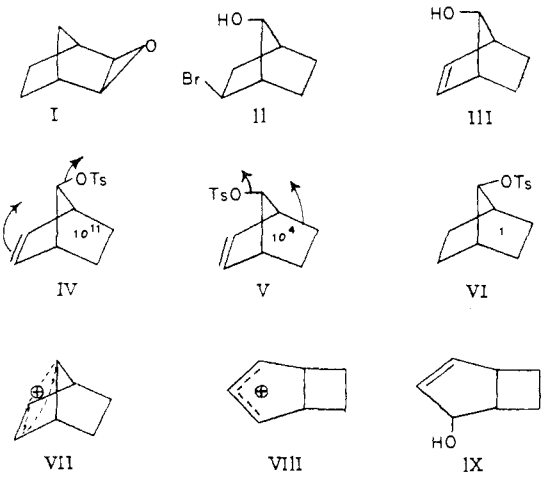

Hydrolysis of the *syn*-toluenesulfonate (V) with aqueous 0.2 *N* sodium bicarbonate at 100° led in *ca.* 90% yield to an unsaturated liquid alcohol (A), whose crude phenylurethan had m.p. 115–118° and 118.6–119.4° after several recrystallizations. The phenylurethan analyzed correctly for that of an alcohol $C_7H_{10}O$. Quantitative hydrogenation of alcohol (A) led to a saturated alcohol (B), m.p. of phenylurethan 113–114°, analyzing correctly for the derivative of an alcohol $C_7H_{12}O$.

In its infrared spectrum alcohol (A) did not display the band at 14.0–14.2μ characteristic of the norbornenols. Instead it displayed strong bands at 12.7 and 13.6μ which disappeared on hydrogenation. As shown by m.p. and mixed m.p., the phenylurethan of alcohol (A) does not correspond to any norbornenol, all the possible 1-, 2-, or 7-isomers now being known.

On the expectation that the new alcohol (A) consisted of one or a mixture of both of the diastereomeric 2-bicyclo[3.2.0]hepten-4-ols (IX), some of this alcohol mixture was prepared by oxidation of the parent hydrocarbon,[3] bicyclo-[3.2.0]heptene-2, with selenium dioxide in acetic anhydride. The synthetic alcohol displayed the strong bands at 12.7 and 13.6 μ in the infrared spectrum. Further, it gave rise to a phenylurethan in 88% yield, m.p. 113–115.8° of the crude material, m.p. 118.2–119.4° after several recrystallizations, mixed m.p. with the phenylurethan of alcohol (A), 118.6–119.2°. It is clear that *syn*-7-norbornenyl toluenesulfonate (V) hydrolyzes to 2-bicyclo[3.2.0]heptenol-4 (IX) of still unassigned configuration.

Ionization of *syn*-7-norbornenyl toluenesulfonate (V) evidently derives substantial assistance from methylene participation, the allylic cation (VIII) being formed. Allylic resonance stabilization outweighs increase in strain associated with ring contraction, so that substantial decrease in transition state free energy results.

DEPARTMENT OF CHEMISTRY
UNIVERSITY OF CALIFORNIA S. WINSTEIN
LOS ANGELES 24, CALIFORNIA E. T. STAFFORD

RECEIVED DECEMBER 21, 1956

(3) A. T. Blomquist and J. Kwiatek, THIS JOURNAL, **73**, 2098 (1951).

BOOK REVIEWS

Nouveau Traité de Chimie Minérale. Edited by PAUL PASCAL, Membre de l'Institut, Professeur honoraire à la Sorbonne. Tome I. **Généralites—Air—Eau—Hydrogène—Deutérium—Tritium—Hélium et Gaz Inertes.** By G. BOUISSIÈRES, M. HAISSINSKY, G. PANNETIER, P. PASCAL and R. VIALLARD. Masson et Cie, Editeurs, Libraires de l'Académie de Médecine, 120 Boulevard Saint-Germain, Paris 6, France. 1956. xii + 1101 pp. 18.5 × 25.5 cm. Price, Broché 7,500 fr.; Cartonné toile 8,400 fr.

A nineteen volume comprehensive treatise on inorganic chemistry, edited by Professor Pascal, is now being published. This series has been planned to present inorganic chemistry in a manner more consonant with the currently accepted physical theories than was possible when its predecessor was published in 1930. When complete, it should serve as the standard French language reference book on the subject.

The first volume apparently went to press late in 1954. Approximately one third of it is a survey of inorganic and physical chemistry written by Professor Pascal. The emphasis is upon bonding types, the structure of chemical entities and the observable states of matter. The approach is descriptive; the presentation is suitable for an advanced undergraduate survey course in inorganic chemistry. Where obviously applicable the terminology and results of quantum mechanics are used as unifying principles in the explanations. However an extended discussion of each subject, written in the same manner as that employed in the previous treatise, remains.

The volume also contains detailed articles about air, water and hydrogen (Pascal); deuterium and tritium (Viallard); and the inert gases (Pannetier) In keeping with the traditional pattern of the work, the literature is collated and recorded. The interpretation of the original author is usually presented. The coverage of physical properties, natural occurrence, chemical reactions and analysis is comprehensive The bibliographical references are extensive and well keyed into the text. A limited subject index is included.

An effort has been made to bring up to date the subjects covered in the earlier work. Most of the information on the isotopes of hydrogen and much of that on liquid helium is new. In general, however, a historical recitation is given of the research in each field. In many sections the work done before 1930 appears to dominate the discussion. As a source book citing the literature in the fields covered, the volume will prove valuable to the chemist who prefers to have his codified reference material in French.

Unfortunately, the book suffers from the common defect of most treatises. The sheer bulk of material mentioned along with the limitations of space preclude either a unified presentation or a critical evaluation. In the opinion of the reviewer, the extensive coverage of material available in

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.

FRICK CHEMICAL LABORATORY
PRINCETON UNIVERSITY
PRINCETON, NEW JERSEY
DAVID GARVIN

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.

113 EAST CHEMISTRY BUILDING
UNIVERSITY OF ILLINOIS
URBANA, ILLINOIS
H. G. DRICKAMER

Les Aérsols. By A. P. AVY, Ingénieur en chef des Fabrications d'armement détaché au Laboratorie 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.

DEPARTMENT OF CHEMISTRY
INDIANA UNIVERSITY
BLOOMINGTON, INDIANA
FRANK T. GUCKER

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