NEW BOOKS

The Biochemistry of the Lipids. By HENRY B. BULL, Assistant Professor of Biochemistry, University of Minnesota. Burgess Publishing Company, 426 South Sixth Street, Minneapolis, Minnesota, 1935. v + 127 pp. Illustrated. 21.5 × 27.5 cm. Price $3.25.

Being a mimeoprint book but one side of each page bears text. As stated in the introduction, the contents of this volume are the notes which the author has collected and used for several years in his course on the biochemistry of the lipids. The first part (100 pages) is devoted to the chemistry of the alcohols, fatty acids, glycerides, hydrocarbons, phospholipids, pigments, sterols, sex hormones and bile acids. Emulsification, hydrogenation, rancidity, and methods of analyses are also briefly discussed. The second part (27 pages) deals largely with the physiology of the lipids and phosphatides. Some of the subjects which have been given consideration are lipid formation, adsorption, transportation excretion and metabolism.

It appears that in quite a number of cases the usefulness of the subject matter to the reader is limited owing to the abbreviated and sometimes disconnected form of its presentation. The information given in some instances is too meager and indefinite, even for a very general understanding of the subject under discussion. With but few exceptions, satisfactory references will be found for those having access to the publications mentioned.

G. S. JAMIESON

The Metal—Iron. By H. E. CLEAVES, Associate Chemist, and J. G. THOMPSON, Senior Metallurgist, National Bureau of Standards. Alloys of Iron Research Monograph Series. Published for the Engineering Foundation by McGraw-Hill Book Company, Inc., 330 West 42d Street, New York City, 1935. xii + 574 pp. 113 figs. 15 × 23.5 cm. Price, $6.00.

This valuable addition to the Monographs of Alloys of Iron Research is essentially the key to the whole series since it summarizes the existing information concerning those properties of iron upon which the usefulness of its alloys primarily depends. As a critical review it nominally duplicates the function of "International Critical Tables" but it possesses in fact a number of advantages over the Tables, the information is more up to date—in several instances data as yet unpublished have been made available to the authors, it is all under one cover, and the reviewing has been considerably more critical. Each chapter, after giving a detailed discussion of the existing data, ends with an "Authors' Summary" which contains selected values for the properties in question together with the reasons for the selection. The authors, while not hesitating to discard measurements which in their opinion are not trustworthy, have been on the whole conservative and have at least considered every datum; moreover, they have had the benefit of opinions from other specialists on the Bureau staff. As a result, the reviewer believes that most of their selections will be retained for some time to come and will be subject to only minor revision as more precise data are obtained. Messrs. Cleaves and Thompson have been very successful in executing the difficult task which they undertook.

The text of the book is divided into two main parts: the first describes laboratory and commercial methods of producing high-purity iron; the second covers the thermal, electric, magnetic, physical and mechanical properties of such iron. There is also a chapter on "Chemical Properties," which, however, is confined to corrosion phenomena, no attempt being made to include the general chemistry of iron. The bibliography contains 1081 references.

This work, which covers an immense amount of information, should prove indispensable as a handbook to anyone who deals with iron, and it will undoubtedly be useful to many who have no interest in other monographs of the series which deal with particular alloy systems. It is not suitable for classroom work, but it is particularly recommended to authors of textbooks on general chemistry since the reviewer has yet to find a correct statement of the properties and relations of the several forms of iron in any such book.

J. B. AUSTIN

Elektrochemie. II Teil. (Electrochemistry. Part II.) Edited by K. FAJANS and E. SCHWARTZ. Elektromotorische Kräfte. By C. DRUCKER and C. TUBANDT. Polarisationserscheinungen. By R. KREMANN. Elektrochemie der Phasengrenzen. By E. LANGE and F. O. KOENIG. Akademische Verlagsgesellschaft m. b. H., Markgrafenstrasse 6, Leipzig C 1, Germany, 1933. xix + 483 pp. 103 figs. 17.5 × 25 cm.

This is the second and final volume of a treatise on Electrochemistry, edited by Fajans. The first volume (parts I–III) was reviewed in the November, 1932, number of THIS JOURNAL. Part IV of the complete work, written by C. Drucker, deals with the electromotive force of galvanic cells with fluid electrolytes. The various types of cells are taken up systematically and the usual equations for the electromotive force of these cells derived. In the discussion of the equations insufficient emphasis is given to the fact that the integration of the fundamental differential thermodynamic equations depends on the introduction of inexact relationships between the variables with the result that the integrated forms of the equations are only approximations to the truth. The attempts to meet this difficulty by the introduction of activity coefficients or other arbitrarily defined functions of the concentration, although touched on in the text, are treated too briefly to give a student not already acquainted with the literature a good understanding of the difficulties and subtleties of this subject. The experimental side of the subject is almost completely ignored. Thus only one page is devoted to the Weston Normal cell without even reference to any of the extensive literature. Although the advantages of the silver-silver chloride-potassium chloride half-cell over the

calomel half-cell are so important that the calomel half-cell may be regarded as obsolescent, yet the silver chloride half-cell is given only four lines without even references to more adequate information. The determination and significance of the *p*H scale is not discussed.

Part V, written by Tubandt, deals with galvanic cells with solid salts as electrolyte, with special emphasis on thermoelectric effects. This is a brief but good discussion of a branch of electrochemistry which has been neglected in America.

Part VI, written by R. Kremann, gives a good discussion of polarization phenomena, including overvoltage and passivity. This chapter would be strengthened by the addition of some discussion of polarization with alternating currents which is important for an understanding of electrolytic condensers and rectifiers and in connection with the measurement of conductance.

Part VII, written by E. Lange and F. O. Koenig, deals with the electrochemistry of phase boundaries and is the best part of this volume.

In spite of the excessive abbreviation of Part IV, the two volumes of Fajans' "Elektrochemie" as a whole are the best general treatise on theoretical electrochemistry now in print.

GRINNELL JONES

Organic Syntheses. An Annual Publication of Satisfactory Methods for the Preparation of Organic Chemicals. Vol. XV. By C. R. NOLLER, Editor-in-Chief, W. H. CAROTHERS, L. F. FIESER, W. W. HARTMAN, JOHN R. JOHNSON, R. C. FUSON, C. F. H. ALLEN, Secretary. John Wiley and Sons, Inc., 440 Fourth Ave., New York, N. Y., 1935. v + 104 pp. 15.5 × 24 cm. Price, $1.75.

The list of preparations in the present volume of "Organic Syntheses" is as follows: Acetone Cyanohydrin, Diazomethane, 2,6-Dibromo-4-nitrophenol, 2,6-Dibromoquinone-4-chloroimide, Di-*n*-butylcarbinol, 5,5-Dimethyl-1,3-cyclohexanedione, 2,4-Dimethyl-3,5-dicarbethoxypyrrole, 2,4-Dimethylpyrrole, 2,4-Dinitroaniline, *n*-Dodecyl Bromide, *n*-Hexadecane, *n*-Hexadecyl Iodide, Homoveratric Acid, Hydrogen Bromide, *p*-Iodophenol, 1-Methyl-2-pyridone, *o*-Nitrophenylsulfur Chloride, Nitrosomethylurea, Oleyl Alcohol, Orthanilic Acid, Phenylarsonic Acid, Phenylbenzoyldiazomethane, γ-Phenylbutyric Acid, Phenylglyoxal, Phloroacetophenone, *n* - Propyl Sulfide, Reinecke Salt, α-Tetralone, Trichloroethyl Alcohol, Veratronitrile.

E. P. KOHLER

The Discovery of Specific and Latent Heats. By DOUGLAS MCKIE, Ph.D., B.Sc., University College, London, and NIELS H. DE V. HEATHCOTE, B.Sc., University College, London. Foreword by E. N. DA C. ANDRADE. Edward Arnold & Co., 41–43 Maddox St., London W 1, England, 1935. x + 155 pp. Illustrated. 12.5 × 19 cm. Price, 6s., net.

Professor Andrade writes in the foreword: "The subject with which the book deals, under its unpretentious title, is no less than the foundation of the modern science of heat, which may be said to have originated when a really clear distinction was made between heat and temperature."

Through their careful and painstaking efforts in reading the original papers in the respective original languages, the authors of this book have made available to science an accurate account of the work which constitutes the beginning of thermodynamics and thermochemistry. The original data and ideas of the various investigators are discussed in the light of the then existing knowledge, so that the reader may appreciate the lines of reasoning followed by these early workers; and, in this manner, there is developed a sympathetic attitude toward conclusions which, though impossible and sometimes absurd in the light of later knowledge, appear to be self-consistent and comprehensible from the standpoint of the first known facts.

The authors discuss the early work of Morin at Paris (1661), Boerhave at Leyden (1732), Krafft at St. Petersburg (1744), and Richmann at St. Petersburg (1744–1747); the epoch-making work of Joseph Black at Glasgow and Edinburgh, his formulation of the doctrines of specific heat and latent heat, the dates and priority of his "discovery" experiments at Glasgow (1759–1764), and the contributions of his associates Irvine, Watt, and Robison; Wilcke's independent discovery of the phenomenon of latent heat at Stockholm (1772), and his work on specific heats; the later contributions of Crawford at Glasgow, Lavoisier at Paris, and Gadolin at Åbo; the rise and early progress of calorimetry; and the classic experiments of Rumford (1787) to determine whether heat possesses weight.

The text contains many interesting observations and facts that are little known to most modern workers in this field. For example, the authors find no evidence that Black ever worked with an ice-calorimeter, which, apparently, was developed by Lavoisier.

This book is recommended highly to all those interested in an accurate record of the early history and development of the science of heat.

FREDERICK D. ROSSINI

Kolloidchemisches Praktikum. (Laboratory Manual of Colloid Chemistry.) By Dr. E. SAUER, Professor of Colloid Chemistry and Chemical Technology at the Technical High School of Stuttgart. Verlag von Julius Springer, Linkstrasse 23–24, Berlin W 9, Germany, 1935. ix + 112 pp. 51 figs. 14 × 21 cm. Price, RM. 4.50.

This handy little volume describes 140 experiments in colloid chemistry distributed as follows: 58 with the preparation of hydrosols, emulsions and aerosols; 17 with the mechanical, optical and electrical properties of sols; 45 with adsorption phenomena including some technical applications; 3 with surface tension; 10 with jellies; 2 with sedimentation analysis; and 5 with chemical reactions in colloids. Most of the experiments can be carried out with the apparatus and equipment available in even the smaller chemical laboratories. For the most part the experiments are qualitative in character, giving but little practice in the quantitative methods of colloid science. The experiments are well chosen for a brief introductory course and the directions are given clearly and concisely. The book will not be used widely in American laboratories since it is less comprehensive and gives a smaller choice of experiments than Holmes' well-known "Laboratory Manual of Colloid Chemistry."

HARRY B. WEISER

Internationale Tabellen zur Bestimmung von Kristallstrukturen. (International Tables for the Determination of Crystal Structures.) Vol. I, Tables on the Theory of Groups. Vol. II, Mathematical and Physical Tables. Gebrüder Borntraeger, Schöneberger Ufer 12a, Berlin W 35, Germany, 1935. Reinhold Publishing Corp., 330 West 42d St., New York, N. Y. xii + viii + 692 pp. 464 + 83 figs. 19.5 × 29.5 cm. Price, RM. 33; bound, RM. 40; $12.00.

Under the honorary editorship of Sir W. H. Bragg and M. von Laue, and the active supervision of C. Hermann, an international group of crystal structure investigators have compiled two volumes of tabular aids to researches in their field. The purpose of the Tables is both to lighten the routine labor of a structure determination, and to simplify the literature by establishing a standard reference work. The experience of the authors is reflected in the practical value and completeness of the tables, while the evident care of the editors has resulted in a commendable clarity of arrangement.

As an example of the content of Volume I, the tabulation of the results of space group theory in Chapter V may be cited. For each space group, this chapter presents under one heading the following information: the coördinates of the special and general point positions, with a diagram of the general positions; the symmetry of each point position; the symmetry of the lattice complex corresponding to each point position; the coördinates of the symmetry elements, with a diagram; subgroups of the described space group; the structure factor for the general positions, reduced to a form suitable for computation; and the extinctions characteristic of the general and of the special positions. Two other chapters of the volume tabulate the extinctions for comparison with observations, and relate the choices of axes and origins in earlier works to the unit cells adopted in the Tables.

The first two chapters of Volume II comprise tables giving the values of the quadratic forms up to high indices for the tetragonal, rhombohedral, hexagonal, and cubic systems; a table of the rhombohedral angle in terms of the hexagonal axial ratio; a table for the transformation of indices accompanying the change from a hexagonal unit to a rhombohedral or orthohexagonal unit; and various trigonometric tables. Chapter XI includes a survey of intensity formulas; tabulations of functions occurring in intensity formulas, such as atomic scattering factors and the temperature factor; ionic and atomic radii; etc.

The Tables are open to criticism in very few particulars. Volume I, which makes up about two-thirds of the total, would be improved by the inclusion of figures representing the symmetry elements of the point groups, and by diagrams of the Bravais lattices. In Volume II a few errors were observed. As noted on page 471, either one of two transformations may serve to convert a hexagonal unit into a smaller rhombohedral unit; if one transformation is required, the rhombohedral condition is $h - k - l \equiv 0 \pmod 3$; if the other, the condition is $-h + k - l \equiv 0 \pmod 3$. The second possibility is overlooked in the table on page 460. In Table I, pages 586–587, the wave length of Mo K α_2 should be given as 712.105 X. U. and of Pt K α_1 as 185.23 X. U. It should further be noted that Table II, page 588, is not based on the wave lengths of the preceding Table I; and that some of the entries on page 610 are inaccurate. The proof reading of the explanatory text in Chapter XI was poor, as it was in some other portions of the book which are printed in English. The concluding chapter, Chapter XII, which is a compendium of graphical methods for the interpretation of diffraction photographs, will be useful principally as a guide to the literature; emphasis has not been placed on procedures which are commonly used. For example, no reference is made to Huggins' valuable modification of the gnomonic ruler for Laue photographs [M. S. Huggins, *J. Optical Soc. Am.*, **14**, 55 (1927)], although four rulers of less advanced design are reproduced.

J. H. STURDIVANT

BOOKS RECEIVED

November 15, 1935–December 15, 1935

H. DÄNZER. "Grundlagen der Quantenmechanik." Verlag von Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany. 163 pp. RM. 12; bound, RM. 13.

CARLETON ELLIS. "The Chemistry of Synthetic Resins." Vols. I and II. Reinhold Publishing Corporation, 330 West 42d St., New York, N. Y. 1615 pp. $19.50.

H. FREUNDLICH. "The Chemistry of Rubber." Methuen and Co., Ltd., Publishers, 36 Essex St., London W. C. 2, England. 72 pp. 2s./6d. net.

H. SPENCER JONES. "Worlds without End." The Macmillan Company, 60 Fifth Ave., New York, N. Y. 329 pp. $3.00.

LUDWIG KOFLER, ADELHEID KOFLER and ADOLF MAYRHOFER. "Mikroskopische Methoden in der Mikrochemie." Verlag Emil Haim & Co., Maria-Theresienstrasse 10, Wien I, Austria. 134 pp. + plates. RM. 9; bound, RM. 10.80.

M. v. LAUE. "Die Interferenzen von Röntgen- und Elektronenstrahlen." Fifth edition. Verlag von Julius Springer, Linkstrasse 23–24, Berlin W 9, Germany. 46 pp. RM. 3.60.

A. D. MITCHELL. "Sutton's A Systematic Handbook of Volumetric Analysis." Twelfth edition. P. Blakiston's Son and Co., Inc., 1012 Walnut St., Philadelphia, Pa. 631 pp.

JULIUS SCHÜLEIN. "Die Bierhofe als Heil-, Nähr- und Futtermittel." Verlag von Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany. 194 pp. RM. 9; bound, RM. 10.

WALTER WEISS. "Bestimmungstabelle zur Benutzung bei mikroskopischen Arbeiten." Bergstrasse 59, II, Dresden A 24, Germany. 78 pp.

"A. S. T. M. Standards on Rubber Products." Prepared by Committee D-11 on Rubber Products. Published by American Society for Testing Materials, 260 South Broad St., Philadelphia, Pa. 204 pp. $1.25.