

Anal. Calcd. for $C_8H_{11}O_2N \cdot C_6H_5O_2N_3$: C, 36.5; H, 3.9; N, 15.5. Found: C, 36.8; H, 4.1; N, 15.0.

The hydrobromide melted at 225°.

Anal. Calcd. for $C_8H_{11}O_2N \cdot HBr$: C, 30.3; H, 6.1; N, 7.0; Br, 40.4. Found: C, 30.8; H, 6.2; N, 7.0; Br, 40.1.

Identification of Choline.—When "β-earleine" was decomposed by heating in a stream of nitrogen, trimethylamine was isolated from the products by means of its picrate, which melted at 228–229°, and gave no depression of melting point when mixed with a known sample. Acetaldehyde was also isolated as the 2,4-dinitrophenylhydrazone which melted at 164°.

Anal. Calcd. for $C_8H_9O_4N_4$: C, 42.9; H, 3.6; N, 25.0. Found: C, 43.1; H, 3.4; N, 24.8.

The picrate melted at 247° and no depression was observed when it was mixed with choline picrate.

Anal. Calcd. for $C_8H_{11}ON \cdot C_6H_5O_2N_3$: C, 39.8; H, 4.8; N, 16.9. Found: C, 39.8; H, 4.7; N, 16.9.

The picrate of the acetate, prepared with acetic anhy-

dride, melted at 111.5–112.5° and gave no depression in melting point with acetylcholine picrate.

Anal. Calcd. for $C_7H_{15}O_2N \cdot C_6H_5O_2N_3$: C, 41.7; H, 4.8; N, 15.0. Found: C, 42.0; H, 4.9; N, 15.1.

The micro analyses reported were performed by Mr. Saul Gottlieb of these laboratories.

We wish to acknowledge our appreciation for the kind coöperation of S. B. Penick and Co., of New York City, and of Parke, Davis and Co., of Detroit, Michigan, in carrying out preliminary extraction of the weed which was secured with the aid of Dr. Frank P. Mathews, of the Loco Weed Laboratory, Alpine, Texas. Our thanks are also due the American Academy of Arts and Sciences for a grant for technical help in this investigation.

DEPARTMENT OF CHEMISTRY
COLUMBIA UNIVERSITY
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RECEIVED NOVEMBER 20, 1940

NEW BOOKS

The Chemical Composition of Foods. By R. A. McCANCE and E. M. WIDDOWSON, Department of Medicine, University of Cambridge. Chemical Publishing Co., Inc., 148 Lafayette St., New York, N. Y., 1940. 150 pp. 14.5 × 22.5 cm. Price, \$2.50.

The data recorded in this book were accumulated as the result of the chemical analyses of foods supported by the Medical Research Council (England) in the laboratory of the senior author. Accordingly, they do not represent a compilation of the data recorded in the literature. This, at least, implies that the analytical methods employed were uniform and that the results are strictly comparable. In the introduction reference is made to certain difficulties involved in the choice of analytical procedures, particularly in the instance of the fat determination, where the Soxhlet method gives much lower results than the Liebermann method with certain foods. The authors also discuss the doubtful propriety of recording phytin (or phytic acid) phosphorus as "non-available," and of classifying as "available" that portion of the iron which reacts with α,α'-dipyridyl, as has been done in two special tables in the closing portion of the book. The occasions for substantial gains in certain elements during the processing for consumption are also presented. Since particular attention is given to cooked dishes ready for the table, the recipes and methods of preparation are given in some detail, so that one section of the volume reads like a veritable cookbook. For the American reader this is desirable, since numerous of the dishes are not well known on this side of the Atlantic, particularly in the instance of the puddings and meat pies.

About four-fifths of the book is occupied by the tabulated

data of analyses. The first series of tables includes the proximate analysis (excluding crude fiber), Na, K, Ca, Mg, Fe, Cu, P, S and Cl content, calories per 100 g. and acid-base balance of 541 foods classified as (1) cereals and cereal products, (2) dairy products, (3) meat, poultry and game, (4) fish, (5) fruit, (6) nuts, (7) vegetables, (8) sugar, preserves and sweetmeats, (9) beverages, (10) beers, (11) condiments, (12) vegetable fats, (13) cakes and pastries, (14) puddings, (15) meat and fish dishes, (16) egg and cheese dishes, (17) sauces and soups. Beginning with (3) the method of cooking, if any, nature of the edible material, and grams of edible matter as eaten, from each 100 grams of purchased food are also recorded and this continues through (7). In the instance of (8), (13), (14), (15), (16) and (17) there are cross references to the recipes appearing earlier in the book.

In the next block of tables the same data are set over into terms of *grams or milligrams per ounce*, presumably for the convenience of dietitians and others who are more accustomed to dealing with portions scaled in the common or avoirdupois system. The one exception to the system is in the instance of beers, which is based upon the pint.

An advantage in the organization of these data lies in the fact that they include food as served. One cannot but wonder if the English culinary practices are so uniform as to permit of accepting these data as representative of each item, however; also whether or not the average of only two preparations (p. 11, line 23) is sufficient to compensate for the variability in raw materials and technical skills.

The reviewer has tried the volume out on several dietitians, who have reacted rather favorably, and it seems probable that they, rather than the food chemist or tech-

nologist, constitute the group that will derive the most service from the data which it contains.

C. H. BAILEY

Statistical Mechanics. By JOSEPH EDWARD MAYER and MARIA GOEBPERT MAYER. John Wiley and Sons, Inc., 440 Fourth Avenue, New York, N. Y., 1940. 495 pp. Price, \$5.50.

In view of the recent appearance of several books on this subject, it will be well to state in the authors' own words their motive for producing another: "The rapid increase, in the past few decades, of knowledge concerning the structure of molecules has made the science of statistical mechanics a practical tool for interpreting and correlating experimental data. It is therefore desirable to present this subject in a simple manner in order to make it easily available to scientists whose familiarity with theoretical physics is limited."

By way of introduction to the characteristic concepts and methods of statistical treatment, the first chapter is devoted to a review of the commoner results of the kinetic theory of gases, including the transport phenomena which are not included in the ordinary definition of statistical mechanics as the theory of matter in equilibrium, and are not mentioned further in the present book.

The next three chapters contain "the derivation of the fundamental statistical laws on which the book is based." It is obviously impossible to compress into 70 pages any fully satisfactory discussion of the many abstruse and difficult questions which arise in connection with the logical foundations of statistical mechanics, from both classical and quantum points of view. Nor, as Fowler points out, is it by any means necessary or even desirable to insist upon such a discussion before taking up concrete applications, since the main results are a set of theorems of great generality, whose form and essential significance are not difficult to grasp. The present reviewer is somewhat doubtful as to the effectiveness of these 70 pages, which contain numerous allusions to matters for which there is no room for further treatment. For example, the principle of detailed balancing is mentioned just once, in connection with quantum transition probabilities. Nevertheless, he would not wish to be responsible for preparing a more satisfactory treatment within the limits of space appropriate for a book of this kind. The discussion of entropy is clear and illuminating. Particularly good is the demonstration that several apparently different formulas for entropy lead (in the case of large systems) to identical values because they differ only by the logarithms of factors which are small in comparison to the numbers whose logarithms make the main contribution. Effective use of this kind of reasoning is made later in several connections.

The remaining 16 chapters are devoted to applications to types of systems of importance in chemistry and chemical physics. The scope is wide, and includes topics of current interest, such as partition functions for liquids and the behavior of liquid helium at the absolute zero. The treatment is necessarily limited in detail, except in the chapters on condensation. Here the more complete treatment will be welcome as a convenient and unified presentation of the authors' recent important contributions to the subject. In general, the style is somewhat, but not excessively, infor-

mal, and the presentation lucid; at times one wishes that a little more space had been allowed.

Evident care has been bestowed to make the book useful for reference without requiring the whole to be read. Chapters contain introductions summarizing their material, and brief explanations of important results and equations are given. Cross reference among equations is facilitated by the excellent device of printing at the top margin of each page the number of the last equation thereon, as in a dictionary the last word on each page is repeated at the top. The appendix contains the more complicated mathematical reductions, and also a very complete glossary of symbols, in which are given not only the usual brief definitions but also references to the chapters in which full descriptions may be found. The appearance of the printed page is clear and attractive, with the equations well set out.

ALBERT SPRAGUE COOLIDGE

Experiments in Colloid Chemistry. By ERNST A. HAUSER, Ph.D., Associate Professor of Chemical Engineering, and J. EDWARD LYNN, Sc.D., Research Assistant in Chemical Engineering, Massachusetts Institute of Technology. McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York, N. Y., 1940. xii + 178 pp. 70 figs. 16 × 23.5 cm. Price, \$2.00.

This volume, in spite of its modest size, describes and gives full directions for over two hundred experiments covering broadly the field of colloid chemistry. These experiments are so interesting and many of them are so easy to perform that anyone with a spark of scientific curiosity will itch to try them. Moreover, the style is so simple and direct that the book makes interesting and entertaining reading even if one cannot undertake the experiments. It should enjoy a wide use both for systematic instruction in colloid chemistry and by the casual reader and experimenter.

ARTHUR B. LAMB

Solubilities of Inorganic and Metal Organic Compounds. By ATHERTON SEIDELL, Ph.D., National Institute of Health, Washington, D. C. Third edition. Vol. I. D. Van Nostrand Company Inc., 250 Fourth Avenue, New York, N. Y., 1940. iii + 1698 pp. 16.5 × 24 cm. Price, \$12.00.

Dr. Atherton Seidell's compilation of solubility data has been a boon to chemists for over thirty years. A revised edition was published in 1919 and a supplementary volume of five hundred pages was issued in 1928. A great mass of new data has now accumulated but, as the author points out, another supplementary volume, making three volumes in all, would have been awkward to use, so a complete revision became desirable. This new compilation is to appear in two volumes, namely, the present one covering inorganic and metal organic compounds, and a second volume to cover the compounds of carbon. Advantage has been taken of this opportunity to abandon the alphabetical plan based on the English names of the compounds and to adopt one based on the symbols of the elements. This plan has intrinsic merits and in addition will be more convenient for chemists with an imperfect knowledge of English.

It should also be pointed out that in the manufacture of this volume advantage has been taken of the more economical process of off-set printing and of the new developments in the microfilm copying of printed pages. This explains the relatively moderate cost of this large volume.

Chemists everywhere cannot but be grateful to the author for his assiduity, patience and care in the compilation of these important and useful data in a convenient and economical form.

ARTHUR B. LAMB

Organic Reagents Used in Quantitative Inorganic Analysis.

By WILHELM PRODINGER, Ph.D. Translated and amended from the second German edition by STEWART HOLMES, New York State Research Institute of the Saratoga Spa. Nordemann Publishing Co., Inc., 215 Fourth Avenue, New York, N. Y., 1940. xiv + 204 pp. 16 × 23.5 cm. Price, \$5.00.

In the review of this book published on page 3272 of the November, 1940, issue of THIS JOURNAL, the price was incorrectly given as \$3.00.—(*Editor.*)

Introduction to Carbohydrate Biochemistry. By D. J. BELL, B.Sc. (Glasgow), M.A. (Cambridge), Ph.D. (St. Andrews), A.I.C. Jesus College, Cambridge, University Lecturer in Biochemistry, Cambridge. With a Foreword by Professor Sir F. G. HOPKINS, O.M., Sc.D., F.R.S., Sir William Dunn Professor of Biochemistry, Cambridge. University Tutorial Press, Ltd., Clifton House, Euston Road, London, N.W. 1, England. viii + 108 pp. 12 × 18.5 cm. Price, 3s/6d.

This little book was designed originally for the use of students reading biochemistry in the Natural Science Tripos at Cambridge, a "course" similar to the tutorial service found in several of our larger American universities. The author has not only satisfied his initial objective of writing for these students but has produced an account of the chemistry and biological aspects of the chemistry of carbohydrates which can be of great value to both advanced undergraduates and graduate students. The topics discussed, and these are indeed embracive, are introduced in an elementary manner and then developed so well that the reader gets an understanding of the subject which he could hardly obtain otherwise without considerable literature research. The author skillfully introduces the names of the more significant workers into the text, and collects at the end of each chapter sufficient references to lead a reader directly to the latest current research on each topic. In this way he successfully avoids cluttering his presentation with too frequent references to individual contributions, a mistake so frequently made by writers of review and survey accounts.

The first topic chosen for discussion is, naturally enough, photosynthesis, from which the reader is taken to the structural chemistry of sugars and polysaccharides. There is next considered the strict biochemistry of carbohydrates, embracing alcoholic fermentation, muscle glycolysis, and the breakdown and synthesis of carbohydrates. Finally we find chapters devoted to structural chemistry of the uronic acids, plant glycosides and nucleotides, and at the

very end a few pages about the carbohydrate chemistry of micro-organisms.

The writer finds this the most adequate and well-digested survey of the fairly large number which have recently appeared in this field. He hopes that similar accounts of protein, fat, and other biochemistry may soon become available.

W. F. ROSS

BOOKS RECEIVED

November 10, 1940–December 10, 1940

SOPHIA BERKMAN, JACQUE C. MORRELL and GUSTAV EGLOFF. "Catalysis, Inorganic and Organic." Reinhold Publishing Corporation, 330 West 42nd St., New York, N. Y. 1130 pp. \$18.00.

WILHELM BILTZ. "Ausführung qualitativer Analysen." Sixth edition. Akademische Verlagsgesellschaft m. b. H., Sternwartenstrasse 8, Leipzig C1, Germany. 180 pp. RM. 5.80, bound RM. 9.60.

HEINRICH BILTZ and WILHELM BILTZ. "Ausführung quantitativer Analysen." Third edition. Verlag von S. Hirzel, Königstrasse 2, Leipzig C1, Germany. 414 pp. RM. 19.00.

M. GUGGENHEIM. "Die biogenen Amine." Third edition. Verlag von S. Karger, A.-G., Stapelberg 2, Basel, Switzerland. In the U. S. A., Nordeman Publishing Co., Inc., 215 Fourth Avenue, New York, N. Y. 564 pp. Price, Swiss francs 48.00 or \$11.25.

H. MARK. "Physical Chemistry of High Polymeric Systems." Volume II of "High Polymers." Interscience Publishers, Inc., 215 Fourth Avenue, New York, N. Y. 345 pp. \$6.50.

E. A. MOELWYN-HUGHES. "Physical Chemistry." The Macmillan Co., 60 Fifth Avenue, New York, N. Y. (Cambridge, England: At the University Press). 660 pp. \$9.50.

ERICH MÜLLER. "Elektrochemisches Praktikum." Fifth edition. Theodor Steinkopff, 32 Residenzstrasse, Dresden, Germany. 276 pp. RM. 11.25.

AUSTIN M. PATTERSON and LEONARD T. CAPELL. "The Ring Index. A List of Ring Systems Used in Organic Chemistry." Reinhold Publishing Corporation, 330 West 42nd St., New York, N. Y. 661 pp. \$8.00.

HENRY T. F. RHODES. "Forensic Chemistry." Chemical Publishing Co., 148 Lafayette St., New York, N. Y. 214 pp. \$5.00.

JEAN TIMMERMANS. "Chemical Species." Translated from the French by Ralph E. Oesper. The Chemical Publishing Co., 148 Lafayette St., New York, N. Y. 177 pp. \$4.00.

HERMANN ULICH and KURT CRUSE. "Kurzes Lehrbuch der physikalischen Chemie." Second edition. Verlag von Theodor Steinkopff, Residenzstrasse 32, Dresden, Germany. 324 pp. RM. 9.

"Abridged Scientific Publications from the Kodak Research Laboratories." Volume XXI. Eastman Kodak Co., Rochester, New York. 386 pp.