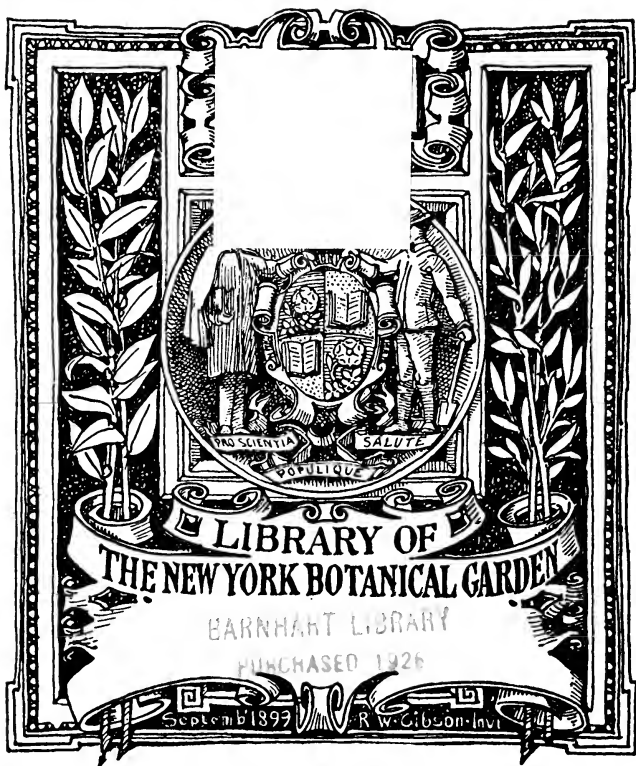


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Ferns
OF
Derbyshire.



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THE FERNS

DERBYSHIRE



LONDON,
J. B. ROSE & SONS,
10, PATERNOSTER BUILDINGS,
DERBY,
IRONGATE & MIDLAND PLACE.

[W. E. Home]

THE FERNS

OF

DERBYSHIRE,

ILLUSTRATED FROM NATURE,

WITH A PREFACE BY THE

REV. GERARD SMITH, B.A.

“HE rests me under the covert of fern, and gently guides me by the still
waters.”—PSALM xxiii. 2. *Literal.*

“A canny, soft, and flowery den,
Which circling brakes have made a bower.”
ALLAN RAMSAY.

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THOUGHTS AND MEMORANDA UPON FERNS.

FERNS, the favourite objects of interest with the lover of plant-culture as well as with the botanist, take their place both in our borders and garden houses, and are no longer excluded from that prominent position among flowering plants which they ever hold in the wild state. By this attention to Ferns, the cultivator is greatly the gainer; for who is not conscious of a deficiency even in a roadside bank that is destitute of Ferns? Independently of beauty, gracefulness, and variety of form, and of long continuance in vigour through the summer season, Ferns possess peculiar interest, both in their identity with the tribes of antiquity which were chosen to supply a considerable part of Coal, and also in their botanical structure. We look upon a Fern as upon a work fresh from the hand of the Eternal Creator, for, I believe, no attempt to hybridize the species has succeeded*; and we are carried back to the "Beginning," and see it the same as it was then—the "deshe," or "sprouting plant" of Gen. i. 11, 12—an un-

*In his paper, read at the meeting of the British Association for the advancement of Science, at Dundee, in 1867, Mr. Lowe observed, "It has been said that the fern *Asplenium microdon* is a hybrid between *Asplenium marinum* and *lanceolatum*—that *Lastrea remota* is a hybrid between *L. spinulosa* and *filix mas*; and that perhaps *Asplenium germanicum* is a hybrid between *A. septentrionale* and *ruta muraria*. Now it does not appear that these ferns have ever been reproduced from their spores—whereas the varieties raised from species can readily be reproduced by spores:" but no proof of hybridization in these cases is given. The capsules and spores of Swiss specimens of *Asplenium germanicum* are better developed than other specimens in my possession from the Minto Rocks, from Germany, or elsewhere: the fronds also are more vigorous, and the pinnæ broader and more distinctly trifid. A glance at the group of *Asplenium*, to which this species belongs, would suggest many a hybrid, if the possession by a species of characters common to two other species were admitted as proof of mixture.

changed and unchanging link of time between the present and all the past. And this interest becomes with us, in this country, yet greater, when we are reminded that we stand and look upon the Ferns of a temperate clime, flourishing upon a soil which contains the entombed remains of vast tribes of the same plants, once abundant on the same localities, but natives of warmer regions; that during the immeasurable periods of the formation of coal, when tropical reeds and conifers, lycopods, and arborescent-ferns adorned this land, the scenery of our vegetation resembled that of the warmest parts of New Zealand, and of islands in the same latitude. Nothing short of a visit to such localities could give an idea of the Fern-scenery of Ancient Britain, as exhibiting the damp shaded ravines and gullies of sub-tropical countries, in which this beautiful order reigns in profuse luxuriance; where the tree-ferns attain their most exalted height, and spread in drooping loveliness a crown of fronds, from six to eighteen feet in length, rising above an erect taper stem often exceeding twenty feet; and where the trailing species hang from stem to stem, and crag to crag, in festoons and fringes of the deepest green;* elegant, featherlike, and clustering fronds forming, beneath, a soft cool carpet; while every cliff is crowned with an overspreading mantle of maidenhair, and the very chinks through which water drips and runs are lined with the more minute species: even the marsh displaying its wiry luxuriant *blechna*, and the dry rocky plains rendered cheerful and bright by the wildest profusion of brakes and *polypodies*. It is not probable, however, that one species of the Coal-flora has survived; the Ferns of our times being peculiar to cooler regions, and attaining less exalted stature and profusion.

* In the East Indies, the slender twining stems of the Snakestongue Fern, *Lygodium scandens*, Sw., with fronds resembling *Spiræa japonica*, but edged with spikes of Lycopod-like fruit, take hold of and elegantly encircle everything within their reach. The maidens of India adorn themselves and crown their heads with wreaths composed of it. This Fern is not rare in our stoves.

But no less interesting are Ferns in point of Structure. They originate from a minute bud or bulb, which in a dust-like form is familiar to every one who has handled the fronds, proceeding mostly from brown chaffy spots on the lower side: we find no blossom, no pod or berry, no true seed in the whole tribe. If the result of exact observation be correct as to the structural laws of this family, the earliest stage of a germinating fern-bud (commonly called the *seed*) exhibits the only *true flower of the plant*, from which the whole after-growth, even to the height of a tree of thirty feet, springs forth; and which must be regarded, so long as it exists, as an ever new and freshly sprouting seed-vessel. That flower springs from the under surface of the earliest fern-leaf, which resembles a liverwort; and the anther, from the anther-bearing flower, which conveys the vital principle to the fruit-bearing flower, is in form akin to a minute hairy worm, and swims actively in water, as in the marine *Algae*, and in the *Confervæ* of fresh water. This anther descends into the fruit-bearing flower, and impregnates the germ of the future plant. From that germ arises a cellular body out of which at length springs the first *fern-frond*, and on that frond are formed the bare or covered capsules or sporangia, mostly furnished with an elastic spring, which contain, and in due time discharge the spores, a light, minute, and copious dust, easily wafted by the breeze,* every particle of which, if perfect, may be regarded as a *bulb* or *bud*, capable of vegetation, but not possessing cotyledons, or any of those symmetrical characters which distinguish the germinating seeds of flowering plants. Thus the first stage of fern-life is all that can be compared with flowering plants, and is minute and remote from observation. A very clear and detailed description of the structure and functions of those parts of inflorescence is given by Dr. Goode, in an

* The interior of the covered gallery at the top of Osmaston Smoke-tower was studded in 1860 with commoner Ferns, the spores of which had, doubtless, been borne thither upon the winds, 640 feet above the sea level.

article upon the Physiology of Ferns, in the *Reliquary*, Vol. I. p. 35—37.

This elementary notice of the Fern tribe, as being a group of Bud-seeded plants, leads to the explanation of the terms employed in this and in other works on Ferns, in describing the individual species. The true fibrous *roots* of a Fern, are distinct, generally, from the more or less underground, and often prostrate and creeping stem, or *rhizome*, which is, however, called *caudex*, when, being erect, it tends to become, as in Tree Ferns, an upright trunk: from this the stalk of the fronds arises, which, up to the leafy part or *lamina*, is called the *stipes*, and above the leaf, or division of the leaf, it becomes the *rachis*. This central stalk is sometimes branched, and that mostly by forking: and from it, the *costæ* or *mid veins* branch into the flat substance of the leaf, and, when branched again, are called costules or *veinlets*. If the veins do not branch, they are described as simple; when they branch and so end, they are said to be *forked* and *free*: if, however, they unite at their extremities and form a network, they are said to *anastomose*, and the spaces thus enclosed by the united veins are termed *areoles*.

The whole, *stipes*, *rachis*, and *lamina*, is called a *Fronde*; if undivided, it is considered *simple*; if it divides, and the divisions are stalked, each stalked division is called a *pinna*. If a pinna be again divided, and the divisions stalked, such secondary divisions are called *pinnules*. These stalked divisions of the main leaf are often multiplied two or three times and more. But if divisions of the main leaf occur, which are *not stalked*, such a frond is said to be only *pinnatifid*. Each mass of fruit on the frond is called a *sorus* or heap, and usually consists of many membranous capsules, *theca* or *sporangia*, with or without an *elastic* ring. The ring is, doubtless, designed to aid both in the bursting of the capsule, and in the dispersion of its contents. If a frond of the common Hart's-Tongue be gathered on an open day in winter, and the under surface is suddenly exposed to the

sun, and the result observed with a magnifier, the bursting of the capsules and the dispersion of the *spores*, or seed-buds, may be seen to great advantage. The *sori*, or bundles of capsules, are sometimes elevated upon a flat or saucer-shaped *receptacle*; and sometimes arranged round a stalk, or sunk in a cyst, as in *Danæa*: rarely, the capsules lie solitary, or in pairs, upon the frond itself. The *sporangia* may be observed covered with a membrane, called an *indusium*, or *involucre*, or they are *naked*. From these characters, and from the form, arrangement, absence, or presence of them, Ferns are divided into tribes, genera, and species. Species are the distinct forms belonging to one genus; genera are the distinct groups of species belonging to one tribe. Species may be further divided into varieties; the Hart's-Tongue, *Scolopendrium vulgare*, for example, has no less than between three and four hundred marked variations from the simple or normal form, catalogued by cultivators of the species.*

Collectors of Ferns, whose knowledge of the primary characters of a species has been confined to the study of a few fronds, gathered perhaps in one, and that a limited locality, are often tempted to assume unusual deviations from the primary characters, as proofs of a distinct species: and by this means, the names of Ferns have been greatly and inconveniently multiplied. There is no necessity to give a name to every variety of form: the true botanist can wait for more exact and comprehensive acquaintance with characters which do, and do not, distinguish species: and when, by experience, he is able to determine such marks, imaginary species fall back into the rank of varieties; or he is able, with the confidence of accurate observation, to pronounce *that* a true species, which by others may have been incorrectly regarded as a variety of some other form.

The popular taste for plants of this class has brought

* See List of British Ferns and their Varieties, compiled by P. Neill Fraser, Esq., Edinburgh, 1868.

into prominent notice the manifold variations in form and development of which individual species are capable, both in their natural and cultivated state; and it may interest the lovers of Ferns to possess a brief sketch of the changes observable in their several parts, so far as they have become known to the editor of this book. The subject must be limited to our own Island-Ferns in chief, but not exclusively, as will be seen in the following pages. Hitherto few exotic species, exhibiting abnormal growth, have appeared in our conservatories and stoves: a few are familiar, such as the beautiful *Nephrodium molle*, var. *corymbiferum*, *Pteris serrulata* var. *cristata*, &c. But our own islands do not probably exceed, in natural varieties, the warmer regions of the globe. In a letter upon the Flora of the East Indies, the Rev. John Barton remarks—"Some of the wild ferns of Indian hill ranges vary exceedingly, quite as much as the Female Fern or the Hart's-Tongue at home. Some species of *Microlepia*, for example, *Lastrea filix-mas*, and another species akin to *Lastrea dilatata* and *spinulosa*, exhibit all manner of varieties. I noticed that in damp warm spots there was a tendency to such irregularities of form, and I imagine this would be the case all over the world."

The observations which we have recorded upon the changes incident to the several parts of a Fern, will be best arranged in the order of those of the stipes, rachis, costa, lamina, and fruit. In doing this, we introduce several illustrative woodcuts; but we also avail ourselves of references to the excellent figures in Mr. Lowe's volumes of "Our Native Ferns," a work which has catalogued and described, with exact care, the numerous abnormalities of British species known to the author, who has spared no expense in his profuse and characteristic delineations of them. Our references to that work will be distinguished by the number of the figure, prefixed by the letters N.F.

1. The Stipes, or frond-stem, varies little, branching from

the base occasionally, as in *Polypodium Phegopteris*, in the Moonwort and Adder's Tongue. It is also sometimes branched above as in *Scolopendrium vulgare*, and the Female Fern: see N.F. plate 55, *S. ramosum majus*, and *S. Coolingii*, f. 744; and *Athyrium filix-fœmina acrocladon*, plate 38. The Female Fern is prolific in varieties. Mr. Clapham, of Scarborough, a master of fern-sports, stated to the writer—"I gave a visitor a fertile frond of *Athyrium f.f. Frizelliaë*. He has raised from its spores 10,000 to 12,000 plants: one to two thousand proved of normal form, but many are most singular in character, and, he tells me, scarcely two are altogether alike!" The Hart's-Tongue is equally given to sport. This Fern, Mr. John Smith, of Kew Gardens, in his "Ferns, British and Foreign," justly describes as attaching itself to the works of man, such as walls of stone, brick, or turf, embankments, hedge and roadsides, pits, quarries, shafts, and deep open wells, and as being capable of adapting itself to the various conditions of dryness or dampness, protection or exposure, in which it thus finds a home. The common Maidenhair Spleenwort, Wall Rue, Ceterach, and Polypody, may be classed with the Hart's-Tongue, as domestic species, loving our weather-worn walls, and the ancient monuments of our parks and graveyards.

2. The Rachis exhibits greater variety of change than the Stipes, but its leading characteristic is a tendency to fork. This is indeed a prevalent feature in Ferns as well as in Lycopods, *Jungermannias*, &c. In *Gleichenia dichotoma* (figured in Mr. Lowe's "Ferns," vol. 8 t. 21, a widely spread species in tropical regions of the south) the division by repeated forking is remarkable. Lady Malkin described plants of that species, gathered in Penang, which extended sixteen feet in length. Every careful observer of Ferns is acquainted with examples of fronds bifurcate at the summit, the forking continued in repeated divisions, f. 3, the

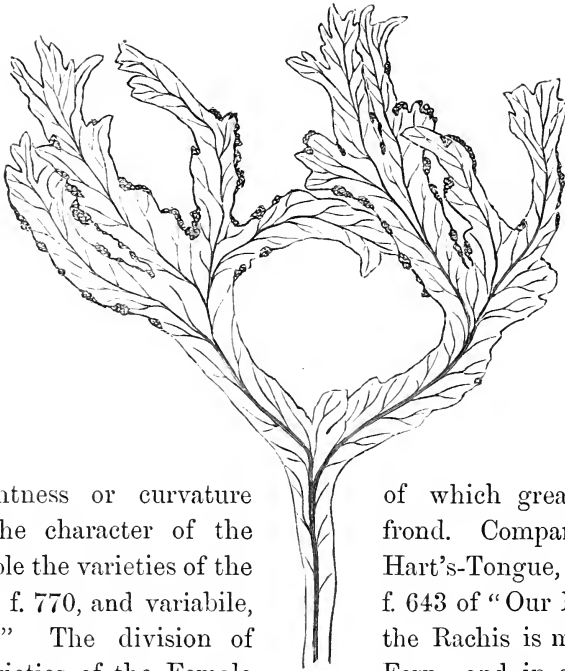


FIG. 3.

straightness or curvature alters the character of the example the varieties of the cornu, f. 770, and variabile, Ferns." The division of in varieties of the Female of the common Polypody, elegantissimum, (fig. 1, plate 1) all trace of the normal character of the species is lost, except that the sori are the same—a circumstance for remark—the much less compound form, Polypodium Cambrium, a pinnule of which we figure (fig. 2, plate 1) producing, we believe, no spores. A more interesting feature in the Rachis is the vegetation of new plants from its termination as well as from the axils of the pinnae along its whole course. In Polystichum angulare proliferum, var. Crawfordii, scaly bulbs bearing frondlets may be seen thus produced both from the summit and sides of the main stalk. But in several exotic species of Asplenium Cystopteris and Aspidium, as well as in the curious Fadyenia and in Camptosurus, perfect plants are habitually produced both with and without contact with the soil at the extremity of the Rachis.

of which greatly alter the character of the frond. Compare, for Hart's-Tongue, Cervi f. 643 of "Our Native the Rachis is marked Fern; and, in a form so well-named P. ele-

gantissimum, (fig. 1, plate 1) all trace of the normal character of the species is lost, except that the sori are the same—a circumstance for remark—the much less compound form, Polypodium Cambrium, a pinnule of which we figure (fig. 2, plate 1) producing, we believe, no spores. A more interesting feature in the Rachis is the vegetation of new plants from its termination as well as from the axils of the pinnae along its whole course. In Polystichum angulare proliferum, var. Crawfordii, scaly bulbs bearing frondlets may be seen thus produced both from the summit and sides of the main stalk. But in several exotic species of Asplenium Cystopteris and Aspidium, as well as in the curious Fadyenia and in Camptosurus, perfect plants are habitually produced both with and without contact with the soil at the extremity of the Rachis.

The most remarkable example of this class is the robust *Woodwardia radicans*, a Fern of warm regions in both hemispheres. In the narrow ravines of South Italy, its fronds stretch from side to side of the volcanic tufa, rooting at their extremity; and, from thence vegetating new fronds which ascend and root again and again, they form, as it were, a zigzag ladder by this repetition of the rooting process.

3. The Costa undergoes the same changes in bifurcation as the Rachis, from which, on that account, it is difficult to distinguish it: but it has peculiarities which deserve remark: First, it has a tendency to enlargement in substance and breadth, which, if not accompanied by a corresponding widening of the lamina or leafy part, causes the leaf to curl back, as may be observed in *Lastrea dilatata*, when growing in dry stony places, as well as in *L. filix mas*: but a second peculiarity noticeable in the Costa is the divarication of the pinnules at various angles. In *Athyrium filix-femina Fieldii*, the pinnæ diverge in many of the fronds so regularly as to form a succession of right-angled crosses, f. 4 and N.F.,

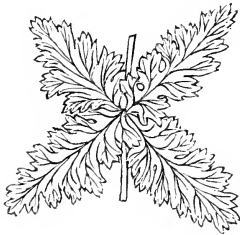


FIG. 4.

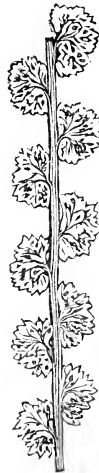


FIG. 4a.

f. 423. The division and divarication of the pinnæ of *Polypodium vulgare*, especially at the lower end of the frond, are familiar to observers: see N.F. f. 14, 19, 29, and especially plate viii. In *Osmunda regalis* this divarication of the branching costa constitutes a distinct variety.

4. We come next in order to the leafy expansion or Lamina of the frond; and in this part, the varieties of form and development may be truly called endless, arising sometimes from excess, at others from defect of the part. If, for instance, the lamina is much enlarged in breadth, while the rachis and costa remain unchanged, the effect of undulation or frilling takes place, as frequently in the Hartstongue; and, when this enlargement occurs in the forked divisions of the rachis and costæ, some of the most elegant forms result, familiar to the cultivators of Ferns. *Polypodium vulgare*, var. *Cambricum*, for example, *Scolopendrium vulgare*, *Standfieldii*, N.F., plate 54, *cristatum*, plate 50, and *ramo-marginatum*, f. 778.

Under this head we place the tufted forkings of the Lamina, f. 4*a*, so much admired in the crested male fern; a rosette-like termination of every pinna, as well as of the apex of the frond, giving this fern, as well as *Polystichum angulare*, *Athyrium filix-fœmina*, *Lastrea dilatata*, and other species, a conspicuously elegant character.

Do these clustering rosettes ever appear *upon* the fronds?

In crested varieties of the Male Fern, the extremity of the frond and pinnules is often branched, and spreads like the feathered foot of the Ptarmigan, forming, with the crested termination, a corymb.

The expansion and lengthening of the Lamina, without an equal enlargement of the costa, sometimes gives rise to a curving upwards and inwards of the margin of the pinnules, as in *Lastrea Fæniseeii*; which character, accompanied by a tufted state of the usually short and decumbent fronds, and the rough rigid narrow scales of the stem, has given this Fern so marked an *ensemble* as, if no

intermediate stages between it and *L. dilatata* were to be observed, would fully justify its claim to be a species.

The various divisions of the lamina in the same species, by which a frond, imperfectly pinnatifid, becomes pinnate, bi-and-tripinnate, f. 5, 6, 7, constitute marked varieties in



FIG. 5.

FIG. 6.

FIG. 7.

the character of the same species, and materially alter—especially when accompanied by diversities in the margin of the lamina, whether it be rounded, sinuate, serrate, jagged, lobed, or capilliform—the aspect of the whole plant. The accompanying figure of a variety of *Athyrium filix-fœmina*,

f. 8, being as great a contrast to the normal frond of the



FIG. 8.



FIG. 9.

same species, as *Asplenium trichomanes* is to *A. adiantum nigrum*.

The contraction and even the suppression of the lamina

yields many marked nondescripts among Ferns. A plot of *Pteris aquilina*, on the roadside near a village, exhibited the stipes and rachis of the usual form and height, but almost wholly destitute of lamina and of fruit—a mere skeleton of the species. Branching forms of the Hart's-Tongue are not seldom similarly defective; and it may be said that, as a rule, the branching of the rachis implies the diminished breadth of the lamina. See our f. 9, of Scol. v. ramo marginatum.

But of all the changes to which the Lamina is subject, the bordering of the Hart's-Tongue by a longitudinal process on both sides of the frond, and more or less regularly continued from its base to its point, deserves attention. See N.F., f. 597, and our f. 10. This bordering is usually divided from the

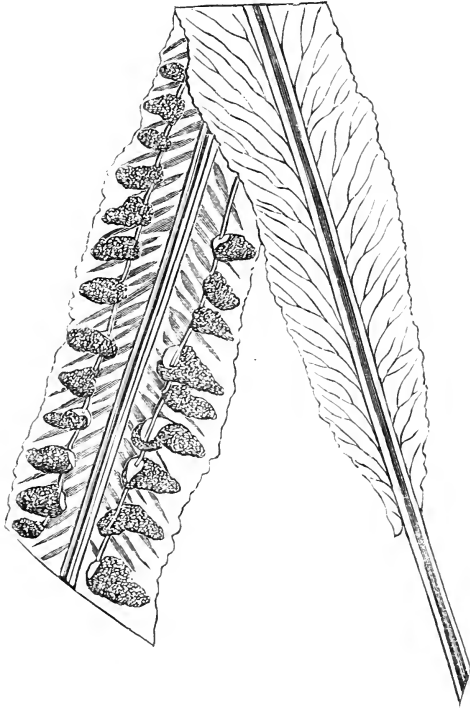


FIG. 10.

main frond by a raised membrane (costa ?) which is even continued sometimes to the base of the frond, and runs down on either side the stipes as a narrow wing. In some cases the bordering costa is not only raised but leafy and lobed, like the margin of the frond, and bears sori, such fronds thus becoming double edged. N.F., f. 609. Scol. vulg. marginatum and description. The regular sori are much interrupted by this projecting membrane, as sometimes the veins are; sometimes the bordering laminae alone bear fruit, f. 11,

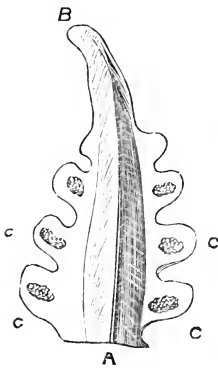


FIG. 11.

while the central portion of the frond is frequently thickened by the redundant matter of the lamina, and shows a puckered, warted, mucicated condition: N.F., f. 642, 597. The whole of the phenomena, observable in these varieties, suggesting that such fronds arise from a coincident but imperfect development of three laminae in one. This explanation is, however, by no means conclusively affirmed; because, in

many such cases, the upper side of the frond gives no indication of the bordering except by a slight depression of its surface here and there, above the line of division—the veins continuing direct from the costa to the margin of the frond. It must be observed, however, that the varieties of Hart's-Tongue which show sori only on the margin of the bordering, N.F., f. 595, while the centre of the frond is destitute of them; or which have sori more numerous than, or in lines not parallel with those in the centre, suggest a fundamental distinctness of origin of the bordering parts, the marginal processes being occasionally as simple as the medial portion is loaded with warty and fluted excrescences.

6. The Fruit of this tribe presents also some marked variations both in position, structure, and function. As a

rule, the sori are developed upon the under side of the fronds, the spiked and paniced fruit of *Acrostichum*, *Aneimia*, &c., *Osmunda*, *Botrychium*, and *Ophioglossum*, being the exceptions. But, among our native Ferns, the sori are sometimes observed upon both sides of the fronds, as in *Asplenium Trichomanes*, and *Scolopendrium vulgare*, N.F., plate 52A, f. 619, 760: the common *Polypody* also rarely showing the same character, N.F., f. 35.

In the Moonwort, the lamina frequently exhibits sori upon its cut edges (Plate 23); and, *vice versa*, the summit of the soriferous frond becomes leafy: this last change is occasionally met with in *Osmunda regalis*, assimilating the species to the Canadian *O. Claytoniana*. Linn.

The conversion of the Sori, or rather of the capsules of fruit, into bulbils is a conspicuous feature in exotic, and occasionally in native Ferns. In *Asplenium Belangerii* and *Viviparum*, the young plants, thus produced, differ greatly in their primary fronds from the parent plant, f. 12. The

sori of a frond of *Pteris quadriaurita*, gathered in Ceylon, vegetated copious *rootlike* processes. The fruit spikes of *Selaginella cuspidata* Link (f. 13), frequently yield perfect plants (f. 13a), especially at the extremity of the older fronds.

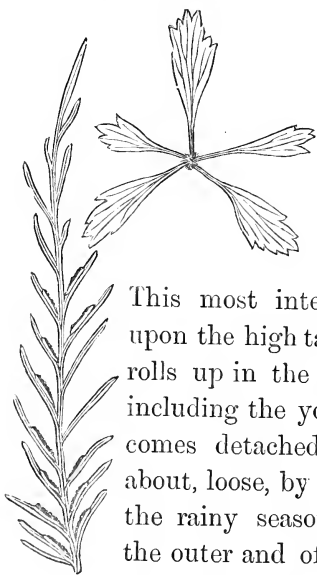


FIG. 12.

This most interesting species, which abounds upon the high table-lands above Tepic in Mexico, rolls up in the dry season into a nestlike ball, including the young plants upon its fronds, becomes detached from the soil, and is driven about, loose, by the wind! Upon the return of the rainy season, however, the plant expands, the outer and often leafless fronds curving back and fixing themselves firmly in the soil, while the development of new roots gives a central

fixedness to the plant. It is obvious that the production of young plants (in place of spores) which do not fall off the fronds or lose the protecting wing of the parent until strong enough to provide for themselves, has an important connexion with the perpetuation of the

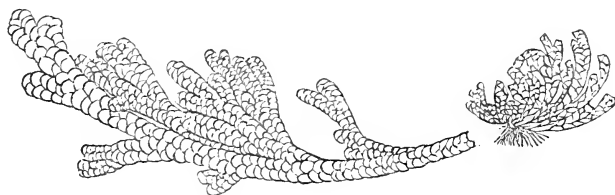


FIG. 13.

FIG. 13a.

species. There have been cases among our native ferns in which the production of bulbils has become the only means for the increase of the species, all parts of the frond yielding them. I am indebted to Mr. Clapham, of Ramsdale Bank, Scarborough, for remarkable illustrations of such abnormalities, which I could not better describe than in his own words. "Scolopendrium Wardii," he states, "a seedling raised in Glave's Garden, is one of the most singular of our native varieties. In a warm moist temperature, especially if covered with glass, it becomes astonishingly viviparous, the veins occasionally carrying tiny plants, while each projection of the margin of the frond possesses one. I have counted sixteen bulbils on one part of a frond. These, when cultivated, yield a proportion of plants *bearing sori*, although the majority resemble the parent in its bulbiferous character. Some years ago I had a plant of *Adiantum Capillus Veneris*, several fronds of which, instead of unfolding their pinnules, became branches of bulbillæ. I noticed a similar change in an *Adiantum* which I gathered in the Isle of Man, in 1864."

The Position of the sori upon the frond presents occasional anomalies which, were the history of certain varieties un-

known, would justify their separation into species, if not genera. No more striking illustration of this remark could be given than our (f. 9) representing *Scolopendrium vulgare*, *ramo-marginatum* of Clapham, the sori of which form an interrupted edging to the lamina, an arrangement at right angles to the usual direction of the fruit, as well as to its relation to the veins of the frond !

7. Besides changes incidental to the several parts of a Fern, there are yet other sources of variation, of which the only one noteworthy is change of Colour. Of this we have few native examples, chiefly observed in the common *Poly-pody variegatum*, N.F., p. 53, and in the *Hart's-Tongue*, N.F., f. 695, 739, &c. ; but in exotic species, a highly ornamental feature is given to a stove by the deep crimson tints of the expanding fronds of *Adiantum Farleyense* and other *Adianta*, and especially by the chequered aspect of *Pteris tricolor* ; a plant of which, cultivated by a lady in a wide glass cylinder with a movable cover, presented the richest and most lovely sight.

Into the causes of the many variations in development to which Ferns are liable, whether in the wild or cultivated state, we cannot fully enter.

The exposure of the plants to a dry impoverishing condition, the pressure of rocky masses upon the roots, their stimulus by a free and rich soil, attended by a warm humid atmosphere ; or, again, the effects of excessive moisture about the roots, or of mineral and other solutions in the soil, prove, in turn, fruitful causes of increase or defect in the several parts of Ferns : but we owe to cultivation far more numerous varieties, perhaps, than to any other cause.

The occurrence of short copiously branched plants of the Moonwort Fern, at Osmaston Manor, and on Harlow Moor, near Harrogate, appeared to be the result of a check given to the descent of the roots by fragments of stone or pebbles : while the stations of *Lastrea Fæniseeii*, both in England, Wales, and Ireland, upon wet stony soil, would account for

its dwarf growth and laminar enlargement. When the same Fern occurs on comparatively dry soil, as in Wootton Park, Staffordshire, its stature is increased and its fronds less compact.

The species recently observed in Derbyshire are twenty-four, all of which are figured in this volume: there are a few which might have been looked for, especially in the more elevated parts of the county, and which may even yet reward the exact scrutiny of persevering search. Such are *Hymenophyllum*—*H. Tonbridgense** (fig. 14) and *H.*



FIG. 14.

Wilsoni †—our *Filmy Ferns*, which creep over the surface of wet and porous rocks, resembling *Jungermannias*, — *Cryptogramma crispa*, and *Asplenium germanicum*, *septentrionale*, and *lanceolatum*; *Polypodium Thelypteris* also, and *Lastrea rigida*, may have escaped observation.‡ But it is more probable that the inroads of improvement in agriculture, the enclosure of wilds, and the opening of all accessible places to the greedy bite of the ox and sheep, have exterminated

many a native plant, and have limited the number of our fern-treasures. The lover of insects and birds, and the lover of landscape also, must cast many a fond regret over scenes once rife with natural beauty and interest; but now modernized into arable or grazing land, and made tributary to the

* "On the hills, from Macclesfield to Buxton, on mossy rocks." Mr. Bradbury, in *Botanist's Guide*.

† *H. Wilsoni* is in Dr. Garner's List of Staffordshire Plants, as occurring at Gradbich, near Flash, within a few miles of Buxton.

‡ Chinley Hills, near Chapel-en-le-Frith, are given in the "Botanical Guide," as a locality of *Cryptogramma crispa*. The plant occurs in similar situations in Cheshire, Yorkshire, and Lancashire. Its English name, "Parsley Fern," correctly describes the appearance of the species.

market and the rent day ! There are antiquities of Nature's wildness, scarcely less deserving protection and preservation, than the antiquities of masonry in ruin ; and if the country scenes of our land become destitute of all that is rustic, picturesque, and worthy of scientific research—if every hedgerow that ventures to luxuriate in a rose or honeysuckle, must be trimmed or levelled—if every marshy nook,

“ Where the morning dew lies longest,
Where the female Fern grows strongest,”

rank with reed and sedge, and with their shelly and insect peoples, must be submitted to drainage, must be cleared, and *be made to pay*—then will the tendency of our population, now already too strong to gather into towns, and to abandon the open parts of the country, spread, in self-defence, even among those who love the country best ; Nature must then be studied in books, and in museums, or in foreign lands ; and our British Floras and Faunas will become historical records of what England once was, before this Utilitarian Age began. But if the lover of Ferns has much to fear from the plough, the draining-tile, and the axe, he has an equally blank prospect of desolation before him, through the rapacity of Traders in his favourite tribe. A bearded dealer in our Northern Fern-treasures visits the Southern counties, to present the bait of a host of captive *Woodsius*, stolen away from their remote mountain homes, and offered in exchange for Ferns of the lowland ! In a few years, what must be the inevitable issue ?* Even private botanists are found to gather plants with no sparing hand ; and if our island is still to be counted the habitat of a native Flora, we would earnestly commend *the lovers of plants that are to come after us*, to the consideration of existing collectors. Some eager eye, intent upon a full vasculum, may smile at the thought ; but permit us to repeat it—Those who are to follow us, are as worthy of regard as we ourselves were by those who preceded us. They loved and studied Ferns, they laboured

* Dovedale is already stripped to the bare rock of its Ferns.

to discriminate the species, and have indicated for our guidance their localities and range; not that we should destroy, but enjoy, use, and *preserve* them for the time to come. He is practically a transgressor of the great law of love, who cares not, *so much as a Fern*, for posterity. Besides this, it is good to deny oneself the childish pride of a *handful*, when one or two plants will suffice to acquaint us with a species; and if the vasculum must be filled, upon the plea that duplicates will be desired by friends, let the collector adopt Dr. Greville's excellent rule, to admit no duplicate which is not complete enough for his own herbarium; and then many a specimen will be suffered to live, and abide for years to come, which, otherwise, rudely torn away from its home, might swell the spoils of a day's excursion, but be as rudely cast off when the day's pleasure was past; or be planted in soil and situations where it must inevitably pine away and die.

GERARD SMITH.

Ockbrook, Midsummer, 1877.

SYNOPSIS OF THE GENERA

OF

DERBYSHIRE FERNS

Order 1. Capsules with a jointed ring, more or less complete.

POLYPODIACEÆ.

Tribe 1. Polypodineæ. Fruit on the back of the frond.

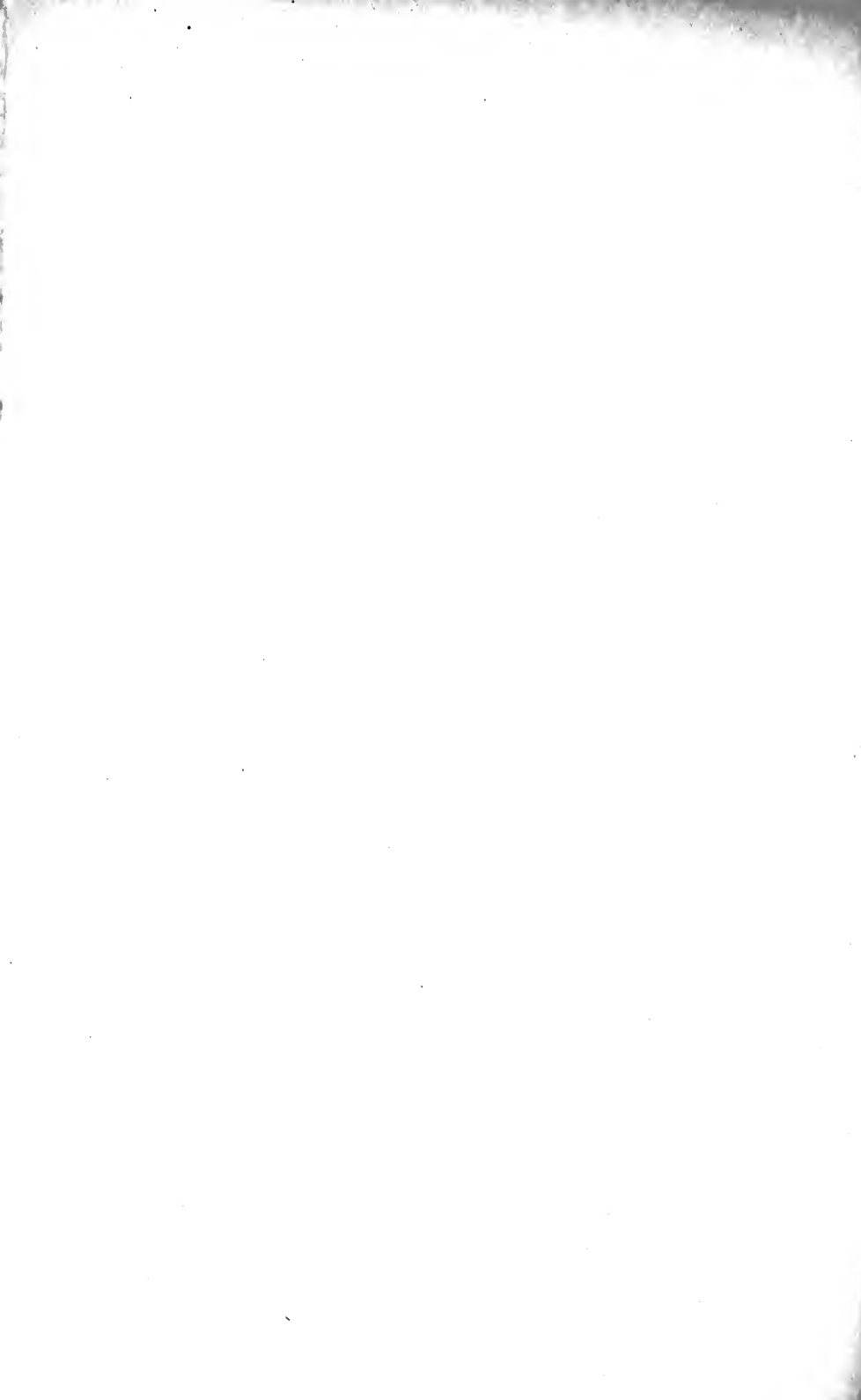
	Page
1. With a linear involucre, near the midrib	<i>Blechnum</i> 13
2. With a linear involucre, marginal	<i>Pteris</i> 14
3. With a linear involucre, near the margin	<i>Cryptogramma</i> xx
4. With an oblong involucre, opening on the inner side	<i>Asplenium</i> 16-17-18-19
5. With a linear oblong involucre, opening centrally	<i>Scolopendrium</i> 21
6. With a vaulted involucre	<i>Athyrium</i> 1
7. With an emarginate, or orbicular involucre	<i>Polystichum</i> 10-11-12
8. Sori in roundish clusters scattered. Involucre reniform	<i>Lastræa</i> 2-3-4-5
9. With a hood-shaped involucre, becoming cup- shaped	<i>Cystopteris</i> 15
10. Fruit without an involucre	<i>Polypodium</i> 6-7-8-9
11. Fruit in a ridge mixed with chaffy scales	<i>Ceterach</i> 20
<i>Tribe 5. Fruit in a two-lobed cup, marginal</i>	<i>Hymenophyllum</i> xx
<i>Tribe 8. Fruit with traces of a jointed ring, two- valved, terminal to the frond</i>	<i>Osmunda</i> 22

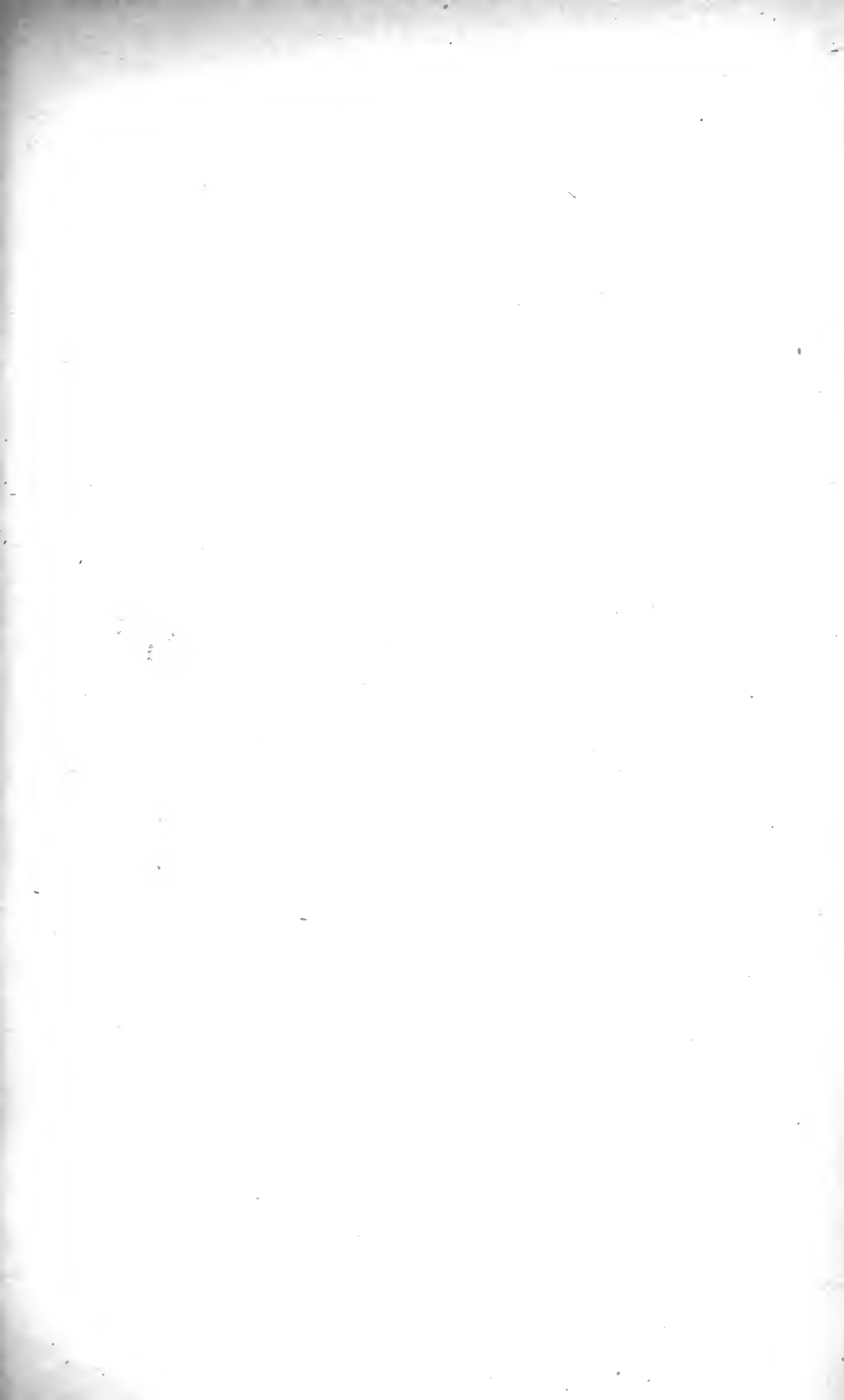
(Order 2. Fruit dorsal, without a jointed ring. Marsiliaceæ.)

(Order 3. Fruit marginal, without a jointed ring.)

OPHIOGLOSSACEÆ.

1. Fruit terminal to the branch, spike-simple	<i>Ophioglossum</i> 24
2. Fruit terminal to the branch, spike-compound	<i>Botrychium</i> 23





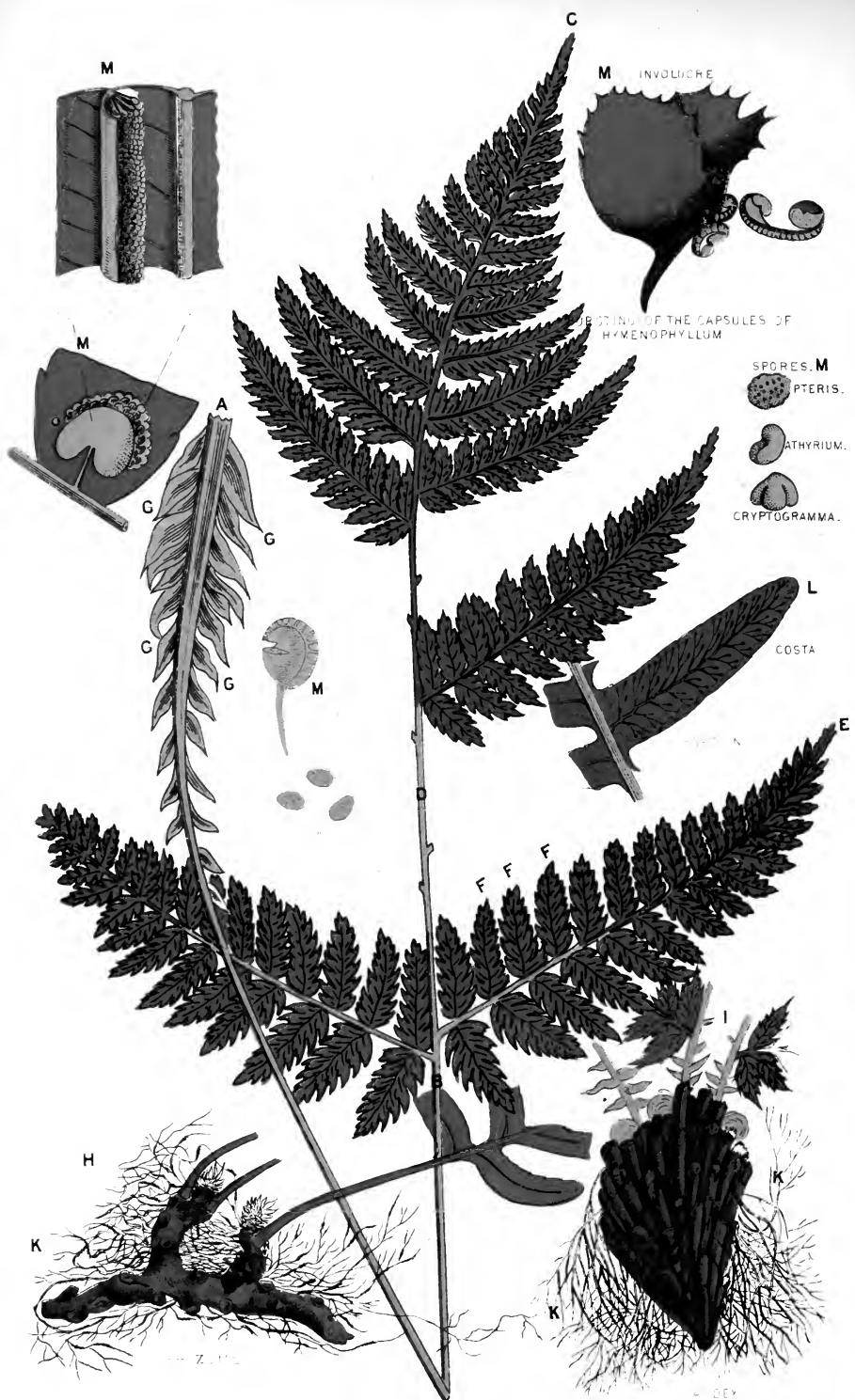


DIAGRAM OF PARTS OF FERNS.

THE PARTS OF A FERN.

KEY TO THE DIAGRAM.

A to C.—THE FROND.

A to B.—STIPES.

D.—THE PRIMARY RACHIS: the branches are the secondary Rachis.

E. E.—PINNÆ.

F. F.—PINNULES.

G. G.—SCALES.

H.—RHIZOME, with the true roots.

I.—CAUDEX, with the true roots.

K.—RADICLES, or true roots.

L.—VENATION,—the arrangement of the veins which intersect the Pinnules. The principal vein being a continuation of the Stipes, is called the Costa; the rest, Costules, Veins, and Venules.

M.—FRUCTIFICATION,—the parts containing the seed-like spores. The several parts are named on the Plate. For full details upon the terms used in describing Ferns, see "Ferns, British and Foreign," by J. Smith, c. 2—Organography.

N.—SPORES.

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GENERA AND SPECIES OF DERBYSHIRE FERNS, AS ARRANGED IN THIS BOOK.

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ATHYRIUM FILIX-FÆMINA, *Roth.*

ASPLENIUM FILIX-FÆMINA, *Hooker and Arnott.*

LADY FERN.

ROOT—Radicles strong and wiry, caudex large and tufted.

FRONDS—Numerous, from one to five feet in length, broadly lanceolate, tapering at the apex, sub-erect, rigid, bipinnate; the three lower pairs of pinnæ droop, the lowermost pair forming acute angles with the rachis.

STIPES—About one-fifth the length of the frond, often of a reddish purple colour, and clothed with a few dark, pointed, membranous scales at the base, which forms a permanent part of the caudex.

RACHIS—Smooth.

PINNÆ—Alternate, lanceolate, pinnate; the pair of pinnules nearest the main rachis being generally longer than the next two pair; apex long and acute.

PINNULES—Distant, linear, pinnatifid; the lowest lobe in each pinnule on the side furthest from the main rachis is proportionately longer than the others; each lobe dentate. Sometimes very narrow and much crowded.

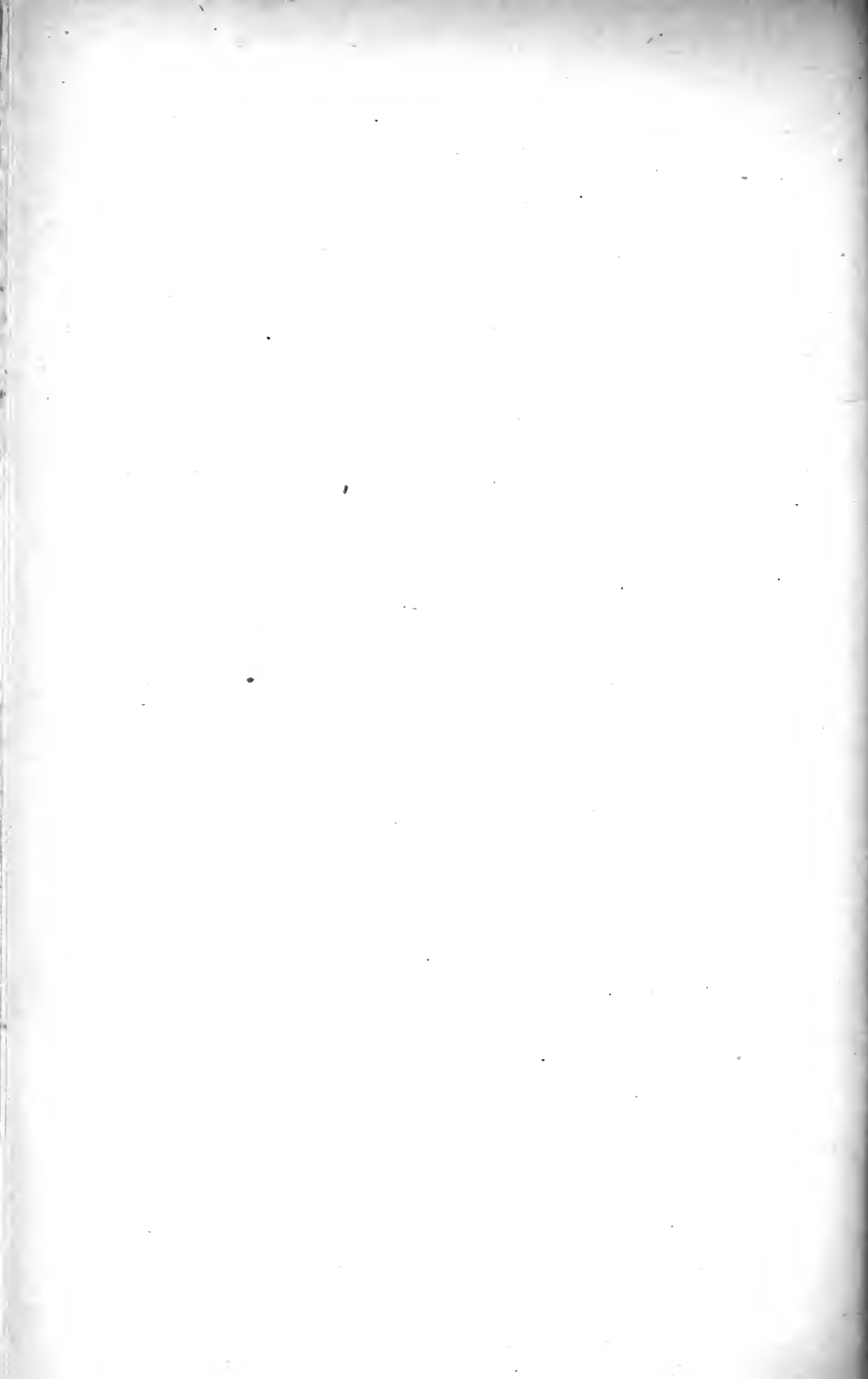
VENATION—Lateral veins alternate, and forked, each branch of the fork ending in the point of a lobe, the lower lobe furthest from the main rachis having a fork of five branches.

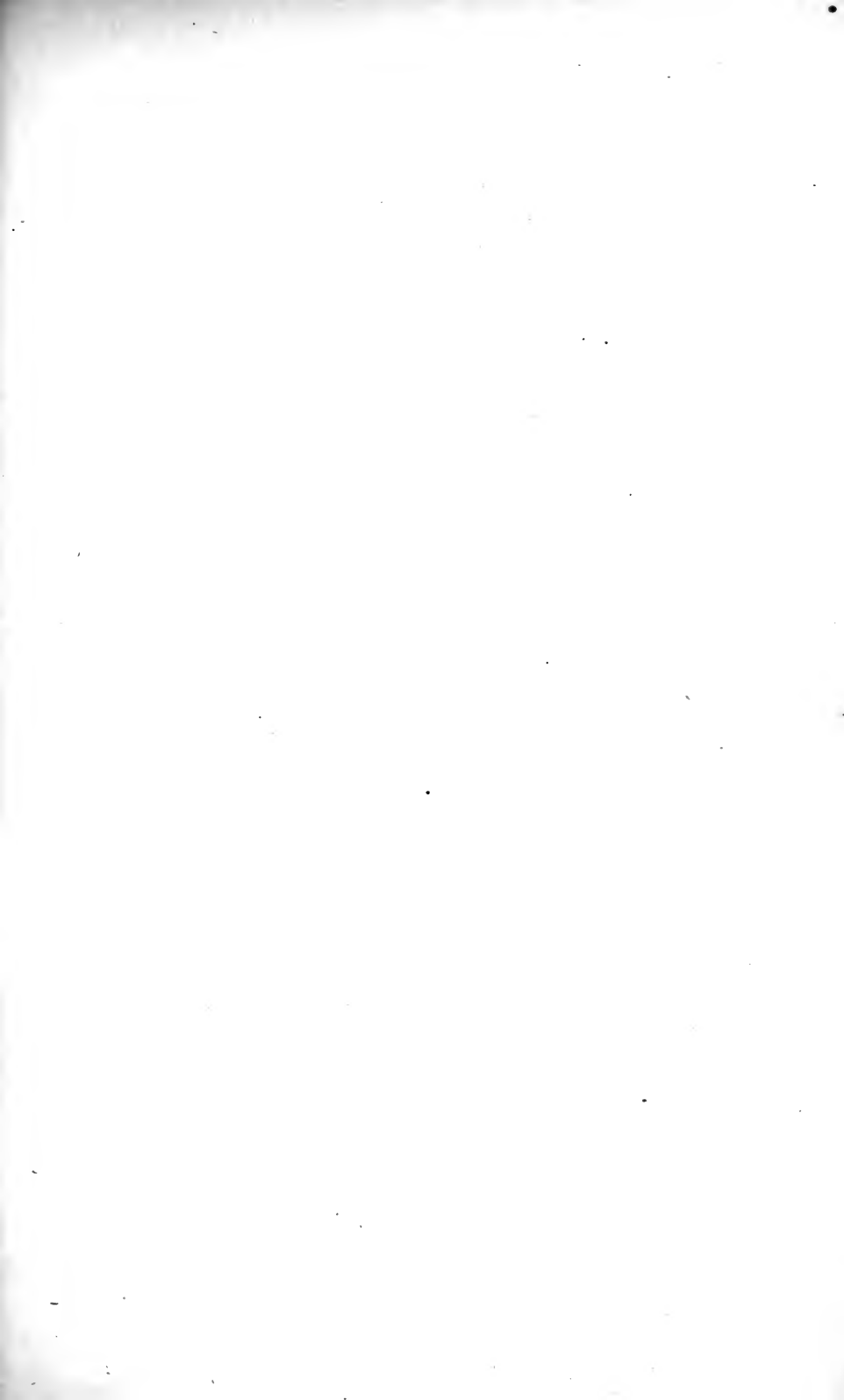
FRUCTIFICATION—Oblong, at length arched; clusters of capsules on the forks of the pinnules.

HABITAT—Moist shady places, in bogs and hedges.



ATHYRUM FILIX FEMINA
Lady Fern





LASTREA FILIX-MAS, *Moore.*

DRYOPTERIS FILIX-MAS, *Newman.*

ASPIDIUM, *Hooker and Arnott.*

MALE FERN.

ROOT—Radicles strong and wiry, of a dark brown colour ; caudex stout and tufted.

FROND—Oblong, lanceolate, pinnate ; the pinnæ gradually narrowing from the fourth or fifth pair, as they near the base ; length from one to four feet.

STIPES—Short, and more or less thickly covered with brown or auburn scales, which are continued the whole length of the rachis.

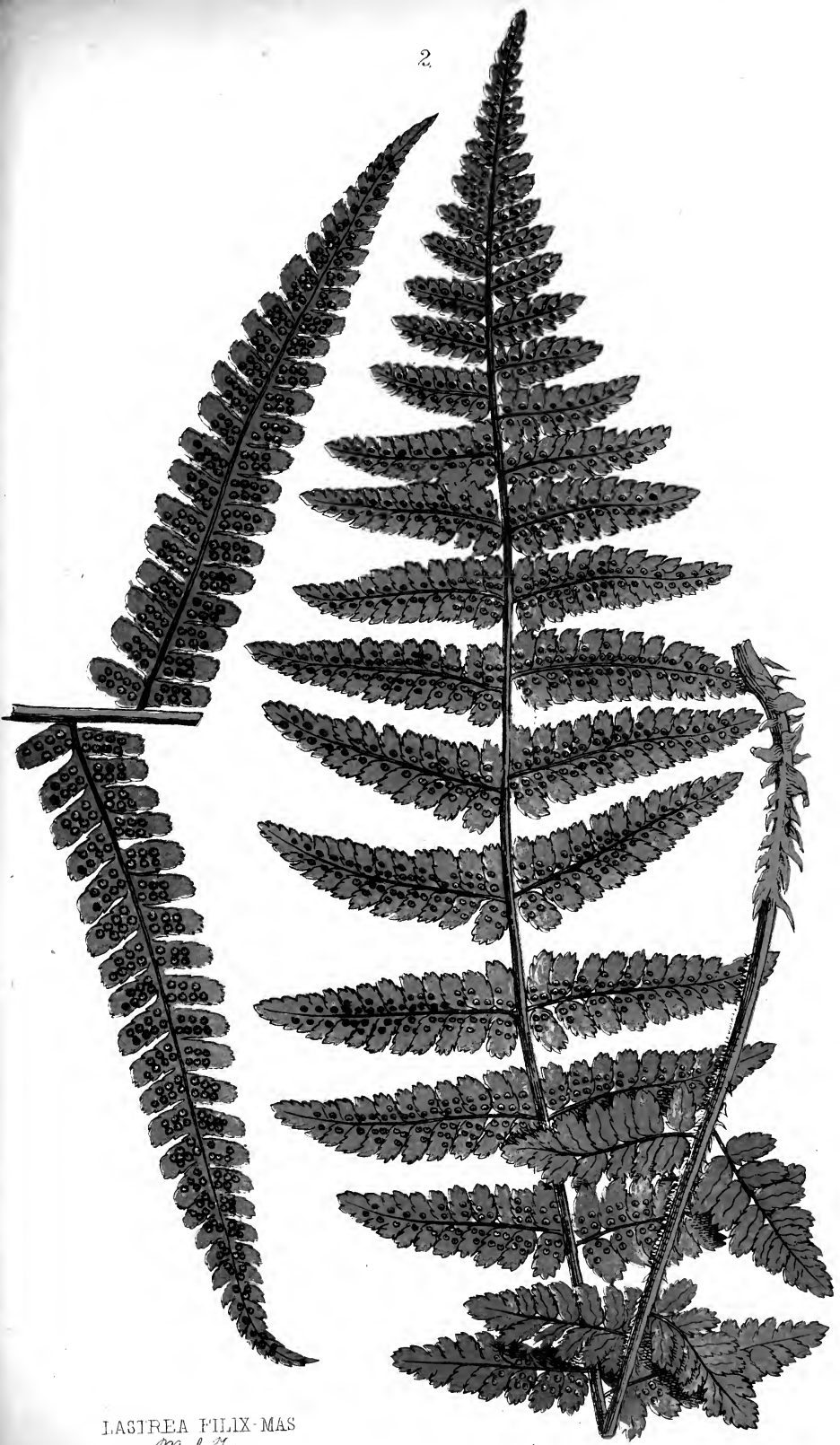
PINNÆ—Numerous, alternate, nearly linear, pinnate, acute.

PINNULES—Somewhat obtuse, dentate at the extremities, mostly serrate at the margin.

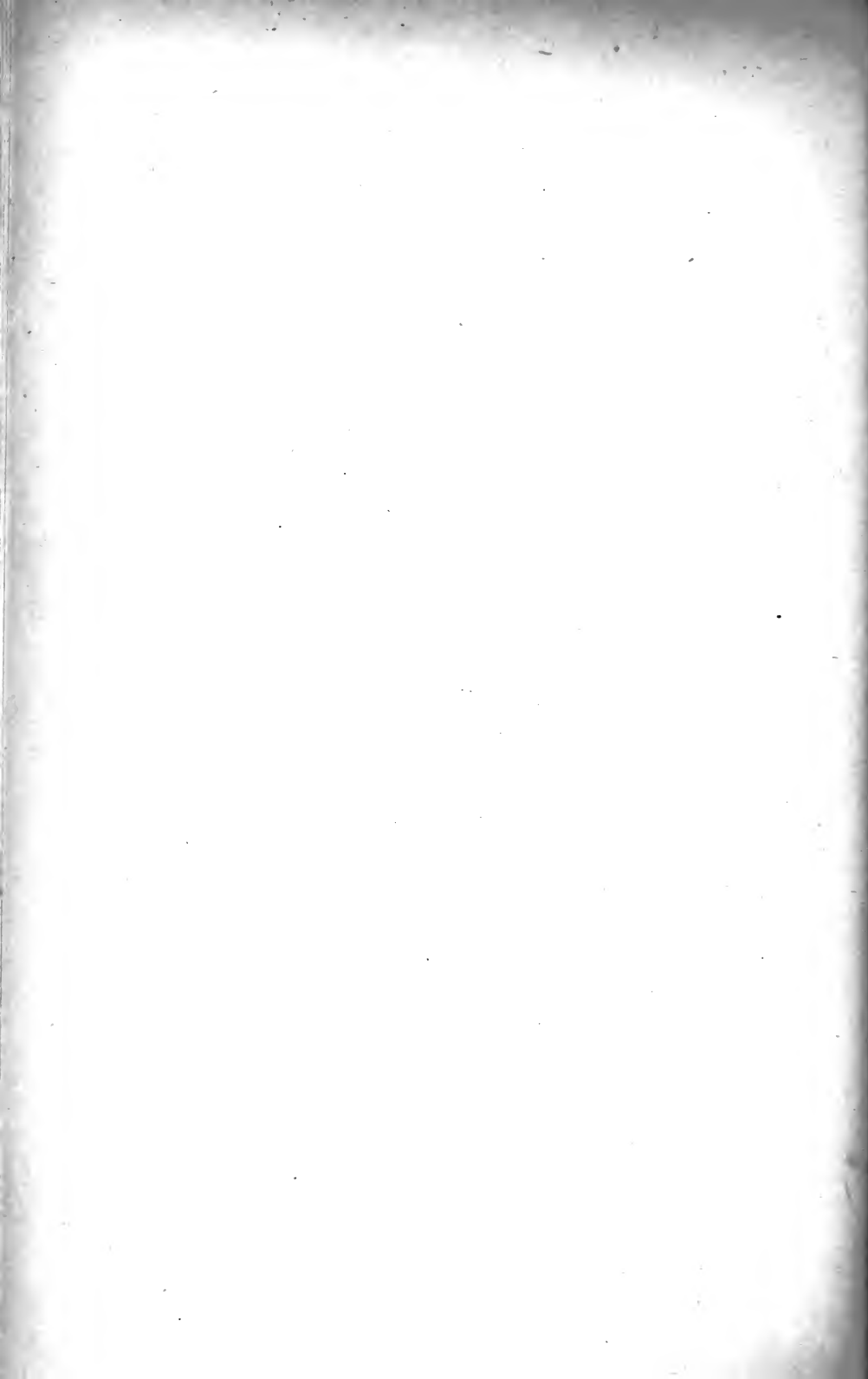
VENATION—Lateral veins forked half-way between the costa and the margin, to which they do not quite extend.

FRUCTIFICATION—Clusters of capsules generally in pairs near the base of the pinnules, more thickly set on the middle and upper portions of the frond, so much so sometimes as to cause the upper pinnæ to assume the appearance of a terminal spike of fruit : the six or seven lowermost pinnæ often being barren. Involucre roundish kidney-shaped.

HABITAT—Common in dry shady or open places.



I. ASTREA FILIX-MAS
Male Fern





LASTREA DILATATA, *Presl.*

ASPIDIUM SPINULOSUM Sw., *Hooker and Arnott.*

LOPHODIUM MULTIFLORUM, *Newman.*

ROTH'S FERN.

ROOT—Black and wiry; caudex strong and tufted.

FROND—Ovato-lanceolate, deltoid or triangular-ovate, bipinnate; from six inches to four feet in length, of a deep green.

In sheltered places among rocks, the frond becomes contracted, the costæ enlarged, and the pinnæ convex, and thickened: while in wet and boggy places, the pinnules are broader, thinner, and paler, turned up at the edges, the stipes thickly clad with rough taper-pointed scales. This last form is *Lastrea Fenisæcii* of Babington, *L. recurva* of Newman, a marked and elegant variety, not yet recorded as a county fern, although found near Ashbourne on the Staffordshire side. Dr. Hooker, Bentham, and others, regard it as a variety of *L. dilatata*, which, probably, upon cultivation from spores, it would prove to be.

STIPES—About one-third the length of the frond, thickly covered with large brown scales, the centre of which has a keel-shaped thickening, consisting of enlarged cells.

PINNÆ—Nearly opposite, oblong-linear; the lower pinnæ nearly triangular, pinnate.

PINNULES—Pinnatifid, the inferior (or lower) ones are longer than the superior (or upper) ones, the lower pinnules have distinctly stalked and serrated lobes; all the lobes are serrated, and terminate with a soft spine; the four or five middle pinnæ in large specimens have the first lobe of the inferior pinnule shorter, broader, and more serrated than the rest.

VENATION—Lateral veins, between the division of each pinnule, forked.

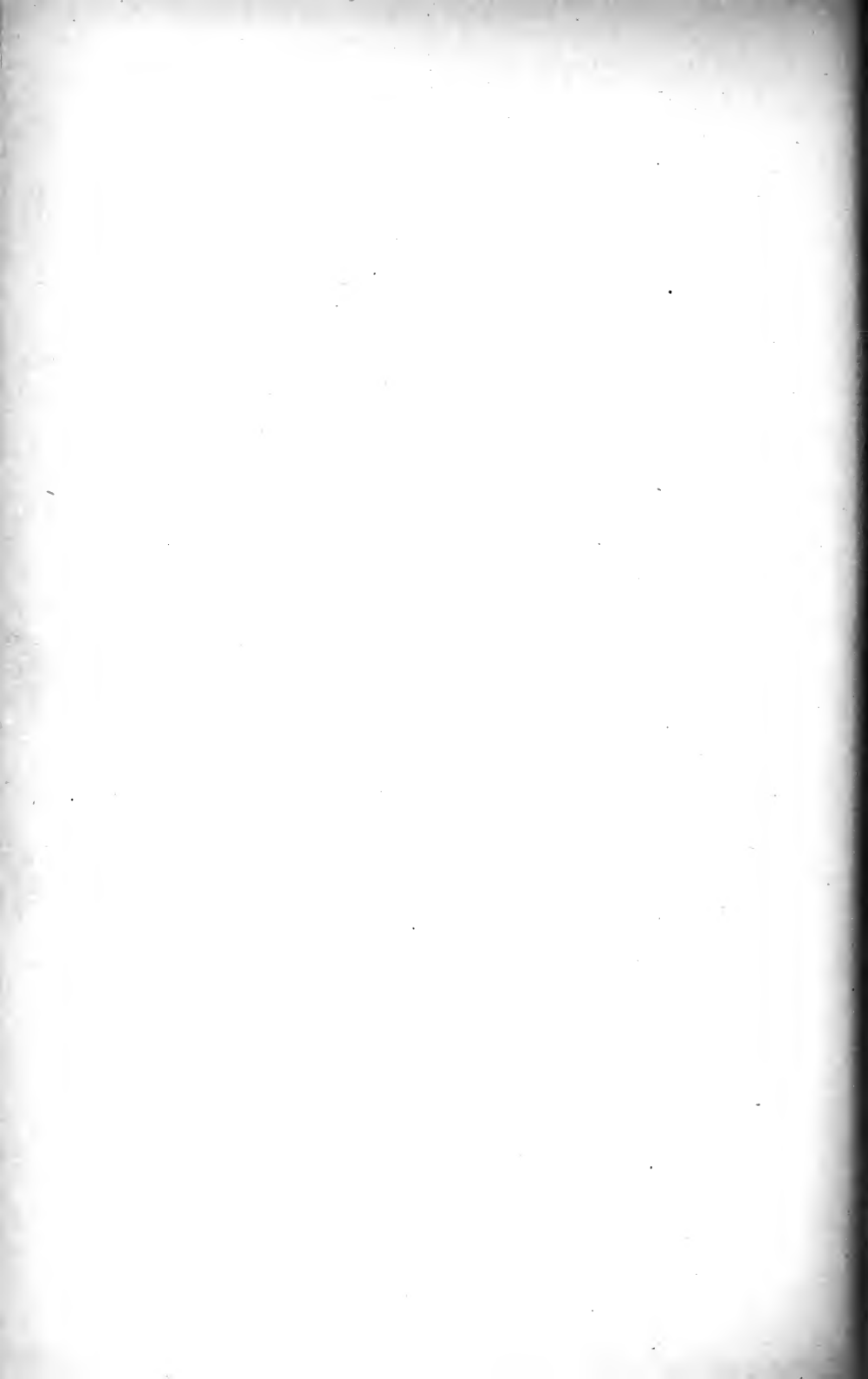
FRUCTIFICATION—Capsules, with a fringed kidney-shaped involucre, on the anterior branch of the lateral veins.

HABITAT—Grows freely on woody slopes, chiefly on a sandy soil.

SCALE,

*Enlarged*

LASTREA DILATATA
Broad Buckler Fern





LASTREA SPINULOSA, *Moore.*

ASPIDIUM SPINULOSUM, *Hooker and Arnott.*

LOPHODIUM SPINOSUM, *Newman.*

WITHERING'S FERN.

ROOT—Radicles black and wiry : caudex stout.

FROND—Narrow, oblong-lanceolate, pinnate ; from one to two feet in length.

STIPES—Nearly as long as the frond, slender and fragile, slightly covered with pale thin membranous scales, which are composed of cells of one size and substance.

PINNÆ—Pinnate, nearly opposite, triangular-lanceolate ; the inferior pinnules in the basal pinnæ, especially the first pair, being much longer than the superior.

PINNULES—Detached : in the first six pairs of pinnæ the lower pinnules are longer than the upper ; the lobes dentate, and the serratures terminating in soft spines, the spinous serrature curving towards the apex of the pinnule.

VENATION—"The veins of the pinnules, *which in adult specimens are sunken on the upper side of the frond*, are alternately branched, each system of branches entering a division of the pinnule, and the anterior branch bearing a circular cluster of capsules just within the sinus, which occurs between each two divisions." . . . "Owing to the constant position of the clusters on each pinnule, they form a regular double line, the midvein of the pinnule passing up the centre."—*Newman*, p. 161, *Third Edition.*

FRUCTIFICATION—The clusters are generally confined to the upper portion of the frond. Involucre with an entire margin.

HABITAT—Damp moist woods and boggy places, near Matlock and Ashbourne.

The careful study of this plant will confirm the character by which it is distinguished from *L. Dilatata* in all its forms. *L. Spinulosa* inhabits more wet and boggy places in general, although not seldom gathered with *L. Dilatata* : its habit is slender and light, yielding to the early frosts ; its stature, when mature, far below that species ; its scales always of a thin membrane, consisting of very minute, *uniform* elongated cells. The species preserves these characters under cultivation, and has been studied in Kent, Sussex, Hampshire, Yorkshire, Cheshire, Cumberland, and North Wales. Varieties of *L. Dilatata* may resemble it : but the scale and habit do not agree.

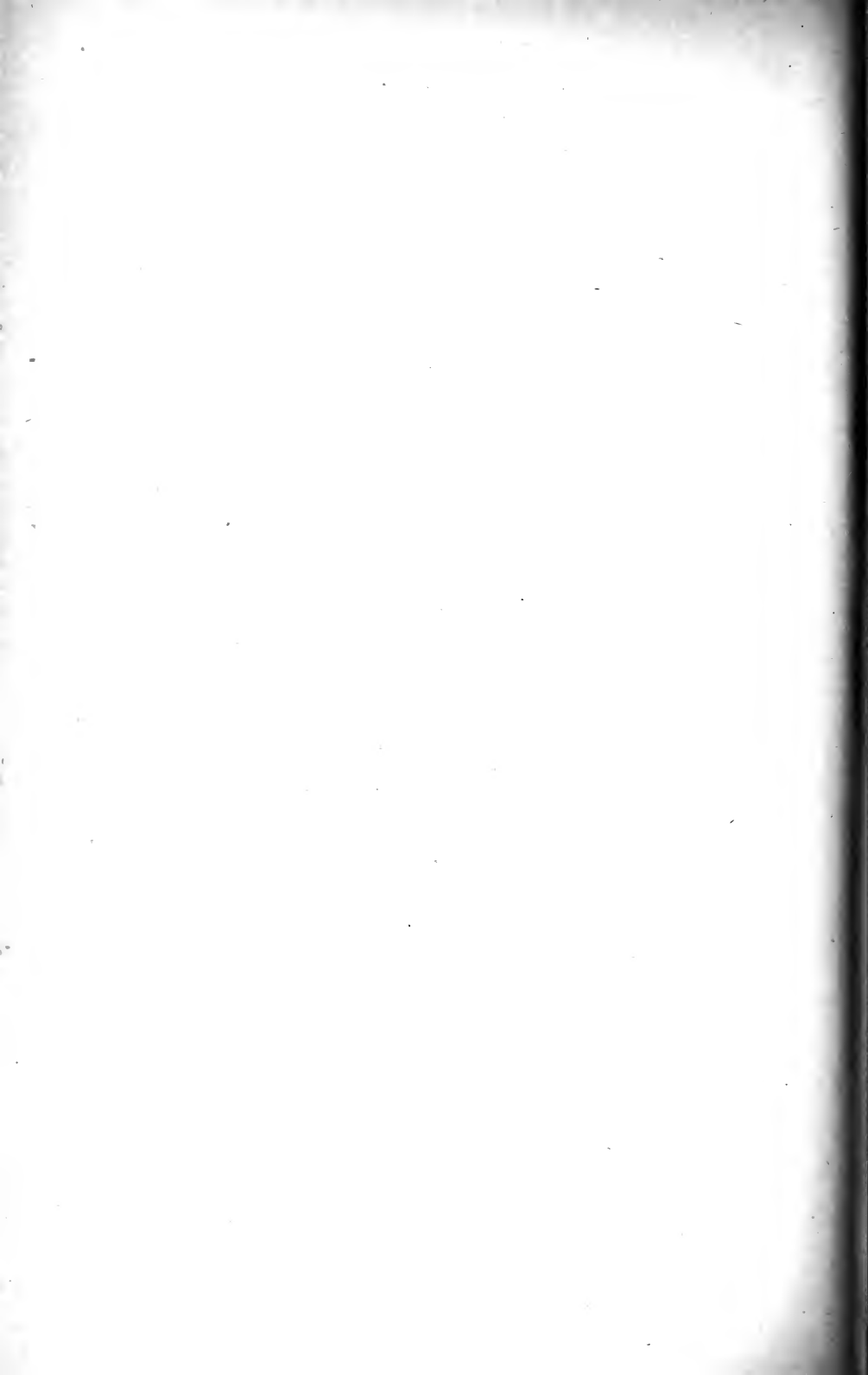


Scale Magnified

LASTREA SPINULOSA



*Veinly Structure
Part of Scale*



LASTREA OREOPTERIS, *Presl.*

LASTREA MONTANA, *Newman and Moore.*

ASPIDIUM OREOPTERIS, Sw., *Hooker and Arnott.*

SWEET MOUNTAIN SHIELD FERN.

ROOT—Radicels strong, tough, and penetrating; caudex thick, tufted, creeping, scaly.

FROND—From one to three feet in length, bright green, lanceolate, pinnate, tapering to the base; the seven lower pairs of pinnæ becoming gradually more narrow, the lowermost even in full-grown specimens being little more than half-an-inch long.

STIPES—Short (about one-seventh the length of the frond), moderately covered with light brown scales.

PINNÆ—Linear-lanceolate, deeply pinnatifid, opposite, clothed beneath with resinous, fragrant glands.

PINNULES—Pinnules rounded, and slightly crenate.

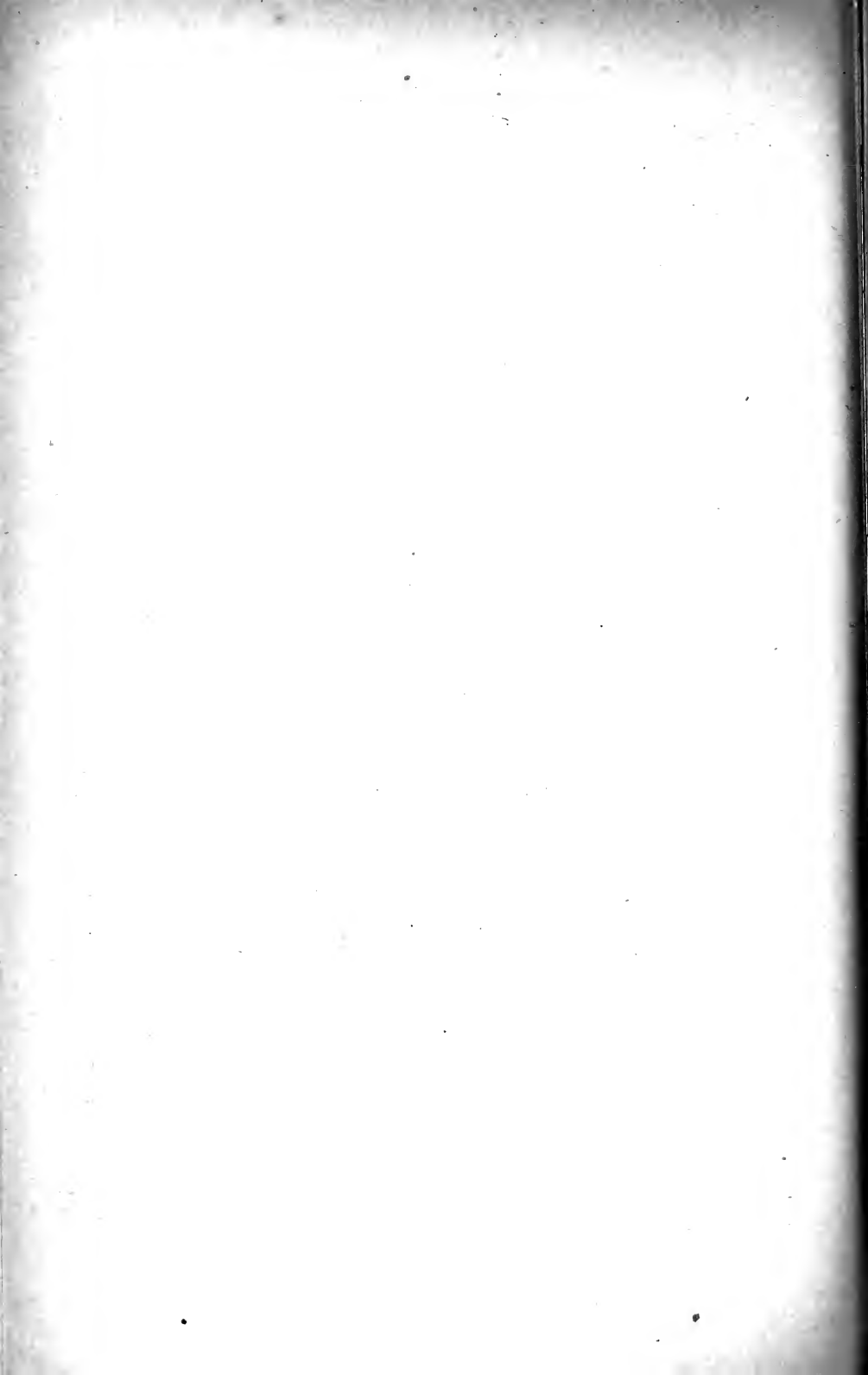
VENATION—Lateral veins alternate; the costæ terminating with a fork; the two veins next the extremity simple, the remainder forked.

FRUCTIFICATION—Clusters of capsules circular, near the extremity of each branched or simple vein, giving to the pinnule the appearance of a marginal braiding. Involucres small, or wanting.

HABITAT—In mountainous districts, generally in boggy ground. Plentiful in the High Peak; found also on the sandstone and shale in the neighbourhood of Matlock and Ashbourne.



LAs'TREA MONTANA
Mountain Fern



POLYPODIUM VULGARE, *Linnaeus*.

COMMON POLYPODY.

ROOT—Radicles dark brown, long and fibrous; rhizome long and creeping, covered with a scaly cuticle.

FROND—Linear-lanceolate, deeply pinnatifid.

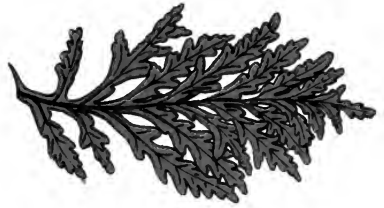
STIPES—About one-third the length of the frond, articulated at the base.

PINNÆ—Linear, alternate, confluent at the base, serrated more or less deeply at the margin, mostly rounded at the apex.

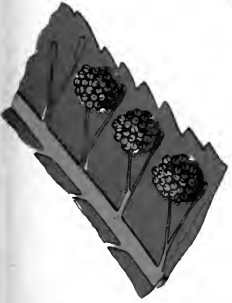
VENATION—Costæ sinuous, lateral veins alternate, three or four times branched.

FRUCTIFICATION—Clusters of capsules circular, on each side the midvein; capsules generally on the upper part of the frond only.

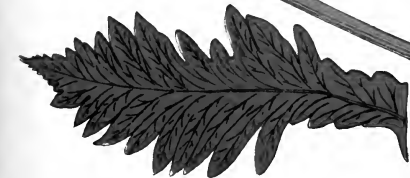
HABITAT—On old trees, hedges, walls, roofs, and ledges of rocks, common.



P. H. Aquaticum.



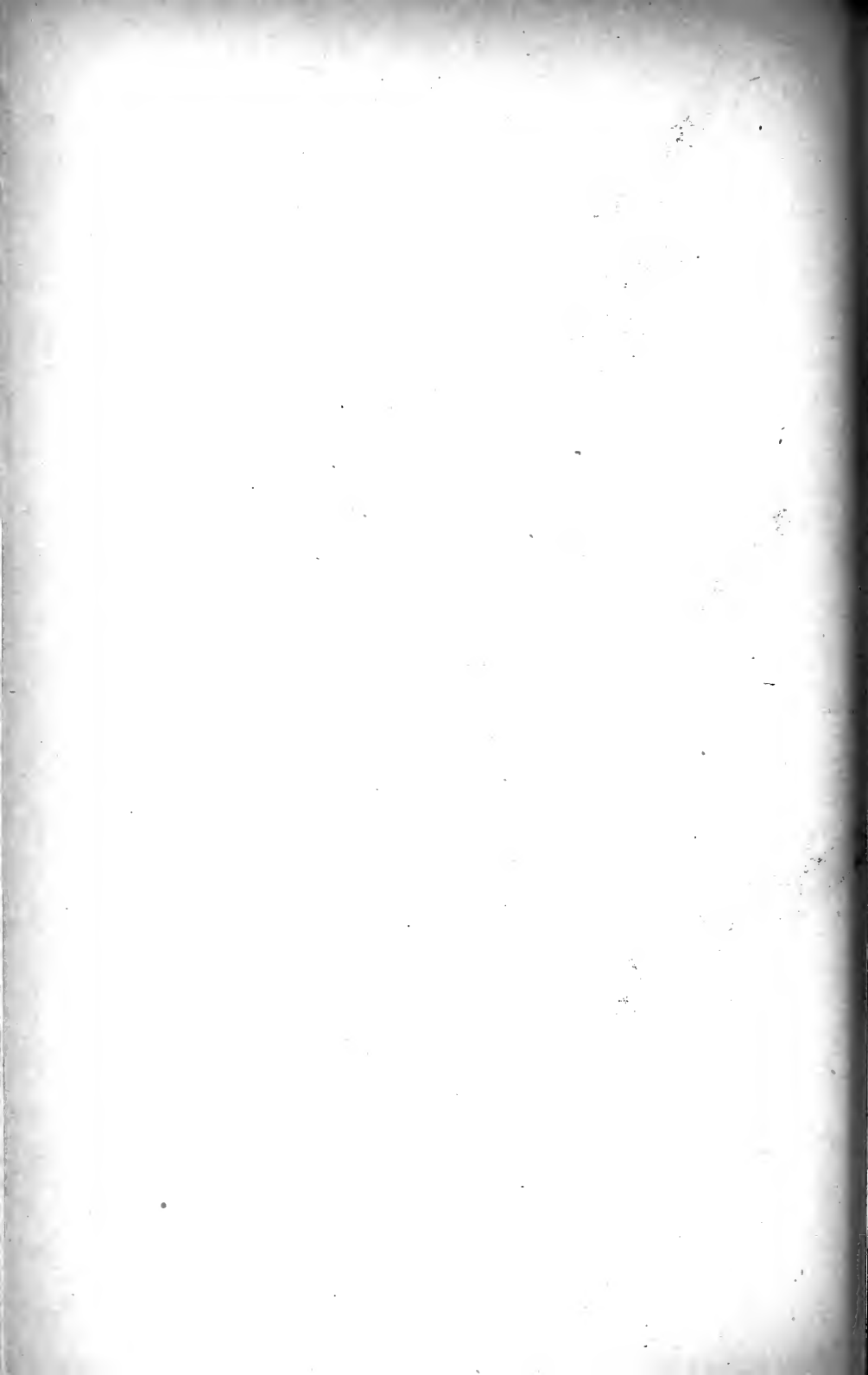
Fruit enlarged.



P. Vulgare, Cambicum.

POLYPODIUM VULGARE

Common Polypody





POLYPODIUM PHEGOPTERIS, *Linn.*
GYMNOCARPIUM PHEGOPTERIS, *Newman.*

BEECH FERN.

ROOT—Radicles black and fibrous; rhizome creeping, tortuous, slender.

FROND—Triangular, broad at the base, acute at the apex, bipinnatifid; the lower pinnæ drooping or projecting inwards; pendulous, of a pale green or olive colour, from six inches to two feet long.

STIPES—From one-half to two-thirds the length of the frond, slightly covered with thin membranous scales.

PINNÆ—Opposite, or nearly so, sessile, pinnatifid, linear-lanceolate, apices acute: the lowermost pair of pinnæ ovato-lanceolate, and at a more acute angle with the rachis.

PINNULES—Ovate-oblong, obtuse, the posterior pinnules in the lowermost pinnæ serrated, the margins variously clothed with minute spear-like hairs.

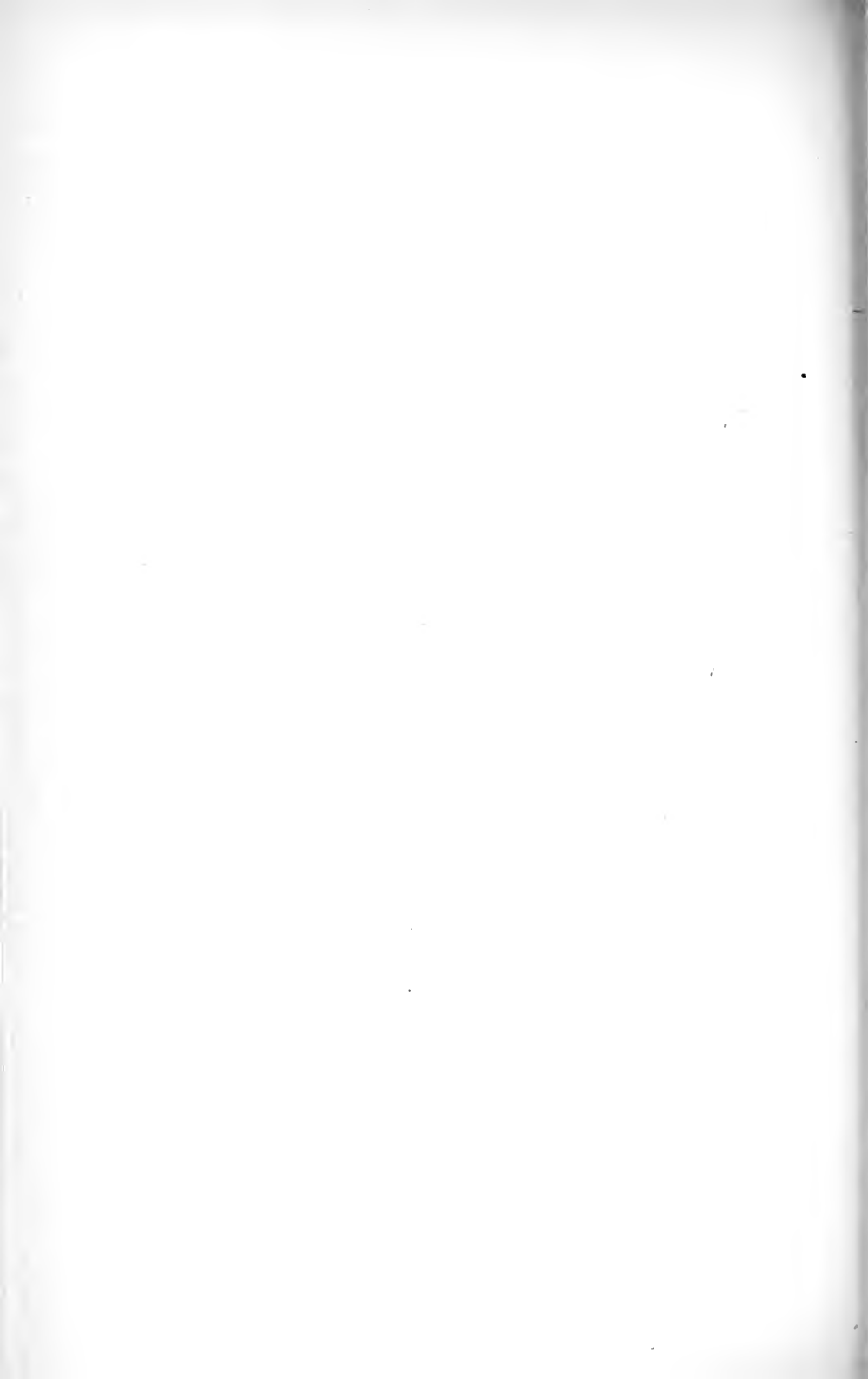
VENATION—Costæ somewhat sinuous, lateral veins simple and branched, extending to the margin.

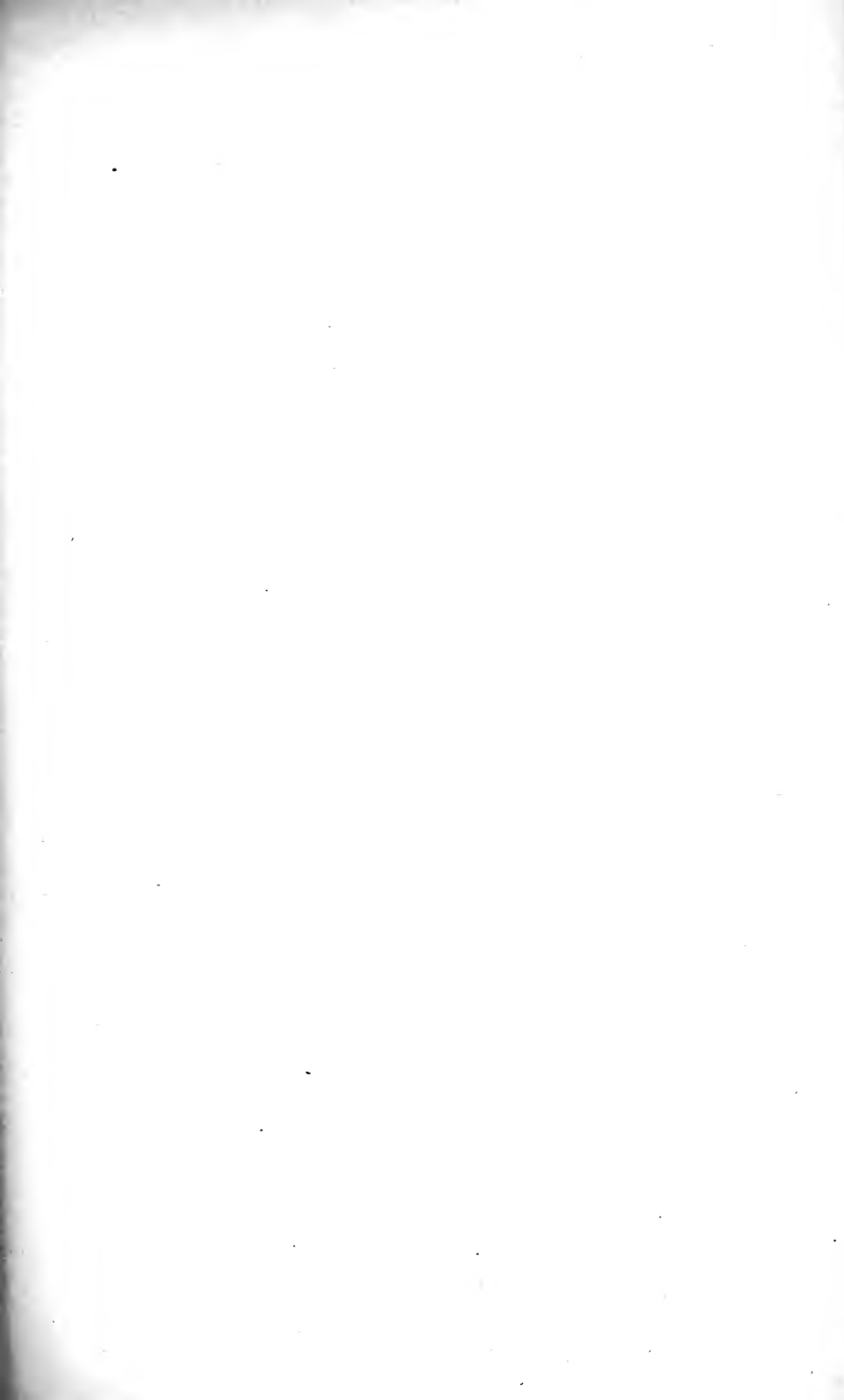
FRUCTIFICATION—Clusters of capsules circular, almost marginal when in perfection, as in *Lastrea Oreopteris*.

HABITAT—Moist woods, and near waterfalls; most luxuriant in shaded places within reach of the spray: when found in high latitudes, and on mountain sides, it becomes more downy, and dwarfed.



P. PHEGopteris
Beech Fern





POLYPODIUM DRYOPTERIS, *Linnaeus*.
GYMNOCARPIUM DRYOPTERIS, *Newman*.

OAK FERN.

ROOTS—Radicles black and wiry: rhizome black, slender, and creeping.

FROND—Often drooping, nearly triangular, three-branched; each branch pinnate, the pinnæ opposite.

STIPES—Twice the length of the frond, very slender, and smooth to the touch (especially when compared with *P. Calcareum*); a few straggling scales at the base.

PINNÆ—Opposite, pinnate at the base, and pinnatifid towards the end; apex sub-acute.

PINNULES—Oblong, somewhat serrated, round at the apex; the basal pinnules are sessile.

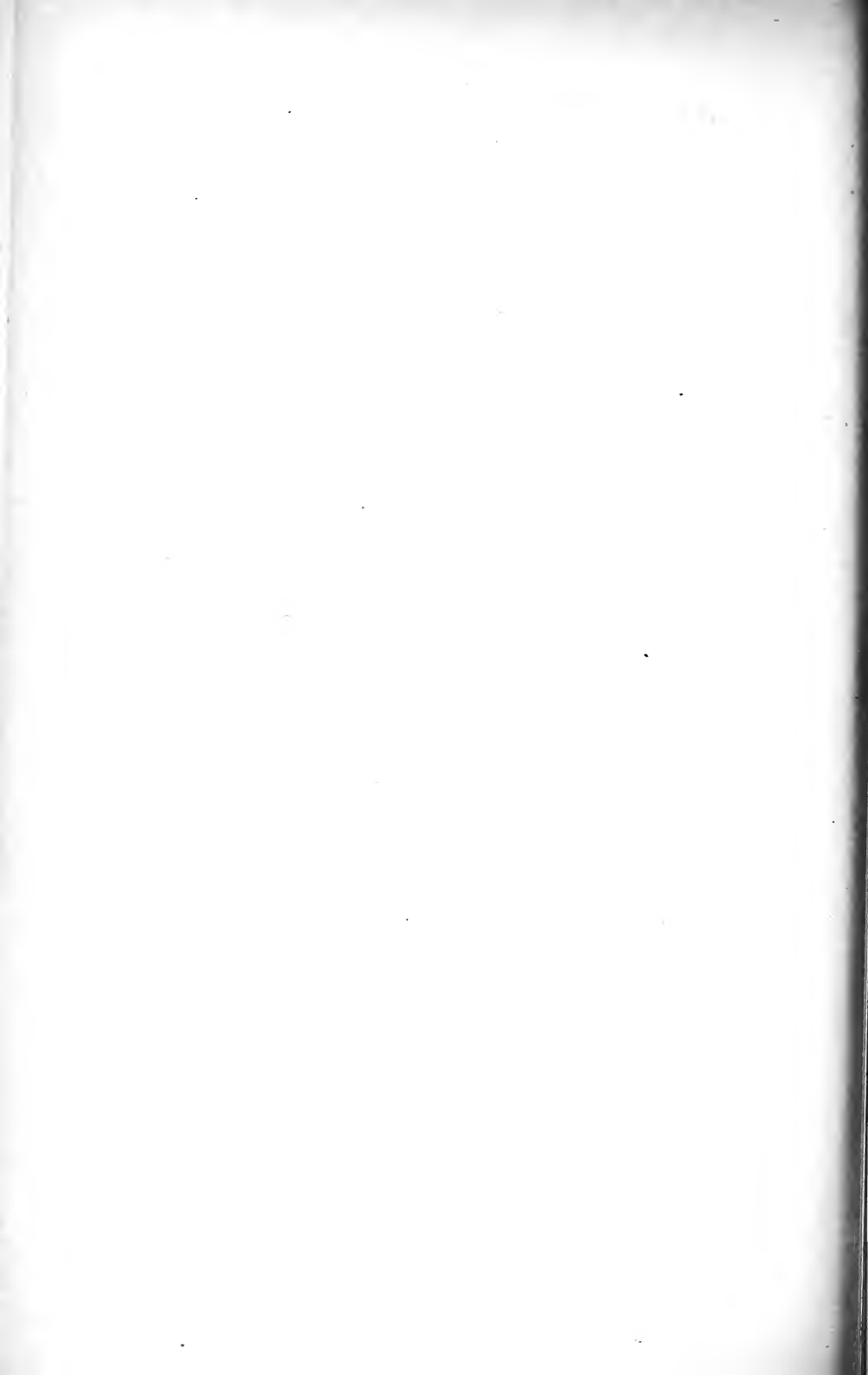
VENATION—Costæ sinuous; lateral veins both simple and forked, extending to the margin.

FRUCTIFICATION—Clusters of capsules scattered, circular.

HABITAT—In moist shady places. Found near Rowsley, Ashover, &c., on sandstone.



POLYPODIUM DROPERIS
Oak Fern





POLYPODIUM CALCAREUM, *J. E. Smith.*
GYMNOCARPIUM ROBERTIANUM, *Newman.*

RIGID THREE-BRANCHED POLYPODY.

ROOT—Fibrous and black; rhizome black and creeping, from which the fronds spring at intervals.

FROND—Erect, rigid, subternate, rhomboid-triangular (the base, or outline below the broadest diameter, being in the majority of Matlock specimens, a little longer than the sides; one measuring 22 inches, is at the base of the frond $11\frac{1}{2}$ inches wide, while the sides are only $9\frac{1}{2}$ inches deep), three-branched: basal branches, lower half pinnate, upper half pinnatifid; the upper branch pinnate, apices acute.

STIPES—About two-thirds the length of the frond, much firmer and stronger than in *P. Dryopteris*, sparingly covered with scales, but grey, as well as the frond, with minute glands.

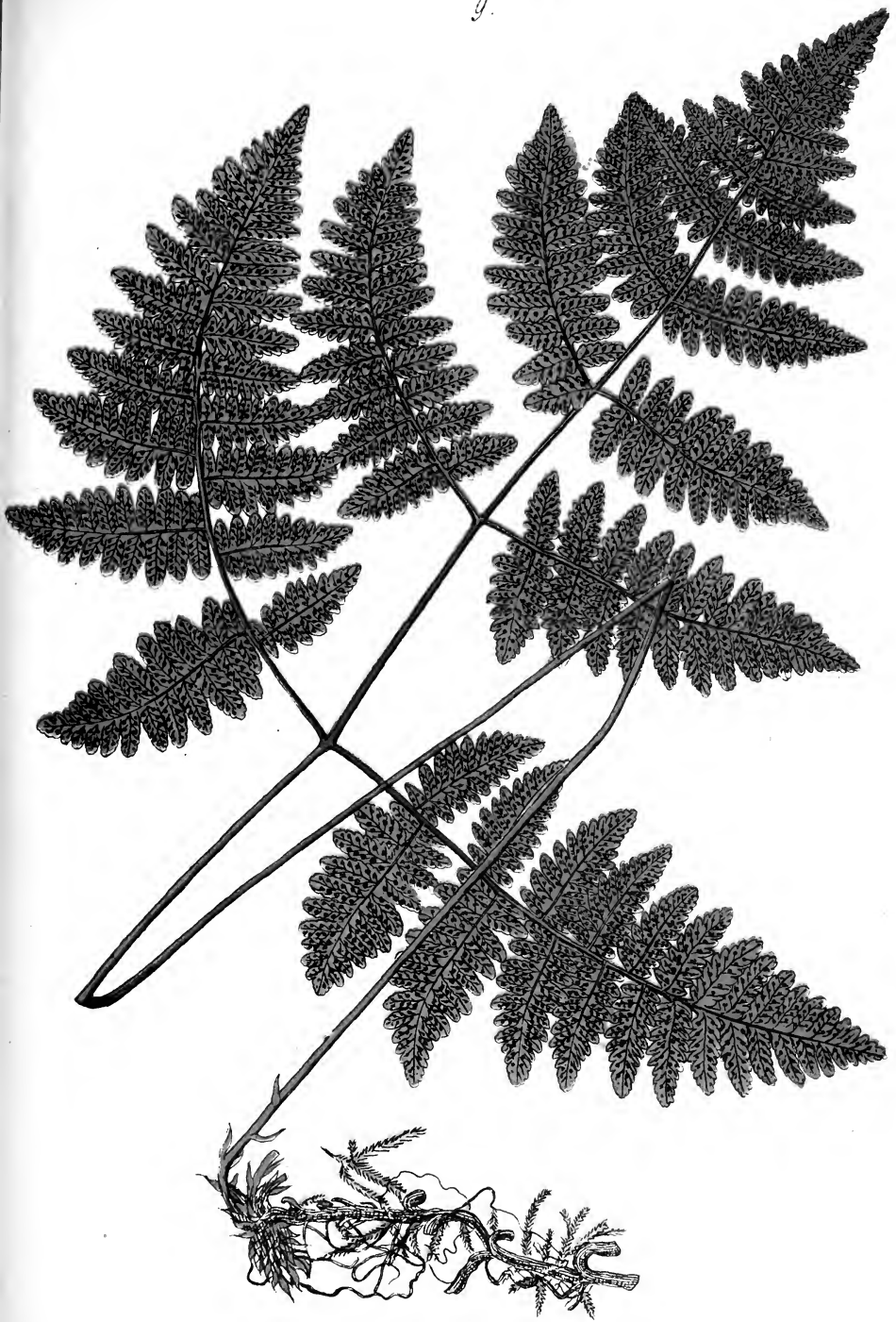
PINNÆ—Triangular-lanceolate, pinnatifid, the lower pinnæ and pinnules being longer than the upper.

PINNULES—Oblong, obtuse, somewhat serrated.

VENATION—Costæ sinuous, lateral veins simple and branched.

FRUCTIFICATION—Clusters of capsules, circular, sub-marginal.

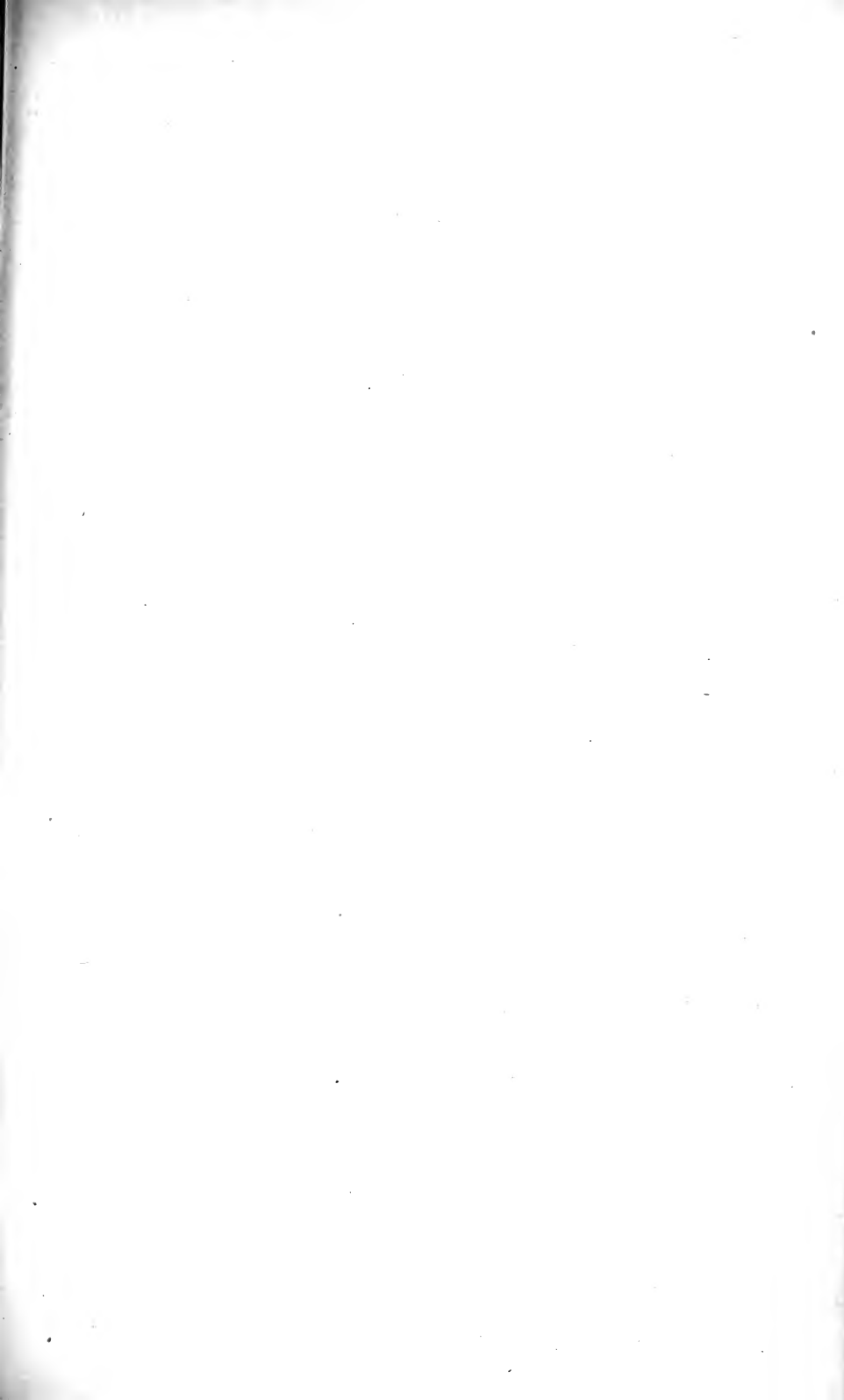
HABITAT—Rocky places, in limestone districts, upon deep loose stones: thrives in sunshine. Once locally abundant about Matlock, Buxton, Miller's Dale, &c.



POLYPODIUM CALCAREUM

Limestone Polyfroidy





POLYSTICHUM LONCHITIS, *Roth, Newman.*
ASPIDIUM LONCHITIS, *Swartz, E. J. Lowe.*

HOLLY, OR ROUGH ALPINE SHIELD FERN.

ROOT—Black, wiry, forked; caudex oblique, short, clothed with chaffy scales.

FRONDS—Tufted, spreading, sub-erect, rigid, linear-lanceolate; pinnate; dark green, paler beneath; rachis scaly.

STIPES—Short, clothed with chaffy scales.

PINNÆ—Shortly stalked, undivided; set obliquely upon the rachis, often overlapping, falcate-lanceolate, or wedge-shaped; rounded below, acutely auriculate above; spinuloserrate, acuminate.

VEINS—Forked from the costa to the marginal teeth.

FRUCTIFICATION—Sori flat, circular, crowded upon the upper part of the fronds, in two or more lines; indusium large, orbicular.

HABITAT—Rocky clefts, or debris in alpine and mountainous places.

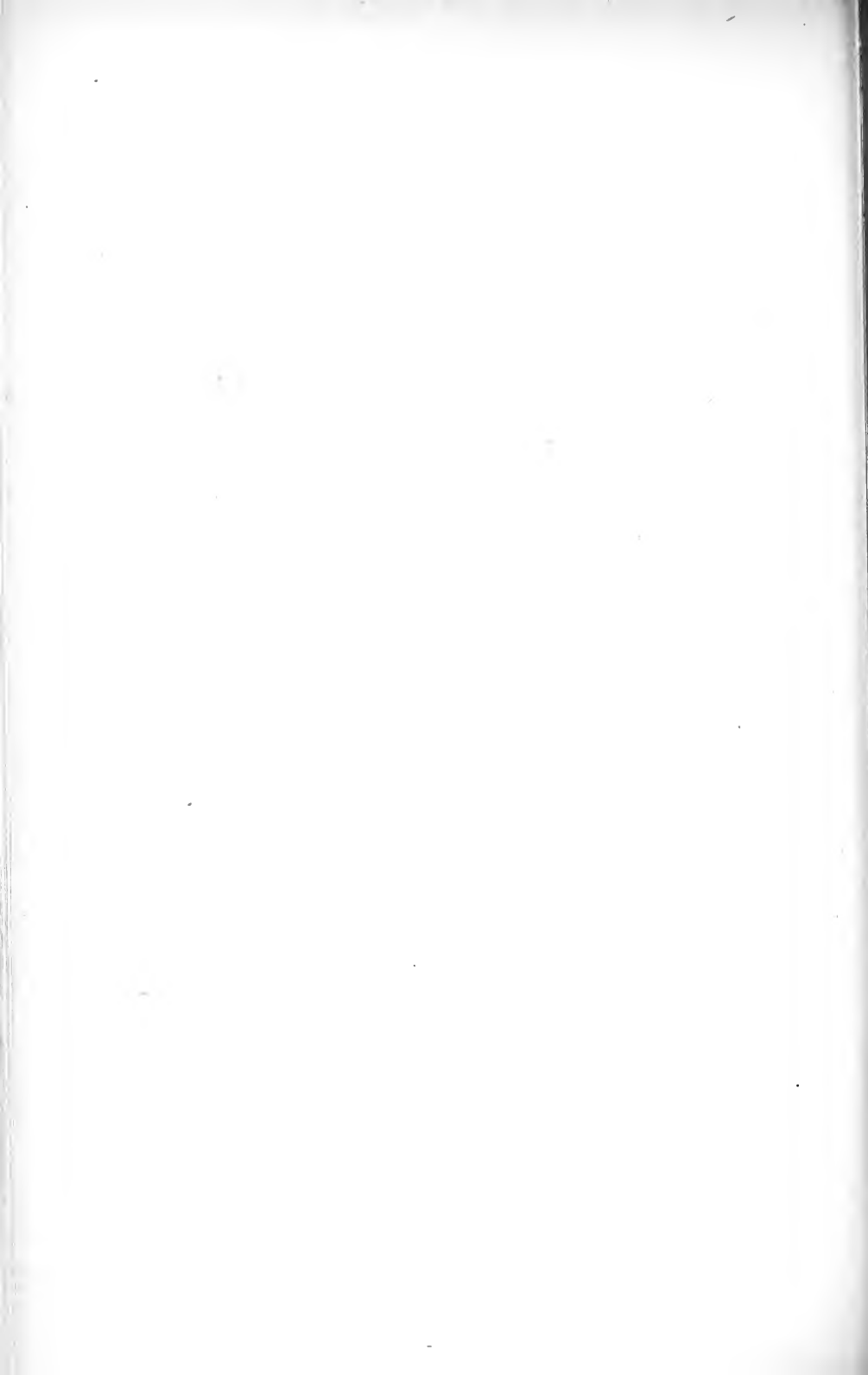
This species has been added to the catalogue of Derbyshire Ferns, since the publication of the first edition of this work, by Reginald Darwin and John Huish, Esq., who discovered it growing with *Asplenium viride*, on the 25th of June, 1863, in a rocky gorge near Fern, Buxton. It is a northern species, extending from Greenland to Kamschatka. In British Columbia, the fronds attain two feet in length.

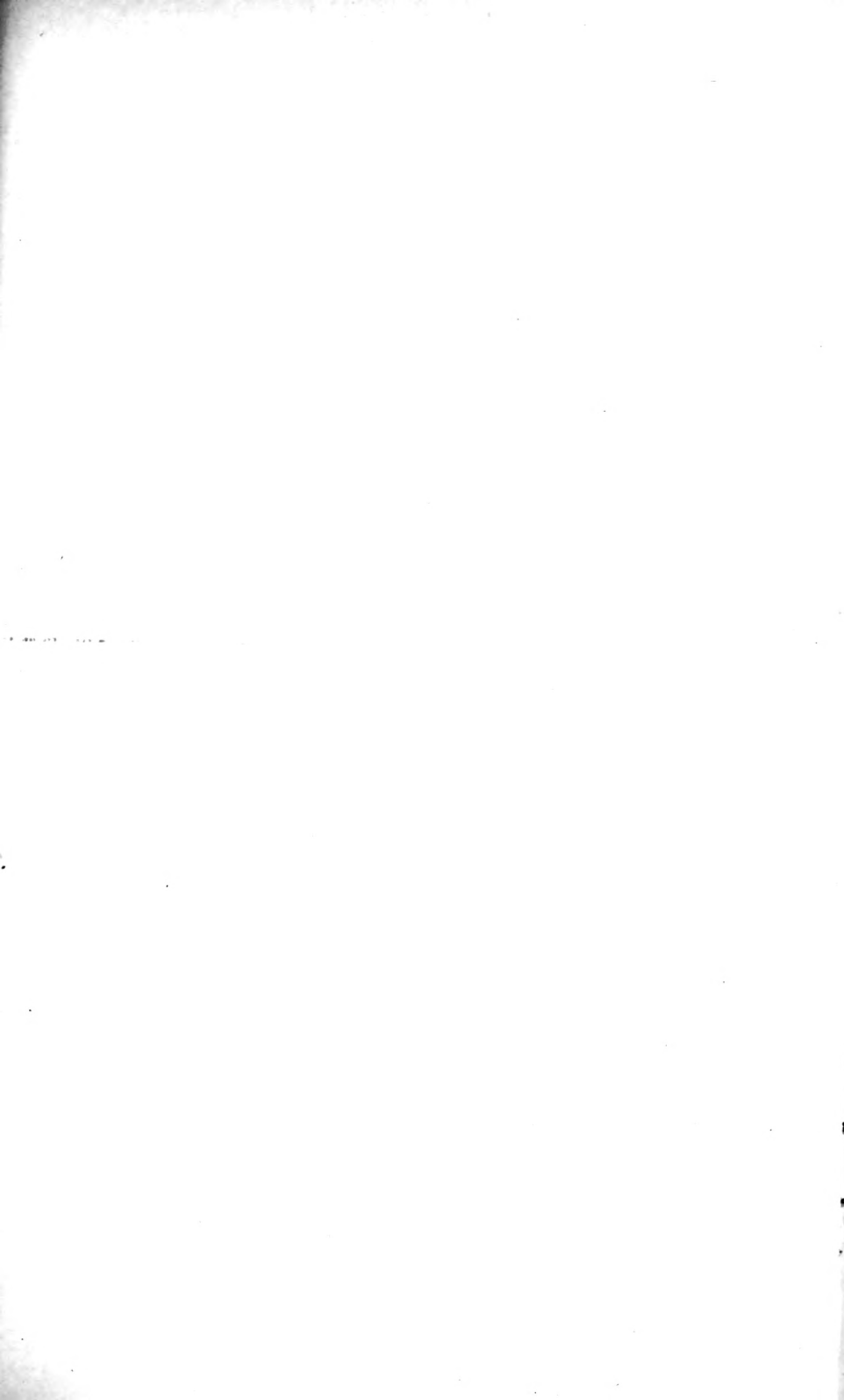


POLYSTICHUM LONCHITIS
Holly Fern.



P. ACULEATUM
very near to P. lonchitis.





POLYSTICHUM ANGULARE, *Presl, Newman.*

ASPIDIUM ANGULARE, *Willdenow, Smith.*

WILLDENOW'S FERN.

ROOT—Radicles long, wiry, and penetrating; caudex stout and tufted, profusely covered with brown scales.

FROND—More or less drooping, lanceolate, bipinnate; curved as a feather.

STIPES—Short, about one-fourth the length of the frond, thick at the base, densely covered with reddish scales; the scales are continued the whole length of the frond, both on the main and secondary rachis.

PINNÆ—Alternate, distant, linear-lanceolate, pinnate; curving towards the apex.

PINNULES—Stalked, ovate-lanceolate, *forming a curved angle with the stalk*, margin serrated, each serrature terminating in a spine; the upper basal lobes are auricled, sometimes so deeply as to make the pinnules pinnate.

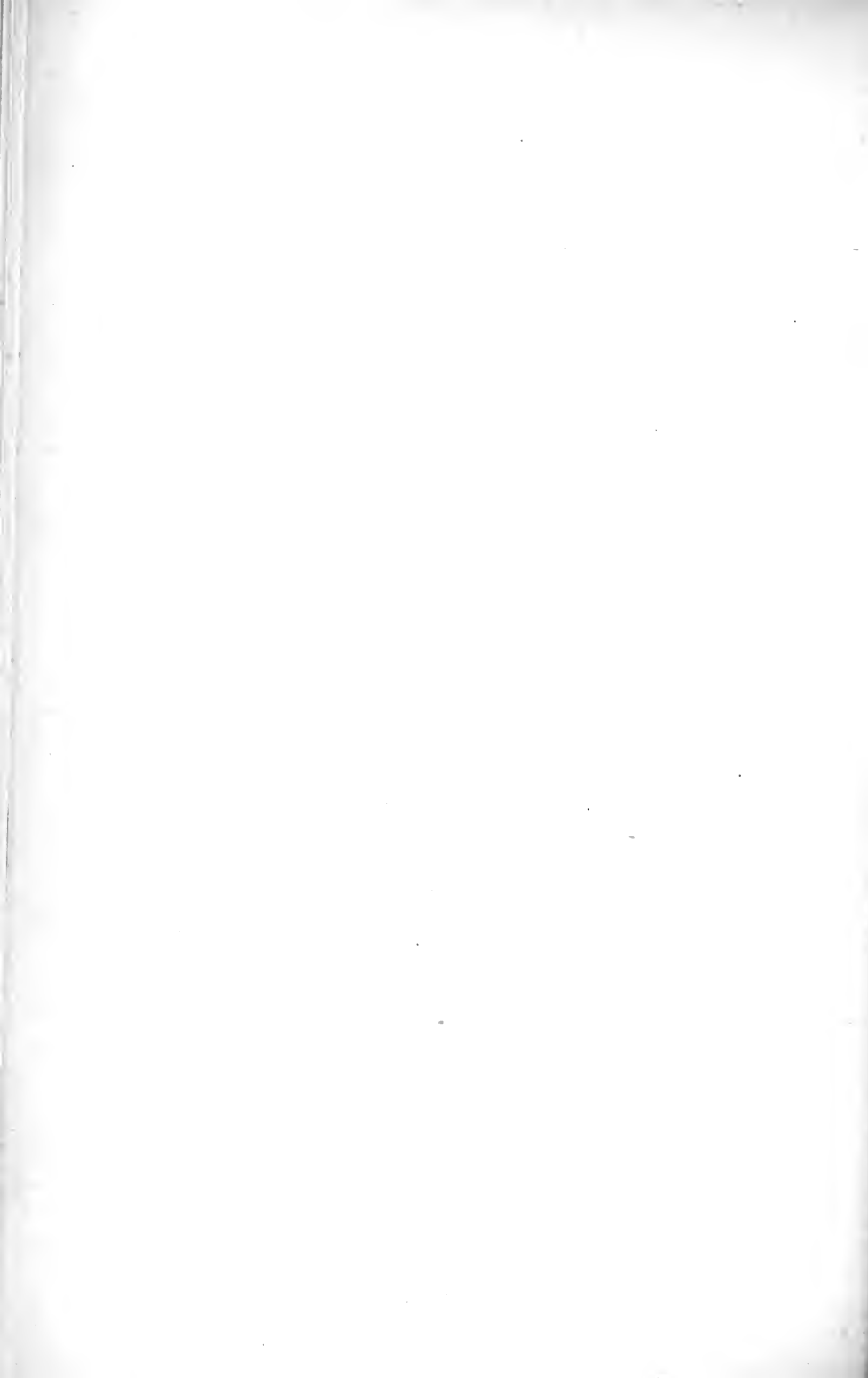
VENATION—Costa sinuous, lateral veins alternate, forked, terminating at the point of the serratures.

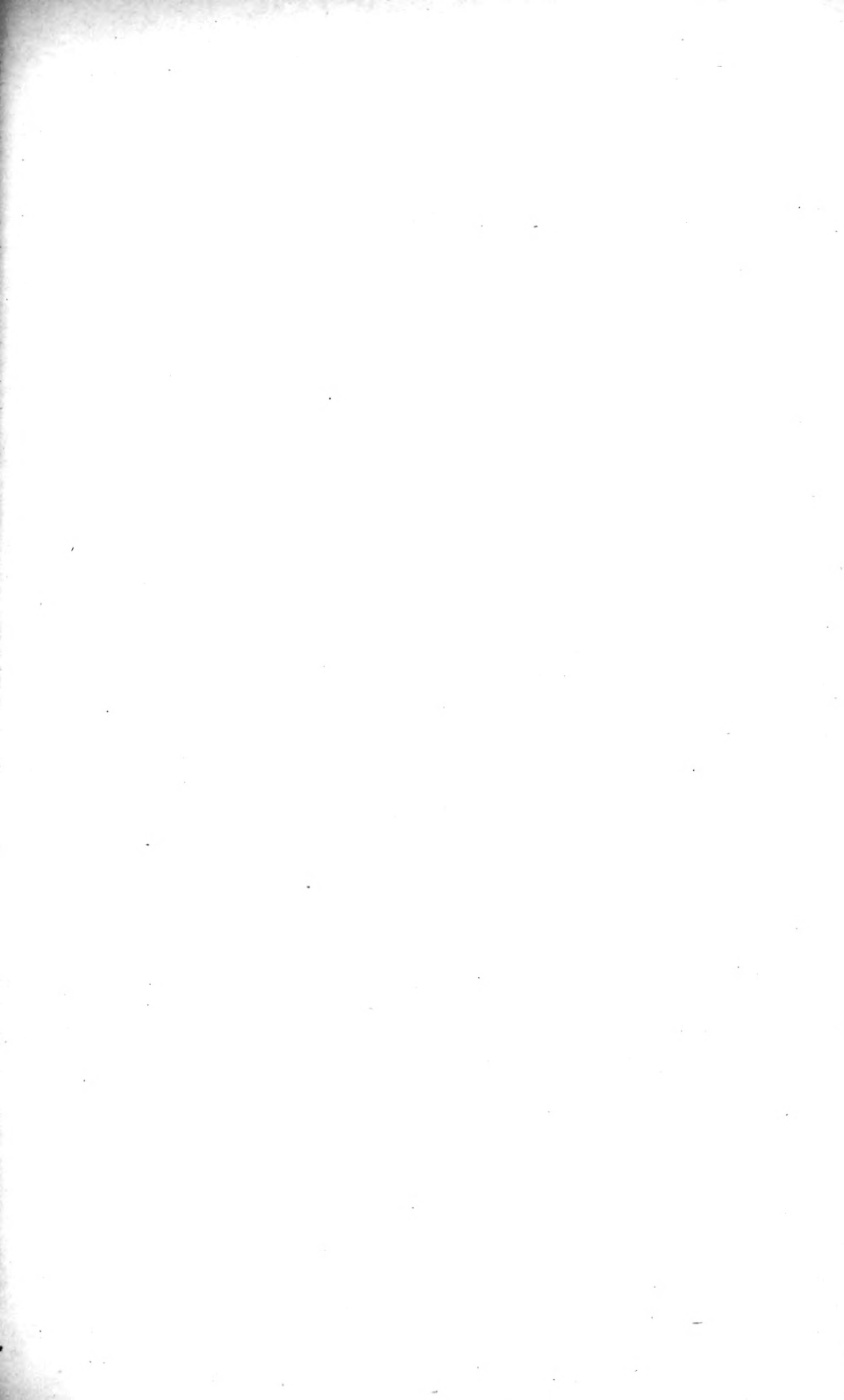
FRUCTIFICATION—Clusters with a jagged involucre, the ripe capsules of a beautiful chestnut colour.

HABITAT—Frequent in woods and hedges, and varying greatly in the breadth, outline, and division of its pinnæ. Mr. Lowe describes 162 forms, many of which he figures in "Our Native Ferns," Vol. I. In the Edinburgh List of British Ferns and their Varieties, 1868, the names of no less than 400 distinct varieties of this species are given!



POLYSTICHUM ANGULARE.
Soft Proof by Shick's Press





POLYSTICHUM ACULEATUM, *Roth.*
ASPIDIUM ACULEATUM AND LOBATUM, *Smith.*

PRICKLY FERN.

ROOT—Radicles long and wiry, caudex large and tufted.

FROND—Erect, linear-lanceolate, bipinnate; of a darker green than *P. Angulare*.

STIPES—Short, thickly clothed with broad chaffy scales.

PINNÆ—Pinnate, lanceolate, alternate.

PINNULES—Ovate-lanceolate, straight, spinous at the apex; the first upper pinnule longer than the rest, and auricled; all *at an acute angle* with the common stalk.

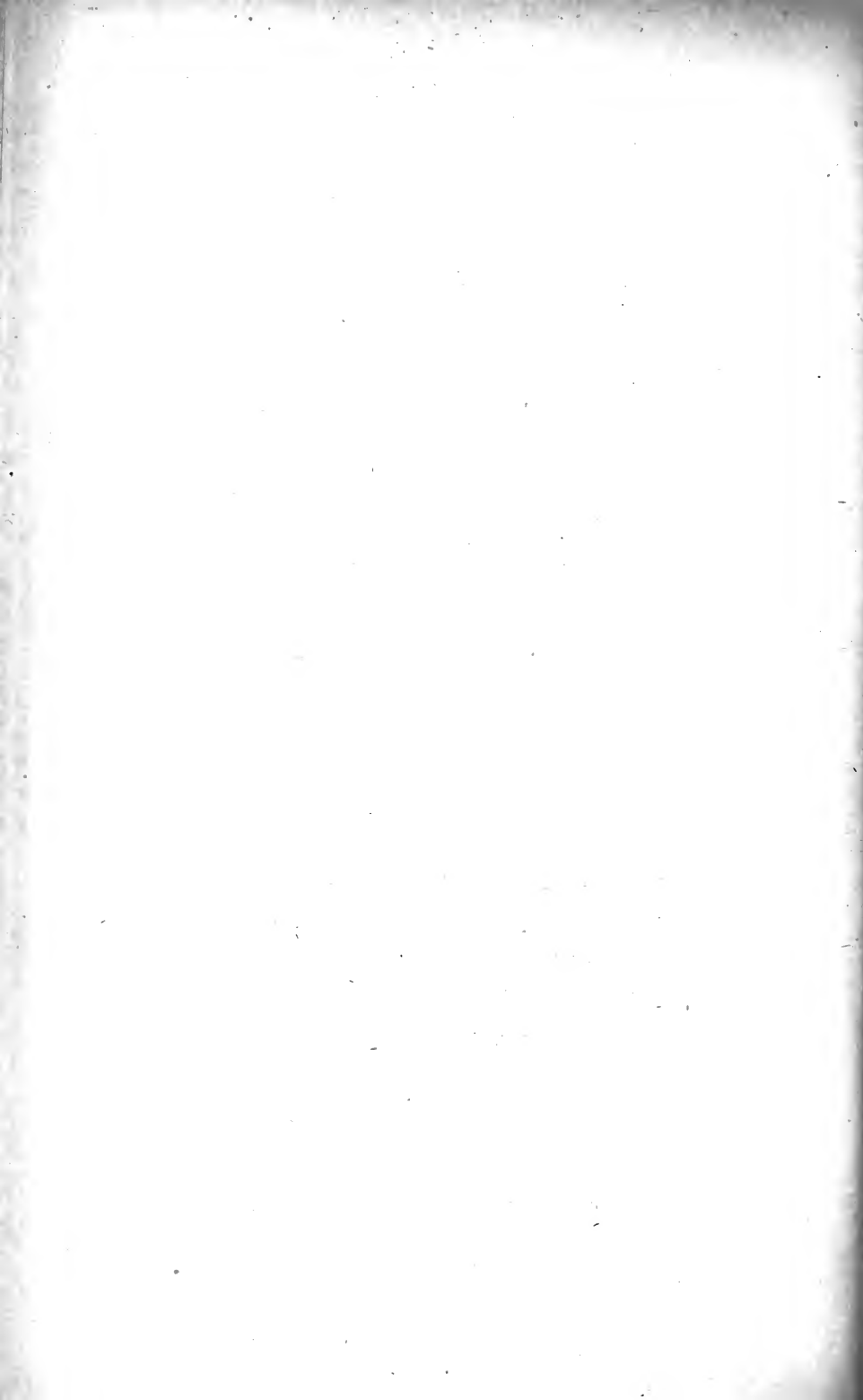
VENATION—Lateral veins alternate, forked, terminating in the serratures.

FRUCTIFICATION—Clusters upon the anterior branch of the vein.

HABITAT—Frequent in woods and lanes. The frond figured in "Our Native Ferns," Vol. I., f. xx, represents the narrow form so frequent about Matlock. When dwarfed by situation on exposed rocks, the pinnules are combined, and the frond simply pinnate. This is Ray's "*Filix lonchitidi affinis*," and not always distinguishable from *P. Lonchitis*.



POLYSTICHUM ACULEATUM
Common Rusty Shield Fern



BLECHNUM BOREALE, *Swartz.*

BLECHNUM SPICANT, *Moore & Newman.*

NORTHERN HARD FERN.

ROOT—Radicles long, tough, and numerous ; caudex thick and tufted.

FROND—Usually in two forms, barren and fertile. Fertile fronds : numerous, erect, linear-lanceolate, pinnate, acute at the apex ; the lower pinnæ reaching nearly to the caudex. Barren fronds : pendant, lanceolate, deeply pinnatifid.

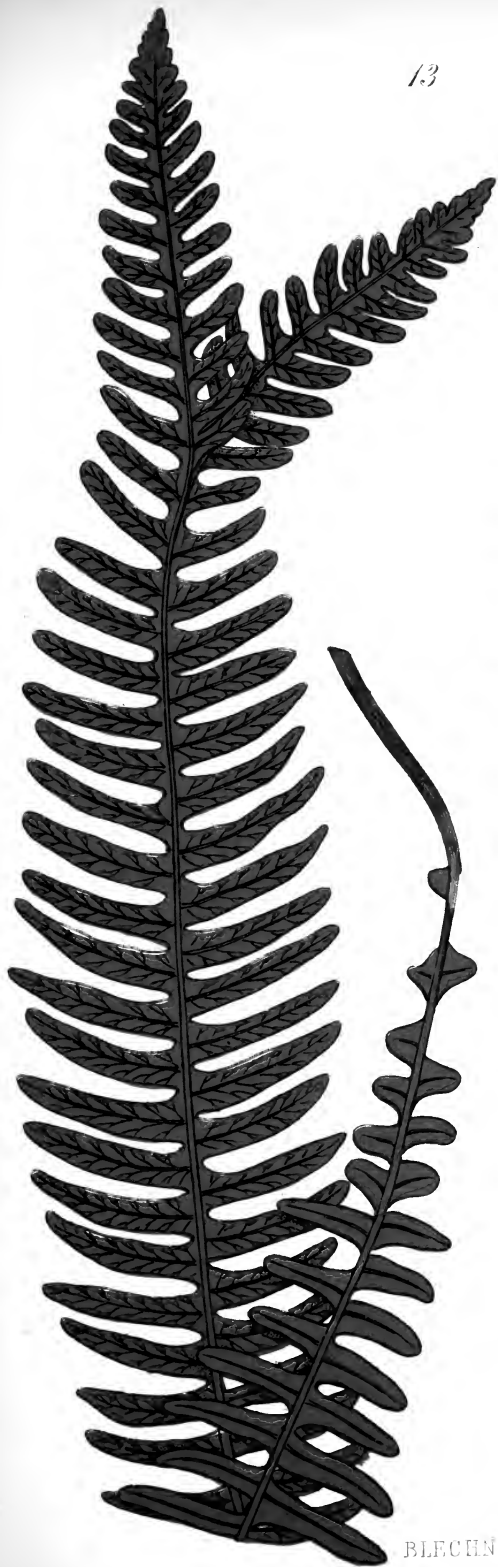
STIPES—Short, dark brown or purple, smooth.

PINNÆ—Fertile : linear-lanceolate, opposite or alternate, pointed at the apex. Barren : lanceolate, pointed at the apex ; alternate, short and broad towards the base.

VENATION—Barren frond : bifurcate, lateral veins not extending to the margin. Fertile frond : the same as the barren, with the addition of veins running parallel with and on each side of the costa, crossing the forked veins near the base of the fork.

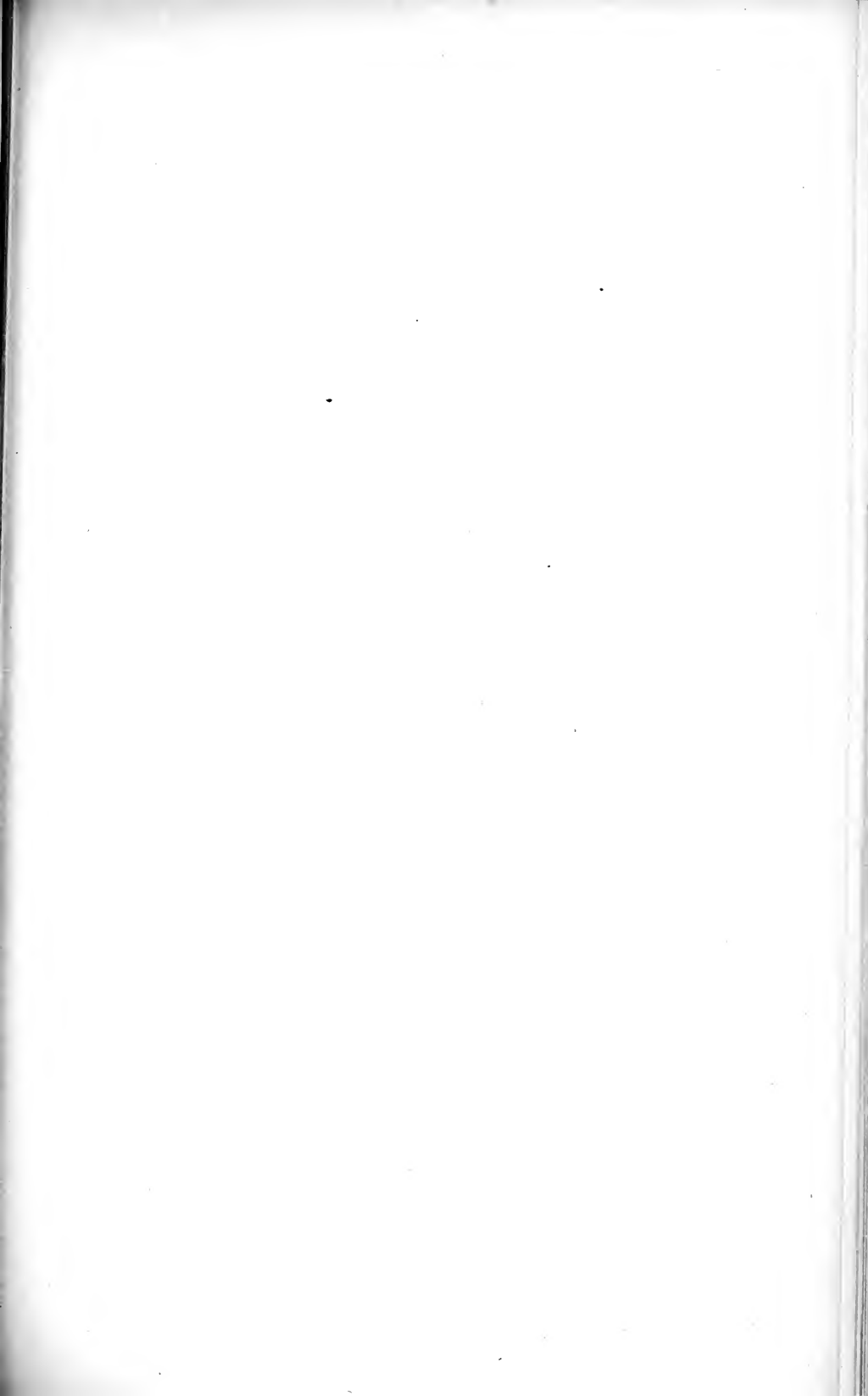
FRUCTIFICATION—Capsules attached to the veins which run parallel with the costæ, at first covered with a linear membranous involucre ; after the bursting of which the spores become of a dark brown colour ; completely covering the pinnæ. A frond gathered near Matlock has the lower half barren and the upper fertile ; the rachis of the barren portion of this frond is of a light brown, and of the fertile portion dark purple.

HABITAT—Common on the sandstone, in woods and damp places, and on moorlands. In very wet shaded spots, the fronds become all fertile.



BLECHNUM SPICANT
Hard Fern.





PTERIS AQUILINA, *Linn.*

EUPTERIS AQUILINA, *Newman.*

COMMON BRAKES.

ROOT—Radicles brown and fibrous; rhizome deep in the earth, thick, long, and creeping, succulent, and of a dark brown colour.

FROND—Triangular, bipinnate, from a few inches to ten feet high, according to locality.

STIPES—Erect and strong, half the length of the frond, pilose.

PINNÆ—Linear-lanceolate, pinnate, acute at the apex.

PINNULES—Ovate or oblong, pinnatifid, lobes rounded.

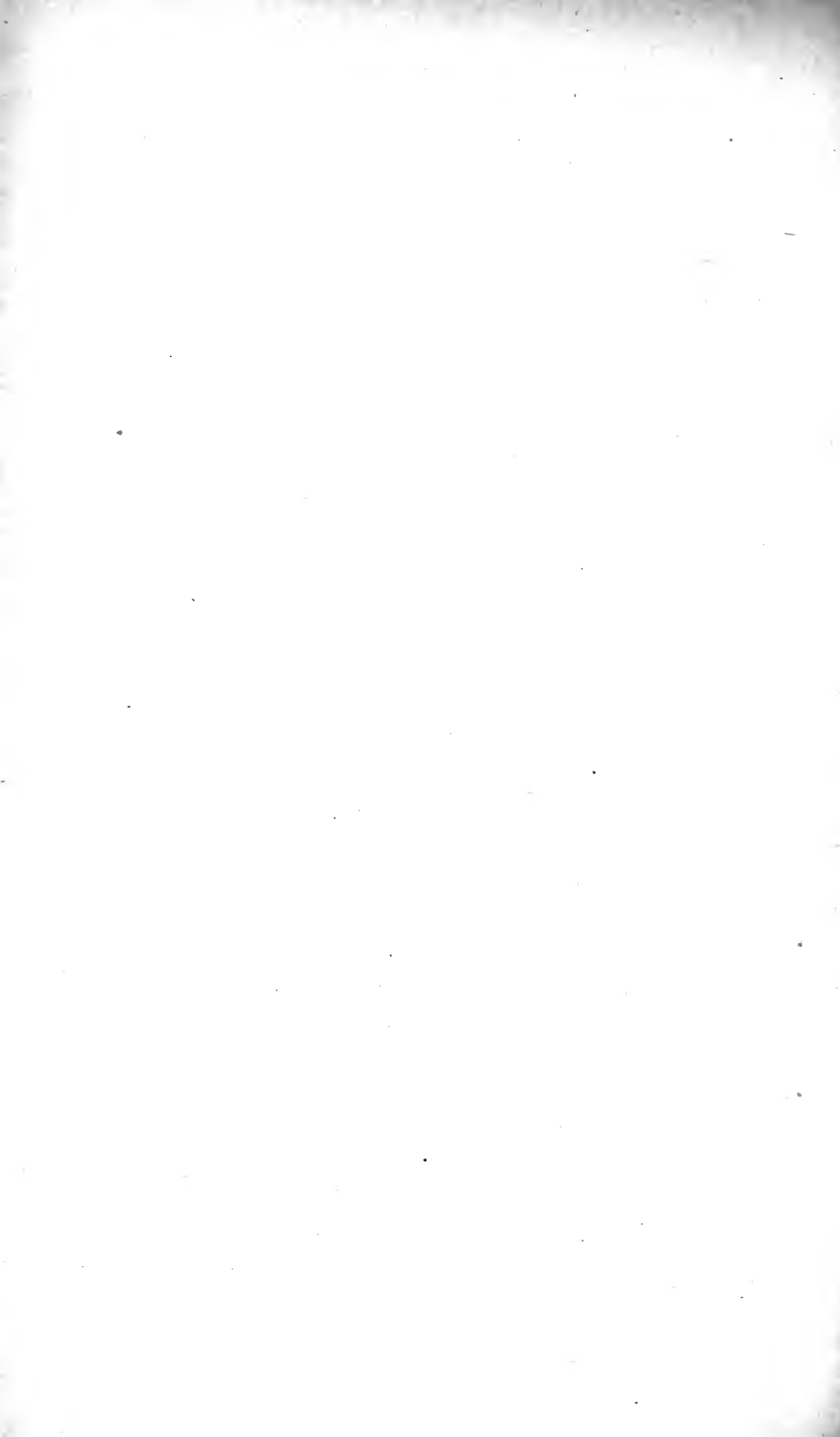
VENATION—Lateral veins alternate, twice forked, extending to the margin, joined to a longitudinal vein running along the margin; this marginal vein forms the receptacle for the indusium.

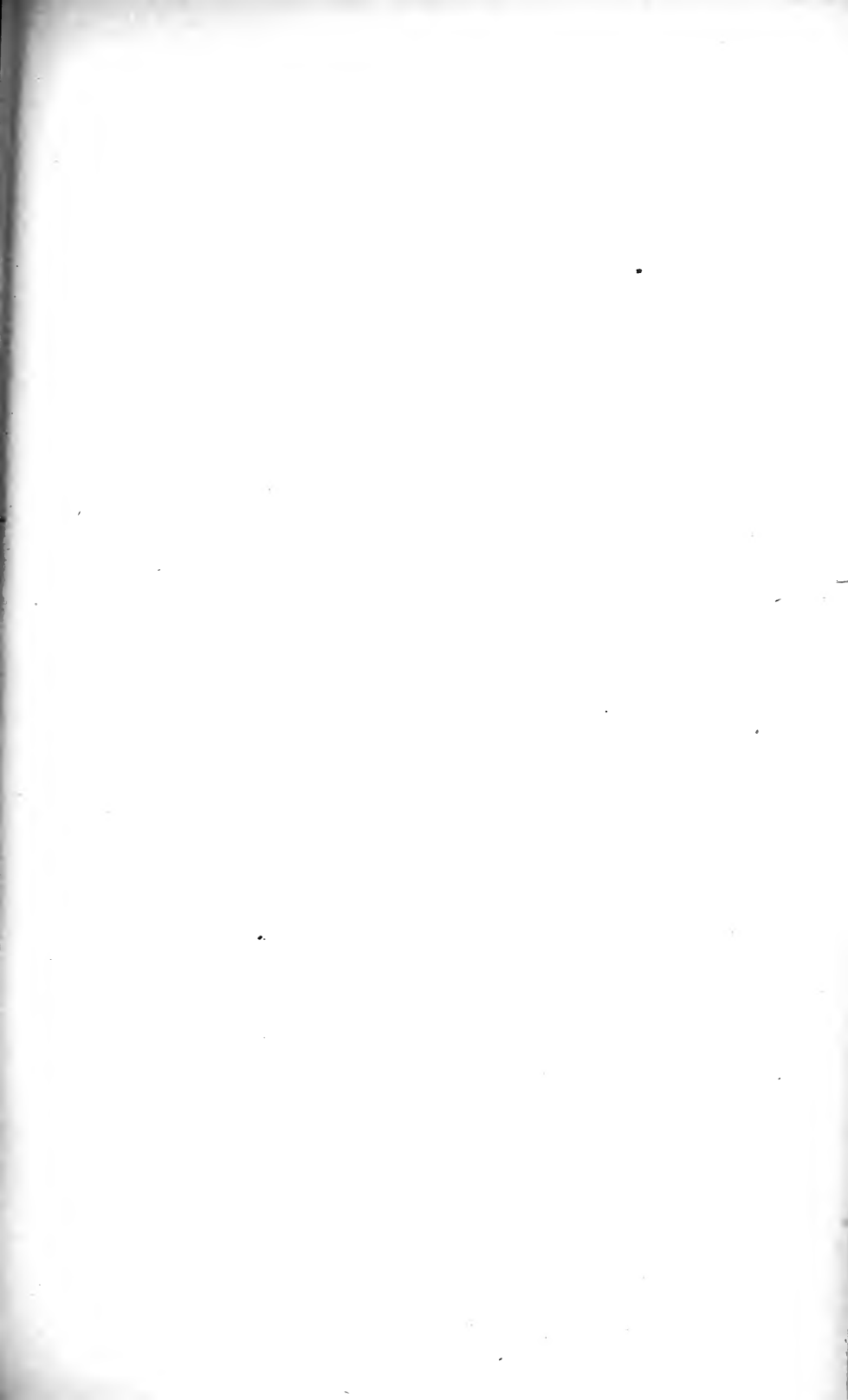
FRUCTIFICATION—Thecæ in continuous lines, marginal, numerous, globose, and encircled with a beaded elastic ring. Sporules numerous, warted, ovate.

HABITAT—Common, except on swamps.



PTERIS AQUILINA
Common Bracken.





CISTOPTERIS FRAGILIS, *Bernhardt.*

BRITTLE BLADDER FERN.

ROOT—Black and wiry, caudex small and somewhat flat.

FROND—Lanceolate, bipinnate, from four to sixteen inches long.

STIPES—One-third the length of the frond, varying, in that respect, with the situation of the plant.

PINNÆ—Lanceolate, alternate, pinnate; the lower pair often deflexed, and shorter than the second pair.

PINNULES—Oblong-ovate, linear, or lanceolate, deeply pinnatifid, serrated.

VENATION—Costa sinuous, lateral veins branched.

FRUCTIFICATION—Clusters of capsules near the extremity of each vein, upon a membranous envelope.

HABITAT—Clefts of stone, in walls and mines; on high and exposed situations, dwarf in all respects. A variable species, attaining the greatest perfection in wide fissures of rocks. When dwarf, compact, and with simple pinnae, resembling but distinguishable from *Woodsia* by the fruit.

LOCALITY—Plentiful about Matlock, Buxton, and in all the limestone districts; occasionally on sandstone.



INDUSTRIUM
Zinnig

CYSTOPTERIS FRAGILIS
Brittle Bladder Fern



ASPLENIUM ADIANTUM-NIGRUM, *Linn.*

BLACK SPLEENWORT.

ROOT—Radicles long, black, and wiry; caudex tufted.

FROND—Elongate-deltoid, bipinnate.

STIPES—As long as the frond, of a dark purple hue.
Principal rachis winged.

PINNÆ—Triangular, alternate, pinnate; apex often acute.

PINNULES—Triangular, pinnatifid, bluntly or sharply serrated; those in the lower pinnæ sometimes pinnate.

VENATION—Lateral veins alternate, branched.

FRUCTIFICATION—Lines of capsules on the forked veins, which, after the bursting of the involucre, become confluent.

HABITAT—In fissures of rocks and on walls, and on well-drained rocky slopes and banks.

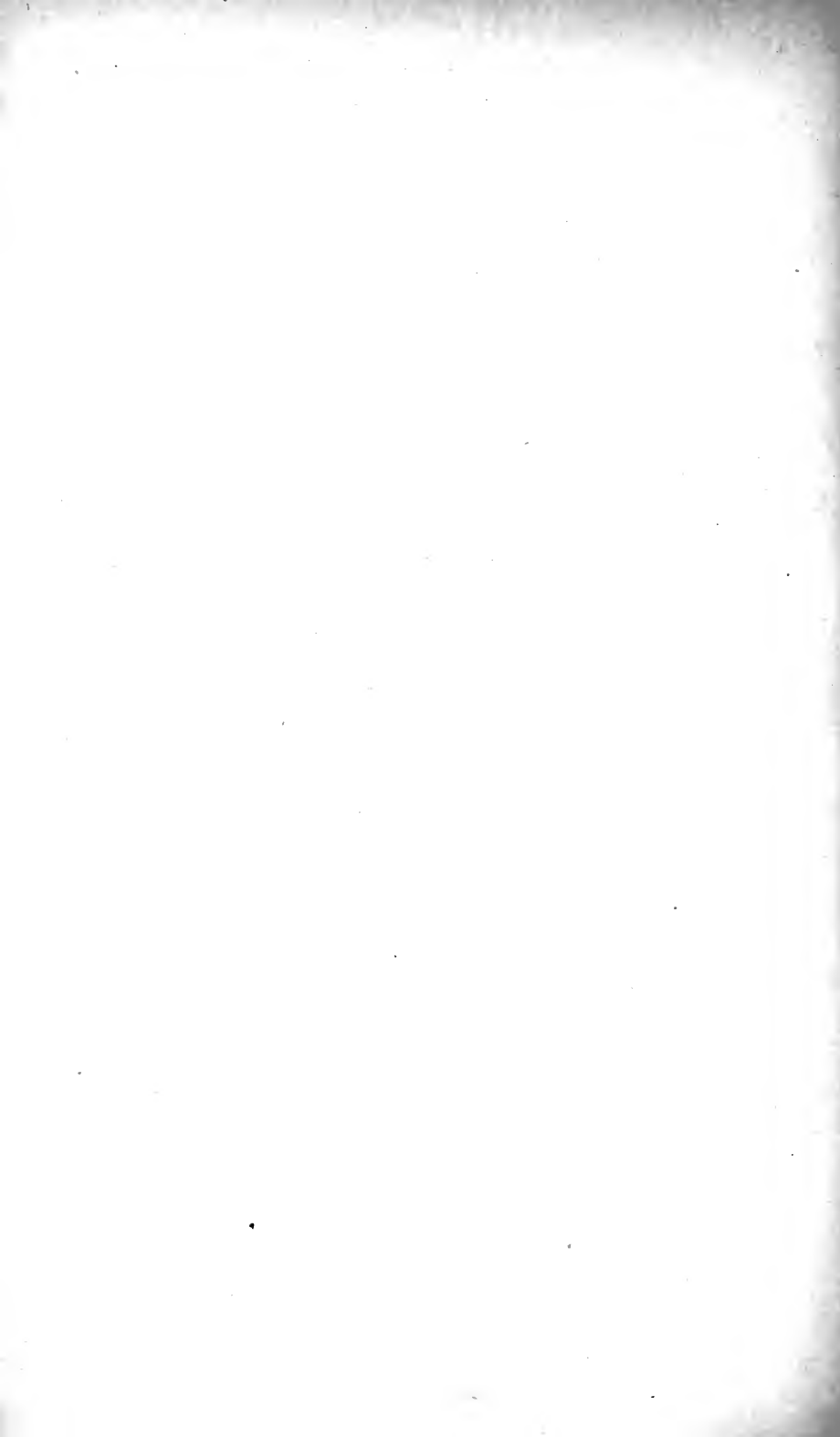
LOCALITY—About Matlock, Buxton, and other places.

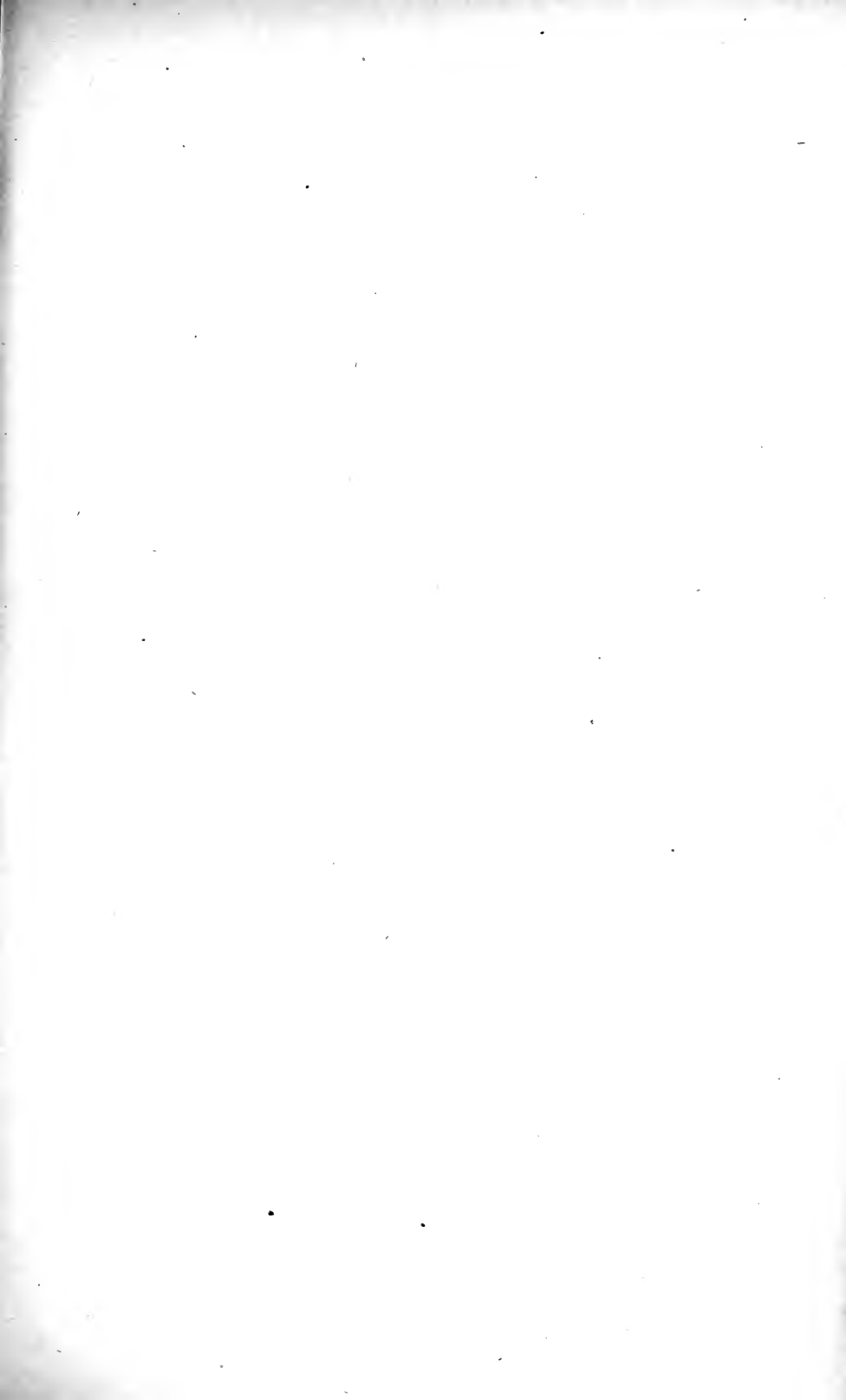


FRONDE, showing
Frond enlarged.

ASPLENIUM ADIANTUM NIGRUM.

Black Spleenwort.





ASPLENIUM TRICHOMANES, *Linn.*

COMMON MAIDENHAIR SPLEENWORT.

ROOT—Radicles long, black, tough, and wiry; caudex often tufted with remnants of hairlike stalks.

FROND—Narrow, linear-elongate, pinnate.

STIPES—Dark purple, about one-third as long as the frond.

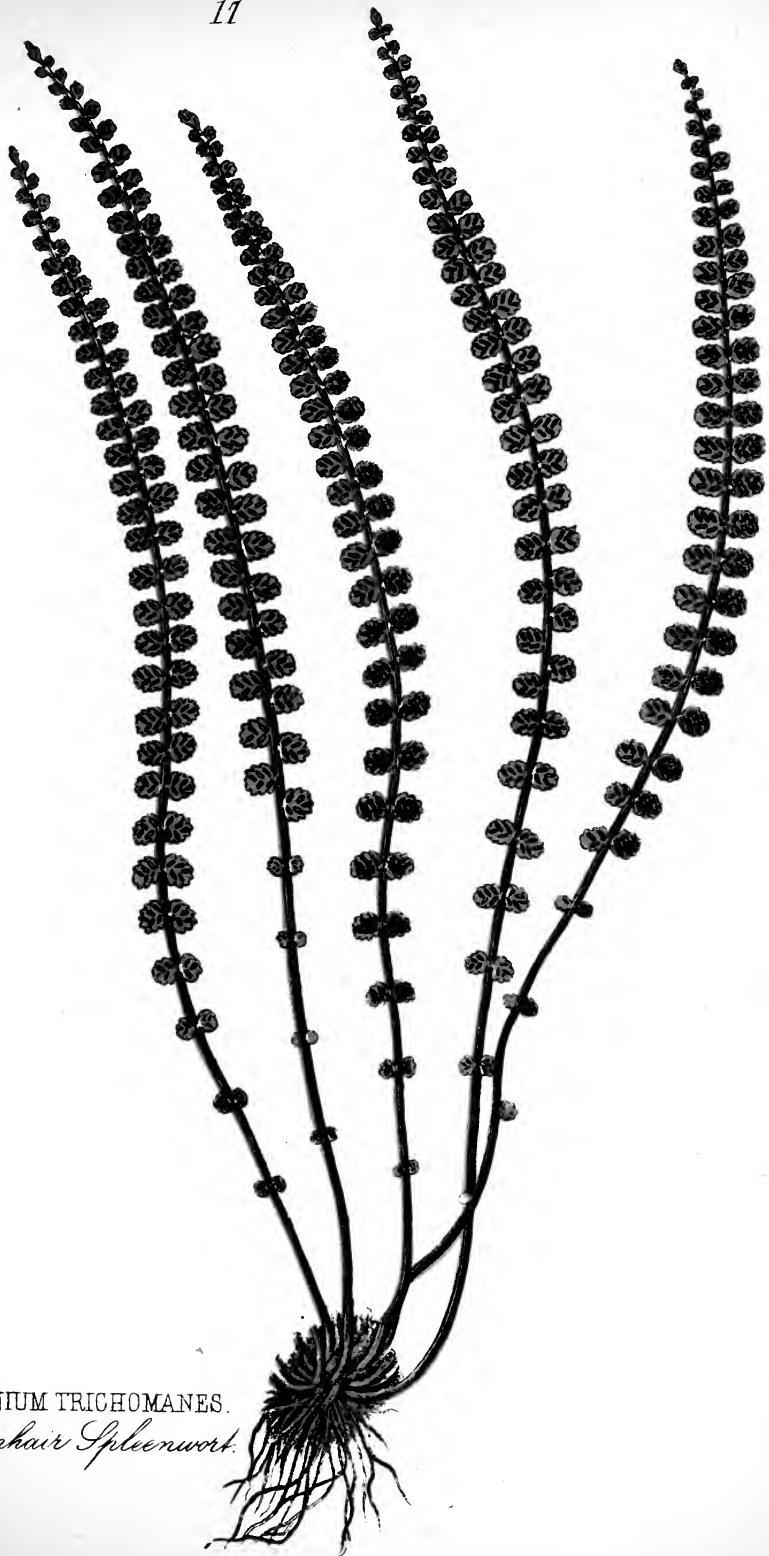
PINNÆ—In pairs, distant, ovate, obtuse at the apex, crenate.

VENATION—Lateral veins forked, costæ sinuous.

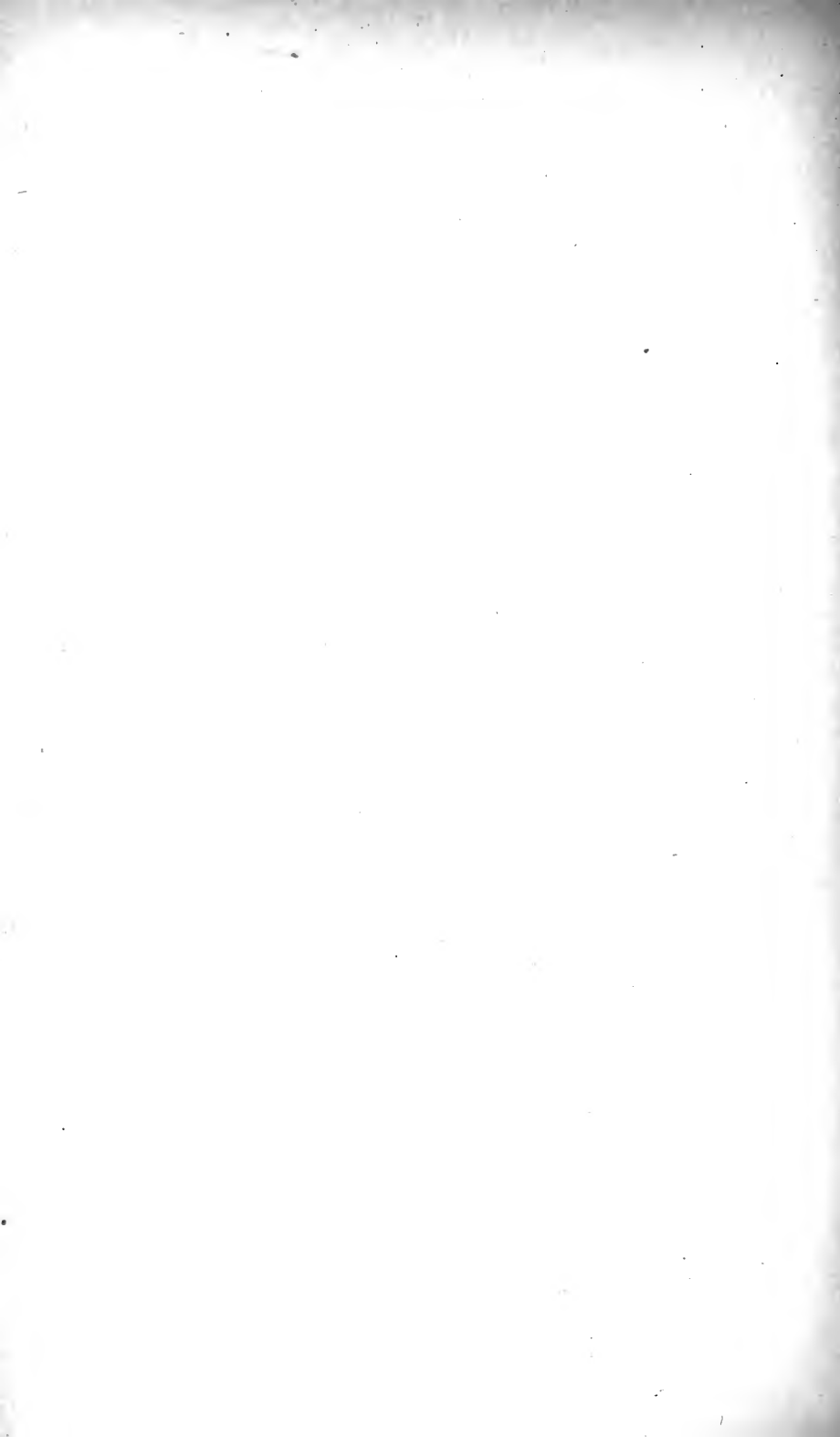
FRUCTIFICATION—Upon the anterior branch of the forked lateral veins, involucre linear, opening towards the costa.

HABITAT—Fissures of rocks, walls, and old buildings.

LOCALITY—Common in many parts of Derbyshire, chiefly on limestone.



ASPLENIUM TRICHOMANES.
Maidenhair Spleenwort.



ASPENIUM VIRIDE, *Hudson.*

GREEN SPLEENWORT.

ROOTS—Long, black, and fibrous; caudex dark brown and tufted.

FROND—Narrow, linear, elongated, pinnate, of a paler and more yellow-green, and more delicate than *A. Trichomanes*. Rachis smooth, of a bright green colour.

STIPES—Dark at the base, becoming paler near the rachis.

PINNÆ—Alternate, or in pairs, distant, shape irregular, roundish ovate or quadrate, margin more or less crenate, or even obtusely serrate.

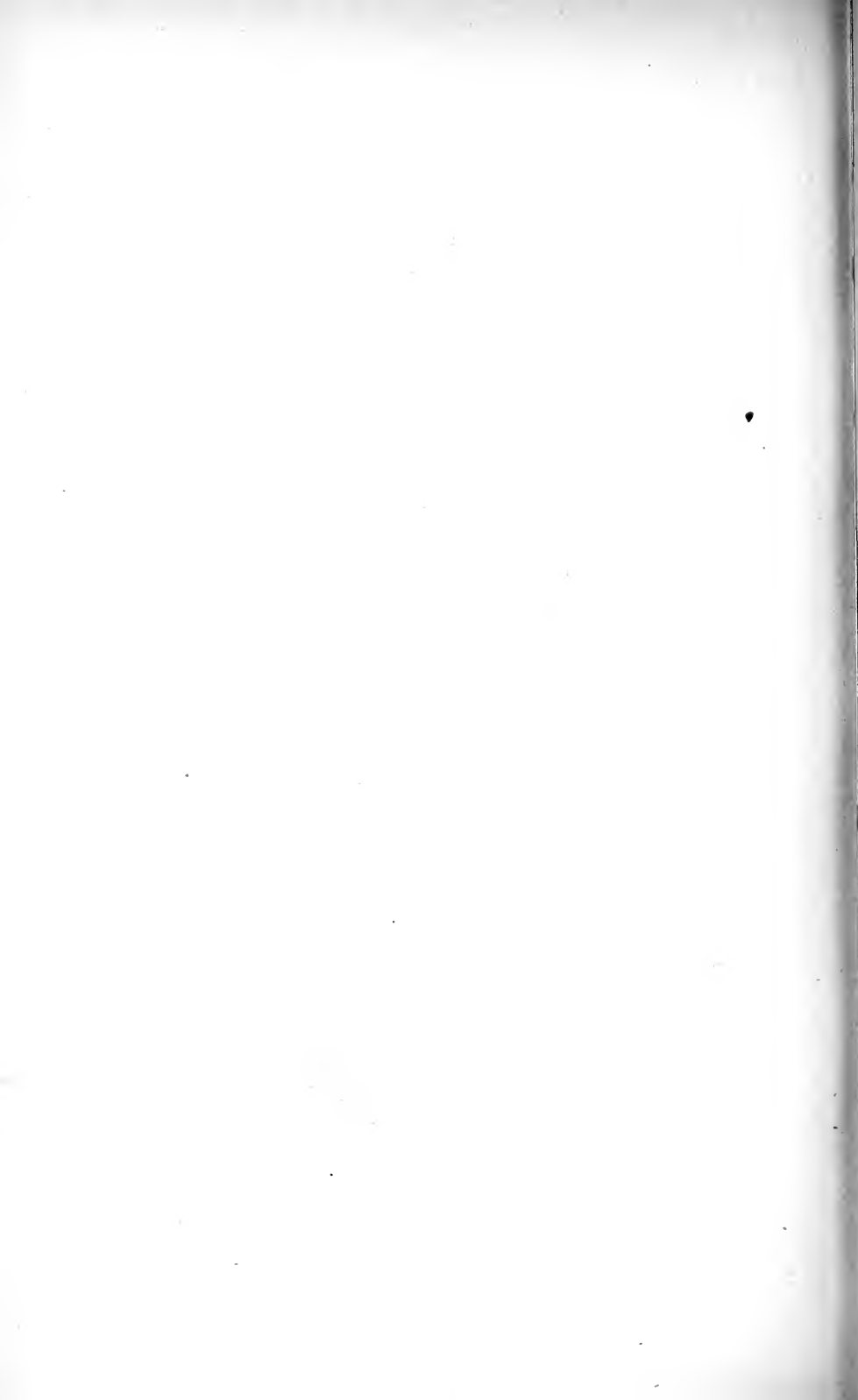
VENATION—Lateral veins both simple and branched, not usually extending to the margin.

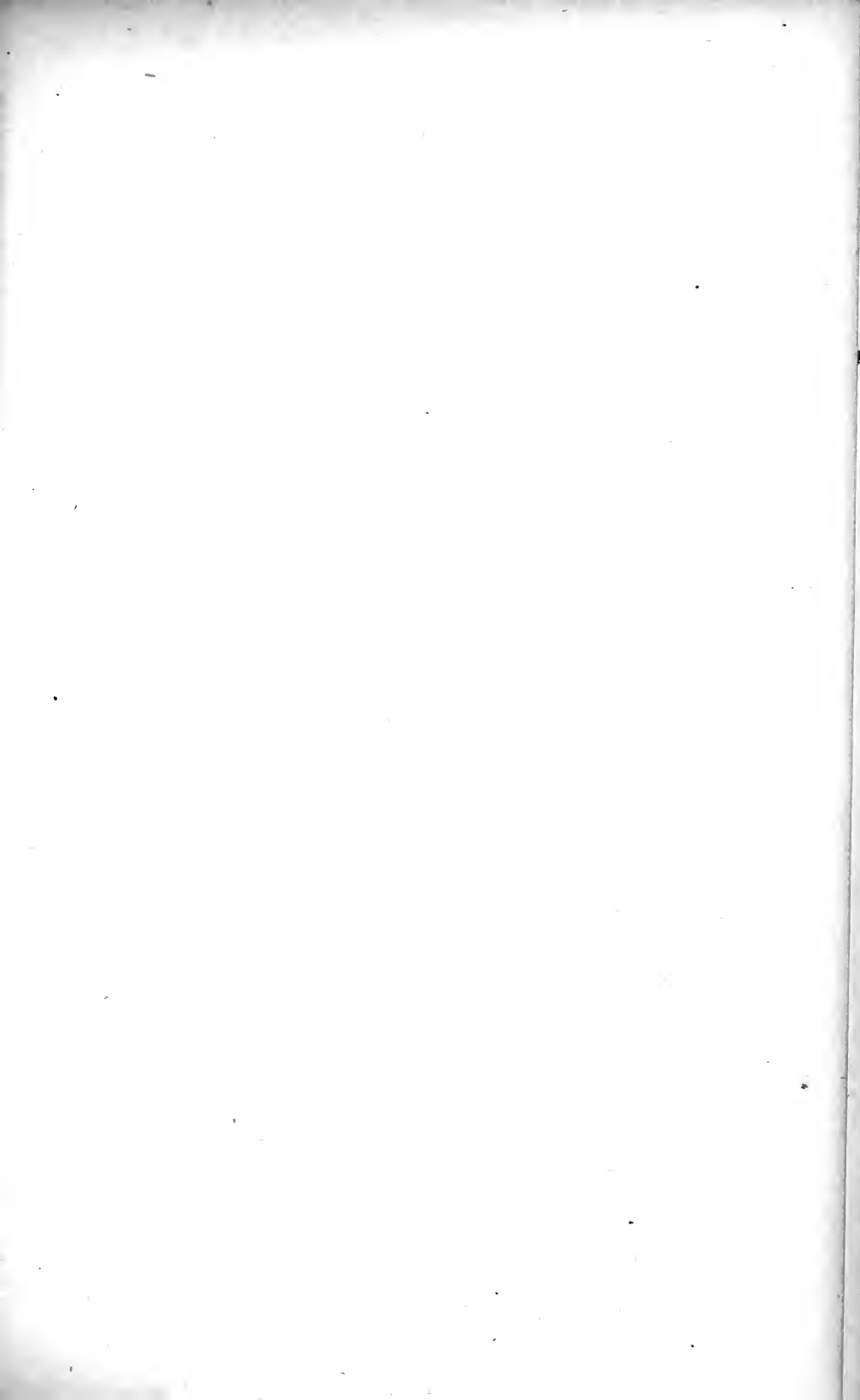
FRUCTIFICATION—Clusters of capsules linear, becoming confluent when in perfection, the thecæ of a bright reddish brown colour.

HABITAT—Moist rocks in mountainous localities. Near Buxton, and in Cave Dale, Castleton, &c.; always with a northern exposure. The species pines away under cultivation.



ASPENIUM VIRIDE
Green Spleenwort.





ASPLENIUM RUTA-MURARIA, *Linn.*

RUE-LEAVED SPLEENWORT.

ROOT—Radicles long, black, and wiry; caudex stout, tufted, and scaly.

FROND—Sub-triangular, or lanceolate, bipinnate, from two to six inches long.

STIPES—About half the length of the frond, of a dark green colour, grooved above.

PINNÆ—Alternate and pinnate.

PINNULES—Stalked, of an oblong diamond shape, the apices serrated and more or less rounded, varying very much on the same root.

VENATION—Veins radiating from the base, each vein terminating in a serrature.

FRUCTIFICATION—Involucre jagged. Sori numerous, linear, generally on the costæ, becoming confluent in Autumn.

HABITAT—Shaded walls and crevices of rocks. Very generally distributed in the Low and High Peak.



ASPENIUM RUTA-MURARIA.
Rue-leaved Spleenwort





CETERACH OFFICINARUM, *Willd*

SCALY SPLEENWORT.

ROOT—Black, wiry, and branched; caudex brown, stout, and tufted.

FRONDS—Numerous, oblong-linear, pinnatifid, thick and fleshy; the whole underside covered with scales of a rusty brown colour.

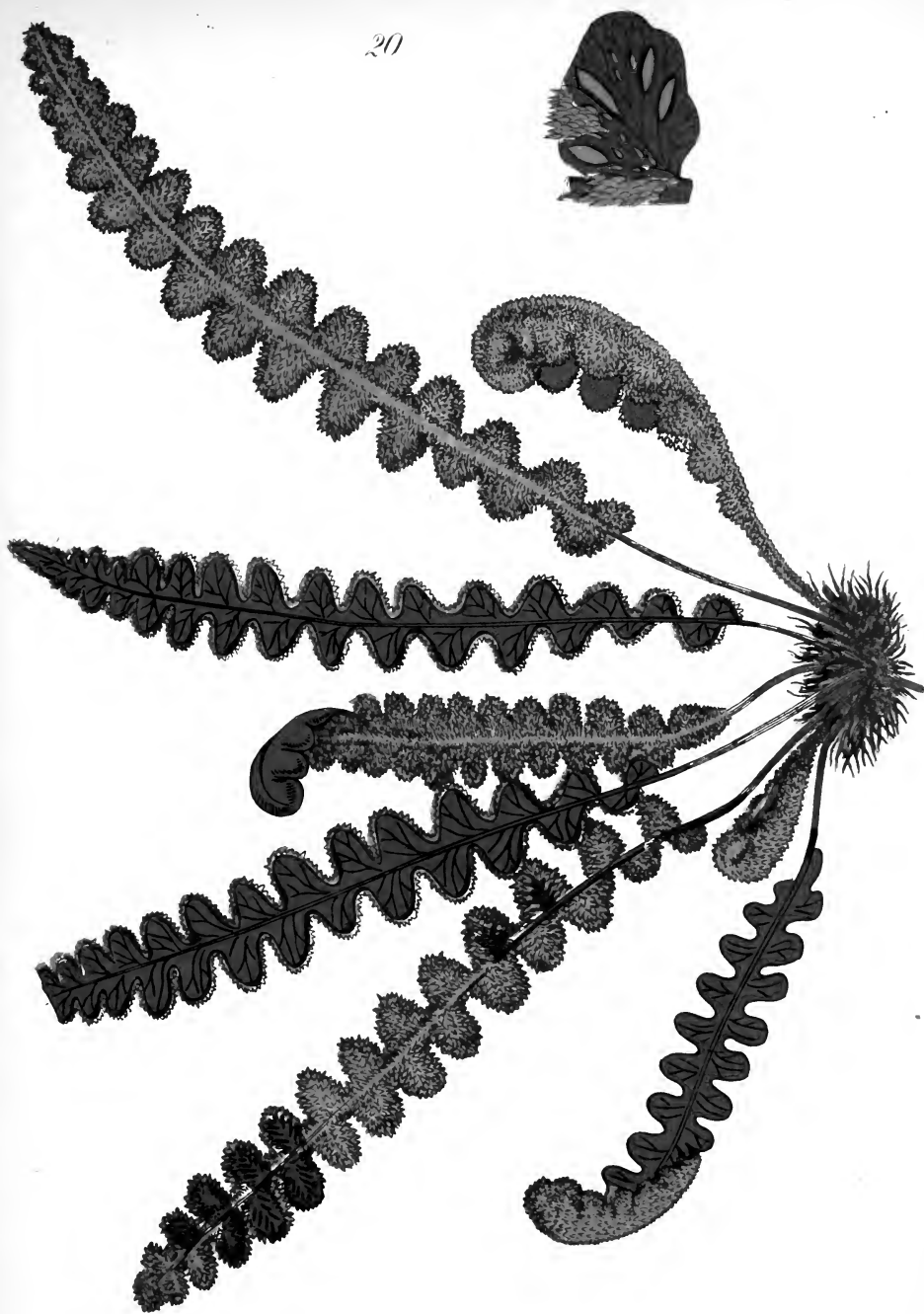
STIPES—Short, clothed with pointed scales.

PINNÆ—Rounded, and occasionally crenate, alternate.

VENATION—Costa sinuous, lateral veins branching alternately and obliquely from the costa; each lateral vein having two or more branches.

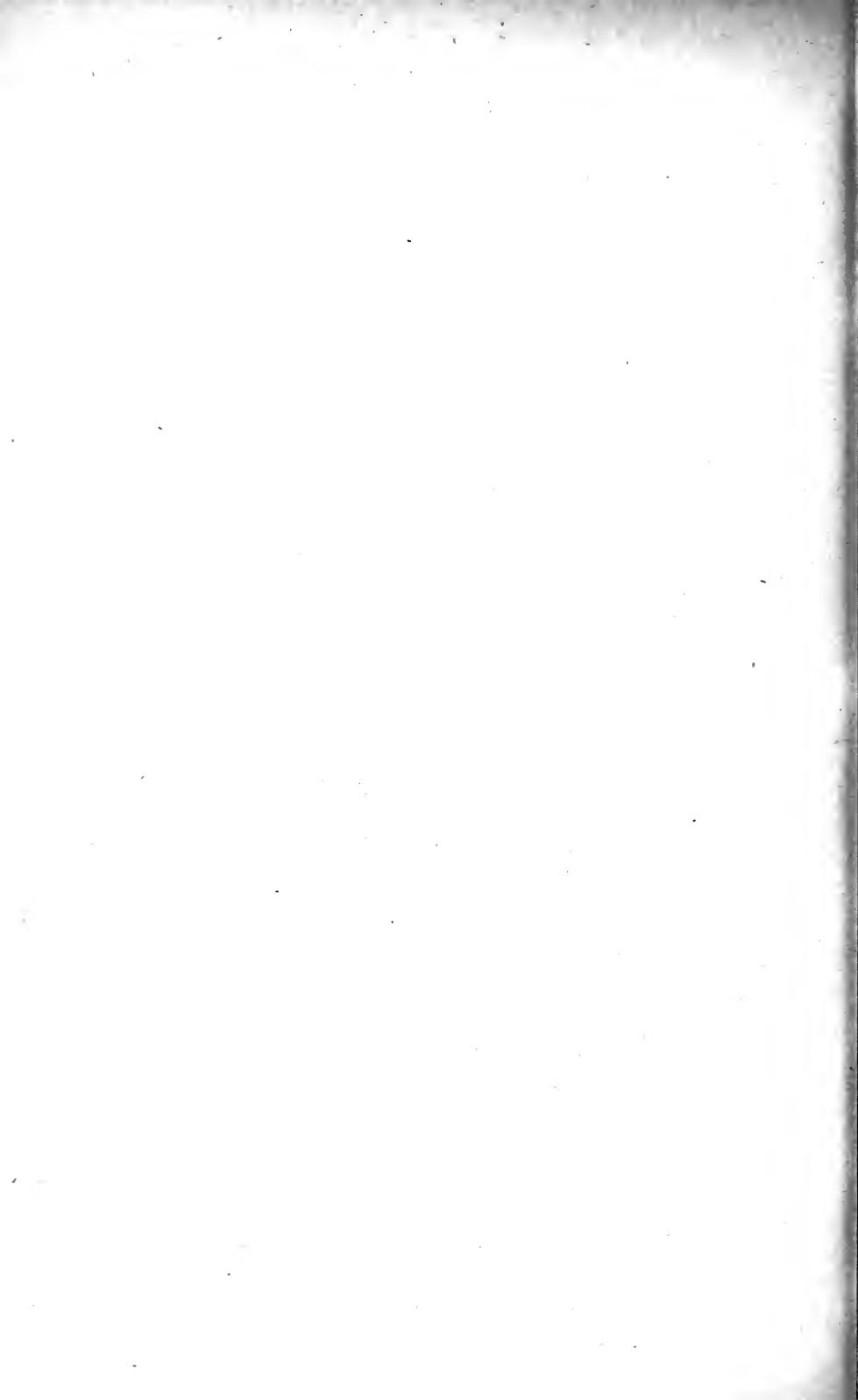
FRUCTIFICATION—Linear; the capsules lying in a ridge, formed by the raised edge of a lateral vein, which is fringed with chaffy scales, similar to those which clothe the fronds.

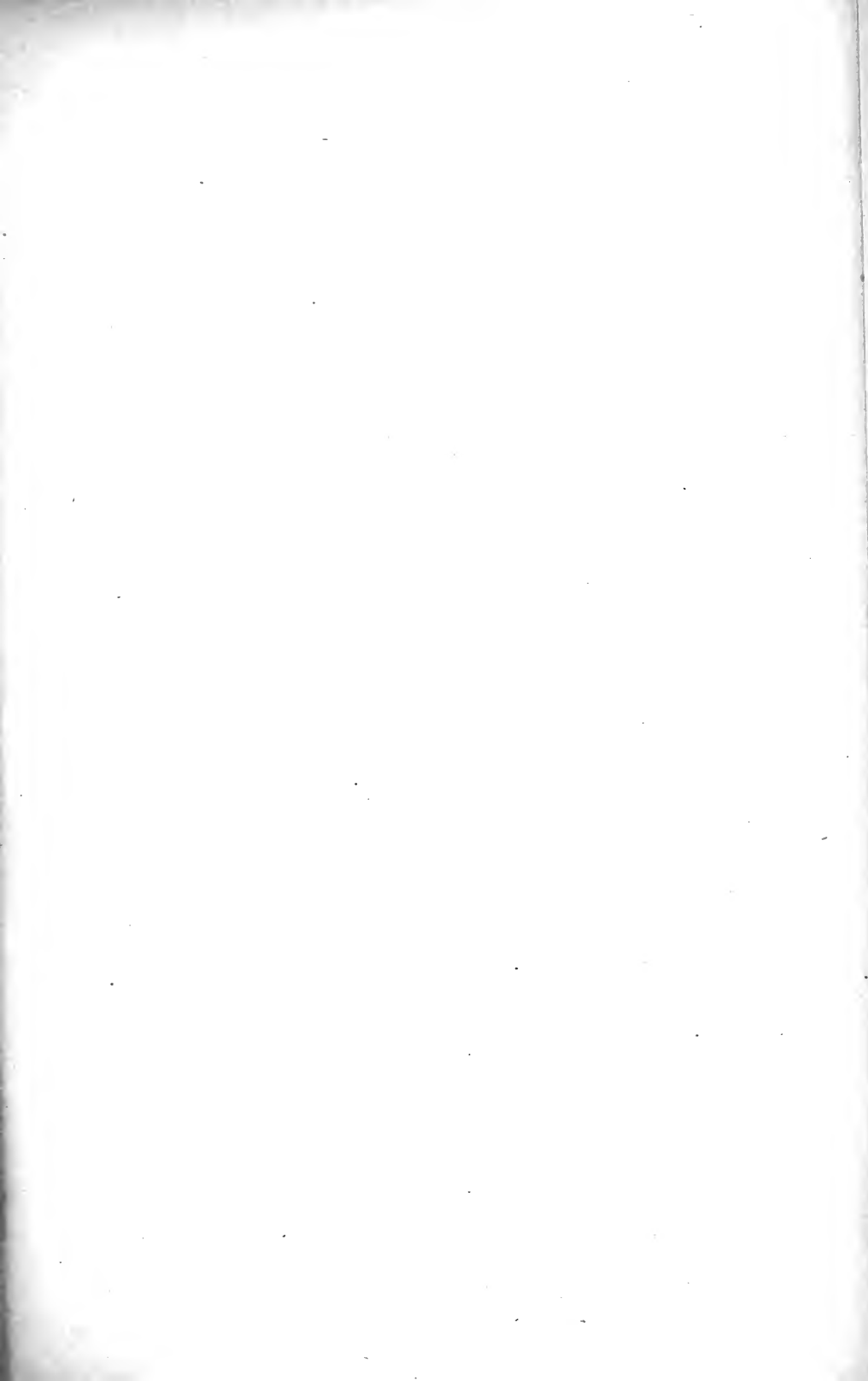
HABITAT—Crevices of rocks and old walls, on limestone soils. Near Dovedale, Lathkil Dale, &c.



CETERACH OFFICINARUM

Scaly Spleenwort.





SCOLOPENDRIUM VULGARE, *Smith.*

COMMON HART'S TONGUE.

ROOT—Radicles black, strong, of great length, penetrating deeply; caudex tufted.

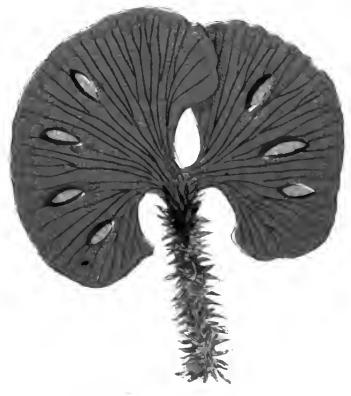
FROND—Strap-shaped, linear, one to two feet long, in the ordinary state undivided; acute at the apex, cordate at the base.

STIPES—About one-third the length of the frond, of a brown purple colour, scaly at the base.

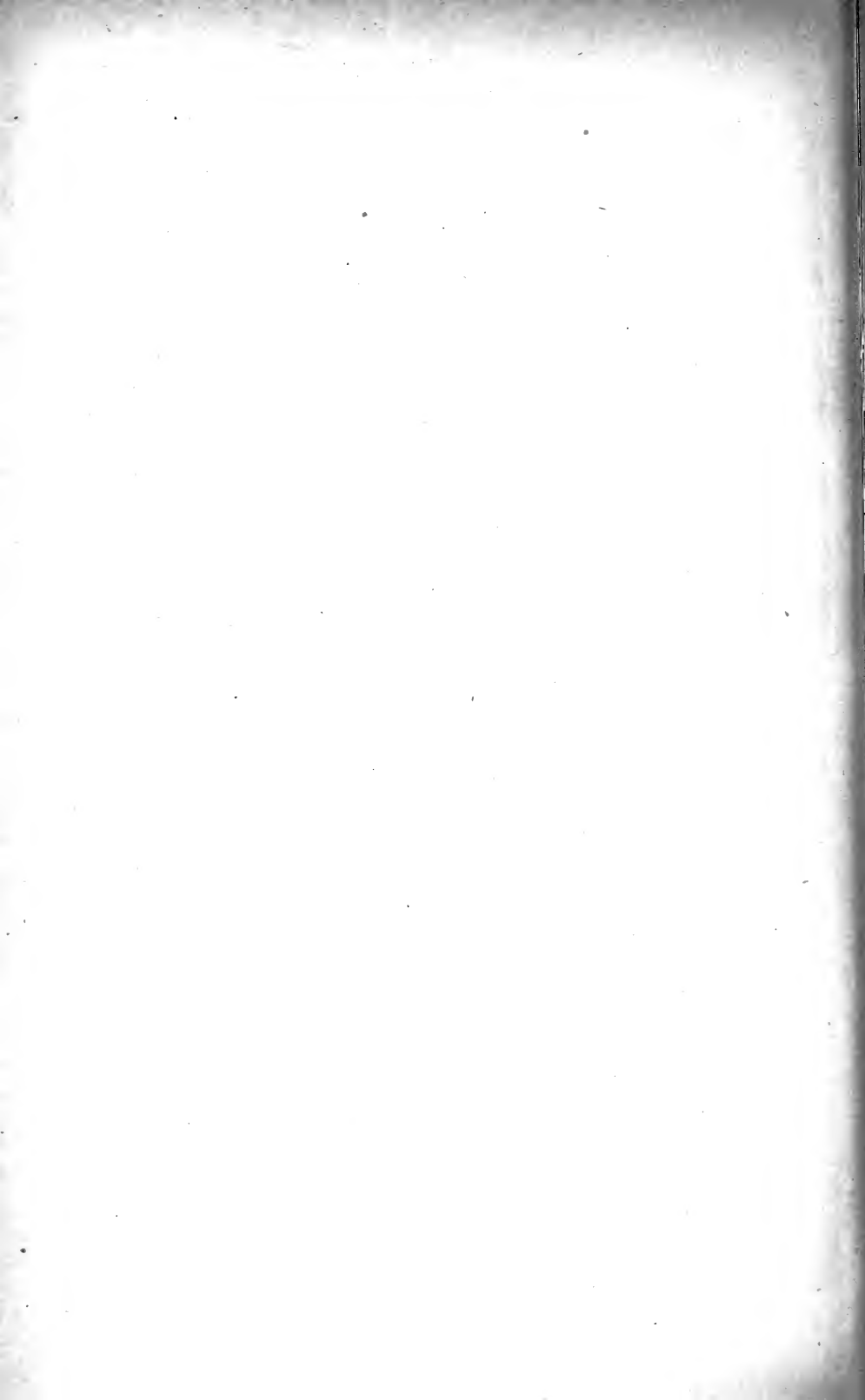
VENATION—Veins branched directly from the main rachis, twice forked; extremities of the veins club shaped.

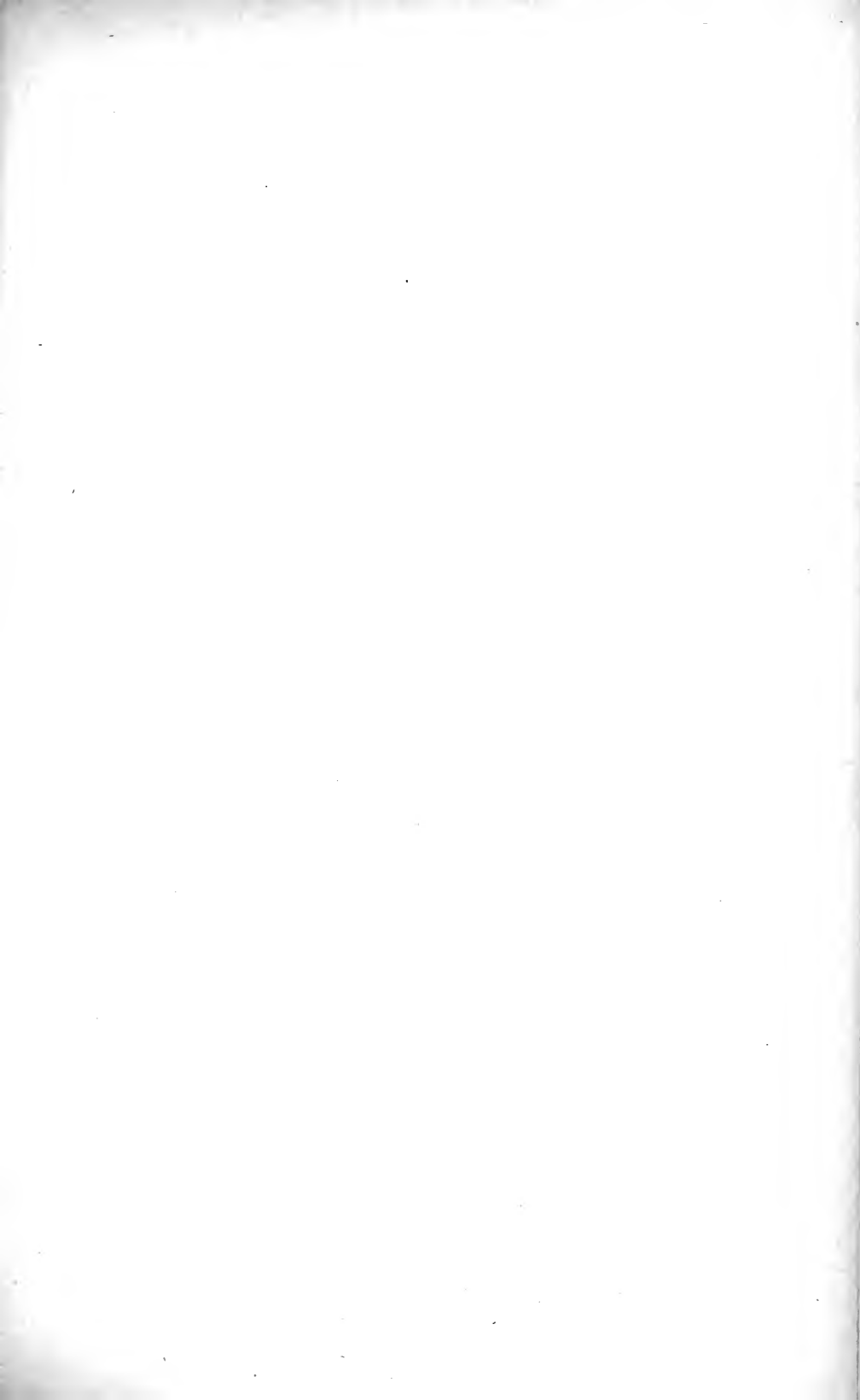
FRUCTIFICATION—In pairs, linear, placed between the outer branches of two sets of veins; the linear involucre opening centrally to the masses of capsules which sometimes nearly occupy the breadth between the rachis and the margin, but rarely quite reach either. Sori often alternately long and short.

HABITAT—Most plentiful among stones on sides of hills, and in woods; generally distributed over the county.



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OSMUNDA REGALIS, *Linn.*

FLOWERING FERN.

ROOTS—Radicles strong and fibrous, caudex large, often rising from a trunk-stock of matted fibres a foot high or more, and many feet in circumference.

FRONDS—Fertile or barren, six inches to many feet in height, and often two feet broad. The barren fronds external, erect, and pinnate.

STIPES—Usually as long as the frond.

PINNÆ--Opposite, subovate, pinnate.

PINNULES—Linear-oblong, in pairs, rounded or auricled at the base, crenate, blunt-pointed; the apex of the fertile frond consists of a spike-like cluster of spores.

VENATION—Prominent, lateral veins branching alternately from the costa, each vein having three or four branches, which extend to the margin.

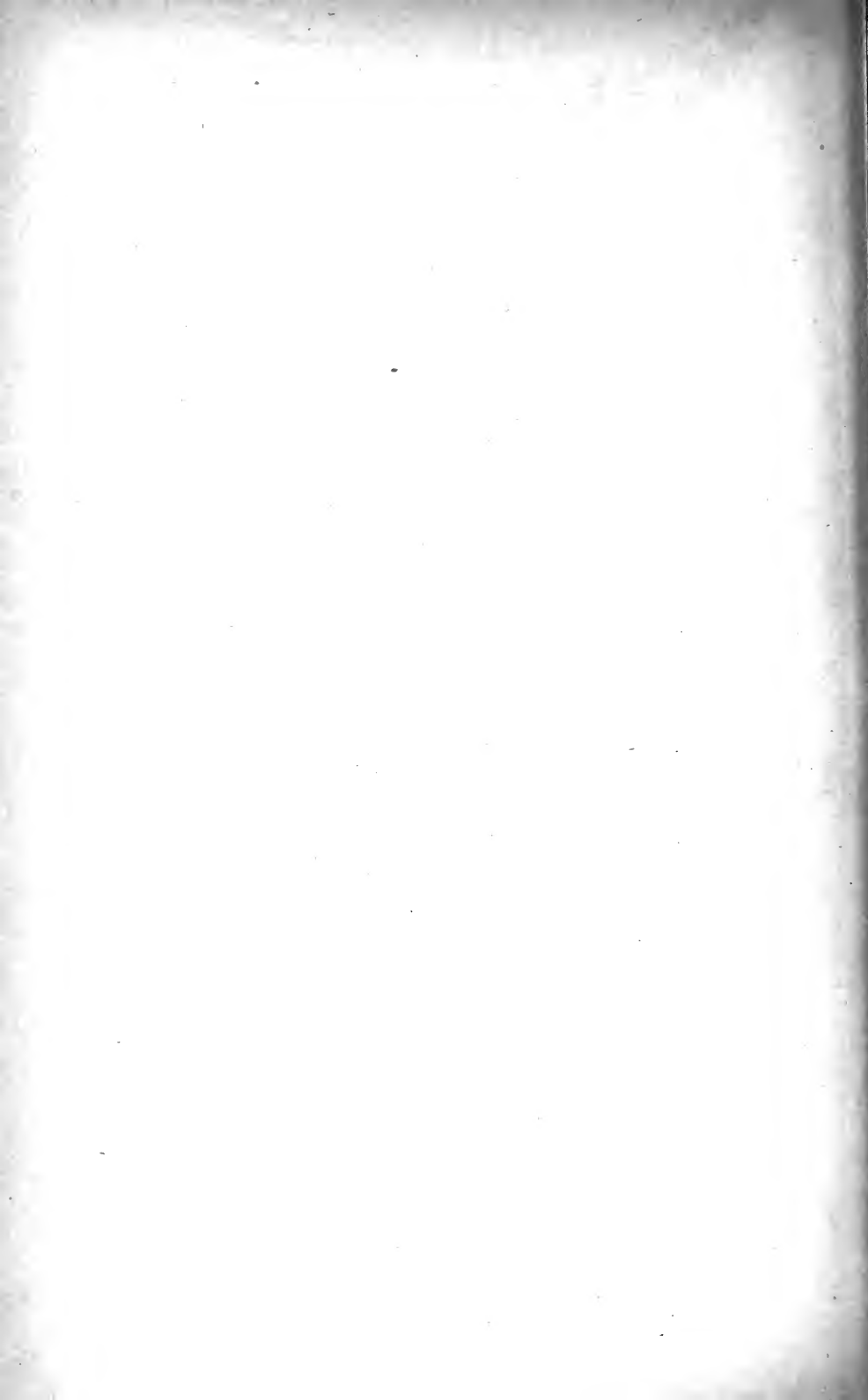
FRUCTIFICATION—Clusters of obovate globose capsules on lateral veins, occupying the summit of the central fronds; the leafy part of which is often lost, the whole of the pinnule, and even of the frond, becoming a branching spike of fruit.

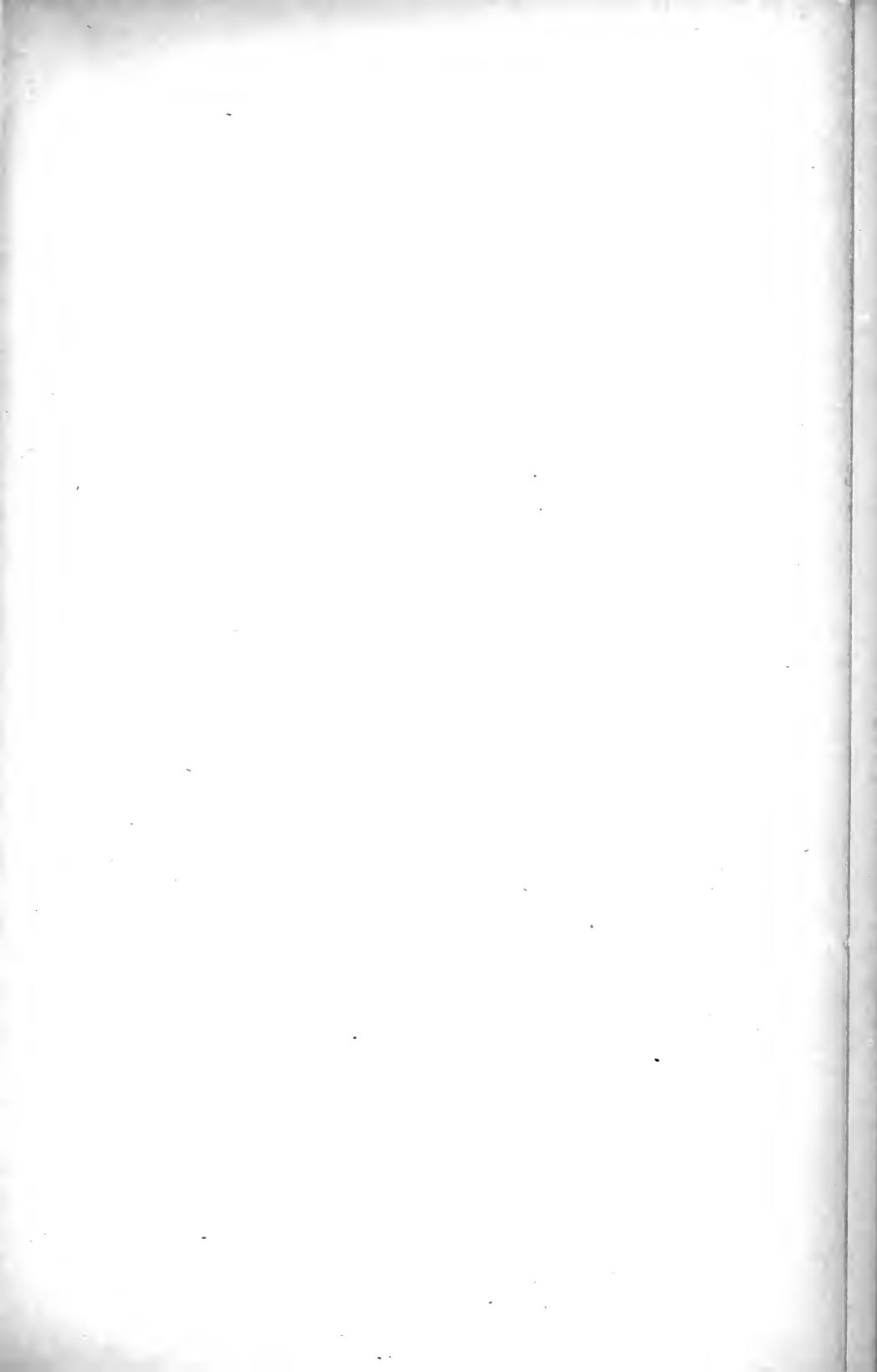
HABITAT—Damp and boggy places.

LOCALITY—Near Ashbourne, Darley, and Derwent Dales.



OSMUNDA REGALIS
Royal Fern





BOTRYCHIUM LUNARIA, *Swartz.*

OSMUNDA LUNARIA, *Linnaeus.*

MOONWORT.

ROOT—Long and wiry, with numerous branches.

FROND—Three to nine inches in length, divided above into a frond-like and fruit-bearing branch; the stipes seldom divided below, round, succulent, sheathed at the base. The frond-like branch is pinnatifid; the pinnæ alternate, fan-shaped; their margin usually crenate, occasionally deeply cut into narrow segments, which not seldom betray their true nature by bearing spore-cases. The fruit-bearing branch is longer, pinnate, the pinnæ alternate, the lowest pinnatifid.

VEINS—Costæ wanting; the veins, simple or branched, radiating from the base.

FRUCTIFICATION—Usually borne by the terminating branch; which consists of a panicle, bearing on its inner side sessile, globular spore-cases, which, when ripe, burst vertically in twain.

HABITAT—Old mine hillocks, and dry turf, or open boggy places. Late in the summer the base of the stem swells, and assumes a bulbous character, the plant of next year being formed within it. This state has commenced in the larger plant of our Plate.



tri marginal



umbellatum



sori orbisus



BOTRYCHIUM LUNARIA

Mosses



Part of stem covered with next year's plant





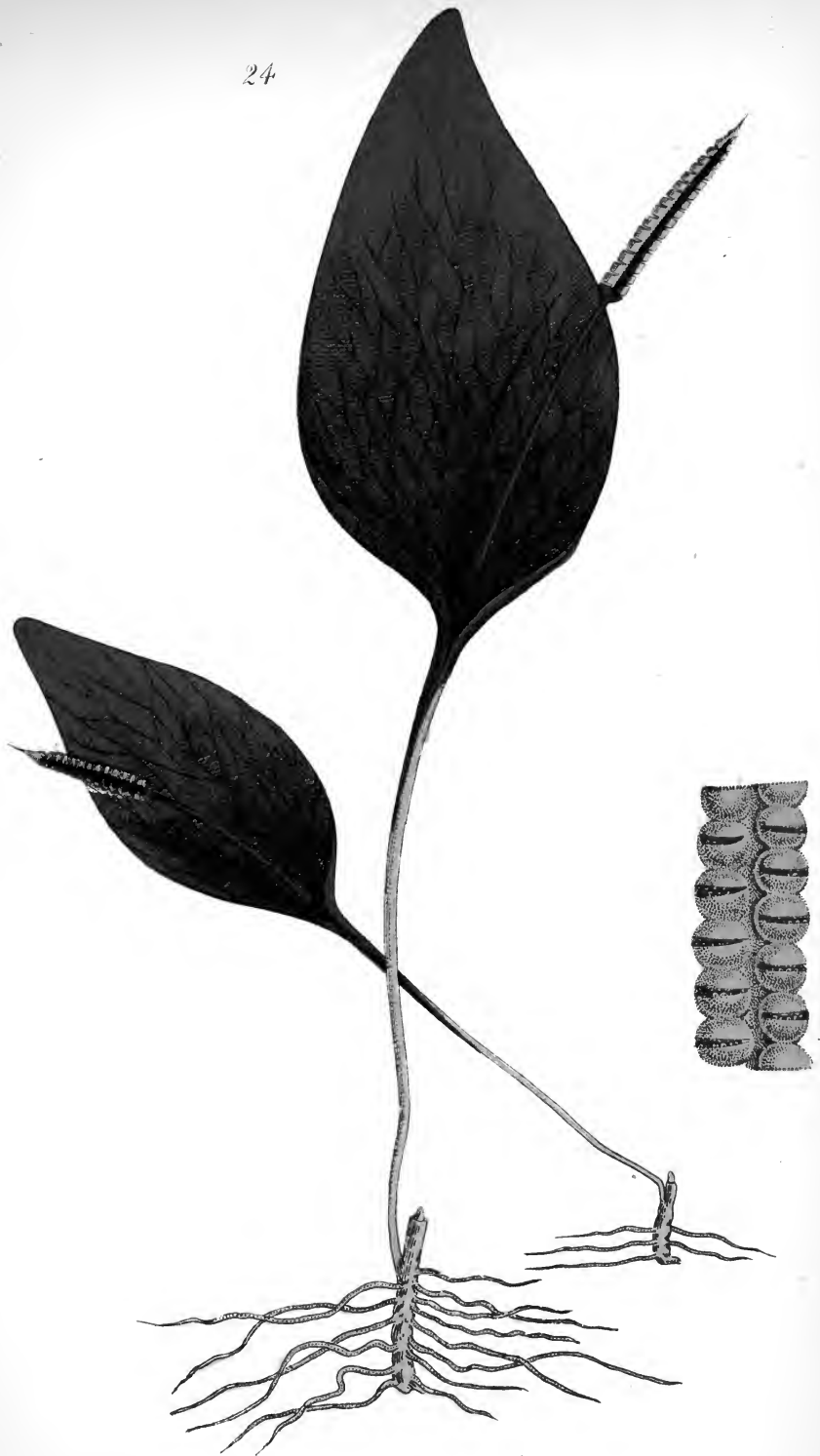
OPHIOGLOSSUM VULGATUM, *Linn.*

ADDER'S TONGUE.

ROOT—Long, branching, and brittle.

FRONDS—Of two kinds, barren and fertile on one stalk; the barren one being a fleshy, ovate, pointed leaf, rising from a thin succulent stipes. The stipes is about twice the length of the frond, rooted deeply in the earth, and showing, at its base, the detached bud of next year's frond. The spore-bearing frond consists of a narrow, spike-shaped single or branched tongue, rising from the base of the barren frond, lying in the hollow of it, and becoming eventually taller. The spike consists of two parallel rows of globular capsules, filled with fine dusk-like spores; bursting, when ripe, in the same manner as *Botrychium Lunaria*.

HABITAT—Pastures and meadow land, common. Matlock-Bath and other places.

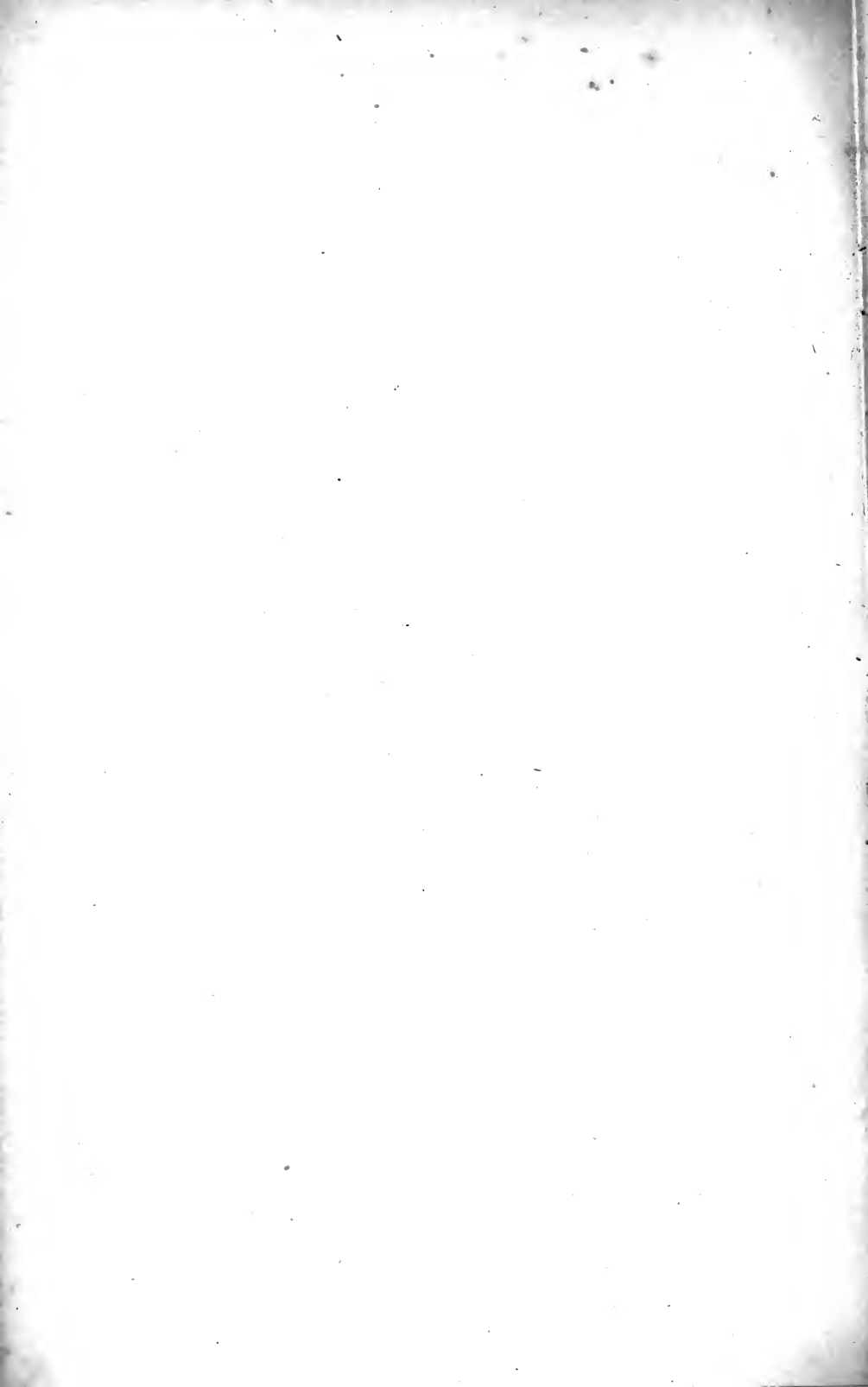


OPHIOGLOSSUM VULGATUM
Adder's Tongue.

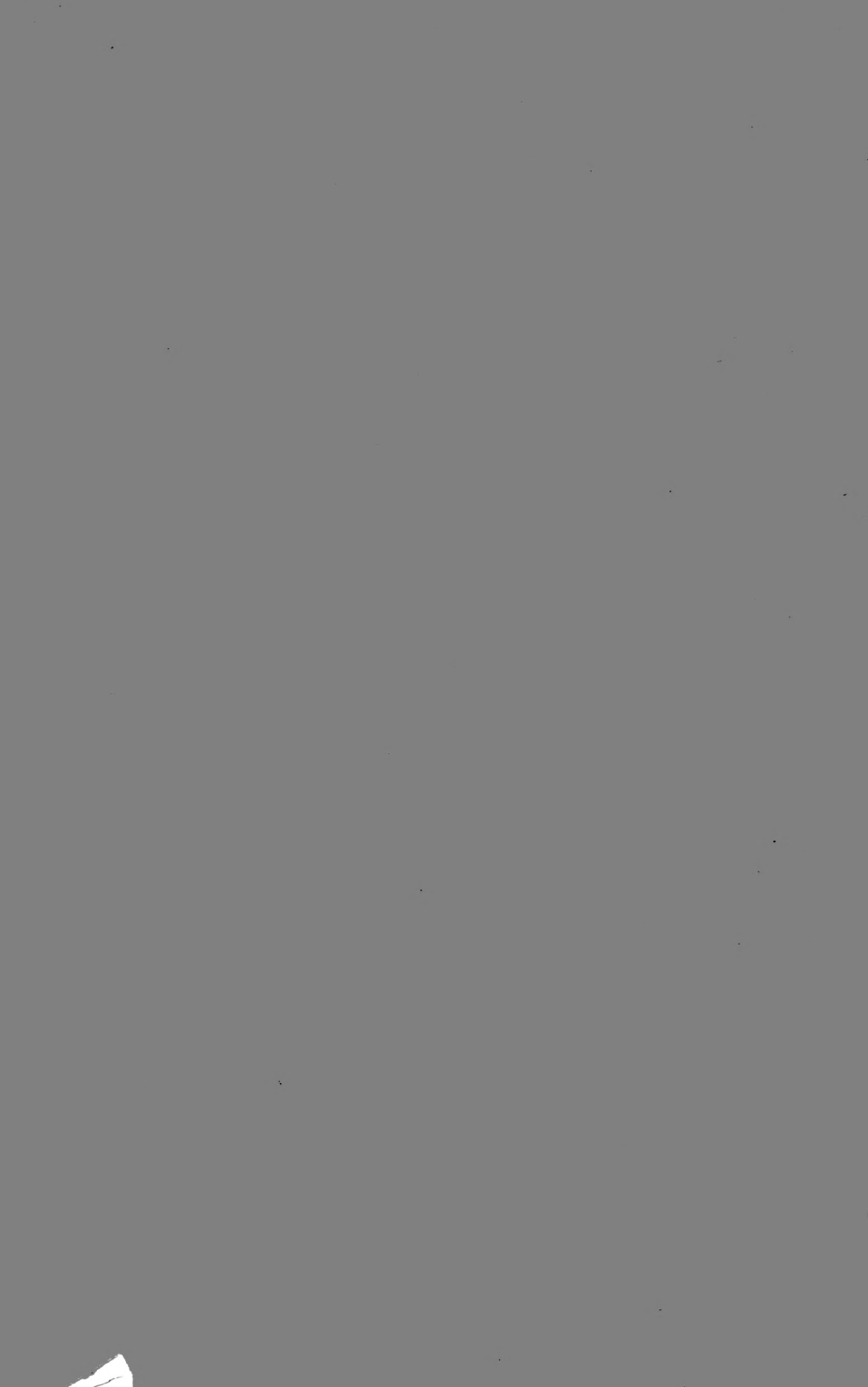


NOTICE.

It is particularly requested, that if any new or doubtful Ferns are met with in this County by our Readers, they would kindly send a Plant or Frond, with the locality, to the Rev. GERARD SMITH, Ockbrook, Derby, or to Mr. W. E. HOWE, Matlock-Bath, for examination.







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