

Perspectives on Energy Issues, Ideas, and Environmental Dilemmas

Edited by LON C. RUEDISILI, University of Toledo, and MORRIS W. FIREBAUGH, University of Wisconsin, Parkside. This collection of contemporary readings, especially suited for non-science majors studying energy and the environment, presents provocative and often conflicting viewpoints by experts in various disciplines. The selections stress the complexity of our problems, the wide spectrum of opinion on how to handle them, and the environmental implications of the various alternatives. The treatment is non-mathematical, and the focus is interdisciplinary.

January 1975 425 pp. 120 illus.
cloth, prob. \$10.95
paper, prob. \$4.95

Molecular Reaction Dynamics

R. D. LEVINE, The Hebrew University and Ohio State University, and R. B. BERNSTEIN, University of Texas. This book deals with the molecular-level mechanism of elementary chemical reactions, emphasizing the important role of binary collisions. The goal is an understanding of chemical and physical rate processes from the fundamental, microscopic point of view. Primary attention is devoted to the physical phenomena and their conceptual interpretation rather than to the details of experimental techniques or theories. The subject is developed assuming only an elementary background in physical chemistry, guiding the reader from well-known principles to state-of-the-art research results.

1974 256 pp.
136 line drawings \$10.00

subjects, and a very well arranged and annotated bibliography of books and research papers.

This book is strongly recommended to the scientist who wants to teach himself how to read crystallographic research papers, to the student who wants to learn about space groups, and to the teacher who needs a text for a crystallography course for noncrystallographers. Parts of it might also benefit some experts in structure determination who need to learn how to relate their results to other physical phenomena.

DAVID H. TEMPLETON
University of California
Berkeley

Quantum Theory of Chemical Reactivity

R. Daudel
162 pp. D. Reidel, Dordrecht, Boston
1973. \$23.50

Electronic theories of organic reaction mechanisms have led to radical changes in the logical structure of organic chemistry over the last several decades. More recently, the use of quantum mechanics to place qualitative concepts on a quantitative (or, at least, semi-empirical) footing has been a popular and productive area of research. In fact, the field has been so popular and productive that a critical review of methods and conclusions is sorely needed. Unfortunately, this short book is too narrow in scope to fill that need.

It is an English translation of the third volume in a series by R. Daudel of the Center of Applied Wave Mechanics in Paris. The first two volumes, published in English by Pergamon Press, dealt with theoretical chemistry and electronic structure of molecules. The third volume focuses on applications of these principles to intermolecular forces, interactions between nonbonded atoms, equilibrium constants in solution, transition-state theory and organic rate constants.

Results are summarized, with references to earlier volumes in the series or to the original papers for methods of calculation. This approach could be attractive to those who are already familiar with the theoretical techniques and even more so to those who do not want to be familiar with the theoretical techniques. However, Daudel's treatment is much too brief, in many cases consisting of merely a sequential listing of specific results. The chapter on organic rate constants, for example, covers 154 references in less than 36 pages. This condensed format leaves little room for general discussion or critical

evaluation, which gives the reader no perspective for assessing the broad range of reaction types and varying degrees of empiricism in the calculations. Reading this chapter is similar to reading only the abstracts of journal articles—informative but not enlightening.

The chapter on statistical-mechanical formulations of equilibrium constants and rate constants is also confusingly abbreviated. Moreover, it is curiously outdated, in that it ignores the existence of computers, aside from references to a few recent calculations. A classical thermodynamic treatment would be simpler and more relevant, because most of the calculations omit partition functions and focus on energy differences.

The best section of the book is the one dealing with intermolecular forces. Although recent advances are not covered, theoretical models are discussed in adequate detail, and a good review is given of such topics as dispersion forces and charge-transfer complexes.

The prose style is somewhat awkward, which may be due to a poor (or too literal) translation. The translator was apparently not familiar with the subject matter, as the book contains much unorthodox terminology ("monomolecular stages of reactions") and a few amusing typographical errors ("thermomolecular stages of reactions").

This book may be useful as a guide to some of the literature on chemical applications of quantum mechanics. However, its high cost and brevity preclude a favorable recommendation.

CAROLE R. GATZ
Portland State University
Portland, Oregon

The Master of Light, A Biography of Albert A. Michelson

D. M. Livingston
376 pp. Scribner's, New York,
1973. \$12.50

Among biographers of A. A. Michelson, Dorothy Michelson Livingston has a unique qualification—she is his daughter. She has included information about his personal life and stories he told to her that are not available elsewhere. A non-physicist herself, she has relied heavily on physicists who were familiar with her father's work and with the field of optics in general, as well as archivists, historians of science, writers and editors. Thus, this thorough biography is the fortunate combination of the efforts of many people, resulting in a valuable reference work as well as a very readable story about one of America's great scientists. The photographs



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