# Book Reviews

**The Kinetic Isotope Method and Its Application.** By M. B. NEIMAN (Academy of Sciences, Moscow) and D. GÁL (József Attila University, Szeged). Elsevier Publishing Co., New York, N.Y. 1972. 390 pp. $29.50.

This book is concerned with the use of isotopes in the understanding of kinetic processes. The first chapter illustrates the difficulties in unraveling complicated successive or interrelated reactions by standard methods, including the use of the steady-state approximation. Subsequent chapters deal with specific examples of how the Kinetic Isotope Method (KIM) can be useful in dissecting the individual specific reaction-rate constants. This is done by using either a labeled reactant or by adding labeled intermediates (known or suspected) at some stage of the reaction. The authors then show how to extract the desired information by appropriate mathematical manipulation. One very simple example taken from Chapter 2 will illustrate the book's focus. In an analogy to the KIM, it is assumed that the rate of change of the volume, $dv/dt = w_1 - w_2$ in a water tank fitted with inlet and outlet tubes is known, but not the individual inlet ($w_1$) and outlet ($w_2$) flow rates. The authors then illustrate how addition of a dyestuff to the water followed by measurement of intensity changes with time can be used to determine $w_1$ and $w_2$.

From here on things become more complicated. For example, theoretical treatments of the determination of formation and consumption rates of reaction intermediates under various conditions of reversibility or nonreversibility, the determination of reaction sequences, the determination of the total or accumulated amounts of intermediates are all given in sufficient detail to be applied to individual chemical systems. The unraveling of competitive radical reactions, heterogeneous catalytic reactions, parallel and parallel-consecutive processes, and application to the biosynthesis of proteins are all covered in the second chapter. Chapter 3 is devoted to the determination of reaction order by the KIM. Chapter 4 defines what the authors mean by "closed" and "open" systems.

The ensuing chapters are devoted to the application of the principles of the KIM to specific chemical problems. Chapter 10, by Lászlo Latzkovits, concerns biochemical applications, and in particular the type of information that can be obtained by investigation of turnover rates of phosphorus-32. There is an appendix which gives the procedures (or references thereto) by which the labeled compounds referred to in the book were prepared.

The methods discussed in the book are primarily those worked out in the USSR or in Hungary, although there is some reference to KIM methods developed in other countries. There are no references later than 1966, and most of the references are prior to 1960.

Reviewing this book was a strange experience for me, for although I have used isotopes for more than 25 years, I never considered the possibility of making a subject out of the KIM. Most of us who constantly use isotopes in our research enjoy improvising the KIM as we go along, or we think we can decide what to do when faced with a difficult kinetic situation. Exposure to the book by Neiman and Gál was a forceful indication that there is a lot about kinetic isotope method I never knew, and I plan to keep my copy available as a reminder. The lack of recent literature coverage is regrettable, but probably not serious, as the methods discussed in the book are timeless. The text, however, would have profited had the proofreading been more thorough.

I don't suppose this book will appeal to a wide audience, and that is a shame, for most of us who are in kinetics or in isotopic research could save a lot of time by becoming familiar with the principles outlined by Neiman and Gál.

**Clair J. Collins,** *The University of Tennessee*

**Biopolymers.** By A. G. WALTON and J. BLACKWELL (Case Western Reserve University). Academic Press, Inc., New York and London. 1973. x + 604 pp. $35.00.

The main theme of this book is the characterization of biopolymers in terms of their structure (chemical, stereochemical, conformational, and intermolecular), with discussions of both experimental and theoretical approaches to this problem and presentation of results obtained on typical systems of interest. According to the authors, the book is directed to those with relatively little background in the application of physical methods to the study of biological macromolecules.

The chapters dealing with general approaches to characterizing biopolymer structure are entitled "Structural Units of Biopolymers," "Conformation," "Structure Determination by X-Ray Diffraction," "Tertiary Structure and Morphology of Synthetic Biopolymers," "Infrared and Raman Spectroscopy," "Electronic Spectroscopy," "Physical Properties of Biopolymers in Dilute Solutions" (contributed by S. H. Carr), and "Electrical and Magnetic Field Effects." This section makes up approximately 60% of the book and is followed by detailed discussions of the structural features of a variety of important biopolymeric systems. The chapters in this section are "Conformation of Polypeptides," "Fibrous Proteins and Biopolymer Models," "The Polysaccharides," "Nucleic Acids and Polynucleotides," and "Globular Proteins." There is an author index as well as a subject index.

The authors present a great deal of interesting information on these topics and much of it is clearly discussed. There are, however, a number of errors which, although rather obvious, could be distracting to the reader (*e.g.*, calling simple H · · · H interatomic potential functions "hydrogen bond functions" and stating that the 21 different amino acids give "$20^2$ = 420 combinations of dipeptides"). Nonetheless, this book could serve as a very useful introduction to a number of techniques used in this area and as a survey of the structural characteristics of a variety of types of biopolymers.

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**Zeolite Molecular Sieves: Structure, Chemistry, and Use.** By DONALD W. BRECK (Union Carbide Corp.). John Wiley & Sons, New York, N.Y. 1974. ix + 771 pp. $32.50.

This volume is an encyclopedic summary of data in which the author has attempted dual goals of providing ". . . an introduction to the subject of zeolite molecular sieves for the newcomer to the field, and a reference for additional information and background." These goals are pursued in chapters entitled: Structure of Zeolites, Mineral Zeolites, The Synthetic Zeolites, Physical Properties of Crystalline Zeolites, Chemical Properties and Reactions of Zeolites, Ion Exchange Reactions in Zeolites, Adsorption by Dehydrated Zeolite Crystals, and Manufacture and Properties of Commercial Molecular Sieve Adsorbents.

The book is indeed an excellent source book with extensive bibliographies and many tables which summarize vast quantities of data. The "newcomer" will find this work useful principally for these features and for the purpose of gaining a general sense of what lines of research have been pursued.

While the author has made an excellent summary of large amounts of data, he has not succeeded in stating clearly the major conclusions or summary conclusions which might be derived from these data. In addition, the level of detail included in brief discussions and the use of unfamiliar vocabulary will severely limit the audience which can attain a significant level of understanding from the author's discussions. For example, someone not already familiar with silicate structures will probably not benefit appreciably from the fifteen-page review of this topic. The sections concerning zeolite structures include several references to geometrical and topological concepts which readers will find intriguing but probably quite unfamiliar. The chapter Mineral Zeolites contains abundant geologic nomenclature which most chemists will find confusing despite the inclusion of a brief glossary.

The confusion introduced by the brief reference to unfamiliar concepts and by the omission of statements summarizing the principles derived from the abundant data presented will limit the utility of the volume for students and casual readers. It is, however, an important reference work which should be available in all science libraries.

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