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In comparison to the previous volume 57 containing 33 reviews, the reviewed book is evidently thinner. It brings only 20 review papers written by 45 scientists that work in eight countries. As usual, authors from the U.S.A. prevail (16), followed by Japan (10), the U.K. (7), Denmark, Korea, and Switzerland (3 each), Canada (2), and Sweden (1).

The introductory review was prepared by Diter von Wettstein whom I know as an excellent scientist in chloroplast field (his previous review dealt with this topic and with chromosome pairing). Here he discusses his engagement in genetic engineering of barley (synthesis and mobilization of endosperm proteins, improved production of feed and malt, proanthocyanidin biochemistry in barley and other plant species). One may be surprised seeing photographs of chickens, but these birds were fed with diet supplemented with small addition of transgenic grain containing (1,3;1,4)-β-glucanase. Phototropins as blue radiation receptors are the next topic (J.M. Christie). These kinases are present in higher and lower (ferns, mosses, algae) plants, they sense radiant energy, are autophosphorylated, and control photosynthetic efficiency, signal phototropism, leaf movements, stomatal opening, chloroplast movement, hypocotyl growth, *etc*. Another type of sensing and signalling is analysed in the following review (D.P. Schachtman and R. Shin): it detects the deprivation of macronutrients such as phosphorus, nitrogen, potassium, and sulphur in soils. The respective signal transduction pathways and networks are elucidated as well as the increase in content of reactive oxygen species (ROS) accompanying the deprivation. A special topic are arabinogalactan glycoproteins of cell surface (G.J. Seifert and K. Roberts) that serve as signals, modulators, or co-receptors, mediating between cell wall, plasma membrane, and cytoplasm; they may also function in organ abscission. These substances are studied using trihydroxybenzene derivatives (Yariv reagents) or monoclonal antibodies. Gibberellin signalling in plants (M. Ueguchi-Tanaka *et al*.) includes action of different receptors; they are gene encoded and depend on specific gibberellin-binding proteins in various plant species. Nevertheless, *Arabidopsis* and rice are very often studied from this point of view.

M.L. Ghirardi *et al*. analyse literature on the hydrogenases and hydrogen photoproduction in photosynthetic microorganisms (green algae and cyanobacteria). They deal with enzyme structures, genetics, mechanisms of action, oxygen inhibition, *etc*. Leaf senescence is explained (O.O. Lim *et al*.) from the point of view of structural and biochemical changes in tissues, programmed cell death, and molecular and genetic approaches and regulatory mechanisms (internal and environmental factors). The review on stomatal development (D.C. Bergmann and F.D. Sack) describes mechanisms and genetics of stomata formation, the participating signals, receptors, kinases, and proteases, and stomatal control of gas exchange affected by environmental factors. Another specialized review is on regulation of stomatal movements (opening) by blue and red radiation (K. Shimazaki *et al*.): signalling, receptors, H^+ pump, K^+ uptake, energy sources *etc*. are discussed. Cyclic electron transport around photosystem 1 (T. Shikanai) has essential function in both photoprotection and photosynthesis. Genetic studies helped rediscover this basic mechanism of photosynthetic electron transfer, its components, subunits, and machinery. Biosynthesis of tetrapyrroles (chlorophylls, hemes, siroheme, phytochromobilin) has a common biosynthetic pathway and is important for plant photosynthetic activities, plastid-to-nucleus signal transduction, organ abscission, cell-death program, acclimation to irradiance, *etc*. (R. Tanaka and A. Tanaka). Genetic modification of this pathway may help in agricultural and horticultural applications (reduction in green colour contamination, formation of herbicide-tolerant plants, "stay-green" phenotype, *etc*.).

The review on the architecture of root systems (K.S. Osmond *et al.*), root responses to endogenous and exogenous factors, and formation of root meristem includes also approaches to studying root branching (microarray analysis, proteomics, isolation of modifiers).

continued on page 266