

EPOXIDES AND THEIR DERIVATIVES

Epoxides and Their Derivatives

By M. S. Malinovskii. Translated from the Russian. Pp. xvii + 493. (Jerusalem: Israel Program for Scientific Translations; London: Oldbourne Press, 1965.) 144s.

THERE are now extant a number of reviews and monographs covering the chemistry of epoxides and their derivatives, and *Epoxides and Their Derivatives* is a commendable effort to provide chemists with a source-book wherein they might find the preparation and reactions of epoxides summarized, together with relevant references to the literature. The obvious limitation is that the literature here covered is only that up to 1958: the book was published in Moscow in 1961, and is now made available in English through the Israel Program for Scientific Translations.

The monograph is conveniently divided into three parts. The first part deals with the structure and reactivity of epoxides, their classification and nomenclature. The second covers the preparation of epoxides, and the third is an extensive review of their reactions to include their hydration, hydrogenation, isomerization, and polymerization, and reactions with alcohols, aldehydes, ketones, amines, organo-metallic compounds, mercaptans and nitrogen heterocycles. Part of the usefulness of the last two sections is that often details of the experimental procedures used are reprinted.

The book concludes with tables of known epoxides in order of their molecular formulae, giving their physical properties. The index is very good, and is not the least useful part of the monograph.

It has to be recognized that the origin of this work is a Russian one, and at times a nationalistic concern is apparent. The introduction includes a reference to Khrushchev's address to the twenty-second Congress of the Communist Party of the U.S.S.R. setting out the aims of Soviet chemical industry, and very frequently the authors attributed as having first made reference to a compound are Russian ones. There are sweeping statements such as "the preparation of ethylene oxide from ethylene chlorohydrin has been thoroughly explained in Soviet literature" (p. 69), and it appears that "Zimakov and Petrov (in 1946) were the first to explain the reactivity of ethylene oxide according to modern concepts" (p. 13): this in spite of the work of Bronsted and the Kilpatrick in 1929. Against this background it looks like wilful misinterpretation on page 113 when the conclusions of Bronsted about his own work are discussed. One of the weaknesses of the book is the lack of a thorough review of the mechanisms of the ring-opening of epoxides.

It is thus politically unfortunate that, in translation, American spellings have been adopted. It must be inevitable that certain phrases in translation appear strange to the reader, particularly when the phrase originally had to be translated into Russian. An example is the determination of bond-lengths by electron-diffraction referred to as investigation of electronograms (p. 3). But these, and other small textual points, should not be allowed to detract from the fact that this is a very useful survey which should find its place among the reference works of most research libraries. J. BRIGGS

ASPECTS OF ENZYMES

An Introduction to the Study of Enzymes

By Dr. H. Gutfreund. Pp. x + 335. (Oxford: Blackwell Scientific Publications, 1965.) 60s. net.

AN *Introduction to the Study of Enzymes* is intended "to give an account of theoretical and experimental methods for the study of enzymes" and "to introduce the reader to the basic principles of the concepts of enzyme kinetics, to methods for kinetic investigations and to

their interpretation". The author admits a bias towards the purely kinetic analysis of the behaviour of enzymes. In a sense, biochemistry is the study of enzymes, and perhaps a more accurate title for the book would be *An Introduction to the Study of Enzyme Mechanisms*. Obviously all aspects of enzymology cannot be embraced even superficially in a single short book, and the isolation of enzymes, for example, is not considered.

Dr. Gutfreund succeeds very well in his aim of giving a readable, introductory account to whet the reader's appetite, especially in those sections of the book which deal with experimental methods and the interpretation of results. He repeatedly points to limitations in the treatment and advises the reader to turn to more detailed sources. The selection of some 500 references includes some papers published in 1964, and an adequate general index is supplemented by a useful index of the enzymes discussed.

Minor blemishes include the occasional use of DPN as well as NAD, and the absence of page references when figures and tables in other parts of the book are under discussion. In the introductory chapter, which includes a helpful outline of applications of digital and analogue computers in enzyme kinetics, a steady-state definition of the Michaelis constant in the original Michaelis-Menten formulation is confusing. A suggestion that prosthetic groups as well as coenzymes should be treated as substrates is corrected later in the book, but then prosthetic groups are said to be present in 1:1 molar ratio to the enzyme.

The following two chapters on formal enzyme kinetics make up one-third of the book. The somewhat diffuse style of the author is perhaps less suited to these theoretical treatments than to the later, more descriptive parts of the book, although asides such as "statistical methods can never be a substitute for adequate experimental data" are illuminating. Unfortunately for the student, these chapters contain more than an acceptable number of errors and misprints in the kinetic expressions, and vagaries of punctuation and syntax largely absent from the rest of the book. Generally, adequate coverage of the usual topics and algebra are provided, together with useful sections on solvent effects, diffusion-controlled reactions and activation by metals. I found the treatment of inhibition confusing, and there seemed to be misconceptions about non-competitive inhibition. Steady-state and equilibrium treatments of a non-competitive mechanism are not equivalent, as they are said to be here, and the possibility of inferring quasi-equilibrium conditions is based on this fact.

Chapter 4 is an admirable account of special techniques for following enzyme reactions, and includes rapid reaction techniques, spectrophotometry and fluorometry, hydrogen ion, oxygen and carbon dioxide concentration measurements, and calorimetry. This lucid survey, and the following chapter on the protein chemistry of enzymes and the active site, can be recommended to both undergraduates and advanced students.

Chapter 6 brings together various applications of isotopes in a satisfactory manner, and includes, with many examples from the literature, the interpretation of isotope rate effects, stereospecificity studies and exchange reactions. In relation to this and the following two chapters, in which various types of evidence of mechanism are reviewed for a good selection of group-transfer reactions, it seems a pity that a closer correlation was not made between isotope exchange, kinetic and other means of distinguishing between the single and double displacement mechanisms, although this would require a more detailed account of the kinetics of two-substrate reactions than is given in Chapter 1. The book closes with some general remarks on the nature of enzyme action, and brief indications of some mechanisms of metabolic control.

With some reservations about the earlier chapters, this book can be recommended to students and research