

behavior of the author's ultrastable systems with that of the nervous systems of various biological entities. Speaking as a nonbiologist, this reviewer did not find these attempts uniformly convincing.

Viewed as a presentation of one successful model for simple adaptive behavior, this book cannot be too highly recommended. However, the author does not keep strictly within his own stated limitations in the more speculative parts of the book. In the last chapter, for example, he puts forth the analogical argument that since natural selection has been observed to create order out of chaos by producing the coordinated spinal reflexes, it seems eminently reasonable that the principle of ultrastability may be sufficient to account for the coordination of the cerebral responses, "considering that the two processes are abstractly almost identical". This and other similar snippets indicate that Dr. Ashby is chafing at his self-imposed bonds. The underlying philosophy of *Design for a Brain* is that the goal of existence is homeostasis, or perfect adaptation to environment. No one, including the author, can believe this with regard to the human species, but from Dr. Ashby's point of view it is a necessary postulate to limit the field of study, and his book beautifully demonstrates that it is a fruitful one. Whether one can go further while still retaining such simplicity is, in this reviewer's opinion, extremely doubtful. Giving up the simplifying assumptions, however, means also rejecting the tried and true principle of "controlled experiment" with one or two well-defined assignable parameters. Such a situation is in fact met with in recent studies of the higher brain functions (the reader is here referred to a recent book by W. G. Walter, *The Living Brain*, where just such experiments are described, and the nonmechanistic view is brilliantly expounded). Dr. Ashby, though, is a thorough-going mechanist, and conscientiously avoids all discussion of such undefined concepts as intellect and imagination, although one feels he would like to say something about them, regardless of his explicitly limited goal.

These criticisms, however, do not relate to the real purpose of the book but only to its title (it should, perhaps, have been called *The Triumph of Feedback*). In summary, Dr. Ashby's achievement is an impressive one, well worth the time and study of all who are interested in what is happening today on the frontiers of theoretical biology.

Paul R. Stein

Los Alamos Scientific Laboratory

An Introduction to Thermodynamics, the Kinetic Theory of Gases, and Statistical Mechanics (Second Edition). By Francis Weston Sears. 374 pp. Addison-Wesley Publishing Company, Inc., Cambridge, Massachusetts, 1953. \$7.50.

The second edition of this book differs from the first edition but slightly. A chapter on fluctuations has been added and the chapter on low temperature physics has been deleted. The chapter on Boltzmann statistics has been rewritten and minor changes have been made in

other chapters. The section on diffusion has been expanded.

Professor Sears has clearly and concisely presented the fundamentals of thermodynamics, kinetic theory of gases, and statistical mechanics on an introductory level. The material is well co-ordinated, although many important topics are, of necessity, omitted, and some, like the treatment of equations of state for real gases, are inadequate.

The book begins with chapters on thermodynamic systems, equations of state, work, the first law of thermodynamics, some consequences of the first law, changes of phase, the second law of thermodynamics, entropy, combined first and second laws, and some engineering applications of thermodynamics. The author then presents the kinetic theory of an ideal gas, the distribution of molecular velocities, and a chapter on transport phenomena. The chapters on statistics include the Maxwell-Boltzmann statistics, applications of the Boltzmann statistics, quantum statistics, and fluctuations.

The system of units is not always used consistently. The principal system used is the mks system. (This can, at times, be awkward; thus, atmospheric pressure is 1.013×10^5 newtons per meter².) In the tabulation of various constants, the author presents tables in mks units, in cgs units, and in various other systems of units (e.g., the constants of the Beattie-Bridgman equation of states are tabulated in terms of atmospheres, liters, gram-moles, and degrees Kelvin).

In general, however, the presentation of the material is lucid and well-written. The large number of problems supplementing each chapter makes the book more useful as a textbook for advanced undergraduate students. This book can, however, be read with profit by graduate students and physicists interested in this field.

Abraham S. Friedman

National Bureau of Standards

Mechanics of Materials

The often reprinted original 1932 text by Professor Seely has been thoroughly revised and more than doubled in size for the second edition of *Advanced Mechanics of Materials* (by Fred B. Seely and James O. Smith; 680 pp.; John Wiley and Sons, Inc., New York; 1952; \$8.50). The purpose remains the same: to provide material for a second-year course in strength of materials for advanced undergraduate and first-year graduate students in engineering and to serve as a reference for design and research engineers. The four parts of the original book have been amplified and modernized: (I) reviews the concepts and results of the first course in strength of materials; (II) treats special topics in flexure, torsion, flat plates, contact stresses, etc.; (III) deals with localized stress and stress concentration; and (IV) takes up energy methods including Castigliano's Theorem and statically indeterminate structures. Two more parts have been added in the second edition: (V) discusses the effect of small in-