

me was the sequence in which the topics are developed and which results in some repetitions (e.g. the term sporopollenin is defined in much the same way on pp. 216, 257, 283, 295, 341 and 345), at least until I arrived at the last pages and a better understanding of the authors' aims. You also will grasp an understanding of their talents if you consider that, 310 pages after the bold introductory statement, they find it equally plausible that the Universe began with a living system and we are now witnessing the conversion of this living system into simpler matter.

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Phytochemistry Volume III: Inorganic Elements and Special Groups of Chemicals: Edited by L. P. MILLER. Van Nostrand-Reinhold, London, 1973. 448 pp. £12.25.

AS THE subtitle implies, this third and final volume in Miller's treatise on Phytochemistry contains an assortment of different topics. Many of the critical comments on the arrangement of subject matter and depth of treatment made in the reviews of the first two volumes (see *Phytochemistry* **13**, 690 and 1636) apply here also. There is at least one chapter, for example, which seems to me to be outside the scope of Phytochemistry, namely W. D. Bonner's 'Mitochondria and Plant Respiration'. This is a useful summary of present progress in this field but, apart from the mention of the cytochromes, really belongs more properly in a treatise on plant biochemistry or plant physiology. In addition, the chapter by F. A. Robinson on 'Vitamins' seems to me to be of marginal relevance; it is also not very up-to-date, e.g. on ascorbic acid biosynthesis.

As an example of differing levels of treatment, one may take the two chapters on growth regulators. That by A. J. Vlitos and B. H. Most on auxins, cytokinins and abscisins is 20 p. long and is just at the right level for 1st yr undergraduates. On the other hand, J. Mac-Millan and R. J. Pryce's excellent account of 'the Gibberellins' (44 pp.) is aimed more at a postgraduate audience. Structures are listed for 36 of the presently known 42 gibberellins and there are sections on chemical inter-relationships, spectroscopic properties and biosynthesis. My only disappointment with this chapter was the absence of even a brief treatment of their biological properties and biochemical functions.

Of the remaining chapters of this book, I found the account of "Surface Waxes" by A. B. Caldicott and G. Eglington especially stimulating to read. Comparative aspects of surface waxes have not been reviewed recently so that the section here on chemotaxonomy is particularly useful. A more general view of chemotaxonomy or "Molecular Taxonomy" is provided by H. Erdtman in a well rounded chapter where he illustrates his theme with examples mainly drawn from the alkaloid field.

Another notable chapter, on the role of minerals in phytochemistry written by the editor and his wife, includes a fascinating account of the many and varied plant substances containing halogen substituents in their structures, referred to here as halometabolites. A very recent and more comprehensive listing of such compounds has been compiled by J. F. Siuda and J. F. DeBernardis (see (1973) *Lloydia*, **36**, 107-143).

Other topics in this volume, covered in a more pedestrian fashion, are sulphur compounds, non-volatile organic acids, acetylenes, lignin and cutin. These are followed by two excellent general essays covering the importance of secondary constituents as drugs (N. R. Farnsworth) and in human affairs (G. H. Stout and R. E. Schultes). The volume concludes with a forecast by L. Fowden of future developments in phytochemistry, in a chapter entitled "Retrospect and Prospect".

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Biological Oceanographic Processes: by T. R. PARSONS and M. TAKAHASHI, Pergamon Press, Oxford, 1973. 186 pp. £4.00 (hard back) £2.85 (flexi cover).

THIS book is intended to serve as an introduction to the field of quantitative biological oceanography. The first two chapters describe the plankton community in terms of the distribution and chemical composition of organisms and nutrients. Chapter 3 deals with the primary formation of particulate material, Chap. 4 with feeding processes and the kinetics of food exchange, and in Chap. 5 the interdependence of all processes in the sea is stressed. According to the text in the sixth chapter "some attempt has been made to identify a number of problems for which solutions may be attempted from a knowledge of biological oceanography". The chapter has two sections. The first "example problems in pollution and water mass identification" consists of a short discourse on the disposal of human excrement followed by some considerations of estuaries, a lake, DDT and apparent oxygen utilization. The second "example problems in fisheries" contains discussion of results which could easily have found their way into earlier chapters. Somehow I feel that there must be a greater purpose for all that has come before.

For the first five chapters, the emphasis is on those processes which have been described in terms of empirical equations. The mathematical treatments are expressed in a clear and concise manner supplemented with a wealth of illustrations, maps, tables, graphs and up to date references. The quality of the text varies. A detailed description of the possible transmission of an antibacterial substance (acrylic acid) produced by *Phaeocystis*, through euphausiids to the penguin (where it causes bacteriological sterility in the anterior segments of the gastrointestinal tract) is followed in the same section by the stark sentiment "the source of oil pollutants might be discovered through hydrocarbon chemistry". In places attempts to simplify complex systems has led to inaccuracies. For instance, straightening the Z scheme of photosynthesis has led to an incorrect redox potential for plastoquinone resulting in the formation of ATP during electron transfer between two compounds of apparent equal potential. Photorespiration is dismissed in a single sentence: "the mechanism is not at present understood". However, these points should not deter anyone interested in biological oceanography from what is a generally well presented and informative volume.

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