throughout are clear and well labelled. The choice of instruments for detailed description reflects the author's own special interests. Thus, polarization interferometers are covered in detail. The chapter on interference spectroscopy, however, deals mainly with Fourier transform instruments and dismisses the now widely used Fabry–Perot photoelectric spectrometer in half a page. (Displacement of the plates to produce optical path variation, far from being "much too coarse", is now nearly as common as pressure scanning.)

Transient interference beats and fringes from laser sources, and optical holography are concisely and clearly discussed, but experimental details in the chapters on thin films and multiple beam interference are somewhat sketchy. Nevertheless this book looks like becoming a standard undergraduate text.

D. J. BRADLEY

SOUNDS VALUABLE

Ultrasonic Machining of Intractable Materials

By A. I. Markov. Edited by E. A. Neppiras. Translated by Scripta Technica, Ltd. Pp. 350. (London: Iliffe Books, Ltd., 1966.) 63*s*. net.

THE book deals with the ultrasonic machining of hard brittle materials and the use of vibrations to assist in conventional grinding and cutting operations. It would appear that, in both these fields, the majority of research and development work has been carried out in Russia and it is of great value to have an English edition of the original Russian book.

The main section of the book dealing with ultrasonic machining first introduces ultrasonic vibrations in a simple and readily understandable way and then shows how these can be applied to machining. Chapters dealing in detail with the design of ultrasonic generators, acoustic heads and ultrasonic machine tools are included together with a very comprehensive and critical survey of research in the subject. The technology and industrial uses of ultrasonic machining are dealt with in a fundamental manner. The final section of the book is devoted to discussions of the benefits to be obtained by sonic and ultrasonic vibrations in drilling, grinding, thread cutting and turning.

In my view this book is an excellent example of how a technological subject should be treated; it is very readable and uses a fundamental approach throughout. The book will be of great value to those involved in teaching production processes and those in industry interested in the applications of modern developments in production techniques.

G. BOOTHROYD

RARE EARTHS

Progress in the Science and Technology of the Rare Earths

Edited by LeRoy Eyring. Vol. 2: Pp. 366. (Oxford, London and New York: Pergamon Press, Ltd., 1966.) 105*s*. net.

THE increasing use of the rare earths in industry is brought out in the well organized chapter (and extremely well arranged bibliography) on their uses and applications contributed by H. H. and R. M. Mandle. This chapter takes up nearly one third of the book, which covers mainly the work published from 1961 to early 1965. The other contributions are also written by acknowledged experts in the field. They are J. H. van Vleck, who writes on the molecular field model of exchange coupling in rare earth materials; A. H. Daane, on recent improvements in methods of preparing rare earth metals; E. F. Westrum, jun., on thermodynamic and magnetic properties of the rare earth chalcogenides and pnictides; R. E. Thoma, on the rare earth halides; W. Low, on some physical properties of mixed cation oxides; D. I. Ryabchikov and E. K. Korchemnaya, on rare earth metal complexes, which provides a review of recent Russian work; and G. Brauer, on structural and solid state chemistry of pure rare earth oxides.

The coverage in all eight chapters is comprehensive for the period concerned and the bibliographies are very good. Although the author index is satisfactory, the subject matter could have been indexed in much greater detail, so making it easier to pick out specific pieces of information. There is an appreciable number of typographical errors (for example, refs. *b* and *d* of Table 3, page 103), and although these are all trivial, they tend to irritate the reader, and, furthermore, data and spectra are plural.

Apart from these few imperfections, the book is well produced and should be very useful to those interested in the field.

K. W. BAGNALL

FLOW OF FLUID

Fluid Mechanics of Internal Flow

Edited by Gino Sovran. (Proceedings of the Symposium held at General Motors Research Laboratories, Warren, Michigan, 1965.) Pp. xi+336. (Amsterdam, London and New York: Elsevier Publishing Company, 1967.) 135*s*.

INTERNAL flows, although of great technical importance, have in recent years barely received the same fundamental treatment afforded their more overtly aeronautical counterpart, the external flows about bodies. The problems they pose, however, are frequently as interesting and often more difficult, as the proceedings of this symposium, ably edited by Dr. Sovran, display.

Many facets of the subject are dealt with: turbulent boundary layer development, secondary flows and the behaviour of diffusers, characteristically from a fundamental standpoint by an imposing list of authors including such names as Ackeret, Rotta, Kline and Hawthorne. While certain of the papers, notably those dealing with boundary layer transition and turbulence, could equally well have appeared in a symposium on external flows, they mostly bear the stamp of freshness (often lacking in the modern ploy of binding symposium papers between hard covers!) and, because of their incisive scientific approach to the subject, provide stimulating ideas for further investigation.

One very welcome (and unusual) feature of the book is the relevance of the open discussions that appear at the end of each paper. These discussions make informative and occasionally delightful reading; like the diatribe by Dr. Liepmann against the random nature of turbulence research—"it cannot be done by one Ph.D. student followed by another Ph.D. student followed by another Ph.D. student, because they'll never agree".

This is a book that can be recommended to workers concerned not only with internal flows but with fluid mechanics generally.

P. R. OWEN

NEW IONS FOR OLD

Ion Exchange

A Series of Advances. Edited by Jacob A. Marinsky. Vol. 1. Pp. xi+424. (London: Edward Arnold (Publishers), Ltd.; New York: Marcel Dekker, Inc., 1966.) 135*s*. net.

WE are told in the preface to this book that "Speculation was sought from each of the distinguished authors of this volume to provide each chapter with a broader base than a technical paper and also to enable each chapter to be