

The systematic principles used in preparing compounds of the various types discussed are not sufficiently well defined for the reviewer to recommend that every scientist should buy a copy of this book. On the other hand, every chemist who wants to improve preparative inorganic chemistry will find this book useful; and some noninorganic chemists may even be surprised at the organization which can be found in these areas.

Ronald D. Archer

Department of Chemistry, Tulane University
New Orleans, Louisiana

Inorganic Reaction Mechanisms. By JOHN O. EDWARDS, Department of Chemistry, Brown University, Providence, R. I. W. A. Benjamin, Inc., 2465 Broadway, New York, N. Y. 1964. xii + 190 pp. 15 × 22.5 cm. Price, \$7.00.

This book is part of the W. A. Benjamin, Inc., series on Physical-Inorganic Chemistry. According to the author's preface, it has been designed to fit the needs of undergraduate seniors and beginning graduate students who seek an introduction to the topic of inorganic reaction mechanisms. After three fine chapters devoted to definitions of terms and descriptions of concepts such as reaction order, molecularity, reaction coordinate, symmetry number, Brønsted theory of acids, general and specific acid catalysis, etc., the author presents separate chapters covering nucleophilic displacements, nonradical mechanisms for peroxide reactions, replacements in octahedral complexes, electron-transfer reactions of complexes, reactions of oxyanions, and free radical reactions.

The author is clearly aware of almost all of the pertinent literature in the fields covered, and has indicated in very brief form the existence of much of the pertinent work on the topics considered. Concepts are covered very briefly. For the worker beginning a research problem in inorganic reaction mechanisms, this book will provide a valuable entry into the literature. On the other hand, this reviewer found the book so terse that logical development suffers; many highly significant points were made as assertions with little attempt at real development. Even a few definitions such as that of symmetry number on page 20 were passed over so lightly that many students will not comprehend the significance of the points raised. On pages 57 and 58 the author has arranged nucleophiles on the basis of their rate of attack on boron compounds, sulfur compounds, carbon compounds, etc. Little reference to the literature or basis for the order is given. Such information seems pertinent.

In short this is a valuable book for all inorganic chemists, but this reviewer hopes that in any revision Dr. Edwards will take time and space to give his readers a little more help in the development of a detailed view of the transition from experimental observation to mechanistic conclusion. This reviewer is only sorry that the book isn't longer.

R. W. Parry

Department of Chemistry, University of Michigan
Ann Arbor, Michigan

Mechanism of Oxidation of Organic Compounds. By W. A. WATERS, Fellow of Balliol College, Oxford Reader in Physical Organic Chemistry, Oxford University. John Wiley and Sons, Inc., 605 Third Ave., New York 16, N. Y. 1964. 152 pp. 14.5 × 22.5 cm. Price, \$5.00.

As usual in this series, this monograph treats its subject in a very concise manner. Correspondingly, many of the references are made to review articles, rather than to original papers. Nevertheless, the subject itself is defined rather broadly to include, e.g., electrophilic substitutions such as halogenation, sulfonation, nitration, etc. On the other hand, only liquid phase oxidations are included. The book is organized according to the type of compounds to be oxidized: peroxides (Chapter 3), alcohols (Chapter 4), 1,2-glycols (Chapter 5), aldehydes (Chapter 7), ketones and carboxylic acids (Chapter 7), unsaturated compounds and aromatic hydrocarbons (Chapter 8), and phenols and aromatic amines (Chapter 9). Besides molecular oxygen, ions of various transition metals are discussed as oxidants in considerable detail. References are often made to biological oxidations, which may correspond to the particular *in vitro* oxidations discussed. The book is a useful short introduction to the mechanisms of oxidation, in general.

There are minor inconsistencies, mistakes, and repetitions in the chapter on peroxides with regard to the chemistry of hydroperoxides (pp. 34 and 45). The organization of the book is not consistent. The order of discussing homolytic and heterolytic oxidations changes from chapter to chapter. This reviewer feels that a separate chapter should have been included on the oxidation of saturated hydrocarbons. It is also felt that the mechanism of oxidations by molecular oxygen, in general—which is of great industrial significance—has not been given enough attention in this otherwise excellent book.

Alexis A. Oswald

Central Basic Research Laboratory
Esso Research and Engineering Company
Linden, New Jersey

Amino Acids and Serum Proteins. *Advances in Chemistry Series, No.*

44. Based on the Richard J. Block Memorial Symposium Sponsored by the Division of Biological Chemistry at the 142nd National Meeting of the American Chemical Society, Atlantic City, N. J., Sept. 11, 1962. JACOB A. STEKOL, Symposium Chairman. Edited by ROBERT F. GOULD. Special Issues Sales, American Chemical Society, 1155 Sixteenth Street, N.W., Washington, D. C. 1964. xxiii + 154 pp. 16 × 23.5 cm. Price, \$5.50.

The papers in this volume were for the most part presented at a Symposium at the Atlantic City meeting of the American Chemical Society in September 1962, arranged by the Division of Biological Chemistry to honor the memory of Richard J. Block who met death tragically in February of that year.

The slim volume contains ten contributions in addition to a very brief biography and a complete bibliography (151 contributions) of his scientific work. The papers presented at the symposium do have a tenuous relationship to Dr. Block's consuming passion for the amino acids. No doubt owing to the wide scope of his interest in amino acids and proteins, he would have been fascinated by every one of these contributions. Unquestionably, those in attendance at the symposium found many if not all of the papers interesting. However, the published work presents neither a systematic survey nor the summation of the current stage of our knowledge in a special area of interest but rather a collection of papers bearing but an extremely remote, if any, relationship one to another. The general biochemist would consider them diverse indeed despite the recurring protein and amino acid theme. Such being the case, it is essentially impossible to review the volume and avoid "refereeing" the individual contributions.

Apart from the significance of the individual papers, and for the most part they are well worth studying, this volume must be considered primarily as a tribute by his colleagues to a dedicated biochemist who contributed significantly to the field of amino acid and protein biochemistry.

Bernard S. Gould

Division of Biochemistry, Department of Biology
Massachusetts Institute of Technology
Cambridge, Massachusetts

Molecular Orbitals in Chemistry, Physics, and Biology. A Tribute to R. S. Mulliken. Edited by PER-OLOV LÖWDIN, Department of Quantum Chemistry, Uppsala University, Uppsala, Sweden, and Quantum Theory Project, University of Florida, Gainesville, Fla., and BERNARD PULLMAN, Institut de Biologie Physico-Chimique, Université de Paris, Paris, France. Academic Press, Inc., 111 Fifth Ave., New York 3, N. Y. 1964. xiii + 578 pp. 16 × 24 cm. Price, \$22.00.

As the title indicates, this collection of papers forms a tribute to R. S. Mulliken. The individual papers range from delightful personal reminiscences to highly technical discussions of almost every phase of quantum chemistry, molecular structure, theoretical chemistry, or whatever one prefers to call this subject. To say that these papers reflect Mulliken's interests is to say simply that he is interested in everything related to molecules.

The first paper by C. A. Coulson gives an excellent general summary of Mulliken's work and discusses in particular its significance in the development of molecular orbital theories and in methods of interpretation of molecular spectra. The results of Mulliken's work have become so much a part of our way of thinking that we may tend to believe that the ideas were *always* there. It is well to