

## BOOK REVIEW

*Secondary Plant Metabolism*, MARGARET L. VICKERY and BRIAN VICKERY. The Macmillan Press Ltd., London WC2E 9LF, England. 1981. xii+335 pp. 15.5 x 23.5 cm. £9.95 (paper bound).

This book describes from a biosynthetic viewpoint the large number of natural products which are considered to be the products of "secondary plant metabolism." It is realized by the authors that there is sometimes not a clear-cut distinction between these compounds and the products of "primary metabolism" which arise by reactions which are common to all plants, such as photosynthesis, the production of the protein amino acids, and coenzymes such as thiamine, pyridoxal, and the pyridine nucleotides. The following topics are covered: sugar metabolism, polyketides, terpenes, shikimic acid metabolites, compounds with mixed biosynthetic origin (flavonoids, quinones), non-protein amino acids and other compounds derived from the amino acids, alkaloids, porphyrins, purines, and pyrimidines. Besides discussing their biosynthesis, the authors have attempted to illustrate the use of these different types of natural products for systematically classifying plants (chemotaxonomy). In each chapter, there is also a discussion of the function of these compounds in higher plants. Much of this is speculative but makes interesting reading. In contrast to a very similar book by R. B. Herbert (*The Biosynthesis of Secondary Metabolites*, Chapman and Hall, 1981), this book suffers from a lack of references. There is a brief bibliography at the end of each chapter but few citations to the original literature. Many sweeping statements are thus made with no documentation: "Vitamin B<sub>12</sub> occurs in all plants (p. 292)," "Azetidine-2-carboxylic acid is probably a ubiquitous plant constituent (p. 1)," "Each metabolite is biosynthesized for a definite purpose (p. xi)," "When structurally similar alkaloids are formed in totally unrelated families their biosynthetic pathways are usually different (p. 255)." I disagree with all these statements. The biosynthetic pathways depicted are often too abbreviated for a beginning student to understand. Almost none of the structures indicate the stereochemistry of the intermediates or ultimate natural product. Numerous errors were detected in the structures (vincalculoblastine, gibberellic acid, chitin, abscisic acid, apiose, mundulone, geraniol, 10-hydroxygeraniol). In many structures, hydrogens are omitted, and it is often not clear where a methyl or a carboxyl group is located since they have been placed midway between two positions on a ring with no connecting bonds.

Many of the biosyntheses are presented as fact, whereas they are often only hypothetical; for example, no definitive work has been published on the biosynthesis of physostigmine (p. 276).

The authors have adopted a very restrictive definition of an alkaloid which I find unacceptable. "True alkaloids" are defined as nitrogen heterocyclic compounds formed from amino acids. By this definition, coniine (derived from acetate) and the numerous terpenoid and steroidal alkaloids would be excluded. Alkaloids such as mescaline and ephedrine (incorrect biosynthesis on p. 236) would also be excluded since they are not heterocyclic.

There are three indexes: general, chemical and botanical. Much time has obviously been spent in writing this book and collecting the chemical, biological, and botanical information on these natural products. It is unfortunate that so many errors and poor interpretation of the facts make this book undesirable as a text for beginning students. A person knowledgeable in this area of research will find much of interest and will be able to reject the deficiencies.

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