NEW BOOKS

Reactions of Hydrogen with Organic Compounds over Copper–Chromium Oxide and Nickel Catalysts. By HOMER ADKINS, Professor of Chemistry, University of Wisconsin. The University of Wisconsin Press, Madison, Wisconsin, 1937. ix + 178 pp. 4 figs. 16.5 × 24.5 cm. Price, $3.00.

This monograph correlates, summarizes and indicates the significance of the experimental results from the University of Wisconsin organic chemical laboratories in the development of high-pressure hydrogenation as a tool for use in synthetic organic chemistry. The experimental work discussed is practically limited to the reaction of hydrogen at 100 to 400 atmospheres and 25 to 260° over nickel or copper–chromium oxide catalysts with quantities of 1 g. to 1 kg. of typical organic compounds.

The scope of the book may be determined by consideration of an outline of its contents. There is given (a) the detailed description of a very satisfactory apparatus, (b) the general procedures to be used, (c) the preparation of many types of catalysts with pertinent facts and theory concerning their action, (d) a survey of the importance of proper pressures, solvents and purification of materials. This is followed by the discussion of the hydrogenation and hydrogenolysis of a variety of organic compounds of many different types under the following headings: the hydrogenation of carbon–carbon double bonds, carbonyls to carbinols, cyanides to amines, imines to amines, benzenoid to cyclohexanoid, furanoid to tetrahydrofuranoid, pyridinoid to piperidinoid, pyrroloid to pyrrolidinoid; the hydrogenolysis of (a) carbon to metal bonds in lead, zinc and magnesium alkyls and aryls, (b) carbon to oxygen bonds in alcohols and glycols, ethers, acetals, esters and lactones, anhydrides and imides, (c) carbon to carbon bonds in hydrocarbons, alcohols, glycols and sugars, 1,3-diketones, (d) carbon to nitrogen bonds in diamines, amino cyanides, amino alcohols, hydroamides, amino amides; hydrogenation accompanied by hydrogenolysis of (a) nitrogen to oxygen bonds in oximes, nitroso and nitro compounds, (b) nitrogen to nitrogen bonds in azo, hydrazo and diazoamino compounds in pyrazolones and azines, (c) carbon to oxygen bonds in esters to alcohols or hydrocarbons, (d) carbon to oxygen bonds in amides and imides to amines. The limitations in the reductions of each type are discussed. A chapter on selective hydrogenation and hydrogenolysis of many types of compounds with particular emphasis on the relationship of structure and ease of hydrogenation is included.

The references to the author's original publications are given (about fifty in number) and about twenty others to more important articles, patents or reference works on catalysis, catalysts and hydrogenation.

It has been only during the past ten years that chemists have fully appreciated the potential usefulness and the varied applications of high-pressure reductions in scientific research. Dr. Adkins and his associates have made a major contribution in the field by designing a convenient, relatively inexpensive apparatus for such experiments and by furnishing explicit directions both for the preparation of catalysts and for the hydrogenation and hydrogenolysis of many types of organic compounds.

The material is carefully organized and well presented. The volume can be recommended as a convenient handbook for chemists engaged in investigational work involving high-pressure reductions or for those who desire information concerning the possible application of high-pressure reductions in their research problems.

ROGER ADAMS

Annual Review of Biochemistry. Vol. VI. Edited by JAMES MURRAY LUCK, Stanford University. Annual Review of Biochemistry, Ltd., Stanford University P. O., California, 1937. ix + 708 pp. 15.5 × 23 cm. Price, $5.00.

The current volume of reviews has been prepared by an essentially new group of authors, only a few of whom have participated in this program heretofore. The section on the chemistry of the carbohydrates and the glycerides was written by Haworth and Hirst, who contributed the section under this title last year. Two new sections have been added, The Application of Microchemistry to Biochemical Analysis, by P. L. Kirk, and The Biochemistry of Fish, by C. M. McCay, respectively. Several sections included at intervals during the series are omitted from this issue. The term "steroid" has been employed in the sixth section by R. Schoenheimer and E. A. Evans, Jr., to describe cholesterol and related compounds which contain a hydrogenated cyclopentenophenanthrene ring system.

In addition to the sections mentioned above, the volume includes the following: Permeability, by R. Collander; Biological Oxidations and Reductions, by F. Lipmann; Enzymes, by K. Linderstrøm-Lang; The Chemistry of the Lipins, by E. Klenk and K. Schuwirth; The Chemistry of the Proteins and Amino Acids, by G. S. Adair; The Chemistry and Metabolism of the Compounds of Sulfur by V. du Vigneaud and H. M. Dyer; Chemistry and Metabolism of the Nucleic Acids, Purines, and Pyrimidines, by F. Chrometzka; Carbohydrate Metabolism, by H. J. Deuel, Jr.; Fat Metabolism, by R. G. Sinclair; The Metabolism of Proteins and Amino Acids, by S. Edlbacher; Detoxication Mechanisms, by A. J. Quick; The Hormones, by G. F. Marrian and G. C. Butler; The Vitamins, by C. C. Sherman and H. C. Sherman; Nutrition (energy metabolism), by M. Kleiber; The Biochemistry of Muscle, by D. M. Needham; The Metabolism of Brain and Nerve, by R. W. Gerard; Chemical Embryology, by D. M. Whitaker; Plant Pigments, by J. H. C. Smith; The Alkaloids, by E. Späth; Photosynthesis, by R. Emerson; Mineral Nutrition of Plants, by F. G. Gregory; Organic Acids of Plants, by T. A. Bennet-Clark; Biochemistry of Bacteria, by C. B. van

Niel; Immunochemistry, by K. Landsteiner and M. W. Chase.

In a general way it appears that the roster of contributors to each successive review becomes more cosmopolitan with the passing years. Thus about half of the contributors to the sixth volume are attached to institutions outside of the United States, and from seven countries. This, combined with the practically complete change in contributors, serves to bring fresh and varied viewpoints into the setting. We must commend the editors upon their choices of reviewers and the supervision which they have exercised in consolidating a great fund of selected material into a moderate amount of space.

This latest volume includes a subject index for the first time, which addition is of great convenience. In the preface the editors intimate that a cumulative index for the series may appear at a later date, and this would be welcomed, no doubt.

C. H. BAILEY

General Chemistry for Colleges. By B. SMITH HOPKINS, Professor of Chemistry, University of Illinois. Revised edition. D. C. Heath and Company, 285 Columbus Avenue, Boston, Mass., 1937. vi + 758 pp. 264 figs. 15.5 × 22.5 cm. Price, $3.72.

This revised text by Dr. Hopkins has been much enlarged and extended. The discussion of industrial reactions is especially complete not only in respect to the details of the individual processes, but also in the large number of these which are mentioned. For the moment, at least, this feature of the book is interesting and valuable. An industrial map of the United States is used as a frontispiece. The book is well illustrated. A large number of excellent diagrams are important helps to the understanding of technical operations as well as of lecture discussions.

Dr. Hopkins has followed recent custom by including the Brönsted system of acids and bases. This has been discussed in excellent fashion. It is probable, however, that our younger generation of chemists will drop the use of the term base as applied to substances like sodium hydroxide. In connection with the chapter on acids and bases the subject of hydrolysis has been well developed.

It must be admitted that little effort has been made to use these modern ideas in the general body of the text. Thus on page 147 we find the reaction $NH_3 + H_2O \longrightarrow NH_4OH$, where NH_4OH is given standing with NaOH as a base. Also, on page 614 we find that the effect of NH_4Cl in preventing the precipitation of magnesium as the hydroxide by ammonia is explained on the basis of the repression of the ionization of NH_4OH, rather than on the shifting of the equilibrium $NH_3 + H_2O \rightleftharpoons NH_4^+ + OH^-$.

There appears to be no discussion of activity product constant in connection with the discussion of solubility product, which seems a little odd in a text where most fields have been covered rather thoroughly.

The earlier statement of the atomic theory has been an important improvement in the arrangement of the theoretical material in the text. Dr. Hopkins has used the Lewis theory of valence to some extent along with the older diagrammatic methods to show molecular structure. The periodic table as given is a very sensible arrangement and should be commended over those which sacrifice simplicity and clarity in order to indicate certain sub-family relationships.

The general appearance of the text is excellent, the discussions are clear and attractively presented. The book should find increased use in the field where a definitely elementary teaching text is not desired.

P. A. BOND

Laboratory Exercises and Problems in General Chemistry. By B. SMITH HOPKINS, Professor of Chemistry, and M. J. COPLEY, Assistant Professor of Chemistry, University of Illinois. Third edition. D. C. Heath and Company, 285 Columbus Avenue, Boston, Mass., 1937. 234 pp. 17 × 24 cm. Price, $1.76.

This laboratory manual is arranged in three divisions. The first of these, entitled the "Non-Metals," includes a quantitative study of general laws along with experiments covering ionization, solutions, colloids and the general reactions of the non-metals. The second includes the metals and their reactions and also a very brief outline of their qualitative separation. The third division consists of a list of over a hundred problems with type solutions.

Lists of supplies and a table of solutions are provided which will be useful to any instructor using the book. The manual contains ample material for a full year's course with the possibility of considerable freedom of selection on the part of the teacher.

Appendices include the metric system, a table of atomic weights, the vapor pressure of water and a periodic table. References are to Hopkins' "Essentials of Chemistry" and to his "General Chemistry for Colleges."

P. A. BOND

Organic Chemistry for Medical Students. By GEORGE BARGER, M.A., D.Sc., LL.D., F.R.S., Professor of Chemistry in Relation to Medicine in the University of Edinburgh. Second edition. Gurney and Jackson, 33 Paternoster Row, London, E. C. 4, England, 1936. xi + 251 pp. 14.5 × 23 cm. Price, 10s./6d, net.

Among the relatively few changes that have been made since the publication of the first edition [reviewed in THIS JOURNAL, **55,** 5066 (1933)] the most extensive are in the section dealing with cholesterol and cholic acid, to which some information on related hormones has now been added. In the previous edition there was no mention of allantoin, and urea was stated to be the end-product of purine metabolism in the lower mammals. This error has been corrected; and a few substances of greater or less biological significance, formerly omitted, have found a place in the revised text (*e. g.*, inositol, gluconic acid, and a number of vitamins).

With a book so elementary and so readable, extensive alterations should be unnecessary, but it is a little surprising to find that the subject of alcoholic fermentation has not been revised at all, or that the list of amino acids marked as "of greatest biological importance" five years ago should be let stand as still correct. Some statements that will not meet with the approval of biochemists gen-

erally still persist: for instance, that the sole effect of the combination of phenols with glucuronic acid in the body is to increase their solubility (p. 106), or that Fehling's solution is the best reagent for the detection of sugar in urine (p. 114).

The book is nonetheless an exceptionally clear exposition of the subject, and probably is unsurpassed among those designed for students so situated as to be able to begin the study of medicine fortified with only the barest essentials of organic chemistry.

CYRUS H. FISKE

Thorpe's Dictionary of Applied Chemistry. Fourth edition, Vol. I, A-Bi. By JOCELYN FIELD THORPE, C.B.E., D.Sc., F.R.S., F.I.C., and M. A. WHITELEY, O.B.E., D.Sc., F.I.C., Assisted by Eminent Contributors. Longmans, Green and Company, 114 Fifth Avenue, New York, N. Y., 1936. xxvii + 703 pp. Illustrated. 23.5 × 16 cm. Price, $25.00.

All chemists who are familiar with the earlier edition of this standard reference work will realize that the name "Dictionary" does not do full justice to the scope and thoroughness of the information supplied. Although the great majority of entries are treated in a few lines in a dictionary style, there are many longer articles which give an encyclopediac character to the volumes. Thus, for example, this first volume contains long detailed articles on acetic acid, acetylenes, acridine, adsorption, alcohol, alizarin and allied dyestuffs, aluminium, amino acids, ammonia, apples, arsenic, arsenical drugs, autoclaves, balances, barbituric acid, barium, barley, benzene, bile pigments, bismuth, and many others.

In their foreword the editors make the following announcement: "The new edition of the Dictionary has been planned so as to embody the monographical aspect present in the supplementary volumes as well as the Dictionary style of the previous edition. It is intended to publish one volume yearly, the last volume containing a General Index and Glossary. The publication of the work over a prolonged period means that a slightly modified system has to be introduced so as to avoid giving in the earlier volumes reference to volumes which may not appear for some years. In order to ensure this, each volume will be used as a means of bringing a previous volume up to date. Thus each item of importance contained in a general article in an earlier volume will be dealt with in a later volume under its own initial letter, and any up-to-date additions included. In a similar manner earlier volumes will contain items of importance dealt with in general articles in later volumes, and in this case such items will be brought up to date in the later volume."

How this works out may perhaps be illustrated by a specific example. A reader desiring information on aspirin will find the following: "ASPIRIN, Acetosal, trade names of Acetylsalicylic acid, also termed xara, coxpyria, helicon, antonin, regipyrin, asposal, empirin, nupyrin, salcetin, salacetol, anglopyrin, salaspin aletodin. Aspirin soluble, calcium acetylsalicylate." All of these names which come within the alphabetical scope of Volume I are given in their proper alphabetical place followed merely by "v. aspirin," except that under acetylsalicylic acid we find "ACETYLSALICYLIC ACID, $AcO{\cdot}C_6H_4{\cdot}CO_2H$, m. p. 134–135°. Aspirin, a valuable analgesic and antipyretic (v. Salicylic Acid)." Evidently any reader desiring more information than the meager amount quoted above will have to wait many years until the volume containing salicylic acid appears or else consult the third edition if he has it, or some other source. This plan of publication of one volume per year obviously has serious disadvantages from the user's point of view. On the other hand, it doubtless simplifies greatly the editorial and financial problems inherent in the publication of a work of this magnitude as well as minimizes the financial strain on the buyers by spreading the cost of $25 per volume over many years.

The third edition required 601 pages to cover the same part of the alphabet as the 703 pages of the first volume of the fourth edition. A detailed comparison of portions of the fourth and third editions shows, however, that the new matter added is in much greater ratio than this because much has been omitted from the old edition and there has been much revision in details.

The type is eight point solid, which at least for the reviewer's eyes is uncomfortably small for continuous reading. This new edition of Thorpe's Dictionary obviously belongs in all chemical reference libraries and will be much used. It is especially useful as a source of information of the real chemical composition of articles sold under trade names.

GRINNELL JONES

Mikromethodik. Quantitative Bestimmung der Harn-, Blut- und Organbestandteile in kleinen Mengen für klinische und experimentelle Zwecke. (Clinical and Laboratory Quantitative Analytical Methods for Urine, Blood and Organic Materials.) By LUDWIG PINCUSSEN. Sixth revised and enlarged edition. Verlag Franz Deuticke, Helferstorferstrasse 4, Wien, Austria, 1937. vii + 193 pp. 31 figs. 14 × 21 cm. Price, M. 5.

Microchemical procedures applicable to the routine clinical analysis of blood, urine, tissues and excreta, and of blood gases, are given in separate sections of this book, with a short appended discussion of colorimetric pH determination. Detailed instructions are given for microanalysis of most of the clinically important constituents, thus covering a field which unfortunately has been largely neglected by authors of books, particularly those writing in English.

Some unusual and interesting methods, *e. g.*, for iodine and for uric acid, are included. Practical instructions are given for the fractional analysis of phosphorus, sulfur, acetone bodies, and blood proteins. Many of the methods given are well known to clinical workers. A few obsolete procedures are included, as well as some which rapidly are being abandoned. The pyroantimonate method for sodium determination is included along with the preferable zinc uranyl acetate procedure. Magnesium determination by way of magnesium ammonium phosphate is described without mention of the use of hydroxyquinoline. The micro-Kjeldahl method used for determination of various nitrogen fractions could be profitably replaced by any one of several of the newer techniques.

The attempt to utilize volumetric methods wherever possible is commendable. Unfortunately, the author has given almost no critical evaluation of the methods included, and little discussion of their principles, limitations, or errors. While the "cook book" style of presentation is often suitable for use by inexpert technicians, it is of little utility to the research worker.

So little original literature is cited, that the book cannot be considered as a reference work.

PAUL L. KIRK

Die Fermente und ihre Wirkungen. (Enzymes and their Action.) Supplement. Lieferung 6 (Bd. II. Specieller Teil: Haupt-teil XIII–XV). By Prof. CARL OPPENHEIMER. W. Junk Verlag, Scheveningsche Weg 74, The Hague, Holland, 1936. 160 pp. 12 figs. 20.5 × 28 cm. Price, Fl. 10.

Lieferung (Installment) 6 is a continuation of Installment 5 (reviewed THIS JOURNAL, **59,** 773 (1937)). The latter was devoted, as stated in the previous review, to the more recent literature dealing with enzymatic proteolysis in general, newer views concerning the constitution of proteins and the chemistry of the peptidases. Installment 6 covers the recent information and views concerning the nature of the true proteinases, trypsins, pepsins, papains and chymases, as well as their sources, newer procedures in their preparation and modes of action.

The author has succeeded admirably in gathering together the vast amount of information which, during the past ten years, has accumulated in this particular branch of enzyme chemistry. Obviously all interested in the chemistry of the proteinases will welcome these two installments of the supplement.

J. M. NELSON

Chemistry of Food and Nutrition. By HENRY C. SHERMAN, Ph.D., Sc.D., Mitchell Professor of Chemistry, Columbia University. Fifth edition, completely rewritten. The Macmillan Company, 60 Fifth Avenue, New York, N. Y., 1937. x + 640 pp. Illustrated. 14 × 20.5 cm. Price, $3.00.

A good deal of this text has been rewritten and some parts expanded considerably. Some material occurring in the fourth edition has been omitted. A number of chapters have new titles. References and suggested readings at the close of each chapter have also been revised and, as formerly, constitute the only author index.

Dr. Sherman's text remains a well balanced and forceful presentation of the major aspects of the chemistry of food and nutrition. Controversial matters have been avoided as much as possible, the student being referred to discussions of such questions for further reading. As formerly, chemical reactions are usually explained rather than illustrated, although chemical formulas are not omitted entirely, leaving room for class room instruction on these points. Some subjects are treated rather briefly, although succinctly, giving the instructor further opportunity for lectures and assigned readings. Other subjects are treated in much greater detail, *e. g.*, the fuel value of food and energy metabolism. In fact the former chapter on "Conditions Governing Energy Metabolism and Total Food Requirement" has been partly rewritten and partly rearranged and also expanded into two chapters entitled, respectively, "The Basal Energy Metabolism, Regulation of Body Temperature and Specific Dynamic Action" and "Total Energy Metabolism and Food Requirement." In the latter chapter a section has been added on the increasingly popular subject of "Food Calories and the Control of Body Weight."

The chapter formerly entitled "Acid–Base Balance in Foods and Nutrition," now entitled "The Nutritional Aspects of Acid–Base Balance," has been reduced in scope, the discussion of *p*H and buffer action being omitted and the table giving base-forming foods abbreviated. Dr. Sherman continues to believe that the practical significance of the acid-base balance of the minerals of the diet is still an open question, which seems to be a generous view of the matter when considering how many years the proponents of this idea have been trying to prove its importance.

The chapter on calcium and phosphorus requirements has been little changed except for new tables of calcium and phosphorus content of foods showing statistical treatment of the data published here for the first time. There has been some revision of the tables giving the iron content of foods in the chapter on iron and copper and the table giving the iodine content of foods from goitrous and nongoitrous regions, in the chapter on iodine, has been revised completely.

As in the fourth edition there are six chapters dealing, respectively, with vitamins A, B, G, C, D, and E. The chapter on vitamin A has been almost entirely rewritten and expanded, and a new table given on vitamin A values of foods, showing both A. C. S.: U. S. D. A. (American Chemical Society; United States Department of Agriculture) units and international units as well as range of values, averages and their probable error. There does not seem to be much point to the double set of units. There has been considerable revision of the chapter on vitamin B (B_1) but the problem of the quantitative needs is discussed only in general terms and no vitamin B values of foods are given (except in Appendix C showing food sources of various vitamins in terms of − to +++). However, the succeeding chapter gives a revised table on vitamin G (flavin) values of various foods. The author's conclusion that, "there is no near prospect of a reliable method for...vitamin G...in vitro," hardly seems consistent with the fluorescent properties of this vitamin, a synthetic preparation of which is now available on the market. The chapter on vitamin C has been extensively revised even to the omission of the table on vitamin C content of foods. The author believes that such data based on a chemical analysis which is subject to some error are of doubtful value at present. But it seems improbable that they are more inaccurate than values for other vitamins based on bio-assays. Parts of the chapter on vitamin D have been revised extensively and the chemistry of antirachitic substances brought up to date. Although antirachitic values of foods are discussed in general terms and a description given of the measurement of vitamin D values, no actual values in terms of international units are mentioned even for U. S. P. cod-liver oil. Also, no mention is made of the addition of artificial vitamin D concentrates to milk in a discussion of this important develop-

ment in practical nutrition. There has been some revision of the chapter on vitamin E, reproduction and lactation. Dr. Sherman seems to have the mistaken idea that bone meal fed to livestock is an important source of vitamin G. Vitamin values of milk are discussed in general terms but no actual values given.

The chapters on "Growth and Development," "Dietary Standards," and "The Problem of the Best Use of Food" follow the same general trend as formerly with the introduction of revised illustrations and some new sections. The latter include discussions of the principle of "natural wholes" or "holism" and a table on suggested dietary allowances.

The text closes with two new chapters entitled, respectively, "Food Economics in the Light of the Newer Chemistry of Nutrition" and "Food Chemistry and Human Progress."

There seems to have been no change in the various appendix tables except for the expansion of the table on Protein, Ca, P and Fe per 100 calories to include the elements Cu and Mn, and some revision of the table showing foods as sources of vitamins A, B, C and G in terms of − to +++.

The final appendix on "Statistical Treatment of Nutrition Data" remains the same. There is the usual subject index.

L. S. PALMER

General Chemistry. By H. I. SCHLESINGER, Professor of Chemistry, The University of Chicago. Third edition. **Laboratory Manual of General Chemistry.** By H. I. SCHLESINGER, Professor of Chemistry, and ADELINE DE SALE LINK, Assistant Professor of Chemistry, The University of Chicago. New edition. Longmans, Green and Company, 114 Fifth Avenue, New York, N. Y., 1937. 14.5 × 22 cm. ix + 857 pp. 86 figs. Price, $3.50. vii + 96 pp. 8 figs. Price, $1.50.

The third edition of this text has been practically rewritten, new material has been introduced and much of the subject matter has been reorganized. ". . . The first few chapters are built about two theses: that matter consists of molecules in motion, and that these molecules exert mutual attractions which, in some cases, are so small as to be negligible, but in others so large as almost completely to mask the effects of molecular motions." By repeated reference to these themes many topics ordinarily widely separated and unrelated are brought together and given unity and coherence.

A new departure in subject matter is the unification of many chemical reactions through the study of their energy. A discussion of the heats of formation of chlorides and oxides of metals leads to an understanding of relative activities of elements, of the factors determining the course of reactions, and of the ways in which the chemist chooses his reagents. As a result of this treatment, reduction of ores to the metals by hydrogen, by carbon monoxide or by electrochemical procedures is presented early in the course and becomes a unified topic instead of widely scattered bits of description.

The reviewer is most sympathetic with the author's emphasis on the energy of chemical reactions, a phase of elementary chemical instruction that had been badly neglected.

Among other changes are a revision of the material on atomic structure; the introduction to atomic structure and the periodic law earlier in the course and a more detailed discussion of the factors which influence chemical change.

It is unfortunate that some of the reproductions of photographs are not more satisfactory.

The author has maintained the high standard of the first edition of this excellent textbook.

The laboratory manual contains a well selected list of experiments with a large number of questions to bring out experimental principles and the relation of the particular experiment to the fundamentals of chemistry. The reviewer approves the omission of experiments that are of importance from the standpoint of qualitative analysis only.

JAMES H. WALTON

Gärungschemisches Praktikum. (Experimental Fermentation Chemistry.) By DR. KONRAD BERNHAUER, Professor in the German University in Prague. Verlag von Julius Springer, Linkstrasse 23–24, Berlin W 9, Germany, 1936. xviii + 249 pp. 27 figs. 14 × 21 cm. Price, RM. 12.60.

The book consists of three parts: (1) an introduction, (2) a section on general methods of fermentation chemistry, (3) the main part consisting of fifty-three experiments, on yeast (16), anaerobic bacteria (16), aerobic bacteria (10), and molds (11). These experiments include procedures for isolating and culturing the organisms and for setting up fermentations and determining products (gases, alcohols, acids, etc.). Methods for the demonstration of intermediate compounds, *e. g.*, phosphoglyceric acid, are also given. The industrial importance of the various fermentations is briefly indicated.

References showing a very careful reading of the literature are cited in connection with each subject. Numerous summary tables are given and a very useful special index on the formation, isolation, identification, and quantitative determination of the most important fermentation products is included. The book contains a great deal of information and will be particularly useful to the research worker in this field.

W. H. PETERSON

Organische Fällungsmittel in der quantitativen Analyse. (Organic Precipitants in Quantitative Analysis.) By Dr. WILHELM PRODINGER. Ferdinand Enke Verlag, Hasenbergsteige 3, Stuttgart-W, Germany, 1937. xii + 163 pp. 4 figs. 16.5 × 25.5 cm. Price, RM. 15; bound, RM. 16.80.

This book is Volume 37 in "Die chemische Analyse" series, edited by Wilhelm Böttger. It describes a number of organic compounds which have been found to serve as good precipitants for certain metallic ions. The first 28 pages are devoted to a general discussion of organic reagents which form (a) normal salts, (b) complex salts, and (c) metallic adsorption compounds. The reagents

discussed are: anthranilic acid, picrolonic acid, quinaldinic acid, α-benzoin oxime, salicylaldoxime, oxalendiuramidoxime, ammonium nitrosophenylhydroxylamine (cupferron), thioglycolic acid β-aminonaphthalide, α-nitroso-β-naphthol, α-nitro-β-naphthol, 1-mercaptobenzothiazole, pyrogallol, diphenylthiocarbazone (dithizone), sulfosalicylic acid, ethylenediamine, propylenediamine, pyridine, quinoline, 8-hydroxyquinoline, β-naphthoquinoline, and tannin. Directions are given for the preparation of the reagent solutions.

Procedures are given for the determination of the following metals: aluminum, antimony, beryllium, bismuth, cadmium, calcium, cobalt, copper, gallium, gold, iron, lead, manganese, mercury, nickel, palladium, silver, thallium, thorium, titanium, uranium, and zinc. Many of these metals may be determined by two or more of the reagents. A few micro, colorimetric, and volumetric methods are included. Also, procedures are given for the separation of the metals from interfering ions.

The use of organic compounds as analytical reagents has increased rapidly during the past few years. Until comparatively recently this class of compounds found very few applications in the quantitative analysis of inorganic constituents. Indeed, most of the literature references in this book appeared during the past decade. By far the most promising field for new and better analytical reagents is among the vast number and variety of organic compounds. This book will be of interest to all those who have occasion to make chemical analyses.

JOHN H. YOE

BOOKS RECEIVED

September 15, 1937–October 15, 1937

H. V. ANDERSON and T. H. HAZLEHURST. "Qualitative Analysis." Second revised edition. Prentice-Hall, Inc., 70 Fifth Ave., New York, N. Y. 280 pp. $2.25.

KENNETH C. BAILEY. "The Retardation of Chemical Reactions." Longmans, Green and Co., 114 Fifth Ave., New York, N. Y. 479 pp. $8.00.

FARRINGTON DANIELS. "Outlines of Theoretical Chemistry." Sixth edition. John Wiley and Sons, Inc., 440 Fourth Ave., New York, N. Y. 662 pp. $3.75.

CARROLL C. DAVIS, Editor, and JOHN T. BLAKE, Associate Editor. "The Chemistry and Technology of Rubber." American Chemical Society Monograph Series. Reinhold Publishing Corp., 330 West 42d St., New York, N. Y. 941 pp.

HORACE G. DEMING. "A Laboratory Manual of College Chemistry. (Elementary Course.)" John Wiley and Sons, Inc., 440 Fourth Ave., New York, N. Y. 268 pp. $1.75.

FRITZ FEIGL and JANET W. MATTHEWS. "Qualitative Analysis by Spot Tests. Inorganic and Organic Applications." Translated from the German. Nordemann Publishing Co., 215 Fourth Ave., New York, N. Y. 400 pp. $7.00.

HANS FISCHER and HANS ORTH. "Die Chemie des Pyrrols. II Band. 1 Hälfte. Porphyrine—Hämin—Bilirubin und ihre Abkömmlinge." Akademische Verlagsgesellschaft m. b. H., Sternwartenstrasse 8, Leipzig C 1, Germany. 764 pp. RM. 42; bound, RM. 44.

K. H. GUSTAVSON, Editor. "Stiasny Festschrift." Eduard Roether Verlag, Darmstadt, Germany. 432 pp. RM. 15.

WILLIAM T. HALL. "Treadwell-Hall Analytical Chemistry. Vol. I. Qualitative Analysis." Ninth edition. John Wiley and Sons, Inc., 440 Fourth Ave., New York, N. Y. 630 pp. $4.50.

HARRY N. HOLMES. "Laboratory Manual of General Chemistry." Fourth edition. The Macmillan Company, 60 Fifth Ave., New York, N. Y. 299 pp. $1.50.

M. G. MELLON. "Methods of Quantitative Chemical Analysis. An Introduction to their Theory and Technic." The Macmillan Company, 60 Fifth Ave., New York, N. Y. 456 pp. $3.00.

STEPHEN MIALL and LAURENCE MACKENZIE MIALL. "Chemistry, Matter and Life." Longmans, Green and Co., 114 Fifth Ave., New York, N. Y. 296 pp. $2.60.

H. I. SCHLESINGER and ADELINE DE SALE LINK. "Laboratory Manual of General Chemistry." Longmans, Green and Co., 114 Fifth Ave., New York, N. Y. 96 pp. $1.50.

GEORG-MARIA SCHWAB. "Catalysis from the Standpoint of Chemical Kinetics." Translated from the German by Hugh S. Taylor and R. Spence. D. Van Nostrand Co., Inc., 250 Fourth Ave., New York, N. Y. 357 pp. $4.25.

RUDOLF VOGEL. "Die heterogenen Gleichgewichte." (Band II, "Handbuch der Metallphysik.") Akademische Verlagsgesellschaft m. b. H., Sternwartenstrasse 8, Leipzig C 1, Germany. 737 pp. RM. 66; bound, RM. 68.

WILLIAM H. WALKER, WARREN K. LEWIS, WILLIAM H. MCADAMS and EDWIN R. GILLILAND. "Principles of Chemical Engineering." Third edition. McGraw-Hill Book Company, Inc., 330 West 42nd St., New York, N. Y. 749 pp. $5.50.

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