Book Reviews*

Activation and Functionalization of Alkanes. Edited by Craig L. Hill (Emory University). John Wiley & Sons: New York. 1989. xi + 372 pp. $49.95. ISBN 0-471-60016-4.

Alkanes are our most abundant organic resource. It seems natural that their functionalization has received a great deal of attention, though surprisingly most of it has been quite recent. In the preface of this book, the editor notes that in 1980 there were only a handful of papers that addressed new alkane activation systems while now there are on the order of 10^3 such publications. This is surely a modest estimate as the 800 or so references in this book comprise a well-selected and representative sample (almost all are indeed post-1980) but only a small fraction of the total literature. Though the activation of C–H bonds has been approached from within a number of chemical disciplines—including heterogeneous, gas-phase, organometallic, bioinorganic, classical coordination, and superacid chemistry—for the most part the individual approaches have not been interdisciplinary. Owing to the rapid pace of developments and the normally sluggish communication between these subdisciplines, few chemists—even among those strongly involved in alkane activation—possess a bird's eye view of the state of the art. This monograph goes a long way toward meeting the challenge of providing that view.

The book is made up of ten chapters from seventeen contributors. Chapter 2 (Olah et al.) focuses on the superacid chemistry of alkanes, largely from the authors' laboratories. Chapters 3–5 provide thorough coverage of the organometallic C–H bond activation of low-valent transition-metal (Crabtree, Jones) and high-valent d- and f-block (Rothwell) systems. Chapters 6–8 (Mansuy and Battioni, Suslick, and Hill) are concerned with cytochrome P-450 and its model (oxometal or "activated oxygen") systems. Chapter 9 (Barton and Ozbalik) is about the unusual "Gif"/"Gif-Orsay" systems (iron source/carboxylic acid/pyridine/oxygen/reducing agent). The final chapter (Tolman et al.) is a fascinating account of diverse studies at Dupont concerning selective partial alkane oxidation. All these chapters are written by leaders in their fields and they are, as would be expected, quite insightful and thorough. They are also mostly concise, well-organized, and well written; this and a fairly uniform presentation style certainly indicate a very positive editorial contribution. A 12-page index is impressively thorough for a volume of this type.

If this book has any shortcomings, the most significant one is that the scope is intentionally more limited than implied by the title. In particular heterogeneous systems are neglected except where directly related to the homogeneous systems under discussion. While it may be difficult to integrate heterogeneous chemistry with the mostly better understood homogeneous systems, one chapter dedicated to that area might have been quite valuable. A second criticism could be the lack of a single "overview" chapter. In addition to a valuable preface, there is an introductory chapter entitled Historical Evolution of Homogeneous Alkane Activation Systems. It is an excellent description of work by the author (Shilov) and other Soviet workers, plus a review of the chemistry of cytochrome P-450 and models. It is well worth reading but does not really offer an overview; for that one must peruse the entire book—a pleasant chore indeed.

There is probably not a worker in this field who could not significantly benefit from reading this monograph. Furthermore, the high scientific and stylistic quality provides a book which can be enthusiastically recommended to anyone who is even considering entry into this challenging field.

Alan S. Goldman, *Rutgers, The State University of New Jersey*

Mass Spectrometry of Biological Materials. Edited by C. N. McEwen and B. S. Larsen. Marcel Dekker, Inc.: New York. 1990. xiii + 515 pp. $125.00. ISBN 0-8247-8182-1.

This book is Volume 8 in the series *Practical Spectroscopy*. It consists of 6 chapters on the mass spectrometry of proteins and 9 chapters on the mass spectrometry of other selected biological materials. Each chapter has an average of 25 recent references. Individual chapters are written by one or more experts in a particular field. There is the unavoidable overlap and repetition among the chapters.

The volume is intended to provide fundamental information on solving structures of biologically active molecules by mass spectrometry. As such, the book is very informative. The text is supported by many examples of structure elucidations, illustrated with typical fragmentation patterns and mass spectra. The contributing authors have succeeded in presenting an instructional manual rather than a series of review articles.

The protein section provides an overview of the analysis of proteins and peptides by GC/MS, FAB/MS, and MS/MS strategies. Protein isolation and purification by methods other than MS is dealt with in some detail first. Subsequently, specific topics on mass spectral applications are presented. These include analysis of posttranslationally modified proteins, natural and recombinant proteins, and glycoproteins. The FAB method for peptides, C-terminal analysis, S–S bridge assignment, and protein sequence analysis by tandem mass spectrometry are discussed in detail.

The "other biological materials" section has chapters on mass spectral analyses of lipids, sterols, bile acids, pesticide metabolites, and porphyrin photosensitizers. Some relatively recent methods of analysis for these non-volatile substances such as derivatization, GC/MS, LC/MS, FAB, isotope dilution, and thermal ionization are included.

For those interested in applying mass spectrometry to the structure elucidation of biological materials, especially proteins and peptides, this volume provides a good introduction. Each chapter has an average of 25 recent references enabling the reader to obtain a more detailed view of a particular topic and possibly suggesting development of newer techniques.

Ulrich Hollstein, *University of New Mexico*

Biomedical Applications of Mass Spectrometry. Edited by C. H. Suelter and J. T. Watson. John Wiley & Sons: New York. 1990. xiii + 396 pp. $45.00. ISBN 0471-61303-7.

This book is Volume 34 in the series *Methods of Biochemical Analysis*. Starting in 1954, the series deals with well-established biochemical methods, techniques, and instrumentation. The format of this and later volumes is changed. From Volume 34 on, each volume will focus on a specific method or the application of a variety of methods to solve a specific biological/biomedical problem.

Volume 34 focuses on mass spectrometry. Each of its five chapters is prepared by an authority in the field. The first chapter gives an overview of basic mass spectrometry, including recent advances. It covers various ionization methods, types of mass analyzers, detectors and data systems, vacuum systems, and inlet systems. Basic interpretation tools, including fragmentation patterns and computerized aids, are discussed and illustrated with examples. The chapter ends with special techniques such as CI, negative ion MS, desorptive ionization, and Tandem MS. All 89 pages of Chapter 1 are equivalent to a condensed textbook on mass spectrometry.

The second chapter is a thorough discussion of the analysis of various classes of carbohydrates by mass spectrometry and GC/MS. It covers the analytical strategies, quantitative and qualitative analysis, linkage analysis using permethylated derivatives, determination of anomeric configuration, and sequence analysis of oligosaccharides by FAB-MS.

The third chapter covers peptide sequencing. After a general discussion of protein isolation and purification, cleavage into smaller fragments, separation, and traditional techniques for sequencing, special considerations for mass spectrometry are introduced. Mass spectrometry of volatile derivates by electron impact (EI) and chemical ionization (CI) is followed by a description of desorption ionization techniques, such as desorption chemical ionization (DCI), field desorption (FD), plasma desorption (PDMS), laser desorption (LD), secondary ion mass spectrometry (SIMS), and fast atom bombardment (FAB). There is a brief explanation of on-line HPLC techniques. The chapter ends with a section on spectral interpretation strategies, including preferred fragmentation patterns and computer aids to interpretation.

The topic of the fourth chapter is nucleic acid components. This chapter starts with the hydrolysis of tRNA and DNA and the isolation and derivatization of components which is necessary to render the components less polar and to allow them to pass through capillary GC columns. Electron impact (EI) fragmentation of nucleosides and nucleotides is then interpreted and strategies are given for structure elucidation. Chemical ionization (CI) methods are covered in fair detail, followed by desorption methods of ionization, such as FAB, ^{252}Cf plasma desorption, field desorption (FD), secondary ion mass spectrometry (SIMS), and laser desorption (LD). The chapter ends with liquid chromatography mass spectrometric (LC/MS) techniques.

The fourth chapter is on mass spectrometry in pharmacology. The first few sections deal with qualitative and quantitative analysis of metabolites. Special emphasis is placed on the techniques GC/MS,

* Unsigned book reviews are by the Book Review Editor.

HPLC/MS, TLC/MS, MS/MS, and FAB/MS. The following studies are described in detail: stereoselective metabolism, isotope effects in drug metabolism, metabolic pathways, drug metabolism by measuring CO_2 in breath, pharmacokinetic and bioavailability studies. A final section is devoted to clinical and forensic toxicology as well as to drugs affecting performance. These include testing for illicit drugs in athletes and racehorses, LSD in urine, and morphine in hair and emergency applications for detection of drug overdoses and neurotoxic impurity in a synthetic narcotic.

This excellent volume should be on the shelf of any biochemist, expert or novice, interested in the mass spectrometric structure elucidation or detection of non-volatile biological materials that are of medical importance. Each chapter is followed by a wealth of references from the 1980's. There is an author index, a subject index, and cumulative author and subject indexes for Volumes 1–34 of the *Methods of Biochemical Analysis* series.

Ulrich Hollstein, *University of New Mexico*

Multidimensional Chromatography: Techniques and Applications. Chromatographic Science Series/50. Edited by Hernan J. Cortes (The Dow Chemical Company). Marcel Dekker: New York and Basel. 1990. viii + 378 pp. $99.95. ISBN 0-8247-8136-8.

Multidimensional (MD) chromatography involves applying at least two separation steps to a sample, with the requirement that each step utilize a different mechanism. On this basis a wide array of separation possibilities unfolds, and most of the important ones are covered in this book. The text consists of ten chapters. Following an introductory theoretical chapter, multidimensional thin layer, gas, supercritical fluid, and liquid chromatography are covered in six chapters; two others cover the coupling of liquid with gas chromatography and supercritical fluid extraction with supercritical fluid chromatography; and the last chapter speaks to some concerns of automating coupled columns. As with most edited works, the writing styles are somewhat uneven, although I found all chapters readable and most quite well written. There is some redundancy in that nearly all authors felt compelled to define multidimensional chromatography. Generally, however, the material fits together rather well. As is true of most works of this type, much of the material is out of date when the book is published. Most of the literature references are pre-1987, but for the most part this is not a serious concern for an introductory work. The book is meant to provide a general theoretical background for multidimensional methods as well as discussion and examples from the main areas of chromatography. I believe it fulfills this goal quite well.

The first chapter, by Calvin Giddings, gives a clear explanation of the theoretical underpinnings of multidimensional chromatography and puts the technique on a more predictable, less "Edisonian", level. He shows why it is so much more powerful than the unidimensional approach. Both planar and column multidimensional systems are treated. This chapter forms a solid base for the more qualitative and applied material which follows. The second chapter, by Colin and Salwa Poole, compares unidimensional multidevelopment TLC with the two-dimensional variety and suggests methods for obtaining the required different mechanisms for the 2-D approach. The problems with detection and automation of multidimensional planar methods are also discussed rather thoroughly. Although much of the material in Chapter 3 on MDGC is rather dated, the advantages of chromatographic "heart cutting" are well illustrated by Wolfgang Bertsch. The next chapter on selectivity tuning in GC at first glance seems out of place in this book, but it becomes obvious that tuning of the stationary-phase polarity makes multidimensional coupled-column GC just that much more powerful. Chapter 5 on process MDGC is the weakest chapter in the book. The authors seem to bounce back and forth between process-specific techniques and a rehash of general MDGC. The next two chapters, on MDHPLC and HPLC-GC, form a solid pair. Hernan Cortes and David Rothman present many good examples of coupled HPLC and then Cortes, in a long chapter, discusses on-line LC-GC, interfacing methods, and trends in LC microcolumns for coupling to capillary GC. Chapter 8 describes some advantages of SFC-SFC over LC-LC, namely the ability to use the flame ionization detector and the possibility of using supercritical CO_2 for both normal- and reversed-phase stationary phases. The coupling of supercritical fluid extraction techniques to SFC is described in Chapter 9, along with the difficulty of directly making this linkage on-line. Chapter 10, by David Rothman, presents a useful starting point for those considering automating a multidimensional system. The types of computing, valving, and other hardware required are qualitatively discussed. All in all, this book provides a good starting point for the chromatographer who requires better resolution of analytes and is considering a multidimensional approach to obtain that result.

John R. Jezorek, *The University of North Carolina at Greensboro*

Electronic Aspects of Organic Photochemistry. By Josef Michl (The University of Texas at Austin) and Vlasta Bonacic-Koutecky (Freie Universität Berlin). John Wiley and Sons: New York. 1990. xiv + 475 pp. $64.95. ISBN 0-471-89626-8.

It is easy to state what this book is not. This book is not an encyclopedia of organic reactions which you can browse for the particulars of a given reaction. It is not a handbook of light sources, solvents, or quantum yields. The authors, two internationally prominent scholars, state their aims clearly in the preface "While the experimental, synthetic, and mechanistic aspects of organic photochemistry are well covered.... No book has been dedicated to the discussion of its theoretical aspects, that is, to the analysis of the detailed electronic nature of the elementary photochemical reaction steps". The authors have fulfilled these aims admirably and have written a lucid and truly unique book for serious students of the subject.

The first fifty pages (Chapter 1) provide introduction to electronic states, potential energy surfaces, and wave functions. A professional theoretician will probably pass over this material quickly but for an experimentalist like myself it was a very welcome review. In fact this chapter contains information which is not usually treated in quantum chemistry books and material which is scattered in the primary scientific literature. As someone who is both fascinated and influenced by theory I found this particular presentation full of useful nuggets which allowed me to view abstract concepts such as avoided crossings in a new way. For a first year graduate student this chapter is probably incomprehensible. This book should be tackled by a second year graduate student who has had at least a semesters worth of quantum chemistry.

Chapter 2 is an introduction to photophysical and photochemical processes. Similarly it is not meant to be ones first exposure to the subject. Chapter 3 completes "Part A: Background" by describing the location of minima, funnels and barriers on potential energy surfaces. The second section of the book "Part B: Elementary Photochemical Steps" begins with Chapter 4 which is concerned primarily with biradicals and biradicaloid species which are commonly associated with the minima and funnels mentioned previously. This chapter is also enormously valuable to photochemists and nonphotochemists alike interested in the *ground state* behavior of biradical and biradicaloid reactive intermediates.

Chapters 5–7 are concerned with the theoretical analysis of photochemical reactions of long-standing interest such as cis-trans isomerizations, electrocyclic ring openings and ring closings, cycloaddition and cycloreversion reactions, bond dissociation reactions, and atom and ion transfer reactions. The emphasis is on the potential energy surfaces which describe the process and on orbital and state correlation diagrams. You will not be given an exhaustive list of examples of a given reaction, along with yields and reaction conditions. For this information you must turn to a standard text or to a review article.

This book will prove to be invaluable to graduate student and postdoctoral researchers who wish to learn how to choose the correct level of theory to calculate a potential surface for a reaction of interest and how to interpret the results. But I predict that this book will be even more valuable to experimentalists who have no interest in doing their own calculations. Instead it will now be possible to look up a potential surface relevant to ones own application, deduce the pertinent features, and plan structural and environmental modifications to the reaction that will allow it to be better understood and ultimately controlled.

In summary, this is a unique book which is highly recommended to those seriously interested in understanding elementary photochemical processes.

Matthew Platz, *The Ohio State University*

Fluorine-18 Labeling of Radiopharmaceuticals. By Michael R. Kilbourn (University of Michigan Medical Center). National Academy Press: Washington, DC. 1990. xi + 149 pp. Free of charge from The Board on Chemical Sciences and Technology, National Research Council, 2101 Constitution Avenue, N.W., Washington, DC 20418. NAS-NS-3203.

This is a review of the radionuclide fluorine-18 with particular emphasis on its applications in the preparation of radiopharmaceuticals for Positron Emission Tomography (PET). Methods of production of fluorine-18 using charged particle accelerators and nuclear reactors are briefly reviewed. The discussion of organic syntheses with fluorine-18 is broadly separated into two areas: electrophilic (18F) fluorination and nucleophilic (18F) fluorination. In each section, the general synthetic strategies are discussed and illustrated with examples from the literature. Finally, detailed histories of development for five representative clinically used fluorine-18 labeled radiopharmaceuticals are presented. To provide rapid and convenient access to the fluorine-18 radiochemical literature, a table of 300 fluorine-18 compounds and their literature citations is included. There are 38 figures and 408 references.

Reviews of Environmental Contamination and Toxicology. Volume 120. Edited by George W. Ware (University of Arizona, Tucson). Springer-Verlag: New York, Berlin, Heidelberg. 1991. ix + 192 pp. $49.00. ISBN 0-387-97445-8.

This Volume is in a series that continues one originally published as Residue Reviews, Volumes 1–97, 1962–1986. The present volume contains three chapters: Organochlorine Pesticides and Polychlorinated Biphenyls in Human Adipose Tissue, by Frederick W. Kutz, Patricia H. Wood, and David P. Bottimore; Pesticide Residues in Foods Imported into the United States, by John R. Wessel and Norma J. Yess; Selected Trace Elements and the Use of Biomonitors in Subtropical and Tropical Marine Ecosystems, by David J. H. Phillips. Cumulative and Comprehensive Subject-Matter Indexes for Volumes 111–120 are included.

Biomimetic Polymers. Edited by Charles G. Gebelein (Youngstown State University). Plenum Press: New York and London. 1990. viii + 297 pp. $75.00. ISBN 0-306-43708-2.

This book is based on the proceedings of the ACS Symposium on Enzyme Mimetic and Related Polymers held at the Third Chemical Congress of North America, July 5–8, 1988, in Toronto, Canada. It consists of a Preface and 16 papers in typescript form, an index of the contributors, and a subject index. The theme is the creation of synthetic polymers which imitate the activity of natural bioactive polymers such as enzymes, heparin, biological membranes, polypeptides, and nucleic acids.

Gibberellins. Edited by Nobutaka Takahashi (The University of Tokyo), Bernard O. Phinney (UCLA), and Jake MacMillan (University of Bristol). Springer-Verlag: New York, Berlin, Heidelberg. 1991. vii + 426 pp. $89.00. ISBN 0-387-97259-5.

This book is a collection of papers based on proceedings of a symposium held at The University of Tokyo, July 20–23, 1989. It consists of a Preface, list of contributors, 39 papers, an Appendix of structures, and a subject index. The papers are presented in the following sections: I. Organ Specificity and Dwarfism; II. Biosynthetic Enzymes; III. Molecular Aspects; IV. Physiology and Metabolism; V. Light Effects; VI. Growth Retardants; VII. Applied Aspects; VIII. Antheridiogens.

Intramolecular Motion and Chemical Reaction. Edited by I. M. Mills, M. S. Child, and R. A. Marcus (Reading, Oxford, and California Institute of Technology, respectively). The Royal Society: London. 1990. iii + 198 pp. £37.50 (U.K. addresses); £40.00 (U.K. Overseas addresses). ISBN 0-85403-417-X.

This volume contains an account of fourteen papers presented at a Royal Society Discussion Meeting held in February 1990. The papers were first published in *Philosophical Transactions of the Royal Society of London, A* (Vol. 332 (No. 1625), pp 187–386). There is a 1-p Preface but there were no indexes.

Guidelines for Mastering the Properties of Molecular Sieves. Relationship between the Physicochemical Properties of Zeolitic Systems and Their Low Dimensionality. Edited by Denise Barthomeuf, Eric G. Derouane, and Wolfgang Hölderich (Université Paris VI, Université Notre Dame de la Paix, Belgium, and BASF, Germany). Plenum Press: New York and London. 1990. xi + 426 pp. $95.00. ISBN 0-306-43599-3.

A publication of the NATO Advanced Science Institutes, this book contains the proceedings of a NATO Advanced Research Workshop and is labeled "Series B: Physics Vol. 221". The 22 papers in typescript form are organized under five headings: Orientation of Chemical Properties by Direct Synthesis of Molecular Sieves; Characterization of Structural and Physicochemical Properties of Zeolitic Systems; Static and Dynamic Parameters in Adsorption and Catalysis in Zeolites; Localized and Overall Properties Related to the Nature and Structural Organization of the Framework Atoms; and Orientation of the Path of Reactions (Catalysis, Adsorption) by Chemical or Other Geometric or Non Geometric Effects. They are followed by an Overview and a section of Discussion Reports. At the end of the book, there is a list of the 36 participants with their affiliations and an index of subjects. Although correctly labeled "Physics", some of the material may be of value to chemists interested in heterogeneous catalysis.

Liquids at Interfaces. Edited by J. Charvolin (Institut Laue-Langevin, Grenoble), J. F. Joanny (Universite de Strasbourg), and J. Zinn-Justin (CEN Saclay). North Holland (Elsevier Science Publishers): Amsterdam, Oxford, New York, Tokyo. 1990. xxxvi + 644 pp. $179.50. ISBN 0-444-88450-5.

This book contains the proceedings of the Les Houches Summer School, May 30–June 24, 1988 (Les Houches is a summer resort near Chamonix, France). After a preface in both French and English, it contains thirteen "courses" and ten "seminars" on the title subject. Although it is mainly about physics, there are "courses" that may be of interest to chemists about polymers at liquid surfaces. Lists of contributors, lecturers, and participants are included, but there is no index.

Microemulsions and Emulsions in Foods. Edited by Magda El-Nokaly (Procter and Gamble Co.) and Donald Cornell (U.S. Department of Agriculture). American Chemical Society: Washington, DC. 1991. x + 268 pp. $54.95. ISBN 0-8412-1896-X.

This book was developed from a symposium sponsored by the Division of Agricultural and Food Chemistry of the ACS at the 199th National Meeting in Boston, April 22–27, 1990. It consists of a preface and eighteen chapters in typescript form. The first two chapters are an introduction and an overview; the other chapters are grouped under the following headings: Microemulsions in Foods (four chapters) and Emulsions in Foods (twelve chapters). There are indexes of authors, their affiliations, and subjects.

Sweeteners: Discovery, Molecular Design, and Chemoreception. Edited by D. Eric Walters (NutraSweet Co.), Frank T. Orthoefer (Riceland Foods), and Grant E. DuBois (NutraSweet Co.). American Chemical Society: Washington, DC. 1991. x + 333 pp. $79.95. ISBN 0-8412-1903-6.

This book was developed from a symposium sponsored by the Division of Agricultural and Food Chemistry of the ACS at the 199th National Meeting in Boston, April 22–27, 1990. It consists of a preface, an introductory chapter, and twenty-three other chapters set in typescript form. They are grouped under the following headings: Sweetener Discovery and Structure-Taste Studies; Sweetener and Sweet Taste Receptor Modeling; Mechanisms of Sweet Taste Perception; and Conclusion. There are indexes of authors, their affiliations, and subjects.

Immunoassays for Trace Chemical Analysis: Monitoring Toxic Chemicals in Humans, Food, and the Environment. Edited by Martin Vanderlaan, Larry H. Stanker, Bruce E. Watkins (Lawrence Livermore National Laboratory), and Dean W. Roberts (National Center for Toxicological Research). American Chemical Society: Washington, DC. 1991. x + 374 pp. $79.95. ISBN 0-8412-1905-2.

This book was developed from a symposium sponsored by the International Chemical Congress of Pacific Basin Societies, Honolulu, December 17–22, 1989. It consists of a Preface and thirty chapters grouped under the following headings: Immunoassays for Chemical Residues in Food and the Environment; Immunoassays for Natural Toxins; and Immunoassays for Monitoring Human Exposure to Toxic Chemicals. There are three appendixes: Environment Monitoring, Mycotoxin Analysis, and DNA-Adduction and Protein-Adduct Immunoassays. There are also indexes of the authors, their affiliations, and subjects.

Comprehensive Organic Transformations: A Guide to Functional Group Preparations. By R. C. Larock (Iowa State University). VCH: New York. 1990. 1159 pp. $55.00. ISBN 0-89573-710-8.

This hefty book is a real bargain for the organic chemist concerned with synthesis, for it contains an enormous amount of information. It is comprehensive, as the title states, but within limits, and that fact requires extreme brevity if the subject is to be contained in one volume. This requirement has been met by omitting discursive text as well as tables; the entries consist entirely of structural formulas and equations, accompanied by key references. The content is divided into chapters according to the functional group being formed, and further subdivided into the type of processes (e.g., oxidation, reduction, carbonylation, rearrangement). For practical reasons, syntheses of heterocyclic rings are omitted, as are obscure functional groups. The latter feature is likely to cause disappointment for many readers, because one chemist's "obscure" functional group is another chemist's central interest. As an example, imidic esters are not included, and thus the several useful transformations of nitriles utilizing them (to generate esters, amides, amidines, etc.) are not listed.

The selection of reactions and references is based on simple practicality: acceptable yields, evidence of generality, availability of reagents. Over 160 journals have been covered through 1987.

The extreme terseness of the entries sometimes leads to difficulty in identifying what is actually going on, for no products of the equations are given except the sought-after compound. However, one can soon clarify the situation by consulting the references. A "Transformation Index" of 163 pp, arranged alphabetically according to class of product (e.g., "2-(acylamino) alkanamide"), supplements the almost self-indexing structure of the chapters.

The Structures of Binary Compounds. Edited by F. R. de Boer and D. G. Pettifor. Elsevier Science Publishers: Amsterdam and New York. 1989. viii + 382 pp. $136.00. ISBN 0-444-87478-X.

Binary compounds are defined as being composed of two elements, A_xB_y. The scope of this book includes the structures in crystals and in the liquid phase, with both experimental and theoretical aspects. The first chapter (P. Villars, K. Mathis, and F. Atullinger) presents a classification of the various types and includes "a fairly complete and up-to-date representation of the structural knowledge on about 5500 binary compounds and alloys". Chapter 2, Crystal Coordination Formulas (W. B. Jensen), addresses the problem of representing non-molecular and non-stoichiometric solids and presents a solution. Chapter 3, Quantum Theory of Structure: sp-Bonded Systems (J. Hafner), gives an overview of theory as developed in the last 20 years. His is in fact quite comprehensive. The last chapter, Quantum Theory of Structure: Tight-binding Systems (J. A. Majewski and P. Vogl), starts with a 4-p list of symbols. In it, the authors attempt to connect "the full-scale microscopic, quantum-mechanical calculations of structural stabilities with intuitive chemical and physical arguments". A true author-citation index and a good subject index are included.

Isoquinolines. Part 2. Edited by F. G. Kathawala, G. M. Coppola, and H. C. Schuster. John Wiley & Sons: New York. 1990. xiii + 541 pp. $175.00. ISBN 0-471-62856-5.

This is the most recent addition to the series *The Chemistry of Heterocyclic Compounds*, under the overall editorship of E. C. Taylor. It consists of four chapters: Halogenated and Metallated Isoquinolines and Their Hydrogenated Derivatives, by Nair and Premila; Isoquinoline Carboxylic Acids and Their Hydrogenated Derivatives, by Popp and Duarte; Isoquinolines Containing Basic Functions at the Ring and Their Hydrogenated Derivatives, by Mathison and Solomons; and Isoquinolines Containing Oxidized Nitrogen Functions and Their Hydrogenated Derivatives, by Bunting. Each follows the custom of the series of including a multitude of carefully drawn structural formulas and large amounts of information in tables. The preface is dated May 1989 and presumably the cut-off date for literature coverage is somewhat earlier than that (there is no statement in the texts about it). The bibliographies are, however, enormous, and in some cases exceed a thousand citations. The subject index covers 9 pp and is augmented by detailed tables of contents for the individual chapters. This is a book that will probably remain the definitive reference work for many years.

Volumes of Proceedings

Chiral Separations. Edited by D. Stevenson (University of Surrey) and I. D. Wilson (ICI Pharmaceuticals). Plenum Press: New York and London. 1988. xi + 206 pp. $59.50. ISBN 0-306-43252-8.

Recognition of the importance of stereochemistry in pharmaceuticals, many of which are mixtures, racemic or otherwise, has led to a growing interest in chromatographic analysis for chiral components. The 1987 symposium of which this volume is the outgrowth consisted of 16 papers, which are set in type and are augmented by three appendixes: Chiral Chromatography Literature 1987–1988; Some Manufacturers and Suppliers of Chiral Columns; and Abstracts. Author, subject, and compound indexes are included.

Origin, Evolution, and Modern Aspects of Biomineralization in Plants and Animals. Edited by Rex E. Crick (University of Texas, Arlington). Plenum Press: New York and London. 1989. xii + 536 pp. $115.00. ISBN 0-306-43498-9.

The subject of the symposium from which this book is derived is the chemistry and biology of the formation of bones, shells, and related structures by living systems. The papers are grouped under seven headings: Ocean Chemistry: Its History and Relationship to Biomineralization Systems; Biomineralization Within the Invertebrates; The Style and Structure of Biomineralization: Ancient & Modern; Role of Phosphate in Biomineralization; Organic Chemistry and Calcification; Inorganic and Isotope Chemistry of Biominerals; Biomineralization in the Fungi, Plantae, Monera and Protista. They are set in type, and each has a formal abstract. There is a good index.

Nucleotide Analogues as Antiviral Agents. ACS Symposium Series 401. Edited by John C. Martin (Bristol-Myers Company). American Chemical Society: Washington, DC. 1989. viii + 190 pp. $44.95. ISBN 0-8412-1659-2.

The ACS Divisions of Carbohydrate and Medicinal Chemistry sponsored the 1988 symposium that generated the twelve typescript papers in this volume. They reflect the greatly increased interest in antiviral agents resulting from the growing AIDS epidemic. Most of the papers describe the synthesis and/or the medicinal activity of analogues of nucleosides and nucleotides. Indexes of authors cited, affiliations of contributors, and subjects accompany the text.

Polymers in Microlithography. Materials and Processes. ACS Symposium Series 412. Edited by Elsa Reichmanis (AT&T Bell Laboratories), Scott A. MacDonald (IBM Almaden Research Center), and Takao Iwayanagi (Hitachi Central Research Laboratory). American Chemical Society: Washington, DC. 1989. x + 449 pp. $94.95. ISBN 0-8412-1701-7.

Three groups of papers, totalling 26, plus an introductory review (Polymers in Microlithography: An Overview, by Reichmanis and Thompson) make up this volume, which originated from an ACS symposium held in Dallas in 1989. The three groups are as follows: Chemically Amplified Resist Chemistry; Multilevel Resist Chemistry and Processing; and Novel Chemistry and Processes for Microlithography. The driving force for most of the research reported is the technology of microelectronics, which demands circuit elements of high resolution. Much interesting photochemistry is to be found in this well-indexed volume.

Probing Bioactive Mechanisms. ACS Symposium Series 413. Edited by Philip S. Magee (BIOSAR Research Project), Douglas R. Henry (Molecular Design Limited), and John H. Block (Oregon State University). American Chemical Society: Washington, DC. 1989. x + 414 pp. $59.95. ISBN 0-8412-1702-5.

The 24 typescript papers in this volume are grouped under four headings: Views of the Field; Ways and Means; Agrochemical Mechanisms; and Toxicity Mechanisms. The viewpoints are mostly biochemical and pharmaceutical; chemical structural formulas are abundant, and some are shown in colored 3-dimensional projections. The symposium from which the papers are derived was held in Los Angeles in 1988.

Carcinogenicity and Pesticides. Principles, Issues, and Relationships. ACS Symposium Series 414. Edited by Nancy N. Ragsdale (U.S. Department of Agriculture) and Robert E. Menzer (University of Maryland). American Chemical Society: Washington, DC. 1989. vii + 246 pp. $54.95. ISBN 0-8412-1703-3.

In the 14 papers in this volume, one has a substantial amount of information on the relation of chemical structure to carcinogenicity, and some others have limited amounts of organic chemistry. The predominant themes are biochemical, physiological, and epidemiological. The papers, which are reproduced from typescripts, come from an ACS symposium held in Los Angeles in 1988.

Liquid Chromatography/Mass Spectrometry. Applications in Agricultural, Pharmaceutical, and Environmental Chemistry. ACS Symposium Series 420. Edited by Mark A. Brown (California Department of Health Services). American Chemical Society: Washington, DC. 1990. xii + 298 pp. $64.95. ISBN 0-8412-1740-8.

Although interfaced gas chromatography with mass spectrometry has become a widespread and powerful technique for analysis of mixtures, many substances cannot be handled by it. Low volatility and low stability toward heat, for example, may prevent application of the technique. An alternative lies in the interfacing of *liquid* chromatography with mass spectrometry.

This volume opens with a review of the development of the technique and then presents papers showing its application to agrochemicals and degradation products, pharmaceuticals and their metabolic products, and mixtures encountered in environmental studies. All are derived from an ACS symposium held in Dallas in 1989. The usual excellent index is included.

Protein Purification. From Molecular Mechanisms to Large-Scale Processes. ACS Symposium Series 427. Edited by Michael R. Ladisch (Purdue University), Richard C. Willson (University of Houston), Chih-duen C. Painton (Mallinckrodt Medical, Inc.), and Stuart E. Builder (Genentech, Inc.). American Chemical Society: Washington, DC. 1990. vii + 280 pp. $64.95. ISBN 0-8412-1790-4.

There are 16 typescript papers in this volume, which is based on a symposium held at the ACS National Meeting in Miami Beach in 1989. Two papers are specifically on large-scale methods, and others are on chromatography, complexation, metal-affinity, electrophoresis, etc. The index is thorough.

Metal–Metal Bonds and Clusters in Chemistry and Catalysis. Edited by John P. Fackler, Jr. (Texas A&M University). Plenum Press: New York and London. 1990. x + 341 pp. $75.00. ISBN 0-306-43527-6.

Papers and Abstracts from the 7th Industry–University Cooperative Chemistry Program symposium, held at Texas A&M University in 1989, make up this volume. The papers are arranged under four headings: Twenty-Five Years of Chemistry Since the Discovery of the Quadruple Metal–Metal Bond, Clusters in Catalysis, Clusters in Materials, and Bonding and Spectroscopy in Clusters. Indexes of contributors and of subjects are included.

Heteroatom Chemistry. Edited by Eric Block (State University of New

York at Albany). VCH Publishers: New York. 1990. xi + 376 pp. $95.00. ISBN 0-89573-743-4.

The second of a planned series of international conferences on heteroatom chemistry was held in 1989 in Albany, New York. The particular view of the term "heteroatom" in the conference embraced the nonmetals and certain closely related metals (e.g., bismuth and tin). Twenty papers given at the conference are nicely set in type in this volume. They are concerned with synthesis, theory, and mechanism, including applications of heteroatom compounds to organic synthesis. There is a thorough index.

Crystal Growth in Science and Technology. NATO ASI Series B: Physics. Volume 210. Edited by H. Arend and J. Hulliger (Swiss Federal Institute of Technology). Plenum Press: New York and London. 1989. viii + 430 pp. $92.50. ISBN 0-306-43393-1.

Sicily was the venue for a NATO Advanced Study Institute course on the title subject in 1987, and the 25 typescript papers in this volume derive from it. They appear to be reviews in all cases, each devoted to a clearly defined aspect, such as Fundamentals of Epitaxy, Crystal Growth in Solid-State Physics, and Growth of Shaped Crystals. A good index gives this book more than ephemeral value, especially in view of the didactic nature of much of the content.

Thermal Analysis. Proceedings of the Fourth European Symposium on Thermal Analysis and Calorimetry 1987. Parts I and II. Journal of Thermal Analysis 33. Edited by D. Schultze (Central Institute of Optics and Spectroscopy, Academy of Sciences of the G.D.R., Berlin). Akademiai Kiado: Budapest. John Wiley & Sons Limited: Chichester. 1988. 1297 pp. $60.00.

These two volumes contain the texts of 15 plenary lectures, two award lectures, and no less than 250 poster presentations from the 4th European Symposium on Thermal Analysis and Calorimetry. These are printed in uniform typeface, with photographs of each plenary lecturer, and short summaries in German and Russian. The poster presentations are arranged in groups with the headings Theory, Instrumentation, Earth Sciences & Raw Materials, Solid-State Reactions, Inorganic Chemistry: Glass, Ceramics, Pharmacy, Biology and Medicine, Organic Chemistry and Polymers. Both subject and author indexes are included in the second volume (in which the table of contents is curiously sandwiched between the indexes and the last paper).

Thermal Generation of Aromas. ACS Symposium Series 409. Edited by Thomas H. Parliment (General Foods USA), Robert J. McGorrin (Kraft USA), and Chi-Tang Ho (Rutgers, The State University of New Jersey). American Chemical Society: Washington, D.C. 1989. xii + 548 pp. $109.95. ISBN 0-8412-1682-7.

This appetizing book is embellished by skewers of shashlik broiling over flames on the dust jacket. The content of 50 typescript papers comes from a symposium held at the 1988 ACS meeting in Los Angeles. There are seven categories: Perspectives, Analytical Methodology, Lipid-Derived Aromas, Mechanistic Studies, Generation of Selected Aromas, Generation of Meat Aromas, Extrusion and Microwave Processing. Such subjects as the flavor of bread, the aroma of crackers, toxicology and food flavors, and the design of flavors for the microwave oven are included, as is an excellent index.

Carotenoids. Chemistry and Biology. Edited by Norman I. Krinsky (Tufts University), Micheline M. Mathews-Roth (Harvard Medical School), and Richard F. Taylor (Arthur D. Little, Inc.). Plenum Press: New York and London. 1989. x + 382 pp. $85.00. ISBN 0-306-43607-8.

The Eighth International Symposium on Carotenoids was held in Boston in 1987. These symposia are held at 3-year intervals. The 25 typescript papers are largely reviews of recent work; they cover occurrence, synthesis, utilization, biogenesis, function, and commercialization. There is a good subject index.

Processing and Utilization of High-Sulfur Coals. III. Coal Science and Technology. 16. Edited by R. Markuszewski (Iowa State Mining and Mineral Resources Institute and Ames Laboratory, Iowa State University) and T. D. Wheelock (Iowa State University). Elsevier Science Publishers: Amsterdam. 1990. xvi + 814 pp. $218.00. ISBN 0-444-88719-9.

The Third International Conference on the title subject was held in Ames, Iowa, in 1989 and gave rise to the many typescript papers in this volume. Following a plenary lecture by H. Feibus, the papers are grouped under six headings: Characterization of High-Sulfur Coals, Coal Desulfurization By Physical Cleaning, Chemical Cleaning and Processing, Biological Processing, Combustion and Postcombustion Control of SO_2, Utilization of High-Sulfur Coal. They are essentially reports of new research, and each comes with an abstract, tables, diagrams, references, etc. Some poster presentations are listed. An index is lacking.

Electron Transfer in Biology and the Solid State. Inorganic Compounds with Unusual Properties. Advances in Chemistry Series 226. Edited by Michael K. Johnson, R. Bruce King, Donald M. Kurtz, Jr. et al. (University of Georgia). American Chemical Society: Washington, D.C. 1990. xvi + 470 pp. $89.95. ISBN 0-8412-1675-4.

The 23 typescript papers in this volume are preceded by photographs and short biographies of the six editors, four of whom wore ties for the occasion. The symposium that gave rise to this book was held at the Biennial Inorganic Chemistry Symposium of the ACS, in Athens, Georgia, in 1989. The volume is nicely indexed.

The 4-Quinolones: Antibacterial Agents in Vitro. Edited by G. C. Crumplin. Springer Verlag: Heidelberg and New York. 1990. xiv + 276 pp. $74.00. ISBN 0-387-19597-1.

4-Quinolones bearing appropriate substitutes (commonly a heterocycle group attached at the 7-position through a nitrogen) have been found to be remarkable antibacterial agents. They are regarded by many as constituting a new class of antibiotics, and they have already become the treatment of choice for certain infections. It was therefore appropriate that an Advanced Study Seminar was organized to assess their value and characteristics, including pharmacology and mode of action. A group of 16 papers and three poster presentations make up this volume of proceedings. Chemistry is largely limited to showing some structural formulas and to discussing structure activity relationships. There is a short index.

Synthesis and Chemistry of Agrochemicals. II. ACS Symposium Series 443. Edited by Don R. Baker (ICI Americas, Inc.), Joseph G. Fenyes (Buckman Laboratories International, Inc.), and William K. Moberg (E. I. du Pont de Nemours and Company). American Chemical Society: Washington, D.C. 1991. xiii + 609 pp. $109.95. ISBN 0-8412-1885-4.

A pair of Erlenmeyer flasks graces the cover of this collection of 46 typescript papers presented at a symposium sponsored by the ACS Division of Agrochemicals at an unspecified location and date. An opening review on trends in the title subject, by Moberg, Baker, and Fenyes, is followed by four groups of papers: Control of Weeds and Plant Growth: Sulfonylurea Herbicides; Control of Weeds and Plant Growth: Other Weed and Plant Control Methods; Control of Insects, Acarids, and Nematodes; and Control of Fungi. Virtually every aspect of the subject is covered, except how to pronounce such names as "quizalifop" or "imazapyr" (and one cannot help but wonder if they have been checked for the possibility of obscene meaning in, say, Kurdish). Although the emphasis is on synthesis, there is also much information on biological activity. The index is substantial.

Antioxidant Nutrients and Immune Functions. Advances in Experimental Medicine and Biology. Volume 262. Edited by Marshall Phillips, Adrianne Bendich, and Robert B. Tengerdy. Plenum: New York and London. 1990. xi + 171 pp. $59.50. ISBN 0-306-43396-6.

Twelve typescript papers, an epilogue, a list of participants, and a short subject index make up this volume, which is derived from a symposium organized by the Agriculture and Food Chemistry Division of the ACS in 1988.

Microbes and Microbial Products as Herbicides. Edited by Robert E. Hoagland (U.S. Department of Agriculture). American Chemical Society: Washington, D.C. 1990. x + 341 pp. $79.95. ISBN 0-8412-1865-X.

This book is No. 439 in the ACS symposium series. It was developed from a symposium held in Dallas, Texas, in 1989. It contains 18 chapters, references, and indices.

Dietary Fiber. Chemistry, Physiology, and Health Effects. Edited by David Kritchevsky (The Wistar Institute, Philadelphia), Charles Bonfield (Astra Associates, McLean, Virginia), and James W. Anderson (Veterans Administration Medical Center, Lexington, Kentucky). Plenum Press: New York and London. 1990. xx + 499 pp. $95.00. ISBN 0-306-43310-9.

The material in this book is derived from the Proceedings of the George Vahouny Fiber Conference held April 19–21, 1988, in Washington, D.C. Thirty seven articles as well as references and an index are included.

Dietary Fibre: Chemical and Biological Aspects. The Proceedings of Fibre 90: Chemical and Biological Aspects of Dietary Fibre. Edited by D. A. T. Southgate and others (AFRC Institute of Food Research, Norwich). The Royal Society of Chemistry: Cambridge. 1990. xiv + 386 pp. £47.00. ISBN 0-85186-667-0.

This book is derived from proceedings organized by the Food Chemistry Group of the Royal Society of Chemistry, held April 17–20, 1990 in Norwich, England. Sixty four papers are included in this publication; in addition there are references and an index.

Food Irradiation and the Chemist. Edited by D. E. Johnston and M. H. Stevenson (Queen's University, Belfast). The Royal Society of Chem-

This book is derived from the proceedings of an International Symposium organized by the Food Chemistry Group of The Royal Society of Chemistry as part of the annual Chemical Congress in 1990. This book contains 10 articles, references, and an index.

Biological Oxidation Systems. Volume I. Edited by C. Channa Reddy and George A. Hamilton (Pennsylvania State University) and K. M. Madyastha (Indian Institute of Science). Academic Press: San Diego. 1990. xxi + 546 pp. $80.00. ISBN 0-12-584551-0.

This book is the outcome of the Bangalore Symposium on Oxygen Systems, held in 1989. It consists of a large number of papers grouped in eight parts: Cytochrome P-450 Catalyzed Reactions, Oxidases and Oxygenases Containing a Flavin/Pteridine, Copper-Containing Oxidases and Oxygenases, Nonheme Iron-Containing and Other Oxygenases, Peroxidases in Cell Protection and Metabolism, Oxidation Mechanisms in Carcinogenesis, Enzymes in Prostaglandin and Leukotriene Metabolism, and Lipid Peroxidation and Other Nonenzymatic Reactions of Oxygen. It is nicely set in type and is well illustrated. An "Overview: Mechanisms of Biological Oxidations", by G. A. Hamilton, introduces the subject.

This volume contains an "author" index, which is actually only an index of contributors, but it covers Volume 2 as well. The other index is of the keyword type and also covers both volumes.

Recent Advances in Receptor Chemistry. Pharmacochemistry Library. Volume 11. Edited by Carlo Melchiorre and Mario Giannela (University of Camerino, Camerino, Italy). Elsevier Science Publishers: Amsterdam and New York. 1988. viii + 334 pp. $123.75. ISBN 0-444-42965-4.

The Sixth Camerino–Noordwijkerhout Symposium held in Camerino, Italy, in 1987, produced the 20 typescript contributions to this book. The opening paper is a 20-page review, "Adventures in Bioassay", by J. Vane, and the closing paper is a summarizing address, "From Receptors to Pharmacist's Shelf", by J. F. Cavalla. The subject index is substantial.

NMR Methods for Elucidating Macromolecule–Ligand Interactions: An Approach to Drug Design. Proceedings of the Fourth Biochemical Pharmacology Symposium. Edited by R. E. Handschumacher and I. M. Armitage (Yale University School of Medicine). Pergamon Press: Oxford and New York. 1990. 175 pp. $55.00. ISBN 0-08-040674-2.

This hard-bound volume, set in type, results from the Fourth Biochemical Pharmacology Symposium, held in New Haven in 1989. A preface gives an overview of the subject, after which the papers and short communications are grouped according to Sessions: Current NMR Structural Methodology and Its Application, Analysis of Bioactive Peptide Conformation, Macromolecular Target Recognition, and Drug–Macromolecular Interactions. There is no index.

Presynaptic Receptors and the Question of Autoregulation of Neurotransmitter Release. Annals of the New York Academy of Sciences. Volume 604. Edited by Stanley Kalsner (City University of New York Medical School) and Thomas C. Westfall (St. Louis University School of Medicine). The New York Academy of Sciences: New York. 1990. xii + 652 pp. $183.00. ISBN 0-89766-614-3.

This soft-bound book, set in type, is the result of a conference on the title subject, held in Philadelphia in 1989. After an introductory chapter, "Heteroreceptors, Autoreceptors, and Other Terminal Sites", by Stanley Kasner, the papers are grouped into seven parts: Categories of Presynaptic Receptors I: Basic Evidence and Pharmacology; Categories of Presynaptic Receptors II: Basic Evidence and Pharmacology; Transduction Mechanisms and Linkages in the Activation of Presynaptic Receptors I; Transduction Mechanisms in the Activation of Presynaptic Receptors II; Presynaptic Receptors and Some Disease States; The Question of Autoregulation of Neurotransmitter Release I; The Question of Autoregulation of Neurotransmitter Release II. The texts of a large number of poster presentations then follow. The index of contributors requires two pages; there is no subject index.

Physiology of Immobilized Cells. Edited by J. A. M. de Bont and J. Visser (Agricultural University, Wageningen, The Netherlands), B. Mattiasson (University of Lund, Sweden), and J. Tramper (Agricultural University, Wageningen, The Netherlands). Elsevier: Amsterdam and New York. 1990. xiv + 716 pp. $218.00. ISBN 0-444-42700-7.

A 1989 symposium was held in Wageningen, The Netherlands, to bring together scientists from different disciplines: biochemical, physiological, industrial, etc. The large number of papers presented include two opening lectures and reports of research arranged under several headings: Immobilized Cells in Nature; Artificially Immobilized Cells; The Microenvironment (Physico-chemical Aspects), The Environment (Physiological Aspects), and Novel Approaches. There is no subject index.