

BOOK REVIEWS

KENDRIC C. SMITH (ed.) *Photochemical and Photobiological Reviews. Vol. 4.* Plenum Press, New York and London. 1979. X + 333 pages, 73 figs. Price U.S. \$ 35.00 in the U.S., outside of the U.S. 20% higher.

This volume contains five reviews, mainly dealing with recent literature. These reviews are meant to introduce younger scientists into a field as well as senior scientists into related fields. The contributors and their reviews are:

1. William W. Ward: *Energy Transfer Processes in Bioluminescence.* After a clear and concise introduction the mechanisms of excitation and deexcitation are discussed only briefly, but references to a number of introductory and more advanced books and articles are mentioned. Reaction mechanisms in both chemiluminescence and bioluminescence are compared. Upon a short consideration of radiative and non-radiative energy transfer, bioluminescence is described for five groups of organisms. A few other partially characterized systems are mentioned as well. The energy transfer phenomenon, in particular its way of functioning in these species, is described. The review is presented in a clear and instructive way.

2. Lee H. Pratt: *Phytochrome: Function and Properties.* A clear and critical survey of the facts and hypotheses concerning various phytochrome reactions and properties is presented. Its purification, biochemistry and the differences between both phytochrome forms, exhibiting different morphogenic activities, as well as the localization are discussed in a most interesting way. The final chapter is very valuable, as it deals with suggestions for future research dealing with the evaluation of the many hypotheses concerning the properties and ways of functioning of phytochrome.

3. Govindjee and Paul A. Jursinic: *Photosynthesis and Fast Changes in Light Emission by Green Plants.* In the first chapter photosynthesis is reviewed. The major part of this chapter deals with system II reactions, as these are of primary interest with regard to the light emission phenomena. Since light emission is likely to be affected by changes in the photosynthetic membrane structure, this structure could have been discussed in some more detail. Next, a very interesting survey is presented on experiments and theories concerning chlorophyll *a* fluorescence and delayed light emission. It demonstrates that many problems remain to be solved.

4. Helga Ninnemann: *Photoreceptors for Circadian Rhythms.* As indicated by the title, the effect of light on circadian rhythms – in both plants and animals – is considered in particular. Various action spectra are presented, whereas many data and problems concerning these rhythms are discussed in a most useful way.

5. Ronald O. Rahn: *Non-dimer Damage in Deoxyribonucleic Acid Caused by Ultraviolet Radiation.* In the introduction the difference between UV-induced pyrimidine dimer formation and non-dimer damage in DNA is discussed. Only the latter phenomenon is considered in more detail. Various techniques for assaying this damage, its types and effects in both plant and animal cells are reviewed in a clear way. Also here, future research is discussed.

In conclusion, this volume contains a large amount of up to date information together with extensive lists of references. It therefore is most valuable to those who are interested in the reviewed fields.

J. B. THOMAS

M. GIBBS and E. LATZKO (eds.): *Encyclopedia of Plant Physiology. New Series, Vol. 6. Photosynthesis II. Photosynthetic Carbon Metabolism and Related Processes*. Springer-Verlag, Berlin, Heidelberg, New York. 1979. XX + 578 pages, 75 figs. Price DM 198.-, U.S. \$ 108.90.

This Volume contains contributions by 51 well-known scientists. In a short, reference-free introduction by the editors the relations between the various reviewed fields are shown in a master scheme figure. The major part of the reviews deals with CO₂ assimilation processes, whereas the remaining contributions refer to ferredoxin-linked reactions.

The section on CO₂ assimilation starts with a review by Bassham on the reductive pentose phosphate cycle. According to the author, the work from his own laboratory is discussed to a great extent, whereas for other research the pertaining contributions in this Volume are referred to. In addition to the C₃ metabolic pathway the C₄ pathway, introduced in a review by Ray and Black, and the CAM (Crassulacean Acid Metabolism), in an introductory review by Kluge, are considered. Many aspects of these metabolisms, e.g. factors influencing CO₂ assimilation, functions, properties, and localizations of the enzymes involved, the relation between photosynthesis and respiration, photorespiration, and the assimilatory pathways in various organisms, are discussed and a large amount of information is presented in a clear and conveniently arranged way. Methods for isolation of intact leaf cells, protoplasts and chloroplasts are considered as well, whereas two chapters deal with the metabolism of primary products of photosynthesis. In these chapters the biosynthesis and degradation of starch, and the enzymology of sucrose synthesis are considered.

In the section on ferredoxin-linked reactions the following topics are surveyed: (1) soluble and membrane-bound transhydrogenases, in particular nicotinamide nucleotide transhydrogenases, e.g. ferredoxin-NAD(P)⁺ reductases, (2) superoxide dismutase and oxygen activation in relation to photosynthesis, and the role of ferredoxin in CO₂ fixation in photosynthetic bacteria, (3) four contributions on nitrogen metabolism, namely (a) reduction of nitrate and nitrite, (b) photosynthetic ammonia assimilation, (c) N₂ fixation and photosynthesis in microorganisms, and (d) symbiotic N₂ fixation and its relationship to photosynthetic carbon fixation in higher plants. Furthermore, (4), the photosynthetic assimilation of sulfur compounds is discussed, whereas, (5), the final contribution deals with hydrogen metabolism.

Apart from ferredoxin activity in photosynthesis, metabolic reactions in non-photosynthetic organelles, such as mitochondria, as well as their relationships are discussed. In every contribution, with the exception of two on nitrogen metabolism – due to the need of future research – pathway schemes of the various reactions are presented. These are most useful tools to enable an easy survey. All articles contain a wealth of most useful information as well as a large number of references.

In conclusion it can be stated that this Volume is to be highly recommended to all who are interested in the fields reviewed.

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