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 BOOK REVIEWS
 

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**Inorganic Syntheses.** Volume IV. By JOHN C. BAILAR, JR., University of Illinois (Editor-in-Chief). McGraw-Hill Book Co., Inc., 330 West 42nd Street, New York 36, N. Y. 1953. xii + 218 pp. 16 × 23.5 cm. Price, \$5.00.

In this volume of the well-known periodical in book form the editorial policies used in the earlier volumes have been retained. Only repeatedly tested syntheses which have been independently checked by one or more persons in laboratories other than that of the contributors are included. The syntheses are practical and they are clearly described. They are useful to research workers and to students learning the art of synthesis of inorganic compounds.

The book contains 56 numbered articles, a large fraction of which describe the preparation of more than one compound. Two of the articles are reviews. One of these discusses anhydrous metal halides; the other deals with the fluorination of volatile inorganic compounds. In the latter, emphasis is placed upon the techniques developed by Harold S. Booth and his students. It is well that this is done, since this volume is dedicated to Professor Booth, the editor-in-chief of Volume I.

While this book does not confine its attention to certain classes of compounds, it is nevertheless true that several syntheses may be found in each of the following areas: derivatives of hydrazine, compounds of phosphorus, anhydrous halides and complex compounds of cobalt (III). A subject index covering Volumes I through IV is included.

The editor-in-chief has been assisted by the associate editors, Jacob Kleinberg, Therald Moeller, Eugene G. Rochow, Walter C. Schumb, Janet D. Scott and Ralph C. Young, and by an advisory board composed of Ludwig F. Audrieth, Arthur A. Blanchard, W. Conrad Fernelius, W. C. Johnson, Raymond E. Kirk and H. I. Schlesinger.

DEPARTMENT OF CHEMISTRY  
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GEORGE H. CADY

**Structure Reports for 1945-1946.** Volume 10. Edited by General Editor, A. J. C. WILSON, University of Wales, Cardiff, Great Britain, and Section Editors, C. S. BARRETT (Metals), University of Chicago, U. S. A., J. M. BIJVOET (Inorganic Compounds), University of Utrecht, Holland, and J. MONTEATH ROBERTSON (Organic Compounds), University of Glasgow, Great Britain. A. Oosthoek Publishing Company, Domstraat 1-3, Utrecht, Holland. 1953. viii + 325 pp. 17 × 25 cm. 45.-Dutch florins.

Those whose work evokes an interest in the structure of molecules and crystals will welcome the appearance of Volume 10 (for 1945-1946) of Structure Reports. As planned by the International Union of Crystallography (under whose guidance these reports are prepared) in 1948, the present work is an important link toward bridging the lapse between the previously published Volumes 11 (1947-1948) and 12 (1949) and the last issue of Strukturbericht (1939).

Volume 10 follows the pattern and high quality established in 11 and 12; abstracts are grouped in three sections; Metals (84 pp.), Inorganic Compounds (95 pp.), and Organic Compounds (114 pp.). Summaries are concerned only with work of structural interest, but from this standpoint are sufficiently complete so that it is rarely necessary to refer to the original papers. The coverage of the literature appears to be excellent; abstracts include papers from approximately 147 different journals. This constitutes a particularly great asset to those having limited access to less familiar publications.

Abstracts are listed according to the name and formula of the substance concerned; a summary of the principal results such as unit cell, space group, atomic positions and parameters, interatomic and intermolecular distances and details of analysis is given along with a brief discussion and the principal references. The discussion frequently in-

cludes useful editorial comments. The paper(s) constituting the basis for each abstract is listed at the beginning of the summary with the major reference generally published in 1945-1946, although occasional instances were noted in which this was not the case (*e.g.*, the papers on formic acid appeared in 1947). Care has been taken, however, to avoid duplication of material previously given in Volumes 11 and 12; a list of papers published in 1945-1946 which were reported in 11 or 12 is given at the end of each section.

As to be expected the large majority of evidence is based on X-ray diffraction work; however, a fair number of electron diffraction papers are to be found as well as occasional abstracts of publications containing material of structural interest derived from other experimental methods. Numerous phase diagrams are included for metal systems in the first section. Some miscellaneous papers of general structural interest are summarized at the end of each section. Name (subject), formula and author indexes are given which greatly facilitate location of work of particular interest. A corrigendum for Volumes 11 and 12 is also included.

The outstanding group of editors and abstractors contributing to this volume are certainly to be commended on this latest step toward completion of their momentous task.

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N. W. GREGORY

**Imidazole and its Derivatives.** Part I. By KLAUS HOFMANN, Professor of Biochemistry, Medical School, University of Pittsburgh. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1953. xviii + 447 pp. 15 × 22.5 cm. Subscription price, \$12.25; single copy, \$13.50.

Klaus Hofmann's volume on "Imidazole and Its Derivatives" is a welcome addition to the series on The Chemistry of Heterocyclic Compounds edited by Arnold Weissberger. The major portion of the book, Section 1, "Chemistry of Classes and Derivatives," deals with synthetic methods and the physical and chemical properties of imidazoles and benzimidazoles.

The first chapter, on general properties and structure, is one of the more valuable since it presents in electronic terms an interpretation of many of the chemical and physical properties of the imidazoles, and sets the tone for the entire volume. Imidazole is regarded as a resonance hybrid in which 8 of the 10 contributing structures bear formal charges. This is consistent with the acidity, the aromatic character and substitution behavior and the high dipole moment of imidazole. In addition, the amidine type resonance and the symmetrical nature of the imidazolium ion assist in an understanding of the basicity of the substance. The high degree of association of imidazole in non-polar solvents is viewed in the light of hydrogen bonding between the "pyridine" nitrogen of one molecule and the hydrogen of the "pyrrole" nitrogen of the next, leading to linear polymers of considerable but unknown dimensions. Similarly, the tautomeric character of imidazoles is regarded as the result of intermolecular prototropic changes rather than the intramolecular shift of a proton from one nitrogen to the other.

The free use of the terms pyridine nitrogen and pyrrole nitrogen, unembellished by quotation marks, may be somewhat confusing. However, the concept of imidazole as a sort of hybrid with pyridine and pyrrole parentage provides a useful first approximation of its properties.

The further development of the subject is by compound type. In each chapter preparative methods and structural considerations are dealt with. Where appropriate, pharmacological properties and biological occurrence have been included. Throughout, a serious and successful effort toward integration and interpretation has been made.

Section 2, "Systematic Survey and Bibliography," occupies 75 of the approximately 400 pages. It consists of a list of the compounds and their salts, together with the

melting points and references, which have appeared in the literature during the period 1919 to 1950. This part of the project may or may not be valuable enough to justify the effort and space devoted to it. It is difficult to think of a situation in which it could substitute for the original literature. Perhaps a survey which would provide more information about fewer compounds would be more useful.

The insistence of authorities on nomenclature, to which Dr. Hofmann has acceded, on the clumsy 4 (or 5) 5 (or 4) type of nomenclature for N-unsubstituted imidazoles, strikes this reviewer as somewhat irrational, and inconsistent in view of the vast numbers of other structures to which similar alternative names could be applied. (Heaven forbid!)

The volume as a whole is well printed and amply illustrated with structural formulas. It is written with clarity and conciseness. It stands high in a series for which a commendably high standard has been set.

THE WELLCOME RESEARCH LABORATORIES  
TUCKAHOE, N. Y. G. H. HITCHINGS

**Preparative Organische Chemie.** Naturforschung und Medizin in Deutschland 1939-1946. Edited by KARL ZIEGLER, Kaiser-Wilhelm-Institut für Kohlenforschung, Mülheim (Ruhr). Verlag Chemie, G.m.b.H., Weinheim/Bergstr., Germany. 1954. 15 × 32 cm. Vol. 37, Part II, 300 pp. Price, DM 20,-. Vol. 38, Part III, 352 pp. Price, DM 20,-.

These books are parts of the German publications of the FIAT Review of German Science for 1939-1946 and hence the syntheses reported are limited to work in Germany during these years. Since the titles do not indicate the actual contents, a summary of the subjects covered is of interest.

Part II of Vol. 37 has an excellent discussion of the investigations on organolithium, -sodium, -potassium, -magnesium and -zinc compounds written by G. Wittig and W. Theilacker. Brief chapters on organic dyes (S. Petersen and P. Tust), sugars and their derivatives (O. Th. Schmidt), the strychnos alkaloids (R. Huisgen) and syntheses under physiological conditions (C. Schöpf) are included. A very good summary of investigations on autoxidation describing the formation and reactions of alkyl hydroperoxides and peroxides is given by G. O. Schenck. K. Alder also has an extensive report on diene syntheses. Chapters on organic chromatography (G. Herse) and automatic micro-analytical technique (W. Zimmermann) conclude this part.

The second publication (Vol. 38, Part III) is devoted entirely to work on natural and synthetic polymers carried out in Germany. The chemistry of cellulose is written by H. Staudinger. G. Jayme has contributed a very thorough discussion of the various analyses of woody cellular tissues with particular reference to their examination and use for producing paper pulp.

The polymerization of vinyl compounds by peroxides and oxidation-reduction methods is discussed by W. Kern and is followed by a chapter on emulsion polymerization of butadiene (E. Konrad and W. Becker). The chemistry of copolymers and condensation polymers is reviewed by H. Hopff and H. Spänig and polyurethans are summarized by O. Bayer.

Although these reports are limited to the work in Germany during 1939-1946, they are well written and contain useful information on each of the above topics.

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R. L. SHRINER

## BOOKS RECEIVED

April 10, 1954—May 10, 1954

A. J. G. BARNETT. "Silage Fermentation." Academic Press, Inc., 125 E. 23 St., New York 10, N. Y., 1954. 208 pp. \$5.00.

OTTO BAYER. Methoden der organischen Chemie (Houben-Weyl). "Sauerstoffverbindungen II, Aldehyde." Volume VII, Part I. Georg Thieme Verlag, (14a) Stuttgart O, Diemershaldeustrasse 47, Germany. 1954. 556 pp. \$19.50.

JESSE P. GREENSTEIN AND ALEXANDER HADDOW, (Edited by). "Advances in Cancer Research." Volume Two. Academic Press, Inc., 125 E. 23 St., New York 10, N. Y. 1954. 530 pp. \$11.00.

H. D. HARTOUGH AND S. L. MEISEL. "Compounds with Condensed Thiophene Rings." Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1954. 515 pp. \$16.50.

JOHN L. MAGEE, MARTIN D. KAMEN AND ROBERT L. PLATZMAN, (Edited by). "Physical and Chemical Aspects of Basic Mechanisms in Radiobiology." National Academy of Sciences, National Research Council, 2101 Constitution Avenue, Washington 25, D. C. 1954. 145 pp. \$1.00.

GUNTHER MATZ. "Die Kristallisation in der Verfahrenstechnik." Springer-Verlag, (1) Berlin W 35, Reichpietschufer 20, West-Berlin, Germany. 1954. 194 pp. Ladenpreis: DM 19.50; Ganzleinen DM 22.50.

GEORGE W. MOREY. "The Properties of Glass." Reinhold Publishing Corp., 330 W. 42nd St., New York 36, N. Y. 1954. 591 pp. \$16.50.

F. HORST MULLER, (Edited by). "Das Relaxationsverhalten der Materie." Verlag Von Dr. Dietrich Steinkopff, Darmstadt, Germany. 1953. 224 pp. DM 24.-.

R. L. MURRAY. "Introduction to Nuclear Engineering." Prentice-Hall, Inc., Publishers, Englewood Cliffs, New Jersey. 1954. 418 pp. \$9.35.

NATIONAL BUREAU OF STANDARDS. "Energy Transfer in Hot Gases." Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. 1954. 126 pp. \$1.50.

KENNETH S. PITZER. "Quantum Chemistry." Prentice-Hall, Inc., Publishers, Englewood Cliffs, New Jersey. 1953. 529 pp. \$10.00.

WILLIAM H. PETERSON AND FRANK M. STRONG. "General Biochemistry." Prentice-Hall, Inc., Publishers, Englewood Cliffs, New Jersey. 1953. 469 pp. \$8.65.

A. L. G. REES. "Chemistry of the Defect Solid State." Methuen and Co., Ltd., London, England, and John Wiley and Sons, Inc., New York, N. Y. 1954. 136 pp. \$2.00.

JOSEPH REILLY AND WILLIAM NORMAN RAE. Volume I and Volume II of "Physico-Chemical Methods." D. Van Nostrand Co., Inc., 250 Fourth Avenue, New York, N. Y. 1953. Volume I—760 pp., Volume II—800 pp. \$15.00 per volume.

W. H. SEBRELL, JR. AND ROBERT S. HARRIS, (Edited by). "The Vitamins, Chemistry, Physiology, Pathology." Volume I. Academic Press Inc., 125 E. 23rd St., New York 10, N. Y. 1954. 676 pp. \$16.50.

ALEXANDER R. SURREY. "Name Reactions in Organic Chemistry." Academic Press Inc., 125 E. 23rd St., New York 10, N. Y. 1954. 192 pp. \$4.00.

VLADIMIR VAND AND RAY PEPINSKY. "The Statistical Approach to X-Ray Structure Analysis." X-Ray and Crystal Analysis Laboratory, Department of Physics, The Pennsylvania State University, State College, Pennsylvania. 1953. 98 pp. \$1.50.