

BOOK REVIEWS

The Chemistry of Natural Products. Edited by R. H. THOMSON, Blackie and Son Ltd., Glasgow, (distributed in the USA by Chapman and Hall, 29 West 35th St., New York, NY 10001). 1985. xii+467 pp. 15×23.5 cm. \$75.

This book is intended as a review of the recent literature of the major classes of natural products with emphasis on structure, chemistry, and synthesis and with only a passing reference to biosynthesis. The chapters are modeled after the corresponding reviews of the natural product literature that appear each year as *Specialist Periodical Reports* published by the Royal Chemical Society. Most of the references in this text are from the late 1960's through 1982 with a few scattered references into 1983.

The chapter on carbohydrates deals almost entirely with synthesis with the emphasis on new reagents. silyl and organo tin protecting groups, anomeric effect in synthesis, sugars as useful chiral templates, and synthesis of complex sugars. In addition to a number of detailed syntheses presented in the chapter on aliphatic compounds, a number of interesting structures of various biologically active polyacetylenes, macrolides, insect pheromones, leukotrienes, prostaglandins, polyethers, and marine natural products are given. At the end of this chapter, in addition to the 163 regular references, the author has listed 38 references to reviews of the various classes of aliphatic natural products.

The chapter on aromatic compounds is more balanced with respect to synthesis vs. structure—isolation chemistry. Although biosynthesis and methods of structure proof are not discussed in any detail, the author gives many references in these areas for the interested reader.

Like the preceding chapter, the one on terpenoids is a fairly even mix of synthesis and the presentation of novel and interesting structures. This chapter suffers from a lack of references. There are 41 references given, but the author refers to a great deal of other work for which he gives no references. Thus, detailed syntheses are given for many compounds (e.g., vernolepin, vernomenin, coriolin, aphidicolin, etc.) with no references! Also, structures and allusions to biosynthesis and structure proofs are often given, again with no references.

The chapter on steroids emphasizes chemical synthesis development and rearrangement reactions using steroids as substrates. Also reviewed are polyene cyclizations leading to the steroid framework, remote functionalizations which mimic enzyme oxygenations of unactivated positions, and novel total synthesis of steroids. The chapter on amino acids, peptides, and proteins covers unusual structures with emphasis on biological properties. There are sections dealing with linear and cyclic peptides, complex glycopeptides (e.g., bleomycins), β -lactam antibiotics, separation and isolation of peptides and proteins and their structure determinations. Synthesis is not emphasized in this chapter, but a number of references are given to the literature in this area.

As with all these classes of natural products, the alkaloids have an extensive literature that simply cannot be exhaustively reviewed in a short chapter. The author of this chapter has chosen to emphasize the more unusual ones isolated recently. The discussion is ordered according to the biosynthetic source (e.g., amino acid, polyketide, or terpenoid) of the alkaloid, although no discussion of biosynthesis is given. Like other chapters, the one on alkaloids places heavy emphasis on chemical synthesis.

The last two chapters, Nucleosides, Nucleotides and Nucleic Acids and Porphyrins and Related Compounds, also emphasize organic synthesis. In the former, there are sections dealing with protecting groups, methods of phosphorylation, and use of condensing agents. There are references given to structure work, including new methods for generating and assigning absolute configuration to chiral phosphorus centers. The chapter on porphyrins deals with chlorophyll, bile pigments, and prodigiosins, again emphasizing chemical synthesis with the tour de force being the Woodward-Eschenmoser synthesis of vitamin B₁₂.

It is ambitious indeed to attempt to cover the vast literature of the past fifteen years of natural product chemistry in a book of fewer than 500 pages. The authors, all from universities in Great Britain except for one from the University of Tasmania, have naturally selected only a small percentage of the respective literature to present. Like the *Specialist Periodical Reports*, this book will serve well those natural products chemists who wish a recent overview of natural product chemistry, particularly with respect to organic synthesis.

BRUCE R. JARVIS, *University of Maryland*

Chemistry and Biochemistry of the Amino Acids. Edited by G. C. BARRETT, Chapman and Hall, Ltd., London, and, New York, 1985, x+684 pp., 16×24 cm. \$99.

Readers involved to any extent in research on amino acids will appreciate the convenience of this one-volume, multi-authored survey. The 22 chapters can be roughly divided into four sections: (1) General: nomenclature (5 pages), surveys of protein, nonprotein, and β - and higher amino acids (19, 84, and 30 pages, respectively), and solution properties (34 pages); (2) Biochemistry: metabolism and pharmacology (58 pages), biosynthesis (30 pages), and enzyme inhibition (19 pages); (3) Chemistry: synthesis (51 pages), protecting groups (41 pages), reactions (22 pages), degradation during protein hydrolysis (23 pages), and resolution and racemization (16 pages each); (4) Separation and Analysis: ion-exchange chromatography (11 pages), liquid chromatography (36 pages), glc (18 pages), mass spectroscopy (45 pages), nmr (20 pages), ord/cd (28 pages), X-ray (29 pages), and colorimetry and fluorimetry (18 pages).

As the short length of many chapters suggests, the style is often terse and telescopic, especially in the chapters dealing with synthesis and reactions, and anyone requiring detailed chemical procedures should not discard his 1961 set of Greenstein and Winitz. Most authors, however, have managed to handle the constraints of space satisfactorily. The tabular coverage of protecting groups (through 1982) is excellent, and the synthesis chapter also brings this area up to date (through 1981) in the form of tables, though with minimal text. The chapters on physical methods, particularly that on mass spectroscopy, are uniformly well-written and will be especially useful to chemists. The brief, tabular approach does not work as well for the treatment of amino acid reactions though it provides leading references through 1981. Perhaps the least satisfactory chapter is that on biosynthesis which is not only disappointingly short and limited to plants but also suffers from the total absence of structural formulas.

Errors are relatively few although the long list of nonprotein amino acids in Chapter 4 contains a number of incorrect names and structures, and Figure 2.1, showing an industrial synthesis of lysine, manages to get every structure wrong, including that of lysine. The references are thorough up to 1981-82, and several authors have provided addenda through 1983.

In summary, while considerable sacrifices in detailed coverage have inevitably resulted in order to squeeze all aspects of amino acids into one volume, the result is a valuable, comprehensive survey. Chemists will find it a handy reference to have on their shelves and will profit from browsing through its pages.

RICHARD K. HILL, *University of Georgia*

Natural Products Chemistry 1984. Edited by R. I. ZALESKI and J. J. SKOLIK. Elsevier Science Publishing Co., Inc. New York, and Amsterdam, 1985, v+685 pp., 17×245 cm., \$142.50.

This book is compilation of 52 invited lectures from the 14th IUPAC Symposium of Natural Products, Poznan, Poland, 9-14 July 1984. The volume is divided into five parts.

Part A contains nine papers on the structure and properties of natural products. This more traditional area of natural-product research comprises the smallest section of the book, but there is considerable diversity of structure type and stylistic approach in the nine reports. Part B covers synthetic methods, total synthesis strategies, and syntheses of nucleic acid fragments (15 papers). In part C, ten papers treat physical methods in structure elucidation. The focus is primarily nmr spectroscopy and x-ray crystallography. Part D, under the heading of bioorganic chemistry, offers seven papers on enzyme/coenzyme studies and biosynthesis. Part E consists of 12 papers dealing with biopolymers and implications for genetic engineering in agriculture. On the whole, the papers are lucid, typographical errors are minimal, and the artwork is of good quality.

The appeal of this book lies in the latter two sections and the papers on the synthesis of nucleic acid fragments. These areas certainly represent some of the major directions that natural-product research will take in the next decade. The papers in these areas give timely, current, and broad coverage to these rapidly growing subdisciplines.

The high cost of this volume and the tendency for such collections of invited lectures to become outdated fairly rapidly may dissuade many individual scientists from adding this book to their personal libraries. The value of this volume as a reference work in so many areas of natural-product chemistry mandates its inclusion in the library of any academic institution or pharmaceutical or agrochemical company.

JOHN H. CARDELLINA, *Montana State University*

Supplements to the Second Edition of Rodd's Chemistry of Carbon Compounds. Volume 4, Part B. Edited by M.F. ANSELL. Elsevier Science Publishing Co., Inc., New York, and AH Amsterdam, 1985, vi+318 pp., 15.5×23 cm., \$89.

This book represents a supplement to Volume IV of Rodd's treatise on Organic Chemistry. The compounds treated are five-membered heterocyclic compounds with a single hetero-atom in the ring. They comprise alkaloids, dyes, and pigments and thus are of interest to many natural-product chemists and practitioners of total synthesis. The editor has assembled a group of authorities in these fields who have produced well-written, readable accounts of some of the main groups of compounds. The chapter on pyrrolidine alkaloids records a number of diverse and interesting new structures. This chapter leads into a chapter on pyrrolizidine alkaloids in which some novel structures and novel synthetic methods are summarized. The chapter on indole alkaloids is particularly valuable for describing a number of novel non-tryptamine compounds with physiological significance and of potential interest for synthetic chemists. Emphasis in the section of this chapter dealing with tryptamine-derived compounds is on some alkaloids of interesting structures derived from microorganisms and also upon rearranged and "dimeric" alkaloids. These chapters provide a rich source of target structures for the attention of those interested in total synthesis. A succeeding chapter on amaryllidaceous alkaloids shows the continuing development of research in this area both with regard to structure determination and total synthesis, and a review of the tropane alkaloids is interesting for its summary of new synthetic approaches and for discussion of a number of structural variants. The chapter on indigo compounds will be interesting not only to those who work in the area of dyestuffs but also to those whose interest is piqued by a revival in interest in this most classic group of natural products. Finally, a chapter on cyanine dyestuffs emphasizes mostly the physical properties and electronic structures of these compounds, the synthesis and structures of which are well-established.

This book contains much to interest the general reader as well as the specialist. The writing and editing have been careful, although the task of editor and writers cannot have been aided by the circumstance that the manuscripts of two of the chapters were unavailable and that direct reproduction from the authors' typescripts had to be used. Furthermore, the fact that the book has required five years between the submission of manuscripts and the appearance of the bound volume diminishes its value as a current, up-to-date reference text. The continuing utility of the book as a supplement to "Rodd" is quite clear; however, its purchase will probably commend itself more to libraries than to individual scientists.

PHILIP W. LEQUESNE, *Northeastern University*

Continued from back cover

BRIEF REPORTS

Essential Oil of <i>Piper marginatum</i> —L.S. Ramos, M.L. da Silva, A.I.R. Luz, M.G.B. Zogbbi, and J.G.S. Maia	712
Constituents of <i>Cornus capitata</i> —R.S. Bhakuni, Y.N. Shukla, and R.S. Thakur	714
Further Novel Constituents of <i>Zanthoxylum zanthoxyloides</i> Root and Pericarp—S.K. Adesina	715
Isolation of Griffonioid from the Stem Bark of <i>Bauhinia thonningii</i> —S.K. Okwuete, G.I. Ndukuwe, K. Watanabe, and N. Ohno	716
Alkaloids from <i>Rollinia emarginata</i> —Matias Nieto	717
Isolation of the Cembranolide Diterpenes Dihydrosinularin and 11- <i>epi</i> -sinulariolide from the Marine Mollusk <i>Planaxis sulcatus</i> —Radhika Sanduja, Sudershan K. Sanduja, Alfred J. Weinheimer, Maktoob Alam, and Gary E. Martin	718
Major Flavonoids of <i>Tephrosia nubica</i> —Nagwa M. Ammar and Bruce B. Jarvis	719
Dihydrocoumarin and Certain Other Coumarins from <i>Prunus mahaleb</i> Seeds—Mansour S. Al-Said and Mohamed S. Hifnawy	721
Pyrrolizidine Alkaloids from Five <i>Senecio</i> Species—M.J. Pestchanker and O.S. Giordano	722
Alkaloids from <i>Fagaropsis glabra</i> —Alain J. Blaise, Chantal Marion, and François Winternitz	724
Additional Constituents of <i>Orchis militaris</i> —Corinne Appolonia, Andrew Marston, and Kurt Hostettmann	725
Chemical Constituents of the Flora of Jordan, II. Alkaloids of <i>Leontic leontopetalum</i> —K.A. Abu Sfieh, D.M. Al-Eisawi, M.H. Abu Zarga, and S.S. Sabri	726
Pyrrolizidine Alkaloids from Borage (<i>Borago officinalis</i>) Seeds and Flowers—Craig D. Dodson and Frank R. Stermitz	727
Metabolites from Two Soft Corals from Guam: <i>Sinularia leptoclados</i> and <i>Sinularia gyrosa</i> —Vijai Lakshmi and Francis J. Schmitz	728
Major Constituents of the Essential Oils of the Fijian Dacrydiiums—J.J. Brophy and M.K. Jogia	730
Flavonoids from <i>Brickellia scoparia</i> —Rongzhi Li, Nianbai Fang, and Tom J. Mabry	732
Alkaloids of <i>Tabernaemontana ventricosa</i> —J. Schripsema, A. Hermans-Lokkerbol, R. van der Heijden, R. Verpoorte, A. Baerheim Svendsen, and T.A. van Beek	733
Cactus Alkaloids, LXI. Identification of Mescaline and Related Compounds in Eight Additional Species Using Tlc and Ms/ms—W.W. Ma, X.Y. Jiang, R.G. Cooks, J.L. McLaughlin, A.C. Gibson, F. Zeylemaker, and C.N. Ostolaza	735
Flavonoid Aglycones from <i>Ageratina tomentella</i> —Nianbai Fang and Tom J. Mabry	737
Flavonoids from <i>Stephanodoria tomentella</i> —Nianbai Fang, Mark Leidig, and Tom J. Mabry	738
Flavonoids from <i>Gutierrezia wrightii</i> —Nianbai Fang, Sanggong Yu, and Tom J. Mabry	739
Book Reviews	742