Progress in Dielectrics, Volume 2. Edited by J. B. Birks and J. H. Schulman. 225 pp. John Wiley & Sons, Inc., New York, 1960. $9.50. *Reviewed by Stuart A. Rice, Institute for the Study of Metals, The University of Chicago.*

UNLIKE its predecessor, this volume contains five articles of basic interest and one more closely related to applications. The first article, dealing with the theory of polarization and absorption in dielectrics, is a rather nice survey, although very condensed. It would have been interesting to have more material on crystalline dielectrics than is given. In the example quoted on ionic solids, the work of Hanlon and Lawson has been overlooked. The second article, dealing with dielectric properties of pure polymeric systems, supplements the recent review by de Brouckere of the dielectric behavior of polymer solutions. The next article deals extensively with the effects of radiation on polymers, but mentions the connection with electrical properties only in passing. A fascinating survey of the dielectric properties of glass constitutes the fourth article, and the final article provides an introduction to the use of conductors to construct artificial dielectrics in the microwave region of the electromagnetic spectrum. The one article of an applied nature deals with high permittivity ceramics for capacitors.

It is the reviewer's opinion that if future review articles will be longer and more detailed, provided that the trend in content established in this volume is maintained, this series will serve a useful purpose in providing collected references and compact reviews.

Mechanical Radiation. By Robert Bruce Lindsay. 415 pp. McGraw-Hill Book Co., Inc., New York, 1960. $10.00. *Reviewed by T. Teichmann, General Atomic Division of General Dynamics Corporation.*

THE consideration of scientific topics in terms of certain characteristic physical and mathematical phenomena (e.g., symmetry, oscillations, etc.) has proved extremely successful in microscopic physics. There has recently been a welcome tendency to expand the applications of this approach in macroscopic physics, and Prof. Lindsay has addressed himself to the problem of mechanical radiations in matter.

The introduction contains a mathematically elementary exposition of wave motion, which progresses before long to variational and Lagrangian methods, and is distinguished by frequent significant physical allusions. Geometrical properties of progressive waves (reflection, refraction, etc.) are discussed, as are normal modes, impedance, and scattering.

The applications include the behavior of elastic waves of various kinds in string membranes, rods, and plates, as well as waves in incompressible and compressible fluids, including shocks. An interesting feature is the discussion of waves in moving and inhomogeneous media. The effect of molecular structure on various aspects of wave behavior in matter, such as sound absorption, optical scattering, and

viscoelasticity, is considered in some detail. Electromagnetic and magnetohydrodynamic waves are, however, dealt with only in passing.

The over-all scope of the book, ranging from the gross to the atomic aspects of matter, is admirable, though it is somewhat disappointing that more attention could not have been given to electromagnetic phenomena and to the symmetry properties of plane waves. The mathematical aspects have been kept under firm control, and a unified and interesting view of a number of separate phenomena has been presented.

Basic Data of Plasma Physics. By Sanborn C. Brown. 336 pp. The Technology Press of MIT and John Wiley & Sons, Inc., New York, 1959. $6.50. *Reviewed by S. F. Singer, University of Maryland.*

THE subtitle really tells the story: "Fundamental Data on Electric Discharges in Gases" is the subject, and not plasma physics, as it is generally understood. Aside from the misleading title, the book is a most useful compendium of fundamental data and brings together results from a vast range of literature, extending back in time some 30 years. About two thirds of the book is given over to the discussion of elastic collision cross sections, charge transfer cross sections, diffusion of electrons and ions, inelastic collisions of electrons, electron attachment, and recombination. The rest of the volume deals with more complicated phenomena, in particular with breakdowns controlled by either diffusion or electron attachment or secondary electron emission, and with various types of discharges. The book has been carefully edited to contain what is useful to the modern worker in the field. As a consequence, many original sources are used but no effort is made to be encyclopedic.

In spite of the excellent coverage of many important phenomena, there are some omissions. Inelastic electron collisions are discussed briefly, but the results of the impacts are not given; for example, I wanted to find out what sort of excitation photons would be produced in the aurora by electron impact and could find no reference to it. Neither does the book go into detail on interactions of electrons with surfaces except for a brief section on secondary electron emission. These omissions, however, detract only in a minor way from the excellent discussion and tremendous amount of solid information contained in the book. One may hope that the author will be persuaded by the success of the present volume to expand his next edition.

I particularly liked the handling of the material. There is enough explanatory matter between the tables and graphs to enable one to use them with some judgment. On the other hand, the author does not try to write a treatise so that one can arrive at the needed data rather quickly. I should imagine that this is the sort of useful reference which is required by workers, not only in the field of gas discharges, but also in astrophysics, thermonuclear reactions, and upper-atmosphere and space physics.