

of results prior to publication. We also acknowledge a NATO postdoctoral fellowship to C.J.S., a postdoctoral fellowship from the Miller Research Foundation at the University of California, Berkeley, to J.H.F., and a generous loan of $\text{RhCl}_3 \cdot 3\text{H}_2\text{O}$ from Johnson-Matthey, Inc.

Supplementary Material Available: Spectroscopic and analytical data for complexes **2a-e** and **5a-e** and details of the structure

determination of complexes **2c** and **5a**, including experimental description, ORTEP drawings showing full atomic numbering scheme, crystal and data collection parameters, general temperature factor expressions (B 's), positional parameters and their estimated standard deviations, and intramolecular distances and angles (34 pages); tables of calculated and observed structure factors for **1** (37 pages). Ordering information is given on any current masthead page.

Additions and Corrections

Magnetic Properties of Manganese in the Photosynthetic O_2 -Evolving Complex. 2. Evidence for a Manganese Tetramer [*J. Am. Chem. Soc.* **1986**, *108*, 4002-4009]. JULIO C. DE PAULA, WARREN F. BECK, and GARY W. BRUDVIG*

Page 4007: In the fourth row of Table I, following (NH_4Cl treated), the exchange coupling constants should be $J = 16 \text{ cm}^{-1}$

and $J' = -42 \text{ cm}^{-1}$ instead of $J = 23 \text{ cm}^{-1}$ and $J' = -53.5 \text{ cm}^{-1}$ and $\Delta_2 = 8.1 \text{ cm}^{-1}$ instead of 48.6 cm^{-1} .

Page 4007: In Table II, the headings should read Δc_1 , Δc_2 , Δc_D , Δc_3 , and Δc_4 rather than c_1 , c_2 , c_D , c_3 , c_4 , where Δc_i represents the difference of the c_i 's (as given in the text) of the two levels of the Kramer's doublet. The corrected Table II is given below.

Table II. Hyperfine Reduction Constants for a $3\text{Mn}^{\text{III}}\text{-Mn}^{\text{IV}}$ Tetramer

state of OEC	illumination (K)	Δc_1	Δc_2	Δc_D	Δc_3	Δc_4
resting	200	-0.006	-0.006	-0.989	1.978	0.989
(NH_4Cl treated)	273	-0.085	-0.085	-0.830	-1.660	0.830
active	245	-0.071	-0.071	-0.859	-1.718	0.859
	160	-0.029	-0.029	-0.941	-1.882	0.941

Book Reviews*

Mechanisms of Inorganic and Organometallic Reactions. Volume 4. Edited by M. V. Twigg. Plenum Press: New York and London. 1986. xviii + 536 pp. \$79.50. ISBN 0-306-42332-4

Reviews of previous volumes have described the antecedents, scope, organization, usefulness, and limitations of this continuing series (*J. Am. Chem. Soc.* **1985**, *107*, 1091; **1986**, *108*, 2496). In this volume, the text continues to be organized into the three main sections: Electron Transfer Reactions (3 chapters), Substitution and Related Reactions (6 chapters), and Reactions of Organometallic Compounds (5 chapters). A fourth section is a 13-page Table of Volumes of Activation. The literature is covered for the period January 1984 through June 1985. To hold down the length of the book and its price, the Author Index has been eliminated. While the user can still turn to a particular subject, one can no longer quickly review the publications of a particular research group. This series belongs in research libraries and is useful to specialists in the field and those writing reviews.

John T. Yoke, Oregon State University

The Peptides: Analysis, Synthesis, Biology. Volume 7: Conformation in Biology and Drug Design. Edited by Victor J. Hruby. Academic Press: Orlando. 1985. xx + 495 pp. \$99.00. ISBN 0-12-304207-0

This is the seventh volume of the very successful, *The Peptides*. As expected from the title, the book describes the present state of conformational analysis of peptides in biology and drug design. There is a balance between chapters describing experimental methods and theoretical analysis with two of the nine chapters devoted to energetic calculations. The critical utility of NMR in the field is borne out by the fact that four chapters introduce different aspects of the applications of NMR. Chapters on the use of fluorescence and circular dichroism as well as a brief introduction to conformational analysis complete the book.

The two chapters on energetic calculations provide a well-referenced, detailed introduction into the field. The chapter by S. Zimmerman represents a clear and concise overview of the development of energy calculations. He begins with a description of the hard-sphere approximations used early in the development of the field and continues with the determination of parameters and methods of minimization. Although

most of the examples and applications used are drawn from the program ECEPP (Empirical Conformational Energy Program for Peptides) the chapter is quite thorough in its coverage. A more general description of the methods employed in energetic calculations can be found in the chapter written by A. Hagler. There is an historical description of the different methods and analysis of what can be gained from the use of them. The chapter concludes with what can be expected in the future with the advent of faster and larger computers.

The use of NMR in conformational analysis begins with a description of the use of paramagnetic ions as a conformational probe. The chapter written by R. E. Lenkinski and J. D. Glickson examines the utilization of the binding of paramagnetic ions by monitoring variance in chemical shift and relaxation rates in conformational analysis. The next topic covered is the NMR examination of peptide-macromolecule interaction. The chapter by M. Blumenstein is a well-written, detailed presentation with many timely examples. S. J. Opella and L. M. Gierasch have examined the use of solid-state NMR in the study of peptide conformations. Solid-state NMR is growing in importance. This chapter should serve as a basic and focused reference on the subject. Finally, H. Kessler et al. have the formidable task of describing the use of NMR studies of solutions in the conformational analysis of peptides. Realizing that a complete introduction of NMR studies in solution would require many monographs of this size the chapter concentrates on the use of 2D techniques. There is a description, with adequate references and examples, of the most common homo- and heteronuclear techniques used in the assigning of proton, carbon, and nitrogen resonances.

Chapters on circular dichroism and fluorescence complete the book. As the contributors note both of these techniques are powerful tools, especially when used in conjunction with NMR and energetic calculations. The chapter written by R. W. Woody is a detailed description of the theoretical and experimental aspects of CD and optical rotary dispersion, ORD. There are many well-referenced examples of applications of these techniques. The use of fluorescence in conformational studies is described by P. W. Schiller. Again there are many referenced examples with an emphasis on the practical concerns of the utilization of fluorescence. The presentation of the theoretical details and the many applications are very timely.

*Unsigned book reviews are by the Book Review Editor.

In conclusion, I found the coverage of each of the topics to be substantive and complete. The style of the book is surprisingly uniform, resulting in a readable coverage of the conformational analysis of peptides.

Murray Goodman, *University of California, San Diego*

The Manipulation of Air-Sensitive Compounds. 2nd Edition. By D. F. Shriver (Northwestern University) and M. A. Drezdron (Amoco Chemical Co.). John Wiley and Sons: New York, 1986. x + 326 pp. \$44.95. ISBN 0-417-0-86773-X

Improving a very popular book is always an onerous task. Improving one that is so good that research groups have been photocopying it because it is out of print can be even more difficult. Nonetheless, Shriver and his co-author M. A. Drezdron have done what they intended to do, make a good book even better. They have brought up to date as a 2nd edition the book of the same title first published by Shriver with McGraw-Hill in 1969. Useful headings and examples make the book excellent for the day-to-day researcher.

In addition to four chapters dealing with Inert Atmosphere Techniques (Part 1), and six chapters on Vacuum Line Manipulations (Part 2), the book has six appendices, each of which is very useful. Part 1 includes chapters on the following: bench-top techniques; glovebox procedures; purification of inert gases; and purification of solvents and reagents. Part 2 has chapters on the design of vacuum lines; pumps; pressure and flow measurement; joints, stopcocks, and valves; specialized line equipment and operations; and metal systems. The appendices cover safety, glass and glass blowing; plastics and elastomers, metals, vapor pressures of pure substances; and conversions for pressure and flow.

By and large, this is a "how to do it" book, organized in a useful, readable manner. The first chapter on benchtop inert atmosphere techniques is essential reading for the student of organometallic synthesis. Since *Aldrichimica Acta* (Vol. 19, pages 31-41, 1986) recently published an excellent review by G. B. Gill and D. A. Whiting on "Guidelines for Handling Air-Sensitive Compounds", I have compared material in Shriver and Drezdron with the material written by Gil and Whiting. The presentations appear to be complementary. Both should be read by users of air-sensitive materials.

Although each chapter in Shriver and Drezdron will have special meaning for the researcher, I find several of the chapters to be excellent information for students of inorganic and organometallic chemistry. Chapter 3 contains information on desiccant capacities, the preparation and use of oxygen removing solutions, oxygen scavengers, and gas purification trains, all topics of considerable importance to the student planning to use air-sensitive materials. The purification of solvents, Chapter 4, also will find general use by all students of chemistry.

Sometimes students treat equipment used in the laboratory as if it were a black box. Shriver and Drezdron help us solve this problem. A good vacuum line is described, various types of baths for handling volatile materials are detailed, and considerable attention is paid to safety throughout the book. The vulnerability of rotary oil seal pump design to mistreatment is impressed upon the mind of the reader by Figure 6-2. Chapter 8 on joints, stopcocks, and valves is especially useful to anyone using ground glass equipment.

Although much of the material in the new edition of *The Manipulation of Air-Sensitive Compounds* can be found in other sources, it is handy to have the essential information in one location. Shriver and Drezdron have done this well. As a result the book undoubtedly will exhaust its current printing within a relatively short period of time. It should find its way into every research laboratory involved with organometallic synthesis and the handling of other air-sensitive materials.

John P. Fackler, Jr., *Texas A&M University*

Cytochrome P-450: Structure, Mechanism and Biochemistry. Edited by P. R. Ortiz de Montellano (University of California, San Francisco). Plenum Press: New York, 1986. x + 556 pp. \$69.50. ISBN 0-306-42147-X

The cytochromes P-450 have made the transition from being classified as a mysterious group of nonspecific monooxygenases to that of an important class of membrane-bound enzymes with properties that cannot only be understood but in some cases can be predicted. This book is organized around an evolving self-consistent body of information concerning these enzymes and a unified picture of their induction, mechanism of action, and physiological regulation in mammalian (including mitochondrial) and bacterial systems. This does not mean that all these processes are understood; for example, knowledge of the remarkable process of substrate induction is in its infancy, but there is enough known to construct a framework of ideas that can serve as the foundation for new experimental studies. This unified approach has resulted in a book that provides both students and researchers in this field with a concise overview of the cytochromes P-450 without overwhelming them with a

bewildering abundance of factual information concerning these complex enzyme systems.

The topics covered include chemical model systems, a comparison of peroxidase and P-450 activity, the topology of the active site, the role of P-450 reductase and cytochrome *b₅*, membrane organization, isozymes, the mechanism of oxygen activation, inhibition, induction, regulation, sterol biosynthesis, and bacterial enzymes with emphasis on P-450_{cam} from *P. putida*.

An approach based on the presentation of the information that is understandable within the context of consistent chemical and biological processes necessitates omitting data that are incomplete or not consistent with this picture. This approach also results in the omission of the discussion of the problems that were overcome in developing new methodology to purify and characterize these membrane-bound enzymes, an essential part of the research that was necessary to bring the field to its present level of understanding. An appendix that lists the properties of thirteen well-characterized rat hepatic cytochromes P-450 hints at the magnitude of this accomplishment. The metabolism of xenobiotics and activation of carcinogens, driving forces for much of the research in this field are discussed only within the framework of mechanism and function. My personal interest in the topic of the P-450's from eukaryotic microorganisms such as yeast and fungi is essentially absent. These omissions are unfortunate but understandable, since the goal was a book and not an encyclopedia. My main criticism is that there is unnecessary repetition of the details of steroid metabolism, but this is not a major deficiency.

I recommend this volume to every chemist, biologist, and physicist undertaking research on the cytochromes P-450. A less expensive paperback version would be desirable for student use in a special topics course which explores this unique and important group of enzymes.

James P. Ferris, *Rensselaer Polytechnic Institute*

Shock Waves in Condensed Matter. Edited by Y. M. Gupta (Washington State University). Plenum Press: New York, 1986. xvi + 954 pp. \$125. ISBN 0-306-42276-X

This book contains the proceedings of the Fourth American Physical Society Topical Conference on Shock Waves in Condensed Matter that was held in Spokane, Washington, July 22-25, 1985. Over 130 papers are included in eleven sections, covering both experimental and theoretical studies of mechanical properties (both microscopic and macroscopic), optical properties, equations of state, geophysical materials, energetic materials, and materials synthesis. The first four papers, which were given as plenary talks, provide a good overview of and introduction to shock-wave physics and chemistry, including a history of the field, the use of diamond-anvil cells to reach static high pressures, computer simulations of nonequilibrium processes, and the role of shock waves in materials science. A subject index is provided.

Richard LeSar, *Los Alamos National Laboratory*

Neuromethods: Volume 1. General Neurochemical Techniques. Edited by Alan A. Boulton and Glen B. Baker. Humana Press, Inc.: Clifton, NJ, 1985. viii + 576 pp. \$64.50 US/\$74.50 export. ISBN 0-89603-075-X

If you have ever needed to know how to dissect a brain, slice it to obtain subcellular fractions, isolate discrete nuclei, perfuse parts of the brain, or lesion or stimulate it, then this is the source book for those and many other specific neurochemical techniques. Although some excellent methods books have recently appeared, notably in neuroanatomy, techniques in the neurosciences are evolving rapidly. There have been very few volumes dedicated to the methodologies employed by neurochemists, and those available often seem either out of date or of limited scope. This volume contains a comprehensive description of the methods most widely used by contemporary neurochemists and is written by colleagues who are practicing experts.

Volume 1 is the first in a series of currently five volumes of *Neuro-methods* and will be useful to all neuroscientists since it concerns those procedures used routinely across the widest range of subdisciplines. The editors and contributors have included clear treatments of fundamental methodologies with practical, step-by-step techniques in adequate detail and in many cases detailed protocols with illustrations, as well as short introductory reviews of the methods and/or related substances, comparisons with other methods, and the relationship of the substances being analyzed to neurological and psychiatric disorders. Each article provides an authoritative in depth treatment of a particular methodology, its specific techniques, its results, and interpretation by scientists who are among the most distinguished pioneers and exponents.

Fundamental techniques discussed in this inaugural volume include the following: Subcellular fractionation; Evoked potential methods; Microiontophoresis; Production of brain lesions; Transmitter identification; Transmitter selective lesions; In-vivo electrical stimulation; In-vivo

chemical stimulation; Microinjection systems; Micropressure techniques; Axonal transport methods; Blood-brain barrier transport; Histochemical mapping; Cell and tissue cultures; Monoclonal antibody methods; Perfusion techniques; Electrophysiological methods; Behavioral electrophysiology; Autoradiography; Brain nuclei microdissection; Postmortem neurochemistry; and Brain slices: uses and abuses.

Collecting these general techniques together in a single volume is not only a service but also will no doubt prove of exceptional utilitarian value as well to every neuroscientist—whether student or professional, experimentalist or clinician. The series of *Neuromethods* has grown and encompasses neurochemistry, neuropsychiatry, neurology, neuropathology, neurogenetics, neuroethology, molecular neurobiology, and no doubt many more “neuros” in the future. Volume I in the *Neuromethods* series will be particularly useful to both basic and clinical neurochemists.

George H. Fisher, *University of Miami*

Processing, Structure and Properties of Block Copolymers. Edited by M. J. Folkes. Elsevier Applied Science Publishers: London and New York. 1985. ix + 212 pp. \$45.00.

Much current interest in block copolymers stems from their remarkable microphase morphology that shows distinct domains corresponding to the two blocks. However, in spite of their commercial importance, for instance, as thermoplastic elastomers or compatibilizers of polymer blends, relatively little has been published on the processing of these polymers and its effect on the domain structure and physical properties of processed samples. As the editor points out, “There is a unique opportunity in this area for the application of fundamental scientific principles to the technology of block copolymers.” The book consists of five chapters, dealing respectively with an “Introduction and Overview”, “The Interrelation between Microstructure and Properties of Block Copolymers”, “Melt-Flow Properties of Block Copolymers”, “Block Copolymers and Blends as Composite Materials”, and “Segmented Copolymers with Emphasis on Segmented Polyurethanes”. The book will be of interest to those with research interests in the general area of block copolymers as well as to the reader with an interest in the science and technology of block copolymers.

The first chapter, by S. L. Aggarwal, provides an introduction to the subject and covers historical aspects as well as the synthesis, domain structure, morphology, and block copolymer types with emphasis on polystyrene-polybutadiene-polystyrene (Kratons).

Chapter 2, by A. Keller and J. A. Odell, largely deals with their own research on the structure of highly regular SBS “single crystals” and their preparation, morphology, and optical and mechanical properties. The chapter clearly demonstrates the use of samples with a well-defined single-crystal morphology in the analysis of morphologically more complex heterogeneous materials.

Chapter 3, by J. Lyngaae-Jorgensen, discusses the melt-flow properties of block copolymer, principally SBS block copolymers with emphasis on the effects of molecular structure, temperature, and frequency on domain structure and on rheology.

Chapter 4, by R. G. C. Arridge and M. J. Folkes, describes the structure and behavior of composite materials formed by block copolymers and their blends with homopolymers. The processing, particularly injection and screw extrusion moulding of SBS block copolymers and their blends with homopolymers, is discussed along with the mechanical properties and the domain structure of the processed samples.

Chapter 5, by S. Abouzahr and G. L. Wilkes, deals primarily with the chemistry and solid-state behavior of segmented polyurethanes with emphasis on chemical structure property correlations. The effects of the structure of both the soft and hard segments are discussed as well as the effects of chain extenders and of molecular weight and polydispersity.

T. E. Hogen-Esch, *University of Florida*

Theory of Intermolecular Interactions. By I. G. Kaplan (Karpov Institute of Physical Chemistry, Moscow). Translated by E. S. Kryachko (Institute for Theoretical Physics, Kiev). Translation editors: S. Fraga and M. Klobukowski (University of Alberta). Elsevier Scientific Publishing B. V.: Amsterdam and New York. 1986. xv + 416 pp. \$108.00. ISBN 0-444-42696-5

The author of this book, which is Volume 42 of the *Studies in Physical and Theoretical Chemistry* series, attempts to cover a very broad subject, namely, to provide both a physical insight into the nature of intermolecular interactions as well as a critical discussion of the modern state of the theory. As the author admits, the breadth of the material necessitates that certain compromises be made in deciding what is covered. All in all, however, the book succeeds in providing a thorough, systematic description of this important field. The book probably will not, however, serve as a practical guide to intermolecular interactions, but rather it seems to be best suited for those interested in the details of calculations of these interactions. While the book may go into somewhat too much

detail for some, the chapters are independent enough so that those of less interest can be skipped. A rather comprehensive set of references is provided. Unfortunately, the book was originally published in 1982 (in Russian) and thus advances in theoretical techniques made since then are not well represented.

After a brief introduction, which includes a survey of the history of studies of intermolecular interactions, the author provides a qualitative discussion of the basic types of interactions (electrostatic, exchange, etc.). In the next two chapters, the book discusses in great detail methods of calculating the interactions, first at long range and then at short and intermediate ranges. Where possible, the appropriate analytical forms of the long-range interactions are given. A useful discussion then follows about the nature of many-body interactions. For completeness, an appendix includes a discussion of the quantum theory of many-electron systems. These chapters provide a very detailed description of the basic theory of intermolecular interactions.

Perhaps the most useful chapter for non-theorists is the last chapter, which deals with the determination of molecular potentials from experimental data. The author presents about thirty different empirical potentials (including Lennard-Jones, Stockmayer, etc.) which can be used to describe interactions between atoms and molecules. A useful discussion then follows about the types of experimental data which can be used in determining potentials.

Despite being an interesting and potentially useful volume, the book suffers from having a poor physical presentation. In particular, the equations are not as easy to read as they might be. Certain symbols and Greek letters were written in by hand. Also, the index is not complete.

Richard LeSar, *Los Alamos National Laboratory*

Annual Review of Physical Chemistry. Volume 37. Edited by Herbert L. Strauss (University of California, Berkeley). Annual Reviews Inc.: Palo Alto, CA. 1986. x + 653 pp. \$32 in the U.S. and \$35 elsewhere. ISBN 0-8243-1037-3

There is no specific theme in this volume, but rather it represents an interesting cross section of recent developments in both experimental and theoretical physical chemistry. There are twenty articles, ranging in subject from NMR studies of metal surfaces to the use of path-integral techniques to study quantum systems. The first article is a rather entertaining history of the first 50 years of the *Journal of Chemical Physics* by J. W. Stout (a former editor). Other subjects include the following: electron and energy transfer, molecular dynamics, biopolymers, molecular crystals, atom-surface scattering, photochemistry, fluids, and computer simulations. Detailed author and subject indices are provided.

Richard LeSar, *Los Alamos National Laboratory*

Analytical Methods for Pesticides and Plant Growth Regulators. Volume XIV. Modern Analytical Techniques. Edited by G. Zweig (Zweig Associates) and J. Sherma (Lafayette College). Academic Press: Orlando, FL. 1986. v + 265 pp. \$50.00. ISBN 0-12-784314-0

This is the latest in a series of books that has been going on for 25 years. The goal of the series is to “introduce the reader to principles and general and specific methods of analysis” of pesticides and related compounds. The goal of this particular volume is to review “the very latest techniques for pesticide analysis”. From the selection of topics and the way in which they are presented, the editors probably did not have a very sophisticated audience in mind. For example, about 70% of the book is devoted to gas chromatography and mass spectrometry—techniques that are *not* “the very latest” to be applied to pesticide analyses.

The book has 6 chapters that range in quality from acceptable to quite good. The chapter on thin-layer chromatography is marred by the gratuitous inclusion of several photographs of one manufacturer’s TLC apparatus. The chapter on high-performance liquid chromatography is nicely supplemented by a long list of “reported HPLC methods for the analysis of pesticides”. There are two chapters on gas chromatography, one on packed columns, and the other on capillary columns; the latter, unfortunately, is the shortest chapter in the book. The chapter devoted to packed column gas chromatography includes 15 pages of relative retention time data for pesticides—this is done despite the clear preference in the modern literature for expressing GC retention behavior as retention indexes (methylene unit equivalents). It is not clear why the material on gas chromatography should have been split asunder, and as a result, neither of these two chapters is particularly successful. There are also two chapters on mass spectrometry. The first (by L. O. Ruzo and W. M. Draper) is excellent. It is a comprehensive, up-to-date review of modern mass spectrometry and its applications to pesticide analysis. The second chapter focuses on case studies and is less useful. As with the two GC chapters, the book would have benefited if these two chapters had been combined.

In general, this is a cute, little book that would be helpful to pesticide analysis technicians and, in some cases, to researchers in this field.

Ronald A. Hites, *Indiana University, Bloomington*

Books on Physics and Mathematics

Maximum Entropy and Bayesian Methods in Applied Statistics. Edited by James H. Justice (University of Calgary). Cambridge University Press: New York. 1986. 319 pp. \$44.50. ISBN 0-521-32380-0

This is actually a volume of proceedings of a "workshop" held in Calgary in 1984, but it also contains a paper not presented there. It is concerned with interpretation of situations in which information is incomplete and derives its focus from a posthumous paper by Thomas Bayes, a British clergyman and mathematician of the eighteenth century.

Empirical Model-Building and Response Surfaces. By George E. P. Box and Norman R. Draper. John Wiley and Sons: New York. 1987. viii + 669 pp. \$45.00. ISBN 0-471-81033-9

This book is concerned with fitting experimental data to mathematical expression, even when the mechanistic model of the system is unknown, with the object of correlation and optimization of results.

Optical Spectroscopy of Glasses. Edited by I. Zschokke (University of Basel). D. Reidel Publishing Co.: Boston. ix + 272 pp. \$79.00. ISBN 90-277-2231-5

In five contributed chapters, the optical properties of glasses, relaxation processes, reaction dynamics, and model calculations are reviewed.

Books on Applied Subjects

Succeeding in High Tech: A Guide to Building Your Career. By Marlene Shigekawa. John Wiley and Sons: New York. 1987. xii + 294 pp. \$29.95. ISBN 0471-85636-3

This is a book about personal behavior and interaction in corporate employment. The author bases her approach on the assumption that modern "high-tech" business differs from the traditional in important organizational ways, especially in relation to innovation. Many chemical firms presumably qualify.

Regulating Pesticides in Food: The Delaney Paradox. National Academy Press: Washington, D.C. 1987. xiv + 272 pp. \$19.95. ISBN 0-309-03746-8

This softbound volume is a report by the Committee on Scientific and Regulatory Issues Underlying Pesticide Use Patterns and Agricultural Innovation. The Committee was formed by the Board on Agriculture of the National Research Council at the request of the Environmental Protection Agency. The main cause of the request is the Delaney Clause in the Federal Food, Drug and Cosmetic Act, which "purports to bar the EPA from granting any tolerance for a pesticide residual that has been found to induce cancer in animals". The impact of this seemingly innocent provision is potentially enormous, and it could influence the availability of food to the world in general and shape the research of chemists in the pesticide field. The Report describes the present situation, estimates of risks, possible scenarios, economic impact, and prospects for pesticide innovation. There are extensive appendices and an index.

Moisture Sensors in Process Control. By K. Carr-Brion. Elsevier: Amsterdam. 1986. ix + 122. \$39.95. ISBN 1-85166-005-4

This book is concerned with process control and the problem of automating it by using on-line sensors. Moisture control is particularly difficult in this regard, and the author brings together a large array of practical information about determining moisture in gases, liquids, and solids. The final chapter even lists suppliers of instrumentation and "centres of expertise".

Silent Spring Revisited. Edited by Gino J. Marco, Robert M. Hollingworth, and William Durham. American Chemical Society: Washington, D.C. 1987. xvii + 214 pp. \$29.95 (cloth); \$17.95 (paper). ISBN 0-8412-0981-2

This book was written in response to the fact that it was over 25 years

ago that Rachel Carson's *Silent Spring* appeared and started a cascade of events, including the establishment of the U.S. Environmental Protection Agency. A symposium was organized to assess the results, or, as the Editors' preface states, "to help assess how right Rachel Carson was". The symposium provided the basis of this book, which reviews both the science and the politics in a reasonably even-handed way. There is a lot of factual information, much of it chemical. Not surprisingly, the Editors conclude that Carson was right in many respects, wrong in others, but that the former clearly predominate.

Nutritional Toxicology. Volume II. Edited by John N. Hathcock. Academic Press: Orlando. 1987. xiv + 300 pp. \$65.00. ISBN 0-12-332602-8

This book is designed to supplement Volume I, which appeared in 1982, by treating subjects that have become more important in recent years, or about which there has been an unusual increase in knowledge or awareness. The eleven contributed chapters reflect the growing appreciation of the fact that toxicology and nutrition interact, each modifying the other. There are thus significant implications for biochemistry, pesticide research and control, and environmental contamination.

Crushing and Grinding Process Handbook. By C. L. Prasher. John Wiley and Sons, Inc.: New York. 1987. vii + 474 pp. \$74.95. ISBN 0-471-10535-X

Almost every chemist has been concerned with crushing and grinding, even if only as an undergraduate preparing to determine a melting point, but there are chemical and mechanical engineers who have become professional crushers and grinders. This book is for them. It takes up the subject in a fully contemporary way and includes such subjects as the physics of breakage, energy consumed in size reduction, and modelling and simulation.

Advances in Cereal Science and Technology. Volume VIII. Edited by Y. Pomeranz. American Association of Cereal Chemists: St. Paul, MN. 1986. ix + 364 pp. \$60.00. ISBN 0-913250-45-7

This is a collection of seven reviews: International Cooperation in Cereal Research; Yeasts; HPLC of Cereal Proteins; Effects of Sulfur Supply; Cell Walls and their Components; The Genetic Organization of Zein, and Traditional Foods from Sorghum. The importance of the general subject is emphasized by a quote from P. C. Mangelsdorf made 35 years ago: "No civilization... has ever been founded on any agricultural basis other than cereals."

Applied Geothermics. Edited by Michael J. Economides and Pierre O. Ungemach. John Wiley and Sons: New York. 1987. xiii + 238 pp. \$69.95. ISBN 0-471-91179-8

The main concern of this book is the use of geothermal sources for heat and conversion to electrical energy. There is a chapter on geochemistry in geothermal exploration, which treats both the chemical characteristics and the isotopic composition of geothermal waters, and another on chemical thermodynamics in geothermal operations.

Methods for Analysis and Testing of Petroleum and Related Products. 1987. Volumes 1 and 2. Institute of Petroleum: London. John Wiley and Sons: New York. 1987. \$179.95. ISBN 0-471-91436-3

This work saw its first publication in 1924 by the Institute of Petroleum (London). It is a compilation of over 250 testing procedures, with full laboratory directions, augmented by seven appendixes that give specifications, physical properties, etc. This edition includes 72 methods that are designated as joint methods by the IP and ASTM. The methods are very thoroughly described and leave little to the imagination, but some of them show their age by specifying nearly obsolete apparatus, such as glassware held together with corks. By the nature of this work, references are not to be expected, and few are given. Methods for calculating results are given routinely, and diagrams of apparatus abound.