THE ART OF FERN-HUNTING.

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HEN August comes the city begins to empty into the country, and jaded people with even the shortest of purses "babble of green fields" and early trains. Then it is that fern-hunting begins. True, it is not so exciting as chasing the red-deer on the Devon uplands, or stalking the stag in Braemar Forests—which are so styled because the country is for the most part heath, rock, and treeless glen—while the Indian "Shikary," who "bags a man-eating tiger before supper," would consider the searcher after weeds unworthy of even the humblest place in the brotherhood to which he belongs. The fern-hunter has, however, his advantages. His pastime may not be so exciting as that of the slayer of wild beasts, but on the other hand it is neither so dangerous to life nor limb, while if more democratic than grouse-shooting or ranging stubble and woods in search of partridge or pheasant, it is infinitely less costly. Above all, the fern-hunter may roam over forest and moor, mountain and plain, without inflicting a pang of pain on any living thing, and at the end of the season his purse need not be appreciably affected, while his lungs are strengthened, his limbs straightened, and his (or her) whole form invigorated by the healthy mental and physical exercise which the pursuit entails. The fern-hunter may also have his trophies just as the deer-stalker or the tiger-slayer has his mementoes in the shape of horns and heads. But the dried ferns which recall many a summer ramble through the wildest haunts can be packed in less space than the skins or skulls of wild beasts, and if understood are even to the least scientific mind capable of imparting greater instruction than even the best-preserved collection of the victims of the mighty hunter's spear and bow. In a word, fern-hunting may be either a harmless amusement as little scientific as stamp-collecting is political, or it may be elevated to the rank of a branch of botanical study—to follow out which to its legitimate termination requires the exercise of the highest powers of the mind and the microscope, and every adventitious adjunct except wealth.

First, then, for something to keep the specimens in until the collector can reach home. A basket, the hand—even the hat, and especially the inside of a tall one, would do. But though ferns do not wilt quite so readily as some flowers, yet it is well, if a long excursion on a hot day is to be taken, that they should be secured from the sun's rays and put out of harm's way. Hence a botanical box is desirable. This oblong tin receptacle can be bought in most ironmongers' and of all sizes, as they are commonly used to carry luncheon in, with a strap to sling it over the back. Then a tiny spade such as is used by botanists is desirable, and if the collector expects rock-climbing, it is well to have it made so that it can fit on to the end of a telescope walking-stick, so as to be capable of punching specimens out of rock-chinks far beyond the reach of the most adventurous climber. Next, a couple of wooden boards—if of fir, with two cross-bars screwed on to keep them from warping—are requisite. The size can be regulated to suit the size of the album or paper on which the specimens are to be eventually secured, but these are usually all much of a size. Paper to dry the plants under pressure must also be taken. Strong blotting-paper will do, but blotting-paper is costly and, moreover, frail. A supply of soft old-fashioned newspapers has also dried many a large herbarium, and so long as there is plenty of it this cheap material will suit very well. But botanists with a proper respect for their calling generally use a coarse grey bibulous paper, which used to be sold—and perhaps is yet—under the name of "Benthall's botanical paper." The paper can be packed within the boards, and the whole, after being wrapped in oil-cloth, well secured with a strap or, better still, with a cord and a rack-pin, which will be found useful if the tourist is moving about much from place to place, or has to leave for home before his collection is completely dry. Even if it is, the boards will do excellently to protect the package of loose sheets within which the dry ferns are laid for conveyance.

The different kinds of British ferns number about forty, but the varieties are very numerous. The reader must, however, not fondly imagine that he is likely nowadays to make any discoveries, for the ferns of these islands have been abundantly studied, figured, and described, and their history is recorded in a number of books, one or more of which it will be well for the amateur to have in his baggage. To learn the scientific or popular name of the fern he has secured will add greatly to the interest with which it is regarded, while the information which the pages of the book give is all the more likely to be remembered when the subject of the history has been found by the reader himself. Such books can be bought at all prices, from a shilling to several pounds. The beautiful serial on Ferns, British and foreign, now being issued by Mr. Britten* will afford all the aid, literary and pictorial, which the most fastidious student can desire. Ferns of some kind or other need not require to be sought far afield, as there are very few parts of the island which do not yield a certain moiety of the British species. As a rule, however, a wet country is more fruitful in them than a dry one, and naturally a district with varied features will produce the greatest variety. Dripping

* "European Ferns." By James Britten, F.L.S. Cassell, Petter, Galpin & Co.

waterfalls will generally reward the searcher with several varieties, but even on old walls the curious rue spleenwort (*Asplenium rutamuraria*) will often be found growing. The oak fern (*Polypodium dryopteris*) and the common *Polypodium vulgare* will frequently attach themselves to the mossy trunks of trees, though the former may also just as often be gathered off dry stony heaths. Ferns, however, as a rule are keenly attached to particular haunts. For example, the *Asplenium septrionale* and *Asplenium Germanicum*, two of our rarest and at the same time most insignificant ferns, are limited to a few localities among high and often inaccessible trap rocks, while the common "bracken-bush" (*Pteris aquilina*) is found not only in almost every locality all over the British Isles, but likewise in nearly every part of the temperate world. It is said to be characteristic of poor soil, and as if to prove this theory is most frequently found on such lands; but possibly the reason of this is that it has been exterminated in places worth cultivating. The lady's-hair (*Adiantum capillus-veneris*) is a rarish fern, but the sea-side visitor who cares to explore moist caves on the shore, such as those near St. Ives, in Cornwall, and in the South Isles of Arran, will often be rewarded by lighting on clumps of this lovely delicate species. In similar localities—but more exposed to the sea-breezes—will be found the black spleenwort (*Asplenium marinum*), easily distinguished by its black mid-rib; and if sunny, dry hills are searched, the rambler will often come upon several acres of the parsley-fern (*Allosorus crispus*). The brittle bladder-fern (*Cystopteris fragilis*), on the other hand, frequents old walls, buildings, or dry stones and if by chance it is found near a torrent its roots will be dry; and its near relative, the mountain bladder-fern (*Cystopteris montana*), is in Britain confined to a few localities in the Highlands of Scotland. The common prickly fern (*Polystichium angulare*) may often be detected in hedge-rows, but the bristle fern (*Trichomanes radicans*) is almost confined to Ireland.* The marsh fern (*Lastrea thelypteris*), as its name indicates, affects wet localities, just as the mountain fern (*Aspidium oreopteris*) is rarely seen far away from high ridges and crags, and is abundant among the quarries which abound in particular districts of Wales and Scotland. It is, however, by no means rare in England, and it is even found, though seldom, in such familiar places as Tunbridge Wells, Epping Forest, and Hampstead Heath.

POLYPODIUM DRYOPTERIS.

Some ferns like the rare woodsias, the maiden-hair, the blechnum, the hart's-tongue, the trichomanes, the rue-wort, the scaly hart's-tongue, the filmy ferns (*Hymenophyllum Tunbridgense* and *H. unilaterale*), as well as the strange moon-wort (*Botrychium lunaria*) of old pastures, and adder's-tongue (*Ophioglossum*) can scarcely be mistaken after having been once seen. But some of the other species require more careful study, while many of their "accidental" varieties are often a puzzle to the most experienced botanist. But the figures—and, after the collector has trained himself to read the descriptions, the text also—of the books will afford a clue through this maze.

But the tyro's difficulties sometimes commence at a much earlier stage than this. Not unfrequently he does not know a fern when he sees one, but mistakes for ferns the narrow leaf of a flowering plant just appearing above the ground, or the much-divided "pinnated" leaves of plants like the hemlock order. However, there is an easy test for a difficulty of this nature—even though it need seldom occur. The young fern-frond or leaf, as it rises out of the ground, is curled up like a bishop's crozier, and at a later stage of its life there will usually appear upon its back certain brownish dots, lines, or spots, which serve in the fern the same purpose that the seeds do in a flowering plant. This "fern-seed"—which was anciently believed, if gathered in a particular way and at a particular moment, to have the power of rendering its possessor invisible—has often peculiar forms and positions, which supply characters for certain groups of ferns. In others—as, for example, *Blechnum* (the hard fern), *Osmunda regalis* (the great royal fern), the moon-wort, and adder's-tongue—it is borne on a special stalk, or even on a separate plant, but in most ferns its position is more or less on the back of the leaf. Next, if the frond is held between the eye and the light, it will be seen that its veins are forked, while in flowering plants they are netted, or arranged in more or less parallel lines. A leaf is not, however, a fern, but only a fragment of one; hence, if the

* Until recently a few spots in Western Spain and Ireland had the monopoly of this rare species. But it has lately been found in the Snowdon Range, in the Isle of Arran. It is, however, a very questionable native of the latter locality.

collector desires to have specimens really of scientific value, he should endeavour to select plants which contain all the essential parts of the species. In the case of the smaller ones there is no difficulty in doing this; but to dig up the larger ferns is often an almost impossible task, while to preserve the part above ground, and the long, spreading "rhizome" (which is not the root, as is commonly supposed, but the underground stem from which the roots proper hang down), is out of the question if an herbarium of uniformly-sized sheets is aimed at. In such a case a frond or two are selected—and in every instance one with the "sori," or patches of seed-like bodies, in addition to the barren frond; or, if the "sori" are on another leaf or stalk, two; so that, when the plant is glued down on the sheets of the album, both sides may be shown.

At the end of every day, or at the close of every excursion, the acquisitions should without loss of time be transferred to the drying-paper. Seated at a convenient table, the collector begins his work, his box at one side of him and his paper at another. Number one board is laid down, on this several sheets of paper—the more the better, if paper is plentiful—and on them the fern is laid out as nearly as possible in the natural position, any twisting into shapes which the fronds would not have assumed in life being avoided. Over it a single sheet of paper is laid, and while with the right hand the plant is being spread out, with the left the paper is being simultaneously smoothed over it. Immediately, a few more sheets are laid over it, and the process repeated with additional specimens until the pile is sufficiently high: then it is topped with the second board, and the bundle deposited with a forty or fifty-pound weight on the top of all. Bricks make good weights, and they can be so distributed as to make the pressure bear equally on all parts at once; but any weight—a large stone, for instance—will do very well. If it is desired to make a large collection, the pteridologist can use as many piles of paper and boards as he likes; but at first he will perhaps find one sufficient for him. Next day he must "change his papers." The pile is reversed, and the top board laid down on the table, with a sheet or two of *dry* paper on the top of it. Then the half-limp, flattened fern is carefully transferred to it, and the process repeated until the whole of yesterday's gatherings are once more in dry sheets, and the weights on the top of them again. The damp paper is then laid out in the sun, or suspended on a cord in the kitchen or other warm place, to dry, and in a short time is ready for use. How often the changing of papers must be repeated, depends upon the number of sheets which is interposed between each plant, the state of the weather, the dryness of the room, or the thickness of the fern-leaves themselves; but, as a rule, half a dozen times are sufficient, and, if need be, the last two or three times may have an interval of two or even three days between them. If the plants make the paper bulge out, a sheet or two of stout pasteboard interposed here and there will smooth down their asperities and secure better-dried specimens. In any case, a little patience and neat-handedness are necessary to secure choice specimens: but if the collector is pressed for time, he may often succeed very well by using lattice-work boards so arranged that a current of air may blow between every few sheets. The bundle, tightened up with a cord and a rack-pin, may then be suspended in the branch of a tree, and untouched, except to tighten up the parcel as it gets loose owing to the absorption of the moisture from the plants. The collector should never take the plants out of the paper until he is certain that they are dry: otherwise, after being fastened on the herbarium paper, they will contract, and become unsightly. If, on the contrary, they are thoroughly dried, the collection, allowing that it is kept in a dry place, will last practically for ever; for the insects which are so destructive to dried collections of flowering plants do not touch the bitter ferns. The best test of their being thoroughly dry is to gently bend back a little bit of the frond. If it is flexible, then it is better to give it another turn of the drying press: if, on the contrary, it breaks, the collector may be sure that all the sap has been extracted from it by the combined pressure of the stones and the absorbing power of the paper on either side of the specimen. The plant can now be either glued down on the stout white or blue paper used by botanists, or secured on the sheets by gumming little straps of paper across the specimens. In the former case they must be re-pressed until the glue is dry; the latter has the advantage that at any time the specimens can be removed from the paper. Then the name is neatly written in the bottom right-hand corner of the sheet, with the locality and date of collection. As, however, most amateurs will preserve their specimens in the albums sold for the purpose, it is needless going into details on the point. Those who are more ambitiously inclined will already be familiar with the best ways of forming an herbarium, as doubtless they are collectors of flowering plants as well.

We have hitherto only considered the fern-hunter as aiming at preserving his trophies, for future reference and pleasure, in a dried state. Many, however, prefer to have them alive, even though their beauty can only be enjoyed during the summer months. In that case the specimens must be carefully dug up, and as carefully transplanted in soil as nearly as possible like that in which they originally grew, while the natural conditions of life must be closely imitated. As a rule, ferns require abundant moisture and cool shade, and the exercise of a little ingenuity will soon provide these requirements for even a varied collection. With the help of a few pieces of furnace slag or other fantastic material, a rockery can be erected in the dreariest courtyard; and if the reader will only closely observe how the plants grew in the wilds in which he gathered them, he must be singularly unhappy in climate and other externals if he does not produce, even amid the city smoke, a tiny *rus in urbe*.