

## NEW BOOKS

*Abridged Scientific Publications from the Kodak Research Laboratories.* Volume XXIV. 391 pp., and additional author and subject indexes. Rochester, New York: Eastman Kodak Company, 1942.

Condensed accounts of sixty scientific publications (Nos. 783H to 882, not continuous) are included in the present volume.

S. C. LIND.

*Chemical Engineering.* By CHARLES ELI REED. 20 pp. Boston, Massachusetts: Bellman Publishing Company, Inc. Price: 75 cents.

This booklet is No. 48 of the series entitled "Vocational and Professional Monographs". Of the several publications on vocational guidance in chemical engineering, this is the most comprehensive and instructive. The subject matter is well arranged and lucidly written. The booklet should be in the hands of all vocational counselors in high schools and colleges. The prospective student of chemical engineering can benefit greatly by its continued perusal during his sojourn at college. So much information and advice is included in this monograph that it can be absorbed only by periodic reading.

CHARLES A. MANN.

*The Physical Chemistry of Electrolytic Solutions.* By HERBERT S. HARNED AND BENTON B. OWEN. American Chemical Society Monograph Series. xxxvi + 611 pp. New York: Reinhold Publishing Corporation, 1943. Price: \$10.00.

Physical chemists who are interested in the properties of solutions of electrolytes will welcome this masterly monograph (or rather, series of monographs) by Harned and Owen. The reviewer is of the opinion that his chief function in the present instance is to give possible readers some adequate idea of the topics discussed and of the comprehensiveness of the treatment.

The first five chapters (pp. 1-134) may be called theoretical. They include a brief but satisfactory thermodynamic introduction, followed by a discussion of the ionic attraction theory in which the authors deal with distribution functions and their change with time, with equations of motion of the ions, with potentials of ions in the absence and also in the presence of external fields of force. Fundamental equations are thus derived to be used in computing activity and osmotic coefficients and in dealing with the theory of viscosity, conductance, and diffusion of electrolytes. In chapter 3, the Debye limiting law is derived as well as the form it assumes when ions are no longer considered to be point charges. The treatment of Gronwall, LaMer, and Sandved is also given in outline. This chapter includes a discussion of Bjerrum's theory of ionic association and of Fuoss and Kraus's theory of the formation of triple ions and of clusters. There is also a derivation of the equation of Debye and McAulay which gives the effect of electrolytes on the activity of a non-electrolyte.

Chapter 4 deals with such irreversible processes as viscous flow, electrical conductance, and diffusion. Here the time of relaxation of the ionic atmosphere (Debye and Hückel), Falkenhagen's theory of viscosity, and Nusager's theory of conductance and related topics are adequately treated. Chapter 5 contains numerical compilations of physical constants and of mathematical functions that are frequently used. It should be noted that the authors adhere to the values of physical constants given in the *International Critical Tables*, Volume I (1930).

Chapters 6 to 10 contain a discussion of experimental methods but no detailed description of apparatus or technique. Included in these chapters is a study of electrical conductance methods, of the effects of high frequencies and high fields, of viscosity and diffusion of electrolytic solutions and of freezing-point, boiling-point, and vapor-pressure measurements.

The remaining portion of the book (chapters 11 to 15) is actually a series of monographs