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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.

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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