

# BOOK REVIEWS

## Natural philosophy

**Radical Knowledge** G Munevar 1981  
Amersham: Avebury 136 pp price  
£11.95 (hardback), £6.95 (paperback)

This essay focuses primarily on two problems in the philosophy of science. Firstly, the status of scientific knowledge, and secondly the distinction between science and nonscience. After a brief outline of the failings of more traditional views, including Lorenz, Popper and others, Munevar introduces his model of scientific knowledge. His starting point is the elementary level of an organism's experience, resulting from the interaction of its biology with the environment. The argument turns on his discussion of colour, where he develops the notion that absolute colour observation is meaningless. This approach is extrapolated to all scientific knowledge; thus for Munevar scientific knowledge has no absolute status, but is observer dependent. This he contrasts with a realist view, where absolute knowledge is held to be attainable.

His distinction between science and nonscience results from the idea that science is a performance-related process. Science allows its practitioners to somehow utilise their environment in a better way, or, in Munevar's words, 'to get along in their universe'. Precisely what this means is not clear; immediately there are problems, and he is forced to add the qualifier 'in the long run'. Is science the only endeavour that allows a better utilisation of the environment?

Throughout the essay Munevar is at pains to point out that science and philosophy are interwoven. That philosophy gains directly from science is clearly illustrated by the diversity of material used to support the claims in this essay. A relationship the other way is less clear. One might argue that science stands only to gain from a reappraisal of the status of its so-called facts or truths. The performance-model approach raises some questions that are particularly relevant in an age of nuclear weapons and genetic engineering.

**A D Watson**

**The Science of Space-Time** Derek J Raine and Michael Heller 1981 Tucson: Pachart Publishing xi+244 pp price \$24

*The Science of Space-Time* is a book about relativistic mechanics which has

the rare virtue that, throughout large portions of its content, it can be *read* as continuous English prose, not solely as abstract mathematical symbolising. What's more, large chunks of the book are a 'good read', requiring no dedication or commitment on the part of the reader other than an interest in science.

Of course, the reader needs some maths to get the most out of the book. The authors describe the assumed mathematical background as 'modest'; by this they mean simple tensors and their manipulation. It's an enjoyable book, taking in some of the more or less stumbling attempts to incorporate Mach's Principle into our world view, touching on unified field theories, but always keeping its feet on the ground. Students of philosophy or the history of science might find the book more relevant to their professional needs than students of mathematics or astronomy, who are well catered for by several excellent relativity texts. But this is not a textbook, and its best value is as an insight into a neighbouring discipline for the specialist in some other field – particle physics, perhaps – who wants to relax while finding out how the other half thinks.

**John Gribbin**

**Concepts of Modern Physics (3rd edn)**  
Arthur Beiser 1981 Maidenhead:  
McGraw-Hill viii+533 pp price £17.25

I have long admired Arthur Beiser's knack of presenting concepts of modern physics in a lucid way to a wide audience. Reading this book has done nothing to reduce that admiration.

This is the third edition of a long established book (is it *really* nearly 20 years since the appearance of the first edition?) in which the tendency to concentrate more upon ideas than upon experimental methods and practical applications has been retained. However, the opportunity has been taken to make some significant and useful changes that will enhance the deservedly high reputation that the first two editions have. For example, there are now quite substantial new sections on topics such as crystal defects, semiconductor devices, nuclear reactors and particle detectors, while the treatment of topics such as the laser, elementary particles and fundamental interactions has been expanded. The inclusion of illustrative examples within the text will be particularly useful to students working on their own.

Anyone looking for a clear introduction to the concepts of modern physics need look no further than this book.

**Maurice Ebsion**

## Mechanics

**Quantum Mechanics** Hendrik F Hameka 1981 New York: John Wiley  
xii+387 pp price £24

This is a revised and updated version of the author's 1967 text *Introduction to Quantum Mechanics*. It was then thought particularly suitable for chemists, and indeed the new version has a flavour not unlike that of the classic *Quantum Chemistry* by Eyring, Walter and Kimball. The main new topics are time-dependent perturbation theory and a semi-classical treatment of the interaction between radiation and matter. However, unlike other books on quantum mechanics aimed at chemists, there is no discussion of even the simplest molecule, nor of group theory. Over one quarter of the book is spent on elementary linear algebra including eigenfunction expansion methods. I would stick with Messiah or Schiff, especially in view of the price.

**M R C McDowell**

**Semi-classical Approximation in Quantum Mechanics** V P Maslov and M V Fedoriuk 1981 Holland: D Reidel  
vi+301 pp price Dfl125

At last this is the English translation of the Soviet work responsible for the last decade's intense interest shown by pure mathematicians in the connections between waves and rays. Maslov's brilliant original contribution has been the conception and detailed working-out of the association between waves and certain phase-space surfaces – 'Lagrangian manifolds'. This is useful to physicists, unlike much of the mathematics which serves to set long-known results on a rigorous basis. There is only passing reference to the fact that this whole treatment is restricted to classically integrable systems and fails utterly to describe semi-classical spectra and eigenfunctions associated with chaotic orbits. The translation is inept ('beak' instead of 'cusp', 'period' instead of 'action', 'foculation'); the bibliography, although giving useful Soviet references, is narrow in scope; and the index is inadequate.

**M V Berry**