

two parts—Part I. is descriptive and deals in full with the life-history of ferns; Part II. deals with methods of study. The descriptive portion of the work is arranged in seven chapters, six chapters being devoted to the Leptosporangiate homosporous Filicineae, and one chapter to the Ophioglossae. The chapters on the ferns trace in detail the development, morphology and anatomy of the gametophytic and sporophytic phases. The text is in no sense a compilation, but is written after a thoroughgoing and serious investigation by the author, using the Collodion Method as a means of bringing the material under contribution, so that in a very large measure it is written from nature revealed by original preparations. One unique feature of the work is the result of a critical examination by the author of the structure of the sporangium in the different orders of ferns and the dispersion of the spores. In the light of this study it is clearly shown that the customary statements regarding the extent of the annulus must be modified. The 163 illustrations are all original from camera lucida sketches, accompanied by a magnified micrometer scale, so that the reader can at once compute the magnification. All of the illustrations of sections are from objects prepared by the Collodion Method, and several of them from preparations made by students of the author during their ordinary laboratory work. The old method of free-hand sectioning rendered it an extremely difficult task even for an expert to make satisfactory sections of the delicate prothalline tissue. The profuse illustrations in this book, representing, as they do, the entire range of development, the chief features of anatomy and a comprehensive treatment of the structure of the sporangia of the different orders, are evidence of the comparative ease with which students may now, by this method, overcome obstacles which heretofore have stood in the way. From the intermediate position which ferns occupy in

the plant kingdom their life-history presents a generalized view of the chief phenomena of plant life, and they are therefore admirably suited for studies of the biological aspect of botany, and form a suitable introduction to this phase of botanical instruction. The book is suited to assist students in laboratory classes in successfully tracing out the more difficult phases in the development of fern organs. The descriptive part affords a convenient means of reference at any step of the work, while the practical part deals with methods, preparation of material and instructions for prosecuting the various phases of the investigation, and is to be used as a laboratory guide. By its use, as first tested by the author in his own classes, the students are enabled to make with precision and accuracy permanent microscopic preparations of all the stages of development. Especial success has been had in adapting the collodion method to the handling of the delicate prothalline tissue, sexual organs and embryo, it being better suited to such delicate tissue than the paraffin method, and the preparation of material can be carried through in less time and with far less trouble. Permanent microscopic sections thus made serve the purpose of study, for future reference, and, if desired, for class illustration. The descriptive part occupies such a prominent part of the book that it will commend itself also to those who do not contemplate the practical study, but desire, in compact form, a much fuller account of fern history than can be obtained in ordinary text-books.

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