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BOOK REVIEWS

Studies in Natural Products Chemistry, Volume 5, Structure Elucidation (Part B). Edited by ATTA-UR-RAHMAN. Elsevier Science Publishing Company, P.O. Box 882, Madison Square Station, New York, NY 10159. 1989. xiii + 906 pp. 17 × 24.5 cm. $244.00. ISBN 0-444-88336-3.

This volume is the fifth in a series covering special topics in natural product chemistry. There are 22 different chapters (essentially unrelated reviews) ranging from 12 to 66 pages in length. The 35 contributing authors represent a variety of subdisciplines, and the book has a distinctly international complexion. Although the volume is entitled "Structure Elucidation," this is not meant literally, because only about half of the chapters truly cover aspects or examples of structure elucidation processes. Other chapters focus on synthetic, biosynthetic, or biological facets of natural product chemistry.

Three chapters are devoted to detailed discussions emphasizing application of one particular technique to the determination of chemical structures. These chapters describe nmr applications (G. Blasko and G. Cordell), mass spectrometry of *Tabernaemontana* indole alkaloids (R. van der Heijden and R. Verpoorte), and biosynthetic approaches to structure elucidation (S. Omura and A. Nakagawa). Many of the other chapters review aspects of individual compound classes or categories. These reviews include chapters on pyrazines from insects (J. Brophy), polysaccharides from fungi and lichens (E. Barreto-Bergter), lignan biosynthesis (P. Dewick), antitumor polyethers from marine animals (D. Uemura and Y. Hirata), Okinawan marine natural products (T. Higa), carotane sesquiterpenes (B. Fraga), oligo(*N*-methylpyrrolecarboxamide) antibiotics (F. Arcamone), flavonoid analysis (F. Ferreres, F. Tomas-Lorente, and F. Tomas-Barberan), 3,2′-dioxygenated flavonoids (N. Fang and T. Mabry), perezone derivatives (P. Joseph-Nathan and R. Santillan), prostaglandin synthetase inhibitors (I. Kubo and T. Kamikawa), and avian hemoglobin (Z. Zahdi and C. Sultana). The remaining chapters present case histories in structure determination, detailed spectroscopic analysis, or biological evaluation, most of which are taken from recent efforts carried out in the individual authors' laboratories.

The chapters in this book generally provide thorough, well-referenced coverage of specialized topics. However, the book is best described as a collection of camera-ready reviews, rather than a general reference. As expected for such a compilation, the usefulness of the individual chapters will vary a great deal depending on the specific interests of the reader. The high cost suggests that it is probably not the kind of book that most scientists will be able to purchase for their own personal use, but this volume would be a worthwhile addition to a departmental library.

JAMES B. GLOER, *University of Iowa*

Electrophilic Aromatic Substitution. R. TAYLOR, John Wiley and Sons, 605 Third Avenue, New York, NY 10158. 1990. xvi + 513 pp. 15.5 × 23.5 cm. $190.00. ISBN 0471-92482-2.

Roger Taylor's book is a fine contribution to the chemical literature and can be highly recommended to everybody interested in the broad field of electrophilic aromatic substitution.

Twenty-five years ago the author wrote with R.O.C. Norman "Electrophilic Substitution in Benzenoid Compounds." This well received book is by now outdated, and Taylor's new book admirably leads the reader through the complex but fascinating modern world of the topic. Extensive and up-to-date references make it easy to use and an excellent resource book of the broad field, assuring also its lasting value. The treatment is quite comprehensive, and the reader will find discussion of most conceivable reactions.

The author, by choice, emphasizes mechanistic aspects. It was pointed out in the preface of the original Norman-Taylor book: "Finally a note of caution. Mechanistic theories in organic chemistry are never cut and dry. Repeatedly throughout this book the reader will find the statement that 'this mechanism is consistent with the data' and there is little doubt that there is still considerable scope for alteration, modification and refinement of the present theories." I hope that the author has not changed his view and wish he had included this caveat in his new book too. Mechanisms are our best interpretation at the present time of the path of a reaction based on available data. As our knowledge expands (as it always does), the mechanisms need to be modified or reconsidered. It is well recognized that the same data can be interpreted to support different pathways. The energy profiles of reactions also turn out to be frequently more complex than originally considered, involving separate steps separated by low barriers. There is little discussion

pointing out limitations of frequently simplified reaction mechanisms. Single electron transfer (SET) plays an increasingly important role in many electrophilic aromatic substitutions (including nitration), and its role in mechanistic discussions could have been more emphasized. Regardless, these are questions of individual judgment. Overall, Taylor's book clearly ranks as one of the best and most valuable books ever written to cover this broad and most important field of organic chemistry. He covers in some 500 pages a wealth of information in a well organized, readable way. The book will be a standard source for information and a stimulation for further study for students and researchers alike for many years to come.

The only negative note I must raise is the price of the book at $190 (513 pages). It is prohibitive and will negate the major purpose of the book, i.e., to be at the desks of students and interested researchers. I still own (and frequently consult) my copy of the original Norman-Taylor book published in 1965. It cost $12.75 (343 pages). In 1965 we still used basically unchanged "Gutenberg technology" to produce books. After 25 years in the midst of the computer age (the author thanks in his preface the availability of budget-cost word processors enabling him to produce the book), this price is hardly justified and will eliminate most potential buyers (and many libraries as well). I greatly regret it.

GEORGE A. OLAH, *University of California, Los Angeles*

Ginseng: A Concise Handbook. JAMES A. DUKE. Reference Publications, 218 Saint Clair River Drive, Algonac, Michigan 48001. 1989. 273 pp. 15.5 × 23.5 cm. $39.95. ISBN 0-917256-32-8.

This handbook is written in popular style with much scientific and general information on American and Asiatic ginseng. The prologue by the author proves an interesting introduction into why the author wrote this text as well as his personal experiences in growing ginseng. He states that he is not convinced that all the claims made about ginseng are true, but he also admits that he is not yet convinced that they are false either. This balanced view has allowed for a relatively personal but fair overall viewpoint of the numerous studies on ginseng (*Panax* spp.). The coverage includes chapters on taxonomy, history, Siberian ginseng, a comparison of carrot and ginseng, a comparison of the folkloric uses and constituents of ginseng, ginger, sarsaparilla, and sassafras, other herbal teas, chemistry, pharmacology, immunology, ginseng pathogens (by Melodie Putnam), other pests, agroecology, economics, law, population biology, bibliography, and index. The text includes several line drawings of ginseng species and *Eleutherococcus senticosus* (Siberian ginseng) and several tables: nomenclature of ginseng, dynasty chart of the Chinese herbals, ailments reportedly treated with *Eleutherococcus*, nutritional comparison of carrot and ginseng, compounds in carrot, compounds in ginseng, toxins in "root booster" teas, folk medicinal uses of "root booster" ingredients, proximate analysis of herbs, minerals in the liquid of tea, nutritional components of Korean ginseng root, ginsenosides in various ginseng plants and products, amino acid composition of ginseng root, herbs used in combination with ginseng, Chinese herbal combinations containing ginseng, herbal immune activities, first year costs of growing ginseng, estimated 1903 cost for an acre of ginseng, estimated 1978 costs for an acre of ginseng, United States ginseng exports 1972–81, Korean ginseng exports 1982, Japanese exports 1981 of ginseng, Hong Kong ginseng imports 1978–81, Taiwan ginseng imports 1976–80, United States imports of crude ginseng roots, Korean and Japanese ginseng production, American ginseng 1983 prices, United States ginseng exports over the years, and two population biology tables. The law chapter summarizes various state legislation relating to ginseng growing, registration, digging, and harvesting.

Dr. Duke has done a great service in providing a popular "folksy" overview of all aspects of ginseng and by providing almost all the governmental and much of the experimental scientific literature on the numerous studies on this plant. He has also included a lot of his personal scientific and skeptical views via letters and comments on the various experiences he has had with the plant through the years. The chronology of scientific studies is accurate and much needed to help put all of the work on ginseng in perspective for the lay and scientific communities. Even though much of the popular advocacy literature cited in popular journals may be scientifically questionable, it is interesting to see both this and the scientific literature alphabetically indexed in a rather comprehensive fashion (334 references) in the bibliography. For all ginseng and related herbal tea devotees and researchers I can only recommend this handbook as a valuable resource for modern studies on ginseng and the various controversies surrounding it.

ARA DER MARDEROSIAN
Philadelphia College of Pharmacy & Science

The Chemistry of Heterocyclic Compounds, Volume 38. Isoquinolines, Part Two. Edited by F.G. KATTAWALA, G.M. KOPPOLA, and H.F. SCHUSTER. Wiley-Interscience, John Wiley and Sons, 605 Third Avenue, New York, NY 10158. 1990. xv + 541 pp. 16 × 24 cm. $175.00. ISBN 0471-62856-5.

This volume "Isoquninolines, Part Two" is a collection of four chapters written by seven qualified experts and contains references to more than 2127 articles. This book reviews various aspects of functionalization of isoquinolines and their hydrogenated derivatives and their reactions. Examples in the text are augmented by 171 pages of detailed tables.

In Chapter 1 a comprehensive look at halogenated and metallated isoquinoline derivatives is presented. This includes the synthesis and reactions of a variety of fluoro-, chloro-, bromo-, and iodoisoquinolines as well as combinations of different halogens at different positions of isoquinolines. Organometallic derivatives of isoquinolines have been very well classified according to the periodic table of elements.

Chapter 2 is an extensive coverage of isoquinoline carboxylic acids and their hydrogenated derivatives. Authors of this chapter have even elaborated with superscripts the availability of uv, ir, nmr, and ms data of specific compounds in the original papers.

Chapter 3 discusses isoquinolines containing basic functions on the ring and their hydrogenated derivatives. Basic groups discussed in this chapter are mainly amino but also piperzino and hydrazino derivatives.

Chapter 4 critically examines isoquinolines containing oxidized nitrogen functions and their hydrogenated derivatives. This chapter is particularly detailed and well written.

In all, the chapters are well written with few typographical errors. The editors convincingly justify that "the purpose of these books on isoquinolines is dual: an introduction for the beginner interested in the general chemistry of isoquinolines and a source of detailed data for the frequent user." The book is an excellent resource and provides rapid entry into the substituted as well as the functionalized isoquinolines. Because of its expense, it will not find its way to many individuals' bookshelves, but it will be a very important addition to any university or industrial library.

Y.H.R. JOIS and H.W. GIBSON, *Virginia Polytechnic Institute and State University*

The Chemistry of Cyclic Conjugated Compounds. To Be Or Not To Be Like Benzene. DOUGLAS LLOYD. John Wiley and Sons, 605 Third Avenue, New York, NY 10158. 1990. xi + 185 pp. 16 × 23.5 cm. $51.95. ISBN 0471-91721-4.

This book provides an introduction to the chemistry of cyclic polyenes from the viewpoints of synthesis, reactions, structure, and properties and is intended as an advanced undergraduate or graduate text. Starting with an introductory chapter dealing with benzene, the text goes on to explore a variety of aromatic (or antiaromatic) systems including other [n]-annulenes, aromatic ions, fulvalenes, azulenes, etc. The final chapter deals with aromatic transition states as a means of understanding and predicting pericyclic reations. While there is a short chapter dealing with Hückel's rule, the text does not include a great deal of theory, nor are any of the experimental criteria for aromaticity (thermochemistry, nmr ring current effects, etc.) discussed in detail. Consequently, supplementary reading might be needed for use at the graduate level. A great deal of chemistry is discussed in a relaxed, well-written manner. More importantly however, the author succeeds in conveying his own perspectives and insight to the reader. For these reasons, the text should prove to be a superb undergraduate textbook.

JAMES M. TANKO, *Virginia Polytechnic Institute and State University*

Plants for Medicines: A Chemical and Pharmacological Survey of Plants in the Australian Region. D.J. COLLINS, C.C.J. CULVENOR, J.A. LAMBERTON, J.W. LODER and J.R. PRICE, Commonwealth Scientific and Industrial Research Organization (CSIRO), Melbourne, Australia. 1990. ii + 303 pp. 21 × 27 cm. $70.00. ISBN 0-643-049927.

This attractive book contains a sensible portion of the record of a half-century of Australian phytochemistry. Faced with the exigencies of World War II, the CSIRO undertook to search for alternative sources of essential drugs and, the same time, to develop knowledge of the flora of the Australian region and its potential for new pharmaceutical or other commercial products.

The text follows a logical sequence of events which transpired as the project developed. After an initial chapter on the origins and objectives of the program, including a section on peripheral studies of stock poisons, Chapter 2 lists the approximately 2000 species investigated during its course. These were screened for the presence of alkaloids which were chosen at the time as the most likely constituents to demonstrate desirable biodynamic activity. Selected crude-base extracts of these, and eventually several purified chemical entities isolated therefrom, were subjected to pharmacological screening (Chapter 3). Plant extracts and their constituents, whether alkaloidal or not, were also assayed for antitumor activity in collaboration with the NCI (U.S.A.). These are indicated in the tables of Chapter 2; those which gave positive results are discussed in detail in Chapter 4. The remainder of the book is devoted to several color plates of unusually photogenic plants (Chapter 5), a bibliography of Australian phytochemistry (1940–1989) with 2100 references (Chapters 6,7), and indexes to plant families, genera, and authors cited in the work (Chapter 8).

Scattered throughout in appropriate places are the structures, with stereochemistry when known, of over 400 alkaloids characterized during the course of the project—some known, some simple, and some bordering on the bizarre in their complexity. The previously unpublished pharmacological data, based on methodologies now 25 years old, may suggest new approaches to the further study of some of them in light of current interests and testing techniques. The book should command the interest of all involved in phytochemistry and its sub-disciplines and serve as a model record of a long collaboration between government, industry, and academia in the assessment of a regional flora for its potentially useful natural products.

North American orders may be placed with International Specialized Book Services, Portland, Oregon 97213.

ROBERT F. RAFFAUF, *Northeastern University*

The Chemistry of Enones, Parts 1 and 2. SAUL PATAI and ZVI RAPPOPORT. Wiley Interscience, John Wiley and Sons, 605 Third Avenue, New York, NY 10158. 1989. xvi + 597 pp. (Pt. 1), xvi + 668 pp. (Pt. 2). 15.5 × 23.5 cm. $315 (Pt. 1), $327 (Pt. 2). ISBN 0-471-92290-0 (Set).

These two volumes continue the encyclopedic coverage of the series "The Chemistry of Functional Groups" under the general editorship of Professor Saul Patai. Volume 1 will be of most interest to readers of this journal, with chapters inter alia on the structural chemistry of enones, on conformations, chiroptical and related spectral properties of enones, on nmr spectroscopy of enones, and on the chemistry of ionized enones in the gas phase. The remaining chapters of Part 1 cover general and theoretical matters, thermochemistry of enones, synthesis of enones, synthetic uses of enones, acid-base behavior of enones, nucleophilic attacks on enones, addition of electrons or radicals to α,β-unsaturated enones, the reaction of enones with electrophiles, and chemical and enzymatic conversion of β,γ-enones to α,β-enones.

The contents of Part 2, which is consecutively numbered with Part 1, consist of enone electrochemistry, the photochemistry of enones, radiation chemistry of enones, the oxygenation of enones, reduction of enones, organometallic derivatives of α,β-unsaturated enones, dienols (enolization of enones), asymmetric synthesis with chiral enones, and polymerization of enones in fluid and solid state. This part concludes with author and subject indexes to both parts.

Literature coverage appears to be thorough, with references in most chapters to the 1987 literature and in a few cases into 1988. These two volumes thus provide complete and up-to-date coverage of the chemistry of enones, and will be an essential purchase for libraries catering to the chemical sciences.

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

Comprehensive Organic Transformations. A Guide to Functional Group Preparations. RICHARD C. LAROCK. VCH Publishers, Suite 909, 220 East 23rd Street, New York, NY 10010. 1989. xxxiv + 1160 pp. 17.5 × 25 cm. $55.00. ISBN 0-89573-710-8.

The development of new and selective methods in organic synthesis has burgeoned in recent years to the point that it is now virtually impossible even for a synthetic expert to be familiar with all the available methods. In the past the researcher seeking information on a particular transformation has had to rely on review articles or on multi-volume works such as the Theilheimer series; recently the Chemical Abstracts CASREACT on-line system has become available, but this is relatively costly and is not available to all scientists.

The book under review represents an excellent and economical alternative to the tedious or costly search methods mentioned above. It consists of nine lengthy chapters, summarizing the preparation methods of alkanes and arenes, alkenes, alkynes, halides, amines, ethers, alcohols and phenols, aldehydes and ketones, and nitriles, carboxylic acids and derivatives. Within each chapter the synthetic methods for the desired compound type are classified by reaction type (reduction, elimination, isomerization, etc.) and then subclassified by type of product and/or reagent type. The transformations are then listed in tabular form, with the substrate and sometimes the reagent indicated, and with an abbreviated literature reference. No yields are provided, but the author states that these are generally at least 50%. To aid in locating specific transformations, a comprehensive transformation index (162 pages) is also provided.

In order to keep the book within reasonable bounds, the author has omitted coverage of heterocyclic chemistry and of the use of protecting groups, and has also omitted detailed treatment of stereochemical considerations. In spite of these limitations, the scope of the work is monumental, with approximately 25,000 literature citations; coverage is complete through 1987. This book will clearly be the first choice for researchers seeking information on synthetic transformations, and both author and publisher are to be commended for producing such a useful compilation at a reasonable price.

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

Herbs, Spices, and Medicinal Plants: Recent Advances in Botany, Horticulture, and Pharmacology, Volume 4. Edited by L.E. CRAKER and J.E. SIMON. The Oryx Press, Suite 103, 2214 N. Central, Phoenix, AZ 85004. 1989. xii + 267 pp. 15.5 × 28.5 cm. $69.50. ISBN 0-89774-363-6.

This volume, the fourth in a continuing series, contains five diverse chapters, each of which is of considerable value to those interested in the broad field of economic botany. In this age of all things "natural" it is appropriate to consider "The Potential of Pesticides from Plants," and this is done in comprehensive fashion by J. Lydon and S.O. Duke. Sections on phenolics, terpenoids, alkaloids, and miscellaneous compounds possessing pesticidal properties are followed by a particularly interesting and useful segment on development strategies.

Xiao Pei-Gen's chapter on "Excerpts of the Chinese Pharmacopoeia" consists largely of tables classifying 386 plant drugs contained in that volume on the basis of their therapeutic applications. An enormous amount of useful information is neatly summarized. What is not said is also intriguing. For example, ginseng is encountered only one in the section on drugs used to treat digestive problems and is not listed for problems of the reproductive system. American ginseng, *Panax quinquefolius*, does not appear at all. Yet when I visited Prof. Xiao's Institute in Beijing two years ago, I saw large fields of it under cultivation there. Perhaps the 1985 edition of the Chinese *Pharmacopoeia* already requires revision.

In his chapter "Phytogeographic and Botanical Considerations of Medicinal Plants in Eastern Asia and Eastern North America," S. Foster calls our attention to the striking similarities in the floras of the two regions. He points out that this classic example of disjunction in plant geography provides a unique opportunity to select parallel plant groups used in folk medicine for evaluation of potential new medicinal agents.

J. Janick, J.E. Simon, J. Quinn, and N. Beaubaire author a comprehensive chapter on "Borage: A Source of Gamma Linolenic Acid." Details of the botany, horticulture, and biotechnology of this plant are presented in comprehensive fashion. While it is known that GLA (or γ-18:3, as the authors prefer to designate it) is an intermediate in the biosynthesis of prostaglandins, its active utility as a drug or dietary supplement requires much additional study. The authors note that the future of commercial borage production, either in the field or by tissue culture, will ultimately depend on market demand for GLA.

The final chapter, on "Botanical Nomenclature of Medicinal Plants," by A.O. Tucker, J.A. Duke, and S. Foster is an extension of two previous nomenclatural reviews in this series by Tucker in Volume 1 and by Tucker and Lawrence in Volume 2. It is highly selective, but it will prove quite useful for the species covered. Although its phylogenetic arrangement by families will frustrate the non-taxonomists who wish to utilize it, fortunately the entire volume has a comprehensive index compiled by L. Webster.

In summary, Volume 4 of this series lives up to the standards of interest, utility, and quality of information established by the three previous volumes. Individuals and libraries interested in the topics covered will need to acquire a copy.

VARRO E. TYLER, *Purdue University*