

## Book reviews

**Hill, R. D.; Munck, L.: New Approaches to Research on Cereal Carbohydrates, Progress in Biotechnology, Vol. 1.** Amsterdam, Oxford, New York, Tokyo: Elsevier Science Publishers 1985. XII+415 pp., several figs. and tabs. Hard bound \$ 101.75.

In six sections, the authors present 47 contributions to the International Conference on New Approaches to Research on Cereal Carbohydrates which was held in Copenhagen, Denmark, June 24 to 29, 1984. Under the wider concept of biotechnology, the topics vary from synthesis *in vivo* and the effects of enzymes to their utilization in the production of food and feed. The greater number of the 18 papers are devoted to starch chemistry. Additional chapters deal with starch technology (5), non-starch polysaccharide chemistry (9), non-starch polysaccharide technology (6), nutrition (6), and general considerations (3). The papers, due to their diversity are of interest to a wide group of research scientists, and scientists in process research, teaching, and industrial management. Special emphasis is put on such topics as starch-lipid interactions, synthesis of enzymes, new technologies for the extraction of starch, and analysis of polysaccharides. With a view to future research, R. L. Whistler refers to the development and structure of amylopectin, the retrogradation, the interactions of the components, the extraction of hemicellulose in connection with the cell wall structure, and the extraction of lignin with the application of genetic control. As the book contains numerous data it may be also used as a book of reference to the latest measuring data. An index should be valuable in this connection.

R. Schneeweiss, Bergholz-Rehbrücke

**Douce, R.; Day, D.A.: Higher Plant Cell Respiration, Encyclopedia of Plant Physiology, New Series, Vol. 18.** Berlin, Heidelberg, New York, Tokyo: Springer 1985. XVI+522 pp., 81 figs. and several tabs.

This book provides a sound review of the knowledge accumulated up to 1983 on all subjects related to cell respiration in higher plants. People interested in the historical aspects of science will be pleased that the topics are presented according to the chronology of their development. However, most of the contributions are organized to make readily accessible the present knowledge and understanding of cell respiration in higher plants. Basic findings are clearly described and discussed so that the non specialist can evaluate the present trends and be aware of the controversial points as well as of the expected developments. This must be kept in mind with a book which covers molecular biology approaches as well as investigations with tissues and intact plants.

Reference to animal metabolism is not overwhelming which reflects the fact that plant biology has become an "adult" science, made very attractive by all the specificities of the plant systems. These peculiarities, like the cyanide insensitive respiration and the oxidation of external NADH by plant mitochondria, are emphasized in several chapters.

This book should be recommended to graduate students to whom it will provide a comprehensive view of the current knowledge of cell respiration in higher plants. Researchers in plant biology will be wise to take advantage of this up-to-date account that integrates well-established information with controversial points in this field so that the present trends of

ongoing work and future areas of investigation are well defined. On the practical side, recipes for plant mitochondria preparation are given in detail and should be of great help to anyone interested in investigating such plant material.

M. Denis, Marseilles

**Adelberg, E. A.; Slayman, C. W.: Current Topics in Membranes and Transport, Vol. 23. Genes and Membranes: Transport Proteins and Receptors.** Orlando, San Diego, New York, Sydney, Tokyo, London, Toronto, Montreal: Academic Press 1985. XIII+216 pp., several figs. and tabs. Hard bound \$ 52.00.

This book describes current research in a wide variety of cells and tissues and illustrates the usefulness of new genetic technologies to probe structure function relationships of membrane proteins. It is divided into three parts: receptors and recognition proteins, ion conducting channels and transport systems, respectively. In the first part sensory transduction in bacteria and the mutational analysis of the structure and function of the Influenza virus hemagglutinin are dealt with. Further evidence for the involvement of specific proteins in the transduction of chemical signals in bacteria is presented. Immunological techniques are applied in a study of the function and structure of Influenza hemagglutinin. The second part contains contributions concerning the  $\text{Ca}^{2+}$  channel of *Paramecium*, a  $\text{K}^{+}$  channel in *Drosophila* and  $\text{Na}^{2+}$  channels in neural cells. A useful application of mutants in the characterisation of  $\text{Ca}^{2+}$  channels that play a role in the generation of action potentials in the unicellular eukaryote *Paramecium* is described. Also for the characterisation of potential-sensitive  $\text{Na}^{2+}$  channels in nerve cells, use is made of mutants and poisons are used that specifically inhibit these channels. The last and major part of the book deals with transport systems and is subdivided into five chapters, four of them describing bacterial transport systems and the last one, a genetic approach to the analysis of the  $\text{Na}^{+}$ ,  $\text{K}^{+}$ -ATPase. Attention is given to genetic approaches in studies of transport proteins involved in the uptake of histidine in *Salmonella typhimurium*, and lactose, potassium and protons in *E. coli*. Kinetic and bioenergetic aspects of the transport systems are also discussed and data on the osmotic regulation of  $\text{K}^{+}$  accumulation in *E. coli* are given.

This book is especially of importance to those working in the field of membrane transport. It shows that the joint research of geneticists and membrane physiologists may lead to the elucidation of mechanisms of membrane transport on a molecular level.

G. W. F. H. Borst-Pauwels, Nijmegen

**Evans, C. W.; Dickinson, H. G.: Controlling Events in Meiosis. Symposia of the Society for Experimental Biology, Symp. XXXVIII.** Cambridge: Company of Biologists limited 1984. VIII+394 pp., several figs. and tabs. Hard bound £ 32.–.

The Symposium "Controlling events in meiosis" must have been very interesting when it was held in 1983. The book still contains a wealth of specific and general information although naturally not all details are as up-to-date as they were in 1983. This is apparently inevitable with such a very well-produced report: it appeared 1½ years after the symposium was held

and even then it was primarily only a review of relatively recent work. It then took another six months before the reviewer received it, and again a similar period before the review appeared.

Yet it is still a book full of valuable information. Most is on specialized subjects, but together the 19 chapters carefully composed by expert authors give a broad review of the field. However, it is somewhat surprising to find that meiosis apparently ends when first metaphase starts. In fact, the symposium was on meiotic resumption in oocytes (about 1/5 of the book) and on factors involved in pairing and recombinational exchange. There is practically nothing on centromere functioning, orientation, segregation. This should have been reflected in the title.

After an Introduction by Callan, there are four chapters which mainly deal with meiotic resumption in oocytes (McLaren; Tsafiriri c.s.; Masui c.s.; Schorderet-Slatkine c.s.). Although, of course, these chapters have an importance outside the subject proper, their number does not improve the balance of the book. The next chapter is on pre- or early meiotic events, mainly position in the nucleus (Bennett). There is one chapter on recombinational exchange at the molecular level in yeast with extrapolation to a wider area (Esposito) and three chapters on the biochemistry of meiotic prophase (Stern c.s.; Pukkila c.s.; Porter c.s.), the latter demonstrating that the narrow basis on which this important field has been based for many years (mainly Hotta and Stern) has been widening. The synaptonemal complex was apparently still popular in 1983, mainly at the EM analytical level, as there are six chapters (v. Wettstein; Carpenter; Moses c.s.; Rasmussen c.s.; Jones; Rees c.s.). These include parts or even chapters on recombination nodules, chiasma position, SC adjustment, DNA variation, etc. and are not entirely restricted to EM studies. Lampbrush chromosomes are represented by one chapter (MacGregor), as is the relation between pairing and gametogenesis (Burgoyne). A concluding chapter on the significance of meiosis is by Holliday.

Reading this interesting 1983 report makes one look forward to a new Symposium on the same topic, to see what the progress is both in experimental results and in concepts. I hope it will include post-metaphase phenomena.

J. Sybenga, Wageningen

**Mantell, S. H.; Matthews, J. A.; McKee, R. A.: Principles of Plant Biotechnology, An Introduction to Genetic Engineering in Plants.** Oxford, London, Edinburgh, Boston, Palo Alto, Melbourne: Blackwell Scientific Publications 1985. 269 pp., several figs. and tabs. Soft bound £ 10.80.

Biotechnology in general implies the application of biological processes to the production, modification and use of materials. It includes not only the application at the industrial level, but also the employment of newly developed scientific methods and techniques to improve biological systems. Most of the biotechnological processes are mediated by microorganisms. However, it is now clear that "plant biotechnology" has grown up, especially due to the recent development in the use of protoplasts and cells or tissues in *in vitro* culture, and the development of the recombinant-DNA technology.

The present book mainly sticks to these developments and comprises in a logical arrangement the subjects molecular biology, tissue culture and vegetative propagation, crop breeding, and industrial biotechnology. It, thus, offers more than is indicated by the somewhat misleading subtitle (an introduction to genetic engineering in plants). Because of the comprehensiveness of each subject it is reasonable to have the book written by a team of authors of different scientific

background (horticulture, pharmacy and botany). However, some independence between the authors might have caused the different plans of the chapters: only a few chapters and subchapters are concluded with brief statements about the status of a specific subject or technique. It would have been helpful to summarize all chapters and important subchapters in this way.

After an introductory chapter, the molecular biology of the plant is treated with emphasis on the action and interaction of the three plant cell genomes (in the nucleus, the mitochondria and the chloroplasts). Next, the possibilities of the cloning of genes from these genomes are described. Techniques as restriction enzyme analysis, blotting and DNA sequencing, and the construction of cDNA clones and their applications are explained. Further, attention is paid to the use of vectors (plasmids, viruses, transposable elements, etc.) for incorporation of cloned genes into plant DNA.

The next chapters of the book deal with technologies at the cell or plant level. Details are given about the culture of plant tissues, cells and protoplasts: growth characteristics and growth conditions, genetic instability, cryopreservation of cells and tissues, and the principles of rapid clonal propagation. In addition, the usefulness to plant breeding of several *in vitro* techniques like somatic hybridization, mutagenesis, somaclonal variation, *in vitro* fertilization and genetic engineering, is described. The eighth and last chapter presents the use of plant material as a resource of energy (methane, ethanol), chemicals (alkaloids, enzymes, vitamins, etc.) and genetic information (to be transferred to microorganisms). Each chapter is furnished with a small selection of specialized literature for further reading.

This instructive book ends in a series of short appendices, giving information about the structure of nucleic acids, plasmid cloning vectors and about tissue culture (media, sterilizing agents, growth regulators and freeze preservation protocols). A short glossary and a list of nearly five hundred mostly recent references complete this book, which contains surveyable tables and clear figures and photographs.

This book can be recommended to undergraduates and all who like to read and study a thoroughly written and plain introduction to the rapid expanding field of plant biotechnology as related to crop improvement and the use of plant processes in industry.

L. J. W. Gilissen, Wageningen

**Alaeddinoglu, N.; Demain, A. L.; Lancini, G.: Industrial Aspects of Biochemistry and Genetics, Series A: Life Sciences, Vol. 87.** New York, London: Plenum Press 1985. 240 pp., several figs. and tabs.

This book includes the proceedings of a NATO Advanced Study Institute held at Cesme (Turkey) in September 1983. Many subjects are stressed in this volume: plasmid incompatibility and replication (Tolun), transposable element from *Halobacterium* (Şimşek), *Streptomyces* plasmid cloning vectors (Thompson and Davies), genetic instability in *Streptomyces* (Hütter and Hintermann), production of glutathione (Kimura), overproduction of amino acids (Hütter and Niederberger), metabolite accumulation in microorganisms (Wright), antibiotic biosynthesis (Lancini), enzymatic production of secondary metabolites (Kleinkauf and Döhren), microbial secondary metabolites (Demain), biochemistry and genetics of vitamin production (Barrere), invertase activity in entrapped yeast cells (Aykut et al.) and computer-control of fermentation processes (De Buyser et al.). The accomplishments and the promise of genetic engineering and industrial microbiology are the missing links between the heterogeneous contributions involved in this book.

R. Borris, Gatersleben