

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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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.

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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.