

## Medical physics

**Computers in Radiotherapy and Oncology** R F Mould (ed) 1984 Bristol: Adam Hilger xiv+246 pp price £24 (IOP members' price £19.20) ISBN 0 85274 780 2

These are the proceedings of a workshop on computer acquisition and analysis of data on cancer patients (WHO, Geneva, 26–28 March 1984). They deal with the impact of micro-computers (two papers), with software in use (ten), with data communications (five), with what data should be collected (nine), with the statistical evaluation of cancer treatment (five), with epidemiology (five), with clinical trials' protocols (two) and with legal and ethical aspects (four). A useful summary and a look at future trends are also included.

A computer application with a very long timescale is revealed in the process of evolution from rigid centralisation towards flexible networks. The striking features are: that international communication has been sparse; that national standardisation is advantageous; and that, unfortunately, few European countries have achieved this level of cooperation.

The book will interest anyone with a professional relationship to cancer treatment and is essential reading for those considering the establishment of systems for the collection of patient data.

J K Haywood

## Science policy

**UK Science Policy: A Critical Review of Policies for Publicly Funded Research** Maurice Goldsmith (ed) Harlow: Longman 1984 xxii+275 pp price £16.95 ISBN 0 582 90256 8

This book is a collection of papers describing UK science policy in several areas of R and D funded by the government. The topics covered are: agricultural research policy; big science; biotechnology policy; defence research; energy research policy; higher education; social sciences; transport research; and a comparison with policy-making in France and The Netherlands. Information technology will be the subject of a subsequent publication of the Science Policy Foundation.

The papers are highly factual, but still interesting, and the descriptions of the various committee structures are instructive. It claims to be a *critical* review of science policy, and is generally successful in this respect – there are, for example, good discussions of the strains on the dual support system, ways of controlling defence R and D,

and the extent to which the government should be involved in energy conservation research. Most physicists will turn first to the chapter on big science – presented as a 'Good Thing', misunderstood by public opinion, the government, and even by some non-nuclear physicists. The paper on agricultural research is fascinating, partly because the structure of the AFRC is so different from the SERC, but also for the criticisms of a research policy which, according to the author, neglects social and economic factors in farming.

International comparisons are important, as they can provide guidance on the right level of funding, but also because international competition determines to some extent the rate at which science should be done. The papers on French and Dutch science policy concentrate on policy-making structure; there is unfortunately no comparison of the effects of French *dirigisme* with British pluralism, or the Dutch system somewhere in between, on the only thing which really matters – the quality of the science.

J E Inglesfield

## Materials science

**Physics of Amorphous Materials** S R Elliott 1984 Harlow: Longman xiv+386 pp price £25 ISBN 0 582 44636 8

This text is intended for final-year undergraduates and for research workers. It is a wide-ranging, densely packed volume including most amorphous systems but dominated by amorphous semiconductors. It covers preparation, structure, characterisation and electron, phonon and defect properties. The author does not shirk difficult concepts, such as localisation, discussing them in a compact manner with reference to other texts for important formulae. Some very recent ideas are introduced, despite the risk that with time they will become outdated. There are also some useful reference tables. The earlier sections of the book, on preparation, glasses and experimental techniques read easily and could provide a useful text for a final year course. The remainder demands some effort to follow and is more suitable for research workers, many of whom will wish to have this volume on their shelves.

J L Beeby

**Matter at Low Temperatures** P V E McClintock, D J Meredith and J K Wiggmore 1984 Glasgow: Blackie vi+258 pp price £19.75 (£10.25 paperback) ISBN 0 216 91594 5 Hdbk, 0 216 91593 7 Pbk

Low temperature physics is no longer

an easily identifiable separate field of solid state physics, except in so far as it concerns macroscopic quantum phenomena (superconductivity and superfluidity). These are, of course, the most fascinating aspects of matter at low temperatures: the chapters in this book on superconductivity, liquid  $^4\text{He}$  and liquid  $^3\text{He}$  provide clear, well organised introductions to these phenomena. Stopping short of detailed microscopic theory, they allow the reader to focus on important physical ideas and relationships.

This emphasis on the physics is continued successfully in the two chapters on methods and applications. Less successful are the chapters on electrons and phonons, mainly because too much is attempted. The inclusion of basic solid state physics leaves too little space for the survey of general low temperature phenomena, and the consequential brevity leads in some cases to incorrect physical description. However, with this caveat, the book provides not only a solid introduction for those starting work in low temperature physics, but also a source of exciting examples with which to illustrate courses on thermodynamics, statistical physics and quantum mechanics.

W A Phillips

## Mathematical physics

**Symplectic Techniques in Physics** Victor Guillemin and Shlomo Sternberg 1984 Cambridge: Cambridge University Press xi+468 pp price £32.50 ISBN 0 521 24866 3

The authors explain, in this book, how a number of laws of physics can be expressed symplectically, that is in terms of antisymmetric bilinear forms (such as Poisson brackets). They explore in detail several levels in the geometrisation of optics, from rotationally symmetric linear ray theory (Gaussian optics), through general geometrical and physical optics, up to Maxwell's electromagnetism. This is the best part of the book, although I was disappointed to find no discussion, or even mention, of the catastrophe theory of caustics. Other topics include geometric quantisation, Yang–Mills fields and completely integrable systems – marred by a failure to point out that integrability is rare. It is interesting for physicists to read about the pure mathematics that their subject has stimulated; this book, however, reads too much like a stream of consciousness to be really useful for systematic learning. Moreover, the title is misleading and should refer to 'formulations' rather than techniques.

Michael Berry