Wave propagation in elastic solids. By J. D. ACHENBACH. (North Holland Series in Applied Mathematics and Mechanics. Vol. 16.) Pp. xiv+425. Amsterdam: North Holland; New York: American Elsevier, 1973. Price *f* 120.00 (about U.S. $46.20).

This book is concerned with stress wave propagation in elastic solids. The treatment is made on the basis of the classical Newtonian mechanics of deformable continua. The subject is one of active continuing interest, in both theoretical and applied physics. Its origins may be traced back to work by well-known 19th century mathematical physicists (beginning with Poisson, Ostrogradsky, Cauchy and Green) but today it forms just a particular part of the general subject of stress wave propagation in solids which now extends to include a whole variety of nonlinear, time-dependent or irreversible effects manifested especially at high stresses, or high strains, or high strain-rates.

The present book treats stress wave propagation primarily from the point of view of linear isotropic elasticity theory under the following chapter headings: One-dimensional motion of an elastic continuum. The linearized theory of elasticity. Elastodynamic theory. Elastic waves in an unbounded medium. Plane harmonic waves in elastic half-spaces. Harmonic waves in waveguides. Forced motions of a half-space. Transient waves in layers and rods. Diffraction of waves by a slit. Thermal and viscoelastic effects, and effects of anisotropy and nonlinearity. The text includes sections which describe relevant mathematical methods, such as integral transforms, asymptotics, stationary phase and steepest descent, and Wiener–Hopf techniques, and each chapter is supplemented by a set of problems. The book covers stress wave propagation in infinite, semi-infinite, layered and guided media, so that, in particular, Rayleigh, Love, Stonely, Lamb and Pochhammer-Chree waves and other newer types of waves are considered. The subject develops to include phenomena of radiation, reflexion, refraction, attenuation, dispersion and diffraction.

The final chapter draws attention to the limitations of linear isotropic elasticity theory and it gives an introduction to stress wave propagation in solids which show linear anelastic, linear viscoelastic, or nonlinear elastic effects. The book is extremely well written and the author, who is a well-known research worker on the present subject, has given particular care to questions of presentation and also to matters of detail, such as for example those in connexion with the procedures of linearization of the governing equations. It is intended for use as a reference book and as a textbook. In this reviewer's opinion, Professor Achenbach's book on *Wave Propagation in Elastic Solids* is to be warmly welcomed and to be strongly recommended to those with interests in this or neighbouring fields.

H. G. HOPKINS

Department of Mathematics
The University of Manchester Institute of Science and Technology
Manchester M60 1QD
England

Unit processes of extractive metallurgy. By ROBERT D. PEHLKE. Pp.xiv + 396, Figs. 117, Tables 21. Amsterdam: Elsevier, 1974. Price *f* 67.00, U.S. $25.80.

There are so few useful textbooks on extractive metallurgy that almost any new one must be welcomed for whatever variations in treatment of the subject it may have to offer. This one is to be commended mainly for its many worked examples of calculations which show how chemical thermodynamics can be used for solving industrial problems, full use being made of available interaction coefficients so that quite complex systems can be examined. Sometimes the methods are rather 'slick' and sometimes the answers are rather remote from reality but the techniques are well demonstrated and in this field it is the best book since Butt's *Metallurgical Calculations* in 1943.

The book deals mainly with chemical aspects of the subject in four chapters on pyro-metallurgy and one each on hydro-metallurgy and electro-metallurgy. There is also a chapter on 'melting, pouring and solidification' which deals with some of the physical aspects, but unfortunately ore dressing is virtually ignored. The treatment is generally hurried and superficial except where the opportunity to engage in some mathematical exercise has led to more detailed discussions of particular topics. Consequently the book is poorly balanced and ill-organized in such a way as would make progressive learning by an unguided student extremely difficult.

Each chapter has appended a set of 'Discussion Questions'. These can rarely be answered by reference to the text and indeed it would often be difficult to find the answers at all in print. There are also numerical problems set at the end of each chapter. The data for these is realistically assembled in an appendix at the end of the book, a feature which makes difficult problems look impossible. A final chapter on 'computer applications of extractive metallurgy' is associated with an appendix which consists of ten 'example problems and computer facilitated solutions'. Here again the text affords insufficient preparation to enable these solutions to be understood. The Fortran language used is not explained at all, although the introduction to computing seems to presume zero prior knowledge of the subject.

One has an impression that the author has used the text of this book as an introduction to his principal course of lectures, discussions and tutorials and that in this book we are given the appetizer only – we are stimulated but left hungry.

J. D. GILCHRIST

Department of Metallurgy and Engineering Materials
Haymarket Lane
Newcastle upon Tyne NE1 7RU
England