CAMBRIDGE MONOGRAPHS ON PHYSICS

Cambridge Monographs on Physics

(1) Excited States of Nuclei. By Prof. S. Devons. Pp. ix+152. (2) Surface Tension and the Spreading of Liquids. By Dr. R. S. Burdon. Pp. xiv+92. (3) Oscillations of the Earth's Atmosphere. By Dr. M. V. Wilkes. Pp. ix+76. (4) Adsorption of Gases on Solids. By A. R. Miller. Pp. ix+133. (5) Some Recent Researches in Solar Physics. By F. Hoyle. Pp. xi+134. (Cambridge: At the University Press, 1949.) 12*s*. 6*d*. net each.

FOR about a decade we have been starved of British books—especially British scientific books—and it is surely a matter for some gentle rejoicing that a positive spate of five "Cambridge Monographs on Physics" has burst upon us.

Every physicist who attempts to keep abreast of his time knows the practical impossibility of doing so without such help as is given, and can only be given, by such masterpieces of compression as these volumes afford. The editors are to be congratulated on persuading five such authorities as R. S. Burdon, S. Devons, F. Hoyle, A. R. Miller and M. V. Wilkes to write on the subjects of their special interests. The price, 12*s*. 6*d*., seems to my tax-burdened self a little stiff; but I am bound to admit that the value is good.

I felt myself a certain difficulty in reading some of the chapters—understandable in view of the compressed style inevitably used—and I venture to suggest that short introductions or summaries at the beginning or end of each chapter would prove a most helpful and useful feature. This is quite usual in original papers, and it certainly is a valuable help. There is no need to say that the printing is uniformly good.

Let us have more and more of these Monographs, even if the editors carry out their welcome threat of giving a lot of attention to nuclear physics.

R. WHIDDINGTON

(1) In his book "Excited States of Nuclei", Prof. S. Devons successfully attempts to give an account of our present knowledge of nuclear levels (up to 1948). A review of this kind can be, of course, by no means final. Experimental evidence is still mounting and is guided only little by theory. Prof. Devons adopts a very justifiable course: he sets out on a phenomenological description of the results of study and succeeds in classifying and presenting them on less than 150 pages.

Although there is no sharp dividing line, the author finds it convenient to collect information about nuclear levels in two groups: those corresponding to bound states and those to virtual states. A further chapter deals with radiative transitions. In these chapters is contained a most thorough discussion of nuclear states. Theoretical results are presented here only as far as they are pertinent, but in a further chapter Prof. Devons investigates in more detail the applicability of the various theories to the interpretation of nuclear spectra, and in particular the work of Wigner and his school, as well as the fit of the various models.

The scope of this book does not allow of description of experimental technique, though neutron spectrometry is singled out by a rather more favourable treatment. Nor is there space to state more than results only of theoretical methods; yet it would be useful here to mention more names and to give more references, and Frenkel's name should not be omitted when describing the statistical method.

An author's index in the next edition would be welcomed by readers of this book, which every student of nuclear physics will be pleased to possess.

E. W. KELLERMANN

(2) Surface tension has been of interest to the physicist in the past mainly because it is one of the few large-scale manifestations of the existence of intermolecular forces. However, owing to difficulties in experimental technique and to complexities in theory, the information obtained from a study of surface tension has been, on the whole, disappointing, and our present knowledge of intermolecular forces has been largely obtained from other sources.

To the physical chemist and the chemical engineer, on the other hand, the allied phenomena of spreading of liquids on other liquids and solids, the formation of monolayers, the flotation of minerals, and so on, have been of great advantage, and it is on these topics that the larger and more successful part of Dr. R. S. Burdon's monograph is concerned. His account of experimental work on spreading and flotation (chapters 4–7) is an admirable summary of the extensive and scattered literature on these subjects. Chapters 2 and 3, on "Measurement of Surface Tension" and "The Surface of Liquid Metals", are also very good accounts of available experimental methods in a formidably difficult field.

Chapter 1, on "The Nature of Surface Forces", is not quite so satisfactory; one might surely expect a more thorough discussion of fundamentals than Dr. Burdon provides. The notion of surface energy is admittedly more convenient than the original concept of surface tension; but it is meaningless to deny the existence of surface tension, as is done in §1.

The physical background of the subject should be given a little more weight in a monograph of this kind. A further valuable improvement would be either a collected list of references at the end of each chapter or an author index.

M. M. NICOLSON

(3) It has been known since the eighteenth century that the daily variation in the barometric pressure at sea-level is principally semi-diurnal in character, and it was pointed out by Kelvin in 1882 that this phenomenon could be explained if the atmosphere has a free oscillation of period about twelve hours, so that the semi-diurnal tide exerted by the sun is magnified by resonance. Kelvin's suggestion is the origin of the 'resonance theory' with which Dr. M. V. Wilkes's book, "Oscillations of the Earth's Atmosphere", is largely concerned. Since Kelvin's time, many attempts have been made to determine the periods of free oscillation of the atmosphere; but the existence of a twelve-hour period was only proved in 1937, when Pekeris extended the theory outlined by G. I. Taylor in 1936. Since then, Dr. Wilkes, in collaboration with K. Weekes and with the mechanical assistance of the Cambridge differential analyser, has considered the problem further and has succeeded in firmly establishing the resonance theory.

The present book describes in detail the mathematical formulation of the problem of oscillations excited by gravitational action in a rotating atmosphere (Chapter 2) and the methods by which the resulting equations may be solved (Chapter 3). A very helpful physical interpretation of the mathe-