

## BOOK REVIEWS

*Studies in Natural Products Chemistry, Volume 1: Stereoselective Synthesis. Part A.* Edited by ATTA-UR-RAHMAN. Elsevier Science Publishing Co., P.O. Box 1663, Grand Central Station, New York, NY 10163. 1988. x + 739 pp. 17 × 24.5 cm. \$223.75.

The first volume of the series entitled *Studies in Natural Products Chemistry* delivers a fine overview of synthetic accomplishments in several areas. In the alkaloid field, indole alkaloids, isoquinoline alkaloids, pyrrolizidine and indolizidine alkaloids, and zwitterionic alkaloids are well represented in ten of the eighteen chapters. Most of these reviews concentrate on the discussion of total syntheses of the particular class of compounds. Exceptions are the chapters dealing with a selected methodology which is presented in the context of its use in synthesis (vinyl azides, cycloaddition methodology). Only three of the ten chapters use this approach. The other seven present a well organized discussion of synthetic achievements, and some of these chapters provide an analysis of synthetic strategies as well. The chapters on *Strychnos* alkaloids (Bosch and Bonjoch), zwitterionic alkaloids (Gribble) and pyrrolizidine/indolizidine alkaloids (Nishimura) deserve special recognition. These stand out because of their excellent organization, well referenced content, and easy reading.

Three chapters deal with the total synthesis of antibiotics (nucleoside, quinoid, and macrocyclic compounds of the milbemycin type). The literature coverage is excellent and should provide a good guide to these accomplishments up to 1987 or so. One chapter focuses on the discussion of several classes of compounds such as quinoid antibiotics, amino sugars, rifamycin, and unsaturated hydroxylated fatty acids. The remaining chapters discuss synthetic methodology in the context of natural product synthesis, the use of tropone in approaches to hydrazulene terpenes, resolution of compounds via homochiral auxiliaries, resolution via microbial transformations (Mori), and biomimetic cyclizations. All are well written with Mori's chapter again deserving special recognition because of its organization and especially the inclusion of experimental. This is by far the best chapter in the volume.

Topics not covered in this volume (and I hope that they will be covered in later ones) include an overview of prostaglandin syntheses, indole alkaloids of *Aspidosperma/Iboga* type (with emphasis on dimeric antitumor members of this class), 1,3-acyclic stereoselection in macrocycle synthesis, triquinane terpenoids, and others. Of the emerging methodologies, certainly the radical cyclizations, meta-photocycloaddition, and various sigmatropic and electrocyclic processes or rearrangements, as well as methods based on organometallic chemistry, need to be reviewed in the context of total synthesis of natural products.

Finally, on the philosophical side: As the eighties are ending, the total synthesis of natural products needs to be refocused, with greater emphasis on general methodology and overall efficiency. A total synthesis of a natural product target in excess of 40 or so steps will probably not be a matter of great interest in the next decade, although it may serve well as an element of education. Some work, especially in antibiotic synthesis, is simply too tedious and lengthy to ever be of practical value to the pharmaceutical industry. These arduous and lengthy manipulations become especially obvious when any such work in the particular field is concisely summarized.

Overall, this is an excellent source book for a practicing natural product chemist. While the price may seem a bit excessive, it is certainly worthwhile to acquire this and other volumes of this series.

TOMAS HUDLICKY, *Virginia Polytechnic Institute and State University*

*Naturally Occurring Quinones III: Recent Advances.* R.H. THOMSON, Chapman and Hall, 29 West 35th Street, New York, NY 10001-2291, 1987. 16 × 24 cm. \$229.50 ISBN 0-412-26730-6.

This book is the third in a series on naturally occurring quinones by Professor Thomson. The first volume, published in 1957, summarized the chemical and botanical data on some 150 quinones that were known at that time. The author of this review remembers it with gratitude, since it proved of significant help in his Ph.D. research on the structure of the complex aphid pigments. The second volume appeared in 1971, and by this time the number of naturally occurring quinones had grown to about 450; this volume included the material from the first edition in suitably revised form.

The third edition, as the subtitle "Recent Advances" makes clear, is actually an update of the second edition rather than a completely new edition. Some 650 new quinones have been characterized during the period 1971-1984, and chemical, biochemical, and botanical data are provided for these compounds. In addition, new data for compounds in the second edition are given, and all compounds in the second edition are cross-referenced. The index to this volume thus provides a complete list of all compounds listed in both volumes.

The successful format of the second edition has been followed in this volume, and the quinones are listed in order of increasing complexity within the major subclasses (benzoquinones, naphthoquinones, anthraquinones, anthracynones, other aromatic polycyclic quinones, and miscellaneous quinones). The biological occurrence and physical properties (including spectroscopic data) are listed for each quinone, and these are followed by a brief discussion of key chemical and/or biological features of the compound. One attractive feature of this presentation is the inclusion in many cases of  $^1\text{H}$ -nmr data on the structural drawings. The overall result is a lucid, yet concise summary of essential information on each quinone listed, providing key information for the structural elucidation of an unknown quinone.

As with any work of this size, there are a number of minor errors and omissions. Thus the correct reference to the occurrence of quinone 76 in *Tabebuia cassinoides* is 88 and not 58, and the biological activities of quinones are treated very briefly or not at all. In addition, it would have been more helpful to the reader if references to the second edition had been identified as such in the index, to avoid the need to turn to a page in this edition only to be referred there to the second edition. However, these are very minor quibbles with a work that will prove enormously useful to all workers in the natural products area. This volume and the previous edition should be on the shelves of all libraries serving the natural products community, and purchase by individual workers is recommended for those working in the quinone area.

The author is to be congratulated for his dedication and perseverance in providing the natural products community with this useful reference work, and the publication of "Naturally Occurring Quinones IV" will be eagerly awaited.

DAVID G.I. KINGSTON

Virginia Polytechnic Institute and State University

*Dictionary of Antibiotics and Related Substances*. Edited by B.W. BYCROFT. Chapman and Hall, 29 West 35th Street, New York, NY 10001, 1988. xviii + 944 pp., 21.5 × 28.5 cm. \$620. ISBN 0-412-25450-6.

One of the delights of natural product chemistry is the discovery of totally new and unusual forms of molecular architecture. Although plants have yielded their share of unusual structures, the full panoply of novel structures is perhaps most clearly revealed by microbial natural products, and in particular by those known as antibiotics. This dictionary of antibiotics provides a comprehensive overview of this fascinating area of natural products.

The definition of an antibiotic is somewhat flexible and can be stretched to include any natural product with antibacterial properties. Wisely, the editor of this volume has chosen to limit the term to "a substance derived from a microbial source possessing some defined biological activity." This definition has been liberally interpreted, however, to include plant-derived substances structurally related to major classes of antibiotics and also semi-synthetic antibiotics. The result of this definition is that some 8000 substances are listed under 4000 main entries.

Each main entry lists key data for the subject antibiotic. Following the name, any synonyms, and the structure of the antibiotic (if known) come entries for its biological source and physical properties. These listings are followed by a catalog of derivatives of the parent substance, and the entry concludes with a selection of key references. The entries are thus concise and yet informative, and the key references are well-chosen and timely, with several citations to the 1987 literature.

As with any work of this nature, the data are useless if they cannot be found. Antibiotic nomenclature is notoriously confused, with the same chemical substance often being known by several names. The antibiotic virginiamycin  $M_1$ , for example, appears as ostreogrycin A, while its congener virginiamycin  $S_1$  is listed as such. Fortunately, this volume has excellent references, and these include a comprehensive name index in addition to molecular formula, CAS registry number, and type of compound indexes.

This book will be a required purchase in any laboratory working with antibiotics, and it will also prove enormously helpful to synthetic organic chemists looking for challenges or to biosynthesis researchers looking for unusual biosynthetic pathways. It is regrettable that the cost of the volume will put it out of reach of all but the most affluent researchers, but it should certainly be in the library of any institution with an interest in natural products.

DAVID G.I. KINGSTON

Virginia Polytechnic Institute and State University

*Natural Toxicants in Food: Progress and Prospects*. D.H. WATSON, Ellis Horwood, Chichester, England. 1987. 254 pp., 16.5 × 24 cm. \$82.00. ISBN 0-89573-548-2.

The objective of this book is to provide a basis on which to develop a clear approach to studying the apparent or assumed risk from natural toxicants in foods. Assessment of human risk from long-term, low-level exposure to these toxins in foods has historically been extremely difficult. The main sources of information have been extrapolation of results from toxicological studies using laboratory and domestic animals and epidemiological studies primarily from developing countries where the quality of the food supply may be quite poor.

The author presents the subject in eight chapters dealing with bacterial toxins, glycosinolates, selected antinutrients, aflatoxin, and glycoalkaloids in potatoes. The selected topics in the book deal with understanding toxin action, assessing toxin intake, identification of toxins and their effects, effects on nutritional balance, influences on aflatoxin metabolism, new quality-control methods, tolerances, and prevention. The book is free of typographical errors.

Because the book covers a wide range of topics, it is useful as a general reference; however, at least one of the reviews cited is of questionable recentness. The references in general for some of the chapters also appear to be of questionable recentness (i.e., Chapter 5 has approximately 70% prior to 1980). This can lead to inaccurate conclusions such as aflatoxin's role in Reyes syndrome. It is now fairly well established that aspirin, not the aflatoxins, is involved in Reyes syndrome.

In spite of the problem with recentness of references in some chapters, the book would be useful as a general reference to people in the field of food science if they are willing to pay the relatively high cost for the book.

RICHARD J. COLE, *USDA ARS*

*Xenobiosis: Foods, Drugs and Poisons in the Human Body*. ADRIEN ALBERT. Chapman and Hall, 29 West 35th Street, New York, NY 10001. 1987. x + 367 pp., 15.5 × 23 cm. \$75.00 (cloth), \$35.00 (paper).

*Xenobiosis* by Albert is essentially a readable text for undergraduate seniors or first-year graduate students in the chemical and biological sciences. This book could also serve as a moderately technical review of the behavior of foreign substances in the human body for any scientifically informed reader. The book discusses a broad range of dietary toxins, both natural and synthetic, and explains their chemical and pharmacological effects. Albert does a particularly good job discussing the risk of ingestion of both natural and man-made xenobiotics (foreign chemicals).

The book begins with an introduction to the concept of foods as foreign substances. As part of this introduction is a section on the evolution of man's diet that is unique and very well-done. There are two sections near the end of the book on "Contaminants introduced during processing, marketing, or meal-making" and "Carcinogens" that deserved more comprehensive treatment. Neither of the sections included any information on the heat processing of meats and the resulting production of highly mutagenic and carcinogenic aromatic amines. In contrast, the ingestion of nitrate/nitrite is discussed quite extensively with a balanced perspective.

Overall, the book is well organized with subheadings on nearly every page, extensive use of structural drawings, and an extensive bibliography of approximately 1000 citations. Finally, each topic has a "further reading" and "follow-up" section which should be especially valuable to the self-motivated reader or student.

JAMES S. FELTON, *Lawrence Livermore National Laboratory*

Continued from back cover

(+)-N-Formylnorantenine, a New Aporphine Alkaloid from <i>Cyclea atjebensis</i> —Bamrung Tantiseuwie, Tharadol Pharadai, Mataya Pandbuganont, Helene Guinaudeau, Alan J. Freyer, and Maurice Shamma	652
Isolation of <sup>1</sup> H and <sup>13</sup> C nmr of Ammiol and Khellol Glucosides—Larry W. Tjarks, Gayland F. Spencer, and Eric P. Seest	655
A New Sterol Sulfate from the Marine Sponge <i>Stylopus australis</i> —Michele R. Prinsep, John W. Blunt, and Murray H. G. Munro	657
Bioactive Compounds from the Root of <i>Myrsine africana</i> —Xiao-Hua Li and Jerry L. McLaughlin	660
12, 13-Deoxytrichoverrins from <i>Myrothecium verrucaria</i> —Bruce B. Jarvis, J.O. Midiwo, and Mao-di Guo	663
Erratum	665
Book Reviews	666