

# MORPHOLOGY OF ANGIOSPERMS

(MORPHOLOGY OF SPERMATOPHYTES. PART II)

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## P R E F A C E

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IN 1901 we published the first part of a work entitled *Morphology of Spermatophytes*, containing an account of the Gymnosperms. At that time it was our purpose to issue as a second part an account of the Angiosperms, which would also contain a complete index of the whole work. We have become convinced, however, that such an association of these two great groups would help to emphasize a relationship that does not exist, and that Gymnosperms and Angiosperms should be treated as independent groups, coordinate with Pteridophytes. Therefore, the present volume is issued, not as Part II of *Morphology of Spermatophytes*, but as an independent volume entitled *Morphology of Angiosperms*; and any subsequent edition of the previous volume will be entitled *Morphology of Gymnosperms*.

This volume, as the preceding, has grown out of a course of lectures accompanied by laboratory work, given for several successive years to classes of graduate students preparing for research. It seeks to organize the vast amount of scattered material so that it may be available in compact and related form. While careful attention has been given to citations, so that the student may know the groups that have been investigated, and be put in touch with the original papers, the work is in no sense a compilation. The ground has been traversed repeatedly, for several years, by various members of the botanical staff and by numerous students, and their results have served to check current statements, as well as to contribute no small amount of new material.

Any one who has attempted to review the literature of the morphology of Angiosperms will appreciate the great amount of labor it involves, as well as the chaotic condition of terminology and citations. There is nothing more baffling than the attempt to follow the guidance of the meager, indefinite, and often incorrect citations of the standard texts. It is believed, therefore, that the attempt to reduce the numerous contributions to a consistent terminology and to make the citations fairly representative of the subject as well as definite and accurate will be of some real service to students of morphology. The volume, therefore, seeks to give to the advanced student a continuous account of the structures involved, and to the research student the details of groups and bibliography that he needs.

In every case where figures have been copied, acknowledgment is made and a reference is given to the original paper containing the illustration. It should be noted that much information included in the legends does not appear in the text, so that in any thorough reading of the book the legends should be included. The bibliography pertaining to each subject is printed in chronological order at the end of each chapter containing numerous citations. At the close of the volume all of the cited bibliography is brought together, arranged alphabetically by authors.

It would be too large a task to include a complete bibliography of such a subject, but we have presented what may be regarded as a full representative bibliography, containing, so far as we know, all of the most important contributions. In the very nature of things, some citations may have been omitted that should have been included, but there has been no intentional neglect.

No attempt is made to present the details of floral structure, so fully described by the earlier morphologists and taxonomists, since they are easily accessible in numerous texts. Nor have we ventured to enter the old and extensive field of anatomy, although many of its details are pertinent to morphology. In

its later development, however, it has contributed so many important data essential in any discussion of phylogeny that we have asked Professor E. C. Jeffrey to present the general outlines of the subject in the last two chapters of this volume, a discussion which includes both Gymnosperms and Angiosperms. It is hoped that this presentation will help to stimulate the cultivation of an important field of research too much neglected in this country.

It did not seem necessary to treat the two great groups of Angiosperms separately. They are so similar in their essential morphological features that their separate presentation would have involved a needless amount of repetition. We have also continued to regard the spore mother-cell as the end of the sporophytic generation, and its division as the beginning of the gametophyte. The reasons for this are more fully presented in the present volume than in the preceding.

In the chapters upon classification we have presented the scheme elaborated by Professor Engler, believing that it is the best expression of current knowledge of relationship applied to the whole group, and that it is suggestive of the most critical regions for research. This has not been pressed to the dreary details of minor groups, for these are easily accessible. It has rather been our intention to present the general ideas involved in the alliances of first rank, so that principles rather than details may be prominent. We have also thought that the special student should be somewhat familiar with the history of the group, so far as known, its geographic distribution, and the current notions as to its phylogeny. The last subject may be regarded as more theoretical than profitable, but the final aim of morphology is a definite phylogeny, and advance toward it must be made by a succession of theoretical conclusions.

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