

larger treatise under the title "Lehrbuch der Enzyme"), the authors should prepare a similar condensed edition with all the important references retained in the case of the present treatise. Such a volume would be exceedingly valuable to students as a laboratory text-book. ARTHUR R. LING.

The Association of Higher Plants and Fungi.

Mycorrhiza: an Account of Non-Pathogenic Infection by Fungi in Vascular Plants and Bryophytes. By Dr. M. C. Rayner. (*New Phytologist* Reprint, No. 15.) Pp. x + 246 + 7 plates. (London: Wheldon and Wesley, Ltd., 1927.) 21s. net.

THE chapters of this volume are already familiar to botanists, having appeared in the *New Phytologist* of 1926-27, and being reprinted here with slight emendations. To the more general biologist the title of the book may suggest a somewhat technical discussion of a particular and restricted problem, but in reality, making intimate contact as it does with horticulture, forestry, mycology, plant pathology, soil science, plant physiology and general biology, its interest is unusually wide. Further, it is well written and may be perused with interest by the more general scientific reader.

The fact that numerous vascular plants show a regular and characteristic yet non-pathogenic infection by fungi has been known for many decades, but the critical study of this relation may be said to date from the researches of Frank in Germany about forty years ago. The first half of this period was devoted primarily to the study of the structural relationship between fungus and host, and the last two decades to analysing the more physiological and biological aspects of the relationship.

Interest in these latter problems received tremendous impetus from the researches of Noël Bernard on orchid mycorrhiza, and this interest continues unabated. The first few chapters of Dr. Rayner's volume give an admirably clear picture of the development of research on the subject, and the way in which an issue, originally of almost parochial interest, has become more vital and inclusive until now it touches fundamentally many subjects not only of theoretical but also of immense practical importance. Excellent accounts are given of the part played by fungi in the growth of orchids and the development of orchid cultivation, and the ways in which the natural relationship may be utilised or circumvented by commercial growers. Equally valuable is the author's discussion of the

recent researches of Melin, Peyronel, Falck, and others on the ecological and physiological significance of tree mycorrhiza and the application of experimental results to field conditions and forestry. A particularly interesting chapter is that devoted to a consideration of the tuberisation theories of Bernard and his modern disciple Magrou, especially in relation to tuber development in the potato, and one cannot but agree with the author's tentative rejection of their validity.

In her last chapter, Dr. Rayner, who is the most distinguished English student of these problems and whose researches during seventeen years have added greatly to our knowledge of the mycorrhiza of the Ericaceæ, summarises her views on the symbiotic relationship, coming to the final conclusion that "the possession of mycorrhiza is frequently of benefit to the vascular hosts, the nature and extent of such benefit depending upon the physical conditions of the environment and the physiology of the association in individual cases."

The author has been to immense labour in bringing together the widely scattered information on her problem and has achieved notable success in her synthesis and presentation. Here and there one notes points which might be commented upon, more especially when the author is discussing the actual fungi. Thus, fungi of the "*Rhizoctonia* group" (p. 72) are quite common and plentiful in most soils, as are the 'pelotons' or skeins in varied and numerous species of fungi growing in pure culture. These are trivial details, however, and on the whole the volume impresses one as being an extremely accurate and balanced discussion of the problems of mycorrhiza. The plentiful illustrations, full bibliography, and adequate index complete a book the author may well be proud to have written. W. B. B.

Our Bookshelf.

Air Ministry: Meteorological Office. British Rainfall, 1927: the Sixty-seventh Annual Volume of the British Rainfall Organization. Report on the Distribution of Rain in Space and Time over the British Isles during the Year 1927 as recorded by about 5000 Observers in Great Britain and Ireland. (M.O. 305.) Issued by the Authority of the Meteorological Committee. Pp. xvii + 290. (London: H.M. Stationery Office, 1928.) 15s. net.

THE volume of "British Rainfall" for 1927, which has just been published, is the sixty-seventh that has appeared since the British Rainfall Organization was founded by the late Mr. G. J. Symons in 1859, in order to standardise the methods of