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mological observations, supplemented by experimental and theoretical analysis of the properties of earth materials.

About one half of this treatise is devoted to deciphering the travel times of seismic waves. It begins and concludes by emphasizing the incompleteness of the picture, and warns against too rigidly believing in the hypotheses of a discipline which is still in a state of flux. It is therefore gratifying to point out some basic features of the internal structure of the earth which no longer appear to be hypothetical: a crust bounded by the Mohorovičić discontinuity at a depth of 9–13 km under the oceans and 30–50 km under the continents; a silicate mantle reaching to a depth of some 2900 km; a liquid core of 3400 km radius; a small inner core, possibly solid.

The other half of the book contains a comprehensive review of the thermal processes, density distribution, flattening, elastic, and nonelastic processes in the earth. Theoretical formulas and tables are given. Wegener's continental drift theory is revived in the light of modern paleomagnetic measurements; the weakness of this theory when relating to postcretaceous events, however, is not pointed out.

Although most of the formulas and numerical data appear to be in order, there are some obvious errors. However, these minor shortcomings do not detract from the value of the book. Beno Gutenberg died four months after the completion of this book, which can be fully recommended as the last word of this eminent geophysicist to all students of the earth sciences and related disciplines.

Introduction to Atomic and Nuclear Physics. By Rogers D. Rusk. 482 pp. Appleton-Century-Crofts, Inc., New York, 1958. \$7.50. *Reviewed by Hans Bichsel, University of Southern California.*

IF the course in which this book is used is given to students majoring in fields different from physics and engineering, it will suit its purpose very well. To a large extent only elementary physics and algebra are used in the development of the ideas. Calculus practically does not occur except in a chapter on wave mechanics.

Approximately two thirds of the book is devoted to atomic physics, the rest to nuclear physics. The list of subjects treated is very comprehensive. Among the things which one would not ordinarily expect in an introductory text are: Bose and Fermi statistics, genetic damage of the human race, detection of the neutrino, neutron velocity selectors, antiproton, about ten different kinds of particle accelerators (including the linac for heavy ions), elementary theory of the nuclear reactor, plasma fusion, reactor poisoning, and Cerenkov radiation. This has the advantage that the book can almost be used as an elementary reference work; on the other hand, much of the treatment of the subjects will be too elementary and too abbreviated. Consider-

able and worthwhile effort has been put into the discussion of relativity. Original points of view appear in several places.

The book would be well suited to a course for arts majors, but for engineers and science majors a deeper treatment of fewer subjects would be preferable.

Deformation, Strain, and Flow: an elementary introduction to rheology (2nd Revised Ed.). By Markus Reiner. 347 pp. Interscience Publishers, Inc., New York, 1960. \$9.75. *Reviewed by Herbert Leaderman, National Bureau of Standards.*

RHEOLOGY, from the phenomenological point of view, may be considered as a branch of mechanics that deals with the relationship between forces and deformations in bodies when this relationship follows neither the classical Hookean nor Newtonian behavior. Rheology by custom has come to include methods of measurement of the viscosity of liquids manifesting Newtonian behavior.

Technologists, especially those with an engineering or chemical background, are frequently called upon to assess the mechanical properties of such materials. While it is easy to devise mechanical tests from which numbers can be obtained, it is not always true that such numbers relate directly to fundamental rheological behavior or to practical performance. Recent treatises at an advanced level are guides to the scientific design and interpretation of experiments. These treatises are however of limited value to the technologist or beginning rheologist, whose knowledge of the mechanics of continuous media may be confined to elementary expositions of Hookean and Newtonian behavior.

The present volume represents the fourth in a series of texts by the author dating back to the ten lectures in theoretical rheology of 1943. In this book, a revision of the 1949 edition, he endeavors to present in simple mathematical language the principles of the phenomenological rheology of non-Hookean solids and non-Newtonian fluids. This work, as explained by the author in the preface, is based upon lectures given to an audience of chemists; for such people, for example, a bending test to yield Young's modulus is discussed in detail. In many cases full discussions are given of fundamental concepts. The scope of the book and the practical applications cover the experimental fields with which the author has been personally related—asphalt, polymer solutions, concrete, and metals. While the concepts and terminology, which correspond generally with those of the earlier volumes, do not always agree with current ones, the student should have no difficulty in relating Professor Reiner's approach to that of the more recent, more advanced, and generally more mathematical treatises.

The discursive personal style, justified by the author in the introduction, makes perhaps for easier reading than the usual dry and impersonal approach of other works on the subject. The treatment of the subject matter follows generally historical lines, and thus pre-

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