NEW BOOKS

PARTICLE SIZE: MEASUREMENT INTERPRETATION AND APPLICATION, by R. R. Irani and C. F. Callis (John Wiley and Sons, New York, London, 161 pp. 1963, $7.50) The book is well bound. The type is clear and easily read and illustrations are numerous and well done. Chapter headings divide this book into essentially independent expositions of particle size topics. The ten chapters are logical divisions including all essential aspects of the subject: 1) Applications of particle size distribution measurements, 2) definitions, 3) methods of data presentation, 4) distribution functions applicable to particle size distribution, 5) sedimentation techniques, 6) microscopy, 7) sieving, 8) miscellaneous techniques, 9) comparison of particle size distribution data from various methods, and 10) procedure for choosing the appropriate method of particle size measurement. The author's preface suggests chapter groupings which will provide the reader with rapid access to specific information such as the proper method for a given material, mathematical treatments, or particle sizing technology and nomenclature. A chapter on distribution functions is included for those who wish to delve more deeply into the mathematics of probability and populations.

This excellent book fills a long-standing need for a useful handbook for anyone engaged in or contemplating particle size analysis. Oil chemists planning to study filter press efficiency or effect of catalyst or bleaching earth particle size would certainly benefit from a knowledge of the techniques presented. Selection of a method and evaluation of results have a particular significance in particle sizing since most techniques require that some assmuptions be made either regarding the physical properties of the particles and/or in the calculation and presentation of results. It is essential, therefore, that the assumptions conceded in the method do not invalidate the results. The authors present this problem and its solution well in the chapter on comparative methods of analysis.

R. D. CONLON
The Procter & Gamble Co.
Cincinnati, Ohio

PHYSICAL ADSORPTION OF GASES, by D. M. Young and A. D. Crowell (Butterworths, 426 pp., 1962, $13). The literature on physical adsorption of gases by solids has been critically reviewed from 1930 onward. The book is well printed and has a good Author Index. The Subject Index does not refer to the various systems studied; such additions would make the book more useful to investigators, particularly those from other fields.

This book supplies the first comprehensive review since Brunauer's famous "The Adsorption of Gases and Vapors" (1943). The numerous references in the new book attest to the continuing activity in the field. It is evident from the treatment given the subject that the authors are thoroughly grounded in the techniques, results and theories involved in gas adsorption. Nevertheless, it is to be expected that only a few oil chemists will be working on projects wherein gas adsorption is involved. For these few, this survey should prove useful. Of course, gas adsorption is a precursor to corrosion of metals and the attack of water vapor, etc. on organic coatings.

There are several places where there are serious omissions. In Chapter 2, there is a section missing on the interaction of polar molecules with graphite and with nonconductors. Invariably, such surfaces (including many polymers and organic coatings) possess polar sites in an otherwise essentially non-polar and hydrophobic surface. These polar sites can furnish points of attack and are also sites in heterogenous nucleaction phenomena. A. V. Kiselev's analysis of the interaction of various organic groups with graphitic surfaces is not adequately covered. Likewise, a brief summary of the uses to which immersion and adsorption calorimetry can be put would improve Chapter 9.

The book is rather free of minor errors, yet some have crept in. For example, Teflon (p. 155) showed a *greater* number of polar sites than Graphon. Reyerson and Cameron (p. 153) got Type III isotherms for bromine on *already saturated* silica gel. It is doubtful that a Type III isotherm ever exists; sufficiently precise measurements would always yield a knee in the isotherm, i.e., Type II character. Several important references to estimations of the average electrostatic field of surfaces from heats of immersion (p. 48) are overlooked: Romo (1962) and Zettlemoyer, Chessick and Hollabough (1958). As a final example, the data of Harkins and Jura (p. 47) show that the heat of immersion of anatase in water falls with precoverage, but only until the first layer is completed (or shortly thereafter) where it reaches the enthalpy change for bulk water.

A. C. ZETTLEMOYER
Lehigh University
Bethlehem, Pa.

ADVANCES IN ORGANIC CHEMISTRY: METHODS AND RESULTS, Vol. 3, ed. R. A. Raphael, E. C. Taylor, and H. Wynberg, (Interscience Publishers, John Wiley and Sons, New York, N. Y., 332 pp., 1963, $13.75). This is the latest volume in a series "in which international groups of experts freely and critically appraise and evaluate useful new methods and ideas, to hasten their acceptance and general use in the field." The volume consists of four chapters which deal with mass spectrometry, phosphorylation, amino protective groups (as employed in peptide syntheses), and a general review of the use of protective groups.

The volume begins with the chapter on mass spectrometry written by R. I. Reed of The University, Glasgow. In the short space of 73 pages the author has attempted to review the applications of mass spectrometry as a structural tool in organic chemistry. Detail is necessarily lacking, and the literature coverage is deplorably scant—particularly for developments since 1960. The first part of the chapter is somewhat difficult to read, but the last section, in which the spectra of several representative compounds are analyzed in detail, is fascinating reading for someone unfamiliar with the analysis of mass spectra. However, any reader with more than a cursory interest in the applications of mass spectrometry to organic problems will want to turn to the more complete works available, such as Beynon's *Mass Spectrometry and Its Application to Organic Chemistry* and Biemann's *Mass Spectrometry. Organic Chemical Applications.*

In the second chapter D. M. Brown of Cambridge University reviews the preparative methods available for the synthesis of organic phosphates. Attention is paid to more recent work and special emphasis is given to the synthesis of the more complex substances of biochemical interest. This review seems particularly pertinent at the presnt time since the synthesis of all but the most complex of the known natural organic phosphates can now be attempted with some degree of confidence.

In the third chapter R. A. Boissonnas of Sandoz, Basle, describes the methods used for the introduction and selective removal of amino protective groups, especially those which have proved the most useful in the synthesis of peptides. Data on the stability of the principal protective groups under various standard conditions is summarized, and the influence of these protective groups on the possible racemization of amino acid components duirng the formation of new peptide bonds is discussed. The coverage of the recent literature is particularly good.

The volume concludes with an excellent review of the use of protective groups written by J. F. W. McOmie of The University, Bristol. All protective groups known to the author are included except for the amino protective groups described in the preceding chapter. Particular emphasis is devoted to the less well-known protective groups; this is particularly valuable since many of the older methods are frequently overlooked and many methods developed for highly specialized cases are certainly capable of general application. In view of the wide scope of this review and the phenomenal literature coverage (613 refer-

(Continued on page 38)

New Books. . . .

(Continued from page 34)

ences), there is no doubt that it will prove to be an invaluable reference source. McOmie has made a significant contribution to the chemical literature with this chapter.

In view of the relatively high price of this book and the broad range of topics covered, it seems doubtful that many organic chemists will want to add this volume to their personal libraries unless they happen to be working in one of the specialized fields covered by the first three chapters. However, the book is a valuable reference source, particularly in view of the last chapter, and every laboratory engaged in organic research should have this volume, perhaps along with the earlier volumes of the series, available.

P. J. KROPP
The Procter & Gamble Co.
Cincinnati, Ohio

LIQUID EXTRACTION, Second Edition, by R. E. Treybal (McGraw-Hill Book Co., Inc., 330 West 42nd Street, New York, 621 pp., 1963, $16.50). This book is as stated by Dr. Treybal in the preface "a complete rewriting of the original book since in the ensuing eleven years the subject has matured considerably." The book is designed to be used as a textbook for an undergraduate course for chemical engineers and is supplied with 19 pages of problems with the answers given in most cases. Illustrative problems are used throughout the text.

Not only is the theory of liquid equilibria and distribution covered, but five of the 13 chapters are devoted to practical applications of liquid extraction from the laboratory and small-scale extractors to plant scale equipment. Two of these chapters discuss various equipment and one chapter is devoted to extractor economics.

At the end of each chapter the notations used in the chapter are listed and defined. The book is well referenced with most of the references to literature published in the 1950's and as late as 1962. In view of the many liquid extraction processes used in the fat and oil industry, this book would be a worthy addition to the technical library.

R. R. ALLEN
Anderson, Clayton & Co.
Sherman, Texas

CHEMISTRY OF COMBUSTION REACTIONS, by G. J. Minkoff and C. F. H. Tipper (Butterworths Xii + 393 pp., 1962, $14.95). This is an attractive book, printed in clear type on good quality paper and well bound. Graphs and tables are freely used to present experimental data from the literature references cited. Line drawings of apparatus help clarify the experimental techniques used, while photographs of flames and flame spectra help the reader visualize the results obtained.

Part I covers the oxidation of hydrogen and carbon monoxide, first presenting general desciptions of the phenomena observed and then the detailed kinetics and mechanisms of the processes. Part II is devoted to gas phase oxidation of organic compounds. The first chapter of this part, a short but interesting one, covers experimental methods. This is followed by chapters on general results and mechanisms, slow combustion of aldehydes, slow combustion of hydrocarbons, oxidation of substituted hydrocarbons and cool flames and ignitions. In Part III, high temperature combustion is described. It includes chapters on pyrolysis of hydrocarbons and their derivatives, combustion in stationary flames and recombination reactions.

Anyone with an interest in or contemplating doing research on the chemistry of combustion will find this volume an invaluable introduction to the subject and, in addition, that it gives a detailed, up-to-date summary of the voluminous literature on the chemistry of combustion. An engineer seeking detailed information on the theoretical aspects of combustion would also find it a valuable source book. There are 922 literature references, the latest ones being dated 1961.

Since the authors are, themselves, authorities on the chemistry of combustion, this is a critical review of the current state of knowledge in the field, not a mere compilation of the literature. It is undoubtedly the outstanding book in its field.

R. H. MUNCH
Monsanto Chemical Co.
St. Louis, Mo.

ORGANIC SYNTHESIS, Collective Volume IV, ed. N. Rabjohn (John Wiley and Sons, Inc., New York, N.Y., 1036 pp., 1963, $16.50). This book brings together the contents of the annual volumes 30-39 in a revised and reorganized format. The material has been brought up to date, and improved methods for the preparation of 2,3-diphenylsuccinonitrile, ethyl azodicarboxylate, and mucobromic acid have been added. The section of Methods of Preparation for each procedure has been revised to include material of preparative value recorded in the literature covered by *Chemical Abstracts* through Volume 54, and later references have been supplied in a few cases. An innovation with this volume is the inclusion of an author index.

The excellent standards of lucidity and detail established in the early volumes of *Organic Syntheses* have been continued. In addition to tested procedures for preparing numerous useful organic compounds, many examples of new and general types of reactions are described. For the chemist engaged in organic syntheses the value of this volume, along with the previous volumes of the series, is beyond question. Every practicing organic chemist should be familiar with this volume and have it readily at hand.

P. J. KROPP
The Procter & Gamble Co.
Cincinnati, Ohio

THIN FILM CHROMATOGRAPHY, by E. V. Truter (Interscience Publ., 440 Park Avenue, South, New York, pp. 205, 1963, $7.00). This book is quite similar in form and content to the reviews which appear in Annual Reviews or Chemical Reviews. The literature on the subject of thin film chromatography covers the period from 1906 to late 1962 and the text includes 282 references. Parts I,II and III are titled Fundamentals, Special Techniques, and Applications. Under the heading of Fundamentals the author discusses preparation of films, various adsorbents, spotting technique, development of the chromatogram, factors influencing the R_f-value, methods of locating colorless compounds and methods of keeping records. Among the special techniques discussed are special methods of development, thin film partition chromatograph, identifications, and quantitative determinations. Applications topics include discussions on the use of TFC with other techniques, chromatographic patterns of natural products, and resolution of groups of related compounds.

The descriptions and discussions are not exhaustive yet are sufficient for even the neophyte to carry out the procedures. As indicated above, the "review" tone keeps this from being just a "cook-book" for TFC. In this reviewer's opinion this book represents a good starting point for the chemist interested in applying the technique to his problem. The technique can be of special value as an adjunct to gas-liquid chromatography in the study of lipids since it permits detection of components which might be unsuspected and unlooked for by GLC.

Because of its relative novelty there are few books yet written covering the technique and this book helps to fill the void which has arisen as interest increases.

C. H. ORR
The Procter & Gamble Co.
Cincinnati, Ohio