Phytochemistry, 1977, Vol 16, p 626 Pergamon Press Printed in England

Commentaries in Plant Science: edited by HARRY SMITH. Pergamon Press, Oxford, 1976. 286 pp. £9.00.

The twenty-one short reviews collected here were published originally in the monthly issues of 'Current Advances in Plant Science' during the period 1973–1975. Together, they present a useful overall picture of where the growing points are in plant science today. It is, of course, difficult to write mini-reviews of the type presented here, which are intended to interest a wide audience of scientists and not just specialists in the particular topic. Broadly speaking, I believe the authors have largely succeeded in the editor's avowed aim of providing entertaining and stimulating, as well as instructive reading.

Most of the topics come in the area of plant biochemistry or plant physiology and phytochemically orientated readers will be particularly interested in reading J. Coombs on carbon assimilation in C_4 plants; R. J. Ellis on Fraction 1 protein; I. Zelitch on photorespiration; D. Boulter on cytochromes *c*; R. K. Downey and D. I. McGregor on breeding plants for fatty acid composition; J. A. Callow on plant lectins and W. Greenaway and F. R. Whatley on microbial resistance to systemic fungicides. Each review is followed by a list of references and the book itself is also well indexed.

This new venture in publishing is to be highly applauded and since there are so few comparable publications today, it is to be hoped that the series will be continued. It is unfortunate that the publisher has chosen such a drab format and the wide page used here is also a feature some will dislike. At £9.00 for 286 pp. it seems to be mainly geared for libraries, which is unfortunate since it will be appreciated most by the individual research worker or University teacher having it at hand to browse through at odd moments.

University of Reading JEFFREY B. HARBORNE

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Light and Plant Development: edited by H. SMITH. Butterworths, London, 1976. 516 pp. £15.00.

This volume presents the Proceedings of the 22nd University of Nottingham Easter School in Agricultural Science, which was held in 1975 at Sutton Bonington. The choice of topic was apt for it reflects the worldwide interest in the response of plants to the most vital and variable element of their environment. The subject matter which could have been included under the chosen title is of enormous breadth but the invited contributions were deliberately concentrated for the most part upon the control by light of the growth and development of higher plants. That the coverage is even more specific than this, with virtually the whole of the volume being concerned with phytochrome, is totally justifiable in terms of the present pattern of our knowledge. The contributing authors come from ten different countries, many of them being eminent scientists of international repute. The net result is an excellent volume which provides a comprehensive and up-to-date presentation of detailed evidence from fundamental research, which ultimately has great potential importance for crop production.

The 31 papers are divided up into six sections which inter-relate to one another. Section I (Perception of Light) contains a review of the evidence concerning the nature of the blue light receptor(s) in higher plants and fungi and draws attention to the need for a great deal of further research. Also contained in this section are important contributions on the photochemical properties of 'large' and 'small' phytochrome, the nature of the intermediates in photoconversion of phytochrome, and a consideration of the high irradience reaction. Section II (The Site of Phytochrome Action) comprises several contributions concerning the association of phytochrome with cellular membranes and one on the important immunological approach to the visualisation of phytochrome. While compelling evidence is available to support the hypothesis that phytochrome is functionally associated, at least in its P_{fr} form, with one or more cell membranes, the necessity to establish the relationship between observations concerning the membranes of particular organelles and the *in vivo* situation is clear. Section III (Cellular Aspects of Phytochrome Action) presents evidence from the use of the elegant electron microprobe technique for rapid light-induced ion movements through membranes, together with papers concerned with the nature of the photocontrol of development of particular cell organelles. Section IV (Physiological Aspects of Phytochrome Action) focusses attention upon the rapid transmission of stimuli, such as plant growth substances, following absorption of light. In Section V (Photoperiodism, Endogenous Rhythms and Phytochrome) the authors tackle the problems of the long-known but most complex and intractable aspects of development. The possibility that phytochrome influences some circadian rhythms and photoperiodism by virtue of its control of the properties of cell membranes is of particular interest. Section VI (Ecological Aspects of Photomorphogenesis) contains important contributions on the spectral distribution of light within canopies and within leaves, and new data which support the hypothesis that in nature, phytochrome serves as a detector of shading, modifying development in response to the

spectral composition of the incident light. In the final chapter the editor concludes the volume with stimulating speculation on important aspects, which relate to the preceding chapters, namely the mechanism of action, phytochrome control of development, and the function of phytochrome.

The participants at the Easter School unanimously approved the dedication of the volume to the late Dr. Harry A. Borthwick and Dr. Sterling B. Hendricks. There can be no doubt that it is a worthy tribute to the inspiration which those in this field owe to these pioneers of the study of photomorphogenesis, whose work originated in the problems raised by farmers in the U.S.A. The volume is very highly recommended for scientific libraries, for specialists in this and related fields, and for those concerned with advanced studies. It is heartening to see in this volume a timely reminder of the importance of fundamental research. The complexity of the natural environment, of which light forms such an important component, is such that full understanding and the ultimate benefit from such knowledge will only come after continued painstaking and critical research. At the same time, substantial progress has been made and the complexity itself is the basis of the challenge extended to the researcher in this fascinating field of scientific endeavour.

University of Manchester R. C. PECKET

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Phytochrome and Plant Growth: by R. E. KENDRICK and B. FRANKLAND. Institute of Biology's Studies in Biology No. 68. Edward Arnold, 1976. 68 pp. £1.50.

This book is a valuable addition to the series. Phytochrome and its physiology are usually dealt with inadequately in general textbooks, and even in many of those purporting to concentrate on plant development. Within the confines of 68 pages, the authors give a concise and clear account of a complex subject. It is particularly good in treating the basic work on photo- and dark transformations of phytochrome and its other physical and chemical properties. This in part reflects the interests of the authors but also the state of the subject. Nevertheless, the student is given a brief but adequate account of phytochrome physiology in so far as it is understood at the moment. There is, however, little about its action in green plants or about the function of phytochrome in time-dependent processes. The book gives a clear introduction to a subject which many students find difficult to comprehend and can be highly recommended as introductory reading for courses which deal with the photobiology of plant development.

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Nitrogen Metabolism in Plants: by LEONARD BEEVERS. Contemporary Biology Series, Edward Arnold (Publishers) Ltd., London, 333 pp. 1976. Price £14.00 (Boards) £6.95 (Paperback).

Our understanding of plant metabolism only really began to progress when radioactively labelled precursors became available for feeding to living plant systems. In the case of carbon metabolism, the key experiments were those of M. Calvin and his co-workers in 1951 on the pathway of photosynthesis while with nitrogen metabolism, important early experiments were those of Yemm and his group at Bristol. Since those days, our knowledge of carbon metabolism has developed enormously and is now pretty complete. The same, however, can hardly be said for nitrogen metabolism since although many experiments have been done with ^{15}N labelled compounds, there are still considerable gaps in our understanding of the nitrogen pathway. For example, only in 1974 was it shown that the preferred pathway of entry of ammonia into organic combination in higher plants was via glutamine synthetase rather than glutamic dehydrogenase. This is probably one of the reasons why so few textbooks on nitrogen metabolism have been written; that there has been an absence of such books is clear since the present text is the first to appear since 1959. It thus has an enormous amount of ground to cover and enters a market where there are virtually no competitors.

The author, who has himself contributed much to our understanding of the subject, here provides in 289 pages of text, with 723 references, a concise and accurate account of this important area of plant biochemistry. Beginning with nitrogen nutrition he passes