

Book Reviews*

Advances in Mass Spectrometry in Biochemistry and Medicine. Volume 1. Edited by A. FRIGERIO and N. CASTAGNOLI. Wiley/Halsted, New York, N.Y. 1976. 586 pp. \$40.00.

The Second International Symposium on the title subject, held in Milan in 1974, generated these Proceedings. There are 51 papers in it, all in English. They are reports of original research and include experimental details. In the Preface, Evan C. Horning calls attention to the often unappreciated fact that in the development of a scientific field, the state of the analytical methodology is the rate-limiting step. These Proceedings demonstrate the power and versatility of analytical mass spectrometry, which has given a new impulse to studies of drug metabolism, detection of toxic agents, and many other biochemical and medical studies.

Glossary of Chemical Terms. By C. A. HAMPEL and G. G. HAWLEY. Van Nostrand-Reinhold, New York, N.Y. 1976. 281 pp. \$14.95.

It is always a risky matter to write a dictionary or glossary (a selectively abbreviated form of the former), for there are strong differences of opinion about definitions, and especially about which terms are important enough to be included. This one is intended "for those who have had minor exposure to chemistry or those who require a source of review information". It includes classifications (e.g., wax), functional terms (e.g., plasticizer), phenomena and processes (e.g., distillation), as well as important compounds, general terms, some biographies, and common prefixes and suffixes. Derivations and cross-references are abundant.

On the whole, the definitions are sound and helpful, and are mostly somewhat longer and more informative than those found in large dictionaries. On the other hand, a few are inexcusably inept, such as that for "ketene", which consists of the sentence, "A class of organic compounds characterized by the presence of two double bonds." (Would butadiene count?). Further in the entry occurs the extraordinary statement "Others are derived by replacement (sic!) of the CH₂ group with one or more methyl groups (CH₃) to form methylketene, dimethylketene, etc." Unfortunately, this is not an isolated example. Formulas are included, and are often unacceptable; benzene rings are represented as cyclohexane rings, for example. The selectivity is curious; for example, D and L are defined, but R and S are ignored, and while H is defined, h is not.

The good points nevertheless outweigh the weak ones.

Heterocyclic Compounds (Volume 4, Series Two, International Review of Science of Organic Chemistry). Edited by K. SCHOFIELD. The Butterworth's Group, Borough Green, Kent, England. 1975. 392 pp. £13.45.

The books of this series consist of biennial reviews; organic chemistry is covered in ten volumes. Series Two covers mainly material published in 1972 and 1973. Each volume consists of a group of contributed chapters. This volume thus covers the major heterocyclic families in ten chapters, which is new to the second series: "The Heterocyclic Chemistry of Phosphorus, Arsenic, Antimony, and Bismuth".

The chapters themselves generally contain separate sections on structure, properties, synthesis, reactions, and functional group properties. Within these, the material is reviewed in an organized, concise manner. There are lots of structures and equations, but no tables. The bibliographies are extensive; one chapter alone has nearly 500 references. There is a good subject index, but an author index has been omitted, presumably because it would have to be uneconomically large.

The book is well produced and quite reasonably priced (about \$24) for a book of this type.

Phytochemical Methods. By J. B. HARBORNE (University of Reading). Wiley/Halsted, New York, N.Y. 1974. x + 279 pp. \$15.50.

This is a book on qualitative identification of plant constituents,

primarily intended for students in plant sciences, but also suggested for use by those in biochemistry, pharmacognosy, food science, and the organic chemistry of natural products. It is a reference book in that it is devoid of pedagogic paraphernalia. It contains an introductory chapter on general methods, after which the various classes of plant constituents are taken up in six broad chapters. The methods described rely heavily on paper and thin-layer chromatography in conjunction with spot tests, ultraviolet spectroscopy, electrophoretic mobility, etc. Specific procedures, including extraction techniques, are described. The chemistry is sound, and the merciful provision of a glossary enables the ordinary chemist to make his way through the omnipresent acronyms. It looks like a useful book, especially to those interested in biochemical systematics.

Residue Reviews. Volume 57. Edited by F. A. GUNTHER and J. D. GUNTHER. Springer-Verlag, New York, N.Y. 1975. vi + 152 pp. \$16.80.

This volume of the series, which is subtitled "Residues of Pesticides and Other Contaminants in the Total Environment", contains three chapters: Interactions between Clay Minerals and Bipyridylum Herbicides; Pesticide Residues in the Great Lakes Region of Canada; Secondary Effects of Pesticides on Aquatic Ecosystems. The first is essentially chemical, whereas the other two are rather more agricultural or biological in perspective.

Synthetic Methods of Organic Chemistry. Volume 30. Edited by W. THEILHEIMER. S. Karger AG, Basel. 1976; distributed in U.S.A. by Albert J. Phiebig, Inc., P.O. Box 352, White Plains, N.Y. xvi + 780 pp. \$212.25.

This volume completes the sixth series, and contains a cumulative index for Volumes 26 to 30. It continues the tradition of providing, in highly systematic form, abstracts of new methods of organic synthesis and improvements on old ones. It thus serves as an invaluable tool for searching the literature, and as an alerting device. Retrieval of specific information is possible either through its magnificently detailed index, or by use of the formal classification of reaction types that frees the searcher from having to know trivial names of reactions.

Thinner but nevertheless sturdy paper has been used to keep the increased content physically manageable. Financial manageability may seem to be a substantial problem, but one should consider that one is buying a highly concentrated information source, the use of which should soon save its cost in time saved in any active laboratory. A library serving the needs of organic chemists cannot forego it.

Metal Ions in Biological Systems. Volume 5. Edited by H. SIGEL (University of Basel, Switzerland). Marcel Dekker, Inc., New York, N.Y. 1976. xiii + 401 pp. \$39.50.

This fifth volume in the series intended to focus attention on the "connection between the chemistry of metal ions and their role for life" is subtitled "Reactivity of Coordination Compounds". To those who are interested in the various aspects of metal ion facilitated reactions which are covered, this book will provide an in-depth understanding of current research without experimental details. However, this volume is probably not the place to begin for introduction to the exploding area of bioinorganic chemistry.

The book begins with a discussion of Schiff bases and their reactions with and without metal ions. In this chapter Leussing leans heavily upon equilibria and kinetic data in model systems to substantiate the relevance to the more complicated biological processes. In Chapter Two, Cooperman presents a lucid mechanistic discussion of the role of divalent metal ions in phosphoryl and nucleotidyl transfer. The metal ion catalyzed nucleophilic attack on model phosphoryl compounds is thoroughly explored, and he concludes with a short critique of studies on two enzymes. Hay follows with a chapter on the metal ion catalyzed decarboxylations of predominately β -oxo acids of biological interest. Hay and Morris then combine to explore the metal ion promoted hydrolysis of amino acid esters and peptides. These two

* Unsigned book reviews are by the Book Review Editor.

chapters contain extensive mechanistic discussions of model systems backed by excellent diagrams and a wealth of data. In the chapter on new enzyme models, Hatano and Nozawa attempt to answer the question of whether a macromolecule is required in order to have enzyme-like properties. After discussing polyelectrolyte and polymer effects on metal complexes, they conclude that too little is known about complex polymeric compounds to answer their initial question, a conclusion convincing to the reviewer. Spence's discussion of molybdenum coordination compounds as biological models is enlightening, and one concludes that this metal must somehow be directly involved in the electron-transfer processes of several enzymes. The final chapter, by Zuberbuhler, deals predominately with the reactions of simple copper(I) complexes and dioxygen.

The editor has done a good job in forging a consistent level of presentation throughout the book. All the chapters should be readable by those experienced in reaction mechanisms and basic coordination chemistry. Most chapters contain a table of abbreviations and symbols and each has an excellent bibliography and an addendum which summarizes significant new developments (often into 1975) which occurred after the Chapter was written. The book contains an author and subject index.

Lauren R. Wilson, *Ohio Wesleyan University*

Diffusion and Defect Data. Volume 8. No. 1-4. Edited by F. H. WÖHLBIER. Trans Tech Publications, Bay Village, Ohio. 1974. iv + 353 pp. \$54.00.

This series is a collection of abstracts and references covering solid-state diffusion and related areas. Liquid-state references are included only if the liquids solidify at normal temperature and pressure. The coverage of the literature is nearly complete for inorganic solids.

Volume 8 of "Diffusion and Defect Data" is an expanded version of the series which was formerly entitled "Diffusion Data". It is subdivided into three main sections. The first data section contains summaries of 307 more important references for which data are well represented in figures and tables using unified notations. The second additional reference section is further subdivided into various subjects, and it lists titles, authors, and the journals in which they appear. The last section is a materials-defect-properties index which lists reference numbers in alphabetic order of elements or compounds. Brief abstracts similar to the ones appearing in the original references are presented here for the papers that are not summarized in the first section. In addition there are a short book review section and a subject index that lists reference numbers under broad subjects.

With increasing number of publications dealing with solid-state properties, this collection of data and literature survey in the area of diffusion and defect properties is a useful reference to scientists and engineers working in the fields involving solid-state chemistry and physics.

Myong-Ku Ahn, *Indiana State University*

Molecular Biology of the Gene. Third Edition. By JAMES D. WATSON (Harvard University and Cold Spring Harbor Laboratory). W. A. Benjamin, Inc., Menlo Park, Calif. 1976. xxiv + 739 pp. \$15.95.

It becomes obvious at first reading that the third edition of Watson's "Molecular Biology of the Gene" is another important contribution by the author. The first two editions were widely praised for being very clearly written, very up to date, and, most important, very stimulating. If anything, the third edition is even better. As before, Watson begins by introducing pertinent aspects of basic biochemistry, cell biology, and classical genetics. This is then followed by very thorough presentations of DNA structure, replication, and transcription, the mechanism and control of protein biosynthesis, and viral replication. Although this material is basically identical with that of the first two editions, additions and revisions have been introduced whenever necessary. This updating has been done without disturbing the clarity and unity of the presentation. Following these chapters, Watson has also now added or extensively revised over 200 pages of material, summarizing the most recent advances in molecular and cell biology (although, as Watson notes, the distinction between the disciplines is rapidly fading). Topics included here are the characteristics of eukaryotic cells, the molecular and cell biology of development, cell culture and the control of cell growth, immunology, and eukaryotic tumor viruses. This new material is extraordinarily up to date, yet is presented without either gross oversimplifications or dogmatic assertions.

The first edition of "Molecular Biology of the Gene" was written as a textbook, and for the purpose of learning, either in the classroom or by individual effort, it was superlative. This edition should prove just as valuable. Few textbooks are both as well-written and as comprehensive as it is. It will undoubtedly be universally used for the teaching of molecular and cell biology and should also see wide service as a supplement to more general biochemistry textbooks.

In addition to being an outstanding textbook, this third edition should also prove to be an excellent reference for the active researcher. With the addition of the new material, "Molecular Biology of the Gene" presents a broad range of topics. These are gracefully integrated to give a balanced overview of molecular biology, and it is startling how current this overview is. Although in his effort to be up to date, Watson occasionally describes as established fact observations and theories that are still in a state of flux, this is not a major flaw, for the emphasis (especially of the new material) is on questions rather than simplistic answers. The discoveries of molecular biology to date are described with elegance, but they are presented in order to show what might be done next. This orientation toward the future should prove very stimulating to the active researcher. The third edition can be recommended for this reason alone, not withstanding its outstanding value as a textbook. It is especially recommended to researchers in other specialties who wish to learn how their disciplines touch on molecular and cell biology.

James M. Bailey, *Southern Illinois University at Carbondale*

Initial Rate Kinetics. By H. J. FROMM (Iowa State University). Springer-Verlag, New York—Heidelberg—Berlin. 1975. x + 321 pp. \$33.60.

Professor Fromm has filled a need for a book on initial rate kinetics that can be readily comprehended by the "fledgling" kineticist. The text deals with kinetic nomenclature, derivation of kinetic equations, plotting of kinetic data, use of competitive substrate analogs and alternate substrates for examining kinetic mechanisms, inhibition by products, substrates and alternate substrates, isotope exchange, the mechanism of isomerization and the Φ and Haldane relationships, the effect of temperature and pH on enzyme activity, and cooperativity and allosteric mechanisms.

A major strength of the book is that it is relatively self-contained. In addition to a concise development of the kinetic equations which describe a particular topic, the text also describes the experimental protocol necessary for setting up and carrying out initial rate and isotope exchange experiments. In many cases, specific examples from the literature are critically discussed in order to clarify both the potential and the limitations of the various kinetic techniques. Each of the chapters is followed by a substantial list of pertinent references to which the reader can refer for further examples of the application of the kinetic methods.

The book is slightly limited in two respects. A discussion of the use of isotopically labeled substrates for examining rate-limiting steps in enzymic catalysis was omitted. This technique has been shown to be a powerful tool for investigating the catalytic mechanisms of many enzymes, and a discussion of this method would have followed logically from the chapter on the use of substrate analogs and alternate substrates as probes of mechanism. The computer program given in the appendix for deriving kinetic equations is interesting but will be of value to only the most dedicated kineticists. The kinetic algorithms very recently developed by W. W. Cleland for deriving complex kinetic equations by hand rather than by machine would have been most appropriate but, unfortunately, these could not have been included in this book.

Nevertheless, Professor Fromm's book is a valuable beginning point for anyone with a serious interest in applying initial rate kinetics to enzyme mechanism problems.

Donald J. Creighton, *University of Maryland, Baltimore County*

Principles of Enzyme Kinetics. By A. CORNISH-BOWDEN (University of Birmingham). Butterworth Publishers, London. 1976. 206 pp. £12.00.

Cornish-Bowden's book sets out to provide a postgraduate level coverage of enzyme kinetics with its stated purpose to lie between the inadequate, and often naive, coverages of elementary texts and the unmanageable (to a beginning researcher) compendia of the subject.

After a short resumé of chemical kinetics, the essentials of steady-state enzyme kinetics are presented. The problems in selecting

an appropriate linearized form of the Michaelis–Menten equation are alluded to at this stage, but are discussed fully later in a satisfying chapter on the statistical aspects of the estimation of rate constants. There is also a useful section explaining derivation procedures for steady-state rate equations, especially the King–Altman method. A welcome and adequate chapter on enzyme control and cooperativity has been included, but the section on fast reactions is so short, relative to the current and potential import of such studies, as to be almost token.

Overall the book is pleasant to read and contains a good presentation of the concepts of enzyme kinetics. It emphasizes the power and, more often, the pitfalls of enzyme kinetics, perhaps somewhat at the expense of the enzymes themselves for there are few examples of specific applications of the concepts—rather a serious shortcoming for a book on an experimental science. The volume is more likely to find a niche on an optional reading list than as a course text.

K. T. Douglas, *Duquesne University*

Molecular Rotation Spectra. H. W. KROTO (University of Sussex). John Wiley & Sons, Inc., New York, N.Y. 1975. xi + 311 pp. \$28.50.

I doubt that there will be any middle-ground readers or reviewers of this book. I suspect that either one likes it or one does not, mainly because it is somewhat different in both its presentation and attitudes than previous books in the field. I should begin by stating that I both like it and am impressed by the thought which has gone into its very precise and concise presentation. The standard of English and the clarity of the discussion is far in advance of many texts presently being published, and this significantly aids the readers—particularly the beginning graduate student—in digesting what is really a large amount of material.

The first four chapters are concerned with developing basic matrix mechanics, quantum mechanics, and theory of the interaction of radiation with a rotating molecule (roughly one-third of the book). The rest of the volume is devoted to the discussion of most of the phenomena and interactions associated with molecular rotations in the ground electronic state, and the discussions of typical interactions are fully illustrated by examples both from Dr. Kroto's own work and from the best cases in the literature. The examples are always pertinent, and Dr. Kroto also presents adequate extensions of the theoretical methods to enable the student to master the essentials of the observed phenomena. Finally, there is also a brief discussion of experimental techniques and instrumentation together with a useful set of appendices and annotated references to the literature.

I believe that Dr. Kroto has managed to do exactly what he, in his preface, avowed to be his aim, and I, for one, will gladly incorporate many of the methods and examples in this book into my own graduate lectures on molecular spectroscopy.

Thomas M. Dunn, *University of Michigan*

Physics of Quantum Electronics. Volume 4. Laser Photochemistry, Tunable Lasers, and Other Topics. Edited by STEPHEN F. JACOBS, MURRAY SARGENT III, MARLAN O. SCULLY (University of Arizona), and CHARLES T. WALKER (Arizona State University). Addison-Wesley Publishers, Reading, Mass. 1976. xi + 470 pp. \$23.50.

This volume contains a collection of papers concerned with recent developments in laser isotope separation (LIS) and quantum electronics. The papers are based on lectures presented at the Quantum Electronics Summer School held at Santa Fe, New Mexico, in summer 1975.

The first section of the book contains two brief papers which discuss the need for isotope separation and review the ERDA LIS program. A third paper discusses, using HCl and bromine systems as examples, LIS through selective photochemical processes. The following section incorporates a very comprehensive, and well-referenced, review and discussion of current experimental and theoretical studies of LIS. Additional papers discuss the application of Raman and infrared spectroscopy and symmetry principles to molecular spectroscopy. The third section is devoted to tunable laser sources, with emphasis on the generation of infrared radiation. The first paper in this section surveys tunable infrared laser sources while following papers concentrate on recent theoretical and experimental developments concerning spin-flip lasers. Two relatively short final sections include papers on a variety of topics, namely light scattering from critical fluids and dense optical

systems, the use of density matrices in quantum electronics, QED and proposed alternatives, and superradiance.

The majority of papers contain sufficient introduction and are of sufficient clarity that neither previous specialized background in the area under discussion, nor the undertaking of an undue amount of further reading, is required in order to achieve a good understanding of the material presented. The papers incorporated in this volume provide an excellent review and discussion of the different areas of photochemistry, atomic and molecular spectroscopy, laser physics, etc., which are encompassed by studies concerning LIS. The interested graduate student or researcher will find this volume both a comprehensive and informative introduction to LIS and associated techniques, and a valuable reference work as it contains a detailed index and references to publications as recent as May 1975.

F. B. Dunning, *Rice University*

The Enzymes. Volume XI. Third Edition. Edited by P. D. BOYER, (University of California, Los Angeles). Academic Press, New York, N.Y. 1975. xiii + 617 pp. \$48.00.

The "Enzymes" series is established as a standard reference source for both students and active researchers. The ten volumes of the third edition published prior to the one considered in this review have been well received. Volume XI is the first of a three-volume series (Volumes XI–XIII) concerning oxidation–reduction enzymes and deals specifically with nicotinamide–nucleotide-linked dehydrogenases and the c-type and b-type cytochromes. This volume covers these subjects in eight chapters within 595 pages and contains both an author and subject index. The references are numerous but without titles and are given at the bottom of the page on which they are cited. The objectives of this volume are defined in the editor's preface and in this reviewer's opinion have been met by the chapter authors.

The first chapter discusses the kinetics of nicotinamide–nucleotide-linked dehydrogenases. The reader who is unfamiliar with the mechanistic and kinetic details of multisite enzymes will find this chapter clear in its presentation and very pertinent to kinetic discussions found throughout this book. Many of the enzymes utilized as examples are those discussed in the following chapters. Chapter two describes the evolutionary and structural features of dehydrogenases in general, and the alcohol, lactate, glutamate, and malate dehydrogenases are covered separately in Chapters 3 through 6. In all these chapters the authors have presented data and interpretations utilizing the formats of original publications as well as diagrammatic representations which are particularly useful in some areas such as the descriptions of nucleotide binding and catalytic domains for the enzymes. Consideration is given to enzyme structure, kinetics, mechanisms, and biological function for all the specific dehydrogenases listed above. After reading these chapters, I was left with the impression that I had a grasp of the "state-of-the-art" for these enzymes.

Chapter 7 deals with cytochrome c covering the subject from structure (evolutionary and functional aspects) to biological roles in eukaryotic and bacterial systems. While the chapter is quite long (153 pp), the chapter outline allows for an easy search for those sections of interest. As with the preceding chapters, the text is well represented by the selected data and diagrams. This feature also allows for a rapid scanning of the chapter to select possible topics of interest by the reader who may be less familiar with this topic. The last enzyme systems covered are the b-type cytochromes (Chapter 8). Here, however, even with the understanding that less is known about this subject than those others preceding it, some of the qualities cited above for the other chapters such as diagrammatic representation of mechanisms or biological roles (defined or speculated) are lacking. This chapter rather turns out to be a descriptive discussion dealing primarily with the physical and spectral properties for the several b-type cytochromes found in mammalian, bacterial, and plant sources. Very few (ca. 6%) of the references post-date 1972.

L. E. Flanders, *Searle Laboratories*

Ion-Exchange Chromatography (Benchmark Papers in Analytical Chemistry/1). Edited by HAROLD F. WALTON (University of Colorado). Dowden, Hutchinson, and Ross, Stroudsburg, Pa. 1976. 455 pp. \$30.00.

This volume consists of reprints of 48 papers on column chromatography and comments by the editor. The emphasis is on papers of historical significance, such as the first paper in a series by a given researcher. The historical framework is outlined in the eight-page introduction. Additional perspective on each paper is provided in

editor's comments which precede each of 13 groups of papers. Partial translations accompany five of the six papers in German or French. Additional editorial material includes a short selected bibliography on ion exchange, an index of authors cited in the papers, and a subject index.

The author has constructed a very attractive, coherent unit from diverse but carefully chosen articles. It is a bit painful to realize that at least 70% of the contents of this \$30 book is already present in even a modest science library, but the remaining 30%—perhaps half is new editorial material—greatly enhances the value of the whole. Of course, the content of these papers could have been rewritten as new text, but it is refreshing to read the originals with brief guidance from the editor. Clearly, this volume is a very good vehicle for gaining an informed perspective on the subject of column, ion-exchange chromatography.

Henry C. Griffin, *University of Michigan*

Nuclear Analytical Chemistry. IV. Analysis Based on the Interaction of Nuclear Radiation with Matter. By J. TÖLGYESSY and S. VARGA (Slovak Technical University). University Park Press, Baltimore, Md. 1975. 300 pp. \$24.50.

This volume is the fourth in a series of five monographs on nuclear analytical chemistry. The emphases of Volume 4 are alpha scattering, absorption and backscattering of beta rays and photons, radioisotope x-ray fluorescence, thermalization and absorption of neutrons, Mössbauer spectroscopy, and analysis based on ionization. Although Volume 1 is purported to treat the basic principles of nuclear physics and nuclear chemistry, including detection and recording of nuclear radiation, each chapter in the present volume includes a section which describes the pertinent interactions. Thus the volume is relatively self-contained with respect to these particular methods.

The monograph series is intended as a reference for practicing analytical chemists and students majoring in chemistry. There are severe limitations on the utility of Volume 4 for either type of reader. With very few exceptions, the many examples of applications are taken from papers published before 1968. The omission of newer techniques is a hazard for a reader who might peruse the volume for solutions to current analytical problems. A student is likely to need more detail than is contained in the introductory sections, which contain a sufficient number of factual errors or misleading generalizations to be of marginal value.

Henry C. Griffin, *University of Michigan*

Vibrational Spectra and Structure. Edited by JAMES R. DURIG (University of South Carolina). Elsevier Scientific Publishing Co., Amsterdam-Oxford-New York. 1975. xii + 287 pp. \$31.25.

This is the most recent volume in the series "Vibrational Spectra and Structure" and includes four chapters on related areas. The literature covered is through 1973-74, and very thorough subject and author indexes are included.

The contribution by L. Andrews concentrates on the complementary nature of infrared and Raman vibrational spectra of matrix isolated species. The majority of the systems discussed involves the products of the reactions of metal atoms with small molecules. However, some consideration and, of course, recent references, is given to other sample preparational techniques such as laser photolysis and the quenching of microwave discharge products, somewhat extending this chapter's usefulness. Emphasis is given to the difficulties experienced by using infrared spectroscopy alone in experimental interpretations; thus Raman spectroscopy is shown not only to be a valuable tool, but an absolutely necessary component in some cases.

The chapter on Plastic Crystals by A. Cabana contains detailed discussions on the infrared and Raman spectra of molecular crystals and their relation to crystal structures. The presentation in this chapter is very interesting and informative and should be particularly useful to one's becoming abreast of the recent developments in this area.

The chapter titled "Intermolecular Force Field Calculations" by I. W. Levin and R. A. R. Pearce provides one of the few documented presentations of the systematic procedures used in performing normal coordinate analyses, in addition to deriving the traditional relevant equations. They discuss the general formulation of the problem, give specific details on the force constant refinement procedures used in the more popular programs, and also give detailed numerical examples. In the latter part of the chapter, they point out the usefulness of these calculational techniques to moderate and large molecules.

The chapter by M. Moskovits and G. A. Ozin titled "Characterization of the Products of the Metal Atom-Molecule Co-condensation Reactions by Matrix Infrared and Raman Spectroscopy" overlaps that by L. Andrews to some extent, although a concerted effort is made to keep this to a minimum. The first part of the chapter deals with the experimental determination of the structure and stoichiometry of the co-condensation products. Of more general interest, the remainder of the chapter discusses intensity calculations, matrix effects, and ligand bonding. This reviewer found particularly interesting the concluding sections on thermodynamic considerations and the relation between matrix studies and chemisorption.

In summary then, this is a useful text for researchers in vibrational spectroscopy but may also have some appeal to those using vibrational techniques to investigate other properties of molecules. Its greatest appeal will probably be limited to those researchers with an interest in low-temperature-solid state vibrational spectroscopy.

William A. Guillory, *University of Utah*

An Introduction to Group Representation Theory. By R. KEOWN (University of Arkansas). Academic Press, New York, N.Y. 1975. xi + 331 pp. \$21.00.

The author intends this book as an introduction to group representation theory for seniors and first-year graduate students. The selected audience is wider than mathematicians, namely, students in physics and chemistry in those areas where significant applications of representation theory are made. Suggested prerequisites include one semester of linear algebra and one semester of general algebra which introduces concepts of group, ring, and field.

The book is divided into four chapters or units. Chapter 1, Groups and Modules, reviews basic algebraic facts required in group representation theory with emphasis on linear transformation of vector spaces and their invariants. In Chapter 2, The Representation Theory of Finite Groups, the basic concepts and definitions of representations are developed. The last section introduces group characters. Chapter 3, The Computation of Representations and Characters of Finite Groups, deals with the general properties of group representation characters, with particular emphasis on the group of Euclidean motions of three-dimensional Euclidean space. Irreducible representations are introduced and developed for certain point and space groups. The final chapter, The Representation Theory of Several Special Groups, is devoted to the symmetric group S_n of all permutations on a set of n objects and to the general linear group of all nonsingular transformations on an m -dimensional complex space.

The writing style is clear and the notation is reasonable and standard. There are 138 problems located at the end of each of the four chapters. Numerous citations are given to the 33 references listed at the book's end.

In the Preface the author states that "the book is intended more as a prerequisite to than as a competitor with most books on representation theory . . . books written by mathematicians are one or two semesters beyond this one; those written by chemists and physicists are three or four." Most physical scientists, especially chemists, will not agree. The style of notation, the method of proof without frequent reference to physical examples, and the overall level of the material will not appeal to chemists. However, for those who have studied one of the books by Cotton or by this reviewer or those by Schonland or Hammermesh, this book will serve as a useful resource to develop further their understanding of group representation theory. Thus, I recommend this book, not as a prerequisite, but as a supplement to group theory books written by chemists or physicists.

Lowell H. Hall, *Eastern Nazarene College*

Matrix Isolation—A Technique for the Study of Reactive Inorganic Species. By S. CRADOCK (University of Edinburgh) and A. J. HINCHLIFFE (Royal Navy). Cambridge University Press, Cambridge, England. 1975. vii + 144 pp. \$18.00.

This book presents a brief introduction to matrix isolation, including techniques, pitfalls, and some results. It is very readably written, and the content should be accessible to anyone from advanced undergraduate up. It is particularly good at pointing out sources of difficulty not obvious to the uninitiated, and should be required reading for anyone proposing to enter this field. The book's greatest drawback is its failure to include literature references, even in those sections where specific results are presented and discussed. The index is also rather perfunctory.

Robert C. Kerber, *State University of New York at Stony Brook*

Trace Element Analysis. By VLADO VALKOVIĆ (Rice University and Ruder Bošković Institute, Yugoslavia). Taylor and Francis, London, and Halsted Press, John Wiley & Sons, Inc., New York, N.Y. 1975. x + 229 pp. \$22.50.

This is a book of facts supported by more than 400 references. The depth and variety of knowledge presented here, which are necessary in our analytical world, are rarely found combined, outside of excelling workers in this field. The information, although cramped and extensive, does not leave the reader breathless, because of the astoundingly good didactic. Hardly anything has been overlooked. The first chapter, which deals with cosmogenesis, seemingly unrelated to the main problem, gives a comprehensive explanation of the formation and relative abundance of elements in nature. Researchers who use artificial mixtures for developing methods ignore the importance of the reality with which we deal daily, i.e., the environmental levels present in different materials, analyzed in Chapters 2 and 5. The important concept of trace elements initially mentioned in the preface is further expanded in Chapters 3 and 4. Chapter 4 presents facts about health, disease, nutrition, and vegetation, difficult to find summarized and combined in an analytical work of the present size. There is no unnecessary detail. Sample preparation, analysis (activation, x-ray emission spectroscopy, optical methods, and mass spectrometry) and data handling are exposed with proper emphasis to relevant detail, principles, and application to the real world. The book, an example of what an excellent editor can do to save its users time and the libraries space, is illustrated with countless tables and graphs. In summary, it is a very complete and useful guide for true analysts and researchers in a variety of scientific fields.

Evaldo L. Kothny, *California Department of Health, Berkeley*

An Introduction to Conservation of Orbital Symmetry. A Programmed Text. By A. J. BELLAMY (University of Edinburgh). Longman Group Ltd., London. 1974. x + 77 pp. £ 1.50.

If you want to learn quickly how to apply orbital symmetry techniques to electrocyclic, cycloaddition, or sigmatropic migration reactions, this may be the book for you. The bulk of each of the five chapters consists of questions and answers set out in the two-column format that is the hallmark of programmed texts. Chapter 1 is a brief (10 pp) treatment of atomic and molecular orbitals. At the conclusion of this chapter, the reader has a fair grasp of the relation between MO energies and AO phases and is capable of obtaining the AO phases in MO's of linear π systems. Chapters 2, 3, and 4 treat the above-mentioned reaction types using either the orbital correlation diagram techniques, the frontier orbital method, or both. In each case, the problem is broken down into its constituent parts (obtaining MO's, recognizing symmetry elements, classifying MO symmetries, deciding electronic configurations, constructing the correlation diagram, reaching a final conclusion) in a very clear manner. In each chapter, detailed treatment of a prototype system is followed by extension of the method to related problems. Literature references are included. The final chapter is a brief (6 pp) excursion into state correlation diagrams. The programmed approach works very nicely for acquiring the *working techniques* of orbital symmetry methods. Even though this book makes no pretense of providing an understanding of the theoretical basis for these techniques, those who are willing to defer such an understanding should welcome this text as an aid toward achieving a working capability with orbital symmetry techniques.

John P. Lowe, *The Pennsylvania State University*

Peptides 1974. Edited by Y. WOLMAN (Hebrew University of Jerusalem). Keter Publishing House Jerusalem, Ltd., Jerusalem, and John Wiley & Sons, Inc., New York, N.Y. 1975. xx + 434 pp. \$32.50.

The book records the proceedings of the 13th European Peptide Symposium held at Kiryat Anavim, Israel, in April and May of 1974. The topics discussed in the Symposium included novel approaches to synthetic peptide chemistry, studies of classical and nonclassical methods of peptide synthesis, evaluation and analytical control of peptide synthesis, separation and purification techniques for amino acids and peptides, interactions between peptides and macromolecules, and the interactions of light with amino acids, peptides, and their derivatives.

The primary emphasis of the papers presented is on the synthetic chemistry aspects of amino acids and peptides, with lesser discussion of the possible secondary and tertiary structural features of these molecules. The ever increasing store of knowledge of synthetic reac-

tions is beginning to make it possible to synthesize peptides by a number of different routes. As a result, one paper raises the point that the selection of the most efficient synthetic route may be best done by computer. A number of papers were concerned with peptide synthesis in aqueous or polar solvents as a method of circumventing limitations encountered in the traditional synthetic schemes using nonpolar solvents. The potential of semisynthesis is still being realized and several papers discussed its application to the synthesis of modified polypeptides and proteins. Recent discoveries of peptide hormones and the involvement of peptides in brain functions ensure that researchers involved in peptide synthesis will face continuing challenges.

C. Robert Matthews, *The Pennsylvania State University*

Biosynthesis. Volume 4 (A Specialist Periodical Report). Senior Reporter and Editor: J. D. BU'LOCK. The Chemical Society, London. 1976. ix + 274 pp. £16.00 (\$44.00).

"Biosynthesis", Volume 4, upholds the high standards which have been established by previous volumes in this series. The latest report contains eight chapters. Seven of these chapters are progress reports (for 1974) of fields reviewed in earlier volumes while the remaining chapter is devoted to a new topic. The former chapters are entitled "Biosynthesis of Polyketides" (T. Money), "C₅-C₂₅ Terpenoid Compounds" (J. R. Hanson), Triterpenoids, Steroids, and Carotenoids" (L. J. Mulheirn), "Phenolic Compounds Derived from Shikimate" (J. B. Harborne), "Biosynthesis of Alkaloids" (E. Leete), "Non-protein Amino-Acids, Cyanogenic Glycosides and Glucosinolates" (A. Kjaer, P. Olesen Larsen), and "N.M.R. with Stable Isotopes in Biosynthetic Studies" (M. Tanabe). The chapter which introduces a new topic, "Biosynthesis of Penicillins and Cephalosporins" (P. A. Fawcett, E. P. Abraham), is a timely and concise review of the state of knowledge in an area which still contains a number of intriguing puzzles despite much investigative effort.

The reporters are to be congratulated on a fine job in selecting and organizing information from a field whose scope is continuing to broaden. The Report is certainly essential reading and an invaluable reference for anyone who is actively engaged in research in biosynthesis or related areas. The only complaint which this reviewer wishes to register is that the continuing increase in the price of the volumes in this series will soon require that the reading be done in the library.

Ronald J. Parry, *Brandeis University*

Prostaglandins from *Plexaura homomalla*: Ecology, Utilization, and Conservation of a Major Medical Marine Resource. A Symposium. Edited by F. M. BAYER (University of Miami) and A. J. WEINHEIMER (University of Oklahoma). University of Miami Press, Coral Gables, Fla. 1974. xii + 165 pp. \$15.00.

The symposium papers presented in this volume of a series on "Studies in Tropical Oceanography" were first presented in May of 1972. The emphasis is biological with details of the sexual cycle, taxonomy, anatomy, and growth pattern of the octocoral, *Plexaura homomalla*, presented. Possible harvesting methods and mariculture are considered.

Of greater interest to chemists are brief historical perspectives on the prostaglandins and their unexpected discovery in the octocoral. A panel discussion on biochemistry and pharmacology presents a few additional details. A report of an intolerance syndrome affecting divers involved in large scale collection of *Plexaura homomalla* gives case histories, but no allergic responses to the prostaglandins could be demonstrated.

Niels H. Andersen, *University of Washington*

Perfumery Technology. By M. BILLOT and F. V. WELLS. Wiley/Halsted, New York, N.Y. 1975. xi + 353 pp. \$41.00.

The authors state that this book is intended as "a reference work for the professional perfumer, but one which will also prove useful as a text for the trainee". The work touches on most aspects of perfumery in sufficient detail to enable the reader to pursue those topics of personal interest. Extensive, often recent references (over 300 in all) are given after each chapter, and the material is arranged for easy reference.

The chemical compounds covered are arranged and discussed solely on the basis of their utility as fragrance ingredients, and no methods of production, chemical transformations, or structural formulas are provided. The hybrid nomenclature peculiar to perfumery is employed,

and although standard synonyms are generally given somewhere in the text, terms such as "methyl heptin carbonate" (methyl 2-octynoate) or "aldehyde C. 14" (γ -undecalactone) are used throughout.

Chemists with no background in perfumery should find this a useful introduction to the subject. Principal topics considered are the history of perfumery, natural and synthetic raw materials, classification of odors, creating a perfume, formulations of flower and fantasy perfumes and colognes, mechanisms of taste and smell, the many applications of perfumery, packaging and marketing, and perfumery as a career.

Keith T. Buck, *Frankincense Company, Inc.*

The Physical Basis for Heterogeneous Catalysis. Edited by E. DRAUGLIS and R. JAFFEE (Battelle Memorial Institute). Plenum Press, New York, N.Y. 1972. xxvi + 596 pp. \$45.00.

This volume presents the proceedings of a Colloquium held in Gstaad, Switzerland, in September 1974, concerned with applications of modern theoretical and experimental surface physics to problems in heterogeneous catalysis. A wide range of topics was covered at this meeting; research papers in this book are concerned with experiments on clean metal surfaces with adsorbates, the theory of chemisorption, effects of small particles and porous carriers, kinetics and transport, and general applications to catalysis. The papers by and large well fulfill the objective of exploring the interface between surface physics and catalysis, both in theory and experiment. In addition the texts of plenary lectures concerned with thermodynamics of adsorption (C. Wagner), specification of active centers of metal catalysts (G. C. Bond), and 50 years of progress in the study of the catalytic synthesis of ammonia (P. H. Emmett) are given. The lecture of Professor Emmett provides a particularly interesting overview of that fascinating subject.

I find the title of this book a little misleading in that it sounds a bit like a collection of general survey papers concerned with catalysis, of potential use to those not necessarily expert in the field. With the exception of the plenary lectures, this is not so. The contents will be of primary interest to those actively engaged in catalysis research, particularly in its physical aspects.

John B. Butt, *Northwestern University*

Characterization of Solid Surfaces. Edited by P. F. KANE and G. R. LARRABEE (Texas Instruments Inc.). Plenum Publishing Corp., New York, N.Y. 1974. xviii + 670 pp. \$32.50.

This book is a collection of 23 chapters, each of which is somewhat akin to a review article. Generally the book suffers by being two years out of date even before it was ever published (literature cited is 1972 or earlier). This problem is not the fault of the individual contributors nor the editors, but is simply an indication of the rapid developments in surface analysis. There are two major divisions: Physical Characterization, Chapters 1-7, and Chemical Characterization, Chapters 8-23. The depth and quality of the chapters vary considerably from excellent to poor. The chapters covered (with the authors in parentheses) include: (1) Light Microscopy (McCrone), (2) Multiple Beam Interferometry (Hall), (3) Stylus Techniques (Whitehouse), (4) Electron Microscopy (Laird), (5) Scanning Electron Microscopy (Johari and Samudra), (6) Field Ion Microscopy (Kane), (7) X-ray Diffraction Methods (Dobrott), (8) Electrochemical Techniques (MacArthur), (9) Emission Spectrometry (Seeley and Skogerboe), (10) Internal Reflection Spectroscopy (Harrick and Beckmann), (11) Radioisotope Techniques (Keenan and Larrabee), (12) X-ray Fluorescence Analysis (Gilfrich), (13) ESCA (Hercules and Hercules), (14) Resonance Methods (Haneman), (15) Mossbauer Spectroscopy (Hobson), (16) Rutherford Scattering (Mackintosh), (17) Accelerator Microbeam Techniques (Pierce), (18) Electron Probe Microanalysis (Hutchins), (19) X-ray Emission Fine Features (Baun), (20) Auger Electron Spectroscopy (Chang), (21) Mass Spectrometry (McCrea), (22) Impurity-Movement Problems in Analysis Methods Using Particle Bombardment (McCaughan and Kushner), and (23) Surface Composition by Analysis of Neutral and Ion Impact Radiation (White, Simms, and Tolk). Two observations can be made: there are a number of chapters covering methods which must be considered only marginally useful as surface tools, e.g., x-ray diffraction, electrochemical techniques, emission spectrometry, resonance techniques, and Mossbauer, while a number of important topics are not covered or only briefly covered, e.g., LEED, ellipsometry, classical BET experiments, SIMS (mentioned briefly in mass spectrometry section), ultraviolet photoelectron spectroscopy, and ion scattering spectrometry

(ISS). Some developments such as the Auger microprobe were developed after the book was printed. Another problem may be terminology since a very large number of the individual chapters really covered "Thin Film Analysis" rather than "Surface Analysis" (see Chapters 7, 9-12, 14, 16-19, and 21). A more descriptive title of this book might be "Characterization of Thin Solid Films". In fairness to the editors, they do comment on both of these objections. They loosely define a surface as whatever thickness the particular technique measures. Further they had intended to include chapters on LEED and ISS but had not managed to do so.

One strong point of the book is that a number of the chapters can serve as a very good introduction to a particular technique. Although it is quite important to a book of this nature, only a few of the authors are honest in their appraisal of their technique. In spite of this problem, even in the chapters on the more unconventional techniques, the authors manage to point out at least one important surface problem that can be easily or sometimes uniquely handled by their method. Often these solutions would never have occurred to many of us who use the more conventional surface techniques. This reason alone should suggest to surface scientists that this book might be worthwhile reading.

None of these chapters are really intended for those who are quite familiar with a particular technique. With this fact in mind, some of the most useful chapters include the ones on stylus techniques (3), ESCA (13), Rutherford Scattering (16), Electron Probe Analysis (18), Auger (20), and SCANIIR (23). Also Chapter 22, which deals with problems that occur in ion bombardment, is well done. Most of the other chapters are certainly adequate.

This book lacks the organization and evenness to be useful as a text book although some of the chapters are done far better than similar chapters in a standard instrumental analysis texts. Some professors, therefore, might find this book useful as a supplement to standard (not surface) instrumental texts. Because of the general lack of depth of the chapters, the book has some limitations as a reference book. Still surface chemists should find sufficient use to merit their buying this book.

James C. Carver, *Texas A&M University*

Donor-Acceptor Bond. By E. N. GUR'YANOVA, I. P. GOL'DSHEIN, and I. P. ROMM (Translated from Russian by R. KONDOR. Translation edited by D. SLUTZKIN). John Wiley & Sons, Inc., New York, N.Y. 1975. ix + 366 pp. \$42.50.

This book is an attempt to present the state of the theory of donor-acceptor bonds and the methods used to determine thermodynamic and molecular structure parameters of complexes. It also reviews the current literature of donor-acceptor complexes of halide compounds with aromatic hydrocarbons (as π donors). Classical coordination chemistry is specifically omitted in the discussion with attention focusing on nonaqueous, one-to-one Lewis acid-base systems.

There are five chapters dealing with (1) theoretical principles; (2) methods; (3) physicochemical properties; (4) complexes of halogens and groups II, III, IV, and V halides with aromatic hydrocarbons; (5) general characteristics of donor-acceptor interactions.

In Chapter One the principles of charge transfer and molecular orbital theory are summarized well. Particular emphasis is placed on correlations between heats of complex formation, dipole moments, $h\nu$ of charge transfer bands, and degree of charge transfer obtained using various computational schemes.

Chapter Two gives, in especially lucid detail, a host of spectral, calorimetric, and other methods of determining equilibrium constants. The "other" methods include cryoscopic, vapor pressure, GLC, mass spectroscopic, dielectrometric, and refractometric methods whose less than routine application make them no less suitable for studying many systems.

Chapter Three discusses UV and NMR spectral properties of complexes and tabulates thermodynamic adduct formation data for several hundred adducts, absorptivity data for many I_2 complexes, charge transfer data, bond lengths and angles, dipole moments, chemical shifts and coupling constants, force constants, and other IR information for numerous adducts.

The remaining chapters detail halide complex studies and more general characteristics of changes that occur in typical donor-acceptor bond formation, such as steric and substituent effects. There are hundreds of references, most of them in English language journals.

Although the Russian structure makes reading an effort in a few paragraphs, it is on the whole a well-written, informative document that should prove valuable to most chemists involved in the study of donor-acceptor complexes.

Michael Collins, *Viterbo College*

Cosmetics Science and Technology. Volume 3. Second Edition. Edited by M. S. BALSAM (Standard Aromatics, Inc.) and E. SAGARIN (City College, CUNY). John Wiley & Sons, Inc., New York, N.Y. 1974. ix + 787 pp. \$36.00.

This volume contains Chapters 34-46 of the series plus cumulative indexes of authors, subjects, and trade names. Many aspects of the cosmetics business, besides chemistry, are treated in considerable detail by the authors of the individual chapters who are experts in their respective fields. Chapter titles are: Status and Structure of the Cosmetics Industry, Historical Development of the Cosmetics Industry, Physiology of the Skin and its Appendages, The Physiology and Pharmacology of Sweating, Sensitivity Testing, Quality Control, Preservation of Cosmetics, Self-Regulation in the Cosmetic Industry—A View from a Scientific Vantage Point, Legal Considerations and Regulatory Procedures Governing Cosmetics, Color in Cosmetics, Emulsification, Processing of Alcoholic Fragrance Solutions, and Performance and Psychometric Evaluation of Cosmetics. The chapters appear to be high quality review articles. There will be much of interest in this volume to persons other than chemists as well as to chemists. One may even find, among the economic statistics, a harbinger of the chlorofluorocarbon ozone problem!

The majority of the references in many of the chapters are dated 1968 or before, so one suspects the volume was a long time in preparation. This is probably unavoidable with so many authors involved, but the datedness of some of the material is a concern. The chapters on Self-Regulation . . . and Legal Considerations and Regulatory Procedures . . . are exceptions and contain more up-to-date references. Few misprints were noted.

Overall, this book is a very worthwhile contribution and deserves to be in many technical libraries.

David W. Emerson, *The University of Michigan—Dearborn*

Advances in Organometallic Chemistry. Volume 14. Edited by F. G. A. STONE (University of Bristol) and R. WEST (University of Wisconsin). Academic Press, New York, N.Y. 1976. xi + 414 pp. \$38.50.

The 14th volume in this excellent series of monographs has been designated by editors Stone and West as a commemorative issue. The ten review articles, which have been solicited from distinguished organometallic chemists of varied geographical origins, reflect the breadth of the field and are comfortably balanced between transition metal and main group metal chemistry.

The first chapter is a referenced version of E. O. Fischer's Nobel lecture, in which he gives a subjective account of his pioneering work on carbene and carbyne complexes. This may well be the last short review of carbene complexes published, as the scope and importance of this research area clearly merit an entire book. Next follows a review by Ittel and Ibers entitled "Coordination of Unsaturated Molecules to Transition Metals", most of which is devoted to structural aspects of metal-olefin complexes. This is complemented by Otsuka's review on acetylene and allene complexes, which emphasizes reactions, mechanisms, and their implications in homogeneous catalysis.

Three articles on main group metal chemistry are featured. A chapter by the Reutov group surveys physical properties and molecular complexes of methyltin halides. A short and somewhat specialized account of recent developments in organoantimony chemistry is followed by an especially well-written review entitled "Pentaalkyls and Alkylidene Trialkyls of the Group V Elements". Author Schmidbaur contrasts the reactivity of various tetraalkylpnictogen halides toward lithium alkyls; depending on the heteroatom and conditions, ylide or pentaalkyl products may be formed. Properties and reactions of these species are described, and a perceptive comparison is made to recent studies on tantalum pentaalkyls and their decomposition to carbene complexes (tantalum ylides).

Hawthorne and Seyferth each present accounts of their work in metallocarboranes and alkylidynetricobalt nonacarbonyl complexes, respectively. The trivial but distinctive root name "Fred" is suggested for the latter compound class. A chapter by Lappert entitled "Free Radicals in Organometallic Chemistry" encompasses both stable paramagnetic species and reactive intermediates. A table of previously

published reviews in this general area is thoughtfully included. The most distinctive and timely review covers the synthesis, structure, and reactivity of high nuclearity metal carbonyl clusters (those containing five or more metal atoms). The inclusion of this article reflects remarkable editorial foresight, and it will be virtually required reading for all researchers in heterogeneous and homogeneous catalysis.

All reviews appear complete through 1974, with a sprinkling of 1975 references. Presumably because of the commemorative nature of this volume, the useful "literature guide" to reviews and new books has been omitted. Surprisingly, the absolute (but not per-page) price is lower than the previous volume in this series. Purchase of Volume 14 is recommended to all research libraries. However, individuals seeking a broad overview of contemporary organometallic chemistry should consider the special 100th volume of the *Journal of Organometallic Chemistry*. It contains 19 brief reviews of a similar subject distribution, and at \$6.00 is substantially cheaper.

J. A. Gladysz, *University of California, Los Angeles*

Analytical Chemistry of Germanium. By V. A. NAZARENKO (Odessa Laboratory, Institute of General and Inorganic Chemistry, Ukrainian Academy of Science). Halsted Press, John Wiley & Sons, Inc., New York, N.Y. 1974. xii + 306 pp. \$30.00.

This book is part of the extensive series "Analytical Chemistry of the Elements" prepared by the Vernadskii Institute of Geochemistry and Analytical Chemistry under the editorship of A. P. Vinogradov. The present volume was translated by N. Mandel. The first four chapters contain an excellent general discussion on the chemistry of germanium compounds, including separation and isolation techniques. Following this are five chapters which cover the entire range of analytical techniques from gravimetric to spectral methods. The last two chapters deal with the determination of germanium in natural and industrial materials and methods for determining impurities in this element and its compounds. The bibliography has 1619 references covering the literature through 1970. It is thoughtfully divided into two sections. The first 722 entries are from Soviet sources, many of which might be difficult for the western reader to obtain. The remainder of the references are from non-Soviet sources.

Each analytical method in this book contains a general discussion and a specific procedure which, in most cases, is complete enough so that the chemist can do the analysis without any further references. Both the discussions and the procedures are, however, well documented with references.

This book is very useful and should be helpful for those involved in germanium chemistry.

Jon Howdeshell, *Laramie Chemical Company*

The Chemistry of Cyano Complexes of the Transition Metals. By A. G. SHARPE (University Chemical Laboratory, Cambridge). Academic Press, London. 1976. 302 pp. \$26.25.

As the most recent contributor to "Organometallic Chemistry: A Series of Monographs", Dr. Sharpe provides an extremely comprehensive and well-organized treatment of transition metal cyano complexes. As pointed out in his preface, this work represents the first major review of cyano complexes in the last ten years.

Starting with a modest introduction to the general nature of the complexes and the cyanide ligand in particular, the book proceeds with a systematic survey of the transition metals and their cyanide complexes. Each oxidation state of a particular metal is treated separately and the order in which its cyanide complexes are presented, ranging from cyanide-only to mixed ligand species, is consistent. In addition to the syntheses and reactions of the complexes themselves, abundant crystallographic and spectroscopic data are included. This, coupled with nearly 1800 references, makes it an exceptional resource for anyone having particular interests in metal cyanide chemistry.

The author includes a wide range of reports of known complexes, but does not hesitate to point out questionable formulations, frequently citing contradictory reports. The addition of this perspective results in a balanced and stimulating review of a most important area of organometallic chemistry.

Bryce V. Johnson, *University of Louisville*

Radio and Microwave Spectroscopy. By DAVID J. E. INGRAM (University of London). Wiley/Halsted Press, New York, N.Y. 1976. 167 pp. \$12.95.

This is a short, largely qualitative introduction to gas-phase microwave spectroscopy, ESR and NMR of liquids and solids. It is di-

rected at undergraduates in physics or chemistry and will also serve as a readable introduction for upper-level students and researchers in other subjects such as biology. The author has succeeded admirably in creating a treatise likely to instruct and stimulate an undergraduate reader. The overview is enriched with the right doses of physical principles, historical and personal insights, instrumentation, applications across chemical disciplines, and timely topics (masers, lasers, radioastronomy, Overhauser effect). I suspect that this monograph will have an effect on some readers similar to that experienced by myself and other proselytes when, as undergraduates, we discovered books like Herzberg's "Atomic Spectra and Structure", Sawyer's "Experimental Spectroscopy", or Brode's "Chemical Spectroscopy".

Robert L. Kuczkowski, *University of Michigan*

Statistical Mechanics. By DONALD A. MCQUARRIE (Indiana University). Harper & Row Publishers, New York, N.Y. 1976. xiv + 641 pp. \$29.95.

The present book is an extension of the author's earlier, introductory book "Statistical Thermodynamics", which has been reviewed elsewhere in this journal [*J. Am. Chem. Soc.*, **97**, 247 (1975)]. Twelve of the fifteen chapters in that book make up the first 250 pages of the present volume, the three deleted chapters being "Two Simple Theories of Liquids", "Ideal Systems in Electric and Magnetic Fields", and "Polymers". The ten new chapters are entitled "Distribution Functions in Classical Monatomic Liquids", "Perturbation Theory of Liquids", "Solutions of Strong Electrolytes", "Kinetic Theory of Gases and Molecular Collisions", "Continuum Mechanics", "Kinetic Theory of Gases and the Boltzmann Equation", "Transport Process in Dilute Gases", "Theory of Brownian Motion", and "The Time-Correlation Function Formalism, I and II". As in the previous volume, the subject matter is clearly discussed, with extensive references to the literature, and there are a large number of very useful problems. There are also eight new Appendices, which are related to these more advanced topics.

This is really an excellent book and is eminently suitable for a one-year course in statistical mechanics. I suspect that it and its predecessor will become standard books for teaching this subject in universities, at least in this country. Both books will certainly be extremely useful to anyone interested in statistical mechanics, including those approaching the subject for the first time.

J. E. Mark, *University of Michigan*

Structure and Function of Plasma Proteins. Volume 1. Edited by A. C. ALLISON (Clinical Research Centre, Harrow, Middlesex). Plenum Publishing Co., Ltd., London. 1974. viii + 316 pp. \$24.50.

This book is the first of two volumes dealing with the biochemistry and clinical chemistry of the plasma proteins. The two-volume set is intended to serve as a convenient handbook on the plasma proteins, serving students of biochemistry and medicine, as well as hospital biochemists, physicians, and the research worker. Ten review articles are included in the first volume, with literature cited generally through 1972, although a few references are cited from 1973.

Chapter 1, by J. K. Lloyd and A. S. Fosbrooke, reviews the "Plasma Lipoproteins", and is oriented toward the clinical chemist and physician. The methodology and basic chemical composition of the lipoproteins are briefly reviewed, followed by a detailed section on clinical disorders; 85 references are cited. Chapter 2, by U. Muller-Eberhard and H. H. Liem, on "Hemopexin, the Heme-Binding Serum β -Glycoprotein", presents a brief review of the physicochemical properties of hemopexin, its synthesis and catabolism, interactions with other proteins, and its relation to disease; 109 references are cited. Chapter 3 by E. Giblett is entitled "Haptoglobin". Following a description of haptoglobin structure and the nature of the haptoglobin-hemoglobin complex, the author discusses haptoglobin from the physiological-

genetic point of view; 87 references are cited. Chapter 4 is a long (60 pp) and excellent review of "Acute-Phase Reactants: Their Synthesis, Turnover and Biological Significance" by A. Koj. The author discusses ten of the acute-phase proteins, including their characterization, methods of study, synthesis, turnover, and their relation to pathological states. The article concludes with a discussion of the chemical significance and possible biological function of the acute-phase reactants; 407 references are cited. Chapter 5 by E. Regoeczi discusses "Fibrinogen". This article is ideal for the clinical chemist, detailing methods of in vivo labeling of fibrinogen and analytical methods for measuring the turnover of fibrinogen. A discussion of the reliability of turnover measurements is also given; 77 references are cited. Chapter 6 by D. E. G. Austen and C. R. Rizza on "The Biochemistry of Blood Clotting Factors" discusses the physicochemical properties of each of the major clotting factors, as well as the interaction between various factors and pathological states resulting from deficiencies of specific clotting factors; 78 references are cited. Chapter 7 by C. A. Alper reviews "Complement". The biochemistry, reactions, biological activity, methods of assay, and disease-related abnormalities of the complement system are discussed; 53 references are cited. Chapter 8 by G. T. Stevenson is an excellent review of the "Immunoglobulins", in which the author discusses general immunoglobulin structure, the varieties of human immunoglobulins, antibody activity, control of variation, and abnormal immunoglobulins; 191 references are cited. Chapter 9 by G. Franglen discusses "Plasma Albumin: Aspects of its Chemical Behavior and Structure"; 118 references are cited. Chapter 10 by J. S. Garrow concludes the volume with a review of "Nutrition and Plasma Proteins". The author discusses the nutritional interrelationship of plasma and tissue protein stores, plasma protein levels as indicators of nutritional states, and the effects of nutrition on plasma protein turnover rates; 85 references are cited.

This book, which is well written and organized, should prove to be a very useful source book on the plasma proteins for both the biochemist and the clinical chemist.

Donald J. Nelson, *Clark University*

Chemotherapy, Cancer Chemotherapy II. Volume 8. Edited by K. HELLMANN and T. A. CONNORS (Westminster Hospital and Chester Beatty Research Institute). Plenum Press, New York and London. 1976. xviii + 618 pp. \$35.00.

This book is a collection of 95 distinct research reports on the progress in Cancer Chemotherapy, discussed at the Ninth Meeting of the International Society of Chemotherapy, held in London, July 1975.

The articles presented in this book are chosen from 1000 papers read at the Conference, in an effort to touch on the most significant and recent aspects of chemotherapy studies carried out. The studies encompass some of the following effects: anticancer agents prolonging life or arresting the growth of cancerous cells; antitumor activities of various antibiotics, such as Adriamycin, Carminomycin, Variamycin, Cleomycin, Bleomycin, and Mitomycin-C; radiotherapy combined with chemotherapy; synergic effects of a combination of drugs; RNA and DNA replication and gene regulators effected by chemotherapeutic agents. These studies were carried out in vitro and in vivo. Some of the carcinomas that were tested against are: lung and bronchial carcinoma, breast cancer, head and neck squamous cell carcinoma, chronic gastritis, gastric and colorectal carcinoma, carcinoma of the prostate, adenocarcinoma of the ovary, carcinoma of the uterine cervix, central nervous system tumors glioblastoma, leukemia, and Hodgkin's disease.

The reports are written in a clear and technical manner supplemented with pertinent illustrations. Pharmacologists, immunotherapists, and clinicians actively involved in chemotherapy would find this book informative on some of the most recent developments in the fight against cancer.

Antowan D. Tadros, *Parke, Davis & Company*