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BOOK REVIEWS

Supplements to the 2nd Edition of Rodd's Chemistry of Carbon Compounds. Volume III: Aromatic Compounds, Part H: Polycarbocyclic Compounds with more than Thirteen Atoms in the Fused Ring System. Edited by MARTIN F. ANSELL. Elsevier Science Publishing, P.O. Box 1663, Grand Central Station, New York, NY 10163. 1988. xvi + 139 pp., 15.5 × 23.5 cm. $76.25.

This slim volume is the most recent in a series of supplements to the second edition of Rodd's Chemistry of Carbon Compounds. It supplements chapters 28, 29 and 30 of Volume IIIH, completing the coverage of the chemistry of aromatic compounds. The Rodd's series is a major reference work which belongs in every science library. Its updating will be greeted with enthusiasm by chemists who have come to rely on it as a valuable source of information on the synthesis and properties of organic molecules.

The topics (and authors) of the three chapters of this volume are: anthracene, phenanthrene, and related compounds (R. Bolton); polycyclics containing one or more five-membered rings (H.F. Andrew); and polycyclics with four or more fused six-membered rings (H.F. Andrew). The emphasis throughout the book is on the synthesis and reactions of the parent aromatic ring systems. The chemistry of related natural products and other compounds of biological importance (e.g., active metabolites of carcinogenic polycy clic hydrocarbons) are only briefly discussed. Within these limitations the coverage of the literature appears reasonably complete. However, notable for their omission in chapter 30 are the syntheses of benzo[*a*]naphthacene, dibenz[*a,h*]anthracene, dibenz[*a,j*]anthracene, and naphtho[1,2-*b*]triphenylene by the reactions of the appropriate arynes with isobenzofuran derivatives [D.J. Pollart and B. Rickborn, *J. Org. Chem.*, **51**, 3155 (1986)] and the related syntheses of dibenz[*a,c*]anthracene and pentacene [J. Netka *et al.*, *J. Org. Chem.*, **51**, 1189 (1986)]. Aside from these and a few other minor omissions, the authors are to be commended for the thoroughness of their coverage of the literature.

This volume was produced by direct reproduction of the authors' manuscripts. With the exception of the chemical structural drawings in chapter 28, which are hand-lettered and below professional quality, this does not seriously detract from the readability of the book. However, there are now many good software programs for drawing chemical structures on the market for personal computers. It is strongly recommended that the publishers adopt one for future editions.

RONALD G. HARVEY, *University of Chicago*

Two-Dimensional NMR Methods for Establishing Molecular Connectivity. GARY E. MARTIN and ANDREW S. ZEKTZER. VCH Publishers, 220 East 23rd St., New York, NY 10010-4606. 1988. xviii + 508 pp., 16 × 23.5 cm. $59.00. ISBN 0-89573-703-5.

There can be little doubt that for the pharmacognosist, as well as for many chemists, biochemists, enzymologists, and physiologists, nmr spectroscopy has become an essential part of studies in numerous scientific areas. But to most of us, nmr spectrometers are like black boxes: they perform experiments according to preprogrammed pulse sequences, and we take the data and interpret it. We rarely look behind the experiment to see why it functions in the way that it does, or more importantly, whether refinement of the experiment could lead to enhanced data and possibly a simpler or more unambiguous result. The creativity of the pulse programmers has also led to quite a different problem, namely: what do the multitudes of acronyms which are currently in use mean in terms of the best experiment to solve a particular problem?

This book has as its subtitle "A Chemist's Guide to Experiment Selection, Performance, and Interpretation," and that perhaps is the real key. For the chemist who does not always have the time to track down the advantages or disadvantages of a particular technique, help is at hand. There has long been a real need for a book that would summarize the multitude of two-dimensional nmr experiments and give them some practical relevance. This book admirably fills that niche. The book is divided into seven chapters, five dealing with techniques and two with examples. Chapter 1 describes what is meant by two-dimensional nmr conceptually and the area of pulse calibration. Chapter 2 deals with the very broad topic of proton-proton coupling and how connectivity networks can be established using the various modifications of the COSY experiment. In Chapter 3 the many facets of the heteronuclear chemical shift correlation experiment, including experiments which yield structurally important information regarding long-range proton-carbon connectivities, are discussed. The chapter concludes with a presentation of proton-detected long-range heteronuclear multiple quantum coherence experiments. Of increasing importance now is the observation of the transfer of magnetization between non-directly-coupled homo- and heteronuclear spins, such as the relay coherence transfer experiments and the isotropic mixing experiments such as HOHAHA. ^{13}C-^{13}C

double quantum INADEQUATE experiments are discussed in chapter 5. In several of these chapters the same compounds (e.g. norharmane, strychnine) are used to illustrate techniques, thereby facilitating for the reader an explanation of the different levels of information that can be gained from an individual experiment.

Chapter 6 presents a series of sophisticated spectral problems involving the integration of information from several two-dimensional techniques, and in the final chapter these problems are elaborately explained. This is certainly one of the real strengths of the book, for rarely with books as advanced as this does one have the opportunity to integrate knowledge so thoroughly.

This is a fully referenced and thoroughly indexed book, replete with elegant figures, some obtained in the author's laboratory and others from the recent literature. The volume is very free of typos and this reviewer's only criticism is that the number of proton and carbon assignments on some of the spectra is somewhat limited. But this is a minor quibble with what is an outstanding volume; it should be on the desk of every chemist interested in nmr spectroscopy. With the advent of three-dimensional nmr one can hardly wait for the next volume.

GEOFFREY A. CORDELL, *University of Illinois at Chicago*

Encyclopedia of Pharmaceutical Technology, Volume 1. Edited by JAMES SWARBRICK and JAMES C. BOYLAN. Marcel Dekker, 270 Madison Avenue, New York, NY 10016. 1988. vii + 494 pp., 18 × 26 cm. $180.00. ISBN 0-8247-2800-9.

This volume is the first in a series representing a major undertaking by the editors. The breadth of topics from many disciplines which must be concentrated in this and subsequent texts presents a laborious task. The editors must be complimented on their enthusiasm for this venture. It is not surprising, however, that they admit a partisan approach to the selection of topics and authors for the first volume. Any fears that this may impair their objectivity may be dispelled; their selection does not appear to detract from the content. Their desire to broaden the scope of subsequent publications is creditable. The alphabetical approach to presentation will of course mean that oversights or omissions will not be easily rectified.

Each chapter is approximately thirty pages in length. The general areas from which the subjects are drawn are analytical, reaction and physical chemistry, metabolism, toxicology, marketing, legislation, and traditional pharmaceutical technology. It would have been difficult for the contributing authors to do more than summarize their topics, but their skill in presenting the salient points with appropriate references serves the purpose of an encyclopedia. Each chapter is supported by a large number of references. A significant proportion of these are recent publications that will be of importance to the reader. While it is possible to criticize portions of the content, the overall achievement of collating material of this nature cannot be underestimated. I concur with the editors in recommending this book to those in the pharmaceutical industry, education, and government. The purchase price, however, may be prohibitive to the casual reader, particularly in view of the long term investment. I believe this volume will eventually appear as a valuable asset in the libraries of most pharmaceutical institutions. Those who acquire this book will enjoy the realm of pharmaceutical technology from "Absorption of Drugs" to "Bioavailability"!

ANTHONY J. HICKEY, *University of Illinois at Chicago*

Countercurrent Chromatography. Theory and Practice. Edited by N. BHUSHAN MANDAVA and YOICHIRO ITO. Marcel Dekker, 270 Madison Avenue, New York, NY 10016. 1988. x + 841 pp., 15.5 × 23.5 cm. $115.00. ISBN 0-8247-7815-4.

As the title suggests, this book provides the reader with an introduction to the theory and practice of countercurrent chromatography. These are twelve chapters, each of which contains a separate list of references to the relevant primary literature. Following an introductory chapter by Drs. Mandava and Ruth, which provides a summary of the general principles applicable to many types of chromatography, the book is divided into two parts. Part 1, consisting of three chapters, is concerned with theory and instrumentation; Part 2 with applications.

Part 1 deals with numerous aspects of liquid-liquid partition systems; in addition to theoretical considerations, there are useful comparisons of the practical characteristics of different systems (e.g., quantities separable, typical mobile and stationary phases) and tables illustrating the numerous types of liquid-liquid partition systems and countercurrent chromatographic instruments that have been developed. It provides detailed descriptions of (synchronous and nonsynchronous) coil planet centrifuges, various types

of flow-through centrifuge devices, helix and nonhelix countercurrent chromatography, slowly rotating coil assembly, and high performance countercurrent chromatography.

Part 2 contains three chapters that illustrate the isolation of natural products using three countercurrent chromatography techniques. Other chapters deal with applications in agricultural chemistry (e.g., plant growth regulators, herbicides, prostaglandins, and insecticides), drug discovery and development, peptide chemistry and the separation of complex biological materials (blood cells, organelles, biopolymers, and biomembranes). A final chapter considers the prospects for countercurrent chromatography/mass spectrometry.

This book provides a detailed introduction to the theory and practice of countercurrent chromatography. Its strengths include comprehensive treatment of the subject matter and the provision of many key references to the primary literature. The "historical" sections will probably interest fewer readers but are really indispensable for a thorough description of the various instruments and techniques that have been developed. The detailed nature of the book is such that it will not prove especially useful to those who simply wish to gain a quick overview of countercurrent chromatography, or to carry out an occasional separation. However, given the growing sophistication of separation by countercurrent chromatography and some of the unique advantages of this technique, the book will be of interest to specialists and is really essential for any library whose users include scientists concerned with the separation of complex, polar molecules.

SIDNEY M. HECHT, *University of Virginia*

Nitrile Oxides, Nitrones, and Nitronates in Organic Synthesis; Novel Strategies in Synthesis. KURT B.G. TORSSELL. VCH Publishers, 220 East 23rd St., Suite 909, New York, NY 10010. 1988. viii + 332 pp., 15 × 23.5 cm. $59.95. ISBN 0-89573-304-8.

There has been an explosive development of 1,3-dipolar cycloaddition chemistry over the past 25 years. Most recently, this chemistry has focused on applications to the synthesis of natural products and related systems. There have been several recent, excellent reviews of nitrones, nitronates, and nitrile oxides which deal with the cycloaddition aspects of their chemistry. This book is more broadly directed and includes a consideration of the synthesis of these functional moieties and other aspects of their chemistry.

The first chapter deals with general aspects of the chemistry of the aforementioned functionalities, including reactions, physiochemical properties, theoretical aspects, and asymmetric inductions. Chapter 2 is a more complete treatment of nitrile oxides, while Chapters 3 and 4 are similarly focused on nitrones and nitronates. Chapter 5, a very extensive and useful chapter, deals with the application of this cycloaddition chemistry to the synthesis of a variety of natural products, including peptides, furans, various heterocyclic compounds, alkaloids, carbohydrates, amino acids, and certain terpenoids. An addendum updates this material to include articles published as recently as August 1987.

This book, containing 1805 references, is encyclopedic in its coverage. It serves as an excellent introduction into the field for those contemplating research using these 1,3-dipolar compounds. The breadth of coverage is excellent. The depth of coverage is appropriate considering the body of material involved. This book should find its way into most academic and industrial libraries. It is also recommended for those specialists with an interest in this rapidly developing area of synthetic organic chemistry.

JOSEPH J. TUFARIELLO, *State University of New York at Buffalo*

Taxonomy of Economic Seaweeds (with Reference to Some Pacific and Caribbean Species) Volume II. Edited by ISABELLA A. ABBOTT. California Sea Grant Program, University of California, La Jolla, California 92093. 1988. xv + 265 pp., 45 × 30 cm., single copies free of charge.

This is the second volume of a series of highly technical taxonomic papers which arise from Sea Grant Program sponsored workshops attended by several of the leading marine algal taxonomists in the world. The focus for these workshops has been provided by the taxonomic uncertainties associated with several of the traditionally important economic seaweeds. Principally, these are the red algae groups, which yield the important marine biopolymers agar and carrageenan, and the brown algae, which yield alginate. The Pacific region provides further focus to this volume, as was appropriate for a conference held at the Institute of Oceanology in Qingdao, People's Republic of China in 1986 with contributors coming from Hawaii, Guam, Chile, the People's Republic of China, and mainland United States.

A brief preface by the Director of the Sea Grant Program (California) and an introduction by the editor provide a historical account of the origin of this workshop series and some of the motivations behind it. The

book is divided into six sections: Section I. *Sargassum* (Phaeophyta); Section II. Gelidiales (Rhodophyta); Section III. *Gracilaria* and *Polycavernosa* (Rhodophyta); Section IV. *Eucheuma* (Rhodophyta); Section V. *Laurencia* (Rhodophyta); and Section VI. A taxonomic index to the volume. Sections I–V each begin with a brief historical overview of taxonomic considerations on the genus or genera considered in that section. Throughout the volume, many high quality line drawings and photographs accompany the keys and precise descriptions for the species under consideration.

Section I consists of five papers (the most of any of the sections), four of which discuss speciation in the genus *Sargassum* in Japan, Taiwan, China, Micronesia, and Hawaii. The fifth deals with an aspect of subgeneric nomenclature in this genus. Section II consists of three papers on the Gelidiales, two of which provide a description of species of *Gelidium* and *Pterocladia* occurring in China; the third describes a differentiation of these two closely related genera based on vegetative characteristics. Section III has three papers describing speciation of the related genera *Gracilaria* and *Polycavernosa* in China, Thailand, and Indo-Malaysia. The focus of section IV diverges from previous sections in that it contains one paper of larger scope (49 pages) by Maxwell Doty on the tribe Eucheumatoideorum and a second and shorter paper on speciation in *Eucheuma* in Florida and the Caribbean. The last substantive section, section V, represents another departure in that it discusses in two papers speciation of the red alga *Laurencia* in Hawaii and China and in a third paper the first extraction of agar from a Hawaiian species. This is notable since *Laurencia* is not widely recognized as being of economic importance but rather is well known as a rich source of halogenated organic natural products. As appropriate to a strictly taxonomic treatise, the index lists exclusively genera and species discussed in this volume.

In summary, this is a high quality collection of papers dealing with taxonomic considerations of various marine algae that are of economic importance because of their production of useful biopolymers. The scope is rather narrow in this regard and could have been enlarged by providing an expanded introduction to each section with a review of the products obtained from the different species and the history of their utilization. Consequently, this volume is recommended for research libraries and for those who are intimately concerned with current developments in the taxonomy of these marine plants.

WILLIAM H. GERWICK, *Oregon State University*

Medicinal Plants of Saudi Arabia. Vol. 1. J.S. MOSSA, M.A. AL-YAHYA, and I.A. AL-MESHAL. King Saud University Libraries, P.O. Box 22480, Riyadh 11495, Saudi Arabia. 1987. ix + 340 pp. 16.8 × 24 cm. No price given (paper).

This book is the first of a series that is currently being written on the medicinal plants of Saudi Arabia and is claimed by the publisher to be "the first of its kind which has ever been written in any language on medicinal plants of Saudi Arabia". The stated goal of the book is "to serve as a useful general reference in the field of pharmacy, medicine, chemistry, agriculture, botany and drug industry". This volume is divided into Preface (1 page), Table of Contents, Introduction (2 pages), Collection and Processing of Crude Drugs (2 pages), Major Plant Constituents (2 pages), Medicinal Plants (300 pages), Glossary of Medical Terms, References (115 entries), and Botanical Index (alphabetical by Latin names and by Arabic character). This book has an attractive dark green cover.

The Medicinal Plants section comprises 150 pages of text, one species per page (on even-numbered pages), and 150 pages of line drawings, one for each species treated (on odd-numbered pages). The common English name of each species is used as the heading of the text description, followed by the Latin name (complete with author citation and family) and the Arabic plant name in Arabic character.

Text information consists of the following patterned subheadings: (Taxonomic) Description, Distribution (in Saudi Arabia), Constituents, and Action and Uses, each of which with one (for Distribution) to 10 lines. As stated in the preface of the book, the botanical portion follows the pattern used in the book "Flora of Saudi Arabia, 2nd edition" by A.M. Migahid (1978): similarly, each taxonomic description has also been taken from the same book, to which it is referenced. Although the information on Distribution is not referenced, presumably it, too, has been taken from the same source. The species entries are presented according to the Engler system of classification, from Ferns to Gymnosperms, to Dicots (Ranunculaceae to Compositae), and Monocots (Liliaceae to Cyperaceae).

Much of the information on chemistry and pharmacology is based on secondary sources and sometimes on one or two original research papers. Less than fifty percent of the references listed are post-1979, and the most recent reference listed (one) is 1984. The line drawings are accurate, though somewhat sketchy, and the color outlay fair to good.

As a general reference, this book has achieved its purpose, but for those involved in research on the medicinal plants of Saudi Arabia, the chemical and biological data presented are rather inadequate and somewhat outdated. This book is most appropriate and recommended for students and for use in courses on the medicinal plants of Saudi Arabia.

DJAJA D. SOEJARTO, *University of Illinois*

Studies in Natural Products Chemistry. Volume 2. Structure Elucidation (Part A). Edited by ATTA-UR-RAHMAN. Elsevier Science Publishing, P.O. Box 1663, Grand Central Station, New York, NY 10163. 1988. xi + 469 pp. 17 × 14.5 cm. $155.25. ISBN 0-444-43038-5.

This volume is a collection of 17 articles by an international group of 32 authors from all continents with the exception of Australia. Although it is the second volume, part A, of a presumed series on structure elucidation in the area of natural products, no hint is given by the editor as to the nature of subjects for the series, the future volumes to appear, or their ultimate intent. Furthermore, no mention is made of Volume 1, short of the listing "Stereoselective Synthesis (Part A)" on the verso of the title page. Because the articles are multi-authored they vary in quality and in several cases overlap in subject matter. The reproduction is by photo-reduction of the camera-ready typed manuscript and one finds examples of easy-reading high-contrast type along with eye-straining pages, especially those from a dot printer. Clearly, the latter should not have been accepted for publication.

Now for content. There are many good examples illustrating the use of physical methods. Three articles are devoted to ms, especially for samples of low volatility such as proteins (to check cross linkages) in which fab is employed, and also the use of nitric oxide as a reagent in chemical ionization for identification of double and triple bond positions. The use of high field nmr including the two-dimensional applications is given excellent treatment with specific examples (COSY, NOESY, INADEQUATE, etc). One method of value for locating quaternary carbons and tying together homo- and hetero-nuclear coupled units is the long-range carbon-proton correlation experiment which is illustrated in several articles, as is the nOe for spatial designation of protons. The alkaloid cytosine was chosen as the example for application of the latter technique and comparison of results with X-ray crystallography for establishing conformation in solution and in a crystal lattice. In contrast to such a specific study the article on cd is a general introduction well suited for the beginning graduate student or advance undergraduate. The reports can be devoted to a single natural product (structure elucidation of mycorhodin, an antibiotic from a *Streptomyces*), a class of alkaloids (stereochemistry of proaporphines), a polysaccharide group (glycans and glycocomplexes from Protozoa), an enzyme (glucoamylases from microorganisms), constituents of a class of bryophytes (biologically active substance from Hepaticae), or to summaries of research studies in a particular laboratory (biosynthesis of *Catharanthus* alkaloids in plant tissue culture, in one case, and plant-derived antifungal agents, in another). This reviewer spotted several errors, one of which is important enough to reveal. On page 161 the last sentence of the first paragraph should read, "This is one of the main reasons why ORD is scarcely used any more." The original has CD replacing ORD. Incidentally, the aporphine alkaloid on page 162 is mecambroline not mecambrine, which is a proaporphine.

There is much useful information here, but the lack of focus on the subject title of the volume will diminish its appeal. With such a wide coverage of material there will be something for everybody, but not enough for any one individual to pay the high price for a personal copy. Only well-funded libraries, in these days of financial cut-backs, will be able to justify its purchase.

RAYMOND W. DOSKOTCH, *The Ohio State University*

The Alkaloids, Volume 33. Edited by ARNOLD BROSSI. Academic Press, 1250 Sixth Avenue, San Diego, CA 92101. 1988. ix + 360 pp. 15.5 × 23.5 cm. $95.00. ISBN 0-12-469533-7.

The thirty-third volume continues this fine series' superb history of detailed reviews of various aspects of alkaloid chemistry with five chapters, each with a unique slant in its updating of a particular class of alkaloids.

Chapter 1 provides yet another look at the tropane alkaloids. The expected summaries of occurrence and synthetic and biosynthetic studies are present, but the key section is the in-depth analyses of ^{1}H-nmr, ^{13}C-nmr, and ms data for this class of compounds.

In Chapter 2, a comprehensive look at the *Gelsemium* alkaloids is presented. The inclusion of recent pharmacological data and a discussion of alkaloids whose structures remain unknown is sure to stimulate even more research activity in this small but unique group of compounds.

Chapter 3 offers an unusual perspective on the abundant and well studied protoberberines. The focus here is transformation reactions, including bond cleavages, oxidations, and conversions to other alkaloid classes.

Chapter 4 examines the various secoisoquinoline alkaloids, the first comprehensive look at this alkaloid type. Both chemistry and biogenetic relationships are explored.

Chapter 5 updates the hasubanan alkaloids, now treated as distinct relatives of morphine rather than members of the same class. Here the emphasis is on new members of this group, along with a discussion of nmr and ms analyses.

In all, the chapters are well written with few typographical errors. The artwork is consistently good, in keeping with the high standards for the series. This volume will be a necessity for alkaloid chemists, and the breadth and depth of coverage warrant its inclusion in all libraries as part of the series.

JOHN H. CARDELLINA II, *Montana State University*

The Alkaloids. Chemistry and Pharmacology, Volume 34. Edited by A. BROSSI. Academic Press, 1250 Sixth Avenue, San Diego, CA. 1988. ix + 454 pp. 15.5 × 23.5 cm. $89.00. ISBN 0-12-469534-5.

This volume continues in the high quality and usefulness of its predecessors and is $10.00 cheaper than the last volume! Chapter 1 is a 69-page review on cyclic tautomers of tryptamines and tryptophans with 351 structures and 240 references. The authors, Tohru Hino and Masako Nakagawa, have excluded physostigmines but include sporidesmins, brevianamides, chimonanthine and its analogues, a variety of related dimers, and prenylated indoles such as flustramine. The review is heavy on chemical transformations and synthesis and contains a large section on prenylation reactions. Spectral data and pharmacology are not included. Chapter 2 by Ralph Mechoulam is a short review of alkaloids from *Cannabis sativa* (16 pp., 56 refs., 53 structures), concentrating on the cannabisativine or spermidine alkaloids. In Chapter 3, Takashi Amiya and Hideo Bando review alkaloids of *Aconitum* species (84 pp., 199 refs., 237 structures). Reactions, transformations, and synthesis are emphasized in the discussion, but there is also a table of new isolates since 1978 and small sections on pharmacology, bioactivity, and analytical methods. A short review (24 pp., 175 refs., 79 structures) by Masayuki Onda and Hiroshi Takahashi covers nearly all aspects of protopine-type alkaloids discovered or studied since earlier reviews in this series. Chapter 5 is a truly monumental review of African *Strychnos* alkaloid isolates and chemistry (118 pp., 275 refs., 304 structures). There is an excellent introduction, a comprehensive tabulation of structures, and a good section on biosynthesis. Structure elucidation methods and pharmacology are given only short treatments. Finally, Robert Verpoorte, Jan Schripsema, and Theo van der Leer devote 67 pages (259 refs., 82 structures) to the *Cinchona* alkaloids. This review covers all aspects of the alkaloids: isolation methods, synthesis, biosynthesis, metabolism, biotechnology, and a strong section on spectroscopic data. The admirable practice of placing nmr assignments directly on structures was used in the last review.

Researchers or libraries with collections will want to continue the series with this volume and others whose research may be confined to one of the reviewed areas will certainly want individual copies.

FRANK R. STERMITZ, *Colorado State University*

Chitin Sourcebook. E.R. PARISER and D.P. LOMBARDI. John Wiley and Sons, Inc., 605 Third Avenue, New York, NY 10158. 1989. x + 534 pp. 22 × 28.5 cm. $140. ISBN 0-471-62423-3.

This volume contains the titles and a list of keywords for each of 503 research publications, books, and patents on chitin, chitin derivatives, and chitin-related enzymes. The citations are indexed with the help of seven subject indexes and an author index. A projected future volume will extend coverage to include approximately 600 patents.

DAVID G.I. KINGSTON, *Virginia Polytechnic Institute & State University*

Carbocycle Construction in Terpene Synthesis. TSE-LOK HO. VCH Publishers, 220 East 23rd Street, Suite 909, New York, NY 10010. 1988. xiv + 768 pp. 16 × 24 cm. $125. ISBN 0-89573-279-3.

In this volume the author has attempted a comprehensive compilation of the various methods employed to construct carbocyclic rings in terpene synthesis. Chapters 2 through 9 are devoted to specific reaction types (Robinson Annulation, Cationic Cyclization, Diels-Alder Reaction, etc.). Chapters 10 through 12 cover the Synthesis of Small-Ring Compounds, Ring Expansion and Contraction, and Transitory Annulation, respectively. Although not stated, the literature is apparently covered through mid-1987 with an addendum through some point in 1988.

There are a vast number of structural formulas presented in this book, all of which appear to have been hand drawn with typewritten substituent groups and heteroatoms. These are neatly done and very clear, but one might reasonably expect better in such an expensive volume. Of much more concern is the fact that only the target molecules are identified. None of the synthetic intermediates are numbered nor are any of the many schemes identified. Although it is possible to sort out the key step, or steps, in a given synthesis, this is frequently rather difficult.

The general coverage of each type of reaction appears to be comprehensive rather than selective, with much of Chapters 2 through 6 devoted to older and rather routine procedures which have been covered in other reviews. On the other hand, the currently important field of Radical Cyclizations (Chapter 9) is limited to only 26 pages with a number of other free radical cyclizations included under "Unconventional Alkylations" in Chapter 5. In at least one instance (p. 384) a reaction is improperly classified. In this example a tandem Mukaiyama alkylation-Michael reaction is referred to as a Diels-Alder reaction.

Although a vast amount of chemistry is included in this volume, the author's lack of discrimination in selecting examples, the failure to number key structures, and a general lack of discussion greatly diminish the appeal of the book. The lack of detail and failure to note the chemical significance of important methods detract from the potential use of this volume by one not engaged in terpene synthesis. This problem is further compounded by the index, which includes only references to the target terpenes and has no references to specific reactions or organic reagents.

Although this volume contains a great deal of data, the problems cited above create considerable difficulties in extracting useful information on a specific topic. The volume is quite expensive and will probably be purchased primarily by relatively large libraries.

JOHN W. HUFFMAN, *Clemson University*

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