

An Outline of Atomic Physics. Third edition.
O. H. Blackwood, T. H. Osgood and A. E. Ruark.
John Wiley and Sons, Inc., New York (1955).
501 pages. \$7.50.

Those who are familiar with the two earlier editions of this book, published in the thirties, will welcome this new edition. Considerable revision and the addition of much new material have served to make this book on atomic physics an excellent introductory text for those students who desire a general knowledge of the modern particulate approach to matter, both atomic and nuclear. The book is an outgrowth of a course directed not to physics students but rather to any others having a year's work in college physics and a desire to know more about the concepts and methods of modern physics.

Approximately half of the book is devoted to the understanding of atomic phenomena, including X rays, atomic and molecular structure, radiation, and spectra, and an introduction to the solid state. The authors are to be especially commended in the manner in which they introduce and use the concepts of quantum mechanics. The discussions are not so oversimplified as to lose all meaning; rather they are introduced as needed, in a logical and quantitative manner, with the appropriate background of classical theory and the explanation of its breakdown. In fact, these sections provide an excellent introduction to quantum mechanics and could well be assigned as preliminary reading to a student about to engage in a more quantitative and mathematical course in quantum mechanics.

The remainder of the book is devoted to nuclear physics, including sections on nuclear structure and transmutations, elementary particles, cosmic rays, and a brief discussion of the applications of nuclear energy. The last chapter provides a brief introduction to the theory of relativity, although those portions of special relativity, such as the relativistic mass increase, are introduced earlier as needed. In fact, much of the material introduced in the earlier editions near the end of the book as special topics has been worked into the body of the text. For example, the uncertainty principle in the new edition is discussed in the chapter on waves associated with material particles, where the De Broglie relation and much of quantum mechanics are introduced.

This reviewer's major criticism is that the authors, perhaps irked as students by "beyond the scope of this text" statements, seem to feel that there is little that cannot be explained within their scope, at least qualitatively. A case in point is their five-paragraph coverage of the general theory of relativity, transferred unchanged from the earlier editions. Not only are their statements and interpretations of the principle of equivalence confusing but their choice of experimental verification, the results of which they state as conflicting, seems ill-conceived. The red shift, the evidence for which seems more conclusive, would have been just as easy to explain. The new section on magnetic susceptibilities will also probably be confusing to the student.

Except for such minor shortcomings as these, the book is excellent, should be quite teachable, and in addition should be

pleasant reading for those who wish a refresher in the field.

Introductory Nuclear Physics. Second edition. David Halliday. John Wiley and Sons, Inc., New York (1955). 493 pages.

The first edition of Professor Halliday's book, published in 1950, won immediate favor with many students then studying nuclear physics at the upper undergraduate and beginning graduate levels and with their instructors. Among its few competitors the book was distinguished for the wide breadth of material surveyed and for the clarity with which the many topics were presented.

Although the number of books on nuclear physics has grown rapidly since 1950, the second edition of *Introductory Nuclear Physics* should hold much of the popularity of its predecessor. It is still frankly an introductory text, covering the broad field of basic nuclear physics briefly and clearly. Topics include cosmic rays, subnuclear particles, and molecular beams, for example, as well as the standard fare of nuclear decays and radiations, particle detection, accelerations, reactions, fission, etc. The arrangement of the material has been improved over the first edition, and the early introduction of new chapters on elements of quantum mechanics and two-nucleon systems should be helpful to the reader. The reviewer recommends the book not only for pedagogical purposes, but also for the library of the nonspecialist in nuclear physics who wishes to have readily available one book in which clear, concise answers to his questions can probably be found.

GEORGE F. PIEPER

Electrons, Atoms, Metals and Alloys. William Hume-Rothery. Revised edition. Philosophical Library, New York (1955). 387 pages. \$10.00.

This book, originally published in 1948, represents an attempt to teach modern concepts of atomic structure and the theory of the crystalline state of matter by means of a dialogue between a "Young Scientist" and an "Older Metallurgist." The latter, who took his degree in the period 1910-1920, is unable to keep up with modern advances in metallurgy and seeks the help of a member of the newer generation who brings him up to date in these matters. Topics covered begin with an introduction to quantum mechanics and proceed through the theory of atomic structure, free-electron theory of metals, Brillouin zone theory, ferromagnetism, and the theory of alloy formation. Also included are short sections on the theory of plastic deformation and the structure of the nucleus, both of which have been modified in this new edition as a result of recent developments.

Hume-Rothery states that the book is intended primarily for industrial metallurgists who wish to become acquainted with modern physical theories of metals and alloys and the dialogue form was chosen to make the material more palatable to such readers. How successful he has been in this objective is hard to say. Undoubtedly, a review of this book would best be given by an "Older Metallurgist" who has tried his hand at this novel form of education. It is hard to believe, however, that the few in this category who would have the perseverance to read this book