

## *Natural Product Chemistry: a Mechanistic and Biosynthetic Approach to Secondary Metabolism*

by K.B.G. Torrsell

*John Wiley & Sons; Chichester, 1983*  
xii + 401 pages. \$9.50 (paper), £23.00 (cloth)

In the classic chemical tradition, natural products provided a seemingly inexhaustible resource for displaying elegant deductive and (literally) synthetic experimentation and reasoning; in today's view, as the author of this useful new textbook very firmly states, 'the recognition of biosynthetic principles is the most significant development in natural product chemistry', and his book is constructed on that basis. Structure-determination, being now little more than a branch of applied spectroscopy, is in effect taken for granted, and organic synthesis is recognized as a legitimate but effectively separate discipline which must seek its own justifications. Readers of biological bent may find the equally explicit separating-off of 'biochemical systematics or chemotaxonomy' less helpful. For this reviewer, one of the main attractions of natural product chemistry is not simply that it makes chemotaxonomy intelligible, but that it provides it with some much-needed intellectual rigour; however, the chemistry itself is perhaps extensive enough to preclude presenting it alongside considerations of phylogeny and taxonomy in any reasonable single-author compass.

On the still-vexed question of 'function', the author reflects his background in higher plant chemistry by a typically botanistic approach – the quasi-vitalistic one in which fortuity has no place and causation is not distinguished from purpose. The role of secondary metabolites as agents 'for' the control of other coexisting species is discussed, but without much thought as to underlying mechanisms of evolution. Conversely, of course, anyone looking at natural products from a background in the world of microbiology will tend to follow Monod and be over-simplistic in the reverse direction, with perhaps an excessive stress

on evolution from the randomness of molecular events.

The book deals successively with the now-accepted biosynthetic classes of natural products – carbohydrate-related, shikimate-derived, polyketides, terpenes, amino acid derivatives, alkaloids, and (a useful subclass) the N-heteroaromatics. Within each section the coverage is quite fully representative, including both near-classic examples and rather recent developments. The writing is very clear, as are the structural formulae which illustrate it, and there are few technical flaws.

The essential basis of the 'tracer' experiment is not presented, and in discussing heavy-isotope methods, the very high sensitivity of the double-label technique is not brought out. The 'flat' representation of sugar molecules means that the general shape of polysaccharides is not conveyed, and the very clear difference between structural and storage molecules is obscured. The formation of patulin is discussed without noting the intermediate epoxides, and it is not made clear just how little direct evidence there is for monoterpene biosyntheses. The rapidly-advanced state of enzymological understanding in several important sectors of biosynthesis does not really emerge, and this is a pity because it precludes much discussion of regulatory mechanisms. There are what make natural products 'secondary', and they are the clue to its biological comprehension.

The book is physically well-produced and good value for money, as a teaching text at advanced undergraduate or early postgraduate level, and it deserves to be widely used.

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