

## NEW BOOKS

**MÖSSBAUER EFFECT METHODOLOGY, VOLUME I. PROCEEDINGS OF THE FIRST SYMPOSIUM ON MÖSSBAUER EFFECT METHODOLOGY, New York City, 1965.** Edited by Irwin J. Gruverman. (New England Nuclear Corporation, distributed by Plenum Press, New York, p. viii + 200, 1965, \$12.50.)

This volume is a verbatim or quasi-verbatim reproduction of the lectures given during a symposium sponsored by the New England Nuclear Corporation by fifteen experts in the field of nuclear gamma ray (Mössbauer) spectroscopy, with emphasis placed strongly in the area of methodology. The book is divided into four major sections—I. Reviews, II. Spectrometers, III. Measurement, and IV. Environment. In the first section recent work and applications of the Mössbauer effect in chemistry, physics and biology are reviewed by R. H. Herber, by S. L. Ruby, and by U. Gonser and R. W. Grant. The second section consists of papers on "Feedback in Electro-mechanical Drive Systems" by E. Kankeleit and on types of constant acceleration and constant velocity by Mössbauer spectrometer drive systems, by A. J. Bearden, M. G. Hauser, and P. L. Mattern and by P. Flinn. The third describes the use of scattering techniques, black absorbers, standardization of chemical shift and computation of Mössbauer spectra by J. K. Major, by P. Debrunner, by J. G. Dash, by J. J. Spijkerman, F. C. Ruegg and J. R. DeVoe, and by J. R. Gabriel. In the last section are discussed the use of superconducting magnets (P. P. Craig), high-field water-cooled solenoids (N. A. Blum), cryostats (M. Kalvius), and high pressure techniques (R. Ingalls). The index is good, although it does not include references to the specific chemical elements referred to in the text.

Most previous texts and compilations on the Mössbauer effect have concentrated on the theory and applications in chemistry, physics, and biology. This book is unusual in the very heavy emphasis on methodology and instrumentation. In consequence it is a valuable source of information for anyone desiring to build or acquire equipment for Mössbauer investigations, for it includes information on the types of apparatus and techniques which have been devised, but provides in many instances comparisons of performance under various conditions. However, the first three papers contain sufficient information on the nature and theory of the effect so that those not familiar with it can acquire a reasonable degree of familiarity.

This book should be valuable to anyone interested in the effects of chemical or physical environment on the solid (or glassy or viscous solution) states of compounds of an ever increasing number of elements heavier than manganese. Although by far the

most published work has been done on compounds of iron, those of tin run a good second and many other elements are susceptible to the technique, including several rare earths, platinum group metals, tungsten, rhenium, iodine, xenon, cesium, and so on. Although the Mössbauer technique is not directly applicable to organic compounds except those containing the appropriate heavy elements, it should be a very useful tool for the study of mineralogical systems containing organic materials and should be able to provide considerable information on the nature of the bonding of the organic materials in them.

The figures and illustrations are clear and the printing good and on good quality paper. There are very few typographical errors. The price is high for a book of this size, but this must be qualified by consideration of its unique coverage and probably limited market.

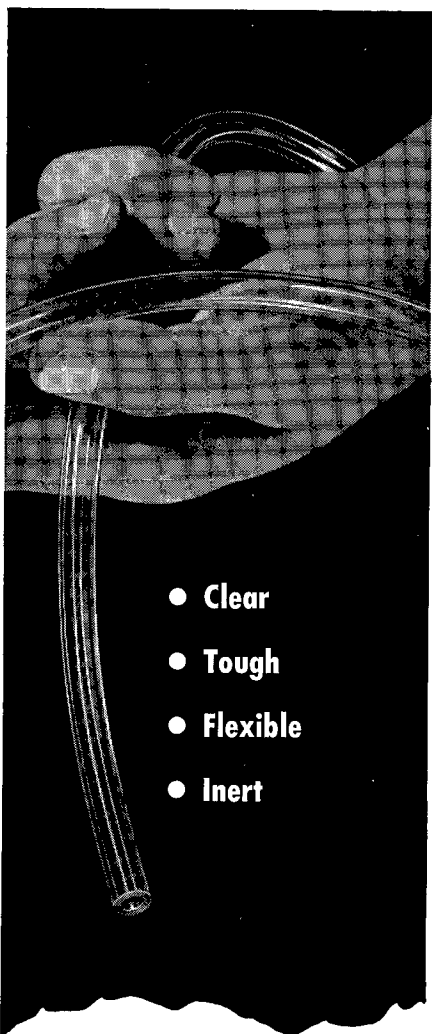
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**OXIDATION OF METALS**, by Karl Hauffe (Plenum Press, New York, 452 p, 1965, \$19.50).

The 1965 English edition of this work is based largely on the 1956 edition of "*Oxydation von Metallen und Metalllegierungen*" by the same author. The new edition is revised and updated to approximately 1963 according to the author's preface.

The book is organized into eight chapters of considerably different size and importance. Chapter 1 serves as a brief introductory statement about reactions being governed by a complex interplay of thermodynamics and reaction kinetics. Chapter 2 is a survey of lattice defects in ionic crystals and metals and relates these to the diffusive phenomena often found in high temperature oxidation. A documented but nonexhaustive compilation of chemical diffusion coefficients in various alloys is an interesting adjunct to the chapter.

Chapters 3 and 4—some 285 pages—relate to the theory of oxidation of metals and alloys with considerable attention to experimental studies of real systems. Although there is considerable engineering significance to the data presented in Chapter 4, the primary point of view is to show the relationships between the various theories of oxidation and experiment. This blend of engineering and science is typical of the German school of physical chemists from which much of the book was derived. One of the real benefits to be derived from Chapter 4 is the opportunity to go from the author's interpretation to the original journal reference from which the example was taken. The entire presenta-



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tion is exceptionally well documented.

Chapters 5 through 8 take up selected topics such as the attack by sulfur and sulfur compounds, special problems dealing with metal-carbon alloys and carbides, aqueous corrosion, and some experimental techniques. In general these chapters are brief and represent review articles of the same caliber that occasionally appear in scholarly journals. Their inclusion in the book seems almost as an afterthought, and indeed they represent special topics which are not as well understood as the phenomena dealing primarily with metal oxides.

The volume parallels closely many of the author's interests over the past 25 years. Considerable contributions to the technical and scientific literature by the author have been incorporated into his text. A similar book entitled "Oxidation of Metals and Alloys" by O. Kubaschewski and B. E. Hopkins (1962) takes up much of the same material, but from a less detailed point of view.

Corrosion engineers and scientists as well as those working in the fields of high temperature materials will find Dr. Hauffe's text to be of great value to them in understanding present phe-

nomena and in attempting to explain new corrosion phenomena. The point of view expressed by the author is considerably more oriented at the scientist than at the engineer. For one involved chiefly in the selection of materials for a chemical plant, for example, the book would be of little value. On the other hand for those involved in developing corrosion resistant materials for application in the chemical industries, the subject matter is indeed necessary.

The book was written by a specialist for specialist. The central portion of the book is currently the most important, and the numerous examples of experimental studies with full explanation of the results are very worthwhile. The attitude of careful scholarship, thoughtful documentation, and thorough indexing all contribute to a worthwhile treatment of high temperature oxidation. In particular the English translation by Karl Vorres appears to be faithful and thus brings this work into the reach of English speaking peoples throughout the world.

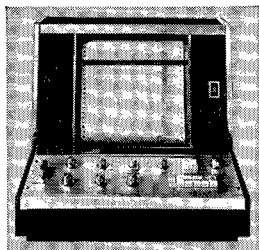
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THE CHEMICAL CONSTITUTION OF  
NATURAL FATS, by T. P. Hilditch and  
P. N. Williams (Wiley, New York,  
Fourth Ed. 1964, 745 p, \$25).

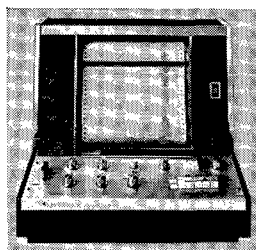
The main objective of this book remains the same as that of the first edition; that is, essentially a compilation of the chemical constitution of natural fats in terms of fatty acid and glyceride composition. This is admirably done, since the present edition covers the compositions of approximately 1450 fats when compared to the 580 covered in the first edition. New results obtained by the use of gas-liquid chromatography and lipase hydrolysis techniques have been included, and the sections dealing with the mechanisms of biosynthesis of higher fatty acids have been included, and the sections dealing with the mechanisms of biosynthesis of higher fatty acids have been expanded. These advances, coupled with the discovery of many new fatty acids have lead to the major revisions which are evident in this edition. Older methodology such as fractional crystallization has either been eliminated or less space has been devoted to it, and the newer methods of chromatography have been discussed in more detail. The indices are commendable; the book is easily read, convenient to use, attractively bound and printed with readable type. The book is an indispensable reference work to all those who need information concerning the composition of natural fats.

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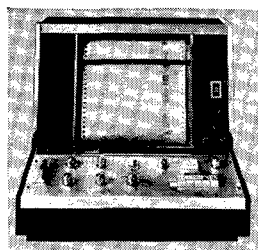
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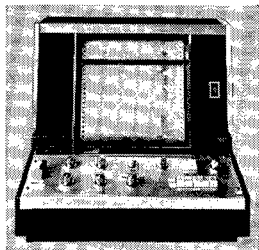
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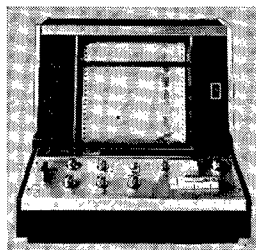
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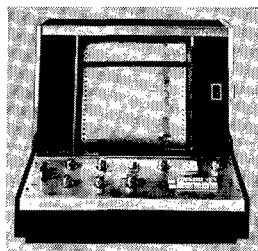
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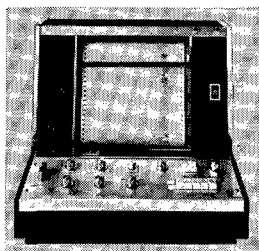
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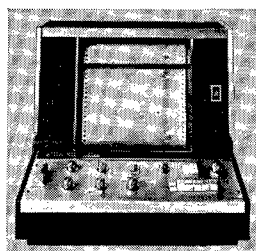
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DYNAMICS OF CHROMATOGRAPHY. PART I. PRINCIPLES AND THEORY, by Calvin Giddings (Marcel Dekker, Inc., 323 p, 1965, \$11.95).

This book is the first of three parts and discusses the underlying mechanisms of all forms of chromatography. Part II will be on gas chromatography, and Part III on liquid chromatography. Part I is presented in seven chapters, supplemented by two appendices, and indexed by both subject and reference author.

Chapter One introduces the book and discusses the dynamics of zone migration, forms of the migration equation and some of the various chromatographic methods currently employed. Chapter Two deals at length with the complex problem of zone spreading and includes a discussion of various zone spreading concepts. These include the role of the theoretical plate, the random walk model, longitudinal molecular diffusion, adsorption-desorption kinetics, the coupling theory of eddy diffusion, and the rigorous stochastic theory involving the kinetics of chromatography. Chapter Three discusses nonequilibrium and mass transfer and thereby introduces Chapter Four on the generalized nonequilibrium theory. Parts of the theory covered are stepwise kinetics-adsorption chromatography, theory of diffusional mass transfer, diffusion in both the stationary and mobile phases, and mixed mass transfer mechanisms. Chapters Five and Six are concerned with the physical events associated with the chromatographic process. Documented classical studies on flow, diffusion and kinetics are summarized for the reader in several categories. These include packing structure, laminar flow, turbulent flow, molecular displacement, nature of diffusion and kinetics of single-step processes. Chapter Seven deals with the achievement of separation. Operating variables such as temperature, carrier flow, column length, particle size, etc., are treated from the aspect of resolution. Here the determination of optimum conditions based on the resolution concept is illustrated. The limits of deviation from the optimum are further examined in a general way and then specifically in the technique of fast separations. The chapter is concluded with a comparison of gas and liquid chromatography. Here the author compares the operating variables, their limits and the physical properties of both systems. The two appendices describe the principal symbols employed in the text and equations significant to the general study of chromatography. The text is supplemented with footnotes and provides an ample number of references at the end of each chapter. Many of the references are from the recent literature. This book is the author's first and is consistent with the high quality of his many technical publications.

In addition to reviewing chromatographic theory found in the literature,

the text contains material new to field. These are principally the extensive chromatography, which the author feels gives perhaps the clearest picture of the column processes, and the concepts on the relationship of fluid flow. The material to a large extent is a composite of much of the author's previous work. As probably would be expected for a subject as complex as chromatographic theory, the material is presented primarily from a mathematical viewpoint and is quite detailed. A good background in both gas and liquid flow physics as well as chromatographic theory seems prerequisite to full comprehension. This book should be most useful, therefore, to the serious student of chromatographic theory; however, elements of the text, particularly the chapter on the achievement of separation, may be of immediate interest to the practicing chromatographer.

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SOLVENT EXTRACTION OF VEGETABLE OILS, Second Edition, by H. V. Parekh (Published under the auspices of the Indian Central Oilseeds Committee, "Telhan Bharan," Hyderabad-29 [December] Price, Rs 151-).

This second edition is considerably expanded over the first edition which was published in 1958. Its value lies in the complete and accurate picture of the practice of solvent extraction of oilseeds throughout the world.

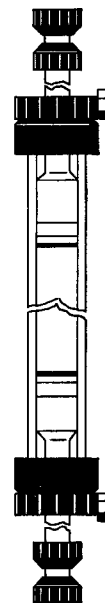
The material is well organized, well presented, and the discussion of theory and engineering principles is accurate although rather general and somewhat brief. However, adequate consideration is given to the theory of extractive rates and the principles of batch, stage-wise, and countercurrent operations.

A considerable part of the book is devoted to solvent extraction practice and the machinery used. This includes seed preparation, the solvent extraction operation, and product and solvent recovery.

The effect of the physical and chemical properties of the various oilseeds and oilseed cakes on the method of processing is well considered.

As would be expected much of the discussion is concerned with the practice, trends, and economy of solvent extraction in India. The Indian Khadi and Village Industries Commission in their series of five-year plans are promoting the introduction of a great number of bullock driven ghanis for oilseed crushing. These inefficient mortar and pestle type operations are promoted to create jobs for the masses of uneducated villagers. The author condones this but contends that the ghani cake should be solvent extracted to prevent oil waste. This ignores the

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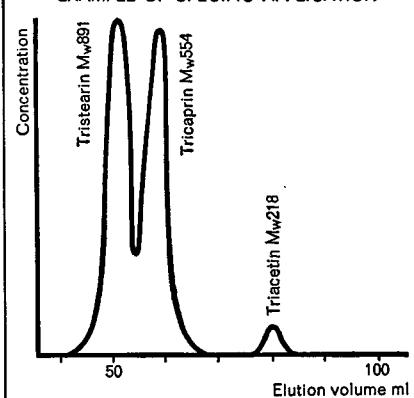
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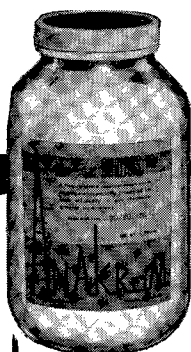
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waste of potential labor which could be used to increase agricultural production to operate other industries which would raise the level of living. Such make-work operations may lead to area famines in years of crop failures.

In general, the book shows that the author has made an extensive literature search and it is recommended for its clear, overall description of the oilseed solvent extraction industry.

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**THE CHEMISTRY OF ALKENES**, edited by Saul Patai (Interscience, 1315 pp., 1965, \$37).

The stated aim of the editor is "to present an up-to-date dissertation on the chemistry of the carbon-carbon double bond in all of its aspects." To do this, he enlisted the aid of 18 other scientists in five countries to prepare a total of 14 chapters. Two additional solicited chapters, 1) electrophilic attacks on alkenes and 2) biochemical formation and reactions of alkenes, were not forthcoming.

In Chapter 1 an 88-page theoretical dissertation precedes a discussion of the wave mechanics of specific alkene molecules, principally acetylene, ethylene and butadiene. These subsequent chapters deal with olefin formation by E2 and E1 reactions, by gas phase reactions, and by condensation reactions.

Reactions of alkenes occupy about half of the space in the book. Four chapters dealing almost exclusively with reactions are concerned with 1) nucleophilic attacks on the double bond, 2) reactions of alkenes with radicals and carbenes, 3) cycloaddition reactions with alkenes, and 4) reactions and properties of conjugated dienes.

Other chapters cover cumulenes, ketenes and the recently investigated area of alkene complexes of transitional metals, especially Fe, Cr, Mn and Mo.

Perhaps of greatest interest to the lipid chemist are chapters on detection and determination of alkenes, and alkene rearrangements. In the latter, carotenoids and unsaturated fatty acids serve as examples.

As is to be expected in such a composite of papers by individual authors, interconnections between the different topics are not emphasized. The editor expresses recognition of this shortening but points out that a unified treatment by a single author was not possible for the subject as a whole.

The chapters are nicely written and amply illustrated with formulas and structural representation. The predominant choice of small molecules as illustrations undoubtedly aids in achieving simplicity. The lipid chemist may be disappointed that unsaturated lipids serve as specific examples for discussions in so few cases. Nevertheless, he will find much useful information in the book in terms of fundamental concepts which are applicable to his problem in the field of lipid chemistry. The book should be available in his library as a reference text.

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**PRINCIPLES OF CHEMICAL EQUILIBRIUM**, by Kelso B. Morris (Reinhold, 114 pp., 1965, paperback \$1.95).

The author states that this monograph is written primarily for the general reader of college chemistry but that it may be useful to readers interested in engineering, metallurgy, pharmacy, and the biological and medical sciences as well.

The text is presented in three chapters: 1) heterogeneous equilibrium and the phase rule (a nonmathematical treatment), 2) nonionic chemical equilibrium and 3) ionic chemical equilibrium. An appendix and a short section of exercises follow.

Examples in Chapter 1 include a phase diagram for water, a simple eutectic, cooling curves and compound formation curves for binary mixtures, vapor pressure curves, melting points in a binary system and solid solutions of different types. The importance of heterogeneous equilibrium in extraction processes is discussed.

Discussed in Chapter 2 are the equilibrium constant and factors which affect it, standard states, free energy, and

equilibrium calculations in gaseous systems.

Predominant space is given to the third chapter which discusses ionization constants and their usage, the solubility product principle, coordination compounds, instability constants, hydrolysis, a scheme for qualitative analysis, buffers, fractional precipitation and resolution, and titrations and calculations therefrom.

The monograph provides a relatively simple treatment of the different subjects which should make them intelligible to the nonmathematical scientist. However, for complete understanding of the subject matter, ability to think in mathematical terms would seem to be a necessity. The exercises present some practical problems of interest to the bench chemist.

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PHYSIOLOGY OF DIGESTION IN THE RUMINANT, edited by R. W. Dougherty, R. S. Allen, W. Burroughs, N. L. Jacobson, and A. D. McGilliard (Butterworths: Washington, London, Sydney, Toronto, Wellington and Durban. 496 pp., 1965, \$14.50).

This volume is a report of the second international symposium on the topic which was held at Ames, Iowa, August, 1964. The book considers recent research and timely reviews by 54 contributors from 11 countries on: anatomy, physiology, and development of the digestive tract of ruminants and ruminant-like animals; rumen fermentation and microorganisms; digestion and absorption throughout the digestive tract; and metabolism of major nutrients by rumen bacteria and by the ruminant animal. The presentations are well written, well edited and well documented; the monograph should become a classic in its field.

Of special interest to readers of JAOCS is a description of component fatty acids, including numerous odd-numbered and branched-chain fatty acids, found in the blood, depot fats and milk fats of the ruminant. The formation of these fatty acids from fermentation products and their conversion into triglycerides of body tissues and of milk is reviewed.

Radionuclide contamination of the ruminant and its relationship to our meat and milk supply is a discussion of special interest.

The monograph is readable and highly recommended. It is the reviewer's hope that this international report will stimulate further research on ruminants throughout the world so that the next symposium on this important topic will include more representatives from Africa, Asia and South America.

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PLASTICIZER TECHNOLOGY, Vol. I, ed. P. F. Burns (Rheinhold Publishing Co., 284 pp., 1965, \$12.75).

This text, the first of a proposed two-volume series, is organized into four major and separately authored parts: 1) "A Theoretical Consideration of the Mechanism of Plasticization," by A. K. Doolittle, 20 pages; 2) Plasticizers for Rubbers and Related Polymers," by S. S. Kurtz, Jr., J. S. Sweely, and W. J. Stout, 164 pages; 3) "Plasticizers for Cellulosics," by A. M. Gearhart and F. M. Ball, 33 pages; and 4) "Plasticizers for Acrylics," by J. L. O'Brien and J. A. Van Hook, 23 pages. The last three sections although primarily concerned with the practical aspects of plasticization do nevertheless give ample consideration to the pertinent theoretical concepts. The text is well documented with references to original publications and is liberally illustrated with cuts and tables. It will serve as an excellent index to original work in these areas, and should be a welcome addition to the library of those interested in either the theoretical or practical aspects of plasticization.

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## Gullander, NAM President, Speaks at SOCMA Meeting

The complicated relationships among consumers, industry and government were discussed by W. P. Gullander, President of the National Association of Manufacturers, at a luncheon meeting of the Synthetic Organic Chemical Manufacturers Association (SOCMA) at the Hotel Roosevelt, New York City, Sept. 15, 1966.

In his talk, entitled, "Industry's Decision Making Partners," Mr. Gullander discussed the need for more effective communications among consumers, industry and Government officials and the importance of encouraging industry representatives to assume greater problem solving leadership in social as well as economic areas.

Further SOCMA meetings are scheduled at the Roosevelt Hotel for Oct. 13, Nov. 10 and Dec. 1, 1966.

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By F. W. BILLMEYER, JR., *Rensselaer Polytechnic Institute*, and MAX SALTZMAN, *Allied Chemical Corporation*. An introduction to the use of color in industry for those actively working in the production of colorants, the coloring of materials, or in design, sales or advertising. An Interscience book. 1966. 182 pages. \$11.95

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