ON THE HABITATS OF SOME OF OUR BRITISH FERNS.

By Nicholas Waterhouse, Esq.

(Read 15th January, 1863.)

I am afraid the present paper will be found open to the criticism that it is more remarkable for its omissions than its contents. For several summers, during many mountain rambles, I have watched the growth of our British ferns, and all that I can now profess is to embody the results of the observations I have then made. Several species of ferns are only to be found among the most beautiful scenery of our island, and to bring back their fronds is almost a certain proof of the character of the district where you have wandered. The botanist or the fern fancier enjoys advantages which are sometimes denied to those engaged in kindred pursuits. During the last summer I twice crossed the range of fells in Westmoreland, which from the Roman road on its summit bears the name of High Street. Both expeditions would have been most unsatisfactory to the archæologist. Whether it was that the sight of such remains is only vouchsafed to the eyes of the faithful and believing, or that the very wet season had produced an unusually verdant crop of grass, I do not know; but I could not discover on the broad mountain's brow anything more impressive than a narrow sheep-path. On both occasions the weather was warm and hot mists enshrouded the more distant landscape in a manner which would have been most disappointing to the artist; but I was amply rewarded for my labour by finding a ravine unusually productive of the more beautiful kinds of ferns. The beauty of this genus

of our wild plants depends almost entirely on the place of their growth, whether they just contrive to exist in some place exposed to the wind and sun, or whether they unfold their delicate fronds under the shelter of the moist and dripping rock, or in the shady hedgerow, or in the rich damp soil of the woodland.

A mountainous country is their chosen abode. It is curious to observe the great variety of soil and climate which may be found in districts of this kind, the many aspects you may obtain in a limited space, the effect of the currents of air, some hot, some cold, the reflecting power of some rocks, the cooling power of others, the bleak exposed summit with its cold piercing blasts, the warm steamy valley, the different character of the various streams, the little rills trickling down the cliffs, the *beck* dashing wildly down the stony gully, throwing showers of spray now on one side, now on the other, now flowing cold and icy through the deep glen, now spreading in lazy pools among the flat meadows where the sun has power to heat its surface. There is no slight difference between the boggy summit of the fell, mother of the *beck* and the river, source and feeder of the *tarn* and the *mere*, and the bog which way-lays the stream already formed, in the valley below. Again, the heather of the moor, the pine forest and the oak copse have each their influence on the growth of minor plants. Still greater is the effect produced by the mineral character and position of the rocks, whether slate or limestone or sandstone, whether a hard volcanic or a porous rock. It is curious to observe what an equable temperature is maintained in some places at a great height on the mountains; for instance, there are certain places in Westmoreland where the mountain's brow breaks away very sharply and suddenly to the eastward, whilst massy spurs or ridges defend the hollows thus formed to the north. The winter snows are heaped up in glens of this kind, forming a warm covering for

the more tender Alpine plants till the spring is somewhat advanced, whilst in summer the mists and showers again shield them from any excess of heat. In such places the sunshine, when there is any, is far brighter than in the smoky atmosphere of our towns.

If we wish to grow ferns ourselves we must take the trouble to see the places where they grow naturally, and the various circumstances of locality, soil &c., attending their growth, and though it may not always be very easy to extemporize a waterfall or to establish a permanent atmosphere of Scotch mist, still if we imitate these conditions to a certain extent, we may reasonably expect to be rewarded with some measure of success.

We now only value the fern for its delicate form and the colour of its fronds, but if we examine the herbarium of the rocks, we shall see how much we are indebted to its congeners of the ancient world—how the ferns and the fern allies of pre-Adamite ages, the Lycopods, the horse-tails, the mosses, have been pressed and dried and preserved Hermetically in stone, and thus have furnished an aid without which modern ingenuity would have been brought to a stand-still, without which the iron way from Liverpool to Manchester would never have been carried over the quaking surface of Chatmoss, without which the iron ship would never have ploughed the broad waters of the Atlantic, without which the countless shuttles of Lancashire would never have "merrily *gone* flashing "through the loom." Would that I could say they now were doing so.

In bringing the subject of the habitats of ferns before this Society, I must premise that this is by no means a rich locality; the rapid growth of the town, and the rapidly increasing study of all branches of Natural History have driven away many of our wild flowers. No doubt two centuries ago, when the batteries of Prince Rupert were playing on Liver-

pool and when a tidal estuary flowed within a hundred yards of this building,* a much richer collection of botanical treasures might have been made than at the present time. Now one hears of a solitary *Osmunda* growing wild in Aigburth, the last of its once numerous class, of a wall on Billinge Hill as the only habitat in these parts of the Scaly Spleenwort, and of the Sea Spleenwort being very rarely found on the rocks near the Mersey.

The *Aspleniums*, the family of ferns which I shall take first, have nine representatives in Great Britain, and these nine may be subdivided into three minor families, each member of these latter subdivisions bearing a considerable resemblance to the others. *Asplenium Marinum, A. Lanceolatum* and *A. Adiantum Nigrum* form the first of these families. *A. Marinum*, the Sea Spleenwort, with its thick leathery frond covered with fructification of a rich, almost golden, hue, loves the rocks overhanging the sea or the cave where it may drink the briny spray from the ocean. Its rootlets attach themselves to very narrow fissures in the cliffs where there is hardly any soil. Its love for the coast proves that it likes a moist equable temperature. In this neighbourhood it is still to be found near the Mersey, on Hilbre Island, on two or three places on the Ormes Head, abundantly in sea caves near Tremadoc, and on several headlands on the Welsh coast. It grows in more abundance at Iona and several other places among the western isles of Scotland, where the climate is tempered by the influence of the gulf stream. In cultivation its fronds attain a considerable size, but they do not produce the rich mass of fructification to be found on those growing in their natural habitat, the sea cliffs. *Asplenium Lanceolatum* bears a certain resemblance to the preceding—forming a connecting link between it and the succeeding fern, though the most delicate of the three. It can hardly be called a native of this

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part of the island; but I have found it growing plentifully on some rocks in the neighbourhood of Tremadoc. It flourishes in rocky situations near the sea, especially on the south-western coasts of England, in Cornwall, and the Channel Islands.

The *Asplenium Adiantum Nigrum*, Black Spleenwort, is much commoner than either of the preceding, and bears a certain resemblance to them in form. It may be that the more sheltered localities in which it grows enable it to develope a more divided frond. It is a fern very widely distributed: I have found it attaining considerable size beneath the hedge rows of Berkshire; but the largest specimens I have ever seen were from North Wales, on the slope of the hills leading inland, about two miles from the coast. As a wall fern its growth is short and stunted. It is very common about Oban and other places in the west of Scotland. On the whole, it flourishes best at a certain distance from the sea, in situations where it finds shade, a certain amount of warmth and a light soil.

Three other Spleenworts may be classed together, namely, *Asplenium Germanicum, A. Septentrionale* and *A. Ruta Muraria*. They are all rock ferns, they are all diminutive in size, they all possess a certain grass-like character, and they are all exceedingly unmanageable under cultivation. *A. Germanicum* is exceedingly rare, but a few specimens have been found on Snowdon. *A. Septentrionale* is rather more plentiful; it has been found on the rocks in Borrowdale, and a few other places in the Lake District; also near Snowdon and other parts of North Wales. *A. Ruta Muraria*, Rue-leaved Spleenwort, is a very common fern, growing abundantly on old buildings, on old stone walls, on the tombs in the church yard and under the shelter of damp rocks, though it seems chiefly to love the habitations of man. There is hardly a more difficult plant to grow. Damp stones form its

natural habitat, but it gives immediate signs of decay if there is the slightest excess of moisture.

Three other spleenworts form the third and last family, *Asplenium Trichomanes*, *A. Viride* and *A. Fontanum*. The first, or common spleenwort, is abundant in the moister parts of England on walls, which in some places are almost covered with it. It struck me that, after the very mild winter and very humid spring of 1861-62, there were an unusual number of seedlings in the walls in some parts of Westmoreland, enough for once to make up for the depredations of tourists. The finest specimens of this, and indeed of many other ferns, are often to be found on the sides of some well, where they grow to a great size and of a colour unusually delicate, having the full amount of shade and moisture they require. The best specimens for cultivation are generally to be found in heaps of shingle near quarries or similar situations, whence they can be removed without destroying a single rootlet.

Though very closely resembling the last species in form, *Asplenium Viride*, Green-stalked Spleenwort, is a much rarer and shyer plant. *A. Trichomanes* flourishes by the road side, and accepts the resting place the common stone wall affords; it is also much more common in the valleys than on the heights. *A. Viride* is to be found, and then only rarely, high up on the rocky side of the mountains, sometimes by the side of some tiny rill, and never except in places where it must enjoy more than its fair amount of mist and rain. My experience is that it is generally to be found on rocks with an eastern aspect. The Rev. Gerard Smith, in his "Derbyshire Ferns," states that it never grows except in a northern aspect. If my observation is right, I think it would imply that it prefers a certain amount of warmth. I have found it plentifully near Llyn Idwal, also on Snowdon, and on Moelwyn in North Wales; near the High Street Fells, on Seat Sandal, and in Easedale in Westmoreland. It either is or was to be found on the eastern side of Helvellyn,

and on Honister Crag. But it is not a common fern; any of these mountains might be hunted over without detecting a single plant. I have never found it in Derbyshire, but I have obtained fine specimens from that county. The finest plants I have ever seen were in a gully in the mountains, from 1,800 to 2,000 feet above the sea. At one part of this gully, on a precipitous bank about seven feet above the stream, I found a small cave from the roof of which a most beautiful mass of *A. Viride* was growing. In situations it likes it seems to be a spreading fern, whether by offsets or by seed I do not know. In cultivation it grows exceedingly well; and not only sends up strong healthy fronds, but they bear an unusually large amount of fructification. *Asplenium Fontanum* is one of the rarest of our ferns. In one of the localities where it is said to have been found last century, Wybourn (Wythburn) in Westmoreland, it has certainly never been seen of late; and some of the local botanists believe the original statement to be erroneous. It has been suggested that it so much resembles *A. Viride*, that it may often have been passed by unobserved.

I have never found the True Maiden Hair, *Adiantum Capillus Veneris;* it is one of the rarest and most beautiful of the British ferns, one of the connecting links between the plants of the south-west of England and those of Madeira and the Mediterranean. I am informed by Mr. Tyerman, of the Liverpool Botanic Gardens, that he has found it frequently in the Isle of Man, but of very stunted growth, not much larger than *A. Ruta Muraria*, and indeed much resembling it in form.

Allosorus Crispus, Parsley Fern, grows most abundantly on the mountains of Wales and Westmoreland, also in similar districts in Scotland. Nowhere does it flourish more luxuriantly than when its fronds have to make their way through a heap of shingle, especially if it is on a sloping hill side and

liable to be occasionally put in motion. In such situations the roots of the fern have very ample protection. Mr. Lees, of the Naturalists' Club at Malvern, says that he once found a small patch of the Parsley Fern on the Herefordshire Beacon, towards the Holly Bush Hill, but that it was a solitary patch; he had never seen another on the whole of that range of hills. I think this shows that it requires a considerable amount of moisture; on the wet, misty mountains of the north and west, it flourishes under all manner of hard usage, whilst on the dry and sunny slopes of the Worcestershire hills it starves and dies.

Athyrium Filix Fœmina, Lady Fern, is one of the most graceful of its tribe, whether we consider its habit of growth, or the elegant bend of its fronds, or the delicacy of their colour. Few of our wild plants are so widely distributed; but it seems to prefer shade and moisture, the sides of a deep ditch, or the bank beneath some spreading tree. Some of its varieties are exceedingly beautiful and curious; but I cannot say I have ever been so fortunate as to find any.

Blechnum Boreale, Northern Hard Fern, is not valuable on account of its rarity. In its ordinary form it certainly is not beautiful; but sometimes it may lay claim to our attention when, on the borders of some copse wood, we see its fertile fronds curled up like croziers, bright red in hue, and just beginning to unroll; or, in some moist piece of ground under the shelter of a dripping rock, we find its barren fronds broad, ribbon-like, verdant and of unusual size. In cultivation it does best in boggy sandy soil.

Cetarach Officinarum, Scaly Spleenwort, I have never found. It is a wall fern, growing chiefly in the limestone districts, in Derbyshire, near Bristol, near Settle, Kendal &c. I believe on rocks or walls, which suit its growth, the Scaly Spleenwort is to be found in considerable abundance, though

it may be confined to a very limited locality in that district. It likes moisture, and has an especial love for the damp mortar in old walls. On the whole, this curious looking fern grows well in cultivation.

Cystopteris Fragilis, Brittle Bladder Fern, is one of the most graceful species in Britain. It is not uncommon on old walls or houses, especially in limestone districts. I have seen it growing with *Ruta Muraria* on the tombs in a churchyard in Shropshire. It grows on Snowdon, on Moel Siabod and near Llyn Ogwen, in Wales. In Westmoreland it is tolerably abundant; it is to be found in all the little gorges coming down from Fairfield and Helvellyn and the neighbouring fells, where it gets shelter from the rocks and water from the streams. I have several times found it growing with the much rarer fern *Asplenium Viride*. In Westmoreland, though it is occasionally to be found by the road side, it seems to prefer a certain height on the hills, from 800 to 1,500 feet. But, in Derbyshire, it seems to grow more luxuriantly than anywhere else. It grows as freely in the limestone walls about Buxton as *Asplenium Trichomanes* does on the walls near Rydal, or *Asplenium Adiantum Nigrum* on some of the walls near Conway and Carnarvon. On the limestone cliffs near the Lover's Leap, it attains a great size; sometimes, in autumn, the varied tints assumed by the fronds beginning to fade add an additional beauty to this exceedingly graceful fern. It is one which does well in cultivation, loving moisture and shelter.

The *Hymenophyllums* form the connecting link in some respects between the mosses and the ferns, and are certainly among the most interesting of their tribe. *H. Tunbridgense* is much the rarer of the two. I am afraid the great demand for ferns is much reducing the number of its habitats. Passing through Tunbridge Wells last March, I enquired for it at two nurserymen's shops; at one I was told that they procured all the specimens they sold from Devonshire,

or other distant parts; and at the other, they made a great mystery of the source of their supply. I found, however, on some rocks in the neighbourhood, a small patch growing very fairly which is now in my possession. It also grows on the rocks in some private grounds in that part of Kent and Sussex. I have since found it on rocks near Llanberis. *H. Tunbridgense* has a shorter, more shapely frond than *H. Wilsoni*. It grows chiefly in the southern parts of England and Ireland; at Killarney it is very abundant on rocks and in the shade. It seems to require warmth and a close atmosphere; but I doubt its requiring as much moisture as its hardier and more robust relative. It is also found in much less elevated situations.

Hymenophyllum Wilsoni is by no means uncommon in the north of England, in places which suit its growth. I have found it near the Swallow Falls, on Snowdon, Moelwyn, Moel Siabod, Moel Hebog, the Pass of Llanberis and other parts of Wales; in Borrowdale, on the banks of the streams flowing to Watendlath, in the gorges on the Langdale Pikes, in the gullies on the western side of Thirlmere, on Helm Crag, in Easedale, on some rocks on Loughrig but very poor and stunted, in Deepdale and also a little in Grisedale. The manner of its growth is exceedingly curious; it cannot live on the rocks near the stream where the water might occasionally overflow its roots and cause them to rot, nor can it live on the rocks at a height above the stream, where it would be exposed to the rays of the sun, but on that middle belt of stone, neither too high nor too low, where it may drink the spray from the stream, it flourishes exceedingly. In some of the gullies near Thirlmere, on this line of rocks, it is much more plentiful than any of the mosses. A spore of its seed sometimes rests in the damp part of some bare stone; there it germinates, and attaches itself; gradually its creeping roots spread, sending up a mass of semi-transparent fronds, which in time covers the whole

rock, absolutely growing without soil except what the fern makes by its own decay. In such places, however, the fronds are generally stunted and less than the ordinary size. Sometimes a spore takes root in some patch of moss; and, as the supply of moisture is greater and more permanent, will generally produce a much larger plant. On rocks which are shaded from the sun and often shrouded by mist it grows very freely. The *Hymenophyllums* seem to possess great tenacity of life; in times of drought they often become masses of parched, brown and apparently lifeless fronds; as soon, however, as the rains commence and the mists again clothe the mountain tops the tiny transparent fronds, of the most delicate shade of green, begin to shoot upwards. As you see it on the rocks when the mist causes it to drip with moisture it forms a really beautiful object. It seems to prefer a northern aspect and also to flourish where it is entirely overhung by rocks. I have found it with the Oak Fern growing among it, also with some of the more beautiful of the mosses; for instance, the *Bartramia Pomiformis,* the Apple Moss, richly laden with its beautiful globes of green. Though *H. Wilsoni* is of much more vigorous growth than *H. Tunbridgense,* I think the latter seems much more manageable and *satisfactory* in cultivation.

Trichomanes Radicans seems nearly allied to the preceding; it is amongst the most delicate and the rarest of our ferns. The places where it is known to grow are few indeed; of late, however, one has heard of several who have chosen to explore the glens of Kerry for themselves, and have been rewarded by bringing home as trophies very fair specimens of this famed Killarney fern. The conditions of its growth are so very similar to those of the *Hymenophyllums,* that any one travelling in that part of the South of Ireland might well spend a short time in examining localities where it would be likely to grow.

Of the large and common family of the *Lastreas*, including *Filix Mas* and its varieties, I mean to say little. *Lastrea Thelypteris*, the Marsh Fern, one of the rarest of the family, was found in a wet meadow at New Church, near Delamere Forest, on one of the Field Naturalist excursions of last summer; it also grows in a meadow near Llanberis. *Lastrea Oreopteris*, the Mountain Fern, is one of the most attractive of its tribe, whether we consider the delicate green colour of its fronds, the graceful form in which the leaflets are placed, reminding one of the blade of a paddle, the manner in which the seed vessels are ranged like a dark braid round the edge of the green frond or the fragrant smell they give out when pressed. It is said not to do well in cultivation. Its great want is shelter from the wind. The habitat it generally prefers is a sloping hill-side and a turfy soil, where the super-abundant moisture quickly drains away from its roots, and where it finds some shelter from the violence of the stormy blast.

The *Osmunda Regalis*, Royal or Flowering Fern, is much the largest of its tribe in Britain: fronds have sometimes been found ten to twelve feet in height. The amount of root required to sustain such a superstructure is immense, as every one must know who has attempted to dig up the black wiry mass from which it springs. It is by no means an uncommon fern in moist and boggy districts. In few places is it more plentiful than in this county, where it is to be found on all the mosses round. On Parr moss, close to the Railway Station at the St. Helen's Junction, it grows in considerable abundance; it also grows in some of the lanes near Speke and Hale. In the Lake District it ornaments the banks of the Brathay and some of the other streams; but so much has been carted away that it is by no means as plentiful as it used to be. It likes a certain amount of warmth; in one district where I have observed it I found it grew on the sheltered banks of the streams as they came down from the hills but

not on the exposed bogs where those streams took their rise. Its fronds perhaps attain their greatest size on the banks of the Long Range at Killarney, where they enjoy warmth, moisture and shelter.

The *Polypodiums* are ferns of great beauty. *P. Dryopteris*, the Oak Fern, grows among the fallen leaves in the copse wood, or by the shaded side of the stream, or not unfrequently among the boulders on the mountain side, where its root creeps along, fully protected from the weather, and its fronds make their way upwards among the stones. I have found it on Moel Siabod, near Capel Curig, near Dunkeld in Scotland, very fine in Borrowdale, in a wood at Skelwith, among the rocks in Easedale, on the sides of Helm Crag, Fairfield, and on most of the Westmoreland fells. In cultivation it succeeds much better than the Beech Fern ; but in a wild state it is much the rarer plant. Shelter and a light soil are all that this most graceful fern seems to require.

Polypodium Phegopteris, Beech Fern, is by no means uncommon. How it gained its name, what connection there may be between it and the beech, I am at a loss to discover. It is fond of a stony abode, often it is to be found creeping along the bottom of a wall—there are some very large patches of it in such a situation by the roadside between Grasmere and Keswick and also between Llanberis and Capel Curig. It is often to be found spreading among a pile of stones or flourishing in some moist nook beneath the rocks. It loves water and a moist atmosphere, and is nowhere to be found in greater beauty than when growing in some narrow cleft in the rock by the side of the dashing stream or waterfall, where it receives occasional showers of spray. In cultivation it should therefore receive more than its fair share of moisture. I have found it in many parts of North Wales, near Llanrwst and the Snowdon range, in Scotland, and at Ambleside, Keswick &c., in the Lake District.

Polypodium Calcareum, Limestone Polypody, very closely resembles the Oak Fern, but it is of much more robust growth. It is also much less common, only being found in limestone districts. In the neighbourhood of Buxton, at the Lover's Leap and other places, it grows most luxuriantly in the fissures of the cliffs. I have found it a plant less satisfactory in cultivation than either of the preceding.

Polypodium Vulgare is to be found on old walls, on hedgerows, on trees almost everywhere. Its varieties are some of them very beautiful. The one called *Serratum* I have found several times in North Wales, but have never been so fortunate as to find the genuine *Cambricum*.

The *Polystichums* appear to flourish on the limestone hills of Derbyshire as much as anywhere else. Some years ago, whilst stopping in that county, I found a cave of some size, the mouth of which was rather low and ornamented with a fringe of *Polystichums* (*Lobatum* I think) of great size and beauty. On a more recent visit, I found that some local bookseller had published a map, in which he had marked the place as Fern Cave, and consequently had brought there a swarm of restless Vandals (they could not have been naturalists), who had, to use an American expression, "blenkerized" the whole place; not a fern was left which could possibly be reached.

It never has been my fortune to find the rare Holly Fern, *Polysticum Lonchitis*. It is becoming scarce on the upper rocks of Snowdon. I hear it has been recently found on one of the Westmoreland Fells.

Scolopendrium Vulgare, Hart's Tongue, is a very common plant. It loves a damp, shady situation—old moats, deep, wet ditches, the mouths of old deserted mines—such are its favourite habitats. From such localities fronds are said to have been gathered three feet long and five inches wide. About Hale it grows to a considerable size. The finest I have

ever seen were in some very deep ditches, entirely sheltered from the sun by thorns and bramble bushes, in the neighbourhood of Furness. No fern so frequently sports and produces fresh varieties both in a wild state and in cultivation. At the meeting of the British Association at Manchester, a fern-grower at Todmorden exhibited a very large collection of the varieties of some of the British Ferns, especially of the Hart's Tongue, the Lady Fern and the Northern Hard Fern, but it is doubtful whether the greater number of these will prove persistent.

The *Woodsias* are very rare and have only been found in a few places on the Snowdon range, in Teesdale and the Highlands. They seem to like inaccessible places and in some of their habitats can now only be obtained by those who choose to be slung down the cliffs by a rope. I lately heard from a friend that he had found the *Woodsias* together with *Asplenium Septentrionale* in considerable abundance in Norway.

The subject which has recently engrossed the attention of that portion of the scientific world which is engaged in the study of natural history is the Origin of Species. Has all animated nature sprung from one type, or from a very limited number of types? Have all the trees of the forest and the flowers of the field been produced from one seed, or from a very small number of parent seeds? Have the weeds—should I not rather say the flowers?—of the sea been changed into the radiata and so into the articulata? Has the fish acquired powers of living and moving on dry land? Has the reptile, with its loathsome form, passed into the songster, gaily carolling in the pure ethereal vault of heaven? Has the struthious bird, formed by its Maker to seek its food on the vast sterile wilderness, lost the power of flight, and thus been formed into a kind of connecting link between the feathered fowl and the four footed beast, whose life is confined to the surface of the earth? Are we to suppose that some bear, of

very aquatic tastes, has found it possible to pass its whole life in the salt seas, subsisting on the animated life they produce, the form of its body suffering

"A sea change,
"Into something rich and strange;"

its mouth increasing vastly in size, its fore paws becoming fins and its hind paws growing into a monstrous tail? Or that the offspring of this amphibious bear should, as generations pass away, become the ancestors of the immense Greenland whale? Are we to believe that the gabbering imitative ape is but a lower form of the reflecting self-dependent man?

I confess I cannot see why we should adopt views such as some of those which have been brought forward—why we should think that every gulf in our way is so easily to be bridged over. I cannot see that because the Creator of all things has disposed all his creatures in a wonderful order, has arranged them with admirable symmetry in a graduated scale, has formed them not fantastic and dissimilar, but with a certain relation to each other, that they are therefore sprung from one source, or from a very small number of sources. If we say from one source, we must almost conclude that they are self-created.

Without adopting the theories which have been propounded, I have no doubt this controversy will result in proving the close connection which exists among the often dissimilar varieties of the same tribe, and that many diverse specimens are sprung from a common origin. Look at our British Ferns—Can we doubt that many species are sprung from the same stock, and have acquired their present characteristics from a long course of growth in very dissimilar localities? For instance, *Asplenium Marinum*, with its tough, leathery fronds, loving the sea cave and the salt spray, has a certain relation to *Asplenium Adiantum Nigrum*, with its much more complex frond, growing luxuriantly in the shady bank beneath

the hedge row, whilst *Asplenium Lanceolatum* seems to form an intermediate link. Are not the differences in the formation of these three plants probably due to the physical differences of the places of their growth?—those differences so long established that it is now imposible to grow the one from the seed of the other. In the same way, the difference between *Asplenium Trichomanes* and *A. Viride* is very slight and may easily be explained by the different character of their ordinary habitats; the one stronger and hardier, growing on rocks and walls in the lower country, where at times it is liable to suffer from drought; the other, generally high up on the fells, only in places where there is plenty of moisture, and where the colour of its frond may have grown delicate and green from the influence of frequent mists. The two *Hymenophyllums* resemble each other very closely; yet, who has seen the more robust *Wilsoni* assume the more spreading frond of the *Tunbridgense*, or the more pointed seed vessel of the former become jagged at its mouth like the latter? The connection between the oak and the beech fern is very near, and the connection between the former and the limestone polypody still nearer; so much so, that we might look for a common origin for these beautiful ferns. Yet no one has succeeded in growing one from the other. So much for the permanence of species, the characteristics of which have been developed by a long course of growth in certain localities. It may be said there are ferns the form of which we can change and which will produce most curious and beautiful varieties under cultivation. The Hart's Tongue, for instance, will produce a divided and a subdivided and, indeed, a perfectly branched frond; the edge will become frilled and curled, or jagged, or narrow like a strap, or broad, almost circular, in shape. In the same way the Northern Hard Fern, the Lady Fern, the Male Fern, all change almost under our eyes. These changes, however, are evidently owing to accidents of soil and

aspect. They are rarely persistent and such plants readily go back to the parent type. Cunning gardeners will very likely produce more remarkable varieties than any we now have.

In these few pages I have attempted to put down some observations on the growth and dwelling place of this most graceful and beautiful tribe of plants, and having done so let me apologize for ever having undertaken the task. Very loud are the lamentations of every lover of nature on the wholesale devastations which, year by year, are being made on the rarer specimens of ferns, and many doubts are felt whether any will soon be left by the road side or by the mountain stream. The author of the "Ferns of Derbyshire" grows very indignant against a certain bearded dealer, who brings his packages from Westmoreland to sell or to exchange for the natives of the former county. Lest similar accusations should be brought against me I have veiled most of my localities in the widest terms, so that the fern fancier will not find them without a certain amount of labour and careful observation. That labour amid the finest scenery our island affords is most health-giving and delightful; those observations cannot but be the source of instruction and enjoyment. I can only wish that whoever undertakes this branch of field botany may be rewarded by as many successful mountain rambles as have fallen to my lot.