Variable as to the size of the plants; the smaller ones approaching *B. gracile* Pursh. This fern, John Robinson tells us, "never spreads except by spores, hence is not found abundant in one locality."

HUDSON FALLS, N. Y.

(To be continued)

Notes and News

NOTES ON FERN LITERATURE

MAXON, WM. R. Contrib. U. S. Nat. Herb. **17:** I–VIII & 541–608. pl. 32–43. 23 May 1916.

In the sixth installment of his Studies of tropical American Ferns cited above, Maxon deals mainly with three groups of *Polypodium*, respectively the groups of *P. trichomanoides*, *P. furfuraceum*, and *P. squamatum*, comprising sixty-four species accepted as valid and more than twenty-five additional forms. In addition the identity of several species of *Notholaena* is also dealt with. Most of the species of *Polypodium* are small forms of the West Indies, Central and South America. The paper includes sixteen new species of *Polypodium*, and two new species in *Notholaena*.

Of particular interest are the characters used in separating the different species, and the conclusions expressed or understood, which may be drawn from the results.

Characters of the scales of the rootstocks and leaves are given more weight than characters of venation, i. e., the actual structure of the individual scale as seen through a microscope. The presence of a large number of scales, as compared with the almost complete absence of scales, is not counted as significant, provided the scales in both cases show similar cell structure. It is found, however, that two forms which in general ap-

pearance are almost exactly alike may be easily separated by a study of the scale characters.

It has been common practice to use as characters of generic rank definite variations in the venation of which *Polypodium* contains a large number. *Polypodium* has been separated into a number of genera on this very basis but Maxon reports that at least one of these kinds of variation may take place even within a single species. This is *Polypodium polypodioides*, the common gray polypody of the southern states which is also common farther south. According to Maxon, it is impossible to draw any other line of distinction between leaves of this plant with free veins and others with the characteristic areolation or net-veining of section or genus, *Goniophlebium*.

Polypodium, in the broad sense, has upwards of one thousand species, the proper separation of which into genera or subgenera is yet to be devised.

R. C. B.

Wanted for study: plants or leaves showing variation in the amount of division.

In connection with the study of *Nephrolepis* variations, I am anxious to obtain leaves illustrating similar or different types of variations among wild ferns. I should be glad to receive for the Fern Society Garden at the Brooklyn Botanic Garden plants of the Christmas fern with deeply incised or twice-divided leaves, as well as similar leaves of other species.

R. C. B.

A POOR PLACE FOR FERN LOVERS.—W. W. Rowlee, reporting on a collection of plants from southern Patagonia,* records only four ferns and one lycopod as col-

* Bull Torrey Bot. Club **44**: 305-322. June 1916.

lected there compared with one hundred and sixty-six flowering plants. Who wants to go there?

QUESTIONS.—If "hex" means six, why is *Phegopteris hexagonoptera* so-called? It is an example of a good equilateral triangle.

What causes ferns to grow forked? If it is a freak, are some genera more liable to grow thus?

LILLIAN A. COLE.

ANSWERS.—The original description of *Phegopteris hexagonoptera* gives the reason for the name, in this phrase: "membranis pinnas oppositas connectentibus oblongo-hexagonis."[1] That is, the name refers not to the outline of the frond (which Michaux notes as "almost an equilateral triangle"), but to the shape of the dilated lower portions of the pinnae which are adnate to the rachis and form wings along it.

C. A. W.

Orthogenesis (a kind of evolution), that is, an innate tendency to vary along that line. That is as much as anyone knows. All we know is that it is a common variation among ferns taken as a whole. It is commoner among certain cultivated kinds of ferns, and probably in some genera or species, *Polypodium vulgare* and *Athyrium filix-femina* for example.

Thirty years ago there were people who could have explained it much better than now. They knew why a leopard is spotted, and a tiger striped. Why? Oh, because the leopard lives under trees with spotted shade, due to their large leaves, and the tiger lives under bamboos and such like which have long leaves and so throw striped shade.

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[1] Michaux, Fl. Bor. Am. 2, 271. 1803.

About those questions of Mr. Bates in the last number, the last is the easiest to answer. The following are a few who study fossil ferns: Prof. C. E. Jeffrey, and numerous students, Messrs. F. H. Knowlton, Arthur Hollick, E. W. Berry, G. Wieland, and David White, of America; Professors Bower, Tansley, Lang, of England, not to go farther.

R. C. B.

The prize for the rarest New England fern will probably have to go to *Cheilanthes lanosa* which is known only from a single station near New Haven, Conn. *Asplenium pinnatifidum*, with two known stations, is a good second.

C. A. W.

We hope to publish very soon an article by Mr. Raynal Dodge containing reminiscences of the early New England fern students, Davenport, the two Eatons and others, and giving a particular account of the original discovery of *Dryopteris simulata* and the hybrid *Dryopteris cristata* × *marginalis*.

American Fern Society

THE SOCIETY'S FERN GARDENS

In the last number of the JOURNAL, a statement was promised of the number and names of the ferns now being grown in the fern collection of the Society at the Brooklyn Botanic Garden. Such a list follows, including all the hardy ferns now growing there, not only those sent by members of the Society but also the species which were there before the Garden was made a depository for the Society.