

Book Reviews

Tunable Lasers and Applications. Edited by A. MOORADIAN (MIT, Lincoln Laboratory) and T. JAEGER and P. STOKSETH (Norwegian Defence Research Establishment). Springer-Verlag, Berlin-Heidelberg, 1976. 404 pp. \$25.70.

This volume contains 35 papers presented at the Tunable Lasers and Applications Conference held in Loen, Norway, in June 1976. The conference dealt with the technology of tunable lasers from the vacuum ultraviolet to the far-infrared and their application in the areas of photochemistry, chemical kinetics, isotope separation, atmospheric photochemistry and environmental studies, photobiology, and spectroscopy.

A number of the papers are reviews of the state of the art in certain areas of either tunable laser development or the applications of these lasers.

Each article is well written and includes introductory material as well as a detailed discussion of the most recent developments. A large number of references accompany each article. For the scientist or engineer working in any of these areas, this volume will provide a comprehensive compendium of the current state of theory and experiment in the rapidly expanding and exciting fields of tunable lasers and their applications.

R. Ken Forcé, *University of Rhode Island*

Immunodeficiency in Man and Animals. Volume XI. Birth Defects (Original Article Series). Edited by DANIEL BERGSMAN, ROBERT A. GOOD, JOANNE FINSTAD, and NATALIE W. PAUL. Sinauer Associates, Inc., Sunderland, Mass. 1975. 599 pp. \$40.00.

This volume is an outgrowth of an informal meeting among members of the World Health Organization Expert Committee on Immunodeficiency held in 1969 in Geneva. Because of the rapid advances, a second international workshop was organized by Fred Rosen, Hugh Fudenberg, Robert Good, and Joanne Finstad and was held in St. Petersburg in February 1973. The papers and discussion presented at the workshop showed the marked progress of our understanding of the immunologic system and of the genetic and acquired abnormalities underlying immunodeficiencies and of the new definitions made and old ones reestablished from the new diagnostic methods developed in the intervening four years. The program participants were comprised of an international Who's Who of experts in immunodeficiency and interrelated syndromes.

After a preface by Henry Kunkel and the opening review of the status of the field by Bob Good ("Immunodeficiencies of Man and the New Immunobiology"), the several day workshop included many chapters in each of six areas namely: (I) Cellular Biology; (II) Molecular Biology of Immunodeficiencies; (III) Immunodeficiency Disease; (IV) Therapy, including new therapeutic methods; (V) *In Vitro* Studies; and (VI) an especially interesting area on animal models. The volume concludes with a summary by Good which was especially relevant to the study of the field, namely, "Primary Immunodeficiencies: Where Have We Been—Where Are We Going?"

It is unfortunate that it has taken so long for this volume to appear. There are many new diseases and new "markers" of B and T, and heterogeneous third population cells have been defined. Nonetheless, this will make an excellent book for those individuals who wish a broad view of the field. Especially worthwhile reading can be found in the discussions following each section.

H. Hugh Fudenberg, *Medical University of South Carolina*

Stereoselective Reductions (Benchmark Papers in Organic Chemistry, Volume 6). By M. P. DOYLE (Hope College) and C. T. WEST (Amoco Chemicals Corp.). Wiley/Halsted Press, New York, N.Y. xvi + 419 pp. \$30.00.

This volume is the latest in the Benchmark series in organic chemistry. It contains copies of important articles dealing with the stereoselective reduction of carbon-carbon double and triple bonds and carbon-oxygen double bonds. These papers are accompanied by

editorial comments which show the correlations between these articles, give other key references, and, in general, put the topic into perspective for the reader. Because of space considerations, asymmetric induction was not specifically considered.

The different types of reduction techniques such as heterogeneous and homogeneous catalytic hydrogenation, and chemical, electrolytic, and enzymatic reductions are all covered, with those papers concerned with a specific technique and substrate grouped together and preceded by an editorial synopsis. The coverage in this volume is quite thorough, with the papers which are included ranging from the classic Horiuti and Polanyi description of the mechanism of the catalytic hydrogenation of double bonds which was published in 1934 to three articles published in 1975 dealing with hydride reducing agents. While one might question the selection of one specific paper rather than another in some areas, the papers presented are all representative of the topic under consideration and, in most cases, are without question major contributions to the field. The editors have done an excellent job in their coverage, selection, and organization of the topic. The editorial comments are concise and to the point. On going through the text the reader is certainly made aware of the important developments which have been made in stereoselective reduction techniques as well as the impact which certain key concepts have had on these developments.

In the Series Editor's Foreword the statement is made that "The purpose of the Benchmark series is to bring together . . . those landmark papers which have advanced our knowledge in the major areas of contemporary interest and significance to its present state of development." This volume certainly meets that goal.

Robert L. Augustine, *Seton Hall University*

Topics in Current Chemistry. Volume 67. Preparative Organic Chemistry. Managing Editor: F. L. BOSCHKE. Springer-Verlag, New York, N.Y. 1976. 136 pp. \$21.40.

This volume provides two extremely short reviews and one rather comprehensive one. These are "Old and New in the Field of Directed Aldol Condensations" by G. Wittig, "Dihetero-tricyclodecanes" by C. Ganter, and "Olefin Insertion in Transition Metal Catalysis", by G. Henrici-Olivé and S. Olivé. The review by C. Ganter encompasses 92 of the 127 pages of text. As a result, the other two reviews are extremely limited, both in scope and in detailed coverage.

The chapter on directed aldol condensations is 14 pages long and it contains 15 references. While extremely short, the review covers an interesting subject, which will be of interest to those involved in organic synthesis.

The article by C. Ganter is very comprehensive. For those involved in the area of diheterotricyclodecanes, this review will probably be an extremely useful source of information and references. However, for most organic chemists, it will probably hold very little in the way of interesting information.

The last contribution on olefin insertion in transition metal catalysis probably represents a review which is potentially of interest to the widest audience. However, its extremely short nature (20 pages) does limit its attractiveness. The 76 references included do provide ready access to original literature in the area.

Overall, this is not a volume which many chemists will wish to have on their shelves. It will, however, be a useful set of reviews to have available in those libraries which service large numbers of organic chemists.

P. G. Gassman, *University of Minnesota*

Gas Kinetics and Energy Transfer. Volume 2. Edited by P. G. ASHMORE (University of Manchester) and R. J. DONOVAN (University of Edinburgh). The Chemical Society, London. 1977. xii + 392 pp. \$48.00.

This volume is the second in the series of Specialist Periodical Reports on gas kinetics. The title reflects the editors' belief that the understanding of intramolecular and intermolecular energy transfer is

"of fundamental importance to our interpretation of reaction dynamics".

The book is comprised of eight review articles of high quality with copious references to original papers. In most cases the literature is covered up to May 1976. The various chapters are: Reactive and Inelastic Collisions involving Molecules in Selected Vibrational States (I. W. M. Smith); The Dynamics of Photodissociation (J. P. Simons); Reactions of Photochemically Generated Hot Hydrogen Atoms (G. A. Oldershaw); Reactions of Electronically Excited Noble Gas Atoms (M. F. Golde); Unimolecular Reactions and Energy Transfer of Highly Excited Molecules (M. Quack and J. Troe); Reactions of Halogen Atoms, Free Radicals, and Excited States (M. A. A. Clyne and A. H. Curran); Rate Constants for Reactions in Gas-Phase Hydrocarbon Oxidation (R. W. Walker); and Self-Heating, Chemical Kinetics, and Spontaneously Unstable Systems (P. Gray and M. E. Sherrington).

Useful features of the volume include the complete author index and the many tabulations of kinetic rate constants. A very complete table of contents makes up for the lack of a subject index. This book will appeal to anyone interested in gas-phase kinetics and dynamics and should be very useful to scientists working in this area.

Eric A. Gislason, *University of Illinois at Chicago Circle*

New Synthetic Methods. Volume 3. Verlag Chemie, Weinheim. 1975. viii + 243 pp. \$28.85.

This book is comprised of 13 brief reviews which are based upon lectures delivered at a symposium on "Metal Atoms in Chemical Synthesis" at Darmstadt, Germany, in May 1974. Together, these articles afford a concise and well-balanced state-of-the-art overview of metal atom chemistry in 1974. Chapters by Skell, Reichelt, Timms, von Gustorf, and Klabunde cover preparative synthetic techniques and reactions. In addition to standard resistive heating methods, the laser evaporation and industrial scale electron-beam evaporation of metals are described. The use of spectroscopic techniques to monitor metal atom reactions in matrices and characterize unstable complexes is touched upon in five reviews. These include a chapter by Ozin on "Transition Metal Atoms in the Synthesis of Binuclear Complexes", a chapter by Turner entitled "Photochemistry in Matrices and Its Relevance to Atom Synthesis", and a chapter by Sheline entitled "Spectral Evidence for Lanthanoid and Actinoid Carbonyl Compounds". The formation and growth of metal clusters in cocondensation matrices is the subject of a paper by Niedermayer.

Several factors limit the usefulness of this book. Each of the chapters has previously appeared in *Angewandte Chemie* (April and May 1975), where they averaged six pages in length. Unless a circulating copy of these articles is sought, there is little justification for library purchase. While this book is highly recommended to both new and established researchers in metal atom chemistry, it is unlikely that they will be able to resist the less expensive alternative of simply xeroxing the articles of greatest interest to them from the original *Angewandte Chemie* issues. Finally, a more recent, detailed, and user-oriented account of many of the techniques and applications covered in this book is contained in "Cryochemistry" (M. Moskovits and G. A. Ozin, Ed., John Wiley & Sons, New York, N.Y., 1977).

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

Biosynthetic Products for Cancer Chemotherapy. Volume 1. By GEORGE R. PETTIT (Arizona State University). Plenum Press, New York, N.Y. 1977. xii + 215 pp. \$19.50.

This volume reviews the biosynthetically produced drugs used in chemotherapy, including naturally occurring antineoplastic and cytotoxic agents, terpenoids, steroids, lignans, quinones, flavans, and alkaloids. It is a readable overview of the subject and would be of particular value to chemists and biochemists interested in learning what classes of compounds are presently used as chemotherapeutic agents and the limits of their utility. The book is divided into chapters based on the types of compounds and their sources, and the history of the isolation and use of the drug are often outlined in an interesting manner.

D. J. Hupe, *University of Michigan*

Intermolecular Interactions and Biomolecular Organization. By A. J. HOPFINGER (Case Western Reserve University). John Wiley & Sons, New York, N.Y. 1977. xvii + 395 pp. \$26.00.

There are 16 chapters in this book with the following titles: (1)

General Concepts and Background (8 pp); (2) Conformation of Small Biologically Active Molecules in Solution and Crystals (70 pp); (3) Intermolecular Interactions and Drug Action (13 pp); (4) Interaction of Solvent Molecules with Polypeptides (20 pp); (5) Interaction of Water with Proteins (31 pp); (6) Drug Molecule-Protein Interactions (14 pp); (7) Hydration Properties of DNA (11 pp); (8) DNA Intercalation Processes (30 pp); (9) Complexes of DNA with Synthetic Basic Polypeptides: Nucleoprotamine and Nucleohistone Models (13 pp); (10) Glycosaminoglycan and Amylose Structural Organization (24 pp); (11) Interaction of Polypeptides and Collagen with Glycosaminoglycans and Proteoglycans (11 pp); (12) Interaction of Ions with Biologic Macromolecules (27 pp); (13) Biomolecular Aggregation and Association (37 pp); (14) Theories of Intermolecular Interactions (36 pp); (15) Ultrastructural Organization (21 pp); and (16) Some Generalizations and Speculations (9 pp). The book is well illustrated and data compilations are given in many tables. A large number of references accompanies each chapter.

In the Preface the author states that the text focuses on information concerning structural chemistry and molecular thermodynamics, and that enzyme-substrate interactions and organization of viruses are excluded. However, several other interactions have been excluded, e.g., the interactions of proteins with amphiphiles and protein-lipid interactions which are now of great interest in the study of membrane structure. The lectin-saccharide interactions also are disregarded in this monograph. Even with these omissions the range of topics in this book is so wide that some problems are treated rather cursory. There is emphasis on the small molecule conformation and models. Many energy contour maps are shown. Some statements, e.g., on p 215, that polysaccharides were long considered to be devoid of uniformly repeating primary structure show that the author has not been interested in the history of macromolecular chemistry. The name of Staudinger could not be found in the references. Generally, the text is well written, especially on the topics in which the author is an expert, and some readers will benefit reading these sections. There are a few misprints, but the name of J. T. Yang, a prominent author on protein and other biopolymer conformation, is systematically misspelled (pp 259 and 275).

B. Jirgensons, *Texas Medical Center, Houston*

Lipid Chromatographic Analysis. Volume 3. Second Edition. By G. V. MARINETTI (University of Rochester). Marcel Dekker, Inc., New York, N.Y. 1976. ix + 286 pp. \$35.00.

This volume contains selected chapters of the first edition of this book published in 1967. The techniques and methods described pertain to older established procedures that have proved successful. Unfortunately, no references are made to newer methods and no attempt was made to update the original material. A glaring lack in this entire edition is the little mention of HPLC techniques which are finding greater use than ever before (perhaps this is the subject of a later volume?). However, the material is presented in a clear and readable format, and sufficient detail is provided so that the newcomer in this area will receive a good fundamental background of the potential of such techniques as column, gas-liquid, and thin layer chromatography in lipid research. The chapters (14, 16) dealing with the gas chromatographic analysis of cholesterol and fatty acids are particularly good. They provide details as to support deactivation, column evaluation, and detector calibration which are often overlooked by the novice chromatographer.

Although dated, the book should prove of value to those just beginning in this interesting area of research.

Ed Johnson, *Varian Instrument Division*

Virus-Inhibiting Factor. By YASUITI NAGANO. University of Tokyo Press, Japan. 1975. (Distributed in the U.S. and Canada by International Scholarly Book Services, Inc., Portland, Oreg.). xvii + 260 pp. \$25.00.

Virus-inhibitory factors (IF) or interferons have been intensively studied since their discovery about 20 years ago. They are factors that partly account for the nonimmunological defense against virus diseases and have the following properties: (i) they are most likely glycoproteins and exhibit heterogeneity of isoelectric point and molecular weight; (ii) they do not inactivate free virus particles but function to inhibit the intracellular replication of many unrelated DNA and RNA viruses; (iii) they are relatively species-specific; e.g., human IF protects human, but not mouse, cells against virus infection, and vice versa;

and (iv) at high concentrations, they inhibit multiplication of tumor cells. In a sense, the IF serve as cellular sentinels. An infected cell destined to be killed by a virus may release IF. Upon contact with the remaining uninfected cells of the population, this released IF elicits an antiviral state (AVS) so that the population as a whole is protected from virus infection.

This monograph on IF consists of six chapters. The first presents a short historical introduction to IF research. The second reviews the biological activity of IF in the whole animal and in tissue culture. Assay procedures for IF are also discussed. The third chapter summarizes purification procedures and the physicochemical characterization of IF. The fourth chapter deals with the diverse materials that induce IF production and release (viruses, nonviral microorganisms, bacterial endotoxin, phytohemagglutinin, poly rI:poly rC, and double-stranded viral RNAs), the conditions influencing IF production, the kind of IF produced, and the cells in vivo which account for most of the release of IF into serum. The fifth chapter compares the properties of virus-induced IF with endotoxin-induced IF. The last chapter provides a brief discussion of experiments in which protection against virus infection was studied after administration of exogenous IF to animals and man. This chapter also deals with the kinetics of exogenous IF clearance from the blood. Numerous references to the voluminous IF literature up to about 1973 are cited and a useful glossary of technical terms and abbreviations is given.

The author of this monograph is a pioneer in the field of IF research. However, despite Dr. Nagano's qualifications and experience and the intriguing nature of the subject matter, the monograph is disappointing.

The monograph has both minor and major deficiencies. Among the minor faults are annoying small errors and use of imprecise language. For example, Nagano states: (a) "*Polioma* (polyoma) virus is fatal for newborn hamsters." On the contrary, this virus abortively infects hamster cells and transforms them to malignant cells. (b) "Pretreatment of mouse embryo cultures with IF prevents cell degeneration by mouse sarcoma virus." MSV does not kill, but transforms the cells. (c) "The inhibitory effect of IF on thymidine kinase activity and the uptake of thymidine was reported to depend on the concentration of IF." IF inhibits thymidine kinase induction, not activity.

Furthermore, the selection of tables and figures is injudicious. Rather than illustrating general principles, the tables and figures appear to be used to document the discussion, like an original journal paper. Also, the legends to the tables and figures are not self-explanatory. For example, Table 25 relates to temperature-sensitive RNA viruses, but the particular virus used is not given.

The monograph has three major deficiencies. First, the organization and presentation of the material leaves much to be desired. A short introductory section on comparative virology would have been useful for nonvirologists so that they could appreciate better the subtleties of the discussion on the mechanism of IF action. The discussion often reduces to an uncritical recitation of literature findings that are sometimes contradictory. The "take home message" does not clearly emerge and the reader may find it difficult to see the woods for the trees.

Second, the author almost completely neglects the contributions of somatic cell genetics to IF research. Since he does not start with a genetic orientation, the author is unsuccessful in dissecting out the genetic control of IF production from the genetic control of cellular sensitivity to exogenous IF. In discussions on metabolism and IF action, the author appears to lump together diverse phenomena such as virus interference by defective particles, the role of helper viruses, interference by leukemia virus producing cells with sarcoma virus infection, IF receptors, derepression of IF formation, and derepression of IF-induced antiviral protein.

Finally, the target audience for this monograph is ambiguous. The monograph may be of interest to interferon researchers and possibly to animal virologists. Medicinal chemists, pharmacologists, physicians specializing in infectious diseases, and biochemists will have difficulty with this book. It is unsuitable as a textbook for graduate students.

Saul Kit, Baylor College of Medicine

Monoamine Oxidase and Its Inhibition. Ciba Foundation. Elsevier/Excerpta Medica/North Holland, Amsterdam. 1976. xii + 415 pp. \$29.95.

This book is the Ciba Foundation Symposium No. 39 (new series), Symposium on Monoamine Oxidase and Its Inhibition, dedicated to

Mary L. C. Bernheim. The introduction outlines the history of monoamine oxidase (MAO) and its implications in psychiatry, and Dr. Bernheim's role in the initial description of the enzyme. The volume begins with several papers treating the biochemical aspects of MAO and its inhibitors, but is mainly concerned with the physiological and pharmacological aspects of MAO and inhibited MAO, particularly psychopharmacological effects and the clinical application of selective MAO inhibitors in the treatment of some human diseases including depression, anxiety, and schizophrenia.

The specific topics discussed are, in order of their presentation, multiple forms of MAO, acetylenic inhibitors and the flavin site, cysteinylflavin in brain MAO, inhibition and transformations of MAO's, nutritional requirements of amine metabolism, physiological aspects of monoamine oxidative deamination, pharmacological effects of selective MAO inhibitors, selective MAO-inhibitor drugs, MAO in catecholamine inactivation in vivo, catecholamine metabolism in CNS, MAO inhibition and hyperactivity, psychopharmacological effects of MAO inhibitors, clinical aspects of MAO-inhibitor antidepressants, classification and drug response in affective disorders, MAO activity in some human disease states, factors influencing platelet MAO, and platelet MAO in schizophrenia. Concluding the symposium papers is a general discussion of future investigations and the standardization of MAO assays. Finally, two of the contributors have prepared appendices treating MAO assays and the preparation of human platelets.

Each paper in this collection is preceded by an abstract and followed by a discussion by the participants. Also included is an index of contributors and an extensive subject index. This book should be of interest to investigators in a wide range of fields including biochemistry, pharmacology, and clinical medicine. Many uncertain and controversial aspects of MAO are discussed in great detail, with extensive data and references facilitating their clarification. As indicated, the participants have also recommended standardized procedures to aid in the comparison of data from several laboratories with the hope of eventually elucidating the in vivo roles of MAO and its inhibitors. I believe this book presents most of the current state of knowledge concerning this complex subject from the standpoints of both basic and applied research and should be a valuable reference text for anyone interested in MAO.

Michael D. Kluetz, University of Idaho

Annual Reports in Medicinal Chemistry. Volume 11. Edited by FRANK H. CLARKE, Academic Press, New York, N.Y. 1976. ix + 330 pp. \$16.50 (soft-bound).

Prior to being named Editor-in-Chief of this current volume, Frank H. Clarke had served as a section editor for the past two volumes. Dr. Clarke should be complimented for the excellent work he has done in presenting a useful and timely volume in the fine tradition of previous reports in this series.

The six main sections of this volume are the same subjects covered in all past volumes. These sections, along with their editor and number of topics (or chapters) in each, are as follows: I, CNS Agents (M. Gordon, 5); II, Pharmacodynamic Agents (J. E. Francis, 4); III, Chemotherapeutic Agents (G. B. Whitfield, 5); IV, Metabolic Diseases and Endocrine Function (H.-J. Hess, 7); V, Topics in Biology (T. Y. Shen, 5); VI, Topics in Chemistry (R. E. Counsell, 6).

The 46 authors of the 32 topics are well versed in their respective fields and have presented excellent overviews of the subjects. Many of the topics were not discussed in the last volume, a practice followed in previous volumes, which enabled new subjects to be covered.

Numerous references cited in various chapters of the present volume have proven to be very helpful in conducting current research in our laboratory. All medicinal and many organic chemists should similarly find this annual report of value to them.

It should be noted that the \$7.00 fee for membership in the Medicinal Chemistry Division of the American Chemical Society includes a copy of the annual report. The economics involved for division membership versus purchase of the annual report are readily apparent.

Charles P. Kulier, Warner-Lambert/Parke-Davis

Progress in Polymer Science: Japan. Volume 8. Edited by KAZUTOMO IMAHORI and TOSHINOBU HIGASHIMURA. Wiley/Halsted Press, New York, N.Y. 1975. ix + 244 pp. \$26.50.

Three of the five reviews appearing in this volume deal with polymer synthesis, and the two with structure and properties.

The first article is by S. Inoue of the University of Tokyo on the novel techniques for synthesizing copolymers of carbon dioxide with epoxides, as well as with aziridine and with diamines. The catalyst systems, the reaction mechanism, and copolymer properties are discussed. Thirty-four references are mostly to articles published in the U.S.

The second article is by K. Takemoto and Y. Inaki of Osaka University titled "Vinyl Polymerization by Polymeric Metal Complexes". Free-radical polymerization processes initiated by various monomeric as well as polymeric metallic complexes are discussed. The high activity of copper(II), iron(III), and manganese(II) chelates for vinyl polymerization is shown, a fact which emphasizes the importance of the coordination state of the polymer to the metal.

The third article is titled "Photoinduced Ionic Polymerizations" by M. Irie and K. Hayashi of Osaka University. It is a review of their studies on ionic polymerization reactions induced by illumination with ultraviolet or visible light. Cationic polymerization with α -methylstyrene and cyclohexene oxide, and anionic polymerization with nitroethylene and acrylonitrile are discussed in detail.

The fourth article is by H. Tadokoro of Osaka University on structural analysis of crystalline polymers by x-ray diffraction and infrared and Raman spectroscopy. Results on a number of crystalline polymers are reviewed which highlight the author's long-standing series of comprehensive studies on this subject. Interesting results on optical compensation of racemic polymers and on crystalline structure of isotactic polymethyl methacrylate are included.

The fifth article titled "Hydration of Biopolymers", by H. Noguchi of Nagoya University, includes discussions on hydration associated with conformational change, hydration of neutral polymers, and hydration of polyelectrolytes. Fifty-six references are included.

S. Matsuoka, *Bell Telephone Laboratories*

Thermodynamics of Seawater: As A Multicomponent Electrolyte Solution. By J. V. LEYENDEKKERS (University of Australia, Sydney). Marcel Dekker Publishers, New York, N.Y. 1976. xi + 512 pp. \$24.50.

This book is Part 1 of a two-volume series on the thermodynamics of seawater. The topics covered in Part 1 include the entropy, volume, expansibility, and compressibility of sea salts and seawater solutions. The author attempts to critically review the literature and develop some new ideas about seawater as a multicomponent electrolyte solution.

Unfortunately, much of the literature covered in the book is outdated. For example, the discussion on the equation of state of water and seawater is based on unreliable data and the so-called "new facts" concerning the properties of water are not real. Recent specific volume measurements¹ on the PVT properties of water and seawater and sound derived data² agree to within $\pm 10 \times 10^{-6} \text{ cm}^3 \text{ g}^{-1}$ from 0 to 30 °C and 0 to 1000 bars applied pressure (which is equivalent to differences of $0.02 \times 10^{-6} \text{ bar}^{-1}$ in compressibility). Thus, if the water structural effects (due to sound absorption) exist, they are within our present capacities of making direct specific volume measurements. The differences of $0.3 \times 10^{-6} \text{ bar}^{-1}$ in compressibility of water found by the author are the result of using the Gibson-Tait equation of state which does not have enough pressure terms to fit reliable PVT data for water and seawater.

I found the book quite difficult to read because of the confused development of the various topics. In summary, the book is out of date as a reference text, is too detailed for most marine chemists to follow, and contains errors in interpretation.

- (1) A. Bradshaw and K. Schleicher, *Deep-Sea Res.*, **23**, 583 (1976). More recent specific volume measurements for pure water by these workers agree with the sound derived data (ref 2) to $\pm 7 \times 10^{-6} \text{ g cm}^{-3}$ from 0 to 30 °C and 0 to 1000 bars.
- (2) C. T. Chen, R. A. Fine, and F. J. Millero, *J. Chem. Phys.*, **66**, 2142 (1977); C. T. Chen and F. J. Millero, *J. Acoust. Soc. Am.*, in press.

Frank J. Millero, *University of Miami*

The Properties of Gases and Liquids. Third Edition. By ROBERT C. REID (Massachusetts Institute of Technology), JOHN M. PRAUSNITZ (University of California at Berkeley), and THOMAS K. SHERWOOD (Massachusetts Institute of Technology). McGraw-Hill Book Co., New York, N.Y. 1977. xv + 688 pp. \$27.50.

This reviewer freely admits to be biased. As a graduate student, the book by Reid et al. was a valuable resource to him. It is gratifying to see that the shortcomings of the first edition are largely eliminated

in this third edition. Of course, twenty years between these editions and a third editor could have had their influence on these improvements. The book consists of twelve chapters and three appendices.

The first two chapters are introductory and deal with general methods of estimation of physical constants and pure-component constants. These exceptionally well written chapters are highly recommended to the beginners. The next two chapters deal with pressure-volume-temperature relationships of pure gases and liquids, and mixtures. Chapters Five and Seven contain general rules of thermodynamic properties, and those of ideal gases. Chapters Six and Eight describe vapor pressure and enthalpies of vaporization of pure liquids and fluid-phase equilibria in multicomponent systems.

The last four chapters deal with viscosity, thermal conductivity, diffusion coefficients, and surface tension. The appendices include a data bank and a compound dictionary.

It is somewhat difficult to check all data presented in such a book for their accuracy; several spot checks indicated no errors.

The value of this book is considerably beyond a tabulation of available data. The authors have shown how to calculate various properties of gases and liquids on the basis of presently known theories. Chemical engineers and physical chemists would particularly benefit from this book.

This reviewer is pleased to have read the book by Reid et al. The late Professor Sherwood would have been pleased to see the newest edition of "his" book.

A. Alan Moghissi, *Georgia Institute of Technology*

Physics of Nonmetallic Thin Films. Edited by C. H. S. DUPUY and A. CACHARD (Université Claude Bernard). Plenum Publishing Co., New York, N.Y. 1976. vii + 510 pp. \$49.50.

This book is a collection of some sixteen lectures varying in quality from excellent to so-so, presented at the Second NATO Summer School on Metallic and Nonmetallic Thin Films held in Corsica during Sept 1-5, 1974. Basically the lectures are broken into three parts: preparation and characterization of thin films in general; physical properties of dielectric films; and applications of dielectric films. (Although the book lists four parts, I have chosen to combine the first two into a single part for purposes of this review.)

The lectures dealing with the preparation and characterization of thin films constitute one of the strong points of the book. They can be recommended as an excellent introductory course to the novice who is suddenly confronted with a project requiring a detailed knowledge of the how's and why's of thin-film technology, metallic or nonmetallic. The lectures are not complete in themselves, however; thus it will require a considerable amount of reading in the more detailed reviews referenced in them and, of course, a lot of practical experience to become one of the experts. In general they are current, reasonably thorough, and well referenced for more detailed studies. An exception to the latter is the section on structure determination where most of the references are to the lecturer's own work.

The seven lectures on the physical properties of dielectric films are somewhat more specialized. Although most of these sections are thorough, they presume a good background in the fundamentals of semiconductors and dielectrics. In general the serious reader will wish to follow up with more detailed readings in the usually complete list of references in these sections. For me the highlight of the book was the excellent section by Henisch and Popescu which compared the thermal and electronic models for threshold switching in chalcogenide glasses. Also noteworthy was the thorough review of the mechanical properties of thin films by Hoffman.

The section consisting of three lectures on applications was somewhat of a disappointment. I had hoped to learn about all of the myriad applications and possibilities for future applications of dielectric thin films. Obviously this cannot be done in only three lectures, so I had to settle with a sketchy survey of the more commonplace applications.

Overall this book would be a useful reference to one active in thin film work but not a necessity in the sense of "Handbook of Thin Film Technology". One caution: the proof reading seems to be annoyingly poor throughout the text of the book; consequently, since it may carry over to the equations, the prudent reader should check with the fundamental references or work out the equations himself before taking seriously any quantitative calculations based on them—a good policy in any case.

D. G. Naugle, *Texas A&M University*

Methods in Receptor Research. Parts I and II. Edited by M. BLECHER (Georgetown University Medical Center). Marcel Dekker Inc., New York, N.Y. 1976. Part I: xv + 383 pp. \$36.50. Part II: xiv + 379 pp. \$36.50.

The stated intention of these two volumes is to collect in laboratory manual form a broad spectrum of the detailed methods currently employed by many of the world's foremost receptor research laboratories. While the experimental approaches, laboratory methods, and data handling techniques described in the two volumes are given in terms of specific ligands and receptor macromolecules, many of the chapters provide information which has general applicability to other substances.

Part I deals with receptors for acetylcholine, adrenocorticotrophic hormone (ACTH), catecholamines, cholera toxin, follicle stimulating hormone, glucagon, gonadotropins, insulin, and growth hormone. Part II continues to discuss the properties of insulin receptors and includes chapters on lectin, opiate, oxytocin, parathyroid hormone, prolactin, prostaglandin, thyrotropin, and vasopressin receptors. Excluded from these volumes are methods involving receptors for steroid and thyroid hormones, which will be the subject of a further book.

The chapters which appear in "Methods in Receptor Research" will provide a valuable carte d'entrée into the complex field of ligand-receptor studies. Each chapter presents a wealth of technical detail concerning the specific system which it describes, and the contributions are all of high standard. The isolation and identification of receptors have been an area of recent rapid progress, and a better insight into the nature of receptor molecules should contribute in a dramatic fashion to our understanding of the macromolecular processes underlying intercellular communication. In many instances, present knowledge regarding the chemical nature of the receptor is extremely sketchy. As Hollenberg and Cuatrecasas appropriately point out in their contribution, "the insulin receptor is taken to mean that membrane-associated moiety which 'recognizes' insulin in the extracellular milieu". Another problem confronting the investigator in the ligand-receptor binding field which is discussed in the book is that of distinguishing specific and nonspecific binding.

In conclusion, "Methods in Receptor Research" presents a series of useful accounts of techniques currently employed in this field. The book can be strongly recommended to scientists who are entering the field and will provide useful information to those who have already embarked on such studies. The standard of presentation of the material in the two volumes is satisfactory and Part II contains very useful author and subject indexes.

J. W. Phillis, *College of Medicine, University of Saskatchewan*

Electrochemistry of Biological Molecules. By G. DRYHURST (University of Oklahoma). Academic Press, New York, N.Y. 1977. xii + 601 pp. \$47.00.

The book is an excellent and critical review of the electrochemistry of nitrogen heterocycles that are related to biological molecules. The review encompasses publications up to 1974. The oxidation and reduction of purines, pyrimidines, pteridines, isoalloxazines, flavins, pyrroles, porphyrins, and pyridines were reviewed. The frequent use of figures to describe reaction mechanisms makes this book quite readable even to those who are not familiar with nitrogen heterocycles. The structure of almost every compound mentioned is drawn, and there are extensive tables of half-wave potentials on most compounds. The text is quite lucid and readable and there are frequent comparisons with the nonelectrochemical literature for which the electrochemical data can be quite helpful in understanding the redox chemistry of these compounds.

The title of the book, though, promises a much broader coverage of the subject than was actually done. Many biological molecules such as quinones, phenols, alkaloids, and proteins were not covered. The "Electrochemistry of Nitrogen-Containing Biological Molecules" would be a more appropriate title.

Michael D. Ryan, *Marquette University*

Elements of Quantum Theory. Second Edition (revised, and enlarged). By FRANK J. BOCKHOFF (Cleveland State University). Addison-Wesley Publishing Co., Reading, Mass. 1976. xii + 332 pp. \$17.50.

One of the rewards of being a chemistry professor is the opportunity to tell undergraduates the story of the quantum theory—its discovery,

its initial development, its significance, and, most of all, its power. It is such an incredible tale. It deserves to be told well. This aspect of chemistry, at least, can and should be presented to the profound entertainment and enlightenment of the beginning student.

Frank J. Bockhoff, whom I know only from the two editions of this book, agrees. In addition, he is the talented storyteller needed. Furthermore, his exposition is simple, entirely clear, and accurate; such a presentation is worthy of a student's study time. The derivations are easy to follow, use standard notation, and are comfortably supported by appropriate words of guidance and simple diagrams. Mostly for these reasons, I have happily used this book from the time I first encountered it, as the required text in a one-semester, junior-level course in elementary quantum chemistry.

The text is appropriately laced with short quotations from the prose of quantum mechanics. These are neither humorous, whimsical, nor obscure; they are descriptive quotations which teach. They reveal something of the personalities of their authors and of the regard they have for their subject. Einstein, Schrödinger, Oppenheimer, Pauling, Feynman, and Gamow are among those quoted. In addition, some references to the more important papers in the original literature are given.

Frank Bockhoff tries hard to give the student a feeling for the physical meaning of some of the more abstract results of quantum theory. Analogies and comparisons with classical behavior are frequently made. The student is never left with a strange new result without enough discussion to allow it to be understood and appreciated. Strong mathematical preparation is not required.

The chapter titles are Introduction: Energy Packets and the Quantum Hypothesis; Line Spectra, the Bohr Model, and de Broglie Waves; Oscillating Masses and Vibrating Strings; Three-dimensional Waves and Time Averages; Nonclassical Waves and Quantum Mechanics (the five postulates are presented here); The Single Particle: Free and in Boxes; Three-dimensional Boxes and Finite Barriers; A Return to the Simple Harmonic Oscillator; The Hydrogen Atom I. Solution of the Schrodinger Equation; II. Angular Momentum and Orbital Shapes; The Helium Atom I. Approximate Methods for the Ground State; II. Excited States and Some Interesting Aspects of Two-Electron Systems; More Complex Atoms: An Introduction; and, Molecules and Bonding: A Capsule Preview. Each chapter has seven subsections on average, and is followed by about ten student exercises, the answers to which are at the back of the book.

The second edition is about 10% longer than the first, by the insertion of material which adds to the integrity and clarity of the presentation, without increasing its scope. Most of the sections of the book have not been altered at all. The erratum level is very low.

This is a good book from which to learn quantum theory. Care for the beginning student is apparent throughout.

Karl Seff, *University of Hawaii*

Developments in Biological Standardization. Volume 27 (International Symposium on Purity of Human Plasma Proteins). Edited by R. H. REGAMEY (Geneva), I. JOÓ (Budapest), and W. HENNESSEN (Marburg/Lahn). S. Karger A. G., Basel. 1974. Distributed in U.S.A. by Albert J. Phiebig, Inc., White Plains, N.Y. x + 274 pp. \$34.25.

This volume contains the Proceedings of Parts A and C of the 13th International Congress of the International Association of Biological Standardization, held in Budapest, Hungary, in 1973. Part A is concerned primarily with the isolation and characterization of plasma proteins, especially immunoglobulins and albumin, from normal or hyperimmunized donors. It is divided into five sessions, dealing with: I, Production; II, Purification; III, Methods of Determination; IV, General Impurities; and V, Special Impurities (Blood and Tissue, Australia antigen, Polymerization, Hormones, and Chemicals). Short papers present original work or literature reviews; throughout the emphasis is on commercial-scale preparations of plasma proteins destined for clinical use, either therapeutically or in laboratory diagnostic procedures. Part C deals with "Topics of Current Interest"; it consists of six papers, the majority concerned with immunoassay materials and with antilymphocyte serum. A final chapter of the volume offers a brief summary of the Congress proceedings. About a quarter of the papers are in French, with English summaries. This book's appeal will be restricted to a narrow audience; few workers outside of diagnostic laboratories or firms engaged in the production of plasma protein products would find it useful.

John C. H. Steele, Jr., *Duke University Medical Center*