

Book Reviews

Topics in Organic Chemistry: Organic Structure Analysis. By Phillip Crews, Jaime Rodriguez, and Marcel Jaspars (University of California, Santa Cruz). Oxford University Press, Inc., New York, NY. 1998. xxiv + 552 pp. 21.5 × 27.5 cm. \$85.00. ISBN: 0-19-510102-2.

This excellent text is designed for advanced undergraduate and beginning graduate students and practicing chemists in organic chemistry. The text addresses the four major spectroscopic techniques, nuclear magnetic resonance (NMR), mass spectrometry (MS), infrared (IR), and ultraviolet–visible (UV–vis), which are used on a day-to-day basis to determine the structure of organic molecules. The text begins with a discussion of the logic and rationale of the application of each technique for the determination of the structure of organic compounds. In addition, the application of molecular formulas, unsaturation numbers, and substructures to aid the interpretation of spectroscopic data are also discussed. This chapter concludes with a discussion of the limitations of spectroscopic data for the determination of molecular structure. These limitations are illustrated by six examples taken from the literature where the structures were originally incorrectly assigned on the basis of spectroscopic data.

The next four chapters discuss the application of NMR to the determination of the structures of organic compounds. Chapter two serves as an introduction to the theory of NMR. Topics discussed include the following: commonly investigated nuclei, how to obtain an NMR spectrum, magnetic shielding, relaxation effects, NOE effects, quadrupole effects, and practical concerns such as sample preparation and data presentation. This chapter is a nonmathematical discussion of NMR, which is appropriate for advanced undergraduate students. However, the discussion should be supplemented by a more mathematical explanation for graduate students. The applications of proton and carbon-13 chemical shift and coupling constant data are presented in the next two chapters. Chapter three presents an excellent discussion on the effect of substitutions on the observed chemical shifts of various proton and carbon-13 nuclei. Chapters three and four include many excellent figures, charts, and tables which correlate chemical shift and coupling constants data to organic structure. This material will be an excellent reference source for all students as well as for practicing chemists.

Chapter five discusses multiple-pulse and two-dimensional NMR methods. Vectors are used in a clear and concise manner to explain basis multiple-pulse one-dimensional experiments. The application of vectors to explain the simpler two-dimensional experiments such as the COSY experiment should be included. This chapter concludes with an excellent discussion of how to extract data from two-dimensional spectra and then how to use this data to determine the structure of organic compounds.

Chapters six and seven discuss the application of mass spectrometry to the determination of the structure of organic molecules. Chapter six provides a sound introduction to the basics of mass spectrometry. Interpretation of the use of fragmentation patterns is stressed. Chapter seven presents a brief overview which is appropriate for the advanced undergraduate or beginning graduate stu-

dent on different types of ionization and ion analysis as well as a survey of more advanced techniques.

Chapters eight and nine present a sound introduction to infrared and UV-VIS Spectroscopies. Chapter ten provides an excellent discussion of the strategies used to determine structure and stereochemistry from spectroscopic data. These strategies are illustrated using 10 worked out problems of increasing difficulty; this section will be of great value to students. Chapter eleven provides 50 challenging problems for the student to solve on his or her own combining all four types of spectroscopy discussed in the text.

Overall, this is an excellent text for advanced undergraduates and beginning graduate students. To reinforce the material presented in each chapter, there are two sets of problems at the end of each chapter. The first set is directly related to the material discussed in the chapter. The second set consists of more challenging and thought-provoking problems.

The text is filled with a wide array of figures, tables, and charts which will be of great benefit to chemists of all levels. In summary, this is one of the very best texts I have ever read combining these four spectroscopic methods. I would highly recommend this text for an advanced undergraduate or beginning graduate course in the application of spectroscopic methods for the determination of the structure of organic compounds.

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NP980245D

10.1021/980245d

Biochemical and Medicinal Chemistry Series: An Introduction to Biotransformations in Organic Chemistry. By James R. Hanson (University of Sussex, England). Oxford University Press, Cary, N.C. 1995. vii + 92 pp. 19 × 24.5 cm. \$19.95. ISBN: 0-7167-4541-0.

In the brief preface to this book, the author states that the objective is to provide an introduction to the subject of biotransformations, especially those that may be alternatives or complementary to strictly chemical methods. Overall, the book does provide a general introduction that is likely to be most useful for the chemist who is unfamiliar with biotransformations and includes numerous examples to illustrate the utility of biotransformations for accomplishing specific chemical modifications.

The book is generally well organized in a manner that should be attractive to the organic chemist, i.e., by organic reaction type, and the table of contents and index are useful for finding information within the text. Although there appear to be few typographical errors, the structures and schemes are well drawn and generally easy to follow.

The most notable weaknesses of the book are the absence of specific literature citations throughout the entire book and the absence of subheadings within the chapters.

Rather than provide specific literature citations within the text, some general references categorized as "Further Reading" for each chapter are listed at the end of the book. This makes it difficult for someone unfamiliar with this subject to quickly find details about a specific biotransformation, or to identify the most appropriate references to further explore important concepts. It is also worth noting that the latest reference in the "Further Reading" was published in 1994, with most references prior to 1992; thus, the utility of the reference list for current research activities may be limited. Also, although the text is generally easy to read, some important points are lost within long narrative sections, and the author moves very quickly between topics. Better use of subheadings within the chapters would have significantly diminished this problem.

Overall, this book will provide chemists a greater understanding and appreciation of biological systems as alternatives and adjuncts to chemical methods, and good specific examples directly relevant to chemical syntheses are provided for illustration. In this context, the book is likely to be useful for teaching purposes, but less useful as a reference text. I recommend the purchase of this book by those who are unfamiliar with this subject and wish to learn about the scope of possibilities in using biological systems to effect chemical modifications. The price of the book (\$19.95) is reasonable.

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NP980244L

10.1021/980244I

Virtual Activity, Real Pharmacology. Different Approaches to the Search for Bioactive Natural Compounds. Edited by Luisella Verotta (Università Degli Studi Di Milano). Research Signpost, Tivandrum, India. 1997. xi + 237 pp. 18 × 23.5 cm. \$40.00. ISBN 81-86481-17-6.

This edited volume contains a total of 15 contributions, all of which are focused on natural products drug discovery to a greater or lesser extent. A broad range of different terrestrial and marine organisms is covered in the book, and a central theme is the wide structural variation of secondary metabolites which can be correlated with important biological activities. One has to hunt around a little for the meaning of the primary title of this book, since this is not explained in the Preface or other introductory material and is mentioned only on p 223 in a chapter on *Combretum* species by the volume's Editor (L. Verotta) and C. B. Rogers. Thus, it is pointed out therein that very rarely does the "virtual activity" represented by ethnobotanical observations on folk medicinal remedies lead to reproducible laboratory biological data ("real pharmacology").

The individual chapters of *Virtual Activity, Real Pharmacology* offer different perspectives on the search for novel bioactive natural products, and some are focused on constituents of a single species or genus, including contributions on *Aconitum napellus* (M. L. Colombo), *Ferula communis* (G. Appendino), *Thapsia* (P. Avato), as well as the above-mentioned chapter on *Combretum*. Other chapters deal with compounds from restricted groups of organ-

isms, inclusive of lichens (A. G. González *et al.*) and Ecuadorian plants (G. Vidari *et al.*), while others are concerned with specific compound groups, namely, cyclopeptide alkaloids (L. Barboni and E. Torregiani), taxane derivatives (E. Bombardelli and A. Riva), and protoilludane sesquiterpenoids (G. Nasini and A. Vajna de Pava). The contributions by G. M. König and A. D. Wright (antimalarials from the marine environment) and by E. Bombardelli *et al.* (medicinal plant constituents for treating alcoholism) feature specific biological activities, while those by B. Botta *et al.* (plant cell culture), O. R. Gottlieb and M. R. de M. B. Borin (morphology-metabolism-geography based evolutionary trends), J.-L. Wolfender *et al.* (LC/MS), and R. Aquino *et al.* (techniques of activity-guided isolation and structure elucidation) are mainly methodological in coverage. Most of the chapters are clearly written, adequately illustrated, and well referenced.

Despite the obviously good intentions of the Editor, the diligence on the part of the contributors, and the reasonable price of this volume, this book cannot be recommended for purchase by members of the scientific community or the institutions to which they belong. Unfortunately, the production of this volume by the publishers does not come anywhere close to internationally accepted standards. There are literally thousands of unacceptable typographical and other errors. This reviewer is left wondering whether the contributors were ever allowed to proofread the galleys of their chapters. There is no index whatsoever, no consistency of font style or size, and many other unnecessary problems with the typesetting such as paragraph indentations. In a volume such as this, when the native language of many of the contributors is not English, it is imperative that there be a copyediting stage to smooth out minor grammatical problems. Simply stated, the overall appearance of the book simply does not do justice to the generally very good scientific input. It is to be hoped that any future volumes by this same publisher on natural products topics will not suffer from the same production deficiencies as are evident in *Virtual Activity, Real Pharmacology*.

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NP9802466

10.1021/9802466

The Pharmacology of Chinese Herbs, Second Edition.

By K. C. Huang (University of Louisville). CRC Press, Inc., Boca Raton, FL. 1998. xxi + 512 pp. 17.5 × 25 cm. \$129.00. ISBN 0-8493-1665-0

The second edition of this book testifies to the rapid global flourishing of herbal products, as both "natural food products" and alternative medical treatments. This burgeoning interest has sparked both concern and attention from medical and scientific researchers. The efficacy of traditional herbal has been proven by its use in China for both past centuries and at the current time. However, the recent focus of research has been aimed at applying modern technology to prove the validity and value found in this unique approach and to develop safe, effective herbal drugs.

The book is arranged as in the previous edition. Section I gives an introduction to Chinese medical terminology, as

well as scope and structure, which allow the non-Chinese reader to grasp the underlying and general principles of Chinese medicine philosophy. Section II then gives a brief history of Chinese medicine from pre-22th century B.C. to the present. This section highlights the extensive scientific Chinese literature related to important herbal medicines. Herbal medicines are then categorized into eight broad systems (cardiovascular, nervous, alimentary, respiratory, genitourinary, hematopoietic, and endocrine systems and chemotherapy) and subclassified by usage. The chemical constituents, pharmacological action, toxicity, and therapeutic uses of each herbal medicine are given.

As identified as a goal in this edition, new research data have been added from both Chinese and international sources through the year 1997. Several important herbs have been added, in particular, herbs from Tibet, Xinjiang, and Manchuria.

As pointed out in the review for the first edition, the structural drawings still lack both a professional, unified appearance and, often, accurate stereochemistry. The quality of the book would be enhanced by a concerted effort

to redraw all chemical structures in a unified manner. Also, in many instances, errors in Chinese characters or pronunciation are found; an example is the newly added, important herb Huang Se (Qi), p 386. Others include Jiao Chiu (Gu) Lan, p 49; Yang Guo (Jiao) Nau (Ao), p 56; San Long (Lang) Zhi (Dang), p 131; Rou Chon Wun (Rong), p 265; Zhi (Shi) Wei, p 308; Ziao (Xiao) Yeh (Bi) Gen, p 388; Qian Ji (Li) Guang, p 391; Yi Gi (Zhi) Jin (Jian), p 426; and Ban Sao (Mao), p 476.

This volume remains an excellent reference or guideline for understanding of how Chinese herbs work and also allows the reader to conceive and interpret ancient Chinese herbal medicine in comparison with Western medicines.

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NP980247Y

10.1021/980247y