Progress in Pesticide Biochemistry and Toxicology: edited by D. H. HUTSON and T. R. ROBERTS. Volume 3. John Wiley & Sons, Chichester, 1983. 449 pp. £54.50.

The first review, the longest in this volume, covers the mode of action of systemic fungicides, an area of active research but one in which much remains to be established. Few generalisations are yet possible, although it is clear from this article that their main effect is to inhibit a particular fungal metabolic pathway. Notably, pyrimidine analogues like ethirimol block nucleic acid synthesis while substances such as fenarimol or buthiobate interfere with sterol biosynthesis of the pathogens. The second chapter is closely related to the first in that it deals with the metabolism of fungicides in the plants, which remain immune to their toxic effects. As the author J. W. Vonk points out, much of the data in this area is collected by pesticide manufacturers and is thus rarely published in full. Our understanding of the fate of many of these particular xenobiotics in plants is therefore often incomplete. The present review deals mainly with the literature since 1977 and in some cases at least, there are valuable lists of the many metabolites formed either by plant detoxification processes or by chemical alterations. At least 18 metabolites or conjugates have been recognised for the fungicide pentachloronitrobenzene. This is one of the rare cases where reduction as well as oxidation occurs. Pentachloroaniline is one metabolite and an aryl nitroreductase enzyme system has been isolated from peanut plants.

The next review—the mode of action of herbicides in plants—is by A. D. Dodge, who considers briefly the primary sites of action on photosynthetic, respiratory, growth or biosynthetic processes. Resistant plants have been found even for paraquat and mechanisms of such resistance are mentioned. The effects of herbicides on plant metabolism are of general relevance to plant biochemistry in that such studies often confirm the functional importance of particular plant metabolites. For example, herbicides which specifically block the synthesis of carotenoid pigments in the chloroplasts are effective because plants so treated die because they are thus rendered susceptible, in the absence of the protective carotenoids, to photochemical damage.

An even more fashionable review topic follows on the oxidation of xenobiotics generally in plants. The basis of the selective action of the phenoxyacetic acids as herbicides is of course based on differences in how they are metabolised by crop as against weed plants, whether it be by conjugation, β-oxidation or aromatic hydroxylation. These oxidations, as well as alkyl hydroxylation, sulphoxidation and epoxidation are considered here by D. Cole, with particular reference to the enzymology involved.

In the two earlier volumes of this series, there were reviews on methodology and in this third volume no less than three articles are devoted to such practical matters. The first deals with the use of plant tissue culture for studying pesticide metabolism, the second with the separation and purification of pesticide metabolites and the third with the role of soft ionization MS techniques in pesticide metabolite identification. These are useful, up-to-date reviews and contain much of interest to phytochemists concerned with the characterisation of constitutive plant metabolites, since many of the same problems exist as with the products of xenobiotic metabolism. The final chapter on pyrethroids is of more interest to insect biochemists, since it deals with the *in vivo* and *in vitro* metabolism of the new synthetic pyrethroids in various insect species.

This volume, as its two predecessors, contains a wide range of well prepared and informative essays and it should be of interest to many plant scientists in addition to those directly concerned with the fate of pesticides in living systems.

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