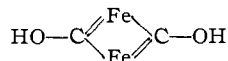


the bridge carbons are formed by  $dsp^3$  hybrid orbitals and the bond from iron to the acetylenic carbon by an unhybridized d-orbital.

This complex is of interest for the following reasons: (1) It contains a novel resonating system



which is analogous to the cyclobutadiene system. (2) Although several metal hydrocarbonyls have been synthesized and studied, this is the first hydrocarbonyl in which the position of the hydrogen has been established. (3) Stable derivatives of a

hydrocarbonyl are now available for study by physical methods. (4) This is the first evidence for the existence of an  $M=C-OH$  grouping, a type of linkage postulated<sup>5</sup> in surface intermediates in the Fischer-Tropsch reaction.

(5) H. H. Storch, N. Golombic and R. B. Anderson, "The Fischer-Tropsch and Related Syntheses," John Wiley and Sons, Inc., New York, N. Y., 1951, p. 592.

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## BOOK REVIEWS

**Technique of Organic Chemistry. Volume I. Part III. Physical Methods of Organic Chemistry.** Second Completely Revised and Augmented Edition. Editor ARNOLD WEISSBERGER, Research Laboratories, Eastman Kodak Co., Rochester, N. Y. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1954. xi + 2097-2530 pp. 16 × 23.5 cm. Price, \$8.50.

The subjects covered in this, the third of three volumes comprising Volume I in a series on Technique of Organic Chemistry, will be of less general interest than those covered in earlier volumes. This is because the techniques under discussion, although potentially of wide applicability, are highly specialized and quite elaborate from an instrumental point of view. However, the standard of presentation continues to be of the highest and those who have occasion to seek authoritative information as to what can be done with these methods, and in a general way how it is done, will find this source invaluable.

The new chapters deal with Electron Microscopy (F. A. Hamm), Microspectroscopy (E. R. Blout), Determination of Streaming Birefringence (R. Signer), Measurement of Dielectric Constant and Loss (J. G. Powles and C. P. Smyth), Radio-frequency Spectroscopy (B. P. Dailey) and Neutron Diffraction (J. M. Hastings and L. Corliss). In addition there are short chapters supplementing previous chapters on viscosity of polymer solutions, crystal structure, electron diffraction, magnetic susceptibility and scintillation counting.

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W. G. BROWN

**Progress in Stereochemistry. Volume 1.** By W. KLYNE, M.A., B.Sc., Ph.D. (Editor), Reader in Biochemistry, University of London (Postgraduate Medical School). Academic Press, Inc., Publishers, 125 East 23rd Street, New York 10, N. Y. 1954. x + 378 pp. 16 × 25 cm. Price, \$8.00.

Stereochemistry, as discussed in this volume, transects the traditional disciplines of chemistry (although the strongest emphasis is in the organic field) and deals with electronic structure as well as with the orientation of groups and with reaction mechanisms as well as with stereoisomerism. The book reflects the growing concern of chemists with physical methods and mechanisms of organic, inorganic and enzymatically catalyzed reactions and provides surprisingly up-to-date coverage of many important areas of chemical endeavor. As implied by the title the emphasis is on recent developments. There are, however, interesting similarities between the present work and Freudenberg's classical volumes published some twenty-three years ago.

Volume One contains nine chapters and a brief appendix on bond lengths and valence angles. Each of these represents a noteworthy contribution and, in the opinion of the reviewer, Chapters 1, 2, 5, 7 and 9 are particularly outstanding. The chapters are as follows:

1. The Shapes of Simple Molecules (A. D. Walsh). This chapter contains a convenient tabulation of bond angles, bond lengths and shapes of di- to octatomic molecules. Generalizations are drawn from these data and are presented together with an excellent qualitative theoretical discussion.

2. The Conformation of Six-membered Ring Systems (W. Klyne). Dr. Klyne has provided us with an expert description of the results in this new field up to the end of 1954.

3. Stereochemical Factors in Reaction Mechanism and Kinetics (P. B. D. de la Mare). This section presents an interesting but limited and sketchy discussion of a very broad topic. Attention is paid chiefly to addition, elimination, nucleophilic substitution and certain 1,2-rearrangement reactions.

4. The Relationships Between the Stereochemistry and Spectroscopic Properties of Organic Compounds (E. A. Braude and E. S. Waight). Applications of both infrared and ultraviolet spectral methods are given, the latter with especially interesting sections on the correlation of absorption intensity with stereochemistry. The infrared section is rather limited.

5. The Correlation of Configurations (J. A. Mills and W. Klyne). This extraordinary section is one of the highlights of the book and is unsurpassed in excellence. The authors, who have themselves contributed brilliantly to the correlation of configurations, have written a stimulating and lucid review which is commensurate with their already demonstrated prowess in the field.

6. The Stereochemistry of the Hydrogen Bond (L. Hunter). Here is an interesting and well documented summary of data from both the organic and inorganic fields.

7. The Stereochemistry of Compounds of High Molecular Weight (E. J. Ambrose). This chapter contains a fine but brief discussion of general principles and methods, followed by a description of the stereochemistry of various long-chain hydrocarbons, proteins and polysaccharides.

8. Stereospecificity of Enzyme Reactions (V. P. Whitaker). The treatment of the subject matter in this chapter falls considerably below that which may be expected for such an important and dynamic field. It is occasionally too rudimentary, too discursive and too superficial and seldom incisive, current or exciting. Stereochemical, theoretical and even general discussion is surprisingly lacking.

9. The Stereochemistry of Complex Compounds (R. S. Nyholm). Professor Nyholm has written a clear and valuable introduction to the stereochemistry of complex compounds which will appeal to chemists of all fields. The

application of (1) qualitative molecular orbital theory and (2) physical measurements to problems of structure is discussed and recent work on the role of d orbitals in bonding is summarized. A section follows on stereochemistry in the periodic table (arranged according to coordination number), and this last chapter of Volume One ends with an intriguing survey of stereochemical changes during reactions of complex compounds with relation to mechanism.

This volume is extremely readable; the printing is clear and well spaced and the illustrations and formulas are superb. The price is very reasonable in view of the quality of the book and current printing costs. On all counts, the book can be recommended highly to students of chemistry.

The editor of Volume One is to be congratulated for an excellent start in what is hoped will be a continuing series of equally valuable works. Although the reviewer has had no indications of the nature and number of the succeeding volumes, it is clear that the present one can stand on its own merits. If, in the near future, this volume is considered outmoded, these merits will have been recognized and the way will have been paved for new compendia of the progress in this important field.

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**Advances in Virus Research. Volume II.** Edited by KENNETH M. SMITH, Virus Research Unit, Molteno Institute, Cambridge, England, and MAX A. LAUFFER, Department of Biophysics, University of Pittsburgh, Pittsburgh, Pennsylvania. Academic Press, Inc., Publishers, 125 East 23rd Street, New York 10, N. Y. 1954. x + 313 pp. 16 × 23.5 cm. Price, \$7.00.

Readers of this volume not directly concerned with research on viruses will become aware both of the fascination of this area of science and of the breadth of the approaches used in the study of viruses. They will see represented here the approach of plant pathologists; the approach of biochemists, on the one hand studying metabolism and development of virus in infected cells, and on the other hand investigating the composition of viruses; and the approaches of biophysicists, one using as his tool the effect of ionizing radiation on viruses, another employing the methods of electron microscopy, and others using the theory and techniques of solution physical chemistry. The specialists working with viruses also will find the volume worth reading and will find it necessary to refer to the book on many occasions.

Holmes, in a chapter on the inheritance of resistance to plant viruses, presents detailed information on the problems of modern agriculture in breeding for resistance to virus diseases. This contribution is not confined solely to practical aspects of the problem, for Holmes discusses as well some of the fundamentals and he presents approaches for future study. A chapter by Bawden on inhibitors and plant viruses is in marked contrast to this for it discusses in detail, and in a lively fashion, problems concerned with the mechanism of action of inhibitors of plant viruses; and, at the same time, Bawden points out that little has been done with regard to practical problems of minimizing virus diseases commercially through the use of the great number of available inhibitors. For the biochemists whose interests in virology had been largely restricted to the bacteriophages until the recent widespread use of tissue culture techniques, the chapter by Ackermann and Francis will be of interest for it highlights an approach to the study of the synthesis of animal viruses. The essay by Von Magnus on the incomplete forms of influenza virus shows some of the interrelationships among viruses affecting animals, plants and bacteria. It is unfortunate that his discussion of the nature and origin of incomplete virus did not include tobacco mosaic virus and the recently discovered x-protein. Pollard's chapter on the action of ionizing radiation on viruses is of interest and reflects the enthusiasm of the author. Sometimes, however, this enthusiasm comes at the expense of careful writing and thinking, for there are more than a few

sentences which defy interpretation. Knight's chapter on the chemical constitution of viruses will be of use to many workers in the field and it shows the power of an approach based on chemical analysis. To this reviewer, Williams' chapter on the electron microscopy of viruses is outstanding. If this article were to be read carefully by all of the virus workers using electron microscopy, then we might hopefully expect more objective evaluations of electron micrographs of material presumed to be either a newly discovered virus or a precursor of a specific virus. The last article in this volume by Lauffer and Bendet discusses in a very thorough fashion the difficult concept and measurement of hydration of viruses, while, at the same time, considering the question of the hydration of all macromolecules and the effect of hydration on their physical chemical behavior.

One criticism this reviewer would like to offer is directed at several authors. This deals with the careless use of abbreviations which go undefined. The reader should not be forced to guess or go to another source to determine the meaning of RDE, MNI, DNA and TMV. Even for those abbreviations which are defined when first introduced it is frequently difficult, at a later reading, to find the site of the definition; and the reader might be greatly aided by a complete list, at the end of the book, of the abbreviations used in the volume. In this way terminology such as EI<sub>50</sub> and ID<sub>50</sub>, which apparently refer to the same quantity, might be standardized.

This reviewer feels that Volume II, containing several chapters dealing individually with phenomena or properties relating to different classes of viruses rather than focusing on a single virus, helps to stimulate the unification of outlook in virus research.

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**High Polymers. Volume V. Cellulose and Cellulose Derivatives.** Part II. Second Completely Revised and Augmented Edition. Prepared under the Editorship of EMIL OTT, HAROLD M. SPURLIN and MILDRED W. GRAFFLIN, Research Department, Hercules Powder Co., Wilmington, Del. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1954. viii + 511-1055 pp. 16 × 23.5 cm. Price, \$12.00.

This book is the second of three parts being issued as a revised edition of the earlier well-known one published under one cover and edited by Emil Ott. The information contained in this part is, to a large extent, of a more practical nature than that of Part I or of projected Part III. One-third of this book covers the preparation of pulp and paper with brief mention of cotton linters and purified wood pulp for chemical purposes. The latter two-thirds of the book is devoted to ester, alkali, ether and xanthate derivatives of cellulose. New sections added are a chapter on the "Properties and Treatment of Pulp for Paper" and a short section on "Degradation of Cellulose Derivatives."

Both the new material and the revisions reflect the considerable advances made in the understanding of the chemistry and mechanism of cellulose treatments. This is particularly true in the case of the well-digested section on the "Reactivity and Reactions of Cellulose" which shows how cellulose structure and swelling affect rates of reaction and the nature of the reaction product.

This book is essentially a reference book and the absence of an index, which presumably will be in Part III, makes it somewhat difficult to find very specific information. This deficiency is partly overcome by the very extensive Table of Contents of the first three chapters; but for the remainder of the book, the Table of Contents is far less complete. This book will be indispensable to anyone working in the pulp and cellulose derivative field. The two dozen contributors are to be congratulated on the quality of this treatise.

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