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ideas rather than just the formalism.

Part Three, "Special Approaches," which includes "Nuclear Models," "The Visual Appearance of Rapidly Moving Objects," "How Light Interacts with Matter," "Fall of Parity" and "The Role of Symmetry in Nuclear, Atomic, and Complex Structures," addresses itself to an even larger audience. Weisskopf admirably succeeds in explaining these topical questions without any mathematics at all.

Part Four, entitled "General Essays" includes "Man and Nature," "Marie Curie and Modern Science," "Science and Ethics" and "The Significance of Science" and is, perhaps, even more characteristic. Here we finally encounter a first-rate physicist who has not only given serious thought to the problems of science and society and of the responsibility of scientists—many of us have—but who is also able to state his ideas articulately and convincingly. Unfortunately it is doubtful whether these essays will ever penetrate to government officials and politicians, who will probably be scared off by the more technical parts of the volume. I wonder whether there might be some point in reprinting these final essays—with perhaps one or two of the others—as a thin brochure.

The book is clearly printed and of convenient size, which adds to the pleasure of reading and rereading.

H.B.G. CASIMIR

*Philips Research Laboratories
Eindhoven, Netherlands*

Compressible-Fluid Dynamics

P. A. Thompson

645 pp. McGraw-Hill, New York,
1972. \$17.50

For many generations of students the standard textbook of gasdynamics has been H. W. Liepmann and A. Roshko's

FOR TEACHERS OF INTRODUCTORY SCIENCE AT THE COLLEGE LEVEL

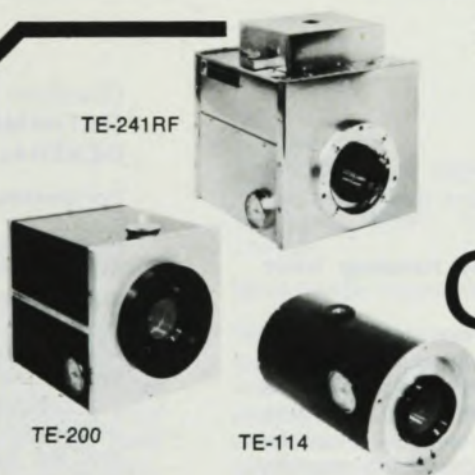
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Elements of Gasdynamics. This text, with its succinct exposition and stress on fundamentals rather than technique, has a balance between detail and generality that other more recent writers have found difficult to improve upon. Another excellent text of about the same vintage and durability is A. H. Shapiro's *Compressible Fluid Flow*. However, because of its greater scope and bulk (2 volumes and 1185 pages) Shapiro's book has often been relegated for use as a reference rather than a basic text.

Now Philip A. Thompson, a one-time student of Shapiro, has produced a new textbook, *Compressible-Fluid Dynamics*, which not only has the best of Liepmann and Roshko's succinct and readable style, but significantly improves upon that book with a more balanced coverage of material.

The book begins with an introduction to the equations governing fluid motion and the thermodynamic principles that are involved. Included in this section is a brief introduction to the kinetic theory of dilute gases and the mean-free-path model for the transport properties. A whole chapter is then devoted to similarity principles (a subject that cannot be overemphasized in fluid mechanics) and to order-of-magnitude estimates of the terms in the conservation equations. The subject matter proper begins with a thorough coverage of physical acoustics. There follows a discussion of steady compressible flows, which includes linearized two-dimensional flows, one-dimensional flows, duct flows with friction, shock waves, detonation waves, and so on. One-dimensional unsteady flow is then introduced, with a clear exposition of the method of characteristics. The treatment is taken to the point where an analysis of shock tube performance is given. The author then returns to steady flows, dealing with plane and axisymmetric problems by the method of characteristics. There is also a chapter on self-similar motions in gasdynamics. This is most welcome in a basic text, since many of the paradigm problems in fluid dynamics (for example, Rayleigh's problem, the boundary layer, intense explosions) are self-similar. The book concludes with a quite thorough discussion of various analogs to compressible flow. The material is chosen coolly to include all the essential fundamental aspects of gasdynamics, without the burden of the more esoteric subjects like very-high-temperature phenomena.

This is an eminently readable book, well organized as a text. Tidbits of historical information give a nice flavor to many of the introductory paragraphs. The line diagrams are chosen not only to illustrate the idealized

mathematical treatment in the text, but also to help the student visualize the real phenomenon it represents. The many photographs of real flows are also most helpful in this regard. Each chapter contains many examples and good exercise problems at the end. In short, it is an admirable text for a first course in gasdynamics on the senior or graduate level.

AIN A. SONIN

Massachusetts Institute of Technology
Cambridge, Mass.

High-Energy Electromagnetic Processes in Condensed Media

M. L. Ter-Mikaelian

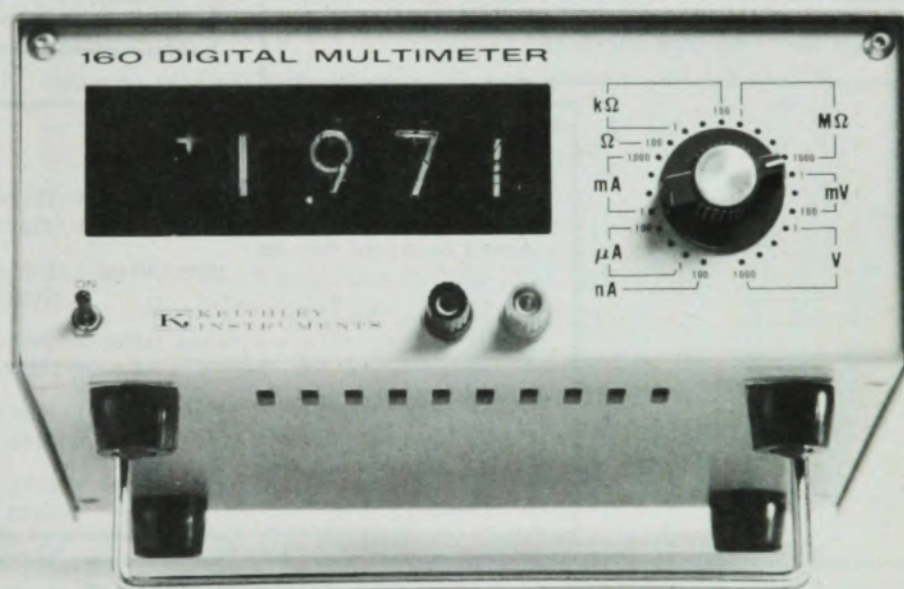
457 pp. Wiley, New York, 1972. \$27.50

It is an amusing apparent paradox that, at ultrahigh energy, processes such as electron bremsstrahlung or electron-positron pair production are affected by the interatomic and even macroscopic dimensions of the material in which the process occurs. The paradox is explained by the observation that at very high energies the mass of the electron plays a fractionally smaller role in the energy-momentum conservation laws. Very roughly, the momentum exchanged with the medium is of the order of Me^2/ϵ (Me = electron mass, ϵ = characteristic bombardment energy). For electrons in the multi-GeV range the characteristic distance corresponding to this momentum is much larger than interatomic distances; for bremsstrahlung of x rays this characteristic distance is even larger—enough to be in the macroscopic range. This book is primarily a compendium of the theory of, and some experiments on, such remarkable phenomena.

The calculations of high-energy electron-photon processes are laborious when done exactly; the author has chosen to solve the problems by the Weizsäcker-Williams method in which the electric field of the medium is transformed into an expansion of pseudophotons seen by the fast particle. The method leads to easier calculations and gives a nice insight into the mechanisms of the effects. The author devotes a great deal of care to examining the limits of applicability of his derivations and the physical processes surrounding the mathematics.

He covers coherent bremsstrahlung and pair production from a crystal. He treats "resonant radiation" in which the proton, equivalent to repeated macroscopic layers of material, bounces off the fast particle to become an x ray. He investigates the changes

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