

International Union of Crystallography

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Book Reviews

Works intended for notice in this column should be sent direct to the Book-Review Editor (R. O. Gould, Department of Chemistry, University of Edinburgh, West Mains Road, Edinburgh EH9 3JJ, Scotland). As far as practicable books will be reviewed in a country different from that of publication.

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Solid state science: past, present and predicted. Edited by D. L. WEAIRE & C. G. WINDSOR. Pp. xviii + 308. Bristol: Hilger, 1987. Price £35.00 (hardback), £15.00 (paperback).

This is an unusual and attractive book. It gives a readable and informative picture of ten distinct areas of present-day solid state physics, showing how these sciences got to where they are now. The selected areas are: diffraction; metallurgy; the Fermi surface; semiconductors; magnetism; superconductivity; critical phenomena; solid state optics; microelectronics; and solid state instruments. The chapter on diffraction is by Michael Woolfson. There is also a particularly interesting essay on the 'pre-history' of solid state physics. In a sense this is a book on the history of science; but it is written by physicists within these fields and its primary concern is the science itself. After outlining the technical and circumstantial details, it describes especially the drama and the human aspects of the development, as seen by the scientists who know the subject.

What is unusual is the division of the subject matter into these distinct subject areas, each of which is treated separately. Each of these chapters is thus a sort of cameo. Each starts with the state of knowledge in the early days of that subject, the theories at that time, and the personalities; then the advances, the crucial experiments, and the new theories are outlined, ending finally with the present-day outlook. The scientific coverage is necessarily somewhat sparse, but one learns a good deal and certainly finds a lot of interest in the essays in which one is not oneself a specialist. The book is very definitely recommended reading.

What is ironic is the manner in which the advances of science are so unpredictable, even by the best scientists. A book of this kind, venturing to point towards the future in each area, is almost inevitably going to miss something important happening directly after it comes into print. So, the essay on diffraction has missed 'maximum entropy', the

latest development in direct methods; and, much more dramatic, the chapter on superconductivity has missed out on the recent explosive discovery of the 'high-temperature' superconducting ceramics. Embarrassing? Not really. This just illustrates, superbly, what an exciting thing science is.

J. H. ROBERTSON

*School of Chemistry
University of Leeds
Leeds LS2 9JT
England*

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Quantum aspects of molecular motions in solids. Springer proceedings in physics, Vol. 17. Proceedings of an ILL-IFF workshop, September 24-26, 1986. Edited by A. HEIDEMANN, A. MAGERL, M. PRAGER, D. RICHTER and T. SPRINGER. Pp. xii + 221. Berlin: Springer-Verlag, 1987. Price DM 85.00.

This volume is a collection of papers on quantum motions in molecular crystals, metals and glasses. It has been divided into five sections, *viz* *Rotational tunneling I - Potentials and phonon interactions*; *Rotational tunneling II - Coupled systems*; *Rotational tunneling III - Surfaces*; *Isotope effect and matrix isolation*; *Translational tunneling and disordered systems*.

The first three sections largely comprise experimental papers. These papers show how inelastic neutron and Raman scattering, nuclear magnetic resonance, heat capacity and dielectric loss measurements can be used to deduce the potential experienced by the tunneling groups, their mutual coupling, and influence of phonons on their behaviour. They are intended to stimulate further theoretical and experimental work as they are generally open ended.

There are two reviews in the sections on rotational tunneling. The first covers the theory of rotational tunneling and