

Book Reviews

Optical Resolution Procedures for Chemical Compounds. Volume 4. Compounds Containing a Sulfur or Selenium Stereocenter. Parts I and II. By Paul Newman. Optical Resolution Information Center, Manhattan College, Riverdale, NY. 1993. Part I, xii + 803 pp. 22 × 28.5 cm. Part II, 808 pp. ISBN Set 0-9601918-7-9. \$145.00 (set).

Volume 4 of this series, *Compounds Containing a Sulfur or Selenium Stereocenter*, continues Dr. Newman's efforts to gather into one place all information relating to optical resolutions of organic compounds. As in the preceding members of the series, *Amines and Related Compounds* (volume 1), *Acids* (volume 2), and *Alcohols, Thiols, Aldehydes and Ketones* (volume 3), the author has performed a page-by-page scan of some 50 primary research journals plus *Chemical Abstracts and Dissertation Abstracts* to collect, mainly by photoreproduction, virtually all procedures for preparation and separation of the indicated classes of stereoisomers. This two-part volume is divided into seven sections which collect (1) procedures for preparation of optically active sulfur compounds, (2) determination of their enantiomeric composition, (3) therapeutically useful chiral organosulfur compounds from garlic and onions, (4) procedures for preparation of chiral selenium compounds, (5) determination of their enantiomeric composition and configurational stability of optically active selenoxides, (6) enantiomeric separation via chromatography, and (7) references. By far the largest section, comprised of 1417 pages, is the first one which details procedures for preparation of chiral sulfur compounds. This section has 1534 up-to-date references to procedures for preparation and separation of optically active sulfur compounds. Typically, the presentations consist of direct photocopies of selected parts of original research publications, patents, and theses, e.g. the introduction, results and discussion, experimental, and concluding sections of the publication and selected authors' comments. A few editorial comments are presented; these are primarily for continuity. The same format is also employed for the remaining sections of this compilation. A total of 47 references is included in the selenium reference list.

The value of this compendium is its collection into one location of nearly all information published about compounds containing a sulfur or selenium stereocenter. A major deficiency of this exhaustive compilation is the lack of a subject or author index. Thus, it is almost impossible to locate specific compounds, syntheses, or separation methods. Also, as the material is presented as a direct reproduction of original research publications with very limited editorial comment, much of the valuable information relative to classical resolutions, asymmetric oxidation, chromatographic methods, formation of inclusion complexes using host compounds, kinetic resolutions, etc. can be accessed only by page-by-page examination. With today's ever-increasing appreciation of the importance of enantiomers in biology and therapeutics, organic chemists, and medicinal chemists in particular, will find much of interest in this volume; however, because of the difficult accessibility of the information, institutional access to the

latest volume in the *Optical Resolution* series will meet most needs.

Staff

Medicinal Chemistry for the 21st Century. A 'Chemistry for the 21st Century' Monograph. Edited by C. G. Wermuth with N. Koga, H. König, and B. W. Metcalf. International Union of Pure and Applied Chemistry and published for them by Blackwell Scientific Publications. Distributed in the U.S.A. and North America by CRC Press, Inc., Boca Raton, FL. 1992. xii + 402 pp. 19 × 27.5 cm. ISBN 0-632-03408-4. \$129.95.

In 1987 the 34th IUPAC General Assembly decided to assemble and edit a series of monographs devoted to the current status and prospects of the chemistry of its scientific divisions at the dawn of the 21st century. This monograph is the product of the IUPAC Section on Medicinal Chemistry. Recognizing the important stages in the development of a new product as the (i) identification of a "lead" compound, (ii) optimization of the lead in terms of potency, selectivity, and safety, and (iii) definition of satisfactory drug-delivery conditions, i.e. means to ensure that the molecule reaches its target organ, the book has been divided into corresponding parts. Part 1 "New Lead Discovery" describes this most uncertain stage in the development of a new drug product for which no established, strictly rational formula is available. This part is divided into five chapters that consider traditional approaches to the generation of new lead compounds as well as rational strategies based on detailed knowledge of biochemical and pathophysiological processes involved in a disease. Part 2 "Protein Structure-Function Relationships" is comprised of six chapters that consider the interaction of enzymes and receptors with smaller molecules and signal transduction. Our increased understanding of these processes is a significant avenue for improved, more rational drug design. Part 3 "Pharmacophore Studies" consists of nine chapters that consider the application of structure-activity relationships in medicinal chemistry. Particular emphasis is given to two major and more recent advances in computer-assisted drug design and peptidomimetics. Several chapters feature discussions related to artificial lead generation using either direct approaches (when receptor structure is known) or indirect approaches (using known ligand structure). Most of the presented computational methodologies are based upon the indirect approach, such as receptor mapping and superimposition studies. In general, a very objective viewpoint is conveyed with respect to the success and limitations of computer-assisted drug design. Though several areas of the drug-discovery process need much further computational advancement (reliability in bioavailability, metabolism, and drug-delivery predictions), computer-assisted lead generation has and will probably continue to be a most interesting subject in the 21st century. Part 4, Bioavailability Manipulations, is divided into four chapters that deal with prodrugs, formulation of drug products, and delivery devices to aid in achieving optimal bioavailability of active drug molecules.

This monograph is a state-of-the-art description of the drug discovery process. All medicinal chemists will derive a great deal from reading this book; many will want their own copy.

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Microbial Reagents in Organic Synthesis. Edited by Stefano Servi. Kluwer Academic Publishers, Dordrecht, The Netherlands. 1992. x + 490 pp. 16.5 × 24 cm. ISBN 0-7923-1953-2. \$188.00.

This book summarizes the proceedings of the NATO Advanced Research Workshop on Microbial Reagents in Organic Synthesis held Sestri, Levante, Italy, in March 1992. As such, it is a continuation of the Mathematical and Physical Sciences Series (volume 381) sponsored by the NATO Science Committee. Microbial transformations which were examined at the workshop include bond formations, functionalization at unactivated carbon centers, regioselective chemoselective transformations, and novel protection-deprotection protocols of structurally complex macromolecules as peptides and oligosaccharides. These are divided into five sections totaling 35 papers: C-C Bond Formation (six chapters), Synthetic Applications (six chapters), Hydrolytic and Proteolytic Enzymes (twelve chapters), Oxidations (five chapters), and Reductions (six chapters). A better systematic understanding of biocatalytic methods, undoubtedly, can be an important addition to the arsenals currently available to scientists engaged in various fields of organic synthesis. The topics included in this book indicate that much progress is being made toward providing the needed insights for predicting reaction applicability, utility, selectivity, and specificity. The individual topics which are covered demonstrate that the potential uses of microbial reagents in organic synthesis are no longer restricted to racemic resolutions, but rather can be applied to important organic transformations which may be costly and/or difficult to achieve using existing synthetic methodologies.

This book should be a useful reference for those scientists considering applying biocatalytic methods for specific synthetic transformations. Since its cost may not be easy on one's individual budget, distribution of this volume will probably be limited to the reference library. The index is sufficient to efficiently identify topics that may be of interest. The book also is timely and pertinent, as publication was during the same year of the workshop.

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Advances in Neurology. Volume 60. Parkinson's Disease. From Basic Research to Treatment. Edited by Hiroto Narabayashi, Toshiharu Nagatsu, Nobuo Yanagisawa, and Yoshikuma Mizuno. Raven Press, New York. 1993. xxvi + 773 pp. 18 × 26 cm. ISBN 0-88167-967-4. \$150.00.

This volume is comprised of the scientific papers presented at the Tenth International Symposium on Parkinson's Disease. It consists of 126 individual contributions deriving from more than 400 prominent researchers in the field. The book provides an overview of a broad range of research directed toward the understanding and treatment of Parkinson's disease. It consists of seven main sections. The initial section contains three superb contributions that provide an overview of the disease, its etiology and diagnosis, and therapeutic strategies directed toward control of its symptoms. The second section considers the dynamics of basal ganglia in normal and pathological conditions. Following this is a section devoted to the degenerative processes; it has subsections that consider the role of monoamine oxidase-B (MAO-B), hydroxyl and superoxide radicals, iron, and MPTP-like neurotoxins in the etiology of Parkinson's disease. Section IV describes various genetic, molecular biological, and epidemiological aspects of the disease. This is followed by a large section directed toward clinical studies related to Parkinson's disease. Divided into subsections that relate to clinical physiology, cognitive dysfunction and dementia, imaging (MRI, PET, SPECT) methods, dystonia, and pathology associated with the disorder, this section consists of 50 major contributions. Section VI deals with drug therapy and describes not only current methods of treatment but also recent advances and future directions. The final section (six contributions) describes recent studies involving transplantation and growth factors in Parkinson's disease.

This volume will be of major value to CNS pharmacologists, neuroscientists, neurologists, and neurosurgeons. It will be beneficial reading to medicinal chemists researching toward the development of new therapeutic agents for parkinsonism and other neurodegenerative diseases.

Staff

Biotransformations. Volume 5. A Survey of the Biotransformations of Drugs and Chemicals in Animals. Edited by D. R. Hawkins. The Royal Society of Chemistry, Cambridge, U.K. 1993. xxx + 446 pp. 19 × 25 cm. ISBN 0-85186-147-4. £120.00.

This series summarizes biotransformations of almost all chemicals, including pharmaceuticals, agrochemicals, food additives, and environmental and industrial chemicals, occurring in vertebrates within the animal kingdom. Each volume is directed toward one calendar year. The first chapter, an overview, highlights particularly significant new pathways of biotransformations, mechanisms of toxicity, and species differences reported during 1991. The remaining sections of the book address biotransformations of specific chemical classes, i.e. aromatic hydrocarbons; alkenes, halogenoalkenes, and halogenoalkynes; acyclic functional compounds; substituted aromatic compounds; miscellaneous alicyclics, aromatics, and macrocyclics; heterocycles; functional nitrogen compounds; nitrosamines; amino acids and peptides; steroids; and miscellaneous compounds. Each section is comprised of collected, referenced abstracts of reported biotransformations of individual compounds, e.g. benzene, naphthalene, benzo[*a*]pyrene, that are typically one to two pages

in length with detailed structural illustrations of the biotransformation(s). The volume includes comprehensive compound, key functional group, and reaction type indexes for Volumes 1–5. These indexes facilitate location of important material.

The overview chapter of this book, coupled with its chemical class organization, allows for derivation of generalities of biotransformations which will be of interest to both the experienced researcher and to students and others new to the field. Medicinal chemists and other scientists concerned with the metabolism of drug products and chemicals in general will benefit from library access to this series.

Staff

Heme Oxygenase: Clinical Applications and Functions. By Mahin D. Maines. CRC Press, Inc., Boca Raton, FL. 1992. 276 pp. 15.5 × 24 cm. ISBN 0-8493-5408-0. \$159.95.

This book represents a comprehensive overview of the heme oxygenase enzyme (EC 1.14.993). The book is concisely written and well organized into six chapters. In the first chapter the author thoughtfully provides an introductory overview of porphyrins, hemes, and their pathways of biosynthesis. A chapter is devoted to each of the following topics: biliverdin reductase; heme-degradation pathways, including discussions on enzymatic and nonenzymatic degradation of heme by heme oxygenase; molecular characterization of heme and the heme oxygenase isozymes HO-1 and HO-2; regulation of heme oxygenase activity; and, interestingly, the identification of HO-1 as a stress or heat shock protein. In the final chapter the author discusses the clinical implications of heme oxygenase, specifically neonatal hyperbilirubinemia. Much of this chapter is devoted to metalloporphyrin complexes and their ability to inhibit the heme oxygenase and thus suppress the hyperbilirubinemia.

The book has an extensive subject index and contains numerous informative tables and figures. Each chapter has an average of 250 references. Since the book was published in 1992, the most recent references are from 1991. Despite the relatively high cost, this book is highly recommended for any scientist interested in heme oxygenase.

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Annual Review of Neuroscience. Volume 16. Edited by W. Maxwell Cowan, Eric M. Shooter, Charles F. Stevens, and Richard F. Thompson. Annual Reviews, Incorporated. Palo Alto, CA. 1993. vi + 758 pp. 15.5 × 22.5 cm. ISBN 0-8243-2416-1. \$44.00.

Like its predecessors, the sixteenth volume of the *Annual Review of Neuroscience* is a superb compendium and review of current knowledge in the field. This particular work contains twenty-eight chapters covering a wide range of subjects, is extensively referenced, is cross-referenced to chapters in other Annual Reviews, and is

thoroughly indexed by author and subject. An index to prior Neuroscience Reviews (volumes 11–15) is also provided.

It goes without saying that the 51 contributors are world-recognized experts in their individual fields. By way of specifics, the 16th volume is weighted toward a review of current theories of the neuronal basis of behavior (Bargmann, genetic and cellular; Reeke and Sporns, behavioral-based modeling and computational approaches), learning and memory (Schacter et al., implicit memory; Daw et al., NMDA receptors; Miyashita, visual perception and memory; Zola-Morgan and Squire, neuroanatomy of memory; Gluck and Granger, computational models of learning and memory) and/or other forms of information processing (Carr, temporal information; Pearson, motor control; Merigan and Maunsell, visual pathways in primates; Petersen and Fiez, single-word processing; Selverston, modeling of neural circuits; Kimmel, patterning the brain of zebrafish) (13 chapters). Additional subject material includes two chapters each devoted to gene expression in neurons (Armstrong and Montminy; Mandel and McKinnan), neuronal development (Johnson and Deckwerth; Anderson), neurotransmitter transporters (Amara and Kuhar; Kandel and Siegelbaum), and the molecular biology of neurotransmitter receptors (Gingrich and Caron, dopamine; Sargent, nicotinic acetylcholine). The remaining seven contributions cover a wide range of material including integrative systems research (Bullock), protein targeting in the neuron (Kelly and Grote), the neurofibromatosis type 1 gene (Viskochil et al.), the regulation of ion channel distribution at synapses (Froehner), the role of glia in development (Steindler), the neurochemistry of sympathetic ganglia (Hokfelt et al.), and growth factor inhibitors (Schwab et al.). Each chapter is accompanied by a limited number of cartoons or tables which summarize the central arguments of the discussion. As is expected for contributions to the *Annual Review of Neuroscience* series, references are extensive, full, and current.

In summary, the 16th edition of *Annual Review of Neuroscience* continues the outstanding tradition of breadth, relevance, and completeness of coverage which is associated with its predecessors. At \$44.00, there is little reason not to acquire a copy for the office.

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Synthetic Fluorine Chemistry. Edited by George A. Olah, G. K. Surya Prakash, and Richard D. Chambers. John Wiley & Sons, New York. 1992. xii + 402 pp. 16 × 24 cm. ISBN 0-471-54370-5. \$95.00.

This book consists of 17 chapters derived from lectures given at a research symposium on "Synthetic Fluorine Chemistry" held at the Loker Hydrocarbon Research Institute at the University of Southern California in February 1990. The editors have done an admirable job in presenting these lectures as a collected volume. The individual contributors are leaders in their disciplines and have presented an immense amount of useful information in a clear, easy-to-read format. This book was a pleasure to review.

The first four chapters deal with inorganic aspects of synthetic fluorine chemistry. In the first chapter, Schro-

bilgen discusses the syntheses, structural characterization, and bonding characteristics of noble gas compounds based on the reaction between noble gas fluorides (Nbf^+) functioning as Lewis acids and a variety of organic and inorganic bases. Next, Christe, Wilson, and Schack describe controlled, step-wise fluorine-oxygen exchange in highly fluorinated compounds of the more electronegative elements using NO_3^- or SO_4^{2-} . In chapter 3, Aubke, Cader, and Mistry provide a comprehensive review of the syntheses and properties of fluorine-containing transition-metal derivatives of strong protonic acids and super acids. In chapter 4, Seppelt discusses preparation and properties of novel compounds containing fluorine-stabilized carbon-sulfur bonds, particularly with respect to such properties as bond lengths, geometry, and rotational barriers.

The next four chapters deal with synthetic procedures for introducing fluorine into organic molecules. In chapter 5, Lagow, Bierschenk, Juhlke, and Kawa review the rapid advances they have made in their efficient and versatile preparation of perfluoro polyethers. Next, Adcock describes aerosol direct fluorination as a universal procedure for the synthesis of perfluorinated organic compounds. Rozen provides an entertaining historical introduction to his work on electrophilic fluorination reactions. This is followed by his in-depth discussion of the many applications of elemental fluorine, and reagents derived therefrom, as practical reagents for the synthesis of fluorine-containing molecules. In chapter 8, Olah and Li present a thorough and very useful review of the chemistry of the versatile onium poly(hydrogen fluoride) fluorinating agents, including pyridinium polyhydrogen fluoride (Olah's reagent) and the recently developed poly(vinylpyridinium) poly(hydrogen fluoride), a convenient solid hydrogen fluoride reagent.

Organometallic fluorine chemistry is considered in the next three chapters. Burton gives an excellent discussion of the preparation and synthetic applications of organometallic organofluorine chemistry. The topic is developed from a logical, historical point of view. In chapter 10, Prakash describes development and applications of perfluoroalkyltrialkylsilanes as nucleophilic perfluoroalkylating agents, including a thorough survey of reactivities of

reagents toward a number of substrates. In Chapter 11, Farnham describes the reactions of anionic-activated tetracoordinate organosilyl ethers with fluorinated alkenes to give fluorinated vinyl ethers. Similarly activated organosilyl perfluoroalkanes transfer perfluoroalkyl groups to a number of electrophilic acceptors.

In chapter 12, Shteingarts discusses the facile reaction of perfluorinated aromatic rings with a variety of electrophiles that lead to *ipso* substitution. The novel chemistry that can arise from this process is reviewed, including many interesting transformations of the dearomatized polyfluorinated rings that often are produced. In the next chapter, Takenaka and Lemal discuss the synthesis and chemistry of the perfluorobenzene oxide-perfluorooxepin system. This work is an impressive demonstration that persistence combined with skillful applications of imaginative chemistry often is required to overcome surprises inherent in organofluorine chemistry. In chapter 14, Krespan and Dixon discuss chemistry of perhalodioxins and perhalohydrodioxins, particularly the high reactivity toward oxy radicals, and mechanistic interpretations thereof. In chapter 15, Welch, Yamazaki, and Gimi first review the Claisen rearrangement and variations and then discuss development of enantioselective fluoroacetamide acetal rearrangements based on C_2 -symmetrical *N,O*-ketene acetals. Procedures and mechanisms are discussed. Chambers discusses synthesis and subsequent transformations of mono-unsaturated products of fluoride-induced oligomerization of highly fluorinated alkenes. Examples include the preparation and further transformations of novel fluorinated dienes, including synthesis of previously difficultly accessible heterocycles. In the last chapter, Baum reviews the synthesis and reactions of fluorinated condensation monomers.

Illustrations are clear and references are plentiful. Much valuable material is contained in this book and chemists from many disciplines will find it useful, and enjoyable, to read.

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