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plemented with concise mathematical analysis. Numerous line drawings and photographs add to the clarity of the presentation.

This fine book should be of interest not only to the acoustic specialist, but also to any serious student of the broad field of fluid physics.

UNO INGARD

*Massachusetts Institute of Technology*

## Theoretical Magnetofluidynamics

By H. Cabannes.

(Trans. by M. Holt.)

233 pp. Academic, New York, 1970. \$12.50

Magnetofluidynamics is the study of conducting fluids moving through electromagnetic fields. The bulk motions of highly conducting fluids such as liquid metals, thermonuclear fusion plasmas and ionized gases of cosmic dimension can be described approximately by the magnetofluiddynamic equations of motion. However, in many practical situations the approximations are inadequate, and numerous efforts are now being made to improve the original magnetofluiddynamic equations by including multifluid and nonequilibrium effects associated with multiple temperatures, partial ionization, radiative losses and so on.

Henri Cabannes developed this book from his lectures given at the University of Paris. The present book is the English translation of the 1969 edition. It contains a very readable summary of classical material abstracted from several decades of research papers, monographs and texts, with only a few references covering the past five or six years.

The magnetofluiddynamic equations of motion are formulated from a macroscopic point of view in the first chapter. The notation and derivation are clear, but discussion of the range of application of the final equations is rather sparse. For instance, the possibility of tensor transport coefficients is mentioned nowhere, nor is the limitation to relatively low frequency phenomena considered.

By the second chapter the author has committed the reader to a rather mathematical point of view. The treatment of propagation of small disturbances is concise and is followed by a discussion of simple waves based on the theory of characteristic manifolds. All experimental information, technical applications and research problems have purposefully been omitted. Unfortunately there is also less physical reasoning than one would expect from material presumably selected to help develop a student's physical intuition

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for the subject.

Magnetofluidynamic shock waves and detonation-deflagration waves are studied in considerable detail in the third and fourth chapters. Realistic, stable waves are chosen from the plethora of mathematical solutions and their structure is examined in a qualitative but convincing manner. The wedge and piston problems are discussed in some detail with a useful section on necessary conditions for well posed initial-boundary value problems. This includes a proper accounting of converging and diverging characteristics. The study of one-dimensional MFD flows concludes with a discussion of unsteady nozzle flow and a few pages at the end on steady MFD flow in ducts with circular cross-sections.

The last chapters concern flow past a flat plate, with considerable attention devoted to the simplification and solution of the flow equations. Flow past a magnetized sphere and flow past slender, aerodynamic bodies (for example, thin wings in aligned-field and crossed-field flows) for both compressible and incompressible fluids are presented in similar fashion. Unusual magnetofluidynamic effects are found in these otherwise classical aerodynamic problems including special upstream wakes in the subalfvenic regime.

One cannot expect a book of this length to compete as the principal text for a graduate course in magnetofluidynamic theory, when several more complete books, some in excess of 500 pages, have recently been published in this field. References have not been included in the text, which makes the book a little clumsy to use. However, references are mentioned in the preface and listed at the end of the book by chapter. This book is probably most suitable as a supplementary text for a graduate course in magnetofluidynamics because of the several classical flow problems presented in detail by the author.

Robert Taussig  
Columbia University

### General Physics

By G. J. Aitchison

522 pp. Barnes and Noble, New York  
1970. \$9.50

"Why write another textbook for a general first-year, calculus-based physics course?" This is the question that the author raises in his preface. The answer is that there is no text suitable for the one-year terminal course in the Australian system. A quick look at the table of contents reveals that only 43 pages are devoted to the entire subject of particle kinematics and dynamics. All of electricity and magnetism including some nonstandard topics takes less

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