

Framework Electron Count in Metalloheteroboranes. Platinathiadecaboranes [*J. Am. Chem. Soc.*, **99**, 6774 (1977)]. By D. A. THOMPSON, T. K. HILTY, and R. W. RUDOLPH,* Department of Chemistry, The University of Michigan, Ann Arbor, Michigan 48109.

Page 6774: For structure IV the reported value of R_1 should be 0.054 instead of 0.54. Also, the 9-4 bond distance for III should be 2.184 (16) instead of 1.184 (16).

Oxidation and Reduction of Iron Porphyrins and Hemoproteins by Quinones and Hydroquinones [*J. Am. Chem. Soc.*, **99**, 8032 (1977)]. By C. E. CASTRO,* G. M. HATHAWAY, and R. HAVLIN, Department of Nematology, University of California, Riverside, California 92521.

An extra iron porphyrin is drawn in the first line of the equation on p 8037. It should be eliminated.

In the paragraph following eq 8 on page 8038, third line down, "iron(III) porphyrins" rather than "iron(II) porphyrins" should be written. Similarly in the next paragraph, fourth line, it should be "iron(III) octaethylporphyrin-*meso-d*₄" rather than "iron(II)".

Nuclear Magnetic Resonance Investigation of ¹⁵N-Labeled Histidine in Aqueous Solution [*J. Am. Chem. Soc.*, **99**, 8149 (1977)]. By F. BLOMBERG, W. MAURER, and H. RÜTERJANS,* Institute of Physical Chemistry, University of Münster, 4400 Münster, Germany.

Equation 21 should read as follows:

$$C_{\text{depr}} = \sqrt{\frac{C_{\text{tot}}K_{\text{prot}}}{2K_{\text{ass}}C_{\text{H}}} + \left[\frac{1}{4} \frac{(1 + (K_{\text{prot}}/C_{\text{H}}))^2}{K_{\text{ass}}} \right]} - \frac{1}{4} \left[\frac{1 + (K_{\text{prot}}/C_{\text{H}})}{K_{\text{ass}}} \right] \quad (21)$$

Diastereomeric Transition States. High and Low Energy Reaction Pathways in the Cope Rearrangement [*J. Am. Chem. Soc.*, **100**, 654 (1978)]. By KENNETH J. SHEA* and RICHARD B. PHILLIPS, Department of Chemistry, University of California, Irvine, California 92717.

The symmetry classification of *dl*-1 as twist (C_{2d}) and *meso*-1 as plane (C_{2h}) is incorrect. The correct assignments are *dl*-1-chair (C_{2h}) and *meso*-1-boat (C_{2v}). Our results do not therefore implicate twist and plane geometries in Cope rearrangements of conformationally flexible 1,5-hexadienes.

A Selective Formose Reaction [*J. Am. Chem. Soc.*, **100**, 1309 (1978)]. By YOSHIHIRO SHIGEMASA, OSAMU NAGAE, CHIKAHIRO SAKAZAWA, RUKA NAKASHIMA, and TERUO MATSUURA,* Department of Industrial Chemistry, Faculty of Engineering, Tottori University, Tottori 680, Japan, and Department of Synthetic Chemistry, Faculty of Engineering, Kyoto University, Kyoto 606, Japan.

Fourth paragraph (line 12): "calcium-EDTA (1.2×10^{-6}) and -NTA (1.66×10^{-4})" should read "calcium-EDTA (1.2×10^{-11}) and -NTA (1.66×10^{-7})".

Book Reviews

Mass Spectrometry of Steroids. By Z. V. ZARETSKII (The Weizmann Institute of Science). Halsted Press, New York, N.Y. 1976. xi + 182 pp. \$22.50.

This text should prove to be an excellent reference text for students and researchers interested in the mass spectrometric fragmentation and identification of steroids. The author has generalized a great deal of experimental data in order to show the potential of systematically applying mass spectrometry to establish the structure and spatial configuration of complex organic molecules such as steroids. The generalizations put forth in this text are also applicable to the fragmentations observed with other classes of compounds.

The text is divided into six chapters: Steroid Hydrocarbons; Ketones; Steroidal Alcohols; Steroid Olefins; Bile Acids; and Estrogens. Where appropriate, each chapter is subdivided into structure elucidation and stereochemical considerations.

Richard A. Okerholm, *Merrell-National Laboratories*

The Chemistry of Organic Film Formers (reprint of the 1967 edition). By D. H. SOLOMON (C.S.I.R.O.). Robert E. Krieger Publishing Co., Huntington, N.Y. 1977. xii + 412 pp. \$18.50.

Except for the addition of a new chapter on powder coatings, radiation curing, and electrodeposition, this book is only trivially different from the 1967 edition (John Wiley & Sons, 1967). This reviewer characterized that volume (*J. Franklin Inst.*, **286**, 95 (1968)) as "a good book, ably written, and chock-full of practical (technological?) information".

But the paint industry has changed drastically in the last ten years, and one gets the feeling that Solomon's minor revisions have not done the changes full justice. In addition, the new printing consists of photographic reproductions of original material interspersed with new text set in type just different enough to be distinguishable. Thus one can see exactly what's new and what isn't, with the whole presenting

a somewhat patchy appearance. One can't recommend "The Chemistry of Organic Film Formers" quite so highly the second time around.

Fred W. Billmeyer, Jr., *Rensselaer Polytechnic Institute*

Radiopharmacy. Edited by M. TUBIS and W. WOLF (University of Southern California). John Wiley & Sons, Inc., New York, N.Y. 1976. xii + 911 pp. \$44.50.

This reference volume (in 27 chapters) covers a great deal of ground ranging from basic considerations in nuclear physics, radiation chemistry, radiation dosimetry and radiation biology to radiopharmacology, the preparation of radiopharmaceuticals and their use in diagnostic procedures in nuclear medicine, and radiation therapy. Various chapters to which 34 authors contributed also deal with various aspects of quality control, assay, and dispensing of radiopharmaceuticals. Even certain legal problems which may arise in the use of radiopharmaceuticals are discussed. Every pertinent aspect concerned with radiopharmaceuticals has received attention extending to such more remote areas as instrumentation, radioisotope production, and space biology and medicine.

Even in a relatively large volume as this one, certain areas had by necessity to be dealt with in a more superficial manner than others. For example, Chapters 6 and 9 on radiation biology and radiochemistry, respectively, are somewhat superficial, and some readers may disagree with the emphasis and selection of topics. However, adequate bibliographies are appended to these chapters so that the reader can extend the material contained in these chapters. The book represents a unique effort in bringing together information on radiopharmacy. It is to be hoped that revisions will keep this book up to date since the field of radiopharmaceuticals is in a state of flux.

Kurt I. Altman, *University of Rochester*

Topics in Sulfur Chemistry, Volume 1. Edited by A. SENNING. Georg Thieme Publishers, Stuttgart. 1976. 223 pp. DM 98.

Three reviews of very different facets of sulfur chemistry are contained in this volume. Each author has systematized a substantial body of information and has presented it in a lucid manner. In "The Chemistry of S,S-Diorgano-Sulfodiimides", M. Haake provides a concise (28 pp, 64 references) survey of the chemistry of the relatively little studied (and awkwardly named) aza analogs of sulfones, $R_2S(=NH)_2$. In "The Role of Sulfur in Amino Acid Protective Group Chemistry", I. Photaki furnishes thorough coverage (72 pp and 278 references) with substantial experimental detail, in a manner complementary to, although not much more up to date than, McOmie's "Protective Groups in Organic Chemistry" (Plenum, 1973). The longest and most extensively referenced chapter, "Sulfur-Containing Cations" (110 pp, 449 references) by J. P. Marino, focuses on "positively charged sulfur species" such as sulfonium and sulfenium ions (RS^+) and thiocarbocations (e.g., $RSCH_2^+$).

Several points of criticism are directed toward this latter chapter. For example, in the section on sulfenium ions, the chemistry of sulfenyl halides is discussed under the heading "Reactions of Sulfenium Ions". Thus, in the reaction of amines with sulfenyl chlorides, it is stated that sulfenamides "are formed by nucleophilic attack by nitrogen on the positively charged sulfur atom". Since no evidence is presented for the existence of free sulfenium ions, or even ion pairs involving sulfenium ions, the reactions and properties of sulfenyl compounds are more aptly described in terms of a polar S-X bond rather than an ionic species RS^+X^- . Similarly it seems inappropriate to classify as oxygen-substituted sulfur cations sulfinyl chlorides (dissociation to RSO^+ is indicated), sulfonyl chlorides, and sulfines (for which an ionic resonance structure, $R_2C=S^+-O^-$, may be written). An inconsistency in nomenclature noted in this chapter is the reference to σ -sulfuranes (R_4S) variously as "pentacoordinate sulfur" (page 37) or "tetra-coordinate" sulfur (page 46); the latter is the correct designation. This chapter contains only a limited discussion of reactions which may involve the intermediacy of $RSCR_2^+$ (e.g., solvolysis reactions of α -halo sulfides and mass-spectral processes producing this ion are not covered), and no discussion of ions of type $RS(O)CH_2^+ \leftrightarrow RS^+(O)=CH_2$; there is only limited discussion of stereochemical features of sulfonium cations and of neighboring group participation by divalent or tetravalent (sulfinyl) sulfur via sulfonium ions; there is no discussion of the electrochemical generation of sulfur cation radicals nor of the chemistry of sulfoxonium salts (R_3SO^+) or alkylated sulfones ($R_2S^+(O)OR$). Aside from these points of criticism, Marino's chapter does provide a useful review of an interesting and significant area of organosulfur chemistry.

It is an unfortunate sign of the times that a thin, 200-page volume should be priced in excess of \$48.00.

Eric Block, *University of Missouri—St. Louis*

Pigment Cell, Volume 3. Unique Properties of Melanocytes. Proceedings of the 9th International Pigment Cell Conference, Houston, Tex., January 1975 (Part II). Edited by V. RILEY. S. Karger AG, Basel (Switzerland). 1976. xv + 430 pp. \$63.75.

This is Part II of the third volume in this set and is divided into seven sections: Ultrastructure and Biochemical Organization of the Pigmentary System (5 papers), Structure and Unique Properties of Melanoproteins (2 papers), Enzymology of Melanin Formation and Transfer (9 papers), Pigment Cell Genetics (7 papers), Hormone and Prostaglandin Influences on Pigment Cells (7 papers), Pigment Cell Photobiology and Control Mechanisms (9 papers), and Cell Culture of Melanocytes (2 papers).

Many of the individual papers give a brief introduction of the general subject; however, because of the limited space provided, this is often inadequate. It would have been better if each section had begun with a general introduction. This fault makes the book of limited value to the novice in the field and necessitates the purchase of the other volumes, a costly proposition.

The strength of works of this type is derived from the centralization of information. Researchers in this area tend to publish their works in a variety of journals, making retrieval difficult. It is convenient to have a volume where one can generate a large number of references in a relatively short period of time.

This particular book is slanted heavily toward the biologist. Chemists and biochemists will most likely find only a few articles of interest. Workers already familiar with the field will probably find

little new material in this book, as much of the important work has either been published in primary journals or is just a rehash of previously published material. In my opinion the usefulness of this volume does not justify the outlay of the \$64 selling price; in short, if your library has a generous budget or there are a number of pigment cell researchers, this is a set of books which should be considered for addition to the stacks.

Miles R. Chedekel, *The Ohio State University*

Halocarbons: Effects on Stratospheric Ozone. Panel on Atmospheric Chemistry (Assembly of Mathematical and Physical Sciences, National Research Council). National Academy of Sciences Printing Office, Washington, D.C. 1976. xv + 352 pp. \$10.25.

The scientific impetus for this rather thorough National Academy of Sciences report can be traced directly to one scientific publication and its spinoffs. The authors of that 1974 paper, M. J. Molina and F. S. Rowland, used available evidence to propose that the chlorofluoromethanes CF_2Cl_2 and $CFCl_3$ are inert enough to survive the upward journey into the earth's stratosphere where they would be photodissociated by solar UV light, and that Cl atoms would be thus released. The remainder of their proposal, that these Cl atoms would catalytically destroy a significant fraction of the global O_3 layer, gave the problem environmental and economic aspects because of the importance of the O_3 layer to life and climate on Earth and the growing usage of chlorofluoromethanes (CFM) as aerosol propellants, refrigerants, foam-blowing agents, and solvents. By 1976 few readers of the *Journal of the American Chemical Society* were oblivious to the CFM-ozone problem and the public debates over whether the Molina-Rowland hypothesis was correct and whether the usage of CFMs should be regulated.

As the months passed, it became evident that an authoritative critical scientific review was needed by governmental bodies considering regulations and legislation, by industrial concerns for future product planning, and by those who fund research, public and private. Before it was even drafted, it became widely accepted that "Halocarbons: Effects on Stratospheric Ozone" would be the needed critical report. The high-quality document (book) that emerged in September 1976, while obviously not the last word, disappointed few scientific readers.

The Preface begins with a useful chronology of events both scientific and political. Nine chapters, six technical appendices, and a helpful glossary of terms follow. Chapter 1, "Findings", resembles a legal brief or a business summary written for an intelligent businessman: it summarizes the key elements of the CFM- O_3 problem, the Panel's findings, and several other possible future threats to the ozone layer. Chapter 2 presents a more detailed description of the chemistry, physics, meteorology, and mathematics relevant to assessing the problem. Possible sources of stratospheric ozone-destroying chemicals, i.e., Cl, NO, and Br are reviewed in Chapter 3. The chief purpose of Chapter 4 is to serve as a summary and introduction to Appendix A, a detailed (55 pages) discussion of atmospheric chemical and physical processes that might remove chlorocarbons and their active decomposition products, Cl atoms. Similarly, Chapter 5 introduces and summarizes Appendix B; together they treat the phenomenology and mathematical modeling of atmospheric air motions. Specific data from actual measurements of atmospheric constituents are discussed and reviewed in Chapter 6 and Appendix C. While data on O_3 , O, and nitrogen-, chlorine-, and hydrogen-containing chemicals are reviewed, no mention is made of solar intensities. In Chapter 8 and Appendix D we are given the mathematical modeling details: the equations, boundary conditions, physical and chemical assumptions, and how state-of-the-art models simulate the stratosphere's photochemistry and motions. Model results are compared with actual data; model predictions for the CFM- O_3 problem are presented and analyzed. The important point that O_3 vertical (and presumably latitudinal) profiles might be significantly altered by continued CFM usage is made here. Chapter 9 might well be entitled "Potpourri", as it includes a number of interesting speculations about possible stabilizing or destabilizing influences in the environment, a brief assessment of problems posed by 50 space shuttle launches annually, and the potential N_2O-O_3 problem due to increased nitrogen fixation. Chapter 9 also contains the book's only mention of the IR "greenhouse effect" of the CFMs, a not-to-be-ignored finding of V. Ramanathan and others. The search for other possible CFM sinks is reviewed in Appendix E and recommendations for continued research are made in Appendix F.

The NAS/NRC Panel on Atmospheric Chemistry consisted of H.

S. Gutowsky,* Chairman, Julius Chang, Robert Dickinson, Dieter Ehhalt, James P. Friend,* Frederick Kaufman,* R. A. Marcus, George Pimentel, H. I. Schiff, John H. Seinfeld, Brian Thrush, Cheves Walling, and Geoffrey Watson. Each apparently contributed a particular expertise and a general determination to issue a critical scientific report that they knew would probably serve as the basis for decisions by a multibillion dollar industry and governments. They examined the Molina-Rowland hypothesis and the work of others in the field of stratospheric studies and pronounced it basically sound as of 1976 but noted that much quantitative work remained. The panel worked rapidly and under considerable pressure to stay on schedule; thus there are a few minor inconsistencies in the book. Also, one recent kinetic rate constant measurement (that for $\text{NO} + \text{HO}_2 \rightarrow \text{NO}_2 + \text{HO}$) that was not listed as a significant source of uncertainty in the predictions has resulted in a 50 to 100% increase in the predicted O_3 losses. Panel members indicated by (*) also served on the parent Committee on Impacts of Stratospheric Change. Chaired by J. W. Tukey, this committee released a separate report designed to face the question of deciding whether to regulate CFM usage ("Halocarbons: Environmental Effects of Chlorofluoromethane Release").

Ralph J. Cicerone

Space Physics Research Laboratory, University of Michigan

Monosaccharide Chemistry. By R. J. FERRIER (Victoria University of Wellington) and P. M. COLLINS (Birkbeck College). Penguin Books Inc., Baltimore, Md. 1972. 318 pp. \$11.95.

"The book should be most suitable for senior undergraduates who wish to study the subject at a more than superficial level, and for postgraduate students engaged in research training." The intent of the authors becomes reality in this highly illustrated book which presents in a short amount of space a considerable amount of depth into the structures and reaction mechanisms of monosaccharides. In addition, the two chapters at the end deal with an introduction to the biochemistry of monosaccharides and the various techniques encountered in carbohydrate chemistry, respectively.

This book should not be considered as a reference book in carbohydrate chemistry since it is completely devoid of specific references. However, it is apparent that the absence of specific references, which are most often incorporated into the text, was the purposeful intent of the authors. What is accomplished, is a readable book in a specific area of organic chemistry. This is something which many authors fail to accomplish and which is of utmost importance for undergraduates and people wanting to learn more in a new area of study. Furthermore, this is done without superficiality. The material is covered in considerable depth so that postgraduates in research, as well as college faculty in organic chemistry and biochemistry, should find it quite informative. It should make a very good text in a short course in carbohydrate chemistry or a supplement in an organic chemistry course where additional reading in carbohydrate chemistry is desired.

Michele A. Crayton, Pacific Lutheran University

Solid-State Laser Engineering. By W. KOECHNER (Korad Division of Hadron, Inc.). Springer-Verlag, New York, N.Y. 1976 xi + 620 pp. \$39.00.

This volume is the first in the Springer Series in Optical Science and should be well received by all those who have an interest in solid-state lasers.

Chapter One outlines the basic ideas underlying laser action and discusses the principles governing the interaction of radiation with matter. Chapter Two gives a fairly detailed comparison of the properties of the various solid-state laser materials. Chapters Three and Four describe the different types of laser oscillators and discuss the different approaches involved in both pulse amplification and steady-state amplification. Chapter Five gives an excellent description of the different modes, both transverse and longitudinal, operating in a laser. Chapters Six and Seven describe the various optical pumping systems and the problems of heat removal. Chapters Eight and Nine are devoted to Q-switching techniques and to both passive and active mode locking. Second-harmonic generation and parametric oscillations are covered in Chapter Ten. Chapter Eleven describes some of the applications of solid-state lasers, ranging from lasers for general research, to military applications, to systems employed in laser fusion experiments. The last chapter describes the problems of optically induced damage to laser materials and components. There are

two appendices, one devoted to laser safety and the other listing conversion factors and constants. There is an extensive subject index at the end.

The book is well written and very readable, with an extensive list of pertinent references at the end of each chapter.

Anyone having a need for a thorough description of solid-state lasers will find this text to be a very welcome addition to their library.

R. Ken Forcé, University of Rhode Island

Structure and Bonding. Volume 28. Electrons in Oxygen- and Sulphur-Containing Ligands. Springer-Verlag, New York, N.Y. 1976. 131 pp. \$19.20.

This volume contains three contributions on widely diverse topics, all primarily descriptive in nature. The chapters really are unrelated to each other, making a concerted review difficult. Hence, each chapter is considered separately here.

"Reversible Oxygenation", by R. W. Erskine and B. O. Field (City University-London), summarizes the known synthetic and biological transition-metal materials which reversibly bind the dioxygen molecule. The text (50 pp) is clearly presented and is reasonably comprehensive (through 1976) in this rapidly developing area. This chapter is both a very useful introduction for those unfamiliar with the area of dioxygen chemistry and a reference source for established workers.

The second chapter (31 pp), "Structural and Bonding Aspects in Phosphorus Chemistry—Inorganic Derivatives of Oxohalogeno Phosphoric Acids", by K. Dehnicke and A. Shihada (University of Marburg, Germany), deals with the syntheses, properties, and structures of halophosphoric acids and halophosphates. The article is comprehensive and well thought out, and is a very useful and authoritative summary of this area. Unfortunately, the text in many places is distracting to read owing to rather stilted English—a problem that a more ambitious referee or editor should certainly have solved.

The third chapter (48 pp), "Dithiocarbamates of Transition Group Elements in 'Unusual' Oxidation States", is by J. Willemsse, J. A. Cras, J. J. Steggerda, and C. P. Keijzers. As the title implies, this competently written article is a review of the interesting propensity of non-innocent dte ligands to stabilize complexes with unusual oxidation states. The possible ambiguity in oxidation state assignments in complexes of such ligands is well illustrated with example complexes in which odd-electron counts are associated with the ligand rather than the metal. The text is nicely laid out according to chemical element, and available structural information is effectively used. The article is an excellent introduction for novices to this area of coordination chemistry.

One problem with this volume, which is associated not with the individual articles (which are all useful), is the lack of relevance of the chapters to each other. Also, the volume titled "Electrons in Oxygen- and Sulphur-Containing Ligands" could be somewhat misleading since the articles are principally descriptive in the chemical/structural sense, rather than in a physical or bonding sense, as the title might imply.

P. Gary Eller

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Iron and Copper Proteins. Edited by K. T. YASUNOBU, H. F. MOWER, and O. HAYAISHI. Plenum Press, New York, N.Y. 1976. 596 pp. \$49.50.

This book is a collection of papers presented at a symposium on iron and copper proteins held at the University of Hawaii, 15–17 December, 1975. It is divided into four parts: (I) iron-sulfur proteins (non-mitochondrial electron transport proteins); (II) iron-sulfur proteins and heme proteins of the mitochondrial electron transport system; (III) other heme and nonheme iron proteins; and (IV) copper proteins. As is to be expected in a collection of symposium papers, the quality ranges from excellent to poor; the overall quality, however, is above average for a symposium. Part III includes several papers on cytochrome P-450, indoleamine 2,3-dioxygenase, and L-tryptophan 2,3-dioxygenase. The copper protein section does not deal in depth with any particular system, but rather is more of a random collection of papers on different copper enzymes. In my view, the book will be useful mainly to metalloprotein specialists.

Harry B. Gray, California Institute of Technology