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BOOK REVIEWS

F. A. LOEWUS and W. TANNER (editors): *Plant Carbohydrates II. Extracellular Carbohydrates. Encyclopedia of Plant Physiology New Series, Volume 13 B.* Springer-Verlag; Berlin-Heidelberg-New York, 1981. 769 pp., 124 figures, 49 tables, Price DM 268,–, approx. $ 124.80.

Aspinall's monograph about polysaccharides published only twelve years ago begins with the following sentence: "Polysaccharides seem at the moment to be less spectacular than proteins and nucleic acids". Now, one might feel tempted to state the reverse and volume 13 B is there to prove it. It seems more than fitting therefore that this volume opens with a contribution by Aspinall about the constitution of plant cell wall polysaccharides.

It was high time that the developments and breakthroughs of the past ten years were reviewed and presented in a single volume, because until now anyone entering the field had to find his way almost on his own. Fortunately, the title of the book has not been taken too literally. Hydroxyproline-rich glycoproteins, cell wall enzymes and cell surface lectins are also covered. The first three sections which comprise the major part of the book review the composition, structure and biosynthesis of the cell wall and its components in higher plants, algae and fungi. Topics like lignin, cutin, suberin, algal autolysins and fungal mannoproteins are also included. The following section deals with secretion processes and the export of cell wall components. The remainder of the book deals with cell surface phenomena and the role of extracellular glycoconjugates in such seemingly diverging topics as pollination, plant-pathogen interactions and the role of lectins in the life cycle of slime molds and in *Rhizobium*-host interactions. Nevertheless, this divergence is mainly superficial because it is likely that common mechanisms underlie these phenomena. Of course, that is part of the excitement felt in this rapidly moving field. It is almost unavoidable that some recent developments such as the discovery of endogenous elicitors and the tentative identification of the proteinase-inhibitor inducing factor as a component of the primary cell wall are barely mentioned. Fortunately, the editors promise us a volume entirely devoted to cell-cell interactions.

The 37 contributors and their editors have given a well-integrated account with extensive cross-references of the developments of the past ten years. As such it will serve as a solid work of reference for this decade. I wish all readers many profitable hours of browsing and studying.

F. M. KLIS

D. G. ROBINSON and H. QUADER (Ed.): *Cell Walls '81. Proceedings of the second Cell Wall Meeting held in Göttingen April 8th-11th 1981.* Wissenschaftliche Verlagsgesellschaft mbH Stuttgart 1981. Paperback. 297 pp. 258 figures. DM 58.–.

This book contains most of the papers presented at the cell wall meeting. Five of them deal with organelles and cell wall synthesis in vivo, twelve are devoted to glycan structure and synthesis, five to microfibril orientation and microtubules, four to hormones, cell walls and elongation, and five to "free themes". Since the participants came from seven european countries, Israel and the USA, the proceedings actually supply the reader an up to date view on the current topics of cell wall research. By its nature the book is clearly intended for use by people active in this still more or less neglected area of botanical research. They will find in it detailed descriptions of methods, techniques, assay conditions, models, and last but not least views. Not only the diagrams and figures, but also the many microscopic photographs and micrographs are well reproduced. The book will undoubtedly stimulate further studies in this important part of the plant.

J. VAN DIE

O. KIERMAYER (ed.): *Cytomorphogenesis in plants.* Cell Biology Monographs, vol. 8. Springer Verlag, Wien-New York, 1981. 439 pages, 202 figs. Cloth. DM 198, US $ 92.10.

In "Cytomorphogenesis in plants" a survey is presented about the recent development in this area on cellular and multicelluar level. The first section, "Cytomorphogenesis in unicellular plants and cell aggregates", contains reports on the procaryotic cell wall (Sleytr), scale formation in flagellates (Romanovicz), morphogenesis of the Diatom cell wall (Schmid, Borowitzka, Volcani), form and pattern of Pediastrum (Millington), pattern formation of *Acetabularia* (Schweiger, Berger), morphogenesis (Kiermayer) and nuclear control (Kallio, Lehtonen) of *Micrasterias* and pore distribution in Desmids (Neuhaus, Kiermayer). This section involves problems as cell polarity, cellular organization, nucellar control and cell wall formation.

In the second part, "Cytomorphogenesis in multicellular plants", plant cells in tissues are considered. Topics are: cell expansion of *Nitella* (Taiz, Métraux, Richmond), cell tip growth (Sievers, Schnepf), the complex relation between microtubules and cytomorphogenesis in the *Azolla* root (Gunning), morphogenesis of tracheary elements and stomata (Hepler) and sporogenesis and pollen grain formation (Buchen, Sievers). Attention is payd to different cytological aspects as nuclear control and the importance of the plasma membrane, but other aspects are reviewed in a more or less restricted way.

The third section, "general aspects of cytomorphogenesis", includes ionic currents (Wiesenseel, Kicherer) and the lipid self-assembly in subcellular morphogenesis (Sitte). These chapters accentuate the complexity on molecular level represented in structural changes.

In cytomorphogenetic studies a cellular process is followed with all its complex interactions. In this sense the book presents on selected objects a more or less morphological approach with an accent on the cell formation.

Considering the great quantity of data, the clear illustrations with only few electronmicroscopical photographs of lower quality and the diversity in approach, the book offers a well-founded introduction to the topics in cytomorphogenesis. Besides, some chapters present a good summary and concluding remarks. The importance of the composition of the membrane or the relation with the cellular organization in morphogenesis is repeatedly revealed.

Some more general, carefully chosen concluding remarks and suggestions as a summary of the separate chapters could have given a more homogeneous image of the subject.

"Cytomorphogenesis in plants" is one of the first surveys on this topic. Although recently this type of study has become more actual and more approachable in experiments, the book is a representative survey and will be very useful in research and teaching.

M. T. M. WILLEMSE

Recent Advances in Phytochemistry; Proceedings of the Phytochemical Society of North America. Plenum Press; New York and London.
Volume 14: *The Resource Potential in Phytochemistry* (Ed. T. SWAIN and R. KLEIMAN); 1980. 215 pp.; Price US $ 29.50.
Volume 15: *The Phytochemistry of Cell Recognition and Cell Surface Interactions* (Ed. F. A. LOEWUS and C. A. RYAN); 1981. 277 pp. Price US $ 45.–.

Volume 14 offers "an optimistic discussion of the exploitable characteristics of native (American) and cultivated plants". Two chapters deal with antitumor agents, and the search for carcinogenic principles in higher plants, respectively. One chapter is devoted to the glycoalkaloids of the Solanaceae and their possible use in steroidal hormone synthesis. Three chapters are the most useful ones: they contain valuble surveys on corn kernel modification, the chemistry and breeding of Cruciferous vegetables, and on chemical investigations in soybeans. One chapter explores the possible uses of many plant species as fuels. It is clearly written in a time in which a world-wide interest exists in other energy sources than petrochemical fuels.

Although the book is heterogenic in its subjects and some chapters, especially that on carcinogenic principles, hardly supply information of any value, the three chapters on cultivated plants alone justify the purchase of the book. These chapters contain a wealth of information on the breeding and selection of protein, oil and carbohydrate rich strains of corn and soybean, and will be of much value for plant physiologists and biochemists engaged in agricultural research.

Volume 15 contains a series of papers devoted to the biological significance of glycosylated biopolymers. In plants these substances mainly occur in the cell walls. Partly their significance may be found on the multicellular and organismal level, analogous to the role this class of substances plays in cell surface interactions and cell recognition in animal tissues, microbial cells, and viruses.

The book starts with an overview of the structures, biosyntheses, and properties of glycoconjugates – mainly lipopolysaccharides and glycoproteins – and their role in cell recognition and adherence of bacteria. In other chapters the properties of plant derived lectins, their possible functioning in the binding of nitrogen-fixing bacteria to the legume, and in their involvement in germination, differentiation and maturation are discussed in comparison with generally known properties such as agglutination of erythro- and lymphocytes, modulation of immune response, etc. Also the molecular aspects of recognition and response in the pollen-stigma interaction are treated in a separate chapter. Other chapters deal with e.g. enzymatic properties of phytohemaglutinins, bacterial attachment to plant cell walls, and lectins and plant – herbivore interactions.

Although the subjects treated are undoubtedly of much interest and very intriguing, the book clearly exhibits the large gap that exists between the many beautiful hypotheses and models presented by the authors, and the relatively rare experimental facts.

An immense task is awaiting plant physiologists and biochemists to produce the data so urgently needed. This book with its many views and ideas, and with its numerous references will be of great help to them.

J. VAN DIE

H. LORENZEN and W. WIESNER: Intracellular and intercellular regulation in algae and symbionts. Gustav Fischer Verlag, Stuttgart and New York, 1981. 320 pp., 157 figs., 46 tab. DM 86,—.

This book is a collection of 26 papers presented at a symposium of the same title in Göttingen, September 1980, sponsored by the Akademie der Wissenschaften in Göttingen. The articles were also published in the Berichte der Deutschen Botanischen Gesellschaft. A wide variety of subjects is presented, dealing with regulatory aspects of physiological processes in algae. They are divided into five sections: 1. circadian rhytmicity; 2. asexual and sexual reproduction; 3. chloroplast structure and development and photosynthetic activity; 4. recognition and interactions in symbionts, particularly the *Hydra-Chlorella* system, and 5. various metabolic processes as osmotic regulation in *Dunaliella* and nitrate metabolism in *Chlorella*.

From such a collection of symposium papers one should not expect a complete and comprehensive coverage of a particular field. The book is made valuable by the fact that most papers review the recent literature fairly extensively, are well presented, and by their diversity give access to areas not generally treated in textbooks of algal physiology, which in themselves are not all too numerous. The price is reasonable.

H. VAN DEN ENDE

W. H. L. LEWIS and M. P. F. ELVIN-LEWIS: *Medical Botany – Plants affecting man's health*. John Wiley & Sons, New York, London, Sydney, Toronto. Paperbound edition 1982. £ 9.75, $ 19.90 (Cloth now: £ 28.45, $ 51.25).

The original (1977) edition was reviewed by G. STARITSKY in *Acta Bot. Neerl.* **27**: 252–253 (1978).