

BOOK REVIEWS

Isolation of Plant Growth Substances: edited by J. R. HILLMAN. Society of Experimental Biology Seminar Series No. 4, Cambridge University Press, 1978. 157 pp. £9.50 (paperback £4.50).

This little practical book is an up-to-date manual on methods of extracting, purifying and identifying the major groups of natural plant hormones. Thus, there are chapters on the GC-MS and spectrofluorimetry of IAA, the HPLC and GC-MS of gibberellins, the chromatography of cytokinins and finally the GLC of abscisic acid and of ethylene. They are all written by international experts and the guidance offered in these chapters will be invaluable to anyone contemplating research in plant hormonology.

In a sense perhaps, this volume may deter many from entering the field since quite an awesome number of precautions are necessary before one can hope to reliably isolate and identify any given hormone. In the case of

gibberellins, for example, the very low quantities in most plant tissues make analysis particularly arduous. During extraction, contaminants from stopcock grease, organic solvents and plastic stoppers must be avoided; even the chemical derivatization of gibberellins can give rise to undesirable side products. The considerable cost of the necessary equipment for isolation and analysis explains why even today the number of centres for plant hormone research is very limited. Nevertheless, it is still the skill of the individual research worker which determines whether advances are made or not. As Dr. Horgan succinctly puts it in his chapter on cytokinins "it ain't what you do but the way you do it, that's what gets results". This book at least gives any beginner all the major clues to the procedures needed for successful growth substance analysis; after that he is on his own.

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Lipids and Lipid Polymers in Higher Plants: edited by M. TEVINI and H. K. LICHTENTHALER. Springer, Berlin, 1977. xii + 306 pp. DM 90; \$39.60.

This book contains sixteen articles written by the principal speakers at the symposium on 'Lipids and Lipid Polymers in Higher Plants' held at the University of Karlsruhe in July 1976. The title of the book will mislead those who are conditioned to believe that symposia on lipids are to do with compounds which contain fatty acyl residues, since eight of the sixteen chapters are devoted to steroids and prenyl-lipids (prenols, carotenoids, and prenylquinones and related compounds). The inclusion of these terpenoids, whilst praiseworthy, has of course made it impossible for the editors to put together sixteen contributions which between them cover all of the recent developments in the biochemistry and physiology of plant lipid metabolism and many readers will feel that some important areas have been neglected.

The book is divided into five sections which cover: Function, Organisation and Lipid Composition of Biomembranes (Chaps. 1–3); Physiology and Biochemistry of Fatty Acids and Glycerides (Chaps. 4–7); Physiology and Biochemistry of Plant Steroids (Chaps. 8 and 9); Physiology and Biochemistry of Prenyl Lipids (Chaps. 10–14); Lipid Polymers in Higher Plants (Chaps. 15 and 16).

Section 1 begins with a nice lucid account by P. Sitte of the roles of lipids in the functional organization of biomembranes. T. W. Goodwin then deals in a very succinct manner with the intracellular and intrachloroplast distribution of sterols and prenyl-lipids and the present state of knowledge with regard to the overall biosynthesis of terpenoids in the chloroplast. The section is concluded by P. Mazliak who discusses the glyco- and phospholipid compositions of individual plant

membranes and then goes on to consider the biosynthetic capability of plant membranes, lipid exchanges between cell organelles and the role of the lipid environment in the activities of membrane-bound enzymes.

Section 2 opens with a concise review by P. K. Stumpf on the biosynthesis of unsaturated fatty acids in developing seeds. In the second chapter, H. K. Mangold and F. Spener provide a comprehensive account of the chemistry and biochemistry of the cyclopentenyl fatty acids and this is followed by a chapter by E. Heinz on the enzymatic reactions involved in galactolipid biosynthesis. In the last chapter in this section M. Tevini describes the effects of light (white, red, far-red and blue) and UV radiation on the synthesis of lipids during etiochloroplast development and relates these changes to the structural and functional changes which take place during the development of the thylakoid membranes.

Section three contains two chapters on steroids, in the first of which L. J. Goad, in a very well written account of the overall pattern of plant sterol biosynthesis, develops the theme that we may now be within reach of a sufficient understanding of the basic phytosterol biosynthetic mechanisms to permit some rationalization of the elaboration and occurrence of the array of sterols produced by the plant kingdom. W. Eichenberger then deals with the glycosylation and acylation reactions involved in the formation of steroid glycosides and acylated sterol glycosides and cites the limited amount of information that is available about their metabolism and physiological functions.

Section four is made up of five chapters on the physiology and biochemistry of prenyl-lipids. F. W. Hemming starts this section with a short account of the biosynthesis and control of the rate of biosynthesis of prenyl pyrophosphates and their involvement in the biosynthesis of mono-, sesqui-, di- and polyterpenes, and then rather briefly deals with the function of polyprenol monophos-

phates in glycosylation reactions. The obligatory chapters on carotenoids are provided by B. H. Davies, who gives a good general account of the formation of carotenoids in higher plants and a brief summary of their possible functions, and D. Siefermann-Harms, who discusses the nature, control and possible function of the xanthophyll cycle in higher plant chloroplasts. The section is continued by H. K. Lichtenthaler who describes the researches of his group at Karlsruhe into the regulation of prenylquinone synthesis in higher plants, the results of which show that light-induced prenylquinone formation in chloroplasts is initiated by phytochrome P_{fr} and is regulated by environmental factors such as red and blue light, low and high light intensities and by the phytohormones IAA and kinetin. The last chapter in this section is a short but interesting article by C. Liljenberg on the state of the game with regard to the elucidation of the various pathways that lead from geranylgeranyl pyrophosphate to the phytol side chain of chlorophyll.

The final section of the book deals with lipid polymers. It is made up of a very comprehensive review by P. E. Kolattukudy on the biosynthesis of cutin and suberin and their degradation by plants, microorganisms and animals, and of a short article by A. H. B. Deas and P. J. Holloway on the intermolecular structure of plant cutins in general and four plant cutins in particular.

The book provides a very readable coverage of some of the recent developments in the subject areas in which the various contributors are actively engaged in research. It does not, however, give a balanced picture of the biochemistry and physiology of lipids and lipid polymers in higher plants. The novelty and possible attraction of the book is that it contains articles on lipid and prenyl-lipid biochemistry between the same covers.

The book is well produced, illustrated and indexed; but its high price must reduce its appeal to the would-be purchaser.

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