

molecular weight by the Rast method was found to be 326. Calculated for $C_{16}H_{18}O_6$, 306.14.

15.06 mg. of the acid in 2.5 cc. of alcohol was titrated against phenolphthalein. Found 1.014 cc. of 0.1 *N* NaOH; calculated for 2 equivalents, 1.082 cc. No additional alkali was consumed after boiling with excess 0.1 *N* sodium hydroxide.

14.96 mg. of the ester required 0.478 cc. of 0.1 *N* NaOH for direct titration in the cold. Calculated for one equivalent: 0.488 cc. After boiling for two hours an additional 0.437 cc. of alkali was consumed.

From these data it appears likely that the substance contained a labile lactone group and that one of the two methyl groups introduced with diazomethane involved a phenolic or enolic hydroxyl. Presence of a phenolic or enolic group was indicated by a prompt, deep red-purple color obtained with ferric chloride. The acid as well as the ester coupled with diazotized sulfanilic acid. On hydrogenation with platinum approximately 3 moles of hydrogen was absorbed, but the product could not be crystallized. It no longer gave the original color reactions.

These properties suggest that the substance

contained a benzene ring and is possibly the lactone of a substituted tetrahydronaphthalene. However, the substance when treated with alkali gave a solution from which carbon dioxide was liberated on acidification. From this solution crystalline degradation products could be isolated which suggested that the original acid is capable of undergoing decomposition similar to that of β -ketonic acids. The phenolic or enolic character may therefore be due to such a grouping and thus the unsaturation of the substance to the presence of ketonic linkages rather than to a benzene ring. The details of this further degradation must be left to a later communication.

Our previous studies [*J. Biol. Chem.*, **119**, 141 (1937); **120**, 447 (1937)] have indicated that the basic portion of the cevine molecule is a substituted octahydropyridocholine. The substance, $C_{14}H_{14}O_6$, must be derived from that portion of the molecule all or in part distinct from the basic portion.

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NEW BOOKS

The Principles of Electrochemistry. By DUNCAN A. MACINNES, Associate Member, Rockefeller Institute for Medical Research. Reinhold Publishing Corporation, 330 West 42d Street, New York, N. Y., 1939. 478 pp. Price, \$6.00.

This book treats the conductive and thermodynamic properties of electrolytic solutions and is not concerned with metallic and gaseous conduction, which the author considers a branch of electrophysics. After a brief historical introduction, there follows an excellent treatment of transference phenomena embodying the masterly researches of the author and his collaborators on the moving boundary method and precision conductance determinations; several well written chapters on the thermodynamics of galvanic cells, standard electrode potentials and the ramifications of Debye-Hückel theory. The vexing problem of liquid junction potentials receives a critical and modern treatment. The practical determination and meaning of *pH*, conductance methods, oxidation potentials, potentiometric titrations with the glass and other electrodes which have found wide application, are adequately presented. Conductance in non-aqueous and mixed solvents is treated in an up-to-date fashion. The book closes with chapters on ionization constants

and structure, effects of centrifugal forces, dielectric constants, passivity and overvoltage, and the latest accepted developments in electrokinetic phenomena.

A comparison of the tables with those of previous texts gives ample evidence of the discrimination that has been exercised in assembling these data. The expert will notice the omission or correction of many of the time-honored values of the pioneers but he will be gratified to learn that these omissions and corrections are the result of painstaking recomputation and critical evaluation of the data from the original sources. Misprints and errors of statement are rare. On page 142, eq. 19, "extremely dilute" instead of "infinitely dilute" would be a more concrete expression. On page 143, *kappa* is to be held constant in the Güntelberg-Müller charging process. The reviewer has not found a single meaningless sentence. The format and printing are in keeping with the high standard of presentation.

Readers interested in locating the very latest theoretical contributions or commercial applications will be disappointed. The author consistently refrains from including theories which have not been adequately verified by experiment, and makes no pretense of dealing with the patent literature.

The artifice of eliminating both liquid junction potentials and activity coefficient corrections in concentration cells by "swamping" with an inert electrolyte deserved mention by the author at least as a simple practical device for determining ionic concentrations. It is unfortunate that the author, in presenting Güntelberg's data (pp. 170-171), did not seize the opportunity to demonstrate the excellent agreement of these data in each case with the specific osmotic properties of the solvent. By introducing the Gibbs-Duhem equation, electrochemistry, instead of appearing as a separate subject, can be correlated with general solution theory in a comprehensive manner. However, like Donnan membrane potentials, some important topics had to be eliminated to keep the book within reasonable compass. The book should prove to be an excellent treatise in Theoretical Electrochemistry.

VICTOR K. LA MER

An Introduction to the Principles of Physical Chemistry.

By O. MAASS, Macdonald Professor of Physical Chemistry, and E. W. R. STEADIE, Associate Professor of Chemistry, McGill University. Second edition. John Wiley and Sons, Inc., 440 Fourth Avenue, New York, N. Y., 1939. ix + 395 pp. 102 figs. 15.5 × 23.5 cm. Price, \$3.00.

The second edition of this text is considerably larger and more complete than the first edition. Many matters which were passed over too rapidly and superficially have now been elucidated in more detail. The discussions are clear and understandable, being particularly adapted to those students who have not had any mathematics beyond algebra. The discussion of electrolytic solutions has now been brought up to date although it is a little unfortunate to begin with the laws of osmotic pressure.

The treatment of reaction rates is now much more rigorous than formerly. While on page 291 the statement is made that "the chemical equation, therefore, does not necessarily represent the true course of reaction," the student might obtain an erroneous idea from the previous two pages. The statement is made on page 290 that the initial rate of a reaction



is given in its initial stages by

$$\text{Rate} = kC_A C_B C_C \dots$$

The discussion on this and the next page creates, therefore, a rather unfortunate impression which may not be completely eradicated by the more correct statements on the following pages.

On the whole, however, the book is exceedingly well and clearly written and is admirably adapted to give an introduction in physical chemistry to those students who have not had much previous experience with physics and mathematics.

W. ALBERT NOYES, JR.

BOOKS RECEIVED

June 15, 1939 to July 15, 1939

D. BALAREW. "Der disperse Bau der festen Systeme. Allgemeine Theorie der Verunreinigung fester Systeme." Verlag von Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany. 240 pp. RM. 10; bound, RM. 11.50.

GARDNER L. CARTER and JAMES W. COLE. "A Laboratory Course in General Chemistry," Second edition. D. Van Nostrand Co., Inc., 250 Fourth Ave., New York, N. Y. 225 pp. \$2.00.

BERND EISTERT. "Tautomerie und Mesomerie. Gleichgewicht und 'Resonanz.'" Verlag von Ferdinand Enke, Hasenbergsteige 3, Stuttgart W, Germany. 204 pp. RM. 14; bound, RM. 15.80.

C. A. ELVEHJEM and P. W. WILSON, Editors. "Respiratory Enzymes." Mimeographed by Burgess Publishing Co., 426 South Sixth St., Minneapolis, Minn. 236 pp.

JAMES MURRAY LUCK and JAMES H. C. SMITH, Editors. "Annual Review of Biochemistry, Vol. VIII." Annual Reviews, Inc., Stanford University P. O., California. 676 pp. \$5.00.

J. W. MELLOR and G. D. PARKES. "Modern Inorganic Chemistry." Revised edition. Longmans, Green and Co., Inc., 114 Fifth Ave., New York, N. Y. 915 pp. \$4.50.

A. MITTASCH. "Schopenhauer und die Chemie." Carl Winter's Universitätsbuchhandlung, Lutherstrasse 59, Heidelberg, Germany. 90 pp. RM. 2.50.

HERMANN STAUDINGER. "Über die makromolekulare Chemie." Hans Speyer Verlag, Hans Ferdinand Schulz, Albertstrasse 16, Freiburg im Breisgau, Germany. 32 pp. RM. 1.40.

"Analyses of Pennsylvania Bituminous Coals." Technical Paper 590, U. S. Bureau of Mines. Superintendent of Documents, Government Printing Office, Washington, D. C. 503 pp. \$0.50.

"Index to the Literature of Food Investigation. Vol. 10, No. 2." (British) Department of Scientific and Industrial Research. British Library of Information, 50 Rockefeller Plaza, New York, N. Y. 102 pp. \$1.35.

"Report for the Year 1937-1938." (British) Department of Scientific and Industrial Research. British Library of Information, 50 Rockefeller Plaza, New York, N. Y. 203 pp. \$0.90.

"Spectrochimica Acta. Ein Forschungsarchiv." Band I, Heft 1. Verlag von Julius Springer, Linkstrasse 22-24, Berlin W 9, Germany. 92 pp. 56 figs. 17.5 × 26 cm. RM. 8.60.