which the transient responses of large classes of circuits are actually exhibited and discussed in the time domain, though of course transform methods are used extentively (and effectively) throughout. Since the impulse response (in the time domain) is a linear transform of the transfer function (in the frequency domain), this method of approach illuminates the physical significance of various types of transfer function behavior.

The book opens with a description of Fourier and LaPlace transforms, buttressed by a mathematical appendix on functions of a complex variable. Examples are given of the transforms of several types of pulses, and sampling effects are discussed.

The next four chapters are then devoted to two-terminal-pair networks (thereafter referred to as fourpoles, the due qualification being stated). The relation between the impedance matrix and the general fourpole parameters is established and used extensively in the subsequent development. The transient behavior of simple fourpoles is discussed, including modulation problems. Wave filters are then discussed both in the frequency and time domains, and examples given of analogous mechanical and thermal problems. The problem of distortion and of idealized networks is dealt with in a most perspicuous way, tying together Küpfmüller's studies of idealized networks, the Bayard-Bode relationships, and corrections for distortion. The final chapter of this section is concerned with active fourpoles (vacuum tubes, transistors, and amplifiers).

The remainder of the book is devoted to transmission lines. The transmission equations are derived in several ways, and the approximations involved are discussed. This is followed by a description of the behavior of traveling waves on lossless lines, and also a standing wave analysis of such lines. An extended discussion is then given of the telegraph cable, containing a careful analysis of the mathematical details, which illustrates clearly the application of LaPlace transform techniques to diffusion type equations. The final chapter deals with the effect of small losses in transmission lines.

Worked out examples are interspersed throughout the text, and each chapter is followed by a number of problems. The format of the book is pleasant and the style lively. It should prove both useful and interesting to anyone having any technical contact with circuit theory.

Reports on Progress in Physics. Vol. 19, 1956. Editor, A. C. Stickland. 367 pp. The Physical Society, London, England, 1956. £2 10s. *Reviewed by S. F. Singer, University of Maryland.*

Every year the Physical Society of London issues a volume containing a number of specialized review papers, each in itself complete, covering the broad field of physics, including applied physics and often geophysics. Because of the wide range of topics it is extremely difficult to write a critical review; it is also very unlikely that many persons would be interested in all of the papers. One, therefore, either subscribes to

the series, receives it every year, and then has a nice library, covering after a few years the topics in physics which are on the forefront of research; or one might merely be interested in one or two specific papers. For this purpose I will briefly describe the contributions in the volume.

G. H. A. Cole of University College, London, writes a 36-page paper on The Kinetic Theory of Monatomic Liquids at Ordinary Temperatures. He puts particular emphasis on a description of nonuniform systems by methods recently developed by workers in statistical physics. A 42-page paper by J. P. Blewett, Brookhaven National Lab, deals with the proton synchrotron and describes the parameters of the three outstanding machines, the Birmingham 1-Gev, the Brookhaven 3-Gev and the Berkeley 6-Gev accelerator. The last part of the paper is given over to a description of new projects using alternating-gradient focusing and the fixed-field alternating gradient principle. A short paper by L. H. Ahrens (26 pages) of Oxford University, deals with Radioactive Methods for Determining Geological Age. It reviews publications and results of the last several years. A more extended paper (49 pages) by H. Y. Fan of Purdue University, deals with Infrared Absorption in Semiconductors giving both experimental results and theory, with a particular description of data on germanium and silicon, indium antimonide, and tellurium.

A relatively new topic is treated by O. K. Mawardi of MIT in a paper (31 pages) on Aerothermoacoustics (generation of sound by turbulence and by heat processes). This matter has some practical importance for the understanding of acoustical phenomena associated with aircraft sounds, and differs quite distinctly from sound production by the vibration of solids. The longest paper is by J. A. Ratcliffe of the Cavendish Laboratory, Cambridge, who deals with Some Aspects of Diffraction Theory and Their Application to the Ionosphere (80 pages). The first half of the paper discusses the mathematical methods of Fourier transforms and autocorrelation functions, and their application to the solution of diffraction problems. The author tries to emphasize the physical terms rather than the mathematical methods. G. H. Tait of the Atomic Energy Research Establishment, Harwell, has written a paper on Some Topics in Neutron Diffusion Theory (29 pages). A paper on New Lens Systems by C. G. Wynne of Wray Ltd., Bromley, Kent, is concerned with the description of new optical materials and processes, as well as lens systems. The article has an extensive list of references and patent listings (27 pages). The last paper, by R. O. Davies of Queen Mary College, London, deals with the Macroscopic Theory of Irreversibility (41 pages). Part I considers complete systems under nonuniform conditions, such as flow; Part II considers incomplete systems under uniform conditions (relaxation) and gives some applications of relaxation theory.

For a member of the Physical Society this book is a publishing bargain since it only costs around $3.80. Nonmembers pay about twice as much and are still

getting a bargain, for the execution of the book, in binding, printing, and in figures, is excellent. I wonder, however, to what extent this type of approach will hold its own with the increasing number of more specialized and more coherent annual volumes entitled: "Advances in . . .", or "Progress in . . .", or "Annals of . . .", each of which deals only with a small field of physics, such as nuclear physics, or cosmic rays, or solid-state physics.

Elements of X-Ray Diffraction. By B. D. Cullity. 514 pp. Addison-Wesley Publishing Co., Inc., Reading, Mass., 1956. $10.00. *Reviewed by R. Smoluchowski, Carnegie Institute of Technology.*

This book offers a very thorough but also a very elementary presentation of the basic elements of x-ray diffraction and its applications. It will be most useful to various x-ray laboratory technicians, and, in teaching, it will be suitable for an undergraduate course in x-ray crystallography for metallurgical engineers. In the reviewer's opinion it is not sufficiently advanced to serve as a textbook either for chemistry or physics students or for graduate students in metallurgy. This limitation stems from the fact that, apart from a short appendix, the notion of the reciprocal lattice is not used and that the powerful rotating crystal method is only briefly treated. Apart from this (planned) restriction the book is very well written, covers the ground in a systematic manner, and is very neatly published. Illustrations are numerous and excellent.

The book consists of three sections: fundamentals (4 chapters), experimental methods (3 chapters), and applications (10 chapters). The first two comprise less than half of the text so that the accent, quite rightly, is placed on applications. Of particular value are the excellent chapters on diffractometric techniques, on single crystal orientation, on texture determination, on chemical analysis, and on stress measurement. Of special pedagogical value are problems appended at the end of each chapter and a set of answers to these problems at the end of the book. The book can be highly recommended to all who, without special background, want to become acquainted with x-ray crystallography.

Physics for Everybody. By Germaine and Arthur Beiser. 191 pp. E. P. Dutton and Co., Inc., New York, 1956. $3.50. *Reviewed by Walter C. Michels, Bryn Mawr College.*

It is indeed unfortunate that public understanding of our profession has been deteriorating just at the time when the research activities of physicists have been undergoing a mushroom-like growth, when our national interests demand the education and wise use of increasing numbers of physicists, and when the physical sciences have become an essential and pervasive part of our culture. In contrast with the present, physics was far better understood in the two decades that preceded