

## BOOK REVIEW

**Photosynthesis I—Photosynthetic Electron Transport and Photophosphorylation:** edited by A. TREBST and M. AVRON. Springer-Verlag, Berlin, 1977. 730 pp., 128 Figs. DM 194, US \$85.40.

This book is the first of the two part volume five of a new version of the *Encyclopedia of Plant Physiology*. It covers those aspects of photosynthesis usually associated with the thylakoid membranes of the chloroplast, i.e. primary reactions, electron transport and photophosphorylation. The second part, not yet published, will cover carbon metabolism and other stromal activities. As pointed out by A. Pirson in the preface so many new concepts have evolved since 1960 that it was difficult to follow the previous division into photochemical and biochemical on the one hand and physiological and environmental on the other. In the old series we had but one photoreaction, many electron transport intermediates were unknown, chloroplasts failed to fix  $\text{CO}_2$  at significant rates and neither the chemiosmotic hypothesis or  $\text{C}_4$  photosynthesis had been conceived.

Following a brief introduction by the editors (which includes a splendid figure summarizing much of what follows) the link between the old and the new is provided by D. I. Arnon in his extensive 'History—photosynthesis 1950–75'. Here he gives a personal insight to the many areas to which he contributed so much during the earlier part of this period. However, in a history one might have expected some reference to the Mitchell hypothesis which surely ranks along with the Z-scheme as the most significant conceptual advances of this period.

The bulk of the book features over 50 writers from 11 countries. Both authors and topics have obviously been chosen with care so that a comprehensive treatment by experts who have contributed much to the areas they review is achieved. The standard of presentation both in terms of content and the standard of writing and presentation is uniformly high. It would be invidious to single out any particular contribution, so one can only summarize. The articles are arranged in four further sections: II, electron transport (18 contributions ranging from a general introduction through intermediates such

as  $\text{P}_{700}$ , techniques such as EPR spectroscopy to inhibitor and antibody studies); III, energy conservation (15 contributions starting with a general introduction to photophosphorylation followed by topics such as proton and ion transport, high energy state, coupling factor, conformation changes and exchange reactions); IV, structure and function (6 sections ranging from general considerations to organization and development); V, algal and bacterial photosynthesis (three sections where we have evolution in reverse ranging from eukaryotes, through the blue-green algae to the bacteria).

This volume has much to commend it, not least the excellent indices. These are essential since this is not an encyclopedia in the normal accepted sense of the word—an anthology would be a better description. In many ways, it does not differ from so many similar collections based on symposia or international meetings, and as such suffers from the usual problems of duplication of material and lack of co-ordination. For example, inhibitors are featured in three articles, in relation to electron transport, photophosphorylation and energy transfer; the definitive figure which distinguishes the three appears in the last of the articles! Similarly, in a book devoted to membrane aspects it would have been nice to see the introduction to structure nearer the front, and why not put all the intermediates of electron transport together? At the same time, I can appreciate the problems faced by the editors in assembling such an extensive volume and producing it within a reasonable time.

It is clear that this will remain a major work of reference for many years to come (although it is interesting to speculate how many of the present concepts will survive a third series which one might expect around the year 2000).

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