

Book Reviews*

Chemistry of Coal Conversion. Edited by Richard H. Schlosberg. Plenum Press: New York. 1985. xi + 336 pp. \$52.50. ISBN 0-306-41974-2

Richard Schlosberg is correct when he describes "when" and not "if" as the essential uncertainty regarding the need for synthetic liquid fuels. Our problem is that even if "when" is the year 2000, commercialization of a coal liquefaction process concept requires immediate action.

Schlosberg's book, *Chemistry of Coal Conversion*, is a useful snapshot of coal reaction research, including basic chemistry, transport, modeling, and processing, developed during the decade of 1970. *Chemistry of Coal Conversion* should assist both the basic research community during the present "low urgency" climate as well as the development community during the inevitable period of commercialization.

The book is a collection of articles by prominent coal researchers in both industry and academia. The authors are chemists and engineers who not only draw upon their own research areas but also provide enough reference to the literature to give *Chemistry of Coal Conversion* pedagogical value.

The excellent chapter by Stephen E. Stein is a survey of the fundamental free-radical chemistry shared by low molecular weight coal model compounds and the coal moieties the models are meant to mimic. Stein's organization of the stabilization energies and elementary reactions of coal-related free radicals is superb; his use of thermochemistry and linear free-energy relationships shows the susceptibility of coal conversion to fundamental analysis. Stein's chapter is of lasting value with or without his working assumptions pertaining to the differences between coals and model compounds: the intrinsic chemistry he summarizes will be coupled to analyses of the extrinsic factors that render coals and coal models different in a comprehensive description of coal reactivity.

Mass transfer limitations provide an example of such an extrinsic factor. This topic is nicely covered in separate chapters by Frank Hershkowitz and Eric Suuberg. Hershkowitz begins with a useful pedagogical review of diffusion and mass transfer fundamentals that serves his discussion of two important mass transfer models well. Suuberg's comprehensive review should be required reading for all new investigators of coal-related mass-transfer effects.

Heat-transfer limitations can also confuse the analysis of a coal pyrolysis in the light of a model experiment. Solomon and Hamblen deal with this along with many other factors they classify as either sensitive or insensitive to rank. Their message is, essentially, that it is a good first-order approximation to view the reactivity of a functional group within a coal as independent of the rank of that coal. Rank may control the distributions of functional groups, but not their reactivity. This seems to be consistent with both the usual short-range effects of neighboring substituent groups and the basic message of Stein; coal comprises a finite number of bonds that follow a fairly well defined set of reaction paths through interpretable mechanisms. Solomon and Hamblen also provide agreement between experiments and functional group-based model predictions.

Stock's discussion of hydrogen transfer reactions addresses several differences between model systems and the reactions of coal. He presents a scholarly and objective analysis of the relative contributions of free-radical and pericyclic mechanisms for the reactions of coal moieties and their models. Although the former likely predominate, the latter are noted as possibly relevant in certain instances, e.g., dehydrogenation, and also in the initiation of free-radical processes. Stock notes as important the interactions between liquefaction components and emphasizes the need to account for the synergy, or coupling, of reaction processes that would go unprobed in well-defined experiments with pure compounds. Finally, his own work is a model of the power of isotopic labeling in unraveling the complexities of coal reactions.

The book concludes with a chapter by Maa, Trachte, and Williams that serves to integrate much of the preceding material in the framework of the Exxon Donor Solvent coal liquefaction scheme. This valuable discussion of the EDS scheme uses solvent effects as the organizing vehicle.

Comparison of the first and last chapters of *Chemistry of Coal Conversion* brings forth the enormous breadth of research in the coal liquefaction community and the need for integration of its various components. The excellent fundamental chemistry summarized by Stein and Stock requires, for example, both the accounting of mass transfer, as illustrated

by Hershkowitz and Suuberg, and also modeling, as illustrated by Solomon and Hamblen, if it is ever to impact the flowsheets presented by Maa et al. Schlosberg has captured representative elements of the work that will allow, someday, his "when" to be "now".

Michael T. Klein, *University of Delaware*

Structural Methods in Inorganic Chemistry. By E. A. V. Ebsworth, D. W. H. Rankin, and S. Craddock (University of Edinburgh). Blackwell Scientific Publications, Inc.: Oxford and Palo Alto, CA. 1987. xi + 456 pp. \$40.00. ISBN 0-632-01592-6

This book is intended to be used by senior undergraduates, graduate students, and those starting research in inorganic chemistry. The content provides a broad overview of the most important spectroscopic methods used to elucidate the structure of well-defined inorganic species. (Methods for characterizing surfaces and heterogeneous systems are not included, although some references for the more important surface techniques appear in Chapter 1.) Chapters 2 through 9 treat the topics of nuclear magnetic resonance spectroscopy (Chapter 2, 77 pages), electron spin and nuclear quadrupole resonance spectroscopy (Chapter 3, 24 pages), rotational spectroscopy (Chapter 4, 35 pages), vibrational spectroscopy (Chapter 5, 75 pages), electronic and ultraviolet photoelectron spectroscopy (Chapter 6, 41 pages), Mössbauer spectroscopy (Chapter 7, 24 pages), diffraction methods (Chapter 8, 41 pages), and mass spectrometry (Chapter 9, 16 pages). Since most of these chapters are sufficiently self-contained to be presented in nearly any order, there is some overlap of material. (For example, rotational fine structure in gas-phase infrared spectra is discussed in both Chapters 4 and 5.) However, the amount of overlap is not objectionable and serves to tie the material in different chapters together. Problems are included at the end of each chapter. Many are referenced in the literature, and answers or hints for the solution of the odd-numbered questions appear at the end of the book.

The stated aim of this book is to help the reader understand the literature, make decisions about what techniques will be most useful in solving a particular structural problem, and interpret the resulting experimental data. In line with this aim, basic principles involving each technique are discussed, although extensive treatment of the theory and experimental details associated with each method has been kept to a minimum. For example, selection rules are given, but not derived. However, a brief introduction to Group Theory is provided in an appendix to facilitate development of the chapter dealing with vibrational spectroscopy. Current examples from the literature illustrate the utility and versatility of each method. An ample listing of up-to-date references at the end of each chapter can be used to locate additional information to supplement the book.

In addition to chapters dealing with individual methods (2 through 9), the book also includes two chapters that present a more general overview of the subject and help to place the importance of each method in perspective. Chapter 1 (27 pages) considers the sequence of steps typically used to characterize an unknown compound, the limitations (as well as the advantages) of each structural method, the effect of time scales on experimental data, and the impact of lasers, computer acquisition and treatment of data, and Fourier transform techniques on modern instrumentation. A strong feature of Chapter 1 is the inclusion of an 8-page glossary of 89 spectroscopic techniques. Each technique is listed alphabetically by name as well as acronym, and each is briefly described with the general area of application specified. All 89 techniques are referenced, by section in the book (where appropriate) or in the current literature.

All of the first 9 chapters lead up to Chapter 10 (53 pages, 86 references)—an examination of 18 case histories from the literature. Some of these case histories involve the structure of only one species ("Sodium Orthonitrate" or "Fe(CO)₄"), while others demonstrate how piase influences structure ("Xenon Hexafluoride"), or compare a series of compounds of a related structural type ("Bridging Hydrogens in Methyl-Metal Compounds" or "Chromium-Chromium Quadruple Bonds"). These studies are well-chosen and demonstrate the value of combining experimental evidence from more than one structural method.

In summary, the book gives an up-to-date presentation of modern methods of inorganic structure determination at a level that is appropriate for its intended audience. Professors using this book as a text for a course in inorganic physical methods may feel the need to supplement the theoretical treatment of some topics and to add material covering physical methods that are not considered in this text (electrochemical methods,

*Unsigned book reviews are by the Book Review Editor.

magnetism, and calculation of ligand-field splittings, for example). While much of the material may be too general for an established researcher in the field, the book will be particularly helpful to those who are just beginning to read the primary literature in inorganic chemistry and need an introduction to the myriad of techniques employed and the acronyms used to describe them. The value of the book as a general source of information on structural methods could be strengthened by including a chapter or two on surfaces techniques. However, the methods chosen for coverage fit the stated purpose of the text.

Marianna Anderson Busch, *Baylor University*

Magnetochemistry. By Richard L. Carlin (University of Illinois at Chicago). Springer-Verlag: New York. 1986. XI + 328 pp. \$38.00.

This is a very concise, extensively referenced, well-written text that emphasizes the relationships between the magnetic properties of transition-metal complexes and their structures.

The introduction to magnetic exchange which begins with dimers and clusters and evolves to more extended, long-range order is exceptionally well done. The text in each chapter is reinforced by many examples of magnetic complexes taken from the current literature and relevant mathematical modeling. Chapter 6, Long Range Order Ferromagnetism and Antiferromagnetism, is quite comprehensive and includes such topics as molecular field theory, Ising, XY, and Heisenberg Hamiltonians, thermal effects, magnetic dipole-dipole interactions, superexchange, field dependent phenomena, and mechanisms of spin canting. Chapter 7, on Lower Dimensional Magnetism, is profusely illustrated and provides an interesting and quantitative overview of a very exciting field of research. This chapter contains 173 references.

The author then turns to brief discussions of the magnetochemistry of the less researched 4d and 5d transition-metal ions and to the extensively researched rare earths and lanthanides.

In Chapter 10, Selected Examples, the author does a nice job in selecting examples of interesting magnetic materials to tie together the principles discussed in the earlier chapters. The author states that the emphasis is on results based on specific heats and magnetic susceptibilities with the objective of laying a firm foundation for a structural basis of magnetochemistry. In this reviewer's opinion, he has accomplished his objective.

Chapter 10 is the grand finale to this excellent presentation, but a chapter which briefly discusses some experimental procedures has been added which could well have been omitted. However, this does not detract from the overall effectiveness of the text.

In the preface the author states "The Nobel Laureate, J. H. Van Vleck, has written a brief but comprehensive review of magnetism and he has argued that quantum mechanics is the key to understanding magnetism. I would go further and argue that magnetism is the key to understanding quantum mechanics, at least in a pedagogical sense, for so many physical phenomena can be understood quantitatively in this discipline." With this text, the author makes his point.

William J. James, *University of Missouri—Rolla*

Essays on the History of Organic Chemistry in the United States, 1875-1955. By Dean Stanley Tarbell and Ann Tracy Tarbell (Vanderbilt University). Folio Publishers: Nashville, Tennessee. 1986. x + 434 pp. \$21.95.

This is a significant book. In 26 essays the authors describe the development of organic chemistry in the United States in the 80 years from 1875 to 1955. There is no other book like it, and this reviewer is convinced that it will be an important influence, both now and for a long time to come, on all who study, teach, and practice organic chemistry. It will also be of use to historians and others involved with organic chemistry. The authors, both of whom have doctorates in organic chemistry, have done an enormous amount of reading in connection with the writing of this work. With their commendable erudition and industry, they are reminiscent of another team of historians, Will and Ariel Durant, the authors of *The Story of Civilization*. The book is illustrated with photographs of 17 leading organic chemists of the period. The photographic portrait of the late Robert B. Woodward by Fabian Bachrach stands out as particularly impressive and shows how a good photographer is able to capture the ethos of a subject.

Organic chemistry in the United States continues its remarkable progress and this progress will have to be the basis of more books that one hopes are written with the same verve and understanding as this one.

The Tarbells' personal involvement with organic chemistry at the laboratory bench and their many professional associations have helped them put across their message. The authors took a relatively long time to write and compile these essays partly because of the enormous amount of work done in American organic chemistry in these 80 years. One is reminded of the Portuguese fisherman's prayer, "O God, your ocean is so large and my boat is so small".

These essays are available to members of the Division of Organic Chemistry and the Division of the History of Chemistry at a discounted price. The Tarbells have well earned the gratitude of the members of these divisions by writing this valuable work.

David H. Kenny, *Michigan Technological University*

Stable Gas-in-Liquid Emulsions: Production in Natural Waters and Artificial Media. By Joseph S. D'Arrigo (Cavitation—Control Technology). Elsevier Scientific Publications: Amsterdam and New York. 1986. xvi + 220 pp. \$66.75. ISBN 0-444-42566-7

Colloidal dispersions of gas-in-liquid type are not as wellknown relative to liquid-in-liquid or solid-in-liquid dispersions. The gas-in-liquid dispersions consist of bubbles in the size range of 0.5-100 μm . Such microbubbles are found to occur in natural waters. Their spontaneous generation in physiological fluids has also been postulated.

The occurrence of gas microbubbles is associated with much practical significance. For example, they affect the inception of hydrodynamic cavitation and thus constitute an important factor in the design of hydraulic devices like pumps, turbines, and propellers. Microbubbles in the upper ocean cause absorption and scattering of sound and thus can have a significant effect on acoustic propagation. Processes of oceanographic and biological significance such as gas exchange, concentration of bacteria, and organic particle formation are also influenced by the presence of bubbles in the surface region of the ocean. Microbubbles are also considered to play a role in the transport of dissolved organic matter into atmosphere. Artificial bubble systems have applications in the area of waste water treatment. They are also useful for the biomedical applications of echocardiography and ultrasonic blood flow measurements. The present book introduces the reader to these and other applications and thus provides a stimulus for research activity in a number of seemingly unconnected areas.

The bulk of the book is devoted to examining the occurrence of the gas-in-liquid dispersions in natural media. The first chapter reviews the occurrence of microbubbles in natural waters. The second and the third chapters are devoted to studies with carbohydrate gels and soil extracts which demonstrate the presence of microbubbles. The extraction and biochemical characterization of the natural glycoprotein type surfactant which stabilizes the microbubbles is considered in detail in the next two chapters. The following two chapters focus on the surface properties of the surfactant material with emphasis on the elucidation of the active component within it. The postulated existence of microbubbles in physiological fluids is examined in chapter eight. The final two chapters are devoted to the generation and identification of microbubbles with synthetic surfactants. Laser light scattering and photon correlation techniques have been used for their characterization.

Overall, the book is successful in introducing the reader to the various phenomena and applications involving gas-in-liquid dispersions. One is rather struck by the virtual absence of quantitative physicochemical analysis in the literature dealing with the area. The book thus provides both a theorist and an applied scientist or engineer interesting raw information to work on.

R. Nagarajan, *The Pennsylvania State University*

A Guide to the HPLC Literature. Volume 2 (1980-1981). Volume 3 (1982). By H. Colin, Ante M. Krstulovic, J.-L. Excoffier, and G. Guiochon. John Wiley and Sons: New York. Volume 2: 1984. xic + 959 pp. \$100.00. ISBN 0-471-087992-4. Volume 3: 1985. xiv + 575 pp. \$100.00. ISBN 0-471-80687-0

High-performance liquid chromatography (HPLC) has undergone phenomenal growth because it has become an essential part of all of science. Consequently, this growth has contributed to an increasing number of publications that deal with chromatographic principles, strategies, and applications. The purpose of this series is to collate these numerous works into a convenient form which allows a researcher to retrieve the literature necessary to solve the researcher's problem. This is a formidable task and perhaps one that is impossible if all HPLC strategies and applications are to be included in a publication that is up to date.

In this series Volume 1 covers the period 1966-1979, while Volumes 2 and 3, which are the subjects of this review, cover the period 1980-1981 and 1982, respectively. No attempt is made to cover all of chromatography and topics such as gel permeation, ion exchange, affinity chromatography, and thin-layer chromatography are not included. Subsequent volume(s) will deal with ion chromatography, supercritical fluid chromatography, and other emerging HPLC strategies.

The volumes are composed of citations of literature articles that contain the title, author(s), affiliation, journal reference, and language. The key to the value of the volumes is to become acquainted with the guidelines used to collate the references. For the most part the cataloging appears to be done only by considering key words in the title. Unfortu-

nately, this presents a limitation since the authors of this series are relying heavily on the ability of past workers to have titled a given research article that is appropriate not only at the time of publication but also for subsequent applications.

Each volume is divided into 7 sections and each section is further divided into chapters. The sections focus on books, fundamentals, preparative HPLC, micro HPLC, columns-instrumentation, sample-data workup, and applications by compound type. Indexing is unusual and apparently indexing is only by compound and only covers the chapters within Section 7 (Applications). Furthermore, each chapter has its own index. Thus, the use of the index can be awkward unless one catalogs the compound by chapter title in the exact way done by the authors. Also, Sections 1 to 6 are not covered by an index and specifics, except compound type, can only be found by scanning the literature titles listed within Sections 1 to 6. In the reviewer's opinion the indexing in its present form is of limited use and, consequently, this reduces the overall value of the volumes if one assumes that the major purpose of the volumes is to help a researcher find rapidly the key literature needed to solve a particular problem.

Donald J. Pietrzyk, *The University of Iowa*

Nucleic Acid Chemistry. Part 3. Edited by L. B. Townsend and R. S. Timpson. John Wiley & Sons: New York. 1986. xi + 337 pp. \$55.00. ISBN 0471-09248-7

This book is sub-titled "Improved and New Synthetic Procedures, Methods, and Techniques" and is the third part of a projected four-part series. The book contains contributions covering Heterocyclic compounds; Carbohydrates; Nucleosides; Nucleotides and Polynucleotides; Isotopically labelled compounds; Reagents, Intermediates, and Miscellaneous Compounds; and Instrumental or Analytical Techniques and Applications.

The very wide area of organic chemistry covered in a book of this size means that it cannot be regarded as a comprehensive review. The individual contributions to this volume are clear and, given the size, reasonably informative. Much of the work described is however several years old and so, to a chemist with any experience in this field, it may come as a disappointment.

Overall this book is a useful contribution to the reference literature in nucleic acid chemistry but cannot be recommended to anyone interested in the work of recent years.

David G. Norman, *Columbia University*

Inorganic Chemistry. 2nd Edition. By Alan G. Sharpe (University of Cambridge). Longman Group LTD.: London. 1986. xvii + 696 pp. \$39.95. ISBN 0470-20673-X

This is an inorganic textbook aimed at upper-level undergraduate or introductory-level graduate courses. The second edition is identical with the first edition in organization and format: the first five chapters cover an introduction to nuclear and electronic structure of the elements, simple valence and molecular orbital (MO) theory, and basic physical properties of molecules (shape, symmetry, bond energies, lengths, and polarities); the next three chapters move into the basic concepts behind solid-state structures (unit cells, packing, ionic radii, and energetics) and inorganic chemistry in aqueous and non-aqueous media; the next nine chapters cover the inorganic chemistry of hydrogen, alkali and alkaline earth metals, and the main group/halogen/noble gas block of elements; the next four chapters cover principles and general aspects of transition-metal chemistry (geometry, isomerism, electronic configuration, valence bond/crystal field/MO theories, thermodynamics, and kinetics); next are two cursory review chapters on metal carbonyl and organometallic compounds; and the last four chapters cover the representative inorganic chemistry of the transition metals (first row, second and third row, lanthanides, and actinides). There is roughly equal coverage devoted to non-transition and transition-metal compounds.

The author takes a very classical approach to inorganic chemistry, a fact that differentiates this text from most American analogues. In particular, there is an absolute minimum of symmetry and MOs and a maximum of chemical facts with thermodynamic and kinetic backing whenever possible. The very skimpy chapter on transition-metal organometallic complexes (only 19 pages) effectively targets this book for a dedicated inorganic class, rather than a more general inorganic/organometallic survey course. In keeping with this concept, much of the transition-metal chemistry is devoted to the higher oxidation states and makes considerable use of halide- or oxo-based compounds as examples.

I found the almost complete lack of molecular orbital based descriptions rather disturbing, particularly since qualitative MO concepts have made such an impact on modern inorganic chemistry. This was especially evident in the limited treatment given to the concept of M-M bonding in dimer and cluster systems (the presence of Re=Re double bonds in Re_3X_9 trimers is not mentioned and quadruple bonds receive only a one

sentence description concerning the nature of the bonding).

A page-by-page comparison of the first and second editions of this book indicates that the changes between them are quite minor. The preface states that discussions on several new topics such as the hydrogen economy, donor-acceptor interactions, silicon- and nitrogen-containing polymers, and molecules of biochemical interest have been added to the second edition. These, however, turn out to be quite short additions; e.g., the discussion on the hydrogen economy (production and storage of H_2 for energy uses) is only a half page contribution with the very active area of water photolysis receiving only a generalized two line reaction scheme. If you have a copy of the first edition, there is no reason to purchase the second, since approximately 98% of the two books is identical.

If you are interested in a textbook that takes a classical, descriptive approach to the inorganic chemistry of the transition and non-transition elements with a thermodynamic/kinetic flavor and little or no organometallic coverage, I would certainly consider this book. If, however, you need a text that integrates inorganic and organometallic chemistry or has a more contemporary mixture of properties, reactivity, electronic structure, and molecular orbital concepts you would be best to consider one of the other popular general inorganic texts.

George G. Stanley, *Louisiana State University*

Photochemistry in Microheterogeneous Systems. By K. Kalyanasundaram (Institute of Physical Chemistry, Swiss Federal Institute of Technology). Academic Press, Inc.: Orlando, FL. 1987. xii + 388 pp. \$49.95. ISBN 0-12-3-94995-5

The author states that this "...monograph was written to provide an introduction to the subject of photochemistry in microheterogeneous systems for the student at the graduate level and to review the recent, significant developments in the field..." The book is organized according to various types of microheterogeneous systems and discusses representative photochemistry and photophysics in each. The author's definition of a microheterogeneous system, one that is heterogeneous at the microscopic level with charged interfaces in hydrophilic or hydrophobic domains, is interpreted very liberally. Surfactant-based systems are emphasized, but non-amphiphilic media such as thermotropic liquid crystals, zeolites, and polymers are covered, also. Clathrates and neat or doped crystals are not mentioned although there have been significant research efforts employing them.

After a short introduction to photophysical and kinetic methods and an overview of microheterogeneous systems, a concise discourse on micelles is presented.

Nearly one-third of the text is devoted to micellar-related photochemistry. The remainder describes applications with reversed micelles and microemulsions, lipid-based systems, monolayers, lipid membranes, liquid-crystalline solvents, polymers, polyelectrolytes, inclusion complexes, and solid surfaces. The literature is covered through 1984 and an appendix lists titles and references to 1985 publications. The index is extensive and helpful in locating specific topics.

The level of the monograph is appropriate for its intended audience—knowledgeable but uninitiated chemists. Those seeking more in-depth information can peruse the many original citations. There are several minor typos which the reviewer found and at least one reproduced figure (p 174) which misrepresents the meaning of the original.

Although several other books with a similar theme have been published, including those by Thomas (*The Chemistry of Excitation at Interfaces*, ACS Monograph 181) and Fendler (*Membrane Mimetic Chemistry*, Wiley), Kalyanasundaram's monograph is a useful, welcome addition. It is neither a text nor a specialist's book. It is not the first book of its type the reviewer will reach for, but it is one he is happy to have on his bookshelf.

Richard G. Weiss, *Georgetown University*

Mass Spectrometry—Application in Science and Engineering. By Frederick A. White and George M. Wood. John Wiley and Sons: New York, NY. 1986. xx + 773 pp. \$72.50. ISBN 0471-09236-3

This book provides an overview of the many applications of mass spectrometry to the problems of science and engineering.

The book is divided into three sections. The first section discusses instrumentation: the various types of spectrometers and their associated hardware. Topics include ion sources, mass analyzers, detectors, tandem systems, computer-aided data processing, and combined chromatography—mass spectrometry systems. These chapters are quite comprehensive in that they mention every conceivable type of instrumentation and technique. However, specific discussion of each topic is necessarily brief, and the reader who wishes to know more about a specific topic should consult the references at the end of each chapter.

The second section covers applications of mass spectrometry to engineering and the physical sciences. Subjects include geochemistry and

geochronology; atmospheric, lunar, and planetary measurements; metals, glasses, ceramics, and composites; electronic materials and devices; electrophysics; energy system diagnostics; and on-line monitoring and process control.

The third section covers mass spectrometry applications to the environmental and life sciences. Topics include air and water monitoring, agriculture and food science, biomedical applications, pharmacology, toxicology, and forensic science. Finally, there is a concluding chapter on new frontiers in mass spectrometry and ion beam technology.

Sections two and three provide very interesting reading. However, they mostly show what types of measurements are possible, without a lot of detail on the hardware and technique used to make these measurements. Likewise, there is not a lot of emphasis on applications in the first section of the book which covers hardware. For scientists who are not mass spectroscopists, it would be helpful if there were more blending of the separate parts of the book on hardware and applications.

The book does, however, accomplish its two main objectives: to show what measurements can be made with a mass spectrometer and to inspire new and creative experiments to be done.

James Windak, *The University of Michigan*

Volumes of Proceedings

Biomolecular Stereodynamics. Volumes 3 and 4. Edited by R. H. Sarma and M. H. Sarma (State University of New York at Albany, and National Foundation for Cancer Research). Adenine Press: Guilderland, NY. 1986. 306 pp (Volume 3), 324 pp (Volume 4); \$75.00 (each volume). ISBN 0-940030-14-4 (Volume 3); ISBN 0-940030-18-7 (Volume 4)

These two volumes contain the texts of the 42 invited papers presented at the Fourth Conversation in the Discipline of Biomolecular Stereodynamics, held at SUNY/Albany in 1985. The papers, which are nicely set in type, are mostly concerned with nucleic acids and proteins, with a few papers on other subjects, such as gelation of agarose, hydration sites of urea, computer graphics simulation, etc. Each volume has its own short index.

Stereochemistry of Organic and Bioorganic Transformations. Workshop Conferences Hoechst/Volume 17. Edited by Wilhelm Bartmann and K. Barry Sharpless. VCH Publishers: New York. 1987. x + 330 pp. \$54.00. ISBN 0-89573-607-1

The Seventeenth Workshop Conference Hoechst, held at Schloss Reisenburg in 1986, was the occasion for the 18 papers in this volume, plus an opening address and introductory remarks, respectively, by the two editors. The majority of the papers have a biochemical flavor, but the topics run from "Alkyl Radicals in Organic Synthesis" (B. Giese) to "The Exciton Chirality Method and its Application to Oligosaccharide Structure Determination" (K. Nakanishi et al.). Not only are stimulating ideas and new results presented, but some leavening humor as well. Seebach, Roggo, and Zimmermann, for example, take evident pleasure in reproducing D. Perlman's "The Laws of Applied Microbiology", which include such aphorisms as "There are *no* stupid microorganisms". Well indexed.

Understanding Molecular Properties. Edited by J. Avery, J. P. Dahl, and A. E. Hansen. D. Reidel Publishing Company: Boston. 1987. x + 598 pp. \$98.00. ISBN 90-277-2419-9

The 60th birthday of Professor Carl Johann Ballhausen was the occasion for a symposium held in Copenhagen in 1986. The many papers are classified under the headings Electronic Structure of Transition Metal Complexes, Reaction Rates, Spectroscopy, Floppy Molecules and the Liquid State, and Computational Quantum Chemistry. The typescripts of the papers are as varied as the countries from which the contributors came. The combined subject/contributor index is substantial.

Nutritional and Toxicological Significance of Enzyme Inhibitors in Foods. Advances in Experimental Medicine and Biology. Volume 199. Edited by Mendel Friedman (U.S. Department of Agriculture). Plenum Press: New York. 1986. xi + 572 pp. \$85.00. ISBN 0-306-42368-5

This volume is aptly described by the editor as "a hybrid between symposium proceedings and a collection of invited papers". "About half the papers" (out of 31) are said to be invited contributions. Some papers are reviews (one of them, on safety of trypsin inhibitors in the diet, is 48 pages long), and others are reports of original research. All are reproduced from typescripts as received, even the table of contents, which shows the result of untidy paste-over correction. There are photographic illustrations and innumerable tables and figures, and a fairly thorough index. Reference citations include complete titles of the papers, and they make rewarding reading; one finds among them such exotic titles as "Comparative biochemistry of penguin egg-white proteins", for example.

Biophosphates and Their Analogues: Synthesis, Structure, Metabolism and Activity. Edited by K. S. Bruzik and W. J. Stec. Elsevier: New York. 1987. xiii + 597 pp. \$155.50. ISBN 0-444-42766-X

There are 64 typescript papers in this volume, which is the proceedings of the 2nd International Symposium on Phosphorus Chemistry Directed Towards Biology, held in Łódź in 1986. The largest group is on synthesis. There are other groups on mechanism of enzyme action and on metabolism of nucleic acids, biologically active phosphates, and physicochemical and biophysical studies of biophosphates. The subject index is substantial.

Carcinogenic and Mutagenic Metal Compounds. Edited by E. Merian, R. W. Frei, W. Hardi, and C. Schlatter. Gordon and Breach Science Publishers: New York. 1985. xii + 549 pp. \$95.00. ISBN 2-88124-022-4

The large number of unnumbered papers in this volume first appeared in the journals *Environmental Analytical Chemistry* and *Toxicological and Environmental Chemistry* and were originally presented at a "workshop" held in Geneva in 1983. There are author and subject indexes.

International Symposium on Bioorganic Chemistry. Edited by Ronald Breslow. New York Academy of Sciences: New York. 1986. ix + 325 pp. \$82.00. ISBN 0-89766-337-3

The symposium that generated the 35 papers (13 of which are poster presentations) in this volume was organized to bring together investigators in the several divergent branches of bioorganic chemistry. The several sections are the following: Mimics of Biological Systems; Chemistry of Natural Products of Biological Importance; and Chemistry of Biological Macromolecules. There is no subject index.

Crystallographically Ordered Polymers. Edited by Daniel J. Sandman. American Chemical Society: Washington, DC. 1987. vii + 287 pp. \$69.95. ISBN 0-8412-1023-3

This volume of 20 typescript papers was developed from a symposium held at the 191st American Chemical Society meeting, April 1986. The sections are the following: Solid-State Polymerization; Chemical Properties and Solution Structure; Photoconductivity; Magnetic Resonance Spectroscopy; and Mechanical Properties. There are indexes of authors, affiliations, and subjects, the latter being extensive.

Chromatography '84. Edited by Huba Kalász and Leslie S. Ettre. Akadémiai Kiado: Budapest, Hungary. 1986. xi + 611 pp. \$59.00. ISBN 963-05-4341-9

This is the Proceedings of the "Advances in Liquid Chromatography Conference", held in Szeged, Hungary, in 1984. It consists of a large number of typescript papers, under the headings General Topics; Stationary Phases; Drugs, Metabolites, etc.; Separation of Amino Acids; Polypeptides and Nucleotides; and Separation of Substances of Various Classes. A 6-page subject index is included.

Solving Hazardous Waste Problems: Learning from Dioxins. Edited by Jurgen H. Exner. American Chemical Society: Washington, DC. 1987. x + 397 pp. \$79.95. ISBN 0-8412-1025-X

This volume is not about dioxins, but only polychlorinated dibenzodioxins and, to a minor extent, dibenzofurans. It is a pity to see an ACS publication proliferate the sort of mislabeling that originates in the popular press. There are 31 papers, in the areas Distribution and Toxicology; Risk Assessment; Exposure and Evaluation; Risk Management; Social Factors and Technology. Indexes of authors, affiliations, and subjects complete the work.

Houben-Weyl: Methoden der Organischen Chemie. Volume XVI, Part 1: Register der Arbeitsvorschriften. Series Editor H.-G. Padeken. Georg Thieme Verlag: Stuttgart and New York. 1987. x + 689 pp. DM 660.00. ISBN 3-13-216404-6

Houben-Weyl has long been known for its emphasis on preparative methods in organic chemistry from a practical standpoint. Throughout the many volumes, examples of experimental directions complete enough for an experienced practitioner to follow appear; they are augmented by general directions for classes of compounds. Since *Houben-Weyl* is such a large work, it can be a tedious task to find a desired procedure. The task has been greatly simplified by the appearance of this special sort of index.

The first part of the index is alphabetic by class name. Actually, parent compounds are also used as class names; thus one finds entries under such names as "nonanes" and "oxazolidines", etc., as well as under true class names such as "nitrones", "sulfonic acids", etc. The second and larger part of this volume is a formula index of individual compounds for which experimental procedures appear somewhere in the work.

These indexes include all 15 volumes of the Fourth Edition, as well as Supplements 1-5 and 11. When all supplementary volumes have appeared, estimated to be about five years from now, a new cumulative

index is promised. A soft-bound volume of errata for Volumes I–XV and Supplements 1–5 and 11 comes with the hard-bound index.

Design and Synthesis of Organic Molecules Based on Molecular Recognition. Edited by Georges Van Binst. Springer-Verlag: New York, 1986. xv + 315 pp. \$87.50. ISBN 3-540-16123-6

The Solvay Conference of which this book is the proceedings was held in Brussels in 1983. The book begins with a list of invited speakers, one of invited participants, one of auditors, and one of scientific secretaries, without, however, any explanation of the distinctions among them. The papers are grouped in four topics: Molecular Recognition in Biochemical Processes; Thermodynamics, Kinetics and Stereochemistry in Molecular Recognition; Synthetic Models of "Hosts", and Design of New "Guests". All are properly set in type with well-drawn structures. Transcripts of the discussions are included. There is unfortunately no index.

Polymers in Medicine II: Biomedical and Pharmaceutical Applications. Polymer Science and Technology. Volume 34. Edited by E. Chiellini, P. Giusti, C. Migliaresi, and L. Nicolais. Plenum Press: New York, 1986. ix + 434 pp. \$79.50. ISBN 0-306-42390-1

The conference on Polymers in Medicine has been set as a biennial affair, owing to the success of the first two. The contributions for the second conference, held in Italy in 1985, provided the basis for this volume, which also includes some specially invited reviews on the present status of certain key problems. The papers are arranged in three groups: Synthesis and Characterization; Applications; and Polymer Drugs and Drug-Delivery Systems. Indexed.

QSAR in Drug Design and Toxicology. Pharmaco Chemistry Library. Volume 10. Edited by Dušan Hadzi and Borka Jerman-Blažič. Elsevier Science Publishers: Amsterdam, 1987. xii + 376 pp. \$97.75. ISBN 0-444-42767-8

The typescripts of invited lectures, contributed papers, and poster presentations form the 6th European Symposium on Quantitative Structure–Activity Relationships, held in Yugoslavia in 1986, make up this volume. The subject areas are the following: Chemometrics in Drug Design; QSAR in Medicinal Chemistry and Pharmacokinetics; Ligand–Receptor Interactions; Structure–Activity Relations of Peptides; and QSAR in Toxicology and Non-medicinal Areas. Contributor and subject indexes.

European Textile Research: Competitiveness through Innovation. Edited by C. Blum and J. G. Wurm. Elsevier: Amsterdam, 1986. x + 485 pp. \$74.25. ISBN 1-85166-058-5

Much of this volume is concerned with wool and linen. Design of clothing and processing of fibers into cloth take precedence over chemistry, but an introductory section takes up the relations between types of fibers and comfort.

Chlorinated Dioxins and Dibenzofurans in Perspective. Edited by Christoffer Rappe, Gangadhar Choudhary, and Lawrence H. Keith. Lewis Publishers, Inc.: Chelsea, MI, 1986. xiii + 570 pp. \$59.95. ISBN 0-87371-056-8

The 37 papers in this volume arise from a symposium held at a National Meeting of the ACS in Miami Beach in 1985. They are grouped into six sections: Human Exposure; Incineration Emissions; Soil Contamination; Bioassays; Analytical; and Synthesis and Destruction. It is gratifying indeed to see accuracy in the title of this book, rather than the customarily overgeneralized term "dioxins"! The subject index is 6 pages long.

Widening the Scope of Chemistry. Edited by Y. Takeuchi. Blackwell Scientific Publications: Oxford, UK, 1987. xi + 253 pp. \$34.50. ISBN 0-632-01537-3

The plenary and invited lectures and selected other contributions (short talks and posters) make up this volume of proceedings of the Eighth International Conference on Chemical Education, held in Tokyo in 1985. The papers provide an intriguing look into the possible future of chemical education, with respect to both role and methods. Use of computers is not neglected, and one impressive page shows 217 structures for C_6H_6 generated by one of the devices. No less than 21 pages are devoted to a list of participants with their addresses, but a subject index, which would be more useful, is not to be found.

Methods in Protein Sequence Analysis. Edited by Kenneth A. Walsh. Humana Press: New Jersey, 1987. xvi + 696 pp. \$79.50. ISBN 089603-118-7

The Sixth International Conference on the title subject took place in Seattle in 1986 and was largely concerned with experimental means rather than biological implications. The large number of typescript papers average about 15 pages in length. The largest single section (9 papers) was on microanalytical techniques. One of these papers may have created a grammatical record in its title, in which five nouns are

strung together with nary an adjective, preposition, or article to aid digestion: "Research Resource Facility Satellite Meeting". A good subject index completes the volume.

Photochemical Conversion and Storage of Solar Energy. In *New Journal of Chemistry*, February 1987, Volume 11, Number 2. Gauthier-Villars: Montrouge Cedex, France, 1987. 136 pp. 250 FF. ISBN 0398-9836.

This volume is actually a special issue of *Nouveau Journal de Chimie*, which contains the proceedings of a conference held in Paris in 1986. There are 23 papers in it, all in English. As is to be expected, many of them are concerned with solid-state effects, semiconductors, and membranes. Six of the papers are called "Round Table Reports" and include such topics as photocatalysis, biomimetic systems, etc. The format is that of a journal, and there is no index.

Fine Chemicals for the Electronics Industry. Edited by P. Bamfield. The Royal Society of Chemistry: London, 1986. vii + 247 pp. \$48.00. ISBN 0-85186-636-0

There are 14 typescript papers in this softbound volume, which derives from a symposium held at the University of Bath in 1986. Subjects such as semiconductors, optical fibers, photochromic materials, liquid crystals, phosphors, and electro-ceramics are prominent in the content. There is no index.

Nutrition and Aging. Bristol-Myers Nutrition Symposia. Volume 5. Edited by Martha L. Hutchinson and Hamish N. Munro. Academic Press: Orlando, 1986. xx + 287 pp. \$32.50. ISBN 0-12-362875-X

The 19 papers in this volume originated with the Fifth Bristol-Myers Symposium on Nutritional Research, held in Boston in 1985. They have been carefully edited and re-cast as chapters, and all are set in type. The subjects range from Vitamin D, osteoporosis, trace elements, and antioxidants to the Elderly Alcoholic. Thoroughly indexed.

Patterns, Defects and Microstructures in Nonequilibrium Systems. Edited by D. Wlagraef. Kluwer Academic Publishers: Dordrecht, The Netherlands, 1987. xviii + 377 pp. \$85.50. ISBN 90-247-3479-7

The NATO Advanced Research Workshop that generated the 22 typescript papers in this volume was held in Texas in 1986. In addition, there is a foreword by Ilya Prigogine that is, in effect, a keynote paper. Many of the papers have intriguing and beautiful illustrations of subjects ranging from the microscopic to the galactic. The typescripts vary jarringly, and several are marred by having handwritten mathematical expressions. There is a very short subject index.

Contemporary Themes in Biochemistry. Edited by O. L. Kon, M. C.-M. Chung, Peter L. H. Hwang, Sai-Fan Leong, K. H. Loke, P. Thiagarajah, and P. T.-H. Wong. Cambridge University Press: Cambridge, 1987. xxxii + 715 pp. \$49.50. ISBN 0-521-33269-9

The 4th Congress of the Federation of Asian and Oceanian Biochemists, which was held in Singapore in 1986, attests to the vigor of biochemistry in that part of the world, for over 300 poster presentations were submitted. They are collected in this volume, subdivided into 28 groups. Among the best represented are Proteins, Enzymes, Nutrition, Plant and Agricultural Biochemistry, Analytical Biochemistry, and Neurochemistry. The index of contributors is 9 pages long, but it is a pity that no subject index, even just of titles, is provided.

Water Chlorination: Chemistry, Environmental Impact and Health Effects. Volume 5. Edited by Robert L. Jolley, Richard J. Bull, William P. Davis, Sidney Katz, Marris H. Roberst, Jr., and Vivian A. Jacobs. Lewis Publishers: Chelsea, MI, 1985. xx + 1575 pp. \$89.95. ISBN 0-87371-005-3

This ponderous volume contains the proceedings of the Fifth Conference on the title subject, held at Williamsburg, Virginia, in 1984. No fewer than 116 papers, all set in type, plus an epilogue, are included. They are grouped in 16 sections, most of which have a substantial involvement with chemistry: Water Chlorination: Basic Issues; Risk: The Bottom Line; Epidemiological Considerations; Carcinogenic and Mutagenic Effects; Toxicology of Disinfectants and their By-Products; Aquatic Models and Tumor Induction; Environmental Effects; Disinfection; Reaction Dynamics in Water Chlorination; Chlorine Demand Reactions; Proteins and Other Organics; Chemistry of Chloramination; Photochemistry of Oxidants; Chemical Methods; Drinking Water Treatment; Cooling Water Treatment; and Wastewater Treatment. The index, with 43 pages, is complete enough to be useful; it includes the names of the contributors as well as the subjects.

Progress in Hydrogen Energy. Edited by R. P. Dahiya. D. Reidel Publishing: Dordrecht, The Netherlands, 1987. xiii + 241 pp. \$59.00. ISBN 90-277-2440-7

A "National Workshop on Hydrogen Energy" was held in New Delhi in 1985 and included 15 papers, an inaugural address, and a panel report, the typescripts all of which appear in this volume, together with indexes.

The topics range from electrolytic to microbial production of hydrogen and from hydrogen as a liquid fuel to enzyme electrodes.

Halide Glasses for Infrared Fiberoptics. Edited by R. M. Almeida. Martinus Nijhoff Publishers: Dordrecht, The Netherlands. 1987. xi + 412 pp. \$85.50. ISBN 90-247-3480-0

Those who use IR spectroscopy as a routine tool are well acquainted with NaCl plates and KBr disks and are aware that there are other materials for certain arcane uses, but that there should be a whole book on the subject is probably a surprise to most. The new development that has so expanded the subject in the last 10 years is the discovery of fluorozirconate glasses and the fabrication from them of fibers that can serve as efficient waveguides. In this volume are found the typescripts of 27 papers and some poster presentations, along with a good subject index.

Membranes in Gas Separation and Enrichment. The Royal Society of Chemistry: London. 1986. viii + 404 pp. £37.50. ISBN 0-85186-676-X

In September, 1986, the 4th BOC Priestley Conference was held at the University of Leeds. Out of it came the 24 typescript papers making up this softbound volume, plus the text of an address preceding the toast to Joseph Priestley at the Priestley Dinner. Not indexed.

Laser Scattering Spectroscopy of Biological Objects. Edited by J. Stepanek, P. Anzenbacher, and B. Sedlacek. Elsevier: Amsterdam. 1987. xvi + 624 pp. ISBN 0-444-98974-9

The many papers in this volume, which arose from a conference held in Prague in 1986, are divided among "chapters": New Techniques and Methods; Vibrational Spectroscopy of Small Molecules with Biological Significance; Scattering Spectroscopy of Proteins; Scattering Spectroscopy of Nucleic Acids; Scattering Spectroscopy of Biological Structures and Cells; and Medical Applications of Scattering Spectroscopy. There is no index.

Catalytic Polymerization of Olefins. Studies in Surface Science and Catalysis. Volume 25. Edited by T. Keii and K. Soga. Elsevier Science Publishers: Amsterdam and New York. 1986. xiv + 489 pp. \$126.00. ISBN 0-444-99518-8

An international symposium on Future Aspects of Olefin Polymerization was held in Tokyo in 1985 and gave rise to the typescript papers in this volume. Ziegler-Natta catalysts are understandably prominent among the concerns. A 6-page subject index is included.

Vibrations at Surfaces, 1985. Studies in Surface Science and Technology. Volume 26. Edited by D. A. King, N. V. Richardson, and S. Holloway. Elsevier Science Publishers: Amsterdam and New York. 1986. 732 pp. \$146.25. ISBN 0-444-42631-0

The Fourth International Conference on the title subject, held in the U.K. in 1985, included a large number of invited and contributed papers, the typescripts of which make up this volume. Among the fascinating titles are "Catastrophes in Surface Scattering" and "Sticking of Molecular Hydrogens". The entire content of this book is reprinted from the *Journal of Electron Spectroscopy and Related Phenomena*, Volumes 38 and 39; a subject index is included, although it does not appear in the Table of Contents.

Shock Waves and Shock Tubes. Edited by Daniel Bershader and Ronald Hanson. Stanford University Press: Stanford. 1986. xiv + 922 pp. \$49.50. ISBN 0-8047-1310-3

The Fifteenth International Symposium on Shock Waves and Shock Tubes, held in California in 1985, was a large one, judging by the number of typescript papers in this volume. There were eight plenary lectures, and papers were grouped in the following sections: Shock Propagation and Interactions; Shock-Generated Chemical Kinetics; Shock Computation, Modeling, and Stability Problems; Shock Wave Aerodynamics; Experimental Methods; Shocks in Multiphase and Heterogeneous Media; High Energy Gas Excitation and Wave Phenomena; and Technical Applications and Shocks in Condensed Matter. The list of contributing authors occupies two pages of three columns each, but there is unfortunately no subject index.

Biological Reference Materials: Availability, Uses, and Need for Validation of Nutrient Measurement. Edited by Wayne R. Wolfe. John Wiley & Sons: New York. 1985. xviii + 425 pp. \$60.00. ISBN 0471-80636-6

Contains the typescripts of 17 papers from a symposium held in Philadelphia in 1983, focussing on "The development and distribution of certified biological materials and other homogeneous and well characterized biological materials essential for the improvement of analytical methods for nutrient analysis." Subject index.

Books on Introductory Chemistry

Organic Chemistry for Students of Biology and Medicine. Third Edition. By G. A. Taylor. Longman Scientific & Technical, copublished with John Wiley & Sons: New York. 1987. x + 352 pp. \$29.95 (paper). ISBN 0470-20711-6

Organic Chemistry: A Background for the Life Science and Solutions to Problems and Study Aids for Organic Chemistry. Second Edition. By Gardner W. Stacy and Carl C. Wamser. Kendall/Hunt Publishing Co.: Dubuque, Iowa. 1985. Text: xiv + 465 pp. Study Guide: 172 pp. \$35.00. ISBN 0-8403-3529-6

Chemistry and Society. Fifth Edition. By Mark M. Jones, David O. Johnston, John T. Netterville, James L. Wood, and Melvin D. Joesten. Sanders College Publishing: Philadelphia. 1987. xviii + 700 pp. \$41.75. ISBN 0-03-008139-4

Environmental Science: Living within the System of Nature. By Charles E. Kupchella and Margaret C. Hyland. Allyn and Bacon: Boston. 1986. xxii + 617 pp. \$38.33. ISBN 0-205-08520-2

Chemical Principles with Qualitative Analysis. Sixth Edition. By William L. Masterton, Emil J. Slowinski, and Conrad L. Stanitski. Saunders College Publishing: Philadelphia. 1986. xviii + 1100 pages. \$40.95. ISBN 0-03-006138-5

Introduction to Chemical Principles. Fourth Edition. By Edward I. Peters. Saunders College Publishing: Philadelphia. 1986. xii + 500 pp. \$37.95. ISBN 0-03-002948-1

Principles of Modern Chemistry. By David W. Oxtoby and Norman H. Nachtrieb. Saunders College Publishing: Philadelphia. 1986. xiv + 800 pp. \$37.95. ISBN 0-03-070653-X

Chemistry and the Living Organism. Fourth Edition. By Molly M. Bloomfield. John Wiley & Sons: New York. 1987. xx + 600 pp. \$35.75. ISBN 0471-84673-2

Quantitative Chemical Analysis. Second Edition. By Daniel C. Harris. W. H. Freeman and Co.: New York. 1987. xviii + 818 pp. \$47.95. ISBN 0-7167-1817-0

Introduction to Chemistry. By Martha J. Gilleland. West Publishing Co.: St. Paul, MN. 1986. xviii + 571 pp. \$35.95. ISBN 0-314-93180-5

Introduction to Chemistry. Fifth Edition. By T. R. Dickson. John Wiley & Sons: New York. 1987. xvi + 600 pp. \$39.00. ISBN 0471-84675-9

Fundamentals of General, Organic, and Biological Chemistry. Third Edition. By John R. Holum. John Wiley & Sons: New York. 1986. xx + 743 pp. \$32.95. ISBN 0471-891517-9

Elements of General and Biological Chemistry. Seventh Edition. By John R. Holum. John Wiley & Sons: New York. 1987. xx + 556 pp. \$37.25. ISBN 0471-83831-4

General Chemistry. Second Edition. By Donald A. McQuarrie and Peter A. Rock. W. H. Freeman & Co.: New York. 1987. xxiv + 876 pp. \$39.95. ISBN 0-7167-1806-5

General Chemistry in the Laboratory. Second Edition. By Julian L. Roberts, Jr., J. Leland Hollenberg, and James M. Postma. W. H. Freeman & Co.: New York. 1987. xiv + 478 pp. \$19.95. ISBN 0-7167-1825-1

Chemistry & Chemical Reactivity. By John C. Kotz and Keith F. Purcell. Saunders College Publishing: Philadelphia. 1987. xx + 1000 pp. \$48.00. ISBN 0-03-0548349-7

How To Study Chemistry. By Irwin Becker. Saunders College Publishing: Philadelphia. 1987. 47 pp (paper). \$13.50. ISBN 0-03-013309-2

Books on Biological and Clinical Subjects

Diagnostic and Laboratory Testing in Psychiatry. Edited by Mark S. Gold and A. L. C. Pottash. Plenum Medical Book Co.: New York. 1986. xxii + 278 pp. \$32.50. ISBN 0-306-42054-6

This volume of contributed chapters deals with the use of clinical chemistry to diagnose psychiatric disorders. A chapter on NMR imaging and other scanning techniques is included.

Toxicity Testing: Strategies To Determine Needs and Priorities. National Academy Press: Washington, DC. 1984. xiv + 382 pp. \$22.50. ISBN 0-309-03433-7

This is a formal study report from three committees of the National Research Council and National Academy of Sciences contracting with the National Toxicology Program. It is printed from camera-ready typescript, and it includes appendices but no index.

Drug Level Monitoring. Volume II. By Emil T. Lin and Wolfgang Sadee. John Wiley & Sons: New York. 1986. xiv + 364 pp. \$59.95. ISBN 0471-80613-7

The 16 chapters in this book are arranged according to the type of drug being considered: anticoagulants, beta blockers, cardiac glycosides, narcotics, diuretics, etc. Various analytical methods for each, from classical colorimetry to radioimmunoassay, are given.

Clinical Specimens: Analytical Chemistry by Open Learning. By David Hawcroft and Terry Hector. John Wiley & Sons: New York. 1987. xviii + 123 pp. \$21.95. ISBN 0471-91397-9

This is a self-teaching book for those who need to know about the routine of clinical testing and analysis. The largest section is on blood, but other bodily fluids, as well as organ and tissue samples, are discussed. **Toxic Susceptibility: Male/Female Differences.** By Edward J. Calabrese. John Wiley & Sons: New York. 1985. xvi + 336 pp. \$59.95. ISBN 0471-80903-9

Differences in response between men and women to toxic substances have been demonstrated. This book surveys drugs, organic contaminants, inorganic contaminants, endogenous substances, etc., with respect to such differences. A chapter is devoted to pregnancy, and another to general biochemical and physiological differences between the sexes. Thoroughly indexed.

Trace Elements in Human and Animal Nutrition. Fifth Edition. Volume 2. Edited by Walter Mertz. Academic Press: Orlando, FL. 1986. xii + 499 pp. \$52.50. ISBN 0-12-491252-4

The metabolism, nutrition requirements, and toxicity of zinc, iodine, selenium, lead, cadmium, arsenic, silicon, lithium, and aluminum are treated in separate chapters, and another chapter takes up 22 elements not believed to be nutritionally essential.

From Neuron to Brain: A Cellular Approach to the Function of the Nervous System. Second Edition. By Stephen W. Kuffler, John G. Nicholls, and A. Robert Martin. Sinauer Associates, Inc.: Sunderland, MA. 1984. xx + 651 pp. \$30.00. ISBN 0-87893-444-8

Chemists who must concern themselves with the functioning of nerves will find this book useful for the comprehensive background that it provides. One of its five parts, Mechanisms for Neuronal Signaling, deals with membranes, ion transport, the chemistry of synaptic transmission, and chemical transmitters. This rewritten edition differs from the first one not only in being brought up to date but also by the addition of a chapter on movement, somatic sensation, and pain, as well as an appendix on neuroanatomy.

Books on Applied Subjects

Synthetic Adhesives and Sealants. Edited by W. C. Wake. John Wiley & Sons: New York. 1987. x + 139 pp. \$59.95. ISBN 0471-91287-5

This book consists of five contributed "critical reports" that are concerned primarily with "the technology of the materials produced by the chemist" for the many uses to which adhesives are put. The chapters are the following: Contact adhesives (R. S. Whitehouse); Polyester, polyamide and polyurethane melt adhesives (A. Hardy); Toughened acrylic and epoxy adhesives (D. J. Stamper); Silicone adhesives, sealants and coupling agents (W. C. Wake); and Marine organisms and their adhesion (G. Walker). In the presentation, chemistry predominates over engineering. The mechanisms of curing and of failure and degradation are discussed, and varied comments on the nature of the adhesion process are to be found throughout. The bibliographies are extensive, and there is a subject index.

Crop Protection Chemicals Reference. Third Edition. Chemical and Pharmaceutical Press: John Wiley & Sons: New York. 1987. x + 2022 pp + 60 pp. Supplement. \$80.00. ISBN 0471-85368-2

The first edition of this book appeared in 1985, and it appears that it will reappear annually. Its purpose is to provide an authoritative source for information on labeling and use of agricultural chemicals. The content is arranged according to manufacturer. New features give information on storage requirements, safety, and shipping. A 60-page brochure accompanies the book to provide information that became available too late for the book itself. Indexes of manufacturers, brand names, chemical names, crop use, and pest use are included.

Strong Solids. Third Edition. By A. Kelly and N. H. MacMillan. Oxford University Press: Oxford and New York. 1986. xiv + 423 pp. \$89.00. ISBN 0-19-851362-3

Whereas the first edition of this book emphasized fiber reinforcement, the present edition recognizes the growing importance of ceramics for attaining maximum static strength. Metals constitute the third class of

material with which this book is concerned. The preface is dated June 1985 and presumably represents the latest date for covering the literature. Extensive appendixes on strong materials, glide systems in crystals, and elastic constants are included.

Rubber Technology. Third Edition. Edited by Maurice Morton. Van Nostrand Reinhold: New York. 1987. x + 638 pp. \$42.95. ISBN 0-442-26422-4

The format of the previous edition (1973) is retained in the third edition. Two new chapters have been added: Thermoplastic Elastomers, and Miscellaneous Elastomers. In the latter, newly developed synthetic rubbers are treated. The book starts with an Introduction to Polymer Science and ends with an appendix on rubber information sources and a thorough index.

Paint and Surface Coatings: Theory and Practice. Edited by R. Lambourne. Ellis Horwood, Ltd.: Chichester. John Wiley & Sons: New York. 1987. 696 pp. \$89.95. ISBN 0470-20809-0

The first two chapters, on the composition of paints and on organic film formers, contain a fair amount of chemistry. Three other chapters cover pigments, solvents, and additives, and also include some chemistry, and chapter 6 is devoted to the physical chemistry of dispersions. The remaining chapters are more applied and deal with the technical aspects of paints for various uses.

Chemical Reactor Design. By E. B. Nauman. John Wiley & Sons: New York. 1987. xxxii + 426 pp. \$53.70. ISBN 0471-84580-9

The author's aim with this book is to provide a textbook for undergraduate chemical engineers that reflects "the remarkable changes that have occurred in academic and industrial reaction engineering over the last decade". The emphasis is on numerical computation made possible by widespread and economical access to computers and calculators.

Organo-Chlorine Solvents: Health Risks to Workers. The Royal Society of Chemistry. 1986. xiv + 254 pp. ISBN 0-85186-078-8

A Committee of the Royal Society of Chemistry prepared this book for the Commission of the European Communities, making use largely of tertiary sources: reviews and books. Nine solvents are treated: chloroform, both trichloroethanes, 1,2-dichloroethane, 1,2-dichloropropane, trichloroethylene, perchloroethylene, and carbon tetrachloride.

Construction of Linings for Reservoirs, Tanks, and Pollution Control Facilities. Second edition. By William B. Kays. John Wiley & Sons: New York. 1986. x + 454 pp. \$49.95. ISBN 0471-83085-2

Until relatively recently, reservoirs were lined with clay, just as were the great industrial canals in the eighteenth and nineteenth centuries. The concern for leakage and the resulting pollution of ground waters in recent years has led to more effective design and materials, ranging from concrete to plastic films. About three-fourths of this book is devoted to lining materials. The last part treats the ROOFLOAT floating cover system. Appendices, a glossary, a bibliography, and an index complete the work.

Clays and Ceramic Materials. Second edition. By W. E. Worrall. Elsevier Applied Science Publishers: New York and London. 1986. x + 239 pp. \$49.50. ISBN 1-85166-004-6

In this edition, following by 11 years the first edition, much new information arising out of the application of spectroscopy to clays has been added. Other sections have been expanded, and a section on chemical methods of separation has been inserted. References are now included, albeit sparingly, and short reading lists are given.

Handbook of Chemicals Production Processes. Edited by Robert A. Meyers. McGraw-Hill Book Co.: New York. 1986. 464 pp. \$69.50. ISBN 0-07-041765-2

The industrial processes for production of basic organic, inorganic chemicals, and polymers are the subject of this book. Specific processes, such as the Hüls synthetic ethanol process, the Phillips process for *tert*-butyl methyl ether, the Hoechst high-density polyethylene process, and the BAMAG nitric acid processes, are treated comprehensively. A glossary of abbreviations and acronyms and a good subject index complete the book.