

Book Reviews*

The Condensed Chemical Dictionary, Ninth Edition. Revised by G. G. HAWLEY. Van Nostrand-Reinhold, New York, N.Y. 1977. 957 pp. \$32.50.

This edition has been brought up to date with respect to the previous one, published in 1971, by modification of older entries and addition of new ones, particularly in the area of energy. Even the recent FDA ban on saccharin is mentioned. The general approach of earlier editions, providing expanded definitions with succinct descriptive detail, has been retained. One may find entries for chemical compounds, especially those of applied importance, chemical processes and phenomena, terms, abbreviations, and a wide selection of trademarked names. There are also some selected biographies, information on technical societies, and an appendix of chemical manufacturers.

The quality of the entries is unusually high for a work of this kind, and it shows the effect of prolonged polishing. There are nevertheless some erroneous or misleading structures shown, such as those for naphthalene (shown as decalin), pyrrole, and saccharin. The most astonishing entry is that for "cube root": "A powdered insecticidal preparation containing 5% rotenone".

Houben/Weyl Methoden der Organischen Chemie, Volume VI/1c: Phenols, Parts 1 and 2. Edited by E. MÜLLER, in collaboration with O. BAYER, H. MEERWEIN, and K. ZIEGLER. Georg Thieme Verlag, Stuttgart. 1976. xlv + 1366 pp. DM 960.

The revision of this standard work of reference continues in the painstakingly thorough style that has made it a work of the greatest importance to the organic chemist. This set of two books covers phenols in their entirety, except for the many substitution reactions that are described in other volumes of the series as preparative methods for other functional classes. Subject and author indexes make this set usable independently.

The first 1114 pages deal with preparation in five parts: introduction of the hydroxyl group; transformation of functional derivatives of phenols; aromatization of six-membered cyclic compounds; ring-closure reactions; and preparation from other phenols or derivatives with retention of the phenolic function. Reactions of phenols are described in 82 pages, and separation, analysis, and stabilization occupy another 33 pages, followed by two pages on occurrence and toxicology. The references to the primary literature are too numerous to count, but an idea of the magnitude can be gained from the fact that the list of the names of the journals searched alone requires 19 pages.

The critically presented and highly detailed discussions cover industrial as well as laboratory methods. Specific examples with yields abound, and many representative experimental procedures are given in full. Liberal use of structural formulas and tables, together with placement of the references at the foot of each page, make this work very convenient to use. The great value of this work, in fact, its uniqueness, makes any disadvantage of having the text in German a relatively minor one. A technical library serving the organic chemist cannot afford to be without the volumes of this series.

Houben/Weyl Methoden der Organischen Chemie, Fourth Edition, Volume VII/2b: Ketones, Part II. Edited by E. MÜLLER, O. BAYER, H. MEERWEIN, and K. ZIEGLER. Georg Thieme Verlag, Stuttgart. 1976. xlii + 789 pp. DM 540.

The editors note in the foreword that the great increase in the number of new or improved preparative methods for ketones has necessitated spreading the treatment of ketone chemistry over three subvolumes, of which this one is the second. It continues the critical presentation of preparative methods and procedures, to which are devoted 624 pp. The remainder of this book covers reactions of ketones, their analytical chemistry, and separation of mixtures containing them.

Preparative methods are taken up under three rubrics: degradation reactions; preparation from other ketones (e.g., by alkylation); and preparation with the aid of protective groups (e.g., ketals, enamines).

As usual in this series, the literature has been searched with outstanding thoroughness, and the bibliographies include a wide selection of reviews, books, and patents in addition to the primary journal literature. The book went to press in 1976 and includes references into 1975. There is a detailed subject index for this volume, but the third part, promised soon, will have cumulative author and subject indexes for all three parts. The completed group will be of inestimable reference value.

Introduction to Ecology. By P. A. COLINVAUX. John Wiley & Sons, Inc., New York, N.Y. 1977. ix + 621 pp. \$29.95.

This book is a text with some reference value, written at a level that appeals to college students in science and to graduates who would like to become better acquainted with a branch of science whose importance has come to be appreciated largely in the past decade. Chapters on primary energy production by plant photosynthesis, transformation through the animal world, the cycling of dissolved nutrients, the nitrogen cycle, etc., have a substantial chemical content and much tabulated reference information for those wishing to improve their awareness of the place of chemistry in the context of the world.

Organic Reaction Mechanism, 1975. Edited by A. R. BUTLER and M. J. PERKINS. John Wiley & Sons, Inc., New York, N.Y. 1977. 623 pp. \$52.00.

With this volume, the second decade of this series is begun. It summarizes the work on mechanism in organic chemistry that appeared from December 1974 to November 1975, and thus has appeared with commendable promptness. It continues the pattern of previous volumes, with 13 chapters classified according to type of reaction or reactive intermediate. An improved method for author index citations has been introduced. The usual very thorough subject index completes this welcome addition to the series which is so helpful to the organic chemist in his never-ending struggle to keep abreast of recent developments.

Fourth Polish Conference on Analytical Chemistry. Edited by A. HULANICKI. Butterworths, London. 1975. 210 pp.

This volume contains the plenary lectures delivered at the conference held in Warsaw in 1974. It is a reprinting of papers that appeared in *Pure and Applied Chemistry*, Volume 44 (no. 3), 1975.

Proceedings of the Third International Biodegradation Symposium, Session XX. Edited by J. M. SHARPLEY and A. M. KAPLAN. Applied Science Publishers Ltd., London. 1977. v + 59 + ii pp. \$7.50.

This section of the proceedings concerns fungicide toxicity and metabolism, and contains two invited and four contributed papers, plus a subject index. It is a small volume to be published separately, but it was apparently felt desirable to make parts of the proceedings available independently, owing to the widely varying subject matter of the Symposium. The reviewer is particularly intrigued by the title of another part of the proceedings not yet received: "Recalcitrant Molecules". It should be a subject all chemists can relate to!

Special Topics in Heterocyclic Chemistry (Volume 30 of The Chemistry of Heterocyclic Compounds). Edited by ARNOLD WEISSBERGER and EDWARD C. TAYLOR. Wiley/Interscience, New York, N.Y. 1977. 601 pp. \$57.50.

This volume in the now standard series is a departure from the previous pattern. It is devoted to "topics of more limited scope whose treatment in a separate monograph might not be appropriate". There are eight chapters, not closely related, contributed by nine authors: 5,5-Systems With a Bridgehead Nitrogen Atom (J. P. Paolini); Indolizine and Aza Derivatives With Additional Nitrogens in the 5-Membered Ring (H. L. Blewitt); Azaindolizine Systems Having More Than One Nitrogen Atom in the 6-Membered Ring (G. Maury); The Chemistry of Cyclazines (A. Taurins); Dithiole and Dithiolium Systems (R. D. Hamilton and E. Campaigne); Heteropentalenes (K. T. Potts); Borazaromatic Compounds (A. J. Fritsch); and Syntheses

* Unsigned book reviews are by the Book Review Editor.

and Properties of Cyanine and Related Dyes (D. M. Sturmer). The style and thoroughness of the conventional volumes of the series are maintained. The production is of the highest quality, as befits a work that will see much use over many years. A very detailed subject index completes the volume.

Analytical Profiles of Drug Substances, Volume 5. By KLAUS FLOREY (The Squibb Institute for Medical Research). Academic Press, New York, N.Y. 1976. xi + 560 pp. \$22.50.

The present volume represents the fifth in the series undertaken by Dr. Florey and his dedicated group of contributors and essentially continues to follow the originally established format. The purpose of these publications is to provide hard, specific facts of an analytical and physical chemical nature to those involved in research on and formulation and control of important drug substances. To some extent this function is assumed by the official compendia and by the Merck Index. By limiting their efforts to only the most important drug entities, Dr. Florey and his associates have been able to provide in-depth information and literature references of real value which are largely lacking in the others.

The reviewer unhesitatingly recommends the series to anyone concerned with day-to-day responsibilities in R&D activities in the drug area. Much of the physical and chemical data appear to have been developed especially for these volumes. On the negative side, readers are cautioned to use some judgment in their use as errors are bound to creep into such an effort. For those who may be interested, Volume 5 covers the following drugs: Bendroflumethiazide, Cephradine, Chloroquine Phosphate, Dapsone, Flucytosine, Glutethimide, Levodopa, Sodium Levothyroxine, Methotrexate, Methyclothiazide, Metronidazole, Nitrofurantoin, Piperazine Estrone Sulfate, Procarbazine Hydrochloride, Promethazine Hydrochloride, Rifampin, Sulfasalazine, and Testolactone.

Takeru Higuchi, The University of Kansas

Structure and Conformation of Nucleic Acids and Protein-Nucleic Acid Interactions. Edited by M. SUNDARALINGAM and S. T. RAO (University of Wisconsin). University Park Press, Baltimore, Md. 1975. xxii + 752 pp. \$44.50.

This volume consists of the Proceedings of the Fourth Annual Harry Steenbock Symposium, held June 16-19, 1974, in Madison, Wisconsin. As a gathering of papers from well-known researchers from throughout the world, whose work relates to the title subject, the book accomplishes its stated purposes: to present an overall view of the current (1974) state of structural studies of nucleic acids, and to sample the recent research on the interactions of proteins and nucleic acids. The papers touch on most of the important areas, including the molecular structure of tRNA; x-ray determinations of aminoacyl-tRNA synthetases; three-dimensional structure of various dehydrogenases and kinases which recognize nucleotides; NMR structural, binding, and dynamic studies of model and natural nucleic acids; and theoretical approaches to nucleic acid structure, including solvation problems. The number of papers which report results of x-ray studies is a tribute to the method itself, as more than half of the 44 papers are based on x-ray structure determinations. (This point is raised in the Introductory Address given by G. A. Jeffrey.) Other physical methods utilized by various authors include NMR (^1H and ^{13}C), Raman spectroscopy, sequential thermal unfolding, and conformational energy calculations.

The main weakness of such a mammoth compendium of research papers is that timeliness is lost in the publication and printing period. Many of the studies reported have since been completed or updated and have appeared in the literature. In addition, there are several areas which are pertinent to the subject of these Proceedings but are not included. For example, no discussion of viral structure, ribosomal proteins, histones, repressors, promoter-reactive proteins, or restriction enzymes appears in this volume. Perhaps the choice was wise, as these are fast-developing topics and would have been out of date by the time of publication.

Lila G. Pease, Amherst College

Contamination Control in Trace Element Analysis. By MORRIS ZIEF (J. T. Baker Chemical Co.) and JAMES W. MITCHELL (Bell Telephone Laboratories). Wiley-Interscience, New York, N.Y. 1976. xiv + 262 pp. \$22.50.

This book is a valuable collection of principles, facts, and techniques

relevant to assuring the reliability of analyses at trace concentration levels. The volume is based on several years of collaboration by the authors in the area of production and characterization of ultrapure chemicals, and is augmented by a thorough coverage of the relevant literature (over 500 references). Through use of many practical and documented examples, the authors examine the possible sources of error during the course of an analysis: the nature of a sample, the method of collection and subsequent environment, reagents and standards, methodology, and the analyst.

For those considering upgrading a conventional laboratory to a high-purity laboratory, there is a chapter devoted to the topic. The chapter which is perhaps of most universal importance discusses selection of materials for containers and apparatus. The problems of chemical and physical stability, and leaching and adsorption at the container wall are studied. Other chapters deal with recommended methods for reagent purification and problems of contamination during routine operations such as sampling, decomposition and dissolution, and concentration. The authors close with a section on selected methods for determining ultratrace elements (neutron activation analyses, isotope dilution, x-ray fluorescence spectroscopy, spark source mass spectrometry, emission spectroscopy, and atomic absorption spectroscopy); the chapter does not dwell on the general principles and theory of the methods, but concentrates on advantages and limitation for trace analysis, and on factors affecting the accuracy of the method.

An extensive, well-written subject index and a table of contents make the information in this volume easily retrievable. An appendix lists sources and addresses for apparatus, materials, and reagents discussed in the text. This volume is a well written and comprehensive collection of practical information which should prove invaluable for laboratories involved in trace element analysis.

Timothy A. Nieman, University of Illinois

Introduction to the Physical Chemistry of the Vitreous State. By P. BALTA and E. BALTA (Polytechnic Institute of Bucharest). Abacus Press, Tunbridge Wells, Kent, England. 1976. xvi + 271 pp. \$38.50.

This book is the English translation of the revised Romanian version. It is concerned with description and discussion of the vitreous state of inorganic materials. Included are an introduction, six chapters, and a reference section with 671 entries. There is, however, no subject index. The first chapter deals with the noncrystalline solid state and contains a discussion of the terms "vitreous" and "glass" as they relate to the amorphous solid state. The second chapter concerns the formation of the vitreous state from supercooled liquids. A general discussion is given there of the various theories which describe formation of the vitreous state from supercooled liquids and the structural features which are related to its formation. There is a discussion at the end of this second chapter concerning the structure of melts and the kinetics of the cooling process.

Equilibrium in the glassy state is dealt with in the third chapter using arguments from physical chemistry. There is a wealth of material in this chapter on theoretical concepts, binary and higher order phase diagrams, and methods to determine the distribution of polymers comprising the vitreous state. Chapter Four pertains to the structure of glasses; the ionic and molecular structure of glasses, with particular emphasis on the borate and silicate glasses. The fifth chapter treats microphase separation in glasses. This topic is discussed from the theoretical point of view (mechanism and kinetics of vitreous microphase separation) as well as the causes and structural factors which bear on this phenomenon. There is a section at the end of this chapter on the technological importance of the vitreous microphase separation process.

Chapter Six is concerned with optical processes in the vitreous solid. There is development of such topics as the behavior of ionic coloring reagents, redox equilibrium in glasses, photosensitive glasses, and optical fibers among others.

This book is highly referenced and provides a valuable reference work. The authors, being active workers in the field, are able to present not only the contributions and opinions of others but their own authoritative summarizing assessments of other work. The book is, as it claims, an introduction to the physical chemistry of the inorganic vitreous state. Although there is quite a bit of material which is referenced and left to the reader, enough material is discussed in the book to provide sufficient detail to be applicable for a beginning text in the field or as a refresher text for those with a prior familiarity with the

vitreous state. The figures are quite well done and add much to the book.

Anselm C. Griffin, *University of Southern Mississippi*

The Dynamic Properties of Supercooled Liquids. By GILROY HARRISON (University of Glasgow). Academic Press Inc., London. 1976. vi + 199 pp. \$15.75.

Supercooled liquids are those that exhibit both viscous and elastic properties. This concise, direct monograph surveys theoretical and experimental studies of the dynamic response properties of such liquids, particularly in the region of high-frequency excitations. The presentation emphasizes phenomenology and the unity of the subject, despite the variety of materials and experiments involved.

From introductory chapters the book proceeds to the phenomenological theory of linear viscoelasticity, relationships between viscoelastic functions, and the method of reduced variables. The chapter on experimental methods covers ultrasonic measurements in the frequency range 10^5 to 10^9 Hz and various light-scattering techniques. It is shown how results in this range bridge the gap between the highly viscous liquid and glassy solid extremes of behavior. The section on the viscoelastic properties of supercooled liquids is a review of a wide range of experimental results, with reference to the theories previously developed.

The book is suitable to those interested in possible applications of supercooled liquids and to those interested in the physical nature of this intermediate liquid state. It is a quite readable introduction to the field, well referenced to the literature and yet complete enough for later use as a reference itself.

David G. Haase, *North Carolina State University*

Disinfection—Water and Wastewater. Edited by J. DONALD JOHNSON (University of North Carolina). Ann Arbor Science Publishers Inc., Ann Arbor, Mich. 1975. vi + 425 pp. \$27.50.

This is a collection of 18 papers edited by J. Donald Johnson on the chemical and microbiological treatment of drinking water and wastewater. The chemistry of all current methods of disinfection are discussed and compared to new methods under consideration. These include chlorination, bromination, iodination, and ozonation.

Some mathematical models are presented for comparing the effectiveness of various systems or to predict the effectiveness of a given system. Both bacterial and virucidal disinfection chemistry are discussed. Several papers give considerable experimental detail and discussion of analytical methods. One paper is devoted to a comparison of the field test kits available for determination of free available chlorine.

Economics of using various disinfectant procedures are discussed. Two papers concern ozone: its use for purification of drinking water and wastewaters, economics, and optimal plant designs.

Several of the papers were concerned with the formation of chlorinated species during the disinfection procedure of wastewaters and factors which should be considered if this water is to be used for drinking water farther down stream. Methods for dechlorination are discussed with carbon adsorption being the most thoroughly discussed.

This book is a good reference for any chemist in a water treatment plant or a wastewater treatment plant using or considering disinfection treatment. Each paper is well referenced.

N. E. Jackobs, *Eastman Kodak Company*

Isotopes in Hydrogen Transfer Processes (Isotopes in Organic Chemistry, Volume 2). By E. BUNCEL (Queens University) and C. C. LEE (University of Saskatchewan). Elsevier Scientific Publishing Co., Amsterdam. 1976. xvi + 318 pp. \$57.50.

This is an excellent reference text for any library shelf. Each chapter appears to be written independently and can be read without reference to any of the other chapters. The first chapter is a general review of the theory of the primary isotope effect. Remaining chapters do not call upon the material outlined in the first one, but present their own review of theoretical topics such as transition state theory and applications of their specific area of interest. This could be somewhat burdensome to those reading the entire monograph, but is very helpful for people interested in only one area. The remaining chapters cover such topics as exchange reactions in carbonyl and nitro compounds. Hydrogen transfer and oxidation reactions are also covered in individual chapters. An extremely thorough discussion of hydrogen isotope

transfer in biological systems can be found in Chapter 5. It includes a thorough tabulation of the "stereochemistry of a series of enzyme reactions determined by the use of hydrogen isotopes". A very thorough review of the theory of elimination reactions is given in Chapter 6. This chapter like the others contains a large number of experimental results as well. Each chapter contains extensive references and the index appears to be adequate.

Kenneth Kaufmann, *University of Illinois*

Residue Reviews, Volume 57. Edited by F. A. GUNTHER (University of California). Springer-Verlag, New York, N.Y. 1975. vi + 152 pp. \$16.80.

This book contains an excellent review of the literature on three pesticide-environment related topics: (1) interactions between clay minerals and bipyridylum herbicides; (2) pesticide residues in the Great Lakes region of Canada; (3) secondary effects of pesticides on aquatic ecosystems.

Topic 1 contains adsorption data on diquat and paraquat, bipyridylum herbicides, on clay and other soils. Topic 2 is an interesting review on properties, usages, and weekly and yearly treatment studies of many recently controversial pesticides used in Canada and in the United States. These include among others DDT, aldrin, dieldrin, chlordane, and heptachlor. Data on pesticide residues in some crops and in some rivers and lakes are presented. One of their conclusions is worth mentioning: "urban use of the organochlorine insecticides and recreational use for biting fly control have been the major sources of insecticidal contamination from the Canadian side of the Great Lakes".

The last article is concerned with changes to the dynamic state of equilibrium in an environment after the primary effect of a pesticide is over. The pesticide kills the bugs. Fish eat the dead bugs and show a buildup in pesticide or another bug that normally eats the first bug dies because the first bug was killed with a pesticide, etc. This article contains studies on secondary pesticide effects on plants, insects, fish, and birds. It includes information on changing of food cycles, both reduction of and increases of food availability, changes in the environment such as amounts of dissolved oxygen and other nutrients, and prey increase when the predator is removed. Several interesting test studies were reported.

This book contains much useful information, especially with the wide and rapidly increasing concern about the toxicity of pesticides to humans in the United States.

G. W. J. Kenney, Jr., *Eastman Kodak Company*

Progress in the Chemistry of Organic Natural Products, Volume 33. Edited by W. HERZ (Florida State University), H. GRISEBACH (University of Freiburg), and G. W. KIRBY (University of Glasgow). Springer-Verlag, Vienna and New York. 1976. viii + 581 pp. \$98.40.

The high standards set in previous issues of this valuable series are maintained in the latest volume, which contains five reviews on topics by active authorities in their respective fields.

The chapter "Natural Products from Porifera" by the Naples group of L. Minale, G. Cimino, S. Lee Stefano, and G. Sodano covers research on the sponges, a group of marine invertebrates which has received much recent chemical attention. Emphasis is on the structure determination and chemistry of bromo compounds, terpenes, sterols, miscellaneous compounds, and a type which the authors designate as "compounds of mixed biogenesis". Brief summaries of distribution of sponges and pharmacological properties of the compounds are included.

"Biogenetic-Type Rearrangements of Terpenes" by R. M. Coates, one of two long (157 pages) chapters, is a comprehensive review of compounds in the four major classes of terpenoids. Mechanisms considered to be basic to the rearrangements, 1,*n*-hydrogen elimination, 1,*n*-hydrogen rearrangements, and 1,2-rearrangements (methyl shifts, ring contractions, and ring enlargements) are discussed in separate sections. Recent literature contains a wealth of studies of rearrangements involving terpenes, and this chapter serves as an admirable coverage of the mechanistic and stereochemical aspects of those investigations.

Chapter 3, "Chemistry of the Ansamycin Antibiotics" by K. L. Rinehart and L. S. Shield, is a timely review of this biologically active group of compounds. Although the majority of these large ring compounds are products of fermentation, recent additions to the group

are the maytansinoids, plant components of which some are of clinical interest as antitumor agents. The chapter contains sections on the structures of naturally occurring ansamycins, their reactions and physical properties.

"The Chemistry of Tryptophan in Peptides and Proteins" contributed by A. Fontana and C. Toniolo of Padova was written "with the interest of both biochemists and organic chemists in mind". While the coverage is primarily related to protein chemistry, the article is introduced with sections summarizing structure and reactivity, chemical and biosynthesis, and metabolism of tryptophan. The literature of tryptophan chemistry is so extensive that even in this long (141 pages) review the authors have found it necessary to limit discussion to more recent developments. The result is an outstanding chapter.

P. Hemmerich, in "The Present Status of Flavin and Flavocoenzyme Chemistry", obviously writing about his chosen field, expresses convictions that the subject should be accorded recognition in its rightful place as a legitimate organic natural product topic. A critique of earlier views regarding the compounds and a section on needed revision of existing nomenclature leads into a refreshing, somewhat personal, review. For the average organic natural product chemist like the present reviewer who has concentrated his attention on more "traditional" topics such as the ones covered in the first four chapters of this volume, this article offers an excellent vehicle for "catching up" modestly in an extremely important and complex area of bioorganic chemistry.

The five manuscripts have submission dates between January and August 1975. In such fast-moving fields of research and in an era of "instant replay", it would be gratifying to have a shorter interval before publication, but for such a well-edited, and polished, product, with excellent subject and author indexes and complete references to each chapter, perhaps one should just count the blessings and not quibble.

Frederic C. Chang, *University of South Alabama*

Surface and Colloid Science, Volume 9. Edited by EGON MATIJEVIC (Clarkson College of Technology). John Wiley & Sons, Inc., New York, N.Y. 1976. ix + 382 pp. \$34.95.

The first of the four articles in this volume is a review entitled The Stability of Emulsions and Mechanisms of Emulsion Breakdown. The author considers three stages of emulsion development: flocculation and coagulation, coalescence, and breakdown. The section on flocculation and coagulation contains a brief account of the Derjaguin-Landau-Verwey-Overbeek theory of emulsion stability along with applications and various prescriptions for modifying the theory. These generally take the form of corrections to the London and double-layer interaction energies as well as including viscous interactions and other forces. The discussion of coalescence phenomena is primarily a review of experimental work. Ultracentrifuge techniques and thin film methods are reviewed as are other more direct methods, e.g., particle number vs. time studies and stability as a function of surfactant chain length and concentration studies. The curious stability of the so-called black films is discussed, and bulk-phase effects in coalescence are described. A brief review of temperature dependence studies of coalescence is also included. The final portion of the review deals with the problem of emulsion breakdown. Various physico-chemical methods are reviewed including electrolyte addition, heterocoalescence techniques, mass transport effects, and the direct control of surfactant concentration. Electrically induced coalescence is discussed in some detail as is coalescence induced by a third body, e.g., filters.

The second article, Nuclear Magnetic Resonance of Surfactant Solutions, deals with applications of proton NMR techniques to micellar solutions, solubilization behavior, mesomorphic phases, and surfactant interactions in mixed micelles. Micelle formation in aqueous and nonaqueous solutions is treated. Chemical shift and relaxation time data (mostly T_1) are presented for solvent and surfactant protons above and below the CMC. Chemical shift data are given for a variety of mixed micelle systems and these are used to model surfactant interaction in mixed micelles. The solubilization of organic

compounds in surfactant micellar solutions is discussed. The authors devote a portion of the article to NMR studies of phase behavior in one-, two-, and multicomponent systems.

The third article is entitled Micellar Aspects of Casein. Casein, the major protein constituent of milk, is a particularly interesting substance from the standpoint of the colloid chemist in part because of the great colloidal stability of the casein micelles. The authors first discuss various properties of casein micelles and then consider the role of inorganic constituents (calcium, in particular), micelle substructure and micelle voluminosity, and hydration. They point out that a casein micelle is really made up of many submicelles, and that the binding of these submicelles depends very strongly on the inorganic constituents, e.g., calcium phosphate. The stability of the submicelle itself, however, is probably due to strong protein-protein interactions and not calcium bridges, and a large portion of the article is devoted to casein association and its effect upon micelle stability. Various experimental methods for studying protein interactions are discussed including average molecular weight measurements, electrophoresis, sedimentation, and gel chromatography techniques.

The fourth article, The Adsorption of Gases on Porous Solids, begins with a review of adsorption phenomena on nonporous solids while the remainder of the article is divided into discussions of adsorption on mesoporous solids and adsorption in micropores. In the former the authors discuss the Kelvin equation and applications to capillary condensation on mesoporous solids. They review theories of adsorption hysteresis and, in addition, discuss a number of methods useful for characterizing pore dimensions. In the latter section the authors review, among other topics, the various attempts to calculate the interaction energy of a molecule adsorbed in a micropore of various geometries. Methods for determining microporosity are discussed as well as methods for measuring micropore volume, e.g., t and α_s plots and the Dubinin-Radushkevich plot. Heats of adsorption and the role constrictions play in micropore adsorption are treated as well.

Richard H. Heist, *University of Rochester*

Applied Spectroscopy Reviews, Volume 11. Edited by EDWARD G. BRAME, JR. (E. I. duPont de Nemours & Co.). Marcel Dekker, Inc., New York, N.Y. 1976. xv + 337 pp. \$34.50

This volume comprises the latest bound collection of articles from the quarterly journal of the same name together with the addition of a rather perfunctory index. There is no unifying theme connecting the articles other than the rather broad one of analytical spectroscopic techniques. Perhaps a more serious problem is that there is also a wide variation in the levels at which the included articles address the reader. The article on the use of hexafluoroacetone as an NMR probe molecule could almost serve as a laboratory manual for the technique while that by T. Shimizu is a very readable but only introductory account of advances in the use of coherence to improve resolution in microwave and infrared spectroscopy. Again, the article by L. Andrews on laser-excitation matrix-isolation spectroscopy addresses a very specialized audience—Professor Andrews does not even define the term matrix-isolation spectroscopy.

The papers which seemed most appropriate for inclusion in a volume of review articles were those by K. Holland-Moritz and H. W. Sisler on the infrared spectroscopy of polymers and by D. Balasubramanian and C. Kumar on circular dichroism in biopolymers. Each of these articles presents clear, well-organized, and well-referenced accounts of its subject with sufficient introduction so that the nonspecialist can follow along easily without undertaking an undue amount of outside reading. They should prove excellent first sources for graduate students beginning work in these fields.

The decision to add this expensive paperback to one's personal library, then, depends on whether or not one has an immediate need either for a thorough introduction to the IR spectroscopy of polymers or for circular dichroism investigative techniques in biopolymers. It must be assumed that the specialists who might be interested in some of the more advanced articles in this volume are already aware of the merits of those articles and do not need the advice of a reviewer.

I. L. Tyler, *University of Missouri-Kansas City*