

Book review

Introduction to Enzyme and Coenzyme Chemistry, Second Edition,
T. Bugg, Blackwell Publishing Ltd. August 2004, 304 pp, Paperback,
£ 29 = 99; ISBN: 1405114525. www.blackwellpublishing.com

Enzymes are wonderful catalysts. Not only is this obvious to readers of this journal, but it is also the title of a chapter and the guiding theme throughout Timothy D. H. Bugg's second edition of *Introduction to Enzyme and Coenzyme Chemistry*. The book is a clear descendent in spirit of Walsh's excellent but out-of-date classic *Enzyme Reaction Mechanisms*, though with its much narrower breadth and depth of coverage, Bugg has clearly aimed at advanced undergraduates in biochemistry, chemistry, medicinal chemistry, and related disciplines. It could also serve as a text for beginning graduate students but lacks the depth needed for a course on enzyme mechanisms. Chapters end with lists of additional reading and problem sets that expand on the material from each chapter. The first chapter provides a general introduction, briefly covering the historical origin of enzymology and the importance of enzymes in commerce and medicine. The second chapter provides a concise review of protein structure which will be useful to students who have learned about protein structure in other courses, but is too brief to adequately introduce the novice. The third chapter provides a distillation of the standard bioorganic analysis of the origins of catalytic power, updated with a very brief mention of the increasingly recognized importance of dynamics. Next, methods for studying enzymes are treated, from enzyme purification through kinetics to an analysis of transition states. After these four general chapters, the book moves on to its main focus with seven chapters on the chemistry of broad categories of reaction types catalyzed by enzymes, and a final chapter on "non-enzymatic biological catalysts"—that is, catalytic RNA, catalytic antibodies, and synthetic

model catalysts. Chapter topics include hydrolysis and group transfer reactions, redox reactions, carbon-carbon bond formation, additions and eliminations, pyridoxal chemistry, isomerizations, and radicals. In the limited space available, depth and breadth are not simultaneously possible. The necessarily short coverage of topics has the detrimental effect of glossing over some unsettled controversies. As a case in point, the mechanism of the flavin-dependent acyl CoA dehydrogenases is presented as a radical reaction despite strong evidence to the contrary obtained from flavin analog studies and kinetic isotope effects. A full hearing of the evidence simply is not possible in the short space allotted, even if the author were so inclined. Still, the well-chosen topics provide a highly readable, coherent introduction to enzyme chemistry. This is both a strength of the book—students are very likely to become interested in the topic and should be prepared for deeper study—and also its weakness, as students are likely to have the impression that many mechanisms are more established than they really are. The book is illustrated throughout with pictures of enzyme-ligand complexes created from coordinate files from the Protein Data Bank and the program *Rasmol*. The integration of protein structure into discussions of mechanism is commendable, but the figures look rather crude and are not always effective; numerous free programs are now available to students that could provide better illustrations.

Bruce A. Palfey
Department of Biological Chemistry,
University of Michigan Medical School, Ann Arbor,
MI 48109-0606, USA

Copyright of *Journal of Enzyme Inhibition & Medicinal Chemistry* is the property of Taylor & Francis Ltd and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.