Phytochemistry, 1978, Vol 17, p 173 Pergamon Press. Printed in England.

BOOK REVIEWS

Progress in Phytochemistry: edited by L. REINHOLD, J. B. HARBORNE and T. SWAIN. Volume 4. Pergamon Press, Oxford, 1977. 289 pp. £16.50

The fourth volume in this series contains 8 chapters. Like its predecessors, it caters for two kinds of phytochemists: those who are chemically oriented and those who are biochemically minded. To some extent, the needs and interests of the two are mutually exclusive. However, some of the chapters bridge the gap between the two interests. The first article by Miflin and Lea deals with the pathway for nitrogen assimilation via glutamine, with glutamine synthetase and glutamate synthetase. It is admirably clear, and the fact that it has already been published verbatim in *Phytochemistry* does not detract from its value. The article by Smith on the plant amines is encyclopedic in nature and as such is a mine of information. The number and type of amines is very large indeed but the function of many of them still seem rather unclear. The chapter by Seigler on the cyanogenetic glycosides deals primarily with the chemistry of these widespread and interesting compounds. Means for their identification and isolation and many NMR spectra are given. It is a little disappointing that their possible function and their biosynthesis are hardly discussed. The discussion by Lea and Norris on *t*RNA and aminoacyl-*t*RNA synthesis is important because it emphasizes the knowledge of these systems in plants, which are systematically ignored by other biochemists. The progress made in this area in the last few years is impressive, and the coverage by Lea and Norris is very complete indeed, even if this chapter is not always very easy to read. An evaluation by the authors of the free vs *t*RNA cytokinin debate would have been greatly welcomed.

Camm and Towers review phenylalanine ammonia lyase. This enzyme has been extremely fashionable in recent years. Nevertheless, the outburst of papers has been somewhat unrewarding. As the authors say. . . . . "all these point to a special role for PAL. This role still remains a mystery."

The presence of flavonoid sulphates in many species is unexpected and presents a challenge for further research. Harborne discussed this newly discovered group of compounds, their distribution, chemistry and possible function. Due to their discovery, the number of substances containing sulphur in the oxidized form has greatly increased. The apparent correlation between salinity tolerance and the appearance of flavonoid sulphates is interesting. Why flavonoid sulphate should appear under the saline condition is unclear, and their possible adaptive value seems dubious. Quantitative data on their appearance are clearly needed.

The sesterterpenes are reviewed by Cordell. This is a complex diverse group of compounds derived from isoprene. Neither their distribution, function or biosynthesis are clear at present. Although there is a hint about their pharmacological properties, this is not amplified and left this reviewer puzzled.

The last chapter by Heftmann deals with the function of steroids in plants. Although Heftmann early on rejects the thesis that secondary plant metabolites function as protective agents, later on he returns again and again to this possible function for them. He also goes on to speculate that since steroids act as hormones in animals, it is very likely that they so function in plants—how could they fail to do so since they must come in contact with the relevant sites. I feel this is dangerous ground for a phytochemist to tread on. Too often the search after analogies with animal systems has bogged down plant biochemists. After all one of the points of plant biochemistry is to determine why daisies and elephants differ—not why they are the same. The possible function of steroids as plant hormones seems at present to be doubtful. However, I agree that much more precise, reproduceable work is needed.

By and large, this volume is well presented and printed. However, the publishers at times have gone to extremes to save space. The table on p. 171 is virtually illegible because of the minute print. In the chapter on the sesterterpenes, space is saved in the various biogenetic and chemical schemes by referring one back to structures shown many pages earlier. The chemistry of these compounds is complex and the structures should have been shown again. If space had to be saved, perhaps Table 2 could have been omitted. Since the policy is to have references arranged in running order rather than alphabetically, an author index is badly needed. This volume continues the tradition of the earlier ones very well. Certainly it is a book which most phytochemists would wish to have on their shelves to browse through and use as a work of reference.

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Plant Biochemistry: Edited by J. BONNER and J. E. VARNER. Academic Press, New York, 1976, 3rd edn, 925 pp. £18.10.

The appearance of the 3rd edition of this well used and popular textbook is very welcome since the 2nd edition was published in 1965 and much has happened in plant

biochemistry in the intervening period. The organisation and coverage in a textbook especially devoted to the biochemistry of plants presents many problems and particularly that of determining how much space to give to the competing subjects of cell structure, molecular biology, photosynthesis, primary metabolism, secondary metabolism and plant physiology. In the 2nd edition all these elements were included and no one could complain that anything of significance was left out although clearly some topics were less adequately covered than others. Unfortunately, in this 3rd edition, the editors have succumbed to pressures from the molecular biology lobby and omitted secondary metabolism completely. Instead, extra space has been devoted to the expansion of the sub-cellular section and the book opens with separate chapters on: cell and sub-cell (J. Bonner); ribosomes (E. Stutz); the nucleus (J. Bonner); cell membranes (A. A. Benson & A. T. Jokela); microbodies (R. W. Breidenbach); chloroplasts (R. B. Park); plant microtubules (P. K. Heppler); vacuoles (P. Matile); and the primary cell wall (P. Albersheim). While all these are excellent chapters it is not clear to me that they really belong in a textbook on biochemistry; much of the material of these chapters is normally taught at university level by biologists, e.g. by specialists in fine structure, rather than by biochemists.

In the second section of the book entitled 'Basic Metabolism' most of the expected topics are well covered including: enzyme regulations (J. Preiss & T. Kosuge); cell wall biogenesis (A. L. Karr); lipid metabolism (P. K. Stumpf) and so on. Plant physiology is dealt with in three swift chapters on phytochrome (P. H. Quail); hormones (J. E. Varner and D. T. Ho) and senescence (L. Beevers). The final section headed 'Autotrophy' covers photosynthesis (path of carbon, M. D. Hatch; path of energy, B. Kok) and nitrogen fixation (R. H. Burris).

There is a particular trend in the teaching of biochemistry today which assumes that all organisms behave in exactly the same way and that it does not matter what material you use for your experiment as long as you can solve the particular problem with that material at hand. I believe that biochemistry can only really make sense if it is related back to the particular living organism or organisms from which the enzyme or sub-cellular fractions have been obtained. Living organisms vary almost as much in biochemistry as they do in outward appearance or in detailed anatomy and substructure. Plant cell wall metabolism does differ from that in animals and in micro-organisms but nowhere is this made clear! I find no mention of lignins anywhere in the book although there are two chapters on the plant cell wall. To ignore comparative biochemistry in the teaching of the subject is to present a blinkered view of the topic. I believe the two editors have done a disservice here in this new edition by eliminating comparative aspects. Much of interest could have been included and at the macromolecular level there are many findings in plants of variations in enzyme specificities, different biosynthetic pathways and variations in protein and enzyme amino acid sequences.

Finally, let me admit that what is included in the book is done extremely well and we must be grateful to the editors and contributors for a very valuable summary of the present position of the art in some, but by no means all, areas of plant biochemistry of interest today. As a teaching manual in plant biochemistry courses, this book has many drawbacks including that of the price and it will only really be suitable for and most appreciated by postgraduates and research workers.

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