

BOOK REVIEWS

Biosynthesis, Volume 6, J.D. BU'LOCK, Senior Reporter. Royal Society of Chemistry, Burlington House, London W1V OBN, England. 1980. x+295 pp. 14.5 x 22 cm. \$111.25.

This volume is the sixth and last in the series of *Specialist Periodical Reports* on the subject of biosynthesis, and it covers the progress in natural product biosynthesis recorded during 1977-78. In the future, reports in this area and in related fields will be included in the new journal "Natural Product Reports", which is described below.

Chapter one, by T.J. Simpson, is on the biosynthesis of polyketides and includes a section on compounds of mixed polyketide-terpenoid origin. The second chapter, by J.B. Harborne, covers phenolic compounds derived from shikimate, while the third chapter, by J.R. Hanson, covers the biosynthesis of terpenoid compounds from C₅ to C₂₀. The fourth chapter, by L.J. Mulheirn, includes material on the biosynthesis of triterpenoids, steroids, and carotenoids. Chapter five, by A. Kjaer and P.O. Larsen, covers non-protein amino-acids, cyanogenic principles, and glucosinolates. The book closes with a chapter by E. Leete on the biosynthesis of alkaloids.

It is a pleasure to report that this volume lives up to the high standards of its predecessors. The individual reports are all economical in the use of words but are nevertheless easy to follow because of an abundance of structures. The Reporters not only summarize recent work, but they also, in many cases, point the way to future studies. While it is invidious to single out any one report, the very detailed and helpful table of tracer work relating to alkaloid biosynthesis in the chapter by E. Leete deserves especial mention. This table not only lists the precursors and the alkaloids labeled for over 150 alkaloids, but it also includes helpful comments and corrections to the literature such as "incorrect structure in original publication" and "it is not clear what the authors have added to the definitive work of H.H. Wasserman *et al.*" Since Professor Leete uses a catholic definition of an alkaloid, this section contains information on the biosynthesis of many antibiotics as well as plant alkaloids.

Several Reviewers of related *Specialist Periodical Reports* have commented on the high cost of individual volumes in these series. It is worth noting, therefore, that associate members of the Royal Society of Chemistry may purchase these volumes at substantially reduced prices. This particular volume, for example, is available directly from England at the price of £26. At the current rate of exchange, the cost of one annual subscription plus this volume would be significantly less than the list price of this volume alone when purchased in the U.S.A.

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Natural Product Reports, Royal Society of Chemistry, Burlington House, London W1V OBN, England. \$240.00 per annum (Members' price £30.00 (approximately \$50.00) per annum).

This new journal will review recent developments in natural product chemistry previously covered by the *Specialist Periodical Reports* entitled "The Alkaloids," "Biosynthesis," "Terpenoids and Steroids," and "Aliphatic and Related Natural Product Chemistry." The Reports will consist of critical reviews written by leading authorities in the manner of the *Specialist Periodical Reports*, and there will be annual author and subject indices. Publication will commence in February, 1984, and the early issues will have articles on rotenoids, indole alkaloids, triterpenoids, carotenoids and polyterpenoids, microbial metabolites, alkaloid biosynthesis, aporphinoid alkaloids, quinoline alkaloids, sesquiterpenoids, diterpenoids, steroids, insect pheromones, and polyketides.

Biosynthesis of Indole Alkaloids, ATTA-UR-RAHMAN and ANWER BASHA. Clarendon Press, Oxford University Press, 200 Madison Avenue, New York, NY 10016. 1983. 270 pp. 24 x 16 cm. \$49.00.

One of the most significant developments in natural products chemistry in the past twenty years has been the use of radiolabeled and, more recently, stable isotope-labeled precursors in the elucidation of biosynthetic pathways. The indole alkaloids as a group have been particularly well investigated, and the fact that a book can be assembled to present these data attests to the vitality of the field.

Biosynthesis of Indole Alkaloids presents in one volume the biosynthesis and biogenesis of a particularly diverse group of compounds, ranging from the monoterpene-derived indole alkaloids and the ergot alkaloids through to the many indole alkaloids produced from tryptophan and a variety of other precursors.

Chapter 1 reviews the data which establish the monoterpene origin of the diverse *Corynanthe*, *Strychnos*, *Aspidosperma*, and *Iboga* alkaloids, and Chapter 2 classifies biogenetically the various indole alkaloid groups. Chapters 3-7 then discuss the evidence for the biosynthetic pathways to the various alkaloid groups, and biogenetic pathways are presented to explain the biosynthetic results or to stimulate thought about the mechanism of formation. An extensive summary table for the biosynthetic experimentation on indole alkaloids constitutes Chapter 8, and their distribution in plants and micro-organisms comprises Chapter 9.

To assemble this vast amount of information in one relatively small volume is a significant achievement which has, for the most part, been quite successful. The diagrams are well presented in spite of the extreme complexity of many of the schemes, and the writing is normally clear and to the point. Sadly, though, the book is marred by some unfortunate problems, and one is forced to read it with one eye on the primary literature.

The authors lean heavily on a number of available reviews of this area of biosynthesis for both organization and content, and this detracts somewhat from the merit of the work. But more importantly, from the point of view of the work as published, there are a number of areas which could have been improved with the aid of a third party who could have critiqued the original manuscript. Among these are: the interchangeable use of *Catharanthus roseus* and *Vinca rosea* which in actuality are the same plant; the incomplete use of an alkaloid name with a structure number; a myriad of typographical errors (at least one per page on average); erroneous statements concerning: the presence of vincoside in *C. roseus* (p. 16), the rearrangement of the monoterpene units (p. 26), the biogenetic origin of subincanine (p. 34), peducularine, vincarpine, naufofine, canngunine, parvine, nauclefine and naulafine groups (pp. 35-36), all of which are probably isoprenoid-derived, akaferine (p. 38), olivacine (p. 38), aristotelone (p. 38), aristoteline (p. 39), borreline (p. 37) which are plant, not fungal, products; paxilline (p. 34) which is described as a non-tryptophan indole alkaloid and the closely related paspalicine (p. 39) which is described as an isoprenoid tryptophan, epicorazine (p. 38) which is phenylalanine-derived not tryptophan-derived; and the weak presentation of bis-indole alkaloid groups (the largest group, those derived from the union of two *Aspidosperma-Aspidosperma* type units, is not included, and neither is the pentameric psychotridine).

In Chapter 3, the significance of vallesiachotamine as an artifact of isolation is not emphasized (p. 59 and p. 27), and the serious issue of vincoside and strictosidine as precursors of the monoterpene indole alkaloids has been treated perfunctorily (p. 47). Indeed, there are several schemes presented which postulate vincoside as an intermediate. In general, the more recent work which has centered on isolated enzyme systems and unstable intermediates receives little attention or is ignored. Several of the pathways shown contain highly unlikely intermediates (e.g., 77, p. 60; 192, p. 78; 126, p. 117; 133, p. 118, and 139, p. 119), and the interesting biogenetic pathways for ellipticine, olivacine, and the *Melodinus* alkaloids are not discussed.

In Chapter 5, catharanthine is described as a "typical *iboga*" alkaloid (coronaridine would have been a better choice). There is considerable duplication with the discussion of Scott's *in vitro* work in Chapter 4, and the biogenesis of the pandine and pandoline alkaloid types is not presented.

In Chapter 6, it is disturbing to see gliotoxin and the mesembrine group of alkaloids included. This stretches the definition of an "indole" alkaloid too far, even for this reviewer. The simultaneous use of ³H- and T- is distracting as is the use of (+)-, L-, and R- terminology for tryptophan; one format should have been chosen and adhered to.

Looking beyond these problems, and many others not indicated here, this is still a book that is a useful acquisition for those interested in alkaloid biosynthesis and biogenesis and is a must for the indole alkaloid chemist.

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