

on to amino acids and their metabolism, purines and pyrimidines, nucleic acids and protein synthesis. He concludes with three chapters describing the movement of nitrogen within the whole plant during leaf growth, fruit ripening and seed germination. Very little is left out and every class of nitrogen compound is covered including auxins, cyanogens, glucosinolates and porphyrins. In summary, therefore, we have here the first complete modern account of the subject for the student and this book will be an essential tool for university teaching in the plant sciences.

In view of its excellence and the wide sales it will undoubtedly enjoy, it is unfortunate that the book is not as up-to-date as it should be. This seems to be entirely the fault of the publishers. It is clear that the manuscript was completed in 1973 and while there are a few late inserted references to the 1974 literature, a gap of nearly three years between writing and final production is inexcusable. The experiments of Hartmann demonstrating the biosynthesis of aliphatic amines from aldehydes, for example, are not included and there is

little about the different systems of protein synthesis in cytoplasm, chloroplast and mitochondria. The recent elegant elucidation of the pathway of coniine synthesis is not mentioned and the section on piperidine alkaloids gives the false impression that these are all derived from lysine. Again, no mention is made of the functionally important amines, spermine and spermidine, which are now known to be widespread in plants; T. A. Smith's important review on plant amines (*Phytochemistry* Volume 14, page 865) is not in the References.

The only other thing missing from this book, which is perhaps more debatable for inclusion in a student text, is any feeling of urgency regarding the practical importance of knowledge of plant nitrogen metabolism and of more than a passing mention of recent efforts to breed plants for improved protein balance and so on. These are all, however, minor criticisms of what is a first class student text and one which is produced at a price which, presumably, students can still afford.

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J. B. HARBORNE

Phytochemistry, 1977, Vol 16, p 628 Pergamon Press Printed in England

Key to Carotenoids: by OTTO STRAUB. Birkhäuser Verlag, Basel, 1976. 163 pp. 56 Swiss Francs.

Not only is this book an updated version of the lists of natural carotenoids which appeared in Isler's "Carotenoids" but it has also certain additional features which make it a must for all those interested in the field of carotenoids. The formulae of some 420 known carotenoids are given with references to their PMR, NMR, MS, IR, UV and visible absorption spectra, melting points, syntheses and distributions. The second section includes carotenoids of unknown structure (4 pages) which is

followed by a list of monographs, reviews and lectures covering the period 1922 to 1975. This is a useful feature and will help beginners primarily but also those of us who have missed certain articles in journals that are not readily available. This book would have been even more useful had the titles of the 1580 references been included in the literature cited. This is a specialist book and is therefore good value at about £15.

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Phytochemistry 1977, Vol 16, p 628 Pergamon Press Printed in England

Sexual Interaction in Plants: by H. VAN DEN ENDE. Academic Press 1976. pp. 186. £6.80.

This is an attractive and well presented little book which I enjoyed reading. It should also appeal to the general readership of "Phytochemistry" because it describes both the essential biology of the subject and the chemistry of the hormones or factors, where they are known, clearly and succinctly. The latter include sirenin, the sesquiterpenoid chemotactic hormone from *Allomyces* spp., antheridiol, the triterpenoid sex hormone in *Achlya* spp., the trisporic acids and their derivatives, possibly carotenoid degradation products, sex hormones in *Mucor* spp., the triene hydrocarbons such as fucosettatene, which are chemotactic hormones in brown algae, and the antheridiogens, diterpenoids, possibly derived from gibberellins, which are sex hormones in ferns. Of the various protein factors which have been detected, only that from *Volvox* has been purified and studied in detail. Dr. van den Ende in his consideration of the

sexual interactions in plants clearly reveals areas of ignorance and half ignorance where a collaborative approach of a biologist and biochemist would pay handsome dividends. One hopes that his efforts in writing this readable book will be rewarded by the stimulation of young workers in plant science laboratories to accept some of the challenges which are particularly attractive in the areas of sexual reproduction in yeasts and chemotropism of pollen tubes in higher plants.

The book is excellently produced and the English style first rate. One cannot however refrain from remarking on one delightful misprint. On p. 106 membrane vesicles from *Chlamydomonas* are said to have fussy coats—a response to modern Paris fashions no doubt.

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