

Additions and Corrections

Synthesis and Reactivity of the Bridging Thiocarbonyl Radical, $\text{Cp}_2\text{Fe}_2(\text{CO})_2(\mu\text{-CO})(\mu\text{-CSMe})$ [*J. Am. Chem. Soc.* **1986**, *108*, 3688–3693]. NORMAN C. SCHROEDER and ROBERT J. ANGELICI*
Page 3689, left column, line 29: 0.2 μA should read 0.2 mA.
Page 3691, left column, the line above eq 2: 4 should read 2.

Epoxy Silyl Ether Rearrangements: A New, Stereoselective Approach to the Synthesis of β -Hydroxy Carbonyl Compounds [*J. Am. Chem. Soc.* **1986**, *108*, 3827–3829]. KEIJI MARUOKA, MASAICHI HASEGAWA, HISASHI YAMAMOTO,* KEISUKE SUZUKI, MASATO SHIMAZAKI, and GEN-ICHI TSUCHIHASHI*

We wish to point out that in prior papers by C. J. Cheer and C. R. Johnson [*J. Org. Chem.* **1967**, *32*, 428; *J. Am. Chem. Soc.* **1968**, *90*, 178] a ring-expansion reaction of some epoxy alcohols with acidic alumina has been published.

Electronic Structure Factors of Carbon-Hydrogen Bond Activation. The Photoelectron Spectroscopy of (Cyclohexenyl)manganese Tricarbonyl [*J. Am. Chem. Soc.* **1986**, *108*, 2560–2567]. DENNIS L. LICHTENBERGER* and GLEN EUGENE KELLOGG

Pages 2560 and 2565: The captions in Schemes I and V are correct but the accompanying drawings have been exchanged.

Book Reviews*

Thermoluminescence of Solids. By S. W. S. McKeever (Oklahoma State University). Cambridge University Press: New York, 1985. xiii + 376 pp. \$69.50. ISBN 0-521-245206.

Thermoluminescence is defined as the emission of light from an insulator or semiconductor when it is heated. Generally, three factors are necessary for the production of thermoluminescence. They are the following: (1) the material must be an insulator or a semiconductor; (2) the material must have at some time absorbed energy during exposure to radiation; and (3) the luminescence emission must be triggered by heating the material. A peculiar characteristic of thermoluminescence is that once heated to excite light emission, the material will not exhibit thermoluminescence again by merely cooling the sample and reheating. To exhibit thermoluminescence again, the material has to be reexposed to radiation. The fundamental principles that govern the production of thermoluminescence are essentially the same as those which govern all luminescence processes; thermoluminescence is thus a member of the large group of luminescence phenomena.

The purposes of this book are twofold: (a) to illustrate how solid-state properties of insulators and semiconductors determine their thermoluminescence characteristics; and (b) to show in detail how the technique is being utilized as a fundamental research tool in many fields. The latter includes such diverse disciplines as biology, chemistry, archaeology, geology, solid-state physics, medicine, and many others.

The book consists of nine chapters; they are the following: 1. Introduction; 2. Theoretical background; 3. Thermoluminescence analysis; 4. Additional factors governing thermoluminescence; 5. Defects and thermoluminescence; 6. Thermoluminescence dosimetry; 7. Thermoluminescence dating; 8. Geological applications; and 9. Instrumentation.

The book is very well written and should be of interest to chemists as well as to workers in the other scientific fields previously mentioned.

W. W. Wendlandt, *University of Houston*

Progress in Reaction Kinetics. Volume 12. Edited by K. R. Jennings (University of Warwick), R. B. Cundall (University of Salford), and D. W. Margerum (Purdue University). Pergamon Press: Oxford, New York, Toronto, Sydney, and Frankfurt. 1985. v + 268 pp. \$120.00. ISBN 0-08-032326-X.

This volume is the continuation of an excellent series. The present volume contains three chapters, two on gas-phase free-radical kinetics and one on catalytic conversion of hydrocarbons. A subject index and a bibliography of previous volumes are provided. The book is done camera-ready, but it has uniform typescript which is attractive and easy to read.

The first chapter is Kinetics of Gaseous Hydroperoxyl Radical Reactions, by M. Kaufman and J. Sherwell; it is 54 pages in length and contains 257 references which cover the literature through 1981. The role of HO_2 radicals in atmospheric chemistry, combustion chemistry, and radiation chemistry is discussed briefly, as are the physical properties of HO_2 and experimental methodology for its production and detection. A majority of the chapter is a survey of HO_2 reactions for which kinetic

data are available. The chapter is well written but, as is often the case with survey articles on topics of current research interest, it suffers from having become somewhat outdated soon after publication.

The second chapter is The Kinetics of Radical-Radical Processes in the Gas Phase, by M. J. Howard and I. W. M. Smith; it is 146 pages in length and contains 407 references which cover the literature through 1982. The authors present a theoretical framework for treating radical-radical processes, briefly discuss experimental methods for studying them, then survey the literature. Three classes of radical-radical interactions are considered—association reactions, nonassociative reactions, and nonreactive collisions which result in vibrational relaxation. Throughout the literature survey, the authors draw mechanistic inferences based on comparison of experimental results with their theoretical framework. At the end of the chapter, they present a flow diagram which can be used to estimate rates of nonassociative reactions between simple free radicals.

The third chapter is On Determining the Mechanism and Kinetics of Reactions on Decaying Catalysts, by A.-N. Ko and B. W. Wojciechowski; it is 62 pages in length and includes 96 references. Only five of the references are to work published in the 1980's and nearly half the references are to the author's own work. In the first third of the chapter a kinetic theory is presented for treating reactions occurring on decaying catalysts. The remainder of the chapter considers applications of the theory to interpretation of experimental data on catalytic cracking of hydrocarbons.

Paul H. Wine, *Georgia Institute of Technology*

The Electronic Laboratory: Tutorials and Case Histories in Laboratory Automation. By Raymond E. Dessy (Virginia Polytechnic Institute and State University). American Chemical Society: Washington, D.C. 1985. ix + 156 pp. \$29.95. ISBN 0-8412-0928-6.

This book is a compilation of tutorial articles which appeared in the "A" pages of *Analytical Chemistry* as A/C Interface from 1982 to 1985. Each tutorial is followed by several case studies where actual laboratory installations are described. The topics—which appear in chronological order—are the following: Local Area Networks (1982), Laboratory Information Management Systems (1983), Languages for the Laboratory (1983), Operating Systems for the Laboratory (1983), Robots in the Laboratory (1983), A Laboratory *Son et Lumière* [voice I/O, graphics, and image processing] (1984), Managing the Electronic Laboratory (1984), Expert Systems (1984), Workstations in the Laboratory (1985), and Disks for the Laboratory (1985).

The intent is to provide a quick summary of the important concepts in each area and to acquaint the reader with some of the basic vocabulary. The tutorials and case studies give no details on how to interface analytical equipment, set up a specific laboratory installation, or massage particular data. In some cases, the specific equipment used in the case studies is not even identified. This is not as serious a drawback as it sounds, since the rapid pace of change in the computer area would have rendered most of the equipment obsolete and unavailable anyway. The name and address of each contributor to the case studies is given, so if the application appears useful, the reader could contact the authors

*Unsigned book reviews are by the Book Review Editor.

directly for details.

Where specific computers, operating systems, or software packages are described, they come almost entirely from the minicomputer world. The powerful supermicrocomputers of today did not exist in the early 1980's when most of the articles and case studies of this book were written. Only the 1985 article on Workstations in the Laboratory addresses the impact of the current generation of microcomputers. For additional information on microcomputers, the reader could go to the A/C Interface section of *Analytical Chemistry*, where a series on personal computers by the same author was begun in the January 1986 issue.

The chief value of this book lies in its device-independent descriptions of how computers can be used to manage and control the modern analytical laboratory. Armed with the concepts and vocabulary from this book, the reader will be better able to talk to the vendors and experts who will have to provide the details on any actual installation.

David L. Zellmer, *California State University, Fresno*

Environmental Applications of Chemometrics. Edited by Joseph J. Breen and Philip E. Robinson (Office of Toxic Substances, U.S. Environmental Protection Agency). American Chemical Society: Washington, DC, 1985. x + 286 pp. \$54.95. ISBN 0-8412-0945-6.

The increasing availability of instrumentation capable of continuous sampling and real-time multicomponent analysis has led to what one of the authors aptly describes as "data burdened researchers". Nowhere has this effect been more visible than in the realm of environmental analyses. The complexity of environmental samples has led to the implementation of extensive monitoring networks and has resulted in the generation of a vast database of information. In this book, the editors have compiled 19 separate papers dealing with mathematical methods by which useful information may be extracted from this database.

Each of these 19 "chapters" deals with a particular application of chemometrics to an environmental problem. The chapters range in length from 7 to 30 pages, with an average of 14 pages. A wide range of applications is illustrated, including the distribution of PCB residues in human adipose tissue, characterization of rain water composition, identification of mineral phases in oil shales, interpretation of a water quality database, and contributions of specific sources to the ambient aerosol. A diversity of computational approaches was similarly represented with the SIMCA method, partial least-squares solutions, fuzzy C-varieties of pattern recognition, and Kriging being invoked about as often as the now-classical principal components analysis. Several of the chapters deal exclusively with the mathematical aspects of various chemometric methodologies. In particular, Chapter 17 presents a concise and coherent introduction to the topic of Simple Modeling by Chemical Analogy (SIMCA) that could have served well as an introduction to the volume. Therein lies one of the weaknesses of the book. The ordering of the papers seems completely arbitrary, with two papers dealing with the same database (the National Human Adipose Tissue Survey) being separated by six unrelated papers. Allowance should be made for the fact that the ACS Symposium Series books are intended to provide rapid publishing of symposia proceedings, but the reviewer felt that a better arrangement of topics would have made the collection more coherent. Another factor that would contribute to continuity would be the requirement that manuscripts submitted for camera-ready copy conform to a standard typeface. There are at least 10 different fonts appearing in the book, with some of them right-justified, while others are not. This may be construed as a general comment addressed to all editors of symposia-related publications.

The quality of the papers presented was quite good, and an up-to-date set of references, with many from 1984 and a few from 1985, adds to the value that this work will have for researchers in environmental chemometrics.

Albert C. Censullo, *California Polytechnic State University*

Kinetics of Heterogeneous Catalytic Reactions. By M. Boudart (Stanford University) and G. Djéga-Mariadassou (Université Pierre et Marie Curie). Princeton University Press: Princeton, NJ, 1984. xviii + 222 pp. \$35.00 (cloth); \$13.50 (paper). ISBN 0-691-03346-0 (cloth); 0-691-08347-9 (paper).

As noted in the preface, this book originated as a series of lectures delivered by Michel Boudart at the Université Pierre et Marie Curie in 1980. The French language edition (Masson, Paris) appeared in 1982. The English edition, released in 1984, is essentially a translation of the French edition, with several notes added at the ends of chapters to clarify points about which more recent discussions have arisen.

This book is an elegant and coherent monograph, demonstrating both the principles of kinetics of importance in heterogeneous catalysis and the interplay between studies performed on single crystal surfaces under ultra-high vacuum and those on supported metal catalysts at higher pressures. The seams between the original lectures are not recognizable,

yet the pedagogical origins of the book will be apparent to anyone teaching from it; the organization and explanation of ideas fit comfortably with classroom presentation.

The text is divided into six chapters, the first five of which are concerned with catalytic kinetics and the last with "parasitic phenomena" (transport limitations and metal-support interactions). Chapter 1 approaches catalysis from the point of view of classical physical chemistry, introducing fundamental definitions and concepts such as the turnover frequency, reaction coordinate, and steady-state approximation. The importance of characterizing the physical properties of the catalyst, such as surface area and metal particle size, arises quite naturally from the idea of a turnover frequency, and the classical means for determining these by gas uptake measurements are discussed. The elementary processes of adsorption, surface reaction, and desorption are discussed in Chapter 2. The surface-science approach to the study of elementary processes is introduced at this point, including both the description of surface structure and methods, such as temperature-programmed desorption, for determining the kinetics of elementary steps. These steps are then assembled into reaction sequences in Chapter 3, and the formulation of rate equations for reactions on uniform surfaces is treated in detail. One of the themes of this chapter is the need for chemical information beyond kinetics to establish reaction mechanisms. The identification of "most abundant reaction intermediates" by direct and indirect means, as well as by inference from separate adsorption and desorption studies, serves to illustrate the integration of surface science and catalysis science emphasized by the authors. The Temkin formalism for kinetics of reactions on non-uniform surfaces is introduced in Chapter 4, along with the consequences for catalyst optimization. The dependence upon the size of the catalytic ensemble of the sensitivity of reaction rate to surface non-uniformity leads to the concepts of structure sensitivity and insensitivity, treated in Chapter 5. Here again the rather remarkable agreement between reaction rates of structure-insensitive reactions on macroscopic single crystals and microscopic supported crystallites is stressed.

This book can be used effectively in graduate courses in both kinetics and catalysis. As a kinetics text it complements the usual physical chemistry texts, illustrating the application of elementary processes and linear free-energy relationships to the complexities of heterogeneous catalysis not usually treated by such texts. As a catalysis text, it provides an elegant introduction to principles and concepts in catalysis and can be productively supplemented by material oriented more toward catalytic chemistry. It will also be of value as an introduction to the principles and kinetics of catalytic reactions for new practitioners in this field. Those seeking a compilation of the chemistry of catalytic processes should look elsewhere; the beauty of this book is that its conceptual approach will endure long after such compilations are out of date.

Mark A. Barteau, *University of Delaware*

Reactions of Small Transient Species. Kinetics and Energetics. Edited by A. Fontijn and M. A. A. Clyne. Academic Press Inc.: London, and Orlando, FL, 1983. 478 pp. \$89.00. ISBN 0-12-262040-2.

This multi-author monograph is a contribution to the general area of chemical reactivity and mechanism. By treating compositional change and energy transfer in small (mainly three heavy atoms or less) systems, the book addresses an area lying somewhere between classical inorganic/organic reaction mechanisms and state-to-state transformations. Being closer to the latter than the former, it has a physical, hence detailed, approach. This has not led to a set of unconnected research contributions. In fact, there are several signs of positive editorial activity that has led to a certain unity of purpose of the individual chapters, e.g., the stated objective of illustrating present understanding of the dependence of reaction rate on reactant energy. The volume is significantly physical in approach and, although experimentally based, does not neglect the theoretical. This is particularly true for the case of unimolecular reactions.

The volume consists of seven chapters, the first five of which are devoted to neutral species and the last two to ion-neutral reactions. Chapters 1 and 2 concern the influence of temperature on rate coefficients of bimolecular reactions (A. Fontijn and R. Zellner) and on unimolecular and termolecular reactions (K. Luther and J. Troe) and constitute about 20% of the book. They are comprehensive and nicely illustrated with real examples. Chapter 3, 4, and 5 focus on the reactions of vibrationally excited molecules (J. Wolfrum), of electronically excited atoms (W. H. Breckenridge), and of electronically excited diatomic molecules (T. G. Slanger). These chapters summarize a large amount of experimental information on the various ways internal excitation is expressed in reactivity. Chapters 6 and 7 are concerned with ion-molecule reactions (about 150 pages). The former concerns ion-molecule reactions at low temperatures (N. G. Adams and D. Smith), while the latter explores the influence of translational and internal energy on ion-

neutral reactions (W. Lindinger and D. Smith). In some senses, Chapter 7 is related to 8 as 1 and 2 are related to 3–5. All chapters present sufficient information to provide a sense of the state of experimental development at the time of writing. The index is very useful and contains topics as well as reactions.

The work constitutes a very good research volume that will have significant value as a supplemental text for a graduate-level kinetics course. It is a valuable source volume serving to help unify a somewhat fragmented area of kinetics.

Thomas P. Fehlner, *University of Notre Dame*

Consider a Spherical Cow. By John Harte (University of California at Berkeley). William Kaufmann: Los Altos, CA. 1985. xv + 283 pp. Hardcover: \$24.95. ISBN 0-86576-093-4. Paper: \$12.95. ISBN 0-86576-086-1

"Consider a Spherical Cow" describes relatively simple mathematical methods for developing quantitative answers to often complex environmental problems. Early chapters provide systematic insights into problem solving and identifying mathematical tools and models that lead to "back of the envelope" answers. Subsequent chapters treat increasingly complex problems. Solutions are sought at different levels, e.g., informed guesses, quantitative solutions based on detailed analytical models, and ultimately, critical evaluation of the consequences of removing simplifying assumptions from the models. The vehicle employed is a collection of 44 challenging problems, with clearly worked out solutions, plus ample exercises.

The book, though directed at environmentalists, should appeal to chemists. Many of the problems are rooted in chemistry, including acid rain, the CO₂ "greenhouse" effect, chemical contamination, and the disturbing of cyclical chemical balances. Readers feeling a civic responsibility to think and speak more clearly on environmental issues will find the essential modeling and quantitative approaches valuable assets beyond the help provided by the usual courses in science and mathematics. In fact, the techniques of problem solving have broad applicability beyond the specific environmental examples covered in this text.

Harry Freund, *Oregon State University*

Physics and Chemistry of III–V Compound Semiconductor Interfaces. Edited by Carl W. Wilmsen (Colorado State University). Plenum Press: New York. 1985. XIII + 465 pp. \$69.50. ISBN 0-306-41769-3.

The object of this book is to bring together much of the fundamental and practical knowledge on the physics and chemistry of the III–V compounds with metals and dielectrics. The contributing authors provide concise overviews and a summary of literature on III–V semiconductor–surface interactions, including the following: Absorption of Gasses on Clean III–V Semiconductor Surfaces (R. H. Williams); Schottky Diodes and Ohmic Contacts for III–V Semiconductors (G. Y. Robinson); Deposited-Insulator/III–V Interfaces (J. F. Wager and C. W. Wilmsen), and their Electrical Properties (L. G. Meiners); Oxide/III–V Compound Interfaces (C. W. Wilmsen); III–V Inversion-Layer Transport (S. M. Goodnick and D. F. Ferry); and Interfacial Constraints on III–V Compound MIS Devices (D. L. Lile). These chapters are written by experts, and the fundamental material aspects, the basic quantum mechanics, and device applications are covered in great depth, such that readers new to the field can get an elementary understanding of the subject.

It is shown how current research in the area of semiconductor surfaces and interfaces is aimed at obtaining a detailed understanding of the interplay between crystallographic structure, the chemical composition, and the electronic properties of surfaces and interfaces. The application of state-of-the-art spectroscopic techniques, including low-energy electron diffraction (LEED), reflection high-energy electron diffraction (RHEED), Auger electron spectroscopy (AES), X-ray photoelectron spectroscopy (XPS or ESCA), ultraviolet photoelectron spectroscopy (UPS) and its angle-resolved version (ARUPS), and secondary ion mass spectrometry (SIMS) to probe the chemical and structural nature of the surface layers of III–V semiconductors and characterizing the various chemical and defect species on them are described.

The electrical properties of metal–semiconductor contacts to III–V semiconductors plays an important role in simple devices such as Schottky diodes. Concepts underlying the parameters used to characterize the properties of Schottky diodes and ohmic contacts are developed. The technology of low-resistance ohmic contacts, necessary for high performance in many III–V devices, and the effect of chemical composition on their electrical properties are described. The application of deposited insulators on III–V semiconductors, with high resistivity, mechanical and electronic stability, and low interface state density in metal–insulator–semiconductor (MIS) devices is reviewed.

An overview of various techniques for the deposition of insulator layers on III–V semiconductors is given; the choice of insulator and deposition technique and factors to be considered in choosing a deposition technique

are discussed. The properties of SiO₂ and Al₂O₃ insulator layers and interfaces with III–V compounds are given particular attention. The electrical properties of insulator–semiconductor interfaces of III–V compounds are compared with SiO₂–Si interface properties, and outstanding problems in devices are reviewed.

An overview of the important scattering mechanisms expected for surface layers of III–V compounds, including Coulomb and roughness scattering from the interface as well as scattering by bulk optical phonon and surface modes, is presented. A review of transport data on III–V metal–oxide–semiconductor (MOS) inversion and accumulation layers seems to indicate that properties are governed by disorder and charge states (defects) at the oxide–semiconductor interface. The importance of improving device interfaces and controlling the surface properties of the semiconductors is emphasized. Some new ternary and quaternary III–V compounds for device applications are discussed.

Native oxides readily grow on the II–V compounds. They appear at deposited insulator/III–V interfaces where they can strongly affect the electrical properties. Insight into the mechanisms of oxide growth and how the oxide/III–V interface is formed is illustrated by scanning electron microscopy (SEM) and transmission electron microscopy (TEM) of oxides grown by various techniques.

The book serves as both an important treatise on III–IV interfaces and an extensive reference to the literature.

Martha Greenblatt, *Rutgers, The State University of New Jersey*

Thin Films from Free Atoms and Particles. Edited by K. J. Klabunde (Kansas State University). Academic Press: Orlando, FL. 1985. xi + 363 pp. \$60.00. ISBN 0-12-410755-9.

This book contains eight chapters contributed by twelve authors. The first two introductory chapters define free atoms and particles and describe the processes and reactions, both in gas and solid phases, which they undergo in forming thin films. Subsequent chapters provide thorough reviews of the deposition of films with glow discharges, superthermal free atoms in high vacuum, and magnetron sputtering. There are two chapters on the preparation and properties of hard carbon (i-C), boron nitride (i-BN), and silicon carbide (SiC) films. Finally there is a chapter on the characterization of thin films by X-ray diffraction.

Chapters in this volume are generally well written and contain numerous references that point to topics not explicitly discussed. The book is thus a useful reference for people working on thin films as well as for those who are unfamiliar with but interested in the subject. It should be of particular interest to the chemists, since much remains to be learned about the chemistry of film formation and the chemical properties of thin films. In fact, this book is meant to bring more chemists into this interdisciplinary area of research so that they can contribute to the important and growing thin-film technology.

Edmond I. Ko, *Carnegie Mellon University*

Metal Ions in Biological Systems. Volume 19. Antibiotics and their Complexes. Edited by Helmut Sigel (Institute of Inorganic Chemistry, University of Basel). Marcel Dekker Inc.: New York and Basel. 1985. xxvi + 429 pp. \$85.00 (US and Canada); \$102 (all other countries). ISBN 0-8247-7425-6.

This monograph in the previously well received series on "Metal Ions in Biological Systems" is concerned with the mechanisms of action of metal ion–antibiotic complexes. The justification for investigating such complexes is clear. Certain metal ions serve as cofactors of the biological functions of antibiotics in living systems, while some metal ions appear to enhance the interactions of antibiotics with their macromolecular cell targets such as DNA. In addition, the biological function of a number of ionophoric antibiotics is to transport metal ions through all membranes.

The scope of the treatment of this subject may be judged from the titles of the chapters. 1. The Discovery of Ionophores: An Historical Account by Berton C. Pressman; 2. Tetracyclines and Anthracyclines by R. Bruce Martin; 3. Interaction of Metal Ions with Streptonigrin and Biological Properties of the Complexes by Joseph Hajdu; 4. Bleomycin Antibiotics: Metal Complexes and their Biological Action by Yukio Sugiwaru, Tomohisa Takita, and Hamao Umezawa; 5. Interaction between Valinomycin and Metal Ions by K. R. K. Easwaran; 6. Beauvericin and other Enniatins by Larry K. Steinrauf; 7. Complexing Properties of Gramicidins by James F. Hinton and Roger E. Koeppel; 8. Nactins. Their Complexes and Biological Properties by Yoshiharu Nawata, Kunio Ando, and Yoichi Iitaka; 9. Cation Complexes of the Monovalent and Polyvalent Carboxylic Ionophores. Lasalocid (X-537A) Monensin A23187 (Calcimycin) and Related Antibiotics by George R. Painter and Berton C. Pressman; 10. Complexes of D-Cycloserine and Related Amino Acids with Antibiotic Properties by Paul O'Brien; 11. Iron-Containing Antibiotics by J. B. Neilands and J. R. Valenta; and 12. Cation Ionophore Interactions: Quantification of the Factors Underlying Selective

Complexation by Means of Theoretical Computations by Nohad Gresh and Alberte Pullman. The volume has been carefully edited by Helmut Sigel.

The topics have evidently been selected carefully and each self-contained chapter covers one or two closely related antibiotics in depth, so that for readers interested in a specific topic the information sought is efficiently obtained. Another attractive feature of this volume is that for those desiring an introduction to a given topic most of the chapters are characterized by a clear introductory section dealing with structural aspects of the metal ion-antibiotic complexes, followed by a description of the binding or transport properties in model or biological systems. Depending on the author's specialty, the emphasis of detailed discussion may range from electroanalytical techniques, spectroscopy, to thermodynamic aspects or X-ray crystallography. Because of space limitations, the treatment of individual techniques is necessarily cursory in places, but for those seeking further details, the literature references cited appear to be comprehensive, at least for those individual topics familiar to the author of this review.

The growing importance of computer graphics and molecular mechanics techniques applied to antibiotic action has been recognized, and its inclusion in this volume is welcomed.

In a field as wide in scope as this subject it is inevitable that many questions remain unanswered. Individual authors have recognized this and, in many cases, their chapters conclude with a lucid statement of areas yet to be explored. With a multi-author volume there are the inevitable differences in style, but on the whole this serves to sustain the reader's interest. The volume, for a camera-ready production, also contains a refreshingly small number of errors. Some omissions in the topics covered are apparent, such as the aureolic acid antibiotics, the saframycins, as well as synthetic functional analogues of the glycopeptides. In summary, this volume represents a useful compilation of information on antibiotic action mediated by metal ions and should be of interest to adherents of such diverse disciplines as bioinorganic and coordination chemistry, biochemistry, pharmacology, microbiology, and toxicology. I can recommend it and fully expect my personal copy to be well-thumbed as it passes around the group.

J. William Lown, *University of Alberta*

Principles of Polymer Composites. By A. A. Berlin, S. A. Volfson, N. S. Enikolopian, and S. S. Negmatov (Institute of Chemical Physics, U.S.S.R.). Springer-Verlag: Berlin, Heidelberg, New York, and Toronto. 1986. x + 124 pp. \$57.00. ISBN 3-540-15051-X.

This book is a short review of the principles of polymer-based composites and also focuses attention on the unsolved problems in the theory and practice of polymer composites. Over 400 references are included in the text (one-fourth are Soviet references), covering books, reviews, and original papers, up to 1983 (a few Soviet papers cover the 1984 and 1985 period).

The book is divided into three chapters. The first chapter analyzes theoretical concepts of reinforcement of polymer matrices by fillers: matrix-to-filler stress-transition mechanism, adhesion at interphase, deformation of polymer matrix composites, fracture toughness, spaciou distribution of fillers, plastization of rigid matrices by fillers, and impact-strength improvement.

The second chapter reviews theoretical models describing physical and mechanical properties of polymer composites: theories for the calculation of elastic properties, thermal and electric conductivities, thermal expansion, modulus, and compressive strength. The deviation between theoretical and experimental results is discussed.

In the third chapter manufacturing principles of polymer composites are reviewed. The coverage is very general and incomplete, but it has an interesting section on the chemical grafting of macromolecules to the surface of fillers.

The book can be of value to researchers entering the field of polymer composites.

Jiri E. Kresta, *Polymer Institute, University of Detroit*

The Pentose Phosphate Pathway. By Terry Wood (University of Zimbabwe). Academic Press, Inc.: Orlando, FL. 1985. xii + 204 pp. \$29.95. ISBN 0-12-762860-6.

With this book on the pentose phosphate pathway, Professor Wood has filled a serious void in our carbohydrate metabolism library. A comprehensive review has not been written on this subject in over 20 years.

Considering the importance of the pathway, e.g., in NADPH production, nucleotide biosynthesis, carbon dioxide fixation, etc., it is indeed unfortunate that a general lack of interest seems to prevail. Even current major biochemistry textbooks generally allot two to three times more space to glycolysis. This is in part a result of a lack of data, but it is also due to the ease with which data can be obtained, i.e., reviews instead of

individual papers, as well as to demand, exposure, and interest. Hopefully, this book will help.

The book is well organized and is complete with respect to animals and microbes. However, I find it unfortunate that reactions common with the reductive pentose cycle (plants) were passed-over. This would have increased the audience and consequently the exposure. The presentation is straightforward, succinct, factual, and an accurate presentation of data.

It might be listed as a reference book, i.e., supplemental to a textbook, in advanced undergraduate or beginning graduate courses in biochemistry. It will be most useful to graduate students as well as professors in highly advanced, topical courses dealing with metabolism and to those individuals either actively pursuing or contemplating entering this area of research.

Jessup M. Shively, *Clemson University*

Oxazoles. Edited by I. J. Turchi (FMC Corp.). John Wiley & Sons: New York. 1986. x + 1064 pp. \$225.00. ISBN 0471-86958-9.

Volume 45 of the series "The Chemistry of Heterocyclic Compounds" (edited by A. Weissberger and E. C. Taylor) consists of a chapter on the synthesis and reactions of oxazoles by the Editor, one on oxazolones (by Y. S. Rao and R. Filler), one on mesoionic oxazoles ("munchones") (by H. L. Gingrich and J. S. Baum), another on spectroscopic properties (by C. A. Maryanoff), and a review of oxazoles and oxazolines in organic synthesis (by B. E. Maryanoff). Except insofar as the last chapter touches on oxazolines, reduced oxazoles are not covered.

The chemistry of oxazoles reaches far back into the 19th century, but the usefulness of oxazoles in synthesis was not appreciated until the latter half of the 20th century. Much of the synthetic importance of oxazoles centers on cycloaddition reactions, which result in ring transformations leading to pyridines, pyrroles, and pyrrolines, but conversion to imidazoles by reaction with amines and formation and reactions of metallated derivatives are also important. In view of the consequent great interest in oxazole chemistry, this volume is timely and very welcome.

The chapters follow the established style of the series and are rich in tables of data. The literature coverage is massive; one chapter alone has 1276 references. Publications as recent as mid-1983 are cited. An author index, which must have been laborious to compile but which increases the reference value of the book, is included, as is the usual thorough subject index.

In view of the practical impact of oxazole chemistry on synthetic organic chemistry, this book should see heavy use, and librarians should not be misled into regarding the subject as an esoteric one.

Modern Analysis of Antibiotics. Edited by A. Aszalos (Food and Drug Administration). Marcel Dekker, Inc.: New York. 1986. xv + 518 pp. \$89.75. ISBN 0-8247-7358-6.

This is Volume 27 of "Drugs and The Pharmaceutical Sciences", a series of textbooks and monographs edited by James Swarbrick of the University of North Carolina School of Pharmacy. The Editor of this particular volume is active in the analysis of antibiotics and a productive research worker. He assembled a team of nineteen scientists from FDA, academia, and private industry to write the fourteen chapters included in the volume. The chapters are evenly divided on subject matter, with half on chemical analysis and half on biological assays for antibiotics. The editor has specified that the methods discussed should be those utilized for antibiotics within the last 5-7 years, and a perusal of the literature references at the end of each chapter indicates that this has been achieved. The subject matter in the various chapters includes gas chromatography, ultraviolet and light absorption spectrometry, infrared spectroscopy, mass spectrometry, electron-spin resonance, thin-layer chromatography, high-performance liquid chromatography, thermal analysis, microbial assays in body fluids and tissues, assays in mammalian cell culture, immunological approaches, determination of antiviral activity, fertilized sea urchin eggs as a model for detecting cell division inhibitors, and a critical appraisal of animal models for antibiotic toxicity.

Some of the chapters include a brief theory section on the analytical technique prior to the detailed discussion of how the technique has been utilized in antibiotic analysis. This reviewer understands the editor's desire to include theory for the sake of completeness but feels that this material adds nothing substantial to the text and should have been omitted. The chapters are well-organized, with methodology for each antibiotic being discussed individually. Figures of the chemical structures of the antibiotics are included in each chapter. I have always liked this approach to presentation of text material.

The chapters read well and there is a flow to the subject matter in the entire volume, which reflects well on the editor. The volume should be included as a reference source in a science library or other appropriate place. It could be utilized as a text for an analytical course offering on antibiotics. It appears to be a significant contribution to antibiotic

analysis and is highly recommended.

James T. Stewart, *College of Pharmacy,
University of Georgia*

Stripping Analysis: Principles, Instrumentation, and Applications. By Joseph Wang (New Mexico State University). V.C.H. Publishers, Inc.: Deerfield Beach, FL. 1985. VIII + 160 pp. \$29.75. ISBN 0-89573-143-6.

This small book is a welcome contribution to the general literature on methodology for trace analysis. The techniques collectively called stripping analysis are described in four sections. The first, and longest, deals with principles of the experiment; greatest emphasis is placed on anodic stripping voltammetry and its variants, with briefer accounts of cathodic stripping methods and techniques using non-electrolytic accumulation. A section on electrode types and construction, cell design, and instrumentation follows. The third section is a short but important chapter that summarizes the kinds of interferences which may affect accuracy and precision in the measurement. Finally, a section on applications to various analytical situations, including environmental and clinical analysis, outlines briefly and usually uncritically many of the methods appropriate for particular problems.

At the outset, Professor Wang states "the main limitation of stripping analysis is its restriction to about 30 metals". This limitation is underlined, as no method is presented for a number of these 30 metals, and the vast majority of examples given throughout the book deal with Zn, Cd, Pb, and Cu as well as a few other elements. Procedures using nonelectrolytic reactions and chemically modified electrodes are increasing the scope of stripping methods, and it is to be hoped that future editions of this book would include expanded sections on these topics.

Two particular virtues of stripping methods for trace analysis are the very low concentrations which may be determined without preconcentration in a separate experiment, and the ability to distinguish oxidation states or species of a particular element. The former advantage is well documented in this book, and methodology for determining sub-ppb levels of elements is adequately described. Less convincing is the discussion on aspects of speciation. Many of the documented procedures involve prior separation of species, with stripping analyses used only to determine elemental concentrations afterwards. In other cases, it is difficult to relate operationally determined concentrations to actual chemical species in solution. Nevertheless, one must agree with the author that "Overall, the application of suitable stripping methodologies will certainly provide better understanding of trace metal speciation in natural waters".

The book brings together, in a very readable form, a scattered body of literature on the of stripping analysis. It will prove to be useful especially for persons who are initiating work of this type as it touches on virtually all important aspects of the technique.

G. W. vanLoon, *Queen's University*

Principles of Colloid and Surface Chemistry. By Paul C. Hiemenz (California State Polytechnic University). Marcel Dekker, Inc.: New York and Basel. 1986. xv + 815 pp. \$39.75. ISBN 0-8247-7476-0.

Dr. Hiemenz recognizes that the vast majority of undergraduate students get very little or no systematic exposure to the chemistry of colloidal-size particles and the two-dimensional world of surfaces. He therefore aims this second edition of his book at students with only a good general background in physical chemistry and an introduction to physics. Each topic is introduced at a level commensurate with this type of background and is developed in a logical and easy-to-follow fashion.

The choice of topics to be covered is quite reasonable for a book on this subject at this level. There does seem to be rather heavy emphasis on polymers in the early chapters. However, the author is very good at showing the relationships between subjects and ideas that at first glance might appear to be unrelated or only remotely related. This should help the students overcome a tendency to compartmentalize their knowledge. Several worked-out examples are included in each chapter to aid in understanding the material, and there are good problems at the end of every chapter. The latter would be more beneficial if answers were included.

SI units are used primarily, but the need to be able to handle cgs units in reading the older literature is recognized and conversion factors are included in an appendix. Dimensional analysis is emphasized throughout the book.

Dr. Hiemenz does not have the objective of taking the students to the forefront of research in any field. That task is wisely left to specialized reviews or monographs and the original literature. However, the total omission from the chapter on light scattering of any mention of the subject most commonly known as dynamic or quasi-elastic light scattering does seem to be at least a decade back from the frontier and a fairly serious omission.

Apart from having Figures 4.1 and 4.2 transposed, I have found no

other serious errors of this nature in the book. This is really a first rate textbook for a senior or beginning graduate level course in colloid and surface chemistry.

Raymond L. Venable, *University of Missouri—Rolla*

Methods in Enzymology. Volume 116. Part H. Section IV. Preparation, Purification and Characterization of Antigen-Nonspecific Lymphokines. Edited by G. D. Sabato (Vanderbilt University), J. J. Langone (Baylor College of Medicine), and H. V. Vunakis (Brandeis University). Academic Press, Inc.: Orlando, FL. 1985. xxvi + 665 pp. \$69.50.

Lymphokines and related cytokines have long posed a difficult enigma for immunologists because of the necessity to rely on the often cumbersome bioassays that define the various factors, the extremely high specific activities of the various proteins, and the additional problem that many of these molecules have significant overlapping and interacting effects with other lymphokines.

Section IV provides a valuable contribution to workers in the field because it brings together the details of methodology for detection and purification of most of the important lymphokines. The methods presented here for several of the lymphokines/monokines, including the interleukins, lymphotoxin, tumor necrosis factor, and the colony-stimulating factors of hematopoiesis, have been proven to be effective by allowing for sequence determination and gene cloning. For several other lymphokines (B cell growth factors, migration inhibition factor, and the suppressor factors) which have not been purified to homogeneity, the methods described reflect currently used procedures. Several chapters provide useful information on lymphokines produced by experimental animals as well as those derived from human cells. This section opens with a much needed and focused perspective by J. Oppenheim, which provides a simple categorization of the various lymphokines and the relevance of the numerous lymphokine activities to immune function, allowing the non-expert insight into the putative role of these molecules in the immune system. Section IV does not cover interferon- γ , although the interferons have been the subject of previous volumes (Volume 78 and 79). Overall, this section provides an excellent collection of successful methodologies and strategies for biochemists/immunologists concerned with the characterization of biologically active molecules.

Carl F. Ware, *University of California*

Molecular Spectroscopy: Modern Research. Volume 3. Edited by K. N. Rao (Ohio State University). Academic Press: New York. 1985. xiii + 452 pp. \$85.00. ISBN 0-12-580643-4.

The first volume in this series was conceived to commemorate the 25th annual Columbus, Ohio, Symposium on Molecular Structure and Spectroscopy, and the third volume has continued the association with this conference. Since virtually everything of note occurring in molecular spectroscopy is discussed at this meeting, the connection is a valuable one. As with its predecessors, the current volume is not a synopsis of the conference proceedings, but the seven review articles contained in it summarize some major developments in spectroscopy and are written by leading figures in this field.

The advent of high-resolution vibration-rotation spectroscopy with use of techniques involving color center, difference frequency, and diode lasers and FTIR methods has required extensions of theory to account for the finer details available from experiment. Two reviews deal with this aspect. The first, by M. R. Aliev and J. K. G. Watson, gives a nice development of higher order effects manifest in the energy levels, nuclear hyperfine interactions, and electric dipole-moment operator of semirigid molecules (small vibrational amplitudes) using contact-transformation methods. The second, by C. Camy-Peyret and J.-M. Flaud, deals more completely with the dipole-moment operator and its relation to vibration-rotation line intensities and molecular Stark effects. Again, the contact-transformation method is featured with specific application to XY_2 asymmetric rotors.

Two articles discuss some experimental aspects of the dipole moment operator. M. A. H. Smith, C. P. Rinsland, B. Fridovich, and K. N. Rao have collected extensive infrared-intensity data and collision-broadening parameters to update (through November, 1983) an earlier compilation in the second volume of this series. A useful review of methods for obtaining the information and of the units employed is included.

The short chapter by E. Hirota is an interesting review of microwave-spectroscopic studies of isotope-substituted nonpolar molecules such as methane, ethylene, and acetylene. Small dipole moments are induced by the isotope substitution for molecules such as CH_3D , allowing the high precision of microwave spectroscopy to be extended to these molecules. Somewhat related to this is a brief review of the electric multipole moments of molecular hydrogen and its isotopes by R. H. Tipping and J. D. Poll. Both experimental and theoretical considerations are covered, including a discussion of dipoles induced by interactions with other molecules.

The chapter by J. M. Brown and M. R. Purnell gives an overview of experimental methods for observing pure rotation and vibration-rotation spectra for free radicals and ions. The discussion of results in this rapidly expanding area is restricted to triatomic species, and a useful set of tables (from references up to June 1984) concludes this review.

The remaining article in this volume, by B. P. Winnewisser, is a lengthy review of quasilinear molecules, whose intermediate behavior between "linear" and "bent" molecule behavior has made their spectroscopy interesting and complex. A detailed discussion of experimental results for four-atom and larger systems is given, along with an introduction to theoretical techniques for handling these molecules. A section concerning quasisymmetric top molecules is also included.

This series of reviews is valuable to researchers in the area of high-resolution spectroscopy, and the current volume is highly recommended.

Thomas R. Dyke, *University of Oregon*

Spectroscopic Properties of Inorganic and Organometallic Compounds. Volume 18. Edited by G. Davidson (University of Nottingham) and E. A. V. Ebsworth (University of Edinburgh). The Royal Society of Chemistry: London. March 1986. XV + 466 pp. \$171.00. ISBN 0-85186-163-6.

This volume reviews the spectroscopic properties of inorganic and organometallic compounds as contained in the recent literature published up to late 1984. Volume 18 is the first of this series to be produced from camera-ready copy. Consequently, there have been minor changes in format. The references are given at the end of each chapter rather than at the bottom of each page. This change in format does not detract in any way from the usefulness of this volume. The book is composed of eight chapters. Chapter 1 deals with Nuclear Magnetic Resonance Spectroscopy (B. E. Mann, 102 pages, 2792 references) and its organization remains similar to that used in the previous volumes. Nuclear Quadrupole Resonance Spectroscopy (K. B. Dillon, 16 pages, 92 references) is reviewed by periodic group. Rotational Spectroscopy (S. Craddock, 17 pages, 151 references) is organized by types of molecules or complexes and numbers of atoms per molecule. Chapter 4 on Characteristic Vibrations of Compounds of Main-Group Elements (G. Davidson, 21 pages, 319 references) is reviewed by periodic group as is Chapter 5 on Vibrational Spectra of Transition Element Compounds (G. Davidson, 26 pages, 359 references). G. Davidson also reviews the literature on Vibrational Spectra of Some Coordinated Ligands (45 pages, 399 references). The chapter on Mossbauer Spectroscopy (S. J. Clark, J. D. Donaldson, and S. M. Grimes) requires 87 pages with 591 references. The last chapter reviews the literature on Gas Phase Molecular Structures as Determined by Electron Diffraction (D. W. H. Rankin and H. E. Robertson, 17 pages, 55 references). An obvious omission in this volume is a review of electronic spectroscopy.

The coverage of the literature appears to be surprisingly complete. The organization of each chapter is logical and well planned. The number of references in each chapter permits only detailed and concise statements regarding the work which has been reported. This volume is an exceedingly valuable addition to the literature on subjects of interest to many researchers. It is important for researchers to purchase this volume so that this valuable series can be sustained.

O. T. Beachley, Jr., *State University of New York at Buffalo*

Physical Chemistry. Third Edition. By P. W. Atkins. W. H. Freeman and Company: New York. 1986. xxiii + 857 pp. \$39.95. ISBN 0-7167-1749-2.

"Increasingly I find myself merely the chairman of an international team which is helping to shape the text and to keep it up to date," writes the author in the preface to the third edition of this widely used book. Topics added "by request" (of teachers, one presumes; not students!) include "more chemical kinetics" (polymerization, oscillating reactions, the diffusion equation) and "a higher level of quantum theory".

Combining telling ("It turns out that...", "The equation is...") with plausible argument ["The simplest way of taking the temperature into account (regarding the degradation of energy) is to define the entropy change of the reference system (a weight + thermal reservoir) as q/T "] and mathematical manipulation ("the spine in the subject"), the author presents briskly some four hundred topics (whose mastery pretty much defines a modern physical chemist) at the rate of about 0.5 topics per page.

To meet the criticism that the *Problems* at the ends of the chapters "are often a quantum leap in difficulty removed from the *Examples*" within the chapters, "an additional 300 'straightforward problems' have been provided by Professor J. C. Morrow of the University of North Carolina, Chapel Hill. Answers to most of the problems are available to the students at the end of the book. For instructors there is a *Solutions Manual*.

To meet students' criticism that p-chem texts are a quantum leap in

difficulty removed from what they can comprehend, each chapter opens with a set of "Learning Objectives" and subsections are more numerous and are now numbered, for ease in assignment—or nonassignment.

In summary, this third edition represents the best of physical chemistry as it is taught today. The writing is crisp and authoritative. The illustrations are generally well-executed. The pages are pleasing to look at. I would be delighted if I knew everything that is in this book.

Henry A. Bent, *North Carolina State University*

Lipids: Chemistry, Biochemistry, and Nutrition. By J. F. Mead (U.C.L.A.), R. B. Alfin-Slater (U.C.L.A.), D. R. Howton (University of Hawaii and Manoa), and G. Popjak (U.C.L.A.). Plenum Press: New York and London. 1986. viii + 486 pp. \$69.50. ISBN 0-306-41990-4.

This is an excellent survey of the subjects mentioned in the title with the possible exception of nutrition. It is the best general, textbook-size, single volume that I have seen on the subject. With only one chapter (15 pages with references) of nineteen devoted to nutrition, and this largely related to disease states, the inclusion of nutrition in the title may be an overstatement.

Choices of what to include in a single volume of reasonable size are very difficult, and different people writing a book on lipids would make somewhat different choices. The commonly expected subjects are all here, up to date, and well surveyed. Two chapters that might not be expected but are most welcome are one on prostaglandins, thromboxanes, and prostacyline and another on leukotrienes. These chapters are relatively more extensive than most others. Another welcome and good chapter discusses digestion and absorption of lipids.

Subjects that I would have liked more coverage of are methodology, steroids, and lipoproteins. There is no chapter on lipid methodology, although extraction of lipids from tissues and some chromatography are discussed briefly where they fit into the discussion of properties of lipids. Other than cholesterol, bile acids are the only steroid covered. The chapter on lipoproteins is very good but I would have liked more.

Chapters 2, 3, and 4 are more detailed and theoretical than I would expect most of the audience to find of much interest. These chapters deal with solubilities and definition of lipids along with several aspects of fatty acids including association between molecules, conformation, crystals, and monomolecular films.

The writing is mostly clear and easy flowing. Chapters 2, 3, and 4 are laborious in places. As a textbook for an introduction to lipids this book is excellent, whether the students are health scientists (the main audience), chemists, or biochemists. Active chemists, biochemists, nutritionists, and people in related fields will also find the book useful. A general understanding of biochemistry is required to best use this book.

J. L. Foote, *Western Michigan University*

Studies in Modern Thermodynamics. 5. Studies in Network Thermodynamics. By L. Peusner. Elsevier Science Publishers B. V.: Amsterdam and New York. 1986. xvi + 370 pp. \$90.75. ISBN 0-444-42580-2.

As the author states in the Preface, this volume is not a textbook on network thermodynamics but a collection of studies which show how network theory can be applied to a number of topics of practical and theoretical interest in thermodynamics. The networks developed for this purpose are analogous to electrical networks in which Kirchhoff's laws are obeyed, except that voltages and currents are replaced by forces and flows. Although most of the results derived by using the network approach can also be derived through the use of differential topology and/or tensor algebra, the use of networks, in many cases, leads to a deeper understanding of the thermodynamic systems modeled. Moreover, since Kirchhoff's laws lie in orthogonal subspaces, the cause-effect characteristic of forces and flows being orthogonal is automatically taken care of. Thus, orthogonality is introduced naturally into the thermodynamic systems described.

The first chapter presents the principles of graph and network theory along with the associated mathematics. These concepts are then applied to thermodynamics, thermostatics, and both equilibrium and nonequilibrium processes. Among the topics discussed are diffusion and related transport problems, kinetic networks, liquid junction potentials, and electrokinetic phenomena. One of the more interesting demonstrations of the power of the methods presented is the simplification, in a number of cases, of the derivation of proper thermodynamic equations without resorting to the use of the dissipation function and involved Onsager calculations.

This is not an easy book to read. Part of the cause is the fact that it presents the results of a number of studies connected by a central theme rather than having the material sorted out and organized as in a textbook. It would have been very helpful to have had a few paragraphs at the end of each chapter which pulled together and summarized the results and conclusions presented. Better proof reading could have reduced the surprisingly large number of typographical and grammatical errors in the

text, which I found somewhat disconcerting.

The results of the network approach to thermodynamics are very impressive, and it will be interesting to see what further elaborations appear in the future.

M. H. Lietzke, *University of Tennessee*

Volumes of Proceedings

Dioxins in the Environment. Edited by Michael A. Kamrin and Paul W. Rodgers. Hemisphere Publishing: Washington, DC, and New York. 1985. vii + 328 pp. \$49.95. ISBN 0-89116-371-9.

This unfortunately titled book contains 16 papers, four panel discussions, and four "Workshop summaries" from a symposium held at Michigan State University in 1983. The subject, of course, is the chlorinated dibenzodioxins and closely related materials; mononuclear dioxins do not appear to be of concern. The subject of chlorinated dibenzodioxins and their precursors is obviously of much importance, and it is useful and appropriate to have a range of aspects treated in one place, such as public policy, analysis and monitoring, behavior in the environment, and toxicology. Those who like folksy dialogue will enjoy the verbatim transcripts of the panel discussions. Indexed.

The Biosphere: Problems and Solutions. Edited by T. N. Veziroglu. Elsevier: Amsterdam and New York. 1984. xvi + 712 pp. \$139.00. ISBN 0-444-42424-5.

Contains a large number of typescript papers from a symposium on the Biosphere, held in Miami Beach in 1984. The topics range from chemical landfills to space debris, with many aspects of chemistry throughout. No subject index.

Third European Bioenergetics Conference. ICSU Short Reports. Volume 3. Edited by Günter Schäfer. Cambridge University Press: Cambridge and New York. 1985. xlviii + 745 pp. \$74.50. ISBN 0-521-30813-5.

The meeting that gave rise to the very large number of typescript papers in this volume was held in Hannover in 1984. Poster Presentation papers are included. The topics range from microbial energy conversion to mechanism of electron transport. The absence of a subject index in a book of this size is a significant drawback.

Thirteenth Symposium on Nucleic Acids Chemistry. Nucleic Acids Symposium Series No. 16. Symposium organizer: Ken-ichi Tomita. IRL Press: Oxford and Washington, DC. 1985. xi + 296 pp. \$25.00. ISBN 0-947946-43-8.

This softbound volume contains in typescript form a large number of short reports of original research presented at a symposium held in Osaka in 1985. Not indexed.

Polymeric Materials in Medication. Edited by Charles G. Gebelein and Charles E. Carraher, Jr. Plenum: New York. 1985. viii + 302 pp. \$52.50. ISBN 0-306-42115-1.

An ACS Symposium held in Philadelphia in 1984 was the basis of the 22 typescript papers in this volume. Some of them, such as Polypeptides as Drugs, are reviews, and others, such as Oxygen Species Chemistry of Osmium Carbohydrate Polymers, are reports of original research. Indexed.

Electronic Properties of Polymers and Related Compounds. Edited by H. Kuzmany, M. Mehring, and S. Roth. Springer-Verlag: Berlin and New York. 1985. xi + 354 pp. \$34.50. ISBN 0-387-15722-0.

There are a large number of papers, essentially reports of original research with some tutorial contributions, in this volume. They are the typescripts of presentations made at an International Winter School held in the Tirol in 1985. Areas covered include conducting polymers, electrochemistry, vibrational spectroscopy, magnetic resonance, etc. Not indexed.

Advances in Polymer Synthesis. Edited by Bill M. Culbertson and James E. McGrath. Plenum: New York. 1985. xi + 553 pp. \$85.00. ISBN 0-306-42109-7.

A symposium held in Philadelphia in 1984 gave rise to the 25 papers in this volume. They are printed in a uniform typescript of high quality and are provided with a subject index. The aspects of the subject that are covered include both new types of polymers and new methods of producing them.

Organic Synthesis: An Interdisciplinary Challenge. Edited by Jacques Streith, Horst Prinzbach, and Gottfried Schill. Blackwell Scientific Publications: Oxford and Palo Alto. 1985. viii + 335 pp. \$47.00. ISBN 0-632-01441-5.

Contains the typescripts of 29 papers from a symposium held in Freiburg in 1984. The papers are reports of original research with some review character; they do not have experimental details. Not indexed.

Biocatalysts in Organic Syntheses. Edited by J. Tramper, H. C. van der Plas, and P. Linko. Elsevier: Amsterdam and New York. 1985. xii + 260 pp. \$77.75. ISBN 0-444-42541-1.

A symposium held in 1985 in the Netherlands gave rise to the 14 typescript articles in this volume. The papers are reviews of recent advances with examples and are concerned with enzymes, chiral intermediates, immobilized biocatalysts, and biotechnology.

Physics of Solid Surfaces. Edited by J. Koukal. Elsevier: Amsterdam and New York. 1985. xvi + 240 pp. \$72.25. ISBN 0-444-42529-2.

Proceedings of the Third Symposium on Surface Physics, held in Czechoslovakia in 1984, consisting of the typescripts of 13 invited papers, 13 short communications, and a large number of poster presentations. No subject index.

Clustering Aspects of Nuclear Structure. Edited by J. S. Lilley and M. A. Nagarajan. D. Reidel Publishing Co.: Dordrecht and Boston. 1985. xii + 420 pp. \$54.00. ISBN 90-277-2002-9.

Contains the typescripts of the 26 invited papers from the Fourth International Conference on the subject, held in Chester in 1984. The topics range from microscopic potentials to anomalous. Subject index.

Comparison of Ab Initio Quantum Chemistry with Experiment for Small Molecules. Edited by Rodney J. Bartlett. D. Reidel Publishing: Dordrecht and Boston. 1985. ix + 513 pp. \$79.00. ISBN 90-277-2129-7.

A symposium held in Philadelphia in 1984 generated the 16 typescript papers that make up this volume. An appendix of 9 pages mysteriously lists a lot of authors with titles of papers, without explaining their connection with the symposium, and also includes a Schedule of Plenary Lectures, many of which are not included in these proceedings. Subject index.

Chromatography and Separation Chemistry: Advances and Developments. Edited by Satinder Ahuja. American Chemical Society: Washington, DC. 1986. viii + 304 pp. \$54.95. ISBN 0-8412-0953-7.

The 15 typescript papers in this volume were developed from a symposium sponsored by the ACS Division of Analytical Chemistry, held in Philadelphia in 1984. They are mostly accounts of original research, but some are reviews of recent advances. Detailed subject index.

Electrochemistry in Research and Development. Edited by R. Kalvoda and Roger Parsons. Plenum Press: New York. 1985. viii + 308 pp. \$55.00. ISBN 0-306-42219-0.

Contains the typescript papers presented at the UNESCO Scientific Forum on Chemistry in the Service of Mankind, held in Paris in 1984. Areas covered include Electrochemistry and Energy, Electrochemistry and the Environment, Electrochemistry in Biosciences, and Electrochemistry in Technology. Subject index.

Biological & Inorganic Copper Chemistry (Two Volumes). Edited by Kenneth D. Karlin and Jon Zubieta. Adenine Press: Guilderland, NY. 1986. Volume I: xii + 273 pp. \$65.00. ISBN 0-90030-11-X. Volume II: xii + 289 pp. \$65.00. ISBN 0-90030-15-2.

Proceedings of the Second Conference on Copper Coordination Chemistry, held in Albany, NY, in 1984. The papers are nicely set in type. Subject areas include (Volume I) Copper Proteins; Medicinal Copper Chemistry; Physical Characteristics of Copper Compounds; (Volume II) Dioxygen Chemistry and Catalysis; Coordination Chemistry; Protein Models; and Organometallic Copper Complexes. One paper has the intriguing running head Hemocyanin Cooperativity, but it stops short of defining this remarkable word. Each volume contains the subject index for both, and each is available separately.

Ultrafast Phenomena. Volume IV. Edited by D. H. Auston and K. B. Eisenthal. Springer-Verlag: Berlin. 1984. xvi + 509 pp. 370 Figures. \$29.00. ISBN 0-387-13834-X.

This book is the proceedings of the Fourth International Conference on Ultrafast Phenomena in Monterey, California, June 11-15, 1984. The papers are each 3-5 pages in length and are organized by topic. Topics are the following: Generation and Measurement Techniques; Solid State Physics and Nonlinear Optics; Coherent Pulse Propagation; Stimulated Scattering; Transient Laser Photochemistry; Molecular Energy Redistribution, Transfer and Relaxation; Electronics and Opto-Electronics; Photochemistry and Photophysics of Proteins, Chlorophyll, Visual Pigments, and Other Biological Systems. The articles are well written and referenced so that this single volume will serve as a guide to the current activity in a wide variety of disciplines. Many of the articles will be published in a more complete form; however, earlier volumes of this series contain many singular contributions that are primary references. This latter fact and the broad coverage of the field are important attributes of this volume, which should serve a wide variety of researchers in this field.

Kenneth G. Spears, *Northwestern University*