pansion. Many of these properties depend upon the non-harmonic character of atomic vibrations, and Professor Cochran provides brief but adequate discussions of phonon scattering by other phonons, by defects and crystal boundaries, so that the basic physics of each property can be readily appreciated. The similarities and differences between electrons and phonons and between neutron scattering and electron scattering are nicely brought out, as is the importance of the electron–phonon interaction. Finally, the connexion between lattice dynamics and phase transitions ('soft' modes) is very well described in relation to the general problem of phase transitions.

The treatment throughout the book is at a reasonably uniform and elementary level, though perhaps a little too condensed in some places. The newcomer to the subject might appreciate some expansion of the sections dealing, for example, with the reciprocal-lattice concept, anharmonicity and thermal conductivity. There are no explicit exercises for the student, but he is encouraged to work through some of the derivations and perhaps find a few 'deliberate mistakes'! (*e.g.* Fig. 3.4). This leads me to a relatively minor but general criticism of the book: the typesetting, alignment of margins and the overall appearance of some of the pages are somewhat below the average standards for scientific textbooks. There are also, inevitably, a few typographical errors which should be corrected in future editions. Nevertheless, at £2·30 for the paper-back version, this little book is an absolute 'must' for anyone starting to learn about the motions of atoms in crystals. Highly recommended.

G. DOLLING

Atomic Energy of Canada Ltd.
Neutron and Solid State
Physics Branch
Chalk River Nuclear Laboratories
Chalk River
Ontario
Canada K0J 1J0

Computed electron micrographs and defect identification. By A. K. HEAD, P. HUMBLE, L. M. CLAREBROUGH, A. J. MORTON and C. T. FORWOOD. Pp. x + 400. Figs. 133, Tables 22. Amsterdam: North Holland, 1973. Price U.S. $40.00.

For those who have followed the work of this Australian school the book holds few surprises. It is a review of their considerable contribution to the subject in recent years. However the book is in no sense a stringing together of published material, nor is it evident that the work is produced by several authors. In fact the presentation of the book has been very carefully thought out, with some excellent introductory chapters which will be particularly valuable for those coming to the subject for the first time. Computer programs, some of which have been freely distributed in the past, are here thoroughly introduced and explained and listings of the programs are given for cubic, hexagonal and tetragonal crystals. The text is illustrated with a rich variety of examples, although they are largely drawn from work on f.c.c. and b.c.c. metals and alloys with relatively little work on other crystal systems or on ceramic materials. Impressive agreement between experiment and theory is demonstrated. The authors are careful to emphasize the limitations of their technique though there is very little discussion of many-beam diffraction effects and no reference to weak-beam work. Moreover, the approach is essentially limited to straight dislocations, not too close to crystal surfaces, with distortions calculated from linear anisotropic elasticity theory.

As far as the identification of perfect dislocations is concerned some may feel that the philosophy of the Australian school is misguided. They deliberately examine situations of extreme pattern detail, using relatively thin foils, inclined dislocations and close reflecting planes. Apart from the fact that this approach is not applicable to layer structures many experimentalists will prefer to work with thicker crystals, mid-foil dislocations and widely separated diffracting planes where the problem is altogether simpler, and analytic expressions for elastic distortions can unambiguously provide the required information without recourse to elaborate calculations. However there can be little doubt about the value of the computed micrograph technique for studying the partial dislocations bounding stacking-fault configurations, and this problem is thoroughly discussed.

In view of its price this book will not be purchased without good reason but it must surely be available in the library of any laboratory regularly studying defects in materials and it will certainly prove most valuable in the training of research students.

J. W. STEEDS

H. H. Wills Physics, Laboratory
University of Bristol
Tyndall Avenue
Bristol BS8 1TL
England

Crystal structures - a working approach. By HELEN D. MEGAW. Pp. xviii + 563. Figs. 208, Tables 42. London: Saunders, 1973. Price £8.30

The results of a crystal structure analysis can be summarized in a set of data (space group, lattice parameters, atomic coordinates, *etc.*) which usually constitute an essential part of an original paper. The data are given together with a discussion of the methods used, of the reliability of the results and with a description of the structure as seen from the point of view of the author in its relation to the particular chemical, physical or purely crystallographic problem which led to the research. But it is possible to obtain a variety of views of a crystal structure, starting from the same fundamental data. To do this it is necessary to know how to interpret the conventional symbols and to be trained in dealing with crystal geometry. That is what the author of the book wants to teach and that is what the subtitle 'a working approach' means. Indeed the purpose of the book is to show how crystal structures ought to be looked at in order to obtain from them the particular information in which one is interested. The importance of this is self-evident since a knowledge of crystal structure is fundamental in interpreting many aspects of modern solid-state physics and chemistry.

The plan of the book is developed for that purpose. The first three chapters are introductory in character and deal with general concepts of crystal-structure building, interatomic forces in crystals and the lattice nature of crystals. In the third chapter a number of simple fundamental struc-