

BOOK REVIEWS

Oxygenases: edited by OSAMU HAYAISHI. Academic Press, New York, 1962, 588 pp., \$17.50.

MASON's review article in *Advances in Enzymology* in 1957 classified the reactions of molecular oxygen with enzymes in a way which has led to subsequent modification of nomenclature but little change in the proposed mechanisms. This classification took into account the finding of direct incorporation of $^{18}\text{O}_2$ in enzyme reactions which cleave and hydroxylate aromatic compounds, and emphasized the differences in mechanism between these reactions and the electron-transferring oxidases. The collection of review articles published under the title "Oxygenases" is a similarly oriented but extensively expanded contemporary treatment of the problem. To the investigator, this book presents detailed speculative mechanisms as well as methodology and will have great value. To the student interested in the metabolism of aromatic amino acids and amines, the articles by Mehler and Kaufman will prove extraordinarily useful. However, a cohesive account of the oxygenases in enzymology, such as Mason presented, is not easily gleaned from this book. Perhaps this is just as well because it is clear from the discussions of mechanism in the chapters by Nichols (Peroxidase as an Oxygenase), Kertesz and Zito (Phenolase), and Vercauteren and Massari (Model Oxygenases) that such deceptively simple statements as "The enzymatic activation of molecular oxygen" cover a bewildering array of speculations and elegant but inconclusive experimental data. For instance, the role of metal ions in most of the hydroxylation reactions cannot be delineated.

The scope of enzyme reactions in the class of oxygenases is surprisingly broad. In an admirable chapter Hiyano discusses the hydroxylation reactions which occur in steroid metabolism. Bacterial oxidation of hydrocarbons is reviewed by Foster in an assessment of the role of oxygenases and hydroxylases in the metabolism of alkanes. A detailed chapter on cytochrome oxidase by Okunuki and a discussion of the physical chemistry of hemoglobin and myoglobin by Wang, although not accommodated in the title of the book, provide a frame of reference in which interaction of oxygen and metal-proteins may be considered. The enzymatic reactions which accomplish hydroxylation and dealkylation of drugs are not reviewed, probably because of scant evidence of mechanism. It is remarkable how pertinent this book is to many areas of current interest in the field of biochemical pharmacology.

C. E. CARTER

The Molecular Control of Cellular Activity: edited by J. M. ALLEN. McGraw-Hill, London, 1962, 328 pp. 81s. 6d.

SINCE this book arose from a series of lectures given at the University of Michigan (in Spring 1960), one might expect a non-specialised survey of the difficult field indicated by the title. By this criterion the thirteen chapters vary greatly in value. Moreover, the price seems excessive, particularly since the printing is by an off-set process. A little of the blame for the high price lies with P. Weiss, whose "lecture" ("From Cell to Molecule") occupies almost one quarter of the book and includes numerous illustrations, of which one (Fig. 2) is an insult to the reader's intelligence and several can be faulted in other respects such as lack of a scale. However, a persevering reader will find in this prolix article some useful warnings and stimulating concepts—for example, the need for "viewing morphologic patterns, such as microscopic or ultramicroscopic structures, as mainly indices and residues of the patterns of processes by which they have been formed", this viewpoint being an aspect of "molecular ecology". The article seeks to show that "the distinction between molecular control of cellular

activity and cellular control of molecular activity is based on the semantic ambiguity of the term "control", hence fades in the light of true understanding of the phenomena involved".

H. Swift discusses Dipteran salivary glands concerning problems such as how DNA fits into the chromosome and how nucleolar RNA originates. The evidence "points to nucleolar and chromosomal fractions as substantially independent". In a rather short article which deals mainly with techniques, T. Caspersson remarks, "The conception—nucleolus—is still complex and relatively undefined; it includes structures of different compositions within the nucleus of the cell", and touches on the possibility that "the occurrence of disturbances in the heterochromatin system is one of the factors required for the malignant type of growth".

The article on metabolic activity and cell structure (P. Siekevitz) serves to warn naive biochemists that enzymes in solution may behave differently from enzymes in the cell, although his examples based on pH optima are of ambiguous interpretation. The articles by M. Demerec (gene structure), D. S. Hogness (phage DNA), R. L. Sinsheimer (DNA and RNA structure), and A. Kornberg (DNA biosynthesis) deserve high praise, particularly since they cater for non-specialists. There is no article on RNA synthesis, but aspects of protein synthesis are covered by V. M. Ingram (control of specificity, exemplified by haemoglobins), P. C. Zamecnik (soluble RNA), and A. B. Pardee (genetic and metabolic control). Metabolic control mechanisms are crisply surveyed by H. A. Krebs; this chapter hardly gives a coherent story, but the fault is perhaps with the subject rather than the presentation. Early in his chapter on steroid hormones and metabolism, C. A. Villee gives a good survey of possible mechanisms, and suggests that hormones may bring about growth responses by affecting energy supply rather than specific biosynthetic reactions—a concept so simple that it seems too good to be true. The rest of his chapter rambles somewhat and would have benefited from sub-headings.

Two good points are the inclusion of titles in the references, and the presence of an index. In summary, some but not all of the material in the book would be excellent for students unfamiliar with the subject. The faults lie partly with the authors; for example, "cistron" is not defined, although terms such as "allele" are explained. However the deficiencies of the book are partly inevitable because of the fragmentary state of knowledge at the present day and more especially at the time when the lectures were given—at which time, for example, the concept of "messenger RNA" had not crystallized.

E. REID

ERRATUM

In *Biochem. Pharmacol.* **12**, 269 (1963):

D. J DENNIS, H. BLASCHKO and A. D. WELCH *J. Pharmacol. exp. Ther.* **117**, 208 (1956), the first name should be D. J. DEMIS.