

journals has increased and the job cannot be delegated or replaced by reliance on abstracts. Chemists should have this book in order to become thoroughly acquainted with sources of information and methods of searching.

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F. LOWELL TAYLOR

Isomerismo E Isomerizacion de los Compuestos Organicos.

By ERNST D. BERGMANN, Director del Instituto de Ciencias Weizmann. **Transposiciones Moleculares Y Combinaciones Organicas Con Isotopos.** By ANIBAL R. MARQUEZ, Profesor titular de Química Orgánica, Universidad Nacional de la Plata—Universidad Tecnológica Nacional Facultad Regional de Buenos Aires, Colegio Militar de la Nación, Director de Indoquímica S.A., ex-Director de Galeno Química, Ind. Quím. Arg. Yatay, Fea. Nacional de Productos Químicos de la Nación, etc. Librería Hachette, Buenos Aires, Argentina, South America. 1956. xiii + 288 pp. 16 × 23.5 cm. Price m\$n. arg. 110.—.

This book is a translation and enlarged edition of the original work "Isomerism and Isomerization of Organic Compounds" (Interscience Pub. Inc., New York, N. Y., 1948) and the reviewer may thus consider the contributions made first by Dr. E. D. Bergmann and then by Dr. A. R. Marquez.

The original work of Bergmann consists of six chapters in which the following topics are discussed: the phenomenon of resonance in organic molecules; *cis-trans* isomerism and *cis-trans* isomerization; isomerization of olefinic structures; mechanism of substitution reactions, racemization and Walden inversion; isomerization of paraffins and related phenomena; mechanisms of intramolecular rearrangements. The discussion of the above-mentioned topics is stimulating because it is based on numerous personal observations, and it includes many literature references and suggestions for future investigations. The chapter on resonance does not pretend to be a profound physico-chemical treatment but rather is descriptive in nature. It is unfortunate that the author retains several structural formulas with pentavalent nitrogen atoms on pp. 27-29, 47, 49 and 147. In the second chapter the discussions of allenic systems and of thermochromism are noteworthy. The heading of the third chapter is somewhat misleading since here the author cites a series of reactions of olefinic substances in the course of which the initial, classical double bonds become dislocated. Aside from 1,4-addition reactions to dienes and the Diels-Alder reaction, the author employs a number of examples which are seldom encountered in other texts. The chapter dealing with the mechanism of substitution reactions, racemization and Walden inversion is not as stimulating as the preceding chapters. This is probably so because it deals descriptively with a subject which has received so much emphasis in most of the modern textbooks of organic theory. Also, the arguments cited on p. 94 to explain the two different dehydration products of diphenic acid are not convincing. The fifth chapter deals mainly with reactions of alkanes and alkenes studied by Ipatieff and his successors, although a few reactions involving free radicals also are mentioned. The last chapter reviews a number of intramolecular rearrangements some of which, such as the Claisen rearrangement of allyl aryl ethers, the pinacol-pinacolone rearrangement, and the rearrangement of 1,2-aminoalcohols in the presence of nitrous acid, have been subject to careful studies since the publication of the original text.

Dr. Marquez has supplemented the descriptive text of Dr. Bergmann with lengthy footnotes in which he presents the physical aspects of atomic and molecular structure as well as summaries of more recent studies. Noteworthy among the latter are the comments concerning the chemistry of cyclooctatetraene, ferrocene, triphenylmethyl radicals, the activation energies of *trans-cis* isomerizations, the reaction of osmic acid with aromatic hydrocarbons, the reactions of peroxides, as well as the little known studies of Marquez and students concerned with the reactions of organic halides with sodium arsenite. Dr. Marquez also contributes to the original bibliography by citing numerous recent literature references. Finally, Dr. Marquez has added an ample, 100 pages long "Appendix" which consists of two chapters. In the first of these he discusses molecular rearrangements

some of which are already dealt with by Dr. Bergmann in his last chapter. In the reviewer's opinion the unity and compactness of the book would have been improved if the first chapter of the "Appendix" were integrated with the last chapter of Bergmann in the same manner in which Marquez amplified the first five chapters of the original work. The second chapter of the "Appendix" is entitled "Isotopes in Organic Reactions" and is an extremely useful and up to date review of the uses of isotopes in the study of organic compounds. Included in this review are numerous isotope effects studied in recent years, nuclear transformations caused by irradiation of organic compounds, and the use of isotopes in the elucidation of the mechanisms of organic reactions. This last chapter is without doubt the most significant contribution which Dr. Marquez makes to the book under discussion.

The book is well presented except for the unfortunate use of poor printing ink which causes several pages to be blurred.

The scarcity of modern chemistry texts in the Spanish language makes the appearance of this book especially noteworthy. It will have a stimulating effect on the much needed development of modern organic chemistry in Latin America. Also, it may help many American chemists to learn chemical Spanish, a language of increasing importance in view of the growing investments of U. S. chemical industry below the Rio Grande.

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H. HARRY SZMANT

The Defect Solid State. By T. J. GRAY, D. P. DETWILER, D. E. RASE, W. G. LAWRENCE, R. R. WEST AND T. J. JENNINGS, State University of New York, College of Ceramics at Alfred University. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1957. vii + 511 pp. 16.5 × 23.5 cm. Price, \$11.00.

This work attempts to explain phenomena associated with reactions in the solid state such as sintering, catalyses and corrosion processes in terms of the defect nature of solids. The presentation of the material associated with these topics is detailed enough to make the book worthwhile for those interested in this specialized field. The book cannot be read, however, as a general exposition on the defect nature of solids. The chapters on the general properties of solids, such as semi-conductivity, ionic conductivity and magnetic properties are too brief and the material in them has been presented in a more satisfactory manner elsewhere.

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K. TEEGARDEN

Vapour Phase Chromatography. Proceedings of the Symposium Sponsored by the Hydrocarbon Research Group of the Institute of Petroleum held at the Institution of Electrical Engineers, London, on 30th May-1st June, 1956. Edited by D. H. DESTY. Assisted by C. L. A. Harbourn. Academic Press, Inc., 111 Fifth Avenue, New York 3, N. Y. 1957. xv + 436 pp. 16 × 25.5 cm. Price, \$12.00.

This volume is a collection of the 36 papers presented at the Symposium on Gas Chromatography held in London on May 30th and June 1st, 1956, together with the discussion by the participants at the symposium, and the recommendations on nomenclature proposed by a committee of scientists prominent in this field. More than half of the papers are from England, but contributions from workers of seven other nations testify to the universal and growing interest in gas chromatography.

A wide range of subjects is covered by the articles presented. Dr. Martin's introductory paper outlines the directions for future developments of the field. The succeeding four papers deal with the factors determining the separation of materials by gas chromatography. Eight papers are concerned primarily with the properties of various types of detectors, including Scott's flame detector, the Martin gas density balance, and the beta ray detector. Other topics considered in various contributions are apparatus for high temperature chromatography, large scale and continuous operation, and for the use of programmed column heating. The analysis of specific mixtures, descriptions of new column

materials, etc., are the subjects of the remainder of the papers.

The book suffers from the lack of continuity and the variation in style common to works of its kind, but these minor faults are more than compensated for by the generally high quality of the material. The diversity of topics covered should make it of interest not only to people active in research on gas chromatography, but also to those for whom this technique is chiefly a valuable new analytical method. Most of the articles give sufficient experimental detail to enable the reader who wishes to build his own apparatus to select the features most desirable for his purpose. All readers should benefit from a study of the theoretical papers. The report of the lively and informative discussion at the symposium adds to the value of the book. The recommendations of the committee on nomenclature seem reasonable; they would perhaps carry more weight had the editor, himself a member of the committee, chosen the title of the book in accordance with them. The contributors, the editor and the publishers are to be congratulated for the speed with which they have made this useful work available.

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KURT F. WISSBRUN

Chemie der Zucker und Polysaccharide. Second Edition.

By FRITZ MICHEEL, Dr. phil., o. Professor der Chemie an der Universität Münster (Westfalen) and ALMUTH KLEMER, Dr. rer. nat., Wissenschaftliche Assistentin am Organisch-chemischen Institut der Universität Münster (Westfalen). Akademische Verlagsgesellschaft, Geest and Portig K.-G., Sternwartenstrasse 8, Leipzig C 1, Germany. 1956. xix + 512 pp. 16 × 23 cm. Price, 36.—DM.

The first edition of Fritz Micheel's "Chemie der Zucker und Polysaccharide" appeared in 1939 and was at the time, easily the best introductory monograph for this field. An English translation, by R. C. Hockett, was published in this country in 1945. There now appears a second revised and augmented edition in the compilation of which Professor Micheel has been assisted by Fräulein Dr. Almuth Klemer. The text is, nevertheless, essentially singly authored and accordingly does not suffer from the repetitions and contradictions characteristic of multiply authored monographs. The book does not profess to be complete but the extent of its coverage is astounding and the essential points in the chemistry and biochemistry of the monosaccharides, oligosaccharides and polysaccharides are well selected and thoroughly covered. Emphasis is placed upon the organic structural chemistry involved. The writing and editing is thorough and is free of those obvious errors, gross omissions, and misinterpretations of published work, which have been so characteristic of most of the carbohydrate monographs appearing in recent years in English. The German language exposition is simple and direct and is highly recommended for students preparing for the American university German reading examinations.

Professor Micheel, a student of Kurt Hess and a former associate of Adolf Windaus, the latter being the one outstanding student of Heinrich Kiliani, writes in the classical German tradition and is no votary of modern mechanistic interpretations of organic reactions. The troublesome problems of ring conformation are never mentioned. What is well grounded in established fact, however, is all there. The nomenclature employed is that of Emil Fischer. The extensive changes and modernizations of this nomenclature which have been developed by the joint efforts of the American and British chemists, has not been translated into the German idiom by the present authors. The one concession is the adoption of the Roman small capital letter for the configurational symbol. While the language barrier is a factor here, some better common ground would be desirable. Professor Micheel favors the Fischer projection formula for the depiction of sugar structures. From this he proceeds occasionally to an "eigentlich" orientation of the Haworth perspective formula which he is later forced to change to the accepted orientation when he discusses oligosaccharide and polysaccharide structures.

This revision was effected under great difficulties. The institute of Professor Micheel was demolished by the aerial bombing of World War II and although he now has a newly

built institute, he still lacks a complete library. In the revision he was forced to depend largely upon reprints sent by authors and upon *Chemical Abstracts*. In spite of these formidable obstacles, the text has been thoroughly modernized and augmented by approximately 120 pages. Eighty-three pages of well documented tables of sugars and sugar derivatives have been collected at the end of the book. The indexes have been about doubled in size from the first edition. The section on the biochemistry of the sugars has been revised completely and new sections on chromatographic separations, isotopic labeling and antibiotics have been added. Cross references are frequent and are well selected. Coverage in the rapidly expanding field of oligosaccharide and polysaccharide structure lags, in part, a little behind the true research front. That of the starches is well delineated. The sections on the seaweed polysaccharides, stachyose and the tissue polysaccharides, stand in need of attention. This undoubtedly reflects in part the "behindness" of *Chemical Abstracts* in the period following the end of World War II. Strange omissions in the reference book listing are the American monographs on cellulose and starch: those of Ott (two editions), of Kerr (two editions), and of Wise. In spite of these few shortcomings, not unexpected in view of the difficulties presented to the authors in their revisionary efforts, this text stands as the best introductory monograph in its field and probably will maintain this position for some time to come.

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M. L. WOLFROM

Electrochemistry. Principles and Applications. By EDMUND C. POTTER, B.Sc., Ph.D., F.R.I.C., D.I.C., Research Branch, Central Electricity Authority for England and Wales. The Macmillan Company, 60 Fifth Avenue, New York 11, New York. 1957. xii + 418 pp. 16 × 25.5 cm. Price \$10.00.

In recent years relatively few texts on electrochemistry have been published. Potter's new book represents one of the first to present both basic and applied aspects of electrochemistry in a concise, well integrated fashion in a single volume.

Primary emphasis is placed on electrode processes in the early chapters which discuss the theoretical aspects of electrochemistry. Reversible electrode systems are treated on a thermodynamic basis as well as in terms of experimental aspects. A description of the factors contributing to the irreversibility of various electrode processes is presented with particular attention on hydrogen overvoltage as is traditional among electrochemists. A separate chapter is used for the discussion of the electrical double layer and electrokinetic phenomena. The treatment of electrolytes is brief and hardly more detailed than is standard undergraduate texts on physical chemistry. Newcomers to the field of electrochemistry as well as chemical analysts will find the concise chapters on electrochemical measurements particularly useful. The applied phases of electrochemistry which are considered by Potter include corrosion mechanisms and prevention, electrodeposition, batteries, and industrial electrolysis.

Throughout this book, the sign conventions for electrode potentials advocated by the International Union of Pure and Applied Chemistry are employed in contrast to the system generally in use in most American texts and publications of the American Chemical Society. The author discusses the problem of sign conventions, however, in a simple but effective fashion; hence, the student who is accustomed to the so-called American system is not likely to be confused.

This text is conspicuous for its excellent organization and concise presentation. The many illustrations and tables are very effective. The text contains a number of problems which are completely worked and integrated within the chapters. The bibliography at the end of the book lists other texts and publications for collateral reading. No specific references are given for the work or data presented in this book.

Many of the contemporary explanations for various electrochemical phenomena are far from well established and in a state of flux. As a result, authors of textbooks on electrochemistry must exercise more than the usual care to indicate fully the status of the various proposed explanations. Un-