the mouth. Tropical Australia.

D. PYXIDATA, *Cav.* Rhizome stout, creeping, densely clothed with subulate ferruginous scales; stipes about a foot long, glabrous; fronds 1 to 2 feet long, coriaceous, deltoideo-ovate, tripinnate, pinnæ broad, lanceolate, pinnules and segments mostly obtuse, pinnatifid or incised, incisures generally retuse soriferous (on fertile fronds); indusium truncated at the mouth. On trees, often found with the *Platyceriums* and Bird's-nest ferns.

Fig. 45.—(a). *Portion of frond*; (b). *Portion of pinnule with sori.*

Sect.—**Dicksoniææ.** Special indusium, more or less adherent to, and connivent with, the margin of the frond, forming an entire or two-valved cup; sori therefore within a marginal cup.

46. DICKSONIA, *L'Heritier.* (In honor of *James Dickson*, a famous British cryptogamic botanist.) *Sori* involucreately-indusiate, globose or short, transverse, oblong, marginal, more or less reflexed; the *receptacle* globose, or transverse, oblong, terminal; *indusium* coriaceous, double, *i. e.* two-valved, the outer or accessory valve formed of a more or less attenuated lobule of the frond, cucullate (hooded), sometimes equalling in size, but more frequently larger than the inner valve or proper indusium, which latter, when smaller, is less convex than the outer; *veins* simple, forked, or pinnate, from a central costa; *venules* free.

D. ANTARCTICA, *Labill.* Caudex 30 or more feet high, covered with matted rootlets; stipes and rachis scabrous;

fronds supra-decompound, elliptical, coriaceous, glabrous, ultimate pinnæ oblong, or oblong-lanceolate, acuminate at the apex, pinnules and segments ovate, very acute, pungent, incisoserrate, fertile ones pinnatifid, scarcely altered. A noble tree fern, scattered throughout the colony. *Macraea*

D. DUBIA, *Gaudich.* Rhizome horizontal, stout; stipes erect, scaly at the base; fronds tri-quadripinnate, lower pinnæ 1 to 2 feet long, 1 foot broad; lower divisions of the pinnule deltoid-acuminate, their segments cut down to the rachis, except at the very apex, with ovate-rhomboidal, acute, sharply—and deeply—toothed lobes; coriaceous, upper surface naked, lower sometimes hairy; sori 2 to 12 to a lobe, small, orbicular, the outer valve large, cucullate, the inner one inconspicuous. Common on hill sides. *= Davallia dubia R. Br.*

Fig. 46.—(a). Fertile pinna; (b). Fertile segment; (c). Sorus, several spore-cases having been removed to show receptacle.

47. DENNSTÆTDIA, *Bernhardi.* Sori involucrely-indusiate, globose, marginal, inflexed; the *receptacles* small, punctiform terminal; *indusium* cupuliform or pateriform (cup or goblet formed), sub-membranaceous, the special and accessory valves nearly equal, and coalescing into an almost entire, rarely sub-bilabiate, reflexed cup; *veins* pinnate, from a central costa; *venules* simple or forked, free.

Fig. 47.—(a). Pinnule; (b). Segment showing venation and sori; (c). Showing the recurved sori, and pateriform indusia.

D. DAVALLIOIDES, *T. Moore.* Rhizome creeping, underground; stipes chestnut brown, glossy, slightly hairy; fronds supra-decompound, membranaceous, flaccid, somewhat hairy beneath, pinnule deeply incised; sori copious in the sinuses of the segment. This, the most lovely of the genus, may be found growing along the Enoggera Creek. *Dicksonia davallioides R. Br.*

Tribe 2.—CYATHEINEÆ. Ring more or less obliquely vertical, nearly complete, narrow; spore-cases crowded, sessile, or sub-sessile, oblique-laterally compressed or sub-compressed, bursting horizontally.

Sect.—**Cyatheæ**. Sori involucrate, *i. e.* indusia inferior (receptacles elevated); fructifications dorsal.

48. CYATHEA, Sm. (From *kyatheion*, a little cup—shape of indusium.) Sori involucrate, globose; the *receptacles* columnar or globose, axillary at the forking of a vein, or medial; *involucre* membranaceous, cup-shaped, at first globose and covering the sorus, opening in a circumscissile manner, near the apex, the cup remaining entire, or bursting unequally, or, sometimes, opening vertically in 4 to 6 nearly equal spreading divisions. *Veins* (in the ultimate divisions), simple, forked, parallel-forked or pinnate, from a central costa; *venules* free.

Fig. 48.—(a). Fertile pinnule; (b). Sorus and involucre; (c). Involucre, showing receptacle.

C. LINDSAYANA, Hook. Caudex ; stipes and rachises quite unarmed; frond membranaceous, glabrous, except on the costæ and costules, which are sub-villous, and have many scattered small bullate scales; primary pinnae 2 feet long, pinnate nearly to the apex; pinnules 3 to 4 inches long, oblong acuminate, deeply pinnatifid; lobes oblong, sub-falcate, serrate; sori on the lower half of the lobe, on the forking of the veins; involucre globose, firm, opening with a circular, rather small and jagged mouth. Mount Lindsay.

C. ARACHNOIDEA, Hook. (Cobwebby.) All the rachises dark-colored and opaque, muricated with short, black, sharp spines, and clothed with rusty tomentum; fronds tripinnate, firm-coriaceous, glabrous above, cobwebby beneath; secondary pinnae 4 to 4½ inches long, ½-inch broad, oblong pinnate, pinnatifid only near the narrow acuminate apex; pinnules scarcely 3 lines long, from a broad base, linear, acute, sub-falcate; veins sunk, inconspicuous; sori near the middle of the pinnule, occupying the whole space between the costule and the recurved margin; involucre thin, membranaceous, white and delicate, breaking into variously lobed, lacinated segments. Rockingham Bay.

Sect.—**Alsophileæ**. Sori naked, *i. e.* without indusia (receptacle elevated). See *Fig. 49*—(d).

49. **ALSOPHILA**, *R. Br.* (Derived from *alsos*, grove, and *phileo*, to love.) Sori naked, or sometimes spuriously (*i. e.* squamoso) involucrate; the *receptacles* globose or columnar, medial or axillary; *involucre* non-apparent, or represented by a bullate scale, or a series of jointed hairs; *veins* simple forked, parallel-forked, or pinnate, from a central costa; *venules* free, unisoriferous.

A. EXCELSA, *R. Br.* Caudex 40 to 50 feet high; stipes stout, articulated on the trunk, muricated, and with the rachis when young clothed with chaffy scales, frequently mixed with wool; fronds bi-pinnate, 8 to 9 or more feet long, 3 to 4 feet broad, pinnæ 2 feet long, 10 inches broad, pinnules oblong-lanceolate acuminate, segments oblong, rather acute, serrated at length, coriaceous, with the margins reflexed, lower ones sub-auriculate 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 membrane beneath the sorus, which entirely conceals it. A noble tree fern.

A. AUSTRALIS, *R. Br.* Caudex, 25 to 30 feet high, clothed with the bases of the old stipes; stipes stout, muricated; fronds 8 to 10 feet long, 3 to 4 feet broad, pinnæ 2 or more feet long 6 to 8 inches broad; pinnules linear-lanceolate, acuminate, deeply pinnatifid, paler, somewhat glaucous beneath, segments ovate, acute, entire, or slightly serrated; sori copious; veins simple and forked, capsules mixed with a few hairs. Tree fern, the most common in the colony.

Fig. 49.—(a). Upper part of fertile pinna; (b). Pinnule; (c). Sorus; (d). Section of same, showing receptacle and spore-cases.

A. ROBERTSIANA, *F. v. Muell.* Caudex 9 or more feet in height; fronds ample, oblong-deltoid, quadri-pinnatifid, lower pinnæ oblong-lanceolate, about 12 inches long, 4 to 6 inches broad, pinnule linear, 2 to 4 inches long, $\frac{3}{4}$ -inch broad, cut down to a narrowly-winged rachis into deeply pinnatifid, linear-oblong segments $\frac{1}{2}$ -inch broad, texture herbaceous; rachis and both sides of frond densely villose; sori, one to each ultimate lobe. A fine tree fern. Rockingham Bay.

A. REBECCÆ, *F. v. Muell.* Caudex about 8 feet high, slender; fronds ample, bi-pinnate, lower pinnae oblong-lanceolate, 12 to 15 inches long, 4 to 5 inches broad, pinnules 20 to 30 on each side, the lower ones stalked, linear, 2 to 4 inches long, $\frac{3}{8}$ -inch broad, the apex acuminate, the upper part deeply, the lower less deeply, inciso-crenate, the base rounded on both sides, slightly auricled above; sub-coriaceous, rachis reddish-brown or ebeneous, slightly fibrillose, the main one rough, with raised points; upper surface naked, lower scattered over with membranaceous scales; veins free, 4 to 5 in a group; sori principally in two rows, midway, the midrib and edge. A very beautiful tree fern. Rockingham Bay.

A. LEICHHARDTII, *F. v. Muell.* Caudex erect, slender; stipes jointed upon the caudex, main and secondary rachises dark purple, deciduously pulverulent, mucronate-spinulose; frond firm, cartilagineo-chartaceous, dark green above, sub-glaucous beneath, glabrous, or nearly so, and scaleless; tri-pinnate; primary pinnae $1\frac{1}{2}$ to 2 feet long, 8 inches broad, oblong-lanceolate acuminate; secondary pinnae oblong acuminate, sessile, pinnatifid only at the apex; costae beneath pubescenti-asperous, ultimate pinnule and lobe linear-oblong, acute, the margin slightly recurved, spinuloso-serrate; sori copious, close to the costa; receptacles small, not hairy. A fine tree fern from Mount Lindsay,

Tribe.—**GLEICHENINEÆ**. Ring horizontally, or rarely obliquely transverse, complete; spore-cases sessile, or sub-sessile, usually vertically compressed, bursting longitudinally, *i. e.* vertically. Sori dorsal; fronds rigid, opaque, with oligocarpous (few sori) sori, and globose-pyriform spore-cases, girt by the ring (zonal).

50. PLATYZOMA, *R. Br.* (Broad-banded; band of spore-case broad.) *Sori* non-indusiate, punctiform, consisting of few, 2 to 4, sessile spore-cases, which are soon deciduous, enclosed within the revoluto-saccate pinnae; the *receptacles* terminal on the veins. *Veins* simple, incurvo-horizontal, from a central costa, free, externally obscure, prominent on the inner surface.

P. MICROPHYLLUM, *R. Br.* Rhizome short, creeping; stipes very short, caespitose (tufted); fronds narrow, linear pinnate, rigid; pinnae numerous, minute, sessile, sub-orbicular-ovate; the margins remarkably revolute and glandulosa-ciliate, the under or inner surface pulverulous. The fertile pinnae are more convex, and are often found split down the costa, thus divided into two sub-hemispherical portions. A particularly beautiful little fern, found in several parts of the colony, but mostly in the tropics.

Fig. 50.—(a). Portion of frond; (b). Pinnae; (c). Fertile laid open to show veins; (d). Spore-case.

51. GLEICHENIA, *Sm.* (In honor of *Baron P. F. von Gleichen.*) Sori non-indusiate, round, superficial or immersed, consisting of few (usually 2 to 4, sometimes 5 to 6, and in one or two species, 8 to 12) spore-cases, which are sessile, deciduous, globoso-pyriform, sometimes concealed by the revolute margins; the *receptacles* terminal or medial, or axillary on the venules. *Veins* simple, or forked, from a central costa; *venules* free, the lower anterior one usually soriferous.

G. SPELUNCÆ, *R. Br.* Rhizome creeping; fronds glabrous, simple or forked and dichotomous pinnate, pinnae pinnatifid, the segments semi-ovate, plane, membranaceous, glaucous beneath.

G. CIRCINATA, *Sw.* Rhizome creeping; fronds dichotomous, divaricated, branches pinnate, pinnae pinnatifid, glabrous, segments ovate, or sub-rotund (most so when fertile), more or less glaucous beneath, the margins slightly recurved; capsules 3 to 4 superficial, branches and rachis glabrous, or more or less clothed with chaffy pubescence. Eight-mile Plains.

G. DICARPA, *R. Br.* Rhizome creeping among rocks, sometimes for several feet; fronds scattered along the rhizome, dichotomous divaricately branched, pinnate pinnae pinnatifid, segments orbicular, sub-hemispherical saccate (pouch-like), capsules about 2, concealed within the almost slipper-shaped lobe, and mixed with ferruginous paleaceous hair, which often extends to the rachis. Brisbane River.

Fig. 51.—(a). Portion of frond; (b). Segment showing spore-cases.

G. FLABELLATA, *R. Br.* Rhizome creeping; fronds 4 to 8 feet high, two or three times dichotomous flabelliform (fan-like), branches lanceolate, ascending caudate at the point pinnatifid, below pinnate, segments linear, acute, serrated, erecto-patent, capsules 1 to 4. Near Brisbane, and in several parts of the colony.

G. DICHOTOMA, *Hook, Sp. Fil.* Rhizome creeping; stipes rounded, 5 to 7 feet long, ultimate branches with a pair of pinnae, and a pair also at the base of the di-trichotomy, pinnae lanceolate acuminate pinnatifid, segments linear obtuse or emarginate, glaucous beneath, glabrous or nearly so, lower external ones generally the largest, often again pinnatifid, capsules 10 to 12. This beautiful fern is very plentiful at the Herbert River.

Tribe.—**TRICHOMANINEÆ.** Sori extrorse-marginal (turned outwards from the margin); fronds usually pellucid, membranaceous, with polycarpous sori and lenticular spore-cases. Ring zonal, *i. e.* spore-cases girt by the ring.

52. TRICHOMANES, *Linnaeus.* (Derived from *thrix*, a hair, and *manos*, soft; stipes of some species appear like fine hair.) Sori involucrate, seated in extrorse-marginal (rarely recurved) cysts, sunk in or free on the margins of the fronds; the veins continued into filiform, exserted, sometimes capitate *receptacles*, which are free within the cysts, and bear sessile, lenticular spore-cases at their base; *involucre*s funnel-pitcher-shaped, or shortly bell-shaped, truncate and entire at the mouth, or two-lipped. *Veins* simple, forked, or pinnate, from a central costa, or simple, costa-like in the ultimate segments, or flabellato-dichotomous; *venules* free, sometimes excurrent in the marginal teeth.

T. FÆNICULATUM, *Bory.* Rhizome short, sub-erect; stipes 2 to 4 inches long, naked or tomentose-tufted, erect, wiry; fronds 4 to 8 inches long, 1½ to 3 inches broad, erect, rigid, ovate-lanceolate, main rachis naked, or slightly winged above; lower pinnae spreading, or erecto-patent, 1 to 1½ inches long, cut down quite or very nearly to the rachis; pinnules regularly pinnatifid, with simple or forked linear segments, 1 to 1½ lines

long, dark green, sub-coriaceous; sori 2 to 12 on a pinnule, minute, axillary, the mouth rather spreading, but two-lipped. Seaview Range and the range around Cardwell. The species is much like *rigidum*, Sw., and *longisetum*, Bory.

T. PARVULUM, Poir. Rhizome creeping, densely matted, tomentose; stipes, $\frac{1}{4}$ to $\frac{1}{2}$ -inch long; frond $\frac{1}{4}$ to $\frac{1}{2}$ -inch in diameter, reniform, or rotundo-cuneate, inciso-palmate, glabrous, segments linear obtuse, emarginate, or bifid; involucre terminal, sunk, sub-turbinate, the mouth spreading, obscurely two-lipped, receptacles slightly exserted. On rocks, Enoggera Creek.

Fig. 52.—(a). Plant, natural size; (b). Sorus.

T. VITIENSE, Baker. Fronds sub-sessile, or very shortly stipitate, oblong, entire, or rarely bifid, 2 to 4 lines long, 1 to 2 lines broad, furnished with a midrib only, lateral veins none, spurious venules none; sori solitary, terminal, the tube partially exserted, the mouth entire, slightly dilated. A rare and minute fern. Three-mile Scrub, Brisbane.

T. Sp. Rhizome creeping, thickly matted, slightly tomentose; stipes half the length of the frond; fronds $\frac{1}{2}$ to 1 inch long, inciso-palmate, segments bi-trifid, linear obtuse, soriferous fronds, pinnate pinnae distant, incised; veins costa only, no venules; involucre axillary, rather large for the size of the frond, dilated at the mouth. This is a most beautiful moss-like fern, common on the damp rocks in the deep gullies of Seaview Range. It closely resembles *T. parvulum*, but the frond is larger and more ovate in general outline.

53. HYMENOPHYLLUM, Sm. (From *hymen*, a membrane, and *phyllon*, a leaf.) Sori involucrate, *i. e.* seated within an extrorse-marginal oblong, or sub-orbicular two-valved involucre; the veins continued into the *receptacle*, which is free, included, cylindrical, or globose at the apex, and bears sessile or sub-sessile, lenticular, (lens shaped) or turbinate spore-cases. Veins dichotomously branched, simple and costa-like in the ultimate segment, or simple parallel from a central costa in undivided fronds; *venules* free.

Fig. 53.—(a). Fertile portion of frond; (b). Sorus and involucre; (c). Vertical section; (d) Spore-case.

H. TUNBRIDGENSE, *Sm.* Rhizome creeping, densely matted; stipes $\frac{1}{2}$ to $1\frac{1}{2}$ inches long; frond small, tender pinnate, pinnæ distichous, flabellato-pinnatifid, lobes linear, 1 to 3 lines long, and, as well as the usually solitary axillary sub-orbicular involucre, conspicuously spinuloso-serrated, rachis winged. Mount Lindsay.

H. DEMISSUM, *Swartz.* Rhizome creeping; stipes 4 to 6 inches long, erect, firm, wingless; fronds 4 to 12 inches long, 3 to 4 inches broad, ovate-triangular, 3 to 4 times pinnatifid; rachis only slightly winged above; lower pinnæ 2 to 3 inches long, triangular-rhomboidal, divided down very nearly to the rachis into numerous pinnules on both sides, which are again divided down nearly to the rachis into pinnatifid segments, ultimate lobes, 1 to 2 lines long, $\frac{1}{2}$ -line broad; sori numerous, 20 to 30 on a pinna, terminal and axillary on the segments, involucre divided nearly down to the base; valves ovate, entire or denticulate. Rockingham Bay, &c.

Tribe.—**SCHIZÆINEÆ.** Ring apical, *i. e.* spore-cases crowned by the convergent striæ of the ring—radiate-striate at the apex.

Sect.—**Lygodieæ.** Striæ united at the apex, without any vacant space (spore-cases attached laterally); scandent plants.

54. LYGODIUM, *Sw. (Lygodes, flexible.)* *Fructification* forming compressed distichous spikelets, exerted on the marginal teeth. *Spore-cases* included beneath ovate cucullate (hooded) imbricated, persistent scariose (dry), bractiform *indusia*, solitary on the anterior side of the venules, attached sideways; oval, resupinate (inverted), sessile, or very shortly pedicellate, having a many rayed apical ring. *Veins* forked, often repeatedly, from a central costa; *venules* free, in the fertile spikelets pinnate, the veinlets sporangiferous on the anterior side.

L. MYCROPHYLLUM, *R. Br.* Rhizome cæspitose, or somewhat creeping, stems climbing, wiry, glossy, 10 to 20 feet long, primary petiole very short, $\frac{1}{4}$ to $\frac{1}{2}$ -inch long; pinnule 4 to 6 inches long, 1 to 2 inches broad, with a terminal segment, and 4 to 5 on each side, which are very variable in shape, usually

simple, short, broad, rounded at the base, articulated on a short petiole, spreading from the rachis at right angles, firm, naked, or nearly so; spikes 1 to 3 lines long, in close rows along the edge of the segments. A pretty climbing fern, rather common in some of the swamps down the river from Brisbane.

Fig. 54.—(a). Two spikelets of fructification; (b). Portion of frond, showing venation; (c). Section, showing spore-cases.

L. SEMIBIPINNATUM, *R. Br.* Rhizome cæspitose, stems climbing, wiry, primary petiole very short, secondary $\frac{1}{4}$ to $\frac{1}{2}$ inch long, pinnules 6 to 10 inches long, 4 to 6 inches broad, with a terminal segment, and 4 to 5 on each side, variable in shape, 2 to 4 inches long, simple, ovate, or ligulate-oblong, hastate, rounded at the base, the lower ones mostly pinnate, the sterile ones palmately lobed; apices acuminate, articulated on a short petiole, spreading from the rachis at right angles, texture firm, surfaces slightly hairy, spikes 3 to 5 lines long, in close rows along the edge of the segments, but not on the elongate acuminate apex. The most beautiful of our climbing ferns. Herbert River. Baron von Mueller considers this species also identical with *L. japonicum*, *Sw.*

55. HYDROGLOSSUM, *Willd.* (From *hydor*, and *glossa*, a tongue.) *Fructifications* forming compressed distichous spikelets, exerted on the marginal teeth. *Spore-cases* included beneath ovate cucullate (hooded), imbricated, persistent, scarious (dry), bractiform *indusia*, solitary on the anterior side of the venules, attached sideways; oval, resupinate, sessile or very shortly pedicellate, having a many rayed apical ring. *Veins* forked from a central costa; *venules* anastomosing in from two to four series of unequal, oblique-elongated, hexagonal areoles.

H. SCANDENS, *Presl.* Rhizome cæspitose, fronds branched, the rachis scandent, branches conjugate (in pairs), primary petiole, $\frac{1}{8}$ to $\frac{1}{4}$ -inch long, secondary $\frac{1}{4}$ to $\frac{1}{2}$ -inch long; pinnules 6 to 9 inches long, 4 to 6 inches broad, with a terminal segment, and 4 to 6 nearly uniform ones on each side, which are cordate-hastate, or ligulate-oblong, rounded or cordate at the base, 2 to 3 inches long, $\frac{1}{2}$ to $\frac{3}{4}$ -inch broad, all articulated at

* = *L. japonicum* from Mueller. Rhizome ^{stem} growing
(Nov 1875) 12 inches in 10 days.

the base, the lower ones short-stalked ; texture, sub-coriaceous, rachises naked, or slightly villose, sometimes ebeneous ; spikes 1 to 3 lines long, in close rows, along the edge of the segments. *Lygodium reticulatum*, Schk.

Fig. 55.—(a). Portion of frond, showing venation and fructification.

Sect.—**Schizeæ**. Striæ disjoined, forming an orbicular apical vacuity (spore-cases attached basally) ; dwarf, herbaceous plants.

56. **SCHIZÆA**, Sm. (From *schizo*, to cleave—form of spikes.) Fructifications paniculate, the spore-cases borne on the inner face of contracted, fertile crests or appendages, which are digitato-pinnate, or pectinato-pinnate, erect, or incurved, and more or less connivent. Spore-cases bluntly ovate, having a many-rayed apical ring ; sessile, arranged in one or two series on each side the costa of the linear segments or pinnæ of the appendages. Veins reduced to the costa, or flabellato-dichotomous ; the venules excurrent in the apical teeth.

Fig. 56.—(a). Fertile segment ; (b. d.) Detached spore-cases ; (c). Fertile pinna ; (e) Spore.

S. BIFIDA, Willd. Rhizome cæspitously creeping ; stipes dense chestnut brown, passing gradually into the frond, which is from 6 to 18 inches long, forked generally below the middle, and sometimes forked again, or at times simple, quite wiry and rush-like, with a prominent scabrous midrib and two narrow thick wings, the whole $\frac{1}{3}$ to $\frac{2}{3}$ -line thick, fertile segments sub-erect or recurved, unilateral, $\frac{1}{2}$ to $\frac{3}{4}$ -inch long, with 10 to 20 slender, erecto-patent spikes on each side, the lowest $\frac{1}{4}$ to $\frac{3}{8}$ inch long. Moreton Bay.

S. DICHOTOMA, Sw. Rhizome, cæspitose, or more or less creeping ; stipes 6 to 18 inches long, firm, erect, glossy, channelled on the face above ; frond flabelliform (fan-like) in general outline, 6 to 9 inches each way, many times dichotomously forked, the ultimate divisions $\frac{1}{2}$ to 1 line broad, with a fertile segment to each, $\frac{1}{4}$ to $\frac{1}{2}$ -inch long, the rachis often curved, with 4 to 10 close, spreading, spikes on each side. This curious genus of ferns has much the appearance of grass, the brown comb of fructification looking like withered stalks. Common along the coast.

Tribe.—**CERATOPTERIDINEÆ.** Ring rudimentary, or incomplete (wanting one-third or more); very broad, flat, obliquely vertical; spore-cases sessile, or sub-sessile, globose. Aquatic annual, proliferous (producing young plants on the fronds) ferns with contracted fertile fronds.

57. CERATOPTERIS, *Brongniart*. From *keras*, *keratos*, a horn, and *pterus*, a fern. *Sori* indusiate, continuous, occupying the longitudinal veins; *spore-cases* few, loosely* disposed, globose, furnished with a very broad incomplete ring, of which from one-third to three-fourths or more is wanting (sometimes almost obsolete, consisting only of 3 to 4 striæ); *indusium* univereal, formed of the membranaceous revolute margins of the narrow siliquiform segments. *Veins* of the sterile fronds uniformly reticulated in oblique oblong hexagonal areoles, of the fertile few, longitudinal, distantly anastomosing.

C. THALICTROIDES, *Brongn.* (Leaves like meadow-rue.) Rhizome short, erect, densely rooting, submersed; stipes nearly quadrangular, fronds glabrous, of two kinds; sterile-bi-pinnate, one to one-and-a-half foot long, reclining, with oblong segments; fertile fronds contracted, three or four times pinnate, one-and-a-half to two-and-a-half feet high, with linear revolute segments. Both forms viviparous, of a light green colour. In shallow water. Port Mackay.

Fig. 57.—(a. b.) *Portion of the fertile*; (c.) *Section of same unrolled*; (d. e.) *Spore-cases*; (f.) *Spores.*

Tribe.—**OSMUNDINEÆ.** Spore-cases two-valved, bursting vertically at the apex. Ring rudimentary, obliquely transverse near the apex.

58. TODEA, *Willd.* (In honor of *Henry Julius Tode*, of Mecklenburg.) *Fructifications* on the under surface of the pinnules, consisting of oblong or linear, simple or forked sori, which are crowded and polycarpous, at length confluent, or oligocarpous (of few fruit), consisting of scattered spore-cases. *Spore-cases* obovate-globose, pedicellate, having an incomplete or rudimentary gibbous ring (represented by a few parallel striæ) near the apex, and bursting vertically in two hemispherical valves. *Veins* simple in the ultimate (narrow)

segments, or simple or forked from a central costa; *venules* free, evident in the unaltered fertile portions, either veins or *venules*, or both, being soriferous.

T. BARBARA, *T. Moore*. Rhizome caudiciform; stipes 1 foot or more long, stout, erect, slightly angular, clothed with brown scales, or quite naked; frond 3 to 4 feet long, often 1 foot broad; pinnules close, linear, erecto-patent, 1 to 1½-inch long, ½ to ¼-inch broad, the edge more or less distinctly toothed, the upper ones connected at the base; coriaceous, both sides naked; sori dense, when mature filling up the whole under surface of the pinnule on which they are placed. Moreton Bay.

Fig. 58.—(a). *Portion of fertile frond*; (b). *Spore-case*.

T. ARBOREA. *This name is used by Mr. Hill, of the Brisbane Botanic Gardens, for a large growing variety of T. barbara.*

Order.—**MARATTIACEÆ**. Spore-cases without a jointed ring. Fructification dorsal on normal fronds (vernation circinate or incurved).

Tribe.—**MARATTINEÆ**. Sori oblong, distinct, longitudinally bivalved.

Sect.—**Angiopterideæ**. Spore-cases free, crowded in two opposite linear series.

59. ANGIOPTERIS, *Hoffmann*. (From *aggeion*, a vessel, and *pteron*, a wing.) Sori dorsal, involucrate, sessile, linear-oblong or oval-elliptic, consisting of two opposite, contiguous series of (5 to 12) free spore-cases, which are obovate retuse, sometimes marginate, affixed by the base, and bursting on the inner face by an obovate or elliptic vertical cleft. *Receptacles* linear, elevated. *Involucres* linear, scariose, fimbriate, persistent. *Veins* simple or forked from a central costa; *venules* parallel, free, dorsally soriferous near the margins.

A. ERECTA, *Hoffm*. Rhizome erect, 2 to 6 feet high, 1 to 2 feet thick; stipes swollen and articulated at the base, furnished with two large leathery auricles, which remain attached to the rhizome when it falls; fronds 6 to 20 feet long, bi-pinnate; pinnæ 1 to 3 feet long, spreading, the lowest the largest, the rachis swollen at the base: pinnules 4 to 12 inches long, ½ to 1½ broad, linear-oblong, sessile or short-stalked, the point

acuminate, the edge entire, or slightly toothed, coriaceous, both sides naked, smooth, shining, veins sub-parallel; sori consisting of 8 to 15 capsules, in close rows near the edge, almost hiding the inferior fimbriated involucre. This, the most noble of all our ferns is growing in great perfection in many of the deep gullies at Rockingham Bay.

Fig. 59.—(a). Cluster of spore-cases; (b). Section of frond and spore-cases.

Sect.—**MARATTIÆ.** Spore-cases concrete, in two opposite linear series.

60. MARATTIA, Sm. (In honour of *J. F. Maratti*, of Tuscany, a writer upon ferns.) Sori dorsal, involucre, sessile, oblong, horny, opaque, longitudinally divided into two opposite valves or lobes, thus consisting of two opposite series of (3 to 11) connate spore-cases; the valves convex outside, plane within, the spore-cases of each valve bursting on their inner face by a vertical cleft or slit; *receptacles* linear or globose, medial; *involucre*s linear-elliptic, oval or orbicular, scarioso, fimbriate, persistent. *Veins* simple or forked, from a central costa; *venules* parallel, free, dorsally soriferous, near or at the margins.

M. FRAXINEA, Sm. Rhizome large, globose, or caudiciform, consisting of the thick squamæform bases of the stipes; stipes 1 to 2 feet long, 1 to 1½ inches thick, smooth, deciduously scaly and swollen in the lower part; fronds 6 to 15 feet long, bi-pinnate, or casually tri-pinnate; pinnæ 1 to 2 feet long, often 1 foot broad, pinnules oblong-lanceolate, 4 to 6 inches long, ½ to 1½ inch broad, the apex acuminate, the edge entire or serrulate, the base cuneate or slightly rounded; texture coriaceous, surfaces naked. Veins simple or forked, the rachis of the pinnæ sometimes slightly winged. Wet gullies of the hills near Rockingham Bay.

Fig. 60.—(a. and b). Portion of frond with a single multilocular receptacle; (c). Vertical section of receptacle.

Order.—**OPHIGLOSSACEÆ.** Fructification marginal, on rachiform fronds or branches (vernation straight).

61. BOTRYCHIUM, Sw. (Derived from *botrys*, a bunch, form of fructification.) *Fructification* paniculate, formed of

numerous secund spikelets, on a distinct branch of the frond ; *spore-cases* erect, sessile free, bi-serial, globose, fleshy-coriaceous, bursting vertically in two hemispherical valves. *Veins* flabellate-dichotomous or dichotomo-furcate, from a central costa ; *venules* free.

B. TERNATUM, Sw. Rhizome short, erect, fleshy ; stipes 2 to 4 inches long ; fronds sub-carnose, tri or quadri-pinnatifid, lower pinnæ much the largest, oblong or sub-deltoid, stalked, the ultimate divisions oblong or obovate, often $\frac{1}{2}$ -inch broad, blunt or acute, slightly toothed, fertile peduncle, usually overtopping the sterile segments, panicle very compound. A curious parsley-leaved fern, generally found along the creeks near Brisbane, where the land is sandy and stony. In gully below Petrie's quarry.

Fig. 61.—(a). Plant ; (b). Segment, showing venation ;
(c). Fertile portion.

62. HELMINTHOSTACHYS, Kaulfuss. (From *helmins*, a worm, and *stachys*, a spike ; shape of spike.) *Fructification* spicate, consisting of glomerate, verticillate, pedicellate tufts of *spore-cases*, the whorls terminated by a crest-like appendage, and arranged in distichous spiked panicles, on a distinct branch of the frond ; *spore-cases* fleshy-coriaceous, globose, sessile, inverse, bursting on the outside, from the base upwards, in two equal or sub-equal hemispherical valves. *Veins* forked, from a central costa ; *venules* free.

H. ZEYLANICA, Hook. Rhizome stout, horizontal, with coarse roots ; stipes often a foot long ; barren segments palmate ; pinnules often in three principal divisions, which are stalked, and again forked or pinnate, the ultimate division linear-oblong, 3 to 4 inches long, $\frac{3}{4}$ to 1 inch broad, the apex acuminate, the edge slightly toothed ; sub-coriaceous ; fertile spike solitary, arising from the base of the barren segments, 3 to 4 inches long, $\frac{1}{2}$ -inch broad, the firm peduncle about as long as itself. Scrubby Creek, Port Mackay ; Herbert River, Cardwell.

Fig. 62.—(a). Plant ; (b). Portion, showing venation ;
(c). Portion of fertile frond.

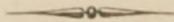
63. OPHIOGLOSSUM, *Linn.* (From *ophis*, a serpent, and *glossa*, a tongue; resemblance of the fructification.) *Fructifications* in a distichous spike, terminating a distinct branch of the frond; *spore-cases* uniserial along each margin of the compressed spike, with which they are connate, horizontal, globose, bursting in two equal hemispherical valves. *Veins* uniformly reticulated in roundish or elongated hexagonal areoles, sometimes from an indistinct costa, occasionally obscure; the ultimate areole with or without included free *veinlets*.

O. LUSITANICUM, *Linn.* Rhizome slightly tuberous; frond 1 to 3 inches long, the sterile divisions placed below the centre, $\frac{1}{2}$ to 1 inch long, $1\frac{1}{2}$ to 2 lines broad, linear-lanceolate, the apex bluntish, the base narrowed; thick, no midrib, the veins indistinct; fertile spike $\frac{1}{4}$ to $\frac{1}{2}$ inch long, the peduncle firm, $\frac{1}{2}$ to $1\frac{1}{2}$ inch long, when mature. *O. minimum* and *O. gramineum* belong to this species. Throughout the colony.

O. VULGATUM, *Linn.* Rhizome not tuberous; frond 6 to 9 inches long, the sterile division generally placed above the middle, 2 to 4 inches long, $\frac{3}{4}$ to 2 inches broad, obtuse, or ovate-oblong, with a distinct haft, shorter than in the others, the midrib usually indistinct; fertile spike, 1 inch or more long, upon a peduncle 2 to 4 inches long, and considerably overtopping the sterile divisions, when the plant is fully matured. *O. costatum* belongs to this species.

O. PENDULUM, *Linn.* Rhizome short, thick, fleshy, and very brittle; fronds pendulous, ribbon-like, or dichomotously divided, fleshy; no midrib, and the veining indistinct, often several feet in length; fertile spike usually low down, 2 to 6 inches long, on a peduncle shorter than itself, usually solitary. This curious fern is generally found growing with the *Platyceriums*, from the base of which its fronds are seen hanging down like so many green ribbons. Brisbane Scrubs; salt-water swamps about Port Mackay, &c.

Fig. 63.—(a). Plant; (b). Fertile portion.



AUTHORITIES

FOR GENERIC AND SPECIFIC NAMES.



Abbreviations.

The full name with nationality.

- Ait.* W. T. Aiton, the manager of the Royal Kew Gardens.
- Baker.* J. G. Baker, of Kew, one of the authors of "*Synopsis Filicum.*"
- Bernh.* Bernhardt, a botanist of Italy.
- Bl.* C. L. Blume, a Dutch botanist, and traveller in Java.
- Bory.* Bory de St. Vincent, a French botanist and traveller.
- Brack.* Mr. Brackenridge, U. S. Expl. Exp.
- Braun.* A. Braun, director of Berlin Botanic Gardens.
- Brongn.* A. Brongniart, Professor of Natural History, Paris.
- Br. R.* Robert Brown, an English botanist and traveller.
- Burm.* W. J. Burmann, Professor of Botany at Amsterdam.
- Cav.* A. J. Cavanilles, a Spanish botanist.
- Colla.* T. F. Colladon, a Swiss botanist.
- Desv.* N. A. Desvaux, a French botanist.
- Don.* David and George Don, both English botanists.
- Dry.* J. Dryander, a Swedish botanist.
- Fée* A. L. A. Fée, a French botanist.
- Forster.* George Forster, a traveller, and early writer on Australian plants.
- Gaudich.* A. Gaudichaud, a French botanist and traveller.
- Greville.* Robert Kaye Greville, author of "*The Scottish Cryptogamic Flora.*"
- Hoffm.* Count J. C. Hoffmannsegg, a German botanist.
- Hook.* Sir W. J. Hooker }
Hook., f., Dr. J. D. Hooker } Directors of the Royal
 Gardens, Kew.
- Hook. et Grev.* W. J. Hooker and R. K. Greville, authors of "*Icones Filicum.*"
- Humb. et Bonp.* A. von Humboldt and A. Bonpland, botanists and travellers.
- Klfs.* G. Frederick Kaulfuss, M.D., Professor of Botany at Halle.
- Kunze.* G. Kunze, Professor of Botany at Leipsic.
- L.* C. Linné, or, as his name is Latinized, Linnæus, the great Swedish naturalist.
- Labill.* J. J. Labillardiere, a French botanist.
- Lam.* J. B. de Manet Lamark, a French botanist.
- L'Herit.* C. L. de Brutelle L'Heritier, a French botanist.
- Linden.* J. J. Linden, a traveller and nurseryman, Brussels.
- Mett.* G. Mettenius.

- Moore, T.* T. Moore, F.L.S., author of several works on ferns.
Muell., F. v. Baron Ferd. von Mueller, Government Botanist of Victoria.
Presl. C. B. Presl, a Bohemian botanist.
Poir. J. L. M. Poiret, a French botanist.
Raddi. A writer on Brazilian plants.
Retz. A. J. Retzius, Professor of Nat. Hist. in the University of Lund, Sweden.
Rich. A. Richard, a French botanist.
Roth. A. W. Roth, a German botanist.
Schott. H. Schott, director Bot. Gar., Vienna.
Sm. Sir J. E. Smith, an English botanist.
Sm. J. J. Smith, late curator of the Royal Botanic Garden at Kew.
Spreng. K. Sprengel, a German botanist.
Sw. O. Swartz, a Swedish botanist.
Thunb. C. P. Thunberg, a Swedish botanist.
Wall. N. Wallich, formerly director of the Botanic Gardens, Calcutta.
Wickst. Wickstr, Kongl. Veg. Acad., Handl., Stockh., 1825.
Willd. C. L. de Willdenow, a Prussian botanical writer.

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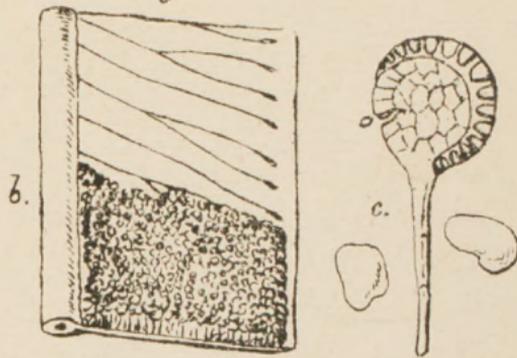
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150 specimens

1 Fig. 1. *Claphy glaucum*



Lomandra

Fig. 2.

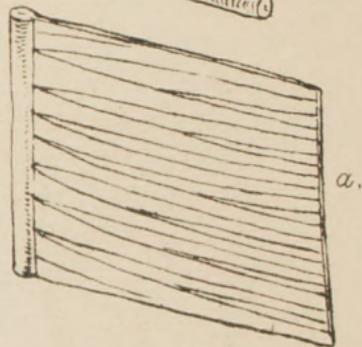
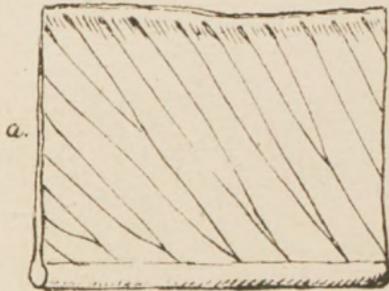
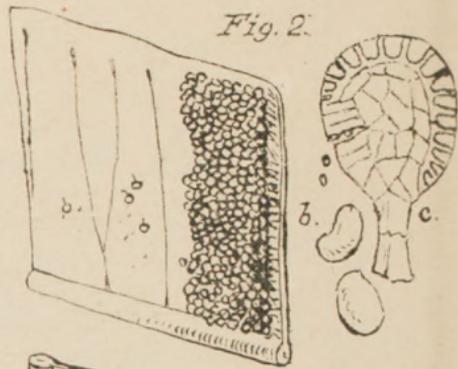


Fig. 3. *Stenohlana*

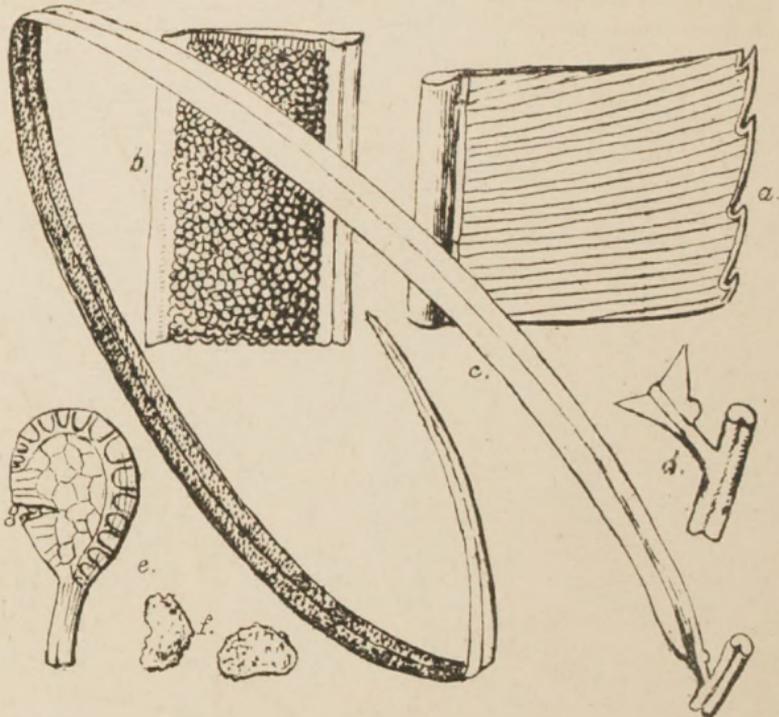


Fig. 4 *Pachypleura*

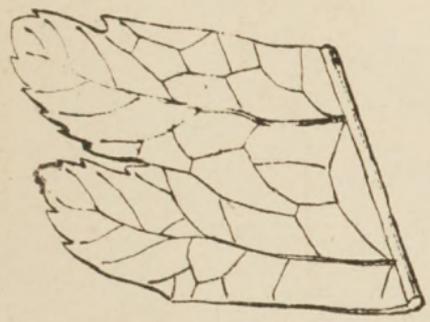


Fig. 5. *arostichum*

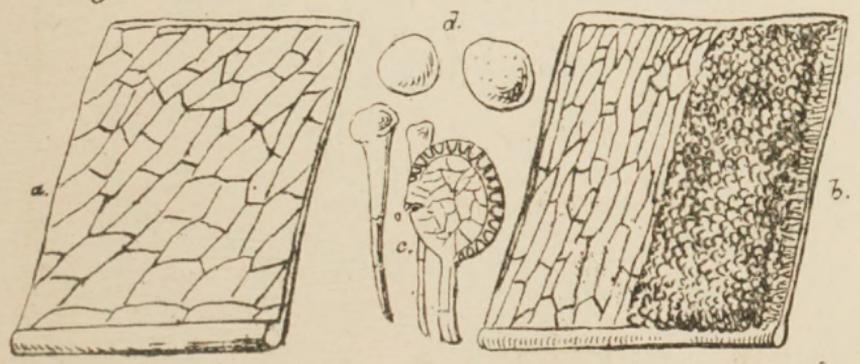


Fig. 6.

Platycodon

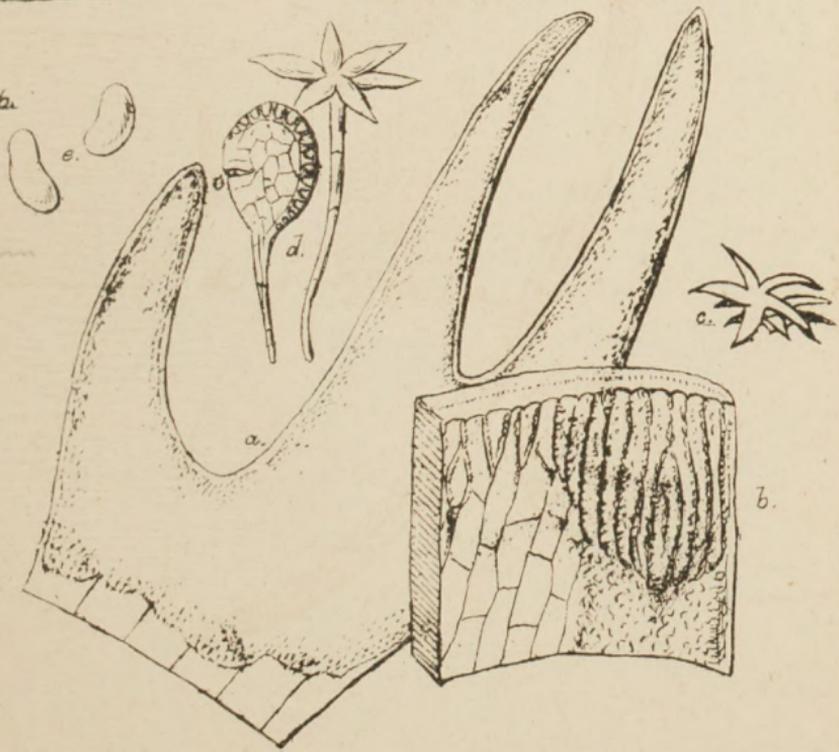
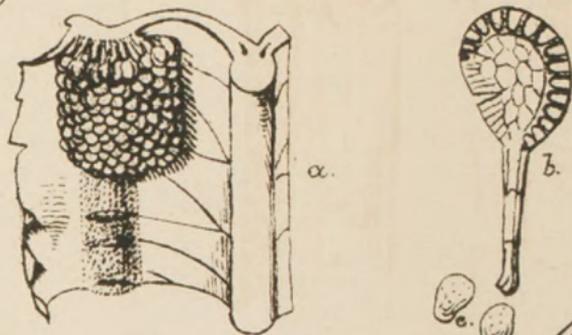
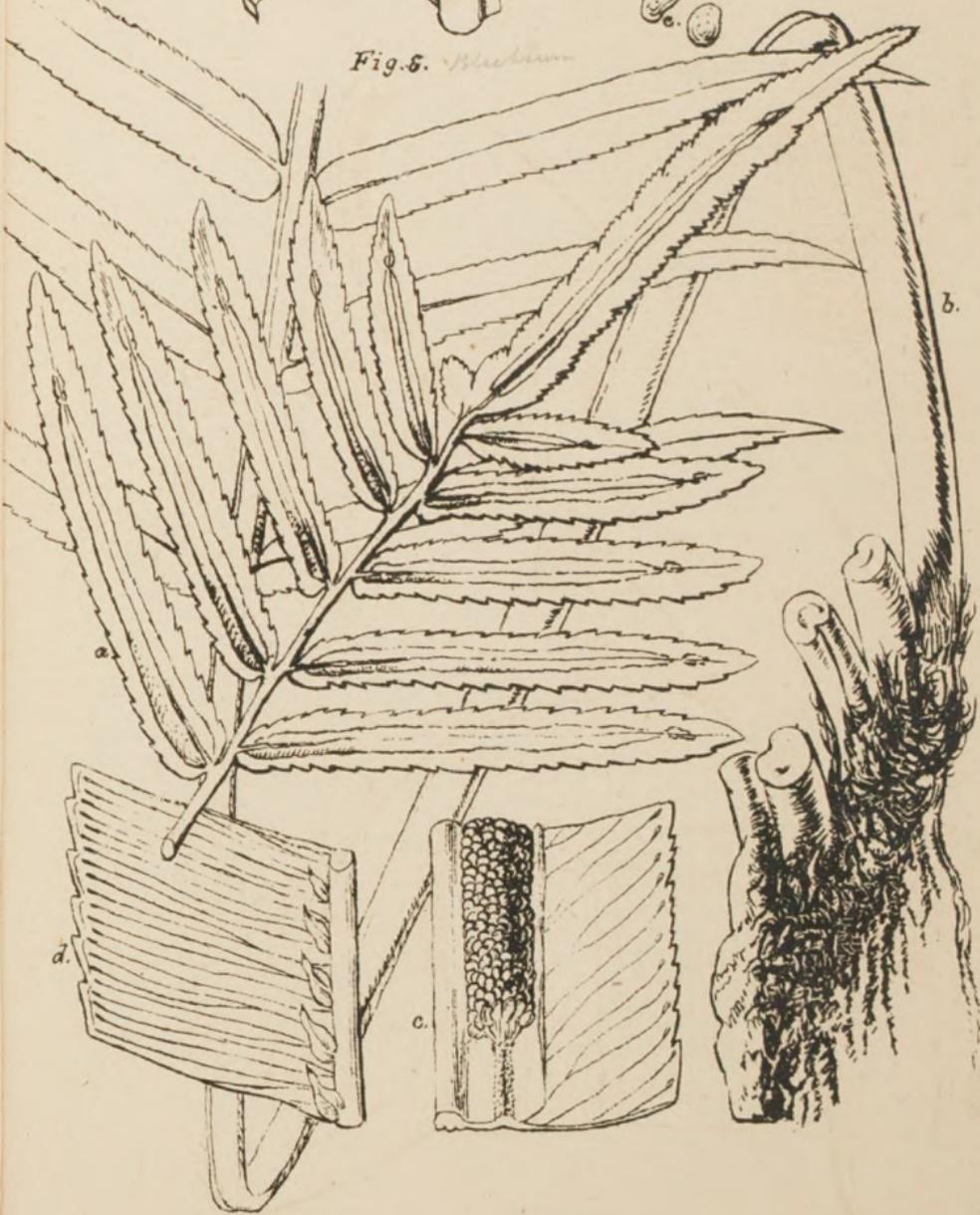


Fig. 7. *Lomaria*Fig. 8. *Machium*

Silphium

4.

Fig. 9.

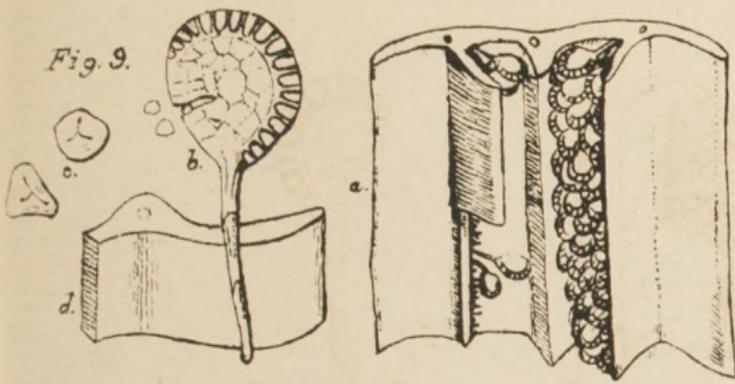


Fig. 10. *Hyssopus*

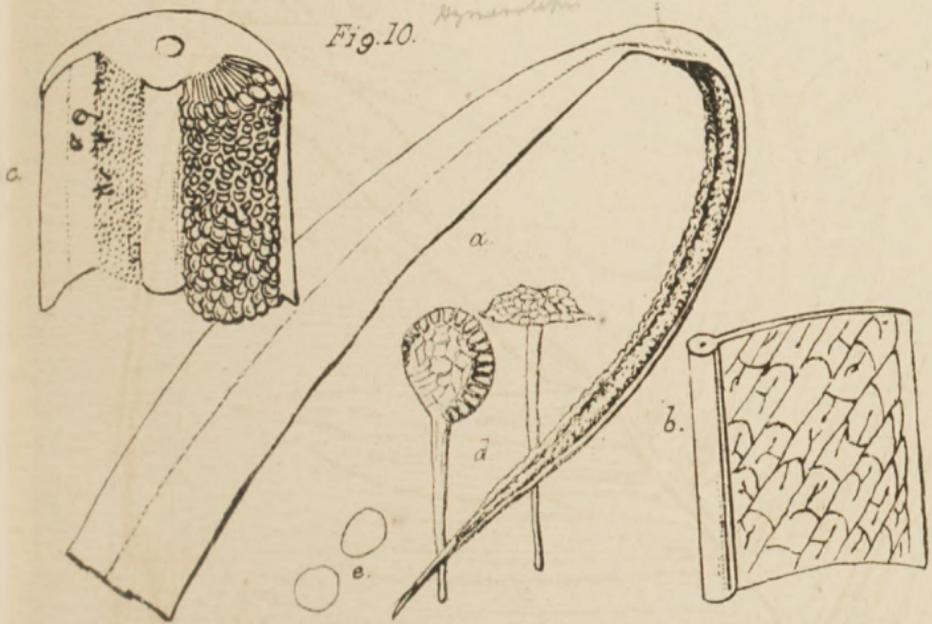
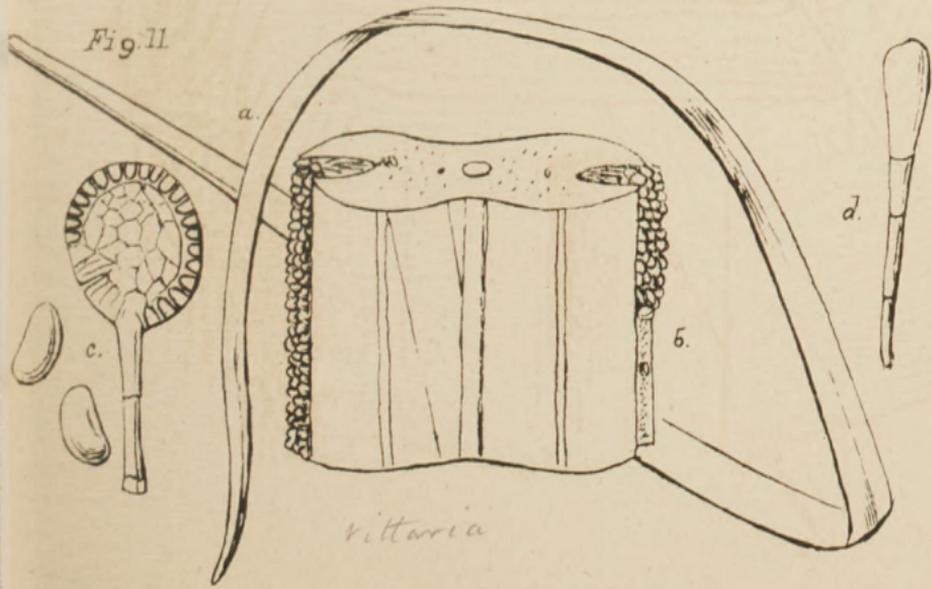


Fig. 11



Vittaria

Fig. 12

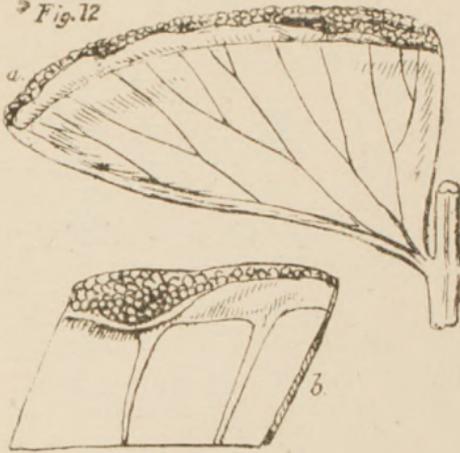


Fig. 14.

adriaticum

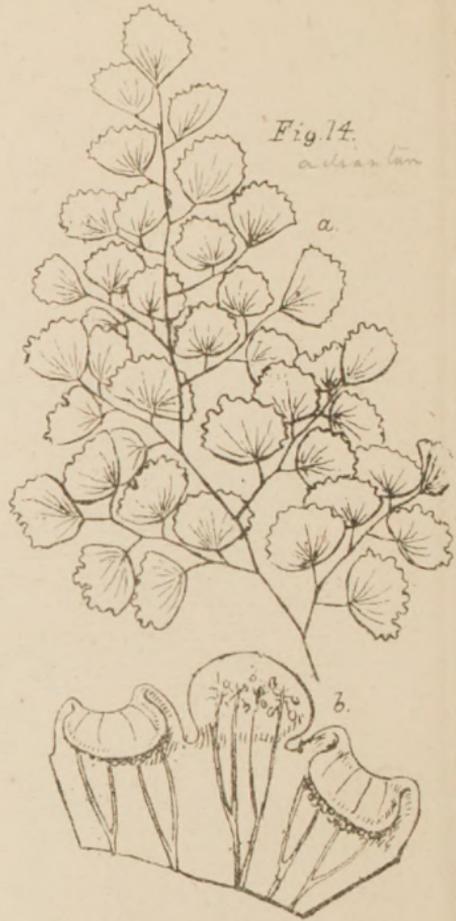


Fig. 13.

schizoloma



Fig. 15.

dehlanthes



Fig.16 *Hypolepis*

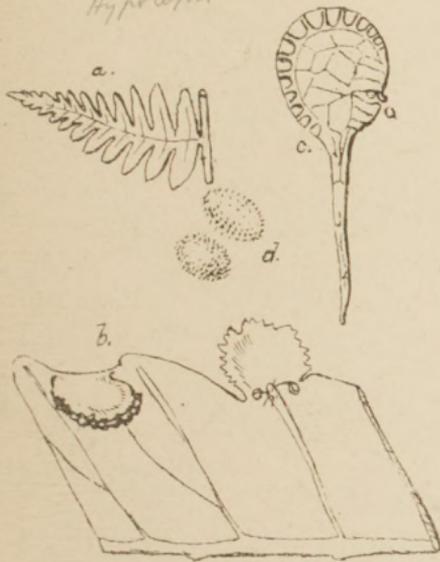


Fig.17 *Platanus*

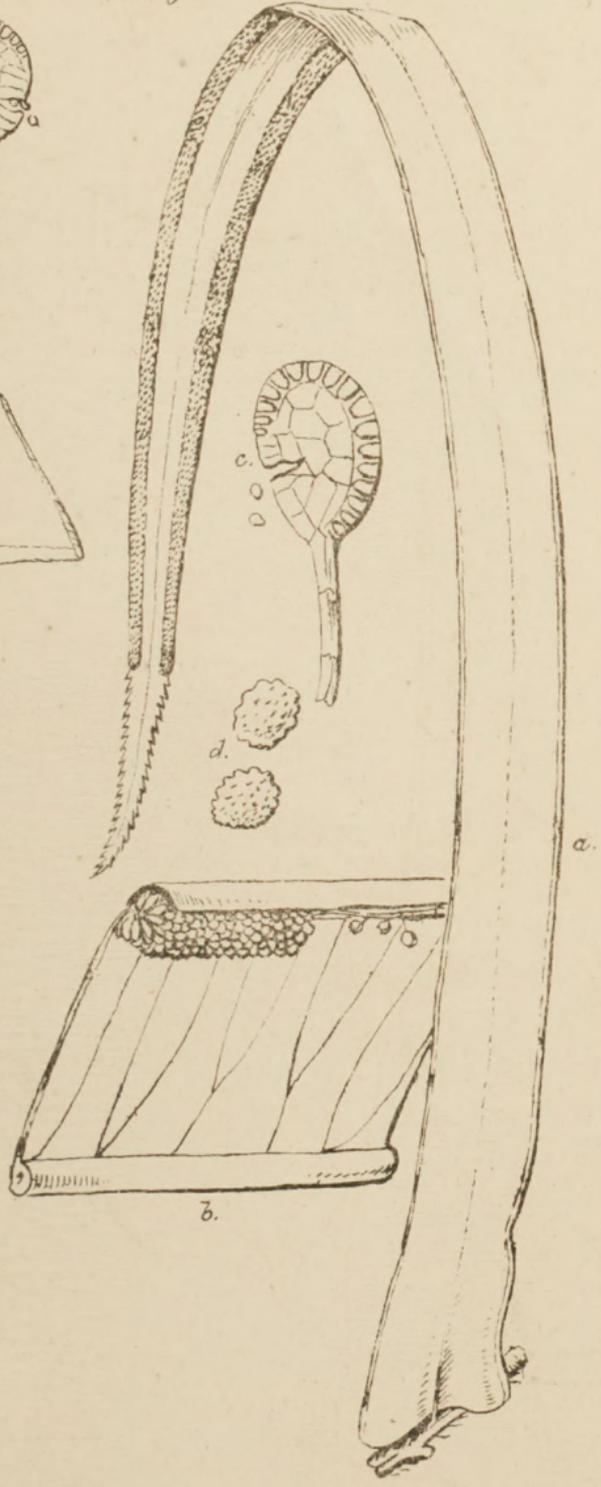


Fig.18 *Lobelia*

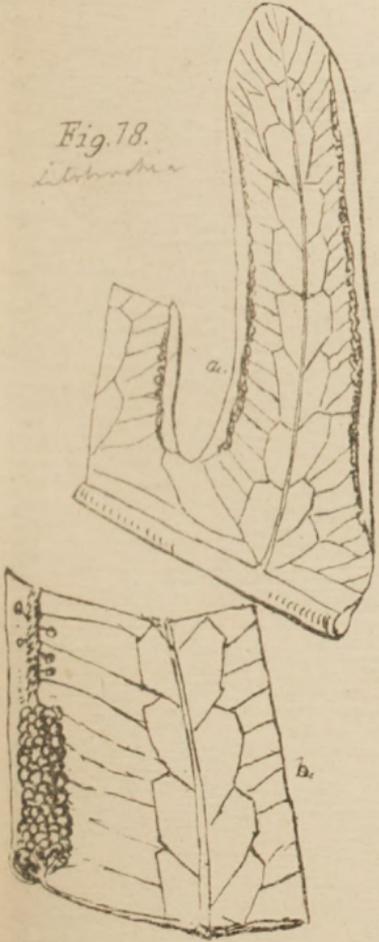


Fig. 19

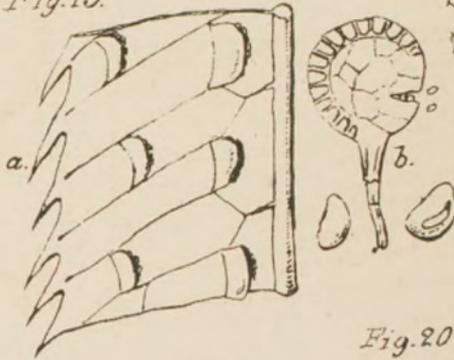
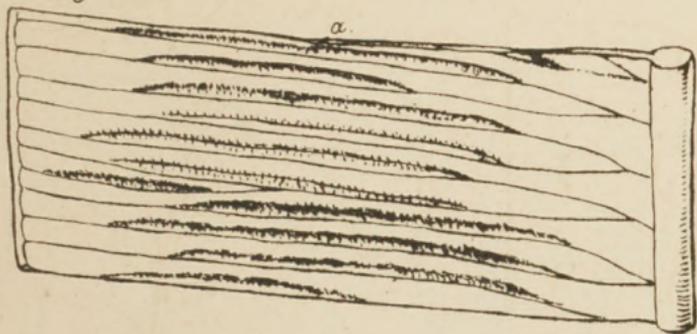


Fig. 20



Fig. 21.

Thamnopteris



8.

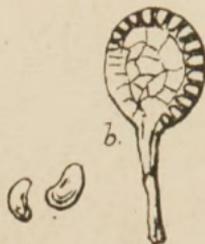
Fig. 22.

Diplazium



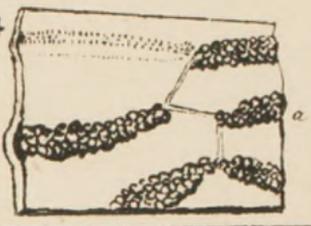
Fig. 23.

Callipteris

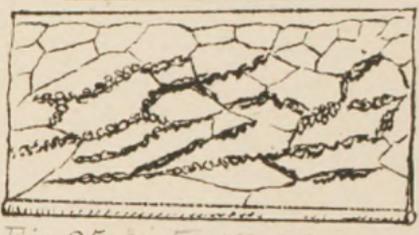


anthropogonum

Fig 24



a.



b.

Fig 25. *Syntherisma*

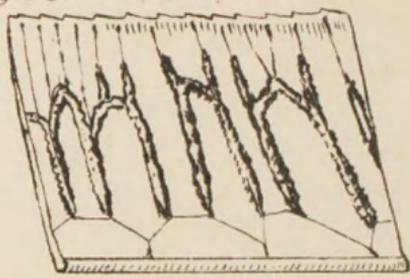
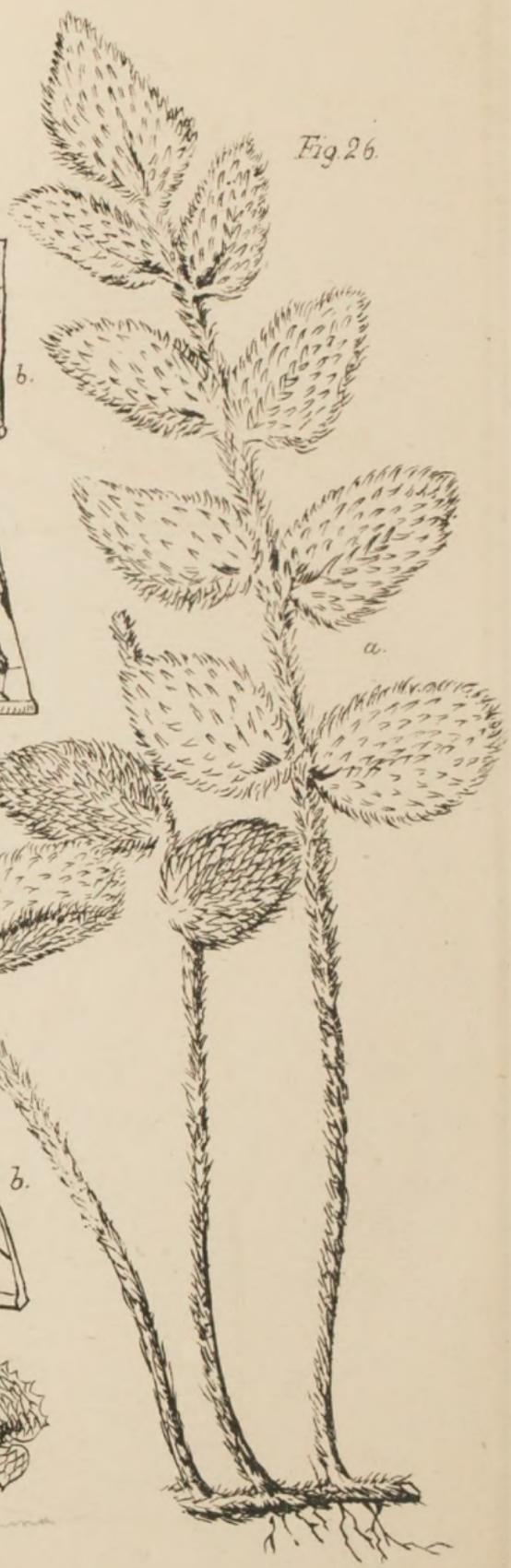


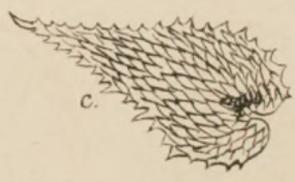
Fig 26.



a.



b.



c.

Syntherisma

Fig. 27.

Grammitis

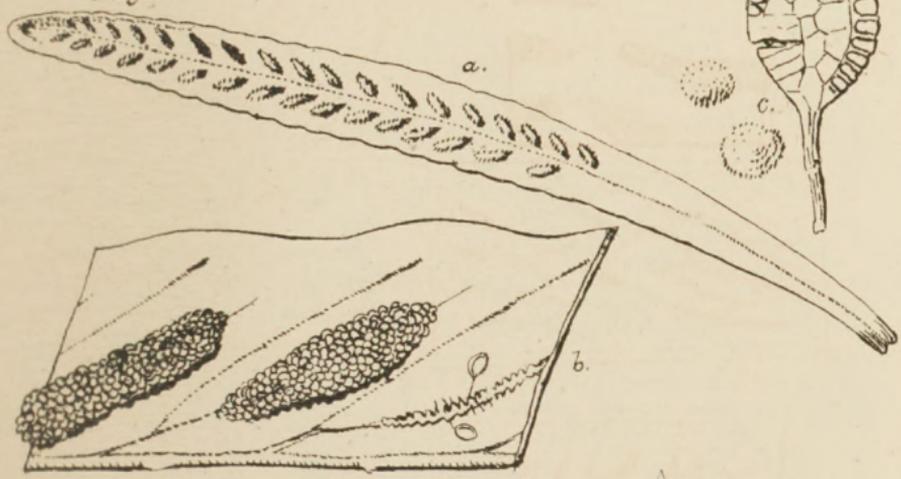


Fig. 28.

Platybome

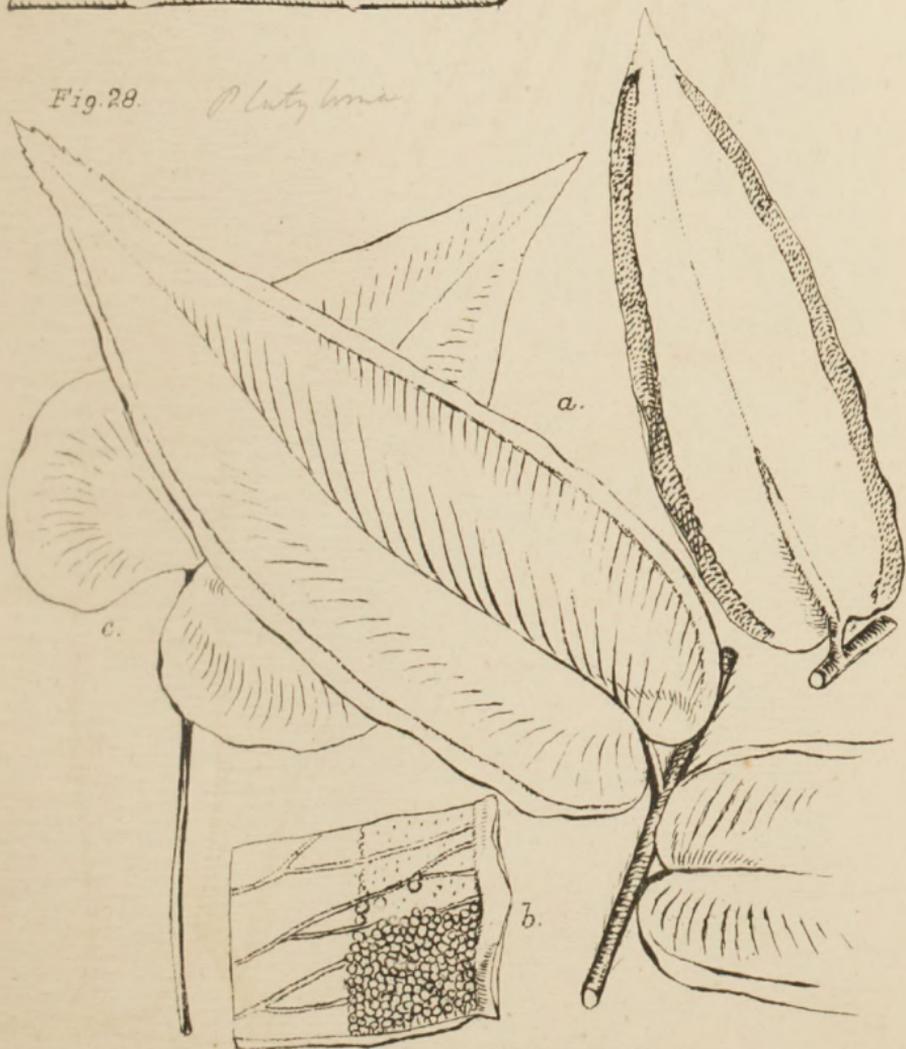


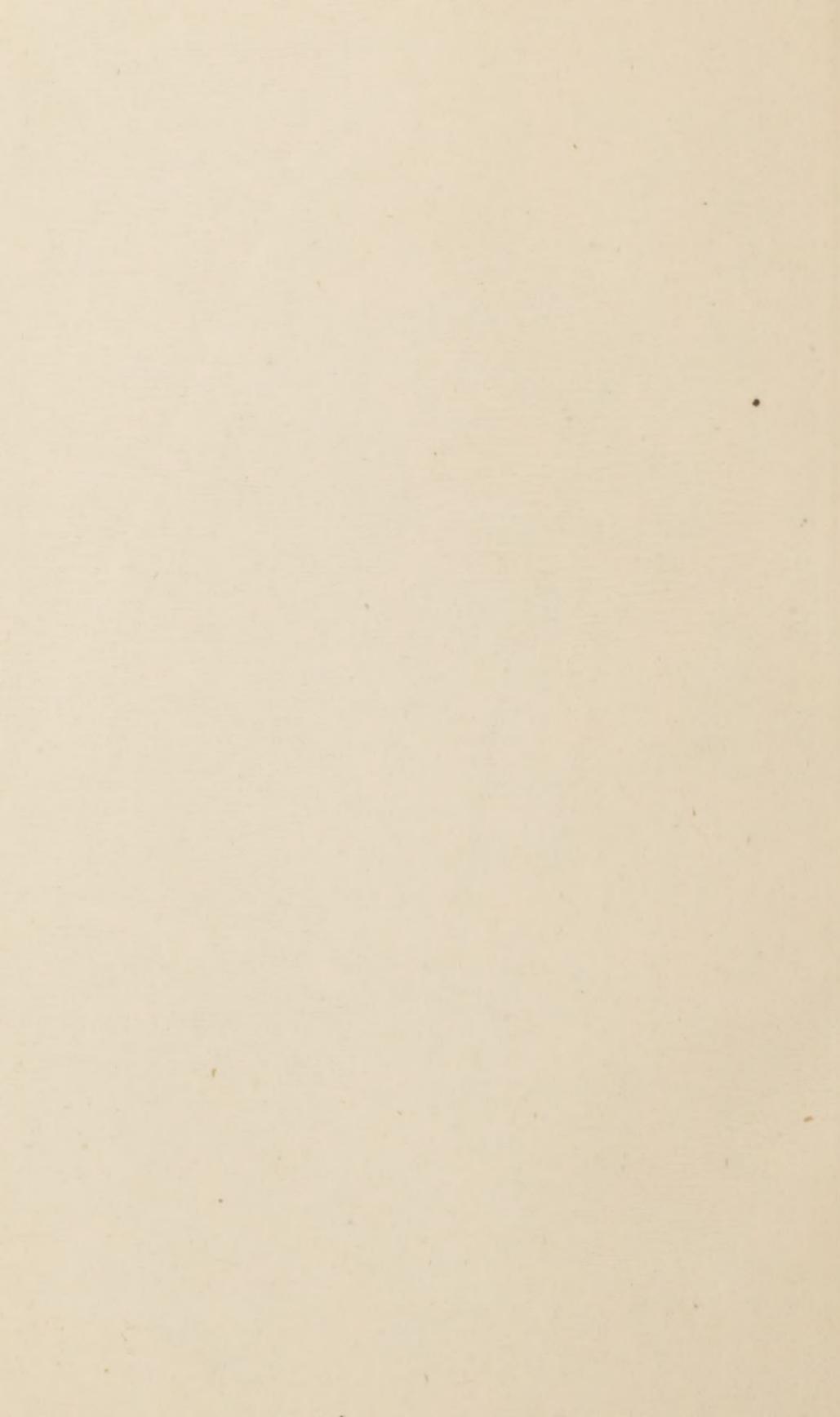
Fig. 29. *Polypodium*



Fig. 30.

Polypodium





Trichostema

Fig. 35.

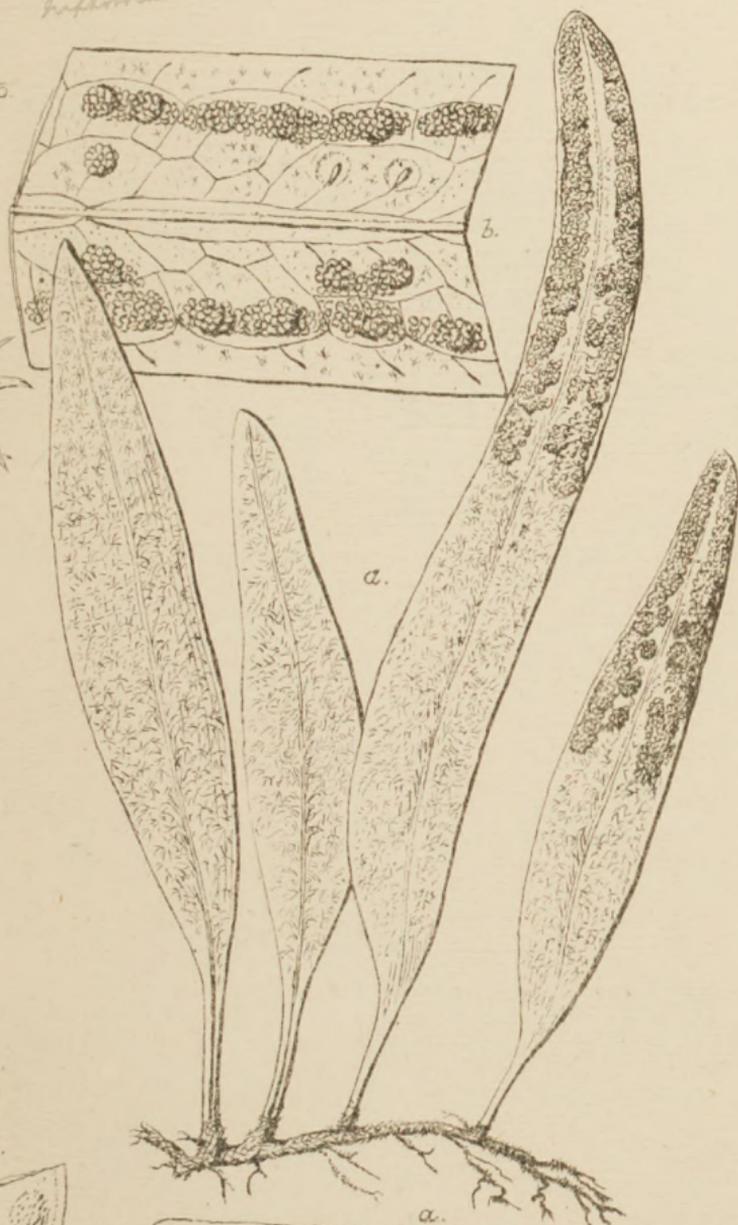
*Claspetta*

Fig. 36.

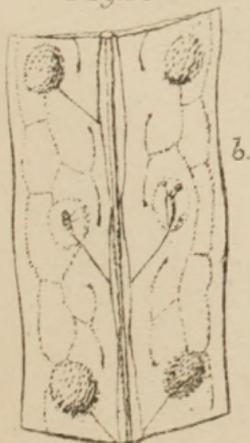


Fig. 37.

Bryonia

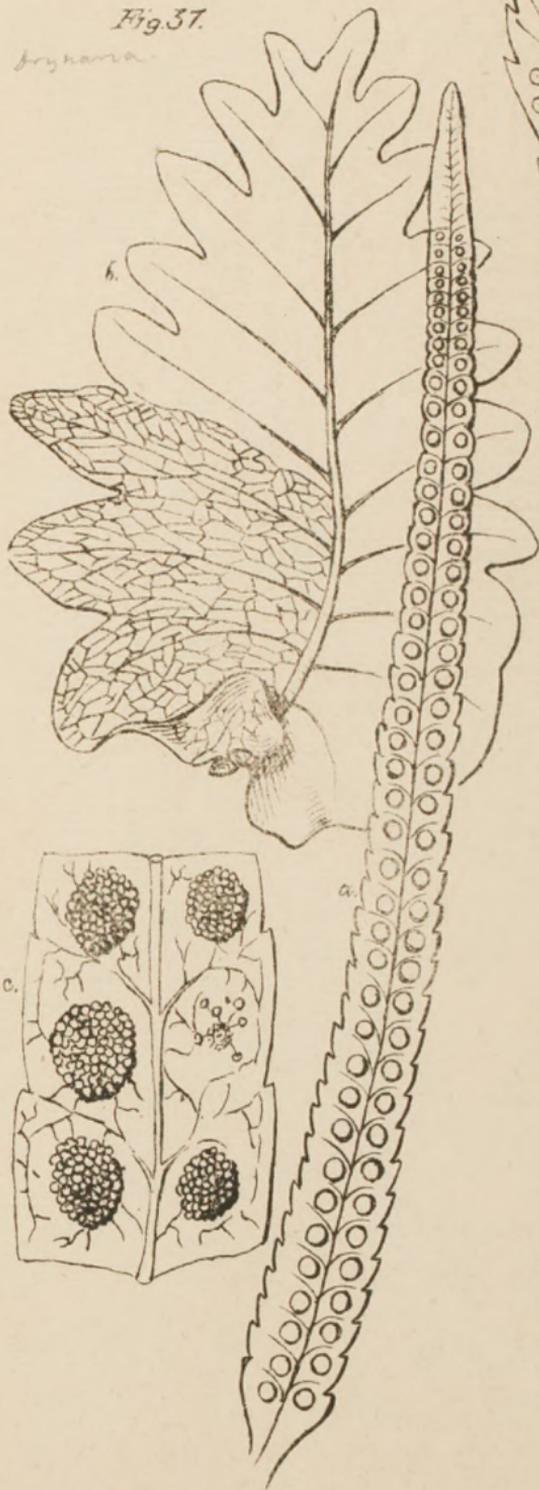


Fig. 38. *Polystichum*





Fig. 40. *Asplenium*

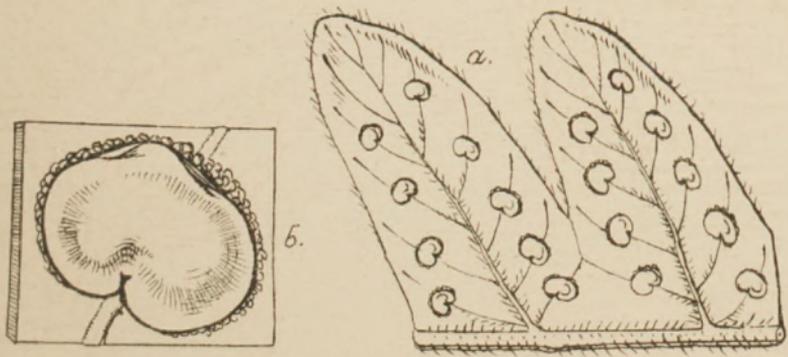


Fig. 41. *Lastrea*



Fig. 42.

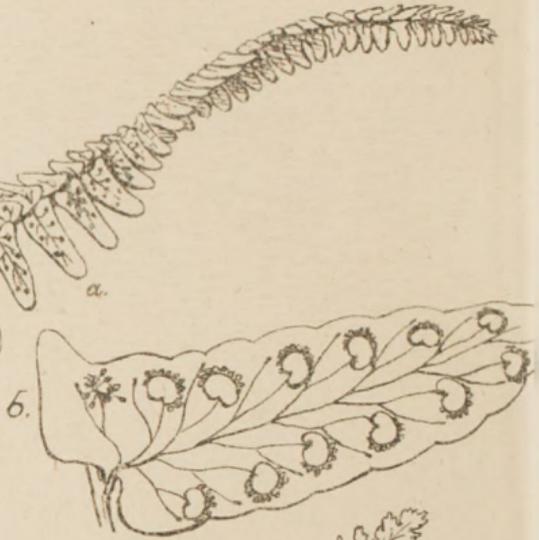
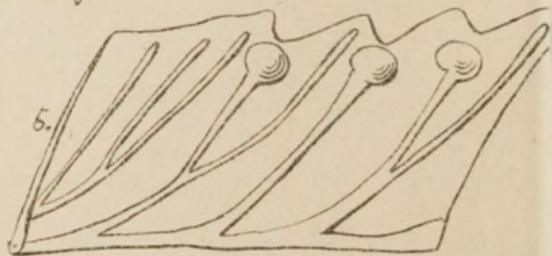
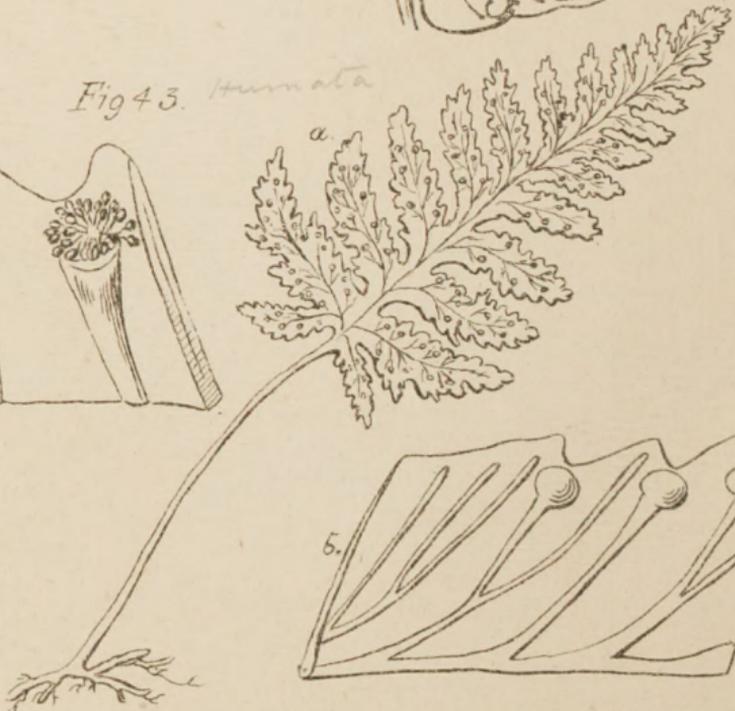
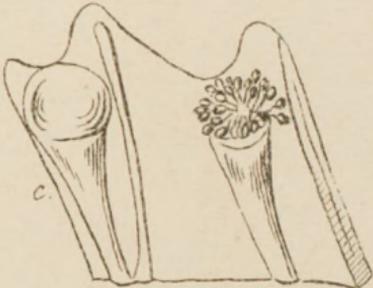


Fig. 43. *Humata*



Macrolepis

Fig 44

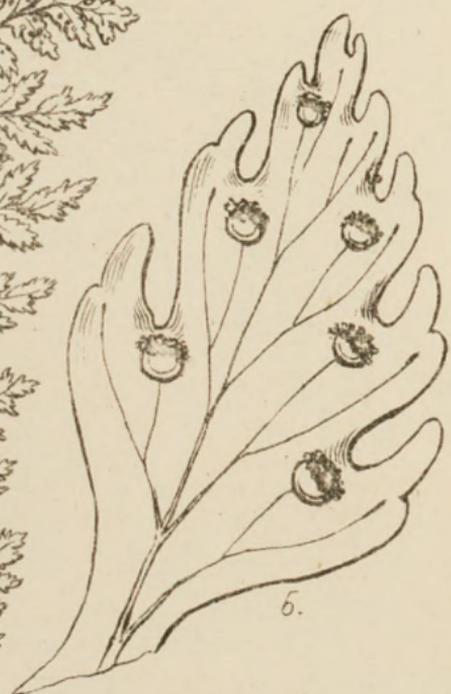


Fig. 45. *Sarrubia*



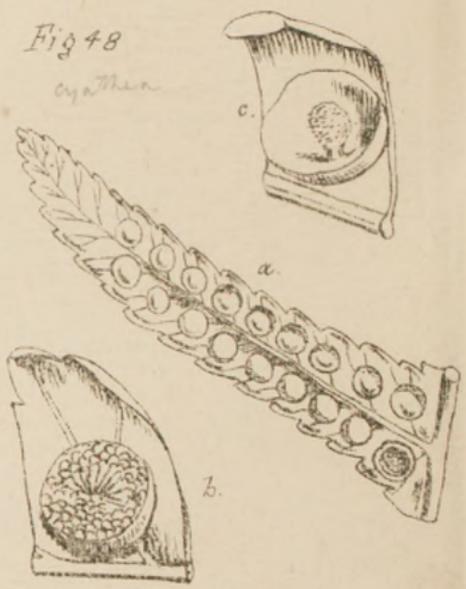
Dubautia
Fig 46



Senecadina
Fig 47



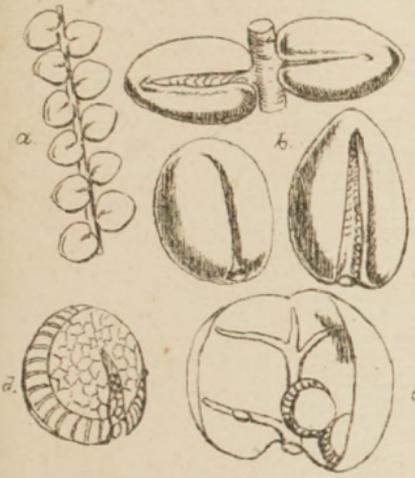
Cyathea
Fig 48



Alphitola
Fig. 49.



Fig. 50. *Platygonia*



gleichenia
Fig. 51. 20

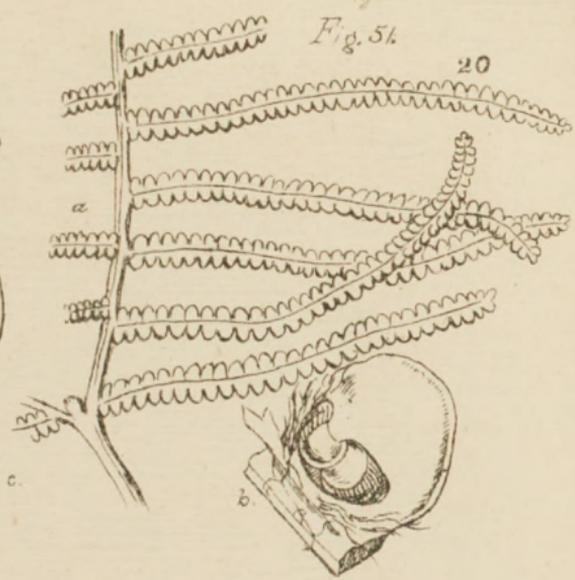


Fig. 52

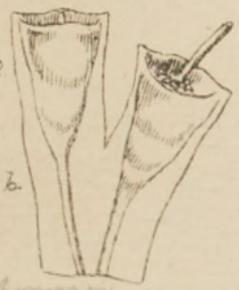


Fig. 53. *Hymenophyllum*



Trichomanes

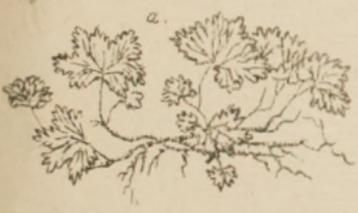


Fig. 54.

Sigillaria



Fig. 55. *Hydropteris*

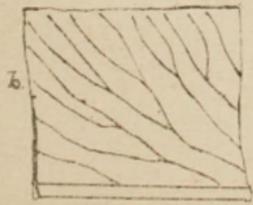


Fig. 56.

Schizaa

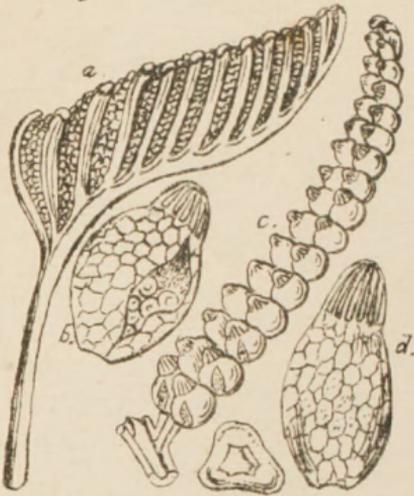


Fig. 57.

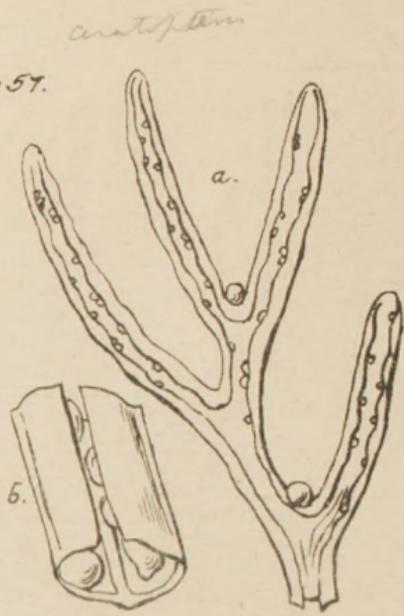


Fig. 58. *Jodea*

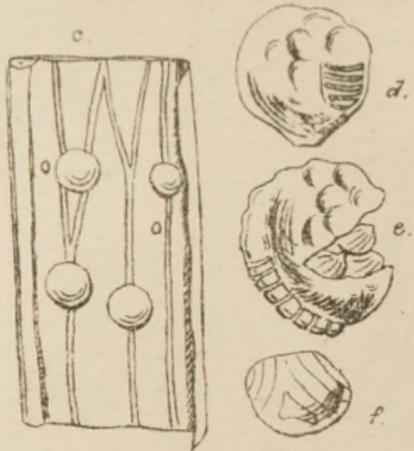


Fig. 59. *angiopteris*

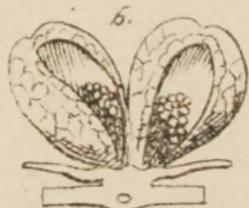
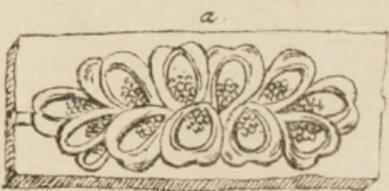


Fig. 60. *marattia*

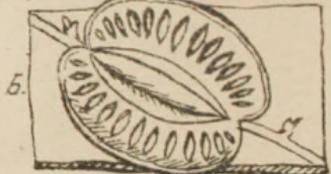
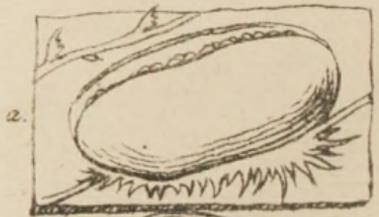


Fig. 62.

Polypodium in this variety



Fig. 63.

Asplenium 22



Fig. 61.

Polypodium



A. ei.



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