

The content is not truly a treatise on chemical physics related to surface studies, and could more accurately be titled 'Chemistry' or 'Physical chemistry' of surfaces. Saying this is not to deny that these fields greatly overlap; it is more a question of focus and scientific approach. For example, the chapter on experimental methods, which gives only a rudimentary - at times misleading - description of a large and yet incomplete number of surface techniques, nowhere mentions ultra-high vacuum; and the importance of UHV preparation receives just passing reference in the chapter on adsorbate-free surfaces.

The theoretical description aims to fuse the 'surface molecule' and 'rigid band' models of surface chemical behaviour, but appears incorrectly to suggest that these models are delineated by theorists; it is, after all, for the experimentalist to recognise that the truth most often lies in a 'resonance' between the theoretical model starting points. On the other hand, the chapters on adsorption (especially ionosorption), solid-liquid interfaces, photo-effects at semiconductor surfaces, and surface sites in heterogeneous catalysis are successful reviews.

D J FABIAN

Better late . . .

The Elements of Wave Propagation in Random Media B J Uscinski *Maidenhead: McGraw-Hill 1977 pp xxvi + 153 price £13.35*

The only criticism I have of this book is that it was not written long ago. It provides an ideal introduction to random wave theory, whose literature (mostly Soviet) has been notoriously difficult to get into.

The author has chosen to restrict his exposition to the simplest system, namely plane wave propagation through a transparent medium with continuously varying random refractive index whose irregularities scatter weakly. He ignores, for example, the case of strong scattering by randomly-sited spherical objects, important in the quantum theory of electron transport in liquid metals. However, the advantage of his approach is to expose the essential physical arguments in the clearest possible way.

After defining the statistics of the medium and introducing the important representation of the field as a sheaf of plane waves, the exposition proceeds smoothly via calculations of mean field and power to a lucid account of the thorny problems associated with non-Gaussian intensity fluctuations of the field. In addition special problems are treated: time-dependent fields, including pulse propagation; incoherent incident fields; and moving sources and media.

This attractively produced book is particularly recommended for research students, and also for any physicist who wants to learn about random wave theory.

M V BERRY

Earth, sun, universe

Physics of Magnetospheric Substorms Syun-Ichi Akasofu *Dordrecht, Holland: D Reidel 1977 pp xviii + 599 price (approx.) \$54*

It is now almost a decade since the publication of Professor Akasofu's first book on magnetospheric substorms. Since that time, satellite experiments have advanced our understanding of the substorm processes and it is appropriate, therefore, that a new volume should now appear.

The book describes in considerable detail the various aspects of the substorm, emphasising the physical processes which produce these events. Each chapter contains a very comprehensive list of relevant published work which enhances the book's value as a reference text. The work is not intended as a general introduction to the subject and will be most useful to those who already have some background in this or related fields. It will be particularly valuable to graduate students seeking an up to date account of the many complicated phenomena associated with the substorm and will be a useful reference source for established workers. In addition, it provides a foundation for many other studies of cosmic electrodynamic processes which are of interest to space physicists.

T B JONES

Solar Noise Storms (International Series in Natural Philosophy Vol 90) O Elgaroy *Oxford: Pergamon 1977 pp xiii + 363 price £9.75*

Considerable advances have been made in the last five years in observing the morphology of magnetised plasmas in the solar atmosphere. Much of this progress has resulted from studies of photographs taken in the extreme ultraviolet and x-ray portions of the electromagnetic spectrum from Skylab. Even so, it is still not clear what basic processes are responsible for heating the plasma and for producing flaring. It is therefore timely to be reminded of the wealth of related data obtained with radio techniques, since models have to explain emission covering the complete spectral range.

In reviewing work on noise storms, the book covers only part of the field of solar radio astronomy, but this restriction is clearly necessary in view of the rapid growth of the subject. There is no section on the instruments used (this information can be found readily elsewhere), but observations of the gradually varying component and bursts are reviewed clearly and comprehensively. A considerable part of the text is devoted to discussion of the processes considered to produce the radiation.

The text is enhanced by a large number of line diagrams: the quality of the few photographs included is adequate although the reproduction process is not ideal for these.

W M GLENCROSS

Physics of the Earth (2nd edn) Frank D Stacey *Chichester: J Wiley 1977 pp ix + 414 price £13.40*

The author aims in this book to bring fundamental problems in solid-earth geophysics to the attention of graduate and advanced undergraduate students of physics. It is a subject that has, of course, undergone several phases of extraordinary and fascinating development in recent years. Several simple but powerful major hypotheses have been tested and refined, and the subject is now rich, often subtle, and treats matters of broad concept and significance. The growing understanding of this complicated but hospitable planet makes the subject one which must attract the interest of more students as suitable textbooks become available. This book, a rewrite of the first edition (1969), seems to me to be a well thought out attempt to awaken and reward such interest. Its chapter headings are: The solar system; Radioactivity and the 'age' of the earth; Rotation of the earth; Gravity and tides; Seismicity and the earthquake mechanism; Seismic waves and the internal structure of the earth; The earth's internal heat; The geomagnetic field; Paleomagnetism, the prehistory of the earth's magnetic field; Tectonics and anelasticity. It would be a good text for an undergraduate advanced course; it has a list of useful references and almost 100 exercise questions.

D H MARTIN

The Key to the Universe Nigel Calder *London: BBC 1977 pp 196 price £5.95*

The 'book of the film' is often more satisfying than the visual work, as the former is not so limited by time and the medium. To some extent this is true of Calder's book - which is a spin-off from a massive BBC television programme - but some of the doubts felt during that programme remain.

In a sense, any semipopular 'report on the new physics', as the book is subtitled, is welcomed and it seems almost churlish to cavil at the author's racy presentation. The book is very well illustrated and no doubt the breathless, journalistic style will appeal to many readers. I found the treatment a little sketchy in places where more careful explanation would have helped. The choice of words - 'cosmic' might be acceptable in a newspaper article - is sometimes a little confusing, and the choice of labels like 'starbreaker' or 'sunfire' for the fundamental forces seems less helpful than the author had in mind.

But perhaps these are but minor irritations of what is after all one of the few recent and up to date popular accounts of contemporary physics. It is coherently presented and puts over well the excitement of the search for unifying ideas - for that it should be welcomed.

KURT PAULUS