

## CHEMICAL REVIEWS

## Essays in Chemistry

Vol. 1. Edited by J. N. Bradley, R. D. Gillard and R. F. Hudson. Pp. x+115. (Academic Press: London and New York, May 1970.) 20s; \$3.25.

THE editors of *Essays in Chemistry* very properly make the point that, for many topics, there is a wide gap between the standard textbooks used by students and the original papers and highly specialized reviews often cited in lectures and recommended for further reading; obviously, their intention is to help remedy this state of affairs. It is a pity that the learned societies have not yet done much in this connexion. The *Monographs of the Royal Institute of Chemistry* are of course very valuable, but many of the articles in publications devoted to reviews and reports seem at present to be aimed primarily at those who have already a fair knowledge of the subjects; thus, there can be very few chemists able really to appreciate more than a few of the articles in recent issues of *Quarterly Reviews* and *Chemical Reviews*. Essays of the type in this book could be very helpful to final year undergraduates, to graduate students and to many others at later stages in their careers.

The present book is the first of a biannual series. The essays in the first volume are entitled "The Structure of Liquids" (J. S. Rowlinson), "Electron Transfer Reactions" (A. G. Sykes), "The Woodward-Hoffmann Orbital Symmetry Rules" (G. B. Gill), "Phosphonitrilic Compounds" (R. H. Cragg) and "Benzyne Chemistry" (H. Heaney). Nobody should expect that these essays are suitable for casual reading; they need and deserve close and detailed attention. It might well be thought that most students will need guidance in their use of the book; it is one thing to read in the preface that the purpose of instruction at higher levels is less to convey matters of detail than to stimulate thought, but it is quite a different matter to convince undergraduates of this.

The book is well produced and very reasonably priced. The authors, editors and publishers are to be congratulated on making an excellent start. The editors invite suggestions for topics to be covered in subsequent essays; it is to be hoped that they will continue to receive contributions from authors who have real understanding of their subjects and who can in their writing transmit it to others.

J. C. BEVINGTON

## JOYS OF CATALYSIS

## Catalysis in Chemistry and Enzymology

By William P. Jencks. (McGraw-Hill Series in Advanced Chemistry.) Pp. xvi+644. (McGraw-Hill: New York and Maidenhead, August 1969.) 139s.

THIS book deals with the nature of catalysis of reactions in aqueous solution. Its objective is to impart that accurate understanding of catalysis which is fundamental to the interpretation of both chemical and enzymatic reactions.

The five chapters of the major part of the book show how the activity of an enzyme far transcends the process of bringing the reactants into proximity without underestimating the value of studies on neighbouring group participation. The details of covalent and general acid-base catalysis are admirably laid bare and illustrated with a wealth of variety from chemical and biochemical examples, each one selected purposefully. Jencks's analysis of the contributions of isotope effects is characteristically objective, simple, and yet thorough, and he writes impartially on the several aspects of strain, distortion, and conformational change of catalytic significance.

The second section of the work discusses forces in aqueous solution which "provide the handles through which enzymes exert their specific catalytic activity". It explains how the properties of this unique solvent govern the delicate balance between hydrogen bonding, coulombic interactions, hydrophobic forces, and electron transfer processes. In this section, perhaps, the author's feel for his subject is most clearly manifest and beneficial. The next part provides definitive diagnoses and specifications of the mechanisms of carbonyl and acyl-group reactions, the author's speciality. Finally, the book is concluded with a section on the elementary use of kinetics, stripped of mathematical sophistication, which is both a primer for the novice and an essay for the expert.

This book is an outpouring of mature, self-consistent thought in a vital area of physical organic chemistry. It has been tested and tempered through class presentation to students by one whose only concession to his own expert contribution to the field is the exclusion of his name from an impressive bibliography. It is set in language of such lucidity that it can be placed profitably in the hands of advanced undergraduates, yet it challenges the initiate to match in breadth and depth the author's own comprehension of catalysis.

Dr Jencks's unquestioned ability as a teacher has already won him many disciples. This book will multiply their number. It is a masterpiece.

G. M. BLACKBURN

## SUCCESSES AND FAILURES

## The Analysis of Binary Data

By D. R. Cox. (Methuen's Monographs on Applied Probability and Statistics.) Pp. viii+142. (Methuen: London, March 1970.) 40s.

THIS monograph concerns the statistical analysis of binary (or quantal) data; that is, data in which the observations take one of two forms, for example, success or failure. An attractive unity is brought to the subject by confining attention almost entirely to analyses based on the assumption that the logistic transform of the probability  $\theta_i$  of success is a linear combination of unknown parameters  $\beta$ ; that is,  $1 - \theta_i = (1 + e^{a_i \beta})^{-1}$  where  $a_i$  is a (row) vector of known constants. Contingency tables are an obvious special case, and it is refreshing to find a discussion of these which avoids the ubiquitous but unsatisfactory  $\chi^2$ . The great advantage of the logistic analysis is that it provides estimates and, in particular, confidence intervals and not, as does  $\chi^2$ , merely tests of significance. Bioassay is another field in which the use of the logistic transform has advantages over, say, probit methods, as has been pointed out by Berkson.

Cox writes primarily for statisticians and a knowledge of statistics is assumed. He remarks that he hopes scientists and technologists will find something useful. I think they will, for the writing is clear and the examples are numerous and illuminating. They would have been served rather better if the various techniques had been more formally stated. As it is, the techniques tend to get buried in the conversational style. It is a curious feature of the book that an important reason for the success of the logistic transform is not mentioned. The likelihood function  $\theta^r(1-\theta)^{n-r}$  for  $r$  successes and  $(n-r)$  failures is brought, to a good approximation, to the normal form by the logistic transformation, and hence methods based on the normal likelihood are available. This was noticed by Fisher when he introduced the  $Z$ -transform of what we now call Fisher's  $F$ .

The monograph should do much to improve the future analyses of binary data.

D. V. LINDLEY