

BOOK REVIEWS

Vapor Pressure of Organic Compounds. By T. EARL JORDAN, Publicker Industries, Inc., Philadelphia, Pennsylvania. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1954. ix + 266 pp. 22.5 × 28.5 cm. \$14.50.

It becomes increasingly important to have reference texts in which carefully compiled data are readily available. This volume is such a compilation of vapor pressures for nearly 1500 organic compounds, the result of a careful search of the literature and previous summaries. References are given if one desires to examine the original data.

The compounds treated in the book are divided into ten chapters, using those names most commonly employed in the laboratory. Each chapter is divided into four parts: (1) a master table giving vapor pressure-temperature data as it was reported, (2) a series of individual tables giving numerical values at selected temperatures, mainly for compounds where no equation has been given, (3) bibliographic sources for the data cited and (4) a series of plates giving vapor pressure data versus temperature as straight lines.

The headings of the chapters are: hydrocarbons, halogen compounds, alcohols, aldehydes, ethers, ketones, and oxides, acids, acid chlorides, and anhydrides, esters, nitrogen compounds, phenols, organic compounds containing arsenic, selenium, sulfur and silicon, organic compounds containing antimony, boron, gallium, lead, phosphorus, tin, thallium, beryllium and zinc. Consideration has been given to include vapor pressure characteristics of many compounds in everyday use. One finds mentioned also such compounds as *d*-limonene, tetrafluorodibromoethane, nitroglycol, estragole, elaidic acid, dimethyl itaconate, cetylamine, peonol, tetraethoxysilane or gallium etherate, all of which are mentioned here to indicate somewhat the scope of the compounds covered along with the more common ones such as methane and benzene.

The printing is clear, the graphs are full page size, the volume shows the marks of good craftsmanship.

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Methoden der Organischen Chemie (Houben-Weyl), Sauerstoffverbindungen II, Aldehyde. Volume VII. Part I. By OTTO BAYER, Prof. ord. hon., Dr. Phil. nat., Dr. rer. nat.h.c., Dr. ing.e.h. Georg Thieme Verlag, (14A) Stuttgart O, Diemershaldenstrasse 47, Germany. 1954. xii + 556 pp. 18 × 26 cm. Price, \$19.50.

Some years ago the outstanding laboratory treatise in organic chemistry was Houben-Weyl. The third edition of this book appeared about twenty years ago and is now largely outdated. However, thanks to Professor Eugen Müller who is editor-in-chief and Professors Otto Bayer, Hans Meerwein and Karl Ziegler who form the board of editors, a greatly expanded fourth edition is being prepared with the capable assistance of numerous authors drawn from both academic and industrial fields. The plan is to complete this edition within four years in a compass of about 18 volumes. [An earlier volume which is the third part of the comprehensive section devoted to "oxygen compounds" was reviewed by H. Heymann, *THIS JOURNAL*, 75, 3613 (1953)].

The present volume by Dr. Otto Bayer is devoted to methods for the preparation and transformation of aldehydes. Nowhere is there so adequate a publication of procedures for the synthesis of aldehydes. It is out of the question to include all references to this broad segment of organic chemistry, but the author has done admirably in providing a general and up-to-date account of essential material which will prove invaluable to organic chemists.

The new Houben-Weyl will supplement other excellent but less extensive works which have appeared in recent years, and it assuredly will again become an indispensable work to those interested in general and specific laboratory methods.

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Fortschritte der Chemie organischer Naturstoffe. Volume X. (**Progress in the Chemistry of Organic Natural Products**). Edited by L. ZECHMEISTER, California Institute of Technology, Pasadena, California. Springer-Verlag, Molkerbastei 5, Wien 1, Austria. 1953. ix + 529 pp. 16.5 × 23.5 cm. Price, Brosch, \$19.00; Ganzleinen, \$19.80.

The "Fortschritte" series is at the present time the most useful collection of review articles in the field of natural products. In contrast to the "Annual Reviews of. . ." type of review which often is little more than a compilation of references, this series consists largely of critical and exhaustive discussions in certain restricted areas. Were it not for the high price of these volumes, this series could well become an indispensable part of the personal library of many chemists in the natural products field. Four of the chapters in the present volume are written in English and one each in German and French. The international character is demonstrated by the fact that of the six contributing groups, two come from the U. S. A. and one each from Germany, France, Mexico and India.

The use of the diene synthesis in the study of natural products by K. Alder and M. Schumacher represents a very complete summary of the subject (118 pages, 347 references). After a brief discussion of the nature of dienes and dienophiles and the stereochemistry of the Diels-Alder reaction, the main emphasis is placed on the use of the reaction in the detection of conjugated double bond systems and the synthesis of natural products (fatty acids, terpenes, steroids, etc.).

The next chapter "Physical Chemistry of Rubbers" (50 pages, 119 references) by H. Mark is concerned with various physico-chemical aspects of rubbers, chiefly synthetic ones, and the kinetic theory of rubber elasticity. The choice of this subject matter for inclusion in the present volume is somewhat surprising since all of the other chapters deal with strictly organic chemical subjects and it is unlikely that physical chemists in the rubber or polymer fields would be attracted by the other articles. Conversely, the topic seems to be of too specialized a nature to be of too much interest to synthetic organic chemists.

The chapter (103 pages, 362 references) by J. Asselineau and E. Lederer on bacterial lipides constitutes an extremely detailed and authoritative description of this class of compounds, particularly fatty acids and carotenoids. The listing of physical constants in each instance should prove to be particularly useful to workers in the field. The synthetic aspects are quite restricted to the particular problems in hand and do not include many of the recent approaches to long chain fatty acid synthesis. The very brief mention of J. Cason's extensive work appears unjustified.

"Syntheses of Cortisone" (115 pages, 340 references) by G. Rosenkranz and F. Sondheimer covers a subject of great current interest as shown by the fact that five other extensive reviews covering the same ground appeared during 1953 and that approximately 150 of the references apply to articles published since 1951. There is little question that the present chapter is the most complete one, particularly since it covers many ancillary problems not considered in the other five reviews. The greatest utility of this excellent chapter is that it fills almost the entire gap between the 1949 edition of Fieser and Fieser's "Chemistry of Natural Products Related to Phenanthrene" and the current state of steroid literature.

A. Chatterjee's article (32 pages, 107 references) on "Rauwolfia Alkaloids" is a case of very unfortunate timing since the bulk of the most important work on these alkaloids, which has received its greatest stimulus from the isolation and hypotensive activity of reserpine, has appeared after the publication of this manuscript. The subject undoubtedly will merit another review in a few years, especially if only a fraction of the 125 Rauwolfia species listed in the chapter will be investigated by alkaloid chemists.

The last review (53 pages, 269 references) "Insecticides Occurring in Higher Plants" by L. Feinstein and M. Jacobson appears to be the least complete one and essentially

involves only an enumeration of the individual substances and of their insecticidal activity. No description of the excellent synthetic efforts in the pyrethrum field is given nor has any particular effort been made to record the structure proof of any of the substances under discussion. While it is understandable that the correct structure (1954) of cevine is not yet given, there is no excuse for showing (p. 463) for jervine a discarded steroid formulation which had already been revised in 1951. Since this review carries the earliest submission date (November 1952), some additions in proof (of the type carried out so effectively in the cortisone chapter) would have been justified. As an example, reference to the article "Isolation of the Toxic Principles of Mamey" by Morris and Pagan (THIS JOURNAL, 75, 1489 (1953)) in the section (pp. 464-465) on Mamey could have been carried out easily during the proof correction.

The physical appearance and especially the excellence and abundance of structural formulas (over 300 in chapter IV) is noteworthy. Particularly striking is the fact that nearly all of the chapters cover the literature up to January 1953, a remarkable feat of up-to-dateness in a book which appeared in the autumn of the same year. The editor is to be congratulated on this tenth volume and it can safely be expected that the over-all excellence will be maintained in future issues of this series.

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Chemistry of the Defect Solid State. By A. L. G. REES, D.Sc., Ph.D., Chemical Physics Section, Division of Industrial Chemistry, Commonwealth Scientific and Industrial Research Organization, Melbourne. Methuen and Co., Ltd., London, England, and John Wiley and Sons Inc., 440 Fourth Avenue, New York 16, N. Y., 1954. viii + 136 pp. 11 × 17 cm. Price, \$2.00.

The avowed purpose of this monograph is to outline in general terms the role played by defects in solid state reactions. As the author points out, there is a great need for an outline of this type to clarify the thinking of classically trained chemists. Unfortunately, this undertaking is similar to making a map of the weather; certain features remain the same, but others are changing rapidly. Consequently, this book, apparently written early in 1953, is already outdated in some respects. The most notable omission is the theory and effect of dislocations.

Chapter I briefly summarizes the nature of the defects in solid systems and introduces a system of nomenclature which is used throughout the book. This system permits a description of defect structure by quasi-chemical formulas. The reviewer admits the desirability of such nomenclature but questions whether it should appear in this book. The suggested system has not been generally used by workers in the field, and it may not be ultimately accepted by them.

Chapter II applies the statistical thermodynamics of defects to the problem of the transport of matter through crystalline solids. Non-stoichiometric compounds, particularly those formed by placing a crystal in contact with the vapor of one of its components, are discussed. The discussion of the quantum theory is facilitated by a number of helpful diagrams.

In Chapter III, the experimental methods used in the study of solid state phenomena are briefly described. The experimental results are related to the theoretical concepts developed in the previous chapters. This discussion is naturally incomplete, and many of the elegant techniques developed by students of semi-conductor electronics have been omitted. Nevertheless, it is a useful introduction to the experimental approach.

The remainder of the book is devoted to consideration of the various types of solid reactions. Corrosion, photochemical and thermal decompositions, and heterogeneous catalysis are discussed in some detail. The photochemical dissociation example is unfortunate. Recent work has shown that

negative ion-vacancies probably do not play an important role in the photographic process.

This book will interest those who wish a brief summary of the physics and physical chemistry of defect solids. Those interested in a more detailed treatment are referred to the recent works of Kittel, Jost, Read and Seitz.

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Advances in Virus Research. Vol. I. Edited by KENNETH M. SMITH, Virus Research Unit, Moltano Institute, Cambridge, England, and MAX A. LAUFFER, Department of Biophysics, University of Pittsburgh, Pittsburgh, Pennsylvania. Academic Press, Inc., Publishers, 125 East 23rd Street, New York 10, N. Y., 1953. vii + 362 pp. 165. × 23.5 cm. Price, \$8.00.

As the Editors point out, virus research has attracted specialists from widely diversified scientific disciplines. In fact, it would be difficult to find another area of scientific endeavor which has commanded the attention of as many scientists with such varied backgrounds and approaches. This being so, some sort of integration of the field seems desirable and it is hoped that this new series can supply the stimulus for such integration. However, the first volume does not go very far in this direction. Despite its coverage of viruses affecting man, animals, insects, plants and bacteria, too little stress is laid on the interrelationships among the various types of viruses and the methods employed in their study.

It might be expected that such a collection of articles would exhibit considerable variation not only in quality but in approach. In the essay on virus nucleic acids, Markham presents his own point of view of the field and discusses his own rather considerable contributions to our knowledge of these important constituents of viruses. One may find fault, as this reviewer does, with his offhand dismissal of physical measurements on nucleic acids as being "misleading at the best." He also might wonder how an article in the "Advances in Virus Research" could omit reference to the paper by Cohen and Stanley on the physical chemistry of the ribonucleic acid of tobacco mosaic virus since that particular nucleic acid, with regard to molecular weight, seems almost unique among ribonucleic acids. In contrast to this individual approach to one segment of virus research is the rather straightforward but relatively indiscriminating summary on bacteriophages by Epstein. There are other illustrations of the heterogeneity of the contributions to this volume. On the one hand, the essay by Black on viruses that infect both plants and insects and the one by Bergold on insect viruses deal largely with their own work; whereas the articles by Henle on influenza virus and by Melnick on poliomyelitis are largely exhaustive reviews of the literature. It is regrettable that the interesting article by Bennett on interactions between viruses was restricted to plant viruses while interference phenomena in other viral systems are discussed in some detail in other essays in the same volume. We might hope that future volumes will discuss important phenomena like interference and hemagglutination not in connection with each individual virus, but rather in terms of the fundamental phenomena themselves. Even though there have been many extensive reviews on the purification and properties of animal viruses, Sharp succeeds in presenting a worthwhile point of view and discussing some of the newer methods.

Only if the future volumes of this new series can stimulate the unification of our outlook on the broad field of virus research, can the addition of "Advances in Virus Research" to the ever-increasing list of *Advances . . .* and *Annual Reviews . . .* be considered justified.

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