Microbial Production of Nucleic Acid-Related Substances

Edited by K. Ogata, S. Kinoshita, T. Tsunoda and K. Aida
Kodansha Ltd; Tokyo. John Wiley; Chichester, 1976
xviii + 348 pages. £ 19.50, $ 30.00 (cloth)

The Japanese fermentation industry produces about 3000 tons of IMP plus GMP per year, as well as other nucleotides and nucleosides, and nucleoside antibiotics, not to mention RNA itself and several important nucleases. IMP and GMP are used as flavourings, especially in synergism with monosodium glutamate. The book attempts to survey the scientific aspects of this industry, going beyond the review by K. Ogata (1975) in Volume 19 of Advances in applied microbiology. All forty-three authors of the book are from Japan, four of them being editors and a further eight are assistant editors. It is disappointing that the bevy of editors have not been more successful in eliminating patchiness and duplication between the various chapters. However, Chapter 2 on the biosynthesis of nucleotides and its regulation is excellent and so is Chapter 10 dealing with the microbial production of IMP and AMP and their leakage from the bacteria by the appropriate level of manganese deficiency. Chapter 1 surveys microbial nucleolytic enzymes, several of which are discussed more fully in three later chapters. There is some duplication among these four chapters and, unfortunately, no cross-references. The chemical phosphorylation of nucleosides is discussed extensively in both Chapters 9 and 14. Other chapters deal with the production of nucleotide co-enzymes and sugar nucleotides, while a final section considers the uses of the many products. In this section, the best chapter discusses the use of 5′-ribonucleotides as flavourings, although it is astonishing to read that compound chemical seasonings can reduce the amount of natural materials required to half of the original level without loss of quality. No information is given about the extent to which the nucleotides are used as flavouring agents outside Japan. The chapter on the use of nucleotide agents for medical treatment is not informative, while the final chapter on nucleoside antibiotics is little more than a catalogue of names and structures.

Besides being uneven in quality, the chapters are uneven in presentation. Some even have separate reference lists for each sub-section. Some chapters indicate type-culture numbers, but most give no indication about the availability of important strains. Genetic markers, even for *Escherichia coli* are, for the most part, designated in non-standard forms. Yet typographical errors are few and there is much useful information that is not easily obtained in Western scientific libraries.

K. Burton

The Enzyme Molecule

Edited by W. Ferdinand
John Wiley; London, New York, Sydney, Toronto, 1976
xvi + 289 pages. £ 9.50, $ 20 (cloth); £ 4.50, $ 10.00 (paper)

This book has the ambitious aim of presenting in under 300 pages what undergraduates in biology, biochemistry and chemistry want to learn about enzymes. In such a short book it is inevitable that

much has to be left out, and no one reader will be thoroughly satisfied.

Dr Ferdinand starts with good introductory chapters explaining the general role of enzymes and the first steps in enzyme kinetics in relation to bioenergetics. He then covers in 24 pages an outline of protein chemistry. It is clear that his interests lie elsewhere, since this is not inspiring, and it lists methods and results without being very enlightening on principles, and contains errors in formulae. Since most biochemistry textbooks contain fairly good accounts of this material, I wonder if it could not have been omitted. The usefulness of several photographs of models of complete protein molecules is particularly questionable.

His fourth chapter is on enzyme structure and function, and in it he gives a good account of ligand binding and its study, and something both on the types of reactions enzymes catalyse and theories on how they do it. He finishes with ribonuclease to show the nature of how the covalency changes occur. This chapter gives the main ideas on enzyme function clearly, but it nevertheless seems to me to miss the excitement that could have been introduced. That enzymes transform substrates that are normally utterly stable, and do so although they have only about half-a-dozen chemically different groups with which to work, and nevertheless achieve rates of up to 10^7 s^{-1} so that each enzyme molecule can transform molecules almost as fast as these collide with it – such ideas are hardly developed at all.

It is the second half of the book that allows Dr Ferdinand to show his own tastes, and it is brilliantly written. He deals with steady-state enzyme kinetics in two chapters, one on independent sites and one on interacting sites, and then devotes two chapters to the control of metabolism. He leads readers fascinatingly through the algebra with good explanations and without departing far from the biological processes being considered. These chapters are truly illuminating, especially on fluxes through metabolic pathways. His first appendix on enzyme nomenclature seems helpful, although I am not sure that the six pages giving the complete classification scheme of the Enzyme Commission are necessary. The second appendix on protein purification may also be useful, although very brief on the principles of some of the methods. He has an excellent system of references, strictly limited to the most useful.

I can recommend the book strongly for its guide to steady-state kinetics, and the relation of this to ligand binding and to overall cellular metabolism. I do not know a simple account that is as good as this, giving interest as well as understanding. The background protein chemistry is less good, but this can much more easily be obtained from textbooks. I miss the excitement possible in the phenomena of making and breaking bonds, topics where biochemistry and chemistry can strongly illuminate each other for elementary students of chemistry and biochemistry. The omission of transient kinetics may be related to a lack of interest in such matters. The author has thought out new ways of describing several important principles and this book enriches the teaching of biochemistry.

H. B. F. Dixon

Introduction to the Spectroscopy of Biological Polymers

Edited by D. W. Jones
Academic Press; London, 1977
xii + 328 pages. £ 11.60, $ 25.50

This book is a collection of eight chapters, each on a particular branch of spectroscopy that has been applied to the study of biological macromolecules. The editor has in addition contributed a short introductory chapter, and a final chapter, correlating the use of different spectroscopic techniques in macro-