

Electronic energy bands in solids. By L. PINCHERLE. Edited by B. DONOVAN. Pp. ix + 196. London: Macdonald, 1971. Price £4.00.

Over the last few years there have been many books on the theory and description of energy bands in solids. It is not too surprising that such a vast and important topic should have produced so many books aimed at such assorted audiences. Professor Pincherle's book is not a specialised account for theorists but is an introductory text directed primarily at final year undergraduates and first year post graduates.

Basic concepts such as reciprocal space, zone schemes, density of states and Wannier functions are clearly explained and the chapter on the dynamics of carriers is concise and useful. The details of how one carries out an actual calculation are not apparent. Although the authors mention the major techniques such as A.P.W., KKR and cellular methods, he does not derive the secular equations which one has to solve to obtain the band structure in any given problem. The last chapter on the classification of bands contains much sound, practical information but the reader would need some familiarity with elementary group theory.

The scope of the book is far too narrow and it does not bring the reader up to date with the literature. It could perhaps be useful for, say, an M.Sc. course solely devoted to band theory but for four pounds, one can buy much more meat than is contained here.

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A review of the structure and physical properties of liquid crystals. By G. H. BROWN, J. W. DOANE & V. D. NEFF. Pp.94. London: Butterworths, 1971. Price £ 5.00.

This book provides a comprehensive and up to date review of the recent achievements in the liquid-crystal research field. The present state of knowledge of liquid crystals is discussed, documented and presented in a clear and authoritative form.

The properties of the liquid crystalline state are not yet clearly defined. For a thermotropic liquid crystal the mesophase between the solid and liquid phase has some properties of both the neighbouring phases – a long-range molecular order and a high motional freedom of the molecules. Liquid crystals are characterized by unusual physical properties, which are of importance in understanding both the liquid and the solid state. They are of significance in living systems and they offer new technological possibilities.

There has been a need for some time for a review of the considerable research activity in this field. This review is well planned and presented. Most of the basic theoretical approaches are included. Some models, although not plausible, have been included in order to present a complete picture. There is an enlightening chapter about the swarm and the presently accepted continuum theory which forms the bridge between the macroscopic observations and the microscopic molecular arrangements. Thermotropic as

well as lyotropic liquid crystals are classified according to their molecular structure as well as their molecular arrangement. The influence of external magnetic and electric fields on the molecular orientation and hydrodynamic patterns is described. The power and limits of various experimental techniques are enumerated and the results obtained are compared with various theoretical models. Liquid crystals can be used as an anisotropic matrix for high resolution n.m.r. structural determination of dissolved molecules and an account of this activity is also included.

The book is an excellent guide to the different well documented approaches to liquid-crystal molecular organization and its value is enhanced by the expert commentary. This review is strongly recommended to any specialist in this or any related field. The well selected and important basic facts which are combined in this single work, represent a tremendous help for the non-specialist who wishes to learn about liquid crystals. There are nearly 300 selected references and the titles of the last Liquid Crystal conference – Berlin, 1971 – are also included.

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The Raman Effect. Vol. 1. Principles. Edited by ANTHONY ANDERSON. Pp.ix+404. New York: Dekker, 1971. Price \$ 28.50.

This first volume of a two volume work contains six contributions. These include an historical introduction by R. S. Krishnan with a bibliography of general articles (dated as recently as 1971) on the Raman effect. The polarizability theory is reviewed by G. W. Chantry and Raman scattering from crystals by R. A. Cowley. The remaining chapters are concerned with instrumentation and techniques (C. E. Hathaway) including complete systems which are available commercially, the stimulated Raman effect (P. Lallemand) and Brillouin Scattering (R. S. Krishnan).

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New Developments in Electron Microscopy. Edited by H. E. HUXLEY and A. KLUG. Pp.230. London: The Royal Society, 1971. Price £10.50, U.S. \$27.00

A Symposium on new developments in electron microscopy was held at the Royal Society in 1970. 22 papers presented at that time and originally published in the Philosophical Transactions of the Royal Society comprise this handsome volume.

Whilst several of the contributions do not add materially to the previously published work of their authors, this book serves the very valuable function of bringing this work together in one place and in eminently readable format. More importantly, it delineates the 1970 frontiers of activity and