

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.

SYNTEX, S. A., MEXICO CITY, AND  
STANFORD UNIVERSITY  
STANFORD, CALIFORNIA

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 anti-ferroelectric 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.

DEPARTMENT OF CHEMISTRY  
THE JOHNS HOPKINS UNIVERSITY  
BALTIMORE 18, MARYLAND

WALTER S. KOSKI

**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.

In the present volume, which does include sections on general enzymology and on the chemistry of enzymes which have been used as therapeutic agents, there is a question whether this ideal has been recognized. While enzymologists may have their memories refreshed by a four page discussion of the methods used for determination of molecular weights of proteins, it is hard to believe that an interested clinician would be much enlightened by such an abbreviated account. Further, in several cases, the results of such measurements are presented in historic order which may well indicate to the general reader that the molecular weights of these enzymes are not known with any measure of certainty.

At our present level of understanding, the sections on *Biochemistry of Enzymes Used Clinically*, on *Parenteral Use of Enzymes in Medicine* and on *Diagnostic Use of Enzymes* must consist largely of reviews of the literature. These appear to have been carefully done. Omissions of papers and of topics is inevitable in view of the extensive literature in this area.

In addition, the editor has contributed four chapters dealing with the general areas of biological specificity, protein structure and synthesis, and a recapitulation of the therapeutic uses which have been made of enzymes. These chapters serve largely as the warp upon which the woof of Dr. Martin's views of "biological relativity" is woven. While little argument will be aroused by the statement that "The first and major tenet of this concept states that there are no absolutes in biological systems," the inferences drawn from this premise appear more provocative than acceptable to this reader. The inclusion of a considerable discussion of the philosophy of molecular biology in a volume bearing a rather prosaic title probably will surprise many library gleaners in the future.

DEPARTMENT OF BIOCHEMISTRY  
UNIVERSITY OF KENTUCKY  
MEDICAL CENTER  
LEXINGTON, KENTUCKY

GEORGE W. SCHWERT

**Medicinal Chemistry.** Volume IV. A Series of Reviews Prepared under the Auspices of the Division of Medicinal Chemistry of the American Chemical Society. Edited by F. F. BLICKE and R. H. COX. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1959. ix + 334 pp. 15.5 × 23.5 cm. Price, \$12.00.

The fourth volume of this series differs from the previous issues in that it covers a single subject, Barbituric Acid Hypnotics. It is an extensive compilation by an author, Wilbur J. Doran of Eli Lilly and Company, who has had long experience with this class of compounds. Approximately 200 pages are devoted to the tables in which compounds are listed systematically by molecular structure and biological activities are recorded where available. In the text (39 pages) the history, the chemistry and the pharmacology of barbituric acid are discussed. The chemistry section covers syntheses, chemical conversions, chemical and physical properties, and identification and quantitative determination. Among the pharmacology headings are General Pharmacology, Testing, Mechanism of Depressant Action, Distribution and Metabolism, Potentiation and Antagonism of Barbiturate Depression. These sections are succinctly presented and the specialist will need more detail, but together with the references they provide a very useful basis for acquiring more detailed information.

The real meat of the book lies in the extensive tables which cover all barbituric acids and not just those structures where experience has shown pharmacological activity can be expected. Many other useful tables are included, for example, two tables list the commercially available barbituric acids by their generic names and by their trade names. A further attractive and unusual feature is a complete formula index occupying 57 pages. The references include slightly over 1200 citations.

The literature is covered through the 1956 index of "Chemical Abstracts." Consequently, there are relatively few references later than 1955. However, in view of the mass of information that is included in a field that has not been too active in recent years this does not detract from the usefulness of this effort. Every scientist interested in drug development will wish to have this work available.

MERCK SHARP AND DOHME RESEARCH LABORATORIES  
DIVISION OF MERCK AND CO., INC. JAMES M. SPRAGUE  
WEST POINT, PENNSYLVANIA

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## BOOKS RECEIVED

November 10, 1958–December 10, 1959

NICHOLAS D. CHERONIS, Edited by. "Progress in Microchemistry. Microchemical Journal." Volume III. Issue 3. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. August 1959. pp. 271–475. \$4.00; Annual Subscription Price, \$16.00.

F. ALBERT COTTON, Edited by. "Progress in Inorganic Chemistry." Volume 1. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1959. 566 pp. \$14.50.

W. F. DE JONG. With the Collaboration of J. BOUMAN. "General Crystallography. A Brief Compendium." W. H. Freeman and Company, 660 Market Street, San Francisco 4, California. 1959. 281 pp. \$6.00.

S. E. FRISH, Editor. "Optics and Spectroscopy." Volume VI. Number 1. Translated on the Initiative of the Optical Society of America Inc. With a Grant-In-Aid from the National Science Foundation by Morris D. Friedman, Inc. American Institute of Physics, 335 East 45th Street, New York, N. Y. January 1959. 84 pp. \$3.00.

JOHN S. KASPER AND KATHLEEN LONSDALE (General Editor), Edited by. "International Tables for X-Ray Crystallography." Volume II. "Mathematical Tables." The Kynoch Press, Birmingham, England. 1959. 444 pp. £5 15s.

CARL S. MARVEL. "An Introduction to the Organic Chemistry of High Polymers." John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1959. 82 pp. \$4.50.

KURT SCHLYTER. "Transactions of the Royal Institute of Technology, Stockholm, Sweden." Number 132. "A Precision Calorimeter for Enthalpy Titrations." Royal Institute of Technology Library, Stockholm 70, Sweden. 1959. 41 pp. Kr. 5.—

EMILIO SEGRE AND LEONARD I. SCHIFF, Co-editors. GERHART FRIEDLANDER AND WALTER E. MEYERHOF, Associate Editors. "Annual Review of Nuclear Science." Volume 9. Annual Reviews, Inc., Grant Avenue, Palo Alto, California. 1959. 625 pp. \$7.00 (U.S.A.); \$7.50 (elsewhere).

MAX TISHLER, Editor-in-Chief. "Organic Syntheses." Volume 39. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1959. 114 pp. \$4.00.