

Book Reviews*

Biochemistry: The Chemical Reactions of Living Cells, Volumes 1 and 2, 2nd Edition. By David E. Metzler and Carol M. Metzler (Iowa State University). Academic Press, New York. 2003. xxi + 1973 pp. 8.5 × 11 in. \$170. ISBN 0-12-492543-X.

The first edition of this text appeared in 1977. A thorough updating was needed for the second edition, and the author has done a monumental job, resulting in a correspondingly massive textbook. Volume 1 runs to 937 pages, including the index, while volume 2 continues out to page 1973.

Volume 1 starts with an overview of the various forms of life, emphasizing cellular structure. The next several chapters cover the essentials of biopolymer structures (proteins, nucleic acids, membranes) intermingled with chapters on biochemical thermodynamics, the biophysical chemistry of macromolecular association, and common biochemical laboratory tools. Chapter 9 is a compact but detailed introduction to enzymology. The elements of primary metabolism are surveyed in Chapter 10, and the regulation of metabolism is reviewed in Chapter 11. Chapters 12 through 16 could be used for a course in bioorganic chemistry (group transfers by displacement, enolate anions and their reactions, coenzymes and their roles in catalysis, and transition metals in catalysis and electron transport).

Volume 2 returns to primary metabolism in Chapters 17 through 25. Of special interest here is Chapter 22, devoted to polyprenyl compounds, a topic often scanted in other biochemistry textbooks. In Chapters 26 through 29 we have a minicourse on molecular biology. Chapter 30 concerns chemical communication among cells (hormones, neurochemistry), Chapter 31 is a brief treatment of immune defense systems, and Chapter 32 deals with growth and development of cells, from bacteria to mammals.

The general layout of the book is well done, though not exciting in the way of Stryer's *Biochemistry* or the textbook by Mathews and van Holde. There are no flashy color molecular graphics illustrations, just solidly executed line drawings with some shading and a minimal application of color, along with reproductions of black-and-white research photographs and charts from research papers. The text is generally laid out in two side-by-side columns that mostly fill the page; the author is clearly aiming at packing the maximum amount of information into the space available. The number and the currency of literature citations are truly impressive (citations run through 2001, many since 1998, and most chapters have at least several hundred references appended).

The author states his intentions as aiming to present a well-integrated, up-to-date and reliable text and reference book and to convey the excitement of present day biochemical studies, in a text written primarily for graduate students and undergrads with adequate training in chemistry. His success? An admirable reference text, especially for grad students and academics. This textbook is thorough, current in its coverage, balanced in handling areas of dispute, and an outstanding introduction to the research literature. For a year-long, intensive course for graduate

students headed toward a research career, this text would be a good choice. For practicing professionals who want an up-to-date reference, particularly if their own coursework were some years ago, this would be an excellent choice. Considering it, however, as a text for undergraduates, I would have to recommend against this as a required text. There is an overwhelming amount of material, and the end-of-chapter exercises are too often of the "academic" type. Last, in my opinion there is not enough material on the applications of biochemistry to clinical problems.

In summary, this second edition is one of the most thorough textbooks of biochemistry I have encountered. It is highly recommended as a reference text and recommended with reservations for adoption in regular biochemistry courses.

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NP0307082

10.1021/np0307082

Organic Syntheses Based on Name Reactions, 2nd Edition. By A. Hassner and C. Stumer (Bar-Ilan University, Ramat-Gan, Israel). Pergamon (Elsevier Science Ltd.), Amsterdam. 2002. ix + 443 pp. 6.5 × 9.5 in. \$45. ISBN 0-08-043259-X.

In this second edition (Volume 22 in the Tetrahedron Organic Chemistry Series), Hassner and Stumer have expanded the content of the first edition by adding 157 additional name reactions (now a total of 545 reactions). Other changes include elimination of some older and less utilized reactions; however, those reactions still are listed in the Name Index, with reference to the first edition. The authors have also incorporated a functional group transformation index, which should be of value to both researchers looking for avenues to a particular transformation and students in the process of learning and categorizing reactions.

The format of the book is very crisp and concise: a graphical example of the reaction; an extensive reference list, including the original reference(s); and, in perhaps half the reactions, an example of the actual reaction conditions. The structure drawings are of high quality, and errors appear to be minimal (e.g., a pentavalent carbon on p 240 and a double bond missing on p 239).

This volume can be compared with Mundy and Ellerd's *Name Reactions and Reagents in Organic Synthesis* (1988). The Mundy/Ellerd book provides a detailed mechanism for each reaction and is thus a better pedagogical tool, but the present volume has more reactions, more references per reaction (including the original work), and, in many cases, actual reaction conditions. As such, it will be of considerable utility to practicing organic chemists and to students seeking to learn the vast array of reactions available to practitioners of modern organic synthesis.

The softcover version of the book is reasonably, accessibly priced; however, given the heavy use the book is likely to endure, the more durable hardback version (\$125) might

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be an appropriate investment. Institutional libraries should all have this volume, as should practitioners of organic synthesis and any serious student of organic synthesis.

NP030709U

10.1021/np030709u

Fitoquímica Orgánica. By Deanna Marcano and Masahisa Hasegawa (Universidad Central de Venezuela). Consejo de Desarrollo Científico y Humanístico, Caracas, Venezuela. 2002. 588 pp. 6 × 9.0 in. \$17. ISBN 980-00-2066-7.

This book consists of six independent chapters covering various aspects of secondary metabolites and provides a very good introduction for undergraduate and intermediate students to some important topics on natural products. As the title suggests, the book focuses on metabolites from terrestrial plants, although some chapters also deal with a few substances from animals, fungi, lichens, and actinomycetes. In fact, considering that the vast majority of natural products are organic, perhaps a better title for the book would have been "Introducción a la Fitoquímica" (Introduction to Phytochemistry).

Chapter 1 is introductory and provides a general overview of natural products with particular emphasis being placed on the basic and traditional methods used for the isolation, biosynthetic studies, and structure elucidation of secondary metabolites. The part concerning the isolation of natural products is primarily focused on chromatographic techniques. The remaining chapters recount different classes of natural products and include subsections on classification, biosynthesis, identification, and, in some cases, their reactivity and spectroscopic properties; the economic importance and the natural sources of some metabolites are also included.

Chapter 2 deals with some aliphatic compounds, such as fatty acids, eicosanoids, and acetogenins. Chapter 3 describes different types of aromatic compounds including polyketides, shikimic acid-derived metabolites, and a few of mixed biogenetic origin. In addition, this chapter considers metabolites not only from plants but also from lichens, fungi, and actinomycetes; the flavonoids are the most

extensively discussed compounds in this section. Chapter 4 deals with the family of terpenoids and provides excellent coverage of the biogenesis of the most important terpenoid backbones; unfortunately, in this chapter the authors do not emphasize the importance of the DOXP pathway for the biosynthesis of such compounds. Chapter 5 describes the most important groups of alkaloids, as well the general methods for the detection, isolation, and chemical characterization of this type of natural products. In this chapter, one can find detailed biosynthetic pathways as well as classical methods for synthesis (e.g., various groups of isoquinolines and ephedrine) and chemical conversions (e.g., tropane, aporphines, and morphinans) of some groups of alkaloids. Finally, Chapter 6 provides some brief considerations on diverse important antibiotics isolated from different natural sources and biosynthesized throughout different pathways. Unfortunately, this chapter is too short for such a broad topic.

By and large the book is well written, properly indexed, and well illustrated in terms of chemical structures, yet it is marred by some shortcomings. Thus, there are a few printing mistakes, erroneous descriptions of the uses of some compounds (e.g., a remark about the use of ethyl codeine in ophthalmology), and the lack of more recent and deserving references. Despite these minor flaws, the book should be welcomed as a good addition to the personal library of natural products teachers, students, and interested scientists, particularly for those in the Spanish-speaking countries.

In summary, the book is a welcome introduction to the study of secondary metabolites, and Professors Marcano and Hasegawa should be commended for their contribution to the teaching and consulting library of phytochemistry, more so since in this area only a few books in Spanish are available.

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NP030707+

10.1021/np030707+