Book Reviews

Macrocyclic Synthesis: A Practical Approach. Edited by David Parker (University of Durham). Oxford University Press: New York, 1966. xii + 252 pp. $90.00. ISBN 0-19-855841-4.

This is the second volume of the *Practical Approach in Chemistry* series edited by L. M. H. Harwood and J. C. Moody. This series aims to provide detailed and accessible laboratory guides which are suitable for researchers not necessarily familiar with the area in question. *Macrocyclic Synthesis: A Practical Approach* is the first practical guide to the synthesis of selected classes of macrocycles. The book consists of nine chapters; they are the following: 1. Aza crowns; 2. Aza-oxa crowns; 3. Thia, oxa-thia and aza-thia crowns; 4. Crown ethers; 5. Cryptands; 6. Torands; 7. Calixarenes; 8. Spherands, hemispherands and calixspherands; and 9. Transition metal-templated formation of [2]-catenanes and [2]-rotaxanes. In a short text such as this, it is not possible to cover the enormous range and varied structural types of macrocyclic ligands now available, and this book makes no pretense to be comprehensive. The first three chapters are contributed by the editor; nevertheless, the book provides a reasonable balance between older, "classical" ligands and some more recently synthesized and more elaborate macrocycles. Despite being a multicontributor book, the quality and uniformity of chapters is unusually high. The majority of references are to material published since 1970, with 1994 being the most recent year covered. Each chapter begins with a brief introduction, followed by experimental protocols consisting of meticulous descriptions of the syntheses, detailed presentations of cautionary notes, and details about equipment employed. When synthetic intermediates are highly air- and moisture-sensitive, the protocols include detailed diagrams of the equipment used for their synthesis and/or purification. There were a few errors noted, all trivial. In summary, this book is a valuable reference work for specialists and nonspecialists alike. It will be a useful addition to institutional and personal libraries given that it is available in both hard and soft covers.

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JA965735B

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CVD of Nonmetals. Edited by William S. Rees, Jr. (Georgia Institute of Technology). VCH: Weinheim, 1996. xvi + 424 pp. DM238.00. ISBN 3-527-29295-0.

As the nonmetal chemical vapor deposition (CVD) technique becomes more attractive to many fast growing industries, such as microelectronics, a good handbook becomes necessary. Often, a computer search is necessary to find pertinent information on a particular material's CVD processes, since the literature is spread throughout journals in many different fields. This book attempts to collect for the growing number of readers the scattered information of many CVD materials. Seven chapters and a number of appendixes deal with superconducting materials, conducting materials, semiconducting materials, insulating materials, structural ceramic coatings, and composites. The style of each chapter is unique, since each was written by a different set of authors. Some focus more on a few materials representative of their category, while other chapters evenly cover most materials in a particular category. As stated in the introduction section, the intent was to provide a handbook for people involved in CVD technology and applications.

The introduction covers most, if not all, of the major CVD techniques, including direct liquid injection (DLI). The introduction is very complete, covering everything from precursor handling to reactor type and kinetics/transport-limited regimes. There is also a very good discussion on precursors and reaction kinetics. The references in this chapter are very current, but there could be a few more. The major shortfall of this chapter is that it either ignores or only briefly mentions ultra high vacuum pumps. Furthermore, it doesn't look ahead for future techniques.

The second chapter's goal is to provide a comprehensive overview of CVD processes to grow superconducting materials, and for the most part, it succeeds. The chapter provides a clear introduction/overview, including a good description of superconducting materials and their uses. A useful history is provided for each major superconductor. A good description of the development of precursors for the desired films is included.

For conductive materials, Chapter 3, the author focuses on nitrides and heavily doped oxides. TiN, arguably the most important nitride in the microelectronic industry, is very well reviewed. Both CVD and OMCVD methods are summarized with respect to growth mechanisms, kinetics, precursors, and film properties, giving readers a complete picture of this particular material. Although some other nitrides, such as tantalum nitride, are mentioned, the category of ternary and quaternary nitrides—prospective materials for future microelectronic devices—was ignored. The portion covering oxides focuses mostly on indium oxide, tin oxide, and zinc oxide. For each, the author summarized precursors, preparation, film properties, and application. All of these oxides are important materials for solar cell applications.

Chapter 4 very briefly reviews the CVD of compound semiconductors. Although it does cover all aspects and materials in this field, there were only 46 references for this extremely active and broad area. One question might be whether this chapter is even necessary, since a separate book deals specifically with this topic, *CVD of Compound Semiconductors*.

CVD of insulating materials and applications to electronic devices is discussed in Chapter 5. General ideas about CVD processes and deposition variables are also addressed. Comparisons of CVD processes for each insulator oxide, nitride, sulfide, and fluoride are well tabulated with significant numbers of references, and the key chemical reactions for each material are also presented.

Chapter 6 addresses the limitations in the use of fiber-reinforced ceramic matrix composites for high-temperature structural application, as well as how these problems might be overcome by CVD and chemical vapor infiltration. This chapter is based primarily on research performed by the author rather than a review of the literature. Practical aspects of fiber growth and property analysis, such as experimental setup, processing details, and analysis of commercialized fibers, are well described, but very little of the underlying science is presented. The references for this chapter are not vast, and most of them are dated.

Properties and CVD preparations of metal compounds (halides, oxides, sulfides, selenides, tellulides, nitrides, carbides, and borides) and complex ceramic materials not mentioned in the previous chapters are described in Chapter 7. Since it covers over 100 compounds in 24 pages, the information provided is very limited. However, 285 references help to compensate for the brief attention given to each compound.

A total of 1361 references are cited, about 40% published between 1991 and 1995. Some chapters' references should be more recent; for example, in Chapters 5 and 6, 40% of the references were published before 1985. In summary, this book covers a vast collection of CVD grown materials, and hence, most compounds are not covered in depth. Needless to say, no such book can cover so broad a range of materials with great depth. Several chapters offer tables listing the electrical properties of the CVD films, physical properties of the precursors, and the growth conditions, which are very useful. With few exceptions, such as titanium nitride, the book is best suited to those seeking an introduction and overview of the CVD process. The book can be used as a reference for the university student or those who use CVD technique and would like to expand their perspective to different materials.

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JA975549L

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Macromolecular Reactions: Peculiarities, Theory, and Experimental Approaches. By Nicolai A. Plate, Arkady D. Litmanovich (Russian Academy of Sciences), and Olga V. Noah (Moscow State University). Wiley: New York, 1995. xi + 438 pp. $148.00. ISBN 0-471-94392-4.

Whereas the reactivity of small organic molecules is dictated by the presence of certain functional groups, macromolecules present a much

richer behavior. As reagents, copolymers are more than the sum of their parts. In addition to functional groups, flexibility and chain topology also affect strongly the reactivity of a macromolecule. This book deals with the latter topic and provides a good overview of a research area bridging organic and physical chemistry of polymers.

The book focuses on macromolecules as special reagents, not on traditional polymer synthesis. It fills a gap in the traditional literature, whereby macromolecules are approached as little different from "normal" (i.e., conformationally rigid) organic reagents. The book deals with the unique reaction pathways allowed by the interrelation between local reactivity and molecular flexibility. These reactions range from the use of polymer catalysts to produce new materials to the action of polymeric drugs and macromolecular stabilizers. The book does not merely catalog reactions. Rather, it puts emphasis on providing a sound physicochemical (mostly kinetic and thermodynamic) basis to rationalize reactivity. This is one of the strengths of this work.

The book is an updated version of the original work by the same authors (Makromolekulyarnye Reaktsii, Khimiya Publishers, Moscow, 1977). Revisions include Chapter 7 (written by I. M. Papisov and A. A. Litmanovich) and sections of Chapter 8 (written by M. P. Filatova and V. G. Zaikin). In addition, there is new material on experimental and theoretical approaches to polymer reactions in the bulk. The book covers relevant literature up to 1993, even though it is heavily slanted toward research by authors in the former Soviet Union prior to 1985. Nevertheless, the book is valuable as it provides a critical discussion of an important body of literature not easily accessible to English-speaking authors.

The book is divided into eight chapters. Chapters 1 and 2 give a conceptual introduction to the main differences between reactions involving macromolecules, as opposed to "normal reagents". Chapter 3 discusses the theory of macromolecular kinetics, including an analysis of how the initial monomer units distribute among the products. The experimental characterization of macromolecular kinetic mechanisms is found in Chapter 4. Hydrolysis and halogenation of polymers are discussed in detail, in addition to several miscelaneous reactions. The interplay between stereochemistry and reactivity in a flexible chain is discussed in Chapter 5. The chapter analyzes phenomena such as intrachain catalysis, cyclization, and cross-linking. Interchain effects in polymer blends, melts, and glasses appear in Chapter 6. Chapter 7 expands further this latter topic by discussing interchain reactions, the formation of interpolymer complexes, and the principles of macromolecular recognition. Finally, Chapter 8 presents experimental techniques (1D and 2D NMR and pyrolysis GC/MS) used to characterize the distribution of initial chain fragments among the products of copolymerization. (This chapter could have been better integrated with the rest of the book.)

To keep the book a manageable size, the authors have compromised on the topics included. Therefore, a number of polymer reactions are not dealt with, including polymer degradation, network formation, knotting, and reactions where the chain length is changed. Reactions specific to biomacromolecules are also excluded. The expanding field of computer simulations for studying polymer stability and reactivity is completely left out.

Despite these omissions, and a somewhat uneven coverage of the literature, the book succeeds in its goal. It provides a clearly written exposition to the field, and its original standpoint will be appealing to a wide range of polymer chemists and physical chemists. The book could easily be included as part of standard graduate courses in modern polymer chemistry.

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JA955303L

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Second Supplements to the 2nd Edition of Rodd's Chemistry of Carbon Compounds. Volume III: Aromatic Compounds. Edited by M. Sainsbury (The University of Bath). Elsevier: Amsterdam, 1996. xx + 524 pp. $350.00. ISBN 0-444-82552-5.

Part D: Monobenzenoid and Phenolic Aralkyl Compounds, their Derivatives and Oxidation Products; Depsides, Tannins, Lignans and Humic Acid. Part E: Monobenzenoid Compounds with Unsaturated or Polyhydroxylated Side-chains, their Derivatives and Oxidation Products. PART F Polybenzenoid Compounds; Hydrocarbon Ring Assemblies, Polyphenyl-substituted Aliphatic Compounds.

Chapter 13. Aralkanols and Aralkylamines by N. H. P. Smith.

Chapter 14. Monocarbaldehydes and Monoketones of the Benzene Series by M. Tanaka and Y. Souma.

Chapter 15. Phenolic Aralkylamines, Monohydric Alcohols, Monocarbaldehydes, Monoketones and Monocarboxylic Acids by W. S. Murphy and B. Sarsam.

Chapter 16. Depsides, Hydrolysable Tannins, Lignans and Humic Acids by W. S. Murphy and B. Sarsam.

Chapter 17. Dihydric and Polyhydric Aralkanols and their Oxidation Products with Functional Groups in Separate Side Chains by J. Charalambous and E. G. Evagorou.

Chapter 18. Dihydric and Polyhydric Aralkanols and their Oxidation Products by H.-F. Chow.

Chapter 19. Benzene Derivatives with One or More Unsaturated Side Chains by K. J. Hale.

Chapter 20. Aryl Benzenes and their derivatives by J. A. H. Macbride.

Chapter 21. Di-, Tri- and Tetra-phenylmethanes, their Derivatives and Oxidation Products by J. D. Hepworth and S. G. R. Guinot.

Chapter 22. Diphenyl-alkanes, -alkenes, and alkynes, their Derivatives and Oxidation products by A. Armstrong and R. A. Stockman.

This new volume of *Rodd* continues a major service to organic chemistry, since it collects a very specialized area of aromatic chemistry into a single book. The chapters are uniformly well written and remarkably free from errors, both in the text and in the structures. It is very pleasing to see that the text discusses structures that are usually on the same page, and does so with admirable clarity. It is obvious that a great deal of common sense has gone into producing this series, which serves as a model for other lesser works. While the price of the books makes individual ownership virtually impossible, they should be a standard component of any good organic chemical library.

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JA9755572

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Fundamentals of Inorganic Membrane Science and Technology, Membrane Science and Technology Series, 4. Edited by A. J. Burggraaf (University of Twente) and L. Cot (Ecole Nat. Super. de Chimie). Elsevier: Amsterdam, 1996. xvii + 690 pp. $390.75. ISBN 0-444-81877-4.

Membrane processes can require less energy and capital investment than many other separation technologies such as distillation, absorption, and extraction. Due to these advantages, the use of polymeric membranes in industrial filtration, water purification, and gas separations has grown dramatically in the past 30 years. New applications of membrane technology for gas and liquid separations will result from new materials providing better selectivity, thermal stability, and chemical stability than existing materials. The investigation of inorganic materials such as porous metal oxides, metals, and dense ionic conducting ceramic as membranes and membrane reactors is a very active interdisciplinary area of research. Two pioneers in the field of inorganic membranes, Prof. Burggraaf of the University of Twente, and Prof. Cot of the Ecole Nationale Superieure de Chemie have edited this book to survey the field of inorganic membrane science and technology. Chapter authors were chosen from many of the most active inorganic membrane researchers in Europe and the United States.

The book provides an excellent, very comprehensive coverage of fabrication, characterization, transport theory, and applications of porous and dense ceramic (metal oxide) membranes. Current industrial applications of inorganic membranes include gas and liquid microfiltration and ultrafiltration. As noted in Chapter 13, industrial application of inorganic membranes have been especially widespread in waste treatment, waste minimization, and food/beverage applications. Research and developmental applications include gas and vapor separations as well as membrane reactors, which integrate chemical reactors and membrane separators. An additional chapter reviews the commercialization prospects for inorganic membrane reactors or membrane assisted reaction engineering based on preliminary process design and economics.

The field of inorganic membranes is strongly interdisciplinary, and the subject of this book will be of interest to analytical chemists, materials chemists, materials scientists, and chemical engineers interested in membrane science and technology. The book is a strong

successor to the 1991 book entitled *Inorganic Membranes* (Van Nostrand Reinhold) by Ramesh. The growth of the field inorganic membranes is also shown by comparing the length of these two books. The current book is nearly 700 pages compared to 300 pages only 5 years ago.

Regrettably, beyond a brief literature survey in Chapter 11, there is no detailed coverage of any aspects of the use of dense metal membranes (Pd and Pd alloys) in separations or reactions. References are cited up to 1995, which is quite current for a book published in 1996. However, many of the chapter authors have chosen to heavily cite conference proceedings from international meetings such as the biannual International Congress on Inorganic Membranes (ICIM). While this improves coverage of the most current research, these may be difficult to obtain in many research libraries.

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JA975556+

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Phytochemistry of Fruit and Vegetables. Edited by F. A. Tomás-Barberán and R. J. Robins. Oxford University Press: New York, 1997. xii + 375 pp. $140.00. ISBN 0-19-857790-7.

Popular interest in the constituents of fruits and vegetables has increased greatly in recent years, owing to the conviction that diet can affect the quality and length of life. This has important consequences for agriculture and the food industry, which must provide nutritious and appetizing food to a growing population. The secondary metabolites of food plants give rise to color, taste, odor, aroma, and occasionally toxicity, and it is in these areas that natural products chemistry has an important role to play.

This book embodies the Proceedings of the International Symposium on Phytochemistry of Fruits and Vegetables, held in Spain in 1995, with some good updating of text and references before publication. The first chapter (Britton and Hornero-Méndez) reviews carotenoid biosynthesis, interconversion, and metabolism, while the second (Brouillard, Figuereido, Elhabiri, and Dangles) reviews the supramolecular influences on color of phenolic compounds, particularly anthocyanins and their molecular complexes. Phenolic compounds play a key role in oxidative mechanisms leading to browning (Amiot, Fleuriet, Cheynier, and Nicolas) and fruit aromas (Crouzet, Sakho, and Chassange), while coumarins in food plants (Zobel) exert a wide variety of physiological effects. The phenomena of aroma are also more broadly reviewed (Sanz, Olias, and Perez). Astringency (is it a taste or a sensation?) is discussed by Clifford.

Plant physiology, genetics, and biochemistry are addressed in chapters on the ACC (ethylene-forming) oxidase gene family (Bouzayen, Ferrer, Guillen, Ayub, Bidonde, Ben Amor, Guis, Ramassamy, Zegzouti, Pech, and Latché), the genetic manipulation of astringent and antinutritional metabolites (Robbins, Bavage, and Morris), and the role of gibberellins in fruit development (García-Martínez and Hedden). Balanced reviews of the possibility that antioxidants from food may protect against coronary heart disease (Leake)—including the beneficent "French paradox"—and of the anticarcinogenic activities of food-derived secondary metabolites (Hertog, van Poppel, and Verhoeven) will be of general interest. Interorganismic relationships in terms of phytoalexins (Mercier) and toxic metabolites (Felix D'Mello) and an ecological overview (Harborne) will also be of interest. Further afield for chemists will be chapters on food processing (Saltveit) and the psychology of food choice (Shepherd).

This book will be of particular importance to food chemists, flavor and fragrance specialists, and those involved in chemical ecology. Academic libraries should also have it to acquaint students with an undoubtedly growing field of activity for organic chemists.

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JA975568V

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Handbook of Capillary Electrophoresis, Second Edition. Edited by James P. Landers (Mayo Clinic Foundation). CRC Press, Inc.: Boca Raton, FL, 1997. 894 pp. $135.00. ISBN 0-8493-2498-X.

This book is a revised and updated version of a book by the same editor and title published in 1994. One might question the necessity of a second edition so soon. However, rapid developments in the field of capillary electrophoresis are documented extensively in this new edition. For example, in the case of common contributors to both editions, the material has been significantly expanded and the number of references in the second edition have doubled or even tripled in most cases compared to the contribution in the first edition. Several new chapters are included which cover topics not incorporated in the earlier edition (e.g., Theory and Practice of Electrochromatography, Use of Capillary Electrophoresis for Binding Studies, Immunoassays, and Enzyme Assays Using Capillary Electrophoresis). Further, several topics which warranted no more than minor mention in the earlier edition (e.g., chiral separations, electrochemical detection) have been promoted to full chapters as the developments continued at a frenetic pace.

The book has three appendices and 30 chapters, which are subdivided into four categories: modes, analyses, applications, and specialized aspects of capillary electrophoresis. One could quibble over the overall organization, but the total content is solid with amazingly little duplication or redundancy despite the number of authors involved. Indeed, there is significant complementarity as topics introduced in one chapter are expanded upon in others (e.g., Chapter 15: Effects of Sample Matrix on Capillary Electrophoresis Analysis and Chapter 16: On-line Sample Preconcentration for Capillary Electrophoresis). As in the earlier edition, the appendices contain sections on important CE equations (with sample calculations), troubleshooting, and a table of general separation conditions for several classes of compounds.

The overall tone of the book, set in the introduction, is that of a handbook and constitutes one of the major strengths of the work. The introduction does a nice job of placing modern CE in the historical context and lays some of the theoretical background while integrating the rest of the book by directing the reader to more complete treatments elsewhere in the book. As in the first edition, many of the chapters have useful, practical tips and representative protocols. For instance, this reviewer found several tips in the introductory chapter which were immediately implemented and solved some long-standing technical difficulties.

The various contributors to this work are active researchers with clear understanding of the advantages, disadvantages, and pitfalls of the various methods covered. Chapters devoted to DNA separation, DNA sequencing, proteins, peptides, carbohydrates, ions, small organic molecules, and drugs highlight both the flexibility of CE as well as its tremendous resolving power. In the earlier edition, most of the chapter devoted to CE analysis of proteins focused on physical properties of proteins. This shortcoming has been addressed. Two chapters, organized according to detection method, are devoted to the analysis of single cells. The chapter on coupling mass spectrometry to CE has been expanded to include a more thorough discussion that may be helpful to CE practitioners less familiar with MS instrumentation. The chapter on optical detection covers both direct and indirect methods and discusses some of the problems inherent in multichannel design. The data analysis chapter makes some interesting points about the limitations of software packages used in CE analysis that are typically adapted from chromatographic applications.

The chapters dealing with new advances in LC-CE, microfabricated devices, continuous Electrophoresis, and strategies for fraction collection or electroosmotic flow control are especially interesting because they reflect the ingenuity that has enabled CE to progress so far so quickly.

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JA975527Z

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Recent Advances and New Horizons in Zeolite Science and Technology. Studies in Surface Science and Catalysis, #102. Edited by H. Chon, S. I. Woo, and S.-E. Park. Elsevier: Amsterdam, 1996. xv + 468 pp. $265.75. ISBN 0 444-82499-5.

This book was written as a reference text for the preconference summer school for the 11th International Zeolite Conference, held in Taejon, Korea, in 1996. The 12 chapters are essentially review articles by recognized experts from the zeolite community who lectured at the school. Overall, the articles are well written and provide an up-to-date review of selected topics in zeolite chemistry. Most of the articles assume considerable knowledge of zeolite chemistry, so that the book is not appropriate as an introductory text.

The range of topics covered in the text is relatively narrow and specialized. The three chapters dealing primarily with synthesis cover mesoporous materials (A. Sayari), octahedral molecular sieves (S. Suib), and attempts to make organic molecular sieves (S. Lee and D. Venkataraman). This leaves out most recent work on more traditional molecular sieves. The three chapters devoted to characterization techniques, including NMR spectroscopy (M. Stöcker), photoelectron spectroscopies (S. Kaliaguine), and other (mainly photoabsorption) spectroscopies (R. F. Howe), cover the field more completely, but a discussion of diffractional methods is notably absent, as are calorimetric and thermal analysis techniques. Two chapters are devoted to incorporation of clusters (K. Seff) and conducting polymers (T. Bein) in zeolite cavities. While only one chapter reviews calculational techniques (J. M. Newsam), this chapter is quite comprehesive. Three chapters are devoted primarily to applications of zeolites: two chapters on catalytic applications in petrochemicals (C. T. O'Connor, E. Van Steen, and M. E. Dry) and in the synthesis of fine chemicals and intermediates (S. Feast and J. A. Lercher), and one chapter on zeolite membranes (M. J. den Exter, J. C. Jansen, J. van de Graaf, F. Kapteijn, and H. van Bekkum). Other major applications of zeolites, including adsorption−separation and ion-exchange applications, are described only in passing.

In summary, the book includes a number of excellent review articles, but is rather limited in scope. It is not as comprehensive or complete as the text used in the preconference school for the 10th IZC Meeting (*Studies in Surface Science and Catalysis. Volume 85. Advanced Zeolite Science-and Applications*. Jansen, J. C., Stöcker, M., Karge, H. G., Weitkamp, J., Eds.; Elsevier: Amsterdam, 1994).

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JA9657667

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Data Analysis for Chemists: Applications for QSAR and Chemical Product Design. By David Livingstone (University of Portsmouth). Oxford University Press: New York, 1996. xvi + 239 pp. $70.00. ISBN 0-19-855728-0.

This book provides a thorough introduction to multivariate statistics, applied primarily to drug design. As stated in the book's preface, the book is not a statistics textbook, but rather is meant as a statistical companion to the novice or casual user. In that role, the book succeeds.

The book begins with an excellent discussion of experimental design applied to drug design. An extensive discussion is given for methods for selection of compounds for training sets useful for quantitative structure−activity relationships (QSAR). Next strategies for data treatment and display are discussed. In these early chapters it is already clear that the book's audience will be limited to those directly involved in QSAR as opposed to a general chemistry audience.

The remainder of the book discusses a variety of methods for data analysis including factor analysis, cluster analysis, regression (linear, nonlinear, and multiple), supervised learning methods , spectral map analysis, expert systems, and neural networks. In each section examples from the QSAR literature are treated extensively.

This reviewer found the book extremely clearly written. The theoretical descriptions are amply illustrated with examples, and the book flows nicely from topic to topic. This, coupled with its short length (just over 200 pages), argues for its purchase by every student or researcher with an interest in quantitative structure activity relationships.

There are two areas in which the book fails, though both are recognized by the author in the preface. The first is that only introductory material is included. When combined with the clarity of presentation, this fact might mislead readers into believing that "real world" QSAR will fit exactly into the discussed methods. The second larger problem with the book is its narrow chemical scope. While it treats many statistical methods, it does so almost entirely in the context of drug design. A person looking for a general introduction to data analysis for chemists would not find it here. On the other hand, a person specifically seeking introductory information on drug design and/or QSAR could not find a clearer presentation than this.

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JA9656762

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The Chemistry of Mind-Altering Drugs: History, Pharmacology, and Cultural Context. By Daniel M. Perrine (Loyola College). American Chemical Society: Washington, DC, 1996. x + 480 pp. $39.95. ISBN 0-8412-3253-9.

Mind-altering substances have captivated human beings through the ages and have certainly been in the forefront of local, national, and international politics for more than a century. This fascination has stirred the imagination of writers, physicians, and scientists through the ages. Because this subject holds the interest of such a disparate group of individuals, it is no easy task to write a book on this subject that would appeal to a diverse audience. Perrine has made a serious attempt to write such a book, apparently evolving from a college course on this topic.

The book begins with a catchall introductory chapter that gives a broad overview of drug use in American society, what is meant by addiction, dependence, and abuse, the principles of neurotransmission in the context of drugs affecting the process, and many aspects of drug pharmacology and development. Subsequent chapters address specific classes of drugs: opioids, depressants, stimulants, antipsychotics and antidepressants, psychedelics, and dissociatives—the latter includes cannabinoids. There are also four appendices (totaling more than 60 pages) that introduce the fundamentals of chemical bonding, structure, nomenclature, functional groups, and chirality, for those who need a refresher course in the basics of organic chemistry.

Each chapter provides a source of anecdotes and passages from many writers (*e.g.*, William Burroughs) that record personal accounts of their experiences with mind-altering drugs. Many of these selections offer a very vivid description of each writer's experience and illustrate very nicely the mind-altering actions of a particular drug. There are numerous descriptions of organic syntheses that are often sketchy, and peppered with jargon, which most of us who are not synthetic chemists would probably skip over anyway. The chemical structures for most drugs are assigned numbers in each chapter, and many synthetic pathways are shown, with descriptions in the text. The material is well researched with numerous references and notes in each chapter.

The pharmacology is brief, usually with one or two paragraph descriptions, if at all. The lipid−aqueous partition of many of these drugs in the body is presented in a very lucid manner, although discussions of their mechanisms of action and metabolic breakdown is minimal. I found relatively few errors in the book, most of them in the introductory chapter. The etiologies of many drug names are nicely described, although a few unfamiliar abbreviations (*e.g.*, 2C-D, DOB) were overlooked.

The book is very readable and chocked with information for a general scientific audience or science students, providing rich descriptions of the psychological and behavioral effects of the mind-altering drugs. Although brief on the chemistry and pharmacology, it whets the appetite of budding young scientists for further exploration in any of the many aspects of drug chemistry and its related fields and is a treasure-trove of the historical and cultural aspects of drugs for the more advanced professionals or those looking for enjoyment.

Glen D. Lawrence, *Long Island University*

JA975550K

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