between thermodynamic properties and gas imperfection incomplete. These criticisms are not meant to imply that the thermodynamics chapter is poor, but rather to indicate some places where improvement is possible. The remainder of the book, especially the sections dealing with the hydrodynamics of compressible fluid flow, is admirably clear.

The final chapter on the kinetic theory of gases is short but complements well the rest of the text. This reviewer was very pleased to see a brief discussion of the properties of Couette flow in the Knudsen region. The development of missiles which fly in regions of the upper atmosphere where the mean free path is of the order of the dimensions of the flying object makes this pressure range of great importance.

Elements of Gasdynamics is to be recommended to all students interested in gasdynamics and its applications. The book will also be of interest to physical chemists, who will find a wide realm of irreversible phenomena which awaits exploration.

STUART A. RICE

The Principles of Chemical Equilibrium. K. G. Denbigh. Cambridge University Press, New York (1957). 491 pages. $9.00.

This is a very good book—well planned and well written. While the major portion of the book is concerned with the applications of thermodynamics to equilibrium, as the title implies, the first part is given over to the fundamental principles of thermodynamics. This fine exposition of the first and second laws and of the various thermodynamic functions is distinguished by its thoroughness and clarity.

The second part, "Reaction and Phase Equilibria," is made up of eight chapters. The subjects treated are the properties and reaction equilibria of gases, the phase rule and phase equilibria of pure substances, and solutions. The treatment of fugacity is very good, and it is a pleasure to report that the term *fugacity coefficient* rather than *activity coefficient* is used for the f/P ratio. The discussion of ideal and nonideal solutions is detailed and lucid. It is unfortunate that the most modern manner of tabular presentation of functions with which standard free energies of formation may be computed is not discussed and that equilibrium ratios (K factors), so useful in hydrocarbon phase equilibria, are not mentioned.

The third part, "Thermodynamics in Relation to the Existence of Molecules," consists of five chapters. Statistical analogues of entropy and free energy, partition functions, the third law, adsorption, and chemical kinetics are discussed. While the last may seem somewhat out of place, it is treated only in its relation to chemical equilibrium. A thermodynamic, as distinct from kinetic, derivation of the Langmuir isotherm is presented. There are a number of problems at the end of each chapter (some from Cambridge University examinations), and answers are given with comments in an appendix. The index is reasonably complete. Professor Denbigh is to be congratulated on this excellent work.

HARDING BLISS