on IV but none on I and II. After hydrolysis, total ninhydrin values corresponded to those obtained for the DNP derivatives.

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BOOK REVIEWS

Advances in Carbohydrate Chemistry. Volume 9. By MELVILLE L. WOLFROM, Editor, R. STUART TIPSON, Assistant Editor, and E. L. HIRST, Associate Editor for the British Isles. Academic Press, Inc., Publishers, 125 East 23rd Street, New York 10, N. Y. 1954. xviii + 426 pp. 16 × 23 cm. Price, $10.50.

It is most appropriate that this, the latest volume of a distinguished series, should begin with a biographical sketch of the late C. S. Hudson, written by the present editor, M. L. Wolfrom. Not only did Professor Hudson play a major part in the development of carbohydrate chemistry in this country but he was also closely associated in various capacities with this series of reviews from its inception until his death in 1952.

The present volume, like its predecessors, reminds the writer of the medieval *Speculum Alchemiae*, for it is a kind of mirror, a mirror of the state of carbohydrate chemistry, and affords even the most casual reader an opportunity to see what areas of this fertile field are being tilled most intensively. In this light two aspects of the latest volume seem particularly worthy of note. First, several of the contributions illustrate the gratifying extent to which modern theories of the mechanism of organic reactions have been applied in the carbohydrate field and, second, the volume, taken as a whole, caters to a surprisingly broad spectrum of interests. The organic chemist concerned with reaction mechanisms will find a chapter by R. U. Lemieux ("Some Implications in Carbohydrate Chemistry of Theories Relating to the Mechanisms of Replacement Reactions"), one by Clinton E. Ballou ("Alkali Sensitive Glycosides") and a third by Mary Grace Blair ("The 2-Hydroxyglycals"). The worker in natural products will turn especially to Ballou's chapter as well as to one by Dexter French entitled "The Raffinose Family of Oligosaccharides." If he is among the increasing number who deal with the uronic acids, G. O. Aspinall's chapter on "The Methyl Ethers of Hexuronic Acids" will prove a useful compilation of important data which have heretofore been widely dispersed in the literature. He will also find a contribution by Robert S. Teague entitled "The Conjugates of D-Glucuronic Acid of Animal Origin" which will, of course, appeal as well to the biochemist and physiologist. One interest of the sugar technologist is represented by "Color and Turbidity of Sugar Products" written by R. W. Liggett and Victor R. Deitz. The chemist interested in the industrial utilization of carbohydrates will find a contribution by J. V. Karabinos and Marjorie Hindert on "Carboxymethylcellulose" while laboratory workers in several fields will note much of practical value in a review on the "Paper Chromatography of Carbohydrates and Related Compounds" by George N. Kowkabany. The present volume is, incidentally, the first of the series in which an attempt has been made to use the new carbohydrate nomenclature [*Chem. Eng. News*, **31**, 1776 (1953)] throughout.

Taken as a whole, this volume, together with the preceding ones, forms a set which is of great utility to chemists generally and invaluable to those specializing in the carbohydrate field.

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The Chemistry of Lipids of Biochemical Significance. By J. A. LOVERN. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1955. xiii + 132 pp. 11 × 17 cm. Price, $1.75.

This relatively short monograph is intended to give an over-all general picture of lipid chemistry and therefore does not fully cover either subject matter or bibliography. In general only major points are presented with a minimum amount of experimental detail. The monograph brings to focus many important aspects of the lipids in a manner that the reader is not bothered with less important minutia. Although the text covers lipid structure, preparation and analysis, a considerable portion is devoted to the distribution, dynamic state and biochemical functions of the lipids. Emphasis is placed on the phosphatides. The carotenoids and fat-soluble vitamins are not included in the monograph. It is the opinion of the reviewer that the title of the book might have been more appropriately chosen since a large part of the monograph deals with topics other than lipid chemistry.

The author gives constructive comments on lipid nomenclature and classification and indicates the need for more uniform and discrete terminology. The interrelationships of the various lipid classes are stressed and an attempt is made to integrate the entire lipid subject.

The reader will find the personal comments of the author interesting, helpful and provocative. An excellent evaluation of the various methods of lipid preparation and analysis is presented including an informative discussion on lipid extraction and purification. In addition, there is a stimulating discourse on the limitations of radioactive isotope techniques for the study of lipid metabolism. Topics such as lipid complexes with proteins and carbohydrates, and lipid digestion, absorption and biosynthesis are briefly covered.

The subject matter of the book is well presented and should have particular appeal to those interested in obtaining the essential highlights of the biochemistry of the major lipids. Moreover, the fine integration of the material should make the monograph especially useful to the beginner in the lipid field.

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The Vitamins. Chemistry, Physiology, Pathology. Volume III. Edited by W. H. SEBRELL, JR., Director, National Institutes of Health, Bethesda, Maryland, and ROBERT S. HARRIS, Professor of Biochemistry of Nutrition, Massachusetts Institute of Technology, Cambridge, Massachusetts. Academic Press, Inc., Publishers, 125 East 23rd Street, New York 10, N. Y. 1954. xi + 665 pp. 16.5 × 23.5 cm. Price, $15.00.

This is the third and last volume of a series. It is, of course, difficult to review adequately one-third without reference to the other two thirds. In the whole series the vitamins are presented in alphabetical order so the biochemist, chemist and clinician, to whom the series is directed,

will be forced to obtain (by purchase, presumably) all three volumes.

Volume III of The Vitamins is a series of six chapters on recognized vitamins and one chapter on compounds either relatively new to the field or as yet unidentified. The chapters are as follows: *p*-Aminobenzoic acid (five authors); Pteroylglutamic acid (three authors); Pyridoxine and Related compounds (eight authors); Riboflavin (five authors); Thiamine (five authors); The Tocopherols (three authors); New and unidentified growth factors (one author).

The plan of presentation throughout the series is uniform for all compounds and includes nomenclature, chemistry, industrial preparation, biochemistry, estimation and standardization, occurrence, deficiency effects, pharmacological considerations and requirements. This becomes monotonous, but when one considers the series as reference material it must be admitted that this style and uniformity is most easily used.

The editors and publishers have produced an invaluable series, and volume III maintains the high standard set by volumes I and II, wherein one may find essentially all the important published material on the compounds which have the status of vitamins (and some which do not). In choosing the specialists for the various sections, the editors have been wise, and the result is the focusing of attention on the compounds, in all their intricate facets. From the biochemical standpoint this emphasis circumvents the concentration on any one phase of interest and any one group of organisms.

This reviewer finds it difficult to single out any one section for special praise, although the one on *p*-Aminobenzoic Acid is particularly valuable because this special subject has not been adequately reviewed elsewhere. The series will be of interest to all students of metabolism and should be extremely helpful to the organic chemist, not only for the review of reactions leading to the syntheses of metabolically active compounds, but because it will allow him to gain understanding into the complex relations between the products of his reaction flask and the reactions within the organism.

The printing is clear and the figures are well executed. Extensive bibliographic references are carried as footnotes for each subchapter, which leads to extensive duplication. Inevitably a few errors appear to have escaped the proofreaders (*e.g.*, a triaminohydroxypyridine, instead of the corresponding pyrimidine on page 105). Most, however, will not lead to confusion.

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Substances Naturelles de Synthèse. Volume VIII. Edited by LÉON VELLUZ, Docteur ès Sciences Physiques. Masson et Cie, Éditeurs, Libraires de l'Académie de Médecine, 120, Boulevard Saint-Germain, Paris VI, France. 1954. 157 pp. 16 × 22.5 cm. Broché, 1.800 fr.; Cartonné toile, 2.200 fr.

Substances Naturelles de Synthèse. Volume IX. Edited by LÉON VELLUZ, Docteur ès Sciences Physiques. Masson et Cie, Éditeurs, Libraires de l'Académie de Médecine, 120, Boulevard Saint-Germain, Paris VI, France. 1954. 186 pp. 16 × 22.5 cm. Broché, 1.800 fr.; Cartonné toile, 2.280 fr.

These latest volumes in this useful series follow the pattern of earlier volumes. Each is divided into three sections: Preparations, Methods, "Practical Note." Volume VIII gives detailed procedures for preparing nicotinic acid, DL-tuberculostearic acid, dicoumarol, hydrocortisone, tryptamine and DL-tryptophan. Volume IX contains synthetic methods for 3-indoleacetic acid, DL-cystine, DL-hydroxylysine, spermine, testosterone-4-C^{14} and thymine. The experimental directions are those given in the journal literature. Each procedure is preceded by a short historical and explanatory introduction and is followed by interesting and useful notes discussing reactions involved in the preparation described, other methods for synthesizing the product, related compounds and their preparation, and similar topics. Each volume contains a frontispiece with photomicrographs of four of the compounds for which preparative procedures are given.

The second section of volume VIII consists of concise reviews of (1) reduction by means of double hydrides and (2) the synthesis of saturated aliphatic monocarboxylic acids. The subjects considered in this section of volume IX are (1) the synthesis of labeled natural products and (2) the resolution of racemic forms. Each review has tables listing examples of the methods discussed together with literature references. Although the illustrations are numerous and varied, the value of these tables would be considerably increased if they gave a more comprehensive coverage of the literature and if yields were indicated.

Procedures for the preparation of lithium aluminum hydride, lithium borohydride and sodium borohydride constitute the third section of volume VIII, while the corresponding section of volume IX describes methods for preparing sixteen optically active reagents used to resolve racemic forms.

The volumes have the pleasing format of preceding ones.

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Ephraim's Inorganic Chemistry. Sixth Edition—Revised and Enlarged. Edited by P. C. L. THORNE, M.A. (Cantab.), M.Sc., Ph. D. (Lond.), F.R.I.C., Formerly H. M. Staff Inspector for Chemistry, Ministry of Education, Sometime Lecturer in Chemistry at Sir John Cass College, London and at Woolwich Polytechnic, and E. R. ROBERTS, A.R.C.S., Ph.D. (Lond.), Ph.D. (Minnesota), D.I.C., Senior Lecturer in Chemistry at the Imperial College of Science and Technology. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1954. xii + 956 pp. 17.5 × 24.5 cm. Price, $6.25.

In this edition of Ephraim's well-known reference book on inorganic chemistry, the novel and instructive approach which characterized the earlier editions has been continued without alteration. By presenting together as classes elements or compounds of similar types and characteristics, this type of approach achieves a degree of logic and a type of systematization not to be found in many other treatments. A wealth of information, especially of a descriptive type, is presented, and no library on inorganic chemistry should be considered complete without a copy of this reference.

It is debatable, however, whether one who owns an older edition of the book would find it desirable to acquire this edition. Except for a few minor changes, particularly in relation to atomic structure, the bulk of the book has been reprinted without alteration and is thus scarcely a revision in the absolute sense of the word. A detailed check of references to papers appearing since the preceding edition reveals that only a very small segment of the tremendous inorganic literature which has accumulated in this fruitful period has been covered. This the reviewer regards as unfortunate because it subordinates important new concepts and discoveries and creates the impression that progress in inorganic chemistry has been immeasurably less than is actually true. The authors' limitation of the net increase in size of the book to some seventeen pages is commendable, but to say that this "has been made possible by skilful replacement of old by new matter made available since the last edition" (Preface) is not completely indicative of what has been done. It is to be hoped that in future editions more thorough revision with adequate and completely indexed literature coverage will seem desirable to the authors.

The book is well and clearly printed in a type size which is not tiring to read. All in all, it is an attractive volume.

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Nuclear Theory. By ROBERT G. SACHS, Professor of Physics, University of Wisconsin. Addison-Wesley Publishing Company, Inc., Cambridge 42, Massachusetts. 1953. xi + 383 pp. 16 × 23.5 cm. Price, $7.50.

This introduction to theoretical nuclear physics is intended for persons already possessing a knowledge of quan-