

problems are very judiciously chosen and cover a very wide area of applications. I do not know of any other example of extensive choice of problems in electron-microscopy practice.

While the price is somewhat high, I would like to recommend this book without any reservations. Its contents are so excellent and the book is so well presented that close to thirty dollars is not too high a price.

Gas flows

INTRODUCTION TO PHYSICAL GAS DYNAMICS. By Walter G. Vincenti and Charles H. Kruger Jr. 538 pp. Wiley, New York, 1965.

by T. Teichmann

Although the classical equations of gas dynamics are the direct consequence of the underlying atomic and molecular interactions and their statistical combination, it is only in recent years that this relation has come to have more than academic and conceptual interest. The practical importance of high-speed, high-temperature and low-density gas flows has impelled consideration both of the physical significance of the quantities occurring in these classical equations, and in the degree of approximation to reality. Kinetic phenomena and transport processes of all types have thus begun to play an important role in expositions of modern gas dynamical situations.

In this book, the authors, who are members of the Aeronautics and Mechanical Engineering Departments at Stanford University, have set out to describe the foundation of high-temperature and nonstationary gas flows with particular reference to the underlying physical phenomena. Most of the contents are therefore devoted to questions of kinetic theory and statistical mechanics, equilibrium and nonequilibrium reactions, and radiative transfer. Interspersed with these are discussions of gas flows, in which the main emphasis is on the deviations (if any) from the classical picture due to the underlying physical phenomena. There is a particularly extensive treatment of nonequilibrium kinetic theory and its application to flows with translational nonequilibrium.

The work is thus designed not so much to facilitate the analytical solution of a variety of problems, but rather to indicate the important physical phenomena, and the way in which they limit the idealized problem formulation in a variety of situations. These are, of course, illustrated by reference to the most important "standard" examples: plane shocks, nozzle flows, Prandtl-Meyer expansions plane acoustic waves, Couette flow, and the wavy-wall problem. The approach is by no means formal and overly academic, and is always aimed at physical situations. It is nevertheless amusing to note that in a book written by engineers and presumably for engineers (among others) very few of the hallowed nondimensional numbers of fluid mechanics are mentioned, and even the Reynolds number appears only as an aside in an example for the reader! Despite this minor caveat, the book can be well recommended, not only as a complement to more standard fluid-dynamical treatises, but also as a clear exposition of modern kinetic theory.

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The reviewer is a member of the staff of the General Atomic Division of General Dynamics Corporation in San Diego.

For users of photography

THE THEORY OF THE PHOTOGRAPHIC PROCESS. (3rd ed.) T. H. James, ed. 591 pp. (Collier-Macmillan, London) Macmillan, New York, 1966. \$25.00.

by M. F. McCarthy, S.J.

The publication of the revised, enlarged and extended third edition of the classic: *The Theory of the Photographic Process* will be welcomed by all whose work involves serious attention to the problems of photometry and photography. This is the first revision to appear after the death of C. E. Kenneth Mees, who edited the earlier volumes of 1942 and 1954; the present edition is a most worthy successor to these and will, together with them and the recently inaugurated Mees Observatory in Rochester, honor the memory of this pioneer of the photographic process.

The reviewer agrees with the new editor, T. H. James of the Eastman

Kodak Research Laboratories, that the title implies a more comprehensive coverage of the topic than could actually be realized. When the time comes for planning the next edition, the editor will have to decide whether to include a proportionate treatment of those processes which employ materials other than silver halides or simply to change the title to "The Theory of Silver Processes in Photography."

The present edition gives us an excellent treatment of a most difficult subject and synthesizes the latest information from several branches of physics and chemistry in a thorough survey of the principles, practice and problems of the photographic process. One notes especially the extensive contributions from crystal physics. In an effort to keep the book within reasonable limits (22 cm $\times$ 30 cm, 591 pages, \$25.00) the editor has condensed certain topics now chiefly of historical importance and quite properly makes frequent references to the earlier editions. This allows him more opportunity to accommodate the many important advances in this field since 1954. However, no one who owns one of the earlier editions will want to part with it; the third edition adds many treasures to the already rich trove of the earlier editions.

The book begins with a description of the properties of the silver halides both as crystals and as grains. There follows a discussion of gelatins and emulsions. It may be noteworthy that not all of the details concerning emulsion making have been revealed. The relations of density and exposure are discussed and the very clear exposition of reciprocity, intermittency and low temperature exposure effects is of special value. The theory of the latent image and its various effects are treated completely. A "textbook" rather than a "handbook" approach to these topics is most commendable. Especially in the chapters devoted to sensitivity, sensitizing dyes and the mechanism of sensitization one notes a certain modest reluctance of the authors to appear to be endorsing the local products. In any case most of those who read this volume will already be well supplied with the Kodak Technical Data Books and do not require