

PREFACE.

IN acceding to Mr Shipley's request to write a book on Fossil Plants for the Cambridge Natural History Series, I am well aware that I have undertaken a work which was considered too serious a task by one who has been called a "founder of modern Palaeobotany." I owe more than I am able to express to the friendship and guidance of the late Professor Williamson; and that I have attempted a work to which he consistently refused to commit himself, requires a word of explanation. My excuse must be that I have endeavoured to write a book which may render more accessible to students some of the important facts of Palaeobotany, and suggest lines of investigation in a subject which Williamson had so thoroughly at heart.

The subject of Palaeobotany does not readily lend itself to adequate treatment in a work intended for both geological and botanical students. The Botanist and Geologist are not always acquainted with each other's subject in a sufficient degree to appreciate the significance of Palaeobotany in its several points of contact with Geology and recent Botany. I have endeavoured to bear in mind the possibility that the following pages may be read by both non-geological and non-botanical students. It needs but a slight acquaintance with Geology for a Botanist to estimate the value of the most important applications of Palaeobotany; on the other hand, the bearing of fossil plants on the problems of phylogeny and

descent cannot be adequately understood without a fairly intimate knowledge of recent Botany.

The student of elementary geology is not as a rule required to concern himself with vegetable palaeontology, beyond a general acquaintance with such facts as are to be found in geological text-books. The advanced student will necessarily find in these pages much with which he is already familiar; but this is to some extent unavoidable in a book which is written with the dual object of appealing to Botanists and Geologists. While considering those who may wish to extend their botanical or geological knowledge by an acquaintance with Palaeobotany, my aim has been to keep in view the requirements of the student who may be induced to approach the subject from the standpoint of an original investigator. As a possible assistance to those undertaking research in this promising field of work, I have given more references than may seem appropriate to an introductory treatise, and there are certain questions dealt with in greater detail than an elementary treatment of the subject requires. In several instances references are given in the text or in footnotes to specimens of Coal-Measure plants in the Williamson cabinet of microscopic sections. Now that this invaluable collection of slides has been acquired by the Trustees of the British Museum, the student of Palaeobotany has the opportunity of investigating for himself the histology of Palaeozoic plants.

My plan has been to deal in some detail with certain selected types, and to refer briefly to such others as should be studied by anyone desirous of pursuing the subject more thoroughly, rather than to cover a wide range or to attempt to make the list of types complete. Of late years there has been a much wider interest evinced by Botanists in the study of fossil plants, and this is in great measure due to the valuable and able work of Graf zu Solms-Laubach. His *Einleitung in die Palaeophytologie* must long remain a constant book of reference for those engaged in palaeobotanical work. While referring to

authors who have advanced the study of petrified plants of the Coal period, one should not forget the valuable services that have been rendered by such men as Butterworth, Binns, Wilde, Earnshaw, Spencer, Nield, Lomax and Hemingway, by whose skill the specimens described by Williamson and others were first obtained and prepared for microscopical examination.

I am indebted to many friends, both British and Continental, for help of various kinds. I would in the first place express my thanks to Professor T. McKenny Hughes for having originally persuaded me to begin the study of recent and fossil plants. I am indebted to Prof. Nathorst of Stockholm, Dr Hartz of Copenhagen, Prof. Zeiller, Dr Renault and Prof. Munier-Chalmas of Paris, Prof. Bertrand of Lille, Prof. Stenzel and the late Prof. Roemer of Breslau, Dr Sterzel of Chemnitz, the late Prof. Weiss of Berlin, the late Dr Stur of Vienna, and other continental workers, as well as to Mr Knowlton of Washington, for facilities afforded me in the examination of fossil plant collections. My thanks are due to the members of the Geological and Botanical departments of the British Museum; also to Mr E. T. Newton of the Geological Survey, and to those in charge of various provincial museums, for their never-failing kindness in offering me every assistance in the investigation of fossil plants under their charge. Prof. Marshall Ward has given me the benefit of his criticism on the section dealing with Fungi; and my friend Mr Alfred Harker has rendered me a similar service as regards the chapter on Geological History. I am especially grateful to my colleague, Mr Francis Darwin, for having read through the whole of the proofs of this volume. To Mr Shipley, as Editor, I am under a debt of obligation for suggestions and help in various forms. I would also express my sense of the unfailing courtesy and skill of the staff of the University Press.

My friend Mr Kidston of Stirling has always generously responded to my requests for the loan of specimens from his private collection. Prof. Bayley Balfour of Edinburgh,

Mr Wethered of Cheltenham and others have assisted me in a similar manner. I would also express my gratitude to Dr Hoyle of Manchester, Mr Platnauer of York, and Mr Rowntree of Scarborough for the loan of specimens.

To Dr Henry Woodward of the British Museum I am indebted for the loan of the woodblocks made use of in figs. 10, 47, 60, 66, and 101, and to Messrs Macmillan for the process-block of fig. 25.

For the photographs reproduced in figs. 15, 34, 68, 102 and 103 I owe an acknowledgment to Mr Edwin Wilson of Cambridge, and to my friend Mr C. A. Barber for the micro-photograph made use of in fig. 40.

In conclusion I wish more particularly to thank my wife, who has drawn by far the greater number of the illustrations, and has in many other ways assisted me in the preparation of this Volume.

In Volume II the Systematic treatment of Plants will be concluded, and the last chapters will be devoted to such subjects as geological floras, plants as rock-builders, fossil plants and evolution, and other general questions connected with Palaeobotany.

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