

APPENDIX
TO
THE PHYTOLOGIST
FOR 1851.

ART. I.—*Synoptical Table of the British Ferns.*

By EDWARD NEWMAN.

Obs. — This is confessedly but a crude attempt to arrange our ferns in accordance with their natural affinities. After maturely considering the associations upon which heretofore so much stress has been laid, I have arrived at the conclusion that they are unsatisfactory; and yet, in abandoning such divisions as Polypodium of the Linnean school; as Aspidium, so earnestly advocated by Smith and Hooker in this country, and equally great names on the Continent; and as the more recent combination called Las-trea by Presl and John Smith, and formerly adopted by myself; I feel as one groping his way in the dark, and shall eagerly avail myself of any friendly hand that may be held out to support and direct my tottering and uncertain footsteps.

VEGETABLES are divided by botanists into four primary groups, one of which, called Exogens, is single, and the others, severally called Endogens, Acrogens, and Thallogens, are double; that is, each of them contains two groups, which, in intimate structure, are alike, but in certain less important characters differ.

Acrogens are either Filicoid, or ferns and their allies; or Muscoid, or mosses and their allies.

Filicoid Acrogens are divided into seven secondary groups, called Orders; which however consist of a single one and three pairs: so that the divisions of the secondary, are in fact numerically identical with those of primary groups.

Primary groups are called *classes*, secondary groups *orders*. The seven orders of Filicoid Acrogens are these : — Polypodiaceæ ; Osmundaceæ and Ophioglossaceæ ; Marsiliaceæ and Lycopodiaceæ ; Equisetaceæ and Characeæ.

The present paper treats only of the first, second and third of these orders, the British species of which are so few in number, that it is extremely difficult so to arrange them as to give any idea of a connected series.

Order. — POLYPODIACEÆ, *R. Brown*.

Plants composed of fibrous roots, solid simple rhizoma, and flat leafy fronds which rise with a circinate veneration and bear capsules in clusters on their back or edges. The capsules are provided with an elastic jointed ring. The divisions of this order are still obscure, and require further investigation ; the subjoined arrangement is confessedly imperfect, but will probably be found convenient to those whose attention is chiefly confined to the European ferns.

Family. — ADIANTEÆ.

The ultimate divisions of the frond generally stipitate and leaf-like but without a mid-vein : clusters of capsules small, nearly circular, seated on the reflexed bleached margin : no apparent involucre.

Genus. — ADIANTUM, *Linneus*.

No mid-vein : veins of divisions of the frond variously branched, free at extremity : involucre not apparent : clusters of capsules nearly orbicular and situate on a bleached reflexed margin.

ADIANTUM CAPILLUS-VENERIS.

Adiantum Capillus-Veneris, *Linn. Sp. Pl.* 1559 ; *Lightf. Fl. Scot.* 679 ; *Huds. Fl. Ang.* 460 ; *Bolt. Fil. Brit.* 24, t. 29 ; *With. Arr.* 781 ; *Sm. E. F.* iv. 320, *E. B.* 1564 ; *Mack. Fl. Hib.* 344 ; *Newm. N. A.* 9, *F.* 83 ; *Hook. and Arn.* 576 ; *Bab.* 416.

Stipes black, shining, about the same length as the frond; frond deltoid, pinnate; pinnæ alternate, pinnate, pinnules stalked, leaf-like.

Sea-coast of Devonshire, Cornwall, Glamorganshire, Isle of Man, and South Isles of Arran.

Family. — PTERIDÆ.

Ultimate divisions of frond with a distinct mid-vein, lateral veins branched and united at their extremities by a distinct marginal vein, on which the capsules are placed in a continuous line, and are covered by the bleached reflexed epidermis.

Genus. — EUPTERIS, *Newman*.

Mid-vein distinct, lateral veins anastomosing at the margin, forming a marginal vein: involucre attached to inner side of marginal vein, linear, its margin split into capillary segments: capsules attached in a linear series to the marginal vein, exterior to the involucre: epidermis prolonged, bleached, reflexed, split into capillary segments and covering the capsules in the manner of an involucre.

EUPTERIS AQUILINA.

Pteris aquilina, *Linn. Sp. Pl.* 1533; *Lightf. Fl. Scot.* 657; *Huds. Fl. Ang.* 451; *Bolt. Fil. Brit.* 16, t. 10; *With. Arr.* 765; *Sm. E. F.* iv. 318, *E B.* 1679; *Mack. Fl. Hib.* 343; *Newm. N. A.* 11, *F.* 93; *Hook. and Arn.* 575; *Bab.* 415.

Eupteris aquilina, *Newm. Phytol.* ii. 278.

Rhizoma creeping; stipes long; frond deltoid, tripinnate, erect.

Abundant everywhere except on chalk.

Obs. — There are several other natural divisions of the Linnean genus *Pteris*, but neither of them contains British species. Messrs. Houlston and Moore, in their "Descriptive List of Cultivated Ferns," now in course of publication in the 'Gardeners' Magazine of Botany,' treat all the species of *Eupteris* as identical, thus making one species

cosmopolitan : in this conclusion, however, I am hardly prepared to agree.

Family. — BLECHNEÆ.

The ultimate divisions of the frond sessile, having a distinct mid-vein, the lateral veins anastomose in a linear series on each side of the mid-vein : capsules seated in a continuous line on that side of these anastomosing veins which is nearest the mid-vein, covered by a continuous linear lateral involucre, which opens towards the mid-vein.

Genus. — LOMARIA, *Willdenow*.

Mid-vein distinct, lateral veins anastomosing in a linear series on each side, parallel to the mid-vein, and emitting free branches to the margin : involucre linear, opening towards the mid-vein ; capsules in a linear series on the inner side of each anastomosing vein.

LOMARIA SPICANT.

Osmunda spicant, *Linn. Sp. Pl.* 1522 ; *Lightf. Fl. Scot.* 654 ; *Huds. Fl. Ang.* 450 ; *Bolt. Fil. Brit.* 8, t. 6.

Osmunda spicanthus, *With. Arr.* 763.

Blechnum spicant, *With. Arr.* 765.

Lomaria spicant (*Desv.*), *Newm. N. A.* 9, *F.* 89.

Blechnum boreale (*Swartz*), *Sm. E. F.* iv. 316, *E. B.* 1159 ; *Mack. Fl. Hib.* 343 ; *Hook. and Arn.* 575 ; *Bab.* 415.

Fronds of two kinds : fertile fronds erect, linear, pinnate ; pinnæ distant, reflexed, narrow, linear ; the lower portion of the stipes naked : barren fronds prostrate, lanceolate, pinnatifid ; pinnæ close, flat, broad, blunt.

Common on damp soils.

Family. — ASPLENIEÆ.

A large and varied group, approaching very nearly to the last, but constantly differing : the capsules are seated in linear clusters on one side of lateral veins, whose direction is always at an angle with the median line of the pinnule, so that in no instance can two or more of these lines of

capsules form a continuous line : each cluster is covered more or less completely by a linear lateral involucre.

Genus. — NOTOLEPEUM, *Newman*.

Mid-vein of pinnules present, lateral veins alternate, branched, branches anastomosing among themselves and with the branches of the next lateral vein : clusters of capsules on the first anterior branch of each lateral vein, and all of them directed towards the apex of the pinnule, except in the first lateral veins, both branches of which bear clusters, the anterior cluster directed as usual, but the posterior towards the midrib of the frond, these are therefore placed back to back : each cluster is accompanied by a narrow and nearly erect involucre, occupying the same position with regard to the capsules as that of a true *Asplenium* : the back of the frond is densely clothed with pointed overlapping scales.

Obs.—This genus has long been noticed as distinct, but I have seen no description in which the characters are correctly given. A new name seemed needful ; the names of *Scolopendrium*, *Grammitis*, and *Gymnogramma*, successively employed, have been severally restricted to very different genera, and that of *Ceterach* seems objectionable, as belonging of right to the species. A mode of overcoming the difficulty certainly exists in a repetition of the name, as *Ceterach Ceterach*, and this plan has been largely followed in the nomenclature of fishes, but I think it has not hitherto found its way into the science of Botany. Whenever it shall be introduced, there can be no doubt that the name of *Notolepeum* must give way.

NOTOLEPEUM CETERACH.

Asplenium Ceterach, *Linn. Sp. Pl.* 1538 ; *Lightf. Fl. Scot.* 661 ; *Huds. Fl. Ang.* 452 ; *Bolt. Fil. Brit.* 20, t. 12 ; *With. Arr.* 767.

Scolopendrium Ceterach, *Sm. E. F.* iv. 315, *E. B.* 1244.

Grammitis Ceterach (*Swartz*), *Mack.* 337.

Ceterach officinarum (*Willd.*), *Newm. N. A.* 28, *F.* 293 ; *Hook. and Arn.* 566 ; *Bab.* 415.

Notolepeum Ceterach, *Newm. F.* 9.

Stipes shorter than the frond; frond linear-lanceolate, pinnatifid, divisions waved or lobed; back of frond ferruginous with the dense covering of scales.

On limestone rocks, very local: on mortared walls, common in the West of England and South of Ireland.

Genus. — PHYLLITIS, *Newman*.

Lateral veins twice or thrice bifurcate, free at the extremity: capsules in linear series upon the anterior and posterior branches, on the anterior directed towards the apex of the frond, on the posterior towards its base, always in pairs, *i. e.*, when the anterior branch of a lateral vein bears a line of capsules, the posterior branch of the lateral vein next before it also bears a line of capsules corresponding in length, and the two lines or series form a confluent mass of capsules, covered by two involucre, which face each other, and even in an early stage of growth overlap and appear united.

Obs.—The name *Phyllitis* was employed by Ray and other eminent botanists of the pre-Linnean era, but I believe has not been used as generic since the introduction of the binominal nomenclature. I consider that the name of *Scolopendrium* should be confined, as intended by its author, to the species. As in the preceding instance, the repetition of the name, thus, *Scolopendrium Scolopendrium*, would be the strict application of the law of priority. The genus is generally acknowledged as distinct.

PHYLLITIS SCOLOPENDRIUM.

Asplenium Scolopendrium, *Linn. Sp. Pl.* 1537; *Lightf. Fl. Scot.* 660; *Huds. Fl. Ang.* 452; *Bolt. Fil. Brit.* 18, t. 11; *With. Arr.* 766.

Scolopendrium vulgare (*Sym. Syn.*), *Sm. E. F.* iv. 314, *E. B.* 1150; *Mack. Fl. Hib.* 342; *Newm. N. A.* 28, *F.* 289; *Hook. and Arn.* 574; *Bab.* 415.

Phyllitis Scolopendrium, *Newm. F.* 10.

Stipes shorter than frond; frond pendulous, linear, strap-shaped, entire.

Common on stone walls, hedge-banks, &c., in damp places.

Genus. — AMESIUM, *Newm.*

Ultimate divisions without a distinct mid-vein : veins of ultimate divisions very few, sparingly branched, free at the extremities : involucres narrow, linear, frequently facing each other as in the preceding genus, but rarely overlapping.

Obs.—Roth unites the species of this genus with those of *Scolopendrium*, all other authors with *Asplenium*, from which, however, they appear to me abundantly distinct.

* *Frond simple.*

AMESIUM SEPTENTRIONALE.

Acrostichum septentrionale, *Linn. Sp. Pl.* 1524 ; *Lightf. Fl. Scot.* 656 ; *Huds. Fl. Ang.* 450 ; *Bolt. Fil. Brit.* 12, t. 8 ; *With. Arr.* 764.

Asplenium septentrionale, *Sm. E. F.* iv. 308, *E. B.* 1017 ; *Newm. N. A.* 27, *F.* 269 ; *Hook. and Arn.* 572 ; *Bab.* 41.

Amesium septentrionale, *Newm. F.* 10.

Stipes and frond of equal length, their separation indistinct ; frond linear, narrow, gradually diminishing into the stipes, sometimes forked, apices of divisions bifid ; clusters of capsules in two, three, or four long linear series.

A small and rare fern, in rocky and mountainous places. Somerset, Caernarvon, Cumberland, Northumberland, Edinburgh.

** *Frond linear, pinnate.*

AMESIUM GERMANICUM.

1770. *Asplenium germanicum*, *Weiss, Pl. Cr.* 299 ; *Willd. Sp. Pl.* v. 330 ; *Hoffm. Deutschl. Fl.* ii. 13 ; *Ehrh. Crypt.* 43 ; *Presl. Tent. Pteridog.* 108 ; *Newm. F.* 265 ; *Bab.* 414.

1779. *Asplenium Breynii*, *Retz, Obs. Bot. fasc. i.* 32 ; *Sw. Syn. Fil.* 85.

1781. *Asplenium alternifolium*, *Wulfen. Jacq. Misc.* ii. 51; *With. Arr.* 768; *Sm. E. F.* iv. 309, *E. B.* 2258; *Newm. N. A.* 27; *Hook. and Arn.* 573.

Amesium germanicum, *Newm. F.* 10.

Stipes shorter than frond; frond linear, pinnate; pinnæ alternate, distant, linear, ascending, bifid or trifid at the apex; clusters of capsules linear.

A small and extremely rare plant. Caernarvonshire, Perthshire.

*** *Frond deltoid.*

AMESIUM RUTA-MURARIA.

Asplenium Ruta-muraria, *Linn. Sp. Pl.* 1541; *Lightf. Fl. Scot.* 665; *Huds. Fl. Ang.* 453; *Bolt. Fil. Brit.* 28, t. 16; *With. Arr.* 769; *Sm. E. F.* iv. 309, *E. B.* 150; *Newm. N. A.* 27, *F.* 261; *Hook. and Arn.* 573; *Bab.* 414.

Amesium Ruta-muraria, *Newm. F.* 10.

Stipes longer than frond; frond deltoid, composed of a few diamond-shaped, stalked, leaf-like divisions; clusters of capsules linear, becoming confluent and entirely covering the divisions of the frond.

A small fern, common on rocks and mortared walls.

Genus. — ASPLENIUM.

Mid-vein distinct; lateral veins simple or branched: involucre linear, attached to the side of the vein, its free margin sometimes jagged, but not split into capillary segments.

* *Frond linear, pinnate.*

ASPLENIUM TRICHOMANES.

1753. *Asplenium Trichomanes*, *Linn. Sp. Pl.* 1540; *Huds. Fl. Ang.* 452; *Bolt. Fil. Brit.* 22, t. 15; *With. Arr.* 768; *Sm. E. F.* iv. 305, *E. B.* 576; *Mack. Fl. Hib.* 341; *Newm. N. A.* 28, *F.* 285; 109; *Hook. and Arn.* 573; *Bab.* 414.

1776. *Asplenium Trichomanoides*, *With. Bot. Arr. Veg.* 653; *Lightf. Fl. Scot.* 662.

Stipes generally shorter than the frond, purple throughout; frond pinnate; pinnæ distant, stalked, ovate; clusters of capsules linear, nearly black.

Common on rocks, walls and hedge-banks.

ASPLENIUM VIRIDE.

1753. *Asplenium Trichomanes ramosum*, *Linn. Sp. Pl.* 1541; *With. Bot. Arr. Veg.* 654.

1762. *Asplenium viridi*, *Huds. Fl. Ang.* 385.

1777. *Asplenium viride*, *Lightf. Fl. Sc.* 663; *Huds. Fl. Ang.* 453; *Bolt. Fil. Brit.* 24, t. 14; *With. Arr.* 768; *Sm. E. F.* iv. 306, *E. B.* 2257; *Mack. Fl. Hib.* 341; *Newm. N. A.* 28, *F.* 281; *Hook. and Arn.* 573; *Bab.* 414.

Stipes somewhat shorter than the frond, purple at the base, otherwise green; frond very narrow, linear, pinnate; pinnæ stalked, distant, diamond-shaped, toothed; clusters of capsules linear, at last confluent, rust-coloured.

On rocks in mountain districts only.

Obs.—In this instance the earliest name, *Asplenium Trichomanes ramosum*, is abandoned, because evidently given as that of a variety, not of a species. The second in date is also abandoned, because of its ungrammatical termination, subsequently corrected by the author himself.

ASPLENIUM MARINUM.

- Asplenium marinum*, *Linn. Sp. Pl.* 1540; *Lightf. Fl. Scot.* 664; *Huds. Fl. Ang.* 453; *Bolt. Fil. Brit.* 26, t. 15; *With. Arr.* 769; *Sm. E. F.* iv. 307, *E. B.* 392; *Mack. Fl. Hib.* 341; *Newm. N. A.* 27, *F.* 275; *Hook. and Arn.* 573; *Bab.* 414.

- Adiantum Trapeziforme*, *Huds. Fl. Ang.* 460; *With. Bot. Arr. Veg.* 655; but certainly not of *Linn. Sp. Pl.* 1559, as cited by early English authors.

- Adiantum Trapeziforme*, *Berk. Syn.* 309.

Stipes shorter than frond; frond pinnate; pinnæ stalked, ovate, serrated; clusters of capsules linear, rust-coloured, always separate.

Common on rocks by the sea.

** *Fronde deltoid.*

ASPLENium ADIANTUM-NIGRUM.

Asplenium Adiantum-nigrum, *Linn. Sp. Pl.* 1541; *Lightf. Fl. Scot.* 666; *Huds. Fl. Ang.* 454; *Bolt. Fil. Brit.* 30, t. 17, 3; *With. Arr.* 770; *Sm. E. F.* iv. 310, *E. B.* 1950; *Mack. Fl. Hib.* 342; *Newm. N. A.* 27, *F.* 255; *Hook. and Arn.* 573; *Bab.* 414.

Stipes longer than frond; frond elongate, deltoid, pinnate; lowest pair of pinnæ always longest, all the pinnæ pinnate; clusters of capsules linear, approximate to mid-rib.

*** *Fronde lanceolate.*

ASPLENium LANCEOLATUM.

Asplenium lanceolatum, *Huds. Fl. Ang.* 454; *With. Arr.* 770; *Sm. E. F.* iv. 311, *E. B.* 240; *Newm. N. A.* 27, *F.* 249; *Hook. and Arn.* 573; *Bab.* 414.

"? *Asplenium obtusatum*, *Guss.*" *Bab. MSS.*

Stipes shorter than frond; frond semi-erect, lanceolate, pinnate; lowest pair of pinnæ shorter than the second pair, all pinnate or pinnatifid; clusters of capsules at first linear, afterwards circular, distant from midrib.

Local, and mostly maritime; chiefly upon stone walls. Caernarvonshire, Cornwall, Devon, Gloucestershire, Kent, Merionethshire, Sussex.

Genus. — ATHYRIUM, *Roth.*

Ultimate divisions generally distinct and leaf-like, each with a distinct mid-vein: lateral veins always branched: involucre crescent-shaped, its free margin split into capillary segments. The rhizoma or cormus is long-enduring, suberect, and often of very large size; it sometimes increases laterally, but generally from the centre, and occasionally, in very old individuals, it becomes erect and trunk-like, as in the tree-ferns. There is probably some difference between the species in this respect, but the subject has not obtained the attention of botanists.

Obs. — This genus has a very great similarity, in general habit, to that which immediately follows; a similarity also extending more or less to several genera of the following family: it is comprised in the genus *Aspidium* of Smith: it is now almost universally regarded as comprising but a single species, the *Polypodium Filix-femina* of Linneus, and the following synonymes are those of the genus.

Polypodium Filix-femina, *Linn. Sp. Pl.* 1551; *Lightf. Fl. Scot.* 673; *Huds. Fl. Ang.* 458; *With. Arr.* 778.

Polipodium Filix-femina, *Bolt. Fil. Brit.* 46, t. 25.

Aspidium Filix-fœmina (*Swartz*), and *Aspidium irriguum*, *Sm. E. F.* iv. 295, 6, *E. B.* 1459 and *E. B. S.* 2199.

Asplenium Filix-fœmina (*Bernh.*), *Mack. Fl. Hib.* 342; *Hook. and Arn.* 574.

Athyrium Filix-fœmina (*Roth*), *Newm. F.* 420; *Bab.* 413.

* *Fronde deltoid.* (No ascertained British species).

(*ATHYRIUM DELTOIDEUM.*

Aspidium crenatum, *Sommerf. in Vet. Ac. Handlung.* 104.

Cystopteris crenata, *Fries, Nov. Fl. Suec.* 165; *Hook. Sp. Fil.* i. 200.

Stipes as long as the frond, pretty thickly clothed towards the base with dark brown lanceolate scales; frond deltoid, resembling that of *Eupteris aquilina*, but of smaller size, pinnate; pinnæ stipitate, lanceolate, pinnate; in the first pair of pinnæ the pinnules on the lower are longer than those on the upper side; pinnules pinnate, their lobes distant, but united at the base by the winged midrib of the pinnule, blunt, slightly lobed on the upper margin; clusters of capsules confined to the upper portion of the frond, rather scattered in an oblique series on each side of the midrib, and rather near it; involucre nearly linear, attached to the side of the capsuliferous vein, and opening towards the midrib, its free margin ragged.

North of Europe, in thick woods. Found by Mr. R. B. Bowman, in the Pass of Kringelen, in Norway.

Obs. — There exist a *Polypodium crenatum*, an *Aspidium crenatum*, and an *Athyrium Filix-femina*, var. *crenatum*; under these circumstances, a change of name will, I hope, be allowed. The plant is here

introduced as being likely to occur in Scotland, and also to show that the genus *Athyrium* is not restricted to the lanceolate form of frond).

**** Frond lanceolate.**

ATHYRIUM OVATUM.

1795. *Polypodium dentatum*, Hoffm. *Deutsch. Flor.* ii. 6.

1800. *Athyrium ovatum*, Roth, *Fl. Germ.* iii. 64; Newm. *F.* 420, *Phytol.* iv. 368.

Athyrium Filix-femina, var. *dentatum*, Newm. *F.* 203, ad partem.

Asplenium Filix-fœmina, var. *latifolium*, Hook. and Arn. 574; Bab. 413; Houlston and Moore, *Gard. Mag. of Bot.* iii. 262.

Frond lax, flaccid, dark green, lanceolate, pinnate; pinnae scarcely ascending, approximate, flattened, pinnate; pinnules ovate, distinctly stalked, crowded, overlapping, lobed at the base, toothed at the apex; clusters of capsules elongate as in *Asplenium*, in a series on each side of the pinnule but *distant from it*. A large plant, two to three feet high.

Rare; found in the neighbourhood of Keswick by Miss Beever and Miss Wright.

Obs. — The prior name of *dentatum* is discarded on account of its identity with another *Polypodium dentatum*.

ATHYRIUM MOLLE.

Polypodium molle, Schreber, *Spic. Flor. Lips.* 70; Ehrh. *Crypt.* 9; Hoffm. *Deutsch. Flor.* ii. 6.

Athyrium molle, Roth, *Flor. Germ.* iii. 61; Newm. *N. A.* 26.

Athyrium Filix-femina, var. *molle*, Newm. *F.* 242.

Athyrium Filix-femina, γ. Bab. 413.

Frond lax, flaccid, bright green, broadly lanceolate, pinnate; pinnae scarcely ascending, approximate, flattened, pinnate, subpinnate, or pinnatifid; pinnules blunt, approximate, connected by the wing of the midrib; clusters of capsules in a series on each side of the midrib of the pinnule, and *very near it*. Generally a small plant, twelve to

eighteen inches high, when larger somewhat more divided, and then it is the *Polypodium trifidum* of Hoffman.

Common in woods.

ATHYRIUM INCISUM.

Polypodium incisum, Hoffm. *Deutsch. Flor.* ii. 6.

Athyrium Filix-femina, Roth, *Flor. Germ.* iii. 65.

Athyrium Filix-femina, var. *incisum*, Newm. *F.* 243.

Athyrium Filix-femina β . Bab. 413.

Fronde suberect, subrigid, dull green, lanceolate, pinnate; pinnæ subdistant, pinnate; pinnules deeply incised or lobed, divisions dentate; clusters of capsules close, owing to the greater subdivision of frond not ranged in series, but crowded and finally confluent. A large plant, two to four feet high, and proportionably broad.

Common in wet woods. A much more beautiful fern than either of the preceding, and the type of the genus.

ATHYRIUM CONVEXUM.

Athyrium rhœticum, Roth. *Flor. Germ.* iii. 67; Newm. *N. A.* 26.

Athyrium Filix-femina, var. *convexum*, Newm. *F.* 245.

Athyrium Filix-femina, α . Bab. 413.

Fronde pale green, erect, rigid, linear lanceolate, pinnate; the stipes and rachis semipellucid, and often beautifully coloured with purple or red; pinnæ distant, at first ascending, then spreading, and finally deflexed, extremely acute; pinnules distant, very narrow, linear, entirely unconnected, their margin convolute; clusters of capsules subrotund, close to the midrib of the pinnule, and finally covering their under surface, and themselves partially covered by the convolute margin of the pinnules.

Not uncommon in exposed localities.

Obs.—The seedlings of these plants are particularly abundant near the parent; they constitute the *A. rhœticum*, var. *minus* of Roth, and the *Aspidium irriguum* of Smith.

Family. — POLYPODIEÆ.

A large and varied group. Capsules seated in circular clusters directly on the back of the lateral veins.

Genus. — PSEUDATHYRIUM, *Newm.*

Involucre wanting: clusters of capsules small, at first distinct, but often crowded when mature: first and second pinnules on each pinna, both above and below, of nearly corresponding size: ultimate divisions pointed but without spines: precisely the habit of *Athyrium*.

PSEUDATHYRIUM ALPESTRE.

Aspidium alpestre, *Hoppe, Taschenb.* (1805), 216; *Schkuhr*, 58.

Polypodium alpestre, *Koch.*

Aspidium rhæticum, *Swartz, Syn. Fil.* 59.

Polypodium rhæticum, *Woods, Tour. Fl.* 423.

Pseudathyrium alpestre, *Newm. Phytol.* iv. 370.

Rhizoma tufted; stipes shorter than frond; frond elongate, lanceolate, pinnate; pinnae pinnate; pinnules approximate, lobed, lobes notched.

Scotland. Three specimens are in the herbarium of Mr. Watson, gathered by himself, one in Canlochen Glen, Forfarshire, a second on Ben Alder, and a third on "mountains near Dalwhinnie." Mr. Watson thinks it possible that, as he went from Dalwhinnie to Ben Alder, both the specimens last mentioned may be from the latter locality. Common in alpine districts of Europe, and will in all probability prove so in Scotland. Lightfoot, in describing the clusters of capsules in the Scotch specimens of *Filix-femina*, says they first appear as "*distinct round dots*;" he had probably seen the present species.

Obs. — In Schkuhr's 'Handbook' there is a reference to plate 60, which plate is named *Aspidium umbrosum*, but certainly represents this species.

Genus. — POLYSTICHUM, Schott.

Involucre circular, scale-like, its margins free, attached by its centre : first upper pinnule of each pair greatly larger than the second, and larger than the first and second lower pinnules ; all the ultimate divisions ending in an acute spine.

Obs.—The genus *Polystichum*, as proposed by Roth, is almost identical with *Aspidium* of Willdenow, but was subsequently restricted by Schott to the typical species, and those having a similar circular involucre. Although as regards British species the genus thus restricted is remarkably distinct, yet among exotic ferns we find species almost precisely intermediate between this and the following genus.

POLYSTICHUM ANGULARE.

Polypodium aculeatum, *Lightf. Fl. Scot.* 675 ; *Huds. Fl. Ang.* 459.

Aspidium angulare, *Willd. Sp. Pl.* v. 257 ; *Sm. E. F.* iv. 291, *E. B. S.* 2776 ; *Mack. Fl. Hib.* 339 ; *Hook. and Arn.* 568.

Polystichum angulare, *Newm. N. A.* 25, *F.* 173 ; *Bab.* 412.

Rhizoma tufted ; stipes one-third as long as the frond, densely clothed with large, red, chaffy scales ; frond drooping, graceful, broad lanceolate, lax, feathery, pinnate ; pinnæ very numerous, linear, distant, pinnate ; pinnules distinct, stalked, often distant, auricled at the base, rounded at the apex, serrated, spined.

Common in woods and shady lanes.

POLYSTICHUM ACULEATUM.

Polypodium aculeatum, *Linn. Sp. Pl.* 1552.

Polypodium lobatum, “affinis præcedenti (*P. angulare*, *l. c.*) an distincta sit species ?” *Huds. Fl. Ang.* 459 ; *With. Bot. Arr. Veg.* 651.

Polipodium aculeatum, *Bolt. Fil. Brit.* 48, t. 26. “*Polipodium lobatum*, *Hall. Hist.* 1712, and *Fl. Ang.* 459, is doubtless a young plant of *Polipodium aculeatum* ; of this I am certain from observation.”—*Bolt. l. c.*

Aspidium lobatum (Swartz), *Sm. E. F.* iv. 291; *Mack. Fl. Hib.* 338; *Hook. and Arn.* 568.

Polystichum aculeatum (Roth), *Newm. N. A.* 25, *F.* 169; *Bab.* 411.

Rhizoma tufted; stipes very short; frond rigid, horizontal, leathery, linear lanceolate, pinnate; pinnæ numerous, pinnatifid, divisions decurrent.

Common everywhere.

POLYSTICHUM LONCHITIS.

Polypodium Lonchitis, *Linn. Sp. Pl.* 1548; *Lightf. Fl. Scot.* 668; *Huds. Fl. Ang.* 455; *With. Arr.* 773; *Sm. E. B.* 797.

Polipodium Lonchitis, *Bolt. Fil. Brit.* 34, t. 19.

Aspidium Lonchitis (Swartz), *Sm. E. F.* iv. 284; *Mack. Fl. Hib.* 338; *Hook. and Arn.* 568.

Polystichum Lonchitis (Roth), *Newm. N. A.* 25, *F.* 163; *Bab.* 411.

Rhizoma tufted; stipes very short; frond linear, rigid, leathery, pinnate; pinnæ entire, auricled at the base, serrated, very spiny; clusters of capsules circular, crowded, often confluent, confined to the upper half of the frond.

On mountains, rare. Caernarvonshire, Durham, Yorkshire, Forfarshire, Perthshire, Kerry, Sligo.

Genus. — *LOPHODIUM*, *Newm.*

Involucre nearly circular, scale-like, its direction oblique to the plane of the frond, its margin with a conspicuous notch, and its attachment at this notch: first upper pinnule generally larger than the second, and always greatly less than the first lower pinnule: all the ultimate divisions ending in a point: cormus or rhizoma large, massive, and long enduring.

* *Frond deltoid; points of divisions spine-like.*

LOPHODIUM (RECURVUM) FÆNESECI.

1790. *Polipodium cristatum*, *Bolt. Fil. Brit.* 42, ad partem, *i. e.*, t. 23.

1832. *Nephrodium fœnesecii*, *Lowe, Camb. Phil. Trans.* iv. 7, ad partem, fortè omninò.

Aspidium dilatatum, var. *recurvum*, *Bree, Mag. Nat. Hist.* iv. 162.

1843. *Aspidium recurvum*, *Bree, Phytol.* i. 773.

Lastrea recurva, *Newm. N. A.* 23, *F.* 225.

Lastrea fœnesecii, *Watson, Phytol.* ii. 568; *Bab.* 411.

Aspidium spinulosum, *γ. Hook. and Arn.* 57.

Lophodium recurvum, *Newm. Phytol.* iv. 371.

Rhizoma tufted, large, crown unusually broad; stipes as long as frond, woody, clothed with long, narrow, laciniated scales; frond elongate, triangular (being exactly that of *Asplenium Adiantum-nigrum*), drooping, elegant, pale delicate green when young, its under surface sprinkled over with sessile, pellucid glands (which probably cause the powerful scent for which this species is remarkable), pinnate; lowest pair of pinnæ longest stalked, all pinnate; all the divisions of the frond concave; involucre jagged, without stalked glands; clusters of capsules round, crowded, covering every part of the frond.

Common in Ireland and Cornwall; occurring in Devonshire, N. Wales, Cumberland, Sussex, &c. sparingly.

** *Frond linear-lanceolate; points of divisions spine-like.*

LOPHODIUM MULTIFLORUM.

Polypodium cristatum, *Linn. Sp. Pl.* 1551, ad partem; *Huds. Fl. Ang.* 390 (1762), (I place this synonyme here without hesitation, not simply from the accordance of Hudson's specific character, but because that author specially cites Hampstead Heath as the locality, and the present species has existed there from Hudson's time to the present, and no other form or supposed species has ever been found there); *Id.* 457, (1778); *Lightf. Fl. Scot.* 670; *Bolt. Fil. Brit.* 42, ad partem, (the second variety refers to this species); *With. Arr.* 778.

Polystichum multiflorum, *Roth, Fl. Germ.* iii. 87.

Aspidium dilatatum, spinulosum, and dumetorum, *Sm. E. F.* iv. 292, 3, 4, and also of *Smith's Herbarium*, now in the possession of the Linnean Society.

Aspidium spinulosum, *Mack. Fl. Hib.* 340; var. β . *Hook. and Arn.* 571.

Lastrea dilatata, *Newm. N. A.* 23; *Bab.* 411.

Lastrea multiflora, *Newm. F.* 215.

Lophodium multiflorum, *Newm. Phytol.* iv. 371.

Rhizoma tufted; stipes very stout, nearly as long as the frond, densely clothed with long pointed scales, which are dark brown along the middle but pale at the edges; frond glandular when young, very large, deep green, drooping, ovate-lanceolate, pinnate; lowest pair of pinnae shorter than the second, third, fourth or fifth, pinnae pinnate; pinnules pinnate or pinnatifid; ultimate divisions serrated, spined; all the divisions of the frond convex; involucre nearly circular, fringed with stalked glands; clusters of capsules circular, covering every part of the frond.

Common everywhere.

Obs.—Two or more doubtful species of *Lophodium* occupy this place; viz., *L. glandulosum*, probably identical, as suggested to me by Mr. Moore, with *Lastrea maculata* of Deakin, *L. collinum*, &c. The characters of these are still insufficiently ascertained.

LOPHODIUM SPINOSUM.

Polypodium cristatum, *Linn. Sp. Pl.* 1551, ad partem.

1770. *Polypodium Filix-femina* γ . *spinosa*, *Weiss, Crypt.* 316.

1800. *Polystichum spinosum*, *Roth, Fl. Germ.* iii. 91.

Lastrea spinosa, *Newm. N. A.* 21, *F.* 209.

Lastrea spinulosa, *Bab.* 410.

Lophodium spinosum, *Newm. Phytol.* iv. 371.

Rhizoma stout, slowly but extensively creeping; stipes as long as frond, clothed sparingly, except at the base, with broad, rounded, pale brown, diaphanous scales; frond slightly drooping, elongate, linear, pinnate; pinnae rather distant, winged, pinnate; pinnules at the base of the pinnae separated from the midrib by a deep notch, towards the apex of the pinnae decurrent, all lobed, the lobes serrated

and spined; divisions at the apex of the frond narrow, their terminations acute; all the divisions of the frond flat; involucre nearly circular, its margins waved, not torn, nor furnished with teeth or stalked glands; clusters of capsules circular, crowded, sometimes confluent, confined to the upper part of the frond.

Common in damp woods in England. I have not seen it from Scotland or Ireland.

Obs.—This very common fern has totally escaped the notice of Smith, Mackay, and Hooker and Arnott. Mr. Moore, in copying my figures of the paleæ and involucre of multiflora and spinosa, has unhappily transposed them. Babington is the only British author to whom I can refer.

LOPHODIUM ULIGINOSUM.

Aspidium spinulosum, var. *uliginosum* (*A. Braun*), *Döll, Rhein. Flor.* 17, 18. Vide *Phytol.* iii. 101.

Lastrea uliginosa, *Newm. Phytol.* iii. 679.

Lastrea cristata, var. *uliginosa*, *Moore, Phytol.* iv. 149, in *Rep. Bot. Soc. Ed.*

Lastrea cristata, *Bab.* 410, ad partem.

Aspidium spinulosum, *Hook. and Arn.* 571, ad partem. —

“The plant under the name of *L. uliginosa* in the Royal Gardens, corresponds with our *A. spinulosum*, *α.*”—*Hook. and Arn. l. c.* The plant here referred to as cultivated at Kew, is correctly named as my *L. uliginosa*; I mention this to show, from the evidence of all parties concerned, that *Aspidium spinulosum*, *α.*, *Hook. and Arn.*, and my *Lophodium uliginosum* are identical.

Lophodium uliginosum, *Newm. Phytol.* iv. 371.

Rhizoma tufted; veneration simply circinate, fronds erect, rigid, linear lanceolate, of two kinds, the fertile resembling those of the preceding, the barren those of the following species, pinnate; pinnæ also pinnate.

Not uncommon; bogs and boggy heaths, in company with the following species.

LOPHODIUM CALLIPTERIS.

Polypodium cristatum, *Linn. Sp. Pl.* 1551, ad partem.

1788. *Polypodium Callipteris*, Ehrhart, *Beitrag*, iii. 77, *Crypt.* 53; Hoffm. *Deutsch. Fl.* ii. 6.

1800. *Polystichum cristatum*, Roth, *Fl. Germ.* iii. 84.

Aspidium cristatum, Sm. *E. F.* iv. 289, *E. B.* 2125; Hook. and Arn. 569.

Lastrea Callipteris, Newm. *F.* 12.

Lastrea cristata, Newm. *N. A.* 21, *F.* 203; Moore, *Phytol.* iv. 149, ad partem; Bab. 410, ad partem.

Lophodium Callipteris, Newm. *Phytol.* iv. 371.

Rhizoma very stout, slowly creeping, often extending two or three feet; stipes branched, as long as the frond, sparingly clothed with short, broad, pale, semi-hyaline scales; frond very erect, narrow, linear, pinnate; pinnæ rather distant, short, somewhat triangular, pinnatifid, from five to eight pairs usually of the same length, but the fifth, sixth, seventh or eighth pair somewhat longest, and the others gradually approaching them in length, the distance between each pair gradually decreasing from the base towards the apex; pinnules generally decurrent, oblong, lobed, serrated, blunt or rounded at the apex, the lower pinnules generally larger and longer than the upper; involucre flat, its margin irregular; clusters of capsules crowded, often confluent, confined to the upper part of the frond.

On boggy ground, in Cheshire, Norfolk, Nottingham, and Suffolk; very local.

*** *Involucre more convex and more completely reniform; points of divisions obtuse.*—*Dryopteris*, Schott.

LOPHODIUM FILIX-MAS.

Polypodium Filix-mas, Linn. *Sp. Pl.* 1551; *Lightf. Fl. Sc.* 671; Huds. *Fl. Ang.* 458; *With. Arr.* 775.

Polipodium Filix-mas, Bolt. *Fil. Brit.* 44, t. 24.

Aspidium Filix-mas (Swartz), Sm. *E. F.* iv. 288, *E. B.* 1458; Mack. 340; Hook. and Arn. 569.

Aspidium cristatum, Sm. *E. B.* 1949; Mack. 340.

Dryopteris Filix-mas, Schott, *Fil.*

Lastrea Filix-mas, Newm. *N. A.* 19, *F.* 197; Bab. 410.

Rhizoma tufted; stipes short, densely clothed with reddish scales; fronds semi-erect, lanceolate, pinnate; pinnæ numerous, pinnate; pinnules blunt, serrated; involucre very perfect, without stalked glands; clusters of capsules less crowded nearer the midrib, absent from the lower pinnæ.

Common everywhere.

Obs.—Two apparent species, when better understood, may be introduced here, *Lophodium erosum*, the *Aspidium erosum* of Schkuhr, and *L. abbreviatum*, the *Polystichum abbreviatum* of Decandolle.

LOPHODIUM (RIGIDUM) FRAGRANS.

1753. *Polypodium fragrans*, *Linn. Sp. Pl.* 1089, (1st edition); *Huds. Fl. Ang.* 388, (1st edition); *With. Arr.* 650; *Villars, Hist. Pl. Dauph.* iii. 843.

1795. *Polypodium rigidum*, *Hoffm. Deutsch. Flor.* ii. 16.

1810. *Polystichum strigosum*, *Roth, Fl. Germ.* iii. 86.

Aspidium fragrans, *Gray, Nat. Arr.* ii. 9.

Aspidium rigidum (*Swartz*), *Hook. E. B. S.* 2724; *Hook. and Arn.* 569.

Lastrea rigida (*Presl*), *Newm. N. A.* 19, *F.* 191; *Bab.* 411.

Rhizoma tufted; stipes much shorter than the frond, densely clothed with reddish scales; frond semi-erect, glandulose, sweet-scented, lanceolate, pinnate; pinnæ very numerous; pinnules oblong, obtuse, serrated; involucre very perfect, fringed with stalked glands; clusters of capsules very crowded, covering the pinnules, absent from the lower pinnæ.

Not uncommon upon limestone rocks in the North of England.

Genus. — HEMESTHEUM.

Clusters of capsules on both branches of the lateral veins, and equidistant from the mid-vein, so as to form a continuous submarginal series, which, in the first division, is completely covered by the revolute margin of the pinnule; in the second division, nearly so: involucre instable, sometimes totally absent, at other times small, indistinct, subreniform, evanescent: first upper pinnule longer

than the first lower, both slightly longer than the second and following pinnules: ultimate divisions without a point.

Obs. — This genus has been carefully defined by Schott under the name of *Thelypteris*; but I object, for the reason before stated, to the transfer of a name from a species to a genus.

HEMESTHEUM THELYPTERIS.

Acrostichum Thelypteris, *Linn. Sp. Pl.* 1528; *Bolt. Fil.*

Brit. part ii. 78, t. 43, 44; *With. Bot. Arr. Veg.* 649.

Polypodium Thelypteris, *Linn. Mant.* 505; *Huds. Fl. Ang.*

457; *With. Arr.* 776; ? *Lightf. Fl. Scot.* 674.

Polystichum Thelypteris, *Roth. Fl. Germ.* iii. 77.

Aspidium Thelypteris (*Swartz*), *Sm. E. F.* iv. 285; *Mack.*

Fl. Hib. 340; *Hook. and Arn.* 569, (excl. syn. "E. B. 1018," which represents *G. Phegopteris*).

Lastrea Thelypteris (*Bory*), *Newm. N. A.* 19, *F.* 183; *Bab.* 409.

Thelypteris palustris, *Schott, Fil.*

Rhizoma creeping; fronds of two kinds, both erect, on long smooth stipes, lanceolate, pinnate; pinnae pinnatifid, lower pinnae equalling the rest in length; pinnules blunt, entire, in fertile fronds with convolute margins covering the capsules; lateral veins branched; involucre small, and present on scarcely more than half the clusters; capsules in circular clusters, scarcely marginal.

In marshes, very local.

HEMESTHEUM (OREOPTERIS) MONTANUM.

Polypodium fragrans, *Linn. Mant.* ii. 307; *Huds. Fl. Ang.*

457, (2nd edition). The reader will see that the altered description no longer agrees with *L. rigida*.

1781. *Polypodium montanum*, *Vogler, Diss. de Pol. mont.*

1788. *Polypodium Oreopteris*, *Ehrh. Beitr.*; *Dicks. Tr.*

Linn. Soc. i. 181, (1791); *With. Arr.* 775.

Polipodium Thelypteris, *Bolt. Fil. Brit.* 40, t. 22.

Polystichum montanum, *Roth. Flor. Germ.* iii. 74.

Aspidium Oreopteris (*Swartz*), *Sm. E. F.* iv. 286, *E. B.*

1019; *Mack. Fl. Hib.* 339; *Hook. and Arn.* 569.

Lastrea Oreopteris, *Newm. N. A.* 17, *F.* 187; *Bab.* 410.

Rhizoma tufted; stipes very short, chaffy; frond semi-erect, lanceolate, much attenuated at the base, pinnate; pinnæ pinnatifid, divisions rounded, lower pinnæ very short, deltoid, obtuse; veins and capsules as in the preceding; involucre sometimes quite obvious.

Mountains and moist woods, frequent.

Obs.—Each species is the type of a group of species, and might be regarded as a genus, but the intervention of *H. Novaboracense* tends very much to unite them.

Genus. — GYMNOCARPIUM, *Newman*.

Ultimate divisions of the frond with branched lateral veins free at the extremity, bearing clusters of capsules on all the branches: involucre none. In the British species the plant extends by means of a rapidly extending, slender, subterranean, stolon-like rhizoma.

GYMNOCARPIUM PHEGOPTERIS.

Polypodium Phegopteris, *Linn. Sp. Pl.* 1550; *Lightf. Fl. Scot.* 669; *Huds. Fl. Ang.* 456; *With. Arr.* 775; *Sm. E. F.* iv. 282, *E. B.* 2224; *Mack. Fl. Hib.* 337; *Newm. F.* 115; *Hook. and Arn.* 566.

Polipodium Phegopteris, *Bolt. Fil. Brit.* 36, t. 20.

Aspidium Thelypteris, *Sm. E. B.* 1018.

Lastrea Phegopteris, *Newm. N. A.* 17, *F.* 13.

Polypodium ? *Phegopteris*, *Bab.* 408.

Gymnocarpium Phegopteris, *Newm. Phytol.* iv. 371.

Polystichum Phegopteris, *Roth, Flor. Germ.* iii. 72.

Rhizoma creeping; stipes long; frond ovate-deltoid, pinnate, drooping; first pair of pinnæ distinct, turned back, the rest united at the base, pointing forwards, all pinnatifid; veins, capsules and involucres as in the preceding; colour dull green; stem concolorous, rather scaly.

By mountain rills and waterfalls, and in wet woods: common in Scotland, North of England, and Wales; rare in Ireland.

GYMNOCARPIUM ROBERTIANUM.

1785. *Polypodium Dryopteris*, *Bolt. Fil. Brit.* 53, t. 1.

1795. *Polypodium Robertianum*, *Hoffm. Deutsch. Fl.* ii. 10. — “Fronde triangulari, foliolis ternis bipinnatis : pinnis pinnulisque inferne pinnatifidis. Stipes glaucus, uno latere sulcatus. Frons tenera. Uterque nudo oculo subtili tomento ad lentem brevissimis glandulis obsitus. Odor debilis Geran. Robert. Fructif. minuta.”—*Hoffm. l. c.*

1804. *Polypodium calcareum*, *Sm. Fl. Brit.* 1117, *E. F.* iv. 283, *E. B.* 1525 ; *Newm. F.* 131 ; *Hook. and Arn.* 567.

Lastrea calcarea, *Newm. N. A.* 17.

Lastrea Robertiana, *Newm. F.* 13.

Polypodium ? *calcareum*, *Bab.* 409.

Gymnocarpium Robertianum, *Newm. Phytol.* iv. 371.

Rhizoma creeping ; stipes erect ; frond elongate-deltoid, glandular-mealy ; lower pinnæ bipinnate, upper pinnæ pinnate only ; colour dull green, stipes concolorous.

Among loose stones in limestone districts, not common.

GYMNOCARPIUM DRYOPTERIS.

Polypodium Dryopteris. *Linn. Sp. Pl.* 1555 ; *Lightf. Fl. Scot.* 678 ; *Huds. Fl. Ang.* 460 ; *With. Arr.* 780 ; *Sm. E. F.* iv. 283, *E. B.* 616 ; *Mack. Fl. Hib.* 338 ; *Newm. F.* 123 ; *Hook. and Arn.* 567.

Polypodium Dryopteris, *Bolt. Fil. Brit.* 52, t. 28.

Polystichum Dryopteris, *Roth. Fl. Germ.* iii. 80.

Lastrea Dryopteris, *Newm. N. A.* 15, *F.* 13.

Polypodium ? *Dryopteris*, *Bab.* 409.

Gymnocarpium Dryopteris, *Newm. Phytol.* iv. 371.

Rhizoma creeping ; stipes erect, glabrous ; frond triple, deltoid, smooth, the three branches pinnate ; pinnæ pinnatifid ; lateral veins usually simple ; involucre generally wanting ; clusters of capsules near the extremity of each lateral vein, forming a marginal series ; colour a bright green, stipes purplish.

An exquisitely beautiful little fern. Common in mountain districts, otherwise rare.

Genus. — CYSTOPTERIS, *Bernhardi*.

Mid-vein of ultimate divisions distinct but sinuous, lateral veins branched, free: involucre attached almost beneath the mass of capsules, half-way between the mid-vein and the extremity, directed at first backwards, then upwards, then forwards, and almost covering the circular mass of young capsules like a hood, its anterior margin split into unequal and often capillary segments.

CYSTOPTERIS (MONTANA) ALLIONI.

1789. *Polypodium montanum*, *Allion. Pedem.* n. 2410.

Cyathea montana, *Roth, Flor. Germ.* iii. 100.

Cystopteris montana (*Link*), *Newm. Phytol.* i. 671, *N. A.* 15, *F.* 13 & 159; *Hook. and Arn.* 572; *Bab.* 413.

Rhizoma creeping; stipes erect, longer than the frond; frond deltoid.

Apparently a rare, certainly a local fern; hitherto observed only in Scotland. Found in 1836 on Ben Lawers, by Mr. W. Wilson: in a ravine called Corrach Dh'Ouil-lach, in 1841, by Messrs. W. Gourlie and W. Adamson: in the same place by Mr. Borrer and Dr. Walker-Arnott in 1850: and again by the Rev. W. Little in 1851.

Obs.—I think the name of *Polypodium montanum* was given to this plant against all the rules of botanical nomenclature, Vogler having given that name to another species eight years previously.

CYSTOPTERIS FRAGILIS.

Polypodium fragile, *Linn. Sp. Pl.* 1553; *Lightf. Fl. Scot.* 677; *Huds. Fl. Ang.* 459; *Bolt. Fil. Brit.* 50, t. 27 & 46; *With. Arr.* 779.

1762. *Polypodium rhæticum*, *Huds. Fl. Ang.* 458; *With. Arr.* 780; *Bolt. Fil. Brit.* part ii. 80, t. 45, but certainly not of *Linn. Sp. Pl.* 1552, as cited by early English authors.

1779. *Polypodium polymorphum*, *Villars, Dauph.* iii. 847.

1793. *Polypodium dentatum*, *Dicks. Crypt. fasc.* iii. 1, t. 7, f. 1, *Id. H. Sicc. fasc.* 16; *With. Arr.* 776.

1796. *Polypodium trifidum*, *With. Arr.* 779.

Cyathea fragilis, *Roth, Flor. Germ.* iii. 94.

Cystea fragilis, *Sm. E. F.* iv. 298, *E. B.* 1587.

Cystea dentata, *Sm. E. F.* iv. 300, *E. B.* 1588.

Cystea angustata, *Sm. E. F.* iv. 301.

Cystea regia, *Sm. E. F.* iv. 302, ad partem, *i. e.*, excl. the plant found on the garden-wall at Low Layton, which has not been gathered wild in Britain.

Cistopteris fragilis, *Mack. Fl. Hib.* 341.

Cystopteris fragilis, *Newm. N. A.* 15, *F.* 13, 149; *Hook. and Arn.* 572; *Bab.* 412.

? *Cystopteris dentata*, *Bab.* 412, ad partem, *i. e.*, excl. *Dickieanum*, *Sim.*

Rhizoma quasi-tufted, but increasing laterally; stipes shorter than the frond; frond erect, lanceolate, bipinnate; pinnæ ascending; pinnules distinct.

A small, elegant, and fragile fern, common in Wales, the North of England, Scotland, and parts of Ireland.

Obs.—*Cystopteris alpina* of Desveux, Hooker and Arnott, and Bawington, being also the *C. regia* of Smith in part, and the *C. incisa* of 'English Botany,' is not a true native.

CYSTOPTERIS DICKIEANA.

Cystopteris Dickieana, *Sim, in Gard. Journ.* 308, 1848.

Cystopteris fragilis, *α. Dickieana*, *Moore, Bot. Gaz.* i. 310.

Cystopteris dentata, *Bab.* 412, ad partem, *i. e.*, excl. *dentata*, *Sm.*

Rhizoma tufted; stipes much shorter than the frond; frond ovate-lanceolate; pinnæ crowded, overlapping, twisted as in *Polystichum Lonchitis*, scarcely pinnatifid, never pinnate, very broad and obtuse, their divisions slightly notched; clusters of capsules small, round, remaining distinct, submarginal; involucre generally wanting.

Rare; found by Dr. Dickie in a cave by the sea near Aberdeen.

Obs.—This little fern is better known to cultivators than to field-botanists. It has exactly the habit of a *Woodsia*: I only know it as cultivated, and then it appears perfectly distinct. It is reproduced readily from seed, and loses none of its distinguishing characters.

Genus. — WOODSIA, *R. Br.*

Mid-vein of ultimate divisions indistinct, lateral veins branched, free: involucre seated near the extremity of each branch, its base inclosing the base of the capsules, its margin split into capillary segments, which mingle with the capsules.

WOODSIA ILVENSIS.

? *Acrostichum Ilvense*, *Linn. Sp. Pl.* 1528.

Acrostichum Ilvense, *Huds. Fl. Ang.* 451; *Bolt. Fil. Brit.* 14, t. 9.

Polypodium arvonicum, *With. Arr.* 774.

Woodsia Ilvensis, *R. Br. Tr. Linn. Soc.* xi. 173; *Sm. E. F.* iv. 322, *E. B. S.* 2616; *Newm. N. A.* 13, *F.* 137; *Hook. and Arn.* 567.

Woodsia Ilvensis, *Bab.* 409, ad partem.

Rhizoma tufted; stipes sometimes as long as the frond, but generally shorter, distinctly articulated towards the base; frond erect, lanceolate, pinnate; pinnæ oblong, subopposite, lobed or pinnatifid, scaly.

A very small and rare fern. Found on rocks in Caernarvonshire by Mr. W. Wilson; in Durham by Mr. Backhouse; in Forfarshire by Mr. Watson and Mr. Wilson.

WOODSIA ALPINA.

Polypodium fontanum, *Herb. Linn. certè.*

1776. *Acrostichum Ilvense*, *With. Arr.* 649.

1790. *Acrostichum alpinum*, *Bolt. Fil. Brit.* 76, t. 42.

1793. *Acrostichum hyperboreum*, *Liljeblad, St. Tr.* 201, t. 8.

Woodsia hyperborea, *R. Br. Tr. Linn. Soc.* xi. 173; *Sm. E. F.* iv. 323, ? *E. B.* 2023; *Hook. and Arn.* 567.

Woodsia Ilvensis, *Bab.* 409, ad partem.

Woodsia alpina, *Newm. N. A.* 13, *F.* 143.

Rhizoma tufted; stipes shorter than the frond, articulated; frond narrow, linear, pinnate; pinnæ distant, deltoid, blunt, lobed.

A very small and rare fern. Found on rocks in Caernarvonshire and Perthshire by Mr. W. Wilson.

Genus. — ALLOSORUS, *Bernhardi*.

Mid-vein distinct, lateral veins free : involucre not apparent : capsules in circular clusters near the extremity of the lateral veins, which are often divided : epidermis prolonged, bleached, reflexed, entire, and covering the capsules in the manner of an involucre.

ALLOSORUS CRISPUS.

Osmunda crispa, *Linn. Sp. Pl.* 1522 ; *Lightf. Fl. Scot.* 655 ;
Huds. Fl. Ang. 450 ; *Bolt. Fil. Brit.* 10, t. 7.

Pteris crispa, *With. Arr.* 764 ; *Sm. E. F.* iv. 319, *E. B.* 1160.

Cryptogramma crispa, *Mack. Fl. Hib.* 343 ; *Hook. and Arn.* 575.

Allosorus crispus (*Bernh.*), *Newm. N. A.* 13, *F.* 103 ; *Bab.* 408.

Rhizoma prostrate ; stipes as long as the frond ; fronds of two kinds, both deltoid, and divided into numerous leaf-like stipitate divisions.

A small plant. Stony mountain regions in Scotland and the North of England.

Genus. — CTENOPTERIS.

Mid-vein distinct : lateral veins of the pinnæ or pinnules branched, free, swollen or capitate at their extremities ; the anterior branch simple, generally terminating midway between the mid-vein and the margin, bearing a cluster of capsules at its extremity ; the posterior branch is twice or thrice dichotomously divided, the capitate extremities usually forming a line parallel to the margin : involucre none : rhizoma usually attached by means of its roots to the surface of a rock, the bark of a tree, &c., thus always having a pseudo-parasitic or climbing appearance, cylindrical, branched, extending itself at the extremities, at first densely clothed with paleæ, but as these fall off becoming smooth and naked ; of slow growth, tough and very enduring, here and there marked with nearly circular scars, the site of fallen fronds, which, though persistent through the winter, are deciduous in early summer, falling off at a basal articulation. (See *Phytol.* ii. 274).

Obs.—This genus is indicated by Presl under the title of Polypodium § Ctenopteris, but I am not sufficiently acquainted with the host of exotic species which that author has placed in his sectional divisions to express any opinion as to their affinity. The genus, as restricted above, is sufficiently extensive, and has not, as far as my information extends, been previously isolated.

CTENOPTERIS VULGARIS.

Polypodium vulgare, *Linn. Sp. Pl.* 1544; *Lightf. Fl. Scot.* 667; *Huds. Fl. Ang.* 455; *With. Arr.* 773; *Sm. E. F.* iv. 280, *E. B.* 1149; *Mack. Fl. Hib.* 337; *Newm. N. A.* 13, *F.* 111; *Hook. and Arn.* 566; *Bab.* 408.

Polipodium vulgare, *Bolt. Fil. Brit.* 32, t. 18.

Polypodium Ctenopteris vulgare, *Presl, Tent. Pteridog.* 179.

Stipes articulated at the base, of nearly equal length with the frond; frond pinnatifid.

Walls, trees and hedge-banks, common.

Obs.—The Polypodium cambricum of all authors is referrible to this species.

Obs.—The beautiful Davallia canariensis, which, together with the extensive family to which it belongs, is intermediate between Polypodieæ and Hymenophylleæ, may possibly occur in the South-west of Ireland.

Family. — HYMENOPHYLLEÆ.

Frond appearing to consist of branched veins, each accompanied throughout by a membranous wing or margin: cluster of capsules nearly spherical, seated on one of these veins which projects beyond the edge of the leaf, the cluster being inclosed in a kind of cup-like involucre.

Genus. — TRICHOMANES, *Linneus*.

Involucre elongate, somewhat urn-shaped: capsuliferous vein projecting beyond it in the form of a long stiff bristle.

TRICHOMANES SPECIOSUM.

Trichomanes speciosum, *Willd. Sp. Pl.* v. 514; *Newm. N. A.* 29, *F.* 305.

Trichomanes brevisetum, *R. Br. in Ait. Hort. Kew.* v. 529; *Sm. E. F.* iv. 324; *Mack. Fl. Hib.* 344.

Trichomanes Europæum, *Sm. in Rees' Encyc.* xxxvi.

Trichomanes alatum, *Hook. Flor. Lond.* t. 53.

Hymenophyllum alatum, *Sm. E. B.* 1417.

Trichomanes radicans, (*Newm. in litt.* 1838, non *Swartz*);
Hook. and Arn. 576; *Bab.* 416.

Rhizoma hairy, creeping extensively; stipes about as long as the frond; frond pendulous, triangular, twice or thrice pinnate.

In Ireland only. Shaded wet glens and the vicinity of waterfalls in Cork and Kerry.

Genus. — HYMENOPHYLLUM, *Smith.*

Involucre shorter and rounder than in the preceding genus, and bivalved: the receptacle or capsuliferous vein not longer than the involucre.

HYMENOPHYLLUM TUNBRIDGENSE.

Trichomanes Tunbridgense, *Linn. Sp. Pl.* 1561; *With. Arr.* 781.

? *Trichomanes pyxidiferum*, *Bolt. Fil. Brit.* 56, t. 30.

Trichomanes Tunbridgense, *Huds. Fl. Ang.* 461, ad partem.

Hymenophyllum Tunbridgense, *Sm. E. F.* iv. 326, *E. B.* 162; *Mack. Fl. Hib.* 345; *Newm. N. A.* 29, *F.* 321; *Hook. and Arn.* 577; *Bab.* 416.

Rhizoma filiform, creeping extensively; frond drooping, pinnate; pinnæ alternate, composed of four or five alternate, dichotomously forked divisions, consisting, as in *Trichomanes*, of a membranous wing and a median stiff wiry vein, margins of the wing serrated; involucre in the axil of the pinnæ, flattened, serrated at top.

A small moss-like plant, growing on rocks, local.

HYMENOPHYLLUM UNILATERALE.

Trichomanes Tunbridgense, *Lightf. Fl. Scot.* 681; *Huds. Fl. Ang.* 461, ad partem; *Bolt. Fil. Brit.* 58, t. 31.

1810. *Hymenophyllum unilaterale*, *Willd. Sp. Pl.* v. 521; *Newm. F.* 14.

1830. *Hymenophyllum Wilsoni*, *Hook. Brit. Flor.* 446, *E. B. S.* 2686; *Mack. Fl. Hib.* 345; *Newm. N. A.* 29, *F.* 325; *Hook. and Arn.* 577; *Bab.* 416.

Pinnæ secund, unilateral ; involucre pear-shaped, entire at the top until mature, then dehiscent, the valves widely separating, otherwise as in *H. Tunbridgensis*.

A small moss-like plant. On rocks in mountain regions.

Order. — OSMUNDACEÆ, *R. Brown*.

Plants composed of fibrous roots, solid simple rhizoma, and flat leafy fronds which rise with a circinate veneration. Fructification upon a portion of the frond in which the veins alone remain, the parenchyma being apparently represented by clustered, globose, reticulated capsules, which are not provided with an elastic ring : involucre none.

Genus. — OSMUNDA, *Linneus*.

Characters those of the order.

OSMUNDA REGALIS.

Osmunda regalis, *Linn. Syst. Nat.* 1521 ; *Lightf. Fl. Scot.* 653 ; *Huds. Fl. Ang.* 449 ; *Bolt. Fil. Brit.* 6, t. 5 ; *With. Arr.* 763 ; *Sm. E. F.* iv. 327, *E. B.* 209 ; *Mack. Fl. Hib.* 345 ; *Newm. N. A.* 29, *F.* 331 ; *Hook. and Arn.* 578 ; *Bab.* 417.

Rhizoma very large, tufted ; stipes woody, as long as the frond ; frond nearly erect, and, including the stipes, four to ten feet high, pinnate ; pinnæ opposite, spreading, pinnate ; pinnules alternate, ovate, stalked, very entire ; terminal panicle of capsules golden coloured, large, very conspicuous.

Wet places, very local.

Order. — OPHIOGLOSSACEÆ.

Plants composed of succulent and comparatively stout roots, some of which travel horizontally in the manner of stolons, succulent stipes, and branched fronds with straight veneration. Frond composed of two branches, the outer leafy, the inner, which it seems to inclose at its base in the manner of a spathe, entirely capsuliferous : capsules large, without reticulations, ring, or involucre, opening by a transverse fissure.

Genus. — BOTRYCHIUM, Swartz.

Frond produced annually *within* the base of the fertile frond of the preceding year: exterior or barren branch variously divided; interior or capsuliferous branch also much divided: capsules spherical, sessile, crowded.

BOTRYCHIUM LUNARIA.

Osmunda lunaria, Linn. *Sp. Pl.* 1519; *Lightf. Fl. Scot.* 652; *Huds. Fl. Ang.* 449; *Bolt. Fil. Brit.* 4, t. 4; *With. Arr.* 762; *Sm. E. B.* 318.

Botrychium lunaria, *Sm. E. F.* iv. 328; *Mack. Fl. Hib.* 346; *Newm. N. A.* 30, *F.* 337; *Hook. and Arn.* 578; *Bab.* 417.

Root stout, spreading, sparingly branched; stipes erect; fertile branch of the frond a racemose panicle, the barren branch pinnate; pinnæ three to seven pairs, flabelliform, with crenate margins.

A dwarf plant. Heaths, rather local.

Genus. — OPHIOGLOSSUM, Linneus.

Frond produced annually *exterior* to the base of the last year's frond: exterior or barren branch a simple undivided spathe; interior or fertile branch a simple, erect, stalked, pointed spike, in the substance of which two parallel series of large spherical capsules are embedded; these open by a transverse fissure, giving the spike a serrated appearance.

OPHIOGLOSSUM VULGATUM.

Ophioglossum vulgatum, Linn. *Sp. Pl.* 1518; *Lightf. Flor. Scot.* 651; *Huds. Flor. Ang.* 449; *Bolt. Fil. Brit.* 2, t. 3; *With. Arr.* 761; *Sm. E. F.* iv. 330, *E. B.* 108; *Mack. Fl. Hib.* 346; *Newm. N. A.* 30, *F.* 349; *Hook. and Arn.* 578; *Bab.* 417.

Stipes erect; fertile branch of the frond an erect, club-shaped, pointed spike; the barren branch an entire ovato-lanceolate leaf.

A dwarf plant, growing on heaths and in meadows.



Newman, Edward. 1851. "Synoptical Table of the British Ferns." *The Phytologist: a popular botanical miscellany* 4, i-xxxii.

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