

The book is well and clearly printed. Regardless of its merits, the book is a tribute to the energy and faithfulness of the many people who acted as compilers. It is proper that recognition be given to them.

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THERALD MOELLER

A Short Guide to Chemical Literature. Second Edition. By G. MALCOLM Dyson, M.A., D.Sc., Ph.D., F.R.I.C., M. I. Chem. E. Longmans, Green and Co., Inc., 119 West 40th Street, New York 18, N. Y. 1958. v + 157 pp. 14.5 × 21.5 cm. Price, \$3.25.

This new edition of a very useful, compact account of methods to examine the chemical literature so that nothing of importance may be overlooked is excellent. Any trained chemist can gain from this book an appreciation of the fundamental requisites for a thorough literature research. The clear directions, suggestions and illustrations are well designed to stimulate the ingenuity and imagination of a research man to investigate the published material in any chemical field.

The greater part of this guide is an annotated bibliography of the different types of chemical literature. This includes the primary and secondary sources which must be consulted to obtain sufficient background for intensive laboratory or theoretical study. The brief descriptions of the contents of the numerous publications will acquaint the reader with the extent and limitations of the material described. This bibliography, which is not intended to be complete, has a noticeable number of British authors and few items published since 1956. Special effort has been made to achieve greater completeness for the lists of treatises, encyclopedias and important journals. An unusual feature is a chapter on medical chemical publications.

The appendix contains valuable information about old and obsolete journals with their often unfamiliar abbreviations. It includes a series of tables to indicate the year and volume number of the most frequently consulted periodicals. A detailed example of an organic literature research problem which shows the many ramifications of such work which are often not realized by a beginner, is instructive. This small volume is likely to be a revelation even to an experienced chemist and a vital aid to the novice in the use of a chemical library.

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VIRGINIA BARTOW

Advances in Protein Chemistry. Volume XIII. Edited by C. B. ANFINSEN, JR., Laboratory of Cellular Physiology, National Heart Institute, Bethesda, Maryland, M. L. ANSON, London, England, KENNETH BAILEY, University of Cambridge, Cambridge, England, and JOHN T. EDSALL, Biological Laboratories, Harvard University, Cambridge, Massachusetts. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1958. x + 524 pp. 16 × 23.5 cm. Price, \$13.80.

As pointed out by the editors in the preface this volume is unusual in that it contains only four review articles, three of them comprising some 440 pages. They take pains, however, to assure the reader that this type of issue does not represent a trend to be followed in the future. It is to be hoped that this is true, since one of the most appealing features of this series has been the incisive character of its reviews. Too great a length not only cuts down the variety of material which can be presented, but acts as a deterrent to the complete reading of individual articles.

The initial article on "Immunochemical Methods in Studies on Proteins" by P. Grabar is very short and has as its aim the suggestion of possible applications of immunochemical methods to important problems in protein structure as well as a means of identification and classification. Immunochemical methods and their limitations are briefly discussed.

Protein-carbohydrate complexes are discussed by F. R. Bettelheim-Jevons. Loose and non-specific protein-carbohydrate complexes are included as well as mucoproteins and

mucopolysaccharides. The subject is first taken up in a general way with a discussion of methods and of the structure and chemistry of the carbohydrate ingredients of the protein-carbohydrate complexes. The latter two-thirds of the article are devoted to individual discussion of mucoproteins and mucopolysaccharides from a very wide variety of sources. Most of the work presented has appeared since the previous review of Meyer (*Adv. Prot. Chem.*, 2, 249 (1945)).

The third article on the silk fibroins is by Lucas, Shaw and Smith. It not only contains a comprehensive review of the chemistry, physico-chemical properties and structure of the fibroins themselves, but a considerable amount of material on the natural history and biology of silkworms, the spinning process and silk technology in general. Emphasis is given to the problem of degradation in the discussion of silk fibroin in solutions.

The last article deals with the synthesis and chemical properties of poly- α -amino acids. It is a measure of the advances which have been made in this field in the past ten years that, though Katchalski and Sela exclude at the outset a systematic discussion of either the physico-chemical or the biological properties of synthetic polypeptides, there is still material enough to provide one of the longest reviews in the series. Typical topics presented are the synthesis and properties of the N-carboxy acid anhydrides, the mechanism and kinetics of polymerization, and the purification and characterization of the resulting polypeptides. A large number of individual polypeptides are discussed as well as copolymers, multichain polyamino acids and polymers which utilize carboxyl and amino groups other than those on the α -carbon atom. There is little doubt but that this will be the key reference in this subject for some time.

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Steroids. By LOUIS F. FIESER, Sheldon Emery Professor of Organic Chemistry, Harvard University, and MARY FIESER, Research Fellow in Chemistry, Harvard University. Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y. 1959. xvii + 945 pp. 16.5 × 24 cm. Price, \$18.00.

The proverbial and rather overworked ending of book reviews "This book belongs on the shelf of every . . . chemist" applies to such an extent in this instance that I would like to start with this recommendation. I am not referring to the industrial or academic specialist in the steroid field, because he has almost certainly already purchased this book, but rather to the large number of chemical virgins in the steroid territory. I am addressing this recommendation to the physical-organic chemist who, out of laziness or fear, has not gone to the trouble of looking at the steroid literature and thus has missed a veritable gold mine of marvelous experimental substrates and challenging theoretical problems; to the synthetic organic chemist who can learn what stereospecificity and synthetic selectivity really mean; to the physical and instrumental chemist, who is interested in the general problem of applications of physical tools and measurements to organic chemistry—this being practiced to a wider and more refined extent with steroids than any other type of organic compound. Finally and perhaps most importantly, it is addressed to the chemistry student and his "non-steroid" professor because of the superb pedagogic value of steroid chemistry with all of its glamor and subtlety. The entire spectrum of organic chemistry—mechanism, stereochemistry, synthesis and structure proof—is placed before him in a unified whole with the additional bonus of extremely interesting biological and biochemical implications. This is what "Steroids" means and the Fiesers have painted this picture in the most brilliant colors possible. The question appearing in THIS JOURNAL, 80, 5007 (1958), "When is the next edition of Fieser and Fieser's steroid book coming out" has indeed been answered in triumphant fashion.

The presentation of the material differs considerably from that encountered in the usual steroid books including the third edition (1949) of "Natural Products Related to Phenanthrene" by the same authors. The new approach is best illustrated by listing the headings of the 22 chapters of the book: 1. Orienting Survey; 2. Investigation of Cho-

lesterol; 3. Structures of the Bile Acids and of Cholesterol; 4. Vitamin D; 5. Physical Methods of Characterization; 6. Oxidation; 7. Enes and Oils; 8. Ketones; 9. Displacements and Rearrangements; 10. Stereochemical Correlations and Conventions; 11. Sterols; 12. Methylsterols (this chapter covers also the chemistry of most of the tetracyclic triterpenoids); 13. Biosynthesis of Cholesterol; 14. Bile Acids and Alcohols; 15. Estrogens; 16. Androgens; 17. Progestogens; 18. Homo and Nor Steroids; 19. Adrenocortical Hormones; 20. Cardiac-Active Principles; 21. Sapogenesis; 22. Alkaloids.

Chapters 1 and 5-10 cover a wide area of very interesting chemistry where steroids are used largely as illustrations while chapters 11-22 deal with the classical areas of steroid chemistry. The book is interspersed in a very effective manner with many intriguing details of a personal or experimental nature. Interesting examples are verbatim reproductions of letters from Windaus (p. 30) and Butenandt (p. 446), and the fascinating story of Marker (p. 548) with its ironical twist of early important contributions to optical rotational studies and subsequent elimination of any rotation constants in his steroid work, and his role in the development of the hormone industry in Mexico. There are numerous tables including matters of logistic (*e.g.*, p. 96), chemical (*e.g.*, p. 100) or commercial (*e.g.*, p. 660) interest. As an example of the type of information that can be found all over the book, one can cite a discussion of Vitamin D chemistry (p. 104) which includes reference to Barton and Elad's (1956) hydrogen sulfide method of decomposing osmate esters. This very useful experimental method was actually described by these authors in connection with the chemistry of the diterpenoid columbin and was surely overlooked by many synthetic organic chemists interested in the *cis*-hydroxylation of olefins. There is practically no chapter in this book which cannot be read with profit by the "non-steroid" chemist.

Before concluding, two general comments come to mind in reading this book.

The first is addressed to the prospective reader. The now famous Pieser style of book writing pervades the entire volume in that the authors have again succeeded in accomplishing the nearly impossible—to produce a book which is invaluable to the most sophisticated steroid specialist and which at the same time serves as a superb introduction to the uninitiated. There is little doubt that the book will stimulate a great deal of research since numerous fascinating research problems are posed in virtually every chapter.

The second comment applies to prospective writers of books and their publishers. The present opus, though containing over 900 pages and several hundred complicated structural formulas, is completely up-to-date. It appeared in mid-July and yet contains numerous 1959 literature references. It offers perfect experimental proof that even such complicated books can be printed rapidly and attractively and that there exists no real excuse for the deplorable time lag found so often these days in monographs and text books.

Traditionally, a book reviewer calls attention, usually rather triumphantly, to printing or factual errors. The following list of rather minute errors on pp. 171, 184, 250, 308 and 594 is only presented *sotto voce* to show that I have actually read the entire book. It was a pleasure from beginning to end.

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CARL DJERASSI

Molecular Science and Molecular Engineering. By ARTHUR R. VON HIPPEL. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1959. xv + 446 pp. 22 X 28 cm. Price, \$18.50.

This volume is the closing volume of a trilogy on modern materials research. It represents the growing trend in engineering of departure from an empirical approach to properties of materials to a more fundamental one in which one applies the basic sciences in order to build materials to order and to understand their behavior.

The first chapter by Arthur von Hippel deals with macroscopic laws and molecular interpretations and gives the reader an orienting look into the procedures of classical science and engineering. The second chapter by the same

author gives a concise account of elementary quantum mechanics and atomic and molecular structure. The behavior of atoms and molecules in magnetic and electrical fields is presented. The third chapter, also by von Hippel, treats the conduction and breakdown of gases using the properties of atoms and molecules developed in Chapter 2. This then leads quite naturally to Chapter 4 by Joachim P. Kuettner on thunderstorms and the electrical state of the earth's atmosphere. Microwave breakdown is the subject of Chapter 5 by Sanborn C. Brown. In Chapter 6 by Edward O. Johnson, the applications of gas discharges to technical devices are treated. The thyatron, voltage regulators, ignitrons, Geiger counters, etc., are some of the devices discussed. Chapter 7 by Bernard Lewis completes the treatment on gases by considering chemical reactions and explosions in gaseous systems. Chapter 8 by Osman K. Mawardi and Arthur von Hippel surveys the thermodynamics of gases, liquids and solids. In Chapter 9 von Hippel discusses the basic aspects of crystal structure. This is followed by a review of chemical reaction mechanisms in liquid systems and the chemical synthesis of polymers in Chapters 10 and 11 written by C. Gardner Swain and Walter H. Stockmayer, respectively. Chapter 12 by Alexander Smakula gives a detailed report on crystal growth. Roman Smoluchowski surveys irradiation effects in materials in Chapter 13 and this is followed by Egon Orowan's discussion of plasticity of crystalline materials in Chapter 14. In Chapter 15 the book returns to electric and magnetic phenomena in which von Hippel treats dipole and coupled dipole systems and ferroelectrics and ferromagnetics. In Chapter 16 by Peter W. Forsbergh, Jr., ferro- and antiferroelectric materials are treated. This is followed by Chapter 17 by Warren P. Mason on present day piezo- and ferroelectric devices and then David J. Epstein discussed ferromagnetic materials and their application in molecular engineering in Chapter 18. Ferromagnetic devices such as amplifiers, transfluxors, frequency multipliers, isolators, gyrators, etc., are treated in the next chapter by Robert A. Ramey, Jr., and Bernard W. Lovell. The book continues in Chapter 20 by James W. Heyer and Donald O. Smith by treating parametric oscillators and amplifiers, masers and thin film magnetic memories. In Chapter 21 von Hippel discusses the behavior of charge carriers in liquids and solids in the light of quantum mechanics. In Chapter 22 Raymond M. Fuoss discusses briefly the subject of polyelectrolytes and this in turn is followed by Charles D. Coryell and Yizhak Marcus' Chapter 23 on ion-exchange resins and their applications. Chapter 24 by Richard B. Adler analyzes semiconductor devices such as rectifier diodes and transistors. The book closes with Karl Martinez's Chapter 25 on molecular engineering and air vehicles of the future and deals briefly with aviation's challenge to modern material research.

The book is well edited and frequent use is made of excellent sketches, diagrams and photographs to illustrate points discussed in the text. Although the book contains contributions from a number of writers, it is not a series of unrelated articles as one might surmise from a cursory examination of chapter titles. It is true that some of the chapters are more pertinent to the main theme than others; however, on the whole the various contributions are inter-related and dependent on each other. The book represents a well organized effort and brings together the contributions of the various disciplines to the field of molecular engineering.

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Clinical Enzymology. Edited by GUSTAV J. MARTIN, Sc.D., Research Director, The National Drug Company, Philadelphia. Little, Brown and Co., Boston 6, Mass. 1958. vii + 241 pp. 16 X 24 cm. Price, \$6.00.

A book which proposes to bridge two fields may be expected to provide the information necessary for practitioners in each of the fields to cross into the other or, at least, to meet in the middle of the span. Ideally, great critical judgment would be used in the selection and presentation of material from each field since the sections on enzymology would presumably be directed to clinicians and the sections on applications in medicine to enzymologists.