

9 → 4) suggests competition of two opposing effects. α -Methylation enhances α cleavage [note P. S. Engel, *et al.*, *J. Amer. Chem. Soc.*, **96**, 924 (1974)], so $\Phi_{4 \rightarrow 9} > \Phi_{9 \rightarrow 4}$ for the 1,3-shift, but the 14 → 5-(*E*) stereoselectivity suggests stereochemical preference for acyl migration across the molecular face less encumbered with methyl groups."

Organosulfur Chemistry. II. Highly Stereoselective Reactions of 1,3-Dithianes. "Contrathermodynamic" Formation of Unstable Diastereoisomers [*J. Amer. Chem. Soc.*, **96**, 1807 (1974)]. By ERNEST L. ELIEL,* ARMANDO A. HARTMANN, and ANTHONY G. ABATJOGLOU, William Rand Kenan, Jr., Laboratories of Chemistry, University of North Carolina, Chapel Hill, North Carolina 27514.

On page 1810, first column, 10 lines from bottom, for "3600 cm⁻¹ in 5a" read "3600 cm⁻¹ in 4a and 3529 cm⁻¹ in 5a."

Stereochemistry of Chloride Displacement from Silacyclobutanes [*J. Amer. Chem. Soc.*, **96**, 2637 (1974)]. By B. G. MCKINNIE, N. S. BHACCA, F. K. CARTLEDGE,* and J. FAYSSOUX, Department of Chemistry, Louisiana State University, Baton Rouge, Louisiana 70803.

Due to a misprint in the original literature and misinterpretation on our part, we have misrepresented the

structural assignments originally made by others for 1-chloro-1,2-dimethylsilacyclobutane and 1,2-dimethylsilacyclobutane on the basis of proton nmr. Our assignments are in fact in complete accord with those made earlier and presented in complete form by J. Dubac, P. Mazerolles, and B. Serres, *Tetrahedron*, **30**, 749, 759 (1974).

Static Structure of the Fluxional Molecule B₅H₉[P(CH₃)₃]₂, an Isoelectronic Analog of B₅H₁₁²⁻ [*J. Amer. Chem. Soc.*, **96**, 3013 (1974)]. By A. V. FRATINI, G. W. SULLIVAN, M. L. DENNISTON, R. K. HERTZ, and S. G. SHORE,* Department of Chemistry, Ohio State University, Columbus, Ohio 43210.

The positions of the two-center and three-center bonds in the topological structures shown in the equilibrium on page 3014 should be reversed.

Reversible Binding of Dioxygen to Mesoporphyrin IX Derivatives at Low Temperatures. [*J. Amer. Chem. Soc.*, **96**, 5600 (1974)]. By JOSEPH ALMOG, JACK E. BALDWIN,* ROBERT L. DYER, JOEL HUFF, and CARLOS J. WILKERSON, Department of Chemistry, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139.

The date the manuscript was received by the Editor was inadvertently omitted in publication. The manuscript was received May 4, 1974.

Book Reviews

Unimolecular Reactions. By P. J. ROBINSON (University of Manchester Institute of Science and Technology) and K. A. HOLBROOK (The University of Hull). Wiley-Interscience, New York, N. Y. 1972. xvii + 371 pp. \$19.95.

This book is a must for anyone whose interests lie in the area of unimolecular reactions. This would include advanced students as well as research specialists. In fact, if one were limited to one book on a subject, this book would be my choice for the subject of unimolecular reactions. Although the emphasis of this book is on recent developments, especially Rice-Ramsperger-Kassel-Marcus (RRKM) theory, a clear discussion of historical developments is given in the first chapter. Chapters 2, 3, and 4 give excellent derivations of Slater theory and RRKM theory with emphasis on their basic differences. The fundamental nature of these differences has stimulated a large amount of experimental activity in the area of unimolecular reactions in the last few years.

Chapter 7 is also noteworthy in that it represents a rather extensive review of the experimental data on virtually every homogenous gas-phase unimolecular reaction known for neutral molecules. The remaining chapters deal effectively with several practical calculational details of RRKM theory as well as describing some of the important contributions made by studies of chemical activation systems as tests of various aspects of unimolecular reaction theory,

John W. Simons, *New Mexico State University*

Physical Chemistry of Organic Solvent Systems. Edited by A. K. COVINGTON and T. DICKINSON (University of Newcastle upon Tyne). Plenum Press, London and New York. 1973. x + 823 pp. \$30.00.

During the past four decades, great progress was made in understanding the behavior of electrolytes in aqueous solutions. With rapidly growing interest in nonaqueous and mixed solvents, the investigation of electrolytes has now entered a new and exciting phase. This excellent summary of the thermodynamic and kinetic

behavior of ionic solutes in organic solvent systems makes it evident that important discoveries concerning the nature of ion-solvent interactions are imminent and suggests that useful estimates of the properties of individual ionic species, such as medium effects, absolute entropies, and heat capacities, may be forthcoming in the near future.

This is the first monograph devoted in its entirety to the physical chemistry of organic solvent systems, and accordingly its impact on future directions of research will be considerable. Fortunately, it is exceedingly well done. Each of the chapters is written with authority and clarity and with a recognition of the pertinent literature through 1971. Although the contributors were 15 in number, the editors have been remarkably successful in achieving a uniformity of style that is rare in a work of this sort. Furthermore, serious instances of overlapping have been skillfully avoided.

The seven chapters are entitled "Introduction and Solvent Properties" (A. K. Covington and T. Dickinson), "Thermodynamic Measurements" (C. M. Criss, M. Salomon, R. Garnsey, J. E. Prue), "Acid-Base Behaviour" (E. J. King), "Spectroscopic Measurements" (I. R. Lantzke, D. E. Irish, T. E. Gough), "Conductance and Transference Numbers" (R. Fernandez-Prini, M. Spiro), "Reaction Kinetics and Mechanism" (D. W. Watts), and "Electrode Processes" (R. Payne, O. R. Brown). All are capably written and several are outstanding. Four of them consist of two to four parts, with different authorship, and most have substantial appendices. The chapter devoted to thermodynamic measurements, for example, comprises 103 pages of tabular data on solubilities, heats of solution, activity coefficients, solvation energies, and the like. This combination of theory with experimental results enhances greatly the value of the work.

Rigor in the theoretical treatment has been achieved without sacrifice of readability. This reviewer regards as particularly noteworthy the discussion by Criss and Salomon of single ion solvation and ionic entropies, King's brief description of the contributions of

dispersion forces to medium effects, Lantzke's summary of nmr techniques for the study of ion-solvent interactions, and the illuminating comparison of the Pitts and Fuoss-Onsager equations for conductivity given by Fernandez-Prini. The latter is accompanied by 25 pages of critically selected parameters for conductivity in nonaqueous solvents. In reading this monograph, one realizes once again the depth of the loss sustained by solution chemistry in the recent untimely deaths of two of the authors, Prue and King.

This systematic treatment of the theory and methodology underlying the behavior of ionic solutes in organic solvent systems will prove of value to all interested in this field. This new book complements effectively the Janz-Tomkins "Nonaqueous Electrolytes Handbook" of which two volumes have appeared. The editors and authors deserve the thanks of the many who will find it an essential guide to further work in nonaqueous solution chemistry.

Roger G. Bates, *University of Florida*

Regulating New Drugs. Edited by R. L. LANDAU (University of Chicago). University of Chicago Press, Chicago, Ill. 1974. xi + 297 pp. \$5.25.

This publication is the proceedings of the conference on "The Regulation of the Introduction of New Pharmaceuticals" held at the University of Chicago, December, 1972, and consists of fourteen papers presented at the conference plus a synopsis of discussion. The papers discuss the effects of the FDA regulations on the various facets involved in drug research and development. The first few sentences of the discussion really lay the ground work for the entire symposium and read as follows: "The 1962 amendments to the Food and Drug Act were designed to insure the flow of safe and effective new drugs to the market with all possible speed, and to protect the public from dangerous preparations. The regulations pending from the amendments, however, have found favor with neither the medical profession nor the pharmaceutical industry, since they appear to have reduced the number of new drugs licensed since 1962, and to have greatly prolonged the periods of preclinical and clinical testing." Investigators and other individuals concerned with the development of new drugs, effects of regulations on new drugs, and possible alternatives in the regulatory procedures will find this publication most informative. The objectives and problems of preclinical investigations are well presented, and emphasis is placed on intraspecies differences, especially related to metabolites of the compounds under investigation and the possible negative influence of current FDA regulations on pharmaceutical research. Goldberg and Azarnoff present a brief but highly informative discussion on new drug investigations in man with descriptions and objectives of the various phases of clinical investigation and possible ways of improving the role of the FDA in regulating the studies. Dr. Crout further discusses clinical investigations and the impact of confidentiality of information submitted to the FDA by the pharmaceutical industry.

The section on the legal and economic effects of drug regulatory policies covers approximately 143 pages, and it is this reviewer's opinion that excessive space is devoted to the economic aspects of drug regulations. On the other hand, individuals who are interested in the economics of the drug industry and the impact of new drug regulations on the development of new drugs, as reflected by costs, will find this section to be most illuminating. Alternative systems of new drug regulations are discussed and criteria set for an ideal system.

Investigators in the area of medicinal chemistry, phytochemistry, pharmacology, clinical pharmacology, and junior executives in the pharmaceutical industry will find this book to be a valuable source of information concerning the impact of Food and Drug Administration regulations on the development of new pharmaceutical agents, including economic implications.

Joseph P. Buckley, *University of Houston*

Progress in Solid-State Chemistry. Volume 8. Edited by J. O. McCALDIN and G. SOMORJAI. Pergamon Press, Inc., New York, N. Y. 1973. xi + 427 pp. \$39.00.

This is the eighth volume in a continuing series which reviews recent advances in basic and applied solid-state chemistry. The volume is comprised of seven contributions, obviously chosen to reflect topics in which there is a high level of current interest. The first three articles form a loosely connected set, broadly dealing with the electronic properties of selected compounds. The first in this series is a detailed review by P. J. Dean of interimpurity recombination in semiconductors. In 15 sections, illuminated by almost 400 references and footnotes, Dean outlines the theoretical concepts and experimental results of donor-acceptor pair spectro-

scopy while emphasizing the practical aspects of the field. The topics treated include the spherical model for the donor-acceptor pair interaction, general characteristics and fine structure of donor-acceptor pair spectra, the intensities of discrete donor-acceptor pair lines, recombinations at nearest-neighbor pairs, pair spectra in direct and indirect gap semiconductors, donor-acceptor dipairs, and pair recombinations involving isoelectronic traps. Commercially, the most interesting compound in which the latter process is important is the ternary system, GaAs_{1-x}P_x, widely used in the manufacture of light-emitting diodes. The properties and electroluminescence of this system are comprehensively reviewed for the first time in the second article by M. G. Craford. The review covers not only the relevant band structure and transport properties, but also includes sections on crystal growth, impurity selection and incorporation, and device optimization. A final section is devoted to the effect of alloy composition upon the system's luminescent properties. The last article in this sequence deals with selected topics of current interest in photographic research. Areas covered by J. F. Hamilton in this review include a brief introduction to the photographic mechanism, the roles of defects and impurities, and a discussion of the physical processes involved when dyes are used for spectral sensitization.

In the fourth article, F. L. Binsbergen reviews recent developments in the description of crystallization initiated by heterogeneous nucleation. Binsbergen details the importance of a microscopic model and presents a molecular treatment of interfacial interactions which incorporates the interfacial free energy as the predominant adjustable parameter. He then outlines the effects of thermal history and cooling rate, mechanical perturbations, ionizing radiation, and electric fields, and discusses selected experimental observations on a wide range of substances from metals and ionic crystals to polymers. Following this is C. A. Bunton's paper on the effect of micelles on chemical reactivity. This clearly written review concentrates on aqueous micellar systems and includes a semiquantitative treatment of micellar catalysis and inhibition. From this foundation, selected topics are treated in detail, including micellar effects on acid-base equilibria, carboxylic ester reactions, aromatic nucleophilic substitution and addition, the hydrolysis of phosphate esters and related compounds, decarboxylation, and acid-catalyzed reactions. Discussions of electrolyte effects and the role of micelles with optically active surfactants as stereospecific catalysts are also included.

The use of epr to observe molecular bond rupture in polymers during fracture is reviewed in the sixth article by K. L. DeVries and D. K. Roylance. Specific topics covered include mechanical degradation by grinding and slicing, stress-induced radical generation in preoriented elastomers, and detailed treatments of the effects of ozone attack on rubber and of fracture in drawn fibers. The final article, by A. Rapini, deals with liquid crystals and selected applications. Following an introductory discussion of the basic theories for elastic and hydrodynamic behavior, the optical properties of liquid crystals, including light scattering, optical anisotropy, electric and magnetic field effects, and flow effects, are treated. Short discussions of electro-optical effects, surface-dependent alignments, and liquid crystal mixtures are also included. In summation, for students and professionals interested in or working in any of the above areas, this volume should prove to be a valuable addition to the office shelf.

Lowell J. Burnett, *San Diego State University*

Strategy of Drug Design—A Molecular Guide to Biological Activity. By W. P. PURCELL, G. E. BASS, and J. M. CLAYTON (University of Tennessee Medical Units, Memphis). Wiley-Interscience, New York, N. Y. 1973. 193 pp. \$9.95.

Intended to acquaint research health scientists with the concepts of quantitative structure-activity relationships, this brief book accomplishes this purpose admirably. Containing 386 references, 214 equations, and 28 tables, three of the six chapters are devoted to the theory, applications, procedures, and examples of linear free-energy-related models and two to the Free-Wilson (physicochemical independent) model. For the mathematically inclined there are 69 symbols for various parameters included in three tables into which he may wish to inquire further while others may find the non-mathematical approach based on Topliss' work of greater interest.

The several examples of the application of mathematical models to the design of molecules with such activities as hypoglycemic, adrenergic blockade, and MAO inhibition are especially helpful. Useful information included in the appendices are linear regression analysis and Free-Wilson computer programs and a section devoted to the experimental determination of partition coefficients.

This practical and well-written book fills a definite need by introducing chemists and pharmacologists to the principles of quantitative SAR and illustrating their applications. It is highly recommended to those who wish to understand the objectives of the many articles in the modern literature involving these approaches to drug design.

Lindley A. Cates, *College of Pharmacy, University of Houston*

Transition Metal Complexes of Phosphorus, Arsenic and Antimony Ligands. Edited by C. A. McAULIFFE (University of Manchester). Halsted Press, John Wiley & Sons, New York, N. Y. 1973. xix + 428 pp. \$32.50.

This volume will be a welcome addition to the literature for researchers studying transition metal complexes involving ligands containing the group VB elements. The material is presented in five parts. The first part is a summary on the nature of the bond formed between transition metals and group VB ligands. Parts Two through Five include transition metal complexes containing monodentate phosphines, monodentate arsines and stibines, bidentate arsines, and multidentate group VB ligands.

The Foreword has been written by Professor J. Chatt and he has provided an interesting introduction to this most important area of coordination compounds. His delightful insight into the historical development of these compounds is refreshing.

The editor states the aim of this book is to provide a reference text for workers in this field, especially for workers new to the field who may find the literature already bewilderingly large. This aim has admirably been achieved. The abundance of references to the original literature will be extremely helpful to workers attacking problems in this field. The coverage appears to be quite complete up through June of 1972.

This book can be recommended as an important reference for inorganic chemists and others working with group VB ligands.

William A. Deskin, *Cornell College*

Structure and Bonding, Volume 17. Edited by J. D. DUNITZ (Zürich), P. HEMMERICH (Konstanz), J. A. IBERS (Evanston), C. K. JORGENSEN (Geneve), J. B. NEILANDS (Berkeley), D. REINEN (Marburg), and R. J. P. WILLIAMS (Oxford). Springer-Verlag, New York, N. Y. 1973. 268 pp. \$27.80.

This volume has "Metal Bonding in Proteins" as its theme and its contents underline the current multidisciplinary, and highly rewarding, assault on metalloproteins. The first essay, by U. Weser, reviews the "Structural Aspects and Biochemical Function of Erythrocyte" while the complex biochemistry/chemistry of "Ferritin" is discussed thoroughly by R. R. Crichton in the next article. Chapter Three, entitled "Metal-Polypeptide Interactions: The Conformational State of Iron Proteins," is by M. Llinás and covers a wide range of iron-based species, *viz.*, the siderochromes, the transferrins, hemerythrin, and the iron-sulfur rubredoxins and ferredoxins. The closing discussion, by F. L. Siegel, on "Calcium-Binding Proteins," encompasses calcium proteins of a wide functional range.

The high price of this work reflects its design as a source of critique and reference at a specialist level. There is no index to the authors whose work has been discussed, nor is there a subject index. A cumulative title index to this and previous volumes is provided.

K. T. Douglas, *University of Chicago*

Inorganic Chemistry of the Main-group Elements, Volume 1. Senior Reporter: C. C. ADDISON, (University of Nottingham). The Chemical Society, London. 1973. xii + 444 pp. £9.00.

"Inorganic Chemistry of the Main-group Elements" is another addition to the series of excellent publications called Specialist Periodical Reports published by The Chemical Society. This volume presents a comprehensive (greater than 3100 literature citations) and systematic coverage of the inorganic chemistry of the main-group elements reported between July 1971 and September 1972. All aspects of the inorganic chemistry of the main-group elements appear to have been covered. References to organometallic compounds have been deliberately excluded inasmuch as these materials, and organo derivatives of the group V and VI elements, are covered in other Specialist Periodical Reports.

This particular volume is divided into eight chapters based upon the periodic groups. However, the coverage is essentially element by element. Where possible, the various authors have attempted to correlate material pertinent to groups of elements. Considerable topical division is also employed throughout the volume and serves as a valuable quick reference aid. Contributors to the volume are M. G. Barker, G. Davidson, M. F. A. Dove, P. G. Harrison, P.

Hubberstey, N. Logan, R. J. Pulham, and D. B. Sowerby, all from the University of Nottingham.

Finally, according to the publishers, these Reports are intended to provide "critical in-depth accounts... less than twelve months after the period of literature coverage." Certainly, the ability to produce a volume such as the present one in the suggested time period, if technologically possible, is of extreme value and should be a goal for all publishers of material of this type. However, the present volume is not a "critical in-depth account." Perhaps a better description for this volume would be an exhaustive summary of recent reports. Nevertheless, this fact does not mean that this volume is of no value. On the contrary, summaries of this type, and this is one of the best, are extremely valuable in many different ways—especially when they appear in print as soon as possible after completion of the literature survey by the authors.

Charles S. Kraihanzel, *Lehigh University*

The Ionisation of Carbon Acids. By J. R. JONES (University of Surrey). Academic Press, London. 1973. vii + 237 pp. \$13.50.

This volume provides an excellent source of basic information on carbon acid ionizations in a terse and logical fashion, and gives ready access to the literature concerning theoretical and practical aspects of carbanion formation. Early chapters are devoted to the methods and then to the results for both the rates and equilibria of carbon acid ionizations. Discussions of highly basic media, ion association, and rate-equilibria correlations follow. Kinetic and solvent isotope effects are then considered along with a final chapter on the labeling of molecules. Over 500 references are given covering the literature into 1973.

Any chemist or biochemist desiring a wide-ranging view of both the experimental methods of studying carbanion formation, the results obtained from such studies, and their interpretation would do well to obtain a copy of this book.

D. J. Hupe, *Brandeis University*

Metabolic Conjugation and Metabolic Hydrolysis, Volume III. By WILLIAM H. FISHMAN (Tufts University). Academic Press, New York, N. Y. 1973. xiv + 472 pp. \$33.00.

This is the third in a series of volumes devoted to those diverse biochemical reactions which determine the amount of unconjugated, active substance which is free to perform a physiological or pharmacological function. There are eight chapters on varied subjects, each written by an expert in the particular field. They include chapters on the biosynthesis of animal glycoproteins, the metabolism of steroid hormone conjugates, the genetic control of acid hydrolases, control of metabolic hydrolysis in the lysosome-vacuolar apparatus, and the acetylation of drugs. There are also chapters on the biochemical mechanisms in methyl group transfer, bilirubin conjugates of human bile, and membrane phosphohydrolases. Each of the chapters is well written and heavily referenced, and subject and author indexes are provided. This book would be a valuable addition to any biochemistry library.

D. J. Hupe, *Brandeis University*

Spectroscopic Properties of Inorganic and Organometallic Compounds, Volume 6. Edited by N. N. GREENWOOD, The Chemical Society, London. 1973. xv + 663 pp. £10.00.

This latest volume of the Chemical Society's Specialist Periodical Report provides coverage of the literature published during 1972 on nmr (by B. E. Mann), nqr (by J. H. Carpenter), microwave (by J. H. Carpenter), infrared and Raman (by D. M. Adams, S. R. Stobart, M. Goldstein, and G. Davidson), and Mössbauer spectroscopy (by R. Greatrex). As might be expected, the bulk of the volume is devoted to the areas of nmr and vibrational spectroscopy, which has been subdivided into chapters on small symmetric species and single crystals, characteristic vibrational frequencies of compounds containing main group elements, transition element compounds, and spectra of coordinated ligands.

The amazing has become commonplace in that once again the reporters have distilled some 5000 references into an organized and succinct survey. This is of real survival value for the rest of us who do not have the time or resources to follow developments in such detail outside of our own immediate areas of interest. Readers should enjoy tracing the threads of their own particular interests (such as linear free energy relationships or p-d π bonding) through the various spectroscopic methods. Even occasional smile-evoking comments, such as a reference to *coutageous* work on solid azides, reassures me that this volume was written by men and not compiled by computers.

Still, the reporters should consider the words of one of their own: "The amount of low-quality spectroscopic work continues to rise and is now of more than nuisance value." I for one would be happier with less complete coverage and more real *critical* and in-depth coverage. The burden of over 2000 references especially shows in the chapter on nuclear magnetic resonance, and trivial references such as that attributed to this reviewer would better be left to volumes indexing spectra.

Brian G. Ramsey, *San Francisco State University*

Fine Powders; Preparation and Uses. By C. R. VEALE (National Physical Laboratory, Teddington). John Wiley/Halsted, New York, N. Y. 1972. ix + 147 pp. \$12.25.

This short monograph reviews methods of preparing and characterizing fine powders, and discusses some of their distinctive properties and uses.

The monograph is designed to present a simplified and unified view of a wide area of particle technology, and, as a result, the treatise appears superficial and noncomprehensive.

The chapter on powder preparation strongly reflects the authors' experience in the use of plasma methods, and other techniques are only briefly mentioned. When particle characterization is discussed, there can be some disagreement with the ranges of application of some of the methods described, and, in some cases, the values recorded in the tables do not match those in the text. Particle shape is treated extremely superficially, and for the uninformed there could be some confusion as to whether the methods for particle size analysis were useful in air or liquid.

The aims of the author have, however, been achieved insofar as the book is easily read and does serve as a very simple introduction to the fine particle field. It is felt that it would be of little value to the industrialist experienced with powders, but could be used by new graduates or employees to introduce them to the field.

R. Davies, *IIT Research Institute*

Industrial Gums, Second Edition. By R. L. WHISTLER (Purdue University). Academic Press, Inc., New York, N. Y. 1973. xii + 810 pp. \$45.00.

The first edition of "Industrial Gums" was quite successful; it was printed twice and both printings sold out. The second edition which has recently appeared is an updated version of this excellent book. It has been revised in such a manner as to include discussions of several new or modified gums that have found acceptance in industry. Certain gums that were included in the first edition which did not live up to expectation have been deleted or treated more briefly to keep the size of the book under control. Like the first edition, this text has been written by several authors, each contributing or coauthoring a chapter or more. Forty-two authors including the editor, Professor Roy L. Whistler, and the assistant-editor, Professor James N. BeMiller, have written the thirty-one chapters of this book.

"Industrial Gums" is divided into two parts. Part A, entitled "Natural Gums," comprises twenty chapters grouped into five sections starting with a general section on the factors influencing gum cost and the solvent-solute interaction. This is followed by a section on seaweed extracts that comprises chapters on agar, algin, carrageenan, fucoidan, furcellaran, laminaran, and seaweed extracts of potential economic importance. Another section on plant exudates contains chapters on gum arabic, gum ghatti, gum karaya, and gum tragacanth. The next section is on seed gums and includes a chapter on guar gum whose consumption has jumped spectacularly from 2.5 million pounds in 1954, one year after its commercial introduction, to 33 million pounds in 1971. It is followed by a chapter on the locust bean gum, another on the quince seed gum, and, finally, one on the tamerind, a well-known

product of the East. This section is followed by two short ones: the first on plant extracts, where larch arabinogalactan and pectin are discussed, and the second on animal extract, which consists of one chapter on chitin. The longest of the above sections is the one on seaweed extracts, followed by the ones on plant exudates and the seed gums.

Part B, entitled "Prepared Gums," is written in ten chapters and is divided into three sections beginning with biosynthetic gums which includes chapters on xanthans and other biosynthetic gums, scleroglucan, and dextrans. The section on starch fractions and derivatives follows and deals in separate chapters with starch amylose, starch amylopectin, starch dextrans, and starch ethers. The last section of the book is on cellulose derivatives which include methyl cellulose and its derivatives, the hydroxyalkyl derivatives of cellulose, ethylhydroxyethylcellulose, and sodium carbomethoxycellulose. The individual gums in each chapter of the book are treated in the same general manner, starting with the source, harvesting, grades, and industrial importance followed by application, structure, and properties.

As expected from a book of this type written by different authors, the quality and presentation of each chapter differs with each writer. However, the editor has done a marvelous job of integrating the original manuscripts into a single book that is coherent and interesting to read.

"Industrial Gums" is an excellent reference book which will find wide use by researchers and students in carbohydrate chemistry, agricultural chemistry, biochemistry, polymer chemistry, pharmacology, food technology, and oceanography, who are interested in industrial gums. It is indispensable to any science library whether in an academic institution or in an industrial organization dealing in foods, pharmaceuticals, agriculture products, petroleum, etc. One can safely predict that this revised edition will, like the first edition, quickly run out of print.

Hassan S. El Khadem, *Michigan Technological University*

Fluorine in Organic Chemistry. By RICHARD D. CHAMBERS (University of Durham, England). John Wiley & Sons, Inc., New York, N. Y. 1973. xv + 391 pp. \$19.50.

It is an extreme pleasure to review a book that precisely fulfills its stated goal of "presenting an outline of fluorine chemistry on a broadly mechanistic basis." This volume is an excellent introduction to fluorine chemistry for organic chemists and also provides an admirable treatment of the subject for workers in the field. The rapid expansion of organic fluorine chemistry precludes a complete summary of the now vast literature. In this volume the author has cited the work which he feels is significant with emphasis on mechanism and the relation of this chemistry to organic chemistry as a whole. In essence the volume may be thought of as a long critical review. The selection and organization of the topics is superb. The ten chapters are (1) General Discussion of Organic Fluorine Chemistry, (2) Preparation of Highly Fluorinated Compounds, (3) Partial or Selective Fluorination, (4) The Influence of Fluorine of Fluorocarbon Groups on Some Reaction Centres, (5) Nucleophilic Displacement of Halogen from Fluorocarbon Systems, (6) Elimination Reactions, (7) Polyfluoroalkanes, Polyfluoroalkenes, Polyfluoroalkynes and Derivatives, (8) Functional Compounds Containing Oxygen, Sulphur, or Nitrogen and Their Derivatives, (9) Polyfluoroaromatic Compounds, and (10) Organometallic Compounds. The layout of the volume is good. The type is pleasant to read with equations and mechanisms simple to follow. References are located at the end of each chapter. The index is only adequate, but since the format is so clear it is easy to find anything one wishes with the help of the excellent Table of Contents. This volume is recommended without hesitation for those interested in organic fluorine chemistry.

Paul R. Resnick, *E. I. du Pont de Nemours & Company, Inc*