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Scolopendrium vulgare, var. Viviparum (showing bulbiferous plants). See Page 81.

(From "The Gardener's Chronicle.")
YOUNG COLLECTOR SERIES.

BRITISH FERNS,

AND

WHERE FOUND.

BY

E. J. LOWE, ESQ., F.R.S., F.L.S., F.G.S., F.ROY.M.S., ETC.

Author of "Our Native Ferns," etc.

London:

SWAN SONNENSCHEIN & CO.,
PATERNOSTER SQUARE.

1890.
Butler & Tanner,
The Selwood Printing Works,
Frome, and London.
IN

AFFECTIONATE REMEMBRANCE

OF THE

LATE COLONEL A. M. JONES,

WHOSE

LARGENESS OF HEART AND STANCH FRIENDSHIP

ARE TRAITS THAT CANNOT BE FORGOTTEN,

AND WHOSE

ENTHUSIASTIC LABOURS AND KEEN PERCEPTION

ENABLED HIM TO DO SO MUCH

FOR THE ADVANCEMENT OF THIS,

HIS FAVOURITE SUBJECT.

E. J. LOWE.
PREFACE.

The Author of this Handbook is anxious to acknowledge the great help that he has received from his numerous fern friends. More especially are these thanks due to Dr. F. W. Stansfield, of Sale, without whose valuable assistance and suggestions (notably as regards classification) it would have been impossible to have written this work in six weeks. The book was required at a short notice, and therefore it is hoped that any imperfections will be dealt with mercifully.

To Dr. Maxwell Masters, Mr. E. F. Fox, Mr. W. H. Phillips, Mr. J. H. Fitt, Mr. W. Barnard-Hankey, Mr. R. Thompson, Mr. J. M. Barnes (now deceased), Mrs. Grant, Mrs. Barnes, Colonel Randall, Mrs. Lewis, Mrs. Curre, Mr. Elworthy (son of the late Mr. C. Elworthy), Messrs. Birkenhead, Messrs. Backhouse, Mr. H. S. Perry, Mrs. J. K. Hodgson, Miss Jones, Mrs. Bagnall Oakeley, Mr. J. Garnett, Mr. R. Ll. Praeger, Mr. Martin-Atkins, Mr. P. B. O'Kelly, Mr. C. T. Druery, Major Cowburn, Mr. Stabler, Mr. W. G. Baker (Botanic Gardens, Oxford), Mr. J. W. Morris, and others, his thanks are also specially due, for plants, fronds, and various information.

The Author has received great help from the invaluable "Nature Printed Impressions of British Ferns," by the late Colonel A. M. Jones, and from an examination of his dried fronds, and his valuable collection of historical ferns now growing in the Clifton Zoological Gardens (under the superintendence of the Author), containing divisions of the principal original wild finds of various collectors, as well as those raised by Colonel Jones and others. Further sources of information have been "Choice British Ferns," by Mr. C. T. Druery; "Ferns of the English Lake Country," by Mr. J. M. Barnes; "The Ferns of Ulster," by Mr. W. H. Phillips and Mr. R. Ll. Praeger; "Select Lists of British Ferns," by Messrs. F. W. and H. Stansfield; "European Ferns," by Mr. J. Britten; "Geographical Handbook of Ferns," by Mrs. Lyell; and "Historical Notes of Ferns," MSS. by Mr. E. F. Fox.

To these must be added the Author's acquaintance with the
collections of growing plants at Milnthorp (the late Mr. J. M. Barnes), at Scarborough (the late Mr. A. Clapham, dispersed); at Bulwell and Exeter (the late Rev. C. Padley, dispersed); at Usk (the late Mr. Carbonell, now at the Royal Gardens, Kew); at Chislehurst (Mr. G. B. Wollaston), Nettlecombe Court (Sir Alfred Trevelyan), Darlaston Hall (the late Mr. Swynfen-Jervis), Rolleston Hall (the late Sir Oswald Mosley), Hawkchurch (the late Mr. J. Wills, dispersed), Chelsea Botanic Gardens (the late Mr. T. Moore), Edinburgh (Mr. P. N. Fraser), Ilfracombe (Mr. J. Dadds), Torbay (Miss Kitson, dispersed), Hartfield, Birmingham (Mr. J. E. Mapplebeck); at Iona House, Clifton (Mr. Martin-Atkins), Hillersdon House, Exeter (Mrs. Grant), Exeter (the late Mr. R. Gray, dispersed), Brislington (Mr. E. F. Fox); at Bowdon (the late Mr. J. Sidebotham), Windermere (Mr. J. Clowes), Bowness (Mr. Garnett, and Mr. Wilson), Scarborough (the late Mr. C. Glave, dispersed), Whitby (the late Mr. W. Willison, dispersed), Malton (the late Mr. Monkman, dispersed), Levens (Mr. Stabler), York (Messrs. Backhouse and Mrs. Buckle), Marwood (the late Rev. F. Mules), Papplewick (the late Mr. Riley, dispersed), Foots Cray (the late Mr. R. Sim), Kirkcaldy (Mr. Sang) Tunbridge Wells (The late Mrs. Delves, dispersed), Wentworth (the late Mr. J. Henderson), Vauvert, Guernsey (the late Mr. J. James, dispersed), Glasnevin Gardens (the late Mr. D. Moore), Belfast (Mr. W. H. Phillips), Edinburgh (the late Mr. Tait, dispersed), Holywood (Mr. R. Ll. Praeger), Ulverston (Mrs. Hodgson), South Kensington Museum (Mrs. Cowper), Ilfracombe (Mr. R. Moule), Charmouth (Mr. J. Moly), etc.

To Mr. John C. Nimmo, Publisher, London, the Author is indebted for the use of the Illustrations, and for which he offers his thanks.*

* The Author is aware that some of the varieties are not sufficiently distinct to be retained; this, however, can be more satisfactorily discussed by the Fern Conference from a careful examination of fronds. A few additional varieties will be found in an Addendum.
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*Note: The table continues with more species and their descriptions.*
Varieties of the British Ferns.

These have been described in 1859 in “Nature-Printed British Ferns,” by Mr. Thomas Moore; in “Our Native Ferns,” in 1867, by the Author of this Handbook; in 1876 to 1880, privately (6 parts) in “Varieties of the British Species of Ferns,” nature-printed, by Colonel A. M. Jones; in 1878, in “Ferns of the English Lakes,” edited by Mr. J. M. Barnes; and in 1888, in “Choice British Ferns,” by Mr. C. T. Druery.

For elaborate descriptions the reader is referred to these works; but the vast increase in our knowledge of this subject, during the last few years, has caused the earlier works to be out of date. Many varieties were unknown when they were written, and a number of unimportant forms have now to be rejected. The English Lakes are, of course, restricted to a prescribed area; and Mr. Druery’s excellent “Choice British Ferns,” as the name implies, is limited to the most striking departures from the normal forms; and even in extraordinary varieties there are many beautiful ferns that have been discovered during the past two years, and others that do not appear to have been known to Mr. Druery.

For several reasons it is desirable to have a record up to the present time; and the most powerful of these arguments is the confusion that exists. Allied varieties have been found by different persons, and such names as divisolobum, grandiceps, plumosum, polydactylum, cristatum, cruciatum, crispum, etc., have been used over and over again, sometimes with the additional name of the finder; or, if showing distinct characters, one or two extra names have been added, until we have varieties that can boast of possessing three or four names, such, for example, as Aspidium angulare, variety decompositum-magnificum-polydactylum, and one or two even longer than this. A simple descriptive name of any marked character, such as plumosum, cristatum or crispum, is desirable, or even a compound name that will denote two marked characters like ramo-coronans, sagittato-projectum, or lineare-cristatum, may not be objected to; but a cumbersome string of names cannot be tolerated, no matter how descriptive it may be; in fact, a name is the symbol by which it is to be recognised, and is not intended to be a description. We can now, by crossing several varieties of ferns, produce all the characters on one frond, and several of these again crossed will give us their combined characters; and this must prove the utter impossibility of a descriptive nomenclature.
It is always undesirable to change a familiar name; and therefore, in order to create as little alteration as possible,—in those families that are particularly rich in varieties,—a plan has been adopted of dividing the varieties of the species Aspidium angulare, Scolopendrium vulgare, and Asplenium filix-femina into divisions, groups, and sections, for the distinct varieties are now to be reckoned by hundreds in these species:—

**Asplenium Filix-femina.**

**DIVISION A. Changes in skeleton.**

<table>
<thead>
<tr>
<th>Group 1 (branched)</th>
<th>Group 2 (dwarfed)</th>
<th>Group 3 (flexuose)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section α ramosum.</td>
<td>Section α pumilum.</td>
<td>Section α flexuosum.</td>
</tr>
<tr>
<td>β grandiceps.</td>
<td>β crispatum.</td>
<td></td>
</tr>
<tr>
<td>γ cristatum.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>δ cruciatum.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DIVISION B. Alteration of soft parts.**

<table>
<thead>
<tr>
<th>Group 1 (subdivision of segments)</th>
<th>Group 2 (diminution of soft parts)</th>
<th>Group 3 (abbreviated pinnae)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section α plumosum.</td>
<td>Section α laxum.</td>
<td>Section γ laciniatun.</td>
</tr>
<tr>
<td>β dissectum.</td>
<td>β depauperatum.</td>
<td>β lineare.</td>
</tr>
</tbody>
</table>

**Scolopendrium vulgare.**

**DIVISION A. Changes in skeleton.**

<table>
<thead>
<tr>
<th>Group 1 (branched)</th>
<th>Group 2 (truncate)</th>
<th>Group 3 (flexuose)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section α ramosum.</td>
<td>Section α truncatum.</td>
<td>Section α flexuosum.</td>
</tr>
<tr>
<td>Sub-section α ramo-inaquale.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Section β cristatum.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-section β ramo-marginatum.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DIVISION B. Alteration of soft parts.**

<table>
<thead>
<tr>
<th>Group 1 (increased development)</th>
<th>Group 2 (narrowing of skeleton)</th>
<th>Group 4 (margin altered)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section α crispum.</td>
<td>Section α exiguum.</td>
<td>Section α fissile.</td>
</tr>
<tr>
<td>β undulatum.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 3 (surface rough)</th>
<th>Group 5 (variegated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section α muricatum.</td>
<td>Section α variegatum.</td>
</tr>
<tr>
<td>β supralinecatum.</td>
<td></td>
</tr>
<tr>
<td>γ marginatum.</td>
<td></td>
</tr>
</tbody>
</table>
Aspidium angulare.

DIVISION A. Changes in skeleton.

Group 1 (branched).

Section a ramosum.

| β grandiceps. |
| γ cristatum. |

Group 2 (dwarfed).

Section a congestum.

| β alatum. |

Group 3 (flexuose).

Section a flexuosum.

Group 4 (stipitate).

Section a stipatum.

DIVISION B. Alteration of soft parts.

Group 1 (increased development).

Section a plumosum.

| β foliosum. |
| γ pulcherrimum. |
| δ macropinnulum. |

Group 3 (subdivision of pinnules).

Section a decompositum.

| β acutilobum. |
| γ divisolobum. |
| δ plumoso-divisolobum. |
| ε multilobum. |

DIVISION C. Alteration of outline.

Group 1 (widened).

Section a deltoideum.

Group 2 (narrowed).

Section a angustatum.

DIVISION D. Alteration in colour.

Group 1 (variegated).

Section a variegatum.

By the above arrangement the number of names to any one variety is in most instances diminished, being merged into the name of the section. The aim has been to correct the unpalatable names that already exist without destroying their identity.* Future names, it is hoped, will be more in accordance with the rules of Botany; and this is important, as the increase in varieties, both by wild

* Mr. Thomas Moore, whose name will always be received with respect, was (perhaps innocently) the originator of compound names. A Hart’s Tongue having a marginal belt was named by him marginatum, another bmarginatum, whilst a third with a branched head became bmarginatum multifidum. This habit became chronic with some of our British Fern authorities, who declared that a descriptive name, no matter how unwieldy, was the one to adopt. Even the nomenclature of Linnaeus and Decandolle was condemned; and the variety of Polypodium vulgare known as cambricum from the time of Linnaeus (more than a century ago) was altered to plumosum. The author believes that nearly all the members of the Pteridological Society now condemn cumber-some names.
finds and by judicious crossing, has never advanced so rapidly as it is doing at the present time.

The nomenclature adopted in this Handbook is that of the late Sir William Hooker, as given in his "Synopsis Filicum," completed by Mr. J. G. Baker, F.R.S., Royal Gardens, Kew. In this work Sir William Hooker has arranged the British species in the following order:

SUB-ORDER II. POLYPODIACEÆ.

Tribe 2. Dicksoniææ.
Woodsià ilvensis, R. Brown.
,, hyperborea, R. Brown.

Tribe 3. Hymenophylleæ.
Hymenophyllum Tunbridgeense, Smith.
,, unilaterale, Bory.
Trichomanes radicans, Swartz.

Tribe 4. Davalliaeæ.
Cystopteris fragilis, Bernhardi.
,, alpina, Desvaux
(Cystopteris regia, Desvaux).
,, montana, Link.

Adiantum Capillus-Veneris, Linnaeus.
Cryptogramme crispa, R. Brown
(Allosorus crispus, Bernhardi).
Pteris aquilina, Linnaeus.
Lomaria Spicant, Desvaux
(Blechnum Spicant, Smith).

Tribe 8. Aspleniææ.
Asplenium viride, Hudson.
,, Trichomanes, Linnaeus.
,, septentrionale, Linnaeus.
,, marinum, Linnaeus.
,, Germanicum, Weiss.
,, Kuta-muraria, Linnaeus.
,, Adiantum-nigrum, Linnaeus.
,, fontanum, Bernhardi.
,, lanceolatum, Hudson.
,, Filix-femina, Bernhardi.
(Athyrium Filix-femina, Roth).
,, Ceterach, Linnaeus
(Ceterach officinarum, Willdenow).

Scolopendrium vulgare, Smith.
NOMENCLATURE.

Tribe 10. Aspidieæ.

Aspidium Lonchitis, Swartz
(Polystichum Lonchitis, Roth).
,, aculeatum, Swartz
(Polystichum aculeatum, Roth).
,, angulare, Kitaibel
(Polystichum angulare, Presl, and included in aculeatum, Swartz).

Nephrodium Thelypteris, Desvaux
(Lastrea Thelypteris, Bory).
,, montanum, Baker
(Lastrea montana, Moore, and L. Oreopteris, Bory).
,, Filix mas, Richard
(Lastrea Filix-mas, Presl).
,, paleaceum, Don
(Lastrea Filix-mas, Presl, and Aspidium paleaceum, Donovan).
,, propinquum, Lowe
(Lastrea Filix-mas, Presl, and L. propinqua, Wollaston).
,, cristatum, Michaux
(Lastrea cristata, Presl).
,, rigidum, Desvaux
(Lastrea rigida, Presl).
,, spinulosum, Desvaux
(Lastrea dilatata, Presl).

Tribe 11. Polypodieæ.

Polypodium Phegopteris, Linnaeus.
,, Dryopteris, Linnaeus.
,, Robertianum, Hoffmann
(P. calcareum, Smith and P. Dryopteris, var. Bolton).
,, alpestre, Hoppe.
,, vulgare, Linnaeus.


Gymnogramme leptophylla, Desvaux.

SUB-ORDER III. Osmundaceæ.

Osmunda regalis, Linnaeus.

SUB-ORDER VI. Ophioglossaceæ.

Ophioglossum lusitanicum, Linnaeus.
,, vulgatum, Linnaeus.
Botrychium Lunaria, Swartz.
In Sub-order I there are no European representatives

2, Tribe I

2, 4, this contains 81 known Davallias, none British.

2, 5, no European representatives.

2, 6, out of 62 Adiantums only one is British.

2, 7, none British.

2, 8, out of 282 Aspleniums 11 are British.

2, 9, Great Britain has one Scolopendrium.

2, 10, out of 56 Aspidiurns we have 3, and out of 224 Nephrodiums we have only 6.

2, II, Polypodium. There are 393 species, of which only 4 are British.

3, we have one Osmunda.

4, there are no representatives in Europe.

5, none in Europe.

6, Ophioglossum and Botrychium, there are 3 in the United Kingdom and 8 in Europe.

THE FERNS OF EUROPE PROPER.

(Natives of this country are distinguished thus *).

Onoclea Germanica, Willdenow.

Woodsiia glabella, Brown.

* Caucasica, J. Smith.

* Ilvensis, Brown.

* hyperborea, Brown.

Dicksonia Culcita, L'Héritier.

* Hymenophyllum Tunbridgense, Smith.

* unilaterale, R. Brown.

* Trichomanes radians, Swartz.

Davallia Canariensis, Smith.

* Cystopteris fragilis, Bernhardi.

* alpina, Desvaux.

* Sudetica, A. Br. & Milde.

* montana, Link.

* Adiantum Capillus-Veneris, Linnaeus.

Æthiopieum, Linnaeus.

Chellanthes fragrans, Webb & Berth.

* Hispanica, Mettenius.

* Szovitzii, Fisch & Meyer.

* Cryptogramme crispa, R. Brown.

Pteris longifolia, Linnaeus.

* Cretica, Linnaeus.

* arguta, Aiton.

* aquilina, Linnaeus.

* Lomaria Spieant, Desvaux.

Arctic Europe to Pyrenees.

Lapland, S. Tyrol.

Caucasus.

England, Wales, and Scotland.

England, Wales, and Scotland.

Spain.

England, Wales, and Scotland.

England, Scotland, and Ireland.

Norway.

Ireland, Scotland, and Wales.

Spain and Portugal.

United Kingdom.

England, and from Sweden to Spain.

Silesia, Moravia, and Carpathians.

Scotland, Scandinavia, and Central Europe.

England, Wales, Ireland, & warmer parts of Europe.

Spain.

Switzerland and Southern Europe.

Portugal and Spain.

Italy and Dalmatia.

England, Scotland, Ireland, Spain, Lapland.

Spain, Dalmatia, Sicily.

Switzerland, Italy, Crete, Corsica.

Portugal.

England, and throughout Europe.

United Kingdom, and throughout Europe.
Woodwardia radicans, Smith.
Asplenium Hemionitis, Linnaeus.
* " viride, Hudson.
* " Heuffleri, Reichardt.
* " Trichomanes, Linnaeus.
* " Petrarchæ, De Candolle.
* " septentrionale, Hoffmann.
* " Scelosii, Leybold.
* " marinum, Linnaeus.
* " germanicum, Weiss.
* " Ruta-muraria, Linnaeus.
* " fissum, Kitaibel.
* " Adiantum-nigrum, Linnaeus.
* " fontanum, Bernhardii.
* " lanceolatum, Hudson.
* " (Athyrium) crenatum, Ru-
precht.
* " (Athyrium) Filix-femina, Bernhardi.
* " (Hemidictyum) Ceterach, Linnaeus.
Scolopendrium vulgare, Swartz.
Hemionitis, Swartz.
Aspidium (Polystichum) Lonchitis, Swartz.
* " (Polystichum) aculeatum, Swartz.
Nephrodium (Lastrea) Thelypteris, Desvaux.
* " montanum, Baker.
* " Filix-mas, Richard.
* " cristatum, Michaux.
* " rigidum, Desvaux.
* " spinulosum, Desvaux.
Polypodium (Phegopteris) Phegopte-
ris, Linnaeus.
* " Dryopteris, Linnaeus.
* " alpestræ, Hoppe.
Spain, Portugal, Italy, Sicily.
Spain, Portugal.
United Kingdom, and from Arctic
Europe to Pyrenees.
Tyrol.
United Kingdom, and throughout
Europe.
S. of France, Italy, Spain, Sicily.
Britain, Scotland, Norway, Spain,
Italy.
Tyrol and Carinthia.
British Isles, Orkney, France, and
Spain.
England, Scotland, Wales; Middle
and N. Europe.
United Kingdom. Arctic Europe
to Spain.
Germany, Italy, Turkey, Hungary,
Dalmatia.
United Kingdom, and throughout
Europe.
England, Spain, Portugal, Greece.
Norway, Sweden, Lapland.
United Kingdom, and throughout
Europe.
France, Italy, Sicily, Spain, Greece.
United Kingdom. From Green-
land to Greece.
United Kingdom. Throughout
Europe.
England, Ireland, Scotland.
Throughout Europe.
United Kingdom. Lapland to
Greece.
United Kingdom. Throughout
Europe.
England, Scandinavia, Italy, Greece.
England, Spain, Greece, Germany,
Switzerland.
United Kingdom. Throughout
Europe.
United Kingdom. Lapland to
Pyrenees.
Scotland, Lapland, Russia, Ger-
many, Alps.
BRITISH FERNS.

*Polypodium vulgare, Linneus.
Nothochlæa lanuginosa, Desvaux.
Gymnogramme Pozoi, Kunze.
* Osmunda regalis, Linneus.
*Ophioglossum Lusitanicum, Linneus.
* Botrychium simplex, Hitchcock.

United Kingdom. Throughout Europe.
Spain, Greece, Syria.
S. Europe.
Spain.
Jersey, S. Europe.
United Kingdom. Throughout Europe.
Guernsey to Mediterranean.
England and Ireland. Lapland, and various parts of Europe.
N. Europe.
Scandinavia.
United Kingdom. From Arctic Europe to Spain.
Lapland to Pyrenees.
Norway to Austria.

To the above may be added, from Algeria, Madeira, Canaries, and Azores:—

Onoclea orientalis, Hooker.
Adiantum reniforme, Linneus.
Cheilanthes pulchella, Bory.
Asplenium monanthemum, Linneus.
" sepulchrale, Hooker.
" furcatum, Thunberg.
" (Athyrium) umbrosum, J. Smith.
Aspidium (Polystichum) falcinellum, Swartz.
" frondosum, R. Lowe.
Nephrodium (Lastrea) æmulum, Baker.
" unitum, R. Brown.
" molle, Desvaux.
Polypodium (Phegopteris) drepanum, Hooker.
Gymnogramme (Leptogramme) Totta, Schlechtendal.
Acrostichum squamosum, Swartz.

A more extended account of the Ferns of Europe, and throughout the world, will be found by referring to "A Geographical Handbook of all the Known Ferns," by Mrs. K. M. Lyell (1870), the above extract being sufficient to show the Ferns of Europe. Reference may also be made to "Cassell’s European Ferns," in which the species are described and figured. There are twenty-nine species not found in this country, out of the seventy European Ferns. My list contains forty-five British species.

† Included in "European Ferns," by Mr. James Britten.
WOODSIA.

SUB-ORDER II. POLYPODIACEÆ.

Tribe 2. DICKSONIÆ.

THE OBLONG WOODSIA.

WOODSIA ILVENSIS.—R. Brown.

A diminutive mountain fern with fronds from 2 to 4 inches long. This plant grows in the crevices of damp rocks. The fronds are lanceolate-pinnate, the pinnae being profoundly pinnatifid. The rachis, stipes, and underside of the frond chaffy, and the sori scattered. It is a deciduous fern, and requires growing under a bell-glass. Exceedingly rare, and found at altitudes of from 1,200 to 3,000 ft. Mr. Joseph Sidebotham discovered it in Carnarvonshire; and it has been found in Westmoreland, Cumberland, and Durham, one locality near the Caldron Spout, Teesdale (in an inaccessible place, E. J. L.). In Scotland, near Loch Skene (Rev. W. Little) to the North of Moffat (P. Gray), hills between Dumfries and Peebleshire (abundant, Mr. W. Stevens), near Crieff on Ben Chonzie (the late Professor Balfour), Ben Lawers (Mr. J. Backhouse), Clova Mountains (Sir W. Hooker). Professor Balfour, Mr. Neill Fraser and myself failed to find it on Ben Lawers.

It occurs in Iceland, Lapland, Norway, Sweden, Denmark, Russia, Nova-Zembla, Caucasus, the Crimea, Spain, Italy, France, Germany, Switzerland, Hungary, Siberia, Kamtschatka, United States, Canada, the Rocky Mountains and Arctic America, Japan, Siberia, Labrador, Greenland.

No varieties are recorded.

THE ALPINE WOODSIA.

WOODSIA HYPERBOREA.—R. Brown.

Hairy, but not scaly.

Equally rare and scarcely as large as Woodsia Ilvensis, and with shorter pinnae; growing in similar situations.

Our British recorded localities are Snowdon (Mr. L. Clark) near Crieff on Ben Chonzie, Perthshire, Glen Isla For-
farshire, and Glen Fiadh, Clova Mountains (the late Professor Balfour), on Ben Lawers (both by Mr. W. Wilson and Mr. Dickson), and between Glen Lochy and Glen Dochart (Mr. J. T. Syme).

It is a native of Finland, Sweden, Lapland, Norway, Russia, Germany, France, Switzerland, Spain, Siberia, Silesia, Transylvania, Hungary, Rocky Mountains, on the Himalaya, and in Massachusetts.

There are no varieties.

**Tribe 3. HYMENOPHYLLEÆ.**

**THE ONE-SIDED FILM FERN.**

**HYMENOPHYLLUM UNILATERALE.**—*Bory.*

(H. WILSONI.—*Hooker.*)

A moss-like fern which might readily be mistaken for one of the Musci family, having pellucid-membranous fronds, from 1 to 6 inches in length. Pinnate, the pinnae divided into 3 or 4 lobes. Involucres stalked, the upper margin serrated. Growing in very damp situations amongst moss on the ground or at the base of trees, and on wet rocks.

Found in Cornwall, Devon, Stafford, Salop, Lancashire, York, Northumberland, Westmoreland, and Cumberland (in the English lakes in at least a score localities), Glamorgan, Brecknock, Cardigan, Carmarthen, Montgomery, Merioneth, and Carnarvon. In 13 Scotch counties, 12 Irish counties, Mull, Arran, Shetland, Orkney, and Harris.

A native of Norway, Faroe, Bourbon, New Zealand, Chiloe, Falkland, Tierra del Fuego, Cape Horn, Tasmania, Cape of Good Hope, and Hermite Island.

The fronds endure for several years, and renew their growth annually. Mr. Gray of Alphington had a plant that had fronds 6 inches long, many of which became branched by subsequent growths.

**Varieties.**


2 Ramosum, Gray. Found in 1867 on Sheep's Tor, Dartmoor, by Mr. R. J. Gray, and in 1882 on the Mourne Mountains, Ireland, by Mr. R. L. Praegger, length 4½ inches. Branching several times from the main stem.

* All varieties marked thus (*) have received 1st class Certificates from the Royal Horticultural Society or Royal Botanic Society.
HYMENOPHYLLUM AND TRICHOMANES.

THE TUNBRIDGE FILM FERN.

HYMENOPHYLLUM TUNBRIDGESESE.—Smith.

A somewhat similar fern, with broader fronds and having more divisions in the pinnæ, sometimes being split into 8 or 10 lobes. Less common than *H. unilaterale*.

Found in Cornwall, Devon, Somerset, Kent, Sussex, Lancashire, Cheshire, Yorkshire, Cumberland, Westmoreland, Glamorgan, Brecknock, Merioneth, Carnarvon. In 5 Scotch and 6 Irish counties. Valentia, Mull, Bute, and Arran.

A native of Norway, Sweden, France, Germany, Italy, Belgium, India, Madeira, Azores, Mauritius, Chili, Brazil, New Holland, New Zealand, Tasmania, Valdivia, and the Cape of Good Hope.

The fronds paler in colour than those of *H. unilaterale*. The involucres without stalk and the upper margin not serrated.

**Variety.**

*latifolium*, Praeger. Found in 1882 at Narrowwater, county Armagh, by Mr. R. L. Praeger. $5 \times 1\frac{3}{4}$ inches (in widest part), lower half depauperate and very narrow, above broad and plumose.

The Film Fern succeeds well when fastened to a large stone with wires, provided the stone is kept wet.

Both the Film Ferns are often found growing together, though *H. unilaterale* is the commoner of the two. In Hooker’s “Synopsis Filicium,” the one-sided Film Fern is considered as a variety of the Tunbridge Film Fern.

THE BRISTLE FERN.

TRICHOMANES RADICANS.—Swartz.

One of the Filmy ferns, and the only Trichomanes that is a native of Great Britain; a genus that abounds in the Tropics. It grows on wet rocks in mountainous districts, delighting in the spray of a waterfall. The fronds vary in length from six to sixteen inches, are membranaceous, pellucid, smooth, and olive-green. The fronds, if uninjured, remain on the plant for several years. It is ovate-triangular in form, and feathery in appearance. Cannot be confused with any other fern.

Bolton saw it in 1758 growing in abundance near Bingley in Yorkshire, but in 1782 could only find one plant. The late Mr. Backhouse found it about thirty years ago tolerably abundant and flourishing luxuriantly in several places, extending over several miles in Wales, but the locality has been kept secret from a dread of its extermination by collectors. Mr. Backhouse gave me a
plant, which is now a large specimen, and proves a distinct variety. More recently Mr. Rowbotham again found this fern in Wales. It is to all intents an Irish fern, and is much more rare than it used to be. Dr. Mackay found it in Hermitage Glen; Dr. Stokes, at Powerscourt Waterfall; Glendine, by Mr. R. Ball; Glanbour, by Mr. J. A. Fisher; Temple Michael Glen, by Mr. D. Murray; Ballinhasy Glen and Bandon, by Mr. S. P. Woodward; Clashgariffe, by Mr. J. Drummond; Glandore, by Dr. Allman; Bantry and Curran Lake, by Mr. C. C. Babington; Kildorerry, by Mr. J. Carrol; Blackwater, by Dr. Kinahan; Cumailte Mountains and Torc, Killarney, by Dr. Mackay; Island of Valentia, by Miss H. Blackburne; Cromaglaun, by Mr. W. Christy; Mount Eagle, by Mr. D. Moore; Gortagaree, by Dr. Taylor; and Blackstones, Glouin, Caragh, Inveragh, by Mr. W. Andrews; and in Donegal (1884), by Mr. P. Mahoney. It has also been found in the island of Arran, Scotland, by Mr. W. B. Simson, of Edinburgh.

A native of Spain, Teneriffe, Canary, Madeira, Azores, Algeria, Jamaica, Martinique, Mexico, Panama, New Granada, Brazil, United States, Venezuela, Galapagos, Sandwich and Society Isles, Northern India, and Polynesia. I have large plants that have been growing in pans for forty years, and my special mode of culture is worthy of being copied. Large pans, well drained, have a compost of freestone, lumps of peat, and silver sand, the stone predominating; on this the rhizomes are fastened. A canal of water surrounds each plant.

My Filmy Ferns are kept in a pit five feet deep, covered at the top with frame lights that are lifted daily (sometimes twice a day), for the purpose of wetting the fronds with a fine spray in imitation of a shower. The plants are elevated on stands (about six inches) to keep them above any water that might drain into the pit in very rainy weather. The lights are shaded with the "green Willesden scrim" (from the Willesden Waterproof Paper Works). It is just the shade ferns delight in; cheap and durable, and in short nothing better could be desired for ferns either in houses or out of doors. It is now more than twenty years since these ferns have been repotted.

**Varieties.**

*1. Alabamense, Birkenhead.* A dwarf American variety, very distinct and almost strap-shaped. 4 x 1 inches.

*2. alatum, Clapham.* Found in Ireland by the late Mr. Clapham, conspicuously winged. 12 x 6 inches.


4. Andrewsii, Moore. Found in Glouin Caragh, Ireland, by the late Mr. William Andrews, from whom I received a portion of the original plant in 1864, fronds narrower and more lanceolate, and pinnae more distant. The involucres are sessile and quite sunk in the frond. 13 x 7 inches.

5. Backhousei, Lowe. Found by Mr. Backhouse of York, in Wales, some 35 years ago. A form between Andrewsii and
dilatatum, with less divided and shorter pinnules, broadly winged, fronds a shining dark green, sori prominent. 13 × 7 inches.

6. Cambricum, Ashton. Found by the late Mr. Rowbotham (of Manchester) in Wales. The tip of the frond and pinnae longer and narrower than in Backhousei. 9 × 4½ inches.

*7. crispum, Lowe, (crispum-cristatum, Jones). Found in the Killarney district in 1852 by the late Colonel A. S. H. Lowe (Gosfield Hall), very distinct, crisp, and irregularly branched. 10 × 5 inches.

8. cuneatum, Kinahan. Sent to me in 1870 by Mr. Kinahan (Roebuck Park), fronds wedge-shaped.


10. dilatatum, Backhouse. Found in Ireland by Mr. Backhouse, and named for its resemblance to Hymenophyllum dilatatum. 13 × 7 inches.

11. dissectum, Stansfield. Broad and tapering to a point, finely divided; beautiful. 15 × 6½ inches.

12. dissectum-cuneatum, Birkenhead. Not unlike dissectum, but wedge-shaped, and scarcely differing from cuneatum.

13. proliferum, Druery (bulbiferum, Jones). Found at Killarney; bearing bulbils. In the possession of Professor Morris of Bath; with him it has not borne bulbils.

Tribe 4. DAVALLIEÆ.

THE BRITTLE BLADDER FERN.

CYSTOPTERIS FRAGILIS.—Bernhardii.

A common deciduous species, from the sea level to the summit of Ben Lawers (4,000 ft., where its fronds have only a height of 2 inches), growing on rocks and walls. The fronds sometimes attain a length of 12 and occasionally 18 inches. Colour a dull green, Growing in spreading tufts, and cannot be mistaken for any other fern. It occurs throughout Europe and in many other parts of the world.

VARIETIES.

1. adiantoides, Lowe. Found near Dundee by myself. It is a large-growing, much-divided variety, with broad pinnae and pinnules (the superior basal one very large).

2. angustata, Smith. Found in Devon, Derby, York, Cumberland, Westmoreland, Carnarvon, Monmouth, Edinburgh, Perth, and Sligo. Length of frond 12 inches. Slender and very narrow, ending both in the pinnae and the fronds in long taper points.

4. **cristata**, *Lowe*. A variety with crested fronds raised by Mr. C. Elworthy at Nettlecombe. In 1871 Mr. R. Moule of Ilfracombe raised another with fronds 8 inches in length in which the fronds are very variable, sometimes symmetrically crested, at others capitate, ramose, or ramose and crested. Mr. Keale of Wantage and Mr. Mapplebeck of Birmingham have raised others, and Mr. J. M. Barnes has found it at Sedgwick.


8. **furcans**, *Moore*. Found at Killin by Mr. S. O. Gray, and on Clova by Messrs. Stansfield. It is of the normal type, with the apex and a portion of the pinnae forked.


11. **minutissima**, *Jones*. Origin unknown. A diminutive bushy variety, crowded with fronds, but never exceeding 2 or 3 inches in height. It came into the possession of Colonel Jones with other ferns.

12. **obtusa**, *Moore*. Found in Scotland by Mr. A. Tait, near Whitby by Mr. Clapham, Llyn Ogwen by Mr. S. O. Gray, and in the Lake district by Mr. Clowes and Mr. Wollaston. Length 12 inches, lanceolate, pinnules blunt.

13. **quadrata**, *Clapham*. Found near Rydal by Mr. A. Clapham. Length 6 inches, basal pinnae remote, pinnules rounded, and a portion, especially the basal ones, flat. Minutely dentate.

14. **sempervirens**. Found at Tunbridge Wells, and in Devon, but supposed to have been introduced from Madeira. It has a short creeping rhizoma, and in a cool greenhouse is evergreen.

16. Wyense, *Lowe*. A very *alpina*-looking form, found on the rocks along the Wye by Major Cowburn; dwarf, pinnæ and pinnules crowded; more nearly resembles *C. alpina* than any other variety.

**THE ALPINE BLADDER FERN.**  
*CYSTOPTERIS ALPINA.*—*Desvaux.*  
(*POLYPODIUM REGIUM.*—*Linneus.*)

A rare British species, found at the end of the last century growing on a wall at Leyton in Essex. This is the only well-authenticated locality in this country; and the plant has now ceased to exist there. Dwarf for a *Cystopteris*, and more finely divided than *C. fragilis*. It is a native of the Alps, and is also found in Spain, Italy, France, Belgium, Switzerland, Greece, Hungary, Sweden, and Asia Minor.

There are no varieties to be recorded, and the species is thought to have been introduced.

**THE MOUNTAIN BLADDER FERN.**  
*CYSTOPTERIS MONTANA.*—*Link.*

A very distinct, fragile, triangular fern, with tripinnate fronds, and very long, slender stipes. It has a lengthy creeping rhizoma, and flourishes well under cultivation, if sufficient room is given for the growth of the rhizoma. Sori copious, medial, and indusiate.

First found in 1836 on Ben Lawers, in Perthshire, by Mr. W. Wilson.

In 1871, Mr. P. Neill Fraser and myself visited this spot, and found that it was still abundant in that habitat. Mr. J. Backhouse has also found it in Canlochen, at the head of Glen Isla (Clova Mountains). It grows on moist ledges of rock, on mountains, and is one of our rare British species.

Abroad, it is a native of Norway, Sweden, Denmark, Lapland, France, Spain, Italy, Germany, Switzerland, Hungary, Kamtschatka, and in the Rocky Mountains.

There are no varieties.

**Tribe 6. PTERIDÆ.**  
**MAIDEN HAIR FERN.**  
*ADIANTUM CAPILLUS-VENERIS.*—*Linneus.*

An unmistakable species, and the only one of a large exotic genus that is found in Great Britain.
The fronds are bipinnate, and in some varieties tripinnate, varying in length from a few inches to 2 feet, according to locality. In some parts of the Burren, in County Clare, it assumes its maximum size. The sori are situated on the apex of the lobes, in marginal lines, the indusium being the reflexed portion of the apex of the lobe. The fronds are thin, membranous, and a vivid green. It is a beautiful and graceful fern.

Found in Cornwall, Devonshire, Somersetshire (Clevedon, by Mr. L. H. Grindon; Cheddar, by the Rev. W. H. Hawker; and Combe Down, near Bath, a single plant, E. J. L.); Clea Hill, Shropshire, by Mr. Westcott; Glamorgan and Barry Island (E. J. L.); Galway, Kerry, Clare, Kincardineshire, Jersey, Guernsey, Isle of Man, and Arran Isles.

It is a native of very many temperate and hot countries, occurring in France, Spain, Portugal, Italy, Switzerland, Belgium, Greece, Turkey, Persia, Java, China, Dalmatia, India, Syria, Siberia, Caucasus, Egypt, Abyssinia, Algiers, Madeira, Canary, Azores, Madagascar, Natal, Alabama, California, Texas, Mexico, Guatemala, Caraccas, Chili, Trinidad, St. Vincent, Jamaica, Sandwich Islands, etc.

**Varieties.**

*1. admirabile, Lowe.* Raised by myself. Length, 2 feet. Stout and distinct; and no Adiantum makes a better specimen. Basal pinnae descending.

*2. angustatum, Lowe (bulbiferum, Clapham).* Dwarf, and when sent to me by the late Mr. Clapham, the fronds literally covered with young plants. There were no perfect spores; and had it come under the keen eye of Mr. Druery, he would have seen another case of apospory?


*5. Cornubiense, Moore.* Found in 1868, near Hayle (Cornwall), by Mr. H. H. Trevethick. A large plumose variety. Pinnules deeply divided into ten or twelve narrow fringed divisions.

*6. Daphnites, Lowe.* A remarkable form, raised from spores from a frond given to me by Sir Joseph Hooker, about twenty-

† Recently another plant has been found.
three years ago. Length, 6 inches. Erect, pinnae large, and so crowded together as to appear crested. Costa wavy.

7. depauperatum, Clapham. Raised by the late Mr. James. Length, 12 inches. Much cut and depauperate.

8. digitatum, Moore. Raised by Mr. O'Brien.


10. fissum, Moore (alcicorne?). Dwarf. Length, 6 inches, Pinnules cut into shreds. A great departure from the ordinary form.


*12. formose, Lowe (perfectum, Padley). Found in the Crimea, and sent to me by Sir Joseph Hooker. Very slender and minute in all its parts.

13. grande, Moore. A fine variety, sent to me by Mr. Jannock. 8½ × 2½. Ultimate pinnules large.


15. incisum, Moore. Found in several localities, but a much more distinct form (incisium-Footii, Lowe) was found in County Clare by Mr. J. F. Foot. Length, 15 inches. Pinnules large and much incised.


*17. kalon, Lowe. Raised by myself. 12 × 6 inches (broadest at base, and gradually narrowing). Pinnules rounded, large, and overlapping.


19. magnificum, Fraser. Large, bold, making a handsome plant.


29. ramulosum, Moore. Found in Ireland. The main rachis dividing near the top, and forming a tuft of short branches.

30. rotundatum, Moore. Found in the Isle of Man, by Mr. T. G. Rylands. Frond, narrow; basal pinnules, round.

*31. spectabile, Lowe. Raised in 1872 by myself. Length. 12 inches. Very large incised pinnules, a close copy of Farleyense, Mr. Elwothy, of Nettlecombe Court, has sent me a seedling that is identical.

32. undulatum, Moore. Length, 1 foot. Fronds, undulate.

THE ROCK BRAKE.

CRYPTOGRAMME CRISPA.—R. Brown.

(ALLOSORUS CRISPUS.—Bernhardt.)

This fern is also called "the Parsley Fern," from its general resemblance to Parsley.

There are two kinds of fronds, the fertile and the sterile; the former, erect with linear oblong pinnules; sori marginal, and eventually confluent.

This dwarf elegant fern is found amongst loose stones (not limestone), on the sides of mountains, and in the North-West of England is so abundant as to look like hill-side pastures at a distance. It cannot be confused with any other fern.

Exceedingly abundant on the mountains of Northumberland, Cumberland, Durham, and Westmoreland. Abundant on the hillside of Lothrigg Fell, at the Head of Windermere. It is also found near Lancaster, Settle, Ingleburgh, Cronkley Scar, Wensley Dale, Fountain’s Fell. In Derbyshire, Shropshire, Somersetshire, and Worcestershire. In Wales, in Carnarvonshire, Montgomeryshire, Denbighshire, Merionethshire, and in Glamorganshire (though rare). In Scotland it is found in almost every county; whilst in Ireland it only occurs in Down, Antrim, and Louth.

Abroad, it is a native of France, Italy, Spain, Germany, Norway, Sweden, Denmark, Lapland, Switzerland, Hungary, and at Sitka, in North-West America.

Although a mountain fern, and found in Scotland at the height of 3,450 feet, in Lancashire it flourishes almost at the sea level.

Several times I have received varieties, and have collected them myself, but none were permanent. There is, however, a
crested variety (cristata, Druery), that was found at Seathwaite, in 1874, by the Right Hon. R. A. Cross, which has retained its moss-like cresting. Of it Mr. Druery remarks: “This variety is more tender than the normal form.”

**THE COMMON BRACKEN.**

**Pteris aquilina—Linnaeus.**

This is a well-known fern, growing up in single stems like a tree from its creeping subterraneous caudex. No other fern is like it. The fronds vary, according to favourable or unfavourable circumstances. It is only 4 inches on the summit of Helvellyn; and I have measured it 12 feet on Longridge Fell. Usually it is from 3 to 5 feet. Deciduous, and fructification marginal.

The most abundant British fern, and also very common throughout Europe, as far north as Lapland.

There are a few distinct varieties:

1. **attenuata, Moly.** Found in North Devon, in 1870, by Mr. J. Moly. Length of frond, 2 feet 6 inches.
4. **crispa, Barnes.** Found at Arnside, by Mr. J. M. Barnes. The pinnules crisped.
5. **cristata, Moore.** Found in Derbyshire, in 1872, by Mr T. Glover; at Langdale, by Mr. J. M. Barnes; and recently at The Hendre, by Mr. Comber. Height, 3 feet. Branch crested.
7. **glomerata, Barnes (flexuosa, Wollaston; incurva, Moore).** Found in Westmoreland, in 1864, by the late Mr. Jacob J. Jones. A conglomerate form.
8. **grandiceps, Moore.** Raised from spores by Mr. A Clapham, Mr. J. E. Mapplebeck, Mr. Forster, and others. This capitate variety is raised from cristata, but grandiceps is sterile. A singular variety. Length, 2 feet.
9. **Hartfieldii, Lowe.** Raised by Mr. J. E. Mapplebeek. A good cross between incurva and cristata.
*10. incurva, Mapplebeck. Raised by Mr. J. E. Mapplebeck. An incurved form.


12. multifida, Barnes. Found at Levens, by Mr. J. M. Barnes, and at Windermere, by Mr. F. Clowes.


14. polydactyla, Moore. Found by the late Mr. Glover, of Manchester. The ends flatly crested.

15. ramo-cristata, Mapplebeck. Raised from spores, in 1871, by Mr. J. E. Mapplebeck. Height, 1 foot. Both branching and crested.

16. variegata, Barnes. Found at Windermere, by Mr. F. Clowes; near Chepstow, by myself; near Linton, by the late Colonel Jones; and near Nettlecombe, by the late Mr. Elworthy. A subpermanent form. More golden some years than others. Mr. W. H. Phillips appears to have found a well variegated form in Ireland, of which I have received prothalli from him.

The common Bracken can only be safely transplanted in winter, when the fronds are below the ground; and even then it is the safer plan to keep them in a hothouse until established. When grown in pans, care should be taken to keep them from frost, for, although hardy enough, if they become frozen, they are certain to perish.

THE HARD FERN.

LOMARIA SPICANT.—Desvaux.

(BLECHNUM SPICANT.—Smith.)

A common fern throughout the United Kingdom, from the sea level to a height of 4,000 feet, growing in heathy or stony situations where there is moisture. Abundant throughout Europe, extending from Lapland in the North, to Madeira.

An evergreen, and easily grown if not neglected. Sterile and fertile fronds different; the latter larger. Sterile fronds spreading; fertile, erect and narrower. Length, from 4 to 30 inches. Colour, rich deep green coriaceous, and pectinately pinnatifid.

Unlike all other British ferns.

VARIETIES.


2. Aitkeniana, Moore. A grand variety, with huge branching heads.


13. *congesta*, Barnes. Found in Wastdale, in 1876, by Mr. W. Crouch; and on Dartmoor, by Mr. Druery. Dense and congested.


19. *cristata*, Moore. Found near Tunbridge Wells, by Mr. G. B. Wollaston; in Yorkshire in 1860, by Messrs. Stansfield, etc. Well crested fern. Fertile fronds, 18 x 1 inches; sterile 9 x 1½ inches. A crested capitate head. Another fine form was found at Orrest Head, in 1872, by Mr. T. Airey.


22. *curta*, Barnes. Found in 1871, in Dumfries, by Mr. W. Foster. A narrow decumbent variety, 10 x 0½ inches.


27. heterophylla, Wollaston. Found in Wastdale, in 1876, by Mr. W. Crouch, and also by others. Fronds irregular.


32. imbricato-cristata, Drury. Imbricate, and neatly crested.

33. imbricato-erecta, Stansfield. Found by Mr. Halstead. A pretty fern.

34. incisa, Barnes (gracile, Crouch). Found in 1874, in Ross-shire, by Mr. W. Crouch. 10 × 2 inches. More depauperate at the base than serra.


39. lancefolia, Wollaston (sub-furcato lancefolium, Barnes). Found near Tunbridge Wells by Mr. J. B. Wollaston; and in Langdale, in 1875, by Mr. T. Airey. A narrow distinct form.

40. lineare, Moore (rotundata, Wollaston). Found on Wither-stack, Westmoreland, in 1862, by the late Mr. J. M. Barnes. 12 × 0 1/2 inches. Remarkably narrow.


42. majus, Moore. Found near Nettlecombe by the late Mr. Elworthy. A large form.

43. Maunderi, Stansfield (glomeratum, Wollaston). Raised in 1878 by Mr. W. H. Maunder. A glomerate form. 4 1/2 inches long.

44. minima-interrupta, Clapham. Found at Ilkley, in 1863, by the late Mr. Clapham.

45. Moukmami, Stansfield. Irregular, flexuose, apex multifid.

46. multifida, Moore. A crested form found at Windermere by Mr. F. Clowes, and by others.

47. multiforme, Wollaston. Found on Bethecar Moor, in 1869, by Mrs. Wilson. Fronds various.

48. multifurcata, Moore. Found near Penryn, by Mr. F. Symons. Fronds many times forked, occasionally brachiate.
49. obovata, *Stansfield.*
52. paradoxa, *Jones.* Found in Banisdale, in 1877, by Mr. G. Whitwell. Three rows of pinnae.
54. plumosa, *Barnes.* A grand variety, raised by Mr. T. Airey.
56. projecta, *Moore.* Found in Cumberland, in 1862, by the late Mr. J. M. Barnes, and near Ben Lawers by Mr. Stansfield. Depauperate, with here and there projecting normal pinnae. Length, 9 inches.
57. projecta-ramosa. Ramose.
*58.* ramo cristata, *Wollaston* (flabellata, *Stansfield*). Found at Helmsley, Yorkshire, in 1865, by the late Mr. Monkman. A fine branching variety, the apices of the segments crested. Fertile fronds, 14 inches; width of head, 8 inches. Sterile, 8 inches; width of head, 8 inches. Mr. Drury has raised a more robust variety.
61. ramo-parviceps, *Barnes.* Found at Orrest Head, in 1874, by Mr. T. Airey. Thin texture, ramose, and crested.
62. retusa, *Clapham.* Found at Ilkley, in 1863, by the late Mr. Clapham. Pinnae curving. 7 × 1½ inches.
63. revolvens, *Barnes.* Found in Swindale, in 1865, by the late Mr. J. M. Barnes. Pinnae recurved.
64. rigida, *Lowe* (serratum-rigidum, *Stansfield*).
67. serra, *Moore.* Found in South Wales, in 1867, by the late Mr. Jacob Jones. 17 × 2 inches. A bold incised variety.
68. serrata, *Jones.* Found in North Wales, in 1865, by the late Mr. J. Clift. 7 × 2 inches. A good serrated form.
70. stricta, *Frances.* Common. Length, 9 inches.
71. stricto-concinna, *Barnes.* Found at Crook, in 1865, by the late Mr. J. M. Barnes.
34. *suplebella*, Barnes. Found near Kendal, by Mr. G. Whitwell.
37. *tridactyla*, Moore. Found on Loughrigg, in 1864, by Mr. W. Crouch; and near Portsmouth by Mr. S. Nowell. Robust; crest three-fingered.
38. *trinervia*, Moore. Found in Kent, in 1851, by Mr. G. B. Wollaston, and on Sugar-loaf Mountains, Wicklow, in 1854, by Dr. Kinahan. A brachiate form, branching at the base of the rachis. 13 × 1 3/4 inches. Mr. W. H. Phillips found many similar plants in County Down and Wicklow, in 1878. Mr. T. Airey has observed it at Langdale.
40. *tripinnata*, Lowe (serratum, Airey, No. 1, Wollaston). Tri-pinnatifid to tripinnate, pinnae cut down to midrib, pinnule half an inch long and incised.
41. *variabile*, Barnes. Found at Crook, in 1866, by Mr. T. Hartley. Irregular and variable.
43. *crispata*, Mapplebeck; *84. Mapplebeckii*; and 85. *Fosteri*, I have not seen.

**Tribe 8. ASPLENIEÆ.**

**THE GREEN SPLEENWORT.**

*Asplenium viride.*—Hudson.

Local, but not common, yet found in many districts growing in moist crevices in rocky mountains. Resembling *Asplenium trichomanes* the nearest, but distinguished by its green stem and pale green fronds. Evergreen, linear, pinnate, and varies in length from 2 to 10 inches.

It has been found at Danny, Southgate, Maidstone, Mickleham, Ham Bridge, Dove Dale, Buxton, Cavedale, Castleton, Beacon Hill, Carr-edge, Staley, Settle Craven, Ingleborough, Gordale, Aisla-Beck, Richmond, Widdal Fell, Wensleydale, Ogden Clough, Reeth Moor, Swaledale, near Leeds, Falcon Clints, Weardale, Patterdale, Kendal Fell, Hutton Roof, Farleton, Arnside, Casterton Fell, Mazebeck Scar, Ambleside, Borrowdale, Carrick Fell, Brandy Ghyll, Ashness Ghyll, Barrow Force, Gillsland, Whitbarrow, in Brecknockshire, Glamorganshire, Carnarvon, and Merioneth. In Scotland, in eleven counties, and in Arran, Mull and Shetland. In Ireland near Lough Eske, Ben Bulgen, Bandon, and Killarney. Abroad it is in France, Germany, Switzerland, Belgium, Norway, Sweden, Finland, Lapland, Russia, Spain, Italy, Greece, Siberia,
Bohemia, Dalmatia, Croatia, India, Peru, Columbia, and Rocky Mountains.

VARIEITES.

1. acutifolium, Gibson. Pinnae lanceolate and acute.
2. bipinnatum, Clowes. Found, in 1853, on Whitbarrow, by Mr. J. Huddart. A handsome variety (a copy of A. trichomanes, var. incisum).
5. deltoideum, Clapham. Deltoid, basal pinnae very large, rapidly smaller, being minute at the apex.
6. imbricatum, Clapham. Found at Settle by the late Mr Clapham. Dwarf and imbricate.
9. ramosum, Stansfield. Upper part of frond two or three times branched.
12. varians, Moore. Found on Kendal Fell, by Mr. Barnes. A singular variety; both fronds and pinnae variable, some depauperate, others beyond the ordinary size. Length 2 to 5 inches.

The present fern, Asplenium Ceterach, and in fact all species that flourish on rocks and walls, require to be grown in exposed situations, using a large amount of stone with the soil. The plan adopted by myself is to grow them in pots, giving the protection of a cool greenhouse in winter, and in April plunging them amongst stones and sand in a long narrow shallow box, fastened on the north side of a wall five feet from the ground, and only watering in very dry weather.

THE MAIDENHAIR SPLEENWORT.

Asplenium Trichomanes.—Linnæus.
A common species throughout the United Kingdom, growing on rocks and walls, and occasionally in hedgerow banks. It attains a large size in the West of Ireland, sometimes the fronds being more than a foot long. Found at every height up to 2,000 feet above the sea. On Ben Lawers the plants are very small. In the Eastern Counties it is not common. A native of the Atlantic Isles, Cape of Good Hope, Kaffraria, the Caucasus, Persia, India, Siberia, Europe (throughout), Australasia, North and South America, Peru,
and the West Indies. In Turner's "Herball," in 1568, it is called "English Mayden's Heare." Under cultivation it succeeds best in sandy loam with broken stones and a little decayed leaf-mould.

Stem dark chestnut brown; fronds linear, pinnate, and deep green. A pretty dwarf species.

Some walls in Monmouthshire are literally covered with this fern.

VARIETIES.

1. acrocladon, Lowe. Found in Owsnip Gill, Swaledale, in 1866, by Mr. R. C. Brown, of Nottingham. Pinnæ very remote, only seven or eight pairs to within an inch of the tip of the frond, and there branching and rebranching so as to form a capitate head 2 inches broad. Pinnæ not crested. Length, 6 inches.

2. Claphami, Lowe (incisum, Moore). Discovered at Smeerset, near Settle, by Mr. A. Clapham and Mr. J. Tathem. The most beautiful variety yet found. An incisum, but unlike the incisum of Moore. Pinnæ sometimes three-quarters of an inch in length, and as much across the base. The basal lobes cut nearly to the costa; it is serrate as well as lobate. The upper lobes are almost as much cut. A sterile very plumose form. Length, 7 inches.

3. confluens, Moore (Mr. Stabler's confluent hybrid not included). Found many years ago near Whitby, by the late Mr. W. Wilson; and in 1875, in the South of Ireland, by Mr. P. Niell Fraser, of Edinburgh. Pinnæ confluent in the upper half of the frond. Length, 4 inches.

4. congestum, O'Kelly. Found in County Clare by Mr. O'Kelly. An interesting congested bushy form, 4 X 0.3 inches.

5. cornutum, Lowe (cornuto-ramosum, Lowe). Found near the Clifton Suspension Bridge by Mr. Edwards. Rachis flexuose, branching in the middle of the frond, where it is horned. Pinnæ lax, some absent. Length 6 inches.

6. corymbiferum, Lowe. Found in Owsnip Gill, by Mr. R. C. Brown, and Crosshwaite, by Mr. J. M. Barnes. Normal, except at the ap. x, where it branches into a wide capitate, foliose head. Segments confluent.

7. cristatum, Moore. Found in Lancashire, Cumberland, Westmorland, Devonshire, and near Ballyvaughan. A handsome, not uncommon fern. The pinnules are from elongate to triangular, and are cut almost to the base. In some forms the pinnæ are depauperate. Length, 6 inches.

8. dendroideum, Wollaston. Found, in 1872, in Westmoreland,
by Mr. G. B. Wollaston. Pinnules small. Length, 3 inches, and almost as much across the many-branched head.

9. depauperatum, Wollaston. Found in 1853, at Black Head, County Clare, by Dr. Allchin; and in 1855, at Rydal, by Mr. G. R. Wollaston; also at Windermere, Arnside, and Bardsea. Intermediate forms have also been found, and Mr. Clapham raised one of these from spores, which he called interruptum, and another, having the apex branched, ramo-depauperatum. The pinnules small, depauperate, and some wanting.

10. Harovii, Moore. Found by Mr. G. B. Wollaston, and also at Portskewett, in Monmouthshire, by the late Colonel A. M. Jones, and recently by myself. A dwarf slender form, with numerous deeply cut pinnæ. Length, 5 inches. Troglyense is, however, a more marked form.

11. hybridum, Lowe (confluens, Moore). Found, in 1870, on Levens Park wall, in Cumberland, by Mr. Stabler, of Levens. It is strikingly different from all other forms of confluens. An undoubted hybrid, probably between A. trichomanes and A. marinum (the counterpart of microdon, a hybrid of A. marinum). Although copiously soriferous, there are no germinating spores, which is the case with the other hybrids. It is not impossible that at some time or other a few spores may germinate, but with these hybrids this is extremely rare.

When last seen, the plant was in the possession of Mr. Barnes, of Milnthorp; it was then a grand specimen. The stem is much thicker than is the case with the ordinary form of Asplenium trichomanes. From near the base the pinnæ are imbricate, and towards the apex confluent. Length 10 to 11 inches, width exceeding an inch.

12. imbricatum, Clapham. Found, in 1863, at Knaresborough, by Mr. A. Clapham. Pinnæ scarcely stalked, large, and overlapping, the base square, and the margins prettily dentate. Length, 3 inches.

13. incisum, Moore (excluding Mr. Clapham's Settle plant). Found in Devon by the Rev. W. S. Hore; near Burnley, by Mr. S. Gibson; in Borrowdale, by Miss Wright; and near Pyle, in
Glamorganshire, by Mr. E. T. Higgins. All are sterile except the Glamorganshire plant. Exceedingly beautiful and plumose. Pinnæ somewhat triangular, deeply incised, and the tips pointed. Length, 4 to 6 inches.


16. majus, *Padley*. Found near Plymouth, by the Rev. C. Padley; in County Clare, by Mr. Foot; near Ballyvaughan, by Mr. P. B. O'Kelly; and at Denny Hill, near Chepstow, by Major Cowburn. Normal, except its gigantic proportions. Length from 12 to 18 inches, and ¾ inch wide.

17. Moulei, *Moore*. Found in Devon by Mr. Moule. Pinnæ narrow, margin wavy. A seedling raised from this "incisura" (*Lowë*) has long narrow pinnæ deeply and equally incised on both margins.

18. multifidum, *Moore*. Found at St. Mary's Isle, Kirkcudbright, by Mr. Dick; at Windermere, by Mr. Clowes; Ulverston, Mrs. Hodgson; Keswick, Miss Wright; at Capel Curig, North Wales, by Mr. S. Clift; and in Swaledale, by Mr. Brown. The fronds are several times ramosely forked considerably below the apex, and the tips are multifidly crisped. Pinnæ small.


20. Pateyi, *Lowë* (*ramo-cristatum, Wollaston*). Found, in 1873, in Cardigan, by Mr. Patey. Another branched cristatum with a less crested head than the ramo-cristatum of *Moore*. It is more ramosely but less crested than Mr. Moore’s plant, having a compact head 1½ inches in diameter. Length, 3 inches.

21. polydactylum, *Lowë* (*cristatum, O'Kelly*). Found in County Clare by Mr. O'Kelly. 11 × 0½ inches. Much larger than cristatum.

22. ramo-cristatum, *Moore*. Found, in 1861, in Cornwall, by Mr. W. H. Sargeant. Normal below, branching near the apex into six or seven crested branches that are 3 inches across. Length 4 inches.

23. ramosum, *Wollaston*. Found in 1864, in South Devon, by the late Rev. C. Padley; Ilfracombe and Tiverton, by Mrs. Chanter; Windermere, by Mr. Clowes; Keswick, by Miss Wright; Arnside, by Mr. Crossfield; Underbarrow, by Mr. T. Hartley; Ow_snep Gill, Swaledale, by Mr. R. C. Brown; Conway, by Mr. A. Stansfield; and in County Clare, by Dr. Kinahan. Stem dividing and sub-dividing into four or five wide-spreading branches. Pinnæ narrow and more or less depauperate. Length 4 to 5 inches.

24. sul læquale, *Moore*. Found near Monmouth, by Mr. J. D.
Enys; Knaresborough, by the late Mr. Clapham; Whitbarrow, by Mr. Clowes; Nettlecombe, by the late Mr. Elworthy; and at Tunbridge Wells, by the late Mrs. Delves. Fronds narrow, and broadest at the base. Pinnae small and crenate.

25. triangulare, Lowe (incisum-triangulare, Moore). Found, in 1863, in County Clare by the late Mr. Stansfield. An incisum with triangular pinnae. Length, 4 inches.

26. Troyense, Lowe. Found in Wentwood, Monmouthshire, by myself, in 1882. This differs from Velum in not having the prominent basal lobe, and in being approximate instead of imbricate. Fronds very brittle, colour a blue green. Length, 5 inches; width, nearly 1\(\frac{1}{2}\) inch.

27. velum, Lowe. Found in Wentwood, by myself, in 1890. Frond very symmetrical, and of a blue green colour. Copiously soriferous. A very handsome variety. The pinnae much incised, and the lower basal lobe of each pinna standing out almost at right angles to the remainder of the pinna like a curtain, the folds resembling stairs. Length 4 inches, and nearly 4\(\frac{1}{4}\) inch wide at the base of the frond.

Other varieties, viz., bifurcum, rotundato-multifidum, Blechnoides, lineare, and rotundatum, have been found in the Lake district, but I have not seen them.

THE FORKED SPLEENWORT.

Asplenium septentrionale.—Hoffmann.

A DIMINUTIVE fern with forked fronds and linear segments, unlike all others. It is evergreen, 2 or 3 inches in length, and of a deep green colour, the stipes being longer than the fronds. It grows in fissures of rocks and between the stones of loose walls. Found in the Lake district near Ambleside, on Helvellyn, Honiston Crags, Red Screes, Crummock Water, Langdale, Scafell, Patterdale, Keswick, Wastwater, Borrowdale, in the vale of Newlands; at Kyloe Crags, Northumberland; Ingleborough, Yorkshire; and at Culborne, near Oare Church, and Exmoor, Somersetshire. In Wales, near Llanrwsst, Pass of Llanberris, Bettwys-y-Coed, Capel Curig, Pont-y-Pair, Llanellyn, and Llyn-y-Cwn. In Scotland: in Roxburghshire, Edinburgshire, Perthshire, and Aberdeenshire. It used to be much more plentiful on Arthur's Seat, Edinburgh, and it is not common on Stenton Rock, near Dunkeld, where a few years ago I only saw a dozen plants (E. J. L.). It is not found in Ireland.

Abroad it is a native of Scandinavia, Russia, Switzerland, France, Germany, Spain, Portugal, Italy, Belgium, Hungary, New Mexico, and Northern India. No varieties are known.
THE SEA SPLEENWORT.

Asplenium marinum.—Linnaeus.

In clefts and caves of rocks, mostly on the sea coast. An evergreen, with shining deep green fronds varying from 6 inches to 3 feet in length. Pinnate, the pinnae being usually an inch long. The stipes shorter than the frond, and channelled in front; sori linear and oblique.

Like the "Maiden-hair," it is soon killed by frost, and therefore requires the protection of a greenhouse in winter, although in its protected sea-caves it grows in districts of severe frost.

Common in Cornwall, Devon, Dorset, Somerset, Sussex, Yorkshire (the habitat north of Scarborough destroyed by the falling of the face of the cliffs), Durham, Cumberland, Northumberland, Westmoreland, Isle of Wight, Isle of Portland, Isle of Man, Holy Island. At the mouths of the Mersey and Dee; Gloucestershire, Warrington, and Newton (rare). In Wales: Merionethshire, Carnarvonshire, and Island of Anglesea. On the east and north coast of Scotland, and in the Western Isles in Orkney, and on Ailsa Craig. In Ireland: Down, Galway, Clare, Dublin, Kerry, Cork, Isle of Rathlin, Arran Isles, Guernsey, Jersey, and abundant along the coast of Connaught and Munster.

It is also found in France, Spain, Portugal, Italy, Corsica, Ionian Isles, Barbary, Tangiers, Madeira, Azores, Canary, St. Helena, New Holland, Rio Grande, New Brunswick, Bermuda, and in North America. In 1860 I found it at the summit of the Vilea Escusa, between Reinoso and Alar, during the time of the Himalaya Eclipse Expedition to Spain, and also on the coast near Santander.

Varieties.

1. acutum, Moore. Found in Jersey, Guernsey, Plymouth, and Dartmouth. Pinnae lax and narrowing to a sharp-pointed apex. Length 2 feet.

*2. Auchmithianum, Lowe. A singular variety, with very prominent ribs on the pinnae. The apices of the pinnae rounded and somewhat crenate. Length, 6 to 8 inches. Found by myself in sea-caves at Auchmithy (between Arbroath and Aberdeen. To reach these caves, it is requisite to have a long ladder, and they can
only be searched at low water on this wild rocky coast. The ferns were very abundant and extended some distance into the caves even where there was but feeble light. Some of the caves are full of water even at low tide, having a passage to the sea, and in these were numbers of seals that darted out on being approached.

3. bicrenatum, Stansfield. One of Messrs. Stansfield's sports. The two basal pair of pinnae distant, the remaining touching each other, margin bicrenated. Length, 6 inches.

4. brachiatum, Moore. Found in Cornwall by Mr. J. Herbert in 1874. Pinnae narrow, with blunt tips, the two lowest brachiate (i.e. distinct branches) and twice as long as those immediately above. Length, 1 foot.

*5. capitatum, Clapham. Found in 1861 near Scarborough. Stem naked for the basal 5 inches, then the leafy portion divided into a capitate head 5 inches wide, the pinnules overlapping. Length 10 inches. I have raised many capitate seedlings from this variety.

6. caudatum, Clapham. Raised from spores by the late Mr. A. Clapham, of Ramsdale Bank, Scarborough. A very distinct fern, with narrow pinnae, the frond terminating in a long caudate (or tail-like) apex. Length, 6 to 8 inches.

*7. decorum, Lowe. Found by Sir W. Jackson Hooker, and also by Mr. O'Kelly in the Burren district, County Clare. 8 x 1 inches. Narrow and smooth.

8. Hookeri, Lowe. Found in abundance in the Burren district, County Clare. I received it from the late Sir William Hooker many years ago, and again recently from Mr. P. B. O'Kelly, Glenarra House, Ballyvaughan. More than 2 feet in length, with short blunt pinnae.

*9. imbricatum, Lowe. Found in 1865, in North Wales, by the late Mr. Clift, of Birmingham, who sent me the original plant, which is still alive. A very distinct variety. The pinnae overlap each other as if tiled. Apex of the frond caudate. Length, 8 inches. A variety named by Mr. Clapham, imbricatum Loweii, is rather larger and more imbricated.†

† Another form raised by myself. Imbricatum superbum is even more characteristic.
10. incisum, Moore. Found at Great Orme's Head by Mr. A. Stowe, and near Llangollen by the Rev. T. Rooper. An elegant variety, having the pinnae and apex of the frond truncate (or blunt-ended). The lobes deeply cut along the anterior margin. Length 6 to 9 inches. Pinnae only half an inch long.

11. interruptum, Moore. History doubtful. Remarkable for the varied length of the pinnae, some projecting far beyond the others causing the outline to be irregular.

12. laxum, Lowe. Found in the Burren district, County Clare, by Mr. F. J. Foot, of the Geological Survey of Ireland. It is not unlike the Asplenium latum (a South European form of A. marinum). Very lax, especially on the lower portion of the frond. Length 2 to 3 feet.


14. multipinnatum, Appleby. Stated to have been found in the Azores. A most beautiful ramose variety growing more or less horizontally. Fronds equal in width throughout, terminating in a branching apex. Pinnae broad and the segments deeply cut.


16. parallelum, Moore. A distinct form found in Guernsey by M. Boistel. Fronds 3 feet in length. Pinnae 2 to 2½ inches long and less than ¼ inch wide, and nearly parallel sided.

17. plumosum, Wollaston. Found in Guernsey by the late Mr. C. Jackson. A magnificent plumose variety in the style of Thompsonæ, but every part of the frond is double the size of that variety. The ends of the pinnae are caudate, and the pinnules divided nearly to the base. Length, from 1 to 2 feet.

18. Price, Lowe (plumosum Price, Jones. Found near Ilfracombe by Miss Price. A beautiful foliose form, not so much divided as plumosum. Frond widest at the base, as also the pinnae. Basal lobes large and deeply cut. 7×4 inches.


20. ramo-trapeziforme, Clapham. Found in 1857 at Burniston, near Scarborough, by Mr. A. Clapham. Dwarf. Pinnae trapeziform, and variable in size and shape. Pinnae branching and the tips dilate. A somewhat similar form was raised by myself.


22. subpinnatum, Moore. Found in Petit Bot Bay, Guernsey, by Mrs. Dobree. It has also been found in Cornwall. Profoundly pinnatifid with deeply divided lobes. Length, 7 inches, breadth, 2½ inches.

*24. Thompsonæ, Lowe.* Found in North Devon by Mrs. Thompson. A plumose variety and only second to plumosum as a beautiful variety of this species. Very feather-like in appearance. Fronds narrower at the base. Pinnae long, narrow, and conspicuously auricled. The superior margin is crenato-serrate yet not deeply divided, whilst the inferior margin is very deeply cut into narrow segments. This applies to the upper half of the frond. Length, 12 inches.

25. trapeziforme, *Clapham*. Found in Cloughton Bay, near Scarborough, by the late Mr. Clapham (the locality now destroyed by the falling of the cliffs). A similar form has been found in Cornwall, Devon, and in County Down. Dwarf, trapeziform, with brief blunt pinnae. Texture leathery.

26. variabile, *Monkman*. Raised from spores by the late Mr. Clapham. The fronds sometimes branch and rebranch several times, no two being alike. It is of erect habit and trapeziform. Length, 8 inches, with a breadth across the ramose head sometimes as much as 4 inches.

27. variegatum, *Lowe*. Found by myself in 1876 in a sea-cave at Auchmithy, where it is (or was) abundant. A form of Auchmithianum, with fronds regularly variegated green and white.


THE ALTERNATE-LEAVED SPLEENWORT.

**Asplenium Germanicum.**—*Weis.*

Another very dwarf rare species, growing in fissures of rocks up to an altitude of 1,000 feet. It is usually found growing with Asplenium septentrionale, and may be a hybrid between that and Asplenium ruta-muraria. At all events, I have been unable to raise it from spores. The fronds are pale green, from 3 to 4 inches long, with a slender stipes of half the length of the frond. They are pinnate to sub-bipinnate, and have a halfway character between *A. ruta-muraria* and *A. septentrionale*. Sori linear, elongate, and central.

It has been found on Helvellyn, Borrowdale, Scafell, Kyloe Rocks (Northumberland), and near Culborne (Somerset). In Wales, near Llanrwst, Llanberris, and Capel Curig. Some years ago I saw it growing and of large size in Cefn Cave. In Scotland it is recorded at Perth, Dunkeld (Stenton Rocks, where I failed to find it), Dunfermline, Kelso, and near Hassendeen. In 1857
Mr. P. Neill Fraser gathered it near Edinburgh. Mr. D. Hutchison says it is also plentiful near Airlie Castle. Not an Irish species.

Found in the Gulf of Finland, in Norway, Sweden, Belgium, Switzerland, France, Germany, Hungary, Spain, Italy, Croatia, Dalmatia, Bukowina, and on the Tyrol and Carpathian mountains.

One variety has been described,—acutidentatum, Moore, which was raised from spores by Mr. Sim, of Foot's Cray. It differs in having the teeth of the lobes acute instead of obtuse.

THE WALL RUE.

Asplenium Ruta-muraria.—Linnaeus.

One of our most abundant ferns, though less common on the eastern side of England. Found on old walls, rocks, churches, bridges, and ruins; in the drier districts occupying a northern aspect.

Forming tufts of fronds from 1 to 6 inches in length, usually about 2 inches. It can only be confused with the Asplenium Germanicum, and even this may possibly be a hybrid between the Wall Rue and the Forked Spleenwort. Although so common, it is difficult to cultivate. A very large amount of broken limestone in proportion to the soil, and a dry airy situation is essential. Widely spread in all temperate climates.

Varieties.

1. attenuatum, Lowe. Large growing (5 or 6 inches), branched and attenuated. Found at Athlone by Mr. F. J. Foot, of the Irish Survey.

2. cristatum, Wollaston. Tasseled in various ways, and the rachis often divided. Found near Ruthin Castle by Mr. J. Daniels; Guildford, by Dr. Allchin; and near Tunbridge Wells, by Mr. G. B. Wollaston.

3. cuneatum, Moore. Mostly merely pinnate with long, narrow, cuneate-based pinnules. Found at Stenton Rock, near Dunkeld; also near Bitton, by the late Rev. T. Ellacombe, of Bitton Rectory, near Bristol; and at Sizergh, in the Lake district, by Mr. J. Crossfield.

4. dissectum, Wollaston. Elongated and deeply incised pinnules. Found in Devonshire by Mr. G. B. Wollaston; and in County Louth by the late Dr. Kinahan.

5. elatum, Lung. Tall (4½ inches), slender, often tripinnate, pinnules very small and narrowly cuneate. Found at Ennis by Dr. Allchin; Michelstown Castle, by Mr. P. F. Keir; near Athenny, by Mr. R. Barrington; Keswick, by Miss Wright; in Dovedale, by Mr. Wilson; and in County Clare, by Mr. O'Kelly.

7. proliferum, *Wollaston*. In this variety young plants are formed on the axils of the pinnules. Found near Guildford by Dr. Allchin.


9. ramosum, *Moore*. Branching in the upper part of the frond. Length, 2½ inches. Found at Arnside, by Mr. J. Crossfield; at Settle, by Mr. Clapham; in County Clare, by Mr. O’Kelly.


11. spathulatum, *Moore*. Large and spathulate. Found at Town Malling, by Dr. Allchin; Marwood, by the Rev. F. Mules; Settle, by Mr. Clapham; Dunkeld, by the Rev. R. Taylor; and at Fife, by Mr. C. Howie.


15. unilaterale, *Moore*. An irregular variety, with the pinnae all on one side of the rachis. Found near Killarney, by Dr. Allchin; at Black Head, by Mr. R. Barrington; at Chaigeley, near Clitheroe, by myself; at Troutbeck, by Miss Wright; and Kendal Fell, by Mr. J. M. Barnes.

16. variabile, *Moore*. Pinnæ and pinnules exceedingly dissimilar, pinnules very small. Found at Settle by the late Mr. Clapham.

**THE BLACK MAIDEN-HAIR SPLEENWORT.**

*Asplenium Adiantum-nigrum.—Linnaeus.*

The present species cannot well be confounded with any other. It approaches nearest to *A. lanceolatum*; but the fronds are triangular instead of lanceolate, and in *A. Adiantum-nigrum* the sori are not submarginal. The stem is as long as the leafy portion of the frond, whilst in *A. lanceolatum* it is only a third the length of the frond.

Fronds ovate or deltoid, bi- or tri-pinnate. Length, from 3 to 20 inches, and varying in width in the leafy portion from 1½ inches to 7 inches. Shining dark green. An evergreen. Rocks, walls, and sandy banks are its natural habitats.

A common fern (though not abundant in Ireland). It occurs all over Europe.

**Varieties.**

1. acutum, *Pollini*. This variety has been found in a number of places in Ireland and on the Continent. Whilst in Northern Spain, in 1860, I found this fern in the greatest profusion near Santander, Las Caldas, between Reinosa and Allar, and in the Congosto Pass,
in the latter locality, growing in the shade of huge plants of Woodwardia radicans that were on the sides of the railway. It is a linear-acute, caudate form.

2. alcicorne, Lowe. Raised by myself. 6 × 2 inches, the upper part branching like stags' horns.

3. angustatum, Lowe. Found in the Burren, County Clare, by Mr. P. B. O'Kelly. It is an acutum-form, but the fronds are narrower and longer than in acutum.

4. caudifolium, Moore. Found by Mr. Druery on a stone wall on Dartmoor. A singular form, the frond and pinnae terminating in long tail-like ends. The lobes are blunt and yellowish.

*5. Cowperi, Lowe (grandiceps, Wollaston). Found in 1865 at Ilfracombe by Mr. Richard A. Thompson. It is a grandiceps, differing from the Irish form in having more pinnae below the capitate head, in the segments being narrower, and in not being confluent in the basal pinnae. The branching head is larger (4½ inches wide), and its base not conspicuously cuneate as in grandiceps. Length, 8 inches.

6. cristatum. I have not seen this.


*8. grandiceps, Lowe. Found in 1865, in Waterford, by the Rev. Travers Smith; 4½ × 2 inches. Head, 3 inches wide. A very handsome variety, having a large compact head which is cuneate at the base. The peculiar fanshaped pinnae and capitate head cause it to be very distinct. There are only two or three pairs of pinnae below where the stem branches; and below the point

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![Figure 17: Asplenium Adiantum-nigrum, var. grandiceps showing capitate head.](image-url)
of branching there is a space without pinnæ, which is not the case in centiceps. Mr. Travers Smith sent me fronds in 1865, and from them I raised a large number of seedlings, which, in 1868, received a First Class Certificate on July 16th from the Royal Horticultural Society.


10. lineare, O'Kelly. Found near Ballyvaughan by Mr. O'Kelly. 12 x 3 inches. A very fine form with almost linear segments.

11. microdon, Moore. Found in 1872 near Ashburton, in North Devon, by Miss Bickford and Mr. James Richards. An undoubted hybrid between the present species and A. marinum. It is sterile. Larger in size though not unlike the hybrid (microdon) of Asplenium lanceolatum and A. marinum. Length, 6 to 10 inches, width at the base, 4 inches.

12. obtusatum, Moore. Found in Devon, Kent, Yorkshire, Stirling, Argyle, Guernsey, and in Ireland. The pinnæ are short and the pinnules roundish. Length, varying from 2 to 8 inches.

13. ramosum, Lowe. Found near Plymouth by the late Rev. C. Padley. Branching several times an inch below the apex, otherwise it is like obtusatum. Length, 6 inches.


15. variegatum, Wollaston. Found both in Yorkshire and in Guernsey. Normal in all respects except being striped with white.

THE SMOOTH ROCK SPLEENWORT.

Asplenium fontanum.—Bernhardt.

A very rare, dwarf fern, growing on rocks and walls. The usual length of frond, four or five inches. It is rather tender, and requires cultivating in a greenhouse, where it grows readily in porous soil, turfy peat with abundance of gritty silver-sand, and a little friable loam. In habit it is erect and tufted, bipinnate and narrow, the frond narrowing from the centre both towards the base and apex. Colour dark green. The margins of the pinnules spinosely dentate. Found near Petersfield, Hampshire, by the Rev. W. H. Hawker; in Swanage Cave, Isle of Purbeck, by Dr. Power; near Tooting, by Mr. Gibbs; between Tan-y-Bwlch and Tremadoc (Sir W. Hooker); and there are several other recorded habitats in Westmoreland, Derbyshire, Yorkshire, Northumberland, Kincardineshire, and Belfast, but these seem to refer to a variety of Cystopteris fragilis.

† See Addenda for another hybrid.
There is a form known as Halleri, yet it is doubtful whether this is not the result of cultivation.

It is just possible that Asplenium fontanum is a variety of the North American *Asplenium ebeneum*. Both Mr. Moore and Mr. Clapham held this view; and this notion is strengthened on examination of the variety *refractum*.

A native of France, Germany, Italy, Switzerland, Spain, Belgium, Greece, Hungary, Siberia, and Kashmir.

There are several marked varieties:

1. *depauperatum*, Stansfield. Length, 2 inches. A remarkable variety, the leafy portion entirely absent, a brief connected footstalk alone being present, surrounded by spore cases.

2. *laciniatum*, Stansfield. Frond, 6 inches; width in centre, 1 inch.

   This is a very much incised variety.


4. *multifidum*, Stansfield. Length, 5 inches, the main difference being, that the frond divides and sub-divides into branches from 2 inches below the tip.

5. *refractum*, Moore. Length, 7 inches; much narrower and more equal in width than *A. fontanum*, and has refracted pinnæ. Rachis bulb-bearing. Found in Scotland by Mr. Filden; but his death cast obscurity over this interesting plant.

   It was first seen at Peper Harrow Park, Surrey, and was afterwards introduced by Mr. Parker of Hornsey.

**THE LANCEOLATE SPLEENWORT.**

*Asplenium lanceolatum.—Hudson.*

A seaside fern, and only locally abundant; not much unlike Asplenium adiantum-nigrum; but the stalks are not as black as in that species, and the frond is more lanceolate in form. Very variable in size, sometimes only four inches, and sometimes as much as 18 inches; growing on walls and rocks in sheltered situations. It requires the protection of a greenhouse, and cannot flourish in excessive moisture.

A native of Cornwall, Devon, Somerset, Sussex, Kent, Gloucester, Pembroke, Glamorgan, Merioneth, Carnarvon, Denbigh, and Cork; also of Jersey, Guernsey, Scilly, and Ramsay. Abroad it has been found in Greece, France, Germany, Spain, Portugal, Switzerland, Belgium, Madeira, Azores, Algiers, Tangier, and St. Helena.

There are a dozen varieties.
1. bifidum, Lowe. Found in Devon. Divided near the apex. Length, 4 inches.


4. crispatum, Moore. Found in Guernsey by the late Mr. C. Jackson. Margins crispy.

5. cristatum, Druery. This is mentioned in Mr. C. T. Druery's interesting work on "Choice British Ferns" as being a recent wild find, and, although yet young, heavily and symmetrically crested.

6. excisum, Lowe. Found at Shawbridge by Mr. G. W. Edwards. Pinnules variously shaped at the upper part of the frond, and the apex is as if bitten off.


10. laciniatum, Wollaston. Found in the Channel Islands. Depauperate, the leafy portion often wanting, and the sori showing on the upper surface.

11. microdon, Moore. A hybrid with Asplenium marinum. Found in 1855, in Guernsey, by Miss Wilkinson, and afterwards by Miss Mansell and Mr. C. Jackson; also near Penzance by Mr. G. Wager. An interesting intermediate form with narrow tapering fronds; confluent at the upper portion. It more nearly resembles Asplenium marinum, but the substance is less leathery, and the colour a paler and less shining green. Sori copious but immature. Length, 12 inches.

12. obtusum, Clapham. Raised by the late Mr. Clapham. An obtuse truncate apex. Length, 9 inches.
THE LADY FERN.

Asplenium Filix-femina.—Bernhardi.

(Sub-section Athyrium.)

This common and elegant species is found throughout the United Kingdom, and is generally distributed through Europe and North America. It is the only species in subsection Athyrium in this country. A deciduous fern, luxuriating in damp, shady places, though found in open situations where there is sufficient moisture. The Lady Fern has a range from the sea-level to 3,000 feet, and at the greater heights assumes the form known as rhaticum or irrigum.

Fronds bi-tripinnate, sori oblong-lunate protected by an indu-sium. It is most nearly allied to the dwarf Asplenium fontanum. The curved sori seems to be the main distinction between Athyrium and Asplenium. Asplenium Filix-femina varies in the length of its fronds from 1 to 3 feet. It cannot be confused with any other fern.

Varieties.

There are many varieties of the Lady Fern, some of which are marvellous in structure. It has therefore been considered desirable to classify these into Divisions, Groups, and Sections. Not only does this seem necessary with Asplenium Filix-femina, but also with Aspidium angulare and Scolopendrium vulgare, as a means of shortening many cumbersome names.

Division A.

Changes in Skeleton.

Group 1. Branching.

Section a. RAMOSUM. (Stipes branching.)

1. acrocladon, Moore (ramo-cristatum, Jones). Found in 1860, near Castle Howard, by Mr. Monkman. 12 × 11 inches (across the much-branched head). A remarkable form, nearly always sterile. I have a batch of promising seedlings.

*2. apioides, Lowe. Raised by myself. 10 × 8 inches. Stipes branching, very parsley-like.

3. brachiatum, Hodgson. Found in 1866, in Lancashire, by Mrs. Hodgson. 12 × 2½ inches. Stem branching into 3 or 4 frond-like divisions.

*4. caudiculatum, Mapplebeck.


8. 

**echnomocladon, Lowe** (laciniato-acrocladon, Stansfield.)

Raised by Messrs. Stansfield. Length, 9 inches, and 6 inches across the head. Stipes and basal half of the branches naked. Laciniate.

9. 

**incongruum, Barnes.** Found in 1874, at Langdale, by Mr. J. M. Barnes. A remarkable variety branching in all its parts.

10. 


11. 

**Mapplebeckii, Moore** (frondoso-cristatum, Jones). Raised in 1866, by Mr. J. E. Mapplebeck. Length, 1 foot.

12. 

**Middletoni, Lowe** (ramulosissimum Middleton, Wollaston).

Found in 1872, in Montgomery, by Mr. Middleton (head gardener to Sir Watkins Wynn). 4 × 0.5 inches. Branching from the ground into 9 or 10 branches, more interesting than beautiful.

13. 

**multifurcatum, Moore** (ramosissimum, Jones). Found in 1871, at Long Sleddale, by Mr. J. E. Mapplebeck. Length, 15 inches, densely foliose, capitate head 12 inches wide.

14. 

**ramocristatum, Jones.** Raised in 1871, by Mrs. Hodgson. Length, 11 inches. Ramose, pinnæ crested, width across the head 6 inches.

15. 

**ramulosissimum, Lowe** (basi-ramosum, Mapplebeck). Raised in 1870, by Mr. Mapplebeck. 10 × 2.5 inches, branching at base of stipes into 6 to 10 crested fronds.

16. 

**Stansfieldii, Lowe** (ramosissimum fimbriatum, Stansfield).

Raised by Messrs. F. W. and H. Stansfield. Length, 13 inches. A very fine variety, with naked stipes, head branching to 11 inches across.

17. 

**unco-glomeratum, Jones.** Raised in 1878, by Messrs. F. W. and H. Stansfield. General character of acrocladon, but even more branched, finely dissected like the finest forms of "uncum," not fimbriate.

18. 


Section 3. GRANDICEPS.

(Terminal crest as wide as, or wider than, frond.)

*1. Albertii, Lowe.** Raised by myself. Densely and compactly bunch-crested. Capitate head, 4.5 inches wide. Stiff erect habit. 16 × 1.5 inches.


3. 

**canaliculatum, Stansfield.** Raised in 1882, by Messrs. F. W. and H. Stansfield. Rachis broad and channelled, hence the name.

4. 

**capitatum, Lowe** (nodoso-cristatum, Jones).

*5. caput Medusæ, Mapplebeck.** Raised by Mr. Mapplebeck.

6. 

**centiceps, Lowe.** Raised by myself. Length, 15 inches.

*7. ceratophyllum, Mapplebeck.
*8. coronare, Lowe. Raised by myself; densely crested. 24 x 3.
9. coronatum, Moore. Pinnae acute, not crested, a branching crown 3½ inches wide. 8 x 1½ inches.
11. depauperatum, Moore. Found many years ago near Ben Bulgen, by Mr. J. Gunning. Depauperate, laciniate, crested. Length, 12 inches.
*13. culophon, Mapplebeck. Raised by Mr. Mapplebeck.

15. grandiceps, Moore. Found near Nettlecombe, by the late Mr. C. Elworthy, and near Wiveliscombe, by Mr. J. Morse. The apex expanded into a large multifid crispy head. Length, 18 inches.
16. Hodgsonae, Lowe (Grandiceps Hodgson, Jones). A narrow compactly crested form, dividing into three branches 7 inches from the apex (6 inches across these branches). 24 x 3 inches.
17. Hookeri, Lowe. Raised by myself, terminating in a crested head 6 inches broad, short crested pinnae at the base, then cruciate to the head. 16 x 2½ inches (at the base), narrowing to one inch higher up.
*19. kalon, Lowe. Raised by myself. A grand cruciate and capitate form, the cruciate pinnae crested. Head densely crested, and 5 inches wide. 35 x 2½ inches.
*20. kephalobares, Lowe. Raised by myself. Pinnae short and heavily crested, frond terminating in a head five inches wide. Immediately above the basal pair of pinnae is a single branch 1 inch wide and 6 inches long, heavily crested and capitate. 20 x 3 inches.

22. nudicaule, Lowe (nudicaule cristatum, Jones). An extraordinary variety, branching at the base of the stipes into three distinct fronds, having naked stems, and merely a leafy capitate head, each head 4\(\frac{1}{2}\) inches wide. Length, 11 inches.

Fig. 22.—Athyrium Filix-femina, var. orbiculatum (apex).

23. orbiculatum, Lowe (capitatum, Padley). Raised by the late Mr. Elworthy. A very finely-divided large capitate head.

24. Padleyi, Lowe (grandiceps Padley, Jones). A narrow normal form with a dense grandiceps head 4\(\frac{1}{2}\) inches wide. 15\(\times\)2\(\frac{1}{2}\) inches.

25. Quilteri, Mapplebeck (macquele capitatum, Jones). Raised in 1872, by Mr. Mapplebeck. Branching head 8 inches broad, below much depauperated. 14\(\times\)0\(\frac{3}{4}\) inches.

26. scopula, Lowe. Raised in 1887 by myself. Rachis dividing. Crests like brushes, head 4 inches across. 18\(\times\)3\(\frac{1}{2}\) inches.
27. *strombomenon*, Lowe. Raised in 1867 by myself. Normal with a crested head \(5\frac{1}{2}\) inches broad. 18 \(\times\) 4 inches.


Section γ. CRISTATUM.

(Bunch crested.)


3. *anomalum*, Lowe (Gillsoniae anomalum, Mapplebeck). Raised in 1869 by Mr. Mapplebeck. 21 \(\times\) 3\(\frac{1}{2}\) inches in middle of frond. Pinnules crowded and margins dentate, tips of pinnæ crested, apex of frond caudate. An extraordinary variety.


5. *caudatum*, Lowe (Gillsoniae anomalum, Mapplebeck; caudato-cristatum, Jones). Raised in 1869. 21 \(\times\) 3 inches. Lax, narrow, pinnules dense, apex of frond caudate.

6. *corymbiferum*, Moore. Found in Guernsey, by the late Mr. James, varying from 18 \(\times\) 6 to 34 \(\times\) 10 inches. A fine form, crested and corymbose.


8. *curvato-digitatum*, Barnes. Found in 1875, on Lancaster Moor, by Mr. Stewardson. Pinnæ curved down and digitate.


10. *defecto-furcillans*, Mapplebeck. Raised in 1869 by Mr. J. E. Mapplebeck. 27 \(\times\) 9 inches, pinnæ longer and much wider (though with less branches) than Howardiae.


12. *digitale*, Jones. A lax narrow form, pinnæ with slender, digitate, conspicuous crests. Apex of frond not crested, but ending in a very fine point. 28 \(\times\) 6 inches.


14. *echinatum*, Lowe. Short pinnæ, densely capitate; the capitate heads 1 inch across, margins conspicuously dentate. Raised by myself. 16 \(\times\) 3 inches.

15. *Elworthii*, Moore. Found near Nettlecombe by the late Mr. C. Elworthy. Densely tasselled, very symmetrical form, pinnules crested. 30 \(\times\) 7 inches.

(Craigii crossed with unicum). A narrow Craigii. \(22 \times 2\frac{1}{2}\) inches.

17. foliosum, Lowe (folioso cristatum, Jones).


*19. furcillans, Mapplebeck.

20. gemmatum, Barnes. A very interesting narrow variety with reflexed pinnules. Pinnae compactly and heavily crested. \(27 \times 4\) inches.

21. gracilissimum, Lowe. Raised in 1867 by myself. \(21 \times 7\frac{1}{2}\) inches. Slender, with short broad pinnules, pinnae crested.

22. gratum, Lowe. Raised by myself. Symmetrical crested variety, slender and lax. \(20 \times 5\) inches.


*24. Howardæ, Moore. Raised in 1864 by Mr. Craig (gardener to the late Hon. Mrs. Howard, Levens Hall). \(24 \times 7\) inches in centre of frond. Pinnae branching and cresting, as broad as long, and though lax overlapping from the great breadth of the ramose ends.


27. incongruum, Barnes. Found in 1875, in Langdale, by Mr. Barnes.


32. mirandum, Lowe. Raised by myself. Very handsome. \(26 \times 6\) inches (lower part), \(2\frac{1}{2}\) inches (upper part). Capitate. Four pairs of basal pinnæ branch-crested, and above this cruciate-crested.
33. multifidum, **Moore.** Found in Wicklow, by Mr. D. Moore. 33 x 10 inches. Normal with crested pinnæ. There are various wild forms (viz. Barnesii, Hodgsonæ, tenue, Fraseri, nanum), and almost an endless number have been raised from spores.

34. paucidentatum, **Lowe** (paucidentatum cristatum, **Mapplebeck**). Raised in 1870 by Mr. Mapplebeck. 16 x 1.2 inches. A marvellous, delicate variety; very broad. Pinnæ with large ramose crenations; apex of frond abrupt, with branching crest; pinnules short and scarcely dentate.

35. percrisatum, **Lowe** (percrisatum Cousins, **Jones**). An interesting form.

36. polydactylum, **Moore.** Found at Windermere, Nettlecombe, and other places. Finger crested.

37. regale, **Moore.** Raised in 1867 by Mr. J. M. Barnes. 30 x 10 inches. The grandest crested Lady Fern; foliose, and the pinnules crested.

38. setigerum, **Jones.** Found in the Lake district by Mr. Garnett. A grand crested, lax form; pinnules dilated at the apex, and bristling with hair divisions. 24 x 5 inches.

39. spinocristatum, **Lowe.** A marvellous production, raised from mixed spores. 20 x 4 inches. Lax, many pinnæ wanting; some reduced to thorns that are crested, the few pinnæ well crested, a large capitate head.

40. splendens, **Moore.** Raised in 1864 by Mr. J. M. Barnes. 30 x 7 inches. A fine plumose form, with tips of pinnæ boldly furcately crested, and pinnules also crested.

41. splendidum, **Lowe** (splendens Craig, **Jones**). Raised by Mr. Craig 36 x 11 inches. One of the finest crested forms. Pinnæ and pinnules crested. Scarceably distinct from Barnes's form.

42. Stewardsoni, **Lowe** (digitale Stewardson, **Jones**). A pretty lax digitate variety. Fronds, 21 x 7 inches.

43. tenue, **Lowe** (cristato-tenue, **Wollaston**; multifidum tenue, **Wilson**). Found in 1869, in North Lancashire, by Mr. J. Wilson. A slender fern, widest in centre, with narrow, distant, fish-tail crests. 12 x 4.5 inches.

44. uncum, **Lowe.** Raised by myself from spores. A copy of uncum, but well crested and capitate. 22 x 5 inches.

Section 8. **CRUCIATUM.**

(Pinnæ and pinnules twin branched.)

*1. Alexandræ, **Lowe.** Raised by myself in 1867. 28 x 3 inches. The three pairs of basal pinnæ, and also near the forked tip of the frond normal, elsewhere broadly and boldly cruciate.

2. angustum, **Lowe** (angusto-cruciatum, **Jones**). Raised in 1868 by Messrs. Stansfield. Smaller than multifidum. 12 x 0.5 inches.

3. arbuscula, **Lowe.** Raised by myself. 24 x 9 inches. Pinnæ normal; pinnules, some cruciate, others depauperate, and part normal.

4. Bakeri, **Lowe.** Raised by myself. Narrow, cruciate, with attenuated tip.

6. *clarum, Lowe.* Raised by the late Mr. Carbonell. $18 \times 5$ inches. Cruciata, both in pinnae and pinnules.

7. *Cœleste, Lowe.* Raised by the late Colonel Jones, and in the possession of Mr. E. F. Fox. $18 \times 0.5$ inches. Very narrow, cruciata and capitate.

8. *columnare, Lowe.* Like crested columns.

9. *contrarium, Lowe* Raised by the late Colonel Jones. $26 \times 2$ inches at base, gradually narrowing to half an inch. The 3 or 4 pairs of basal pinnae long, narrow, and reflexed, above these more or less horizontal cruciata pinnae, and near the apex lunulate; frond ending in a narrow, pendent apex. A fine variety.


11. *Craigii, Moore* (crucipinnulum cristatum Craig, *Jones*). Raised in 1864 by Mr. R. Craig. $8 \times 1$ inches. Stem red. Pinnae and pinnules varied in size and shape, apex very leafy and crested.


13. *Craigii-splendens, Mapplebeck.* Raised by Mr. Mapplebeck.


15. *cruciato-multifidum, Praeger.* Found in 1880 at Castle Rock, Co. Derry, by Mr. A. J. Praeger. $20 \times 1.5$ to $4.5$ inches. Lower half cruciata, upper normal, but crested.


17. *cruciferum, Lowe.* From the late Colonel Jones's fronds. Length 20 inches, width $\frac{3}{4}$ of an inch, cruciata from the base to the densely tasselled apex. Pinnae in lower half of the frond crested and longer, but, lying parallel with the rachis, the frond is not wider. A pretty variety.


21. *Evelyna, Fox.* Raised by Mr. E. F. Fox. A distinct form of Victoriae, $30 \times 1.5$ inches. The cruciata parallel with the rachis, conspicuously bidentate.

22. *exempluum, Lowe.* Raised by myself. Length 15 inches. Pinnae narrow, the basal 2 or 3 pairs at right angles to the rachis, the rest of the pinnae cruciata, the frond narrowing to a point. The whole of the pinnules are cruciata, and this gives the frond an elegant appearance.

24. *gemellipara, Lowe*. Raised by myself. 30 x 4 inches below and 2 x 2 inches above. A handsome combination. Lowest 4 or 5 pairs of pinnæ crested, their pinnules cruciate; above pinnæ cruciate and the crested apex capitate.


27. *Gilsonæ - furcans, Mapplebeck*.


29. *Hallaæ, Lowe*. Raised from spores in 1869 by myself, lower half of the frond normal and crested; centre of frond, pinnae dividing in the middle; above cruciate and crested, apex capitate, 18 x 5 inches, and 2½ inches where cruciate; raised from "Craigii."

30. *invincere, Lowe*. Raised from spores in 1870 by myself. 18 x 4½ inches. Lower half of frond normal and densely crested, above cruciate with a capitate head. Where cruciate, width only 1½ inches.


32. *Lawsoni, Lowe*. Raised by myself. 26 x 0½ inches. In style of *Frizelliae-cristatum* of *Jones*; but the pinnae are cruciate. A large capitate head.


34. *mixtum, Lowe*. A narrow, very slender form, raised by myself in 1887. Length 20 inches, width 3 inches where poly-
dactylous, and 1 inch where cruciate; near the base polydactylous, and the superior basal pinnule brachiate.


36. nanum, Lowe. Raised by myself. A pretty dwarf cruciate form with a finely cut capitata head. Length 9 inches, width $\frac{1}{2}$ an inch, head 2 inches across.

37. Nereidæ, Lowe (cruciato-cristatum Lowe, Wollaston). Raised in 1873 by myself. Cruciate throughout the frond; pinnæ and also pinnules crested; capitata crested head. $18 \times 1\frac{3}{4}$ inches.

38. nutamen, Lowe. Raised by myself. A pretty dwarf cruciate form with a finely cut capitata head. Length 9 inches, width $\frac{1}{2}$ inch. Apex weeping.

39. projectum, Lowe. A narrow, cruciate, crested capitata form, with here and there projecting non-cruciate pinnæ. Raised by myself. Length 15 inches; width where cruciate, 1 inch, where projecting, 3 inches.

*45. proteoides Lowe. Raised from spores by myself from Mr. Clapham’s “proteum.” A much finer cruciate form, with projecting pinnæ, length 25 inches, width 3 to 5 inches. Habit erect, fronds stiff, and every frond alike. In Colonel Jones’s “Nature-printed Ferns,” proteoides is figured under the name “proteum.”

46. proteum, Clapham. Found in Cumberland in 1866 by the late Mr. Clapham. Half the fronds narrow and cruciate, and half normal. $21 \times 4\frac{1}{2}$ inches.

*47. regale, Lowe (Victoriae magnificum, Jones). Raised by myself. $25 \times 5\frac{1}{2}$ inches. Pinnules lobed; pinnæ broader than in Victoriae, $2\frac{1}{2}$ to 3 inches in length, forming open squares 1 inch in diameter.

48. reticulum, Lowe. Raised by myself. A narrow, profoundly dentate, cruciate variety. Length 20 inches, width $1\frac{1}{2}$ inches, apex pointed.


*52. strombomenon, *Lowe*. Raised by myself. Length, 14 inches. Pinnæ on lower half of frond reflexed, on upper half cruciate and truncate, the apex twisted round to the shape of a ball.


*54. triumphale, *Lowe*. Raised in 1866 by myself. Like a narrow Craigii, with a large symmetrical capitate head, 7 inches across; the tips of the cruciate pinnæ boldly crested. 18 x 4½ inches, and where cruciate only 2½ inches.


58. Victorïæ, *Moore*. Found in 1861, in Stirlingshire, by Mr. J. Cosh. 20 x 5 inches. Pinnæ narrow, the cruciation forming a number of square openings. A remarkable form.


**Group II. Pumilum.**

(Skeletal axis shortened in relation to soft parts.)

Section a. **CONGESTUM.** (Main axis shortened.)


2. Cathedrale, *Lowe* (Simpsonii cristatum, *Jones*). A crested Simpsonii, said to have been found on Lichfield Cathedral 200 years ago?


4. cristatum, *Lowe*. Raised by myself. A densely crested capitate form, very much dwarfed; neat. 8 x 2 inches.


*7. Edwardsii ramosum, *Lowe*. Similar to Edwardsii, with the addition of branching at the apex.


12. Grantae, *Moore* (congestum Paul, *Wollaston*). Found in 1865 in Cornwall by Mr. Paul, of Truro. Pinnae and pinnules over-lapping, densely frondose; stipes and rachis very stout, the latter somewhat flexuose; crispate. $23 \times 6$ inches.


16. minimum, *Birkenhead*. Found at Grange, Lancashire, by Mr. Mason. Height only 6 inches.

17. nanodes, *Lowe*. Found in Monmouthshire by Mrs. Bagnall Oakeley. $24 \times 4\frac{1}{2}$ inches (the stipes being 6 inches). Stipes bending, rachis flexuose, pinnae almost imbricate.


Section 3. CRISPATUM.

(Subsidiary axes shortened more or less.)


*3. comicum, Mapplebeck*. Crispy, pinnules irregular.

4. conioides, *Appleby*. Found near Doncaster by Mr. S. Appleby. Length, 2 feet. Named from the outline and divisions of the frond resembling hemlock leaves. Mr. Praiger has found a nice form in Co. Antrim.


6. Vernonæ, *Jervis*. Found by Miss Vernon. $18 \times 4\frac{1}{2}$ inches. Divisions frilled.

*8. Vernonæ-cristatum, Maplebeck (crispato-cristatum, Jones).* Raised in 1873 by the late Colonel Jones. 18×4 inches. Pinnae overlapping and crispate, pinnae lax, short, very broad and well crested.

**Group III. Flexuosum.**

Section a. FLEXUOSUM. (Bending.)

1. adulterum, Lowe. An extraordinary and beautiful mixed narrow variety. 17×2½ inches Lower half of frond pinnae very gracefully flexuose; above this cruciate, with flexuose pinnae, and near apex normal; pinnae more or less reflexed throughout. Another of the cruciate batch of seedlings raised here.

2. Craigii, Lowe. Not unlike Harrisæ but larger (one of Mr. Craig’s seedlings). Pinnae flexuose, and crested. Pinnae long and reflexed; tip of the frond crested. 21×7 inches.


5. cruciatum, Lowe. Raised from spores. Length 24 inches, width 4½ inches. Pinnae narrow, flexuose, and cruciate; more regularly cruciate in upper half of frond, and apex capitate. This was from a mixture of spores (Frizellœ, Foxii, cruciatum, and uncum); and all these forms are shown in the frond.

6. cymba, Lowe. Raised by myself. 18×5½ inches. The pinnae curve upwards (boat-like) and are heavily crested; pinnae tortuous and are turned downwards.

7. flexuosum, Wollaston. Found in 1858 in Lancashire by Mr. Huddart. The stipes, rachis, pinnae, and pinnales twisting in a most grotesque manner, varying much in the manner of twisting 18×5 inches.

8. Foxii, Lowe (reflexum Fox, Wollaston). Found in 1850 in South Devon by Mr. E. F. Fox. A much narrower variety than reflexum, with the same revolving character; tips of pinnae reflexing giving a hooked look. 27×4 inches.


*10. lineare, Lowe (lineare reflexum, Lowe).* Raised in same batch of seedlings with cruciatum; 16×2½ inches; to above the middle of frond; pinnae one inch apart; upper third of frond cruciate with minute lunulate pinnales.

11. perplexum, Lowe. Raised by myself. 27×3 inches (though some pinnae five inches long). Remarkably depauperate and very flexuose. Pinnae mostly on one side, and in pairs almos touching each other; some pinnae crested; many pinnae wanting, and most lunulate and minute.

12. plumosum, Jones. A flexuose plumose form found in County Kerry by the late Mr. Tyerman. 20×4 inches.

14. reflexum, *Wollaston*. Found in 1858 in Westmoreland, by Mr. F. Clowes. The flexuose character is in the pinnules revolving. A remarkable variety. 24 × 10 inches.


**DIVISION B.**

**ALTERATIONS IN SOFT PARTS.**

**Group I. Compositum.**

(Subdivision of ultimate segments.)

Section a. PLUMOSUM.

(Subdivision associated with increased development.
Fructification scanty or absent.)

1. Axminsterense, *Lowe* (plumosum Axminster, *Jones*). Found in 1860 at Axminster by Mr. J. Trott. A noble plumose form, more frondose than plumosum but very feathery. I had a large plant from Miss Bellairs completely covered with bulbils. 32 × 14 inches.


*4. Clarissima, *Jones*. Found in 1868 in North Devon by Mr. R. Moule. 32 × 18 inches. A most lovely fern, and strikingly distinct. The linear segments give a lax appearance. Pale green. Lower pinnae 14 inches long and 4 inches wide; largest pinnules, 2½ inches long.

Fig. 25.—Athyrium filix-femina, var. Barnesii (pinna, showing feathery character).
5. decoratum, Lowe. From the late Colonel Jones's collection. History not known. A subplumose, narrow, lax form; very symmetrical. A great beauty. 23 x 6 inches.

*6. dilatatum, Maplebeck. Rather foliose.

7. divaricatum, Lowe (plumosum-divaricatum, Moore). Found in 1872 in Lancashire by Mr. W. Morris. Pinnules almost perpendicular to the main stem. A very fine divaricate plumosum. 30 x 12 inches.

8. elegans, Lowe (plumosum-elegans, Parsons). Raised by Mr. Parsons. Slender, with finely cut pinnules. 28 x 7 inches.


10. frondoso-cristatum, Jones (in the late Colonel Jones's collection).


12. kalothrix, Lowe. Raised in 1870 by Mr. Howlett. 18 x 6 inches. A most lovely, delicate, pale-green, hair-like form.


15. plumosum, Moore. Found in Yorkshire in 1860 by Mr. J. Horsfall. A fine plumose variety. 33 x 8 inches.


17. Stansfieldii, Lowe (plumosum-Stansfieldii, Stansfield). Raised by Messrs. Stansfield from kalothrix; a larger and less fragile form than that lovely variety. A most beautiful plumosum.

18. subplumosum, Padley. Found near Nettlecombe by the late Mr. C. Elworthy. 26 x 8½ inches. A very elegant plumose form.

*19. superbum, Lowe (plumosum-superbum, Druery). Raised by Mr. C. T. Druery. One of a number of lovely ferns raised by Mr. Druery.

20. Thompsoni, Lowe. A singular plumose form, the pinnae furcating near the ends, and the tips being caudate. Found at Mousehole, Cornwall, by Mr. R. A. Thompson. 24 x 7 inches. Apex furcate.

21. Willsii, Lowe (plumosum Wills, Jones). Found in Dorset in 1869 by Mr. J. S. Wills. Very robust. Mr. Wills had a plant 6 feet high and as much wide.

Section β. DISSECTUM.

(Subdivision of ultimate segments without marked increase in development of soft parts.)

1. Barnesii, Clapham. Raised by Mr. Barnes, of Thirsk. Somewhat in the way of pulcherrimum, though distinct.
SUB-SECTION ATHYRIUM.

2. coronatum, Lowe (setigerum-coronatum, Birkenhead).
3. corymbiferum, Lowe (setigerum corymbiferum, Birkenhead).
4. cristatum, Lowe (pulcherrimum cristatum Hodgson, Jones).
A crested form of pulcherrimum found in the Lake District by Mrs. Hodgson.
5. diffissum, Moore. Found originally in Guernsey by the late Mr. James. Length 18 inches. Pinnules irregularly cut.
8. grandiceps, Lowe (setigerum grandiceps, Birkenhead).
9. Jacksoni, Lowe (pulcherrimum plumosum, Jones). A plumose form of pulcherrimum found by the late Mr. Jackson.
13. rectangulare, Moore. Found in 1870, in Westmoreland, by Mrs. J. Wilson. 21 × 8 inches, in centre of frond. Apical pinnules bidentate; pinnules so small that the spore-cases are wider. A very pretty variety. Doodioides Lowe is very similar.
15. spinosum, Lowe. Raised by myself. 15 × 5 inches. Pinnules deeply split into very dentate thorny lobes.
16. todeoides, Stansfield. Large and very finely dissected.

Group II. Exiguum.
(Regular diminution of soft parts.)
Section a. LAXUM. (Pinnæ wide apart.)
3. lineare, Lowe (uncum-lineare, Jones), a very narrow uncum, raised by the late Colonel Jones. 12 × 1½ inches.
4. pannosum, Moore. Found in a number of places. Slender; pinnules irregular and tapering.
24 × 3 inches in the broadest part, only \( \frac{3}{4} \) inch at the base, and below the branched head.

6. uncum, Moore. Found in 1860, in Levens Park, by Mr. J. M. Barnes. 10 × 3 inches. Pinnae narrow and lax; pinnules varied, although having a general resemblance; divided to the costa and often bent like a hook.

7. Woodii, Lowe (curtum-Woodii, Wollaston). Found in 1865, at Bowness, by Mr. J. Wood. 11 × 2\( \frac{1}{2} \) inches. Regular outline, compact and leafy.

Section β. DEPAUPERATUM. (Irregular, part wanting.)


*3. amœnum, Mapplebeck. Defective.

4. capitatum, Tyerman. A form very much like cephalomanes was raised by the late Mr. Tyerman.

5. cephalomanes, Jones. Raised from spores. Length 14 inches. Normal reflexed crested pinnæ at the base; above this pinnæ absent; apex capitate, the head five inches broad.

*6. defecto-sectum, Mapplebeck.

*7. Du Boule, Lowe. Found in Cornwall by Mrs. Du Boule, and sent to Mr. Sang to raise plants from spores, in order to realize money towards restoring Mr. Du Boule’s church. Unfortunately the seedlings would not come true from spores. 22 × 4 inches. A singular depauperate and laciniate variety.

8. excurrens, Moore. Found in 1853 at Tunbridge Wells, differing in the tips of the pinnæ having transparent hair-like points.

9. interruptum, Moore. Found near Nettlecombe, by the late Mr. Elworthy. 26 × 7 inches. Pinnae very various; pinnules much depauperated. A singular form was found near Ambleside by Mr. G. B. Wollaston; and Mr. W. H. Phillips has found two good forms, one at Carlingford and the other at Killymoon.

10. medio-deficiens, Jones. Found in 1884 at Innerwell, Wig-townshire, by Mr. C. T. Druery. Outline symmetrical; basal pinnules (2 to 6 pairs) in all the middle pinnæ depauperate.

11. polymorphum, Ciapham. Found in 1872 near Scarborough, by Mr. Keld. Pinnae and pinnules depauperated; many pinnules absent, and some branched and others confluent; somewhat crested; a tail-like depauperate apex of frond. A singular fern. 18 × 7 inches.


*13. Sylvia, Lowe. Raised by myself. A slender depauperate variety, with diverse pinnae and pinnules; reflexed. 15 × 2\( \frac{1}{2} \) inches. The larger pinnules confluent.
Group III. Heteromorphum.

Section a. ROTUNDATUM. (Rounded pinnules.)


*2. cymbaforme*, Lowe. Raised by myself. A cross between Pulleri and cruciatum. In lower half of fronds, which are lax, each pair of pinnae curve upwards and assume the shape of a boat; above the middle of frond cruciate, and towards the apex Frizellia-like. The upper half of each pinna is lunulate, terminating in a large lunulate pinnule, as broad as the rest of the frond. 20 × 4 inches at base, and 20 × 0½ inches near apex.

*3. Fraseri*, Lowe. Raised from spores by myself. Quite distinct from Pulleri, with larger and less rounded pinnules. Truncate and branched at the apex. Length, 22 inches, width, 2½ inches.

4. *Pulleri*, Moore (rotundatum, Wollaston). Found in 1864 in the Isle of Skye by Mr. C. Puller. Length, 18 × 3 inches. Very lax, pinnae short and narrow, with lunulate pinnules; tip of frond caudate. A distinct fern. I have raised a form from this, fronds 6 inches broad, and pinnules of double the size of Pulleri.

Section b. LINEARE. (Narrow pinnules.)

1. diminuato-pinnulum, Lowe. Raised by myself in 1884. 18 × 7 inches. A slender variety, with very small, reduced pinnules, broader than long.

*2. Flexile*, Mapplebeck. Narrow.

3. Girdlestonei, Ivery (lineare, Wollaston). Found in 1866 in Rossshire by the Rev. Canon Girdlestone. Length, 21 × 9 inches. Pinnæ ascending, linear or depauperate, especially near the rachis, where the pinnules are reduced to a thorn, or wanting. Apex of pinnules confluent.

Section γ. LACINIATUM. (Jagged pinnules.)

1. arbuscula, Lowe. Raised by myself.


3. conioides, Appleby.

4. elegans, Lowe (laciniatum elegans, Stansfield). A sport from ramulosum. The ramulose apex has disappeared, and is replaced by cruciate pinnules.


Section 8. **LUNULATUM** (or **FRIZELLÆ**).

(Pinnæ abbreviated to lobes.)

1. capitatum, *Lowe* (Frizelliae cristatum, *Jones*; lunulato-cristatum, *Wollaston*). Raised in 1875, by the late Colonel Jones. 24×0·2 inches. Pinnæ smaller than in Frizelliae, terminating in a compact capitate head 5 inches wide. From the branching of this crested head there is a complete change in the character of the segments. I have raised an identical form.

2. Carbonellii, *Lowe* (Frizelliae capitatum, *Carbonell*). Raised by the late Mr. Carbonell. 14×0·½ inches. A narrow capitate form.


5. cruciatum, *Lowe*. Raised from spores by myself. Narrow, cruciate, and capitate. 25×0·½ inches; capitate head 5½ inches across. Head dense and foliose.

6. dentato-capitatum, *Lowe*. Not unlike dentatum but broader fronds, longer teeth, and a capitate dentate head. 16×1 inches at base, and 16×0·½ inches in upper half.

7. dentatum, *Lowe*. Raised from spores (of uncum, cruciatum, and Frizelliae). Combining the characters of all; below uncum, then cruciatum, ending in Frizelliae; everywhere deeply dentate. 16×1½ inches at base, and 16×10½ inches near apex.

*8. flabellifolium, *Mapplebeck*.


subsequently in Co. Donegal, by Mr. H. C. Hart. Very narrow with half-moon shaped pinnae. 15 x 0.3 inches.
11. gracile, Lowe (Frizellæ gracile, Birkenhead).
13. Helena, Fox. Raised by Mr. E. F. Fox. 15 x 2 inches. lower half branch-crested; upper pinnae all but wanting. Cuneate branched apex.
14. lunuloides, Lowe. Raised by myself. 12 x 1 ¼ inches. Upper half of frond pinnae lunulate but confluent, apex truncate.
15. multifidum, Lowe (Frizellæ multifidum, Barnes, lunulato-multifidum, Wollaston). Raised in 1871, by Mr. Barnes. 18 x 0.2 inches. Pinnae smaller and more abortive than in Frizellæ. Frond terminating in a capitate head 9 inches across. The tips of the numerous branches crested, the crests being of a different character. I have raised one almost identical.
16. ramosissimum, Lowe (Frizellæ ramosissimum, Mapplebeck; ramulo-lunulatum, Wollaston). Raised in 1873, by Mr. Mapplebeck. Length, 4 inches, width across the ramose head, 5 inches. A mass of branches (as many as 17) starting at the stipes.
17. ramosum, Lowe (Frizellæ ramosum, Lowe; and ramo-lunulatum, Wollaston). Raised in 1874 by myself. 12 x 0.3 inches. Branching from the rachis, each branch representing the top portion of Frizellæ.
19. Shawii, Moore. A dwarf Frizellæ, with lobes single instead of double, as in Frizellæ.
*20. spicatum, Mapplebeck.
22. superadornatum, Lowe. Raised by Mrs. Grant, of Hillersdon. The lunulate pinnae smaller, and the capitate head larger than in capitatum, and the plant more robust. 26 x 0.2 inches (capitate head 6 inches).

THE COMMON CETERACH.

ASPLENIIUM CETERACH.—Linnaeus.

(CETERACH OFFICINARUM.—Willdenow.)

A small pinnatifid fern, growing on rocks and walls in a limestone district, mostly on the sunny side; having bluish-green, leathery, numerous fronds varying from 3 to 10 inches in length. The underneath of the frond is covered with reddish, chaffy scales, and the sori, which are more or less hidden by these scales, are linear-oblong. It is more abundant and more luxurious in Ireland than in England. During droughts the fronds fold up as if dead, but become fully expanded again after the first shower. Although it is abundant in the southern counties of England, and found in
30 English, 7 Welsh, and 7 Scotch counties, it is nevertheless rare in some of them. Years ago a single plant was found by the late Mr. Joseph Sidebotham, on Colwick Park wall, in Nottingham, and a second plant was on the sunk fence wall at Highfield House; but both of these plants are now dead. It had been seen years before in Nottingham Park and at Papplewick, but is destroyed in these places. The Lancashire plants are the variety crenatum. In Ireland it is more or less abundant in fourteen counties, and is also found in the islands of Jersey, Anglesea, Arran, and the Isle of Wight. Widely spread throughout Europe, and an inhabitant of Madeira, Azores, Canaries, Cape de Verde Isles, India, Asia Minor, Brazil, etc. In Lancashire it is found locally on Pendle Hill, and at Browsholme Hall, near Clitheroe.

In Madeira there is a very similar fern on a much larger scale, known as Ceterach aureum. This I have crossed with the English species, but the seedlings are yet too small to speak about positively. The Barony of the Burren, in County Clare, is extraordinarily rich in varieties, some very large, and some exceedingly distinct. Mr. P. B. O'Kelly, of Glanarra House, Ballyvaughan, has sent me more than a dozen distinct varieties, and all good characteristic plants. Mr. O'Kelly's name is attached to all his Burren forms.

Varieties.

1. angustatum, O'Kelly. 2 × 0 1/4 inches. Concave.
2. bifidum, O'Kelly. Bifid.
3. crenatum, Moorre. Found in Lake district, by Miss Beever; near Clitheroe, by Mr. Garnett and myself; Crickhowel, by Mr. J. R. Cobb and myself; Devon, Mr. J. R. Gray; Perth and Kircudbright, by Mr. W. G. Johnstone; Carberry Island, by the late Colonel A. S. H. Lowe; Waterford, by Mr. J. R. Kinahan; but by far the best forms in the Burren, by Mr. O'Kelly. The margin crenate. 6 × 1 1/2 inches.
4. crenatum-major, O'Kelly. 8 × 1 1/2 inches.
5. crenulare, Lowe (crenatum minor, O'Kelly). 2 1/2 × 0 3/4 inches. Concave, very pretty.
6. crispum-major, O'Kelly. 10 3/4 × 1 1/2 inches. A giant.
7. cristatum, O'Kelly. Crested.
8. decorum, O'Kelly. Stiffer texture and rugose. 8 × 1 inches.
9. densum, O'Kelly. 3 × 0 3/4 inches.
10. densum-variants, O'Kelly. 4 × 0 3/8 inches.
11. depauperatum, Wallaston. Found at Kilkenny, by Colonel Buchanan.
12. giganteum, O'Kelly. 7 1/4 × 1 inches.
13. grandiceps, O'Kelly. 4 × 0 3/8 inches. A fine capitate form.
14. interruptum, O'Kelly. $7 \times 0 \frac{1}{2}$ inches. Lax and interrupted.
15. kalon, Lowe. Found near Athlone by the late Colonel A. S. H. Lowe. $8 \times 1 \frac{1}{2}$ inches. Crenate.
16. lineare, O'Kelly. $2 \frac{1}{2} \times 0 \frac{1}{2}$ inches. A narrow form and depauperate.
17. lineare-major, O'Kelly. $9 \times 0 \frac{1}{2}$ inches. Very lax, stipes long.
18. majus, O'Kelly. $9 \frac{1}{2} \times 1 \frac{1}{2}$ inches. Flat.
19. minimum, Lowe. Devon. 2 inches long.
20. multifido-cristatum, O'Kelly. $4 \times 0 \frac{1}{4}$ inches. Multifidly crested.
21. ramoso-cristatum, Lowe. Found in Co. Clare, by Mr. A. Wise. $5 \frac{1}{2} \times 0 \frac{1}{4}$ inches.
22. ramosum, O'Kelly. $6 \times 0 \frac{7}{10}$ inches. Also Arnside, by Mr. J. Crossfield. Branching in the rachis.
23. subpinnatum, O'Kelly.
24. superbum, O'Kelly. $9 \times 1$ inches. A fine deeply crenate form.
25. tenuifolium, O'Kelly. $5 \frac{1}{2} \times 0 \frac{1}{2}$ inches. Slender.
26. truncatum, O'Kelly. $2 \frac{1}{2} \times 0 \frac{1}{2}$ inches. Depauperate and truncate.
27. variabile, Lowe. Found at Browsholme Hall, Clitheroe, by myself. 5 inches. And also in the Burren by Mr. O'Kelly; the latter has a more bushy habit.

Tribe 9. SCOLOPENDRIÆ.

THE HART'S TONGUE FERN.

SCOLOPENDRIUM VULGARE.—Smith.

No one can mistake the Hart's Tongue; for in its normal state, its strap-shaped, entire tongue-like deep green fronds are quite distinct in appearance. Although a widely distributed fern, it is only locally common, and occurs only to the height of about 600 feet, luxuriating most in shady, moist situations where the water drains off; damp walls, mouths of wells, and banks in shady lanes, are its special delight. It is not found north of the island of Gothland, in the Baltic Sea.

An evergreen species, with fronds from four to twenty-four inches in length. Although the Hart's Tongue has a single undivided frond, its prolific varieties assume the most remarkable peculiarities, so much so as to make it requisite to subdivide the varieties, and this has been done in the following manner:—

| branched. | plumose (crispum) |
| equally branched | undulate |
| crested | narrowed |
| conglomerated | muricate |
| sagittate | supralineate |
| truncate | marginate |
| pouch-bearing | margin-altered |
| flexuose | variegated. |

Readily grown under cultivation, but liable to be attacked by the
grub of the Weevil (*Curculio sulcatus*), which destroys the roots and eats into the centre of the stem. Although this grub occasionally attacks the Lady Fern and the Aspidium angulare, it is far more destructive to the Hart's Tongue.

**DIVISION A.**

**ALTERATION IN SKELETON.**

**Group I. Ramose.** (Branched.)

Section a. **RAMOSUM.** (Stipes branched.)

*1 areston, Lowe. Raised by myself. 10 × 0.5 inches; branches twisting and crossing each other; divisions finely cut. Head, 6 inches across.*

2. cristatum, Lowe (ramo-cristatum, Clapham). Raised by the late Mr. Clapham. Width across the finger-crested divisions, 7 inches. Stipes, 4 inches. Length of whole frond, 7 inches.

*3. dichotomum, Lowe. Raised by myself. 14 × 0.5 inches. Branching from the base, again below the rachis, and again 4 inches below the apex, into many narrow divisions. Outline irregular; crests, 7 inches wide.*

4. digitatum, Wollaston. Raised from spores by Mr. Wollaston; branched into a flat crest. In 1860 Mr. Crossfield found a form of this at Cork; and one has been raised by myself 9 × 0.5 inches with a digitate head 4.5 inches across.

5. Edwardsii, Lowe. Found in Devon by Mr. Edwards; branching from the base and again on the stipes, and repeating this on the rachis; bunch crested.

6. majus, Lowe (ramosum-major, Clapham). Found in Yorkshire in 1857, by the late Mr. Clapham, 15 × 2 inches. Stipes and rachis splitting and producing two or more normal fronds.

7. Molyi, Lowe (ramo-cristatum Moly, Wollaston). Found in 1862 in S. Devon by Mr. Moly, 12 × 1.5 inches. Branching into five normal fronds with crested heads, 4 and 5 inches across.

8. ramosum, Willdenow (dædaleum, Deakin). A ramosely crested form, known for many years.
Sub-section. RAMO-INÆQUEALE. (Unequally branched.)

1. admirabile, Lowe. Raised by myself. 12\(\times\)0.5 inches. Branching, and crested with narrow divisions; margin regularly dentate.

2. Alexandræ, Lowe. Raised by the late Colonel Jones from Victoria, and more ramose than that variety. Length, 11 inches; width across the ramose head, 6 inches. Rachis linear and dentate.

3. arbusculare, Lowe. Raised by myself. Length, 9 inches, and width across the head, 7 inches; stem naked; palmate.


5. blandum, Lowe. A ramose form raised by myself.

6. capitatum, Lowe (inæqualе capitatum, Lowe). Raised by myself. 18\(\times\)1 inches. Margin deeply and variously cut; the capitatum part also much cut; the crest 5 inches wide. A bold fern with a straggling stag's-horn-like crest.

7. concavum, Lowe (concavo-ramosum, Clapham). Raised by the late Mr. Clapham. Length, 7 inches, leafy portion only 2 inches. Stipes branching at base into 5 or 6 fronds that are concave; margin irregular; rachis also branching and crested.

8. conjungendum, Lowe. Found in Devon by the Rev. F. Mules. 13\(\times\)1 inches. Twin-fronded, strap-shaped and multifid; the divisions angular and pointed.

9. constellatum, Lowe. Raised by Mr. Glave. A dwarf, stem-branched form; depauperate below the numerous bunch crests; length, 6 inches.


11. Delesserioides, Lowe. Raised by myself. 18\(\times\)0.5 inches. Stipes branching and rebranching, not unlike the red seaweed. Delesseria sinuosa, Lamour; is a very singular variety.

*12. Elworthii, Lowe (inæqualе-furcans Elworthy, Wollaston). Raised in 1873 by the late Mr. Elworthy. Length, 9 inches; width across the branching head, 9 inches.

*13. formosum, Lowe. Raised by myself. 14\(\times\)0.5 inches. Branching, margin irregular; the branches twisting across each other; the tips lacinately crested.

*14. gloriosum, Lowe. Raised by myself. 22\(\times\)1\(\frac{1}{2}\) inches. Irregular outline, as if bitten in places. Branching most on one side. Stipes, 7 inches; head 7 inches across.

15. keratooides, Lowe (inæqualе cristatum, Jones). Raised by the late Mr. Clapham. 9\(\times\)0.5 inches. Branching and rebranching into a head 4 inches across. All parts of the frond narrow and irregularly lacerate; very stag's-horn-like.


*17. mirabile, Lowe. Raised by myself. 7\(\times\)1 inches. Widening
from the base, and dividing into branches on one side; termin-
ing in a large crest.

18. mirificum, Lowe. Found by myself in 1869, at Westward Ho. 16×0\frac{7}{8} inches. Branching and rebranching; the topmost branches long, narrow, and stag's-horn-like. Width across the head, 4 inches. Margin, irregularly dentate.

19. multipinnatum, Moore (inaequale cristatum, Wollaston).

*20. notabile, Lowe. Raised by myself. 12×0\frac{1}{3} inches. A narrow dentate, Victoriae-like variety; branching in stipes and rachis; the head not so spreading and divisions narrower. Stipes only 2 inches.

*21. Ourania, Lowe. Raised by myself. 15×0\frac{3}{4} inches. Branching and rebranching; the topmost branches long, narrow, and stag's-horn-like. Width across the head, 4 inches. Margin, irregularly dentate.

22. patulum, Lowe. Found at Littleham, by the late Rev. C. Padley. A large ramose form; rachis dividing in the middle and branching in a ramose manner.

23. ramo-congregatum, Birkenhead. Length, 1 foot.

24. ramo-cristatum, Clapham. Raised by Mr. Clapham, Mr. Moly, and Mr. Foster. Branched in stipes; and ends of branches crested.

25. ramo-digitatum, Bolton. Found in 1863 at Warton Crag by Mr. Bolton. Large, strong-growing, ramose, and slightly undulate.


*28. summum, Lowe. Raised by myself. 9×0\frac{3}{4} inches. Branching; the margins depauperate and irregularly toothed; terminating in a crest 4 inches across.

29. Trevellyanae, Lowe. Found near Nettlecombe by the late Mr. Elworthy. Stem nearly naked; erect. Width across the crested head, 4 inches; finely cut, interesting variety. Distinct, much branched and crested; leafy part linear. 12×0\frac{1}{3} inches. Stipes, 7 inches; a Victoriae-like form.

30. variabile, Lowe (ramo-variabile, Wollaston). Found in Dorset in 1875, by the late Colonel Jones. 8×1\frac{3}{4} inches. Branching in stipes, and again in rachis into twin truncate fronds.


32. Victoriæ, Lowe. Raised by myself. 9×0\frac{4}{8} inches. Branching in stipes and rachis, into very narrow divisions. A pretty fern.


Section β. CRISTATUM. (Tasselled.)


fronds: 


4. attenuatum, *Low* (attenuato-cristatum Stewardson, *Wollaston*). Raised in 1877 by Mr. Stewardson. 10 × 1\(\frac{1}{2}\) inches in widest part. Narrowing from the base to the crested apex; the cresting ax. An interesting form.

dately and densely crisp-crested head, 6 inches across.


7. columna, *Low*. Raised at St. Pierre, in 1885. 10 × 1\(\frac{1}{2}\) inches. Normal, but ending abruptly 2\(\frac{1}{2}\) inches below the apex, where it branches into an erect crest 2\(\frac{1}{2}\) inches across. Very column-like.


10. coronatum, *Stansfield*. 11 +0\(\frac{1}{2}\), a long strap-shaped form; the costa splitting 2 inches from the apex; the frond ending in a globular crown-like head. Found in 1872 by the late Mr. A. Stansfield.


12. cristagalli, *Wollaston*. Found in North Devon in 1864 by Mr. R. Moule. 12 × 1\(\frac{1}{2}\) inches. Normal, with a symmetrical finely-divided crest. Found also in the Lake district; and at Drogheda by Mr. W. H. Phillips.


15. digitale, *Low*. A digitate form raised by myself.

16. flabellatum, *Moore*. Found near Nettlecombe by the late Mr. Elworthy, 8 × 1\(\frac{1}{2}\), flabellately multifid.


18. Fosteri, *Low* (medicaule capitatum, *Jones*). A most interest


20. Hendersoni, *Willison*. Found in 1866, near Whitby, by Mr. J. Henderson. Like a dwarf ramo-digitatum. Length, 6 inches. Stipes branching and re-branching into divisions (5 or 6 in number) that branch and crest at the apex.


23. Milletii, *Lowe* (cristatum Millett, *Wollaston*). Found in North Devon in 1865 by Mr. Millett. 1 4 x 1 1/2 inches; having a crested head 6 inches across.


25. mutandum, *Lowe*. In Colonel Jones's collection of living plants. History unknown. Length 10 inches. Normal for 5 inches, then branching and contracting to very narrow, whip-like branches, the tips bunch-crested; some of the heads being 5 inches across.

26. ornandum, *Lowe*. Raised by myself. 1 4 x 1 inches. Crested digitately; has a slight tendency to be muricate.


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**Fig. 29.—Scolpendrium vulgare, var. constellatum.**

Sub-section. **Ramo-marginatum.** (Marginal branched.)


2. alato-cristatum, *Stansfield* (not of *Moore*).

3. capitatum, *Jones*. Found by Mr. Foster. A densely crested, infra-lineate variety.

4. cervi cornu, *Stansfield* (not of *Moore*). Fronds linear, branched and crested; segments very narrow. Length, 5 inches, Head $3\frac{1}{2}$ inches across. Pretty.


7. coronarium, *Lowe*. Raised by myself. Length 9 inches. Crenate, wavy; frond widest in the centre, contracting to the finely-cut crown, and then 4 inches across.

8. distortum, *Moore*. Raised by Mr. Elworthy. Stipes and rachis bent; outline irregular; branching several times, but only dilate at the apex.

9. divaricatum, *Moore*. Found in Westmoreland by Mr. J. Crossfield. Dividing near the apex into two branches, which spread at a wide angle; and these fork again in the same manner.

10. Dunkeldense, *Lowe*. Found by myself at Dunkeld. $6 \times 2$ inches. Very irregular, having a branching stipitate lobe in the middle of the stipes $2\frac{1}{2}$ inches long. Very curious. Deeply incised; and apex flat owing to the costa dividing.


13. kephaloton, *Lowe*. Found in Devon by myself. $9 \times 1$ inches. Margin irregular. Costa branching into a leafy laciniate head 6 inches across.


15. multifido-variants, *Jones*. Found in Devon in 1870 by Mrs. Grant. $20 \times 3\frac{1}{2}$ inches. A noble grandly multifid form, sometimes 11 inches across the broad foliose head.

cut circular crest. Colonel Jones considered that it suggested "seaweed."

*17. pericalles, *Lowe*. Raised by myself. $14 \times 0.3$. Branching in both stipes and rachis, and forming a branching head 5 inches across. Margin irregular, in the manner of polyschides.

18. *polycuspis-transversum, Moore*. Found in 1861 at Briggsteer by Mr. J. M. Barnes. Remarkable for the crests crossing each other.

19. *polycuspis-undosum, Moore*. Found at Giggleswick Scars by Mr. Stansfield, near Doncaster by Mr. S. Appleby, and at Heversham Head by Mr. J. M. Barnes. A many-pointed twisted crest. A form of *polycuspis* has been found at Fermanagh by Mr. W. H. Phillips.


23. Shirenewtonense, *Lowe*. Found in 1888 on a wall in the grounds at Shirenewton by Mr. Ireland. Naked stems. Length 5 inches. Digitately branched; dividing into three leafy fronds, each dividing into two digitate crests; the tips flat and dentate; margin coarsely dentate; partly suprasoriferous. A very interesting dwarf form.

*24. tortuoso-cristatum, Lowe*. Raised by myself. $14 \times 2$ inches. Normal below the crestings. Tortuose crestings of large size (7 inches across), springing out of the leafy part of the frond. Half a dozen fronds forming a bush 12 inches across.

25. unguiceps, *Wollaston*. Raised in 1870 by Mr. E. F. Fox. $9 \times 0.4$ inches. A narrow variety with a bird’s-claw-like crest. Sori on the margin.


Section γ. **CONGLOMERATUM.** (Conglomerately branched.)


2. conglomeratum, *Lowe*. Found at Truro by Mr. Dadds. Less leafy; the apices more lacerate, and more depauperate than conglomeratum.

3. congregatum, *Lowe*. Raised by myself. Stipes branching; and costa in leafy part splitting into branches that are densely crested.


6. coronans, Moule. Unknown to me.
7. coronare, Lowe. Raised by myself. Length, 7 inches. Branching several times in stipes, and also in rachis, forming a dense, crested ball $\frac{5}{3}$ inches wide. Soriferous.
8. Cousensii, Jones. I have never seen this.
9. densum, Lowe (conglomeratum-densum Kelway, Jones). Raised by Mr. Kelway. Length, 3 inches. A close, ball-like plant, the frond branching and cut up into numerous threads, producing plants at their tips. A marvellous form.
10. Drueryi, Lowe. Found at Sidford in 1888; robust and normal for 2 feet; then expanding into a corymb, which is divided into a moss-like ball.
11. Elworthii, Moore. Raised by the late Mr. C. Elworthy. Length, only 2 inches. A singular ramose-flabellate form.
14. conglomeratum, Moore. Found in Jersey by M. Piquet. Length, 6 inches. A globular crispy mass. Miss Nicholson found a form of this at Storth in 1867.
15. Gloveri, Stansfield. Raised by the late Mr. Glover. Length, 4 inches. A leafy conglomerate form, with rounded divisions.
16. Irelandii, Lowe. Found in the Aylstone, near Ross, by Mr. W. Ireland. Stems naked and very thick; much branched; forming a rounded mass in the manner of Wardii, but having a fimbriated margin. Length, 6 inches.
17. Jacksoni, Lowe (glomeratum Jackson, Jones). Found by the late Mr. Jackson. Length, 10 inches. A conglomerate form with normal-looking fronds rising out of the crest; head, 5 inches across.
19. Morgani, Moore. Length, 6 inches. Fronds flexuose; partly digitate and partly bunch-crested. Stem naked to crest; head 4 inches across.
21. ramusculum, Lowe. Found in Devon by Mr. W. Edwards, somewhat undulate, with a small multifid crest.
23. sphaenula, Lowe. Raised by myself. A densely branching foliose fern with rounded divisions. Length, $3\frac{1}{2}$ inches; width across the head, 4 inches.
24. splenula, Lowe. Found in Somerset by the late Mr.
Elworthy. Length, $3\frac{1}{2}$ inches. Repeatedly branching into rounded foliaceous divisions. Bolder than "Gloveri."

25. sylvestre, Lowe. Raised by myself; but there is a very similar variety at Nettlecombe Court, said to have been found in Somerset by the late Mr. Elworthy. A dense globular-crested form, branching in the stipes. Length, 5 inches; width across the head, $4\frac{1}{2}$ inches.

26. variabile, Lowe (glomerato-variabile, Monkman). Raised by Mr. Stansfield. Length, 16 inches (stipes, 6 inches). The glomerate head from 6 to 10 inches across. Like glomeratum, with a few normal branching divisions.


Section 8. SAGITTATUM. (Arrow-like projections.)

1. acanthodes, Lowe. Found in Devon by Mr. Edwards. Resembles "cristatum," but with a larger crest and less sagittate lobes.

2. capitatum, Lowe (capitatum-projectum, Jones). $22\times 6$ inches (in widest part). Sagittate; branching along the upper portion of the frond into heads 6 inches across.

3. Colmeri, Lowe (Sagittato-crispum, Wills). Found in Dorset, in 1875, by Mr. M. Colmer. $17\times 1\frac{3}{4}$ inches. Somewhat resembling "Drummondii," but having a sagittate base.

4. conglobatum, Lowe. Found at St. Pierre in 1887, by Mr. H. Bull. $4\times 2$ inches. Projecting; deeply cut and multifid; sagittate lobes placed at right angles; forming a ball-like plant, hence the name.

5. cristatum, Lowe (Sagittato-cristatum, Clapham). Found near Scarborough by the late Mr. A. Clapham. $11\times 3$ inches. Sagittate and crested. One found in Devon in 1859 by Mr. Hillman is more sagittate and has a crest 9 inches wide.

6. foliosum, Lowe. Raised by myself. $14\times 2\frac{1}{2}$ inches. Very foliaceous, and broadly sagittate; the head 7 inches across.

7. Hankeyi, Lowe (Sagittato-cristatum Hankey, Wollaston). A splendid variety, raised by Mr. W. Barnard Hankey. $16\times 3$ inches. A crested sagittate form, 7 inches wide at the sagittate base, and 7 inches across the large sagittate head.

8. hastatum, James. Found in Guernsey, in 1860, by the late Mr. James. $7\times 0\frac{7}{8}$ inches. A dwarf, normal, sagittate variety, with a crenate margin.

*9. hemionitoides, Moore (Sagittato-cristatum, Dadds). Mr. Dadds' plant (which is a copy of "hemionitoides," raised by Messrs. Stansfield,) was found in North Devon, in 1860, by Mr. J. Dadds. Length, 9 inches; width of sagittate base, $4\frac{1}{2}$ inches. Apex and lobes crested.

*10. Hookeri, Lowe. Raised by myself. $16\times 5\frac{1}{2}$ inches. Differs in the projections commencing on the sagittate base. Fronds broad. Colour, very bright green.

12. laceratum, *Moore* (endivisfolium, *Wollaston*). Found in 1851, in Somerset, by the late Mr. J. Young. Length, 11 inches; width across the sagittate base, 7 inches; capitate head often 7 inches across. Mr. Glave raised a very fine form. Mr. W. H. Phillips also found a plant at Strabane.

13. lacertum, *Willison*. Found near Whitby by Mr. W. Willison, and called by him “The Lizard,” from the apex of the frond resembling a lizard’s tail, and the lobes the paddles of this reptile.


20. sagittatum, *Moly*. Found in Somerset, in 1876, by Mr. J. Moly. 14×1½ inches. Normal; with a sagittate base, where 4 inches wide. It was also found at Force by Dr. Allchin.


24. Westroppii, *Lowe* (Sagittato-projectum Westropp, *Stansfield*). 24×3 inches. A very large and fine variety found in one of the islands of Arran, Co. Clare, by Mr. Westropp.

25. Wollastoni, *Lowe* (Sagittato-crispum, *Moore*). Found at Petersfield and Ottery St. Mary by Mr. G. B. Wollaston; and Barnstaple, by the late Mr. Jackson. 13×3 inches. Sagittate and crisp.

Section a. TRUNCATUM. (Ending abruptly.)

1. accisum, Lowe. Found in Devon; and recently at Carron, by Mr. P. B. O'Kelly. $12 \times 1\frac{1}{2}$ inches. Normal, except at the apex, which terminates in a leafy frill within the frond.

2. constrictum, Moore. Found in Guernsey by the late Mr. James. $6 \times 1\frac{1}{2}$ inches. Depauperate; and naked to stem in centre. Very irregular, lacinate, and slightly marginate.

3. corniculatum, Lowe. From the late Colonel Jones's collection. $8 \times 1$ inches. Truncate, cornute, rugose (except a broad flat rachis); the rugose margin $\frac{1}{4}$-inch thick. Stipes, $4\frac{1}{2}$ inches.

4. cornutum, Lowe (truncato-cornutum, Mapplebeck). Raised in 1872 by Mr. Mapplebeck. $9\frac{1}{2} \times 2\frac{1}{2}$ inches. Frond terminating in a horn $1\frac{1}{2}$ inches long. No pouch. Found also in the Lake district by Mrs. Hodgson and Mr. J. Crossfield. One raised by myself is $6 \times 2$ inches; with wavy margin.

5. obtuso-dentatum, Moore. Found in 1855, near Ilfracombe, by Rev. J. M. Chanter. $12 \times 1\frac{1}{4}$ inches. Apex blunt, margin having uniform dentate crenatures.

6. O'Kellyi, Lowe (truncatum, O'Kelly). Found at Blackhead by Mr. O'Kelly, where he also found another small round form.

7. reniforme, Williams. Found in several localities. $4 \times 2$ inches. Abrupt and kidney-shaped. Mrs. Grant has the best form.

8. significans, Lowe. Raised by myself. $5 \times 1\frac{1}{2}$ inches. Rugose and truncate.

9. subcornutum, Tait. $8 \times 1$ inches. Rigid. Crenate; apex abruptly rounded. Cornute.


11. truncatum, Ivery. Not uncommon. A nice form has been found at Black Head, Co. Clare, by Mr. P. B. O'Kelly.

Sub-section. PERAFERENS. (Bearing a pouch.)

1. acetabulum, Lowe. Raised by myself. A shallow cup at apex, and there supralinear. $12 \times 2\frac{3}{4}$ inches (of which 7 is the stipes).

2. anomalum, Lowe (perafero-anomalum, Mapplebeck). Raised by Mr. Mapplebeck in 1872. $8 \times 1\frac{1}{4}$ inches; stipes 4 inches long. Pouch muricate, but frond smooth.


5. fimbriatum, Lowe (marked 102 in the late Colonel Jones's collection). $6 \times 1\frac{1}{2}$ inches. The edges of the cup fringed; cornute. Mr. W. H. Phillips found a similar form at Gonnastown.

6. incurvare, Lowe. Raised by myself. $10 \times 1\frac{1}{2}$ inches. Costa dividing 2 inches from the apex, forming an imperfect pouch at the top, which faces the front of the frond. There are two horns at the base on the underside bearing sori.

8. Jonesii, *Lowe* (peraferens Jones, *Jones*). Raised by the late Colonel Jones. 9×2½ inches. Some fronds smooth, others rough. Costa ending 1 inch below the tip, where a large horn is formed. Margin irregularly fimbriated. Pouch, 2 inches in length.


*10. mirandum, *Lowe*. Raised by myself. 9½×2 inches. Smooth and normal, the costa splitting near the apex, each half furnished with a horn; very large pouch, 2×1 inches.

11. muricatum, *Lowe* (perafero-muricatum James, No. 2, *Wollaston*). Raised by the late Mr. J. James. 8×1½ inches. Cornute; texture thin; pouch confused.

12. peplum, *Lowe*. From the late Colonel Jones's collection. 6×1½ inches. Rugose, with a sharp horn-like elongation above a rosette-like pouch.

13. peraferens, *Wollaston*. Found in Ireland by Dr. Allchin, and at Ballygarth, by Mr. W. H. Phillips. The type. 10×2 inches. Costa not reaching the margin, but developing a leafy pouch.


*15. rosetta, *Lowe*. Raised by myself. 9×2 inches. A broad rugose form, ending in a horn half an inch long. The pouch, like a rosette (or double flower), and half an inch in width. Not rugose to the margin. Another seedling, 7×1½ inches, is very similar, except having concave fronds.

16. rugosum, *Allchin*. Found in Ireland by Dr. Allchin. 8×1½ inches. Leafy part only 3 to 4 inches. Apex irregular, rugose, and having an irregular pouch.

17. sinum, *Lowe* (pocilliforme, *Padley*). Found at Hawkchurch by Mr. Moly. 8×1½ inches. Undulate, irregularly marginate, truncate, horned, and bearing a pouch (with a crisp margin); 1½×0½ inches.
*18. Stella, Lowe. Raised by myself. 10 × 1¾ inches. Very papillose; rounded basal lobes extending beyond the general outline; a rosette pouch and cornute.

19. supraperaferens, Lowe. Raised by myself. 17 × 1 inches. Irregular; very rugose, extending to the rachis; with a small pouch on the rachis (upper side), 5 inches below the apex. Rachis bending and tip of frond weeping. Sometimes cornute.

20. varians, O'Kelly. Found at Ballaganor, County Clare, by Mr. P. B. O’Kelly. 9 × 2 inches. The leafy portion only 3 inches long.

Group III. Flexuose. (Bending.)

Section a. FLEXUOSUM. (Bending.)

1. complicandum, Lowe. Raised by myself. 5 × 1¾ inches. A twisted, undulate, rugose and spiral form; near the apex the margins of the frond fold over and claspl each other.

2. flexuosum, Wollaston (cymbaeforme, Wollaston). Found at Whitbarrow in 1861 by Mr. J. M. Barnes. The best flexuose form. 14 × 1¼ inches. Miss F. Kitson found a flexuosum in South Devon, Mr. A. Leipner another in Somerset, and Mr. G. Stabler one at Whitbarrow.

3. muricatum, Lowe (tortuoso-muricatum, Jones). Raised by myself. 15 × 1½ inches. Rachis twisting, and costa on upper side ribbed.


5. torquere, Lowe. Raised by myself. 7 × 1¼ inches. Stipes and rachis flexuose, rugose, undulate, twisting, but not marginate. Rachis dividing 3 inches from apex, the divisions twisting round each other.

DIVISION B.

ALTERATION IN SOFT PARTS.

Group I. Increased Development.

Section a. CRISPUM. (Crispy.)

*1. adornatum, Lowe (crispum-multifidum, Jones; and crispum-grandiceps, Jones). Raised by myself in 1884. 12 × 3 inches. A large capitate head (4½ inches wide). Sterile; well crisped.


*3. angustum, Lowe (crispo-angustum, Lowe). Found in Devon by the late Rev. C. Padley. 15 × 1½ inches. Narrow, with naked stem of 6 inches.

4. Baldwyni, Lowe. Found in the Mountain Valley, near Chepstow, by the late Mr. John Baldwyn. 16 × 2½ inches. Well frilled. A marvellous form, one half of the fronds being conglomerate; these are 6 inches in length, and 5 inches across the conglomerate, dense, foliose crown. I am indebted to Mr. Edwin Ellis for this striking variety.

5. Bowdoni, Lowe (crispum Bowdon, Jones). Found in the
Lake district by Mr. Bowdon. \(14 \times 1\frac{3}{4}\) inches. The sagittate lobes branching.


7. capitatum, *Lowe* (crispum-capitatum, *Jones*). The late Colonel Jones’s collection. History unknown. \(22 \times 3\) inches (of which the stipes is 6). A capitate head, 5 inches across.


9. Claphami, *Lowe* (crispum Clapham, *Wollaston*). Found in 1857, in Yorkshire, by the coachman of the late Mr. Clapham. \(18 \times 1\frac{1}{4}\) inches. Base sagittate; projecting lobes fimbriate; apex crested. Fronds variable. A more recent seedling is densely crested.

10. convolvere, *Lowe*. Found by the late Rev. C. Padley. \(14 \times 3\) inches. Lower half of frond irregular; rolling round; and the stem is naked for 2 inches above the round basal lobes.


13. crispum, *Grey*. (The original type.) Elegantly frilled. A number of distinct forms (all sterile) have been found in the Lake district. Mr. W. H. Phillips found it in Co. Tyrone.


17. Currei, *Lowe*. Found in 1870 at Itton Court by the late Mr. Pierce (gardener to Mr. W. E. C. Curre). A long and somewhat narrow form. \(16 \times 2\frac{1}{4}\) inches. Flatly crisped, and basal lobes round, folding over and hiding the stipes. Not unlike Grantæ in form, but not variegated.


19. Drummondæ, *Moore* (crispum Miss Drummond, *Wollaston*). Found near Falmouth by Miss M. Drummond. \(22 \times 1\frac{1}{2}\) inches. Frond narrowing upwards and terminating in a head 9 inches broad. In 1875 a variety with sagittate base, but with much smaller crest, was found in Dorset.

21. excisum, *Lowe*. Found in 1888 at Dennil Hill by Major Cowburn. This variety only differs from "Cowburni" in being deeply incised on the upper part of the frond; occasionally soriferous.

22. fertile, *Lowe* (crispum-fertile, *Stansfield*). Found in 1863, at Grange, by Mr. E. G. Wrigley. 24 x 1½ inches; width at base 1 inch and in centre 2 inches. Well crisped and crenulated, and copiously soriferous.


24. fimbriatum, *Lowe* (crispum fimbriatum *Stansfield, Jones*). Raised by Messrs. Stansfield, at Sale. A large fimbriate form, profusely frilled; the frills below overlapping from opposite sides and hiding the rachis. Fertile. 16 x 2½ inches.


27. Foxii, *Lowe* (crispum fertile, *Fox*). Found in 1868, in Cornwall, by Mr. Moule. 19½ x 3 inches. Fronds densely fringed. The rounded sagittate lobes are occasionally very large. Fertile. A "crispum-fertile" was found in 1858, and another in 1863.

28. grande, *Lowe* (crispum grande Wills, *Wollaston*). Found by the late Mr. Wills. A very large, broad, beautifully frilled form, with an unusually long, naked stem.

29. grandidens, *Lowe*. Found in North Wales by the late Mr. Clift. Split quite to the rachis, and depauperate.

30. imbricatum, *Lowe*. A splendidly crisp form, frills quite wrapping over each other; known as the Roundstone variety. 9 x 2½ inches.


32. Jacksonii, *Lowe* (Sagittato-crispum Jackson, *Moore*). Found at Barnstaple by the late Mr. Jackson, and at Ottery St. Mary by Mr. G. B. Wollaston. 16 x 2 inches. Undulate and crenate and sagittate, combining Sagittatum and crispum.


36. latum, *Lowe* (crispum-laturnum, *Moore*). Found near Barnstaple by the late Mr. C. Jackson, and at Nettlecombe by the late Mr. Elworthy. 16 x 4 inches. Broad. Basal lobes separated from the rest of the frond.
Scolopendrium. 87

37. longipes, Lowe (crispum longipes, Jones). A flatly crisped form. 17 × 3 inches. (The stipes 6 inches long.)

38. macandri, Lowe. A bold, handsome form. Raised by the late Colonel Jones, and given whilst young to Professor Morris, of Bath. The frillings are wider apart than usual. 18 × 5 inches.

39. majus, Lowe (crispum majus, Moore). Found in Guernsey by the late Mr. Jackson. Length, 19 inches (of which the stipes is 7). Habit erect. Basal lobes large.

40. minus, Lowe (crispum minus, Jackson). Found by Mr. Jackson in Guernsey. 10 × 1 1/2 inches. Margin well frilled.

41. Mosesii, Lowe (crispum majus Moses, Jones). A broad, symmetrical form found in the Lake district. 20 × 4 1/2 inches. A grand variety. The basal lobes overlapping the stipes.


43. projectum, Lowe. A crispum found by Mr. H. Bull at St. Pierre, which is also sagittate, much cut, multifid, and well crisped. *44. ramo-cristatum, Stansfield (crispum fimbriato-cristatum, Stansfield). A fimbriated form of great beauty. Raised by Messrs. Stansfield. Branching in the stipes and rachis, and crested.

*45. reflexum, Lowe (crispum reflexum Wills, Jones). Found by the late Mr. Wills. Large; very broad, and long naked stems (7 inches long). Basal lobes very large. Frilling reflexed. 20 × 5 inches (at base, where broadest). Beautiful.

*46. Robinsoni, Lowe (crispum Robinson, Jones). Found in North Lancashire by Mr. Robinson. 20 × 3 1/2 inches. Crenate on the margin and exquisitely frilled.

*47. robustum, Lowe (crispum robustum, Jones). Found near Shirenewton, Monmouthshire, in 1866, by the late Colonel A. M. Jones. 23 × 4 1/2 inches. Stipes short. A grand variety, with curving fronds. Found also at Hawkchurch by Mr. Moly.

48. serratum, Lowe (crispum serratum, Jones). Found in 1866 near Shirenewton by the late Colonel Jones. 18 × 3 inches. Serrated. Stipes brief.

49. serratum-fertile, Lowe (crispum serratum-fertile, Jones). Found in Devon by Mr. Moule. A serrated, fertile form.


52. Stableræ, Lowe (crispum Stableræ, Jones). Distinct. Found in the Lake district by Mrs. Stabler. Large. Stipes very long; fronds pointed, broadest at the base. 17 × 3 inches.

53. Stansfieldii, Stansfield. Raised in 1872 by Messrs. Stansfield. 9 × 1 1/2 inches. It differs from the original "Stansfieldii" figured in "Our Native Ferns," in being crested and sagittate; sometimes the fronds are branched.
54. *uncinatum*, Moore. Found in 1863, in County Clare, by Mr. A. Stansfield. 11 x 2 inches. Apex rounded; costa crooked; and the basal lobes twisted in the way of a hook.

55. *variabile*, Lowe (crispum-variabile, Jones; and crispum-diversifrons, Jones). Raised in 1874 by the late Colonel Jones. 13 x 41/2 inches. Stipes, 41/2 inches. Fronds broadest at the base. Occasionally normal, but sagittate; fertile fronds, varying in width from 2 to 31/2 inches.

*56. Willsii*, Lowe (crispum Wills, Wollaston). Found in Somerset in 1870 by the late Mr. J. Wills. 17 x 4 inches. Stipes, 43/4 inches. Fronds broadest at the base. Occasionally normal, but sagittate; fertile fronds, varying in width from 2 to 3 inches.


Note.—There are several forms of Crispum that have been recently found near Chepstow, which are not yet fully enough developed to be included.

Section 8. **UNDULATUM.** (Wavy, but not crispy.)

1. *asperitate*, Lowe. Raised by myself. 6 x 1 inches. Very rough; subspiral as well as undulate.

2. *capitatum*, Lowe. Raised by the late Colonel Jones. Length 9 inches. Dividing into two leafy branches, twisting into a capitulate head.

3. *cochleato-multifidum*, Lowe. Raised by myself in 1879, differing from "cochleatum" in having a spirally coiled branching apex. 16 x 21/2 inches.

4. *cochleatum*, Lowe. Raised by myself in 1879. The apex turning spirally like a snail's shell; a well-marked undulate form.

5. *contractum*, Lowe. Found in Devon, by the late Mr. C. Jackson. Lower half undulate, above contracted and partially marginate.


8. *extans*, Lowe. Raised by myself. Base of the prominent parts rugose; prominences very stiff and half an inch long. Spirally twisted; a distinct wavy form. 5 x 1 1/2 inches.


10. *multifidum*, Lowe (undulato-multifidum, Wollaston). Apex multifid, but scarcely wider than the frond. Found in 1862 at Witherslack by Mr. J. M. Barnes, also in Lancashire in 1877 by Mr. Stewardson. Frilled as well as crested.

Segments narrow and frond-like, their margins conspicuously toothed.

*12. ptereidon, Lowe. Raised by myself. Rugose. $12 \times 1\frac{1}{2}$ inches. Very irregular; round lobed; upper half contracted.


14. reflexum, Lowe (undulato-reflexum, Jones). From the late Colonel Jones's collection. $11 \times 1\frac{1}{2}$ inches. Dark shiny green; reflexed; slightly multifid.

15. rigidum, Lowe (undulato-rigidum, Jones). Found in Devon by Mr. Edwards. A large form.


17. spira, Lowe. Raised by myself. $5 \times 1\frac{1}{2}$ inches. Spiral as well as undulate. Rachis, near summit, dividing and twisting.

18. spirale, Moore. Found in Guernsey by the late Mr. J. James, and at Nailsworth by Mrs. Campbell, and at Heversham Head by Mr. J. M. Barnes. $5 \times 1$ inches. Basal half undulate; above, spirally twisted.


*22. tortum, Lowe. Raised by myself. A bold undulate form. $14 \times 1\frac{1}{2}$ inches. Apex crested and twisted.

23. transverso-lobatum, Moore. Found at Nettlecombe by the late Mr. C. E. Elworthy, at Doncaster by Mr. S. Appleby, and at Castle Howard and Gordale Scars by Messrs. Stansfield. The multifid apex has its branches crossing each other.

24. transverso-multifidum, Moore. Found near Ilfracombe by Mr. Dadds. Having a compact, multifid, weeping apex.

25. undulatum, Moore (type). Found in many localities. $12 \times 1\frac{1}{2}$ inches. Wavy, but not crispy. Thick and fertile.


**Group II. Narrowing of Skeleton.**

**Section a. LINEARE.** (Narrowed.)


2. circinatum, Lowe. Raised by the late Mr. Clapham. $18 \times 0\frac{3}{4}$ inches. Bidentate margin. Apex tasseled with small foliose segments; and circinate.

3. coriaceo-cristatum, Lowe. Raised by the late Mr. Clapham.
9×0.5 inches. Deep green, thick, fleshy fronds; with a small, thick, erect crest.

4. crispatum, O'Kelly. A curled form from the Burren.

*5. curiose, Lowe. Raised by myself. 8×0.8 inches. Like a very irregular “lonchophorum.” Basal lobes, and here and there projections. Apex crested.


11. laciniato-marginatum, Barnes. Found in 1865, at Heversham Head, by Mr. J. M. Barnes. Fronds reduced and margined.


14. limbospermo-cristatum, Wollaston. Found in 1838, in Somerset, by the late Mr. Elworthy. 16×1.5 inches. Crest 3 inches across.

15. limbospermum, Moore. Found near Nettlecombe by the late Mr. C. Elworthy; and in 1860, on Beetham Fell, by Mr. J. Crossfield. Outline slightly irregular. Sori on the margin. 10×1.5 inches.

16. lineare, Jones. Raised in 1870 by the late Colonel A. M. Jones. 18.5×0.6 inches. Very long and narrow; margin toothed. Two basal lobes. I raised an almost identical form in 1867, named “grammicon.”


18. lobato-divergens, Barnes. Found in 1864, at Heversham, by Mr. J. M. Barnes. Lobes at right angles in form of a cross.


20. lonchophorum, Moore. Found in North Lancashire, in 1862, by Mr. R. Preston, and in Baycliff Lane, in 1870, by Mr. J. K. Hodgson. 9×0.6 inches. Strap-shaped; sori marginal.


22. polyschides, Ray. One of the earliest known forms. 12×0.6 inches. Irregularly crenate.
23. polyschides-crispum, Lowe. Raised by the late Mr. Clapham. Length, 10 inches. A crisped “polyschides.”

24. rimosum, Moore. Found in Guernsey by the late Mr. James. 18 x 2 inches. Crenate; near the divided apex profoundly incised. Upper surface sulcate, having thickened prominent points.

Group III. Surface rough.

Section a. MURICATUM. (Rough surface.)

1. bimaginato-cordatum, Moore. Raised by the late Mr. Elworthy. Dwarf. Broader than bimarginatum; it has also cordate basal lobes. 11 x 0.3 inches. Margin toothed.

2. bimarginato-multifidum, Moore. 12 x 0.5 inches. Broken up to the rachis; with a divided multifid apex of narrow branches. Sori marginal. An interesting form.

3. bimarginatum, Moore. Found at Ulverston by Mr. W. Hadwin. Fronds very narrow.

*4. blandum, Lowe. Raised by myself. 15 x 1.5 inches. Broad rugose form. Half the width of the frond, next the rachis, quite smooth; beyond this, a rugose wall, and muricate to the margin.

5. capitatum, Lowe (muricato-capitatum, Jones). Raised by myself. Branching both in stipes and rachis; and forming a close, foliose, rugose, weeping head; fronds stiff.

6. cernuum, Lowe. From the late Colonel Jones’s collection. 11 x 1 inches. Frond convex, rachis dividing three inches below the apex into a capitate head.

*7. circulum, Lowe. Raised by myself. 11 x 0.7 inches. Densely but minutely rugose; margin bending under; apex weeping and crested. At basal lobes frond 1.5 inches across.

8. columnare, Clapham. Raised by the late Mr. Clapham. 8 x 0.2 inches. Linear, and lobate-dentate; with a column-like crest.

9. complicatum, Lowe. Raised by myself. 14 x 1.5 inches. Irregular rugose margin; almost plaited; frond terminating in a rugose crested head, which is twisted ball-like, width 2.5 inches.

10. corniculatum, Lowe. Raised by myself. 20 x 1.5 inches. A fine form of muricatum, with stag’s-horn-like head.

11. cristatum, Lowe (muricato-cristatum, Jones). Raised by the late Colonel Jones. 10 x 0.5 inches. A “mirum” looking form, but so depauperate as to become pinnate. A finely divided capitate head, 2.5 inches across.

*12. illustre, Lowe. Raised by myself. 16 x 2 inches. Rich green, thick, stiff fronds; very rugose except close to the rachis, where smooth. Apex pointed and twisted. A fine form.

13. inaequale, Lowe (muricato-inaequale, Jones). Raised by the late Colonel Jones. Very minute, and irregularly forked.


15. Jonesii, Lowe (muricato-multifidum, Jones). Raised by the late Colonel Jones. 13 x 0.3 inches. Strongly rugose, the costa
even rugose. A twisted rugose head, composed of narrow, long branches. Stipes 6 inches long.


19. muricatum, Moore. Found in Guernsey by the late Mr. James, at Nettlecombe by the late Mr. Elworthy, and at Farleton Knot by Mr. J. J. Jones. Muricate on the upper surface.


21. nupta, Lowe. Raised by myself. 12 x 0 1/2 inches. Fronds convex; branching at the top of the stipes. Coarsely rough.


23. prominens, Lowe. Raised by myself. Undulate and spirally twisted. The prominences (which are very stiff) are rugose at the base, and are half an inch long. 5 x 1 1/2 inches.


25. revolutum, Lowe. Raised by myself. 10 x 0 1/2 inches. A tasselled rugose variety, with large, round, basal lobes. Fronds revolving.


*29. scalpturato-latum, Lowe. Found near Scarborough by myself. 23 x 3 1/4 inches. Shining; but widely rugose; margin dentate-lobate.

30. scalpturatum, Moore. Found in Guernsey by the late Mr. James, at Nettlecombe by the late Mr. Elworthy, in the Isle of Wight by Mr. Bloxam, and near Dalton by Mrs. Hodgson. 12 x 1 1/4 inches. Irregularly ridgy and crenate lobed.


32. striatum, Lowe (muricato-striatum, Moore). 13 x 1 1/2 inches, of which the stipes is 6 inches. Regularly roughly striate.

33. superbum, Lowe (muricato-superbum, Lowe). Raised by myself. 16 x 2 inches. A very bold muricate form.


35. undulatum, Lowe (undulato-muricatum, Lowe). Raised by myself. 15 x 1 1/4 inches. A fine, very rugose form, with a bold smooth costa.
Section 8. SUPRALINEATUM. ( Marginal ridge on upper surface.)

1. constrictum, Lowe (supralineato-constrictum, Moore). Variable; the constricted portion markedly supralineate; sometimes not constricted, but having patch-like processes on the back of the frond.

2. cristatum, Lowe (supralineato-cristatum, Jones). Raised in 1872 by the late Colonel A. M. Jones. 13 × 1 1/2 inches. Supralineate; and branching at the apex, where 9 inches across.


6. Kitsonae, Lowe (supralineato muricatum Kitson, Jones). 14 × 1 1/2 inches. A singular form; the linear membrane, a quarter of an inch from the costa and within, concave and smooth, whilst outside this line convex and muricate.


12. supralineatum, Moore. Found in 1875, near Ulverston, by Mrs. Hodgson. A beautiful form, lined on the upper side. Found also in County Clare by Mr. O’Kelly, and at Knocknarea, County Sligo, by Mr. W. H. Phillips.


14. undulatum, Lowe (undulato-supralineatum, Jones). Raised by the late Colonel Jones. 14 × 2 inches. Only differing from Moonae in the supralineate membrane extending to, instead of terminating 2 or 3 inches above the base. Moonae is much more soriferous.

Section γ. MARGINATUM. ( Marginal ridge on under surface.)


2. alatum, Moore. Raised by Mr. Clapham. 6 × 0 1/4 inches. Marginate; winged; projecting teeth.

3. amabile, Lowe. Raised by myself. 16 × 1 1/2 inches. Undulate and marginate; the margin of the frond crimped.

5. cervi-cornu, Moore. From Messrs. Stansfield. $7 \times 0.5$ inches. Branching like stags' horns. Margin densely denticulate.

6. corrugatum, Lowe (marginato-corrugatum, Moore). Narrow; margined; upper surface deeply corrugated.

7. cristatum, Lowe (marginato-cristatum, Moore). Raised both by Mr. Clapham and Mr. Elworthy, and found in 1860 at Arnside Tower by Mr. J. M. Barnes. Marginate and crested.

8. fimbriatum, Lowe (marginato-fimbriatum, Moore). Found by Mr. Clapham and Mr. Elworthy, and found in 1860 at Arnside Tower by Mr. J. M. Barnes. Margin fimbriated.

9. fissum, Lowe (marginato-fissum, Moore). Found at Barnstaple by the late Mr. Jackson, and at Ilfracombe by Mr. J. Dadds. Margin deeply cut into narrow obtuse lobes. Mr. H. Bull has found this at Mountain, near Chepstow (in 1880). In the Chepstow form the marginal belt is close to the costa.

10. irregulare, Lowe (marginato-irregulare, Moore). Raised by the late Mr. Clapham. A remarkable depauperate form; branching at the apex. Length, 18 inches.

11. (Fig. 31.) kraspedoumenon, Lowe. Raised by the late Mr. Elworthy. $8 \times 0.5$ inches. Conspicuously dentate; apex furcate.

12. Lyellii, Lowe (bimarginatum Lyell, Jones). Raised by the late Dr. Lyell. $12 \times 0.5$ inches. Rough, but very shining. Dentate.

13. marginato-coronatum, Moore. Margin cut into small rounded lobes; apex coronate, and twisted in a curly manner.

14. marginato-multiceps, Moore. History unknown. $14 \times 1$ inches. Dentate margin; an erect crest. A handsome form of "marginatum."

15. marginato-multifidum, Moore. Raised by the late Mr. Elworthy. Length, 12 inches. Slightly flexuose; apex multifid; fronds narrow at base, widening to the apex; marginate excrescences.

16. marginatum, Moore. A common form, with an excurrent membane within the margin on the under side of the frond. $12 \times 1$ inches.

17. mirum, Lowe. Raised by myself. Forms a dwarf, undulate, rugose, twisted, capitate bush. $7 \times 0.5$ inches. Below the head small stalked lobes; segments near the head, 4 inches wide.

*19. numphion, Lowe. Raised by myself. $4 \times 0^3$ inches. A dwarf, rugose, undulate, marginate, sub-peraferens form; with a cuneate head $3^1_2$ inches across.

20. Oakeleyana, Lowe. Found in 1870 at Penalt (Monmouth) by Mrs. E. Bagnall Oakeley. $14 \times 1$ inches. An extraordinary combination. The marginal line has long dentate lobes; margin of the frond deeply fimbriated. Stipes dividing 2 inches from the base; and at the lower portion of the leafy part minutely pinnate. Surface shining, but rough.

21. optatum, Lowe. Raised by myself. $6 \times 0^3$ inches. Marginate, dentate, and contracted; narrowing to a thickened but pointed apex.

22. papillosum, Lowe (marginato-papillosum, Moore). $9 \times 0^3$ inches. A double row of projecting fleshy points extends on either side of the midrib, on upper surface.

23. pectinatum, Lowe. From the late Colonel Jones's collection. $17 \times 1^2_2$ inches. A marginate form with the edge cut into teeth a quarter of an inch long.

*24. plicare, Lowe. Raised by myself. $16 \times 1^4$ inches. Lobate and muricate; lobes projecting.


26. rugosum, Lowe (rugoso-marginatum, Lowe). Raised by myself. $18 \times 2^3_4$ inches (the stipes 7 inches long). A broad fronded, rugose variety; the margin crenate.

27. sculpturatum Lowe, Lowe. Raised by myself. $16 \times 0^3$ inches. Very dentate.


30. submarginato-multifidum, Moore. Found at Hackness by the late Mr Clapham. $12 \times 1^4$ inches. Margin sinuous; ending in a multifid tuft. A continuous marginal belt.

31. submarginato-ramosum, Lowe. Raised by myself. $12 \times 1^4$ inches. Branching in the stipes and rachis; the frond terminating in a flat, branched head 3 inches wide.


*33. tenue, Lowe (marginatum-tenue, Moore). Raised by Mr. S. Appleby. $6 \times 0^3$ inches. Laciniate-toothed.

*34. triforme, Lowe. Raised by myself. $16 \times 1$ inches. Shining, though rough; submarginate line thorny; margin of frond deeply dentate; apex twisting and forming a circle.

35. triumphale, Lowe. Raised by myself. $4 \times 0^3_5$ inches. Rugose; the marginal membrane close to the margin, with a dentate edge; crested with a "Cliffii"-like head $1^3_8$ inches across.

36. trossula, Lowe. Raised by myself. $17 \times 0^3_5$ inches. More
widely and squarely dentate than "stenomenon"; upper half of frond widest; marginal line close to rachis at the base, yet becoming close to the margin at the apex.

37. turgido-irregulare, Moore. Found at Whitby and Nettlecombe. More irregular and more profoundly lobed than "turgidum;" and marginate.


39. undulato-contractum, Lowe. Found in Devon by the late Mr. C. Jackson. Undulate and irregular in outline; contracted in part of the frond. Partially marginate.

40. undulatum, Lowe (marginato-undulatum, Barnes). Found in 1865, at Heversham Head, by Mr. J. M. Barnes. Also in County Clare, by Mr. O’Kelly. A dense, undulate form.

41. venosum, Lowe (marginato venosum, Barnes). Found in 1874, at Flookborough, by Mr. J. Stewardson. Known by its prominent veins.

Group IV. Margin jagged.

Section a. CRENATUM. (Margin altered.)

1. aduncum, Moore. 10 × 1 inches. Conspicuously lobate; irregular, and apex bifurcate.


4. angustato-nitidum, Lowe. Found at Lower Commons, Co. Clare, by Mr. O’Kelly. 12 × 0¼ inches. Densely fimbriate; having a shiny frond.

5. contractum, Wollaston. Found in Clare, Guernsey, Smeerset, Nettlecombe, and Ruthin. 10 × 1 inches (in widest part). Crenate; contracted below the densely flabellate multifid crest; partly supra-soriferous.

6. crisspo-fissum, Barnes. Found in 1877 at Milnthorpe by Mr. T. Airey. A beautiful, small, narrow, crispy variety.

7. dareoides, Wollaston. Raised by the late Mr. Elworthy. Length, 12 inches. Depauperate, and almost pinnatifid; with lax teeth. The apex much the broadest part of the frond.


9. erosum, Lowe. 8 × 1 inches. Outline irregular and here and there erose; interruptedly marginate and dentate. A good form has been found at Mucknish, Co. Clare, by Mr. O’Kelly.

10. fissidens, Wollaston. Found in N. Devon. Deeply cut and narrower than "fissum."

11. fissile, Moore. Found at Nettlecombe by the late Mr. Elworthy, and at Malton by the late Mr. C. Monkman. 12 × 1 inches. Irregular, and sub-pinnatifid; and crenate-dentate.

13. imperfectum, Wollaston. Found in 1855, at Whitbarrow, by Mr. G. B. Wollaston. 10 × 1½ inches. Fronds defective, broader than "polyschides."

14. inciso-lobatum, Wollaston. Found in 1861, in N. Devon, by Mr. Dadds, also at Mucknish, Co. Clare, by Mr. O'Kelly. Normal, but incised and lobed.

15. incisum, Barnes. Found in 1861, in Levens Park, by Mr. Barnes. Deeply cut, almost pinnate.

16. irregularare, Padley. Found in S. Devon, in 1865, by the late Rev. C. Padley. Length, 8 inches. A most irregular variety, having more the appearance of an irregular Asplenium marinum.


19. mutatum, Moore. Found near Nettlecombe, by Mr. C. Elworthy. 18 × 0½ inches. Incised halfway to the costa at about half-inch intervals, forming square-ended lobes. The base of the frond narrowest, and the apex broadest.


*21. omnilacerum, Lowe. Raised by the late Mr. Glave. 22 × 1 inches. Erect habit. Lacerated almost to the costa; the lacerations soriferous along their margins. A distinct form. Fig. 32 is an improved form raised by myself.

*22. Padleyense, Lowe. Found in Devon by the late Rev. C. Padley. 24 × 4 inches. A very broad, large form. Normal on one side of the costa, and interrupted on the other.

23. pinnatifidum, Moore. Raised by the late Mr. Elworthy. 10 × 0½ inches. Narrow at the base; widening to the apex, where rounded. Pinnatifid with deep open sinuses. Mr. Clift raised a similar form. 17 × 1 inches.

24. polymorphum, Wollaston. Found in 1854, in Sussex, by Mr. Wollaston; and in 1861, at Haversham Head, by Mr. J. M. Barnes. Irregular, and of many forms.

25. prominens, Moore. Found near Ruthin by Mr. T. Pritchard. Length, 12 inches. Irregularly crenate; with few rounded narrow lobes projecting beyond the general margin half an inch.

27. sinuatuum, *Wollaston*. Not uncommon. 18 x 0 1/2 inches at base and 18 x 1 1/2 in upper portion. Margin sinuated with irregular projections; fronds differing from each other.

28. sub-pinnatum, *Moore* (semipinnatum, *Moore*). Found at Ilfracombe by Mr. J. Dadds. 6 x 2 inches. Split to the costa into irregular lobes, often distant, with an open sinus. Found also in Sligo, by Mr. W. H. Phillips.

29. suprasoriferum, *Lowe*. Not uncommon. Crenately lobed, bearing sori on the upper as well as under surface of the frond. 12 x 1 1/2 inches. A dwarf form was found at Mountain, in 1888, by Mr. Bull, of the St. Pierre Gardens. Margin deeply cut and apex lacerate. Sori near the margin, and as copious above as below. 8 x 2 inches.


31. turgidum, *Wollaston*. Found in many places. 12 x 2 inches. Coriaceous; margin very irregular; apex often multifid.


**Group V. Variegated.**

Section a. **VARIEGATUM.** (Fronds variegated.)


2. albulum, *Lowe*. A narrow, sagittate, crested, crispum. Raised by myself. 17 x 2 inches. The sagittate lobes long and narrow, with crested tips, and situated at right angles to the costa, variegated with white. Frond narrowing upwards. The late Colonel Jones raised a somewhat similar variety.


4. aureolum, *Lowe*. A golden variegated "crispum." Raised by myself in 1887, together with a number of other forms. Obtained by crossing with a variegated variety. Sagittate lobes, rotund and curling inwards. 16 x 2 inches.


8. conglomerere, *Lowe*. A dwarf, conglomerate, golden variety. 5 x 0 1/2 inches (head 2 1/2 inches wide). Raised by myself in 1887.

9. consummatum, *Lowe*. Raised by myself. 12 x 1 1/4 inches. Nor-
mal rigid fronds, striped regularly with thin lines of white, parallel with the veins. Inconstant.


13. Elworthii, **Lowe** (variegatum Elworthii, Moore). A handsome narrow, permanently variegated variety. Found by the late Mr. Elworthy, in Somerset.


17. **Jonesii, Lowe** (cristato-variegatum, Jones). Raised by the late Colonel Jones.

18. **lacteolum, Lowe**. From the late Colonel Jones's collection. 14 × 2½ inches. A normal, broad, variegated variety. The variegation regular; and milky-white.


*20. **luminare, Lowe**. A bold golden "crispum." Raised by myself in 1887. "Cowburni" was one of the parents. Erect. 18 × 2 inches.


22. **Molyi, Lowe** (variegatum Moly, Jones). A very fine variety.

23. **multifidum, Lowe** (multifidum lutescens, Jones). I have not seen this.

24. **O'Kelly, Lowe** (lutescens O'Kelly, O'Kelly). 17 × 1¼ inches. Found at Carron, in County Clare, by Mr. P. B. O'Kelly (15 × 1 inches), who at the same place has found another (albo-lobatum, O'Kelly).


27. **rugosum, Lowe** (rugoso-variegatum, Jones). Raised by myself in 1887.

28. **tridentiferum, Lowe**. Concave; the apex separating into a trident-head 7 inches across; the tips also trident-formed. A golden variety 10 inches in length. Raised by myself in 1887.

Tribe 10. ASPIDIEÆ.

THE HOLLY FERN.

Aspidium lonchitis.—Swartz.

(Polystichum lonchitis.—Roth.)

A mountain fern, ranging from 1,000 to 3,000 feet above the sea. It is pinnate, very rigid, and the margin conspicuously spinous. Mostly found amongst stones; frequently the roots running along the roof of small cavernous rocks, and therefore easily detached without injury. In most localities it requires to be grown in a frame in a somewhat moist atmosphere. A difficult fern to cultivate successfully.

Some of its native habitats are now destroyed. It is recorded as having been found on Snowdon; in the English lakes, on Helvellyn, Fairfield, Deepdale, near Ullswater and Farleton Knott; in several places in Yorkshire; in Teesdale; Ben Lomond, Ben Lawers, Ben Chonzie, Ben Voirlich, Ben Ledi, Clova, and other places in the East Highlands; mountains in Inverness, Isle of Mull, Ross, Sutherland, Orkney; Donegal, Sligo, Leitrim, Meath, and Kerry. Found also on the mountains of Iceland, Lapland, Sweden, and Denmark; and in the Arctic regions; Germany, Hungary, France, Belgium, Spain, Italy, Switzerland, Greece, Kashmir, Altai, Kamtschatka, and the Rocky Mountains.

An evergreen fern with linear lanceolate pinnate fronds from 6 to 18 inches in length, of a rich green colour.

There are but few varieties:—

2. cristatum. Found on Ben Qui by Dr. Craig. Is well crested.
3. imbricatum, Boyd. Found by Mr. Boyd. Is a distinct imbricated variety. A similar one was received many years ago from Ireland.
4. multifidum, Moore. Multifid, but not constant.
5. proliferum, Moore. Producing bulbils in the axils of the lower pinnae.

THE COMMON PRICKLY SHIELD FERN.

Aspidium aculeatum.—Swartz.

Sub-section. Polystichum.

A large-growing, handsome evergreen fern, which could only be confused with Aspidium angulare; the pinnules, however, are
stalkless; with acute-angled or wedge-shaped bases; whilst in A. angulare the pinnules are stalked and their bases obtuse-angled.

In A. aculeatum the fronds are darker and more shining, stouter and more leathery in texture, and the habit of the plant is more
erect. Common throughout the United Kingdom and throughout Europe. An inhabitant also of Asia, Algiers, British India, and the United States. A very hardy plant, readily cultivated. It is to be found in hedgerows, woods, and on shady banks. Ordinary length, 2 to 3 feet.

**Varieties.**


5. capitatum, *Jones*. A narrow form, widening to a conspicuous capitate head. 27 x 2½ inches at base, and 5 inches below the head.

6. caudiculare, *Lowe*. Found at Shirenewton by myself. 12 x 1¼ inches. A lobed form, having the basal lobes conspicuously stalked and sharp-spined.

7. corymbiferum, *Fox* (cristatum *Fox* No. 10, *Wollaston*). Said by Mr. E. F. Fox, the raiser, to be a hybrid with Aspidium angulare, and from the smallness of the sporangia seems probable, although very like A. angulare. 22 x 5 inches. Frond terminating in a conspicuous head.


12. densum, *Moore*. Found in Devon by the late Mr. Jackson. 12 x 5 inches. Very folioid and distinct.


*15. hybridum, *Lowe* (cruciatum, *Jones*). Raised in 1878 by myself. A hybrid between Aspidium angulare, var. Wakeleyanum, and A. aculeatum, var. densum. There are no half-way characters; it is a sudden change from one species to the other of the cruciate, strap-shaped, character. Previous to this cross, there had been no cruciate A. aculeatum. 20 x 3 inches. Copiously soriferous; but the spores seldom germinate; and the descendants are unlike "hybridum."

17. lobatum, Deakin. Found at Shirenewton and elsewhere by myself; and at St. Pierre by Mr. Bull. 30 x 5 inches. Larger, and the characters of lobatum better developed than in the original form.

18. micaceum, Mules. Found near Barnstaple by the Rev. F. Mules. 6 x 1 inches. Pinnæ almost as broad as long. Said only to grow on a micaceous soil.

19. multifidum, Wollaston. Found in several places in the Lake district and elsewhere. Frond dividing into a tuft of branches.

*20. nepos, Lowe. Raised from *hybridum by Mr. Barnes of Milnthorpe. A narrow, very rough-looking spinous cruciate form. 17 x 1 1/2 inches.

21. neptis, Lowe. Raised from *hybridum by the late Mr. Carbonell. An interesting variety. 18 x 3 inches. This and No. 20 are grandchildren of densum.


23. polydactylum, Fox. Raised by Mr. E. F. Fox. 14 x 4 inches. Pinnæ polydactylous. Apex of frond crested. *24. proliferum, Wollaston (acutilobum, Jones). Found in 1853 by Dr. Alchin. 36 x 6 inches. In 1873 the late Mr. John Wills found a very similar plant in Dorset. Not unlike a proliferum (or acutilobum) in A. angulare, but longer and more lax.

*25. pulcherrimum, Jones. Found in 1876, in Dorset, by a labourer, and given to the late Mr. Wills. It is one of the most beautiful of the British ferns; is sterile, has a very silky appearance, and is a lax proliferum-looking variety.

26. pulchrum, Lowe. Found in North Devon by the late Rev. C. Padley. Narrow; pinnae minutely crested, the tip of the frond branching into a large foliaceous head.

27. rotundatum, Lowe (imbricatum, Fox). Raised by Mr. E. F. Fox. 16 x 2 inches. An interesting, narrow form. Tips of the pinnæ confluent (not imbricate). Pinnules rotund, and the basal ones stalked.

28. stipatum, Lowe. Found in 1890 by Major Cowburn, at Dennil Hill. A bold form, with large stipitate uncut pinnules, having a minute dentate margin. 27 x 6 inches.

29. tergeminum, Lowe. Raised from *hybridum by the late Mr. Carbonell. Lower pinnæ normal "densum," then cruciate, and here and there brachiate in the pinnæ to near the apex. A bold form. 28 x 4 inches.

THE SOFT PRICKLY SHIELD-FERN.

Aspidium angulare.—Kitaibel.

Sub-section. Polystichum.

Some of our best authorities consider the present fern as a form of the last, and there is more or less resemblance amongst the varietal forms, but this has a softer feel and a less stardy con-
stitution. To me the greatest proof seems to lie in the difficulty in producing hybrids between A. aculeatum and A. angulare. After many years of perseverance there now exist several undoubted crosses; and again it is as difficult to raise young plants from these hybrids. If, however, we mix the varieties of the reputed species, i.e. varieties of A. angulare together, or varieties of A. aculeatum, then this difficulty no longer occurs, for seedlings come up by the thousand.

As with the Lady Fern and the Hart's Tongue, this species teems with remarkable varieties, and an attempt at classification has again been resorted to.

A common species, except in Scotland, where only found in a few localities in the Lowlands.

It is so mixed up with the last species by botanists that it is impossible to trace it with certainty on the Continent.

One difference in the normal form of the two ferns is in the pinnules of A. angulare being stalked and having an obtuse-angled base, whilst in A. aculeatum they are without stalks and acute-angled.*

This species selects shady woods and hedgerows, ranging from the coast to 600 feet. Evergreen, or subevergreen where exposed, varying in length from a few inches to 3 feet. More or less lanceolate in form; and bipinnate even to quadripinnate. It is difficult with all but botanists to distinguish the present from the last species. Easily cultivated.

* Since this has been written, Major Cowburn has found at Dennil Hill a variety of Aspidium Aculeatum, with pinnae and pinnules stalked, and which has been named stipatum.
Varieties.

Division A.

Changes in Skeleton.

Group 1. Ramosum. (Branching of some part of skeleton.)

Section a. RAMOSUM. (Stipes branched.)

1. acrocladon, Moore (ramo-cristatum, Jones). Found in South Devon, in 1862, by Mr. J. E. Mapplebeck. Length of frond, 1 foot 2 inches; width across the branches, 1 foot 4 inches. Most profusely branched.


3. capitatum, Lowe. Raised from spores at Highfield House. Frond widest in the middle, and narrowing to the base of a capitate head of 7 or 8 inches across. Pinnae polydactylous. Length, 2 feet; width, 7 inches.

4. cladodesteron, Lowe (viviparum, Jones). Branching from the base; and very much branched to the apex; ending in an erect capitate head. Dwarf; only 5 inches in length.


6. furcillatum, Lowe (ramo-furcillatum, Wollaston; ramosum, Jones). A remarkable ramose form, branching from below the rachis, and rebranching several times. Found in 1867, in South Devon, by Mr. G. B. Wollaston. Length, 1 foot 9 inches; width across the branches, 12 inches.


11. projectum, Wollaston. Found in 1862, in Devon, by the late Rev. C. Padley of Enville. 18 x 3 inches. Curious projecting and ascending branches on the lower half of the frond.

12. ramo-gracile, Wollaston. Found by Mr. Wollaston.

13. ramo-multifidum, Wills. Found in 1874 by the late Mr. J. Wills. 15 x 3 inches, and 9 inches across the branching head.
Section 3. GRANDICEPS.

(Rachis dividing near summit, into numerous branches, and large heads.)


2. *capitatum, Clapham* (Claphami, Moore; multifidum Clapham, Wollaston). Raised by Mr. Clapham in 1864. A dense capitate head, 12 inches across. Not cristate, except the head. A splendid form. \(22 \times 7\) inches.

3. *capitosum, Lowe.* Found at Tatworth by Mr. Moly. Pinnae crested. A grandiceps with a head 7 inches across. \(28 \times 4\frac{1}{2}\) inches.

4. *coronatum, Lowe.* Raised by Mr. E. F. Fox. A cross between Molyi and plumosum. Pinnae crested; apex crowned (width 7 inches). \(15 \times 5\) inches.

5. cristatum, Wollaston (marked W. No. 10). Found in Somerset by Mr. G. B. Wollaston. Minutely crested, but largely capitate. \(21 \times 5\frac{1}{2}\) inches.


*10. inaequale-furcans, Cowper.* Found by Mrs. Cowper near Sidmouth. \(24 \times 10\) inches. Pinnae unequally furcate. A grand capitate head, 8 inches across.

11. Jonesii, Lowe (cristatum Jonesii, Stansfield; grandiceps Jacob Jones, Wollaston). Found in Pembrokeshire, about 1869, by the late Mr. Jacob Jones.

12. Molyi, Lowe (grandiceps Moly, Wollaston). Found in 1869, in South Somerset, by Mr. Moly. A bold, compactly crested variety, with a dense compact head. \(19 \times 7\frac{1}{2}\) inches (where widest, i.e., at the base).


14. orbiculatum, Lowe. Found at Langmoor, Charmouth, in 1887, by Mr. Moly. \(21 \times 4\) inches.


17. ramulosum, Stansfield. Found in Co. Antrim by Mr. W. H. Phillips. \(30 \times 8\) inches. Normal, with a dense ramulose head.

18. scopaeoides Lowe. History unknown. From Colonel Jones's
SUB-SECTION POLYSTICHUM. 107

collection. 16 × 5 inches. Short pinnae, large rounded pinnules; costa splitting and forming a besom-like head.


Section γ. CRISTATUM. (Bunch crested.)


2. attenuato-cristatum, Wollaston. Found by Mr. Elworthy.

3. brachiale, Lowe. A superb variety, found in the late Colonel Jones’s collection of dried fronds. The superior basal pinnule unequally brachiate; pinnules setose; pinnæ crested; and apex of frond capitate. 18 × 6 inches.


6. Cowperi, Lowe (cristato-gracile Cowper, Wollaston). Found in 1874, in Dorset, by the late Mr. R. Cowper. Much narrower near the apex. A slender variety, with small crests and pinnules. 16 × 4 inches.


8. cristatum, Moore. Under this name there are many forms.

9. cristulum, Lowe (cristatum Stormount, No. 1, Praeger). Found in 1883, at Stormount, by Mr. Praeger. A neat cristulate form, in which the upper part of the midrib of the pinnæ expands and becomes transparent.


12. Jacksoni, Lowe (cristato-gracile Jackson, Jones). Found by the late Mr. Jackson. 15 × 6 inches. A pretty thorny-looking variety.


16. multifidum, Wollaston. A number of varieties have been found; more or less branched.

17. multilobum, Lowe (multilobum cristatum Jones, Wollaston). Raised in 1873 by the late Colonel Jones. 24 × 4½ inches. A very fine, densely crested form.


23. **Thompsonii**, Moore (cristatum Mrs. Thompson, Wollaston). Found in 1866, in North Devon, by Mrs. Agar Thompson. A very narrow, close-crested variety, with a compact capitate head. 20 × 2½ inches. This fern is sometimes branched and crested.


Section 8. POLYDACTYLUM. (Pinnæ digitate, not bunched.)

1. **conspicuilobum**, Lowe (polydactylum-conspicuilobum, Jones). A good polydactylous form. 28 × 6 inches.


6. **Jonesii**, Lowe (polydactylum, Jones). Found in Hampshire in 1875. It differs from Padleyi in having the two pairs of basal pinnæ much longer than the rest, and in the rachis dividing some 6 inches from the apex of the frond, and again subdividing into a crested head 8 inches broad. 24 × 6 inches (at base).


10. **scalptum**, Carbonell. Raised by the late Mr. Carbonell. A slender polydactylous decompositum. 15 × 5 inches.

11. **splendens**, Lowe (polydactylum splendens, Jones). Raised by the late Colonel Jones from Mr. Padley's Vale of Avoca polydactylum,
12. Willsii, Lowe. Found by the late Mr. Wills. A subrotundate crested variety.

13. Wollastoni, Lowe (polydactylum, Wollaston). Found in 1870, in Somerset, by Mr. G. B. Wollaston. Conspicuously polydactylous and capitate; peculiar cut pinnules, ending in a sharp point. $20 \times 5\frac{1}{2}$ inches.

Section ε. BRACHIATUM.

(Rachis branching into three near the base.)

1. brachiatum, Gray. Found in 1860, in South Devon, by the late Mr. R. J. Gray, and at Axminster by Mr. Moly. $21 \times 5$ inches (base, 14 inches). Basal branches make the frond triangular. Mr. Gray raised very many brachiate seedlings.

2. capitatum, Wollaston. Found in 1862, in Dorset, by Mr. J. Moly. Length, 12 inches. Short irregular pinnae and a large capitate head (8 inches broad).

3. coronare, Lowe (brachiato-cristatum, Gray, in part). Raised by Mr. R. J. Gray.

4. deltoideo-decompositum, Moly. Found in 1874, in Devon, by Mr. Moly. $21 \times 5$ inches (basal pinnae 9 inches). An interesting form.


6. Grayi, Moore (brachiato-cristatum, Wollaston). Found in 1854, in South Devon, by Mr. R. J. Gray. Length and breadth, 18 inches. Mostly branching in the leafy portion of the frond at its base into a magnificent tree-like frond with three conglomerate heads. Mr. Gray raised many forms of this variety.

7. Hankeyi, Lowe (brachiato-cristatum Hankey, Wollaston). Found in Sussex, in 1866, by Mr. Barnard Hankey. $21 \times 6$ inches (except brachiate base, where 12 inches). Frond capitate, the head 7 inches across. A marvellous form, with pinnules plumosely dentate. There is a brachiate character with all the pinnæ.


9. Keallii, Lowe (brachiato-cristatum, Keall). Length, 15 inches; width, 12 inches. A fine form, found by Mr. Keall, in which each of the two branches is as large as the central frond; the apices in all are branched and their tips crested. Mr. Elworthy found a very similar variety.


12. multifidum, Lowe (brachiato-multifidum, Jones). Found in
1877 in Dorset by the late Mr. J. Wills. 18 x 13 inches. Branched in the middle of the rachis, and each again near the apex. Naked stem, 6 inches.


14. Padleyi, Lowe (brachiato-cristatum, Padley). Found in Sussex by Mr. W. Barnard Hankey in 1866. Length, 1 foot 8 inches. Ten years previously, Mr. Gray, of Exeter, found this variety in South Devon. Recently, Mr. W. H. Phillips has found it in County Down. “Padley” branches in capitate heads.


*17. Smithii, Lowe (brachiatum cristatum Smithii, Mapplebeck). I have not seen this.

18. Willsii, Lowe (brachiato-cristatum Wills No. 4, Wollaston). Found in 1876, in Dorset, by Mr. Wills. Very plumose pinnules. Small capitate apex of frond. 20 x 7 inches; and across basal pinnae, 10 inches.

Section 5. CRUCIATUM.

(Pinnae or pinnules twin-branched.)

*1. Cliftonae, Lowe. Raised by myself. Erect; well cruciate; having a large capitate head.


3. cruciato-polydactylum, Jones (cruciato-cristatum, Wollaston). Raised in 1874 by the late Colonel Jones. A crested variety. 27 x 3 inches.

4. cruciatum, Wollaston. Found in 1862, in Somerset, by Mr. G. B. Wollaston. 30 x 2 inches. Cruciate above the centre of the frond.

5. Elworthii, Moore (cruciato-truncatum, Jones). Found in 1854, in Somerset, by the late Mr. Elworthy. 14 x 1 inches, except below the truncate apex, where there are 3 or 4 long pinnae.


7. majus, Lowe (cruciatum-majus, Jones). The boldest cruciatum yet found. 34 x 4½ inches.


10. Willsii, Lowe (cruciatum Wills, Jones).
Group II. Dwarfed.

(Abbreviation of skeletal axis in relation to soft parts.)

Section a. CONGESTUM. (Central axis abbreviated.)

1. annutum, Moore (conspicuo-crispatum, Jones). A dwarf cris-pate form. Possibly the same as coriaceo-crispatum, Jones.

2. Carbonellii, Lowe (obtusissimum Carbonell, Fox). Found in 1883, at Littleham, by the late Mr. Carbonell. 16×3 inches. Imbricate, pinnules falcate with blunt ends; very neat.


4. crispatum, Jones. Found at Hale, near Salisbury, by the late Colonel Jones. Crisped.

5. decurtum, Lowe. Found at Holditch by Mr. Moly. Narrow, and imbricated. 15×2½ inches.


8. multifidum, Lowe (congesto-multifidum, Jones). Raised by the late Colonel Jones. 8×4½ inches. Pinnæ much branched; costa splitting and forming a branched head.


10. parvissimum, Moore. Less in size. Length, 6 inches.

11. polydactylum, Lowe (polydactylum-congestum, Fox). A cross between congestum, Wills, and polydactylum, Jones. Raised by Mr. E. F. Fox. 8×2¾ inches. Apex multifid, not crested.

12. stipatum, Wollaston. Found by Mr. Tait. Pinnæ short, crowded and overlapping; pinnules also crowded and overlapping.


14. turgidum, Moore. Found at Littleham, Devon, by the late Rev. C. Padley. Dwarf. 9×2 inches.

15. Willsii, Lowe (congestum Wills, Jones). Dwarf; beautiful.

Section b. ALATUM.

(Lateral axes abbreviated, pinnules more or less confluent.)

1. alatum, Moore. Found in Somerset by Mrs. Thompson, and in Devon by Mr. Wollaston. Pinnules joined together by a well-developed wing. A dwarf variety.
2. angustifrons, *Moore*. Found at Barnstaple by the late Mr Jackson. 8 × 1 inches. Exceedingly narrow.

3. extremum, *Lowe*. Found in Devon, in 1864, by the late Mr. C. Elworthy. 14 × 3 inches. Allied to obtusissimum. Pinnæ touching, but not overlapping.


5. imbricatum, *Moore*. A narrow, imbricated, very lax form, found in Somerset by the late Mr. Elworthy. Length, 24 inches. Proliferous.


**Group III. Flexuose.**

(Abnormal curving of skeleton.)

**Section a. FLEXUOSUM.**

1. abasipinnulum, *Moore* (medio-deficiens, *Pailey*). Found in Dorset, in 1876, by Mr. R. Thompson (3, The Residences, South Kensington Museum). A flexuose variety, not unlike gracile in general appearance. The three or four basal pinnules, to within two inches of the tip of the frond, reduced to the stem of the pinnule. 22 × 5 inches.

2. flexuosum, *Wollaston*. Mr. Wollaston, between 1870 and 1873, found several plants in North Somerset and South Devon that varied in the flexuose character. The stipes and rachis bending in an extraordinary manner. 20 × 5 inches. A dwarf form in the Clifton Zoological Gardens was possibly raised from flexuosum.


5. reflexum, *Wollaston*. Found in Devon by Mr. G. B. Wollaston, pinnules reflexed.


7. revolvens, *Moore*. Found in 1872, in Somerset, by Mr. J. Wills. 18 × 2 inches. The pinnæ revolve, curving over the back of the frond, and by this means shortening their width one half.

SUB-SECTION POLYSTICHUM.

Group VI. Stipitate.

(Pinnæ and pinnules distinctly stalked.)

Section a. STIPATUM.

1. deorsopinnatum, Moore. Found in 1871, in South Devon, by Mr. J. Moly. The inferior pinnules much the larger. 27 × 9 inches.
4. levidense, Wollaston. Found in 1866, at Windermere, by Mr. J. M. Barnes. Pinnules thin, and long-stalked.
7. stipitatum, Moore. This and pedicellatum, Wills, are much alike. Known at the Todmorden Nursery as far back as 1865.

DIVISION B.

CHANGES IN SOFT PARTS.

Group I. Amplum. (Increased development.)

Section a. PLUMOSUM.

(Texture thin. Fructification scanty or absent.)

4. grande, Jones. Raised by Mr. E. F. Fox from spores (of decompositum-splendens) supplied by the late Colonel Jones; and from which also the three magnificent plumose divisolobes were raised by Mr. Fox. A barren handsome form. 28 × 9 inches.
5. Hillersdonense, Lowe (plumosum Hillersdon, Jones). One of Mrs. Grant’s beauties.
6. laxum, Jones. A superb fern, raised by the late Colonel Jones.
7. Mousogines, Lowe. Purchased in Yorkshire. Not unlike Pateyi, but without the large basal pinnæ; and occasionally bearing bulbils at the apex of the frond. 32 × 7½ inches. A splendid form.
10. plumosum, Moore. Found in Somerset in 1856 by the late Mr. C. Elworthy. A sterile form, 36 x 9 inches.


Section β. FOLIOSUM.

(Foliose or subplumose. Texture and fructification normal.)

1. bulbiferum, Lowe (frondoso-bulbiferum, Jones). A grand foliosum, developing bulbs into little plants (some as much as 2 inches long) at the base of the pinnae. As many as 50 plants on a frond. 30 x 7 inches.

2. concinnum, Moore. Found near Nettlecombe by the late Mr. C. Elworthy. A pretty foliose variety. 24 x 6 inches.

3. crispum, Lowe (foliuso-crispum, Jones).

4. cristatum, Lowe (foliuso-cristatum, Jones).

5. cruciatum, Lowe (frondoso-cruccatum, Jones). History obscure.


7. frondosum, Jones. A densely foliose yet refined variety. 24 x 10 inches.


9. Jonesii, Lowe (foliosum, Jones). Found by the late Colonel Jones. When vigorous, lower pinnules falcate. Both Mr. Wills and Mr. F. W. Stansfield pointed out this as suggestive of the pulcherrimum type.

10. latipes, Moore. Raised in 1870 by Mr. Parsons. A fine foliose form. 27 x 8 inches.

11. multifidum, Lowe (foliuso-multifidum, Jones). A fine variety with solid rotund pinnules. Stipes dividing considerably below the apex into a capitate head (8 inches across). 20 x 4½ inches.


13. polydactylum, Lowe (frondoso-polydactylum, Jones). A foliose and polydactylous variety. 30 x 7 inches.

Section γ. PULCHERRIMUM. (Ultra plumose.)

[Lower pinnae, and sometimes upper, falcate, deeply incised, and drawn out into thread-like processes. Fructification generally aposporous. Character more or less intermittent.]

1. Molyi, Lowe (pulcherrimum Moly, Jones; and caudiculato cristatum, Wollaston). Found in 1876 in S. Devon by Mr. Moly. Tips of the pinnae crisped and feathery. Mr. Moly also found other forms, from one of which Mr. F. W. Stansfield has raised seedlings by apospory. The Rev. C. Padley also found a pul-
cherrimum, from which Mr. Morris of Bath has raised seedlings by apospory (Mr. Moly also found a characteristic pulcherrimum with variegated fronds. See section variegatum). 24\times5 inches.

2. pulcherrimum, Moore (pulcherrimum Wills, Wollaston). Found in Dorset by the late Mr. Wills.

3. Thompsonæ, Lowe (pulcherrimum Mrs. Thompson, Jones). Found in 1863, in S. Devon, by Mrs. Agar Thompson. A most feather-like variety, especially near the tips of the pinnae. 27\times6 inches (in the middle of the fronds).

Section 8. MACROPINNULUM.
(Unusually large pinnules.)

1. cristatum, Lowe (latifolio-cristatum, Jones). Raised by the late Colonel Jones. 18\times9 inches. Lax, and slightly crested.

2. divisum, Smith. Found in 1869 in S. Devon by Mr. Moly. 18\times6 inches. Lax. A number of forms have been found.

3. globosum, Lowe (latifolio-globosum, Jones). Lax, with globose crests and a branched head. Distinct. 20\times4 inches.

*4. grandiceps, Lowe (latifolio-grandiceps, Jones). Raised by the late Colonel Jones. 14\times7 inches, having a tasselled head 6 inches long.

5. Jonesii, Lowe (pendens Jones, Jones). Found in 1873, in Dorset, by the late Colonel Jones. A lax, large-pinnuled form. 27\times7 inches.

6. latifolium, Wollaston. Found in 1873 in S. Devon by Mr. J. Moly. 32\times10 inches. One of our finest varieties. The development of the posterior basal pinnules is very exceptional.

7. latitudine, Lowe. 22\times12 inches. A frond found in the late Colonel Jones's collection, apparently raised from latifolium. A lovely, slender form.

8. pendens, Lowe (pendens Wills, Jones). A very handsome form, found by the late Mr. Wills. 24\times5\frac{1}{2} inches.

Group II. Exiguum.
(Diminished development of soft parts.)

Section a. LAXUM.
(Pinnæ and pinnules distant.)

1. acutilobum, Lowe (gracile Grayi, Gray). Found in 1865, in S. Devon, by Mr. R. J. Gray. Length, 2 feet 3 inches. An acutilobe of the finer kind.

2. Jonesii, Lowe (laxum Jones, Jones). Found by the late Colonel Jones.


Group III. Compositum. (Subdivision of pinnules.)

Section a. DECOMPOSITUM.
(Subdivision on normal lines.)

1. Clowesii, Lowe (decompositum Clowesii, Moore). Found in 1869, at Whitbarrow, by Mr. F. Clowes. Robust, dense, plumose, with profoundly cut pinnules. A similar variety was found at Arnside by Mr. J. Crossfield.

2. decompositum, Moule. Found by Mr. Moule in Devon.

3. Foxii, Lowe (decompositum Fox, Jones). Large.


5. Gilletii, Lowe (tripinnatum Gillett, Jones). Found in 1864, near Yeovil (Somerset), by Mr. Gillett, of Cirencester. A grand form, densely foliose. 27 × 14 inches.


8. laxum, Lowe (decompositum-laxum, Wollaston). Found in 1876, at Brislington, near Bristol, by Mr. E. F. Fox. A large, bold form. 33 × 10 inches.

9. magnifico-polydactylum, Lowe (decompositum magnificum polydactylum, Jones).


13. plumosum, Lowe (plumoso-decompositum, Jones). The late Colonel Jones raised three interesting forms from his multilobum-laxum. 15 × 5 inches.


15. serrulatum, Wollaston (deltoides-decompositum, Stansfield). Raised by Messrs. F. W. and H. Stansfield. It is stipitate, deltoid, and decomposed; with strongly toothed pinnules.

16. splendens, Lowe (decompositum splendens Moly, Wollaston). Found in 1875, in S. Devon, by Mr. J. Moly. Contrast of development in centre of frond remarkable. 34 × 5 inches. From this Mr. E. F. Fox raised the grand divisolobums named by the late Colonel Jones, densum, robustum, and laxum; described in Section 8.

17. tripinnatum, Moore. A confusion has occurred with regard to this plant; it was originally found by Mr. R. Tracy Millett, of Penzance, and named by Mr. Moore. (See page 155, vol. I.
Nature-Printed British Ferns," by Thomas Moore.) In the original plant the pinnae were twisted so as to lie one above the other like stairs. It is not so decidedly tripinnate as Gillettii, and altogether a different-looking plant. Found also in the English Lake district.

Section β. ACUTILOBUM.

(Pinnules acute-lobed, upper and lower ones of equal length.)

1. acutilobum, Wollaston. Raised from spores by Mr. Wollaston in 1873. 34 x 3 inches; in middle of frond, only 2 inches.
2. acutissimum, Wollaston.
3. acutum, Lowe (acutilobum acutum Wills, Jones). Crowded with bulbils along the rachis.
4. Allchini, Lowe (proliferum Allchin, Jones). Also copiously bulbiferous.

*5. arctissimum (Lowe). A very narrow form, raised at Highfield House. Apex attenuate.


8. exile, Lowe (acutilobum exile, Phillips). Found at Holywood by Mr. W. H. Phillips. 12 x 3½ inches. A pretty form. Mr. Phillips has found other sub-forms.


12. Grayi, Lowe (gracile Grayi, Gray). Found in 1865, in South Devon, by Mr. R. J. Gray. 27 x 6½ inches. Very slender and aculeolobed. A narrower form was found in 1860, in Hampshire, by Mr. T. B. Rake, which is more divisolobe. Length, 2 feet.


15. laciniare, Lowe. Found at Coombebyne, Devon, by Mr. Moly. A lovely lace-like form. 24 x 6½ inches.

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17. *oxyphyllum*, Moore (divisolobum Elworthy, Wollaston). Found in 1852, in Somerset, by the late Mr. Elworthy. 21 × 6 inches.


21. proliferum, Moore. There are many similar forms; one found in 1876, in Dorset, by Mr. Wills, is more proliferous than Mr. Choule's original plant. 24 × 63 inches.

22. scopae, Lowe. Raised from spores, at Shirenewton Hall (from vars. polydactylum and multilobum). A very divisilobum-looking variety, with pinnae heavily crested. The late Colonel Jones raised four seedlings very like the present one, but larger.

23. tenue, Lowe (proli'erum tenue, Clapham). Raised by the late Mr. Clapham. 14 × 3½ inches. Lax.


Section γ. DIVISOLOBUM.

(Pinnules cut into acute lobes; lower pinnules distinctly larger than the upper ones.)

1. acutum, Lowe (divisolobum acutum, Jones). Found by Mr. Padley. An interesting lax form. 22 × 10 inches.

2. Carbonellii, Lowe (divisolobum Carbonell, Jones). Raised by the late Mr. Carbonell. A handsome lax form. 28 × 6 inches.


4. crista, Lowe. Raised in 1886, by the late Colonel Jones. A dwarf imbricate variety; with close, dense, cock's-comb-like crests. 6 × 2 inches.

5. cristatum, Lowe (divisolobum cristatum Ivery, Wollaston). Raised in 1870, by Messrs. Ivery. A grand fern; heavily crested on lower half of frond. 22 × 8 inches.

6. decorum, Lowe (divisolobum decorum, Jones). Raised by the late Colonel Jones. 32 × 10 inches.

7. deltoideum, Lowe (divisolobum-deltoideum, Jones). Lax. 33 × 10 inches.


10. elegans, Lowe (divisolobum elegans, Jones).
11. falcatum, Lowe (divisolobum falcatum Moly, Stansfield; and divisolobum laxum Moly, Wollaston). Remarkably lax and falcate, both in the pinnae and pinnules. Pinnae, shaped like a reaping sickle, 7 inches long, whilst the frond is only 7 inches wide. 22 × 7 inches.
13. grande, Lowe (divisolobum grande, Jones). Raised by the late Colonel Jones. A well-merited name. 21 × 13 inches.
14. grandiceps, Lowe (divisolobum grandiceps, Jones). Raised by the late Mr. Carbonell. A very fine variety.
18. laxum, Lowe (divisolobum laxum, Jones). Found in 1874, in South Devon, by the late Mr. J. Wills. A grand form. Pinnules somewhat depauperate at the base of the pinnae. 30 × 12 inches.
19. longipinnatum, Lowe (divisolobum longipinnatum, Jones). Raised by the late Mr. Carbonell. A lax and very graceful fern, with very long inferior pinnules. 32 × 12 inches.
22. Padleyi, Lowe (divisolobum Padley, Jones). Found in 1866, in North Devon, by the late Rev. C. Padley. One of the finest of the lax forms. 34 × 10 inches.
23. perfectum, Lowe (divisolobum perfectum, Jones). Raised by the late Colonel Jones.
25. plenum, Lowe (divisolobum plenum, Jones). Raised by the late Colonel Jones.
26. polydactylum, Lowe (divisolobum polydactylum, Jones). Raised by the late Colonel Jones. A cross between Henleyæ and polydactylum. 21 × 5 inches.
27. robustum, Lowe (divisolobum robustum Moly, Jones). Found in 1874, in South Devon, by Mr. J. Moly. A grand, robust form. 36 × 16 inches.
Found in 1870, in South Devon, by the late Miss Seymour. A dense form. 18×7 inches.


30. stipula, Lowe (divisolobum stipulatum, Jones). Raised by the late Mr. Carbonell, from spores given him by the late Colonel Jones.

31. Willsii, Lowe (divisolobum Wills No. 3, Jones). Found by the late Mr. Wills, as recorded by the late Colonel Jones.

Section 8. PLUMOSO-DIVISOLOBUM.

(Like divisolobum, but with greatly increased development of leafy part of frond.)

*1. Baldwini, Lowe. Raised by the late Colonel Jones, about 1885, from a bulbil of “densum,” and given whilst young to Mr. John Loraine Baldwin. The finest of all the plumose divisolobums. Costa of the pinnae very thin, and the pinnae imbricate; quadripinnate. The divisions finer and more feather-like than any other variety. 22×8 inches. Colonel Jones's greatest achievement.


4. grande, Lowe (plumoso-divisolobum grande, Jones). Raised in 1885 by Mr. E. F. Fox. A cross between decompositum-splendens and plumosum of Wollaston. Far superior to the parent plumosum. [Mr. Fox has a large number of forms not yet named from this batch of seedlings.]

*5. imbricatum, Lowe. Raised about 1885, from a bulbil of “densum.” Exceedingly imbricated and plumose. Baldwini and imbricatum were considered two of the most notable varieties at the Royal Horticultural Society's Fern Show, on July 22 and 23, 1890.

6. laxum, Lowe (plumoso-divisolobum laxum, Jones). Raised in the same batch of seedlings with densum and robustum by Mr. E. F. Fox. Length, 24 inches. Quadripinnate; and more lax than densum or robustum. Sterile, but copiously bulbiferous.


8. robustum, Lowe (plumoso-divisolobum robustum, Jones). Raised by Mr. E. F. Fox. Not as luxuriant or so finely divided as densum. Pinnae somewhat curt and rounded. Sterile, and very sparely bulbiferous.
SUB-SECTION POLYSTICHIUM.

Section e. MULTILOBUM.
(Pinnules divided into rounded lobes.)


*2. ariprepes, Lowe. A very graceful large fern. Frond equal in width for the lower half, and then gradually narrowing to a point. $33 \times 7$ inches. A somewhat similar variety (multilobum-Lowe) was also raised at Highfield House.

3. attenuatum, Lowe (attenuato-multilobum, Moly). $20 \times 8$ inches. A very fine tripinnate form, the pinnulets being very finely cut and divided.

4. conspicuilobum, Padley. Found in Somerset by Colonel Jones in 1878. Length, 1 foot 6 inches. Mr. Padley has found even finer forms.

5. cristatum, Lowe (multilobum cristatum Jones, Wollaston). Raised in 1873 by the late Colonel Jones. Heavily crested. $24 \times 5$ inches.

6. decorum, Lowe. Raised by myself in 1876. A large narrow form. $36 \times 4$ inches.

7. deltoideum, Lowe (multilobum deltoideum, Jones). $24 \times 8$ inches. A fine form.

8. densum, Lowe (multilobum densum, Jones). Raised by the late Mr. Carbonell.


10. Iona, Lowe (multilobum Jones Iona, Jones). Raised by the late Colonel Jones. $26 \times 9$ inches. A fine form.

11. Jonesii, Lowe (conspicuilobum Jones No. 2, Jones). Found in 1878, in Somerset, by the late Colonel Jones. Much smaller pinnules than in Willsii, and ending in a sharp point. $18 \times 5$ inches.

12. laxum, Lowe (multilobum-laxum, Jones). Found in 1872, at Teignmouth, by the late Colonel Jones.

13. lineare, Lowe. Raised by Mr. E. F. Fox from attenuato-multilobum of Moly. Very handsome, and lineare-looking form. $16 \times 6\frac{1}{2}$ inches. Although pinnae crowded, pinnules so narrow as to give a lax appearance.

14. multilobum, Lowe (multilobum Gray, Wollaston). Found in 1865, in S. Devon, by the late Mr. R. J. Gray. Foliose. $30 \times 9$ inches.

15. multilobum minor, Lowe (multilobum Jones, Wollaston). Found in 1874 in Hants, by the late Colonel Jones. $20 \times 5$ inches.


17. polydactylum, Lowe (multilobum polydactylum, Jones). Raised by Mr. E. F. Fox. $30 \times 17$ inches. A dense, divisilobum-looking form. Pinnae with polydactylous ends.

18. tripinnatum, Moore. Found at Penzance by Mr. R. Tracey Millett. $27 \times 5$ inches. Pinnae horizontal (like steps), and pinnules
very conspicuously dentate. Totally distinct from Mr. Gillett’s tripinnatum, which is a form of decompositum.


20. Willsii, Lowe (conspicuilobum Wills, Wollaston). Found in 1873, in Dorset, by the late Mr. J. Wills. 27 x 10 inches (in centre of frond). Lax, the lobes being very conspicuous.

Group IV. Heteromorphum.

(Alteration in contour and margin, etc., of ultimate segments.)

Section a. ROTUNDATUM. (Rounded pinnules.)

1. angustior, Lowe. Raised from spores. Dwarf. 8 x 0½ inches.

3. conchatum, Moore. Found at Hawkhurst by Mr. Moly. Very distinct. Pinnules like shells. 16 x 3½ inches.

*4. cruciatum, Lowe (rotundato-cruciatum, Jones). A cruciate narrow form. Raised by myself from spores. 22 x 1½ inches. Everywhere cruciate; and pinnae longer at upper part of frond than Hankeyi.

5. diversum, Lowe. Raised by myself (between rotundatum and cruciatum). 12 x 2½ inches below, where normal; narrowing above to 1 inch, where cruciate.


8. Hankeyi, Lowe (rotundato-cruciatum, Hankey). Raised in 1875 by Mr. W. Barnard Hankey. Cruciate from the base upwards. 20 x 1 inches. [lato-cruciatum is not unlike this form]
but on a much larger scale; and the lobes are divided to the costa at the base of the pinnæ; and they are broad, deeply crenate, and confluent above.]


*10. lato-cruciatum, *Lowæ*. Raised by myself. $23 \times 1\frac{1}{2}$ inches. (var. cruciatum $\times$ rotundatum.) Pinnæ cruciate and confluent. Only the basal lobe divided. A most distinct fern.


12. Ligoniælense, *Lowæ*. Found at Ligoniel, Co. Antrim, by Mr. W. H. Phillips. $27 \times 6\frac{1}{2}$ inches. An interesting subrotund form.


14. rotundatum, *Moly*. Found in 1860, in Somerset, by the late Mr. Elworthy. $20 \times 2$ inches. A narrow fern, with only two to four pairs of pinnules, which are rounded.


Section 8. LINEARE.

(Pinnules narrow, supra-lineate or infra-lineate.)

1. confluens, *Foot*. A lineare form found in Ireland by Mr. S. Foot; and in S. Devon, in 1873, by Mr. J. Moly. Length, 18 inches. The ends of the pinnæ and frond confluent. A lax variety.

2. cuneatum, *Wollastons*. Found in 1873 in S. Devon by Mr. J. Moly. $24 \times 6$ inches. Lax, with broader pinnules than in lineare.

3. depauperatum, *Padleys*. Found by Mr. Padley. $16 \times 5$ inches. A depauperate lineare.


5. extremum, *Lowæ*. A very extreme form (frond without label in the late Colonel Jones’s collection). Lax; much depauperate; and the apices of the pinnæ confluent and linear. $30 \times 7$ inches.


7. gracile-interruptum, *Lowæ*. Found in Somerset by the late Mr. Elworthy. Nearer Mr. Foot’s confluens than lineare; the three pairs of basal pinnules wanting; on the upper half of the frond the superior basal pinnule is narrow and very long; beyond which again wanting or depauperate. $24 \times 5$ inches.

8. hirondelle, *Wills*. Found by Mr. Wills, small but very symmetrical.


11. lineare, *Moore*. Larger and more decidedly bipinnate than confluent. Found in Devon by the late Mr. C. Jackson.


15. remoto-decurrens, *Wollaston*. Found in 1863, in S. Devon, by the late Rev. C. Padley. 22 x 5 inches. Like a broad pinnuled confluent. Thorny.


Section γ. LACINIATUM. (Lacinate forms.)


2. Carbonellii, *Lowe* (grandidens Carbonell, *Jones*). Raised by the late Mr. Carbonell. A symmetrical laciniate variety. 16 x 4½ inches.


6. difficiens, *Wollaston*. Found in 1874, in Dorset, by Mr. John Wills. An extraordinary fern, with deficient pinnules, mostly wanting about an inch from the apex of the pinnae, where only points remain. Least deficient near the base of the pinnae. 21 x 7 inches.

7. Fittii, *Lowe* (grandidens Fitt, *Jones*). A very distinct crisp form with dark-green fronds, raised by Mr. Fitt. 10 x 3 inches.

*8. flabellipinnulum, *Jones* (cristipinnulum, *Wills*). Found in 1878, in Dorset, by the late Mr. Wills. The pinnules fan-shaped. 20 x 4½ inches.

9. Foxii, *Lowe*. Raised by Mr. E. F. Fox (a cross between grandidens and Jacksonii) in 1872. 10 x 5 inches. It is a grandidens to the apices of the pinna, and then a cristato-gracile.


12. grandidens, Wollaston. Found in 1872 in Dorset by Mr. J. Wills. Everywhere depauperate. 20 × 1 inches. A number of kindred forms have been found.

13. interrupto-caudatum, Praeger. Found in 1885, in Glenarm, by Mr. Praeger. 21 × 7 inches (at base); only an inch in upper half of frond.

14. interruptum, Wollaston. Found in Hampshire, in 1862, by Mr. Rake. Length, 18 inches. A most interrupted form; some pinnae 4 inches long, others not ½ an inch; most of the pinnae are not an inch in length.

15. irregulare, Jones. Found at Ballymenoch by Mr. W. H. Phillips. 12 × 1 inches. Much depauperated and truncate.


17. Lowei, Lowe (grandidens Lowei, Moore). Very dwarf and fine-cut, the pinnules being acutilobe. Truncate. Length, 4 to 6 inches.


22. premorsum, Allchin. Found in Ireland, in 1853, by Dr. Allchin, and subsequently in Devon and Haasts. Dwarf, narrow, praemorse variety. 14 × 3½ inches. Mr. W. H. Phillips found a form at Knock, 24 × 4½ inches.


25. truncatum, Lowe (grandidens truncatum Elworthy, Wollaston). Found in 1859, in Somerset, by the late Mr. Elworthy. Pinnae and apex truncate; pinnules very abnormal. 7 × 1½ inches.

Section 8. SETOSUM. (Pinnules thorny.)

1. cristatum, Lowe (setoso-cristatum, Moore). Found in 1874, in S. Devon, by Mr. J. Moly. Apex of pinnae slightly crested, and a compact, much-branched head, not wider than the frond. This
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charming variety has the margins of the pinnules crowded with bristles. 20 × 5½ inches.

2. cuneatum, Lowe (setoso-cuneatum, Jones). Found in 1877, in Co. Antrim, by Mr. W. H. Phillips. A delicate, pale, lustrous green; and so copiously dentate as to resemble Kalothrix of the Lady Fern. 16 × 4 inches. A grand form. Mr. Moly found a similar plant, but whether exile I am unable to say.

3. exile, Wollaston.


5. inæquale, Lowe (inæquale Setosum, Phillips). Found in Glen Devis by Mr. W. H. Phillips. 16 × 3 inches.


Section e. PERSERRATUM.
(Pinnules deeply and acutely serrated.)


2. Carbonellii, Lowe (perserratum Carbonell, Jones). Found by the late Mr. W. C. Carbonell in Monmouth. Dwarfer than Bayliæ.

3. fisso-decurrens, Wollaston. Found in 1874, in Dorset, by Mr. Moly. Narrow and branching at the base into twin fronds. 19 × 2½ inches.


DIVISION C.

ALTERATION IN OUTLINE OF FROND.
(The relations of hard and soft parts remaining unchanged.)

Group I. Widened.

Section a. DELTOIDEUM. (Deltoid.)


2. decompositum, Lowe (deltideo-decompositum, Moly). Found in 1874, in Devon, by Mr. J. Moly. 21 × 9 inches; middle of frond 6 inches wide; basal pinnæ much larger.


4. foliosum, Lowe (deltideo-foliosum, Jones). Found in 1875, in Devon, by Mr. Moly. 24 × 6 inches. A foliose, coriaceous form.

5. latipes, Moore. Raised in 1870 by Mr. Parsons. A fine deltoid
form. 27 × 9 inches. The late Mr. Elworthy, in 1854, found a very similar fern.

6. plumo sum, Lowe (deltoideo-plumo sum, Moly). Found in Dorset by Mr. J. Moly. Length, 2 ft. 3 inches.


Group II. Narrowed.

Section a. ANGUSTATUM. (Frond simply narrowed.)


DIVISION D.

ALTERATION IN THE COLOUR OF FROND.

Group I. Variegated.

Section a. VARIEGATUM.

1. aureolum, Lowe. Found at Martin Hoe, Devon, by myself, in 1885. Narrow, pinnules imbricate at the base of the pinnae; apex of the frond branching. An autumnal golden hue. 24 × 5 inches.

2. aureum, Jones. Found by the late Colonel Jones.


4. Jonesii, Lowe (variegatum, Jones). Found by the late Colonel Jones. Mr. Moly has also found a similar one.

5. leucothea, Lowe. A large fern in Colonel Jones's collection, some fronds entirely white, and others well variegated. 31 × 7 inches.


7. polydactylum, Lowe (inaequale variegatum polydactylum, Jones). Raised by the late Colonel Jones. A cross between No. 3 and polydactylum grande. Some pinnules very large, others all but wanting. A grand variegatum. 36 × 8 inches.

8. pulcherrimum, Lowe (pulcherrimum variegatum Moly, Jones). Found by Mr. Moly. A variegated pulcherrimum. 28 × 8 inches. A charming variety, with rich golden variegation.

9. venosum, Padley (venoso-variegatum, Jones). Found by the late Rev. C. Padley.
THE MARSH FERN.
Nephrodium thelypteris.—Desvaux.
(Lastrea thelypteris.—Bory.)

An interesting fern, the associate of Osmunda regalis in boggy situations. It is readily cultivated, but prefers wet peat, as water is its especial requisite. The fronds vary from 6 inches to 4 feet, including the stem; for at least half the frond is the naked stem. It is erect, and the fronds are of a delicate pale-green. Deciduous; rhizoma creeping. Quite distinct from all other species. Widely spread, but very local. It is found in Devon, Somerset, Hampshire, the Isle of Wight, Sussex, Kent, Surrey; Berkshire, Essex, Norfolk, Suffolk, Cambridge, Bedford, Huntingdon, Warwick, Stafford, Hereford, Salop, Nottingham, Yorkshire, Cheshire, Westmoreland, Cumberland, and Northumberland. In Wales—Glamorgan, Pembroke, Carnarvon, and Anglesea. In Scotland—Forfar; Shetland. In Ireland—Antrim, Galway, Mayo, Wicklow, and Kerry.

Occurs throughout Europe; in North America; and North Africa.

There are no varieties.

THE MOUNTAIN BUCKLER FERN.
Nephrodium montanum.—Baker.
(Lastrea montana.—Moore.)

K \n\nRown as the "Sweet Mountain Fern," owing to the strong yet pleasant scent of the fronds. Although recognised as a mountain fern, it is nevertheless found from the sea-level to an altitude of
about 3,000 feet. Usually an inhabitant of hillsides, especially in mountain districts; luxuriating in strong soil in damp situations. An easily recognised species, with lanceolate, pinnate fronds. Sori marginal. Fronds varying from 1 to more than 3 feet in length, and from 2 inches to nearly a foot in width. Erect in habit. A deciduous fern, requiring a damp situation for successful cultivation. A common species in this country, and found throughout Europe. Of late years a number of varieties have been discovered, the late Mr. Barnes, of Milnthorpe, being the most successful discoverer as well as cultivator.

Varieties.

1. abruptum, Moore. An interesting variety, found at Barnstaple by the late Mr. C. Jackson. Pinnæ narrow and short, pinnules interrupted.
2. albo-variegatum, Barnes. Found in 1872, in Wastdale, by Mr. J. M. Barnes. Fronds green and white.
3. angustifrons, Wollaston. Found in Patterdale by Mr. G. Whitwell.
4. angustum, Wollaston. Found at Staveley by Mr. J. Westlake.
5. apusæforme, Moore. Found in 1865, in Swindale, by Mr. J. M. Barnes. Apex of frond many branched.
6. attenuato-cristatum, Moore. Found in 1865, in Mardale, by Mr. J. M. Barnes. A handsome robust form, with caudate and crested fronds.
7. Barnesii, Moore (adpressa, Wollaston). Found in 1865, in Swindale, by Mr. J. M. Barnes. A grand, bold, dark-green variety, with erect fronds which are very narrow; pinnules horizontal. Length, 26 inches; width (at widest), only 2½ inches.
8. Bellii, Lowe (crispum Bell, Barnes). Found at Coniston by Mr. Bell.
10. brevilobum, Moore. Found in 1864, in Mardale. A distinct and beautiful form, with pinnules evenly reduced.
11. caudato-cristatum, Barnes. Found in 1863, at Rydal Head, by Mr. Crouch. Robust; very caudate. Small crests.
12. caudatum, Moore. Found in 1868, in Mardale and Wastdale, by the late Mr. J. K. Hodgson. The frond and pinnæ conspicuously caudate.
14. concinnatum, Barnes. Found in 1866, on Loughrigg, by Mr. W. Crouch. An interesting variety, the points of the pinnæ like ringlets.
15. congestum, Barnes. Found in 1873, in Langdale, by Mr. J. M. Barnes. A fine variety; densely foliose.
17. corymbiferum, *Whitwell*. Found at Grasmere by Mr. J. Garnett.
22. crispum, *Moore*. Found in 1865, in Furness Fell, by Mr. J. M. Barnes. Previously it had been found on the Clova Mountains by Dr. Balfour. A striking variety, with undulate pinnules.
25. cristatum, *Wollaston*. Found in 1871, in Westmoreland, by Mr. J. M. Barnes. A grand crested variety. Length, 24 inches; width, 6 inches; a small capitate head. A form of *cristatum* was found in Monmouthshire by Mr. T. H. Thomas.
27. curtum, *Barnes*. Found in Wyresdale by Mr. J. Hartley.
28. curvatum, *Moore*. Found in 1863, at Farleton Knot, Westmoreland, by the late Mr. Jacob Jones. Length, 30 inches; width (in middle of frond), 4½ inches. Pinnae curving downwards; and upper half of frond gradually narrowing, to a point. A fine variety.
30. curvatum-Whitwellii, *Barnes*. Found at Coniston by Mr. G. Whitwell.
32. deficiens, *Wollaston*. Found in Longsteddale by Mr. G. Whitwell.
33. depauperatum, *Druery*. Found in 1888, at Sticklepath, North Devon. Dwarf; very depauperate.
34. digitatum, *Jones*. Found in 1875, in Langdale, by Mrs. J. K. Hodgson. Length, 21 inches; width, 5½ inches. Digitate except the apex, which is pointed. Mr. J. Hartley has also found a digitate variety at Coniston.
35. erosum, *Moore*. Found near Bowness by Mr. F. Clowes. The pinnules are deformed.
36. flavo-variegatum, *Barnes*. Found in several places. Fronds green and yellow.
37. flexuosum, *Wollaston*. Found in 1870, in Westmoreland, by Mr. W. Crouch. Length, 24 inches; width (in middle of frond) 4½
inches; at the base, only 1 inch wide. Rachis slightly flexuose; pinnae and pinnules much twisted.

38. fosteri, Lowe (brevilobum Foster, Barnes). Found in Patterdale by Mr. W. Foster. Another brief-lobed variety.

39. furcans, Moore. Found in Westmoreland by Mr. Stansfield. Length, 12 inches; ending in a tuft of spreading segments.

40. furcillatum, Wollaston. Found at Brotherswater and Fros- trow, by Mr. G. Whitwell.

41. Gottii, Lowe (crispatissimum Gott, Hartley). Found at Troutbeck by Mr. J. Gott.

42. grandiceps, Barnes. Raised by Mr. Barnes in 1872. Length, 18 inches; width, 1 inch; the apex capitate and crested, and 4 inches wide.

43. grandiceps-Fosteri, Lowe. Found in Martindale, by Mr. J. J. Smithies.


45. inæquale, Wollaston. Found at Hartsop and Brotherswater by Mr. G. Whitwell.

46. inæquale-acutilobum, Wollaston. Found at Cautley by Mr. G. Whitwell.

47. inæquale-confluentes, Wollaston. Found at Hartsop by Mr. G. Whitwell.


49. interrupto-crispum, Barnes. Found at Coniston by Mr. G. S. Whitwell.

50. interrupto-laciniatum, Moore. Found in 1872, in Langdale, by Mr. T. Hartley. Length, 18 inches; width (in middle), 5 inches. Very irregular; pinnae interrupted, pinnules much depauperated, and apex truncate.


53. laciniato-caudatum, Barnes. Found in 1865, in Mardale, by Mr. J. M. Barnes. Pinnae and pinnules defective.

54. latifolium, Barnes. Found at Cautley, by Mr. G. Whitwell.

55. lobatum, Moore. Found in 1873, in Langdale, by Mr. J. M. Barnes. A very fine, almost tripininate form.

56. multifidum, Barnes. Found in 1872, at Seathwaite, by Mr. J. K. Hodgson. An interesting variety, with apex of frond multifid. Mr. J. Stewardson found this also at Clougha.

57. multiforme, Barnes. Found in Garsdale, by Mr. G. Whit- well.

58. multifurcatum, Wollaston. Found at Coniston by Mr. G. S. Whitwell.

60. plumosum, *Barnes*. Found in 1876, at Little Langdale, by Mr. T. Airey. A splendid, finely cut, plumose, sterile form. Mr. G. Whitwell has also found this on Patterfell.

61. polydactylum, *Barnes* (cristatum, *Moore*). Found in 1860, by Mr. Clarke, of the Glasgow Botanic Gardens. Mr. J. Stewartson has also found at Clougha a polydactylous form.


64. ramo-cristatum, *Barnes*. Raised in 1873, by Mr. Barnes. Length, 16 inches; width, 1½ inches. Branching, both in the stipes and rachis. Width across the lax head, 5 inches.

65. reflexum, *Jones*. Found at Coniston by Mr. J. Stewartson.


68. rugoso-interruptum, *Barnes*. Found at Coniston by Mr. G. Whitwell.

69. serrulatum, *Wollaston*. Found at Troutbeck, and another found in Garsdale by Mr. G. Whitwell.

70. simplex, *Moore*. Found in 1867, in Mardale, by Mr. J. M. Barnes. Mr. Barnes remarks, that it closely resembles *Polypodium vulgare*.


72. strictum, *Wollaston*. Found at Cautley by Mr. G. Whitwell.


75. truncatum, *Wollaston*. Found near Tunbridge Wells by Mr. G. B. Wollaston. Fronds and pinnae horned; apex like bitten off.


77. Whitwellii, *Lowe* (congestum Whitwell, *Barnes*). Found in Little Langdale by Mr. G. Whitwell. Another form of congestum

The names only of half these varieties are known to the author.
THE MALE FERN.

*Nephrodium Filix-mas.—Richard.

*(Lastrea Filix-mas.—Presl.)*

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**Fig. 39.**—Pinna (showing fructification of *Nephrodium Filix-mas*).

**UNDER Presl’s Lastrea Filix-mas** we have apparently three species. They are too distinct, both in their normal forms and in their varieties to enable us to consider them as mere sections, unless we look upon *N. propinquum* as the mountain form of *N. paleaceum*. As our object is, to produce a Handbook of all the distinct varieties, it has been thought best to follow Wollaston’s arrangement.

According to Mr. G. B. Wollaston (who pointed out these distinctions some years ago), we have the following characteristics:

<table>
<thead>
<tr>
<th>N. Filix-mas</th>
<th>N. paleaceum.*</th>
<th>N. propinquum.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fronds and pinna</td>
<td>convex . . . . .</td>
<td>plane . . . . .</td>
</tr>
<tr>
<td>Colour</td>
<td>shining pale green</td>
<td>shining deep green</td>
</tr>
<tr>
<td>Fronds</td>
<td>partially deciduous</td>
<td>evergreen or sub-evergreen</td>
</tr>
<tr>
<td>Indusium</td>
<td>not embracing spore cases; evanescent, disrupted</td>
<td>embracing spore cases; persistent, entire</td>
</tr>
<tr>
<td>Texture of frond</td>
<td>papery . . . . .</td>
<td>coriaceous . . . .</td>
</tr>
<tr>
<td>Pinnules</td>
<td>saw-toothed . . . .</td>
<td>scarcely toothed . . . .</td>
</tr>
</tbody>
</table>

The concave character of the frond is not uncommon on mountains, or when plants grow under difficulties, such as insufficiency of soil, unfavourable climate, etc. This may be seen on Ben Lawers, with the examples of half-starved *Polypodium vulgaris*, *P. dryopteris*, and *P. phegopteris*. Diminished size, wavy outline, crisp, and a more or less abnormal and starved-look are features familiar to all mountain Botanists. This is also to be seen with regard to ferns growing on rocks and walls in the Lowlands.

*Lastrea pseudo-mas, Wollaston.* There can be no doubt this is the *Aspidium paleaceum* of older writers, hence its adoption.
Near Chepstow, except when growing with great luxuriance, the Hart's-tongue is scarcely ever flat-fronded; it is mostly undulate (or wavy), and often crisp. The beautiful form of Harts-tongue, known as crispum, is more abundant in Monmouthshire than in the whole of the rest of the United Kingdom. Within the last few years, not more than half-a-dozen miles from Chepstow, more than fifty plants of "crispum" have been found; and of these twenty-nine were discovered by the late Colonel Jones, between Caerwent and Shirenewton; whilst on the opposite side of the Wye, near Tidenham, Major Cowburn has found nineteen, for which refer to section "crispum" in the descriptions of the varieties of Scolopendrium vulgare.

Mr. Wollaston proposed the name, *pseudo-mas*, for one of these species; but Féé, in "Iconogr. Nouv." uses the same name for *Filix-mas*, whilst Aspidium paleaceum Don "Prod. Fl. Nepal" has been adopted years ago for var. *paleacea*, Moore, "Nature-Printed Ferns." (This is the type of the normal form of the sub-evergreen fern under discussion, after the present species; and no more appropriate name could be suggested.)

**THE MALE FERN.**

*NEPHTRODIUM FILIX-MAS.—Richard.*

The normal form is large, but less elegant than *N. paleaceum*; texture of the frond thinner, colour paler and less shining; partially deciduous. The fronds become broken at the ground by autumnal winds, and lie prostrate, whilst those of *N. paleaceum* retain their erect position until the spring fronds are ready to unfold. It is a common fern in this country.

**Varieties.**

1. _acrocladon_, Lowe. Raised by the late Mr. A. Clapham, of Scarborough. A shield-fern-looking plant with deep green fronds, which are digitately crested, except towards the apex; the extreme tip is however crested. Pinnules deeply incised. Length of frond, 2 feet.

2. _acuto-furcatum_, Barnes. Found in 1873, on Borwick Moor, by Mr. J. Bolton. A neat crested variety with very acute fronds.

3. _argenteum_, Phillips. A white variegated variety, found in Ulster by Mr. W. H. Phillips.

4. _athyrioides_, Lowe. More like the "Lady" than the "Male Fern." Raised from _lineare_. A pretty variety, with fronds gradually becoming narrow and ending in a sharp-pointed tip. Pinnae attenuated at the tips, and occasionally depauperate at the base. Pinnules linear, deeply cut, and curving upwards, giving a very dentate appearance. 32 × 9 inches (at base, only 2½ inches).

5. _attenuato-multifidum_, Wollaston. Found in 1864, in Martdale, by Mr. J. M. Barnes, of Milnthorpe. A graceful variety, with narrow finely-cut pinnules.

6. _attenuatum_, Padley. Found in 1864, in North Devon, by the
late Rev. Charles Padley, of Enville. Pinnae lax; pinnules narrow and sessile, except the basal pair. Frond symmetrical, yet more or less depauperate, the apex of the front most so. 24 x 9 inches.


8. Berryae, Lowe (grandiceps, Berry). Found in 1870, in North Devon, by Mrs. Berry, and now in the possession of Mr. Gardener of Ilfracombe. A very fine grandiceps form, differing in being more thoroughly ramose, and in being often cornute. Length, 2 ft.


10. Clowesii, Moore. Found in 1859, at Troutbeck, by Mr. F. Clowes, of Windermere. A robust variety, with frond and pinnae digitate.


12. crispatum, Barnes (congesta, Wollaston; fluctuosa, Stansfield). Found in 1864, at Coniston, by the late Mr. J. K. Hodgson, of Ulverston. A superior variety, with a compact habit and dark-green fronds. Pinnules crisp. 15 x 6 inches. Canon Swayne, of Salisbury, gave Colonel Jones a remarkable dwarf crisp form, which he had found in 1874 in Carnarvon; and the Rev. S. A. Brenan also found another in Tyrone.


14. Cronkleyense, Lowe. Found in 1863, in abundance, on Cronkley Fell, near the Falcon Clints, by myself and my brother (the late Colonel Arthur S. H. Lowe, of Gosfield Hall). It has the general appearance of attenuatum, but the pinnules are twice as broad. Many of the pinnae are confluent at their extremities. A somewhat similar form was found by myself near Chaigeley Manor, Lancashire, named Marsidena, differing only in not being confluent.

15. decompositum, Allchin. Found in 1871, in South Devon, by Dr. Allchin. A handsome very foliose fern, with broad pinnules, which are toothed and overlapping. Basal pinnules very long. 24 X 11 inches.


17. dentatum, Lowe. Found near Nettlecombe Court, by the late Mr. Elworthy. A large-growing, coarsely dentate variety, with fronds 4 feet in length.

18. depauperatum, Padley. Found in 1868, on Exmoor, by the late Rev. C. Padley. A most distinct and interesting variety. Frond widest at the base. Pinnae crested. Pinnules depauperate; most so in the middle of the frond. More or less confluent on the upper third of the frond. 21 X 5 inches.
19. digitale, *Lowg* (digitatum *Barnes, Whitwell*). A digitate variety found at Burneside by Mr. J. M. Barnes.


25. excurrens, *Moore*. Found in 1862, in Silverdale, by Mr. J. Crossfield, and at Staveley by Mr. J. A. Martindale. The frond and also the pinnæ terminating with a horn.


29. gracile, *Jones*. Raised by the late Colonel A. M. Jones. A very lax, regular, and symmetrical fern. Pinnules broadest at the base of the frond, and also broadest at the base of the pinnæ; gradually becoming smaller to the pointed apex of the pinnæ. Length, 1 foot 8 inches, breadth, 7 inches.

30. grandiceps, *Sim*. Found in 1862, on Warton Crag, by a labouring man (Wearing). Stem dividing into twin branches, which again branch several times, producing a large spreading head. Pinnæ crested. (A seedling raised from *grandiceps* at Highfield House, *"acceptum," Lowg, is more vigorous and has a more sturdy upright growth.)

31. Hodgsonæ, *Lowg* (gracile, *Barnes*). Found in 1873 at Seathwaite. A different fern has been figured under the name *gracile* by Colonel Jones, necessitating the change of name of the Seathwaite variety. A beautiful form, with narrow, finely cut pinnules.

33. interruptum, Moore. Found near Bowness by Mr. Clowes, and at Morecambe Bay by the late Mr. Monkman. A good form was also found in 1874, at Windermere, by Mr. T. Airey. Very irregular; most of the pinnules much shortened, and some wanting.

34. Iveryanum, Moore (cristata Martindale, Wollaston). Mr. W. Martindale found in 1870, at Winster, a copy of this crested fern.

35. Jervisii, Moore. Found near Darlaston Hall, Staffordshire, by the late Mr. Swynfen Jervis. A large-growing, coarse, tasselled fern of no great beauty.


37. Kilmaryense, Lowe. Found at Kilmory, Argyleshire by Canon Ellacombe. It is not unlike Bollande, but more depauperate, and pinnules smaller. 33 x 8 inches.

38. lineare, Wollaston. History unknown. Very distinct. Pinnules linear, or wanting, or merely thorn-like. 21 x 6 inches.

39. multiforme, Barnes (inaequale-furcans, Jones). Found in 1871, in Lancashire (near Ulverston) by Mr. J. M. Barnes. A more curious than graceful fern, with very broad pinnæ; mostly polydactylovs, some without crestings and shorter, and some wanting. Pinnules varying, some depauperate; in fact, all manner of forms.


41. platyphyllum, Clapham. Found in 1871, in Perthshire, by a gardener (Peter McDonald). Another polydactylovs form, conspicuously crested. Pinnæ approximate, pinnules of one touching those of the next pinna. Basal pinnules on the lower half of the frond, smaller than the rest; and slightly crested below the tasselled apex of each pinna; pinnules almost wanting. 24 x 10 inches.

42. polydactylum, Lowe (polydactyla Barnesii, Barnes). Found in 1865 at Whitbarrow by Mr. J. M. Barnes. A very robust crested form. Length, exceeding 3 feet.

43. productum, Moore. Found in 1862, in Silverdale, by Mr. J. Crossfield. Somewhat like the ordinary incisum, with large pinnules.

44. ramosum, Barnes. Found in 1875, at Red Bank (English Lakes), by Mr. T. Airey. A fine variety, with ramose, crested fronds.

45. recurvum, Murray. Found in 1889 at Innerwell, Wigton. A striking form, with pinnules recurved nearly into tubes.

46. reticulatum, Birkenhead. Length 1 1/2 feet.


49. tortuosum, Moore (flexuosa, Wollaston). Found in 1864, in Dumfries, by Mr. Tod, of Edinburgh. Fronds and pinnæ (the latter more especially) flexuose. 20 x 3 inches.
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50. variegato-aureum, Lowe. Found in 1883 at Monkton Wylde, Dorset, by Mr. Moly. Normal in form, with a yellow variegation. 20 × 5¾ inches.

*51. variegatum, Lowe (Wrightae, Clapham; Lux Lunae, Wollaston). Found in Yorkshire by Miss Wright, and distributed by the late Mr. Clapham. Normal, except in being green and white. When not grown in a moist situation, the fronds soon fade in full sunlight. Length, 2 feet.

52. Willisi, Lowe (grandiceps, Wills). Found in 1870, in Dorset, by the late Mr. John Wills. The largest of all the grandiceps forms; regularly crested, and having a large branching capitate head (8 inches wide). 36 × 9 inches.

THE CHAFFY MALE FERN.

Nephrodium paleaceum.—Don.
(Nephrodium Filix-mas of most authors.)

A handsome, thick-fronded species, with shining fronds from 2 to 3 feet in length, the rachis being thickly clothed with bright brown scales. Fronds sub-evergreen, or evergreen in shady situations. Broadly lanceolate, gradually tapering to the apex. Fructification most abundant at the upper portion of the frond, but none near the base. A common English fern, though less so than Nephrodium Filix-mas. This is the species known as Lastrea pseudo-mas of Wollaston; but Nephrodium paleaceum of Don (the normal type) has a prior claim for adoption. Like N. Filix-mas, there are no difficulties in its cultivation.

Varieties.

1. abasipinnulum, Wollaston. Found in Westmoreland by Mrs. Robinson, of Bowness. Lax. Pinnules small, and absent at the base of the pinnae. 27 × 5 inches.


3. Beeverae, Lowe. Found near Coniston by Miss Beever. It differs from Pinderi in the pinnae overlapping, so as to cause the frond to be imbricate.


5. crispare, Lowe (crispa, Barnes). Found in 1865, in Mardale, by Mr. J. M. Barnes. A robust fern, with deeply-cut undulate pinnules. It is larger growing than the crispa of Moore.

6. crispatum, Wollaston. Found in Devon by Mr. G. B. Wollaston, and near Levens by Mr. J. M. Barnes. In Ireland, by Mr. W. H. Phillips and Rev. S. A. Brenan. Differs in being crispy-waved throughout the frond.

7. crispo-cristatum, Moore (congesto-cristata, Wollaston). Raised in 1886 by the late Dr. Lyell, of Newbury. A congested form.
Pinnae crested, except near the tip of the frond, the tip itself branching and crested. 11 x 5 inches. Fronds stiff.


Fig. 40.—Nephrodium paleaceum, var. crispulum (upper pinna, showing bunch-cresting).

9. crispulum, Lowe (cristatum-globosum, Druery). Found in 1879 in a wood about two miles from Bettws-y-coed by Mrs. Boyd, and has been growing in her garden until it came into my possession. It is an interesting variety, for it is almost a copy of N. cristatum, except that the cresting is in bunches instead of being flat. 36 x 8. A very similar variety was raised in 1865, at Highfield House, from cristatum.

10. crispum, Moore. Found in Wales, and given to The Hon. Mrs. Wrightson, of Warmsworth Hall, Doncaster. A dwarf, very stiff, erect-growing fern; crisp. 11 x 5 inches.

11. cristato-angustatum, Moore. A sport of cristatum, with much shorter pinnae. Very narrow strap-shaped fronds, well crested. 24 x 3 inches. An intermediate variety between this and cristatum "Winstanleyi" was raised at Highfield House in 1862.

12. cristatum, Moore. One of our most beautiful symmetrical varieties, having the tips of the pinnae and the apex of the frond tasselled with a flat crest. It was found at Charleston, near St. Austell; also at Upper Cultra Wood, in Co. Down, by Mr. R. Milligan. The basal half of the frond is very heavily crested. 36 x 8 inches.

13. Fittii, Lowe (ramo-cristata, Jones). Raised by Mr. Fitt. This distinct variety is very ramose, branching several times from the base upwards. It is a branching form of N. cristatum. A massive, attractive variety.

14. furcillatum, Wollaston (sub-cristata, Moore). Found in 1861, in North Devon, by Mr. John Dadds, of Ilfracombe. Fronds very wide. Pinnae narrow, and tassels less than in the var. polydactylum. 36 x 9 inches.

15. grandiceps, Jones. History obscure.

16. Lyellii, Lowe. Raised at Highfield House from crispo-lineare (one of Dr. Lyell’s sports), and is more marked than that variety. A narrow, well-crested form, with an erect habit, and fronds so remarkably stiff as to break if bent. Length, 6 inches.
*17. magnificum, Lowe. Found by myself at Dunkeld in 1867. A bold, foliose form. 36 x 8 inches.

*18. Mapplebeckii, Moore (polydactyla, Wollaston). Found in 1862, in Westmoreland, by Mr. J. E. Mapplebeck. Pinnæ contracted at the base. The branching apex much larger than in var. polydactylum. 31 x 9 inches.


*20. nitidum, Lowe. Found in 1867 by myself, at Dunkeld. Foliose, deep green, shining. 30 x 7 inches.

*21. pendens, Lowe (grandiceps Ranyard, Wollaston). Another very handsome, bold, symmetrical fern, having very long, narrow pinnæ, drooping in a very graceful manner. Pinnæ crested, and the apex of the frond branched and crested. Length, 3 feet. The name has been changed to pendens, as there is already a grandiceps.

22. Pinderi, Moore. Found in 1855, near Elterwater, by the Rev. G. Pinder. A distinct, handsome, narrow-fronded variety, tapering both to the base and apex, and terminating in a long, slender point. 36 x 6 inches. The late Mr. C. Monkman found a somewhat similar variety in 1862 at Coneysthorpe, near Malton.


*24. plumosissimum, Lowe (limbriata-cristata, Stansfield). Another grand symmetrical form, found by Mr. Cropper. It is in the style of cristatum, but cut up into narrow lobes with limbrite edges. A very plumose variety. Length, 2 feet.

25. polydactylum, Wollaston. Raised in 1872 by Mr. John Dadds, of Ilfracombe; found also in Co. Down, by Mr. W. H. Phillips. Conspicuously crested. Pinnæ an inch wide at the base. 36 x 8 inches. There are several sub-forms of this variety.

26. polymorphum, Barnes. Found in 1865, at Kentmere, by Mr. J. M. Barnes. A fine variety, with variable, tripinnate fronds.

27. pumilum, Moore. Found on Snowdon by the late Mr. D. Cameron. A much smaller fern than N. propinquum, var abbreviatum. Compact, bushy habit. Sori, a single pair on each pinnule. Length, 9 to 12 inches.

28. ramo-cristatum, Jones. Found in 1871, in Lancashire, by Mr. Wilson, of Bowness. This very fine variety is in the possession of Mrs. Hodgson, of Ulverston. Branching several times, and terminating in a wide, capitate head. Pinnæ crested in compact bundles. Length, 2 feet.


30. ramo-furcallatum, Wollaston. Found in 1864, in North Devon, by Mr. Dadds, of Ilfracombe. Branching and furcate. Length, 2 feet 2 inches.

*31. ramosissimum, Moore. Found in 1864, in North Wales, by the late Mr. Robert Wright. A very distinct, sterile variety.
Fronds dividing into two or three at the base of the stem, and each again dividing 2 or 3 inches higher, and becoming very ramose 3 or 4 inches below the apex, making the frond as broad as it is long. The tips of the pinnæ crested. Length, 1 foot 6 inches.

32. ramulosissinum, Wollaston. Raised from spores in 1865 by Mr. Sim, of Foots Cray. A very curious dwarf variety. More than half the length of the frond consists of its naked stem, above which it is a diminutive grandiceps. Length, 3½ inches.


*34. revolvens, Wollaston. Found at Troutbeck Bridge, Westmoreland, by Mr. F. Clowes. A remarkable, thin-textured variety. Owing to the pinnæ curling round the back of the frond, the width is only 2 inches. Length, 1 foot.


36. Sangii, Lowe (crispa-cristata-angustata, Sang). A distinct, dwarf, very narrow, crisp, and well-crested variety, with thick stem. Length, 6 inches.

37. Schofieldii, Moore (ramulosa, Wollaston). Found in 1855, at Derby, by Mr. J. Schofield, of Rochdale. The stem divides into two foliose fronds, and these again divide at the tips. Length, 2 to 3 inches. Var. ramulosissimum was raised from this variety.

38. Stableri, Moore. Raised by Mr. Stabler, of Levens. Not unlike Pinderi, but in every way larger.

39. Willsii, Lowe. Found in South Devon by the late Mr. Wills. A grand polydactylos fern.


ALLIED MALE FERN.

NEPHRODIUM PROPINQUUM.—Lowe.

(LASTREA PROPINQUA.—Wollaston.)

A perfectly deciduous species, with fronds and pinnæ concave; pinnules biserrate. Indusium embracing spore-cases, persistent, and entire. Fronds dull pale-green, and of a soft texture. This fern approaches nearer to N. paleaceum than to N. Filix-mas, and may eventually prove to be a mountain form of the former.

VARIETIES.

1. abbreviatum, Babington. Considered the normal form of the species. It has been found on Snowdon by the Rev. J. M. Chanter, in Teesdale by Mr. Backhouse, on Cronkley Fell by myself, Ingleborough by the Rev. G. Pinder, Coniston by Miss Beever, in Westmoreland by Mr. G. B. Wollaston, Glen Isla by Mr. J. Backhouse, on Ben Lawers by Mr. P. Neill Fraser and myself, at
Killarney by Mr. R. Barrington, and on the Clova Mountains by Mr. T. Westcombe. Dwarf, though larger than N. paleaceum var. pumilum. Pinnate, the lowest pinnules alone being separate, the remainder decurrent. Pinnules large. Length, 1 foot.

2. attenuato-cristatum, Barnes. Found at Clougha by Mr. J. Stewardson. A narrow, attenuate, crested variety.


4. confluens, Moore. Found in Swindale by Mr. J. M. Barnes. A neat variety, with confluent pinnules.

5. congestum, Barnes. Found in Patterdale by Mr. W. Foster. A dwarf, congested form.


7. crispum, Wollaston. Found in Wales. Pinnae overlap each other, and are deeply pinnatifid. Segments also overlapping, crispy, and crowded.

8. cristatum, Moore. A plant was found in Borrowdale many years ago by Mr. J. D. Harrison; a second in 1863, in Swindale, by Mr. J. M. Barnes, who considered it distinct; and a third in 1871, at Ambleside, by Mr. Coward. Graceful, and very neatly crested.

9. curvato-cristatum, Barnes (the Swindale variety found by Mr. Barnes). A dwarf, interesting, small-crested form, having curving-down pinnules.

10. dactyliferum, Moore. Found also in Swindale by Mr. J. M. Barnes. A fine polydactylous form, with long, finger-crested pinnules.

11. erosum, Moore. Found at Keswick by Miss Wright, and at Troutbeck by Mr. Clowes. This has the pinnules regularly reduced.

12. excurrens, Moore. Found on Langdale by Mr. J. M. Barnes. An interesting, excurrent fern, with very dark-green fronds.


14. furcans, Barnes. Found in Marwood by Mr. W. Foster. Fronds forked.


16. gracile, Moore (gracile-furcans, Jones). Found in 1886 or 1887 by Mr. Foster. Very graceful, the fronds being pendent and unusually wide. A more beautiful form had been previously found at Mardale by Mr. J. M. Barnes, having narrow, finely-cut pinnules.

17. grandiceps, Moore. Found at Mardale by Mr. J. M. Barnes. This has a very large, spreading head.

18. interruptum, Moore. Found at Windermere by Mr. F. Clowes. Both fronds and pinnules irregular.
20. lineatum, Lowe (lineatum-furcans, Barnes). Found in Patterdale by Mr. W. Foster.
22. multifidum, Barnes. Found in Mardale by Mr. T. Airey. A small-growing, multifid form.
23. multifforme, Moore. Found in Long Sleddale by Mr. J. M. Barnes. Fronds variable and very irregular.
25. productum, Foster. Found in 1887 or 1888 by Mr. Foster. When fully developed, this is a very fine, slender fern. The lower pinnules are long and much divided.
26. pulchellum, Stansfield. Found in Patterdale by Mr. W. Foster.
27. Smithiesii, Barnes (cispata-incisa, Jones). A distinct, interesting fern. Found by Mr. Smithies. Pinnules finely cut and crisped.

THE CRESTED BUCKLER FERN.

Nephrodium cristatum.—Michaux.
(Lastrea cristata.—Presl.)

![Fig. 41.—Nephrodium cristatum, pinna (showing fructification).](image)

A rare and local fern, growing only in boggy localities. It has been found near Ipswich, Lynn, Dersingham, Holt, Yarmouth, Norwich, Wymondham, Newcastle-under-Lyne, Oxton Bogs, Bulwell Marshes (not now), Wybunbury Bog, Knaresborough, and Malton. It is also a native of France, Germany, Italy, Switzerland, Russia, Belgium, Holland, Scandinavia, Siberia, Canada, and the United States.

Fronds from 1 to 3 feet, of which one-third is the stipes. Erect in growth. Narrow, linear-oblong, sub-bipinnate, tapering to the apex. Lower pinnæ distant. Sori large and conspicuous. Deci-
duous. The normal form is distinct in appearance from all other species.

VARIETIES.


*2. confluens, Lowe (cristatum-confluens, Clapham). Found by myself, on Oxton Bogs. Normal in size; pinnae confluent.

3. Floridanum, Birkenhead. A large-grower, from Florida.

4. spinulosum, Moore. Basal pinnae more remote and larger, and more nearly like some of the forms of "spinulosum." It is a much more common form, growing in damp boggy places, and sometimes in woods.

5. uliginosum, Moore. More linear-lanceolate, with oblong acute pinnules. Only found growing in boggy situations, mostly amongst plants of the normal form.

THE RIGID BUCKLER FERN.

Nephrodium rigidum.—Desvaux.

(Lastrea rigida.—Presl.)

Another mountain fern; with dull-green fronds of from 1 to 2 feet high; somewhat lanceolate, bipinnate, and scented. Not easily confounded with any other species. It has been found in Cornwall, also in Yorkshire (Wharnside, near Ingleburgh, and near Settle); in Westmoreland (Arnside, Farleton, and on Hutton Roof Crags); and in North Lancashire. It is a native of France, Germany, Switzerland, Sardinia, Italy, Sicily, Dalmatia, Hungary, Russia, Siberia, and Asia Minor.

A deciduous species, confined to limestone mountains at heights ranging from 1200 to 1500 feet.

VARIETIES.


3. cristatum, Barraud. Found recently. Small crests throughout the frond. Mr. Drucy possesses this plant.


5. polyclados, Moore. Found at Farleton Knott, by Mr. J. M. Barnes, and at Crosby Ravensworth, by Mr. Clarke. Fronds divide into two, either at the base or higher up.

6. ramosum, Lowe. Received from Mr. Clarke's gardener, at Floss House, Crosby Ravensworth, Westmoreland. It differs in two fronds rising from one stem. Another variety, polyclados, found at Arnside, only differs in having the frond sometimes dividing in the upper parts as well as at the base. This form was sent to me in 1863, and it is still in my fernery, and has retained its branching habit. More dwarf than the normal form.
SUB-SECTION LASTREA.

THE BROAD BUCKLER FERN.

Nephrodium spinulosum.—Desvaux.

Fig. 42.—Nephrodium spinulosum, pinna (showing fructification).

A word or two is requisite in order to point out why the ferns known as Lastrea dilatata and L. æmula are included in the present fern.

There can be no doubt that locality, especially height above the sea, changes the character of a plant. We may instance “the common Brake,” which attains 12 feet in height on Longridge Fell, and yet only 4 inches near the summit of Helvelyn. As a rule, ferns are diminutive on mountains. In a wood at Hackness, near Scarborough (I am speaking of twenty years ago), N. dilatatum (Section γ) was near the base of the hill 5 feet high, and was common to half-way up this hill, where N. æmulum (Section α) mingled with it; higher, æmulum was common and dilatatum absent. My brother and myself being surprised at this change, we determined to test it; and from many thousand plants of æmulum we removed 500 to Highfield House. In a couple of years, several changed to dilatatum; the next year an increased number, until at length æmulum was the exception to the rule. At the same time we had a score in pots, but none of these changed. The same has occurred with the mountain form alpinum, dwarf plants on removal having much increased in size. The Oak fern, only an inch high, and the Beech fern, not much larger, when gathered at the summit of Ben Lawers, assumed their natural size in three or four years. Polypodium vulgare, var. cambricum, and Scolopendrium vulgare, var. crispum, when planted in a wood, gradually reverted to the normal form of the species, whilst divisions of the same plants grown in pans did not change; and, again, divisions taken from those planted out and repotted did in the course of time resume their original character of cambricum.
and crispm. Further, when I came to reside at Shirenewton Hall, I brought a superb collection of Scolopendriums to this place, which were unfortunately planted in an unsuitable situation; and the result was that every one of them (even the most ramose or most rugose forms) became as normal as the common Harts-tongue. Several years later some were removed into a better situation, and in three years they had returned to their original varietal forms. Two years ago the remainder were treated in a similar manner, and are now assuming their original characters. This is strong presumptive evidence, that the following may really belong to one species.

Nephrodium spinulosum has been divided into three sections, viz.:

Section a. aemulum.

" b. alpinum.

" γ. dilatatum.

Section a. ÆMULUM. (Hay-scented Fern.)

The distinctive characters are dwarfness, crispy fronds, and scent like new-mown hay, the last character being said to be unlike any other species; but here, where the Brake is commonly cut as a substitute for straw, the scent, when freshly cut, is even more powerful than that of aemulum.

Varieties.

1. aemulum, Swartz (Lastræa aemula, Brackenridge; L. foenisecii, Watson; L. recurvum, Newman). A beautiful crispy fern, so strong as to be difficult to break, either in the leafy or stem portion. Found in Cornwall, Devon, Somerset, Gloucester (Boyle), Hereford, Shropshire, York, Lancaster, Cumberland, Northumberland, Glamorgan, Pembroke, Anglesea, Merioneth, Carnarvon, Forfar, Dumbarton, Argyle, Inverness, Arran, Mull, North Uist, Orkney, Guernsey, Antrim, Londonderry, Donegal, Mayo, Galway, Wicklow, Waterford, Clare, Cork, Derry, Louth, Armagh, Tyrone, Fermanagh, Cavan, Sligo, and Leitrim.

2. angustipinnulum, Moore. Found at Antrim by Mr. D. Moore, and in Co. Down by Mr. W. H. Phillips. In this the secondary pinnules are more confluent; and the lobes are irregularly shortened.


*4. cristatum, Jones. Found in North Devon by Mr. Gill. Well crested; rather dwarf.

5. interruptum, Clapham. Found at Hackness both by the late Mr. Clapham and myself, and subsequently in the same locality by my son. Fronds depauperate; pinnae and pinnules shortened and misshapen.

6. ramosum, Clapham. Found by the late Mr. Clapham. Twin fronds from the base.
Section β. ALPINUM.

(Distinguished by its dwarf and more slender fronds.)

1. alpinum, Moore. Found by Mr. Clowes, at Haweswater, and on Ben Lawers, by Mr. P. N. Fraser and myself. A small, delicate form.


3. angustipinnulum, Moore. Found in Lancashire, by Mr. R. Morris; and in Yorkshire, by Mr. W. Willison. A depauperate yet symmetrical form, with very narrow pinnules.

4. anomalum, Lowe. Found in Yorkshire, by the late Mr. Clapham. A dwarf depauperate variety.


9. dumetorum, Moore. Found in a number of places. Dwarf broad fronds, with a glandular surface. Length, 12 inches.


12. grandidens, Lowe (interrupto-grandidens, Clapham). Found in 1873, in Yorkshire, by the late Mr. Clapham. Dwarf; interrupted; half of the pinnules minute.

13. Howardii, Monkman (cruciata pinnula, Fox). Found in 1863, in Ray Wood, Castle Howard, by Mr. J. Greenwood, and soon after by Mr. Monkman and Mr. Stabler (six plants were found in this wood. A remarkable fern with cruciate pinnules.

14. hymenophylloides, Lowe. Found at Ilfracombe by Mr. Dadds. A very Filmy-fern-looking variety. 9 × 2 1/2 inches. Stiff and erect in growth.

15. irregularare, Moore. Found in 1862 at Witherslack, by Mr. J. M. Barnes; an irregular form.


*17. ornamentum, Lowe. Found in 1867, on Ben Lawers, by myself. A slender dwarf variety with twisted pinnules.


19. pumilum, Moore. Dwarf, not uncommon.

20. ramoso-cristatum, Barnes. Raised in 1874 by Mr. J. M. Barnes. Branching at the base and again in the middle (below the pinnae),
ending in large capitate, closely-crested heads. Length, 15 inches.


*23. spectabile-ramosum, Lowe,† found in 1867, on Ben Lawers, by myself. Like spectabile, with the apex forked.

Section γ. DILATATUM.

The large-growing form. Exceedingly common, and requiring but little care in its cultivation. Where there is an abundance of half-decayed leaves, it grows to a great size. Fronds spreading and ovate lanceolate in form, bipinnate and even tripinnate. Basal pinnae obliquely triangular; pinnules very dentate. Usually erect, with a long densely scaly stem. Length, from 1 to 6 feet.


4. crispatocristatum, Jones (cristata Oscroft, Wollaston). Found in 1873, near Bristol, by Mr. J. Oscroft. Pinnae minutely crested; rachis dividing and subdividing into a foliose, crisped, and crested head, 9 inches or more across. Length, 2 feet.

5. crispum, Wollaston. Said to be a good crisp form.

6. cristato-gracile, Jones (cristata Roberts, Wollaston). Found in 1870, in Carnarvon, by Mr. Roberts. Pinnae narrow; pinnules small; better crested than any other variety. Length, 19 inches.

7. cristatum, Moore. Found near Doncaster by Mr. S. Appleby, and a more marked form in Yorkshire, by Miss Wright. Pinnae twice forked.


9. folioso-cristatum. A vigorous, handsome, foliose form, found in the Azores. Fronds and pinnae heavily crested.

10. folioso-digitatum. Also found in the Azores. A fine variety. Fronds heavily polydactylously crested.

11. grandiceps, Barnes. Raised by Mr. J. M. Barnes. A grand variety, very heavily crested.

12. hybridum, Stansfield. Accidental seedling. Came up on the bole of another hybrid, i.e. remotum (a cross between Nephrodium spinulosum and N. Filix-mas).

Nos. 11, 17, 20 and 21 were all found on Ben Lawers, beneath one heap of stones.
13. interruptum, *Moore*. Found near Harrogate by the late Mr. Clapham, and also in the Hole of Hercum, by the late Mr. Monkman. Pinnules irregular, some wanting.


15. remotum, *Lowe* (Lastrea remota, *Moore*). Found in 1859, at Windermere, by Mr. F. Clowes (this and hybridum might equally be placed with N. Filix-mas, though the resemblance is nearer the present species; they are hybrids between the two). Fronds erect, oblong lanceolate, smooth; basal pinnae unlike N. spinulosum. Copiously soriferous; but after a score trials I have failed to raise one plant. Length, 3½ feet. It has also been found in Germany.


**Tribe 11. POLYPODIEÆ.**

**THE BEECH FERN.**

**POLYPODIUM PHEGOPTERIS.—Linnaeus.**

A beautiful fern, creeping along damp ground, either in woods or on shady banks, and is more abundant in mountainous districts. The entire length of the frond varies from 1 inch (under rocks near the summit of Ben Lawers, E. J. L.) to 20 inches in woods at Hackness, near Scarborough (and near Ambleside), one-half of which is stalk. Some few years ago there were carpets of this fern in woods near Scarborough, more than a dozen yards across, with not a single vacant spot. It inhabits fourteen counties in England, seven in Wales, seven in Ireland; the Isle of Man; and Shetland; and it is generally distributed through Scotland. Found throughout Europe, and extends from Italy to Iceland. Widely spread in North America, also Kamtschatka and the Altai Mountains. The frond is ovate-triangular; the basal pair of pinnae curved downwards, and the pinnae narrow from the base upwards. Colour, pale dull-green.

**Varieties.**


3. interruptum, *Barnes*. Length, 4 inches. Found at Witherslack by Mr. J. M. Barnes, of Milnthorpe, in 1863. This is a very narrow, irregular form; the pinnae being variable in size, their apices truncate, and the tip of the frond tail-like.


5. multifidum, *Moore*. Differing in having a portion of the lobes multifid and longer; and in the tips of the pinnae being crested. I
found it in great abundance in 1857, near Stockghyll Force, Ambleside, where it clothed a bank of a wet shady lane for six or eight yards. In 1865 a similar form was found by the late Mr. J. J. Jones and by Mr. J. E. Mapplebeck in the same district.

6. strictum, Barnes. Found at Witherslack by Mr. J. M. Barnes.

THE OAK FERN.

Polypodium Dryopteris.—Linnaeus.

A small, exquisitely beautiful species, inhabiting mountainous, rocky situations in shady woods; or beneath hedges where the atmosphere is damp but not the soil. It is sometimes called "The Smooth Three-branched Polypody," because the frond is three-branched. Usually varying in size from 4 to 12 inches, but occasionally very diminutive. I found it under cavernous stones near the summit of Ben Lawers, not much more than one inch long. Frond triangular, and of a brilliant refreshing green. Rhizoma creeping. This fern can only be confused with the Limestone Polypody; but the latter has its fronds as if dusted with lime. It is a common Scotch and Welsh fern, and occurs in fifteen English counties. In Ireland it is exceedingly rare. Widely spread in Europe and America. A rapid-growing fern with a creeping rhizome. It is met with in very large clumps. Easily cultivated.

There are no varieties.

THE LIMESTONE POLYPODY.

Polypodium Robertianum.—Hoffmann.

(P. calcareum, Smith; and P. Dryopteris var., Bolton.)

In appearance very like the Oak Fern, but more obliquely triangular. It varies from 8 to 18 inches in length. The stipes is much longer than the rachis, whilst in Dryopteris it is just the reverse. This species delights in sunshine; Dryopteris, in shade. The fronds being pubescent, they have the appearance of being dusted over with lime. Rhizoma, creeping. Found in Cumberland, Westmoreland, Yorkshire, Derbyshire, Gloucestershire, Wiltshire, Somerset, Caernarvon, Denbigh, and Glamorganshire. Near Buxton its rhizomes creep about heaps of stones; and plants can be obtained by removing the stones, when it is seen that the plants are luxuriating without the roots penetrating soil. It is found in France, Germany, Switzerland, Hungary, Norway, Canada, the United States, and on the Himalayan Mountains.

There are no varieties.
THE ALPINE POLYPODY.

Polypodium alpestre.—Hoppe.

A Lady-fern looking plant, but having circular (minute) sori, which are not covered with an indusium. It is only found on mountains of from 2,000 to 4,000 feet elevation. The fronds are somewhat lanceolate and bipinnate. Usually 20 inches in length, but sometimes double this size. The habit is erect, and the fronds are deciduous.

First recognised as British by Mr. Watson, in 1841. It has been found on the Clova mountains by Mr. Backhouse and Mr. G. Lawson; on the Deeside mountains, by Mr. T. Westcombe and Mr. Backhouse; on Ben Aulder, by Mr. Watson; Lochnagar, by Mr. Croall; and on Ben Lawers, by Mr. Fraser and myself. It appears to be abundant though local. It is exclusively a Scotch fern, as far as the United Kingdom is concerned; but it is found in Switzerland, Germany, Russia, Norway, Sweden, Lapland, and the Caucasus.

Varieties.

1. flexile, Newman. Found in Glen Prosen (Clova). Handsome and distinct. Length, 6 to 18 inches. Very narrow; the pinnae shorter, and the pinnules less in number. Sori only near the base of the frond.

2. laciniatum, Stansfield. Raised from spores by Mr. Stansfield. More dense than flexile, and the pinnae laciniate.

3. lanceum, Moore. Found on Clova by Mr. G. Lawson; and on Lochnagar by Mr. Croall.

4. tripinnatum, Moore. Found at the Wells of Dee by Mr. G. Lawson. Fronds large, tripinnate, and the pinnules very large.

THE COMMON POLYPODY.

Polypodium vulgare.—Linnaeus.

The common Polypody cannot be confused with any other British fern. The stout, firm fronds attached to the thick, creeping rhizoma in such a manner that they separate from it, like leaves
from a branch as they approach decay, is a unique character. The fronds vary from 2 to 22 inches in length; are linear, oblong in form; deeply pinnatifid; with large, conspicuous sori. Except in very hard winters, the fronds remain green till spring, when they are cast, and fresh ones appear. It grows on rocks, walls, tree-stumps, and banks, and is common throughout Great Britain and Ireland, from the level of the sea to a height of more than 3,000 feet. It is also abundant throughout Europe, Siberia, Kamtschatka, Canada, the United States, California, Mexico, and Guatemala.

The sections including Cambricum and semilacerum are not uncommon in Monmouth and Wales.

Readily cultivated if grown in leaf mould, sand, fibrous loam, and lumps of decaying wood, care being taken that the rhizomes shall be fastened on the surface of the soil. In the varieties of this fern the departure from the normal form is unusually great.

**Varieties.**

These have been grouped in several sections, Section δ containing all those that could not be classed in Sections a to γ.

Section a. plumosum.
   " β. cristatum.
   " γ. semilacerum.
   " δ. anomalum.

Section a. contains feathery varieties, such as Cambricum, Cornubiense, and pulcherrimum.

Section β, the tasselled, branched, or capitate forms.

Section γ, semilacerum and omnilacerum, *i.e.*, lacerate forms.

Section δ, anomalum (a term used to denote that these are not classed). This section contains those varieties not included in the first three classes.

**Section a. PLUMOSUM.**

1. **Barrowi, Lowe** (Cambricum Barrowi, *Barnes*). Found in 1874, at Witherslack, in the Lake district, by Mr. T. Barrow. It is a splendid form; with very dense, finely-cut, thin-textured fronds.

2. **Cambricum, Linnaeus** (plumosum, *Wollaston*). A well-known, plumose, sterile variety. Found many years ago in Wales. Mentioned as early as 1743. The late Mr. Joseph Sidebotham, of Manchester, found it in North Wales, at Mill Dingle, Beaumaris, and Conway Castle; also at Troutbeck, near Ambleside; and at Flenerim, in County Antrim (the Irish form not sterile). Found in South Devon, in 1867, by W. Easterbrook. It is also recorded from Monmouthshire, Glamorganshire, Cheshire (where it was found in a wood near Macclesfield), and from Almondsbury, near Bristol.

3. **Claphami, Lowe** (multifido-elegantissimum, *Clapham*). A cross between a crested form and "Cornubiense," raised by the late Mr. Clapham; in fact, a crested Cornubiense.
4. Cornubiense, Moore (elegantissimum, Stansfield). The original plant was found in 1867 in Cornwall, growing on an ash pollard, and was distributed by the Rev. J. B. Whyte. A wonderfully fine, divided form, somewhat resembling the Killarney Fern, yet also having some normal and some half-normal fronds. 14×4½ inches.

5. foliosissimum, Lowe (Cornubiense-foliosum, Clapham). Another of Mr. Clapham’s fine varieties. A very mossy form.

6. Fowleri, Lowe. Raised from Cornubiense by the late Mr. Fowler. Has no normal fronds.


11. pluma, Lowe. Found 30 years ago, on Tintern Abbey, by Mr. Cowburn. A handsome variety, with characters between Cambricum and pulcherrimum. Sparingly fertile. 20×5½ inches (stipes, 6 inches).


15. serra, Wollaston. Found in 1868, in Furness Fell, by Mr. J. A. Wilson. A sub-Cambricum, with erect basal pinnae.

16. trichomanoides, Backhouse. A sport in the York Nursery of Cornubiense. Finely divided; and with no normal fronds. 12×4½ inches.


Section 3. CRISTATUM.

1. acuto-bifidum, Wollaston. Found in 1858, at Stainton, by Mr. J. M. Barnes. Acute bifid points.

2. bifido-cristatum, Mapplebeck. Found in 1867, near Grange, by Mr. T. Waumsley. A fine bifid, crested form, with a branching crested head. 5½ inches wide. 17×2½ inches.


5. cristatum, *Moore*. Found in 1854 in County Cork, by Mr. H. S. Perry. A fine foliose, well-crested capitate form.


8. glomeratum, *Mcly*. Found in 1873, by Mr. Job Mullins, in Dorset. Half stem, the leafy part broader than long, tips crested. 8 × 6 inches.


11. lomarioides, *Lowe*. Found in Ireland by Mr. Stewartson. Very narrow. 8 × 0¾ inches.


14. Parkeri, *Lowe* (multifido-cristatum, *Moore*; grandiceps Parker, *Wollaston*). Found in 1854, in Somerset, by Mr. H. Parker. A fine grandiceps with a large capitate head. 12 × 3 inches. [I raised a form of this in 1880 which Colonel Jones called capitatum Lowei. The tips cristulate and crisp. 8 × 4 inches]

15. ramosum, *Moore*. Found in 1860, in Hampshire, by Mr. C. Hillman. Branching at the base and also above. 12 × 3 inches (11 inches across the branches). [I raised a somewhat similar form some years ago, known as gleichenioides.]

Section γ. SEMILACERUM.


2. brachiato-semilacerum, *Jones*. Found in 1862, in Worcestershire, by Mr. J. E. Mapplebeck. Branching where the basal segments should be. 17 × 5½ inches; and 11 inches across the arms.

3. brachiatum, *Wollaston*. Found in 1856, in Guernsey, by Mr. C. Jackson. 17 × 5 inches; and 8½ inches across the arms.


5. grande, *Lowe* (semilacerum grande, *Jones*). Found in 1862 in Wicklow. Near the rachis the pinnae are confluent and depauperate. This magnificent plant is in the possession of Mr. Barnard Hankey. 16 × 13 inches.


12. semilacerum, *Link*. Not uncommon in Monmouthshire. Originally found in 1850 by the late Mrs. Delves, in County Wexford. 15 x 7 inches. [Mr. W. H. Phillips has found it in County Antrim. 18 x 9 inches.]


Section 8. ANOMALUM. (Unclassified varieties.)


2. acutum, *Moore*. A characteristic form was found by the late Mr. Sidebotham in Patterdale. The lobes have no irregularities on the margins. Length, 6 inches.


8. densilobum, *Fitt*. Narrow dentate segments. 8 x 3½ inches.

9. dentatum, *Moore*. Found in 1865, in Westmoreland, by Mr. Barnes. 13 x 7 inches. Frond broad; lobes narrow and crowded; margin dentate. Not uncommon. [A good form, found in Co. Clare by Mr. O'Kelly, has fronds 16 x 5½ inches.]
10. depauperatum, Wollaston. Found in South Devon by Miss Kitson. A depauperate form, found on their garden wall at Shiphay. Cornute. 9 × 4 inches.


14. lineare, Lowe (marked “Irish Polypody” in Colonel Jones’s collection). Very distinct, long linear lobes. 10 × 0.4 inches.

15. Llanvairense, Lowe. Found at Llanvair, near Shirenewton, by myself, in 1887. Segments narrow; apex of frond branching, and ending in 3, or 4, cornute tips. 10 × 3 inches.


17. marginatum, Moore. Found in 1854, at Windermere, by Mr. F. Clowes. An interesting form, although it appears as if bitten. Mr. W. H. Phillips has also found a good form. 16 × 3 inches.

18. minimum, Hodgson. Found in 1866 at Millom by Mrs. J. K. Hodgson. Fronds small and of many shapes.


21. rotundatum, Phillips. Found in Ireland by Mr. W. H. Phillips, and also by Mr. O’Kelly. Reduced to rounded lobes in basal portion.

22. serra, Wollaston. Found in 1865, in Lancashire, by Mr. J. Wilson. Very distinct; biserrate, and the lobes overlapping. 13 × 2.4 inches.

23. serratum, Moore. Found in several places. Cut like a saw.


25. suprasoriferum, Wollaston. Found in 1865, on Cartmel Fell, by Mr. J. M. Barnes. Sori on the upper surface.

26. truncatum, Wollaston. Found in 1870, in S. Devon, by Miss Kitson. Truncate. 13 × 5 inches. [Mr. P. B. O’Kelly has found a curious form in Co. Clare. 6 × 2.5 inches.]


Tribe 12. GRAMMITIDÆ.

THE SLENDER-LEAVED GYMNOGRAM.

GYMNOGRAMME LEPTOPHYLLA.

—Desvaux.

The only British species of the very handsome hot-house Gold and Silver Ferns. Diminutive. Length, 3 to 8 inches. Fronds fragile and few in number. Only found in Jersey, where it is abundant in several places. It is an annual; but if under suitable circumstances it will sow itself. Found on moist banks with a sunny aspect. A native of France, Switzerland, Germany, Spain, Portugal, Italy, Sicily, Sardinia, Dalmatia, Crete, and Greece; India, Algiers, Morocco, Egypt, Abyssinia, and in the Atlantic Isles; Mexico and Australasia.

There are no varieties.

SUB-ORDER III. OSMUNDACEÆ.

THE ROYAL FERN.

OSMUNDA REGALIS.—Linnaeus.

The Royal, or, as it is often called, the Flowering Fern, is a most interesting and majestic species, and grows in situations where it can supply itself with water; flourishing on the margins of lakes and rivers, and in swampy fields. It varies considerably in size (from 1 foot to as much as 12 feet). It is abundant at Shapwick, in Somerset, but very dwarf. In 1860 I noticed a number of plants in the crevices of low rocks at Santander, in N. Spain, by the side of the sea, where they must be frequently splashed by the waves. They were all small, none more than 6 inches in length. In the early part of the present century, before the land was effectually drained it was not uncommon at Bulwell.
in Nottinghamshire. In 1855 only three plants could be found, and they were gradually perishing for want of water. One of these was removed into my fernery at Highfield House, and it is still alive; the other two perished in 1857. It is, or was, found in twenty-six English, five Welsh, ten Scotch, and nine Irish counties, Anglesea, Isle of Wight, Arran, Bute, Mull, Islay, Uist, Harris, Lewis, Shetland, and Jersey. It is also widely spread on the Continent; in India, Algeria, Natal, Madagascar, Newfoundland, Canada, United States, Mexico, Brazil, and the Azores.

Froonds somewhat erect and trunk-like, the stipes being half the length of the frond; yellowish-green in colour, and broadly lanceolate in form; the pinnules sometimes being 2\frac{1}{2} inches long. The fronds are part sterile, and part have a terminal fertile panicle, giving the appearance of a flower. It cannot be mistaken for any other fern.

**Varieties.**

1. **bulbifera, Lowe.** The exact counterpart of cristata, but bearing bulbils at the base of the pinnæ. Raised from spores by Mr. Clift, of Birmingham.

2. **capitata, Lowe.** Dwarf. 16 inches in length, three-fourths of which is the stipes. Crown, spreading and almost creeping, making a wide plant with numerous fronds, which give a ball-like character. It is a conglomerate variety, and was raised from a bulbil of bulbifera by myself. The plant is still in my possession.

3. **cristata, Moore.** Extremely handsome. Length, 3 feet. The apices of all the pinnules are dilated and crested. It was introduced by Messrs. Osborn & Son, of Fulham. I had a plant in 1866 that was 14 feet in circumference.

4. **interrupta, Moore.** This has a few normal pinnæ, the remainder reduced in size, and of a rounder form.

5. **Phillipsii, Lowe.** Another interrupted form, found by Mr. W. H. Phillips, of Belfast, in Co. Fermanah. It is more distinct than v. interrupta. 36 × 15 inches.

6. **purpurascens, Moore.** Remarkable for its colour; but is distinct also in habit, not being unlike Osmunda spectabilis, a North American species.

7. **ramo-cristata, Jones.** Raised from spores. Almost a copy of cristata; but the stalk splits into two in the upper portion of the frond.

8. **undulata, Brown.** From the Azores.

**SUB-ORDER VI. OPHIOGLOSSACEÆ.**

**MOONWORT.**

**Botrychium Lunaria.—Swartz.**

A common, but local, inconspicuous species; growing in dry mountain pastures; having a single, pinnate, stout, fleshy frond;
varying from 2 to 10 inches, out of which rises the fertile spike, which somewhat resembles a bunch of young grapes. Usually only one frond.

Found in most parts of Europe as far as the Arctic Circle, and within it. Also on the Himalaya and Rocky Mountains.

A botanical curiosity, difficult to cultivate.

Mr. Moore has described three varieties: 1. Rutaceum, found near Dundee; 2. tripartitum, in County Dublin; and 3. incisum, found at Halifax by Mr. Bolton; Crosby Ravensworth by Mr. Clarke; and near Dublin by Dr. Allchin. The latter has the pinnae deeply incised.

THE ADDER’S TONGUE.

Ophioglossum vulgatum.—Linnaeus.

Another diminutive, inconspicuous fern, growing in moist, loamy pastures and woods; widely spread throughout Great Britain; and throughout Europe. Also found in America, Mexico, New Zealand, New Holland, Cape of Good Hope, East Indies, Kamtschatka, and Siberia. Fronds, 3 to 12 inches in length; thin and fleshy. Frond entire and yellowish-green; the fertile spike rising from the base of the sterile frond. Creeping rhizoma, sending up solitary fronds; as it forms rhizomas, like the common Brakes.

Varieties.

1. lusitanicum, Linnaeus. Much more diminutive. Found in Guernsey, in 1854, by Mr. G. Wolsey. [This may be a distinct species; as it has been found in about twenty other countries.]

2. microstichum, Moore. A very dwarf variety, with narrow fronds. Found at Swanbister, in Orkney, by Mr. J. T. Syme.

CONCLUDING REMARKS.

It only now remains to say a few words about how the varieties just described have been obtained. A certain portion are natural wild finds, whilst the remainder have been raised from spores. Every now and then a remarkably distinct variety has been found wild, but the occasions are few and far between; whilst, guided by judicious selection, the amount of forms that can be raised from spores is practically inexhaustible. Wild finds are important, as new blood is infused into these crosses.

Whilst residing at Highfield House, near Nottingham, I began (in 1842) to cultivate British ferns. The only species then growing on that estate were a few examples of Asplenium adiantum-nigrum, on a new-red sandstone rock near the lake; one single example of the Asplenium Ceterach in a sunk-fence wall (erected in 1829); and some half-dozen plants of Aspidium aculeatum half a mile from the house; the neighbourhood being singularly deficient of ferns. How-
ever, after their cultivation for several years, the following could be found growing wild in suitable places: Scolopendrium vulgare, Asplenium Filix-femina, Asplenium trichomanes, Nephrodium Filix-mas, Nephrodium paleaceum, Nephrodium spinulosum, and Aspidium angulare—not normal, but varietal forms, that owed their origin to the plants that had been introduced.

In 1867 I wrote "Our Native Ferns," and before that time began to raise varieties from spores.* In order to economize space, spores from the varieties of any one species were sown together; and from the plants so obtained it seemed certain that crosses had taken place whilst in the seed-pans. This circumstance caused a series of experiments, with a certain object in view, to be commenced. From these experiments it became evident that spores gathered from a peculiar part of a frond would produce more striking results than from those gathered haphazard. In 1866 the late Mr. Clapham had found Asplenium Filix-femina, var. proteum, and in 1870 he sent me a plant. Spores of this were mixed with those of the variety Victoria, and produced a series of forms having proteum as the one extreme and Victoria as the other; every seedling showing in a greater or less degree the peculiarities of the parents. This series was seen in 1879 by Mr. Clapham, who before did not believe that ferns could be crossed, but who now became convinced; and on the strength of this conviction he mixed spores of Polypodium vulgare, var. Cornubiense, with the var. bifidoscrisstatum, and raised a crested Cornubiense.

My next attempt was to cross species; and spores of Aspidium aculeatum were sown with those of Aspidium angulare. The object was, to obtain a narrow cruciate variety of Aspidium aculeatum, similar to the variety Wakeleyanum of Aspidium angulare, as this was as yet a desideratum. Spores of Wakeleyanum were sown with those of Aspidium aculeatum, var. densum; and out of a thousand seedlings there were five plants unmistakably Aspidium aculeatum, and having cruciate fronds like Wakeleyanum. In 1881 a short paper, with fronds of this cross, was sent to the Linnean Society; yet even this did not remove the doubt of Botanists; but a year later Sir Joseph Hooker informed me that the crossing of ferns was an acknowledged fact; and this change of opinion appears to have arisen from seeing a foreign hybrid Adiantum. It is true, however, that in 1868 the late Rev. M. J. Berkeley submitted a hybrid between Asplenium ebeneum and Scolopendrium rhizophyllum to the late Sir W. J. Hooker, who replied, it was* the most probable instance he had yet met with of a real hybrid amongst ferns. In 1888 the late Colonel Jones and myself set forth, in a joint paper "On Abnormal Ferns"† at the British Association meeting at Bath, our experience; Colonel Jones taking Aspidium,

* At the British Association at Dundee, in 1867, I read a paper on "Hybrid Ferns;" but Botanists (except the late Professor Hutton Balfour) would not admit they were satisfied that ferns could be hybrids.
and myself the Hart’s-tongue and Lady Fern. In the Lady Fern twelve marked varieties, and in the Hart’s-tongue eight varieties, were sown together; and the result was, that seedlings were raised having the peculiar characters of three or four varieties blended in the same frond. There are several hybrids now known besides the above: one with Asplenium trichomanes, another with Asplenium marinum, a third with Asplenium lanceolatum, the fern known as Nephrodium remotum, Pteris pendula, etc., and may I add Asplenium Germanicum. Although these are apparently fertile, plants have not been raised from their spores after frequent trials.*

Mr. James Britten, in his “European Ferns,” mentions as foreign hybrids:—

Asplenium adulterinum, Milde (A. trichomanes + A. viride).

" dolosum, Milde (A. trichomanes + A. adiantum-nigrum).

" ebenoides (A. ebeneum + Camtosorus rhizophyllus).

Scolopendrium hybridum (S. vulgare + A. Ceterach).

Adiantum Farleyense (A. capillus-Veneris + A. scutum?).

Nephrodium remotum (N. Filix-mas + N. spinulosum).

Space will not allow me to describe the reproductive organs;† it may however be mentioned that Professor Arthur Henfrey published in 1851 a paper in which he stated that ten years previously Professor Nageli, of Zurich, had discovered the male organs, and in the year 1844 Count Leszaye-Suminski, of Berlin, had discovered both the male (Antheridia) and the female (Archegonia) organs, on the underside of the prothallus, ‡ during the prothalloid life of the fern; and on the male organs finding the female cell coition took place. Some experiments that I am now making, bearing on this subject, will, I believe, open up a new field of inquiry. In Mr. Druery’s “Choice British Ferns,” the reproductive organs are explained, as well as Mr. Druery’s newly-discovered phenomenon of Apospory in Ferns.

It is an established fact, that the bulbils found on some varieties of ferns, do not always produce the same variety. Bulbils from the Scolopendriums “Wardii” and “Kelwayi” have yielded new varieties; those from Aspidium angulare, Section plumoso-divisolobum, variety “densum,” have originated the beautiful forms “Baldwini” and “imbricatum,” and a bulbil from Osmunda regalis,

* Several plants have recently been raised from my hybrid Aspidium aculeatum, and also from Nephrodium remotum, but the number is insignificant.
† Usually the archegonia are situated in the kidney-shaped prothalli, just behind the indented portion, and the antheridia amongst the rootlets. The archegonia are bottle-shaped, with a rather long neck, and contain a minute central cell (oosphere). The antheridia are spiral ciliated bodies, endowed with movement and called spermatozoids. These pass down the neck of the archegonia and fertilize the oosphere.—Britten’s “European Ferns.”
‡ The prothallium was first noticed by Dr. Lindsay.—“Linn. Trans.” 1792.
variety "cristata," a grandiceps form. Even by aposporo (i.e., prothalli formed directly on the frond, without the intermediate spore,) varieties are produced; and in the case of those from "Clarissima" (of the Lady fern) we may instance a subplumose form, a flexuose-pinnuled one, and another that is furcate and flexuose.

There is a peculiar connecting link between one species and another, for there is a mimical power that gives crested, branched, cruciate, and in short increased or diminished development in fronds, pinnæ, and pinnules, so that these characters are found almost identical in many species. Again, a well-developed variety may (as example) have a crested peculiarity in which the pinnæ copy the whole frond, and even the pinnules imitate the pinnæ. Variegation can also be obtained by crossing. The late Colonel Jones exhibited a striking example in Aspidium angulare: having added the polydactylous character to a multilobe, he then succeeded in making it variegated by a second cross; whilst in Scolopendrium vulgare I have obtained a dozen variegated forms.

The usual method of raising varieties is the one pointed out by me in 1867; but more recent experiments have shown that we can go beyond this. In 1888 experiments were made, based on the notion that it required a swarm of antheridia to make the archegonia fertile. I had formed this opinion partly by what I had learned from Dr. Hudson on microscopic animal life, and partly on what I had done in crossing Dahlias. In the latter case, if I filled half a dozen small brushes with the pollen of a white Dahlia, and one with that from a coloured flower, and mixed these together (in the proportion of 6 to 1) and then impregnated a white flower, there was 87 per cent. of white seedlings, whilst if the process were reversed, i.e., six times as much pollen from coloured flowers, white was almost absent in the seedlings.* To get a certain desired colour, moist paints were mixed together in various proportions of white and colour; and this was imitated with so many brushes full of white pollen to one of the colour selected. This could not, however, be done with ferns; but certain proportions in bulk of spores from a crested Nephrodium paleaceum and of an uncrested variegated Nephrodium Filix-mas were sown together, and the plants (500 in number) though yet too small to exhibit variegation, are large enough to be crested, and every one of the plants is crested. If, therefore, it be desired to produce heavily-crested ferns, and at the same time to increase the size of the variety without reducing the crests; to make any alteration in form that shall not be at the expense of these crests, it is recommended that a much larger proportion of the spores of the crested than of the other form shall be sown together.

* As an experiment, in 1889 pollen was used from different genera and species; the seedlings have bloomed, and are like the seed-bearer. The pollen was apparently able to give life to the seed, but not to show any of the characters of the male,
HINTS TO FERN CULTIVATORS.

Ferneries. Mounds, unless with a considerable thickness of soil, are not suitable for ferns, as during droughts they become too dry; a sunken rockery (assuming the water can drain off) is far better. A north border (under a wall), some 5 or 6 feet wide (prepared with suitable soil), is one in which all large-growing ferns delight. On the other hand, an open windy position is the very worst that could be selected. Within a series of walls (like a ruined castle) is an admirable situation. Ferns planted near tree-roots often require the renewal of soil as it becomes exhausted.

Compost. This should be coarse, except the surface (in pot-culture), and the leaves used should only be half-decayed; roots grow much quicker and stronger when the soil is not too fine and close. Rock-ferns require the addition of stone, and do well (if in pots), plunged in a mixture of stone and compost in narrow boxes fixed against a north wall, a few feet from the ground.

Drainage. Perfect drainage is essential in pot cultivation, as ferns do not like water to stagnate about their roots. Cockle-shells, and above this a thin layer of spent hops, may be used with advantage, the roots receiving nourishment as well as drainage.

Manure. Very weak manure water given occasionally; and old cow manure mixed in the compost is beneficial.

Watering and Syringing. Ferns require attention in watering, especially if young and delicate. Hunt's aphicide (a cheap spray distributor, made on a larger scale than the one in ordinary use), is an excellent instrument, holding a quart of liquid. A spray of water can be rapidly blown on the fronds. A solution of fir-tree oil blown through this "aphicide" on to the fronds kills insect pests, therefore another should be kept specially for this purpose. An excess of water is as injurious as a deficiency, and not constant small supplies, but a copious watering at proper intervals.

Shading. This is an important matter, especially with delicate plants. Ferns do not like full sunshine, and overhanging trees give too dense a shade. Exposed situations and green-houses require shading. For years I have used the "Willesden Scrim"; it gives a subdued light without being too dense. I can recommend it as by far the best shading.

Gathering Fronds. Gathering fronds, and their breakage by wind or other causes, is a source of weakness to ferns. In drying fronds it is requisite to change the blotting paper frequently. "Bentham's Paper" is very good for the purpose; and a new blotting paper named Robosul seems, from a brief trial, to be equally good. The felt-like material used under carpets is a useful absorbent of moisture, if placed between newspapers containing fronds.

Slugs, Beetles, etc. Where houses are infested by beetles, Birkenhead's "beetle-trap" is effective. For eradicating slugs and woodlice, small heaps of a mixture of bran and vinegar will attract them; and by visiting these heaps at night-time they may be cap-
tured whilst feeding. A flower-pan with a canal surrounding it, made at the Royal Potteries, Weston-super-Mare, is a simple and useful contrivance; and "Toope's Plant Stand," i.e. a metal support surrounded by water, acts in a similar manner. Mr. P. Neill Fraser adopted this on a large scale for specimen plants twenty years ago.

**Fern Hunting.** When exploring the country for ferns, always have several tin boxes of about $20 \times 14$ inches, and about 3 inches deep; these will strap together so as not to be cumbersome. Carefully tie the fronds together, and place at once in the boxes, where they will remain for several days without injury; and the plants, when taken home, will not be unsightly for the rest of the summer. A record of each wild find should also be kept for future reference, giving date and locality.

**Filmy Ferns.** These require their fronds to be kept damp, without an over-abundance of water at the roots. A sunken pit (4 to 5 feet deep), covered with glass and shaded with Scrim, is the most successful plan. In such a pit an extra cover in frosty weather is all that is required for the Killarney Fern and Todea superba. Fire heat is injurious.

**Raising from Spores.** Freshly gathered spores germinate more quickly than those from dried fronds. The time of their appearance (as green specks) is variable; some will have put on their first frondlets in three months, whilst others may be more than a year before showing any sign of life. Conferve and mosses are apt to spring up and destroy the tiny ferns whilst in their prothalloid growth. To prevent this, it is advisable to use a clean earthenware (glazed) pan, the soil having been previously plunged in boiling water to destroy the animal and vegetable life contained in it. Protect with a glass cover, to prevent outside confervoid spores (of which the air is full) from being deposited on the soil, and use distilled water, or that which has been boiled, as ordinary water also teems with vegetable life. These pans, having no hole, do not require watering after the spores have been sown until the young ferns appear, i.e., if placed in a moderately damp situation and shaded. Worms also (that are destructive to infant ferns) do not get into the pans. Pricking out into small patches and ultimately dividing into single plants, is a delicate process, requiring great care and experience. In the earlier stages it is better to keep the soil damp by standing the small flower-pots in saucers of water, slightly wetting the frondlets with the spray distributor.

Attention to the above remarks may prevent disappointment.

Since "Our Native Ferns" was published, in 1867, with the exception of the late Colonel Jones's privately printed "Varieties of the British Species," there has been no large work issued to illustrate the great number of marvellously beautiful ferns that have been discovered or raised since that time. A new work is therefore much wanted; and the author of the present Handbook has been for some time collecting materials to supply this want, and would be glad to receive fronds of any new varieties.
ADDITIONAL VARIETIES.

PTERIS AQUILINA.
17. tortuosum, Low. A large-growing variety in Mrs. Grant’s fernery, with pinnules twisting in an extraordinary manner. Length, 4 feet.

ADIANTUM CAPILLUS-VENERIS.

ASPLENIUM ADIANTUM-NIGRUM.
16. plumum, Low. A grand feather-like hybrid (with asplenium marinum), with deep green fronds. In Mrs. Grant’s collection. 13½ x 4½ inches (of which 5½ inches is the stipules).

ASPLENIUM FILIX-FEMINA.
A. 1. B. GRANDICEPS.
30. dentatum, Low. Raised by Mr. E. F. Fox. Profoundly dentate; pinnæ narrow and lax, and a much-branched capitate head 6 inches wide. 22 x 4 inches.
31. superadornatum, Low. Raised by Mrs. Grant. Not unlike coronare, but with a larger and more dense head (5 inches wide). 23 x 3 inches.

A. 1. γ. CRISTATUM.
45. cymba, Low. Raised by Mrs. Grant. A boat-like form as in cymbaforme, but the pinnæ are densely crested. 20 x 3 inches.

A. 1. δ. CRUCIATUM.
60. grandissimum, Low. Raised by Mrs. Grant. A narrow, lax, cruciate form of enormous length. Cruciate except a normal apex. Widest in centre of frond where 63 x 4 inches (at base only 1 inch wide).

A. 2. a. PUMULUM.
22. cengere, Low. Raised by Mr. E. F. Fox. Basal half lax, upper half congested. Sub-tripinnate. 27 x 4 inches.
23. prodigiosum, Low. Raised by Mrs. Grant. A narrow, confluent, feathery fern, with half the pinnæ all but wanting. 15 x 2 inches.
24. silvescere, Low (Fosteri, Jones). Found by Mr. Foster. A dense forest of dwarf fronds forming a ball-like plant. 8 x 2½ inches.

A. 2. β. CRISPATUM.
8. pavoninum, Low. Raised by myself in 1888. A feathery capitulate variety, with the pinnules roundly crested like the eye in the peacock’s feather. 9 x 2½ inches.

B. 1. a. PLUMOSUM.
22. Molyi, Low. Found by Mr. Moly. A finely cut plumose form, widest in the middle of the frond, where 32 x 12 inches.
23. plumæ, Low. Found by Mr. Moly. A narrow, lax, finely-cut plumosum, widest in the middle, where 27 x 7 inches.

B. 1. δ. MACROPINNULUM.
9. tæda, Low. An unusually bold, polydactylous form raised by myself in 1888. Pinnules of great size, capitate. 23 x 9 inches.

B. 2. a. LAXUM.
8. illustration, Low. A distinct form, raised by myself. Pinnæ and pinnules very lax; pinnules narrow and deeply cut; pinnæ crested, and frond ramosely crested. 24 x 7 inches.
9. sponsa, Low. A large, distinct, very lax, feathery form, raised by Mrs. Grant. Some pinnæ 2 inches apart, and very narrow (5 x 0¼ inches); pinnules cut to base, and lobes bidentate. 40 x 9 in centre of frond (only 3 inches at base).
1. variegatum, Moly. Found by Mr. Moly, in 1878, at Colyton, Devon. Normal, but variegated.

The two following I do not know:—
* flabellifolium-tenuis, Mapplebeck.
* Jonesii, Mapplebeck.

**SCOLOPENDRIUM VULGARE.**

**A. i. B. CRISTATUM.**

32. Jubatum, Lowe. Raised by myself. The crests falling over like a horse’s mane. 16 x 2 inches. (Head 8 inches wide.)

**A. i. 6. SAGITTATUM.**

32. aureum, Lowe. A variegated sagittatum, raised by Mrs. Grant. 11 x 2 inches.

**B. 1. a. CRISPUM.**

58. caulitorquere, Lowe. Found by the late Mr. Wills. Rachis bending. 12 x 2\(\frac{3}{4}\) inches.

**B. 5. a. VARIEGATUM.**

30. candicans, Lowe. Found at Hawkchurch, by Mr. Moly. Only marginally crisped. Pale golden variegation. 16 x 2\(\frac{1}{2}\) inches.

**ASPIDIUM ACULEATUM.**

30. conopeum, Lowe. A normal, lobate form, with a flat head 10 inches wide. Raised by the late Colonel Jones.
31. cruciferum, Lowe. Offspring of hybridum, raised by the late Mr. Barnes. Pinnules cruciate and narrow. 32 x 6 inches (in centre where widest).
32. distinctum, Lowe. Offspring of hybridum, raised by myself. Long, broad, cruciate, pinnules. Frond lax and broad at base, but much contracted in upper half. 27 x 8 inches at base (and only 1\(\frac{1}{4}\) inches in upper half).
33. filia, Lowe. Offspring of hybridum, raised by the late Mr. Barnes. Fronds foliose, concave, dark green, and very thorny. Pinnæ confluent at the tips, cruciate; pinnules large and cruciate. 28 x 4 inches.

**ASPIDIUM ANGULARE.**

**A. i. B. GRANDICEPS.**

21. coronale, Lowe. Raised by Mr. E. F. Fox. Distinct, erect, with very dentate subrundum pinnules, and a much-branched, spirally-twisted, compact head. 20 x 4 inches in middle (only 1 inch at base).
23. surculosum, Lowe. A narrow, erect, capitate form, in Mrs. Grant’s fernery, having conspicuous lobes. 30 x 6 inches in middle (only three inches at base).

**A. i. 5. POLYDACTYLM.**

14. excellens, Lowe. Raised by the late Colonel Jones. A narrow, polydactylous variety, compactly well branched. Pinnules simply lobed. 26 x 6 inches in middle (only 3 inches at base).
15. Foxii, Lowe (remoto-decurrens polydactylum, Stansfield). A polydactylous form, raised by Mr. E. F. Fox.
16. notable, Lowe. Raised by the late Colonel Jones. A narrow, lax, crested form. Pinnules more divided than in excellens. 27 x 6 inches in middle (4\(\frac{1}{4}\) inches at base).
17. splendens, Lowe. Differing from notable in having thick round crests. Raised by the late Colonel Jones. 24 x 6 inches in centre (only 3 at base).

**A. i. 6. CRUCIATUM.**

12. rectangulare, Jones. Found by Mrs. Wilson. Large, lax, cruciate, and capitate. Pinnules in lower half merely lobate. 26 x 6 inches.

**A. 3. a. FLEXUSOM.**

9. deformè, Lowe. An ugly variety, found by Mr. Moly. A tortuose linear, with scarcely anything but the midribs of pinnæ and pinnules. Length of frond 25 inches, but only 16 inches high.
10. proSternum, Lowe. A very distinct, slender, pendulous, flexuous, depauperate and lax variety, raised from inaequalis-fuscans. 9 x 1 inches, branching head, 1\(\frac{1}{4}\) inches.
11. torquerc, Lowe. A very flexuous form. Found by Mr. Moly. 26 x 4 inches.
12. tortum, Lowe. A narrow twisted variety. Found by Mr. Moly. 30 x 3\(\frac{1}{4}\) inches.

9. lucidum, Padley. Large pinnules, and shining, pale-green fronds.

18. pluma, Lowe. A very plumose form of Mr. Padley’s tripinnatum. Raised by the late Colonel Jones. 24 x 8 inches.

19. pteron, Lowe. A narrow plumose form of Mr. Padley’s tripinnatum. Raised by the late Colonel Jones. 26 x 4½ inches.

20. venustum, Lowe. Raised by myself. A tripinnate divisolobe, narrowing to the apex. 40 x 10 inches (at base).


27. invincere, Lowe. Raised by Mr. E. F. Fox. A grandly polydactylous acutilobum. 23 x 9 inches (at base).

28. Trevellynææ, Lowe. Found in Somerset, by the late Mr. Elworthy. Pinnæ overlapping; pinnules long, narrow, and lax. 30 x 9½ inches.

29. viviparum, Lowe. An acutilobum with plants along the rachis. In Mrs. Grant’s fernery. 16 x 5 inches (at base).

16. circulare, Lowe. Raised by the late Colonel Jones. Distinct, subrotund form with lax pinnules. 25 x 3½ inches (in middle), only 2½ inches at base.

17. exile, Lowe. Found by Mrs. Grant. A gracile-looking, conspicuously lobed variety, with lax pinnules. 27 x 9 inches (in middle), only 4 inches at base.


27. caudatum, Lowe. Raised by myself in 1887. A distinct caudate grandidens. 16 x 4 inches at base, and only 1 inch near the tip.


16. autunnale, Lowe. Raised by Mr. Fit. Not unlike Mr. Parson’s foliosum, but green and gold. 20 x 6 inches.

**NEPHRODIUM FILIX MAS.**

*53. Festingii, Thompson. From the South Kensington collection.

54. revolvere, Lowe. Found by Mrs. Grant. A revolved Stableri. 29 x 5 inches.

**NEPHRODIUM PALEACEUM.**

41. grandescere, Lowe. A very refined yet giant form, having embossed pinnules Found by Mr. Moly. 52 x 10 inches in centre; only 2½ inches at base.

42. ornamentum, Lowe. A neat variety with dense pinnæ. Found by Mr. Moly 44 x 7 inches.

**NEPHRODIUM SPINULOSUM.** (Subsection dilatatum.)

18. diversospinulæm, Lowe. Found by Mr. Moly. A distinct, pretty, very lax, depauperate form. 32 x 14 inches (stipes 15 inches).

**POLYPODIUM VULGARE.** (Subsection semilacerum.)

15. Tinternense, Lowe. A plumose form, obtained in 1847, on the ruins of Tintern Abbey, by Colonel Randall, and independently, some 30 years ago, by Mr. Cowburn. It is not now however to be found there. A large, graceful variety, much divided in the centre of the pinæ in a regular manner. 23 x 6 inches.

The above additions increase the list as follows:

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<th>VARIETIES</th>
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