

Book Reviews*

Catalyst Deactivation. Proceedings of the International Symposium, Antwerp, Belgium, October, 1980. Edited by B. Delmon and G. Froment. Elsevier Scientific Publishing Company, Amsterdam and New York. 1980. x + 602 pp. \$92.75.

This book is sixth in a series of symposia proceedings on the subject of heterogeneous catalysts of practical application in industry. The papers presented concern themselves with mechanisms involved in the deactivation of heterogeneous catalysts by poisoning, coking, and solid-state transformations. There are no entries on the subject of deliberate deactivation to increase selectivity. About one-half of the papers included consider coking mechanisms on catalysts used in petroleum reforming and cracking; the remainder consider mechanisms for deactivation of other industrially important heterogeneous catalysts. This volume will be of interest only to specialists in the field, especially in view of the extremely high price.

Donald Z. Rogers, *SRI International*

Bioenergetics and Thermodynamics: Model Systems. Edited by A. Braibanti (University of Parma, Italy). D. Reidel Publishing Company, Dordrecht, Holland/Boston, USA/London, U.K. 1980. 1x + 474 pp. \$58.00.

This book reports the proceedings of the NATO Advanced Study Institute held in Italy in 1979. It contains 33 presentations of somewhat uneven scope and depth. The general goal is to present the state of the art review of research on the synthesis and the properties of organic compounds which may be viewed as models for biological systems. Four chapters deal with designing synthetic peptides, crown ethers, and macrocyclic ligands in general. They provide good account of the synthetic and functional considerations which go into preparation of model compounds. Testing such compounds, measurement of metal-ligand interactions, and discussion of structural and energetic aspects of metal-ligand binding are the subjects of several papers. In this context special emphasis is placed on calorimetric techniques. Eight contributions are concerned with liquid membranes and lipid bilayers as models for biological membranes. These chapters provide valuable insight into the thermodynamics of transport across synthetic membranes, and the role of carriers and membrane potential in such transport. However, to "practitioners of Biology" these systems appear to be a long way away from the real biological membranes.

Some of the more basic material presented in this book, including the chapters on concentration scales, kinetics of enzyme action, equilibrium studies, and others, probably served an appropriate educational function for the students of the summer school. Its usefulness in the published proceedings is less clear.

Three short but well-conceived chapters discuss calorimetric studies on proteins and recent advances in instrumentation and interpretation of heat capacity data obtained from biological systems. These papers, together with the chapter on the dynamic nature of protein structure (conformational fluctuations), bring into focus the large gap which separates model systems from real biochemical systems.

In summary, this book is a valuable status report for researchers interested in constructing and studying models for biological systems. It will attract little attention from scientists working with real biological systems since the gap between the two worlds has not been bridged.

Emil Reiser, *University of California, Los Angeles*

Modern Physics: The Quantum Physics of Atoms, Solids and Nuclei. Third Edition. By Robert L. Sproull (University of Rochester) and W. Andrew Phillips (University of Cambridge). John Wiley and Sons, New York. 1980. xi + 682 pp. \$27.95.

This textbook is designed to follow an introductory general physics course and is addressed to a general audience of science and engineering majors. No knowledge of quantum physics or advanced mathematics is assumed. The new edition includes a new chapter which introduces postulatory quantum mechanics and the associated linear algebra, wave packets, and perturbation theory. It also gives more thorough treatments of introductory molecular and solid-state physics. Inclusion of these topics constitutes a desirable departure from the standard coverage in textbooks of modern physics. In this way the textbook certainly fulfills its objective for a general audience of science students and makes a strong case for a common course in physical science in the curricula of physics and chemistry majors in particular—a move which makes both rational and economic sense in university curriculum development especially

where student numbers of departments concerned are small. Various sections have been rewritten to incorporate new developments in the field. Very few historical notes have been included, and SI units are used throughout the text.

The text is attractively and clearly presented with sufficient detail being paid to mathematical development of theory for the benefit of the inexperienced reader. There are, however, occasional instances of over-writing. For example, the Debye theory of solids, which customarily is dealt with in careful detail within the main text in textbooks of solid-state and thermal physics, is mainly derived by the reader through problems with the help of an appendix. Answers to problems are provided in one of the appendices.

Chodziwadiwa C. Mjojo, *Chancellor College, University of Malawi*

Alternative Fuels: Chemical Energy Resources. By E. M. Goodger (Cranfield Institute of Technology, United Kingdom). John Wiley and Sons, Somerset, New Jersey 08873. 1980. xvii + 238. \$43.95.

This text is primarily addressed to the fuel specialist and decision maker. It discusses in detail the technical potential of alternative chemical fuel substrates for combustion engines excluding nuclear fuels. The book begins with a survey of global energy resources and consumption patterns. This is followed by three chapters which discuss the chemistry of conventional combustion reactants and alternative fuels. A remarkable feature of this section is the inclusion of detailed stoichiometry of combustion processes. The technical issues of combustion processes occupy much of the remainder of the book. A final chapter discusses the production, utilization, and likely costs of the most promising alternative fuels for the future. Throughout the text special attention has been paid to terminology. For example, Goodger makes the point of using the term biomatter instead of biomass.

The text makes interesting reading material even for the nonspecialist in the field. The style of presentation is certainly not suitable for class use, but the subject matter covered presumes a background of elementary chemistry and therefore is readily accessible to the undergraduate in science. University teachers preparing courses on energy issues will find this textbook a useful source of information and references.

Chodziwadiwa C. Mjojo, *Chancellor College, University of Malawi*

The Rare Earths in Modern Science and Technology. Volume 2. Edited by G. J. McCarthy, J. J. Rhyne, and H. B. Silber. Plenum Press, New York. 1980. xxiii + 647 pp. \$59.50.

This is the proceedings of the Fourteenth Rare Earth Research Conference, held in North Dakota in 1979. It consists of 118 refereed papers, including the Spedding Award address, *Studies of Rare Earth Intermetallic Compounds and Rare Earth Hydrides*, by W. E. Wallace. The papers and notes are arranged in various subject groups: Materials Preparation; Coordination Chemistry; Structural and Solid-State Chemistry; Valence Instabilities and Superconductivity; Physical Properties of Elements and Alloys; Intermetallics; Semiconducting and Insulating Compounds; Spectroscopy; Sources and Applications; and Lasers. It is evident that it was a very comprehensive conference. The 9-p subject index is unusually detailed for a volume of proceedings and markedly increases its value.

Pulp and Paper: Chemistry and Chemical Technology. Third Edition. Volume 2. Edited by James P. Casey. John Wiley and Sons, New York. 1980. xxii + 625 pp. \$50.00.

Volume 2 follows the general organization of this four-volume series by picking up the papermaking process at fiber preparation and carrying forward through sheet formation and drying, with several supplementary chapters for enrichment. Chapter 6 (the first in Volume 2) offers a rather academic discussion of fiber preparation which enumerates the effects of a large number of variables on fiber properties and the resultant effect on sheet properties. There is sound coverage of testing, but unfortunately this chapter's references are not current; they date from the 1960's and earlier. The bonding chapter approaches fiber bonding from sound theoretical ground, as well as from the practical. Both obvious and less understood factors are well treated; some examples are the effects of increased use of recycled paper, the role of the hemicellulose, and the bonding of non-cellulosic fibers. The fundamentals of sheet formation and drying are studiously covered in Chapter 8, complete with schematics and equations. Such nontraditional topics as nonwovens and synthetic paper which are given attention in Chapters 9 and 10 add a modern note to this encyclopedic text. A very timely note is also added by the nearly 200 page chapter on environmental control. Chapter 11 relates the

*Unsigned book reviews are by the Book Review Editor.

techniques and economics of papermaking to such topics as: air and water quality, governmental regulations and agencies, fuel selection, and monitoring techniques. The final chapter takes up the microbiological concerns of the papermaking business. Some important species which can spoil or weaken paper are identified along with possible control methods and their cost. The authors of this chapter offer their prescription for a proper microbiological containment system.

The editor's stated goal of emphasizing today's concerns as well as the basics, for example, more effective fiber utilization, lowered energy usage, water conservation, increased automation, and new sources of fiber, are given credence by the inclusion of a chapter on environmental controls and of sections on such topics in other chapters. This edition represents a valuable new resource; it is not just a new patch on an old wine skin.

C. Eugene Cain, *Millsaps College*

Recent Developments in Mass Spectrometry in Biochemistry and Medicine. Volume 6. Edited by A. Frigerio and M. McCamish. Elsevier Scientific Publishing Co., Amsterdam and New York. 1980. ix + 552 pp. \$83.00.

The 6th International Symposium on the title subject, held in Venice in 1979, generated this volume of Proceedings. There are 52 papers, reproduced from typescript, with figures, tables, and references. All of them appear to be accounts of original research with abbreviated experimental details. They are arranged in six categories: qualitative and quantitative studies of endogenous compounds; qualitative and quantitative studies of exogenous compounds; instrumentation; methodology; and environmental studies. The subject areas included clinical investigations, insect biochemistry, and agricultural biochemistry. There is an author index, but no subject index.

Nitrogen Oxides from Coal Combustion—Abatement and Control. By G. F. Morrison. IEA Coal Research, Technical Information Service, 10/15 Grosvenor Place, London SW1W OEX. 1980. 86 pp. £10.00 within member countries, including USA, otherwise £20.00.

This report summarizes the recent literature (mostly from the 1970's) and is primarily concerned with emissions from coal-fired utility boilers. By "abatement" is meant methods by which the formation of NO can be reduced, and by "control" is meant methods for reducing the NO_x content of flue gases. The first section takes up formation and decomposition of NO, and the second considers how the conditions of combustion influence its formation. Methods for abatement are next presented, and include burner design, two-stage combustion, limiting air supply, and flue gas recirculation. The concluding section reviews wet and dry processes for removing nitrogen oxides from flue gases. These include reductive, oxidative, and absorptive methods or combinations of them.

This is a very good presentation of an important practical subject. It lacks an index, but that is not a real drawback, considering the detailed table of contents, but the ungainly format makes it irritatingly inconvenient to store and use (it is 11.5 in. high therefore not fitting in common bookshelves, and soft-bound and floppy).

Inorganic Syntheses. Volume XX. Edited by D. H. Busch. J. Wiley and Sons, New York. 1980. xx + 303 pp. \$29.95.

As in previous volumes of this series, this current volume covers a diverse range of syntheses in several areas of inorganic chemistry. The first chapter deals with crystal growth techniques, with examples of rare earth and platinum salts. Chapter Two, on stoichiometrically simple compounds, includes preparations of several halide and oxide derivatives of transition metals and main group VI elements. Coordination compounds of a number of transition metals with ethylenediamine, pentanedionate-, trimethylphosphine, and trimethylphosphite ligands are described in Chapter Three. Chapter Four deals with complexes with complicated chelate ligands and includes preparations of metal sephalates, clathrochelates, and tetraazacyclooctadecatetraene-dione complexes. The longest chapter in this volume describes syntheses of compounds of biological interest. Among the many compounds described are platinumintercalates, tetraazamacrocyclic cobalt and nickel derivatives, several dinitrogen complexes of molybdenum and tungsten, and numerous metalloporphyrins. The section on organometallic compounds includes silyl and germyl selenides and tellurides, organoplatinum derivatives, halocyclopentadienyl rhodium and manganese compounds, mixed benzene-cyclopentadienyl derivatives of molybdenum, and some acetyl complexes of rhenium carbonyl. The final chapter, on metal clusters, includes some of Chini's rhodium carbonyl clusters, some iron carbonyl salts, and a number of alkylidyne tricobalt nonacarbonyl derivatives.

At this stage of its development, little else needs to be said about the quality and value of this series, which has become the standard reference in the area. The current volume is no exception and provides yet another

valuable collection of syntheses for inorganic and organometallic chemists.

Robert F. Gerlach, *University of Michigan*

Organometallic Chemistry Reviews; Annual Surveys: Silicon, Germanium, Tin, Lead. Journal of Organometallic Chemistry Library. Volume 10. Edited by D. Seyferth and R. B. King. Elsevier Scientific Publishing, Amsterdam. 1980. 614 pp. \$119.

This volume surveys the literature on silicon, germanium, tin, and lead for 1978, with the same format as that normally seen for most element groups as a regular part of the *Journal of Organometallic Chemistry*.

Silicon is dealt with in four sections: Synthesis and Reactivity by J. Y. Corey (126 pages, 596 references), Organosilicon Reaction Mechanisms by F. K. Cartledge (57 pages, 324 references), Bonding and Structure by C. H. Yoder (41 pages, 345 references), and Applications to Organic Synthesis by G. M. Rubottom (34 pages, 409 references).

Germanium by D. Quane (49 pages, 218 references), Tin by P. G. Harrison (74 pages, 255 references), and Lead by J. Wolters (12 pages, 104 references) make up the final third of the book and are followed by a comprehensive author index.

As in other annual surveys of this series, the standard of presentation is uniformly high and subject coverage for each element is comprehensive. The ease of access to specific information through layout and indexing will make this a useful reference addition for anyone in the area of group IV chemistry as well as many synthetic organic chemists.

Robert F. Gerlach, *University of Michigan*

Introduction to Chemical Process Technology. By P. J. van den Berg and W. A. de Jong (Delft University of Technology). D. Riedel Publishing, Dordrecht, Holland. 1980. ix + 309 pp. \$26.00.

This introductory book gives qualitative discussions of several representative areas of chemical technology, namely the nitrogen industries, olefin production, hydrocarbon oxidation, and production of gasoline. Derived from a lecture course, it would be especially useful for beginning students trying to decide on a career in chemistry or chemical engineering. (The more advanced student is better served by Shreve's classic work, or by a more encyclopedic work such as Kirk-Othmer.) Only a few general references are given and no problems are included.

After a good general and historical introduction, it has very good descriptions of the current technology for the production of ammonia, nitric acid, and urea. Interspersed are more general treatments of industrial gas purification and manufacture of sulfuric acid and phosphoric acid and of nitrophosphate fertilizer. A short chapter on the chloralkali industry is followed by a chapter on naphtha cracking for ethylene production, but this too has other lesser topics interspersed. The overall organization of the book is difficult to follow, and the subtopics in each chapter are not organized in a parallel fashion. An index would be a useful addition, or at least a fuller table of contents.

The second half of the book contains a long comprehensive chapter on hydrocarbon oxidation, which includes good sections on the manufacture of acetaldehyde and of vinyl chloride; a general chapter on monomers and polymers; and a chapter on gasoline components, especially on catalytic cracking and catalytic reforming. The final chapter on energy and the environment has a good section on fuel desulfurization.

The material is up-to-date, and most chapters include a brief description of Future Prospects. The book may be valuable for nonchemists employed in certain chemical process industries who need a readable introduction to their field.

Robert H. Schwaar, *SRI International*

Topics in Current Chemistry. 91. Syntheses of Natural Products. Edited by F. L. Boschke (Springer-Verlag). Springer-Verlag, Heidelberg. 1980. ii + 118 pp. \$40.20.

This book is part 91 of a series of "Topics in Current Chemistry" in which critical reviews of present and future trends in chemistry are published. Though it is not apparent from the general title, the book comprises only three articles which deal with synthetic aspects of natural products.

In the first article, S. G. Warren presents a thorough and up-to-date treatment of Reagents for Natural Product Synthesis Based on Ph₂PO and PhS Groups (27 pages). The review covers the literature to 1979 (received July 19, 1979) and many of its 90 citations are to the 1978 and 1977 literature. Those from 1979 usually reported Warren's own work.

The second review, by J. Tsuji, is entitled Applications of Palladium-Catalyzed or Promoted Reactions to Natural Product Syntheses (46 pages). Both oxidative and catalytic reactions are discussed in this informative article (received October 10, 1979). Of the 101 references, many are to the 1979 and 1978 literature.

Aflatoxin Chemistry and Syntheses (P. F. Schuda, 36 pages) is the

title of the final article. It contains sections which introduce the reader to isolation and structure of a multitude of aflatoxins and similar mold metabolites. The review concludes with a detailed description of the laboratory syntheses of mycotoxins and a brief comment on their biosynthesis. There are 188 literature citations ranging from 1883 to 1978 (received April 17, 1979). The book concludes with an author index for Volumes 50 through 91, but no similar subject index.

I was personally surprised to see the specialized aflatoxin article included in the same volume with the two more general reagent-oriented reviews. Perhaps a good companion would have been a general review on the use of selenium compounds in natural product syntheses. However, this is clearly a book which should be available in all well-stocked libraries. At \$40.20 (34¢ a page, with uneven right-hand margin) I do not see many individuals buying it; one hopes that the publisher has provided the authors with a generous supply of reprints for distribution.

Kevin M. Smith, *University of California, Davis*

Spin Exchange. By Yu. N. Molin, K. M. Salikov, and K. I. Zamaraev (Institute of Chemical Kinetics and Combustion and the Institute of Catalysts, Novosibirsk, U.S.S.R.). Springer-Verlag, Berlin. 1980. xi + 242 pp.

This volume (number 8 in the Springer-Verlag series in chemical physics) is an up-dated version of an earlier (1977) monograph on the spin-exchange process which occurs upon collision of paramagnetic particles in solution. The phenomenon has assumed increasing importance in the study of collisions in polymer solutions, multicomponent mixtures, and heterogeneous mixtures, particularly in biological systems.

The monograph is written in four chapters. The first summarizes the physical principles of spin exchange and outlines the major applications. The second chapter presents the theoretical background of the phenomenon. Experimental techniques are presented in the third chapter; while the fourth summarizes the results of these techniques with examples drawn from chemistry, molecular physics, and biology.

As an organic chemist who has twice recently run into spin-exchange phenomena in his own research, once in an ESR study and once in an NMR experiment, I looked forward to reading this book. I was apprehensive of the mathematics. It would appear, however, that only the necessary math is included, and the authors write so well and the text is so clear that one can get a very good feeling for the subject without becoming unduly enmeshed. I doubt if current experts in the field will learn anything new here, but for people such as myself, who have encountered spin exchange in their research and who wish a better understanding, this is a very good place to start.

William B. Smith, *Texas Christian University*

Cancer Markers: Diagnostic and Developmental Significance. Edited by Stewart Sell (University of California, San Diego). Humana Press, Clifton, N.J. 1980. xxvii + 541 pp. \$49.50.

This 19-chapter multi-authored work is concerned with the biochemical, immunological, and clinical characterization of tumor markers. The literature up to 1979 dealing with circulating enzymes, antigens, hormones, and immune complexes, with membrane-bound and chromosome-associated antigens, and with transfer ribonucleic acids from patients with malignancies is critically and concisely reviewed. The majority of the chapters are well-balanced in their presentation of the biochemical and the clinical data, while a few are concerned primarily with research aspects of animal models or antigen purification. Photographs of electrophoretic gels and immunofluorescent stains add to the utility of the book. Overall, this text presents a timely, thorough, and detailed introduction to and evaluation of the field of tumor markers, and it should prove to be a useful reference work to both researchers and clinicians interested in oncology.

John C. H. Steele, Jr., *Louisiana State University Medical Center*

Organic Chemistry: A Brief Contemporary Perspective. By C. W. Spangler (Northern Illinois University). Prentice-Hall, Inc.; Englewood Cliffs, N.J. 1980. xv + 432 pp. \$17.95.

This textbook is intended for use in a one-semester survey course for nonchemistry majors. Each chapter has a highlighted introductory paragraph which places the chapter in perspective with other material and which also summarizes important facts about the subjects to be covered. At the end of each chapter is a section listing new concepts and terms. The problem sections are quite adequate, and a solutions manual is available for student use. With solutions manuals available, and they usually are, students are inclined to look up answers rather than to work them out. This manual anticipates that and consequently answers are explained and not just recorded. Though this will not solve student indiligence, it is a step in the right direction.

The text is clearly written in an informal style. Examples and figures

contain more helpful remarks than those usually found in comparable textbooks. This feature, in my opinion, is used with very effective pedagogy.

The book also has a "Core Enrichment" section with additional subjects which can be introduced at various points in a course. Very early (page 24), transition states and all types of reaction intermediates are discussed, even before the chapter on alkanes. This appears unrealistic since students have not had much about organic structures or functional groups yet.

The textbook has most of the important concepts of organic chemistry and explains them well. There are places where it seems more rigorous than other competitors yet just as easy to understand. Although my current book does not explain the $4n + 2$ rule, this one does. In the 80 or so pages that I read, I found only one potentially misleading statement. On page 94, it reads, "Isolated dienes, having at least one $-CH_2-$ unit separating the two π bonds ..." (What about $-CHR-$ and $-CR_2-$ units, etc.?).

This book is worth serious consideration. It appears to be written with the learner's perspective well in mind. I see some positive things about it, and would encourage others to examine it too.

Stephen K. Taylor, *Olivet Nazarene College*

Metal Ions in Biological Systems. Volume 10. Carcinogenicity and Metal Ions. Edited by Helmut Sigel (University of Basel). Marcel Dekker, Inc., New York. 1980. xxii + 381 pp. \$49.75.

One of a series of books concerned with various aspects of bioinorganic chemistry, this volume contains ten chapters which deal with the relationship between metal ions and neoplasia. Topics covered include the role of metal ions in normal and abnormal genetic regulation, the carcinogenicity of different metals, the use of electron-spin resonance and of radioactive metals in evaluating malignancy, and the apparent roles of copper, zinc, cobalt, selenium, and their carrier proteins in tumor growth (or inhibition) and in clinical diagnosis. Additionally, the relations of trace metals to leukemia are delineated. Each chapter provides a critical, extensive review of the literature, complete through 1978 and in some cases 1979. Results of research performed in the authors' laboratories, including previously unpublished data, are also presented. This volume should be of value to chemists and biomedical scientists with interests in neoplasia and in bioinorganic chemistry.

John C. H. Steele, Jr., *Louisiana State University Medical Center*

Numerical Methods in Chemistry. By K. J. Johnson (University of Pittsburgh). Marcel Dekker, Inc., New York. 1980. ix + 503 pp. \$39.50.

This would be a handy book for any chemist who uses or plans to use a computer in data analysis, numerical simulations, or small-scale "number-crunching."

There is a quick review in Chapter 1 of FORTRAN IV and the fundamentals of computing, certainly not adequate for those with no knowledge of programming in FORTRAN. Chapter 2 contains nine small programs which are appropriate for chemistry students at perhaps the junior undergraduate level. Taken together they are a "P. Chem. Lab" for the computer, a nice idea. Chapters 3-9 get down to business covering a good selection of standard but useful numerical algorithms. Each algorithm is briefly discussed, its use illustrated by application to a chemical problem, and a FORTRAN program listing given (along with sample input and output). Be careful to check the programs with the sample input; several programs a colleague used (MATINV and LINEAR) have trivial errors.

The book's organization is quite good. Study problems appear both in the text and at the end of each chapter. Extensive reference is made to the scientific literature in the text and the number of references cited is reminiscent of a review instead of a textbook.

This is an excellent book which I believe would be fun to teach and learn from.

Joel M. Bowman, *Illinois Institute of Technology*

Qualitative Analysis of Flavor and Fragrance Volatiles by Glass Capillary Gas Chromatography. By Walter Jennings and Takayuki Shibamoto (University of California, Davis). Academic Press, New York. 1980. vii + 472 pp. \$39.00.

In the United States, approximately 1200 organic compounds are approved for use as food flavorings, making flavor chemicals the numerically largest category of food additives. However, the total consumption of individual compounds is quite low, the usual consumer use level being in the parts per million. When one also considers flavors added as complex mixtures (e.g., essential oils and extracts), and compounds resulting from thermal processing of flavors and normal food precursors, it is apparent that the identification of an individual com-

pound presents a formidable challenge. The situation in fragrances is even more complicated since any materials not known to be dangerous may be employed by perfumers, subject only to industry association review.

For reasons of speed, versatility, and sensitivity, the dominant method of analysis for aroma chemicals is gas chromatography, often coupled with mass spectrometry. To ensure correct identifications, reference spectra and/or authentic samples are usually required. Many ingredients are either proprietary or covered heavily by use patents and are therefore unavailable on the open market; hence a small company must rely on published data, which are not standardized and difficult to correlate.

It is the main purpose of the present work to provide a single source of reference data for flavor and fragrance researchers. The book concerns itself with GC, using glass capillary columns, which have superior inertness and resolution. An introductory section of 26-p discusses such factors as system design, temperature programming, the study of reaction mixtures, use of a modified column to run reactions directly during chromatography, and interfacing with MS. One-hundred and two references are cited.

The bulk of the book consists of three sections. The first two are tables of Kovats retention indices of over 1200 compounds on both OV 101- and Carbowax 20 M-coated, temperature-programmed, glass, capillary columns. The tables are arranged alphabetically and by retention indices on both types of columns. The final section lists MS fragmentation patterns of 701 compounds. About a third of U.S.-permitted food flavoring chemicals are included in the tables, which consist mainly (about 65%) of fragrance compounds not used in food. It would be almost impossible to include all known flavor and fragrance compounds by reason of unavailability and production limitations in assembling an extensive reference work. However, a wide variety of structural types are considered, from which the behavior of many compounds not included can be extrapolated. This book is an important contribution which should be in the libraries of all those dealing with flavor and fragrance identification.

Keith T. Buck, *Frtes and Fries Division, Mallinckrodt, Inc.*

Progress In Biomass Conversion. Volume 2. Edited by Kyosti V. Sarkanen (College of Forest Resources, University of Washington, Seattle, Washington) and David A. Tillman (Envirosphere Company, Bellevue, Washington). Academic Press, New York. 1980. x + 216 pp. \$19.50.

A number of authors have contributed to the seven papers that make up this book. Although the emphasis is on wood, papers on sugar stalk crops for fuels and chemicals and acid-catalyzed delignification of lignocelluloses in organic solvents are also included. Of particular interest to workers in the wood products industry are articles dealing with logging residue as an energy source, genetic improvement of forest trees for biomass production, wood fuels consumption methodology, environmental considerations in wood fuel utilization, and wood fuel preparation. References and an index are included.

M. C. W. Smith, *Ann Arbor, Michigan*

Oxocarbons. Edited by Robert West (University of Wisconsin). Academic Press, New York. 1980. xi + 235 pp. \$32.00.

As the editor points out in the introductory chapter, the term "oxocarbon", first suggested in 1963, designates compounds in which all of the carbon atoms are bonded to carbonyl or enolic oxygens or their hydrated or deprotonated equivalents. This covers the chemistry of deltic, squaric, croconic, and rhodizonic acids and their aromatic salts. As stated, these materials may have been the first organic compounds synthesized, predating Wöhler's classical 1828 synthesis of urea by 3 years. However, the field of oxocarbons remained dormant for 125 years, until its renaissance in the late 1950's.

This compilation of papers by recognized experts covers most synthetic and physical aspects of oxocarbons and pseudooxocarbons. Chapter 1 (R. West, 14 pp, 45 references) enthusiastically introduces oxocarbons from an historical perspective. Chapter 2 (G. H. R. Seitz, 26 pp, 69 references) focuses on studies pertinent to the aromatic oxocarbon dianions in which the carbonyl atoms are either partially or completely replaced by sulfur. Chapter 3 (L. M. Schwartz, R. I. Gelb, and D. A. Laufer, 15 pp, 43 references) deals with the physical chemistry of aqueous oxocarbons. Chapter 4 (A. J. Fatiadi, 19 pp, 33 references) discusses the bond-delocalized dicyanomethylidene oxocarbons and their electrical conductivity.

Chapter 5 (J. Michl and R. West, 21 pp, 11 references) considers the π, π^* and n, π^* excited states, including magnetic circular dichroism measurements and various numerical calculations. The naturally occurring compound "Moniliformin" which was found to be the potassium

salt of semisquaric acid is discussed in Chapter 6 (H.-D. Scharf and H. Frauenrath, 20 pp, 62 references). The Raman and Jahn-Teller effects of oxocarbon dianions are presented in Chapter 7 (M. Ito, K. Kaya, and M. Takahashi, 19 pp, 15 references).

The final three chapters deal with the chemistry of squaric acid and its derivatives. Chapter 8 (J. Feder, 16 pp, 46 references) deals with the structural phase transitions and dielectric properties of squaric acid. Chapter 9 (D. Belluš, 16 pp, 37 references) presents the syntheses of highly oxidized cyclobutanes via [2 + 2] cycloaddition reactions of ketene and the book concludes with the chemistry of squaraines in Chapter 10 (A. H. Schmidt, 46 pp, 48 references). A subject index is included.

This publication not only provides the most comprehensive and authoritative coverage of this area of research, but the concise and uniform presentation makes for pleasant reading. The text is attractively and appropriately packaged in a rhodizonate ion cover with croconate ion lettering.

Clifford D. Bedford, *Stanford Research Institute, International*

High Explosives and Propellants. Second Edition. By Stanley Fordham (Formerly of Nobel's Explosive Co. Ltd.). Pergamon Press, New York and Oxford. 1980. ix + 207 pp. \$26.00, hardbound; \$13.50, softbound.

As the author points out in the preface, the task of selection is the most immediate problem facing any author of a book on explosives. What importance should be placed on commercial versus military explosives, or on theoretical versus practical aspects of explosives technology? In answering these questions the author has tried to straddle the middle ground, giving the reader the most fundamental aspects of all these subjects.

The 19 chapters are arranged into four basic groups: (1) High Explosives, dealing with general principles, i.e., shock waves, military high explosives, commercial explosives, design of commercial explosives, assessment of explosives, i.e., impact, gap, and friction sensitivity, long-term storage stability, power and detonation velocity, and permitted explosives as used in many coal mines; (2) Blasting Accessories, dealing with the initiation of explosives by plain, electric or delay detonations and with detonating or safety fuses; (3) Application of High Explosives, treating their use from both a commercial and military aspect; and (4) Deflagrating and Propellant Explosives, dealing with blackpowder, the manufacture and properties of propellants, and the design and application of propellants. The book also contains a 5-p glossary of common terms and abbreviations used in the explosives community, as well as an adequate index.

In the reviewer's opinion, this book deals concisely and directly with the topics targeted in the title. This is a good, straightforward introduction to the explosives community for the undergraduate, technical college student, and novice. The book does fill a gap in the literature, but would seem shallow to those long involved in this area of research. Its major drawback is the lack of sufficient references for the reader who wishes to pursue the topics covered. The author states that references were limited in reference to the wishes of the publishers. Perhaps an acceptable solution to both publisher and author would have been a concise and selective bibliography.

Clifford D. Bedford, *Stanford Research Institute, International*

Computing in Crystallography. Edited by R. Diamond, S. Ramaseshan, and K. Venkatesan. The Indian Academy of Sciences for The International Union of Crystallography, Bangalore, India. 1980. x + 512 pp.

These lectures, delivered at the International Winter School on Crystallographic Computing organized by the Commission on Crystallographic Computing of the International Union of Crystallography in January 1980, cover the complete range of crystallographic computing. Twenty-three experts from all over the world covered subjects such as: (1) data collection (diffractometer control with a minicomputer, absorption correction for single crystals, extinction corrections); (2) structural solution methods (vector space Patterson search, automatic interpretation of Patterson functions, symbolic addition, multisolution methods, and the use of structure invariants and semivariants); (3) crystallographic refinement (least squares, error analysis, thermal motion, the use of stereochemical information in refinement, and refinement by fast-Fourier least-squares); (4) macromolecules (heavy-atom positions in macromolecules, Fourier refinement of macromolecules, and problems in map interpretation); and (5) graphics (interactive graphics and computer-generated illustrations).

Other topics covered were the use of mini- and microcomputers in crystallography, new concepts in program system design, and the methodology of artificial intelligence.

William Butler, *University of Michigan*