Phytochemistry, 1979, Vol. 18, p. 1421. Pergamon Press Ltd. Printed in England.

BOOK REVIEWS

Mammalian Metabolism of Plant Xenobiotics: by R. R. SCHELINE. Academic Press, London, 1978. xii + 502 pp. £28.

This book comprehensively and succinctly surveys the metabolism of secondary plant compounds in mammals, bringing together from a wide variety of sources, metabolic data for a large number of plant xenobiotics. It should, therefore, prove to be a most useful reference source for those actively engaged in research involving secondary plant compounds.

Chapter 1 outlines the metabolic reactions of plant xenobiotics in mammals. It deals first with the reactions of the body tissues by giving examples of the different types of oxidations, reductions, hydrolyses and conjugations undergone by secondary compounds *in vivo*. The biochemical mechanisms responsible for carrying out these reactions are dealt with only briefly, but references are given to recent reviews on the enzymes involved. The wide variety of reactions catalysed by the enzymes of the intestinal microflora are then described and contrasted with those carried out by the tissue enzymes. Thus, metabolism by the body tissues is mainly oxidative and conjugative, whereas gut bacterial metabolism tends to involve the hydrolysis of conjugates, degradative and reductive reactions. The toxicological significance of these bacterial reactions is discussed. The excretion of xenobiotics is only briefly mentioned in this introductory chapter. A general account of the types of xenobiotics excreted via the bile into the intestine, and of the factors influencing biliary excretion, would have been useful, because many xenobiotics, following metabolism, are eliminated in bile bringing their metabolites into contact with the intestinal microflora.

Subsequent chapters describe the metabolic fate of individual plant xenobiotics, each chapter dealing with a particular chemical class. Thus, chapter 2 describes the metabolism of hydrocarbons (aliphatic, monoterpenoid and aromatic hydrocarbons); chapter 3 deals with alcohols, phenols and ethers; chapter 4 with aldehydes, ketones and quinones and chapter 5 with acids, lactones and esters. Chapter 6 discusses the metabolism of higher terpenoids (sesquiterpenoids, diterpenoids and tetraterpenoids). It is followed by a chapter dealing with oxygen heterocyclic compounds, which includes metabolic data on pyrones, chroman derivatives, coumarins, flavonoids and xanthones. Chapter 8 is on the metabolism of amines, nitriles, amides and non-protein amino acids, and is followed by a long chapter (104 pages) on nitrogen heterocyclic compounds. This describes the mammalian metabolism of pyrrolidine, piperidine, pyridine, pyrazine, tropane, indole, quinoline, morphinan, pyrrolizidine, imidazole and purine alkaloids. The final chapter considers the metabolism of organic sulphur compounds derived from plants. Each chapter has an extensive list of references to original papers.

In each chapter the metabolism of specific compounds is illustrated by structural formulàe, and, for those compounds which have several metabolic routes open to them, by detailed figures showing the structures of the intermediates in each pathway. There are also several useful tables summarizing data from the literature on the metabolites of individual compounds. The literature coverage on each compound is extensive, making this book a very useful reference source for those who need to obtain, quickly and conveniently, the known metabolic data on a specific secondary plant compound.

Department of Biochemistry,
St. Mary's Hospital Medical School,
London

PETER MILLBURN

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Progress in Phytochemistry Vol. 5: edited by L. REINHOLD, J. B. HARBORNE and T. SWAIN. Pergamon Press, Oxford, 1978. 329 pp. £35.00

This book follows the policy established for the earlier volumes in the series and includes six authoritative reviews covering what the editors term 'both the dynamic and static aspects of plant chemistry.' In the first article, H. Kauss reviews 'Osmotic Regulation in Algae' and deals with two mechanisms. The role of inorganic ions in the giant algae will be familiar to plant physiologists but much less so to biochemists; the review of the use of the organic constituents galactosylglycerol and glycerol for regulation in *Ochromonas* and *Dunaliella*, respectively, will be much appreciated by both physiologists and biochemists. In view of the importance of the biochemical work on glycerol and galactosylglycerol, it is unfortunate that there are no formulae given in the very brief outline of the metabolic pathways involved.

I. Uritani, in the second article 'Biochemistry of Host Response to Infection', concentrates particularly on the interaction between sweet potato roots and *Ceratocystis fimbriata*. This is a subject on which Uritani has concentrated his own research for many years. Although it is an impressive review of the findings of his own research group, it is perhaps unfortunate that the scope of his review was not broadened to include more information on other host–parasite combinations since some aspects

of the subject are treated very cursorily or omitted altogether.

'The Biosynthesis of Monoterpenes', reviewed by B. V. Charlwood and D. V. Banthorpe, covers all the enzymology, metabolic pathways and chemical rearrangements involved in the biosynthesis of this very large group of compounds and concludes with a review of the use of cell-free systems, tissue culture, the biological significance of the compounds, together with a short section on genetic studies and the chemotaxonomic importance of monoterpenes.

The next article by E. Harel on 'Chlorophyll Biosynthesis and its Control' is an excellent review of a very complicated subject from which he has made a readable and comprehensive story from 440 references. The article is extremely valuable because the author critically reviews each part of the biosynthetic pathway, paying particular attention to possible control points. The article emphasizes our lack of knowledge about the metabolic pathways involved in several of the stages in chlorophyll biosynthesis and their enzymatic control, and in particular, those concerned with ALA synthesis. The author indicates, at several points in the review, possible new approaches to research on the different stages of the biosynthetic pathway.

As K. R. Markham and L. J. Porter point out in their review 'Chemical Constitution of Bryophytes', there has been a very large increase in published work on this plant group recently. For this reason the review is most timely. It covers the chemistry of lipids, terpenoids, flavonoids, lignins and dihydrostilbenes of the bryophytes and then has a relatively large section on chemosystematics, paying particular attention to flavonoids and terpenoids as chemosystematic markers in the group. This is not, like many articles on the chemistry of plant groups, merely a collection of formulae and tables but includes a great deal of discussion on the validity of the procedures used for characterization and structural determination of many of the compounds isolated from bryophytes.

In the final chapter, 'Anticancer Agents from Plants', G. A. Cordell describes compounds isolated from plants according to their chemical classification. The majority of the compounds investigated to date are either terpenoids or alkaloids. Cordell explains the type of biological activity demonstrated by the compounds, their possible clinical use, as well as the methods used for investigating their structure and biosynthesis.

The general quality of the articles in the book is high. The editors must be congratulated on their choice of authors and subjects. Although many phytochemists would wish to be able to purchase their own copies of this volume, they will probably be unable to afford it at such a high published price. Furthermore, research workers may wish to have access to individual chapters. Would the publishers consider producing these separately at a price which postgraduate students could afford?

Department of Plant Biology. J. FRIEND
The University, Hull

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Handbook of Phycological Methods: Physiological and Biochemical Methods: edited by J. A. HELLEBUST and J. S. CRAIGIE. Cambridge University Press, 1978. xiv + 512 pp. £18.00.

This volume was sponsored by the Phycological Society of America as a companion volume to 'Handbook of Phycological Methods: Culture Methods and Growth Measurements', edited by J. R. Stein. The present book, according to the Introduction, has as its remit 'the presentation of as many useful methods as possible for physiological and biochemical investigations with algae'. The editors attempted to use the limited space available to the best effect by the inclusion, as far as possible, of methods which are applicable to as broad a range of experimental procedures and algal types as possible. The extent to which these objectives have been achieved can be seen by reference to list of contents and to the taxonomic index.

The range of techniques covered are, according to the groupings of chapter headings in the contents list: Isolation of organelles and membranes; Analysis of chemical constituents; Enzymes; Physiological and biochemical processes; Nutrients; Ion content and transport; and Inhibitors. It is perhaps unfortunate that the distinction between 'nutrients' and 'ions' should be perpetuated so early in the book when the general trend of research and hypothesis is to break down this distinction. The taxonomic index does not do justice to the range of organisms covered: for example, the Prasinophyceae do not feature in the index yet are mentioned in the text (e.g. p. 230).

Focussing more finely on the contents, the individual chapters differ considerably in the experimental details supplied and in the range of applicability of the methods. There are some annoying omissions: thus the chapter on chloroplasts concentrates on the isolation of *Euglena* chloroplasts, which are ultrastructurally and enzymically good, but cannot (as yet) carry out photosynthetic CO_2 fixation at significant rates. It would have been useful had there been at least a reference to the ability of isolated chloroplasts from such giant-celled marine algae as *Acetabularia*, *Bryopsis*, *Caulerpa* and *Codium* to carry out photosynthetic CO_2 fixation at near the *in vivo* rate, even if the criteria of purity set in the *Euglena* work are difficult to meet for these marine algae. The reviewer finds it difficult to justify the separation of Chapter 9 (Protein determination by dye binding) and Chapter 10 (Carbohydrate determination by the phenol–sulfonic acid method) from Chapter 18 (Quantitation of macromolecular components of microalgae). All three chapters are by the same author, and at least the first two lack