intuitively simple, their precise formulation and justification tend to be cumbersome. The authors have, however, succeeded in finding a middle ground showing us both precision and intuition, the science and the art. This book is clearly the best available introduction to the subject and can be examined with profit by anyone concerned with complicated particle-transport problems.

GEORGE BELL
Theoretical Division
Los Alamos Scientific Laboratory

Mechanics

By Wallace Arthur, Saul K. Fenster
665 pp. Holt, Rinehart and Winston, New York, 1969. $14.95

The prevalent trend to upgrade undergraduate physics courses has resulted in the publication of high-level, mathematically sophisticated undergraduate physics texts. Unquestionably not all students have the proper mathematical sophistication to take full advantage of these newer texts.

This book does not follow the trend. It represents Newtonian mechanics at a more traditional intermediate level. It appears to be addressed to students who are not as proficient in mathematical manipulations as we would like them to be. To help such students, the authors, Wallace Arthur and Saul K. Fenster, have retained a considerable number of intermediate mathematical steps in the solution of problems and in the derivation of pertinent results. Regrettably, from the reviewer's point of view, this help is not coupled with a sufficient repeated stress on the physical principles that frequently provide the motivation for the mathematical techniques. For example, the text repeatedly utilizes the work–energy theorem without any mention of it until the very end of the problem under discussion, when the results are interpreted as attesting the work–energy theorem.

The text begins with a chapter on vector algebra and vector calculus, followed by eight chapters on the kinematics and the dynamics of particle motion. Sufficent stress is given to the very important topics of simple harmonic motion and the central force-field motion of a particle. The reviewer was irked by the treatment of Newton's first law of motion as a special case of the second law. On the whole, however, the material in this first half of the text is clearly presented and easy to follow.

Chapter 10 provides a brief and elementary introduction into relativistic mechanics. It is marred by a confusing derivation of the dependence of the relativistic mass of a particle on its speed. Chapter 11, on the dynamics of a system of particles, is followed by a chapter on rigid-body motion that includes a discussion of the inherently difficult topics of the motion of a top and the torque-free motion of rigid body. Chapter 13 is a long chapter titled "Mechanics of Deformable Continua." In 85 pages this chapter treats such diverse topics as stress and strain, the bending of beams, vibrating strings and vibrating beams, fluid statics, static fluid flow, viscous fluid flow and sound waves in fluids. It is one of the more formidable chapters in which Fenster's engineering background is clearly evident. The text concludes with a chapter on Lagrange's equations of motion. They are derived from Newton's equations through use of the principle of virtual work.

In summary, what we have here is a generally clear, traditional mechanics text. Although it is not this reviewer's cup of tea, it may appeal to the mathematically weak student to whom this text appears to be directed.

WALTER HAUSER
Professor of Physics
Northeastern University

A Discussion on the Origin And Treatment of Noise in Industrial Environments

E. J. Richards, *ed.*
(Philosophical Transactions of The Royal Society of London, Series A: Mathematical and Physical Sciences, Vol. 263.) 480 pp. Royal Society, London, 1968. $14.00

We may not all agree with Macbeth that "life is a tale told by an idiot," but when the Scottish king goes on to describe life as "full of sound and fury," most of us are perfectly willing to acquiesce.

During the past decade a great many conferences have been held on various aspects of the noise problem. This book is the report of the proceedings of such a conference held in the spring of 1967 under the joint auspices of the Royal Society of London and the British Acoustical Society. The

organizer, E. J. Richards, was at that time director of the Institute of Sound and Vibration Research at the University of Southampton. He has since become vice-chancellor of Loughborough University.

The volume consists of 17 articles, divided into five groups that are all related to some aspects of industrial noise. Topics covered include deafness in industry, social effects of noise, noise and the law, noise control in factories and roadway noise. On the average, about equal attention is paid to the origins of noise and to possible methods for its suppression. The conference was international to the extent that although eleven of the papers are by British authors, three German and two Dutch contributions are included as well as one from the US. The bibliographical references are moderately extensive, and sufficient regard is paid to recent relevant American studies, particularly along physiological and psychological lines.

The presentations are in general clear and illustrated with well drawn graphs and diagrams. The volume could, of course, have been made more useful if it had included a few summarizing sections to tie together the individual contributions and an index. However, one hopes that this publication will serve to attract more attention to the vital problems of noise and its control.

R. Bruce Lindsay
Hazard Professor of Physics
Brown University

Elements of Gasdynamics And the Classical Theory of Shock Waves

By Ya. B. Zel'dovich, Yu. P. Raizer
115 pp. Academic, New York, 1969. $3.95

This small paperback is identical to the first chapter of the two-volume work, *Physics of Shock Waves and High Temperature Hydrodynamic Phenomena* by the same authors. It was printed separately in order to reach a wider audience of students of gasdynamics and shock waves.

Consequently, as an introduction to a work devoted largely to shock waves, this book is entirely devoted to the simplest aspects of wave phenomena in gasdynamics. This includes an introduction to sound waves, the theory of characteristics, rarefaction waves, simple shock waves, effects of viscosity and heat conduction and a few simple examples. The latter are mostly strong-point explosions and expansion of a gas into a vacuum.

By considering flows with one space coordinate and the time coordinate, the authors keep the mathematics as simple as possible while emphasizing the physical and intuitive aspects. This is the style of the complete two-volume work and anyone who reads this first chapter will no doubt be motivated to turn to the larger work for the fascinating study of shock waves in real gases at high temperatures where the effects of radiation and dissociation play a primary role. Specific references to later chapters in the two volumes facilitate this.

Robert E. Street
Professor of Aeronautics and Astronautics
University of Washington

Nuclear Structure, Vol. 1

By Aage Bohr, Ben R. Mottelson
471 pp. Benjamin, New York, 1969. $25.00

This is the first of three volumes that took ten years to write. The authors are the two foremost living exponents of the collective and unified models of atomic nuclei. Since, according to the preface, the second and third volumes are concerned with "consequences of nuclear deformations" and with "collective phenomena," respectively, this volume may be regarded as preparatory. The collective model gives in some cases remarkable agreement with experiment. A systematic presentation of its theoretical justification should therefore be welcomed. This first volume is devoted mainly to single-particle motion and to "a summary of the important symmetry features of nuclear systems," which are applicable to the other two volumes as well.

As set forth in the preface the approach is concerned with "the identification of the appropriate concepts and degrees of freedom that are suitable for describing phenomena" through a combination of "approaches based partly on clues provided by experimental data, partly on the theoretical study of model systems," and of general symmetry relations. The more customary procedure consists in starting with data and hypotheses regarding nucleon–nucleon (N–N) interactions