

identity of which was confirmed by a mixed melting-point determination with an authentic specimen.

The non-acidic fractions also gave 10.9 g. or a 47.4% yield of *p*-phenyltriphenylmethane which after several crystallizations from hot absolute alcohol melted at 111°.

Anal. Calcd. for $C_{25}H_{20}$: C, 93.69; H, 6.31. Found: C, 93.20; H, 6.48. Mol. wt.: calcd., 320; found, 311.4.

The identity of this hydrocarbon was confirmed by a mixed melting-point determination with an authentic specimen melting at 111–112° and prepared in accordance with the directions of Schlenck, Weickel and Herzenstein, *Ann.*, **372**, 18 (1909).

Summary

In connection with rate studies, series of mixtures containing an $R'X$ and an $RMgX$ compound have been heated to determine whether there is an interchange of radicals. No such interchange was observed. In the reaction between triphenylchloromethane and phenylmagnesium bromide an unusual product, *p*-phenyl-triphenylmethane, was obtained in a 47% yield.

AMES, IOWA

NEW BOOKS

Introductory Theoretical Chemistry. By G. H. CARTLEDGE, Associate Professor of Chemistry, The Johns Hopkins University. Ginn and Company, 15 Ashburton Place, Boston, Massachusetts, 1929. xiv + 523 pp. 71 figs. 14 × 21 cm. Price, \$3.60.

In the order of treatment, the author has followed the plan of his earlier "Inorganic Physical Chemistry."

Part I, pp. 1–202, The Nature of Matter, gives an interesting résumé of the historical development of the various laws relating to the gaseous, solid and liquid states. The kinetic theory, Avogadro's law, the determination of atomic weights, radioactivity, atomic structure and surface tension are carefully treated. Numerous examples and references are given to classical experiments, such as Black's quantitative study of chalk and lime, and Landolt's research into the conservation of mass. An abstract (7 pages) from "A Revision of the Atomic Weights of Sodium and Chlorine," Richards and Wells, serves to stimulate interest in original work.

Part II, pp. 203–294, deals with the nature of solutions. Here also the historical development is emphasized. Perfect solutions and Raoult's law are illustrated by the method of vapor pressure lowering. The molecular weight of dissolved substances is determined in accordance with the older ideas (van't Hoff factor i) instead of by application of modern thermodynamic methods. A whole chapter (16 pages) is devoted to osmotic pressure. The electrical properties of solutions are given 38 pages with emphasis upon the Arrhenius theory and the degree of ionization. Colloidal solutions are treated in 10 pages.

Part III, pp. 295–466, deals with the nature of reactions. The author first devotes a chapter to the speed of reactions. The equilibrium constant

is then introduced as the quotient of two rate constants. The phase rule, equilibrium in gaseous reactions, the Ostwald dilutions law, with emphasis upon the concentration of the ions, valence equilibrium (oxidation, reduction and electromotive force), energy and free energy are treated in this section. The activity concept is given a third of a page.

Part IV, pp. 467-543, is an application of the foregoing principles to special ionic equilibria: solubility products, indicators, hydrolysis, complex ions.

An outline at the beginning of each chapter and many excellent exercises increase the usability of the book. Altogether the author has given us an interesting book, quite free from errors. The reviewer feels that this work will find favor as a text in a chemistry curriculum in which the ideas of Physical Chemistry are reserved to special courses. The theoretical chemistry which should be given college freshmen is reviewed, so that the book should be a valuable reference work for advanced students.

MERLE RANDALL

Organic Laboratory Methods. By the Late Professor LASSAR-COHN (Königsberg).

Authorized translation from the general part of the fifth revised edition. By RALPH E. OESPER, PH.D., Associate Professor of Analytical Chemistry in the University of Cincinnati. Edited by ROGER ADAMS and HANS T. CLARKE. The Williams and Wilkins Company, Baltimore, Md., 1928. xi + 469 pp. 186 figs. 15.5 × 23.5 cm. Price, \$6.50.

Lassar-Cohn's "Arbeitsmethoden für Organisch-Chemische Laboratorien" appears in the original German in two volumes, the first of which deals with laboratory technique, and the second with fundamental organic reactions such as nitration, etc. The present work is a translation of volume one. Its appearance is timely in that there are not many handbooks, written in English, which adequately cover this important subject.

There is a fairly broad diversity of topics, which include among others, distillation, dialysis, passage of vapors through hot tubes, evaporation, decolorization and clarification, extraction, filtration, crystallization, solvents and diluents, dehydration and comminution. It contains many useful suggestions, and should prove of especial value to graduate students majoring in organic chemistry. The stilted form which unfortunately characterizes so many translations is largely absent from this work. As a whole, then, it impresses the reader very favorably.

A. J. HILL

Gesammelte Abhandlungen zur Kenntnis der Kohle. (Assembled Scientific Papers on Coal.) Vol. 8, by DR. FRANZ FISCHER, Director of the Kaiser Wilhelm Institute for Research on Coal. Gebrüder Borntraeger, Berlin, Germany, 1929. viii + 790 pp. Price, bound, \$18.50.

This volume, like the preceding ones, consists of a collection of papers, for the most part previously published, dealing with the origin, constitution

and utilization of coal. The papers included in the present volume give the results of researches carried out at the Institute during the years 1924 to 1927 inclusive. There are 111 in all, and of these 90 have appeared in *Brennstoff-Chemie*, 8 in various other periodicals and 13 are published here for the first time. A considerable proportion of the researches covered had for their objective the conversion of coal into oils, particularly by hydrogenation of carbonization products and by catalytic synthesis from water gas. The following titles will serve to illustrate the nature of this work: "The Reducibility of Cresols by the Bergius Method," "Petroleum Synthesis at Ordinary Pressures from the Gasification Products of Coal," "The Reduction and Hydrogenation of Carbon Monoxide," "Equilibrium Conditions in the Formation of Hydrocarbons and Alcohols from Water Gas." Bitumens extractable from coal and their relation to cokability are covered by several articles, and some experimental evidence is offered in support of the Fischer-Shrader lignin theory of the origin of coal. This book as well as the other seven volumes of the series will be found to be a valuable adjunct to libraries of those interested in coal research. They would be more readily usable if an index were provided.

JOSEPH D. DAVIS

Jahrbuch der Organischen Chemie. (Yearbook of Organic Chemistry.) By Professor Dr. JULIUS SCHMIDT, Stuttgart. Franz Deuticke, Vienna, Austria, 1929. 17.5 × 25.5 cm. xviii + 256 pp. Price, unbound, M. 21; bound, M. 24.

The thirteenth volume of the *Jahrbuch* deals with investigations that were completed in 1926. For this tardy appearance which materially diminishes the value of such an annual, the author disclaims all responsibility, and he also gives assurance that, hereafter, the *Jahrbuch* will appear with its pre-war promptness and regularity. The general plan remains the same and there has been but little change in scope. The mechanical work of the new publisher is excellent.

F. P. KOHLER

The Theory of Emulsions and their Technical Treatment. By WILLIAM CLAYTON, D.Sc., F.I.C. Foreword by Professor F. G. Donnan, C.B.E., M.A., Ph.D., D.Sc., F.R.S. Second edition. P. Blakiston's Son and Company, 1012 Walnut St., Philadelphia, 1928. xi + 283 pp. 42 figs. 14 × 22.5 cm.

In writing the second edition the author has held to the same context as in the earlier book (160 pp., 1923). Theories of the formation of emulsions are discussed in great detail. A brief chapter on technical emulsions has been included.

Appendix I, written by W. Ramsden on the "Theory of emulsions stabilized by solid particles," might well have been elaborated as in the discussion on the important physical factor, "angle of contact," clarity appears to have been sacrificed for brevity.

Some condensation of the chapters on the theories of emulsions and elaboration of the chapters on de-emulsification and technical emulsions would probably have been welcomed by industry.

The comprehensive review of the literature presented by Clayton guarantees that a thorough knowledge of the subject may be obtained from this source. Mayonnaise is discussed with less than a page and no mention is made of the non-colloidal emulsifying agents. Yet many interesting ideas are included. Ayres' use of a solid fat, more readily wetted by oil than by water, as a water-in-oil emulsifying agent is worth noting. So is Schou's proposal to gelatinize soya bean oil at 250° and to mix it when cooled to 100° with twice its volume of cold soya bean oil in order to prepare an excellent water-in-oil emulsifying agent. The two-page list of emulsifying agents is especially useful.

Thirty-two pages of classified references are found in the Appendix.

The book contains much valuable information for workers in diverse fields. Biologists, pharmacists, chemical manufacturers and dairy chemists especially may profit.

HARRY N. HOLMES

Elektrizität und Eiweisse, insbesondere des Zellplasmas. (Electricity and Albumins, especially of the Cell Plasma.) By Dr. HANS PFEIFFER, Bremen. Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany, 1929. xii + 149 pp. 7 figs. 15.5 × 22 cm. Price, unbound, R. M. 10; bound, R. M. 11.50.

This book is Volume XXI of a series, "Wissenschaftliche Forschungsberichte, naturwissenschaftliche Reihe," edited by R. E. Liesegang. The object of these monographs, as stated by the editor in an introductory note, is to offer in condensed form a selection of the most important accomplishments since about 1914, at home and abroad, in some single branch of natural science. This volume is concerned with a part of the field of electrophysiology, taking up (1) electrical properties of colloids, (2) electrical and colloidal properties of proteins, and (3) attempts to interpret the behavior of living cells from electrical measurements, and from the colloidal behavior of the cell proteins. It presents a very condensed abstract of the work of a large number of authors. (Over a thousand names are included in the author index.) It is evident that in so small a book the discussion of any one among so many papers must be extremely brief. Many of the references, indeed, are not mentioned in the text.

There is a subject as well as an author index. An improvement would be a list of the books and periodicals reviewed. An appendix gives a brief report of the symposium on Electrostatics in Biochemistry, at Basle, October 8-12, 1928.

EDWIN B. DAMON