

New Books

1954 VACUUM SYMPOSIUM TRANSACTIONS, Committee on Vacuum Techniques (Committee on Vacuum Techniques Inc., Box 1282, Boston 9, Mass., 147 pp., 1955, \$10). In 1944 the technical men of 12 American companies prominent in the manufacture or use of vacuum equipment organized a Committee on Vacuum Techniques "for the purpose of sponsoring symposia on vacuum technology and assisting the dissemination of related knowledge." The first symposium was held in June, 1954, and the transactions were published as the volume under review. The 35 papers, varying from reports on basic science to praise of new gadgets, are grouped in the following categories: New Equipment and Instrumentation, Methods and Techniques for Obtaining High Vacuum, Developments in Fundamental Vacuum Technology, Vacuum Systems Application and Processes, and Standards and Nomenclature.

Standard nomenclature was not finally adopted, but the glossary of the various terms with the same basic meaning will certainly be helpful to newcomers studying the literature in this field.

The specific problems discussed in these Transactions mainly pertain to the physical engineering field, including lens coating, electron tube evacuation, deposition of metal and other films, and vacuum metallurgy. The average oil chemist or engineer working with vacuum processes will not need this book, but the specialist in vacuum processing should obtain it to complete his library.

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FUEL: SOLID, LIQUID, AND GASEOUS, by J. S. S. Brame and J. G. King, 5th ed., rewritten by J. G. King (Edward Arnold Publishers Ltd., London; St. Martin's Press Corporation, 103 Park avenue, New York, N. Y., 551 pp., 1955, \$10). This excellent book, which deserves a place in every industrial or private library concerned with fuel problems and utilization, was first published in 1914 and went through several editions, the fourth edition appearing in 1935; therefore this fifth edition, which has been done principally by Dr. King since Professor Brame died in 1952, brings the intervening subject matter up to date and presents it in a fashion that is both interesting and readily understandable. The book's readability and appearance are enhanced by numerous pictures, drawings, and tables which illustrate various aspects of the subject-matter.

The book is printed on good-quality paper with cloth binding, and the contents are well organized into 20 chapters with a total of 74 tables of data. Although the bulk of the subject-matter naturally deals with coal and petroleum products, including their occurrence, properties, specifications, and utilization, the book covers the entire fuel field from wood to natural gas and even touches upon water power, solar energy, and nuclear energy. In discussing the various fuels from both the theoretical and practical or plant aspects, emphasis is placed upon power plant practice, burners, stokers, boilers, gas generators, and other fuel utilization equipment and methods. The manufacture of metallurgical coke and the production of producer gas, water gas, oil gas, and coal liquid by-products are treated in considerable detail. Likewise the gas turbine, diesel engine, and gasoline engines are discussed in connection with quality of fuel required, performance characteristics, and operational problems encountered. The completeness with which the subject of fuels is covered is shown by the interesting discussion, on the one hand, of the use as motor fuel of ethyl alcohol and benzol and, on the other hand, of the use for house-heating and steam-raising of peat, charcoal, and bagasse or residual crushed cane. The information in the various chapters is well documented with book, journal, and other literature references.

The book is valuable for use by chemists and chemical or mechanical engineers of plants and laboratories in the oil and fat industries not only because of its broad coverage of the occurrence, properties, and utilization of the solid, liquid and gaseous fuels but also because of its sections which deal with theoretical and technical aspects of fuel utilization, such as limits of inflammability, calorific value, flame velocity and temperature, fuel injection and combustion, anti-knock agents, ignition quality, and production of burning oils by hydrogenation and other synthesis processes.

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A.S.T.M. STANDARDS ON SOAPS AND OTHER DETERGENTS (with Related Information), prepared by A.S.T.M. Committee D-12

on Soaps and Other Detergents (paper-bound, 6 x 9 in., 163 pp. + VIII, Sept., 1955, \$2.50 [less to A.S.T.M. members and in quantity], American Society for Testing Materials, 1916 Race street, Philadelphia 1, Pa.). This useful little volume contains 17 specifications for soaps and soap products, nine specifications for various alkaline detergents, and 15 methods of analysis covering soaps and other detergents. In addition, an excellent glossary of technical terms is included in two pages at the end of the book.

Except for specifications and definitions this work is directly comparable with such publications as "Standard Methods for the Analysis of Oils and Fats," 4th ed., 1954, of the International Union of Pure and Applied Chemistry (\$3) or perhaps more closely with "Official and Tentative Methods of Analysis" of the American Oil Chemists' Society looseleaf, 6 x 9 in., revised annually, price, including binder, \$14.50. Since A.S.T.M. Committee D-12 and A.O.C.S. Committee on "Analysis of Soaps and Other Detergents" have a joint membership and chairman, it is understandable that much of the analytical material is common to both publications.

As usual, one may expect to find a number of misprints and inadvertent omissions. An example of the former is "PO₂O₃" on p. 43; of the latter is failure to saturate ammonium molybdate solution with phosphomolybdate on p. 133 though 0.05 g. Na₂HPO₄ is added for that purpose in directions for preparation given on p. 97.

In general, instructions covering procedures are remarkably clear and concise. Calculations are easy to follow though the reactions involved are seldom given. The determination and computation of free KOH and K₂CO₃ on p. 70 seems needlessly complicated. A simple balancing of the column of distilled hydrocarbon oil against a similar column of water would suffice to yield specific gravity without recourse to the small Sprengel tube which is suggested (p. 68).

Probably it is too much to expect a comprehensive system of analysis for synthetic detergents at this time. In this publication the entire subject is covered in only eight pages (71 to 78) and is restricted to the "Analysis of Soaps Containing Synthetic Detergents." With the rapidly increasing use of these products it is to be hoped that they will receive the attention they deserve in future revisions of this and other works of similar nature.

These minor criticisms are not intended to imply that these methods have not been carefully formulated, tested, and edited. Each is complete in itself, and individual methods or groups of methods may be obtained separately for a few cents each. The complete book well merits a place of honor on the desk of every chemist engaged in the purchase, specification, or analysis of the types of products covered. Future revisions and extensions will be extremely welcome.

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THE PRACTICE OF MODERN PERFUMERY, by Paul Jellinek (Leonard Hill Ltd., London, England; Interscience Publishers Inc., New York). Even though "do-it-yourself" books often become best sellers, there is small chance that even the best works on perfumery will ever become popular reading. "The Practice of Modern Perfumery" cannot, alone, popularize the subject, but it does give the the layman and beginner an exceedingly esoteric subject.

The language of perfumery is understood by the professional, but the layman or perfumer-trainee finds it completely confusing. Too many writers have ignored this fact and launched into treatises meant only for the select few already living in the fragrant atmosphere of the industry.

Dr. Jellinek has taken the initiative by the hand and skillfully pointed out how to smell a sample and memorize it by making a record of the odor data. To all who are not anosmics, there is good common sense in his suggested Index Card for recording the impressions registered in the nose and transmitted to the brain. It is this very simple but carefully-prepared Part I, An Introduction to Perfumery, that makes this an outstanding book and prepares the reader for the valuable instruction that follows.

Part II, The Perfumery of Cosmetics, and Part III, The Perfumery of Toilet Soaps, are well-written, factual, and interesting to both layman and perfumer-trainee. We may expect no sudden increase in the number of perfumers available to an industry already shorthanded, but there are many valuable bits of information to be gleaned by professional perfumers from these two sections.

Part IV, Perfumery, Cosmetics, and Psychology, presents a unique discussion on the erogenic effect of perfumery in gen-

eral and odorous materials in particular. Dr. Jellinek has devoted considerable space to this discussion, a subject more esoteric than basic perfumery. Thought-provoking though it may be, this section of the book contributes least to the general excellence of the presentation.

This book, by its attention to the basic training of the beginner, furnishes a foundation for perfumery not provided by other writers. It cannot fail to stimulate both beginner and accomplished perfumer.

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PARTICLE SIZE DETERMINATION by R. D. Cadle, Stanford Research Institute, Stanford, Calif. (Interscience Publishers Inc., New York, and Interscience Publishers Ltd., London, 1955, pp. 303, vii, \$5.50). This is the latest of seven Interscience Manuals intended to "provide a straight-forward description of laboratory procedures and methods for the calibration and recording of experimental results." In the preface the author says: "Although this manual has been written for the non-expert, I hope that it will be of value as a reference book for those experienced in making particle-size determinations." In accomplishing the general intentions of the series and the specific intentions of the author, the book is an unquestionable success. It should find a place in the library of all individuals and institutions seriously interested in the subject. While it reflects the author's own particular interest in aerosols, the treatment is quite general, and while it is intended for the practical laboratory worker who wants to use particle size measurement as a tool in solving his own diverse special problems, it gives considerable fundamental background and is well spotted with references for deeper study.

There are 10 chapters whose titles show the coverage: Introduction, Treatment of Data, Sampling Methods; Choice of Technique for Particle-Size Determination, Optical Microscopy, Electron Microscopy, Sieve Analysis, Sedimentation and Elutriation, Surface-Area Measurements, Optical Methods, and Miscellaneous Methods. An indication of the thoroughness and convenience of the volume is the table of 126 symbols used in work on particle-size determination at the beginning of the book.

Dr. Cadle does not overlook the old established methods for he gives ample praise and ample treatment to sieve techniques; the optical microscope he recommends as a generally valuable tool for many particle size problems despite the tedium involved in quantitative work; the electron microscope, now come of age, is rated best for particles below 0.2 microns. He does not neglect newer or ingenious methods such as light-scattering, the electrical sensing of a "diver" or tinting strength, which has a remarkable range of applicability, 0.2 to 200 microns. Table II on p. 93 which gives size range for various methods will be particularly convenient.

The book naturally invites comparison with Dallavalle's *Micromeritics*, 2nd ed., 1948, which is primarily on the technology of fine particles although it deals briefly with particle-size determination and with the recent publication of the Institute of Physics, "The Physics of Particle Size Analysis (1954)," which is not a laboratory manual but a theoretical and diverse treatment by various specialists of the latest developments in several areas of the field.

There are some points of style which could be improved in this very readable and effective book. The sudden use of the imperative on p. 211 and again on 224 is startling. Then the participle "using" has a dangling way as on pages 67, 210, and 230. In the middle of p. 205 there is a sentence which does not read; perhaps "this" should be deleted. The sentence on "lower-size limit" near the bottom of p. 281 is puzzling. It seems that the paragraph on sieving in the middle of p. 185 somewhat details the obvious.

This is a volume which will be intermittently on many technical library shelves for some time to come.

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ATOMIC ENERGY RESEARCH AT HARWELL, by K. E. B. Jay (printed in Great Britain for Philosophical Library Inc., 15 East 40th street, New York 16, N. Y., xii + 144 pages, 1955, \$4.75, 14.5 x 22 cm.). This book, issued by the United Kingdom Atomic Energy Authority, describes the program of the Atomic Energy Research Establishment at Harwell, primarily during the period from 1951 to August 1954, when the Atomic Energy Authority took over from the Ministry of Supply. The author is a Principal Scientific Officer at Harwell. An earlier book, "Harwell—the British Atomic Energy Research Establishment," covered the period from 1946 to 1951.

The text is divided into two parts. Part I, about 80 pages, describes the major programs of the Harwell Establishment in relatively non-technical language. Topics covered include the production program, the reactor program, the isotope program, development of electronic instruments, industrial and university contracts, and a few pages on human aspects of the Laboratory's operation. The second part of the book, 60-odd pages, is devoted to a description of fundamental research programs in physics, chemistry, chemical engineering, and metallurgy. This part is written in a somewhat more technical fashion and is directed to scientific readers who have not specialized in the various fields.

In a sense this book may be regarded as a counterpart to the United States Atomic Energy Commission's semi-annual reports to Congress. However, with its longer time-range and its more restricted subject-range, the book succeeds in giving a much clearer and better rounded picture of the scientific program at Harwell than one could obtain for corresponding American establishments from the AEC semi-annual reports.

The material is well organized and presented in a clear and interesting manner. The serious scientific reader will find the book more an outline of work in progress than a presentation of specific results. Nevertheless its perusal should be rewarding to any United States scientist who is interested in learning in some detail the scope of the British peacetime atomic-energy program. Chemists will probably be more interested in the general picture presented than in the specific chemical subjects discussed. Among the chemical topics are the separation process for plutonium used at the Windscale production plant, sources of the heavy elements, heavy element chemistry, chromatographic separation processes, solvent-extraction chemistry, and the behavior of liquids in countercurrent extraction columns.

Only occasional reference is made to United States work in the many areas where there is overlapping so that this book alone will not give the reader any idea of the relative positions of the United States and the United Kingdom in the various parts of the atomic energy field. Similar books covering United States work in the field would be welcome.

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SEIFEN UND WASCHMITTELL (Swiss Society for Analytical and General Chemistry, 139 pp., 12 German marks or \$3, 2nd ed.). This second edition has been edited by a group of six Swiss chemists, constituting much the same board as for the first edition in 1943. It gives in nicely condensed form, suitable for the practicing chemist, all of the conventional determinations of soap ingredients. Thus its completeness is illustrated by its not only giving iodine number and hydroxyl number but also polybromide number and carbonyl number. The methods include those of the International Fat and Oil Commission. The determination of various forms of condensed phosphates is based on both European and U. S. literature. Analytical procedures and test methods applicable to synthetic detergents are covered in about 20 pages and constitute a particularly valuable summary from the literature. The authors have been careful in most cases to indicate substances which interfere.

It concludes with tables. One shows the minimum fatty acid content, titer, maximum resin acid and free alkali content of soaps. Another shows minimum fatty acid content of compounded products. These are similar to but not identical with U. S. practice. Constants for fatty acids, composition of fatty alcohol sulfates, constants for fatty alcohols, and temperature corrections for refractive indices follow.

For the practicing chemist this little book constitutes a very convenient supplement to the standard manuals based on American practice, and reading it offers a number of interesting suggestions as to modifications of our standard practice. Some of the tables are not readily available in U. S. handbooks.

FOSTER DEE SNELL
Foster D. Snell Inc.
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Publishes Patent List

More than 900 government-owned patents available for private use on a royalty-free basis are described in the "Patent Abstract Series Supplement," a 134-page volume available from the Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C., at \$3.75 per copy. This supplement, PB 111854, brings up to date the original seven volumes in the Patent Abstract Series by listing all patents acquired by the government during the period from January 1954 through June 1955.