

by successive applications of electrophoresis at right angles to each other, or by combining electrophoresis with chromatography. The procedure has been used for many mixtures, mostly of biological interest, and even for inorganic ions.

The authors are to be commended for producing a most useful book which will have influence, not only in its own field, but also in a whole range of research, particularly in biology. It represents a vast amount of hard work on the part of the authors. It is to be hoped that the book will get the recognition it deserves from the scientific public. The reviewer has only one criticism to make, *i.e.*, that the mathematical apparatus in some of the chapters is over-elaborate for interpretation of the data at the stage of precision now attained, but that is only his personal opinion.

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Recent Advances in the Chemistry of Cellulose and Starch.

Edited by J. HONEYMAN, M.A., Ph.D., Shirley Institute, Manchester. Published by Arrangement with the Manchester College of Science and Technology. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1959. viii + 358 pp. 14.5 × 22 cm. Price, \$9.25.

A currently popular method of producing a book is to call a conference and to require the invited speakers to furnish chapters suitable for publication in book form. This book embodies one of the better efforts along these lines and is based upon a course of lectures held in Manchester, England, in 1958. The editing is excellent and the typography, especially in formula depiction, is unusually fine. As befits the present advanced status of the topics covered, the disciplines of physics, physical chemistry, organic chemistry and biochemistry are all brought to bear upon the subject in a well-integrated manner; this is true science. The chapters, short and compact, emphasize modern concepts and delineate the research frontiers in a fascinating manner. The concisely written, introductory chapter by Leslie Hough is outstanding as a summary of modern concepts in monosaccharide structure. Cellulose, being the most thoroughly investigated entity in organic chemistry, is emphasized in the chapters, but nevertheless the coverage on the organic chemistry of the starches is certainly the best modern exposition on this topic currently in print. Great reliance is placed upon the "degree of crystallinity" of cellulose preparations but "measurements" on this vary by 100% or more according to the method employed. It is therefore painfully obvious that the concept has no true experimental basis. The old and puzzling problem of the nature of polysaccharide degradation by alkali has received new illumination in the recent application of the principle of organic β -elimination by Kenner and associates and is well outlined by Corbett. It is odd that while the recent exciting utilization of cellulose triacetate is well described, no mention whatsoever is made of cellulose nitrate. While the biochemical treatment of the synthesis and hydrolysis of cellulose and starch is written in an excellent and challenging manner by Whelan, it is highly probable that the currently accepted schemes of synthesis will shortly require revision. But this is not a fault—it is progress. The reviewer is pleased to recommend this book in the highest degree to *both* the "expert" and the beginner—higher recommendation can be made for no book.

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M. L. WOLFROM

The Structure of Electrolytic Solutions. Edited by WALTER J. HAMER, National Bureau of Standards, Washington, D. C. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1959. xii + 441 pp. 15.5 × 23.5 cm. Price, \$18.50.

This book edited by Walter J. Hamer is a compilation of old and new ideas, new approaches, novel techniques and recent data related to the structure of electrolytic solutions.

Forty-two eminent scientists, representing twenty-four research institutions of seven nations, have collaborated in such a way that each of the twenty-seven chapters encompasses the recent thoughts of one or more brilliant minds and/or the results of recent experiments by at least one qualified expert in the particular field of endeavor. The scope of the book is so broad that it embraces subjects ranging from dilute solutions to concentrated solutions, fused salts and the pure ionic solid state.

The book is not intended for the novice, but is pitched at a quite high level. It should be regarded as an authoritative reference book to be used by persons well acquainted with such treatises as "The Physical Chemistry of Electrolytic Solutions" by H. S. Harned and B. B. Owen, and "Electrolyte Solutions" by R. A. Robinson and R. H. Stokes. It is unfortunate that no attempt was made in this work to completely standardize the nomenclature or to choose a common set of symbols. Nevertheless, it appears that the author of each chapter has clearly defined his terms so that with a little care the sophisticated reader will encounter little difficulty in following the train of thought.

All of the subject matter is of current interest and each chapter is well-written and adequately illustrated. This book should be a valuable addition to the libraries of advanced students of the behavior of electrolytes.

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Seventh Symposium (International) on Combustion at London and Oxford, 28 August–3 September, 1958. Published for the Combustion Institute. Academic Press, Inc., 111 Fifth Avenue, New York 3, N. Y. 1959. xlvii + 959 pp. 18.5 × 26 cm. Price, \$35.00.

To the research worker, the proceedings of the symposia organized by the Combustion Institute have become a necessary complement to the current literature. The hundred and twenty-four papers presented before the Seventh International Symposium on Combustion are grouped under eleven chapters, covering a wide range of topics on which the chemist, the physicist and the engineer each speaks in his own language. A welcome feature of this book is a substantial account (70 pages of fine print) of the discussion which followed each group of papers. Although there are no survey articles, several aspects of the philosophy and history of the field, and of the present state of the art, are explored in introductory addresses by Prof. Sir Cyril Hinshelwood, Dr. Bernard Lewis, Sir Alfred Egerton and Dr. J. W. Linnett.

Of special interest to chemists are the papers grouped under: Mechanism of combustion reactions, Spectroscopy of flames, Ionization in flames, Special fuels, Instrumentation in combustion research. The other headings are: Structure and propagation of flames, Ignition and limits of inflammability, Interaction of flames and surfaces, Turbulence in flames, Combustion in practical systems, Detonation and its initiation.

The rich collection of findings reported in these papers reveals significant advances in familiar directions, rather than novel concepts or radical departures from recent trends. Several papers are devoted to the hydrogen-oxygen reaction; the nature of ignition and the mechanism of anti-knock action are still hotly debated. As a result of technical refinements, direct sampling methods, sometimes in conjunction with mass spectrometry, are yielding information on intermediates and clarifying the relations between composition profiles and flame structure. The mass-spectrometric identification and measurement of ions in flames, and speculation about their origin and possible role, open a promising field. Another interesting new trend is the increasing attention paid to unconventional fuels, especially metals.

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