

ADAPTABILITY IN FERNS.

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A few years ago while making a collection of Licking County, Ohio, ferns, the idea of starting a fernery suggested itself. A few of the common species had already been planted on the north side of the house. To these more were added until a large number of the ferns of the country and some from distant localities were making themselves at home in the door-yard.

The house mentioned is at Granville, being built on the hill-side and standing upon a terrace. The north side of the house faces the bank which was made in cutting down to the terrace. There is a space from six to eight feet wide between the house and bank. The rain-wash is carried off by a ditch at the base of the bank. Only a few inches of the foundation of the house show above the ground. The kitchen being narrower than the main part of the house, an angle is formed. In this angle and all along the entire length of the building the ferns are planted. The excavated bank, the north exposure and the angle in the house, combine to furnish the conditions favorable for ordinary fern growth. Shady conditions do not, however, prevail throughout the entire day. For during most of the year the morning and afternoon sun shines along the north side of the house, from one to four hours a day; the remainder of the time it is quite shady, and yet there is no noticeable moisture.

The method used in planting was to put the large, tall species next to the house, and the smaller ones further forward. The soil was enriched occasionally and a little sand was also added. In the driest summer months the ferns were watered occasionally, but beyond this they have received but little attention. At present they are all in flourishing condition. Only one has been lost, *Polypodium vulgare*. It did well at first but died about six months after it was transplanted.

Propagation has been very active in many of the species. In fact some have spread so rapidly as to endanger their less thrifty neighbors. In such cases a weeding-out process became necessary.

A few of the members of this unique colony deserve special mention. *Asplenium ruta-muraria* was transplanted from the top of an isolated limestone rock in Clifton Gorge, Greene County, and is growing well in the totally different soil and surroundings. *Osmunda regalis* was taken from a pond situated in a dense wood. The roots and stems formed a large hummock in the center of the pond. About a cubic foot of the root mass was taken with the fronds for transplanting. In its new environment it has had comparatively little moisture, yet it grows quite vigorously. *Pellaea* was taken from a crevice in the rocks, where there seemed

to be no soil whatever, now it lives in the drift soil with apparent ease. *Camptosorus* was taken from the face of a cliff where it invariably grows. Now it is growing flat on the ground and has spread considerably by its peculiar method of leaf-rooting.

The fact that these ferns, many of which live under peculiar conditions, should flourish under one and the same environment with but little of human control, certainly shows a remarkable power of adaptation.

The question might well be asked: What would become of these ferns if left entirely to themselves? From what has already been stated with regard to the rapidity of propagation in some of the species, it would seem that those that find here their normal habitat and those that can most readily adapt themselves to the new conditions, would eventually choke out the weaker species. It is interesting to note in this connection that among those which have shown a decided tendency to spread, *Cystopteris bulbifera*, *Dryopteris thelypteris*, and *Phegopteris dryopteris* have been troublesome.

A list of ferns which were transplanted is given below. A few of these were brought from a distance. In such cases the localities are given opposite the names.

1. *Botrychium virginianum*.
2. *Botrychium lunaria*.
3. *Osmunda regalis*.
4. *Osmunda cinnamomea*.
5. *Osmunda claytoniana*.
6. *Onoclea sensibilis*.
7. *Onoclea struthiopteris*—Brevoort Lake, Mich.
8. *Cystopteris bulbifera*.
9. *Cystopteris fragilis*.
10. *Dryopteris acrostichoides*.
11. *Dryopteris thelypteris*.
12. *Dryopteris cristata*—Brevoort Lake, Mich.
13. *Dryopteris marginalis*.
14. *Dryopteris spinulosa*, var.—Walter's Park, Pa.
15. *Dryopteris spinulosa*, var.—Walter's Park, Pa.
16. *Phegopteris hexagonoptera*,
17. *Phegopteris dryopteris*—Brevoort Lake, Mich.
18. *Camptosorus rhizophyllus*.
19. *Asplenium pinnatifidum*.
20. *Asplenium platyneuron*—Walter's Park, Pa.
21. *Asplenium trichomanes*,
22. *Asplenium angustifolium*,
23. *Asplenium ruta-muraria*—Clifton Gorge, O.
24. *Asplenium acrostichoides*.
25. *Adiantum peclatum*.
26. *Pteris aquilina*.
27. *Pellaea atropurpurea*—Clifton Gorge, O.
28. *Polypodium vulgare*.