Jones, R.L., Bohnert, H.J., Walbot, V. (ed.): **Annual Review of Plant Physiology and Plant Molecular Biology. Vol. 50, 1999.** - Annual Reviews, Palo Alto 1999. 760 + 7 pp. USD 120.00 (USA), 130.00 (elsewhere); half prices for individuals. ISSN 0-8243-0650-3.

The largest part of the reviewed volume is dedicated to papers dealing with photosynthesis and related topics (nine out of 25 papers). Already the introductory historical paper is an autobiography of Martin Gibbs, a well-known researcher in photosynthetic carbon metabolism, teacher at Brandeis University, and Editor-in-Chief of the journal "Plant Physiology" (for three decades, starting in 1963!). Further reviews are on phosphate translocators in plastids (U.-I. Flügge deals with chloroplasts and non-green plastids in heterotrophic tissues of roots, embryos, inflorescences, tubers, yeast cells, *etc.* in normal and transgenic plants) and on the 1-deoxy-D-xylulose-5-phosphate pathway of isoprenoid biosynthesis that ends in production of carotenoids, phytol of chlorophylls, plastoquinones, sterols, and various terpenoids (H.K. Lichtenthaler). Chlorophyll degradation during plastid development (formation of gerontoplasts and chromoplasts) and the related changes in heme, phytochrome, *etc.* were reviewed by P. Matile *et al.* Three reviews are on genetics of photosynthesis: J. Sheen emphasises advances in gene expression in C_4 plants, including also the interesting differences in gene expression during leaf development and regulation of expression by diverse signals, such as nitrogen, cytokinins, metabolites, stresses, abscisic acid, and irradiance. In the review on molecular genetics of Crassulacean acid metabolism (J.C. Cushman and H.J. Bohnert), genes encoding key CAM enzymes and evolutionary aspects of CAM are in focus. The following review (K.K. Niyogi) is on genetic and molecular approaches to photoprotection mechanisms: formation, targets, and scavenging of reactive oxygen species are the main questions. CO_2 concentrating mechanisms in carboxysomes of cyanobacteria and in pyrenoids of eukaryotic microorganisms is the topic of paper written by A. Kaplan and L. Reinhold. The water-water cycle in chloroplasts, the scavenging of active oxygens, and the dissipation of excess photons (protection from photoinhibition) is the last photosynthetic topic (K. Asada).

Other topics include enzyme functions. D.G. Hardie reviews papers on plant protein serine/threonine kinases (their functions were modelled in animals and yeast). Nitrate reductase structure, its functions and regulations are analysed by W.H. Campbell; this enzyme is also an environmental biotechnology tool for solving nitrate pollution. D.J. Cosgrove reviews literature on enzymes (endoglucanases, xyloglucan endotransgycosylase, *etc.*) and other agents (expansins and hydroxy radicals) that enhance cell wall extensibility.

P. McCourt deals with genetic analysis of hormone signalling; hormone response mutants are often used in this research. Freezing tolerance genes and acclimation mechanisms are reviewed by M.F. Thomashow.

D.P. Delmer reviews papers on cellulose structure and biosynthesis as well as genetic bases of this process. Silicon amounts in plants as well as silicon effect on plant growth and development, and its function in biotic and abiotic stresses is the topic of paper by E. Epstein. The shikimate pathway linking in microorganisms and plants the metabolism of saccharides to the biosynthesis of aromatic compounds is the topic of review by K.M. Herrmann and L.M. Weaver.

The literature on leaf development in angiosperms (morphogenetic patterns, genetic and molecular analyses) is evaluated by N. Sinha. Asymmetric cell divisions in plants (in embryos, roots, pollen, stomata, *etc.*) and their relation to cell divisions in soil nematodes, yeast cells, *Drosophila*, and *Bacillus* is the question elaborated by B. Scheres and P.N. Benfey. Gametophyte development in ferns is another interesting topic: J.A. Banks reviews the surprising amount of 85 papers in this field, many of them based on experiments with the model species *Ceratopteris richardi*. Mycorrhizal symbioses between fungi of the order *Glomales* and various angiosperms, gymnosperms, pteridophytes, and bryophytes are the topic of review by M.J. Harrison.

Acquisition of phosphate from soil by various plant mechanisms and adaptations, P_i transporters, and activation of related genes is the next topic (K.G. Raghothama). Another review deals with root system in soils (M.E. McCully), its heterogeneity, function, and the respective model studies using maize.

The review of M.A. Grusak and D. DellaPenna is on an interesting medical question: how to enhance human nutrition and health by improving mineral and organic nutrient composition of plants; the focus is on iron and vitamin E.

As concerns methods, the use of pressure probe for measuring cell turgor and other water relation characteristics is the topic evaluated by A.D. Tomos and R.A. Leigh.

As an improvement in this book series I see the increase in number of review authors that work in countries other than the mother U.S.A. Thus H. Thomas, D.G. Hardie, A.D. Tomos, and R.A. Leigh work in the U.K., H.K. Lichtenthaler and U.-I. Flügge in Germany, P. Matile and S. Hörtensteiner in Switzerland, P. McCourt and M.E. McCully in Canada, A. Kaplan and L. Reinhold in Israel, B. Scheres in the Netherlands, and K. Asada in Japan. In this way the Annual Review series becomes more and more international. A negative trend is that starting with this volume the full index of authors of the reviewed papers has been eliminated: this lowers the use of the books as sources of correct references. Otherwise, the quality of reviews is high as usual.

Z. ŠESTÁK (*Praha*)