

Kinetic Theory

Mathematical Methods in Kinetic Theory. By Carlo Cercignani. Plenum Press, New York, 1969. v and 227 pages. \$15.00.

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THIS book summarizes recent work in two closely related areas of the kinetic theory of gases: the mathematical properties of

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the linearized Boltzmann collision operator, and the application of this operator, or simple model versions of it, to boundary problems such as Couette flow. In each of these areas, the main points of the theory are clearly presented and there are sufficient references to more detailed discussions in the literature. Especially interesting are the sections devoted to the application of the Bhatnagar, Gross, Krook equation. There is no discussion of the nonlinear Boltzmann collision operator, or of the kinetic theory of dense gases. However, the book is a good introduction to the area of kinetic theory with which it is concerned.

Creep Problems

Creep Problems in Structural Members. By Yu. N. Rabotnov. English translation from the Russian. Edited by F. A. Leckie. North-Holland Publishing Company, Amsterdam, and John Wiley & Sons, Inc., New York, 1969. xiv and 822 pages. \$39.00.

REVIEWED BY W. PRAGER²

THE original Russian edition of this comprehensive treatise appeared in 1966. The availability of an English translation will be appreciated by all engineers concerned with the analysis of creep problems in structural members. The author uses the term "creep" in a very broad sense comprising "the totality of effects which can be explained on the assumption that the relationship between stress and strain is time-dependent, either ex-

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PLICITLY or in terms of certain operators." To make the presentation reasonably self-contained, three introductory chapters are included that deal with fundamental concepts of solid mechanics, and the theories of plasticity and linear viscoelasticity. Chapter 4 presents the basic experimental facts and theories of uniaxial creep. The next six chapters deal with various aspects of steady-state creep under combined stresses. Chapter 5 discusses various theories and their adaptation to experimental results. Chapter 6 is concerned with long-term strength at elevated temperatures. Chapter 7 is devoted to general theory with emphasis on questions of uniqueness and stability, and on variational formulations. In Chapters 8, 9, and 10, the theory is, respectively, applied to bending and torsion, plane axially symmetric problems, and plates and shells. Chapter 11 is concerned with transient creep, and Chapter 12 with geometrically nonlinear problems. Throughout the extensive work, the exposition is clear and very easy to follow. The translation is of high quality.