Fourier transforms and their physical applications. By D. C. CHAMPENEY. Pp. x + 256, Figs. 26, Tables 16. Techniques of Physics Series No. 1. London: Academic Press, 1973. Price £5·20.

My reactions to this first volume of the 'Techniques of Physics' series are somewhat mixed. Perhaps this should not be too surprising as the author has set himself the almost impossible task of writing a single book of moderate size which will serve 'both as an introduction and as a reference book for those whose work brings them into contact with the subjects, be they advanced undergraduates, postgraduates or others'.

The plan is straightforward; about a third of the book is devoted to introductory theory and the remaining two thirds to applications in electrical systems, to information retrieval, and to optical, X-ray, neutron and electron diffraction. The choice of topics is good and I certainly applaud the notion of using the wide range of applications to enable students to bring the equations to life and to see how the various concepts have such wide validity. As a reference work it is of great value and I particularly liked the beautifully drawn table of one-dimensional Fourier transforms which I would place among the most useful 20 pages in any text on this subject that I have seen for a long time. What a pity that the table of two-dimensional transforms confines itself to equations: a corresponding series of drawings – or photographs of optically-derived transforms – would have widened the usefulness and appeal of the book enormously. Indeed the very small number of drawings and the complete absence of any photographs in a book dealing with experimental applications in optics, holography, X-ray diffraction *etc.* seems to me to be an unfortunate feature.

The chapters on optical and X-ray diffraction – which I freely admit are those to which I turned first – seem disappointing and contain ideas which I find obscure. As an example, the reference on pages 148–149 to the idea that diffraction at one-dimensional objects occurs in two-dimensional space and the conclusion that the results cannot be extended to X-ray diffraction by three-dimensional objects since this would involve four-dimensional space leaves me thoroughly confused and leads the author to miss some splendid opportunities for extending the ideas of unification. I was also disappointed to find a brief – and somewhat odd – reference to Fourier synthesis using a 'large array of loudspeakers each emitting a harmonic wave' on page one and then no further reference to applications in acoustics though this would seem to be an admirable field for illustrating many of the one-dimensional ideas. My final criticism is that there are no references to original papers and the bibliography is short and very limited.

Perhaps most of my comments reflect my own biased view. The whole subject of Fourier transformation is of such elegance and the range of applications so wide that personal preferences are bound to colour one's view. This is a most valuable addition to the literature of the subject and I shall certainly keep my copy close at hand for reference.

C. A. TAYLOR

Department of Physics
University College
P.O. Box 78
*Cardiff CF*1 1*XL*
Wales

Laser theory. Edited by FRANK S. BARNES. Pp. ix + 469, Figs. 242. New York: IEEE Press Selected Reprint Series, 1972. Price £7·50 (cloth), £3·75 (paper).

When Dieter Röss's book on lasers, light amplifiers and oscillators by was translated into English in 1968, he took the opportunity of up-dating the references. There are 4310 of them in the English edition. It is unusual for a lecturer to quote all of these in a course on lasers. Out of any such comprehensive collection however, there emerge a number of papers which form true landmarks of the development of the subject, papers of which the free supply of reprints from the author have long since dried up, and which provide work for the Xerox machine annually in departments where lasers are studied. *Laser Theory* is a collection of just such papers, tracing the development of the major ideas in laser theory since the early fifties. In six sections – Historical, Resonators, Oscillators, Amplifiers, Modulation and Mode-Locking, and Noise, it gives a remarkable perspective of the whole field of laser theory. The selection of only 37 papers from the deluge of the period up to 1971 (the latest date appearing) can have been no easy task. No two editors would probably agree *precisely* on such a selection, but there would be few indeed who would not have included the majority of the papers in this volume. Useful.

O. S. HEAVENS

Department of Physics
University of York
Heslington
*York YO*1 5*DD*
England

Internal friction of structural defects in crystalline solids. By R. DE BATIST. Pp. xii + 490, Figs. 180, Tables 28. Amsterdam: North Holland, 1972. Price *f*120.00 (*ca.* $37.50).

This book is the fifth in the series *Defects in crystalline solids*, edited by S. Amelinckx, R. Gevers and J. Nihoul. Elastic waves in a real crystal interact with point defects, dislocations and internal surfaces, leading to internal friction: a dissipation of energy which accompanies the strain response of a solid to a stress. The effect provides a powerful tool for the study of defects in solids, and one which has been extensively developed and applied in the past two decades. Not a few of these contributions have been made by the author of the present volume. Broad coverages of the interactions of phonons with both intrinsic 'lattice' properties and defects are available – the series *Physical acoustics*, edited by W. P. Mason, for example. The present volume is unique in providing thorough and balanced coverage of the principles, experimental procedures, and review of the experimental results of internal friction studies.

The book is well planned and organized. It opens with a brief (34 pp.) review of the nature of crystalline solids, point defects, tensor representation of elastic properties, and planar defects. This summary is superficial. Crystallographers, in particular, will be disappointed to find mention of only a few simple structures, and at encountering, the all-too-familiar reference to interpenetrating cubic lattices'. The coverage of point defects is correspondingly thin. The discussion of tensors and elasticity is too terse to