for such equations with constant coefficients. Systems of first order equations are then discussed in all the usual ways. At this point, the treatment becomes a little more sophisticated: approximate solutions of first order differential equations are discussed together with Picard's theorem. Problems of existence and uniqueness arise naturally at this stage of the discussion. The book then goes on to treatment of the finite difference equations showing methods of solution in the common cases and then deals with the approximation of differential equations by difference equations and comments on the manner in which error may arise in such an approach. The book concludes with a brief discussion of partial differential equations and solution of the equation of heat conduction solids using various different techniques in illustrating some properties of the solution. Short groups of exercises are included after almost every topic throughout the book.

In this reviewer's opinion, the authors have succeeded admirably in "contributing not only to the reader's knowledge of differential equations but also to his ability to think about problems of mathematical analysis in general" and they have also provided both a good foundation and a stimulus for further interest in the deeper or more abstract problems of differential equations.

Molecular Flow of Gases. By G. N. Patterson. 217 pp. John Wiley & Sons, Inc., New York, 1956. $7.50. *Reviewed by S. F. Singer, University of Maryland.*

At this time when so many trained in nuclear physics and atomic physics are turning their attention to classical physics, it is very good to have available a book which approaches gas dynamics from a molecular point of view. It is somehow more satisfying to know, even in macroscopic flow, something about the part which individual molecules and their unseen internal motions play. However, when the flow can no longer be treated by the usual methods and depends on the internal motions and often on the physical properties of the molecules, then a molecular approach is the only one which can be taken. Applications occur in the slip flow of highly rarified gases, in high-speed flight at high altitudes, and the properties of individual molecules are of great importance in flow at high Mach numbers.

The author starts with a molecular model, a simple sphere, and the Maxwell distribution law for velocities and derives from it the macroscopic properties of compressible, frictionless (isentropic) flow. With slight modifications the corresponding properties for a viscous compressible flow (slightly nonisentropic) are obtained. About half of the book is given over to applications of nonisentropic flows to weak shocks, boundary layer problems and similar topics, and to problems in the mechanics of rarified gases, for example the flow at low density and the effects of the molecular flow conditions on momentum and energy exchange. Transport phenomena are discussed from the same point of view.

The volume serves as excellent preparation for the

more difficult areas where present advanced research is concentrated: shock tube experiments involving dissociation and ionization in collisions of complex molecules and their influence on flow; flow under conditions where the gas is partially or completely ionized; and flow where turbulence plays an important role and in which encounters between clusters of molecules need to be treated.

Annual Review of Nuclear Science. Vol. 5. Edited by James G. Beckerley, Martin D. Kamen, Leonard I. Schiff. 448 pp. Annual Reviews, Inc., Stanford, California, 1955. USA $7.00; elsewhere $7.50, postpaid. *Reviewed by B. T. Feld, Massachusetts Institute of Technology.*

The editors of this series, in a preface reviewing the problems and their solutions as recognized in the half decade of experience so far accumulated with this review, allow themselves the somewhat modest conclusion that "the results to date have been well worth the effort". An outsider may, perhaps, be permitted to exhibit somewhat more enthusiasm regarding the results so far achieved by this series. Through a balanced choice of subjects and the excellence of the authors, the *Annual Review of Nuclear Science* has established itself as one of the most important means of maintaining contact and stimulating cross-fertilization among the rapidly expanding branches of this young science. Most important, as is clearly recognized by the editors, the *Annual Review* devotes an appreciable fraction of each volume to reviews of new advances in the fundamental problems of nuclear physics. It is in finding and maintaining this proper balance between the fundamental and applied that the editors have found the greatest challenge; they have achieved notable success to date.

Volume 5 contains the following reviews: (1) Electromagnetic Transitions in Nuclei, M. Goldhaber and J. Weneser: A concise summary of the theory and its use as a tool for checking the predictions of various nuclear modes. (2) The Distribution of Charge in the Nucleus, K. W. Ford and D. L. Hill: An exhaustive survey of the available evidence concerning the size and shape of nuclei. (3) Nuclear Radiation Shielding, E. P. Blizzard: The experimental and theoretical bases of the art of shielding design. (4) Nuclear Reactions of Intermediate Energy Heavy Particles, D. C. Peaslee: An excellent reassessment of reaction theory in the light of recent advances in the statistical and optical approaches. (5) Nuclear Particle Detection (Cloud Chambers and Bubble Chambers), W. B. Fretter: Recent important advances in a technique which has contributed and continues to contribute more than any other to fundamental particle research. (6) Design Comparison of Reactors for Research, L. B. Borst: Procedures and criteria for the choice and construction of a research nuclear reactor. (7) Industrial Applications (Mass Spectrometry), C. E. Berry and J. K. Walker: Analytical techniques, mainly for use in problems of the hydrocarbon indus-