

cryogenics includes an interesting discussion of the Mössbauer effect, which is having an influence in various fields. In the high-temperature field, which this year is confined to moderate temperatures, it is said that the melting-point of gold is still uncertain by one or more degrees, and the accepted heat of formation of silica is apparently too low. The intervention of the solvated electron in radiolytic oxidations seems to be more probable than that of the H_2^+ ion. In water the OH' ion is probably more highly solvated than the H^+ ion, and in acid solutions the H^+ ion is more solvated than H_3O^+ . The production of isotopes in meteorites by spallation reactions induced by cosmic rays is likely to throw light on the question of the constancy of cosmic rays in time and space.

The chapter on solutions of non-electrolytes seems to suggest that in this field some stagnation has set in and that what is called for is a new approach. That on electrolyte solutions repeats once more the familiar criticism of measurements with cells involving liquid contacts, without throwing much light on the validity of the thousands of measurements made daily with such cells in laboratories of all kinds; a more constructive approach would have been of more interest. In studies of gas kinetics, it is said, gas chromatography (on which some 1,500 publications appear annually) is replacing mass spectrometry. The mechanism of acid-catalysed reactions is much less simple than has been supposed.

J. R. PARTINGTON

SPECTROSCOPY IN SCIENCE AND TECHNOLOGY

Fundamentals of Infrared Technology

By Marvin R. Holter, Sol Nudelman, Gwynn H. Suits, William L. Wolfe and George J. Zissis. (Macmillan Monographs in Applied Optics.) Pp. xv + 442. (New York and London: The Macmillan Company, New York, 1962.) 79s.

Theory and Applications of Ultraviolet Spectroscopy

By Prof. H. H. Jaffé and Prof. Milton Orchin. Pp. xv + 624. (New York and London: John Wiley and Sons, Inc., 1962.) 113s.

Standardization of Spectrophotometric Data in the Near Ultraviolet, Visual and Near Infrared

By Dr. Jørgen Fog. (Institute for Medical Biochemistry and Physiology, University of Oslo.) Pp. 64. (Oslo: Johan Grundt Tanum Forlag, 1962.) n.p.

THE interaction of matter with electromagnetic radiation of all wave-lengths is assuming an ever-increasing importance in both pure and applied science. The nature of the absorption of wave-lengths 5–50 times as long as those of visible radiation has become of great industrial as well as academic interest as a result of the successful application of infra-red spectroscopy to the analysis of organic materials. The military applications of infra-red radiation, particularly its use for the guidance of missiles, are so important that the fate of a nation might well depend on the state of its infra-red technology.

The first of these books deals mainly with the latter aspect of the technology of infra-red radiation. It contains the substance of a course of lectures given at the University of Michigan by its five authors. Its first section covers basic radiation concepts, radiation measurements and transmission through various media with particular emphasis on the Earth's atmosphere. The second part is devoted to optical materials and instruments. The next section deals with the theory of detectors, noise in semiconductor detectors and detector measurements. The final chapters are concerned with typical applications,

with atmospheric spectra and the major sources of infra-red information. While the growth of this subject has undoubtedly received its greatest stimulation from its use in warfare, its non-military applications such as the investigation of the radiation balance in the atmosphere are of great importance. This book will be very valuable to those who wish to profit from developments that have sprung from military requirements as well as those whose present responsibility it is to satisfy them.

The second of these books deals with the ultra-violet absorption spectra and electronic structures of molecules. It marks the enormous progress which has been made in the past thirty years in explaining chemical properties in terms of electronic structures. This achievement has resulted largely from extensive studies of the nature of the electronic spectra of a vast number of molecules. The early chapters of the book contain an excellent account of basic molecular orbital theory and the subsequent discussion of molecular spectra is developed logically within this theoretical background. Starting with the interpretation of the spectra of the simple chromophores the subject is expanded to include the whole range of organic molecules. In later chapters ligand field theory and the part played by 'd' orbitals are discussed and applied to the spectra of inorganic complexes. Other topics treated less thoroughly in this book include fluorescence, phosphorescence and equilibrium constant determination. It is clear that the modern chemist and spectroscopist has to be steeped in quantum theory if he is to have any real understanding of his subject. At times the going is hard, but the reward is well worth the effort required for its comprehension.

The third book deals with some of the practical details of ultra-violet spectrophotometry. That its author is a professor of medical biochemistry is indicative of the way in which spectroscopic techniques have proved of great analytical value in diverse fields. The content of the book is, however, very limited, and most of what it contains can be found in the manuals issued by the instrument manufacturers.

W. C. PRICE

CHEMICAL PHYSICS

Determination of Organic Structures by Physical Methods

Vol. 2. Edited by F. C. Nachod and W. D. Phillips. Pp. xiii + 771. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1962.) 114s. 6d.

VOL. 1 of this work (1955) dealt with recent developments of established methods of elucidating molecular structure and the present volume supplements this by a series of 50–90 page review essays dealing with rapidly developing physical techniques of recent origin. Each writer assumes that interested readers are well acquainted with the most modern, expensive, type of American equipment that is available and that they are primarily concerned in understanding further the significance of recent precise data.

Chapter 1, on optical rotatory dispersion, will appeal most to the conventional organic chemist, for it surveys the very considerable achievement of C. Djerassi and his colleagues and can be used as a précis of his book. For the organic chemist who is interested in reaction mechanisms, Chapter 2, on mass spectrometry, collects much significant information, for mechanisms of formation of mass spectra are essentially similar to routes of unimolecular decomposition of organic molecules and give knowledge about bond strengths and of the tendencies of activated molecules to undergo molecular rearrangement. Very soon organic chemists will be demanding mass spectrometers as essential tools in studies of molecular stability and not merely as equipment for finding molecular weights.