

Plant Pigments: edited by T. W. GOODWIN, Academic Press, London, 1988, 362 pp., £35 00

From a first glance at the title of the present book and the name of the editor, it would appear that this is the third edition of Goodwin's 'The Chemistry and Biochemistry of Plant Pigments' which was first published in 1965. However, this is an entirely new book, "dealing only with a group of topics which the editor decided were the current 'growing points' of the subject" (preface). Thus compared to the earlier volumes this is much slimmer. It consists of seven selected chapters written by some of the world's leading authorities on plant pigments surveying critically the progress which has been made since Goodwin's second edition in 1975. The contributions are by W. Rüdiger and S. Schoch (München) on chlorophylls, by T. W. Goodwin (Cheshire) and G. Britton (Liverpool) on distribution and analysis of carotenoids, by G. Britton also on biosynthesis of carotenoids, by R. Cogdell (Glasgow) on function of pigments in chloroplasts, by W. Rau (München) on functions of carotenoids other than in photosynthesis, by G. Whitelam and H. Smith (Leicester) on phytochrome, and by J. B. Harborne (Reading) on flavonoids.

This book covers all relevant recent advances in research on the chlorophylls in metal complexation and as "pigments of life" (Battersby) in energy transformation and the most widespread carotenoids with their functions in photoreception, photoprotection, reproduction of

fungi or—disputable—as possible precursor units in sporopollenin formation. The phytochrome chapter deals with its biochemical action as a photoreceptor in controlling developmental and metabolic processes and the flavonoids as the universally distributed water-soluble pigments in vacuolar plants with new stabilizing complex structures and new understanding of their biochemistry.

In its choice of topic, however, this publication seems to be out of balance and is not as complete as it could be. Firstly, the carotenoids take almost half of the book and, compared to the other chapters, analytical procedures are overemphasized. This is probably due to the fact that numerous publications on carotenoids have appeared in recent years and that these pigments play important roles in photosynthesis as well as show various functions other than in photosynthesis. Secondly, the betalains, chemotaxonomically the most important pigments in families of the Caryophyllales (Centrospermae), are missing. This may be due to the fact that they have not been sufficiently investigated recently.

Overall, this volume will nevertheless be of use for specialists in the field, interested non-specialists as well as advanced students. It is attractively produced, with many chemical structures and various illustrations. It is hoped, however, that the next edition of 'Plant Pigments' will present the betalains as a subject of current work.

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Immobilised Cells: Principles and Applications: edited by J. TAMPION and M. D. TAMPION. Cambridge Studies in Biotechnology Vol. 5, Cambridge University Press, 1987, 257 pp. £30.00

This offering is the fifth in the Cambridge Studies in Biotechnology and was published in 1987. This has been a highly successful series with so far a mainly microbiological bias dealing with malting and brewing, waste water treatment, economic aspects and fermentation. This volume attempts a comprehensive treatment of immobilisation covering a variety of organisms including plants. However, inevitably because of the lack of published work using immobilised plant cells this aspect of the subject receives less attention as exemplified by the relatively small number of references quoted in the bibliography. Having made this point, which is I believe highly relevant to a review in a plant journal, my overall view of the text is exceedingly favourable and this is a book that should be read and digested by all interested in cell immobilisation whether green or not! It is so encouraging to see authors who set out the definition and scope of the subject and produce such a clearly presented text. Counting the Introduction, there are nine chapters: Cell biology of immobilised cells, Production and characterization of cells for use in immobilised cell reactors, Entrapment, encapsulation and retention by membranes, Covalent

bonding, cross-linking and flocculation of cells, Adsorption, Special methods, Reactor design and operation and Special systems. The Introduction is a model of its kind which quickly and authoritatively leads the reader into the complexities of the subject; indeed, the Introduction could stand alone as a succinct summary of the subject. In a book which is addressing a wide range of biologists and chemical engineers, some treatment of the cell biology of immobilised cells is important. However, the treatment is probably more helpful to the chemical and process engineers and provides ground already familiar to most biologists. In contrast some of the later chapters which deal with the reactors and the processes are areas where the biologist will be less familiar with the subject, unlike the engineers. The methods employed to immobilise cells by a variety of procedures are explained in detail with many helpful diagrams and this part occupies the major part of the book, as it should. The chapter on reactor design is well laid out and easily understood even by a botanist! Finally, attention is given to special systems. All in all this is a good, nicely presented book which is to be recommended to both biologists and engineers with a wish to pursue their research using immobilised cell systems.

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