

equipped for their task. Half of the 1174 references are dated later than 1967 and represent contributions scattered among journals, conference reports, abstracts and personal communications the world over, so the book provides a valuable condensation of current knowledge.

Nine chapters deal comprehensively with the whole field; definitions and historical aspects (R. L. Wain and G. A. Carter); structure-activity relationships and toxicology (D. Woodcock); translocation (S. H. Crowdy); effects on host physiology and host/pathogen interactions (A. E. Dimond); effects on pathogens (A. Kaars Sijpesteijn); fungicide resistance/tolerance (J. Dekker); methods of application (E. Evans). The remainder of the book is devoted to practical results of using systemic fungicides on cereals (D. H. Brooks), glasshouse crops (D. M. Spencer), vegetable crops (R. B. Maude) and fruit crops (R. J. W. Byrde).

The text is plainly and properly aimed at specialists on systemic fungicides, so it is not surprising that it is not easy reading. In parts, especially in the historical sections which have already been adequately reviewed, many of the references seem superfluous. By contrast, the single reference given in the chapter on toxicology may seem like a general absolution, especially as one of the materials 'ranking among the safest pesticides in current use' has since been withdrawn. The chapter on acquired resistance should be required reading for all those able to influence the general policy of fungicide use and long term welfare of crop protection.

The book might have been improved by a final chapter discussing present trends, future needs, the new methods of disease control systemic fungicides offer, and the research required to develop more new compounds with wider spectra of activity, different modes of uptake, action, translocation and degradation. Such a chapter would obviate repeating basic points that occur in many of the reviews, and, together with a more consistent policy on the inclusion of authorities for fungal species and use of currently accepted binomials, the book would have more general appeal to students and non-specialists.

*Systemic Fungicides* is the first book to be published on the subject, and, as a paper-back at £4, it is certain to be welcomed, widely read and much referred to.

*Rothamsted Experimental Station*

C. J. RAWLINSON

**Phytochrome:** edited by K. MITRAKOS and W. SHROPSHIRE. Academic Press, London, 1972. 631 pp. £7.50.

IN ORDER to celebrate the coming of age of the discovery of phytochrome, most of the active workers engaged in research on this elusive photoreversible plant pigment met together in Greece, under the auspices of NATO, for a Summer School and the present volume is the product of this gathering. It contains 23 review articles, covering almost every possible aspect, ranging from history (H. Borthwick), physical chemistry (J. M. Lhoste), chemical structure (W. Rüdiger), physiological responses (P. Rollin, D. Vince and others), and biochemical effects (H. Virgin, H. Smith, P. Schopfer, K. Mitrakos).

Because of the vanishingly small amounts of phytochrome present in plant tissues, its chemical study is difficult and two central problems remain. Although its general formulation as a biliprotein is well established, its precise chemical structure has yet to be determined. Also the chemistry of the photoreversible change it undergoes needs much further elucidation. Its role as a trigger mechanism in controlling the effects of light on plant growth and development is extremely well documented and the review papers in the present volume very adequately cover what is now familiar ground. The relationship of phytochrome to the biochemical pathways of the plant has been less studied, although it is known to control the activity of a variety of plant enzymes. One area of active research is the photocontrol of flavonoid synthesis and, in an excellently written chapter, Harry Smith provides a lucid and fascinating account of recent developments in this field.

The book has been well edited and there is hardly any overlap between the various contributions. There are both author and subject indexes. The volume is very reasonably priced and should command a wide readership among plant scientists.

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J. B. HARBORNE

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**Secondary Metabolism in Plants and Animals:** by M. LUCKNER (translated by T. N. VASUDEVAN and J. L. WRAY), Chapman & Hall, London, 1972. £8.00.

THIS BOOK gives a good general account of secondary metabolism in plants and animals from the chemical rather than the biological viewpoint. It is, as might be expected from Dr. Luckner, precise, informative and comprehensive. But, it suffers from three drawbacks for the audience at which it is aimed, third year undergraduates: price, lack of information on the role of secondary products, and having been originally written in 1968. I realise that, with increasing costs, hard back books are fast getting beyond the reach of students' pockets. I also know that the saving on soft covers is minimal. But I believe that no publisher should *consider* producing a book for undergraduate students costing more than £5.00 (most students would halve this). The lack of information about the multifarious roles of secondary products is expectable but a great pity. Students should be given information about the host of examples of the importance of secondary products in controlling interactions between organisms and not that these compounds 'may be considered as excretions which are of no importance to the living organisms which produce them'. Such ideas are patently absurd and would cause their study to degenerate into a mere diletantism, eliminating the need for text such as this. The third drawback is less important. Dr. Luckner has included a few new references in this edition, although the text does not always reflect these. However, so much useful and accurate information is included in this book that such criticism should be regarded as something to take into consideration for the next edition. The whole volume forms a comprehensive survey of the interconnections between primary and secondary metabolites. No important class of compounds is ignored and the inclusion of all organisms, rather than just plants or animals, gives a much more rounded view than consideration of any one Kingdom alone. I certainly hope that the University libraries will be able to buy two or three copies and that the publishers can produce a reprinting at a fraction of the price.

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T. SWAIN

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