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BOOK REVIEWS

The Biosynthesis of Secondary Metabolites: by R B HERBERT Chapman & Hall, London and New York, 1981 ix + 178 pp Paperback £6 50

R B Herbert has attempted the impossible to produce a concise but comprehensive account of the biosynthesis of secondary metabolites, suitable for both undergraduate and postgraduate students of chemistry and biochemistry, all within the space of 178 pages In this endeavour he has been surprisingly successful, and the book's shortcomings are primarily the result of squeezing so much information and so many structural formulae into such a slim volume There are seven chapters of which the first two are of an introductory nature, and the rest encompass all of the usual biosynthetic pathways Chapter one contains a brief introduction to primary and secondary metabolism including a rather superficial discussion of fatty acid biosynthesis, polyacetylenes and prostaglandins, all within the space of four pages, a section on stereochemistry in biosynthesis which contains a useful account of the utility of compounds containing chiral methyl groups, and finally the essential chemistry of oxidative phenolic coupling, aromatic hydroxylation and methylation merits three and a half pages The second chapter is concerned with the techniques used in biosynthetic studies, and 11 pages are devoted to the use of radioisotopes and stable isotopes Overall this is a useful section, though there is a rather complex example to illustrate the use of $^{13}C-^{2}H$ double labelling for NMR analysis On the final page of the chapter there is a mention of the isolation of biosynthetic enzymes and the use of mutants

The next four chapters provide a conventional but comprehensive account of polyketides, isoprenoids, the shikimic acid pathway and alkaloids There are examples of polyketide metabolites derived from four C_2 units through to those derived from ten C_2 units, but some of the complex pathways will be hard to follow for the uninitiated because they are illustrated with great economy Steroid biosynthesis is discussed in great detail, but monoterpenes merit only one page Sesquiterpenes fare rather better, though the complex route to the trichothecane skeleton is poorly illustrated The biosynthesis of shikimic acid and aromatic amino acids is covered in some detail, then quinones, coumarins, flavonoids and odd compounds like helicobasidin and the furanocoumarins are given an abbreviated treatment Chapter six is probably the best in the book with a very comprehensive account of all of the main classes of alkaloids and their biosynthetic pathways This chapter also contains the best illustrations Finally, a concluding chapter contains a diverse collection of odd microbial metabolites containing nitrogen This miscellany includes the ergot alkaloids, diketopiperazines, benzodiazepines, ansamycins, cytochalasins and β-lactam antibiotics, amongst others In addition there are 584 references, and an eight page index, but no problems for the student to tackle

This is a useful book, with few apparent errors or serious omissions (though the cannabis metabolites are not mentioned), but the major disappointment is the size of the structural formulae Many are very small and the complex pathways are often unclear because the mechanistic arrows are so tiny I imagine that the publisher desired a cheap book, and the paperback version is certainly within the right price range for undergraduates, but the cramped appearance of the figures lessens the appeal of the book Finally, although this is a book 'about experiments and the results of experiments', there is no mention whatsoever of the pharmacological, toxicological, or ecological significance of the secondary metabolites—and it is usually these biological properties that provide the raison d'être for the experiments We are left instead, with tantalizing phrases like 'biologically interesting' or 'important plant hormone', but such comments are very rare indeed

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Phytoalexins. edited by J A BAILEY and J W MANSFIELD Blackie, Glasgow, 1982 334 pp £28

Considering that the phytoalexin concept was not comprehensively formulated until 1940 and that the first phytoalexin was not fully characterized until 1962, the progress that has been made in studying these natural defence agents has been truly remarkable Of course, the idea that plants might be able to produce toxins in response to pathogen attack has a respectable history in plant pathology and early experiments by Bernard on orchid bulbs soon after the turn of the century can in retrospect be interpreted as being phytoalexin based Nevertheless, it was not until the pioneering experiments of Cruickshank and Perrin with pisatin from pea pods during the 1960's that the phytoalexin concept caught on Since then, many notable advances have been made and we now have a very extensive knowledge of these fascinating biologically active phytochemicals The phytoalexin response, for example, has now been recorded in at least 20 higher plant families and over 100 phytoalexins have been characterized in the Leguminosae alone

Although it is always dangerous to prophesy about future scientific developments, it does appear at present that most of the major experiments with phytoalexins have been carried out It is time to take stock and look at the considerable body of data that has accumulated What better way to do this than to produce the first monograph dealing exclusively with these compounds?