Developments in Plant Biology: Volume 1, Plant Mitochondria; Volume 2, Chloroplast Development

Volume 1, G. DUCET and C. LANCE (Editors); Volume 2, G. AKOYUNOGLOU and J. H. ARGROUDI-AKOYUNOGLOU (Editors)

Elsevier/North-Holland, Amsterdam, 1978, Volume 1, pp. 480, $60.00; Volume 2, pp. 904, $98.00

These volumes contain the proceedings of two conferences held in July and August 1978. To reduce the time lag between the conferences and the date of publication, both volumes have been produced directly from the unedited typescripts by an offset-lithographic process.

Volume 1 is a collection of the papers presented at the International Symposium on Plant Mitochondria, which was held in Marseille, France, from 31 July to 4 August 1978. This symposium, the first of its kind to be devoted exclusively to plant mitochondria, dealt with various aspects of mitochondrial function, but excluded genetics and biogenesis.

In an introductory paper, Claude Lance presents a short and lucid account of the 'evolution of experimental plant mitochondriology' over the last 30 years and discusses the current trends in the various areas of plant mitochondrial research. The rest of the volume consists of 56 papers arranged in three sections, with some degree of overlap between sections. The first section entitled 'Structure and Function' contains 28 papers dealing with familiar topics of mitochondrial research: electron-transport components, enzymes and compartmentation, energy transduction, ion uptake and the action of inhibitors. The next section is concerned with 'Cyanide Resistance' and consists of 15 papers on several aspects of cyanide-resistant respiration in organisms ranging from a soil amoeba to the tubers of the white potato. The last section, 'Physiological Aspects', includes studies in which attempts have been made to correlate changes of mitochondrial structure and function with the physiological changes which take place during germination, growth, chilling and infection by pathogens.

Although the overall emphasis of the symposium appears to have been on higher-plant mitochondria, there is, in each section, a number of significant contributions on mitochondria from micro-organisms.

Volume 2 is the published proceedings of the International Symposium on Chloroplast Development held on the Island of Spetsai, Greece, in July 1978. This volume contains 107 papers contributed by the 150 participants of the symposium. In an introductory paper, Boardman and Anderson contribute a useful review of the structure–function relationships of developing and mature chloroplasts, with particular emphasis on pigment–protein complexes. The rest of the volume is segregated into six sections covering the major areas of interest. The first section, 'Structure and Organisation of Chloroplast Lamellae', contains only one paper, which presents a model for the thylakoid membrane based on data obtained with the freeze–etching technique. The next two sections are concerned with 'Biosynthesis of Chloroplasts Components'. One of these sections contains 16 papers on the pathways and enzymes involved in the synthesis of chlorophyll and chlorophyll precursors. The other consists of 23 contributions on the assembly of lipids and proteins during thylakoid development.

The next section, 'Development of the Photochemical Activity', deals with the development of the photosystems in greening algae and developing higher-plant chloroplasts. The largest section in this volume is entitled 'Chloroplast Genetics—Information Processing' and comprises 27 papers dealing with studies on the transcription and translation of chloroplast genetic information. The final section, 'Control of Development', is made up of 15 papers that cover the control of chloroplast development by phytochrome and environmental factors. In the preface to this volume, the Editors promise the inclusion of the text of an evening lecture by Calvin on synthetic chloroplasts; this, however, fails to materialize in the book.

Both volumes are of value in that they provide comprehensive accounts of current work and developments in two important areas of plant biology. However both volumes have the same two serious drawbacks. One is the lack of a subject index, the other is the rather exorbitant price. Consequently these two volumes are no more than very expensive specialist journals.

J. O. D. COLEMAN

Recent Advances in the Biochemistry of Cereals

D. L. LAIDMAN and R. G. WYN JONES (Editors)

Academic Press, London and New York, 1979, pp. 391, £18.60

There is no need for detailed statistics to point out the importance of cereals to man. The heavy direct and indirect dependence of mankind all over the world on a few cereal species is well known so there can be no argument about the need to gain as much knowledge as possible about these plants. Because they are grown on a vast scale the sums of money involved are also vast. As pointed out by Osborne in this book, about £30 million are lost each year in the East of England alone due to the occurrence of wild oats in the cornfield; in the foreword, Fowden mentions that nearly one-third of all the fertilizer used in Britain is applied to winter-wheat and spring-barley crops. The possibilities of savings due to the development of improved varieties, improved growing techniques and better weed control are therefore very large—quite enough to transform the finances of the Universities if appropriate redirection could be achieved.

The book itself is a collection of papers given at the 16th Annual Symposium of the Phytochemical Society (or Phytochemical Society of Europe as it is now more properly known). Most of the space is taken by twelve invited papers, although five free communications presented at the meeting are also included. Obviously within a limited time and space there was no possibility of covering all aspects of cereal biochemistry, and fairly arbitrary selections have been made. Four main areas of interest have emerged: ion transport and osmotic relations, germination, seed development and wheat products. There is nothing on photosynthesis. This is a major omission but, as the editors say, it is the topic probably best covered elsewhere, and by leaving it out it has been possible to have four reviews on ionic relationships, a subject of considerable importance that is often neglected. The section on germination also has four contributions. In this case two are reviews and two are reports of the authors' own extensive work in highly specialized areas (Osborne and Cuming on 'Membrane Proteins and Phospholipid Turnover in Imbibed Dormant Embryos of Wild Oats' and Trewavas on 'Nuclear Phosphoproteins in Germinating Cereal Embryos and their Relationship to the Control of mRNA Synthesis and the Onset of Cell Division'). The rest of the book contains two papers on the synthesis of carbohydrates and proteins during the development and maturation of the grains and two on

The Plant Sciences will be published both in print and online; the online text will be regularly updated to enable the reference to remain a useful authoritative resource for decades to come. The aim is to provide a sustainable superstructure on which can be built further volumes as plant science evolves. The first edition will contain ten volumes, with approximately 20-30 chapters per volume. The target audience for the initial ten volumes will be upper-division undergraduates, as well as graduate students and practitioners looking for an entry into a particular topic.Â The Encyclopedia will provide both background and essential information in plant biology.