

sites. However, judging from the fragmentation of $[\text{Fe}_6\text{S}_9(\text{S}-t\text{-Bu})_2]^{4-}$ by excess thiol it appears that any such site may not be securely identified by our usual applications of the core extrusion method.²³ Related behavior has been encountered in certain

(23) Gillum, W. O.; Mortenson, L. E.; Chen, J.-S.; Holm, R. H. *J. Am. Chem. Soc.* **1977**, *99*, 584; Wong, G. B.; Kurtz, D. M.; Holm, R. H.; Mortenson, L. E.; Upchurch, R. G. *Ibid.* **1979**, *101*, 3078.

(24) Kurtz, D. M.; Holm, R. H.; Ruzicka, F. J.; Beinert, H.; Coles, C. J.; Singer, T. P. *J. Biol. Chem.* **1979**, *254*, 4967.

Book Reviews*

Syntheses with Stable Isotopes of Carbon, Nitrogen, and Oxygen. By D. G. Ott (Los Alamos Scientific Laboratory). John Wiley & Sons, New York. 1981. viii + 224 pp. \$28.50.

Synthesis of organic compounds with isotopic labeling differs from conventional synthesis in that the cost of the isotope-enriched material makes it necessary to place the efficiency of its conversions above that of all other reactants. When this requirement is added to the necessity to work with rather small quantities, the result is often a preparative procedure substantially different from that used for ordinary compounds. This book is largely a collection of such procedures, gathered from the literature and presented with sufficient detail that they can be used directly in experimental work. It is a selective, rather than comprehensive, collection.

An introductory section of 15 pp gives general considerations, describes apparatus and techniques, and outlines the special features of designation and nomenclature applying to the subject. The six other chapters take up compounds by functional class. It is somewhat difficult to find what is included, because the table of contents gives no detail whatsoever, and there is no breakdown at the start of each chapter. One must either browse or use the index. The usefulness of this work goes beyond the specific preparations given, for they can serve as models for other preparations, but the indexing method makes it unnecessarily difficult to retrieve such information. There is, for example, no chapter devoted to hydrazine derivatives, and the index has no entry under "hydrazides", and one might easily overlook the fact that there is, indeed, a procedure given for an ¹⁵N-labeled hydrazide (maleic hydrazide) in the book, in the chapter on heterocyclic compounds.

Reactive Intermediates. Volume I. Edited by R. A. Abramovitch. Plenum Press, New York and London. 1980. xiii + 522 pp. \$49.50.

This is the first volume in an open-ended series in which are presented reviews of "relatively new areas of the chemistry of reactive intermediates" at a detailed, specialized level. As the title implies, the topics may be drawn from all of chemistry, including biochemical, industrial, and atmospheric areas.

The five contributed chapters in the present volume show a marked bias toward organic chemistry. The growing field of atomic carbon is the subject of a short review by P. B. Shevlin, and is concerned with methods for generation of atomic carbon as well as its reactions. The adjacent chapter, Metal Atoms as Reactive Intermediates, by K. J. Klambunde, nicely complements the foregoing one. The subject has developed rapidly, and there are 238 references, starting with one to Michael Faraday in 1875, but mostly in the 1970's. The chapter on Aminium Radicals, by Y. L. Chow, deals with the derivatives of H_3N^+ , which are of importance in oxidation reactions and in photochemistry. Curt Wentrup is the author of a short chapter on a complex and intriguing subject, the formation and reactions of Arylmethylenes and Arylnitrenes in the gas phase. The last chapter, by D. S. Wulfman and B. Poling, again provides a complement, dealing with Metal-Salt-Catalyzed Carbenoids. One might be puzzled about how a substance, rather than a reaction, can be "catalyzed", but it soon becomes clear that the authors mean the formation and reactions of the enigmatic species conveniently called "carbenoids" that result from the interaction of diazoalkanes with many metal salts. It is a big and complex subject and the authors helpfully begin their review of it with a somewhat philosophical analysis of meaning of the terms "carbene" and "carbenoid" and their relation to the interpretation of experimental data. The size of the authors' task may be estimated from the fact they have digested the

extrusions of protein [3Fe-3S] core units, which did not remain intact under the experimental conditions employed.^{7a,24} Studies of Fe_6S_9 and other sulfur-rich clusters are continuing.

Acknowledgment. This research was supported by NIH Grants GM-28856 (Harvard University) and HL-13157 (Northwestern University). We thank K. S. Hagen for preliminary X-ray data and Drs. R. B. Frankel and G. C. Papaefthymiou for Mössbauer spectral results.

material from 741 references and presented it critically.

The reviews cover the literature through 1977, and there is a subject index of moderate dimensions.

Versatility of Proteins. Edited by C. H. Li. Academic Press, New York. 1979. xiv + 465 pp. \$22.00

This is a collection of the invited papers presented at the International Symposium on Proteins held in Taipei in 1978. There are 26 papers plus an introductory address by Hans Neurath. The papers are grouped under the headings Techniques of Protein Chemistry, Enzymes, Protein-Protein Interactions, and Regulatory Proteins. The papers are reproduced from typescripts of an interesting variety of fonts but are clear and well-illustrated. Usefulness of the book is enhanced by a subject index.

Kirk-Othmer Encyclopedia of Chemical Technology. Third Edition. Volume 14. Laminated Wood-based Composites to Mass Transfer. Edited by M. Grayson and D. Eckroth. John Wiley & Sons, New York. 1981. xxvi + 981 pp. \$145.00.

This would be an important volume if for no other reason than it includes the elements lead, lithium, magnesium, and manganese and their compounds. However, it also includes valuable reviews on lasers, lignin, lignite, liquid crystals, lubricants, maleic and malonic acids and their derivatives, etc. Readers of reviews of previous volumes will know that the content of the series maintains a high standard in both presentation and scientific approach. This volume is no exception, and chemists who are not engaged in applied chemistry will find themselves surprisingly well served with the balanced selection of material.

Correlation Analysis in Chemistry: Recent Advances. Edited by N. B. Chapman and J. Shorter (The University of Hull, England). Plenum Press, New York. 1978. xiii + 546 pp. \$49.50.

"Correlation analysis" is a discipline which has its origins in linear free energy relationships (LFER) but presently encompasses biochemical quantitative structure-activity relationships (QSAR) as well as pattern recognition. This book is a sequel to the earlier monograph "Advances in Linear Free Energy Relationships" by the authors.

The book consists of an authors' introduction followed by ten amply footnoted chapters which are cross-referenced and comprise a coherent presentation. They are: Chapter 1. Linear Free Energy Relationships as Tools for Investigating Chemical Similarity—Theory and Practice (S. Wold and M. Sjostrum); Chapter 2. The Bronsted Equation—Its First Half-Century (R. P. Bell); Chapter 3. Theoretical Models for Interpreting Linear Correlations in Organic Chemistry (M. Godfrey); Chapter 4. Multiparameter Extensions of the Hammett Equation (J. Shorter); Chapter 5. Applications of Linear Free Energy Relationships to Polycyclic Arenes and to Heterocyclic Compounds (M. Charton); Chapter 6. Substituent Effects in Olefinic Systems (G. P. Ford, A. R. Katritzky, and R. D. Topsom); Chapter 7. The Correlation of Nucleophilicity (C. Duboc); Chapter 8. Correlation of NMR Chemical Shifts with Hammett Sigma Values and Analogous Parameters (D. F. Ewing); Chapter 9. Recent Advances in Biochemical QSAR (C. Hansch); Chapter 10. A Critical Compilation of Substituent Constants (O. Exner).

This book is highly recommended for the personal libraries of scientists including chemists, biologists, pharmacologists, and toxicologists. For those not immediately conversant in this area, a perusal of the appropriate section of an advanced organic chemistry textbook will allow entry into the present volume. This reviewer's one small gripe deals with the order of presentation of topics. The organization follows a logical one beginning with the theoretical justification of the approach, followed by theoretical chemistry, experimental organic chemistry, then biochemical

* Unsigned book reviews are by the Book Review Editor.

and medical applications. However, the article by Hansch would have been a much less forbidding introduction to the non-specialist or non-theoretician. However, this is a minor complaint when one considers the excellence and timeliness of this book.

Arthur Greenberg, *New Jersey Institute of Technology*

Basic Exercises in Immunochemistry. Second Edition. By Alois Nowotny (University of Pennsylvania). Springer-Verlag, Berlin, Heidelberg, and New York. 1979. xiv + 314 pp. \$17.80.

In the preface to his first edition, Dr. Nowotny made it clear that the main purpose of his manual is to introduce students "to some frequently occurring problems in the three major sections of the immunochemistry of natural products" viewed by him to be (a) isolation of materials, (b) chemical analysis of constituents, and (c) assays of important biologic and immunologic activities. This goal remains unchanged in the second edition in which 32 new exercises have either replaced or augmented the original set to provide 95 exercises. Each problem is written clearly and concisely, yet with the kind of attention to technical detail that is so often missing in methods manuals. The accuracy of printing enhances the value of the collection. Although Dr. Nowotny had no intention of compiling an exhaustive survey of immunochemical methods—and stated as much in his preface to each edition—he did omit a few procedures that are rather basic to contemporary immunochemical fare. For example, the method of equilibrium dialysis to measure hapten binding at variable ligand concentrations is so basic to immunochemical practice and thought that one would want it always included in any student's diet. One would also have thought that photo-affinity labeling might have found a place in this second edition. And it does seem difficult to understand in this day and age why one would omit an exercise on the popular radioallergosorbent test (RAST) for antigen-specific immunoglobulin E, particularly when one does include an exercise on isolation of ragweed pollen allergens. In spite of these and similar omissions from the basic immunochemical menu Dr. Nowotny's book does definitely deserve a place on one's shelf—in the laboratory if possible. Although meant for the student it has much to say to the researcher as well.

Eugene D. Day, *Duke University Medical Center*

Coordination Chemistry. 20. Edited by D. Banerjee (University of Calcutta). Pergamon Press, New York. 1980. ix + 275 pp. \$75.00.

This volume contains 26 of the invited lectures which were presented at the 20th International Conference on Coordination Chemistry in Calcutta, India, in December, 1979. The conference theme of "Recent Trends in Coordination Chemistry" covers a broad spectrum of topics. Several aspects of bioinorganic chemistry are covered in papers on mimicry of metalloenzymes (J. Chatt), synthetic oxygen carriers (F. Basolo), low molecular weight complexes in biological systems (D. R. Williams), nitrogen fixation (G. N. Schrauzer), and metal chelates as anti-cancer agents (S. E. Livingstone). Other topics which are treated include mechanistic studies of ligand substitution and electron transfer reactions (M. L. Tobe, J. C. Earley, R. C. Cannon, and K. Saito), stereochemistry of coordination compounds (J. C. Bailar, Jr.), complexes with macrocyclic ligands (T. A. Kaden), reactions of coordinated oxalate ligands (A. L. Odell), transition metal dialkylamides (D. C. Bradley), insertion reactions (L. M. Venanzi), and linear free energy relationships (Y.-T. Chen). Several papers on additional aspects of structural and reactivity features of coordination compounds are also presented. The papers are generally concise reviews of recent work in the authors' laboratories with references to related work by other researchers. No single topic is covered in depth in this volume; however, because of the broad range of topics which are presented with recent literature references, this volume should be particularly valuable as an addition to libraries.

M. Rakowski DuBois, *University of Colorado*

The Carbohydrates, Chemistry and Biochemistry. Volume IB. Edited by W. Pigman (New York Medical College) and D. Horton (Ohio State University). Academic Press, New York. 1980. XXIII + 984 pp. \$69.50.

This book presumably represents the final issue of a four-volume set (IA, IB, IIA, and IIB) detailing the Chemistry of Carbohydrates. The remaining volumes are already in print. The untimely death of Ward Pigman brings to an end his long association with carbohydrate chemistry and the completion of the third issuance of this series. The first (with Max Goepf) was published in 1948 and the second in 1957. The prior editions of "The Carbohydrates" have always been considered a standard, high quality, authoritative text for workers in the field. This volume, edited with Derek Horton, continues this tradition of excellence.

Volume IB contains chapters on Amino Sugars, Deoxy and Branched Chain Sugars, Thio Sugars and Derivatives, Unsaturated Sugars, Gly-

cosylamines, Hydrazine Derivatives and Related Compounds, Reduction of Carbohydrates, Acids and Other Oxidation Products, Oxidative Reactions and Degradations, Glycol-Cleavage Oxidation, Effects of Radiation, Physical Methods for Structural Analysis, and Separation Methods. Chapters are written by experts in the field and the reference lists which appear at the end of each chapter are generally quite complete.

Volume IB deals largely with chemical and physical aspects of carbohydrates and contains only minimal, direct information of a biological nature, i.e., enzymology, biosynthesis, etc. The choice of title, therefore, could be misleading to some scholars. Nevertheless, the chemical information contained would be of use to the practicing biologist, biochemist, and clinician who deals with carbohydrates in research.

In conclusion, Volume IB represents a well-written, highly recommended portion of a four-volume set and is recommended for use by any scientist whose research touches the field of carbohydrates.

Milton S. Feather, *University of Missouri*

Clinical Chemistry. By R. Richterich and J. P. Colombo (University of Berne). John Wiley and Sons. New York. 1981. xxiv + 766 pp. \$94.50.

Clinical chemistry is somewhat of an interdisciplinary area of science. It includes knowledge from analytical chemistry, biochemistry, and medicine. This raises a dilemma for any author of a book on this subject. How much does he present about all of the potential topics? One approach, which I think is a mistake, is to say a little about everything. The mistake is compounded when both elementary and advanced aspects are all mixed in together, so that the book does not focus on a reader at a particular level. Unfortunately, this is the nature of this text. Even extraneous bits and pieces of information are included, e.g., we are informed that "Today the second is redefined as 9,192,631 times the period of oscillation between the two lines of the doublet hyperfine structure of the ground-state of atoms of the ^{133}Cs isotope." One would be hard pressed to use this information in a clinical laboratory. The discussion of clinical chemistry per se which remains is available at a far lower cost in other general texts on the subject. I was also disappointed to find only a hint of the important new topic of therapeutic drug monitoring. Thus, although the book provides an overview, more thorough background information is available in separate, introductory texts on analytical chemistry and biochemistry; far less expensive books are available to introduce clinical chemistry to the novice; and the practicing clinical chemist can better spend his money on monographs which cover specific areas in depth.

Roger W. Giese, *Northeastern University*

Introduction to Pascal for Scientists. By J. W. Cooper (Bruker Instruments, Inc.). Wiley-Interscience, New York. 1981. xv + 260 pp. \$19.95.

Of the computer languages I have seen to date, BASIC is still the easiest to learn for a novice programmer. To a chemist with some (even if small) familiarity with BASIC, FORTRAN, or the like, this book is a good introduction to the next level of sophistication in programming.

The style is easy to follow, and examples abound. Each chapter includes both references and problems (many with solutions). Included are chapters on matrix manipulations (inversion and diagonalization), the fast Fourier transform, and the simplex method of optimization. Most of the more complicated examples come from NMR software with one application to Hückel MO calculations as well. Further, one entire chapter is devoted to the most important part of programming—documentation.

Finally, a set of appendices (as well as the text) lists the differences between two of the more common versions of Pascal in use: UCSD Pascal and the Carnegie-Mellon DEC-10 version.

The bad points: the book suffers from poor proofreading, having missing lines of text, some incorrect solutions to the problems, and a number of typos. While most of these are obvious, a few are quite confusing. Program examples often include statements which are not defined until the third chapter following and, while printed in a standard terminal font, contain typos which imply that the programs may not actually have been tested. Finally, the index is almost useless, being incomplete and misdirecting (e.g., the entry for "variable names" refers you to the first occurrence of that work pair, not to where the definition of valid variable names appears). Fortunately, the Table of Contents is comprehensive enough to allow one to find most of the important features of the language.

To someone with a background in other languages, this book can be very useful. To a novice, I recommend you wait for the second edition (or errata sheets) or be willing to struggle a bit.

Kurt W. Hillig, II, *University of Michigan*