

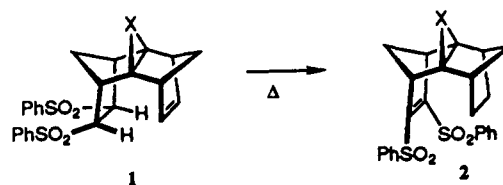
Patrick Murray for the analysis of **4c**. We also thank Dr. T. Rathmann of the FMC Corporation for a gift of *sec*-BuLi. We are grateful for support of this research by the National Science Foundation and the National Institutes of Health.

Supplementary Material Available: Experimental details, enantiomeric purity assays, and spectral data for compounds **1**, **4a–e**, **5**, and **6** (14 pages). Ordering information is given on any current masthead page.

Additions and Corrections

Intramolecular Reaction Rate Is Not Determined Exclusively by the Distance Separating Reaction Centers. The Kinetic Consequences of Modulated Ground State Strain on Dyotropic Hydrogen Migration in Systems of Very Similar Geometric Disposition [*J. Am. Chem. Soc.* **1991**, *113*, 7761–7762]. LEO A. PAQUETTE,* GEORGE A. O'DOHERTY, and ROBIN D. ROGERS

Page 7761: Structure **2** was depicted with a double bond that is not present. The correct reaction is given below:



Book Reviews *

Chemical Information Systems—Beyond the Structure Diagram. Edited by David Bawden (Pfizer Central Research) and Elenor M. Mitchell (Cambridge Crystal Data Centre). Ellis Horwood: Chichester. 1990. 178 pp. \$58.00. ISBN 0-13-126582-2.

This is a thin (172 pages plus an index) book that aims to cover a very broad area for chemists in the information field. It developed from a Chemical Structure Association meeting in Durham, England, in 1989. The book contains 10 chapters, an introduction, and a good 6-page subject index, but no author index. The book is divided into five sections, with 1–4 chapters in each section. The sections (with the respective number of chapters in parentheses after the title) are the following: Overview (1), Three-Dimensional Structure Handling (4), Reactions and Synthesis (2), Property Prediction and Analysis (3), and Integrated Systems (1).

The book starts off with an introduction from the editors explaining that the book is designed to cover two areas which are “beyond the structure diagram”. These are computation chemistry and access to a wider array of chemical data.

Chapter 1, by S. Ward, describes the management point of view of chemical information for the pharmaceutical industry. It is well-written by an experienced person in the field. The next chapter, by J. Barnard and colleagues, describes activities in the area of representing stereochemistry in two-dimensional structure representations. As the authors point out in the first sentence of this chapter, “this paper is out of place in this book”.

Chapter 3 is a presentation of a commercial software system, MACCS-3D, by the company that developed the system. Chapter 4, by P. Willett and his research group at Sheffield, is an excellent introduction to structure (graph) matching techniques of 3-D structures. This prob-

ably is the best chapter in the book.

The chapter on the Cambridge Crystal database is primarily a historical presentation of the activities of this center. It also describes the evolution of their software which is used to search the database. As much better software is available from other sources, I found the value of this chapter is for someone who wishes to create their own 3-D database.

The next two chapters are about reactions and synthesis. The first describes a commercial reaction database system, ORAC. As it is one of the few papers published by this company, it merits reading. The second chapter in this section is a good overview of the many synthesis planning programs by F. Loftus, a researcher at ICI Pharmaceutical.

The property prediction and analysis section starts off with a chapter on a new software language, GLOBAL, which the eight authors from Proteus Biotechnology have developed. They then go on to explain how this polymorphic programming environment is a useful tool for many scientific activities of the company. No actual applications are given to chemistry.

The next chapter by D. Rouvray, the longest in the book, describes the use of topological indices for property prediction, with both a historical description and some recent work by the author. This is followed by a chapter by M. Johnson of The Upjohn company, on similarity-based methods for predicting chemical and biological properties. This is a good, but short, discussion of the topic.

The book concludes with a chapter on the progress being made toward integrated chemical information systems by D. Bawden, one of the editors of this book. The chapter contains some very general comments on the subject and describes, very briefly, what is being done at Pfizer in this area.

Overall I found this a useful but somewhat limited book. As the bulk of the chapters are written by people in the UK, it is difficult to expect a wide variety and in-depth coverage of the many opportunities offered by today's computer systems, software, and databases.

Stephen R. Heller, *USDA, ARS*

*Unsigned book reviews are by the Book Review Editor.

Proteins: Structure, Dynamics, and Design. Edited by V. Renugopalakrishnan (Harvard Medical School and The Children's Hospital), Paul R. Carey and Ian C. P. Smith (National Research Council of Canada, Ottawa), Shaw G. Huang (Harvard University), and Andrew C. Storer (National Research Council of Canada, Montreal). ESCOM: Leiden. 1991. xiv + 406 pp. \$155.00. ISBN 90-72199-09-X.

This book contains the proceedings compiled from the plenary lectures, workshops, short invited talks, poster sessions, and chapters that were solicited from the authors present at a symposium held in Whistler, British Columbia, Canada, July 23–27, 1990. The 59 chapters are divided into four main sections: (1) NMR as a probe for protein structure; (2) Optical spectroscopy as a probe for protein structure; (3) Protein dynamics: theory and experiment; and (4) Polypeptide and protein design: Protein engineering. There are subject and author indexes.

Phospholipids: Biochemical, Pharmaceutical, and Analytical Considerations. Edited by Israel Hanin (Loyola University of Chicago, Stritch School of Medicine) and Giancarlo Pepeu (University of Florence, Italy). Plenum Press: New York and London. ix + 318 pp. \$75.00. ISBN 0-306-43698-1.

This book contains the Proceedings of the 5th International Colloquium on Lecithin, which took place in Cannes, France, April 10–12, 1989. It contains 30 papers in typescript form, a list of participants and a picture of some of them, and a subject index.

Biotechnology of Amylodextrin Oligosaccharides. ACS Symposium Series 458. Edited by Robert B. Friedman (American Maize-Products Co.). American Chemical Society: Washington, DC. x + 342 pp. \$84.95. ISBN 0-8412-1993-1.

This book was developed from a symposium sponsored by the Divisions of Carbohydrate Chemistry and of Agricultural and Food Chemistry at the 198th National Meeting of the ACS at Miami Beach, FL, September 10–15, 1989. It consists of a preface and 20 chapters organized under the following sections: Biotechnology and Biochemistry; Analysis and Characterization; and Applications. There are indexes of authors, their affiliations, and subjects.

Coal Science II. ACS Symposium Series 461. Edited by Harold H. Schobert (Pennsylvania State University), Keith D. Bartle (University of Leeds), and Leo J. Lynch (Commonwealth Scientific and Industrial Research Organization, Australia). American Chemical Society: Washington, DC. 1991. xiv + 338 pp. \$77.95. ISBN 0-8412-2005-0.

This book was developed from a symposium sponsored by the Division of Fuel Chemistry of the ACS at the 198th National Meeting in Miami Beach, FL, September 10–15, 1989. This symposium was held as a tribute to Peter H. Given, late retired professor at Pennsylvania State University, who organized a symposium in 1964 that resulted in a publication entitled *Coal Science*. There is a preface and 24 chapters that attempt to build on and bring up to date the material of the first symposium. The first chapter, dedicated to Peter Given, describes briefly his life and achievements. There are indexes of authors, affiliations, and subjects.

Selective Activation of Drugs by Redox Processes. NATO ASI Series, Series A: Life Sciences Volume 198. Edited by G. E. Adams (Medical Research Council, Chilton, UK), A. Breccia (University of Bologna), E. M. Fielden (Medical Research Council, Chilton, UK), and P. Wardman (Cancer Research Campaign, Gray Laboratory, Northwood, UK). Plenum Press: New York, London. 1990. xii + 361 pp. \$89.50. ISBN 0-306-43735-X.

This book contains the Proceedings of a NATO Advanced Research Workshop on Selective Activation of Drugs by Redox Processes held in Fermo, Italy, August 28–September 1, 1989. There are 30 pages (in typescript form) that were presented and 19 pages of poster presentations. These are followed by a list of the participants with their affiliations and a subject index.

Surface and Colloid Chemistry in Natural Waters and Water Treatment. Edited by Ronald Beckett (Monash University, Melbourne, Australia). Plenum Press: New York, London. 1990. viii + 159 pp. \$59.50. ISBN 0-306-43802-X.

This little book is based on a symposium held in Melbourne, Australia, June 16–17, 1987 concerning the role of surface and colloid chemistry in natural waters and water treatment. It consists of a preface and 11 chapters organized under the following two headings: Section I, Processes in Natural Waters; and Section II, Water Treatment Processes. There is a list of contributors with their affiliations and a subject index.

Enzymes in Biomass Conversion. ACS Symposium Series 460. Edited by Gary F. Leatham (University of Wisconsin) and Michael E. Himmel

(Solar Energy Research Institute). American Chemical Society: Washington, DC. xv + 520 pp. \$99.95. ISBN 0-8412-1995-8.

This book was developed from a symposium sponsored by the Cellulose, Paper, and Textile Division as part of the program of the Biotechnology Secretariat at the 199th National Meeting of the ACS in Boston, MA, April 22–27, 1990. It consists of a preface and 38 chapters organized under the following headings: Enzymes for Specialized Applications; Improved Methods for Producing Enzymes; Ligninases and Oxidative Enzymes; β -Glucanases (Cellulases); α -Glucanases and Polysaccharidases; and Other Polysaccharidases, Oligosaccharidases, and Isomerases. There are indexes of authors, their affiliations, and subjects.

Analytical Instrumentation Handbook. Edited by G. W. Ewing. Marcel Dekker: New York. 1990. xi + 1071 pp. \$195.00. ISBN 0-8247-8184-8.

This massive volume is "intended to be a guide for workers in the field of analytical chemistry who are called on to decide what approach to pursue in solving specific problems". It is divided into an Introduction, which includes a long chapter on the use of computers in the laboratory, and the following five sections: The Measurement of Mass; Spectrochemical Instrumentation; Electrochemical Instrumentation; Chromatographic Methods; and Miscellaneous Methods. Each part consists of several contributed chapters. There are also a 6-page list of abbreviations and acronyms and a good subject index.

This book is nicely produced and should stand up to the considerable amount of use that it will probably get. It includes many diagrams and illustrations of instruments and their parts and many references. The level of presentation is suitable for the technician and other informed chemists, for whom it could serve as a convenient introduction. The emphasis is largely on the practical; theoretical aspects can be pursued by using the references.

Annual Reports on NMR Spectroscopy. Volume 22. Edited by G. A. Webb (University of Surrey). Academic Press: London, San Diego. 1990. xi + 429 pp. \$59.00. ISBN 0-12-505322-3.

The present volume in this open-ended series contains six chapters. The subjects covered are ion binding, small-molecule–large-molecule interactions, agrochemicals, shielding in macromolecules, and nuclear spin relaxation in diamagnetic fluids. There is a thorough index.

A Guide for the Perplexed Organic Experimentalist. 2nd Edition. By H. J. E. Loewenthal (Israel Institute of Technology, Haifa). John Wiley & Sons: New York. 1990. x + 239 pp. \$59.95. ISBN 0471-91712-5.

The first edition of this book, which appeared in 1978, was well received, and its success was sufficient reason to prepare a new edition in which earlier shortcomings in some areas could be attended to. The book continues to be engagingly readable. The two chapters on searching the literature make up a third of the book; they give down-to-earth practical information and guidance. Other chapters cover basic safety rules, small-scale reactions, isolation and purification, solvents, and "What Base Should I Use?". Further chapters deal with small-scale distillation, hydrogenation, cleaning apparatus ("On Keeping It Clean", a 3-page chapter), and bottling and storage. Altogether, this looks like a good book to have around.

Advances in Chemical Physics. Volume 79. Edited by I. Prigogine (University of Brussels) and Stuart A. Rice (University of Chicago). John Wiley and Sons: New York. 1990. xi + 322 pp. \$75.00. ISBN 0-471-52768-8.

This open-ended review series continues its efforts to help the nearly overwhelmed chemist to keep up with fields of interest. In this volume there are three reviews: Dynamics of Entangled Polymer Liquids: Do Linear Chains Reptate?, by Lodge, Rotstein, and Prager; Ultrafast Processes and Transition-State Spectroscopy, by Lin, Fain, and Hamer; and Feedback Analysis of Mechanisms for Chemical Oscillators, by Luo and Epstein. The verb "reptate" used in the first review is not a part of most chemists' vocabulary, and in fact is missing from most dictionaries. It is derived from the Latin *reptare*, to creep, and means to slither along like a snake threading its way through a pile of spaghetti (polymer chemists can be very erudite!). A full and proper index of authors cited as well as a substantial index contribute to the value of this book.

Chemical Oceanography. Volume 9. Edited by J. P. Riley (Oceanography Laboratories, Liverpool). Academic Press: London, San Diego. 1989. xii + 259 pp. \$45.00. ISBN 0-12-588609-8.

Since the publication of the first seven volumes of this series (1975–78), it has been redefined as an open-ended "occasional review series". There are three chapters in the present volume: Organic Matter in Sea Water: Biogeochemical Processes; Marine Pollution, and Electroanalytical Chemistry of Sea Water. The remark by the editor in the preface that advances in chemical oceanography are tied to advances in

analytical methods is reflected in these three reviews.

This volume contains a good subject index and a list of the chapter titles in the eight previous volumes.

Chemistry and Physics of Matrix-Isolated Species. Edited by Lester Andrews (University of Virginia) and Martin Moskovits (University of Toronto). North-Holland: Amsterdam, New York. 1989. vii + 430 pp. \$102.75. ISBN 0-444-7059-X.

This is a book of 12 contributed chapters that review recent applications of matrix isolation of unstable species to chemistry and physics in the past dozen years. The Editors contribute an introductory chapter that emphasizes experimental developments. Ions, neutral and charged radicals, metal clusters, and unstable organic compounds are discussed. Photochemistry and photoexcitation, fluorescence and ESR studies, energy transfer, and solid-state aspects are also treated. The chapters were written independently and vary in style, but all have excellent bibliographies and are well-illustrated with diagrams and structural formulas and supplemented with many tables. There is both a subject index and a materials index, the latter arranged by formula.

Topics in Current Chemistry 151: Synchrotron Radiation in Chemistry and Biology III. Edited by E. Mandelkow (Max-Planck Unit for Structural Molecular Biology, DESY, Hamburg, Germany), with 20 contributing authors. Springer-Verlag: Berlin, Heidelberg, and New York. 1989. 229 pp. \$79.50. ISBN 3-540-5120-2.

Along with Volumes 145 and 147 of the series *Topics in Current Chemistry*, the present book comprises part of a three-volume set devoted to the topic Synchrotron Radiation in Chemistry and Biology. The first chapter, written in a historical vein by K. C. Holmes of the Max Planck Institute for Medical Research, Heidelberg, explains how dissatisfaction with the inadequate intensity of even the best rotating-anode X-ray generators for time-resolved experiments on biological samples led in 1970 to the first X-ray diffraction pattern with synchrotron radiation taken on a sample of insect flight muscle. The book ends with a chapter by C. Riekel of the European Synchrotron Radiation Facility in Grenoble, who looks into the future to describe experiments envisaged for the 6 GeV instrument expected to be operational at his Institute in 1994.

As noted by the Editor, the intervening chapters define no unifying topic other than the numerous elegant applications of synchrotron radiation in chemistry and biology. Applications described include the following: studies of biological liquid crystals and membranes; studies of conformational transitions in DNA; and even the investigation of state-selected ion-molecule reactions. A chapter describing a revival of the Laue diffraction method and its application to protein crystallography deserves mention.

Individuals may be unlikely to purchase this book other than as part of the three-volume set, except possibly in case of an urgent interest in one or two particular chapters. The range of topics covered is so broad that few are likely to be interested in the entire book—or indeed competent to read and understand all of it.

Robert J. Hanrahan, *University of Florida*

The Chemical Physics of Solid Surfaces and Heterogeneous Catalysis. Volume 3. Chemisorption Systems, Part A. Edited by D. A. King (University of Cambridge) and D. P. Woodruff (University of Warwick). Elsevier: Amsterdam. 1990. XIII + 475 pp. \$248.50. ISBN 0-444-42027-4.

This book reviews the state of understanding of a range of adsorption systems as obtained from the application of a variety of sophisticated surface analysis techniques. By the mid-1980s surface science techniques had developed to the extent that they were routinely supplying reliable information on surface problems. A large number of papers have been published over the past 20 years on the chemisorption of simple gases. This volume provides a critical review and detailed assessment of the work on H₂, N₂, O₂, and CO chemisorbed on well-defined metal surfaces. The authors of the four chapters are all experts in chemisorption phenomena and have made major contributions to understanding the chemisorption of the specific gas which they are reviewing: hydrogen, reviewed by Davenport and Estrup; nitrogen, reviewed by Raval, Harrison, and King; oxygen, reviewed by Brundle and Broughton; and carbon monoxide, reviewed by Campuzano. New fundamental results on these systems were at that time, and still are, being acquired at such a rapid rate that it is difficult to capture the true state-of-the-art at any given point in time. Nevertheless, this volume provides a comprehensive evaluation of the literature and the state of understanding of surface adsorption and reaction processes for these chemisorption systems as of the late 1980s.

This is a valuable book for scientists interested in chemisorption phenomena. The text is written in sufficient detail such that the important results and conclusions of the original papers are clear. The book

is unique in that it provides, in a single source, a comprehensive coverage of the state of knowledge on these chemisorption systems and saves valuable time in searching through the original literature. It is an integral part of a five-volume series, ranging from general principles and phenomena at surfaces to applications such as heterogeneous catalysis and semiconductors. It will serve as an excellent resource for surface scientists with interests in the chemisorption of diatomic gases on metal surfaces and for students who are just learning the subject.

J. Wayne Rabalais, *University of Houston*

Particles in Gases and Liquids 2: Detection, Characterization, and Control. Edited by K. L. Mittal (IBM US Technical Education). Plenum Press: New York and London. 1990. x + 408 pp. ISBN 0-306-43809-7.

This book contains the proceedings of the 2nd Symposium on Particles in Gases and Liquids held as a part of the 20th Annual Fine Particle Society meeting in Boston, MA, August 21–25, 1989. The 31 papers in typescript form contained in this volume are divided into four parts as follows: I, General Overview Papers; II, Particle Generation and Deposition; III, Particles in Gases: Detection, Characterization and Control; and IV, Particles in Liquids: Detection, Characterization and Control. There is a list of contributors with their affiliations and brief biographies as well as a subject index.

Contemporary Electroanalytical Chemistry. Edited by Ari Ivaska, Andrzej Lewenstam, and Rolf Sara (Abo Akademi University, Finland). Plenum Press: New York and London. 1990. x + 458 pp. \$120.00. ISBN 0-306-43818-6.

This book is based on the presentations given at the ElectroFinnAnalysis conference held in Turku-Abo, Finland, June 6–9, 1988. The introduction by Ari Ivaska is followed by 53 chapters in typescript form organized under the following headings: Electrochemical Instrumentation and Methods; Industrial Applications; Electrochemical Sensors; Electrochemical Flow Analysis; Clinical Applications; Pharmaceutical Applications; and General. There is a list of the contributors at the end, but the chapter headings must be consulted for their affiliations. A brief subject index concludes the volume.

The Molecular Basis of Bacterial Metabolism. Edited by G. Hauska (Institute für Botanik, Regensburg) and R. Thauer (Philipps-Universität, Marburg). Springer-Verlag: New York, Berlin, and Heidelberg. 1990. x + 184 pp. \$79.00. ISBN 0-387-52996-9.

This book contains 17 lectures (in English) presented at the 41st Colloquium für Biologische Chemie in Mosbach/Baden, Germany, April 5–7, 1990. There is a small subject index; the affiliations of the authors are given at the headings of each lecture.

Eighteen Years of Colloid and Surface Chemistry: The Kendall Award Addresses, 1973–1990. Edited by Tomlinson Fort (Vanderbilt University) and Karol J. Mysels (University of California, San Diego). American Chemical Society: Washington, DC. 1991. \$59.95. xii + 398 pp. ISBN 0-8412-1890-0.

This book presents the addresses of the 18 persons chosen for the Kendall Award in the years 1973–1990. In some cases, the original published address is given; in others, the address was reconstructed from notes or slides. A few awardees were unable to provide material closely connected to the original address and so an article representative of their views at about that time is presented here. The Awardees are, in chronological order, as follows: Robert L. Burwell, Jr.; W. Keith Hall; Robert Gomer; Robert J. Good; Michel Boudart; Harold A. Scheraga; Arthur M. Adamson; Howard Reiss; Gabor A. Somorjai; Gert Ehrlich; Janos H. Fendler; Brian E. Conway; Stig E. Friberg; Eli Ruckenstein; John T. Yates, Jr.; Howard Brenner; Arthur T. Hubbard; and John Michael White. There are indexes of authors, their affiliations, and subjects.

Frontiers of Organosilicon Chemistry. Edited by A. R. Bassindale (The Open University, UK) and P. P. Gaspar (Washington University). The Royal Society of Chemistry: Cambridge, UK. 1991. x + 410 pp. £52.50. ISBN 0-85186-097-4.

This book was developed from the IXth International Symposium on Organosilicon Chemistry held in Edinburgh in July 1990. Over 500 participants attended this meeting, for the first time some from eastern Europe. About 100 papers and 200 posters were presented. This book contains 34 chapters in typescript form organized under the following headings: Section I, Silicon-based Polymeric Materials; Section II, Mechanistic Organosilicon Chemistry, (a) Gas Phase and Photochemical Reactions; Section III, Mechanistic Organosilicon Chemistry, (b) Hypervalent Silicon, Nucleophilic Substitution, and Biotransformations; Section IV, Structural Organosilicon Chemistry and New Organosilicon Compounds; and Section V, Organic Synthesis using Silicon. Affiliations

of the authors are given at the heading of each paper; there is a subject index.

Polymers as Rheology Modifiers. ACS Symposium Series 462. Edited by Donald N. Schulz (Exxon Research and Engineering Co.) and J. Edward Glass (North Dakota State University). American Chemical Society: Washington, DC. 1991. xii + 348 pp. \$79.95. ISBN 0-8412-2009-3.

This book was developed from a symposium sponsored by the Division of Polymeric Materials: Science and Engineering at the 198th National Meeting of the ACS in Miami Beach, FL, September 10–15, 1989. It consists of a preface by the editors and 20 chapters organized under the following headings: Rheological Concepts; Gels and Latices; Associating Polymers; Polymer–Polymer and Polymer–Solvent Interactions; and Deformation-Related Orientations. There are author, affiliation, and subject indexes.

Inositol Phosphates and Derivatives. Synthesis, Biochemistry, and Therapeutic Potential. ACS Symposium Series 463. Edited by Allen B. Reitz (R. W. Johnson Pharmaceutical Research Institute). American Chemical Society: Washington, DC. 1991. xii + 236 pp. \$59.95. ISBN 0-8412-2086-7.

This book was developed from a symposium sponsored by the Division of Carbohydrate Chemistry at the 200th National Meeting of the ACS in Washington, DC, August 26–31, 1990. It consists of an explanation of the artwork on the cover (a turtle representing inositol phosphate!), a preface by the editor, and 16 chapters followed by indexes of authors, their affiliations, and subjects.

Inorganic and Metal-Containing Polymeric Materials. Edited by John E. Sheats (Rider College), Charles E. Carraher, Jr. (Florida Atlantic University), Charles U. Pittman, Jr. (Mississippi State University), Martel Zeldin (Indiana University–Purdue University), and Brian Currell (Thames Polytechnic, London). Plenum Press: New York and London. x + 424 pp. 1990. \$95.00. ISBN 0-306-43819-4.

This book contains in typescript form an expanded version of the papers presented at the Symposium on Inorganic and Organometallic Polymers at the National Meeting of the ACS in Miami Beach, FL, September 1989. It consists of 24 chapters and an extensive subject index; the affiliations of the authors are given at the headings of the chapters.

Biomedical and Clinical Aspects of Coenzyme Q. Volume 6. Edited by K. Folkers (University of Texas, Austin), T. Yamagami (Center for Adult Diseases, Osaka, Japan), and G. P. Littarru (Universita degli Studi di Ancona, Italy). Elsevier: Amsterdam, New York, and Oxford. 1991. xix + 555 pp. Dfl. 345.00. ISBN 0-444-81152-4.

This book contains the Proceedings of the Sixth International Symposium on the Biomedical and Clinical Aspects of Coenzyme Q held in Rome, Italy, January 22–24, 1990. It consists of 63 papers in typescript form organized under the following headings: Coenzyme Q and Mitochondrial Bioenergetics; Alternative Functions of Coenzyme Q and Antioxidant Properties, I and II; Coenzyme Q: Biosynthesis Uptake and Metabolic Demand; Transport of Coenzyme Q, Blood Levels and Pharmacological Aspects; Coenzyme Q₁₀ and Heart Failure, I and II; Coenzyme Q₁₀ and Ischemic Heart Disease; Coenzyme Q₁₀ in Muscular Dystrophy and Related Syndromes; Coenzyme Q₁₀: Different Clinical Aspects; Coenzyme Q₁₀ and Aging; and, finally, Coenzyme Q₁₀ and Physical Performance. There is an index of authors.

Organic Chemistry in Action. The Design of Organic Synthesis. By F. Serratosa (University of Barcelona). Elsevier: Amsterdam and New York. 1990. xxii + 396 pp. \$148.75. ISBN 0-444-88345-2.

The planning of organic synthesis through “retrosynthetic” thinking has seen an enormous surge in the last two decades, and this is greatly due to the systematic development of the concept of retrosynthesis by Prof. Corey. Teaching concepts of organic synthesis and synthetic planning to upper level undergraduates and beginning graduate students is somewhat hampered by the lack of textbooks in this area. Prof. Serratosa’s goal is to partly fill this void through this new book. The book is also accompanied by a computer program CHAOS.

The book consists of 12 chapters and 4 appendices. Chapter 1 starts off with a historical introduction and continues with definitions of basic terms. In Chapter 2 the reader is introduced to Evans’s systematic classification of functional groups and their reactivity patterns. The key principles of retrosynthetic analysis and simple bond disconnections along with some specific examples are described in Chapters 3 and 4. The concept of “umpolung” (Seebach) is well illustrated with a variety of examples in Chapters 5 and 6. These chapters also include a discussion of methods for the construction of carbo- and heterocyclic rings. The

synthetic analysis of more complex systems, in particular, molecules containing quaternary carbons and bridged and fused systems, are well exemplified in Chapter 7. The concept of stereochemical control is dealt with in Chapter 8. The aldol strategy for stereochemical control in acyclic systems is discussed in detail in Chapter 9. This chapter also includes a brief section on Sharpless epoxidation tactics. Chapter 10 reiterates the basic rules of disconnection with specific examples. The concepts of computer-assisted organic synthesis and the program CHAOS are described in Chapter 11. Appendices 2–4 contain details regarding the usage of CHAOS. The syntheses of several interesting molecules are discussed in detail in Chapter 12.

This book is a useful text and illustrates the concepts of retrosynthetic analysis quite competently. The program CHAOS on the other hand is still in its infancy and requires a lot of modifications to be of practical utility. The book is recommended for libraries.

Mukund P. Sibi, North Dakota State University

Recent Advances in Chiral Separations. Edited by D. Stevenson (University of Surrey, UK) and I. D. Wilson (ICI Pharmaceuticals, UK). Plenum Press: New York and London. 1990. xii + 230 pp. \$69.50. ISBN 0-306-43836-4.

This book represents the proceedings of the 2nd international meeting on chiral separations held at the University of Surrey, September 12–15, 1989. The book begins with brief descriptions of the Chromatographic Society and the Robens Institute of Industrial and Environmental Health and Safety, the organizations that organized the meeting. Twenty-one papers are presented; these are followed by an appendix of abstracts of the papers and posters for which no manuscript was received. An appendix of all of the chiral chromatography literature for the year 1988–1989 is also included as well as a cross-reference list of the authors of the preceding literature and a cross-reference subject index to the same.

Thermodynamic Properties of Propane. By V. V. Sychev, A. A. Vaserman, A. D. Kozlov, and V. A. Tysmarly (all Soviet Union scientists) and Theodore B. Selover, Jr. (English-Language Edition Editor). Hemisphere Publishing Corp.: New York, Washington, Philadelphia, and London. 1991. x + 272 pp. \$120.00. ISBN 0-89116-932-6.

This is Volume 11 of the series National Standard Reference Data Service of the USSR. It includes data from many studies not previously known to Western scientists. Part I contains the following three chapters: (1) Experimental Data on the Thermodynamic Properties of Propane; (2) Method of Constructing a Single Equation of State and Calculating the Tables of the Thermodynamic Properties; and (3) Equations of States and Tables for the Thermodynamic Functions of Propane. Part II consists of tables of thermodynamic properties of propane while Part III is made up of 109 references and a subject index.

Chemical Engineering Bibliography 1967–1988. By Martyn S. Ray (Curtin University of Technology). Noyes Publications: Park Ridge, NJ. 1990. xvii + 887 pp. \$98.00. ISBN 0-8155-1241-4.

This remarkable compilation contains “nearly 20,000 references—taken from 40 journals” covering “the most important literature published over the last 20 years”. Finding one’s way in it is made reasonably easy by the table of contents, which lists the 27 sections with subclassifications for each. The sections have such titles as Safety and Loss Prevention, Materials, Biotechnology, Fluid Flow, Adsorption, and Crystallization. The references themselves are given with full titles. There is also an index, but it contains only fairly general terms, such as ammonia, boilers, elastomers, and nuclear waste. The collection is obviously the result of selection, which is the assessment of the author about importance or usefulness. For those willing to do a little browsing, this book could be a valuable source of literature leads about industrial chemistry.

Peter A. S. Smith, University of Michigan

Gas Chromatography—Biochemical, Biomedical and Clinical Applications. Edited by Ray E. Clement (Ontario Ministry of the Environment). John Wiley and Sons: New York. 1990. x + 393 pp. \$90.00. ISBN 0-471-01048-0.

This is an excellent book for many reasons. It is a fitting contribution to the definitive series of monographs by the publisher entitled *Chemical Analysis* in which series it is No. 111. It provides not only a current review and up-to-date practical coverage of specific “biologically related” aspects of gas chromatography (GC) but also an excellent contemporary introduction to both instrumental aspects and applications of GC in general. The material written by a group of capable contributors is divided into two major portions. The first six chapters cover general principles and provide a good basis for research or instruction. The coverage of capillary columns, mass spectral detection, multidimensional techniques, and derivatization is of a high standard. The remaining eight

chapters focus on specific areas of application including biomedical profiling to amino acid analysis, drug testing and toxicology to microorganism determination, and considering environmental and biomedical aspects of metal compound GC.

The whole volume serves to emphasize the versatility and range of GC applications in the area, a field which has been somewhat overshadowed in recent years by the widespread application of liquid chromatographic methods. It could be well adopted as a base reference and guide by bioanalytical chemists who will perhaps be encouraged to adopt the many sophisticated GC approaches now available in practical problem solving.

The quality of the book is excellent, with good typesetting and attractive figures. The reasonable price suggests that it may be adopted as a course text in specialized instruction situations as well as providing a sound reference.

Peter C. Uden, *University of Massachusetts, Amherst*

NMR: Basic Principles and Progress. Volume 25. NMR at Very High Field. Guest Edited by J. B. Robert with contributions by E. W. Bastiaan, D. Canet, R. Freeman, U. Haebleren, C. MacLean, D. Marion, and J. B. Robert. Springer-Verlag: Berlin. 1991. 168 pp. \$79.00. ISBN 3-540-52946-2 and 0-387-52946-2.

This addition to the *NMR: Basic Principles and Progress* series reviews considerations which are relevant for doing NMR spectroscopy at very high magnetic field strengths (e.g. 23.4 T, 1000 MHz ^1H frequency). It is comprised of clearly written chapters by a number of different authors addressing specific aspects of this topic. The chapters are written as reviews rather than as a text or description of primary research results. Chapter 1 (Freeman and Robert) gives a brief, somewhat anecdotal history of high-resolution NMR, which will be particularly interesting for those new to NMR. It describes the past time course and general effects of the past increments in magnetic field (30–600 MHz) over the past 40 years. Chapter 2 (Bastiaan and MacLean) reviews the current status of work using orientation of molecules in liquids by magnetic susceptibility anisotropy. Both the basic underlying theory and experimental examples are described. This area of work will particularly benefit from higher field, but in addition this phenomenon may have adverse effects on routine experiments. Chapter 3 (Canet and Robert) discusses general relaxation theory, in particular giving equations for most relaxation mechanisms such that the field strength dependence of the relaxation times can be easily seen. In general there are no dramatic changes with the expected increases in field. Chapter 5 (Marion) gives a general discussion of NMR methods used in structure elucidation of biomolecules. In the context of this discussion aspects of the work which will be either aided or hindered by moving to higher field are pointed out. This section provides a fairly complete discussion of 2D NMR methods with numerous examples; higher dimensional experiments are only briefly mentioned. Chapter 6 (Haebleren) addresses prospects of solid-state NMR at very high field. The commonly used solid-state NMR methods are reviewed in the context of possible advantages or disadvantages for each with increased field. Although there is relatively little discussion of how the techniques work, all of the important aspects of field strength dependence are presented.

Overall this book does a very good job of reviewing considerations (both advantages and disadvantages) of moving to yet higher field strengths than are presently available. As such it will not be a frequently used reference for spectroscopists, but it is certainly a useful compilation for those making decisions about what field strength spectrometer may be most appropriate for particular types of experiments, or those who are concerned with particular field dependent phenomena. The only topic conspicuously absent is the status of magnet development for providing these very high fields, clearly the rate limiting step in the next upward step for NMR.

David Wemmer, *University of California, Berkeley*

Photoemission and Absorption Spectroscopy of Solids and Interfaces with Synchrotron Radiation. Proceedings of the International School of Physics "Enrico Fermi" (1988, Varenna, Italy). Edited by M. Campagna and R. Rosei (Italian Physical Society). North-Holland Elsevier Scientific Publishers: Amsterdam. 1990. xiv + 500 pp. \$128.25. ISBN 0-444-88470-X.

This book contains a number of review articles derived from lectures presented at the 108th Course of the Enrico Fermi Summer School held in Varenna, Italy, July 18–22, 1988. As the title indicates, the articles discuss the rapidly developing use of high-energy electron and photon spectroscopies to address problems in a number of fields relevant to

physical, organic, analytical, and theoretical chemists. A wide range of problems extending from those usually addressed by surface science (i.e. gas-surface interactions) to novel applications (i.e. X-ray magnetic circular dichroism) are discussed in varying degrees of detail by the contributors. Although most of the articles are related to work done at synchrotron radiation facilities, a useful survey of bremsstrahlung isochromat and inverse photoemission spectroscopy is presented by V. Dose (Max-Planck Institute, Garching-Munich, FRG). The depth and breadth of the articles varies, and several authors found it easier to illustrate specific aspects of what is a broad and rapidly evolving field with their own work rather than attempt to survey the large amount of work already published.

The first four chapters discuss theoretical approaches often used to interpret photoemission data and connect it to physical phenomena like magnetism. C. Kunz (University of Hamburg, FRG) reviews the physical principles and engineering of the apparatus used in many of the following experimental reviews. J. C. Fuggle (University of Nijmegen, Netherlands) provides a very readable review of core level photoemission and the pitfalls in its interpretation. Similarly, G. Wertheim (AT&T-Bell Laboratories) discusses the use of core level results in the study of mixed valence compounds and alloys. F. J. Himpsel (IBM-Yorktown Heights) and G. Margaritondo (formerly at the University of Wisconsin) review the application of synchrotron radiation photoemission to the study of surfaces and interfaces involving electronic materials like silicon. Spin resolution of photoemission data and the use of polarized photons permitted detailed studies of surface and interfacial magnetism and E. Kisker (University of Dusseldorf, FRG), and C. Carbone (KFA, Julich, FRG), H. Heinzmann (University of Bielefeld, FRG), and F. Meier and co-workers (ETH-Zurich, Switzerland) describe forefront research in this area. J. J. Barton and F. J. Himpsel (IBM-Yorktown Heights) discuss the development of holographic photoemission and compare it as a probe of surface structure in relation to SEXAFS and LEED. Two articles by J. Hasse (Fritz Haber Institute-Berlin, FRG) and B. Lengeler (Siemens, AG, FRG) review the application of X-ray absorption to study surfaces and bulk materials, respectively. Lastly, the use of bright photon sources greatly assists the study of clusters and gas-cluster interactions which are so important in catalytic chemistry, and this important subject is reviewed in separate articles by H. C. Siegmund and H. Burtscher (Swiss Federal Institute of Technology—Zurich) and R. Jones (KFA, Julich, FRG). The articles are of a nature that suggests the reader should have some familiarity with the basic principles of photoelectron spectroscopy. The reviews do provide a good indication of the current status of high-energy electron and photon spectroscopies and their application to a wide range of problems and would be of interest to physical and analytical chemists who want a concise survey of this rapidly expanding field.

Mark W. Ruckman, *Brookhaven National Laboratory*

Host-Guest Molecular Interactions: From Chemistry to Biology. Ciba Foundation Symposium 158. Edited by Derek J. Chadwick and Kate Widdows. John Wiley and Sons: Chichester, New York, Brisbane, Toronto, Singapore. 1991. x + 278 pp. \$69.50. ISBN 0-471-92958-1.

This volume contains the papers presented at the Ciba Symposium in London during July 3–5, 1990. It contains an Introduction and a Summing-up by I. O. Sutherland (University of Liverpool), 15 papers, each with a beginning abstract and an ending discussion, as well as three General Discussions. The symposium appears to have brought together some of the leading chemists and biologists in Europe, the US, Canada, and South Africa. There is an index of the contributors of the papers, which includes in the listing the nonparticipating coauthors as well as contributors to the discussion. A subject index is also provided.

Chemistry of Microporous Crystals. Studies in Surface Science and Catalysis. Volume 60. Edited by Tomoyuki Inui (Kyoto University), Seitaro Namba (Tokyo Institute of Technology), and Takashi Tatsumi (University of Tokyo). Elsevier: Amsterdam, Oxford, New York, Tokyo. 1991. xx + 390 pp. \$168.50. ISBN 0-444-98702-9.

This book contains the Proceedings of the International Symposium on Chemistry of Microporous Crystals held in Tokyo on June 26–29, 1990. The 39 papers in typescript form are organized under the following headings: Synthesis; Structure; Modification, Diffusion; and Catalysis. There is a list of contributors with their affiliations but no subject index. A list of the 59 preceding volumes in the series edited under the advisory supervision of B. Delmon (Université Catholique de Louvain) and J. T. Yates (University of Pittsburgh) is provided at the end.