

On page 9281, column 2, in the seventh line from the bottom, the conventional *R* should read 0.07 instead of 0.70.

**An Approach to Tetrahedrane. Pyrolysis of the Dilithium Salt of *trans*-Butenedial Bistosylhydrazone** [*J. Amer. Chem. Soc.*, **95**, 623 (1973)]. By LYNN B. RODEWALD\* and HAK-KI LEE, Department of Chemistry, The University of Texas at Austin, Austin, Texas 78712.

The mass spectrometer which was employed and referred to in footnote 9 was a CEC Model 21-110, not a

CEC Model 21-102 as reported. Additionally, sufficiently high resolution was maintained to avoid interference at *m/e* 28 by CO and N<sub>2</sub>.

**Facile and Reversible Homolysis of Iron-Germanium, -Tin, and -Lead Bonds by Lewis Bases** [*J. Amer. Chem. Soc.*, **95**, 769 (1973)]. By TOBIN J. MARKS\* and ALAN R. NEWMAN, Department of Chemistry, Northwestern University, Evanston, Illinois 60201.

The name of the first new compound synthesized in the Experimental Section (fourth paragraph) should be di- $\mu$ -di-*tert*-butylstannylene-bis(tetracarbonyliron).

## Book Reviews\*

**Analysis Instrumentation. Volume 10.** Edited by R. L. CHAPMAN (Beckman Instruments, Inc.), G. A. MCNEILL (Monsanto Co.), and A. M. BARTZ (Dow Chemical Co.). Instrument Society of America, Pittsburgh, Pa. 1972. 234 pp. \$15.00.

This softbound volume contains the Proceedings of the 18th Annual ISA Analysis Instrumentation Symposium (May 1972), containing 32 papers emphasizing process and environmental instrumentation. There are also cumulative subject and author indexes for 1954-1971.

**Atlas of Protein Sequence and Structure 1972. Volume 5.** Edited by MARGARET O. DAYHOFF. The National Biomedical Research Foundation, Silver Spring, Md. 1972. xxx + 544 pp. \$22.50.

Eleven essays, each written by the editor with various collaborators, on relationships among protein structures, with particular concern with biochemical evolution, constitute the first part of this work. A frontispiece depicts a figurine of an ape, seated in a Rodin-like pose on a stack of books by Darwin, contemplating a human skull, as though he were thinking "If man evolved from the ape, how is it that I am not a man?" The remaining four-fifths of the book is the Data Section, wherein the amino acid sequences in a quite incredible number of proteins, published before January 1971, ranging from trypsinogen of the spiny dogfish to neurotoxin of the Egyptian cobra, are presented in tabular form. A section of fold-out pages shows the three-dimensional structure of lysozyme, and protein alignments and nucleic acid alignments for a substantial group of proteins. Taxonomic, author, and subject indexes complete this thorough work.

**Biological Oxidation of Nitrogen in Organic Molecules.** Edited by J. W. BRIDGES (University of Surrey), J. W. GORROD (Chelsea College), and D. V. PARKE (University of Surrey). Halsted/Wiley, New York, N. Y. 1972. xxi + 269 pp. \$21.00.

An International symposium on the title subject was held in London in December 1971; the proceedings are collected in this book. Forty papers are included; the majority are concerned in one way or another with amine oxides and not all are concerned with the process of oxidation. It is pleasant to find subject and author indexes in a volume of this kind.

**Chlorine: An Annotated Bibliography.** By RALPH G. SMITH (University of Michigan). The Chlorine Institute, Inc., 342 Madison Ave., New York, N. Y. 1972. \$6.00.

This paperbound book of about 200 pages (which are not numbered) consists of one-paragraph abstracts of 488 papers arranged chronologically from 1824 to 1971. The title is highly misleading in its generality; the references listed are confined to those concerned with exposure to chlorine from the standpoint of medicine, toxicology, industrial hygiene, and effect on the environment, and all others are ignored. The Introduction states that most of the

abstracts are from the original author's summary, or from *Chemical Abstracts* (the C.A. citations are not given, however!). Where neither of these was available, the editor has not filled the gap, but has simply stated "No summary." There are author and subject indexes.

**Organic Syntheses. Volume 52.** Edited by H. O. HOUSE (Georgia Institute of Technology). John Wiley & Sons, Inc., New York, N. Y. 1972. xii + 152 pp. \$9.50.

The regular reappearance of this helpful friend is always a pleasant occasion. There are twenty-seven preparations described, of which the largest number involve the use or preparation of organometallic reagents (aluminum, copper, lithium, nickel). A gap of long standing is filled by two electrochemical procedures, one of which is a preparation of Fremy's salt (sodium nitrosodisulfonate), an oxidizing agent that has been long known, but little used, owing to difficult accessibility. Among the many other valuable and significant preparative procedures that could be mentioned are those of two macrocyclic (crown) ethers, substances that have recently come into prominence for their ability to form complexes with alkali metal cations.

A continuing concern with safety manifests itself throughout this volume in the form of suitable warnings, not only about possible explosion dangers, but also toxicity.

An unnumbered appendix of 25 pages lists additional procedures currently under consideration, the full texts of which can be ordered by those who want them before they eventually appear in a future volume.

**Photographic Analysis. A Textbook of Photographic Sciences.** By J. KATZ and S. J. FOGEL. Morgan and Morgan, Inc., Hastings-on-Hudson, N. Y. 1971. \$25.00.

The presentation of the subject of this book, the chemistry (organic, inorganic, and physical) of the photographic process, is unfortunately marred by many scientific errors and substandard writing. The selection of topics for the individual chapters is far from systematic, and the book as a whole lacks any clear plan or cohesion in its intent. These shortcomings, which could have been substantially reduced by good editorial service, unfortunately outweigh its good points.

**Physical Methods in Heterocyclic Chemistry. Volume 5. Handbook of Molecular Dimensions.** Edited by A. R. KATRITZKY (University of East Anglia) and compiled by P. J. WHEATLEY (Cambridge University). Academic Press, New York, N. Y. 1972. xiv + 598 pp. \$39.00.

This volume is devoted to a single topic, unlike previous volumes in the series. It consists entirely of a tabulation of "all known x-ray structure determinations of molecules and ions containing heterocyclic rings to 1970," arranged in formula-index order of the rings. For each entry, the structural formula is shown and is keyed to a list of its angles and distances. The coverage is stated to be encyclopedic rather than critical. The author's stated pur-

\* Unsigned book reviews are by the Book Review Editor.

pose, "to reduce the time spent on literature searches," is outstandingly met. The magnitude of the accomplishment can be appreciated by considering the fact that there are 1367 different structures given.

**Phosphorus-Nitrogen Compounds. Cyclic, Linear and High Polymer Systems.** By H. R. ALLCOCK (Pennsylvania State University). Academic Press, New York and London. 1972. xiv + 498 pp. \$24.50.

Phosphorus-nitrogen compounds, in general, and the phosphazenes, in particular, have excited the interest of a wide variety of chemists, resulting in studies ranging from the theory of chemical bonding in these systems to the application of high-polymer chemistry. The intent of this monograph is to review the entire range of phosphorus-nitrogen chemistry. Introductory chapters on history, bonding, and structure are followed by more extensive treatments of syntheses, reactions, and reaction mechanisms, concluding with chapters devoted to polymeric systems. Appendices on structural and characterization data as well as author and subject indices are included. The work is fairly thoroughly keyed to the original literature through the middle of 1971.

Professor Allcock has had extensive experience with phosphazene chemistry in both academic and industrial institutions and hence is admirably suited to present the subject in the totality it deserves. Among the pleasing aspects of the monograph are the broadness of the coverage, the interrelation of the monomer and polymer chemistry, and the indications of the applications of phosphorus-nitrogen compounds. The aspect of the monograph which could stand improvement is the depth of coverage of some topics. For instance, the rationalization of the conformations adopted by tetrameric and larger ring systems in terms of current bonding models should have been discussed in considerably more detail. On the balance, however, this is a clearly written and well-documented work.

Christopher W. Allen, *University of Vermont*

**Understanding Physical Chemistry. 2nd Edition.** By ARTHUR W. ADAMSON (University of Southern California). W. A. Benjamin, Inc., New York, N. Y. 1969. xiii + 516 pp. \$12.50 (cloth), \$4.95 (paperbound).

Students of physical chemistry will welcome this book as an aid to problem solving. The second edition follows closely the organizational pattern of the first edition which deals with classical physical chemistry in early chapters and takes up quantum chemistry near the end of the book. Each chapter contains some brief comments on the subject, a list of important equations and concepts, and a group of problems followed by a section in which solutions are given.

An important change from the first edition is the introduction of elementary statistical mechanics in the chapter on heat capacity. Energy equations from wave mechanics are given in this chapter so that partition functions for different kinds of energy can be derived. In the chapter on the second law of thermodynamics, the relationships between thermodynamic properties and partition functions are given. Thus, classical and statistical thermodynamics are presented together in the same chapters.

The book is offered as a supplement to rather than a substitute for a regular textbook. Discussion sections are very concise and are useful in pointing out important relationships. Derivations of these relationships are left to the main textbook. The scope of subject matter covered is that generally encountered in a first-year physical chemistry course. The problems are closely related to the equations and concepts given, and additional references are not needed for their solutions. Many of them involve more than substitution into obvious formulas and will be helpful in training the student to apply general principles to unique situations. According to the author, the book has been expanded by about ten per cent over the first edition.

William B. Bunger, *Indiana State University*

**Elucidation of Organic Structures by Physical and Chemical Methods.** Edited by K. W. BENTLEY (Reckitt and Colman, Hull, England) and G. W. KIRBY (Loughborough University of Technology). Wiley-Interscience, New York, N. Y. 1972. Part I: xiii + 689 pp. \$29.95. Part III: xiii + 415 pp. \$25.00.

This series in three parts by Bentley and Kirby constitutes Volume IV of "Techniques of Chemistry," edited by Arnold Weissberger. The scope and general usefulness of the first edition, published nearly ten years ago, is evident again in this second edition. The contributors are new and well-chosen experts in their representative fields; the only holdover from the first edition is K. Biemann whose

chapter in Part I, "Applications of Mass Spectrometry," is current, informative, and well written. The coverage of specific subjects has been expanded, and new topics have been added.

Physical methods for structural determinations are treated through nine chapters in Part I. New subjects include "Applications of Electron Spin Resonance Spectroscopy to Structural Determinations of Diamagnetic Substances; the Generation of Useful Spin Labels in Solution" by G. A. Russell and "X-Ray Crystal Structure Analysis" by A. F. Cameron; separate sections of "Applications of Nuclear Magnetic Resonance Spectroscopy" are devoted to  $^{19}\text{F}$  (by L. Phillips) and  $^{31}\text{P}$  (by M. Murray and R. Schmutzler) nmr spectroscopy and to high-resolution pmr spectroscopy (by W. McFarlane). Other chapters include subjects introduced in the first edition: "Chromatography, Electrophoresis, and Other Methods of Fractionation and Separation" by D. M. W. Anderson and I. C. M. Dea; "Applications of Electronic Absorption Spectroscopy" by C. J. Timmons; "Vibrational Spectroscopy—Applications to Organic Chemistry" by J. P. Devlin and R. P. J. Cooney; "Applications of Optical Rotation and Circular Dichroism" by G. C. Barrett; and "Dissociation Constants in the Elucidation of Structure" by G. B. Barlin and D. D. Perrin. There is little overlap between the first and second editions; subjects previously included in the first edition are treated supplementally. An adequate introduction to each of the physical methods is presented. Emphasis is placed on experimental uses of the described techniques; discussions of theoretical principles and manipulative instrumental techniques are minimized. Numerous specific examples, extensively from polymer and natural products areas, serve as illustrations. The literature is surveyed through 1969; few references to 1970 are included. In any undertaking of this magnitude certain topics are necessarily omitted or treated cursorily; this book is not an exception. However, Part I of this series is an informative practical introduction and valuable reference source to structural determinations by physical methods. Like its predecessor, this work will be appreciated for many years to come.

Part III is divided into two chapters, "Assignment of Stereochemical Configuration by Chemical Methods" by J. H. Brewster (249 pp) and, a new subject, "Aspects of Stereoselective Synthesis" by J. W. ApSimon (158 pp). The former chapter, unlike its counterpart in the first edition, is not limited to natural products. A significant portion of Brewster's chapter is devoted to preparative methods, and a wealth of references through 1969 is provided. In ApSimon's chapter emphasis is placed on the synthesis of fused ring systems with abundant examples (through 1970) from natural products areas. Considering the similarity of the two chapters, there is not a significant amount of overlap. Topics range from classical configurational assignments to stereoselective electrocyclic and photochemical processes. The synthetic nature of the topics and the scope of their coverage will make Part III of general interest and longstanding value.

Michael P. Doyle, *Hope College*

**Surface Diffusion of Metals.** By G. NEUMANN (Institute für Physikal. Chemie der Freien Univ. Berlin) and G. M. NEUMANN (OSRAM Studiengesellschaft, Munich). Diffusion Information Center, Bay Village, Ohio. 1972. 129 pp. Paperback, \$15.

It is refreshing to see a subject developed in the order a newcomer thinks about it. The Neumanns discuss surface diffusion first from the experimental standpoint, then present test results, and then analyze the theoretical considerations. Many texts would get the reader bogged down by an early discussion of the theory before it gets to the meat of the subject.

The techniques are all there, from scratch smoothing to field ion-emission spectroscopy. They are discussed in enough detail for the novice to appreciate their potential, but the fine points are left for referenced sources. By surface diffusion, the authors mean surface self-diffusion. The occasional reference to impurity atoms is more to discuss their effect on self-diffusion than to treat surface diffusion of foreign atoms.

Surprisingly, the text is in colloquial English which is quite readable. There is only an occasional Germanism such as, "The discrepancies are only but difficult to explain," or a rare touch of whimsy such as, "The oscillation frequency of an ad-atom, which might as well be approximated by the lattice frequency."

Speaking of ad-atoms, the Neumanns never get around to defining them, but the test is clear enough for the reader to figure them out. He should be warned though that the discussion of activation energies within various temperature ranges works only when the units are cal/mol and  $^{\circ}\text{K}$ , respectively.

References are included through 1970. Although there is no

index, the text is subdivided in such a way to make one unnecessary. For someone interested enough in surface diffusion to pay the price, this is a ready reference.

William G. Fricke, Jr., *Alcoa Technical Center*

**Aerosols and Atmospheric Chemistry.** Edited by G. M. Hidy (North American Rockwell Science Center, Thousand Oaks, Calif.). Academic Press, New York and London. 1972. xviii + 348 pp. \$14.50.

This volume contains papers presented at the 1971 American Chemical Society Kendall Award Symposium honoring Professor Milton Kerker. These papers have been published earlier in the *Journal of Colloid and Interface Science*, Volume 39 (No. 1), April 1972, and Volume 40 (No. 1), July 1972.

The symposium has presented various studies on the physical chemistry of aerosols and their relationship to atmospheric chemistry. The majority of the papers are mainly of interest to experts in the aerosol field. However, several chapters on optical, dynamical, and analytical properties of aerosols are of value to the education of environmental engineering students in general. These are followed by a detailed review of a coordinated aerosol study conducted in the Los Angeles area.

The symposium is largely directed toward specialists in the field; however, the many aspects of aerosol study presented make the reading of selected chapters interesting and useful to others in the air pollution field.

A. J. Haagen-Smit, *California Institute of Technology*

**An Introduction to Air Chemistry.** By SAMUEL S. BUTCHER (Bowdoin College) and ROBERT J. CHARLSON (University of Washington). Academic Press, New York and London. 1972. xiii + 241 pp. \$10.95.

"An Introduction to Air Chemistry" is meant as a textbook to acquaint the student in science and engineering with a field which has become of scientific, as well as applied engineering, interest. The authors have limited themselves mainly to chemical and meteorological problems but in the introductory chapters have succeeded to arouse the interest of the student in related subjects. The book originated as lecture notes of a course given by the authors. This fact should be taken into account in judging its merit. The prerequisites listed for the course—a year of college chemistry and calculus—are certainly a minimum, and considerable assistance by the lecturer will be needed to master the contents of this text.

A. J. Haagen-Smit, *California Institute of Technology*

**Thermodynamic Theory of Structure, Stability and Fluctuations.** By P. GLANSDORFF and I. PRIGOGINE (Université Libre de Bruxelles and University of Texas). Wiley-Interscience, New York, N. Y. 1971. xxiii + 306 pp. \$15.50.

This monograph contains a detailed account of the authors' views and research results in the area of the stability of thermodynamic systems. The phrase "thermodynamic systems" is used to imply that thermodynamic concepts may be applied locally. Since the class of systems involved is large and is not limited to those described by either linear processes or by small deviations from overall thermal equilibrium, the range of topics to be covered is potentially very wide. Indeed, such diverse topics as the Einstein fluctuation formula and the origins of the dissipative space structure observed in the Zhabotinski reaction are examined from a unified point of view.

The book is divided into three sections. The first section deals with the general theory. It begins with conservation laws and the linear thermodynamics of irreversible processes. In "easy" stages, successively more complex situations are considered until, in Chapter 9, a general evolution criterion is developed for systems for which local thermodynamic equilibrium can be invoked. The second and third sections are devoted to the application of the theory to hydrodynamic applications and to chemical processes, respectively.

This is not an easy book to read. The argument proceeds by means of calculations which are necessarily complicated. An understanding of the structure of the thermodynamics of equilibrium and linear irreversible processes is necessary to follow the argument. Having said this, let me also state that critical study of this book will be of great benefit to anyone concerned with stability problems.

Raymond D. Mountain, *National Bureau of Standards*

**Chromatography of Environmental Hazards. Volume 1. Carcinogens, Mutagens and Teratogens.** By LAWRENCE FISHBEIN (National Institute of Environmental Health Sciences). American Elsevier Publishing Co., New York, N. Y. 1972. vii + 499 pp. \$44.50.

It is difficult to imagine a title more likely to attract attention than this one containing the five words environmental, hazard, carcinogen, mutagen, and teratogen. Title notwithstanding, the contents of this book will be a disappointment to chromatographers and environmentalists alike. This first of three volumes contains a random selection of literature reviews for 90-odd compounds, including some groupings. Two conditions for inclusion of a given compound in this volume appear to be (a) one or more references to carcinogenic, mutagenic, and/or teratogenic testing, and (b) one or more references to chromatography. The implied environmental hazards for each compound seem incidental. In fact, use of "Environmental Hazards" in the title is misleading with respect to many of the presentations.

The author's Preface states that incredible abuse of the environment by man dictates a need to measure and to curtail this abuse. But many natural products are included which would not seem to be environmental hazards because of man. These are compounds such as acetaldehyde, pyrrolizidine alkaloids in certain western rangeland plants, *Vinca* alkaloids in the periwinkle plant, cypasin in cycad plants, mycotoxins such as aflatoxins, and caffeine.

Man-made products as environmental hazards include isoniazid, the most effective tuberculostatic drug yet introduced, Myleran, active against chronic myeloid leukemia, and thalidomide, the sedative withdrawn from the market because of its teratogenicity. Other compounds are the pesticides aminotriazole, which is no longer registered as a pesticide, and trichlorophenoxyacetic acid; most agricultural uses of the latter have been cancelled. It is not clear why each of the above is a significant environmental hazard now.

Rough groupings in chapters include alkylating agents, pesticides, drugs, and food and feed additives and contaminants. An impression hard to ignore is that the entire volume is a large card file of literature briefs and references gathered over many years because of passing interests in many areas.

Environmentally speaking, this volume does little to establish the multi-disciplined approach to curtailment of man's abuse of the environment as stated in the Preface.

Chromatographically speaking, this volume might provide leads to original literature for specific compounds in the book, but the user would be wise to check the original literature for compounds of interest. The author admits to this being less than an exhaustive review of the literature, but he appears not to have exercised his prerogative to offer a critical review.

Presentation of textural material is of average quality, in some instances containing errors, in others erroneous information. Most of the chromatogram figures are hand-drawn reproductions, and many of them are poorly done. A minor number of tables and figures have direct reference numbers to the original literature source, but for most sources one needs to search the adjoining text, and antecedents are sometimes doubtful. Errors in structural formulas stand out and are obvious detractions, e.g., pp 275, 278, 279, 282, 315, 318, to cite a few.

In a few words, this is not an overly impressive work.

Dexter B. Sharp, *Monsanto Company*