Book Reviews

Works intended for notice in this column should be sent direct to the Book-Review Editor (M. M. Woolfson, Physics Department, University of York, Heslington, York YO1 5DD, England). As far as practicable books will be reviewed in a country different from that of publication.

Crystal geometry. A set of transparencies for an overhead projector with notes for lectures.

London: ITL. Vufoils Ltd., 1970. Price Unit H1: 5 foils £2·75; Unit C1: 9 foils £3·90; Unit 2: 3 foils £1·65; Unit 3: 3 foils £1·60; Unit 4: 5 foils £2·25; Unit 5: 9 foils £3·63.

ITL Vufoils are diagrams related to a variety of topics, produced on transparent plastic, which can be used with an overhead projector. Several complete sets are available from the manufacturers or individual frame units may be purchased if so desired. Only the set of diagrams on crystal geometry will be reviewed here.

The diagrams are well produced on flexible, transparent plastic sheets, set in a more rigid frame for easy handling. There are several diagrams in each frame, arranged in such a way that only one may be viewed or any combination of them used as overlays and projected simultaneously as a composite diagram. The location of each overlay is quite positive and the plastic sheets are sufficiently robust to stand up to rather more than normal usage. Very brief though useful lecture notes are supplied with the Vufoils.

There are two frame units illustrating close-packed structures – one each for hexagonal and cubic, consisting of five and nine overlays respectively. The diagrams relating to cubic close packing are particularly good. They clearly illustrate the form of packing by using different colours for the atoms of different layers and quite convincingly show that the cubic close-packed structure is identical to the face-centred cubic structure. This is where the Vufoils will be found to be most useful as such diagrams never quite 'come off' when drawn hastily on a blackboard and ping-pong ball models are much too small to show to a large audience.

Three frame units cover the topic of unit cells in which the features of the fourteen Bravais lattices are illustrated and the unit-cell parameters defined. Primitive lattices are converted into centred lattices by the use of overlays, though the positioning of the lettering on the overlays is not always accurate. However, this is a minor blemish easily allowed for. The lecture notes define a lattice point as '. . . a point within a group of atoms such as the centre of symmetry or centre of gravity . . .'. So long as this information is not passed on to the students it does not matter, but if the notes are to be useful they should be accurate. To be fair, they give a more correct definition in the next paragraph. The reviewer would have liked to have seen diagrams illustrating the reasons why there are only 14 Bravais lattices, for example why we don't have a body-centred monoclinic lattice and why the face-centred and body-centred tetragonal cells are equivalent. This is only a personal preference, however, and their absence does not detract from the usefulness of the set of diagrams.

To complete the set on crystal geometry, there is one frame unit on Miller indices consisting of nine overlays. These diagrams are always difficult to draw so that their meaning is obvious and the Vufoils are quite successful in this respect. However, the diagrams are oriented solely towards the use of Miller indices for the description of crystal morphology and may have had a wider appeal if they also illustrated the diffraction planes which give rise to Bragg reflexions.

For lecturers whose artistic talents do not quite match their scientific abilities, these Vufoils should prove to be a valuable teaching aid.

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Martensite: fundamentals and technology.

Edited by E. R. PETTY. Pp. 205+xi. London: Longmans, 1970. Price £3·50.

Important as both research and scientific understanding may be in the current era they are not necessary precursors to technological innovation. For example, although the art and technology associated with the hardening of 'ignited iron' has been known to smiths since the early iron age some 3000 years ago it was not until 1861 that Sorby, followed by Martens and Osmond, used a microscope to identify those micro-constituents of steels which gave the basis for understanding this behaviour. Martensite is a name originally given to that constituent which involves a phase change from one crystal structure to another by means of shear-like processes which are accompanied by a systematic change of shape of the transformed region. The name is now commonly used generically to denote similar transformations in all pure or alloyed systems; the kinetics and other properties of these martensites can be very different and an exclusive definition is difficult. Martensitic transformations are of current interest both in new methods for processing steels and in the processing of the new metallurgical materials arising from the atomic energy and space industries.

The present book consists of eight chapters each written by different authors and is an outgrowth of a course of lectures originally given at what is now the Sheffield Polytechnic in November 1966. These lectures were intended for student lecturers, newer research workers and technologists. The chapters are: 1. *Introductory* (E. R. Petty), 2. *Basic crystallography and kinetics* (J. W. Christian), 3. *Experimental observations on the crystallography* (P. M. Kelly), 4. *Martensitic and massive transformations in ferrous alloys* (T. Bell), 5. *Martensitic and massive transformations in non-ferrous alloys* (R. D. Garwood), 6. *The strength of martensite* (M. J. Roberts), 7. *Tempering of carbon and low alloy steels* (F. G. Wilson), 8. *Controlled transformation and maraging steels* (P. Kovesi and G. B. Allen).

Matters of purely crystallographic interest are confined to chapters 2 and 3. In these chapters there is given, from both the theoretical and the experimental points of view, a very readable and non-mathematical account of geometrical relations between two cohering crystal structures (mechanical twinning is a special case). Structural information