

Chloroplasts

CELLULAR ORGANELLES

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Preface

This monograph is intended to provide an overview of the structure, function, and development of the chloroplast. It should be viewed as a beginning of the study of chloroplasts and not as an end. In keeping with an introductory approach, abbreviations generally have not been used, so that substance is not replaced by symbol.

The principal aim has been to provide a teaching tool to introduce students to the major characteristics of the chloroplast, with as much emphasis on mechanisms as possible at this level. It was written for students with an advanced college level education in biology and chemistry who also have some knowledge of biochemistry. The fundamentals of these subjects cannot be included in a book of this type. However, to provide a meaningful description of how the chloroplast works, i.e., what the mechanisms of photosynthetic reactions are, the subject must be dealt with at the molecular level. Living systems are chemical systems, and the importance of understanding these systems at the molecular level cannot be overstated. Therefore, although attempts were made to keep the chemistry at a relatively simple level, occasionally statements are made that can be understood only with a sufficient background knowledge of chemistry.

It is important for students to realize in broad outline form the functions of the chloroplast and where its functions fit into the scheme of life. It is important to appreciate the evolutionary as well as the biochemical development of the structure. Also important is an awareness of the history of research on photosynthesis. Given the vast amount of information available today, there is often too little time or, more unfortunately, interest in knowing where the information came from. Although a detailed history of research on photosynthesis cannot be covered in a small book such as this, a brief account of its first hundred years is included with the hope that the factors that gave this research its direction, and the pioneers who ventured into unexplored areas, will be appreciated.

This monograph has several features that should be pointed out to the reader. Most books of this type present the areas that are most interesting and important to the author, i.e., how he perceives the subject. This one is no exception. Emphasis is placed on those aspects that are particularly appealing to me. Therefore, the discussion is not complete, for which I apologize. Although I have tried to include the essentials of the subjects, there undoubtedly are errors

and omissions because of my own lack of knowledge or recognition of importance. Advanced students may find this monograph disappointing in its depth of coverage. For such students the current literature has no substitute. This monograph cannot provide the detail found in recent in-depth reviews on specific subjects.

I wish to express my gratitude to the many investigators who allowed me to reprint their results and to those who generously provided micrographs. Special appreciation is expressed to Dr. Philip Siekevitz for providing the opportunity to undertake this task and for his expert editorial guidance.

Philadelphia

J. Kenneth Hooper

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