Wilks, J. and E. *Properties and Applications of Diamond*. Oxford (Butterworth-Heinemann Ltd.) 1991. xii + 525 pp. Price £90.00.

Diamonds are used in a wide range of applications. Traditional uses rely upon its exceptional hardness and high thermal conductivity, e.g. in drilling for oil, machining motor car engine blocks, sawing quarry faces, grinding and polishing hard materials and drawing non-ferrous wires. Diamonds do not however all behave in the same way: there is considerable variability of properties from stone to stone, and even within the same diamond. So diamonds have to be chosen carefully for each particular job.

The combined experience of two life-times of research into the mechanical properties of diamond are distilled here into this book. John and Eileen Wilks can indeed be forgiven for emphasising diamond's mechanical properties (about two-thirds of the book) since these are the ones mainly exploited in industry. The promotion of their own research is understandable (though in places at the expense of the 'Cambridge School' of Bowden, Tabor, Brookes, Field and others). The copious lists of references (totalling nearly 1300) nevertheless allow the reader to follow up the arguments and they make this text-book useful for the student of diamond mechanics.

Much of the discussion refers to natural diamond, though synthetic material receives adequate treatment, including a chapter on man-made polycrystalline diamond. About 100 million carats (20 tonnes) of diamond are mined annually compared with about 300 million carats manufactured. Carefully controlled growth conditions result in a less variable product; and by doping with boron, the diamond can be made semiconducting. Making diamond from isotopically pure carbon bestows an even greater thermal conductivity.

Early chapters deal with mineralogy: mineral inclusions in diamonds, morphology, defects and cleavage. There are two good chapters on optical properties and luminescence. The subject of optical centres in diamond is very complex, with nitrogen in its various states of aggregation contributing several different absorption spectra, and with irradiation adding further complications.

Although the diamond structure is recognised (in section 1.5) as being two interpenetrating face-centred cubic lattices, the authors confuse matters by referring to this structure throughout the book as a lattice (with the atoms located on lattice points!). Their treatments of twinning and of stacking faults are erroneous. Figure 5.37 and the accompanying text (section 5.7a) rehearse earlier misconceptions. The examples given (section 6.1) of stacking sequences are impossible: *abcaabc* (stacking fault) and *abcabcabbacbacba* (twin). A layer cannot be immediately followed by the same lettered layer! Their examples of synchrotron radiation topographs are exceptionally poor and do not do justice to the technique.

The cover picture of a piece of impregnated diamond wire saw gives the clue to the major emphasis of the book; the exploitation of diamond's remarkable mechanical properties. Part II (160 pages) comprises detailed chapters on strength and fracture, fatigue, plastic deformation, techniques of polishing and shaping diamond, friction of diamond on diamond and on other substances; and the mechanical, electrical and thermal properties of polycrystalline diamond. Part III (180 pages) deals with mechanical wear and surface characteristics; turning, boring and milling; grinding, sawing and drilling; and miscellaneous applications. Here there is helpful practical advice on diamond tool making and tool setting to achieve the best surface finishes on workpieces. There is a useful list of applications of high-precision engineering but electronic applications are mentioned only on the last page.

The text has not been accurately proof-read and, like a real diamond, contains some minor imperfections: typographical errors and odd spellings. In the early chapters one would have liked more detail. For example, although the Raman spectrum of a diamond thin film is illustrated (Fig. 1.17) there is no mention in the text of the characteristic 1332 cm^{-1} shift in wavenumber. The book is well illustrated with over 400 figures (and two colour plates) and there is a good index.

M. MOORE

Howie, F. M., Ed. *The Care and Conservation of Geological Materials*. Oxford (Butterworth-Heinemann), 1992. 138 pp. Price £35.00.

To many people, academics and non-academics alike, geological samples are robust objects needing little to no maintenance and no special storage conditions. This is reflected in the general lack of published information on the care and maintenance of geological collections, and also in the scarcity of geological conservators. At present there are only 10 to 12 specialist geological curators employed in Britain's museums. However, as most geological curators know all too well, geological materials are indeed subject to