

## • *New Books*

PHYSICAL CHEMISTRY OF SURFACES, by Arthur W. Adamson (Interscience Publishers Inc., New York, 1960, 629 pp., \$12.75). This book was written not only as a textbook for graduate students but also as a bridge for professional chemists between basic physical chemistry and the proliferating specialized literature on surface chemistry. It is a readily understandable, informative presentation, which manages to explain complicated phenomena without requiring the knowledge of advanced thermodynamics or statistical mechanics. Most readers will find this book far more readable and much more practical than the several well-known treatises which are so abstrusely sophisticated that they are beyond the comprehension of persons with the average chemical background.

The major aspects of surface chemistry are developed, chapter by chapter, in a logical sequence from the more simple and clear-cut topics to the more complex. The concept of capillarity is followed by the physical chemistry of solutions, then the subject of spread films. A discussion of charged films precedes the chapter on the electrical aspects of surface chemistry. The detailed treatment of the nature of solid surfaces serves as a basis for the discussion of contact angle and nucleation phenomena. A general discussion of the meaning of solid surface areas helps to clarify the succeeding chapters on the adsorption of gases on solids, chemisorption and catalysis, and adsorption from solution.

Chapters on friction and lubrication, flotation and detergency, and emulsions and foams are inserted into the mainstream of subject development to introduce these important applied areas of surface chemistry. These three chapters alone make this book valuable to almost every chemist in the fat and oil field. In fact, members of the Society will find that practically every chapter in the book contains useful and enlightening information applicable to some phase of fat and oil technology.

This book is definitely a worthwhile contribution to the general comprehension of the physical chemistry of liquid and solid surfaces. Interesting, thought-provoking problems are provided with the chapters in the first half of the book for those who wish to gain a more concrete understanding of the various concepts. The 30 pages of author and subject indexes are adequate for a book of this size. Like all of this publisher's books, this one is nicely bound, neatly printed, and suitably illustrated.

C.W. HOERR, Durkee Famous Foods, Division of the Glidden Company, Chicago, Ill.

ORGANIC REACTIONS, Vol. XI, Arthur C. Cope, editor-in-chief (John Wiley and Son Inc., 501 pp., 1960, \$12). Like "Ole Man River," "Organic Reactions" just keeps rolling along. The detailed review of such a well-known series would be redundant; the same high quality we have come to expect is maintained in this, the latest volume.

As in the past, the chapters in this volume have been written by authors who have had extensive experience in working with the reactions described. Thus we have a critical, authoritative, and up-to-date discussion. The following reactions have been described: The Beckmann rearrangement (L.G. Donaruma and W.Z. Heldt), The Demjanov and Tiffeneau-Demjanov Ring Expansions (P.A.S. Smith and D.R. Baer), Arylation of Unsaturated Compounds by Diazonium Salts (C.S. Rondstedt Jr.), The Favorskii Rearrangement of Haloketones (A.S. Kende), Olefins from Amines: The Hofmann Elimination Reaction and Amine Oxide Pyrolysis (A.C. Cope and E.R. Trumbull).

Everyone interested in the organic chemistry of fats cannot afford to be without this volume and all of the preceding members of the series. Although there are only few direct references to the use of these reactions in the chemistry of fats, this volume should suggest many fertile and fruitful ideas for application in the fat field. As usual, the book is free of typographical errors, it is well indexed, and the tables are clear, detailed, and easy to read.

DANIEL SWERN, Eastern Regional Research Laboratory, Philadelphia, Pa.

SYSTEMATIC ANALYSIS OF SURFACE-ACTIVE AGENTS, by Milton J. Rosen and Henry A. Goldsmith (Interscience Publishers Inc., New York, 422 pp., 1960, \$13.50). As Volume 12 of the chemical analysis monograph series, this work maintains the high caliber of organization and presentation which is characteristic of prior volumes. It is the first major survey to cover all classes of surfactants with an over-all systematic and rational scheme of analysis.

The first chapter introduces, succinctly, the problems in recognition, isolation, and identification of surfactants and presents a new classification, based on elemental and functional group analyses. All types of cationic, anionic, non-ionic, and ampholytic surfactants are logically arranged into 11 classes. In the second chapter the detection of surfactants in mixtures is presented, replete with detailed methods and their scope. In addition, methods for the isolation and group estimations are described. After a brief citation of physical methods a scheme of qualitative analysis for specific surfactants is detailed in Chapter 3. Using elemental and functional group analyses, the surfactant is placed in a single subclass. Methods for identifying individual members of the subclass are also given. The next chapter covers quantitative analyses, utilizing modifications of well-known analytical procedures. The detailed procedures are arranged according to the 11 basic classes. In the final chapter on the separation of mixtures of surface-active agents, ion exchange techniques and solvent extractions are described along with other tests necessary for the separations. A listing of the representative, commercially available surfactants and their suppliers is given in the Appendix. Also included in these lists are the refractive indices of the agents and the raw materials.

The rapidly expanding number of surfactants and their wider use in all types of products has complicated the identification of surfactants in new materials. This book provides in a handy, easy-to-use manner the information and detailed methods necessary to conduct such investigations. The clear type, explicit instructions, and the extensive tables and flow charts make this a handy reference for any laboratory concerned with such agents.

The authors have taken into account the variations in materials bearing the same name from different suppliers and discuss these facts at several points. The need for additional research is indicated in many areas, such as page 187, where the methods for polyoxyethylene derivatives are described as "the most nearly quantitative methods published so far, but they are still not truly quantitative." In those instances where several methods are presented for a given type of determination, some basis for selecting one or the other would be desirable. The presentation however does allow for handling those materials that are not yet commercially available.

All analysts engaged in the examination of surface-active materials should have this book on their desks.

J.H. BENEDICT, Procter and Gamble Company, Cincinnati, O.

TABLES FOR IDENTIFICATION OF ORGANIC COMPOUNDS, Supplement to Handbook of Chemistry and Physics, edited by Charles D. Hodgman, Robert C. Weast, and Samuel M. Selby (Chemical Rubber Publishing Company, Cleveland, O., 256 pp., 1960, \$7). The above volume lists in tabular form the derivatives of 4,380 parent compounds arranged in 17 classes. The 17 classes include: alcohols, aldehydes, alkyl and aryl halides, amines, amino acids, aromatic hydrocarbons, carbohydrates, carboxylic acid anhydrides, carboxylic acid halides, carboxylic acids, ethers, ketones, nitriles, nitro compounds, phenols, quinones, and sulfonic acids. For a given class of compounds, liquids and solids are listed separately and arranged according to increasing boiling- and melting-points. In the case of sulfonic acids, where melting points are unreliable, the listing is according to the increasing melting-point of derivatives. In all, there are more than 30,000 constants of organic derivatives.

This book comes up to the usual high standards of the Handbook of Chemistry and Physics. It will be extremely useful to chemists engaged in qualitative organic analyses.

FRANK L. JACKSON, Procter and Gamble Company, Cincinnati, O.

ENCYCLOPEDIA OF CHEMICAL TECHNOLOGY, edited by Raymond E. Kirk and Donald F. Othmer; Second Supplement Volume, Anthony Standen, editor (Interscience Encyclopedia Inc., 970 pp., 1960, \$25). The Second Supplement Volume to the Encyclopedia of Chemical Technology is similar in size and format to the 15 regular volumes. Fifty-eight subjects have been selected for comparatively full review. They are written by authors who are experts in their respective fields.

Among the subjects discussed in 916 pages are the elements beryllium, boron, cesium, helium, rubidium, tantalum, titanium, and tin—principally organotin compounds. Processes covered include diffusion separation, the oxo process, synthesis of stereoregular and linear addition polymers, and thermonuclear power conversion. Discussed are such timely subjects as electric cells, fuel cells, instant coffee, epoxidation, gas chromatography, laminated products, polycarbonates, radioisotopes, solid rocket propellants, solions, sugar derivatives, ultraviolet absorbers; the compounds acetylene, acetylenic alcohols, ammonium nitrate, borazines, cyclopentadiene, nitric acid, perchloryl fluoride, polyethylene oxide, polymethylbenzenes, polyoxetanes, polypropylene, polyvinylpyrrolidone, sulfur hexafluoride, chitin, nonionic surfactants, penicillin, and unsaturated polyester resins; theories concerning free radicals, solid state dislocation, and thermodynamics of irreversible processes; and other topics including analgesics, ceramics, chemical coding, corrosion, cryogenics, electrodeposition of metals from nonaqueous media, geochemical prospecting, glass, magnetic materials, synthetic mica, halogenated butyl rubber, synthetic gas, and tool materials for machining.

The printed text is generously documented with photographs, drawings, graphs, tables of data, and hundreds of references. In addition, The Second Supplement Volume not only contains its own completely alphabetized index of 42 pages but also has an integrated list of more than 1,000 articles in alphabetical order covering all the fields embraced by the complete encyclopedia.

To cover adequately the field of chemical technology requires 15 volumes, and, since publication, a first supplementary volume has appeared. The object of the latter and the Second Supplementary Volume is to restore to current status those portions of the 15 volumes which have inevitably become obsolete because of rapid technological progress in certain fields. Those who have used the encyclopedia will welcome the appearance of a second supplement, and those who have not will find it definitely gratifying to make its acquaintance. All who work in the field of chemistry and chemical technology will find something of value in its pages.

MADELINE G. LAMBOU, Southern Regional Research Laboratory, New Orleans, La.

OFFICIAL METHODS OF ANALYSIS OF THE ASSOCIATION OF AGRICULTURAL CHEMISTS, 9th ed., edited by William Horowitz (Association of Official Agricultural Chemists, Washington, D.C., 832 pp., 1960, \$17.50). The book is a compilation of methods sponsored by the Association up to and including those adopted at its 1959 meeting. These standardized methods are used by governmental regulatory agencies, federal, state, and municipal, and by the regulated industries. Included are the following chapter titles: Agricultural Liming Materials; Fertilizers; Caustic Poisons; Pesticides; Disinfectants; Plants; Baking Powders and Baking Chemicals; Beverages: Non-alcoholic and Concentrates; Beverages: Distilled Liquors; Beverages: Malt Beverages, Sirups and Extracts, and Brewing Materials; Beverages: Wines, Cacao Bean and Its Products; Cereal Foods; Coffee and Tea; Dairy Products; Eggs and Egg Products; Enzymes; Fish and Other Marine Products; Flavoring Extracts; Fruits and Fruit Products; Gelatin, Dessert Preparations and Mixes; Grain and Stock Feeds; Meat and Meat Products; Metals, Other Elements, and Residues in Foods; Nuts and Nut Products; Oils, Fats, and Waxes; Preservatives and Artificial Sweeteners; Spices and Other Condiments; Sugars and Sugar Products; Vegetable Products, Processed; Waters, Mineral, and Salt; Drugs; Drugs in



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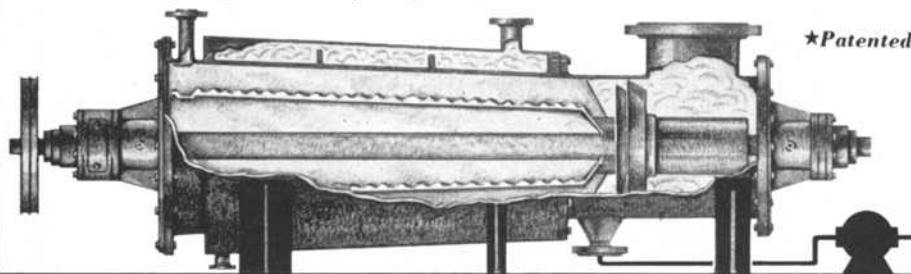
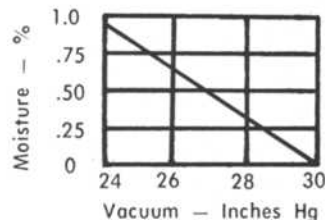
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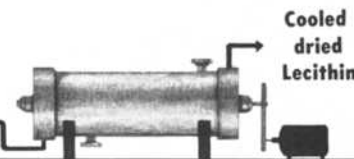


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Although no extensive changes have been made, this edition contains a number of additions to the previous 8th edition (1955). The format has been revised to a larger page size, containing two columns of type. The bacteriological methods for disinfectants have been separated from the chemical methods for pesticides, and the specific methods for drugs in feeds have been placed in a separate chapter. Procedures have been added for the newer organic pesticides, Aramite, benzene hexachloride, captan, malathion, methoxychlor, piperonyl butoxide, Sulphenone, and tetramethylthiuram disulfide. Other additions are found scattered throughout the book. The classical scheme of elementary analysis formerly in the chapter on soils, which is now omitted, has been retained in the chapter on liming materials. The added methods include the use of the newer analytical techniques such as paper chromatography, infrared and ultraviolet spectrophotometry, and radioisotopes.

Users of previous editions naturally will want to have available this up-to-date version. The book is highly recommended to anyone concerned with the analysis of natural products.

A.J. MILUN, General Mills Inc., Minneapolis, Minn.

PHYSICAL METHODS OF ORGANIC CHEMISTRY, 3rd ed., Vol. 1, Part III, edited by Arnold Weissberger (Interscience Publishers Inc., New York, 850 pp., 1960, \$24.50). The comments this reviewer made in examining Part II of this fine series apply equally well to Part III. Many of the striking advances in organic chemistry during the past two decades have been the direct consequence of the rapid development and application of physical methods. Since 1946, when the first edition was published, we have seen dramatic improvements in older physical methods as well as the introduction and "perfection" of many new methods. This fine series of books has kept up with the progress by timely revisions.

The chapters in this volume have been written by individuals who are active in the fields which they discuss; thus authoritative, critical, and up-to-date presentations have been made. The present volume has the following subjects and authors:

Spectroscopy and Spectrophotometry in the Visible and Ultraviolet, by W. West

Infrared Spectroscopy, by D.H. Anderson, N.B. Woodall, and W. West

Colorimetry and Photometric Analysis, by W. West

Determination of Fluorescence and Phosphorescence, by N. Wotherspoon and G. Oster

Light Scattering, by G. Oster

Polarimetry, by W. Heller and D.D. Fitts

Optical Rotatory Dispersion, by W. Klyne and A.C. Parker

Streaming Birefringence, by H.A. Scheraga and R. Signer

The Kerr Effect, by C.G. Le Fevre and R.J.W. Le Fevre

Determination of the Faraday Effect, by C.E. Waring and R.L. Custer

Measurement of Dielectric Constant and Loss, by J.G. Powles and C.P. Smyth

Determination of Dipole Moments, by C.P. Smyth

It is difficult to see how any chemical library can be without the entire series.

The present volume is easy to read, it is well illustrated, it has an excellent balance of theory and practice, and it is free of obvious errors. It appears to be adequately indexed. This reviewer is looking forward to the remaining parts of this series.

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APPLIED GAMMA-RAY SPECTROMETRY, edited by C.E. Crouthamel (Pergamon Press, New York, 1960, xii-443 pp., \$6.50). This book is Volume II of an International Series of Monographs on Analytical Chemistry, with R. Belcher and L. Gordon as general editors. It is intended to meet the needs of chemists, biologists, engineers, and other research

workers in fields other than nuclear physics who, wishing to take advantage of the rapidly increasing and widespread application of gamma-ray spectrometry, are faced with the task of selecting the instrumentation and of interpreting the spectra.

To this reviewer the volume might more completely meet this need if it included an additional chapter presenting an elementary introduction to the whole subject of gamma-ray spectrometry. It is doubtful if, without recourse to other works, the average fatty acid chemist (or other research worker) investigating the use of gamma-ray spectrometry for the first time can readily digest the material written by authors well versed in the field and well acquainted with its vocabulary. There is a tacit assumption that the reader is familiar with at least the fundamentals and terminology of the subject matter.

However it can be countered that such an elementary introduction is available elsewhere and, to the serious fatty acid chemist (or research worker in other fields) actually attempting to utilize gamma-ray spectrometry, the information contained in the four chapters of the text will undoubtedly be extremely valuable.

Chapters 1 and 2, by C.E. Crouthamel and by William Managen and C.E. Crouthamel, respectively, contain detailed discussions of intrinsic and extrinsic variables as they affect gamma-ray spectra and their interpretation. Chapter 1 contains a table summarizing the various ways in which a nucleus in an excited state may return to the ground state. The decay schemes of the various nuclides and the interaction processes of radiation with matter are discussed. The former include sections on A. Internal Conversion, Gamma Emission, and Isometric Transition; B. Angular Correlation of Gamma-Rays in Cascade; C. Characteristic X-Ray Excitation; and D. Beta Transitions (Electron Capture, Positron Emission, and Beta Emission). The latter includes discussions of A. Photoelectric Effect; B. Compton Scattering; C. Pair Production; and D. Bremsstrahlung. Chapter 2, on extrinsic variables, includes the subjects: 1. Scintillation Spectrometer Statistics; 2. Basic Test Equipment; 3. Photomultipliers; 4. Scintillators; 5. Special Spectrometer Arrangements; 6. Design of the Detector Shielding and an Analysis of the Sources of the Detector Background; and 7. Proportional Gas Counter as a Spectrometer for Low Energy Applications.

Chapters 3 and 4 by C.E. Crouthamel and by Christopher Gatrousis and C.E. Crouthamel deal with calibration of the detectors and specific applications, respectively. The chapter on calibration includes discussions of 1. Computed Efficiency; 2. Experimental Methods for the Determination of the Full Energy Peak Efficiency; and 3. Special Effects in Measuring the Full Peak Efficiency. Chapter 4 describes applications to 1. Activation Analysis; 2. Tracer Applications; and 3. Photon Absorption and Characteristic X-Ray Emission.

To the chemist or other research worker once embarked in gamma-ray analysis the 280 pages of appendices in this volume may well become of more permanent value than the text. These include a three-page table of "X-Ray Critical Absorption and Emission Energies in KEV," compiled by S. Fine and C.F. Hendee; a four-page list of "Gamma-Ray Spectra" by Carl E. Crouthamel, Christopher Gatrousis, and Stanley J. Goslovich, followed by a 143-page library of gamma-ray spectra; 21 pages of tables listing the "Intrinsic Efficiencies of Right Cylindrical Sodium-Iodide Crystals"; and a 92-page table of "Photon Energy, Atomic Number, and Half-Life Sequences of the Nuclides," compiled by Allen A. Madson. To anyone engaged in gamma-ray spectrometry analysis, such compilations of data would appear to be of inestimable value.

The monograph is recommended to any worker engaged in or contemplating applications of gamma-ray spectroscopy. The format of the text is excellent, the numerous figures and tables are clear and easily read. Indices by subject and to the various figures and tables are included.

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