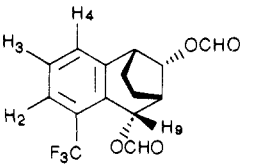
relatively lipid soluble compounds, the depletion of C_{out} was at most 2-fold.

Gary L. Grunewald,* Kimberly M. Markovich, and Daniel J. Sall: Binding Orientation of Amphetamine and Norfenfluramine Analogues in the Benzonorbornene and Benzobicyclo[3.2.1]octane Ring Systems at the Active Site of Phenylethanolamine *N*-Methyltransferase (PNMT).

Page 2191. In structures **41–44** and **51–55**, the stereochemistry of the oxygenated function at the benzylic position is incorrectly drawn. In all cases the stereochemistry should be represented with a dashed (rather than solid) line. For example, compound **41** should be as drawn below.



41

Book Reviews

Hetero Diels–Alder Methodology in Organic Synthesis. Organic Chemistry, a Series of Monographs, Volume 47. Dale L. Boger and Steven N. Weinreb. Series Editor: Harry H. Wasserman. Academic Press Inc., Harcourt Brace Jovanovich, San Diego. 1987. x + 366 pp. 16 × 23 cm. ISBN 0-12-110860-0. $89.00.

The hetero Diels–Alder reaction has, in recent years, become firmly established as a strategy for the construction of complex natural products. The present volume is an important addition to this excellent series of monographs on organic chemistry and is written by two of the foremost advocates of this synthetic methodology.

The book is divided into 10 chapters, the first six of which deal with the use of various types of heterodienophiles. The remaining four chapters are concerned with the reactions of several classes of heterodienes. Throughout the work the emphasis is upon the practical significance of the hetero Diels–Alder reaction though in many cases this is of necessity due to the paucity of existing mechanistic information.

Many of the examples cited in this work are presented in tabular form, which includes such information as reaction conditions and yields as well as references to the original literature. This layout makes the book an ideal reference for the practicing chemist since it allows a rapid preliminary assessment of the value of the methodology for their own particular needs. The text is well supported by over 1000 references covering the literature through 1986.

This work succeeds well in its major aim of drawing the attention of organic chemists to the power of the hetero Diels–Alder reaction for stereoselective synthesis. It should, however, also suggest areas of fruitful research for the mechanistic organic chemist. The book should be included in the library of all academic and industrial institutions where synthetic organic chemistry is an integral endeavor.

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Chemical Research Faculties. An International Directory, 2nd Edition. Coordinated by Meg Marshall. American Chemical Society, Washington, D.C. 1988. xlvii + 689 pp. ISBN 0-8412-1017-9. $159.95.

This is the second edition of *Chemical Research Faculties*. The first edition (1984) derived from a need within the scientific community for current information about chemical colleagues throughout the world. The present edition details descriptions of areas of specialization and research conducted in 107 countries; it complements similar information on university faculties in the United States and Canada which is contained in the *ACS Directory of Graduate Research 1987*. This compilation derives from data collection initiated in December 1986 in which representatives from 149 countries were contacted. Listings are included for more than 11 500 individual faculty members, their field of interest, and their current research. *Chemical Research Faculties* also provides information on 72 chemical societies, including addresses, principal officers, publications, structures, and membership enrollments. The first 558 pages list faculties of various departments of chemistry in the countries included. The next 23 pages list corresponding chemical engineering societies. This is followed by 99 pages devoted to an Index of Research Subjects, and seven pages that present an Index of Institutions.

The book is one which provides invaluable information that should be available in all libraries, academic institutions, chemically oriented businesses, and chemical societies. The objective of the American Chemical Society in compiling this volume, i.e., to foster international communication to increase and improve scientific developments serving humanity, has been admirably achieved.

Staff

Neuromethods. 9. Neuronal Microenvironment. Edited by Alan A. Boulton, Glen B. Baker, and Wolfgang Walz. Humana Press, Clifton, NJ. 1988. xxvi + 732 pp. ISBN 0-89603-15-2. $94.50.

This latest volume in the *Neuromethods* series is directed toward a relatively new area of neuroscience, the neuronal microenvironment. It is based on the observation that 20% of the brain volume is extracellular space and is a functional compartment in itself. By virtue of its changes in electrolyte composition and volume it influences neuronal excitability and, indeed, many pathological processes. For example, stroke, eschemia, anoxia, and epilepsy involve dramatic changes in these factors. The 14 chapters in the book clearly describe information on the topic and latest techniques in ultrastructural and extracellular space, computer tomography and NMR, energy metabolism, ion and water shifts, ion-selective microelectrodes, voltammetric microsensors, brain slice preparations, cell cultures, techniques for assessing pathways and fluid dynamics in the blood–brain barrier and cerebral spinal fluid choroid plexus, cerebral spinal fluid system, arachnoid membrane, fluid compartment analysis, metabolic activity, patch clamp methods, acid–base balance, and calcium, magnesium, and hydrogen ion concentrations.

This is the first book dedicated to methodological approach for the study of the "neuronal microenvironment". It will serve as an important source of information to neuroscientists planning to initiate research in this promising, new, and rapidly developing area.

Staff

NMR Shift Reagents. By Thomas J. Wenzel. CRC Press, Boca Raton, FL. 1987. 286 pp. 18 × 26 cm. ISBN 0-8493-5298-3. $134.00.

Lanthanide shift reagents (LSR) were first introduced in 1969 and quickly gained popularity in the early and mid-1970s. The phrase, "poor man's high field spectra", was coined for LSR spectra obtained at low fields. While the use of these and other similar reagents do provide greater spectral dispersion, the concomitant line broadening that is inevitably associated with the use of these reagents partially offsets the gains in spectral dispersion. Further, sample contamination and the possibility of chemical reactions with the carbonyl groups are additional reasons for being wary of their use.

It is now 19 years after the introduction of LSR, and "high" field spectrometers are routine. In 1969, 4.7T was considered "high". Presently 4.7T is considered "low", 5.9–7.1T "medium" and 9.4–14.1T is "high". Hence, the usefulness of shift reagents has gradually diminished as higher fields became more accessible. This trend will continue. In addition, the explosive development of two-dimensional (2D), 3D, and multidimensional techniques have provided such a unique and informative class of "spectral dispersions" that the continued decline of the use of shift reagents is unavoidable.

There is, however, one unique area in which LSR will continue to make an important contribution. This is in the study of enantiomers through the use of chiral reagents. Combined with higher fields and current 2D techniques, LSR can play an important role in unraveling the structure of enantiomers.

This book is a very thorough and complete compendium of the use of LSR for studying a wide range of compounds. After a very brief introduction in Chapter 1, the achiral reagents are covered in a lengthy Chapter 2. This chapter is appropriately divided according to functional groups. Chiral reagents are covered in Chapter 3, and binuclear reagents in Chapter 4. The "theory" is discussed in Chapter 5, which is far too short, and water-soluble reagents are treated in a final Chapter 6.

The book notably lacks in discussions of how, where, why, and when to use LSR. Instead, it is peppered with phrases such as "... has been described", "... has been reported", "... have been assigned", etc., each followed by numerous references to which the interested researcher must turn to understand the rationale behind the use of LSR in these experiments.

The most useful feature of this book is the wonderfully complete and extensive list of 1534 references that occupy the last 63 pages. It would be a valuable addition to the reference library of anyone working in this field.

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Xenobiosis. Food, drugs and poisons in the human body. Adrien Albert. Chapman and Hall, London, New York. 1987. x + 367 pp. 15.5 × 23 cm. ISBN 0-412-28810-9. $35.00.

One does not often find a book writen by a master that covers authentically virtually every aspect of the author's subject. Professor Albert has expanded and amended his previous classical volume on selective toxicity in the present book that mirrors his comprehensive view of chemical pharmacology and his erudition as a pioneer in the field. Equipped with a Ph.D. and an M.D. degree and with a historical memory of almost 8 decades, Albert looks at poisons and iatrogens from a global perspective. How many of us think of overeating as poisoning our system, although we should remember Paracelsus' statement "that it is all a matter of the dose".

The book is a synopsis of a lecture course the author gave at the National Australian University. It begins by teaching the biochemistry of intermediary metabolism, of carbohydrates, lipids and proteins. Too much or too little of these food constituents may lead to serious diseases, just as overdoses of drugs can cause iatrogenic disturbances. This follows mention of overdoses of vitamins A and D, menadione, K^+ and Na^+ (effects of hypertension), Fe^{2+}, Se, I^-, the excesses or lack of these ions; deficiency diets cause well-known diseases. Examples are drawn from common foods. Potatoes contain 150 identified substances many of which are toxic but only in unusually high doses as when the glycoalkaloids increase through sprouting, bruising, or greening. Pineapple contains 59 volatile aliphatic compounds, among them 19 hydrolyzable methyl esters which can give rise to methanol toxicity if ingested in large amounts. In coffee are found 500 compounds of undetermined toxicity, and spinach and other N_2-accumulating plants produce KNO_3, which is toxic to infants. Many microbes elaborate toxic lectins, peptides, and goitrogens; chickpeas cause paralysing lathyrism through their β-*N*-oxalyl-L-α,β-diaminopropionate, which inhibits the binding of glutamate to its receptor. Then there are cyanogenic compounds such as amygdalin which renders laetrile poisonous, although CN^- is needed in erythrocyte metabolism. All this councels for moderation; just think of lima beans, which contain a toxin, linamarin, and tri- and tetrasaccharides that can be attacked by anaerobic conditions in the colon and liberate HCN. In the colon, also, bacteria cause the release of methane and hydrogen that leads to intestinal cramps. In the Pacific, puffer fish is widely used as a seafood, but if not properly prepared bares its tetrodotoxin. In the Gulf of Mexico, red tide poisoning due to dinoflagellates has been common.

After this frightening account of toxic foods which leaves one wondering what to eat, the discussion turns to drugs. Each class is introduced with good historical accounts, often with rarely recorded insights. The fate of drugs in the body through absorption, distribution, metabolism, storage, receptor interaction, and drug activation provides a handy overview of drug pharmacology. Then follows a brief classification of drugs according to their site of action, structure, and physical properties. The latter overemphasize the author's own experience with acridines, but obviously one man cannot know every corner of such a vast field. Molecular modification to decrease toxicity based on bioisosterism is not mentioned.

Outright poisons join the toxic foods and drugs in the third part of the book. The role of As in the composer Tschaikovsky's suicide, of HCN in Nazi extermination camps, of hemlock extracts as executing agents in ancient Greece, and of narcotics in euthanasia form such experiences. Children often poison themselves by taking accidental overdoses from medicine cabinets; there is poisoning in the work place and the release of poisons by industrial disasters; rats are poisoned by anticoagulants. All these processes are based on principles of toxicology, mostly studied in mice. But toxic components of drinking water have extensive sequels in human medicine and in politics and economics.

The final chapters are devoted to discussions of carcinogens and CNS drugs of abuse which must be regarded as poisons. The reader will get something of interest in each chapter and enjoy the fluent, lucid style of the presentation. This is a thoroughly readable book for the professional biochemist, pharmacologist, medicinal chemist, medical student, toxicologist, and even the educated layman.

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Books of Interest

Toxicology. A Primer on Toxicology Principles and Applications. Michael A. Kamrin. Lewis Publishers, MI. 1988. xiii + 145 pp. 15.5 × 20.5 cm. ISBN 0-87371-133-5. $27.50.

Human Aging Research. Barbara Kent and Robert N. Butler. Raven Press, New York. 1988. x + 372 pp. 15 × 23.5 cm. ISBN 0-88167-372-2. $86.50.

Frontiers In Neuroendocrinology. Volume 10. Luciano Martini and William F. Ganong. Raven Press, New York. 1988. xii + 343 pp. 16 × 24 cm. ISBN 0-88167-379-X. $120.00.

Phenol Oxidase (EC 1.14.18.1). A Marker Enzyme for Defense Cells, Progress in Histochemistry and Cytochemistry, Vol. 7, No. 3. H. Schmidt, VCH Publishers, New York. 1988. 194 pp. 17 × 24 cm. ISBN 0-89574-256-X. $86.75.

The Management of Headache. F. Clifford Rose. Raven Press, New York. 1987. x + 182 pp. 16 × 24 cm. ISBN 0-88167-246-7. $19.50.

The International Pharmacopoeia. Volume 3, Quality Specifications. World Health Organization, Geneva, Switzerland. 1988. 407 pp. 16 × 24 cm. ISBN 92-4-154152-0. $38.40.

Organometallic Chemistry. Volume 16. E. W. Abell and F. G. A. Stone. Royal Society of Chemistry, London. 1987. xviii + 525 pp. 14.5 × 22 cm. ISBN 0-85186-641-7. $236.00.

Physiological Models in Microbiology. Vol. I and II. Michael J. Bazin and James I. Prosser. CRC Press, Boca Raton, FL. 1988. 139 pp (Vol. I), 149 pp (Vol. II). 18 × 26 cm. ISBN 0-8493-5953-8 (set). $92.50 each book.

Selective Toxicity. Seventh Edition. Adrien Albert, Chapman and Hall, New York. 1985. xii + 750 pp. 15.5 × 23 cm. ISBN 0-412-26020-4. $34.95 (paper).

The Biochemistry of the Nucleic Acids. Tenth Edition. Roger L. P. Adams and John T. Knowler. Chapman and Hall, New York. 1986. xviii + 526 pp. 19 × 24.5 cm. ISBN 0-412-27280-6. $33.00 (paper).

Molecular Photodissociation Dynamics Advances in Gas-Phase Photochemistry and Kinetics. M. N. R. Ashford and J. E. Baggott. Royal Society of Chemistry, London. 1987. xiii + 243 pp. 15.5 × 24 cm. ISBN 0-85186-373-6. $117.00.

Introduction to Drug Metabolism. G. Gordon and Paul Skett. Chapman and Hall, New York. 1986. xii + 293 pp. 15.5 × 23.5 cm. ISBN 0-412-26400-5. $29.95 (paper).

Problems in Chemistry. Henry O. Daley, Jr. and Robert F. O'Malley. Marcel Dekker, New York. 1988. xvii + 476 pp. 16 × 23.5 cm. ISBN 0-8247-7826-X. $39.50.