

between chemically different groups and between different arrangements of groups in three-dimensional space. If Dr Alworth's explanations seem elaborate, it's only because he doesn't want to give you any chance of getting the subject slightly wrong, as he thinks many biochemists do. He is lucid as well as careful."

The reader is taken through an historical introduction, and discussions of symmetry and of molecular dissymmetry. The terms and conventions of stereochemistry are carefully explained, though it could be objected that more detailed discussion is given to the obsolescent D, L system than to the rational R, S system which is superseding it. Methods of assigning absolute configurations are described. The ground having been cleared, the stereo-

chemical basis for distinguishing between "paired groups" in a molecule is considered in depth. Enzyme-substrate interactions are examined in the particular case of α -chymotrypsin. There is a long final chapter describing the use of stereochemical methods to investigate the mechanisms of a variety of enzymic reactions.

I have already said that the author has succeeded in his aim; but one could have wished that the stereochemical specificity of enzymes had been shown more clearly as the necessary consequence of their substrate specificity and of their role as catalysts. It could also have been brought out that our ability to demonstrate an enzyme's discrimination between "paired groups" depends absolutely on our power to put a private mark on one of them, by means of an

isotope. Without isotopes, a logician might eventually have inferred this property of enzymes; but his only chance of proving it would have been to inspect somehow, at the molecular level, a substrate reacting at an enzyme's active site. As it was, Ogston's note in this journal in 1948, which laid the foundation for the whole subject, was an explanation of results already obtained with isotopes.

Blemishes in the text are agreeably few, but errors were noted in several diagrams. J. W. CORNFORTH

Evolutionary Essays

On Evolution. By John Maynard Smith. Pp. viii + 125. (Edinburgh University: Edinburgh; Aldine Atherton: Chicago, 1972.) Paper 75p; hardback £1.50.

EVOLUTIONISTS often claim that their science includes in its domain all of biology, that the study of the history and dynamics of change of organic forms is the study of biology in its most complete sense. Despite this catholicity of professed interest, "evolutionists" turn out, on examination of their professional work, to be comparative anatomists or palaeontologists, or statisticians, or population geneticists, or biochemists, or something else rather specialized. Some few have made forays into philosophy or history of biology, often as amateurs and dilettantes. But never has anyone made professional and non-trivial contributions to such a diversity of fields as, say, population genetics, functional anatomy, developmental genetics, insect physiology, optimality theory and the philosophy of science, all in an evolutionary context. Never? Well, hardly ever. For there is John Maynard Smith, whose new collection of papers and essays, *On Evolution*, reminds us that it is possible to be an "evolutionist" after all. What is required is an extraordinary intelligence, a high degree of originality and imagination, a bird-watching boyhood in Dartmoor, a training in dialectical thinking, professional experience as an aircraft engineer, and many years of close association with another polymath of evolutionary biology like J. B. S. Haldane.

On Evolution is a sample, and by no means an exhaustive one, of the various evolutionary problems to which Maynard Smith has contributed solutions. The papers are not technical, but are not condescending in their simplicity either. They can all be read profitably by any natural scientist or student of natural science, and most of them are well within the capability of any serious intellectual. The topics include the evolution of animal flight, the develop-

Developing Nerve



A nerve fibre during development of the myelin sheath. Microtubules are visible in the Schwann cell cytoplasm (X). Photomicrograph from Hirano's chapter on "The pathology of the central myelinated axon" in *The Structure and Function of Nervous Tissue*, volume V, *Structure III and Physiology III*, edited by Geoffrey H. Bourne (Academic Press, London and New York, 1972).