

## BOOK REVIEWS

**Annual Review of Plant Physiology**, Vol. 33 (Annual Reviews Inc., 4139 El Caminoway, Palo Alto, California, USA), 1982, pp. vi + 744, Price: USA \$ 22.00; Elsewhere \$ 25.00.

This volume of the 'Annual Review of Plant Physiology' has in all 22 review papers, besides the Prefatory Chapter, on various plant physiological aspects of topical interest.

The review paper entitled "Compartmentation of Non-photosynthetic Carbohydrate Metabolism" by D. T. Dennis and J. A. Mierniyk deals with the transport and metabolism of various intermediates of the Calvin Cycle. The conversion of hexoses to fatty acids, the enzymes of glycolytic and pentose phosphate pathway in plastids, the involvement of many isozymes in these reactions and the problems of assay and quantitative estimation are discussed.

In the review entitled "Stomatal Conductance and Photosynthesis" by G. D. Farquhar and T. D. Sharkey the inter-relationship between plant conductance to CO<sub>2</sub>, the photosynthetic rate and the biomass production are highlighted. Besides, the role of substomatal CO<sub>2</sub> concentration on opening and closing of stomata particularly under stress conditions has been pinpointed. The opening of stomata when substomatal CO<sub>2</sub> concentration is low and the low stomatal width when CO<sub>2</sub> concentration is high in the atmosphere irrespective of the other environmental conditions, show the adaptation of plants for absorption of CO<sub>2</sub> and biomass production. Some new ideas developed on the stomatal opening and closing as affected by external and internal factors are also discussed.

In the paper by A. D. Hanson and W. D. Hitz on "Metabolic Responses of Mesophytes to Plant Water Deficits", several plant adaptations to maintain higher water status in the organs are discussed in relation to productivity under stress. The carbon and nitrogen metabolism under stress conditions and accumulation of small molecules and their role in stress tolerance, the adaptive significance of the metabolic responses are discussed.

"Phosphoenolpyruvate Carboxylase an Enzymologists' View" a review by M. H. O. Leary is timely and useful. The last general review on this important enzyme was in 1972. All aspects of the enzyme relevant to an enzymologist and the physiological importance are discussed.

In this volume, three papers "Blue Light Effects on Respiration", by W. Kowallik, "Light-Mediated Movement of Chloroplasts" by W. Haupt and "Light Quality Photoperception and Plant Strategy" by

H. Smith deal with light and light quality on metabolic processes and environmental effects. blue light effects on plant processes which are gaining importance are highlighted.

"Cellular Organisation of Glycerolipid Metabolism" by P. G. Roughan and C. R. Slack and "Phospholipid Biosynthesis" by T. S. Moore Jr. are two papers dealing with the synthesis of lipids particularly seed triglycerides and the second paper deals with biosynthesis of different phospholipids and their metabolism.

The paper on "Oxygen Activation and Oxygen Toxicity" by E. F. Elstner gives an exhaustive account of various reactions in which oxygen participates.

The paper by J. Barber on "Influence of Surface Charges on Thylakoid Structure and Function" gives an account of biophysical aspects of the thylakoid membranes and functions.

"Regulation of the Biosynthesis and Degradation of Starch" by J. Preiss deals with the regulation of starch synthesis in different groups of organisms and in the leaves of higher plants, conversion of sucrose to starch and degradation of starch. The topic is of importance in that it provides an understanding of the mechanism of starch accumulation in storage organs.

"Chemistry and Physiology of Bound Auxins" by J. D. Cohen and R. S. Bundurski updates the information on this topic. The importance of the conjugates of IAA for transport, for storage and subsequent use, for protection of IAA from enzymatic destruction and for homeostatic control are discussed.

In the review by R. Malkin on "Photosystem I" identification of the electron acceptors and donors and PS-I reaction centre are discussed.

"Mitochondrial Genome Organisation and Expression in Higher Plants" by C. J. Leaver and M. W. Gray deals with function, diversity and size of mitochondrial genome, the translation systems and products. The role of mitochondrial genes in cytoplasmic male sterility in crop plants is highlighted.

"Plant Molecular Vehicles: Potential Vectors for Introducing Foreign DNA into Plants" by S. H. Howell deals with plant genetic engineering using recombinant DNA technology. The discussion is confined to the vehicle component of the recombination DNA.

The topic "Microtubules" is reviewed by B. F. S. Gunning and A. R. Hardham. With the isolation of the protein tubulin in 1974, the topic has become important. The synthesis, the structure of the microtubules, the nature of development are discussed.

"Cell Biology of Abscission" by R. Sexton and J. A. Roberts deals with the changes that occur in the abscission zone and the involvement of cell wall degrading enzymes, growth substances and calcium in the phenomenon of abscission.

"Genetic Approaches to Circadian Clocks" by J. F. Feldmann reviews the recent developments on this topic.

"Responses of Plants to Low Non-freezing Temperatures: Proteins, Metabolism and Acclimation" by D. Graham and B. D. Patterson deals with the possible mechanism of acclimation for cold temperature through changes in membrane composition and protein metabolism.

The prefatory chapter by P. E. Wareing—"A Plant Physiological Odessey" deals with the work and achievements by the author.

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**Experimental Physiology:** By S. C. Rastogi, (Wiley Eastern Ltd., New Delhi), 1982, pp. 159, price: not mentioned.

This book describes experiments in physiology utilizing a wide variety of animal tissues to illustrate the principles of measurements of physicochemical processes in biology (pH, osmotic concentration, Donnan

equilibrium, dialysis), experiments to study the maintenance of water balance, ion exchange phenomenon, osmo-regulation, effect of oxytocin on permeability of urinary bladder, effect of temperature on respiratory rate (Q10), determination of oxygen consumption, determination of cutaneous and pulmonary respiration, study of oxygen consumption and metabolic rate, elucidation of electron transport system, determination of carbohydrates, proteins and amylase, finding of the acid value and iodine number of fat, study of gastric digestion, pancreatic digestion, renal control of water balance and acid-base balance, tests for urea, creatinine, determination of haematocrit, preparation of haemin, estimation of haemoglobin, determination of blood groups, determination of haemolysis, recording of blood pressure, heart beat, perfusion of heart study of contraction of muscle and the influence of reflex action potentials of nerve, demonstration of reflex action, study of estrous cycle in mammal, etc. The experiments have been clearly described with illustrative figures and proper examples. The book will be extremely useful to students of experimental biology, general physiology and animal physiology. The book is free from errors and is refreshing to read. The book is recommended for study and use of the laboratory, without any hesitation.

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#### FORM IV

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I, Prof. M. R. A. Rao, hereby declare that the particulars given above are true to the best of my knowledge and belief.

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