
 BOOK REVIEWS

Constantes Sélectionnées Pouvoir Rotatoire Naturel. I. Stéroïdes. Tables de Constantes et Données Numériques Organisme Affilié de l'Union Internationale de Chimie Pure et Appliquée. Volume 6. By J.-P. MATHIEU, Professor à la Faculté des Sciences de Paris, and A. PETIT, Ingénieur I.C.P. Masson et Cie, Éditeurs, 120 Boulevard Saint-Germain, Paris 6, France. 1956. ix + 507 pp. 22 × 27.5 cm. Price, Volumes brochés 12000 Fr., Volumes reliés 12900 Fr.

The purpose of this book is to collect all of the optical rotation data of steroids and to present them in tabular form. This tremendous job has been accomplished with conspicuous success and the authors are to be congratulated and admired for their patience and perseverance. There is no question that this book will be indispensable to investigators in the steroid field, especially research chemists for whom the calculation of molecular rotation differences has been made much easier.

The arrangement of the data (by empirical formula) and of the references (separated by individual journals for each year and then in alphabetical order of authors) is superb and any desired compound or reference can be found at a glance. The introduction (French as well as English) covers various nomenclature problems and on the whole follows the recommendations of the Ciba Foundation Conference.

The book is supposed to cover the literature up to January 1, 1953 and it does so admirably. However, there are listed an additional 600 references for 1953-1955 and spot checks by this reviewer have shown that many of these references are *not* represented in the body of the book. For instance, specific rotations of compounds listed in references 53.142, 53.144, 53.147, 54.254 are not given in the book, while other references from the same years (*e.g.*, 53.129, 54.94, 54.249 and 54.236) are represented. Furthermore, even though a later reference is listed, it does not necessarily mean that earlier incorrect assignments have been corrected (*e.g.*, 19-nordesoxycorticosterone where the rotation listed in ref. 53.223 is not given but rather that of a stereoisomeric mixture reported in 1944). The book is not free of errors (*e.g.*, three consecutive rotations on p. 253, j, k and l, are reported incorrectly) as in fact no compendium of this type could be, but in view of the excellent literature coverage, the original paper can and often should be consulted. It appears to this reviewer that while the reader can take it almost for granted that all compounds listed in the papers of the bibliography through 1952 are given in the tables, this is not the case from 1953-1955 and cross checking with the original papers will be required.

The need for such a book has been created by the great awareness on the part of steroid chemists of the importance of rotational data and the valuable information that can be deduced from them utilizing the method of molecular rotation differences. It is the feeling of this reviewer that much of this work will be supplanted in the future by optical rotatory dispersion data because of the much greater accuracy and scope of this method, particularly as it pertains to the evaluation of conformational factors. At some future date, a similar compilation of rotatory dispersion data will be indispensable and since the direct reproduction of rotatory dispersion curves would hardly be feasible when one deals with many hundred or thousand of them, a general abbreviated scheme for reporting such data should be agreed upon in the very near future. This would insure uniformity in reporting such material in journal articles and it will greatly facilitate eventual collection of optical rotatory dispersion data in book form.

WAYNE STATE UNIVERSITY
DETROIT, MICHIGAN

CARL DJERASSI

Mechanism of Organic Chemical Reactions. By E. DE BARRY BARNETT, D. Sc. (Lond.), F. R. I. C., formerly Head of the Chemistry Department, Sir John Cass Technical Institute. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1956. vi + 289 pp. 15 × 22 cm. Price, \$4.75.

Perhaps only three kinds of people should write books dealing with mechanisms of organic reactions: (1) the highly critical (their texts may serve a decade or more), (2) the highly up-to-date (their texts may serve for as long as five years) and (3) those who have made such major contributions that a whole book is required for their work alone. The present book is rather far from these considerations.

The purpose of the author has been to discuss some of the familiar reactions of organic chemistry by means of "a brief account of modern views of the mechanism by which (they) take place." The combination of a wide range of topics with the shortness of the book might render it attractive to some groups of chemists; and the facts, as far as they are given, are presented in a readable and clear style. The emphasis on reactions rather than on mechanisms *per se* occasionally results in rather speculative discussions of little-understood reactions. But the book suffers in a number of more serious ways. Perhaps the major criticism is that not only is the material badly out of date in many areas of current interest but that classic studies done over twenty years ago have been overlooked. The number of incorrect statements of the type, "The mechanism of formation of oximes, phenylhydrazones, semicarbazones and the like does not seem to have been examined," (p. 156) is substantial. In some of these cases the data have been in the literature only a few years, but in several cases for a much longer time.

But even confining evaluation to what is discussed, the book comes off poorly. There is much imprecision of expression and all-too-many errors in interpretation and definition. In a discussion of the nitration of *p*-isopropyltoluene, the conclusion is drawn that "the nitro-group takes the position *ortho* to the methyl group, almost certainly owing to hyperconjugation of the three methylic hydrogen bonds with the nucleus" (p. 48). It is not until three pages later that the importance of the bulk of a directing substituent in electrophilic substitution is introduced (in connection with the *ortho-para* ratios of nitration of monoalkylbenzenes), but there is no suggestion that these same steric considerations may have been the decisive factor in attack by the nitronium ion *ortho* to the methyl group in *p*-isopropyltoluene. Although the author's discussion of mesomerism (or resonance) is satisfactory (p. 1-3), the statement, "the carbonium ion $^{\oplus}\text{CPh-CH=CHMe}$ isomerizes very easily to $\text{CHPh=CH-}^{\oplus}\text{CHMe}$," (p. 252) gives one pause. And to say that acid-catalyzed esterification is *probably* (italics mine) the reverse of acid-catalyzed hydrolysis (p. 254) is an unduly mild way of stating the principle of microscopic reversibility. Incorrect definitions of words, such as *threo* and *erythro* (p. 122) and of expressions, such as "partial rate factor" (p. 50), and incorrect mechanisms (particularly with radical reactions: free radical halogenation, p. 24, substitution, p. 86, 207, N-bromosuccinimide, p. 275) are a further misfortune.

In the preface the author expressed the hope that "the book will be useful not only to students . . . but also be of interest to the older generation of organic chemists who have got somewhat out of touch with modern academic work." For those desiring a general, qualitative introduction to theories of organic chemical reactions, the author's hope may be realizable, but for the reasons outlined above, the book is not recommended to students.

MASSACHUSETTS INSTITUTE
OF TECHNOLOGY
CAMBRIDGE 39, MASSACHUSETTS

FREDERICK D. GREENE

Physics of Fully Ionized Gases. Interscience Tracts on Physics and Astronomy, No. 3, edited by R. E. MARSHAK. By LYMAN SPITZER, JR., Princeton University Observatory, Princeton, New Jersey. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1956. ix + 105 pp. 13 × 20 cm. Price, paper cover, \$1.75; hard cover, \$3.50.

The number of brief monographs intended to serve as introductions to complicated topics appears to be on the increase. Professor Spitzer's little book on ionized gases might well serve as a model for such publications, for few, in this reviewer's opinion, succeed so well in cutting through a mass of detail to present the basic physical ideas clearly and simply. An introductory exposition must necessarily omit or dismiss with a phrase many topics that demand pages for adequate explanation, and the author commits many such items to the physical intuition of the reader or to the bibliography.

The interests of simplicity and brevity are further served by the fact that a fully ionized gas in many ways is less complicated than one that is weakly ionized, for the many quantum phenomena characteristic of the latter are missing. Attention can be focussed on the basic problems of particle motion in electric and magnetic fields, particle interactions, and the way in which the combination contributes to macroscopic motion. With these basic concepts in hand, the reader is prepared to look further into astrophysical problems that are the principal interest of the author, or to proceed with the additional complications of the gaseous electronics field.

The book begins with a discussion of motion of charged particles in various combinations of fields of electromagnetic and gravitational origin, and gives as an illustration the Fermi and Alfvén theories of cosmic-ray production. Then follows a discussion of macroscopic motion, with emphasis on the effects of external magnetic fields. The various types of plasma waves, including hydromagnetic (magneto-hydrodynamic) are treated briefly. The last chapter concerns the effects of collisions between charged particles, and here most of the results must be taken on faith, as they depend upon calculations that are beyond the scope of the book. In the Appendix the basic equations of motion are derived from the Boltzmann equation. One might wish for some mention of the basic difficulties involved, first in conceptual problems involved in applying the Boltzmann equation, and second in the actual calculations using it.

In summary, this little book is a very readable introduction to the behavior of charged particles at low pressures and high temperatures, and should prove useful as a simple introduction to those unacquainted with the field.

DEPARTMENT OF PHYSICS
THE JOHNS HOPKINS UNIVERSITY
BALTIMORE, MARYLAND

DONALD E. KERR

High Polymers. Volume V. Part III. Cellulose and Cellulose Derivatives. Second Completely Revised and Augmented Edition. Edited by EMIL OTT, HAROLD M. SPURLIN and MILDRED W. GRAFFLIN, Research Department, Hercules Powder Company, Wilmington, Delaware. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1955. viii + 1057-1601 pp. 16 × 23 cm. Price, \$12.00.

Rapid growth of the knowledge of chemistry of high polymers has rendered many excellent texts obsolete. Appearance of this revision of Ott's 1943 compendium alleviates this difficulty for cellulose chemistry for perhaps another dozen years. The editors have done a commendable job in compiling the bulk of industrially significant information in the three books. So complex is the subject matter that reviews will rival the books in length if any adequate description were offered.

Like Gaul, the books divide, rather illogically, into three parts. These are the revision of the 1943 edition of Volume 5 on High Polymers. This review covers Part III corresponding to Chapter IX of the original volume on the physical and mechanical properties of cellulose and its derivatives. The book begins with a clear and authoritative discussion of the physical properties of cellulose and its derivatives. It includes solubility information, the thermodynamic properties of those solutions, problems arising in determination of molecular weight and molecular weight distribution. In addition, there are theories of viscosity of dilute solutions of macromolecular compounds, and a discussion of flow properties. Next there is a chapter on the mechanical properties of cellulose and its derivatives, including creep, stress relaxation, deformation, elastic recovery, and that elusive concept, ultimate strength.

The collation of these usually widely scattered data will endear the book to researchers in the field of celluloses. It is to be recommended to all engaged in technical activities on the numerous end products of cellulose.

As a final bonus there are two indices at the end of Part III. These include an author index and a subject index to the three volumes.

The book is excellently done, and commendably accurate in typography and detail.

PLASTICS DIVISION RESEARCH DEPT.
CELANESE CORPORATION OF AMERICA
SUMMIT, NEW JERSEY

O. V. LUKE, JR.

Essays in Biochemistry. EDITED BY SAMUEL GRAFF. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N.Y. 1956. x + 345 pp. 15 × 23.5 cm. Price, \$6.50.

The twenty-five essays compiled in this book and written in honor of Hans Thacher Clarke present a unique coverage of biochemical material which should be of general interest to a variety of disciplines. The essays, written in large part by former students of Hans Thacher Clarke, encompass limited aspects of carbohydrates, proteins, lipids, nucleic acids, enzymes, viruses, porphyrins, hormones, stereochemistry of enzymatic reactions and other special topics. The freedom allowed the writers for speculation and thought projection has added a desirable and not too common personal tint to this remarkable collection of essays. The ideas presented by the writers may serve to stimulate further discussion on controversial and unexplored fields and may also provide fruitful avenues for future research. Much of the subject material included in this group of essays is not covered adequately in textbooks on general biochemistry. Consequently this book should serve a useful function as a supplement to the usual textbooks on biochemistry. Above all, the unrestricted style and freedom of thought depicted in this book may prove to be a rewarding stimulus to others.

THE UNIVERSITY OF ROCHESTER
SCHOOL OF MEDICINE AND DENTISTRY
DEPARTMENT OF BIOCHEMISTRY
ROCHESTER 20, NEW YORK

GUIDO V. MARINETTI

The Mathematics of Physics and Chemistry. Second Edition. By HENRY MARGENAU, Eugene Higgins Professor of Physics and Natural Philosophy, Yale University, and GEORGE MOSELY MURPHY, Chairman, Department of Chemistry, Washington Square College, New York University. D. Van Nostrand Company, Inc., 120 Alexander Street, Princeton, New Jersey. 1956. xii + 604 pp. 16 × 23 cm. Price, \$6.85.

The first edition of this book, which appeared during the war years, has found a secure place in the libraries of graduate students in physics and chemistry. The second edition, although containing numerous minor changes and corrections, has been only slightly expanded (~20 pages) through the introduction of new material, mainly on Laplace and Fourier transforms. Thus this review would not differ materially if it concerned, instead, the first edition.

The authors' aim "to present between the covers of a single book, those parts of mathematics which form the tools of the modern worker in theoretical physics and chemistry," has been largely achieved. The digestibility of the condensation "on the senior and first year graduate level" may be somewhat more in doubt. In any event, the airing of the reviewer's prejudices which follows cannot detract from the main fact that this book is the most comprehensive single volume of its kind in English.

For the most part the treatment is conventional, being designed to fit onto the usual courses in differential and integral calculus. While this may aid the understanding of the mathematical (as distinct from the physical) aspects at the senior level, adherence to this conventional approach postpones the introduction of those tools—such as matrix algebra and group theory—whose use could have greatly simplified the presentation of many earlier topics. For example, angular momentum and spherical harmonics can be seen in their full splendor only in terms of the rotation groups—which, alas, conclude the last chapter. In fact, the connection between conservation laws and invariance