

The first edition which dealt with a smaller number of Mosses and included no Liverworts has proved so useful both in schools and colleges and to individual collectors that a wide sale is assured for this much improved edition.

A. B. K.

THE LICHENS OF MINNESOTA: Contributions from the United States National Herbarium, Vol. 14, Part 1, by BRUCE FINK.

IN this volume of 269 pages, Prof. Bruce Fink gives us a work of immense value to the botanists of Ontario, for although, as the title indicates, it deals primarily with the lichens of Minnesota, the great majority of the species described are common to the two districts. This report is no mere catalogue of the lichens of a single state, for in the first portion the structure of lichens, their methods of reproduction, and their economic importance, are fully discussed. Then follows a most excellent key to the genera; while the rest of the volume is taken up with keys to the species of each genus, descriptions of the species, together with their habitats and ranges, both in Minnesota and elsewhere. Under each family and genus, the affinities of the groups are carefully discussed. In the descriptions of the species, a most commendable feature is the data given as to variations in size of thallus and size of spores, for in many works spores are given as 12 microns by 8 microns, when they may in reality be 10—14 microns by 7—9 microns, thus implying a constancy which does not exist. The illustrations reproduced from photographs of lichens in their haunts are particularly good.

A. B. K.

THE MISSOURI BOTANICAL GARDEN: Twenty-first Annual Report (1910).

In this report some very valuable scientific papers appear. In "Periodicity in *Spirogyra*, with Special Reference to the Work of Benecke," C. H. Danforth shows that, as far as the common Missouri species of *Spirogyra* are concerned, Benecke's conclusions that conjugation is brought about by a lack of nitrogen in the water, are not borne out. E. G. Arzberger's paper on "The Fungous Root-tubercles of *Ceanothus americanus*, *Elacagnus argentea*, and *Myrica cerifera*," is a valuable contribution to our knowledge of *mycorrhizae*. Some of his