fundamental relationship between metabolism and function.

The reader becomes rapidly aware, however, that, whereas the chemical transformations of carbohydrates and phosphate esters in nervous tissue are known in considerable detail, information about the metabolism and function of the lipids and proteins (which constitute the greater part of the dry weight of the tissue) is sparse. The link between the metabolism of these large molecules and the activity of the brain is a rich field for future study.

Consistent with the broad view taken of his subject, Prof. McIlwain does not hesitate to discuss biochemical lesions associated with nervous dysfunction; the relevant biochemical characteristics of phenylpyruvic oligophrenia and Wilson's disease are among the topics included in the book.

Apart from the rather frequent use of sub-headings, the lay-out of the book is good and the list of references to original papers at the end of each chapter a considerable asset. The index comprises 10 per cent of the total number of pages and is exhaustive. One of the sentences on p. 238 must be a misprint, and a reference to a non-existent table occurs on p. 239. Students of biochemistry and physiology will find the book a most helpful guide to the intricacies of cerebral metabolism.

G. B. ANSELL

PHYSICS FOR THE ORGANIC CHEMIST

Determination of Organic Structures by Physical Methods

Edited by E. A. Braude and F. C. Nachod. Pp. xiii+810. (New York: Academic Press, Inc.; London: Academic Books, Ltd., 1955.) 15 dollars.

THE extent to which publishers, particularly in the United States, encourage the production of costly monographs on specialized techniques of physical chemistry is now quite disturbing; the comprehensive collection of such books is getting beyond the scope of many chemical departmental libraries in Britain, since consideration must be given to the high probability that their subject-matter may rapidly get seriously out of date. A summarizing volume on modern techniques of physical chemistry, written so as to give weight to methods of permanent value, is thus welcome, and the editors of this book deserve thanks for the way in which they have organized the collected work so as to describe essentially the principles involved and the scope of the results obtainable by applying various types of physical measurements in the elucidation of the structures of organic molecules, wisely advising that detailed accounts of particular apparatus are given literature citations only.

The book is made up of three parts, totalling sixteen chapters, and Part 1, "The Determination of Molecular Size", consists of two chapters on the phase properties of small molecules (H. F. Herbrandson and F. C. Nachod) and the equilibrium and dynamic properties of large molecules (P. Johnson), respectively. In Part 2, "The Determination of Molecular Pattern", there are five chapters: optical rotation (W. Klyne); ultra-violet and visible light absorption (E. A. Braude); infra-red absorption (R. C. Gore); Raman spectra (F. F. Cleveland); and magnetic susceptibilities (C. A. Hutchison). Part 3, "The Determination of Molecular Fine-structure", contains nine chapters on the following subjects: surface films (E. Stenhagen); dipole moments (L. E. Sutton); electron diffraction (J. and I. L. Karle); X-ray diffraction (J. M. Robertson); microwave spectroscopy (E. Bright Wilson and D. R. Lide); thermodynamic properties (J. G. Aston); dissociation constants (H. C. Brown, D. H. McDaniel and O. Häfliger); reaction kinetics (E. A. Braude and J. M. Jackman); and wave-mechanical theory (C. A. Coulson).

The names of the various contributors suffice to indicate the high quality of each section of the work. Many chapters are model essays on their subjects, delightfully readable and admirable for the breadth of their outlook. One can, however, note great differences in the extents to which individuals have visualized the problems which the organic chemists of to-day regard as matters of elucidation of molecular structure. The extremes are the chapters on applications of optical rotation measurements and on visible and ultra-violet absorption spectra and that on applications of wave-mechanics. The former two, written by experimental organic chemists, both show how physical data are of crucial value in determining the configurations of complex organic molecules of all shapes and types, with examples chosen from studies of natural products of recent interest, while the latter deals only with exact bond-lengths and electron distributions in aromatic systems—a topic which to an organic chemist has interest only in connexion with chemical reactivity.

Chapters that deal adequately with the applicabilities of their techniques are those on surface films, dipole moments, X-ray diffraction, magnetic susceptibility and thermodynamic properties. Of these, the last is noteworthy for the way in which it shows the significance of theoretical calculations in relation to conformation problems. The chapter on infra-red spectroscopy is too brief to give more than the physical background of the subject and fails to show its scope. Those on Raman and microwave spectroscopy and on electron diffraction are again highly physical, specializing on geometrical details for quite simple molecules; but of course the scopes of these techniques are essentially limited to the domain of true physical chemistry.

The long chapter on dissociation constants is over-detailed and yet tends to assume that the reader is already acquainted with both past and present theories of chemical polarity and steric hindrance. Again, the essay on chemical kinetics, in attempting to illustrate too wide a subject, assumes a background knowledge of mechanisms of organic reactions. The need for this whole chapter may be questioned, for at the present time most investigators of the kinetics of organic reactions use knowledge of molecular structure to explain details of their reaction mechanisms and not the reverse (for example, in kinetic studies of isotope replacement). In the examples given, the writers do not give due warning of the serious errors that can so easily be made by assuming that any one reaction mechanism has general validity, but do bring forward the main correlatory schemes of proved value.

Considering the extent to which each contributor has had to curtail his subject-matter to his allocated space, the wealth of information of permanent value, the excellence of its typography and, above all, its readability should ensure the book's success.

W. A. WATERS