

itself follows closely the arrangement of the larger work by Ingold, including some diagrams and tabulated matter from the latter's book.

The material included comprises all the basic considerations of reaction theory, the classification of reagents as nucleophilic or electrophilic, the molecularity of reactions and the nature of various classes of rearrangements. In addition, some of the physical evidence for the existence of electron displacements, as well as a qualitative description of the quantum theory of valency, is included. Each topic is carefully and concisely explained and accompanied with appropriate examples. The book is adequately indexed.

Such criticisms as I have to offer are of a minor nature. As the author points out, Fig. 1, on p. 35, is not an adequate representation of an electronic charge-cloud. It is rather unfortunate, therefore, that some other device was not adopted the better to demonstrate the charge distribution; particularly in an introductory text-book such as this. Secondly, the evidence for the direct linking of the carbon-sulphur bond in bisulphite addition products may now be considered well established as a result of isotopic studies, Raman and ultra-violet spectra. This might have been made clearer in the discussion of these compounds (p. 121).

The book is well produced, as may be expected of the Oxford University Press. The lettering and the diagrams are clear and well distributed. The text is, moreover, remarkably free from casual errors, the only one that I have noticed being a missing 'h' on p. 168.

This book is to be recommended as an authoritative account of its subject-matter and one which will well repay an attentive study. The demands the book makes on a previous knowledge of structural organic chemistry may be a little severe for any but the most advanced sixth-form schoolboys, but should be within the capacity of the other readers for whom it is intended.

R. I. REED

ECONOMICS OF TELECOMMUNICATION

Telecommunication Economics

By T. J. Morgan. Pp. 452. (London: Macdonald and Co. (Publishers), Ltd., 1958.) 50s. net.

IF the difference between 'pure' science and engineering could be expressed by a single word, that word would well be 'economics'. Yet the amount of economics which enters into the basic training of most professional engineers is still very small. Of all branches of engineering, surely telecommunication is one of which the social, economic function is most apparent (the very word 'communication' means 'sharing'), for its primary function is to widen relationships between people, extend the speed of their actions, of their trade and business. But there are very few text-books of telecommunication suitable for students which even touch upon the economic aspects, and this thoroughly readable work will be very welcome.

The author, Mr. T. J. Morgan, is a member of the planning staff of the Post Office, which well qualifies him to write this book, having extensive experience of large-scale planning, both in Britain and elsewhere. He recognizes the relative poverty of economic studies among engineers by wisely starting his book

with an apology for attempting their enrichment, continuing with an elementary account of the general principles of economics, and adding a chapter on the mathematics of statistics and probability. An excellent bibliography provides a list of texts for further detailed reading in these fields.

The influence of economic principles upon the planning and operation of large-scale telecommunication systems is gently introduced to the student, by first stressing that all engineering plant has a finite life and requires regular outlay for upkeep and operation, in addition to initial capital cost, so dictating a certain minimum utility, charges, justified development and additions, etc.; this material is well illustrated by examples and is extended to include considerations of forecasting of future needs.

More sophisticated and specialized aspects are treated in detail, including the economics of manual and of automatic exchanges, of various types of transmission, of buildings and other ancillary structures, of traffic routing and many others.

The book is well indexed and provided with extensive references, with tables of data and illustrations. It will be welcomed by professional engineers and may well serve as a text-book for college students.

COLIN CHERRY

PROGRESS IN VITAMIN AND HORMONE RESEARCH

Vitamins and Hormones

Advances in Research and Applications, Vol. 16. Edited by Prof. Robert S. Harris, Prof. G. F. Marrian and Prof. Kenneth V. Thimann. Pp. xi+437. (New York: Academic Press, Inc.; London: Academic Books, Ltd., 1958.) 11.60 dollars.

THIS book contains nine review articles, three of them dealing primarily with nutritional matters, five of them mainly concerned with hormonal affairs, and one, entitled "The Dependence of Gonadal Function upon Vitamins and other Nutritional Factors", by C. Lutwak-Mann, with both. In this article Dr. Lutwak-Mann ranges widely and engagingly, discussing not only mammals but also birds, amphibians, fishes, marine invertebrates, and insects and trematodes. An article which extends its interest from the queen substance in honey-bees to the diet of Charles Dickens's *Oliver Twist* cannot fail to stimulate.

The discussion of "Nutritional Effects of Parasitic Infections and Disease", by Q. M. Geiman, is another interesting treatment of a subject ripe for review. Dr. E. E. Snell opens his article on "Chemical Structure in Relation to Biological Activities of Vitamin B₆" by posing the general question of specificity of structure and function of physiologically important compounds, and referring to the fact that any alteration in the structure of pantothenic acid diminishes its vitamin activity although, so far as we now know, the functional portion of coenzyme A is not present in the pantothenic acid part of the molecule. He then poses the arresting question: "Is the specificity in structure merely a developmental accident, a genetic fixation upon a useful compound that happened to be present when life first arose?" He examines in an authoritative manner such questions in relation to pyridoxamine, pyridoxal, and their chemical relations, substances in which, as he points out, a knowledge of the relationship of