BOOK REVIEWS

Synthetic Methods of Organic Chemistry. An Annual Survey. Vol. 7. By W. THEILHEIMER. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1953. xi + 450 pp. 16.5 × 23.5 cm. Price, $14.90.

This most recent volume in Theilheimer's survey contains abstracts of papers appearing for the most part in 1950 and 1951, with a few as late as 1952. Since this survey of synthetic methods began in Volume 1 with the literature appearing in 1942, a full ten years are now covered. Thus, essentially all reactions of synthetic utility, whether originally discovered recently or long ago, are likely to appear in one or more volumes of this series. This may well be regarded as the most characteristic feature of this survey. Whereas "Organic Syntheses" presents very reliable preparations of a relatively few compounds and "Organic Reactions" presents exhaustive and critical coverage of a relatively few types of reactions, Theilheimer's survey presents a key to the literature for nearly the entire spectrum of organic reactions. The important function of this survey is to quickly put the investigator in contact with modern original literature on whatever transformation may concern him. This function appears to the reviewer to be adequately fulfilled.

Five of the previous volumes of Theilheimer's survey have been reviewed in THIS JOURNAL (1946, 1950, 1951, 1952, 1953), and in several of these reviews more or less extensive comment has appeared concerning the "simple, although purely formal basis" for arranging the syntheses according to the types of bonds made and broken. One reviewer stated that "Although at first this classification seemed somewhat obscure and devious, after one becomes accustomed to thinking in these terms, the advantages of the system become more obvious." The present reviewer has definitely not become accustomed to thinking in these terms, and doubts that many chemists will ever seek to find a reaction in Theilheimer's survey by following "the system" in the manner that a chemist usually locates a compound in Beilstein without using the indexes. For this reason, it should be emphasized strongly that it is not at all necessary to decode the system of listing used by Theilheimer in order to secure full benefit from the books, for there is included a subject index that may be justly described as excellent. In this index are listed reactions by name (*e.g.*, Clemmensen reduction), general topics (*e.g.*, isomerism, *cis–trans*), types of compounds (*e.g.*, cyanohydrins), reagents (*e.g.*, lithium aluminum hydride), etc. For a given type of compound there are listed, among other things, compounds from which it has been prepared, and compounds to which it has been converted. Naturally, one encounters unexpected types of listing, as in all name indexes (*e.g.*, alkenoic acids are listed as ethylenecarboxylic acids), but no deceptive ones or ones difficult to locate were noted. The reviewer searched several syntheses with which he happens to be familiar, had no difficulty in locating them rapidly, and found the coverage excellent. Since Volume 5 contains a cumulative index for Volumes 1–5, and Volume 7 contains a cumulative index for Volumes 6 and 7, let Theilheimer's "simple, although purely formal" system for listing reactions bluff no one away from taking advantage of the really great utility of these books!

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Introduction to Electron Microscopy. By CECIL E. HALL, Associate Professor of Biophysics, Massachusetts Institute of Technology. McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York 36, N. Y. 1953. ix + 451 pp. 16.5 × 23.5 cm. Price, $9.00.

Within the twelve years since the electron microscope became a commercially available instrument in the United States instead of a scientific curiosity in the hands of a few experts, several books on the subject, both highly technical and popular have appeared. These have served their purpose but as the science has grown and the demand for skilled electron microscopists in university and industrial laboratories has accelerated there has been developed an urgent need for a genuinely authoritative text skillfully combining essential theory, construction, techniques and applications, for use in a growing number of courses given in universities, and for individual self-instruction and reference.

In answer to this unique need this timely text by the distinguished Associate Professor of Biophysics at M.I.T., himself a pioneer electron microscopist, comes as a most welcome milepost in the brief history of this youthful science. The book has evolved from perhaps the most comprehensive course given in the country, an optional graduate course in Biophysics at M.I.T., but taken by students undergoing training in biology, medicine, chemistry, metallurgy, physics and mathematics.

This is called an Introduction and in the judgment of the reviewer, who has worked long in the field and has been equally concerned with training competent electron microscopists, no better and sounder introduction to the subject can possibly be imagined. As Dr. Hall has clearly stated, the guiding principle and the primary purpose is not to turn out merely able technicians but to impart to students "such principles and methods of thought that they will be able to make progress on their own against the unpredictable problems that they will surely meet later."

There is magnificent stimulation and training to be gained from a knowledge of this electronic instrument far beyond taking pictures at a magnification of 100,000. The theories of electron optics, electrostatic and magnetic lenses, resolving power, aberration, scattering, image formation and other phenomena are not the simplest to be found in science. But the understanding of these is essential and mastery is rewarding. The theoretical treatment in this book takes no unnecessary mathematical flights for it is meant for the working practical electron microscopist.

Electron microscopy is no purely routine technique, for success lies in correct specimen preparation, the real bottleneck requiring experience, skill and imagination. Every specimen presents its own new problem. Here lies the cause for the large number of electron microscopes purchased but standing idle.

Previous books or published papers do not adequately indicate the complications encountered in methodology. Chapter 11 of this new text (81 pages) is a mountain peak of helpfulness in disclosing the tricks of the trade gained by years of trial, failure and success. Understandably, but perhaps disappointing to metallurgists, ceramists, chemists, clay mineralogists and others, the applications illustrated are limited to the author's own experience in the field of biology. But every page, every one of the 250 clear valuable diagrams and nearly 100 photographs, every detail of laboratory procedure apply just as directly to the microscopy of colloidal clays or metal replicas as to viruses and protein molecules. In the best tradition of textbooks there are excellent problems and an essential though not exhaustive bibliography following each chapter. As the teachers of courses in Electron Microscopy breathe a sigh of relief and adopt this text there might well be the unexpressed thought in the mind of each, "I wish I had written that book." No higher tribute could be paid to Dr. Hall for a contribution truly timely and well done.

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Organic Reactions. Volume VII. By ROGER ADAMS, Editor-in-Chief. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1953. viii + 440 pp. 16 × 23.5 cm. Price, $9.00.

Volume VII of this series represents another excellent contribution to the literature on organic reactions. Most of the contributors to this volume, like the previous ones,