

Pascal's earlier treatise adds little to the utility of this volume. A presentation based on current ideas of the state of the art, with a detailed description of the more recent work and a summary treatment of material previously exposed, would serve equally well the needs of the chemical public.

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Transport Processes in Applied Chemistry. The Flow of Physical Properties in Chemical Reactors. By R. C. L. BOSWORTH, Ph.D. (Cantab.), D.Sc. (Adel.), F. Inst. P., F.R.A.C.I. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1956. x + 387 pp. 14.5 × 22 cm. Price, \$12.00.

The author presents a somewhat original attack on the problem of presentation of transport processes in general for Chemical Engineers and applied chemists. He has attained some success, marred by the uneven quality of certain sections. The first five chapters on the Significance and Mechanism of Transport Properties, the Phenomenological Description, on the concept of Potential, and on Coupled Transport Processes are very well done. These would constitute an excellent introduction to the field for a senior or early graduate student. On specific topics he appears to be rather shallow. On page 94 he refers to experimental data in some papers which contain no experimental data. His failure to refer to Enskog and Chapman in discussing the theory of thermal diffusion is inexcusable.

Chapters VI through X discuss specific modes of transport. These seemed quite superficial to me. The discussion is not as detailed as an ordinary undergraduate chemical engineering course in these fields, but is otherwise at this level. The references appeared to be selected by going through abstracts with no selection as to relative significance. The chapter on Diffusion makes no mention of the excellent text by Hirschfelder, Curtiss and Bird.

Chapter XI on Irreversibility is well done and would again serve as a good introduction. The author's concept of the "Grand Transport Process" is an interesting one, although this reviewer has not yet convinced himself of its usefulness. Nevertheless, its introduction adds to the book.

There are some worthwhile and thought provoking concepts well presented in the last six chapters. The discussion of feed-back is particularly useful.

Where the author discusses general principles, he presents them in an intelligent and original manner. His forte seems to be the bringing together of problems treated in widely varying fields to show that they fit a single set of principles. His discussion of specific processes is too superficial to be of much value.

The book can be recommended to students as an introduction to important and useful generalizations, presented in an original manner.

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Les Aérosols. By A. P. AVY, Ingénieur en chef des Fabrications d'armement détaché au Laboratoire central des Services chimiques de l'État, Lauréat de l'Institut. Dunod, 92 Rue Bonaparte, Paris 6, France. 1956. x + 292 pp. 16 × 24.5 cm. Price, 2,700 F.

The author presents in clear and simple form a discussion of aerosols—which he defines as suspension of fine solid or liquid particles in a gas—and some practical uses to which their study can be put.

Part I, comprising slightly more than half of the book, deals with general properties of aerosols. The first chapter of 46 pages discusses individual properties of the dispersed particles and methods of observation; the effect of a gravitational field; Brownian movement and diffusion; particulate shape and density; vapor pressure and rate of evaporation; electrification, thermal precipitation and optical properties. The second chapter of 107 pages takes up a

general study of particulate clouds, including methods of dispersion; changes due to coagulation and settling; methods of sampling; and determination of mass concentration, particulate concentration and size distribution, with considerable discussion of statistical treatment of results.

Part II cites a few illustrative examples of applications of aerosol studies to practical problems. The first chapter of 43 pages is devoted to a discussion of silicosis as a typical problem of industrial hygiene. This is followed by a chapter of 27 pages on an industrial application—the filtration of industrial dusts. The next chapter briefly treats military uses of aerosols as smoke screens and toxic smokes, and points out problems common to aerosols of military and industrial origin. The final short chapter deals with such miscellaneous applications as meteorological studies of clouds and fogs, medicinal aerosols, insecticides and dust explosions.

M. Avy says that his purpose in writing this book is to give a general view of the properties of aerosols which will facilitate applications to an increasing number of practical problems connected with them, and also to present briefly the present status of several important problems, on the basis of recent work in France and elsewhere. He is well qualified to write such a book. He has been instrumental in organizing yearly international colloquia on dusts and is at present the chief engineer for the French armament industry.

The author has chosen to write an introduction to the subject, rather than a treatise, and has covered a good deal of material in less than 300 pages. His book is well organized, lucidly written, profusely illustrated, and well printed: but its usefulness would be enhanced considerably by a good index, for which its fairly complete table of contents is not a satisfactory substitute, and by more references to the original literature and to some of the pieces of apparatus which are illustrated. M. Avy wisely chose not to attempt complete coverage of the copious literature of this subject, but he would have helped the reader wishing to apply some of the methods of aerosol study to his own specific problems if he had listed in every case the key references which describe them.

The choice of topics may be a matter of individual preference, but this reviewer felt the lack of a few items which would have improved the balance of the book. In discussing experimental methods of studying aerosols, the author emphasizes chiefly the classical methods and has little to say of the recent development of more rapid methods of counting and sizing aerosol particles. Thus under automatic counting he briefly describes Guyton's electrostatic instrument, but makes no mention of photoelectronic counting in the aerosol phase, which may be applied to even smaller particles, or of the many ingenious methods of automatized counting and sizing of particulate samples on microscope slides, which have been developed chiefly in England and were discussed in the Conference on Particle Size Analysis held by the (British) Institute of Physics at the University of Nottingham in April, 1954. It seems also that the reader interested in understanding and applying the light-scattering properties of aerosols would profit by the inclusion of more than the half dozen pages devoted to this subject. Certainly this could well include references to van de Hulst's definitive theoretical discussion of light scattering and the elegant optical methods of determining size and mass concentration of aerosols to be found in the extensive work of LaMer and Sinclair and their collaborators.

These omissions are minor in comparison to the author's solid achievement in writing a book which will be useful to a wide variety of persons wishing a general introduction to this important and growing field.

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Quantum Field Theory. By H. UMEZAWA, Professor of Physics University of Tokyo. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, New York. 1956. xiv + 364 pp. 16 × 23 cm. Price, \$9.75.

In this text, the author has given us an excellent presentation of the quantum theory of fields, without concealing the unsatisfactory basis on which it rests. Although there is a

good historical survey of the development of the theory of elementary particles, the treatment as a whole tends to be formal rather than physical. This is by no means a disadvantage, since there is no real agreement among theoretical physicists that the present formalism can be adequately related to experiment. The text contains not only the usual material on quantum electrodynamics, but also considerable attention is paid to higher spin fields. It concludes with a very interesting chapter on the theory of propagators. Due to the inevitable time lag between writing and publication, the book contains no hint of the extension of the concept of isotopic spin due to Gell-Mann and Pais, or of the recent work on dispersion relations. Otherwise it should serve very well the purpose of bringing the reader to the point where he can understand current papers on field theory.

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Die Wissenschaftliche und Angewandte Photographie. Fünfter Band. Die Technik der Negativ- und Positivverfahren. By EDWIN MUTTER, Hamburg. KURT MICHEL, Editor. Springer-Verlag, Mölkerbastei 5, Wien 1, Austria. 1955. xix + 396 pp. 17 × 25 cm. Price, Ganzleinen US \$15.70.

Dr. Mutter's book is part of a handbook-like survey of scientific and applied photography, intended to be a continuation or resumption of the well known Handbook by A. Hay and M. von Rohr. This volume deals with the negative and positive processes of black and white photography with silver halide gelatin emulsions. It is intended to serve the scientist, the student and the practical worker. The first chapters of the book contain a presentation of the basic facts and concepts of photographic technique, a discussion of photographic chemicals, and an introduction to the theories of latent-image formation and of the development process. There follows a comprehensive treatment of the various photographic techniques, such as development, fixation, washing, drying, intensification, reduction, toning, desensitization, hypersensitization and latensification. Nearly one-third of the text is devoted to a collection of formulas and specific processing instructions. The character of topics covered by the book varies greatly, ranging from basic theoretical problems to such practical topics as the construction of developing tanks and the toxicity of photographic chemicals. Unavoidably, the treatment of many of the topics is superficial; some have not been brought up to date, and some techniques are included which may be considered as obsolete. To many readers the latter will be quite welcome since many techniques, which have now disappeared from common practice, are interesting and contain possible points of departure for future developments. Every effort has been made to make the book a useful reference work. About 350 pages of text are preceded by a remarkable table of contents whose 370 titles and subtitles

show the structure of the book in great detail. The text is followed by a list of nearly 700 references including about 100 patents, and, finally, by a 20-page index. Anyone interested in the technical aspects of photography will find this volume informative and useful.

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FRANZ URBACH

The Chemistry of Phenolic Resins. The Formation, Structure, and Reactions of Phenolic Resins and Related Products. By ROBERT W. MARTIN, Shell Development Co., Emeryville California. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1956. xi + 298 pp. 15.5 × 23.5 cm. Price, \$9.50.

There has been a need for a semi-critical survey in English of the chemistry of phenolic resins in the same pattern as Hultzsch's "Chemie der Phenolharze" in German. Martin's new book certainly satisfies this need. In the opinion of the reviewers, it is the best book that has been written on phenolic chemistry.

The literature has been extensively covered into 1955—there are 1373 references. A very large number of topics are treated with excellent review and detail. The author has been particularly effective in presenting different viewpoints on controversial areas of the subject without losing the semi-critical approach. In one sense, there are those who would have been happy to have the personal—and perhaps more critical—view of such an expert in the field as Mr. Martin on some of these controversial areas. However, this cannot be classified as a criticism of the method of presentation or of the book in general. It might have increased the significance of the discussion on many of the points on mechanisms and kinetics to have drawn on more evidence outside the area of phenolic chemistry, although again one cannot regard this as a criticism of a well-written book.

On page 264, there could have been more discussion on the point of acid catalysis. On page 267, there is no analysis of the possibilities of why novolak resins are essentially linear and short chained. Sprengling's work and that of Imoto could have been discussed in this connection. But these and other minor items are likely a matter of individual preference that do not detract from the value of the book.

This is a book that should be on the shelf of every organic chemist. For those working in the field of phenolics, it is a necessity.

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