

## BOOK REVIEWS

**Particulate Clouds: Dusts, Smokes and Mists. Their physics and physical chemistry and industrial and environmental aspects.** By H. L. GREEN, M. A. (Cantab), F. Inst. P., and W. R. LANE, B. Sc. (Birm.), F. Inst. P. D. Van Nostrand Company, Inc., 126 Alexander Street, Princeton, New Jersey. 1957. xix + 436 pp. 16 × 25.5 cm. Price, \$11.25.

The authors of this volume are among the foremost investigators in their field. Their work has been conducted at the British Chemical Warfare Establishment at Porton, England. Although they have been concerned primarily with military aspects of toxic and obscuring clouds, their interests have been far larger than this. As is too often the case, the many noteworthy achievements of the Porton Establishment have been given little acknowledgment outside military circles, although many of these achievements have been translated by others into useful civil application.

The field is of increasing civilian interest as exemplified by the current underspread concern with smog, lung cancer, cigarette smoking, radioactive fallout and similar problems. There are many declassified military findings which would be of great value here to governmental and industrial investigators. Unfortunately these findings are widely scattered. Some excellent collections have been made, for example, that on "Aerosols," for the U. S. Atomic Energy Commission, but these are still too specialized to provide an adequate general background in the subject.

This book is an attempt by the authors to collect necessary basic knowledge on behavior of certain particulates and to systematize the known industrial and environmental applications. In this they have succeeded admirably. Part I is perhaps the best presentation this reviewer has seen of the physical and chemical properties of particulate clouds. The experimental techniques described are well chosen and well presented. Mathematical treatments are used where appropriate, but the text and illustrative data are sufficient to make the section invaluable to those with little background in mathematics.

Part II of the book deals with selected industrial application, with particular emphasis on health hazards and atmospheric pollution. Perhaps because of the authors' own limited backgrounds, this section is not as broad in coverage as some users of the book might desire. However, sufficient supplementary references are supplied to take care of most special requirements. The large number of references in British publications should be especially useful to American workers.

One minor critical comment: Where British and American opinions differ, the authors unduly stress their own positions. But this is a minor note, and certainly is not reflected in the factual bases of the book.

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**Methoden der Organischen Chemie (Houben-Weyl).** Vierte, Völlig Neu Gestaltete Auflage. Unter Besonderer Mitwirkung von O. BAYER, Leverkusen, H. MEERWEIN, Marburg, and K. ZIEGLER, Mülheim. Band I/1. Allgemeine Laboratoriumspraxis. Edited by EUGEN MULLER, Tübingen. Georg Thieme Verlag, (14a) Stuttgart, Herdweg 63, Germany. 1958. xlii + 1048 pp. 18.5 × 26 cm. Price, DM 198.—(Subskriptionspreis DM 178.20).

The number of manipulative methods comprising the art of actual laboratory work with organic compounds has increased to the point where the editors of the new "Houben-Weyl" are devoting two half-volumes to such procedures, not including the bulk of the physical methods of investigation that are dealt with elsewhere. The first half-volume (I/1) "General Laboratory Practice" is now at hand.

In general the discussions pertain to gram-scale preparative work and are in many instances extended to operations of pilot-plant size. This is particularly true of manipulations like filtration, pressing, solvent extraction, adsorption, drying, distillation, evaporation, centrifugation. Com-

mercially available pieces of equipment referred to are, not unexpectedly, of preponderantly continental manufacture, which detracts somewhat from the interest to an American reader.

An unusual but welcome feature consists in the inclusion of several chapters that convey knowledge useful for the establishment and maintenance of laboratories and equipment: laboratory glass and its properties; assembly of glass apparatus; the use of ceramics, plastics and metals in the laboratory; cements and glues; general notes on laboratory planning. Even though much of this is directed at European readers, there is a great deal of generally useful information to be found here.

Space does not permit reference to all of the subjects covered, but mention will be made of chapters that seemed to have particular interest. A. Lüttringhaus' contribution on "Crystallization" endeavors to present in systematic form the manifold methods and tricks by which chemists have coaxed molecules to arrange themselves in the orderly fashion of a lattice. A unique presentation of the use of inclusion compounds is given by W. Schlenck, and a chapter by F. Cramer and O. Bayer on the use of complexes and molecular compounds will be welcomed by many. G. Hesse has dealt with chromatography and K. Bratzler with gas adsorption. Gas chromatography has advisedly been omitted, until "its development for preparative purposes has been achieved." Ion exchange is treated in an extensive chapter by R. Griessbach and S. Naumann, and the more recently developed redox resins are discussed by A. Manecke. A thorough discussion of extraction and multiplicative distribution in columns or batches is given by O. Jüermann. Electrophoresis in its preparative aspects is described by W. Grassmann and K. Hannig.

Throughout the work, the theoretical principles for each method are clearly set forth to enable the reader intelligently to apply the practical examples to his own problems.

An American chemist may find much of the material in this volume well covered in indigenous monographs or treatises, but some of the chapters mentioned above appear to be unique and will surely be an asset to any library. In addition, perusal of the book permits one to catch a glimpse of how things are done in various laboratories, a privilege generally enjoyed only by the traveller. Part 2 of the volume ought to constitute an interesting continuation of this vicarious journey.

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**Catalysis. Volume V. Hydrogenation, Oxo-Synthesis, Hydrocracking, Hydrodesulfurization, Hydrogen Isotope Exchange and Related Catalytic Reactions.** Edited by PAUL H. EMMETT, W. R. Grace Professor of Chemistry, The Johns Hopkins University, Baltimore, Maryland. Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y. 1957. vi + 542 pp. 16.5 × 23.5 cm. Price, \$15.00.

This volume, according to the preface, is the last of the volumes dealing with hydrogenation. It contains six chapters written by the following authors: U. Colombo, J. B. McKinley, G. Natta, M. Orchin, I. Pasquon, H. Smith, H. W. Sternberg, T. I. Taylor and I. Wender.

The first chapter "Reactions of Carbon Monoxide" (73 pages) does not deal with hydrogenation reactions but contains a comprehensive survey of reactions of carbon monoxide with hydrocarbons, alcohols, ethers, etc., catalyzed by acids and bases.

Chapter 2, 58 pages, contains an enlightening discussion of the mechanism of the Oxo reaction.

Chapter 3, 48 pages, contains a discussion of catalytic syntheses of higher alcohols from carbon monoxide and hydrogen.

Chapter 4, 82 pages, summarizes work done on hydrogenation of benzene, pyrrole, pyridine and quinoline nuclei.

It contains numerous tables of comparative rates of hydrogenation of related compounds.

Chapter 5, 148 pages, contains a comprehensive and exhaustive summary of the use of hydrogen isotopes and its relation to the understanding of the mechanism of hydrogenation reactions.

The last chapter, "The hydrodesulfurization of liquid petroleum fractions," 122 pages, seems to be more suitable for a book dealing with petroleum processing reactions.

Volume 5 of "Catalysis" contains an excellent survey of the literature in the various fields of catalytic hydrogenation reactions and as such is highly recommended to those interested in catalysis and particularly in hydrogenations and related reactions.

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**Introduction to Protein Chemistry.** By SIDNEY W. FOX, Professor in the Chemistry Department, Florida State University, and Director of the Oceanographic Institute, and JOSEPH F. FOSTER, Professor of Chemistry, Purdue University. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. viii + 459 pp. 15.5 × 23.5 cm. Price, \$9.50.

The authors have aimed to provide a text that would be an outline of knowledge for a course in protein chemistry; more time would then be available in class for the elaboration of selected topics. They have gone far in achieving their goal.

Of the 440 pages of text, about 130 have been devoted to a discussion of amino acids, about 60 to peptides and the remainder to proteins. The discussions are both general and specific and are logically and clearly presented. The student who assimilates the information in this book probably will know all that he needs to know about protein chemistry unless he wishes to specialize in the field. The specialist will find the volume a good review of infrequently used information that may have become hazy.

A few inconsequential errors have been noted. The discussion of essential amino acids (top of p. 14) seems to have gone astray. One may question whether a typical hydrolysis with hydrochloric acid (p. 75) uses as little as 3 to 5 parts of acid per part of protein. Figure 8-1 (p. 133) shows apparatus for paper electrophoresis not paper chromatography as the text reference states. The structure of phenyl isothiocyanate (p. 152) is incorrect.

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**Cahiers de Synthèse Organique. Méthodes et Tableaux d'Application.** Volume II. Elaboration des Structures. 3. Alcoylation en série aliphatique. 4. Alcoylation en série aromatique. 5. Arylation en série aromatique. By JEAN MATHIEU et ANDRÉ ALLAIS, Ingénieurs-Docteurs. Published under the direction of LÉON VELLUZ. Masson et Cie., 120 Boulevard Saint-Germain, Paris VI<sup>e</sup>, France. 1957. 322 pp. 16 × 22.5 cm. Price, broché: 4,000 frs.; cartonné toile 4,400 frs.

The series by Mathieu and Allais represent probably the most up-to-date volumes on Organic Synthetic Reactions which are available in the French language today. This volume is organized according to the types of bonds which are formed in particular reactions, much along the lines of Theilheimer and Weygand's classification. The present volume is concerned mostly with alkylation reactions with a small additional section on arylation. The organization consists usually of a review of the various types of reactions which are available for a particular goal. This is followed by a general consideration of mechanisms and then examples are given of the application of the particular reaction under discussion. The good points of the book include mention of reagents and conditions as well as yield, and the references include a large number to the recent literature and an unusual number to the English literature in contrast with other French chemistry books. The volume certainly represents a useful and interesting survey of many

of the methods which are available without attempting to be exhaustive in considering any of them. At least a general idea is given of the variety of methods which might be employed in a given synthetic scheme. One might have wished a more thorough interweaving of the qualitative mechanisms of the reactions under consideration with the description of the particular method. It is true that, as has been mentioned above, some discussion of mechanism precedes the various sections of the book but this is not nearly as effective as would have been treatment of mechanisms together with the particular reactions under discussion. A number of synthetic reactions of considerable importance have been left out, such as the alkylation of enol ethers by alkoxyocations which has been so successfully used in recent syntheses of vitamin A; the Wittig reaction which is proving of considerable interest in the synthesis of complex olefins; and the alkylation of ketones through their enamines.

The examples are, in general, well chosen and useful. There are, however, a few cases where the reviewer would take exception with statements in the book. For instance, the difficulty involving enol ether formation in the Stetter synthesis of long-chain fatty acids is not mentioned (page 60). The suggestion on page 61 that formylation of a ketone is a useful device to achieve monoalkylation should be qualified with the statement that this is, in effect, only useful for the specific case of methylation. The mechanism given for the Carroll reaction which is cited as an example of base alkylation of  $\beta$ -ketoesters is incorrect on page 76 but is more properly illustrated on page 122. The example of alkylation by  $\beta$ -aminoesters is poorly chosen (page 81), since the particular illustration involves neither elimination nor direct displacement of an amino group. This is better treated on page 221.

The reviewer feels that, all in all, this is an interesting addition to the library of an organic chemist involved in syntheses and, in particular, it should prove an extremely useful volume for those who wish to learn chemical French in a profitable way.

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**Tracer Applications for the Study of Organic Reactions**  
By JOHN G. BURR, JR. Atomic International Division, North American Aviation, Inc., Canoga Park, Calif. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1957. x + 291 pp. 15.5 × 23.5 cm. Price, \$7.50.

This book was written with the intention of presenting to the organic chemist a picture of the broad capabilities of isotopic tracers in investigating organic reaction mechanisms and other aspects of theoretical organic chemistry. It is essentially a mammoth review article, giving references to and discussions of a great many of the reports of applications of tracers in these areas. The applications are classified according to the type of compound or type of reaction studied. The book is not intended to serve as a laboratory manual or a guide to techniques, but rather as an exposition of the kinds of information which may be gained using isotopic tracers, and as a guide to the design of experiments.

The subjects covered include, by chapter: general considerations for the use of isotopic tracer methods; a discussion of isotopic exchange reactions; proton transfer in nonaromatic systems; nucleophilic displacements in nonaromatic substances; exchange reactions in aromatic systems; free radical processes; carbonium ion processes; molecular rearrangements with specific mechanisms; reactions of the carbon-oxygen bond; the oxidation of aliphatic molecules; polymerization reactions; miscellany (here are included discussions of papers on the Fischer-Tropsch synthesis, the Fischer indole synthesis, the Mannich reaction, the Elbs reaction, and assorted others); and the structure of molecules and stable intermediates. There are appendices containing lists of general references and references which appeared after the text was complete. There is also an author and a subject index.

Part of the value in this book lies in the assembly in one place of leading references to and brief abstracts of papers in a number of fields where the literature has been until now poorly indexed. The worker interested in the application of tracers in one of these areas will find the book attractive for