

Book Reviews

Principles and Applications of Asymmetric Synthesis. By Guo-Qiang Lin, Yue-Ming Li, and Albert S. C. Chan. Wiley Interscience, New York. 2001. xvii + 515 pp. 16 × 24 cm. ISBN 0-471-40027-0. \$89.95.

Asymmetric synthesis continues to be a fast-moving field, particularly where catalytic method development is concerned. The book by Lin et al. attempts to provide an overview of asymmetric synthesis in three major sections: (1) a review of fundamental principles, (2) a compendium of important asymmetric processes arranged according to reaction type, and (3) examples of total syntheses of complex natural products.

The second section is by far the largest and most successful part of the book. It comprises five chapters that include α -alkylation and catalytic alkylation of carbonyl compounds, the aldol and related reactions, asymmetric oxidations, asymmetric Diels–Alder and other cycloaddition reactions, and asymmetric catalytic hydrogenation and other reduction reactions. Within the scope of these broad areas, the authors have done a laudable job of reviewing the most influential literature of each reaction type. Within each section, the material is organized conceptually but there is a strong sense of the historical development of each field. The chemistry is up-to-date, it is covered in reasonable depth, there are many examples and mechanistic rationales taken from the primary literature, and the reader is given a lot of references. Catalytic methods are included where appropriate. The presentation is generally clear and concise, and the structures are nicely rendered in a consistent way throughout the book. This section will be useful to advanced graduate students seeking a broad overview of a given mainstream area in asymmetric organic synthesis and would also be a good literature entry for practicing chemists who wish to get up to speed on a particular reaction type. There is also a section entitled “Enzymatic Reactions and Miscellaneous Asymmetric Syntheses” for processes and concepts that do not fit neatly into one of the main methodology chapters. This section seems rote compared to the other methodology sections. In particular, resolutions and enzymatic reactions—two processes that continue to be of enormous importance, especially to process chemists—do not receive the coverage that they deserve.

The two other main chapters of the book are also less satisfying. The introduction, which covers subjects like analytical methodology, the determination of asymmetric configurations, strategic concepts in asymmetric synthesis, and nomenclature, is uneven. The discussion of stereochemical nomenclature is in places imprecise, incomplete, or out-of-date. For example, “asymmetric” is sometimes used improperly in place of “chiral”. Although there is a section devoted to pseudo-chiral centers, the concepts of stereogenicity and chirotopicity as introduced by Mislow and Siegel are completely absent. Readers of *J. Med. Chem.* will probably find the brief discussion of the affect of chirality on biological activity to be superficial.

Any discussion of applications of asymmetric methodology to the total synthesis of complex molecules is

unavoidably idiosyncratic. Here, the offerings are erythronolide A (Woodward), 6-deoxyerythronolide (Masamune), rifamycin S (Kishi and Masamune), various approaches to prostaglandins, and a long section devoted to paclitaxel synthesis. Although these sections are well-written, interesting, and undeniably present landmark achievements in organic synthesis, they do not really build on the methodological sections of the book in an instructive way.

Overall, this book provides a very good review of basic asymmetric methodology that can be recommended to students of organic chemistry, although deficiencies in other areas may discourage use of this book as a text in graduate courses. It is a pleasant read, attractively presented, and the price is in line with other books of similar scope and intent.

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Synthesis and Applications of Isotopically Labelled Compounds. Volume 7. Proceedings of the Seventh International Symposium, Dresden, Germany, June 18–22, 2000. Edited by U. Pleiss and R. Voges. Wiley, New York. 2001. xxv + 702 pp. 17 × 25 cm. ISBN 0-471-49501-8. \$220.00.

Divided into 12 sections, this volume chronicles the meeting's contents, utilizing author-prepared abstracts directly reproduced. The 104 talks and 139 poster presentations are grouped together in common chapters of the book, including both state of the art reviews and initial publications of new research findings. Among the topics covered are the production of stable and radioisotopes, synthesis of compounds containing isotopes of hydrogen and carbon, and the synthesis and applications of compounds labeled with short- and long-lived isotopes. These sections relate the preparation of specific compounds, usually of pharmaceutical or agricultural importance, along with the synthesis and use of new labeling reagents and techniques that could be widely applied to the isotopic labeling of many diverse substances. One intriguing paper outlines several “anomalous events” during the preparation of some stable isotopomers and describes how these problems were circumvented.

Another section discusses the applications of isotopes in pharmaceutical research and development, including the new (to this audience) and useful technique of accelerator mass spectrometry, which exploits the mass (not the radioactivity) of the ^{14}C labeled compound, requiring only nanocuries of material. Time will tell to what degree this method will supplant the more clas-

sical use of larger amounts of radiolabeled compounds for metabolic studies. Finally, given the fact that this discipline is an increasingly regulated technology, the text concludes with a discussion of the safety and political and social dimensions of handling isotopes. The book contains helpful author and subject indices.

With each successive volume in this series, both the scientific merit and quality of publication increase, and the editors of this volume are to be commended for their

diligent efforts to produce such a comprehensive work. The book will be a welcome addition to the libraries of researchers in isotopically labeled compounds.

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