Ort, D.R., Yocum, C.F. (ed.): **Oxygenic Photosynthesis: The Light Reactions.** - Kluwer Acad. Publishers, Dordrecht - Boston - London 1996. ISBN 0-7923-3683-6. 682 pp., Dfl. 410.00.

Fourth volume of the series Advances in Photosynthesis (Series Editor: Govindjee) contains 34 reviews on eleven topics connected with the so-called "light reactions" of photosynthesis. In general, they deal with structure, synthesis, and assembly of thylakoid membranes, with the photosynthetic apparatus (photosystems, coupling factor, light harvesting complexes), and with chloroplast and nuclear genomes. In the introductory chapter, the Editors sum up these fields.

Chapter 2 (L.A. Staehelin and G.W.M. van der Staay) deals with the morphology, composition, and physiology of thylakoid membranes as dynamic components in which photoreactions take place. It contains instructive electron microphotographs, models of structure of stacked and unstacked thylakoids, genes controlling individual membrane components, sizes of complexes, alterations induced by irradiance, *etc.* Next chapter is on the evolution of thylakoid structure (G.R. Wolpe and J.K. Hoober), photosystems, and light-harvesting complexes. Synthesis and assembly of thylakoid membranes is the topic of next four reviews. A.N. Webber and N.R. Bakker deal with the control of thylakoid membrane development (multimeric protein complexes and their coding, photochemical activities, effects of environment). Membrane stacking is the next item (L. Mustárdy): it is modelled from electron micrographs in an ontogenic sequence. Biosynthesis of thylakoid lipids, chlorophylls, carotenoids, and prenylquinones, and transfer of lipids between chloroplast envelope and thylakoids are described in detail next (R. Douce and J. Joyard). Insertion of proteins in thylakoid membrane and transport of proteins across the membrane is dealt with by C. Robinson.

Next three chapters are on oxygen evolution: the introductory review by T.M. Bricker and D.F. Ghanotakis describes work with photosystem (PS) 2 preparations, structure and function of individual proteins, inorganic cofactors, and mechanisms of water oxidation. Kinetics and thermodynamics of oxygen evolution, structure and function of manganese clusters, and water oxidation mechanisms are described next (R.D. Britt). Finally, protons and charge indicators in oxygen evolution are reviewed (M. Haumann and W. Junge).

Four chapters are devoted to PS2. In chapter 11, K. Satoh describes its isolation and characterization. Structure, dynamics, and efficiency of energy conversion in PS2 is the next item (B.A. Diner and G.T. Babcock). Structure and function of cytochrome b_{559} as an integral part of PS2 reaction centres is dealt with by J. Whitmarsh and H.B. Pakrasi (its roles in photoprotection and water oxidation are included). J. Lavergne and J.-M. Briantais analyse PS2 heterogeneity: the studies are based mainly on parameters of chlorophyll fluorescence kinetics.

Number four seems to be magic in this book. The following four chapters are devoted to PS1. In the first of them, R. Nechushtai *et al.* deal with PS1 reaction centre function, composition, and structure. R. Malkin describes PS1 components and kinetics of electron transfer (also cyclic electron transfer and cyclic photophosphorylation). Ferredoxin and ferredoxin-dependent enzymes (including nitrite reductase, glutamate synthase, and thioredoxin reductase) are the topic of chapter 17 (D.B. Knaff). In structural studies, single crystals may be analysed by X-ray, electron paramagnetic resonance, and ENDOR techniques (H.T. Witt).

Again, four chapters deal with components of intersystem electron transfer: cytochrome b_6f complex (G. Hauska *et al.*), cytochrome f (S.E. Martinez *et al.*), and plastocyanin (E.L. Gross). Occurrence, structure, isolation, and functions in electron transfer reactions are described. Chapter 20 (L.I. Krishtalik and W.A. Cramer) is on electron and proton transfer reactions in photosynthesis. Reactions in bacteriorhodopsin and bacterial reaction centres are also explained.

The following four chapters are devoted to photophosphorylation, or more exactly to ATP synthase. All deal with its functions, composition, and structure (R.E. McCarty; M.L. Richter and D.A. Mills; J.D. Mills; E.J. Boekema and U. Lücken); models of ATP synthase functions and subunits are also presented. Four chapters are on light-harvesting complexes of plants and algae (D.J. Simpson and J. Knoetzel), on polypeptides in these complexes (E. Pichersky and S. Janson), on their size (A. Melis), and on carotenoids in photosynthetic pigment complexes (with interesting discussion on the xanthophyll cycle - H.Y. Yamamoto and R. Bassi).

Molecular biology is the main aspect of the last block. Two chapters deal with chloroplast gene expression. M.K. Roell and W. Gruissem explain regulation of syntheses at multiple level (transcription, translation, and post regulations). Results of chloroplast transformation and prospects of future research are shown by J.M. Erickson. Nuclear gene expression is the topic of chapters by J.C. Gray (regulation of expression in light reactions of photosynthesis) and M. Reith (evolution of plastids and of the photosynthetic apparatus).

The chapters fully cover the topic of the volume, sometimes with some overlapping. They bring broad lists of full references (per chapter < 100 references 14 times, 100-200 13 times, > 200 7 times). Therefore I regret that no authors' index is supplemented: such index would change the book into a welcome source of references. Nevertheless, the subject index is very detailed. I do not like the idea of distinguishing editors and assistant editors: this will certainly introduce a mess in future references. Generally, this volume is, similarly to the preceding ones, a necessity for every photosynthesis library and for all libraries of universities.

Z. ŠESTÁK (*Praha*)

Ord, M.G., Stocken, L.A. (ed.): **Foundations of Modern Biochemistry. Vol. 3. Further Milestones in Biochemistry.** - JAI Press, Greenwich - London 1997. ISBN 1-7623-0078-7. 346 pp., USD 112.50.

Third volume of this encyclopedy presents in nine chapters the progress in various fields of animal, plant, and microbial biochemistry. With one exception, the chapters were written by English authors.

Chapter 2 (S.J. Ferguson) deals with mechanisms of bioenergetics. It starts with the revolutionary chemiosmotic hypothesis of Mitchell (1961), the P/O ratios, participation of sodium transport, resolution of the structure of ATP synthase and of its functions, participation of cytochromes, *etc.* Chapter 3 (F.R. Whatley) overviews the mechanisms of photosynthesis in general, starting from the hypothesis of van Helmont. It is an interesting summary for students, but it does not bring any new information to photosynthesis researchers, may be with the exception of Fig. 12 that shows the probable sites of action of various inhibitors of photosynthetic electron transfer.

Further chapters deal with muscle contraction and relaxation, bacterial motility (includes the photoresponses of photosynthetic bacteria and halobacteria), cell membrane receptors, protein phosphorylation, regulation of expression of microbial genes, and antibody specificity and diversity. Pp. 165-171 brings 28 portraits of well-known biochemists, among others of D.I. Arnon and R. Hill. Good author and subject indexes are supplemented.

I regret that the scope of the book is not clear: the topics are chosen freely, without any time limit, some chapters go into much detail, but other ones are cursory. Eventual future volumes will certainly require a better editorial work.

Z. ŠESTÁK (*Praha*)