

Acid Hydrolysis of 1,1'-Methylidene Glycerol 2-Methyl Ether (X).—Five grams of this ether was hydrolyzed by the same method and yielded 2 g. (45%) of pure glycerol β -methyl ether;¹⁸ b. p. 120° (13 mm.); $n_D^{20} = 1.4480$.

The identity was further confirmed by conversion of the product into 1,1'- p -nitrobenzylidene glycerol 2-methyl ether and isolation of the two crystalline isomers, m. p. 42 and 47°, respectively.¹⁹

Summary

1. The possibility of both optical and geometrical isomerism in the structurally isomeric cyclic acetals of glycerol is pointed out.

2. Advantage is taken of the absence of geometrical isomerism in the methylidene glycerols in order to isolate and determine the structure of the two isomers formed by partition of formaldehyde between the 1,2- and 1,1'-hydroxyl groups of glycerol during cyclic acetal formation.

3. The isolation and identification of the two isomeric methylidene glycerols and of certain of their derivatives are described.

4. The interconversion of the ring systems of the two isomeric acetals has been investigated.

MONTREAL, CANADA

NEW BOOKS

A Textbook of Inorganic Chemistry. Volume VI, Part I. **Nitrogen.** By EDMUND B. R. PRIDEAUX, M.A., B.Sc. (N. Z.), D.Sc. (Lond.), F.I.C., and HERBERT LAMBOURNE, M.A. (Cantab.), M.Sc. (Lond.), F.I.C. J. B. Lippincott Company, Philadelphia, 1928. xxviii + 242 pp. 25 figs. 15.5 × 23 cm.

This volume deals solely with nitrogen, and in view of the present importance and extensive literature on the subject, naturally presents a problem to the authors as to what they shall include in the 231 pages of text allotted to them.

The fourteen chapters include an introductory chapter on the nitrogen atom, the properties of nitrogen, one on ammonia, hydroxylamine, nitrogen and the halogens, oxy-halogen derivatives, hydrides and their derivatives, hyponitrous acid, the oxides of nitrogen, nitrous acid, nitric acid, nitrogen and sulfur and one on the fixation of nitrogen. Some space might have been saved in the chapter on ammonia by a more judicious selection of graphs. For textbook purposes a satisfactory discussion of the synthetic production of ammonia is presented, including a brief reference to the technical features of the process.

The authors' prefatory intention to avoid "undue detail in physical constants and in the minutiae of chemical processes" has been somewhat overlooked by the later inclusion of such data as the tables of the solubility of nitrogen in water, and in sea water, and the listing of five different equations for the specific heat of ammonia at constant pressure. This

¹⁹ A full account of this work has been submitted for publication in THIS JOURNAL.

oversight, however, is not a serious one and merely attests to the zeal of the authors in making their book "a starting point for research."

The chapter on the fixation of nitrogen, in 26 pages, includes a discussion of the arc process, with a brief historical account of the early developments, and gives the reader some idea of the details of construction of the various furnaces. The section on Synthetic Ammonia includes a discussion of the "Haber" process with a brief discussion of the method of gas preparation and purification. The Claude, Casale and Fauser processes are briefly dealt with, as is also the commercial oxidation of ammonia. Brief mention is made of the Serpek, or aluminum nitride process, the Bucher cyanide process and the cyanamide process. A survey of the nitrogen fixation problem completes the chapter and the book.

As a whole the book is a valuable compilation of information on the chemistry and technology of nitrogen and should be of service to the student and research worker in this field.

H. J. KRASE

Physical Chemistry and Biophysics for Students of Biology and Medicine. BY MATTHEW STEEL, Ph.D., Professor of Biological Chemistry, the Long Island College Hospital, Brooklyn, New York. John Wiley and Sons, Inc., New York, 1928. x + 372 pp. 38 figs. 15 × 23.5 cm. Price, \$4.00.

Chapters 1 to 4 are entitled, respectively, General Introduction; Nature and Structure of Matter; General Properties of Matter; Energy Transformations in Living Matter. Chapters 5 to 12 contain the usual treatment of elementary physical chemistry. Such recent developments as the theory of Debye and Hückel and Cohn's studies of the physical chemistry of the proteins are unmentioned. Chapter 13, the last, is entitled "Dynamical Physical Chemistry of the Cell."

This book is fairly satisfactory in scope but the treatment of several subjects lacks precision. Thus on p. 106 we learn that when "a mixture is chemically and physically homogeneous, and no abrupt change in its properties results from a change in the proportions of the compounds of the mixture, it is a one-phase system and is termed a solution." However, this appears to be a definition not of solution but of "true solution," for glucose and water form "a homogeneous, one-phase system composed of two different substances, uniformly mixed with each other. Such a system is called a true solution, to distinguish it from heterogeneous mixtures, such as colloidal solutions." This ambiguity is accentuated on p. 108 where smoke in air is given as an illustration of solutions of solids in gases.

"Water as a Solvent" is the title of a paragraph on p. 120. Water has great "power of solution." "All kinds of substances dissolve in it. . . . The urine, for instance, may have as many as a hundred substances dissolved in it. Among these are. . . adinine, allantoin, . . . tyrocine, . . . ;

salts of sodium, . . . iron, carbonic acid, nitrogen, argon; . . . blood form elements and pigments, pus, . . . arsenic, mercury, . . . urosin, urocromogen. . ." In this one paragraph, in addition to typographical errors, the words *power*, *substance* and *element* are used in the popular sense and an error of logic is made in illustrating the solvent "power" of water by the solvent "power" of urine.

This lack of precision may also be illustrated by inconsistency in nomenclature. Thus we have on p. 121 "ions of water," and on the same page, "OH-ions of the substrate are substituted for H-ions"; on p. 173, "quantity of H⁺ ions and OH⁻ ions"; on p. 189, " $\text{HCl} \rightleftharpoons \text{H}^+ + \text{Cl}^-$ " and "the H⁺-ion content"; on p. 232, " $\text{Ct}' - \text{An}' + \text{H}'\text{OH}' \rightleftharpoons \text{H}' - \text{An}' + \text{Ct}' - \text{OH}'$ ", and on page 362, "the (H⁺) and (OH⁻) concentrations."

Although errors and inconsistencies appear to be rather numerous, it may be said that the plan and scope of the book should make it useful to students of biology who have little time to devote to chemistry and physics.

D. B. DILL

Holzchemie. (The Chemistry of Wood.) BY DR. FRIG HÄGGLUND, Professor of Wood Chemistry at the Academy of Åbo. Akademische Verlagsgesellschaft m. b. H., Markgrafenstrasse 4, Leipzig C 1, Germany, 1928. viii + 275 pp. 33 figs. 16 × 23.5 cm. Price, unbound, M 18; bound, M 20.

The name of Hägglund needs no introduction to students of wood chemistry. In the Foreword of his present book he calls attention to the lack of publications in the line of wood chemistry. He acknowledges recent American publications, but justifies his own book on the ground that he has drawn for material on a great number of German and Scandinavian investigators, and thus he gives his work a more widespread appeal.

This small but rather comprehensive text is divided into eleven chapters, commencing with a very interesting one on The Texture of Wood. This chapter is illustrated by photographs and diagrams on sections of various types of woody plant structures. The next chapter deals rather briefly with The Physical Attributes of Wood. It is in this chapter that the tremendous amount of work connected with gathering material for the text begins to become apparent. There are in the entire text somewhat over 175 tables and curves representing data either accumulated by the author or taken from other literature in support of one of his contentions.

The third and most elaborate chapter deals with The Constituents of Wood and their Chemical Properties. Therein are studied in some detail the usual list of wood constituents. The formulas of lignin due to Klason and to Schrauth are presented. Subsequent chapters deal variously with the reactions of wood with acids, sulfites and alkali. The two last chapters treat of The Behavior of Wood Accompanying Storage

(Stratification) and Certain Opposing Reagents, and with The Decomposition of Woods in Nature.

Throughout the text are innumerable references to the literature, much of which is American. There is at the end of the book an eleven-page Author Index to the rich list of references, which, for one interested in this subject, is worth the price of the book, for the author has spared no labor in gathering these references.

As a whole, the text is a fine review of the subject, not adding much that is startlingly new, but organizing and tabulating that which had already been written in such a way as to eliminate much of the usual "dead timber."

R. LYMAN HEINDEL, JR.

Synthese der organischen Arzneimittel. (Synthesis of Organic Medicinals.) By PROFESSOR DR. ERNST WASER, Zürich. Ferdinand Enke, Stuttgart, Germany. 1928. xi + 227 pp. 16.5 × 25.5 cm. Price unbound, M 16; bound, M 18.

This book is an advanced text on the synthetic methods for preparing organic medicinals and is planned by the author as an aid to students in chemistry as well as to those in medicine and pharmaceutical chemistry who desire to become acquainted with this field. The discussion is limited essentially to the methods of preparation. The physical properties of the various drugs are described very briefly and the general physiological action of each is given in a table, classified in one of fourteen different groups, such as drugs exciting the central nervous system, drugs for local anesthesia, etc.

The discussion of the various compounds is under six headings:

- (1) Aliphatic Compounds
 - (a) Hydrocarbons and Halogen Compounds
 - (b) Oxy-compounds (Alcohols, Ether and their Halogen Compounds and Esters)
 - (c) Oxo-compounds (Aldehydes and their Halogen Compounds)
 - (d) Sulfoxes
 - (e) Carboxylic Acids and their Derivatives (Esters, Amides, Urethans, etc.)
 - (f) Amino Alcohols and their Derivatives
 - (g) Amino Acids and their Derivatives
- (2) Aromatic Compounds
 - (a) Phenols and Derivatives
 - (b) Carboxylic Acids and Derivatives
 - (c) Amines and Aminophenols
 - (d) Aminobenzoic Acids and Derivatives
- (3) Mixed Aliphatic-Aromatic Compounds
 - (a) Halocaine Group
 - (b) Novocaine Group
 - (c) Tyramine Group

- (4) Alicyclic Compounds
- (5) Heterocyclic Compounds
 - (a) 5-Membered Heterocyclic Systems, such as Indole Derivatives, Pyrazole Derivatives, etc.
 - (b) 6-Membered Heterocyclic Systems, Such as Pyridine, Quinoline, Hecog-nine Derivatives, etc.
- (6) Dyes
 - (a) Azo Colors
 - (b) Phthaleins
 - (c) Acridine Colors
 - (d) Thiazine Colors

References from which the information is obtained about the preparation of the drugs are included. Over 250 drugs are listed with their trade names.

The book is copiously supplied with structural formulas which are a great aid to the reader and make it possible to obtain proper information without too much study. All of the methods of preparation or references to all of them for each of the individual drugs are not in every case included; in fact now and again omission of a very important method has been noted. The author has made no attempt to indicate which of the methods described is of the greatest commercial value and frequently more detail is given about a less important method than about a more important one. As a consequence, the student must not be misled into believing that the information which is given is more than of general help in the development of a manufacturing process for any drug.

To the reviewer it seems a pity that the author could not have added to his rather extensive list of drugs a few of the more important ones which have been developed, manufactured and widely distributed in the United States, such as mercurochrome-220, hexylresorcinol and butyn. These are certainly of far more commercial value than a large proportion of those described which find only a very limited use and distribution. It should be mentioned also that the author has omitted a discussion of the therapeutic compounds of arsenic, antimony and mercury.

At the end of the book are appended five useful tables which indicate by means of structural formulas all of the various methods of preparation for novocaine, tyramine, hordenine, suprarenine and hydrastinine.

It is unfortunate that a chapter on the comparative medicinal value of the individual substances in any one class could not have been given but it is clearly recognized how difficult it is to procure this information.

If an occasional statement is overlooked such as that ethylene chlorohydrin is made from ethylene glycol, much valuable chemistry is involved in the book and is presented in a very condensed and readable form. The student, therefore, will benefit by the study of this book from the purely

synthetic organic chemical standpoint at the same time that he is acquiring a knowledge of synthetic drugs.

The book is one which any chemist interested in synthetic drugs should surely have at his disposal.

ROGER ADAMS

The Chemistry of Leather Manufacture. By JOHN ARTHUR WILSON, Chief Chemist. A. F. Gallun and Sons Co. (Tanners), Milwaukee, Wisconsin. Volume I. second edition. American Chemical Society Monograph Series. The Chemical Catalog Company, Inc., 419 Fourth Avenue, New York, 1928. 495 pp. 105 figs. 95 plates. 15.5 × 23.5 cm. Price, \$10.00.

The first English edition of this book appeared early in 1923. Its outstanding merit was instantly recognized as shown by the publication of translations in three foreign languages, the German in 1925, French in 1926 and Russian in 1927. Since the publication of the first edition, scientific knowledge of the fundamentals pertaining to the many materials used and the leathers produced by tanneries has grown enormously, the author himself being one of the most prolific contributors. As a result of the increase in exact information, together with "many and varied suggestions for increasing the scientific value and general usefulness of the book," the author has found it necessary to increase the size of the book to two volumes, each greater in size than the original book.

Volume I consists of 14 chapters including Histology and Chemical Constituents of Skin, Measurements of Acidity and Alkalinity, Physical Chemistry of Proteins, Microorganisms and Enzymes, the Preservation, Disinfection, Soaking, Fleshing, Unhairing, Bating and Pickling of Skins and the practical aspect of Vegetable Tanning Materials as well as their chemistry and evaluation.

The author has acquitted himself well in a difficult task, producing a work so fundamentally chemical that it possesses broad scientific value as well as being the authoritative reference and textbook for the leather and tanning industry.

ARTHUR W. THOMAS