

section are not, and so we have to deal with two hierarchies of variation at once. The book would be worth having for this chapter alone.

Next there is a detailed treatment of projected images, as for instance dislocation lines as seen by TEM, and finally the author tackles what is conceptually the most difficult part of the subject, the quantitative specification of shape in three dimensions from the examination of section. The derivation of mean curvature in three dimensions from measurements on the section is particularly interesting, and so is the summary of topological relationships.

Throughout the book, formulae are given in a way that permits their immediate use; where they

are needed tables of coefficients are given. The reader may test his understanding by attempting the numerical exercises at the end of each chapter. He will be helped by the author's care in specifying the pros and cons of the various alternative ways of deriving particular parameters.

Now that various manufacturers are offering electronic scanning instruments with miniature computers to assess such features as two-dimensional volume fractions of phases, this book will be an essential piece of equipment in properly instrumented metallographic, ceramographic and histological laboratories.

R. N. CAHN

## Short Notices

### **Crystal Growth in Gels**

*Heinz K. Henisch*

Pp 111 (Pennsylvania State University Press, 1970) \$6.95

This short volume by the Associate Director of the Materials Research Laboratory at Penn State is the work of an enthusiast, who grows crystals because he loves them, needs them and wants to know why his methods work. Crystals grow well from hydrogels because the reactants diffuse slowly through the gels and because the rate of nucleation can readily be kept down. The author explains what crystals can be grown, how to do it, why gels behave the way they do, and concludes with a chapter full of unsolved problems. As he says, here is one field where "the scales are not completely weighted in favour of the deluxe experimenter".

R.W.C.

### **Materials Science and Engineering in the United States**

*Rustum Roy (editor)*

Pp 177 (Pennsylvania State University Press, 1970) \$9.50

This volume contains the Proceedings of the National Colloquy on the Field of Materials,

held at Penn State in April 1969. Various authors survey the development of materials science education in the US and Britain, the role of the US Federal Government in fostering it, the problems of administering large interdisciplinary projects, and the demands likely to be made on the subject (field, discipline, profession?) by future technological tasks in the US. The political accounts in particular make some interesting points, which is perhaps more than one can say for the quasi-theological convolution on matters of terminology. The acicular ballet of angels still, it appears, excites comment.

R.W.C.

### **Mechanical Behaviour of Materials under Pressure**

*Ed. H. W. D. Pugh*

(Elsevier Publishing Company Ltd). 785 pages £16

More and more industrial processes are making use of high pressure technology in the manufacture of materials and components, and this is a timely volume which seeks to cover the effects on the mechanical properties of materials subjected to pressures of up to 35 Kb.

Following a useful historical introduction to the subject there are specialist review papers

which cover the design of high pressure containers and the measurement of hydrostatic pressures.

The applications of high pressure to rocks, ceramics and metals are then reviewed, together with a thorough study of the effect on the elastic constants, creep and fatigue of metallic materials.

It is in the use of hydrostatic pressure to produce better extrusions and forgings and powder compaction that the more recent advances have been made and these are discussed fully in articles by H. W. Pugh, and S. Paprocki and E. Hodge. The final chapter in the book is devoted to explosive formation, and it covers both the effect on the mechanical properties and the microstructural changes. This is a very detailed reference book which should find a place on the library shelves of institutions with an interest in mechanical deformation and fabrication.

R. A. F.

### **Non Destructive Testing. Views, Reviews, Previews**

*Edited by H. B. Egerton*

Oxford University Press Atomic Energy Research Establishment Harwell. 223 pp. £2.50.

The subject of non-destructive testing has changed dramatically in the past decade, and the articles in this book, which is based on courses of

lectures delivered at Harwell, show how far the subject has developed.

In his introduction to the book R. S. Sharpe highlights the change in thinking "NDT is not just looking for cracks. It is rather a branch of materials science and is concerned with *all* aspects of quality and uniformity of materials". NDT is necessary because no material is perfect, and it is the task of NDT to detect and identify these deviations from perfection.

The initial sections of the book are concerned with the application of advanced electronics to the acquisition and presentation of NDT data and the implications for the design engineer and producer when this data is available.

The next series of articles indicate how NDT may be applied to a wide range of problems including the measurement of grain size, profile recording in the measurement of the bore of tubes, acoustic emission from materials. Other applications include the use of neutron radiography, television radioscopy and the extension of ultrasonic holography for describing defects in the depth of materials.

The final chapters are a series of reviews dealing with radioisotope techniques, ultrasonic probes, leak detection methods, and the inspection techniques for pressure vessels.

The book will appeal to both beginners wanting to learn about NDT, and to the experts who wish to understand some of the more recent methods now available, which are a far cry from the wheel tapper's hammer.

R. A. F.