

produce a coordinatively unsaturated intermediate followed by CO addition.

$$-d[I]/dt = k_2[I]P_{CO} \quad k_2 = 2.7 \times 10^{-8} \text{ s}^{-1} \text{ mm}^{-1} \quad (5)$$

The present results demonstrate that the Lewis acid $AlBr_3$ may be employed in the alkyl migration reaction to stabilize unusual products and to greatly accelerate the migration step. Similar results are obtained with a variety of Lewis acids and with protic acids; details will be presented later. The structural and mechanistic information obtained here may apply to more complex reactions such as the generation of methane¹³ or cyclic ketones¹⁴ in the presence of metal complexes, Lewis acids, and CO.

Acknowledgment. This research was supported by the National Science Foundation through Grant CHE 77018747.

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Received February 20, 1979

Book Reviews*

CRC Handbook of Chemistry and Physics. 59th Edition. Edited by R. C. WEAST. CRC Press, Inc., Cleveland, Ohio. 1978. 2512 pp. \$44.95.

The last review in this Journal of this well-known work was of the 52nd edition, and appeared in Vol. 93, p 7122 (1971). In the intervening seven years, the number of pages has increased by nearly 200. This book is composed of separately paginated sections, to enable certain sections to be revised without disturbing others, which may continue unchanged through a number of editions. Revisions in this edition are found in the section on the chemical elements, the table of bond strengths, the table of radiation emissivity, etc. Additions include an extensive table of line spectra of the elements, a table of lattice energies, and a supplementary table of key values for thermodynamics. Some mathematical tables have been dropped, because simple calculators have supplemented them.

The most obvious shortcoming in this volume is the table of conversion factors, which has remained unrevised for so long that it does not include the SI units, such as pascal, hertz, becquerel, etc. This discrepancy should have been attended to long ago.

The CRC Handbook continues to be one of the greatest bargains in science for sheer quantity of useful information.

The Tropospheric Transport of Pollutants and Other Substances to the Oceans. Edited by NRC Workshop Staff Steering Committee (J. M. Prospero, Chairman). National Research Council, Washington, D.C. 1978. xi + 243 pp. \$11.75.

This softbound volume was prepared by an international group of scientists who met in December 1975. The subject matter is divided into transport and removal processes, and data on specific pollutants and trace substances, such as metals, hydrocarbons, radionuclides, etc. There is thus much of concern to chemists in this book. There is included a chapter on Summary and Principal Conclusions and Recommendations, in which it is stated that available data are insufficient to assess possible impacts of the phenomenon, and a major research effort is required.

Natural Zeolites: Occurrence, Properties, Use. Edited by L. B. SAND and F. A. MUMPTON. Pergamon Press, New York. 1978. xi + 546 pp. \$75.00.

An international conference on the title subject was held in Arizona in 1976. The motivation for such a conference is suggested by a statement in the Introduction: "In less than 20 years' time, the status of the zeolite group of minerals changed from that of a museum curiosity to an important industrial commodity." This volume consists of 45 papers given at the conference; some are reviews, and others appear to be reports of original research. Eight of the papers fall into the category "physical and chemical properties", and a number of other papers on applied aspects are chemical in nature. The book is unusually well illustrated and has a subject index.

Dictionary of Scientific and Technical Terms. Second Edition. Edited by D. N. LAPEDES. McGraw-Hill Book Co., New York. 1978. xv + 1771 + 58 pp. \$39.50.

The first edition of this dictionary appeared in 1974 to supplement the general dictionaries in existence, in which technical terms are inadequately represented. Many new terms have had to be added.

Because of the broad scope, terms peculiar to chemistry are in the minority, but those that do appear are defined with professional competence. The criteria for listing a term are not readily apparent, however, for one finds "carbene" but not "nitrene", "nitronium" but not "nityrium", etc., and many important chemical terms, such as "nitrosamine", "molecular sieve", "ambident", etc., are omitted, whereas "car" and "automobile" are given places. "Vigreux column" is misspelled with a superfluous "a", and is misleadingly defined as a term belonging to analytical chemistry, and defined as "An obsolete apparatus . . .". The publishers should include an organic chemist on the editorial team for any future edition.

The book is very well produced, and has many illustrations in the margins. It appears to be a generally reliable reference, and is excellent value for the price in today's market of expensive books.

Thin-Layer Chromatography. 2nd Edition. By J. G. KIRCHNER. Edited by E. S. PERRY. Wiley/Interscience, New York. 1978. xix + 1137 pp. \$60.00.

This is Volume XIV in the series "Techniques of Chemistry" under the general editorship of Arnold Weissberger. Some chapters have been completely revised, and all have been brought up to date with references through 1975, and in some cases up to 1977. Detection reagents are given expanded treatment, in recognition of their increased importance. The general outline of the first edition is main-

* Unsigned book reviews are by the Book Review Editor.

tained, with a separation into two divisions: techniques and applications. The first division describes both the theory and practice of the operations, including such matters as preparation of plates, application of samples, and adaptation to preparative purposes. The second section is subdivided into 21 classes of substance, from amines to dyes, lipids to inorganic ions, and hydrocarbons to antibiotics.

This book invites comparison with Egon Stahl's book of the same title, published in 1969. Both are monumental treatments of the subject, and both are by pioneers in the field. The latter book, however, is composed largely of contributed chapters, and is, of course, a decade older, although books on techniques do not necessarily become out of date so rapidly as other types of books.

Proceedings of the 1978 Heat-Transfer and Fluid Mechanics Institute. Edited by C. T. CROWE and W. L. GROSSHANDLER. Stanford University Press, Stanford, Calif. 1978. xii + 329 pp. \$28.50.

There are 26 review papers in this book. They are largely concerned with fluid mechanics in applied situations where heat transfer and energy conservation are of importance. There is no index.

Scientific Problems of Coal Utilization. Edited by B. R. COOPER. Technical Information Department, U.S. Department of Energy, 1978. Available as CONF-770509 from National Technical Information Service, U.S. Department of Commerce, Springfield, Va. 22161. xi + 409 pp. \$9.00.

This is the proceedings of a conference held in 1977. The scope is broad, and includes 21 lectures or panel discussions dealing with chemical and physical properties of coal, various aspects of liquefaction and gasification, beneficiation, mining, etc. In addition, the abstracts of a large number of research papers presented at poster sessions are included. The contributions originated from academic, industrial, and governmental laboratories, and so cover a range of viewpoints. There is a subject index, fortunately, for without one, such a book would be hard to use.

Science and the Human Imagination: Einstein. Edited by C. ANGOFF. Fairleigh Dickinson University Press, Cranbury, N.J. 1978. 94 pp. \$4.50.

In this slim book are presented the two Leverton Lectures, one by Jeremy Bernstein and one by Gerald Feinberg, which constitute a scientific biography of Albert Einstein. In the second half of the book appear lectures by Henry B. Hass and A. K. Bose on "New Jersey's Contributions to the Chemical Industry and Chemical Education".

Speaking of Science 1977. Volume 50 of the Proceedings of The Royal Institution of Great Britain. Taylor and Francis, Ltd., Basingstoke, Hants., England. 1978. vii + 294 pp. £8.00.

The Royal Institution presents a series of evening lectures by people eminent in their fields. Fourteen of these, given in the 1976-7 season, are included in this volume. Several of them should be of interest to chemists, such as "Chemistry, The Past Century and the Next", by Linus Pauling, and "Food \rightleftharpoons Fuel", by Peter B. King.

Hypothalamic Hormones—Chemistry, Physiology, and Clinical Applications. Edited by D. GUPTA and W. VOELTER. Verlag Chemie, Weinheim and New York. 1978. 754 pp. plus advertisements. \$65.70.

This volume reports the Proceedings of the 2nd European Colloquium on Hypothalamic Hormones, held in 1976. It consists of a large number of papers that appear to be reports of original research, reproduced from somewhat pale typescript, but well illustrated. Fourteen of the papers fall under the rubric Chemistry. The utility of the book is enhanced by a proper subject index (8 pp) and a true author index that includes citations as well as contributors.

Annual Reports on Fermentation Processes. Volume 2. Edited by D. PERLMAN (University of Wisconsin, Madison). Academic Press, New York. 1978. ix + 338 pp. \$19.00.

Anyone interested in current activities in the field of fermentation processes will find this collection of twelve papers informative. Among the topics covered are fermentation substrates and products from cellulosic materials, computer applications to fermentation processes, immobilized cells, enzymes of industrial interest, amino acids, yeasts, antibiotics, and cytotoxic and antitumor compounds. References are included.

M. C. W. Smith, *Ann Arbor, Michigan*

Biochemistry and Genetics of Yeasts. Pure and Applied Aspects. Edited by METRY BACILA (Universidade de São Paulo, Brazil), BERNARD L. HORECKER (Roche Institute of Molecular Biology, Nutley, N.J.), and ANDRÉS O. M. STOPPANI (Universidad de Buenos Aires). Academic Press, New York. 1978. xx + 594 pp. \$27.50.

Brazil is a leader in the production of alcohol and has pioneered in its use as a substitute for gasoline. An estimated 2.5 billion liters of alcohol was produced from sugar cane in 1978. It was appropriate, therefore, that an international symposium on yeasts should be held in Brazil. The result is this collection of 32 papers arranged in seven sections. Yeast enzymology, retrospective and perspectives, forms the introduction. This is followed by sections on metabolism and its regulation, macromolecular synthesis and growth, genetic control of energy-yielding metabolism, cloning of yeast DNA, biogenesis of mitochondria, and perspectives in yeast technology. Papers are well illustrated, contain references, and will be useful to anyone interested in yeasts or biotechnology.

M. C. W. Smith, *Ann Arbor, Michigan*

Disinfection of Wastewater and Water for Reuse. By G. CLIFFORD WHITE (San Francisco). Van Nostrand-Reinhold, New York. 1978. xi + 387 pp. \$24.50.

Engineers and public health workers involved in wastewater treatment, as well as graduate students and researchers in sanitary engineering, will find that this handbook provides up-to-date information on all aspects of water disinfection. Concepts of wastewater disinfection are discussed followed by three chapters devoted to chlorination-dechlorination systems. Other chapters include hypochlorination, chlorine dioxide, bromine, bromine chloride, iodine, UV radiation, and ozone. Disinfectants are evaluated from the standpoint of safety, effectiveness, and cost. Each chapter includes references and an appendix contains useful tables.

M. C. W. Smith, *Ann Arbor, Michigan*

Colloid Formation and Growth. A Chemical Kinetics Approach. By JULIAN HEICKLEN. Academic Press, New York. 1976. xx + 132 pp. \$14.50.

This volume presents a discussion of colloid formation, from the standpoint of chemical kinetic theory, at a level suitable for a graduate student or a researcher entering the field. The book opens with an introduction to the notation for coalescence reactions. A chapter on first-order loss processes primarily presents solutions to the diffusion equation for systems influenced by chemical reaction and losses (or sources) at the walls. The author keeps the discussion to a reasonably simple mathematical level, though casual readers may feel slightly intimidated by the notation. A third chapter discusses the kinetics of particle coagulation, closing with an explanation of the appearance of log-normal distributions. Processes which disperse colloidal aggregates are discussed from the standpoint of equilibrium thermodynamics. Further chapters treat homogeneous and heterogeneous nucleation and accommodation coefficients, with appreciable attention to experimental work and the experimental difficulties in its interpretation.

Kinetic theory is here treated as a mathematical exercise, with physical effects being brought in by macroscopic treatments and semiempirical prescriptions. However, there is also a lot of experimental data, with failings and limits of the theoretical calculations being pointed out. The author discusses at length the problem of treating small clusters as macroscopic particles and presents experimental data bearing on the problem; an analysis of small clusters from a microscopic (molecular) standpoint is not within the scope of the volume.

An eight-page symbol table precedes the text. The utility of the footnotes is greatly enhanced by the inclusion of titles for individual articles. The volume may be favorably recommended as a concise exposition of its chosen topic.

George D. J. Phillies, *University of Michigan*

Applied Atomic Spectroscopy. Volumes 1 and 2. Edited by E. L. GROVE (ITT Research Institute). Plenum Press, New York. 1978. xv + 313 pp. xvii + 344 pp. \$39.50 each.

This two-volume publication, part of the "Modern Analytical Chemistry" series, describes several practical applications utilizing atomic spectroscopy. The editor's stated objectives are to treat new developments within a historical framework. Although not a comprehensive text on atomic emission, these volumes offer, in addition

to applications, an excellent review of several techniques of emission spectroscopy. Chapters in Volume 1 include discussions of photographic photometry, laser emission excitation and spectroscopy, electrode material design for emission spectroscopy, behavior of refractory material in direct-current arc plasmas, preparation and evaluation of spectrochemical standards, and applications of emission and X-ray spectroscopy to oceanography.

Atomic emission techniques applied to several disciplines are described in Volume 2. Disciplines include precious metals, the petroleum industry, biomedical research, toxicology, and clinical chemistry. The chapter by Buell on the analytical applications of atomic spectroscopy in the petroleum industry gives a comprehensive description of the spectroscopic methods available to determine inorganic constituents present in organic systems.

The reviewer recommends this publication as an excellent source of information for the spectroscopist. If the material of interest is not covered directly in the text, one of the over 2000 references will certainly be of benefit.

N. M. Potter, *General Motors Research Laboratories*

Electron Correlation in Small Molecules. By A. C. HURLEY (CSIRO, Australia). Academic Press, New York, 1977. viii + 276 pp. \$23.00.

This book is the sixth volume of a series of monographs on theoretical chemistry. As the title indicates, the book deals exclusively with the electron correlation problem, and hence is on somewhat a more advanced level than Hurley's other recent book, "Introduction to the Electron Theory of Small Molecules".

The book consists of two major chapters and two appendices. The first chapter deals with the qualitative correction of the errors in the Hartree-Fock method, i.e., the more obvious corrections which are necessary to give qualitatively correct behavior at dissociation. Theories which are capable of giving a quantitatively accurate description of the electronic structure of molecules are discussed in the second chapter. The primary emphasis of the book is on pair theories, although other methods employing explicitly correlated wave functions and natural orbitals are discussed. Only *ab initio* methodology is considered.

The book is reasonably representative of work on the correlation problem prior to 1973. Work on the excited states of molecules and more recent advances as many-body perturbation theory and Green's function methods are not discussed. On balance, however, this volume is a significant contribution to the theoretical chemistry literature, and it should be very useful to all quantum chemists.

Stuart M. Rothstein, *Brock University*

Topics in Antibiotic Chemistry. Volume 1. Aminoglycosides and Ansamycins. Edited by P. G. SAMMES (The City University, London). Halsted Press, New York, 1977. 217 pp. \$28.50.

The majority of patients go to physicians hoping for (a) sympathy and (b) a pill or injection to cure their ailments. A large drug industry exists to provide physicians with category (b). In the case of antibiotics continued research is required not only to find new antibiotics to cure additional diseases, but also to counteract the rapid evolution of microorganisms resistant to existing antibiotics. Volume 1 in this new series on antibiotic chemistry consists of a slim volume containing reviews of two groups of antibiotics produced by actinomycetes. D. A. Cox, K. Richardson, and B. C. Ross review the chemistry of aminoglycosides (91 pp), and M. Brufani reviews the ansamycins (122 pp). Relationships between chemical and biological properties are also included. Authors of both reviews have managed to condense a large amount of useful information widely scattered in the literature into compact and readable form. However, an opening volume in a series on such an important subject might be expected to contain much more material. It is anticipated that this series will be purchased primarily by individuals actively engaged in antibiotic research and by libraries of drug companies and large research universities.

James B. Walker, *Rice University*

Liquid Chromatography Detectors. By R. P. W. SCOTT (Hoffmann-La Roche Inc.). Elsevier Scientific Publishing Co., Amsterdam, 1977. v + 248 pp. \$34.50.

The technical advances in liquid chromatography during the last decade have depended on the development of accurate high-pressure

pumps, low dead-volume injectors, and especially high-sensitivity linear detectors. This book, Volume 11 in the *Journal of Chromatography Library*, is a well-balanced, practical review of modern LC detectors. Part 1 outlines criteria of detector performance and the detector characteristics that affect band dispersion and thus column performance. Part 2 discusses detectors that measure changes in refractive index, dielectric constant, electrical conductivity, or other bulk properties of the column eluent. Part 3 describes detectors that measure a property of the solute, such as ultraviolet absorption, fluorescent emission, electron capture, or flame ionization. Part 4 is a practical discussion of the selection and operation of the more commonly available LC detectors, including direct measurement of the ultraviolet spectrum or mass spectrum of the column eluate. This first comprehensive book devoted to LC detectors will be valuable to workers in academic and industrial laboratories who desire a clear understanding of the principles of detection in order to choose a detector suitable for their research needs.

Bruce W. Erickson, *The Rockefeller University*

Colloid Science. Volume 2. A Review of the Literature Published 1972-1974. Edited by D. H. EVERETT (University of Bristol). The Chemical Society, London, 1975. x + 323 pp. \$49.50.

The stated purpose of the book: "To discuss critically and to attempt integration of new material with established knowledge", and not to provide an exhaustive bibliographic review is well accomplished by the editor in the course of eight chapters. The research described is generally not a restatement of work done in previous years, although that work is certainly built upon. In each chapter good discussions of current investigations are provided. In addition, a good bibliography is provided with each chapter. The selections of chapters deal with areas of surface science that are of current interest. These chapters are: "Adsorption at the Gas/Solid Interface", by N. D. Parkyns and K. S. W. Sing; "Adsorption at the Solid/Liquid Interface: Non-electrolyte Systems", by C. E. Brown and D. H. Everett; "Porous Media: Structures and Models", by J. M. Haynes; "The Theory and Calculation of van der Waals Forces", by P. Richmond; "Insoluble Monolayers—Equilibrium Aspects", by G. T. Barnes; "Thin Films", by R. Buscall and R. H. Ottewill; "The Rheology of Dispersions", by J. W. Goodwin; "Emulsions", by B. Vincent. The serious investigator in surface science would find this book to be of much interest and value.

Richard L. Garner, *Hardin-Simmons University, Abilene, Texas*

Radiochromatography: The Chromatography and Electrophoresis of Radiolabelled Compounds (Journal of Chromatography Library, Volume 14). By T. R. ROBERTS (Shell Research Ltd., U.K.). Elsevier Publishing Co., Amsterdam, 1978. x + 174 pp. \$39.95.

Tracking down metabolic pathways and the transport of toxic residues in plants and animals is often a very difficult task because of the myriad of compounds of similar structure which are often present. The performance of gas chromatography, liquid chromatography, and electrophoresis techniques has improved markedly over the last decade. Nevertheless, these techniques by themselves are usually inadequate for very complex samples, especially if the specific compounds which must be measured are of unknown structure (e.g., in the initial screening of a new drug candidate for its metabolic disposition in a laboratory animal). Researchers with these problems continue to rely on a combination of intuition and radiolabelled compounds.

The present volume is an excellent review of the state-of-the-art in monitoring radiolabelled substances separated by chromatographic or electrophoretic methods. Both continuous (on-line) and discontinuous (discrete sampling) methods are covered in detail for column and two-dimensional separation techniques. The text abounds with history, information on both commercial and noncommercial apparatus, and a selection of the more important applications. The literature coverage is excellent through 1976 and there are many references from 1977 as well. There is an emphasis on commercial equipment, and a number of photographs of somewhat dated apparatus are given. This does not detract from the utility of the book as a practical guide for anyone using or contemplating the use of radiolabelled compounds.

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